



User Manual

Hotplate & Magnetic Stirrer

Model: TS-14SG, TS-17SG, TS-18QG
Manual No. :34415L002 Version : 4.0



 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.

Jeio Tech Co., Ltd. is committed to customer service both during and after the sale. If you have questions concerning the operation of your unit or the information in this manual, contact our sales department. If your unit fails to operate properly, or if you have questions concerning spare parts or Service Contracts, contact our Service Department.

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Table of Contents

1.0	Safety	1
1.1	How to use the Manual.....	1
1.2	Symbols used in this manual	1
1.3	Exemption for responsibility	2
1.4	Warning statement	2
1.5	Caution statement	3
2.0	General Description.....	4
2.1	Product Introduction.....	4
2.2	Characteristics	4
2.2.1	Superior performance	4
2.2.2	Safety	5
2.2.3	Convenience	5
2.3	Structures	7
3.0	Unpacking and Installation	9
3.1	Checking Shipment Damage and Unpacking	9
3.2	Checking the Contents of the Package	9
3.3	Operation conditions.....	9
3.4	Pre start up check.....	10
3.5	Power Connection	10
4.0	Operation	11
4.1	Control Panel	11
4.2	Operation.....	13
4.2.1	Checking Power Status	13
4.2.2	Connecting external temperature probe.....	13
4.2.3	RUN/STOP	15
4.2.4	Stirrer knob	16
4.2.5	Temperature Setting	16
4.2.6	Timer Setting.....	20
4.2.7	External Temperature Probe Control Mode	22
4.3	Configuration	23
4.3.1	Temperature Unit Conversion (Unit)	24
4.3.2	Selection of the Timer Mode (TIME).....	25
4.3.3	Offset (OFST/OFSP)	27
4.3.4	Maximum Heating Rate Setting (LIMt).....	29
4.3.5	Changing the High Temperature Limits (t-H).....	30
4.3.6	Changing the Low Temperature Limits (t-L)	31

4.3.7	Check of the Configuration Settings (LISt).....	3 3
4.3.8	Calibration (CALI)	3 3
4.3.9	Coefficient (COEF).....	3 5
4.3.10	Default (DEFA).....	3 7
4.3.11	Motor Minimum (Mmin).....	3 8
4.3.12	Escape (ESC).....	3 9
5.0	Safety Features.....	4 0
6.0	Maintenance.....	4 1
6.1	Inspection Interval	4 1
6.2	Cleaning.....	4 1
6.2.1	Cleaning the machine body.....	4 1
6.2.2	Accessories	4 1
6.3	Relocation	4 2
6.4	Storage.....	4 2
7.0	Troubleshooting Guide.....	4 3
7.1	Power Troubles	4 3
7.2	Malfunctions during Operation	4 4
7.3	Error message.....	4 5
8.0	Accessories.....	4 6
8.1	Assembly of Support Rods	4 8
8.2	Assembly of Transparent Safety Shield and Non-slip Heating Bath	4 9
8.3	Heating block for round bottom flask.....	5 0
8.4	Heating block for vial	5 1
8.5	Silicon cover.....	5 3
9.0	Appendix	5 4
9.1	Technical Specification	5 4
9.2	Equipment Disposal.....	5 5
9.3	Warranty	5 5
9.3.1	Warranty period	5 5
9.3.2	Technical Service Contact Points	5 5
9.3.3	Certificate of Product Warranty.....	5 6

1.0 Safety

1.1 How to use the Manual

This manual is intended for individuals requiring information about the use Hotplate Stirrers. Use this manual as a guide and reference for installing, operating, and maintaining your Jeio Tech Hotplate Stirrers. The purpose is to assist you in applying efficient, proven techniques that enhance equipment productivity.

This manual covers only light corrective maintenance. No installation, service procedure or other maintenance should be undertaken without first contacting a service technician, nor should be carried out by someone other than a service technician with specific experience with laboratory equipment and electricity.

1.2 Symbols used in this manual

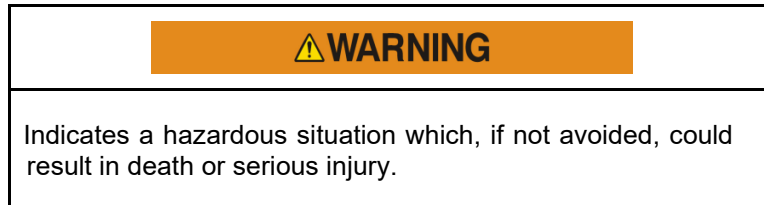
- (1) The user's manual uses warning and caution marks to ensure safe and proper use of the product and to prevent accidents or damage.
- (2) Information about safety precautions is defined in the signal word panels according to their importance and risk.
- (3) Please thoroughly read and understand the warning contents when using.

Signal word panels	Use
	"Danger" is a signal that indicates a dangerous situation. Failure to prevent it can result in death or serious injury and property damages.
	"Warning" is a signal that indicates a dangerous situation which, if not avoided, could result in serious injury or serious injury and property damage.
	"Caution" is a signal to indicate a dangerous situation, and if not avoided, it could result in injury and property damage.
	"Notification" is a notification of actions requiring attention that are not related to the user's injury.

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. The claim which is out of the quality guaranteed by the manufacturer is out of Manufacturer's responsibility.

1.4 Warning statement



Please thoroughly read and understand all warning labels.

Do not remove or damage the warning label.

Do not move the product while it is running.

Do not use or store flammable gas near the product.

Do not install the product in an environment where there is a possibility of flammable gas leakage.

Do not use the product in an environment where there is a possibility of explosion due to organic vapor.

Do not place explosive, flammable chemicals (alcohol, benzene, etc.) on the product.

Do not allow moisture, organic solvents, dust, or corrosive gases to enter the product.

Install the product on a stable and flat surface in a laboratory equipped with safety equipment in case of an accident.

Before installing the product, check the voltage, phase, and capacity of the ID plate and connect it properly.

Be sure to use a grounded power source.

Do not expose the product to direct sunlight. Do not expose the product to direct heat sources.

Do not install in a place subject to high humidity or water leakage.

Do not use the product in the presence of soot or metal dust.

Do not use the product if it produces unusual sounds, smells, or smoke.

Do not disassemble or modify this product beyond those described in this user's guide.

1.5 Caution statement

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

Do not touch the top plate or any object near it even when the heater is turned off. You may get burned due to residual heat.

When connecting external temperature probe, be careful not to be touched on the heating plate.

When the unit is in the external temperature sensor mode, please make sure that the end of the probe is filled in the media.

After using this equipment, make sure to turn off the main power switch and also to disconnect the power cord from the power outlet for the safety of other users.

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.

Do not place heavy objects on the power cord and do not let the power cord be pushed under the appliance.

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.

Do not put or insert any objects (especially if conductive or flammable) inside this equipment.

Do not pour water into the unit.

Do not impact the top plate or heat sink. You can damage the equipment or get injured. Do not touch the heat sink with your hands or shock it.

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.

Note that 'Cardiac pacemaker' or 'Magnetic data devices' may be affected by the instrument and the magnetic bar.

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.

Before cleaning, make sure to unplug the power cord to avoid electric shock or fire.



Caution! Hazard of electrical shock.



Caution! Hot surface.

2.0 General Description

2.1 Product Introduction

TS-14SG/17SG/18QG models offer to show temperature and control by External temperature probe. Above models boast quick heat up time thanks to ample heating capacity as well as the superb heat transfer rate enabled by the tightly integrated structure of the heater and the ceramic-coated aluminum alloy top plate. Also provide variants of temperature mode relate temperature control, heating up time.

2.2 Characteristics

2.2.1 Superior performance

- By adopting a special magnet with exceptionally strong magnetic coupling power as well as smooth-start stirring mechanism. You will experience virtually no decoupling of magnetic stir bars even with viscous media or at high speeds (30~2000rpm, Guarantee). The BLDC motor and the special magnet also provide big stirring.
- Real-time stirring with quick operation or stop.
- In case of External temperature probe coupled, automatically change to external sensor mode. And user can check media temperature also control.
- Microprocessor PID Feedback Control
Fast and precise temperature control is provided by the microprocessor PID controller.
- Selection of the Temperature Control Modes
Three user-selectable temperature control modes are provided for your convenience among Optimum, Fast, and Slow.
- Auto-Tuning
Automatic tuning of the PID parameters provides more accurate temperature control.
- Changing Temperature Limit
The top plate temperature control range can be changed to protect media by changing over temperature limit value or low temperature limit value.
- Offset
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 from -10°C to ±50°C at 0.1°C interval.
- Selection of the Timer Mode

Immediate Activation(T1)	The timer starts immediately after setting the timer.
Delayed Activation(T2)	The timer is activated only when the set temperature is reached.
- Quick Heat Up Time
Ample heating capacity and superb heat transfer rate of the tightly integrated structure of heater and ceramic-coated aluminum alloy top plate allow quick heat up time.

- The ceramic-coated top plate is highly resistant to heat and corrosion. In addition, its white color is optimal for monitoring color changes of the media during operation.

2.2.2 Safety

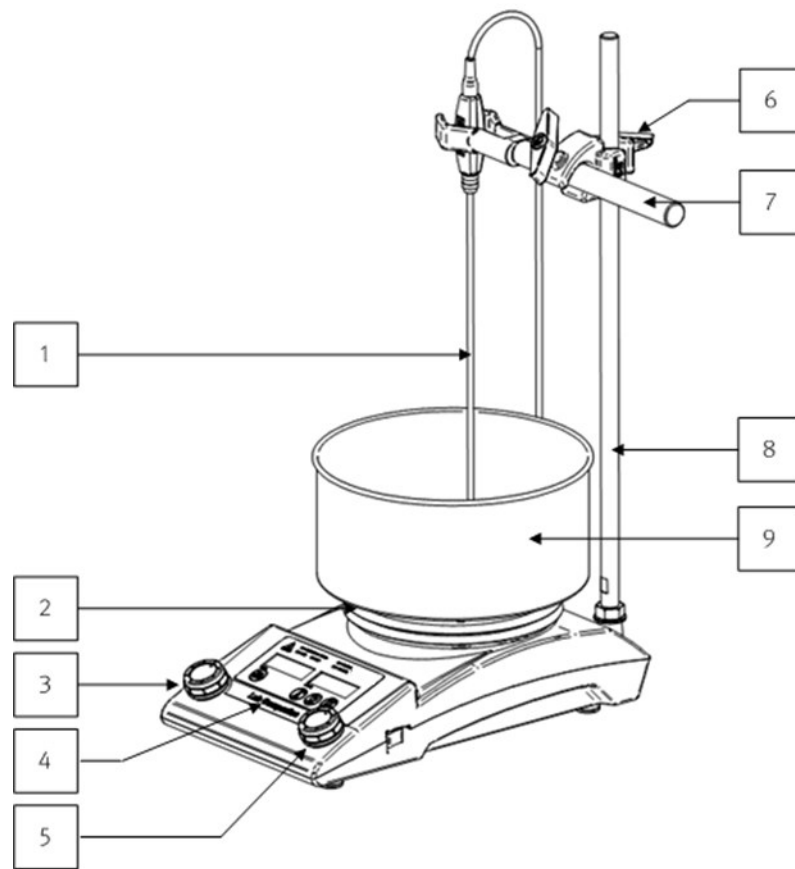
- **Hot Top Warning Indicator**
The top plate temperature can remain very hot for some time even after the heater is turned off. To prevent injury or fire under such circumstances, this instrument has a hot top warning indicator on the control panel. This indicator will illuminate if the top plate temperature is over 50°C. Even so, do not rely on this indicator alone for your safety.
- **Overheating prevent device**
Basically built in electronic overheating prevent device and mechanical body overheating prevent device.
- **Heating plate overheating prevent device**
A heating plate overheating prevention device is particularly built-in.
- **The devices overheat warning function**
The devices WARNING LED will be light. In case of the device's temperature goes over safe range.
- **Error indication regarding external temperature sensor**
In case of Error message, the Probe does not contain enough in media or on air.
- **Silicone cover**
A silicone cover prevents foreign substances from entering the knob and display.
- **A transparent safety shield is also provided to allow you to monitor your operations more safely by shielding you against decoupled stir bars or liquid splashes. (TS-14SG/17SG Option)**
- **Non-slip Heating Bath**
A specially designed non-slip heating bath comes with the instrument. To prevent unintentional slips of the bath during operation, this bath has concavo-convex bottom shown below so that it can sit stably on top of the top plate.

