



User Manual

Hotplate (Digital)

Model: T-14SG, T-17SG, T-18QG

Manual No. : 35011L002 Version : 5.0



⚠ 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.

Quality Management System



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Visit our Web site at www.jeiootech.com/eng to view a copy of our certificate.

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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.

1.4 Warning statement

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

Please thoroughly read and understand the 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.

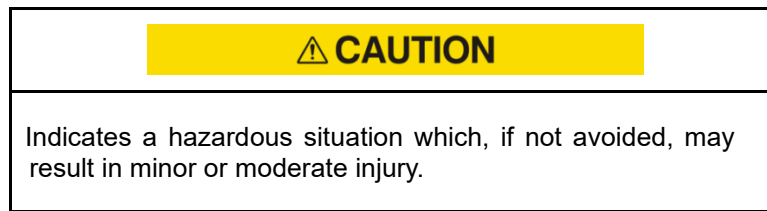
Do not install in a place subject to high humidity or water leakage.

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



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.

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 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.

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.

2.0 General Description

2.1 Product Introduction

Exothermic capacity of T-14SG is 600W, those of T-17SG and T-18QG are 800W.

Above models boast quick heat up time 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 it provides variants of temperature mode relate temperature control, heating up time.

2.2 Characteristics

2.2.1 Superior performance

- **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.
- **Adjustment of the Heating Rate**
You can adjust the heating rate ranging from 0 to 100%.
- **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**
You can calibrate the differences of the temperature of your thermometer and the displayed temperature using Offset function.
- **Selection of the Timer Mode**
You can select the timer starts immediately after setting the timer(t1) or the timer starts when the set temperature is reached(t2).
- **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.
- **Heating plate**
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.

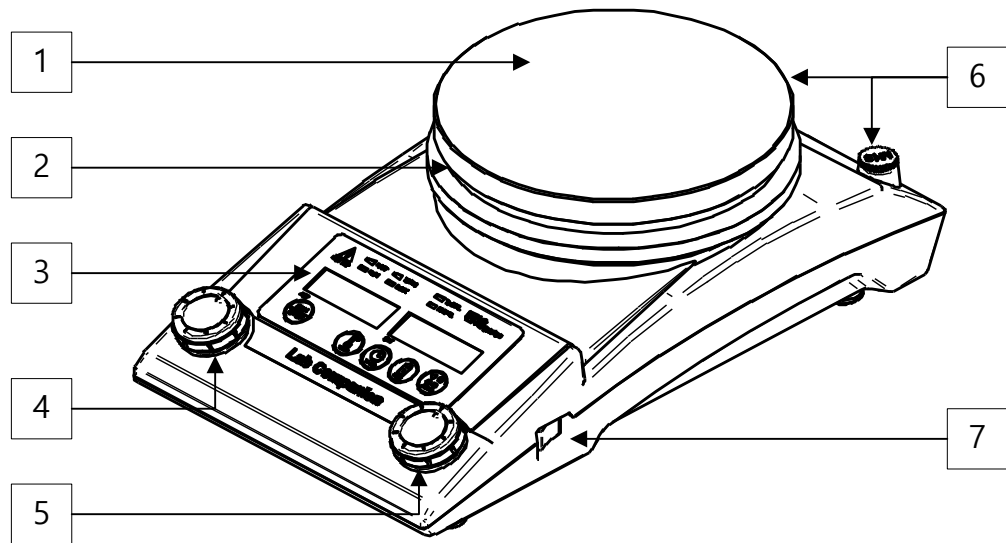
2.2.2 Safety

- **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**
Electronic overheating prevention device, mechanical overheating prevention device and electronic PCB overheating prevention device is built in the instrument.
- **Heating plate overheating prevent device**
A heating plate overheating prevention device is particularly built-in.
- **Silicone cover**
A silicone cover prevents foreign substances from entering the knob and display.
- **Non-slip Heating Bath (T-14SG/17SG Option)**
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