2.2.3 Convenience

- Convenient set or indicating temperature and stirring speed by 2 different knobs.
- In case of External temperature probe coupled, automatically change to external sensor mode (Option).
- The External temperature probe(sensor) is made by PP material. So, the probe (sensor) can be fixed easily on labware.
- Showed on digital display-top plate temperature, Probe measuring temperature, stirring speed, timer setting value, and remaining time value.
- In case of the stirring media viscosity change, the Feedback function maintains regular speed.
- Smooth-start Stirring system reduce Magnetic Bar decoupling.
- Two support rods are provided to hold various kinds of devices such as temperature sensors, thermometers, laboratory glassware, and so on. (Option)

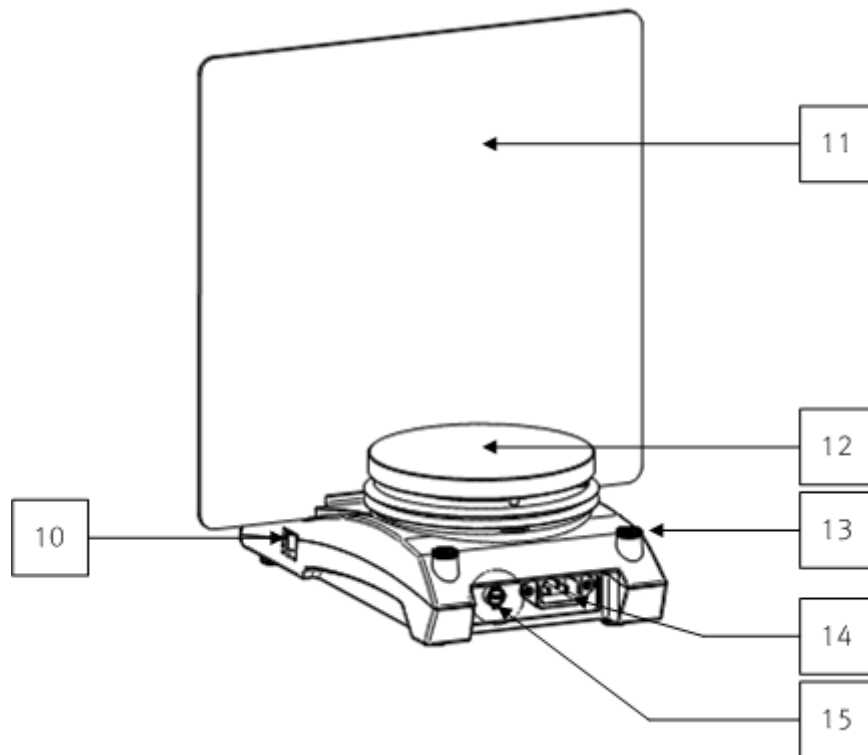
- User designation temperature range
You can easily set your own temperature limit and protect simple from controlling time or user mistake.
- User designation stirring speed range
User can set up the lowest stirring speed. So, the device can be stirring by least time.

2.3 Structures



[TS-14SG]

- (1) External temperature probe : PT100 sensor to check media temperature.
- (2) Heat sink
- (3) Heater knob
- (4) Control panel
- (5) Stirrer knob
- (6) Clamp holder(Option)
- (7) 3 Prong clamp(Option)
- (8) Clamp rod (Option)
- (9) Heating bath (Option, TS-14SG/17SG) : This is dedicated heating bath that is sized to the heating plate for TS-14SG, TS-17SG



- (10) Power switch.
- (11) Transparent Safety Shield(Optional, TS-14SG/17SG) : Safety shield protects user or control panel from high temperature liquid.
- (12) Top plate
- (13) Threaded hole
- (14) Power socket
- (15) External temperature probe cap

※ TS-14SG, TS-17SG, TS-18QG models have the same function and internal structure.

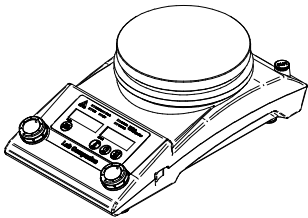
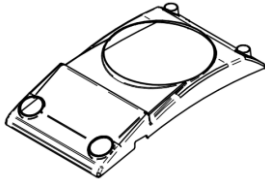
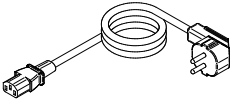
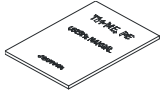
3.0 Unpacking and Installation

3.1 Checking Shipment Damage and Unpacking

Upon receiving the instrument, 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 parts and accessories are included in the package. If not, contact your dealer or Jeio Tech immediately.

Item	Figure	Quantity	Description
Main body		1	-
Silicone cover		1	-
Power cord		1	-
Operation Manual		1	-
External temperature probe, Pt100		1	B Class : Max 250 °C

3.3 Operation conditions

Maintain proper spacing (typically over than 30cm) to avoid placing it too close to other equipment.

WARNING

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

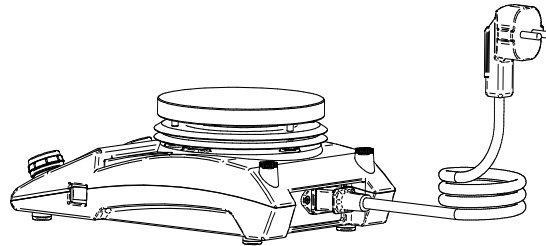
3.4 Pre start up check

- Check the unit is balanced well.
- Never install or use this instrument with or near to hazardous or flammable substances.
- Do not install this instrument near any device that generates high frequency noise.
- Do not install with short circuit, water leak, and risk of flooding places.
- Do not install with industrial harmful gas, metal dirt environments.

3.5 Power Connection

When connecting power, use only the power cord that came with your instrument. The power connection procedures are as follows:

- (1) Before connecting the power cord, make sure that the main power switch is turned off
- (2) Plug the power cord into the power socket at the back of your instrument as shown in the diagram below.
- (3) Plug the other end into a properly grounded and dedicated power outlet nearby.



WARNING

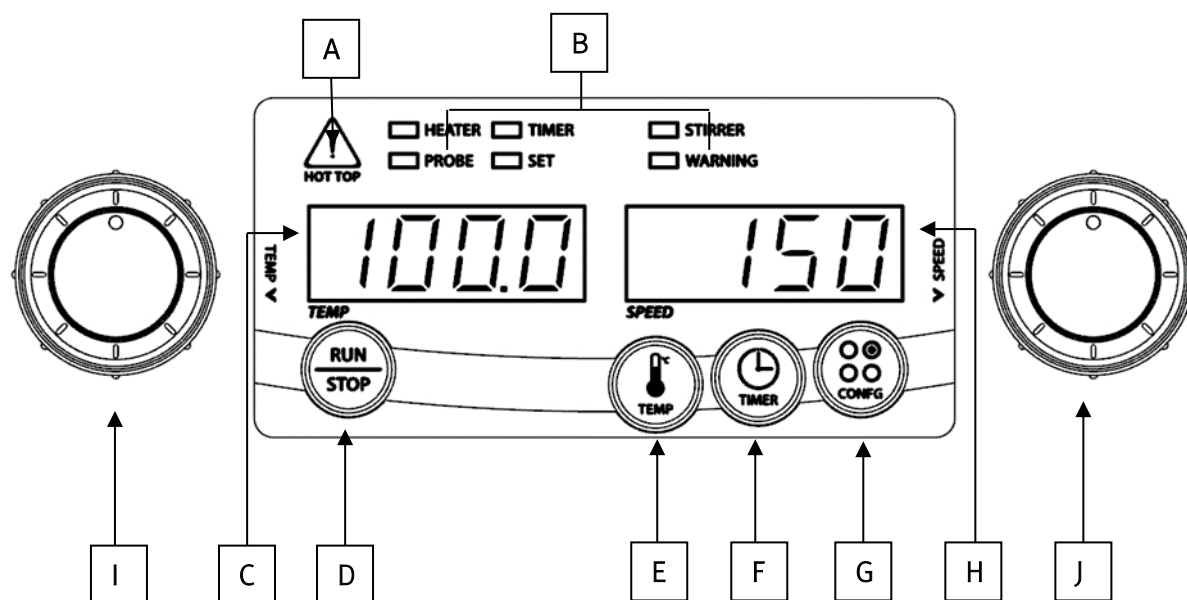


Electrical Shock Hazard.

- Check the voltage, phase and the capacity of the power supply and connect properly.
 - DO NOT use a branch socket or a double tap, as it may cause a cable burnout or fire due to over current.
 - Improper power connections may result in serious injury or death to the equipment and damage to the equipment.
 - DO NOT use without safety equipments. (working clothes, gloves, glasses)
 - DO NOT handle or touch electrical cord and electrical parts with wet hands.
 - Make sure to connect this instrument only to properly grounded power outlets to protect you and your instrument.
-

4.0 Operation

4.1 Control Panel



[TS-17SG Control panel]

(1) Control panel

A	HOT TOP	Although this instrument has a hot top warning indicator  , which is turned on when the top plate temperature is over 50°C, do not rely on this indicator alone for your safety.
B	HEATER TIMER STIRRER PROBE SET WARNING	During heater operation. During timer operation. During stirrer operation. During the Probe measurement temperature indication. During temperature, Timer, Config. set Overheating warning.
C	Temperature indication display.	Hot plate temperature, measurement temperature, and setting temperature showed.
D	RUN/STOP button	Heater ON/OFF, End of Timer, Scape function during button operation.
E	TEMP button	Setting temperature confirmation of a heating plate. Temperature setting.
F	TIMER button	Elapsed time, remaining time, and timer settings.

G	CONFIG button	When this device is stop status, Config. functions can be set when user wants to change mode, press the Config. Button with stirrer knob to clockwise turning. Then the mode can be switching the following order.	
		Unit	Changing the temperature unit “Cels” - Celsius, “Fahr” - Fahrenheit
		Time	Changing timer mode
		Offset	Changing Offset setting
		Limit	Set the maximum heater rate when used to temperature control.
		t-H	The highest temperature set the top plate and external temperature sensor.
		t-L	The lowest temperature set the top plate and external temperature sensor.
		List	Indicating the set value to turning stirrer knob.
		Calibration	Matching the Auto tuning the device to current situation or best condition.
		Coefficient	Select to using control temperature coefficient.
		Default	Change all the settings to the default values.
		Motor Minimum	Minimum stirring speed set (range : 1~1000rpm)
		Escape	Config mode to be end.
H	Speed display		STIRRER speed, timer

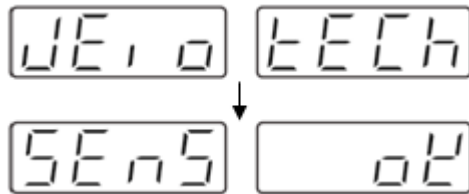
(2) Knob – Turn left or right to select functions, press to save.

I	Heater knob	Temperature setting.
J	Stirrer knob	STIRRER speed setting, value setting on Config.

4.2 Operation

4.2.1 Checking Power Status

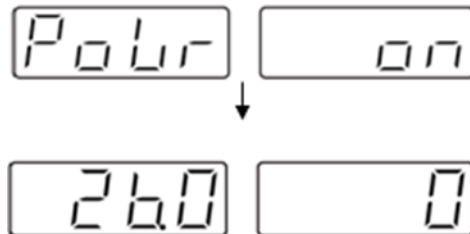
- (1) The following displays will appear in sequence together with a beep sound when the power cord is connected.



Note that the following display will also appear momentarily if the main power switch is off.



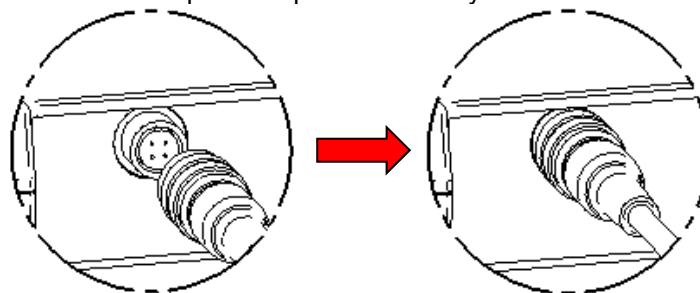
- (2) If you turn on the main power switch, the following display will appear in sequence.



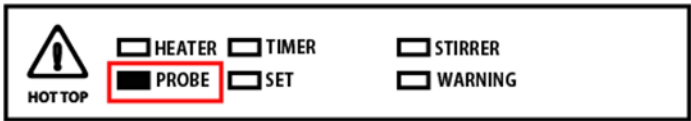
4.2.2 Connecting external temperature probe

When the external temperature probe connects with the body, The temperature display part shows Probe measuring temperature. If the probe disconnects with body, The temperature display part shows top plate temperature.

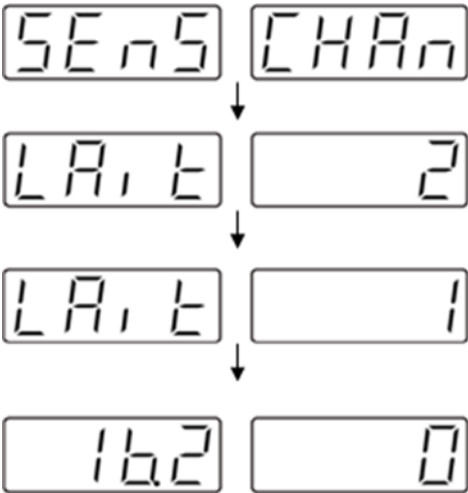
- (1) Open the external temperature probe cap and turn right.
- (2) Insert external temperature probe with body.



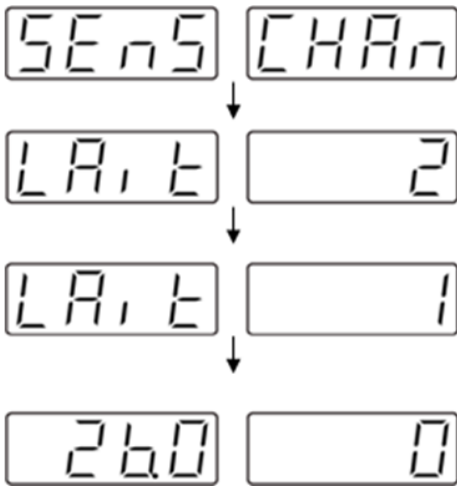
When you connect with External temperature probe, the LED lamp is automatically turned on.



Temperature display windows are shown on “Sensor change” message. After then, the display windows showed “Probe” measuring temperature.



In case of separating External temperature probe from the main body, the temperature display windows are shown followed the message.



⚠ CAUTION



- When you connect with an external temperature probe, please check firstly the hotplate temperature.
 - When you connect with an external temperature probe and hotplate temperature is over than 50°C, the “HOT TOP” LED will be lit.
 - Please set the Probe under 20mm from Media. If Probe is not set perfectly or on air, the Probe will be “Error” or the hotplate will be overheating.
 - Please be careful that the probe may be damaged due to external shock when operating the external temperature sensor control mode.
 - Please pay attention to a high temperature.
-

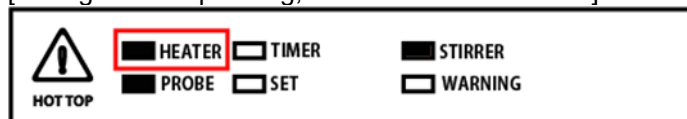
4.2.3 RUN/STOP

Even if the main power switch is turned on, you have to press the RUN/STOP Button to start or to finish the operation.

The RUN LED illuminates only when the unit is operating and the HEATER LED blinks only when the heater is activated.

If you press the RUN/STOP Button to start the operation and the current temperature is below the set temperature, both the HEATER and the RUN LEDs will light up as shown below.

[During heater operating, the state indication LED]



Note, however, that the HEATER LED will be turned on and off during the operation because the heater is automatically activated or deactivated to maintain the set temperature.

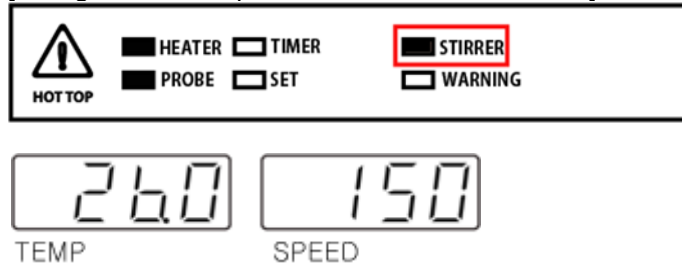
NOTICE

- You can check set temperature during heater operating. Press the heater knob.
 - In case of a user press TEMP button, users can change set temperature during operation.
 - At this time, if there is no additional input, it exits set temperature change mode automatically about 20 seconds later.
 - User can check the elapsed time during operation use of a press TIMER button. If user wants to go TIMER setting mode during operation, just press timer button one more time.
-

4.2.4 Stirrer knob

When the stirrer knob [4.1 (2) J] is turned right, the device will start to operate. And the stirrer function is operating individually without heating part.

[Turing STIRRER operation, State indication LED]



During STIRRER function operating, the stirrer value will show on display window. When you push the stirrer knob, you can check the current stirrer operating value. In case of user want to stop stirrer operation, just turn left all.

NOTICE

- Stirrer speed range 1~2000rpm, you can control more correctly from 30 to 2000rpm

4.2.5 Temperature Setting

The temperature setting procedures are preceded by using the TEMP button and the Heater Knob. (left control knob)

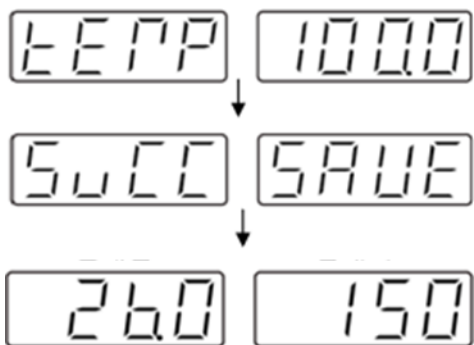
(1) Temperature Setting

Step 1 : Press the TEMP Button.



The display is converted by the temperature setting mode and the current setting temperature is displayed in the right window.

Step 2 : If you want to change the temperature setting, select the desired temperature by turning and press the Heater Knob.



Step 3 : Push the RUN/STOP Button. Heater LED will be on and heater will be activated.



If the external temperature probe is connected, the temperature which probe detects will be displayed. If not, the top plate's temperature will be displayed.

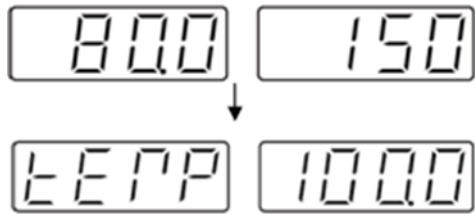
NOTICE

- The recommended allowable temperature for the product operating environment is less than 25 ° C.
- If the product must be used in an environment of 30 ° C or more, in order to
- Manual NO.34415L002 Version :2.1
- 1 5 prevent the product from overheating the protective circuit
- (refer to 5.0 Safety Device, 7.3 ERROR message), it is necessary to set the product temperature below 300 ° C in an environment of 30 to 35 ° C and below 250 ° C in the environment of 35 ~ 40 ° C.
- The set temperature can only be changed within the t-L, t-H range.
- If the set temperature does not change smoothly, check the set value of t-L or t-H. [Refer to 4.3.7 setting value]
- The set temperature of t-L, t-H can be adjusted from 0 to 350 ° C.

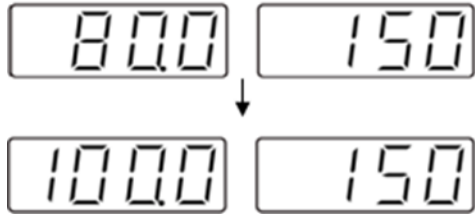
(2) Temperature Setting Check during operation

Press TEMP Button or the Heater Knob during operation to see the set temperature.

If you press TEMP Button, set temperature is shown on the right. After about 20 seconds, the mode will be escaped automatically.

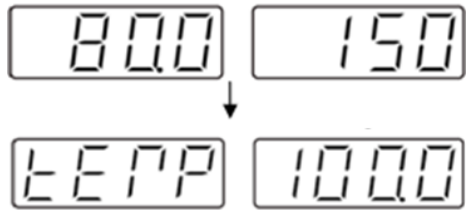


If you press the Heater Knob, set temperature is shown on the left. After about 5 seconds, the mode will be escaped automatically.

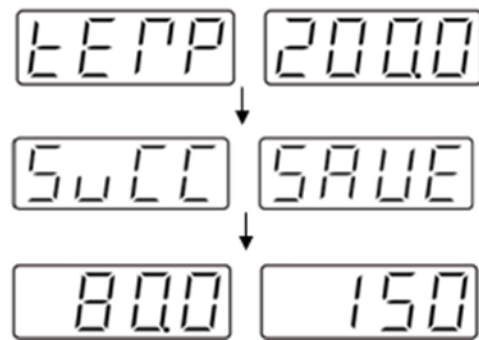


(3) Resetting Set Temperature during operation

Step 1 : Press TEMP Button during operation.

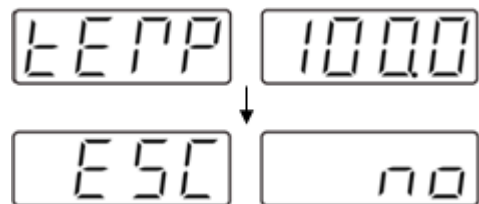


Step 2 : Select the desired temperature by turning and press the Heater Knob.

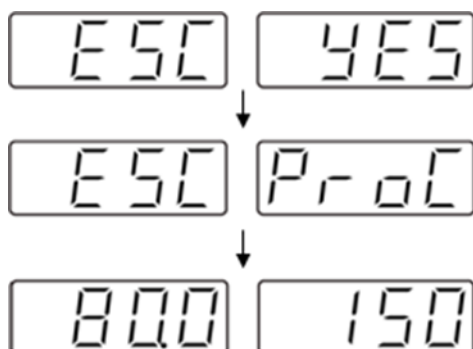


After about 20 seconds, the mode will be escaped automatically.
Or push RUN/STOP Button as shown below to escape the mode.

Step 1 : Push RUN/STOP Button during resetting the set temperature.



Step 2 : Turn the Heater Knob clockwise and press the Heater Knob as shown below.



(4) Maximum Heating Rate Setting

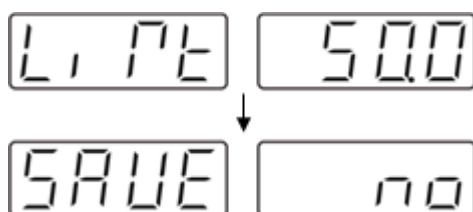
The higher the heating rate, the faster the heat up time but the wider the temperature overshoot and undershoot. Therefore, if you want to reduce the temperature fluctuation, you need to limit the heating rate to a certain degree by limiting maximum heating rate. [Same function as 4.3.4]

If, for example, the current heating rate is 100% but you want to set the heating rate limit at 50%, do as follows:

Step 1 : Press the CONFIG Button. The default value is 100%.

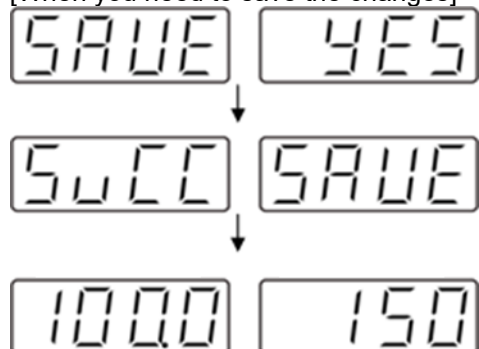


Step 2 : Change the limit to the desired value by turning the Stirrer Knob and press the Stirrer Knob.



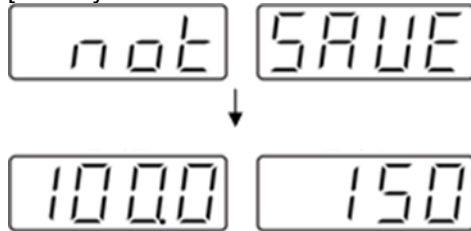
Step 3 : Save the desired limit by using the Stirrer Knob as shown below.

[When you need to save the changes]



If you don't want to save it, press the Stirrer Knob when the display shows "SAVE NO".

[When you don't need to save the changes]



4.2.6 Timer Setting

This unit provides two types of timer mode: immediate timer activation and delayed timer activation. (For selecting the timer mode, see 4.3.2.)

For both timer modes, the timer setting procedures are the same:

The timer setting uses the timer button and the right control knob(stirrer knob), and can be set from 1min to 99hr 59min.

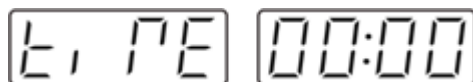
[LED Indicating LED status during timer is activated]



You can stop a timer by pushing the RUN / STOP Button during timer's activation.

(1) Timer Setting in stop mode

Step 1 : Press the Timer Button to begin the timer setting and also to check the display showing the current timer setting. Note that the hour frame is blinking first as shown below. (In the figure below is Initial value of 00:00)

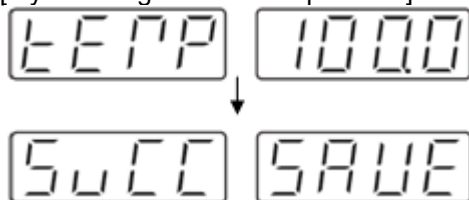


Step 2 : If you want to change the timer setting, select and then save the desired values into the hour frame and the minute frame by turning the Stirrer Knob and pushing it for confirmation as shown below.



Step 3 : Now, the unit will display the set temperature for verification as shown below. Turn the Stirrer Knob to select the desired value and then press it for confirmation. The following display will appear momentarily.