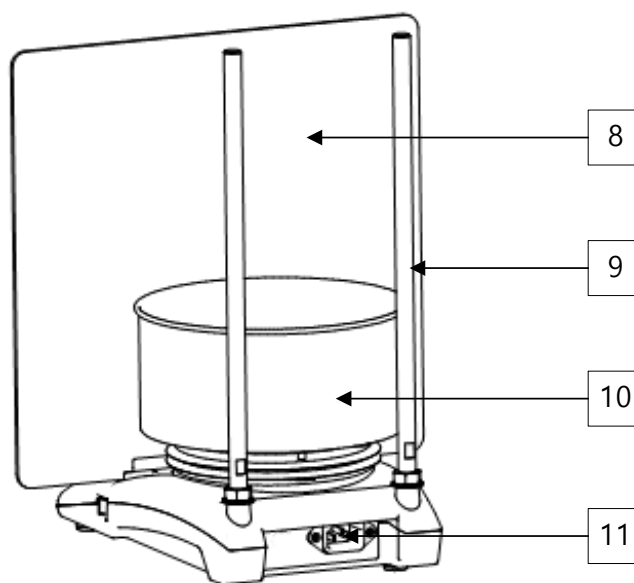
- **Convenient temperature check**
Setting temperature and current temperature can be checked at the same time.
- **Lock function**
Mistake occurred by unintended button control can be prevented with Button Lock function.
- **User designation temperature range**
You can easily set your own temperature limit and protect simple from controlling time or user mistake.

2.3 Structures



[T-14SG / /17SG]

- (1) Top plate : It is heating plate heating testing container.
- (2) Heat sink : As a structure to prevent heat from being transferred to the main body, the ends have been gently rounded for safety.
- (3) Control panel : It is consist of LED indicating operational status, digital displays, buttons.
- (4) Heater knob : It controls the heating rate of the heater.
- (5) Control knob : The knob that makes the required input to the control. Rotate to select the desired item, then press to enter.
- (6) Threaded hole : Maximum two support rod fixing the test instrument can be installed
- (7) Power switch : This is the power switch of the instrument.



- (8) Transparent Safety Shield(Optional, T-14SG/17SG) : Safety shield protects user or control panel from high temperature liquid.
- (9) Clamp rod(Optional) : Thermometer or assorted testing apparatus can be fixed using this rod.
- (10) Heating bath(Optional, T-14SG/17SG) : This is dedicated heating bath that is sized to the heating plate for T-14SG, T-17SG.
- (11) Power socket : This is the input that accepts the main power, and this is where the power line is connected.

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

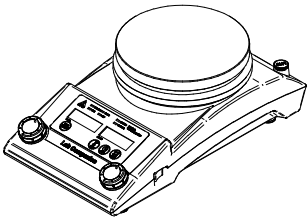
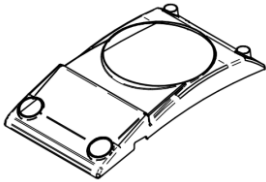
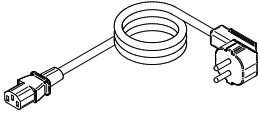
3.0 Unpacking and Installation

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	-

3.3 Installation

This instrument 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 instrument are as follows:



Avoid from direct radiation



Remain the temperature from 5 to 40 °C near the unit



Remain the relative humidity under 10~80%.



Remain an altitude of installation place under 2,000m above sea level

3.4 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.
-

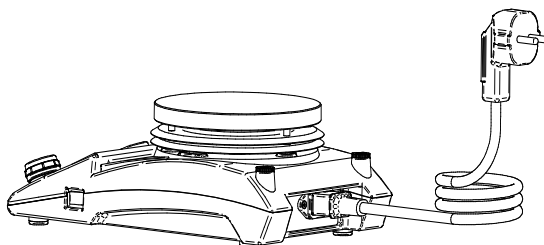
3.5 Pre start up check

- 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.