[If you change the set temperature]

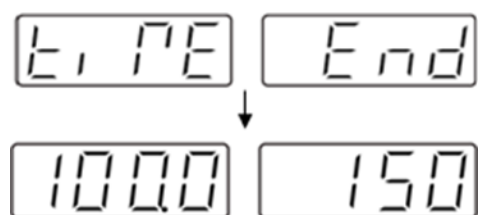


Step 4 : Then, the following display will appear asking whether you want to start the timer operation or not. If you want to save the new timer setting and to start the timer operation, you are required to change 'NO' to 'YES' by turning the Stirrer Knob and press it for confirmation as shown below.

[Operating confirmation]



Step 5 : When the timer operation ends, you will be alerted by audible signals as well as the following display.



(2) Timer Setting during heating

Press TIMER Button once to check run (remained) time of heating if the heater is in operation.



Press TIMER Button twice to set the timer during heating and follow above instruction (1) for timer setting.

(3) Run(remained) Time Check during timer operation

Press TIMER Button once to check the remained time during timer operation.

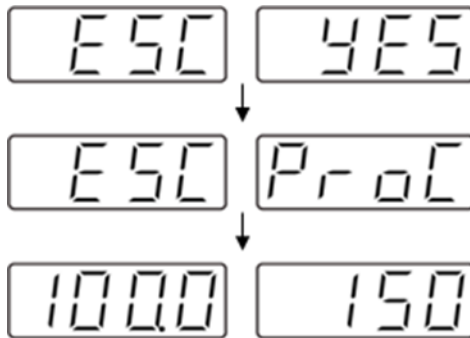


After about 20 seconds, the mode will be escaped automatically. Escape of timer mode is shown as below.

Step 1 : Press RUN/STOP Button.



Step 2 : Turn the Stirrer Knob clockwise and press the Stirrer Knob.



4.2.7 External Temperature Probe Control Mode

Connect external temperature probe to the unit. The default mode will be automatically changed to the External Temperature Probe Control Mode and display shows the temperature value detected by the probe. [see 4.2.2]



For temperature and timer setting on the External Temperature Probe Control Mode, see 4.2.5 for temperature setting and 4.2.6 for timer setting.

In case of low smoke point media heating, High temperature limit value should be lower than smoke point. [See 4.3.5 for High temperature limit setting]

(1) External Temperature Probe Errors

On external temperature control mode if the external probe is in the air or is not enough socked into the media, error message will be shown on display and the heater will be automatically turned off.

For correct control media by the external temperature probe, make sure the sensor to completely sock into the media (more than 20mm deep). If the sensor is in the air due to evaporation of media, precise temperature control may fail.

[See 7.3 for Error message]

Error code	Cause		Effect
ERRO NO 6	External Temperature Probe Errors	If the external temperature probe is in the air	Heater off
ERRO NO 7		If the external temperature probe is not completely sucked into the media	Heater off

CAUTION



- Hot Top Warning Indicator will illuminate if the top plate temperature is over 50°C.
- Install the probe so that it is immersed in the media by 20 mm or more.
- If the probe is insufficiently immersed in the media or exposed to air, an associated error or overheating of the heating plate may occur.

4.3 Configuration

Various configuration settings can be adjusted under the configuration mode such as heating mode, timer mode, maximum heating rate, low and high temperature limits, temperature unit, temperature offsetting, temperature control mode, and so on.

You can enter this configuration mode by pressing the CONFIG Button when the unit is properly connected to a power outlet but not operating.

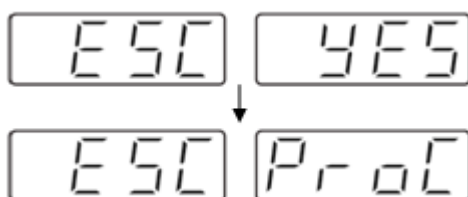
You can terminate the configuration mode by using one of the following methods:

[When pressing the RUN / STOP button]

Step 1 : Press the RUN/STOP Button.

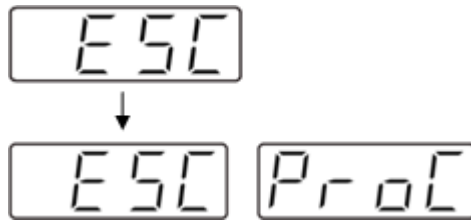


Step 2 : Turn the stirrer knob to select YES and push it to confirm the termination as shown below.



[When using the Stirrer knob]

Or turn the stirrer knob clockwise until you get the following ESC display and then push it to confirm the termination as shown below:



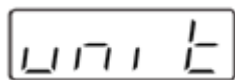
[When it be switched automatically]

Note also that the configuration mode is automatically terminated if there is no button operation for more than 20 seconds.

4.3.1 Temperature Unit Conversion (Unit)

You can select the desired temperature unit as follows.

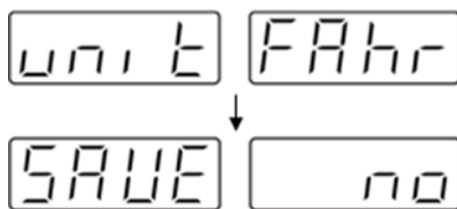
Step 1 : Press the CONFIG Button.



Step 2 : Select the temperature unit conversion by turning the Stirrer Knob as shown below.

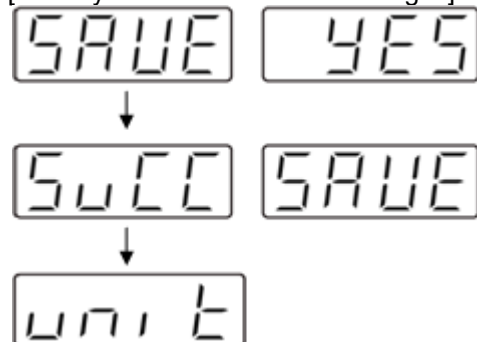


Step 3 : Select either Celsius (oC) or Fahrenheit (oF) by turning and pressing the Stirrer Knob.



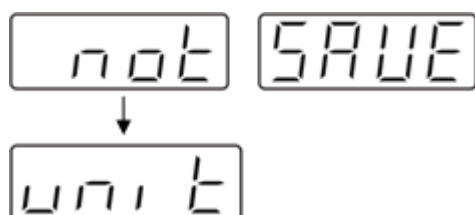
Step 4 : Save the selected temperature unit by using the Stirrer Knob as shown below.

[When you need to save the changes]



If you don't want to save it, press the Stirrer Knob when display shows "SAVE NO".

[When you don't need to save the changes]



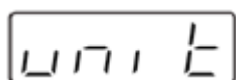
Step 5 : Terminate the configuration mode as described in 4.3.

4.3.2 Selection of the Timer Mode (TIME)

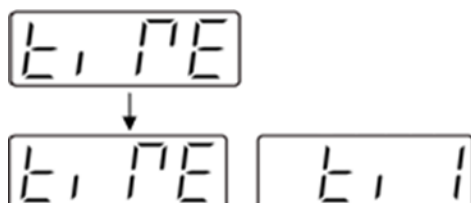
Two different timer modes are provided: Immediate Timer Activation (ti1) and Delayed Timer Activation (ti2). In case of the Immediate Timer Activation, timer starts immediately after setting the timer. In case of the Delayed Timer Activation, on the other hand, timer is activated only when the set temperature is reached.

The timer mode selection procedures are as follows.

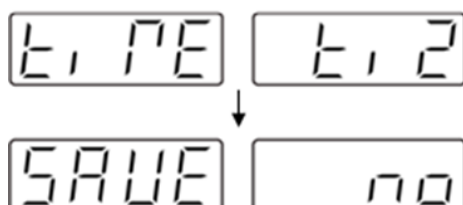
Step 1 : Press the CONFIG Button.



Step 2 : Select the timer mode shown below by turning and pressing the Stirrer Knob.

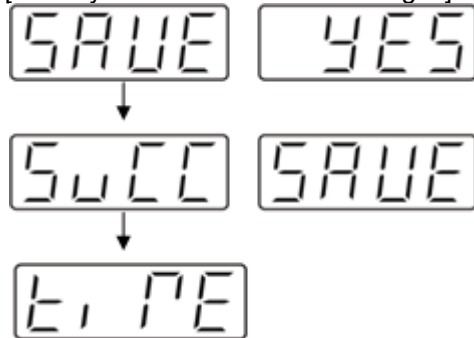


Step 3 : If you want to change the timer mode, then turn and press the Stirrer Knob.



Step 4 : Save the desired timer mode by using the Stirrer Knob as shown below.

[When you need to save the changes]



If you don't want to save it, press the Stirrer Knob when display shows "SAVE NO".

[When you don't need to save the changes]



Step 5 : Terminate the configuration mode as described in 4.3.

4.3.3 Offset (OFST/OFSP)

The temperature shown on the Actual Temperature Display is measured by a temperature sensor inside the unit. However, this temperature can be different from the temperature of the external temperature probe. If needed, you can offset such temperature differences at 0.1°C interval.

* Offsetting of top plate is displayed as OFST and offsetting of the external temperature probe is displayed as OFSP.

NOTICE

- In OFST, the calibrating value is applied to the heating plate measurement temperature, and the calibrating value is not applied when switching to the external temperature sensor control mode.
- OFSP applies the calibrating value to the temperature measured by the external temperature sensor, and when switching to the heating plate control mode, the calibrating value is not applied
- It is possible to set the calibrating value of OFST within the range -10 ~ +50°C, and the calibrating value of OFSP can be set within the range of -3 ~ +3°C.

Step 1 : Press the CONFIG Button.

Step 2 : Select the offsetting mode(OFST or OFSP) by turning the Stirrer Knob and press the Stirrer Knob as shown below.



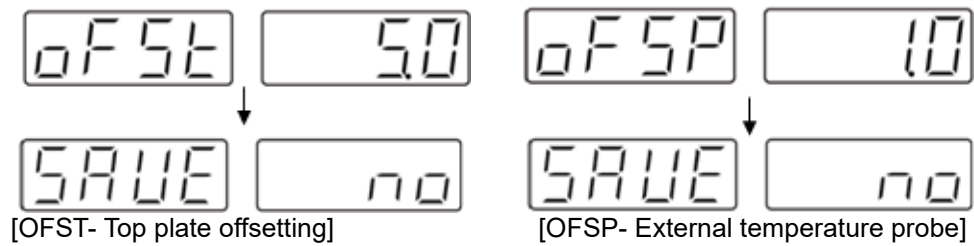
[OFST- Top plate offsetting]



[OFSP- External temperature probe]

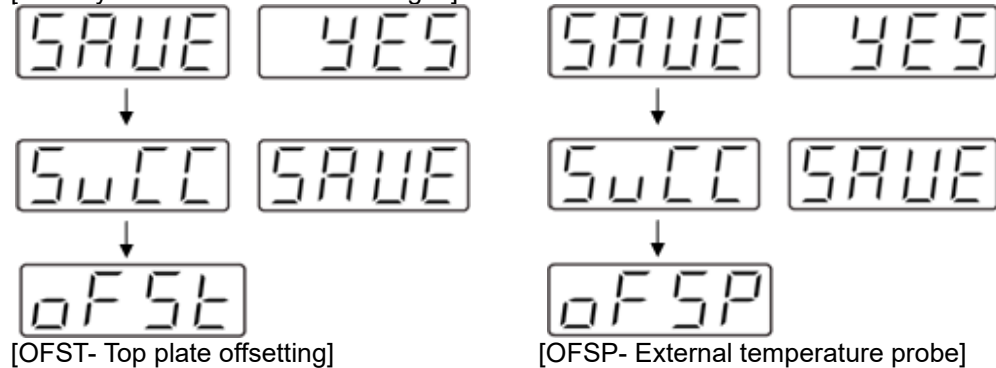
Step 3 : Select the offset value by turning the Stirrer Knob.

The allowed ranges of the temperature offsetting are from -10 to +50°C for OFST and from -3 to +3°C for OFSP.



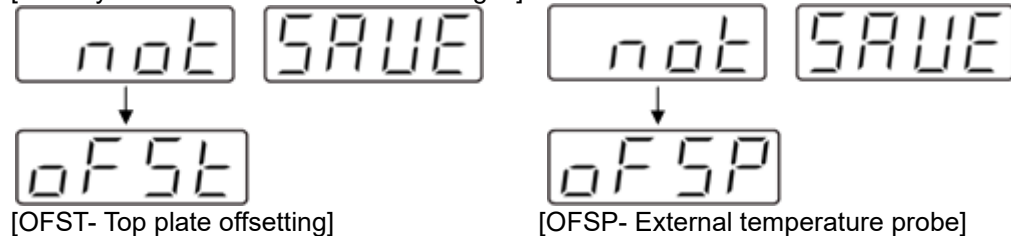
Step 4 : Save the desired offsetting value by pressing the Stirrer Knob as shown below.