3.6 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

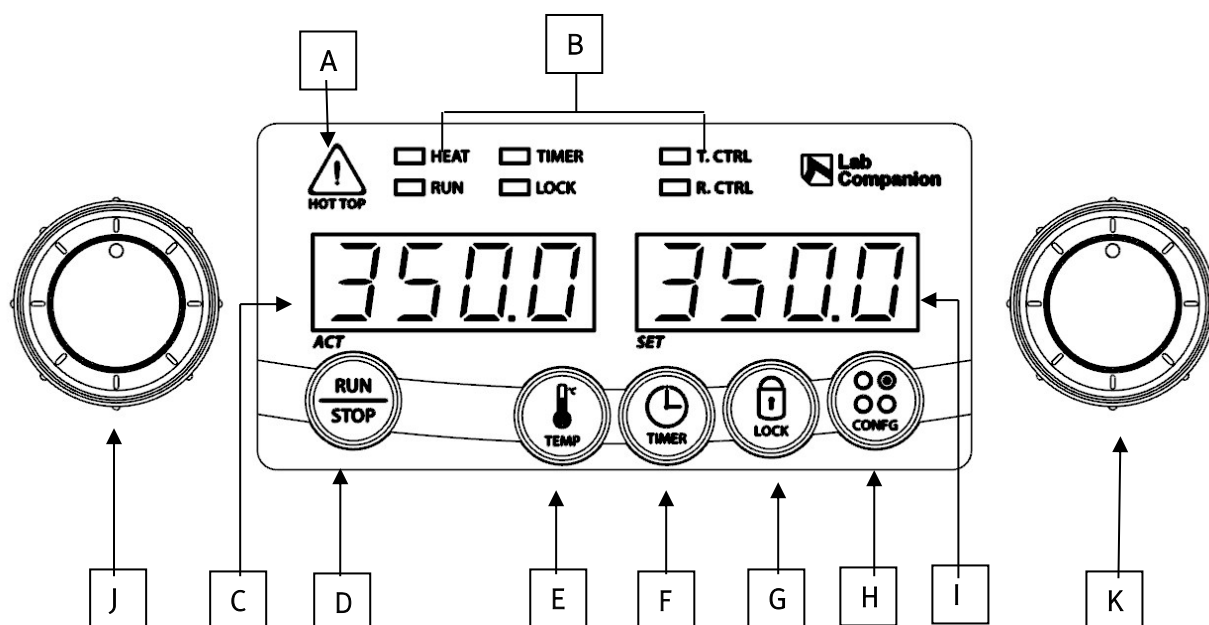
Electrical Shock Hazard.



- 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 equipment. (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



[T-14SG/17SG Control panel]

(1) Control panel

A	HOT TOP	When Heating plate temperature is 50℃ or higher, lights on, under 50℃ or less, lights off. If the temperature of the heating plate is 50℃ or higher even when the power switch is switched off, A is lit and the temperature is displayed in the temperature display window of C.
B	HEATER TIMER T. CTRL RUN LOCK R. CTRL	During heater operation. During timer operation. Temperature Priority mode. Operating. Button LOCK function in operation. Heating rate priority mode.
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	LOCK Button	Stop or disable the function of other buttons.

H	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.	
		Type	Heating mode setting. “t” - Temperature Priority mode, “r” - Heating rate priority mode.
		Unit	Changing the temperature unit. “Cels” - Celsius, “Fahr” - Fahrenheit.
		Time	Changing timer mode. “ti1” – Timer starts with RUN, “ti2” – Timer starts when the set temperature is reached.
		Offset	Correction of the difference between the actual temperature of the heating plate and the instrument display temperature. (Adjustment range : -10 ~ +50 °C)
		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.
		Escape	Exit setup mode.
I	Set temperature display window	Indicate set temperature.	

(2) Knob

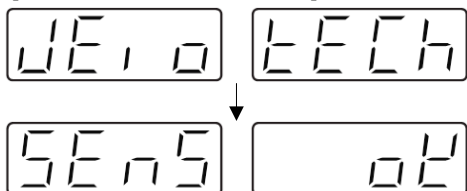
J	Heater knob	Heating rate control. Use in the heating rate Priority mode. (R.CTRL)
K	Stirrer knob	Input something necessary for controlling. Save the set value turning right or left and pressing.

4.2 Operation

4.2.1 Checking Power Status

Step 1 : Connect Power cord.

[Power cord is connected]



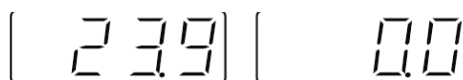
[When power switch is Off]



[When power switch in On]

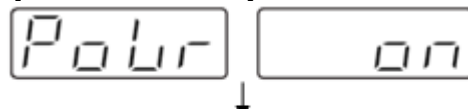
Current temperature

Set temperature



Step 2 : Turn on the power switch.

[Power switch is On]



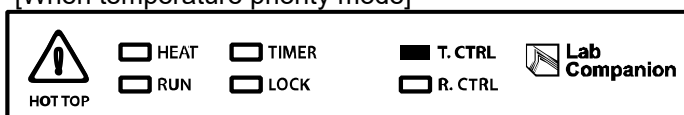
Current temperature

Set temperature

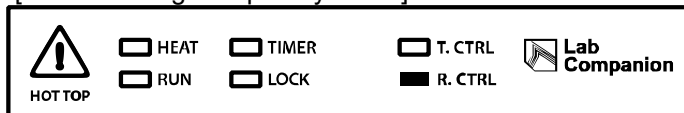


Step 3 : check the heating mode by checking the LED.

[When temperature priority mode]



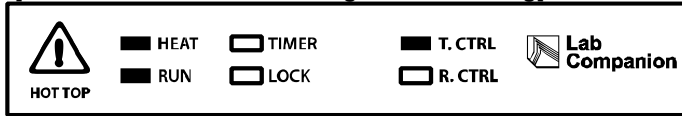
[When heating rate priority mode]



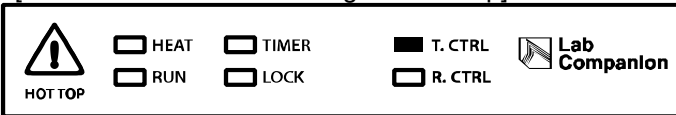
4.2.2 Device Heat and Stop

Heat and stop the devices pressing RUN/STOP button.

[Status indication LED during device heating]



[Status indication LED during device stop]

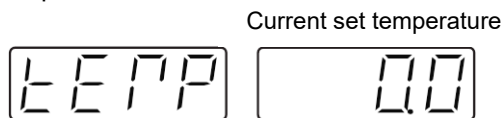


4.2.3 Temperature setting on the temperature priority mode

Temperature priority mode(T.CTRL) can maintain a constant temperature and minimize temperature fluctuations. There are 5 temperature control coefficients, Optimum, Fast, Slow, User, Point. See 4.3.9 Coefficient(COEF) for details.

The setting method is as follows.

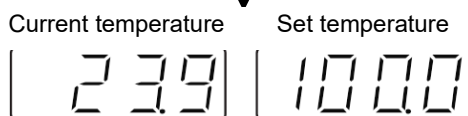
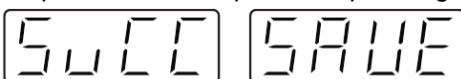
Step 1 : Press TEMP button.



Step 2 : Input set temperature using control knob.



Step 3 : Save the input value pressing control knob.



NOTICE

- It is possible to change set temperature during operation (Refer to 4.2.3 Temperature setting on the temperature Priority mode.
- It is possible to cease during set temperature input. (Refer to Step 5 of 4.3.11 set value check)
- It is possible to change the set temperature in the range of t-L and t-h. If you are struggling with changing the set temperature, please check set value of t-L or t-h.
- It is possible for the set temperature of t-L and t-h to control 0~350°C.
- The recommended allowable temperature for product use environment is below

25°C. In the event that the product is required to be used over 30 °C, Please set the temperature below 300°C to prevent the protective circuit operation for environment with 30~35°C (refer to 5.0 safety device and 7.3 Error message during operation). Please set the temperature below 250°C for environment with 35~40°C.

- Temperature priority mode is used when you want to keep the sample at a constant temperature.
 - If you want to control the temperature and heating rate at the same time, you can set it in the heating rate priority mode(R.CTRL).(See. 4.2.4 Heating rate & temperature setting on the heating rate priority mode)
-

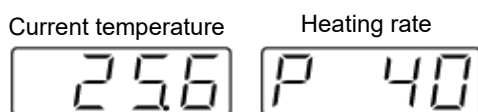
4.2.4 Temperature & Heating rate setting on the heating rate priority mode

When you need to melt or heat the sample slowly, you can adjust the heat rate in the Heating rate priority mode(R.CTRL). Heating rate can be adjusted up to 100%, and temperature deviation may occur in this mode.

In the heating rate priority mode, there are two ways to control heating rate or to control heating rate and temperature at the same time.

(1) Heating rate setting on the heating rate priority mode.

Step 1 : Control the heat rate using a heater knob.



Step 2 : Operate the device pressing RUN/STOP button.