[When you need to save the changes]



If you don't want to save it, press the Stirrer Knob when display shows "SAVE NO".

[When you don't need to save the changes]



Step 5 : Terminate the configuration mode as describe in 4.3.

4.3.4 Maximum Heating Rate Setting (LIMt)

The higher the heating rate, the faster the heat up time but the wider the temperature overshoot and undershoot. Therefore, if you want to reduce the temperature fluctuation, you need to limit the heating rate to a certain degree by limiting maximum heating rate. [Same function as 4.2.5 (4)]

If, for example, the current heating rate is 100% but you want to set the heating rate limit at 60%, do as follows:

Step 1 : Press the CONFIG Button.

The LCD display shows the word 'unit' in a seven-segment font.

Step 2 : Select Limit (LIMt) turning and pressing the Stirrer Knob.

The LCD display shows 'LIMt' on the left and '1000' on the right. An arrow points from the 'LIMt' display to the next state.

Step 3 : Change the limit to the desired value by turning the Stirrer Knob and press the Stirrer Knob.

The LCD display shows 'LIMt' on the left and '600' on the right. An arrow points down to the next state where the display shows 'SAVE' on the left and 'no' on the right.

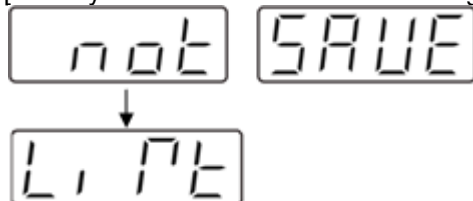
Step 4 : Save the desired limit by using the Stirrer Knob as shown below.

[When you need to save the changes]

The LCD display shows 'SAVE' on the left and 'YES' on the right. An arrow points down to the next state where the display shows 'SuCC' on the left and 'SAVE' on the right. Another arrow points down to the final state where the display shows 'LIMt'.

If you don't want to save it, press the Stirrer Knob when the display shows "SAVE NO".

[When you don't need to save the changes]



Step 5 : Terminate the configuration mode as described in 4.3.

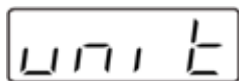
NOTICE

- When the heat up time is too slow, check whether the maximum heating rate is set too low.
- A maximum heat rate set point can only be applied in top plate's control mode, not the external temperature probe mode.

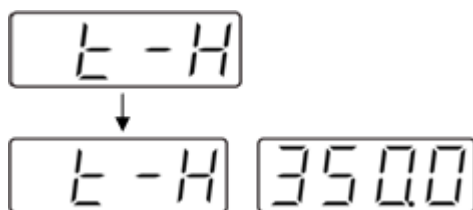
4.3.5 Changing the High Temperature Limits (t-H)

Note that the default setting of the high temperature limit [t-h] 350°C . If needed, however, you can set your own temperature limits.

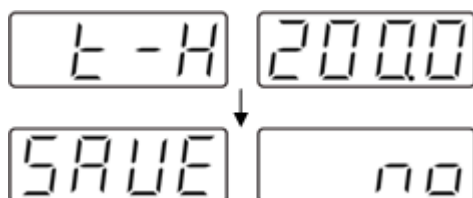
Step 1 : Press the CONFIG Button.



Step 2 : select the temperature limit mode shown below by turning the Stirrer Knob. Press the Stirrer Knob and check the current high temperature limit.

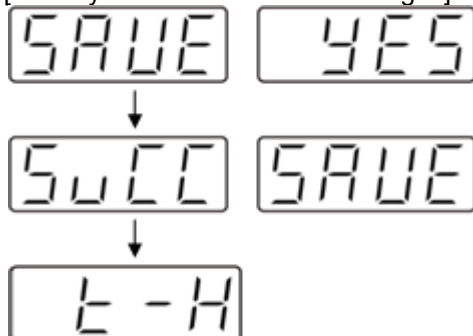


Step 3 : Change the limit to the desired value by turning the Stirrer Knob.



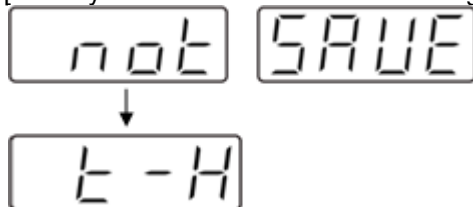
Step 4 : Save the desired limit by using the Stirrer Knob as shown below.

[When you need to save the changes]



If you don't want to save it, press the Stirrer Knob when the display shows "SAVE NO".

[When you don't need to save the changes]



Step 5 : Terminate the configuration mode as describe in 4.3.

Step 6 : Press the TEMP button and turn the heater knob to confirm the setting changes and reset to the desired temperature.

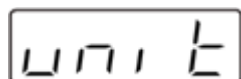
NOTICE

- The allowed range of the temperature limit setting is 0°C ~ 350°C.
- After terminating the configuration modes, new temperature setting should be arranged within the range of the temperature limit.

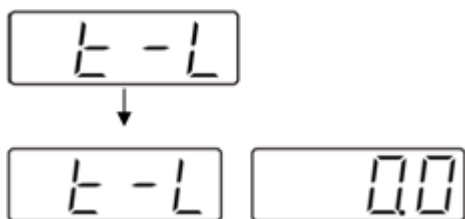
4.3.6 Changing the Low Temperature Limits (t-L)

Note that the default setting of the low temperature limit [t-L] 0°C. If needed, however, you can set your own temperature limits.

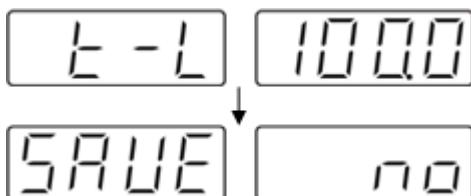
Step 1 : Press the CONFIG Button.



Step 2 : Select the temperature limit mode shown below by turning the Stirrer Knob. Press the Stirrer Knob and check the current low temperature limit.

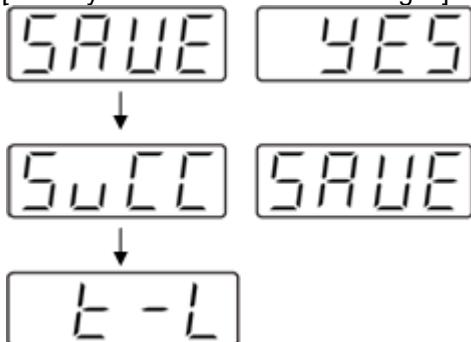


Step 3 : Change the limit to the desired value by turning the Stirrer Knob.



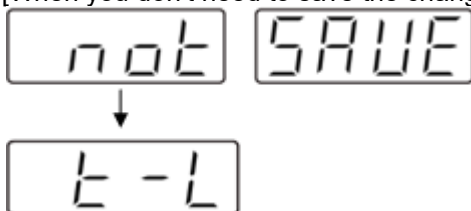
Step 4 : Save the desired limit by using the Stirrer Knob as shown below.

[When you need to save the changes]



If you don't want to save it, press the Stirrer Knob when display shows "SAVE NO".

[When you don't need to save the changes]



Step 5 : Terminate the configuration mode as describe in 4.3.

Step 6 : Press the TEMP button and turn the heater knob to confirm the setting changes and reset to the desired temperature.

When setting as shown in 4.3.5 and 4.3.6, the temperature setting range is limited to 100 ~ 200 °C.

NOTICE

- The allowed range of the temperature limit setting is 0°C ~ 350°C. However, low temperature limit[t-L] set point should not be more than high temperature limit[t-H] set point.

4.3.7 Check of the Configuration Settings (LISt)

Step 1 : Press the CONFIG Button.

Step 2 : Select the configuration checking mode [LISt] shown below by turning the Stirrer Knob.

Step 3 : Press the Stirrer Knob and check the current settings by turning the Stirrer Knob.

The default configuration settings are as follows:

MODE	Default Setting	MODE	Default Setting
Unit	Cels	Time	ti1
OFST/OFSP	0.0	Limt	100.0
t-H	350.0	t-L	0.0
Coef	Opti	Mmin	1

Step 4 : After checking the settings, terminate the checking mode.

[Either by pressing the RUN/STOP Button]

[Or by pressing the Stirrer Knob]



Step 5 : Terminate the configuration mode as described in 4.3.

4.3.8 Calibration (CALI)

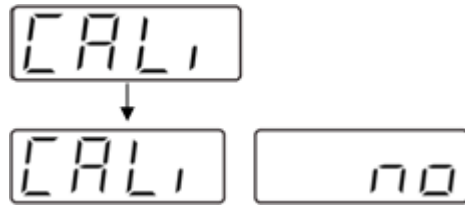
This function is Auto tuning function for coefficient for temperature control according to the current situation. It activates by 4 steps.

You can see the current progress by the number of beep sounds for each step.

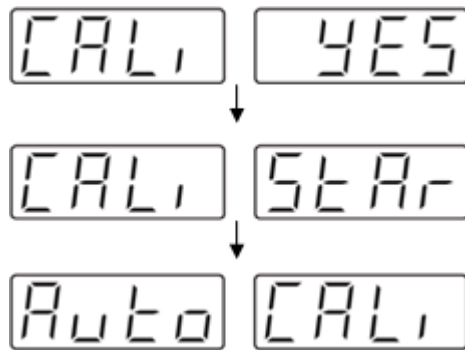
If you select User Mode [4.3.9 Coefficient], the unit will be operated with the auto tuning value.

Step 1 : Press the CONFIG Button.

Step 2 : Select the Calibration [CALi] shown below by turning the Stirrer Knob.



Step 3 : Press the Stirrer Knob and select YES by turning the Stirrer Knob. Press the Stirrer Knob again to start the calibration.



Step 4 : Terminate the configuration mode as described in 4.3.

To cancel the calibration during the process, turn off the main power switch. If cancelled, the screen below will be displayed with an alarm.



4.3.9 Coefficient (COEF)

Five user-selectable temperature control modes are provided for your convenience.

Step 1 : Press the CONFIG Button.

Step 2 : Select the temperature control mode selection [CoEF] shown below by turning the Stirrer Knob.

Step 3 : Turn the Stirrer Knob to check the five temperature control modes in order. And select the desired mode by using the Stirrer Knob as shown below.

[User-selectable temperature control modes]

Fast	The set temperature is reached as quickly as possible, and there is a possibility of overshoot depending on the load.
Optimal	Provides a control method that sets the set temperature reach time and fluctuation width without overshoot and undershoot.
Slow	It is the control method that reaches the set temperature at the latest but it is the way of least temperature fluctuation.
User	In "Calibration", it performs optimized temperature control with auto tuning value.
Point	This is the method of ON / OFF switching based on the set temperature after linear heating with the saved maximum heating amount up to set temperature. Overshoot and undershoot are the largest, and even after reaching the set temperature, there may be a temperature change around the set temperature.

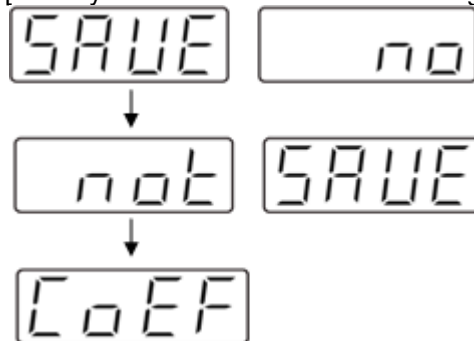
Step 4 : Save the desired mode by using the Stirrer Knob as shown below.

[When you need to save the changes]



If you don't want to save it, press the Stirrer Knob when the display shows "SAVE NO".

[When you don't need to save the changes]



Step 5 : Terminate the configuration mode as describe in 4.3.

4.3.10 Default (DEFA)

Default all settings.

Step 1 : Press the CONFIG Button.



unit

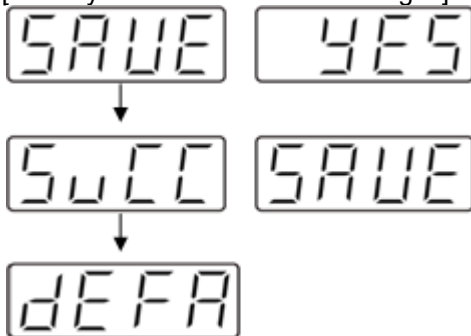
Step 2 : Select the default setting [dEFA] shown below by turning the Stirrer Knob.



dEFA
↓
SAVE no

Step 3 : Press the Stirrer Knob and confirm the change to the default settings by using the Stirrer Knob as shown below:

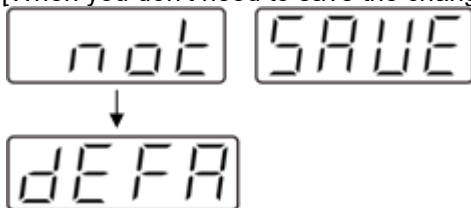
[When you need to save the changes]



SAVE YES
↓
SuCC SAVE
↓
dEFA

If you don't want to save it, press the Stirrer Knob when display shows "SAVE NO".