NOTICE

- It is possible to control heating rate using heater knob during operation.
 - Temperature deviation may occur in the heat rate priority mode.
-

(2) Heating rate & temperature setting on the heating rate priority mode.

Step 1 : Press TEMP button.

Step 2 : Input the set temperature using control knob.

Step 3 : Save the set temperature.

NOTICE

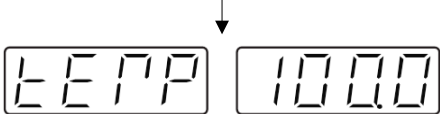
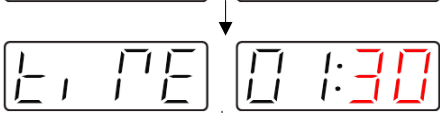
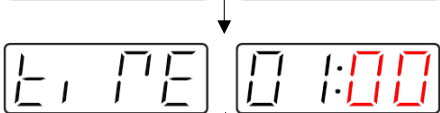
- When temperature setting on the heating rate priority mode, the heater is controlled at the set temperature, and the heating rate can be adjusted using the heater knob while the hotplate is operating.
 - Temperature deviation may occur in the heating rate priority mode.
-

4.2.5 TIMER Setting

Step 1 : Press TIMER button.

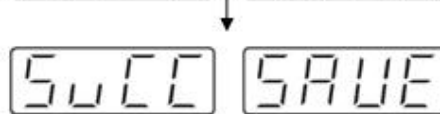


Step 2 : Input an hour and minutes in order.



Step 3 : Input the set temperature.

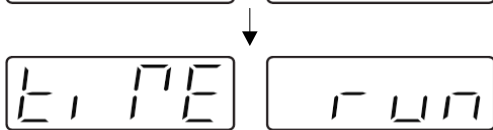
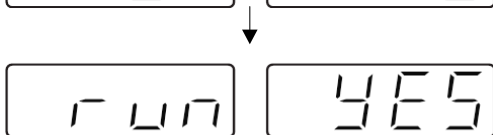
[When the set temperature is changed]



[When the set temperature is not changed]



Step 4 : Select whether the device will operate or not.



Current temperature

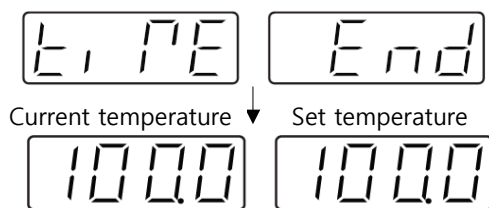
Set temperature



Step 5 : Please stop the timer function with 2 ways after timer operate.

[Timer stop using press button]

Press RUN/STOP button when alarm sounds.



[Stop timer using the power switch]

Press power switch when alarm sounds]



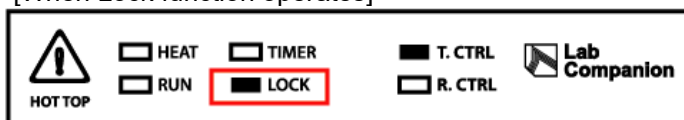
NOTICE

- It is possible to cease timer input when you are inputting the value.(Refer to step 5 of 4.3.8 the set value check.
- When the device stops, if you press the timer button you can see check the last setting timer value.
- During the device or timer operate, you can check elapsed time using timer button. At this point ,if you press the timer button you can enter to the Setting mode.
- During Timer operates, you can cease the device RUN/STOP button.

4.2.6 LOCK function setting

When the device operates or stands-by, if you press LOCK button for over 2 seconds, The LOCK LED lights up.

[When Lock function operates]



In the status, it is not possible for other buttons except LOCK button. LOCK function turns off with alarm sound after pressing LOCK button for over 2 seconds or pressing power switch.

4.3 Configuration

4.3.1 Heating priority mode change (Type)

It is possible to set the heating priority mode between temperature priority mode[TYPE(t)] and heating priority mode[TYPE(r)].

[Temperature priority mode - TYPE (t)]

Step 1 : Press Configure button.

TYPE

Step 2 : Select "TYPE" using control knob.

TYPE r

Step 3 : Change the heat priority mode.

TYPE t

Step 4 : Save the changes.

SAVE no

SAVE YES

SUCC SAVE

Step 5 : Exit Configure mode. (Refer to Step 5 of 4.3.11 the set value check)

[Heating rate priority mode - TYPE (r)]

Step 1 : Press Configure button.

TYPE

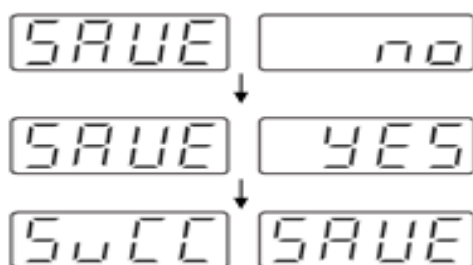
Step 2 : Select "TYPE" using control knob.

TYPE t

Step 3 : Change the heating priority mode using control knob.

TYPE r

Step 4 : Save the changes.

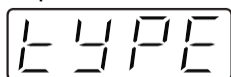


Step 5 : Exit Configure mode. (Refer to Step 5 of 4.3.11 the set value check)

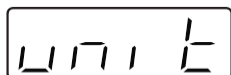
4.3.2 Temperature Unit Conversion (Unit)

It is possible to set temperature unit with Celsius and Fahrenheit.

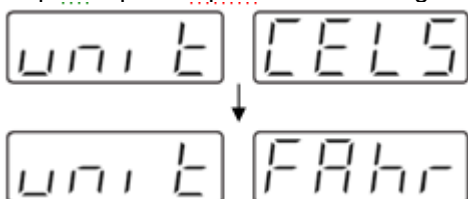
Step 1 : Press the CONFIG Button.



Step 2 : Select "UNIT" using control knob.



Step 3 : Input temperature unit using control knob.



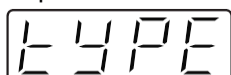
Step 4 : Exit Configure mode. (Refer to Step 5 of 4.3.11 the set value check)

4.3.3 Selection of the Timer Mode (TIME)

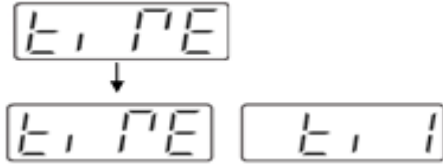
Two different timer modes are provided: Immediate Timer Activation (ti1) and Delayed Timer Activation (ti2). In case of the Immediate Timer Activation, timer starts immediately after setting the timer. In case of the Delayed Timer Activation, on the other hand, timer is activated only when the set temperature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

The timer mode selection procedures are as follows.

Step 1 : Press CONFIG button.



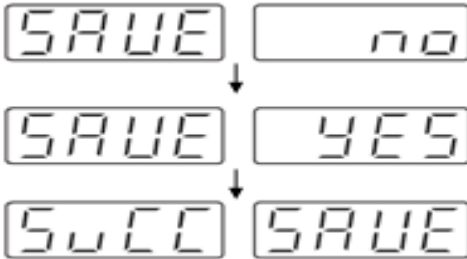
Step 2 : Select “ Timer” using control knob.



Step 3 : Change Timer mode using control knob.



Step 4 : Save the changed timer mode.



Step 5 : Exit Configure mode. (Refer to Step 5 of 4.3.11 the set value check)

4.3.4 Offset (OFFS)

This is a function to correct the temperature difference when the temperature difference between the temperature measured by sensor (the temperature shown in display) and actual temperature on the heating plate happens.

Step 1 : Press Configure button.

Step 2 : Select Offset(OFFS) using control knob.

Step 3 : input the temperature difference, turning control knob clockwise.

Step 4 : Save the value.

Step 5 : Exit Configure mode. (Refer to Step5 of 4.311 the set value check)

For example, if Offset is set to +5℃, the temperature is controlled by adding the offset to the measured temperature.

NOTICE

- The set range of offset is -10~+50℃.
- Refer to 9.2.1 Temperature calibration for the relations between actual temperature and the shown temperature of the heating plate under no load conditions.

4.3.5 Maximum Heating Rate Setting (LIMt)

This function limits the maximum amount of heat when temperature is controlled in temperature priority mode.

This can be used when stable heating is more important than heating time during device use.

Step 1 : Press the CONFIG Button.

Step 2 : Select Limit(LIMt) using control knob.



Step 3 : Enter heating amount limit, using control knob.

Step 4 : Save the value.