[When you don't need to save the changes]



not SAVE
↓
dEFA

Step 4 : Terminate the configuration mode as describe in 4.3.

4.3.11 Motor Minimum (Mmin)

You can limit the stirring speed to a certain point by setting the limit of maximum stirring speed. The range of speed adjustable is from 1 to 1000rpm.

Step 1 : Press the CONFIG Button.

The LCD display shows the word 'unit' in a segmented font.

Step 2 : Select the Motor Minimum [Mmin] shown below by turning the Stirrer Knob.

The LCD display shows 'Mmin' in a segmented font.



The LCD display shows 'Mmin' in a segmented font.

The LCD display shows the number '1' in a segmented font.

Step 3 : Change the limit to the desired value by turning the Stirrer Knob and press the Stirrer knob.

The LCD display shows 'Mmin' in a segmented font.

The LCD display shows the number '350' in a segmented font.



The LCD display shows the word 'SAVE' in a segmented font.

The LCD display shows the word 'no' in a segmented font.

Step 4 : Save it by using the Stirrer Knob as shown below.

The LCD display shows the word 'SAVE' in a segmented font.

The LCD display shows the word 'YES' in a segmented font.



The LCD display shows the word 'SUCC' in a segmented font.

The LCD display shows the word 'SAVE' in a segmented font.



The LCD display shows 'Mmin' in a segmented font.

If you don't want to save it, press the Stirrer Knob when the display shows "SAVE NO".

The LCD display shows the word 'not' in a segmented font.

The LCD display shows the word 'SAVE' in a segmented font.



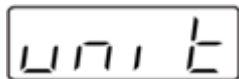
The LCD display shows 'Mmin' in a segmented font.

Step 5 : Terminate the configuration mode as describe in 4.3.

4.3.12 Escape (ESC)

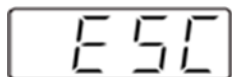
Terminate the configuration mode.

Step 1 : Press the CONFIG Button.

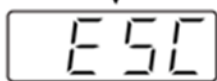


unit

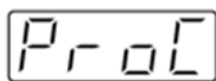
Step 2 : Select and press ESC by turning the Stirrer Knob.



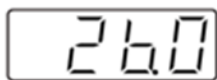
ESC



ESC



Pr oL



26.0



0

5.0 Safety Features

(1) Heating Plate Safety Limit

This is a protection device that prevents the heating plate from heating above the set value by setting the safety limit of the heating plate in advance. The default setting is 350 °C, and it can be adjusted as needed by using external temperature probe. [Refer to 4.3.5 Temperature setting upper limit value change]

If the temperature of the heating plate overheats from the set value, the heater operation is stopped and the Heat LED of the status display LED would be turned off, but the temperature of the heating plate may rise continuously depending on the specific heat of the object. When the temperature of the hot plate is lowered, the heater power is automatically connected and reheated.

(2) Thermal plate overheat protection device (ERROR 1)

This is a protection device that cuts off the power of the heater and sounds a buzzer when the temperature of the heating plate exceeds the safe range due to the function of Heating Plate Safety Limit not working or a circuit malfunction.

If the hot plate overheat protection device operates, turn off the power switch of the device and unplug the power cord. When the heating plate has cooled down, restart it.

(3) Device protection device

It is a protection device that cuts off the power supply of the heater when the temperature of the main body is overheated.

When the temperature of the main body is lowered, the heater power is automatically connected and reheated.

(4) Circuit protection device (ERROR 3)

In order to protect the circuit inside the device, if the internal circuit board is overheated, the heater is turned off and a buzzer sounds.

If the circuit protection device is activated, turn off the power switch of the device and unplug the power cord. If the unit has cooled down, restart it.

(5) Warning light for user protection

If the temperature of the heating plate exceeds 50 °C, the "HOT TOP" LED on the control panel lights up on the temperature display. When the temperature of the heating plate is over 50 °C, this LED will continue to light with the temperature display even if the power switch is turned off.

When the temperature of the heating plate drops below 50 °C, it goes off automatically.

(6) Warning according to temperature variation of external temperature sensor (ERROR6, 7)

In the external temperature sensor mode, if the probe is insufficiently immersed to the media or is exposed to air by measuring the variation of Probe measurement temperature, an error message is displayed and the heater is turned off.

In this case, turn off the power switch of the unit and unplug the power cord. Install the probe so that it is immersed to the media by 20 mm or more and restart it.

NOTICE

- If any overheat prevention activates or warning sound is alarming, turn off the power switch and disconnect the power cord first. Then allow your unit to cool down completely before operating it again.
- If the error occurs repeatedly due to the overheat protection device, check the temperature of the product operating environment. When the ambient temperature of the product is 30 ~ 35 °C, set the product temperature less than 300 °C and if the condition is 35 ~ 40 °C, set the product temperature less than 250 °C.

6.0 Maintenance

6.1 Inspection Interval

Item	Inspection Interval	
	Daily	Weekly
Connection status of power cord or plug	•	
Damages in power cord or plug	•	
Damages or cleanliness of top plate		•
Cleanliness of main body and accessories		•
Damages in external temperature probe, switches, buttons, LED's, dial knobs		•
Heating capability check (up to 350°C)	•	
Assembly status of all parts or accessories		•

6.2 Cleaning

Periodically cleaning your device will keep your device in top condition at all times. In addition, you can use your device more efficiently and increase the life of your device. It is recommended that this unit be cleaned daily, cleaned once a week, and cleaned once a month. In addition, if the instrument is contaminated with special use, clean it immediately.

6.2.1 Cleaning the machine body

Make sure that there is foreign material before and after use, and wipe with a mild detergent and a dry cloth to remove any foreign matter and keep it clean.

CAUTION

- Never immerse this unit in water or any other liquid.
- Take care not to damage any components or systems inside the unit.
- Avoid contact with corrosive solvents such as nitric acid, sulfuric acid, sodium hydroxide or acetone, benzene, phenol, toluene, chloroform, cresol, acetic acid or chlorine.
- Do not use chlorine bleach, ammonia-based cleaners abrasives, ammonia, or metal scouring pads when cleaning
- Disconnect the power cord when not in use.
- Do not move the unit with the power cord connected

6.2.2 Accessories

Before and after use, check for foreign objects, wipe with a mild detergent and a dry cloth, always keep it clean by removing it.

6.3 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

- After the heating plate is cooled sufficiently, move the unit.
 - Pay attention to avoid mechanical shock or vibration while moving the instrument.
- Damages caused by mechanical shock or vibration may result in injury or fire.
-

6.4 Storage

If not used for an extended period of time,

- (1) Disconnect the power cord from the power outlet.
- (2) Clean the equipment with soft cloth.
- (3) Pack the equipment properly and make sure to store it in a dry place.

7.0 Troubleshooting Guide

If any abnormality occurs while using the device, check the following and act according to the instructions.

If the problem cannot be solved even after checking the contents of the problem, please contact JEIO-TECH sales department to solve the problem immediately.

7.1 Power Troubles

Problem	Cause	Corrective Action
No power	Unsuitable power supply.	Meet the electrical requirements of this instrument before use. Check the voltage, phase, and capacity of the power supply and connect the power properly.
	Power cut-off by a circuit breaker or power blackout.	Find out why blackout or cut-off 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 instrument.
	Damages in power cords, power outlets, or plugs.	Replace the damaged part with a proper one.
	Internal circuit failure.	Contact Jeio Tech for service.
Repetitive tripping of the circuit breaker	electrical overload.	Disconnect all the appliances connected to the breaker first and reconnect them one by one to find the reason for the overload.
	Internal circuit failure.	Contact Jeio Tech for service.
No operation with power on	Power cut-off by built-in overheat prevention circuit.	If the main body is overheated, the built-in overheat prevention circuit stops heating to protect the instrument. In such cases, let the instrument cool down for some time before power reconnection.
	Internal circuit failure.	Contact Jeio Tech for service.

7.2 Malfunctions during Operation

Problem	Cause	Corrective Action
No heat	Failure to push RUN/STOP button.	Push RUN/STOP button.
	Set point value is lower than Present temperature value.	Adjust Set point lower than Present temperature value.
	Power cut-off by built-in overheat prevention circuit.	Turn off the main power switch and wait until the heater cools down. Then, turn on the main power switch.
	Internal circuit failure.	Contact Jeio Tech for service.
	Button switch failure.	Contact Jeio Tech for service.
If the measured temperature of the probe does not rise during the set temperature measuring.	The Probe is not immersed in the Media.	Install the Probe in the media which is immersed over than 20mm.
Knob malfunction	Damaged knob.	Take out the knob and relocate it. Contact Jeio Tech for service.
Probe lamp is not light on	- Probe connection failure. - Damage due to chemical spill or overheat.	- Reconnect probe in right way. - Contact Jeio Tech for service.
LED display malfunction	Damage due to chemical spill or overheat.	Contact Jeio Tech for service.

7.3 Error message

If you see below “Error codes”, please take off the power reuse it after having the unit rest enough.

Error code	Cause		Effect
ERRO NO 1	Related to Heater system	If top plate is overheated	Heater off
ERRO NO 2		If sensor detects a sudden temperature change	Heater off
ERRO NO 3		If PCB is overheated	Heater off
ERRO NO 4		If sensor is not connected correctly	Heater off
ERRO NO 5		If temperature difference has arisen between two sensors	Heater off
ERRO NO 6	Related to External temperature probe	If external probe is in the air	Heater off
ERRO NO 7		If external probe is not soaked enough into media	Heater off

8.0 Accessories

Designation	Order No.	Description
External temperature probe, A class	AAA34502	Option, Pt100, Max.400°C
External temperature probe, B class	AAA34501	Pt100, Max.250°C
Heating Bath for 14 series	HPS0012	Option
Heating Bath for 17 series	HPS0015	Option
Transparency Shield PC for 14 series	HPS0059	Option
Transparency Shield PC for 17 series	HPS0039	Option
Support Rod, M10 (Ø12mmx400mm / Ø0.47"x15.74")	MTT0132	Option
Clamp holder, max. Φ27, C-20	AAA37511	Option
Clamp holder, max. Φ17, C-10	AAA37512	Option
Clamp holder, max. Φ12, C-7	AAA37513	Option
Clamp holder, max. Φ12, C-5	AAA37514	Option
3 Prong clamp, 80mm grip	BEA1000011	Option
3 Prong clamp, 60mm grip	BEA1000012	Option
3 Prong clamp, 20mm grip	BEA1000013	Option
RBP-100, Round flask heating block plate 100ml	AAA34511	Option (for 100ml Flask, including 3EA of M8 Support)
RBP-500, Round flask heating block plate 500ml	AAA34512	Option (for 500ml Flask, including 3EA of M8 Support)
RBP-1000, Round flask heating block plate 1,000ml	AAA34513	Option (for 1000ml Flask, including 3EA of M8 Support)
RBP-2000, Round flask heating block plate 2,000ml	AAA34514	Option (for 2000ml Flask, including 3EA of M8 Support)
RBI-25, Round flask heating block insert 25ml (for Plate 100ml)	AAA34521	Option (for 25ml Flask)
RBI-50, Round flask heating block insert 50ml (for Plate 100ml)	AAA34522	Option (for 50ml Flask)
RBI-100, Round flask heating block insert 100ml (for Plate 500ml)	AAA34523	Option (for 100ml Flask)
RBI-250, Round flask heating block insert 250ml (for Plate 500ml)	AAA34524	Option (for 250ml Flask)

RBI-500, Round flask heating block insert 500ml (for Plate 1,000ml)	AAA34525	Option (for 500ml Flask)
RBI-1000, Round flask heating block insert 1,000ml (for Plate 2,000ml)	AAA34526	Option (for 1000ml Flask)
VBP, Vial heating block plate, 190x190x20mm	AAA34531	Option (191x191x20mm, Including M8 Support x 3, M4 Support x 4)
VBI-1D, Vial heating block insert 1dram (4ml), Φ 15x17mm, 16holes	AAA34541	Option, 1dram (4ml), Φ 15x17mm, 16holes
VBI-2D, Vial heating block insert 2dram (8ml), Φ 17x23mm, 16holes	AAA34542	Option, 2dram (8ml), Φ 17x23mm, 16holes
VBI-4D, Vial heating block insert 4dram (15ml), Φ 21x30mm, 16holes	AAA34543	Option, 4dram (15ml), Φ 21x30mm, 16holes
VBI-20S, Vial heating block insert scintillation 20ml, Φ 28x22mm, 4holes	AAA34544	Option, scintillation 20ml, Φ 28x22mm, 4holes
VBI-30S, Vial heating block insert scintillation 30ml, Φ 28x32mm, 4holes	AAA34545	Option, scintillation 30ml, Φ 28x32mm, 4holes
VBI-40S, Vial heating block insert scintillation 40ml, Φ 28x42mm, 4holes	AAA34546	Option, scintillation 40ml, Φ 28x42mm, 4holes
Silicone Cover for TS-14SG	00HPS0000190	Cannot installed with Transparency Shield
Silicone Cover for TS-17SG	00HPS0000191	
Silicone Cover for TS-18QG	00HPS0000192	