Step 5 : Exit Configure mode. (Refer to step 5 of 4.3.11 the set value check)

NOTICE

- Please check the set value of Limit when heating lead time is long.
-

4.3.6 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 t-h using control knob.

Step 3 : Enter the upper limit temperature using control knob.

Step 4 : Save the value.

Step 5 : Exit Configure mode. (Refer to Step 5 of the Set value check)

NOTICE

- The allowed range of the temperature limit setting is 0°C ~ 350°C.
-

4.3.7 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 t-L using control knob.

Step 3 : Enter the lower limit temperature using control knob.

Step 4 : Save the value.

Step 5 : Exit Configure mode. (Refer to Step 5 of the Set value check)

NOTICE

- The allowed range of the temperature limit setting is 0°C ~ 350°C.
-

4.3.8 Calibration (CALI)

Auto tuning the coefficients used for temperature control to suit the current situation.

If you choose the user of Coefficient, the temperature is controlled with the auto tuned value.

NOTICE

- The allowed range of the temperature limit setting is 0°C ~ 350°C.
 - Please turn off the switch if you want to cancel while it is being calibrated. If it is canceled during calibration, temperature control coefficient is set to Optimum.
 - The calibration takes about 40 minutes to 1 hour.
-

4.3.9 Coefficient (COEF)

This mode is to select the coefficient used for temperature control.

- Optimum : It provides the set temperature attainment time without overshoot and undershoot and the proper variation range.
- Fast : It reaches to the set temperature the fastest, depending on the load there is a possibility of overshoot.
- Slow : It reaches to the set temperature the slowest, the fluctuation range is the narrowest.
- User : Optimized temperature control is performed with auto tuning values in “Calibration”
- Point : This is ON/OFF switching method after heating straight with maximum heating based on the set temperature.
Overshoot and Undershoot are the largest, the temperature may change after it reaches to the set temperature.

4.3.10 Default (DEFA)

Default all settings.

4.3.11 The set value check (LiSt)

Step 1 : Press CONFIG button.

TYPE

Step 2 : Select “List” using control knob.

L 1 SL

Step 3 : check the each set value using control knob.

The basic set value is as the followings

Mode	Set value	Mode	Set value
Type	t	Unit	Cels
Time	ti1	Offs	0
Limit	100	t-h	350
t-L	0	Coef	Opti

Step 4 : Exit "List" mode with the following two ways.

[when pressing RUN/STOP button]

L 5t

[when pressing control knob]

L 5t out

↓
L 5t

Step 5 : Exit "Configure" mode with the following three ways.

[When pressing RUN/STOP button]

Exit it pressing RUN/STOP BUTTON.

ESC no
↓
ESC YES
↓
ESC Pr oL

[When using control knob]

Choose "ESC" after turning control knob right.

ESC
↓
ESC Pr oL

[In case of automatic switching]

It turns into standby mode automatically if you do not control any button for 20 seconds.

4.3.12 Escape (ESC)

Terminate the configuration mode.

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.

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

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 sounds an alarm and mechanically 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

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.

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 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.

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.

6.2.1 Cleaning the machine

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.

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

- 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.
	The set heat is low.	Check and arrange the set heat.
	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.
When button is not pressed	LOCK function is being operated.	If LOCK LED turns on the status LED turns on, Please LOCK button for 2 seconds.
	Button switch failure.	Contact Jeio Tech for service.
Knob malfunction	Damaged knob.	Take out the knob and relocate it. 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
ERRO NO 1	if top plate is overheated
ERRO NO 2	if sensor detects a sudden temperature changes
ERRO NO 3	if PCB is overheated
ERRO NO 4	if sensor is not connected correctly
ERRO NO 5	if temperature difference has arisen between two sensors