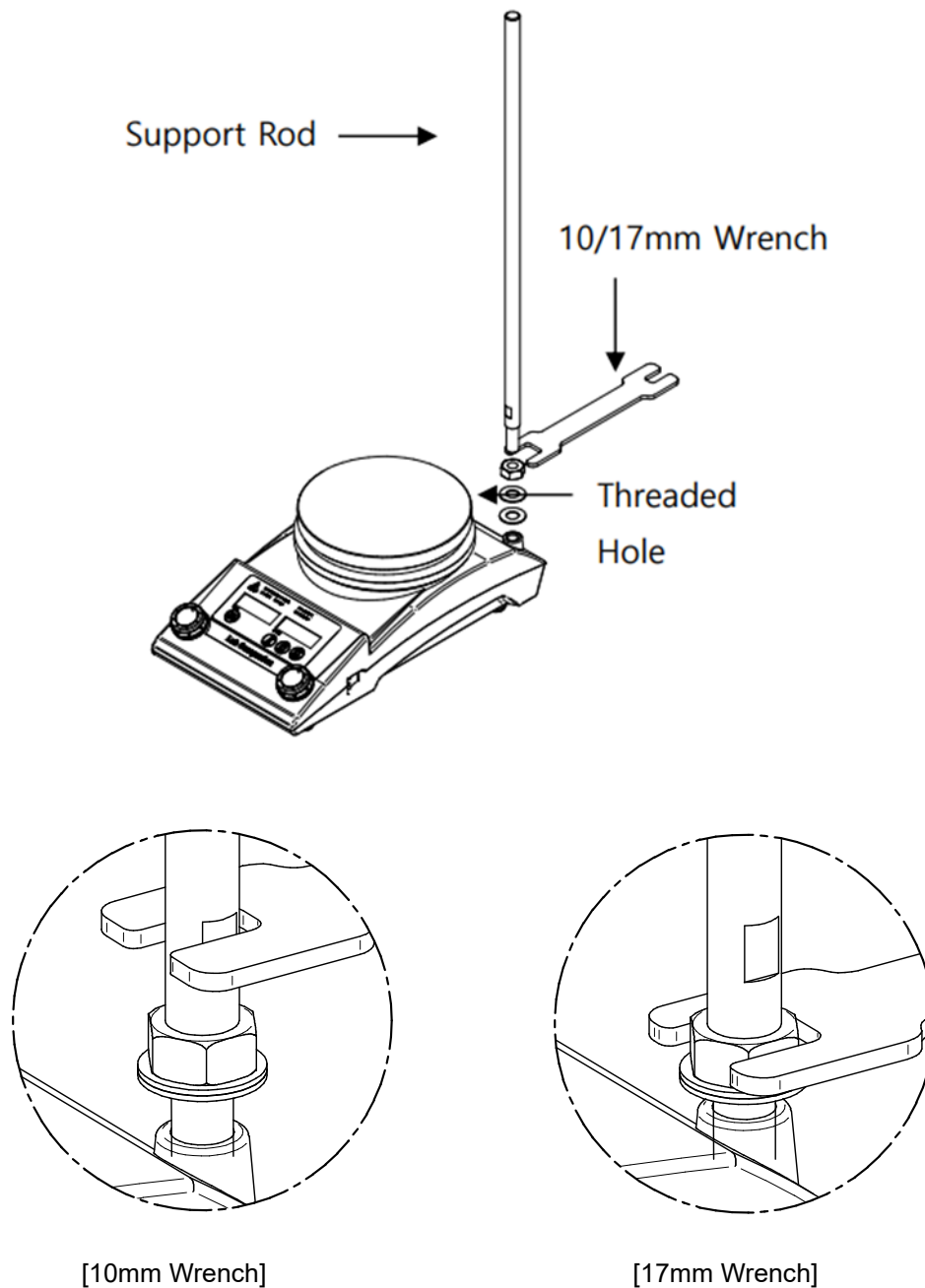
※ For accessory exchange, please visit JEIO-TECH homepage (<http://www.labcompanion.com>), or contact sales department or seller(Distributor)

8.1 Assembly of Support Rods

Step 1 : Insert two M10 nuts and two flat washers at the bottom of the support rod.

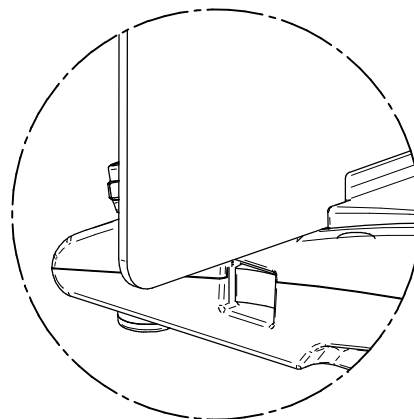
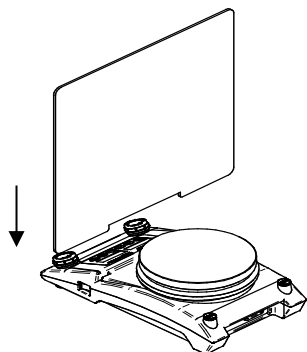
Step 2 : Set up the support rod, insert the thread groove of the screw into the holder of the body, and turn it clockwise using the 10mm groove of the wrench.

Step 3 : Fix the M10 nut clockwise by using the 17mm thread groove of the wrench.

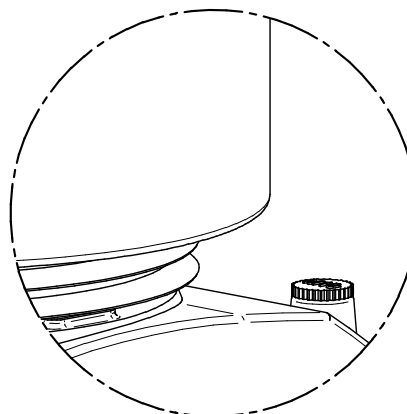
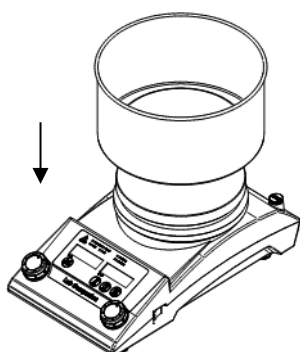


8.2 Assembly of Transparent Safety Shield and Non-slip Heating Bath

When necessary, you can easily assemble the transparent safety shield and/or the non-slip heating bath as shown below:



[Transparent Safety Shield]



[Non-slip Heating Bath]

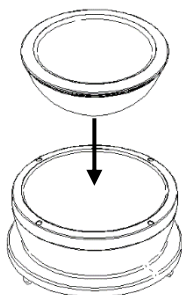
CAUTION



- The "HOT TOP" LED on the control panel illuminates when the temperature of the heating panel is more than 50°C.
 - Do not touch the heating block with your bare hands until the "HOT TOP" LED is switched off and the heating block is sufficiently cold.
 - Heater power may be turned off for instrument and circuit protection when the heater is used continuously at a maximum output (350°C, 2000 rpm).
 - The shield cannot be installed with the silicon cover.
-

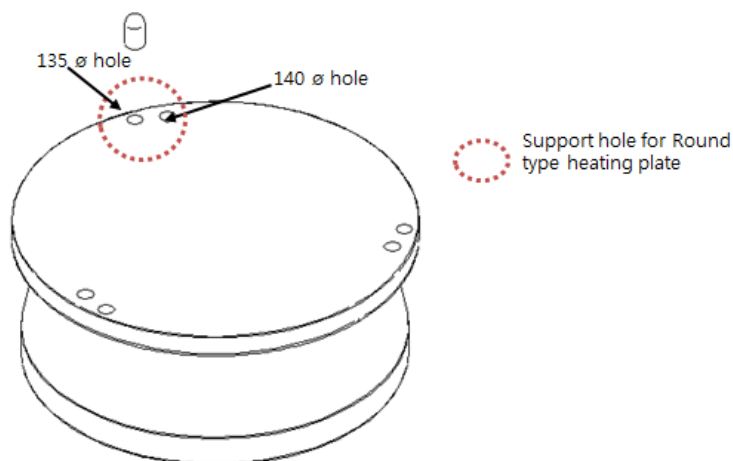
8.3 Heating block for round bottom flask

Using the heating block for round bottom flasks for TS, TM and T models, you can perform the reaction test safer and more convenient than heating mantle or oil bath. On TS models, the external temperature sensor can be used to control the temperature of the heating block. Install the heating block plate for the round floor flask and then insert the correct size for the flask capacity to be used as indicated.



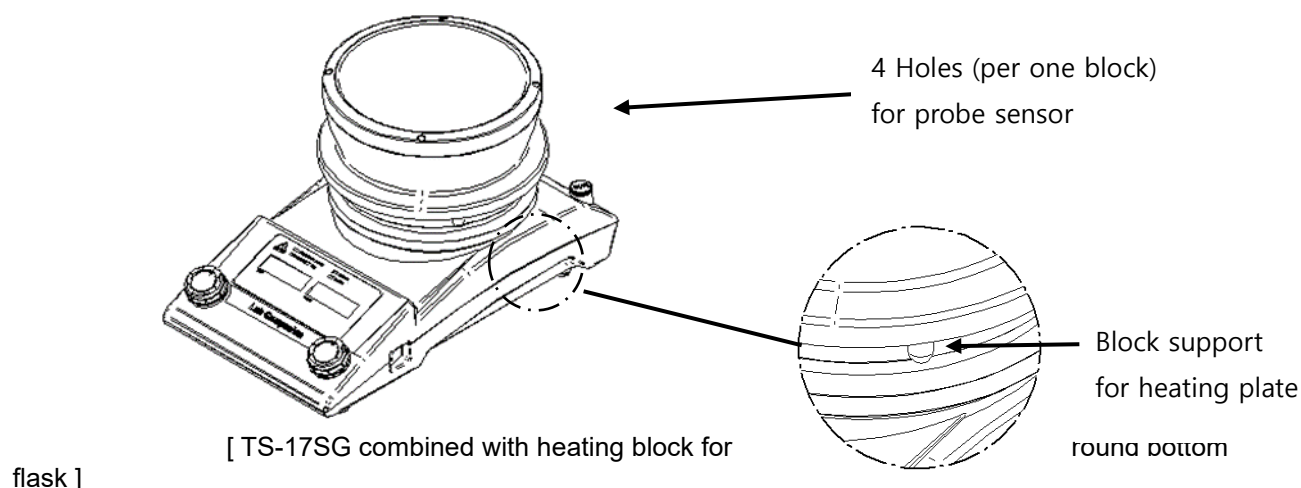
[Combination of Heating plate for round bottom flask and Insert]

The bottom face of the heating plate for round bottom flask provides a support fixing hole to ensure that the heating block is safely secured without being pushed onto the heating flask as the below picture, and it is supplied with a securing support (bolt). (Three points fixing on the round heating plate, Three M8 support are provided) Check the location of the support fixing hole suitable for the size of the hot plate you wish to use, and then tighten the suitable support provided with the heating block plate. However, in case of round or square heating plate with a size of 170ø or more, the heating block plate can be placed directly on the heating plate without any support engagement.



[Position of support fixing on the bottom face of heating block for round bottom flask]

Install the heating block for the flask on the product body heating plate as detailed in the drawing below.



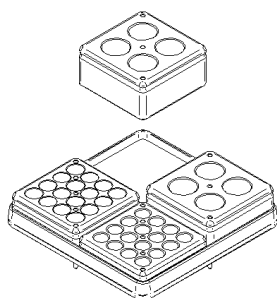
⚠ CAUTION



- The "HOT TOP" LED on the control panel illuminates when the temperature of the heating panel is more than 50°C.
- Do not touch the heating block with your bare hands until the "HOT TOP" LED is switched off and the heating block is sufficiently cold.
- The temperature range of heating blocks is up to 300 degrees. Depending on the heating conditions, it may not reach 300 degrees.

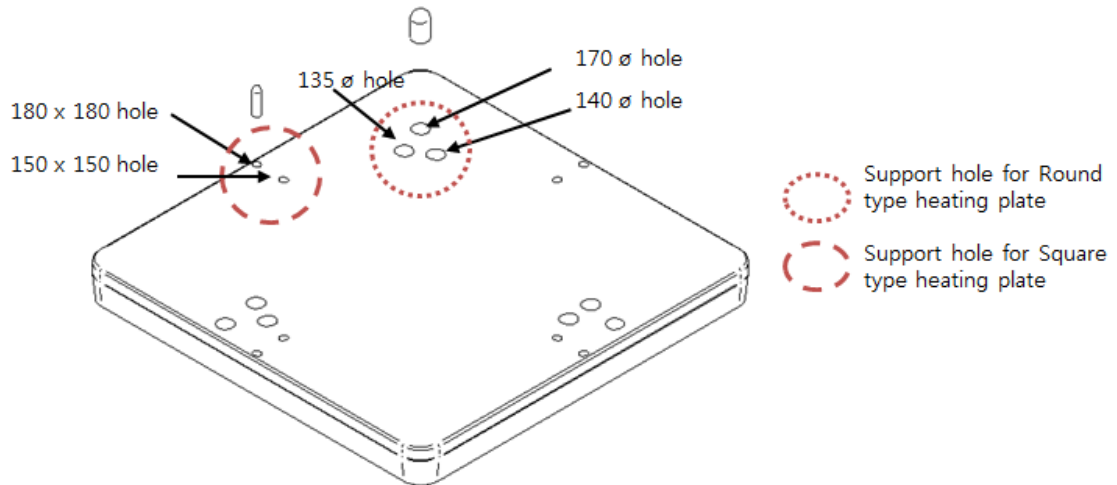
8.4 Heating block for vial

Using the heating block for the vial for TS, TM and T models, you can perform the reaction test safer and more convenient than the heating mantle or oil bath. On TS models, the external temperature sensor can be used to control the temperature of the heating block. Install the heating block plate for the vial followed by the appropriate size insert as indicated.



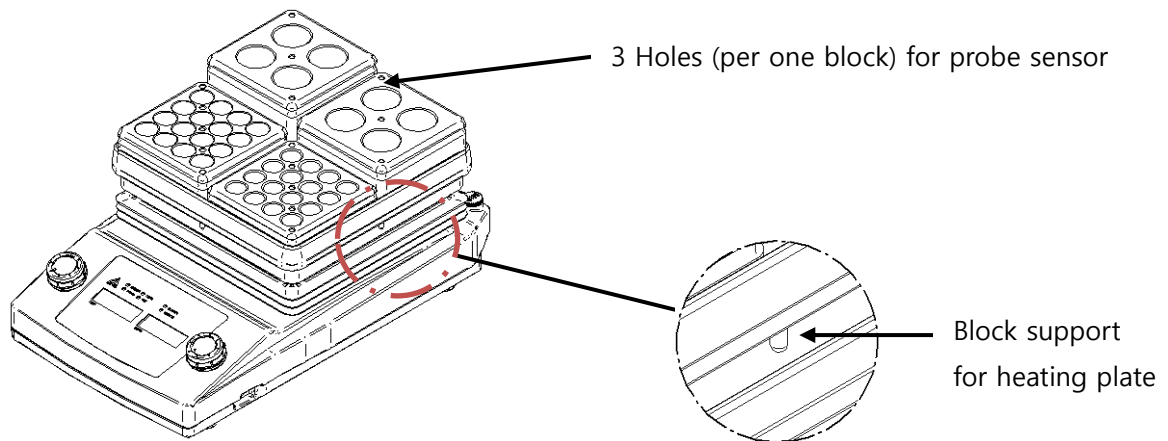
[Combination of Heating block for vial and Insert]

The bottom face of the heating plate for vial provides a support fixing hole to ensure that the heating block is safely secured without being pushed onto the heating flask as the below picture, and it is supplied with a securing support (bolt). Three points fixing on the round heating plate, three M8 support, four points fixing on the square heating plate, and four M4 support are provided. Check the location of the support fixing hole suitable for the size of the hot plate you wish to use, and then tighten the suitable support provided with the heating block plate.



[Position of support fixing on bottom face of heating blockplate for vial]

Install the heating block for the flask on the product body heating plate as detailed in the drawing below.



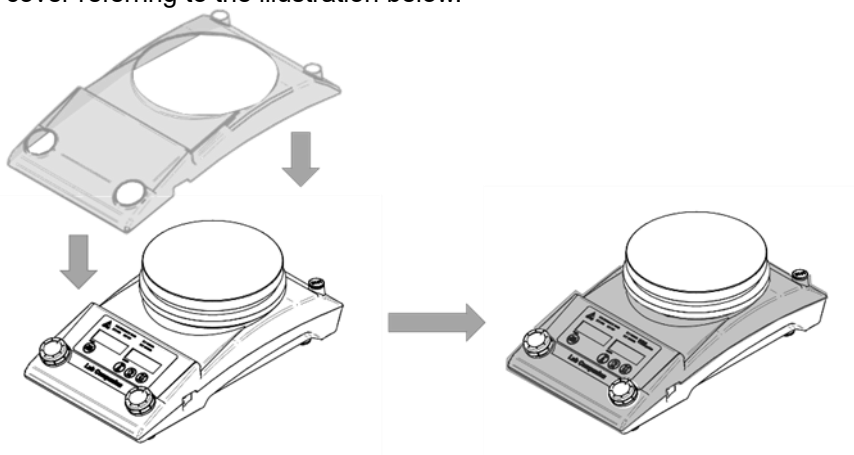
[TS-18QG combined with heating block for vial]

⚠ CAUTION

- The "HOT TOP" LED on the control panel illuminates when the temperature of the heating panel is more than 50°C.
 - Do not touch the heating block with your bare hands until the "HOT TOP" LED is switched off and the heating block is sufficiently cold.
 - The temperature range of heating blocks is up to 300 degrees. Depending on the heating conditions, it may not reach 300 degrees.
-

8.5 Silicon cover

The silicone cover prevents foreign substances from entering the knob and display. Install the silicone cover referring to the illustration below.



[TS-14SG with Silicon Cover]

⚠ CAUTION

- The "HOT TOP" LED on the control panel illuminates when the temperature of the heating panel is more than 50°C.
 - Do not touch the Silicon Cover with your bare hands until the "HOT TOP" LED is switched off and the heating block is sufficiently cold.
 - Do not poke or scratch the silicone cover with sharp objects.
 - Do not pull the silicone cover with excessive force.
 - The heating plate must not be covered by a silicone cover.
 - Silicone covers cannot be installed with transparent shields.
 - If foreign substances enter between the silicone cover and the body, remove the silicone cover and remove the foreign substances from the silicone cover and body and refit it.
-

9.0 Appendix

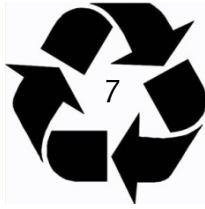
9.1 Technical Specification

Model		TS-14SG	TS-17SG	TS-18QG
Heater	Heating temperature range(°C/°F)	Max. 350 / 662		
	Temperature control mode	PID(optimal, fast, slow)		
	Function	Offset, Auto tuning		
	Temperature display	up to 350°C, 0.1°C resolution		
	Heater output, max. (W)	600	800	800
	Timer	2 type, 1min to 99 hrs 59 min		
Stirrer	Speed range (Guarantee rpm)	30~2,000		
	Speed display resolution (rpm)	1		
	Stirring capacity, Max (H ₂ O, L)	20		
	Motor type	BLDC		
	Magnetic bar, Length max. (L x ø, mm/Inch)	40 x 8 / 1.57x0.31		
Probe	Type	PT100, B class		
	Accuracy (°C, at 0°C)	±0.15		
Safety	Warning	Hot top warning lamp blink over 50°C at Top plate		
	Overheat Prevention	Top plate, Main body, PCB		
Dimension of top plate (Φ or W x D, mm/Inch)		140/5.51	170/6.69	180 x 180/7.08
Overall dimensions (W x D x H, mm/Inch)		161 x 290 x 100/ 6.34x11.42x3.94	191 x 330 x 101/ 7.52x12.99x3.98	209 x 326 x 102/ 8.22x12.83x4.0
Weight (kg/lbs)		2.8/6.17	3.5/7.72	3.8/8.37
Current consumption (A)	230V, 50/60Hz	3	4	4
	120V, 60Hz	5	6.7	6.7
	100V, 50/60Hz	6	8	-
Maximum load (kg/lbs)		25/55.1		
Material	Heating plate	Molded aluminum alloy, white ceramic coated		
	Main body	Cast aluminum alloy, powder coated		

※ Unless otherwise specified, the above-mentioned data represent values at 25°C and 60% relative humidity.

※ Jeio Tech reserves the right to make changes in design and specification without prior notice.

9.2 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.

9.3 Warranty

9.3.1 Warranty period

- (1) If the product fails during normal and proper use, the warranty period for manufacturing liability shall be two years from the date of delivery.
- (2) If you request a repair, please check the items below and let us know so that you can get a quicker and more accurate repair.

- | |
|---|
| <ul style="list-style-type: none">• Date of purchase:• Customer name / address / phone number / E-mail:• Fault status• Model• Serial number |
|---|

9.3.2 Technical Service Contact Points

Address : 153 (Youngsan-dong), Techno 2-ro, Yuseong-gu, Daejeon, 34025, Republic of Korea

Tel : +82 (0)2-2627-3824

Website : www.jeiotech.com/eng/

E-mail : overseas@jeiotech.com

9.3.3 Certificate of Product Warranty

This is a guide to the product quality warranty and service terms provided by Jeio Tech Co., Ltd

All products are guaranteed to operate normally when installed under proper conditions, as specified in the user manual for each product, and used according to the intended purposes and permissible operating conditions.

The warranty period for product quality starts from the delivery date and is indicated in the catalog provided for each product or in the purchase order agreed upon with the customer. If a product malfunctions within the warranty period, Jeio Tech Co., Ltd. provides free repair services. However, among the transportation costs incurred during the repair process, any special costs resulting from the customer's site conditions (e.g., door or wall modifications, use of special handling equipment) are not covered under the warranty. Furthermore, Jeio Tech's liability under this warranty is limited to replacing the product or refunding the original purchase price at Jeio Tech's sole discretion if reasonable attempts to repair or replace the product fail.

Parts replaced during free repairs within the warranty period become the property of Jeio Tech Co., Ltd. Additionally, the warranty period is not extended due to free repairs. Jeio Tech is not responsible for any losses incurred by the customer due to delays in repairs caused by issues such as part shortages or shipping delays.

The following cases will be handled as paid repairs, even within the warranty period:

1. Non-defective cases

- * Requests to resolve issues arising from improper operating environments or abnormal installations.
- * Reinstallation requests or connections with external equipment other than the initial installation.
- * Requests for usage instructions or simple adjustments that do not require disassembly.
- * Inspections of non-defective products.
- * Cleaning or debris removal service requests.

2. Failures caused by user errors:

- * Malfunctions due to usage not in accordance with the user manual.
- * Issues resulting from improper operating environments or abnormal installations.
- * Malfunctions caused by incompatible chemical usage.
- * Malfunctions caused by irregular or improper electrical or utility supplies.
- * Damage due to product movement, storage, external impact, or dropping by the customer.
- * Malfunctions resulting from unauthorized modifications or repairs without prior written approval from Jeio Tech Co., Ltd.
- * Malfunctions caused by using consumables or optional components not specified by Jeio Tech Co., Ltd.
- * Repairs performed by personnel other than Jeio Tech or its authorized service agents.

3. Other cases

- * When the product model or serial number has been damaged, removed, manipulated, or altered.
 - * Malfunctions caused by fire, flooding, or other natural disasters.
 - * Failure due to consumable parts reaching the end of their lifespan (e.g., lamps, filters, fuses, gaskets, packings, hoses, heat transfer fluids).
 - * Natural wear and tear (e.g., discoloration, screen printing degradation).
 - * Damage or malfunction of product accessories (e.g., power cables, data cables, glass components) or options.
 - * Malfunctions caused by errors in computers, computer components, or connected network systems.
-
- Before Jeio Tech performs free or paid repairs or accepts the return of a product, the customer must ensure the product has been decontaminated of chemical and biological hazards.
 - Replacement parts used during repairs may differ from the original but will function correctly and be equivalent in performance.
 - Jeio Tech does not bear any responsibility for damage to stored samples, data loss, or any other direct or indirect damages caused by product malfunctions, regardless of the warranty period.
 - Jeio Tech does not guarantee issues related to computers, computer components, or network systems connected to the product, regardless of the warranty period.
 - This warranty is the sole and exclusive warranty provided. Any implied warranties imposed by applicable laws are limited to the warranty period stated herein. This warranty cannot be modified by any verbal advice, statements, or documents on behalf of Jeio Tech unless explicitly labeled as a "Warranty Amendment" and signed by an authorized representative of Jeio Tech.
 - This warranty applies only to products purchased for direct use by the customer. It does not cover products purchased for resale purposes without prior written approval from Jeio Tech.
 - This warranty does not apply to consumables and is non-transferable.

- The contents of this manual can be changed or upgraded without prior notice.
- The copyright of this manual is reserved by Jeio Tech