8.0 Accessories

Designation	Order No.	Description
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 250ml 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 x3, M4 Support x 4)
VBI-1D, Vial heating block insert 1dram (4ml), Φ15x17mm, 16holes	AAA34541	Option, 1dram (4ml), Φ15x17mm, 16holes
VBI-2D, Vial heating block insert 2dram (8ml), Φ17x23mm, 16holes	AAA34542	Option, 2dram (8ml), Φ17x23mm, 16holes
VBI-4D, Vial heating block insert 4dram (15ml), Φ21x30mm, 16holes	AAA34543	Option, 4dram (15ml), Φ21x30mm, 16holes
VBI-20S, Vial heating block insert scintillation 20ml, Φ28x22mm, 4holes	AAA34544	Option, scintillation 20ml, Φ28x22mm, 4holes
VBI-30S, Vial heating block insert scintillation 30ml, Φ28x32mm, 4holes	AAA34545	Option, scintillation 30ml, Φ28x32mm, 4holes
VBI-40S, Vial heating block insert scintillation 40ml, Φ28x42mm, 4holes	AAA34546	Option, scintillation 40ml, Φ28x42mm, 4holes
Silicone Cover for TS-14SG	00HPS0000190	Cannot installed with Transparency Shield
Silicone Cover for TS-17SG	00HPS0000191	
Silicone Cover for TS-18QG	00HPS0000192	

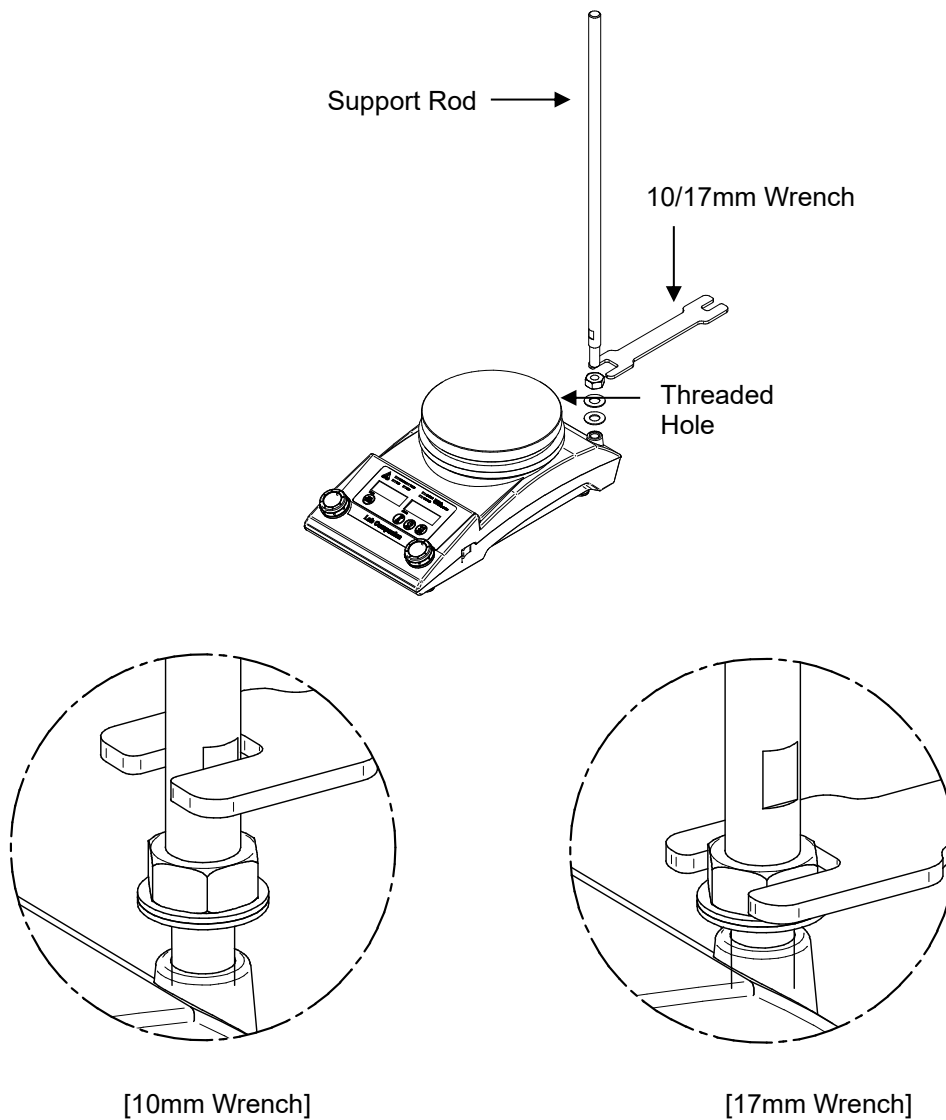
※ For accessory exchange, please visit JEIO-TECH homepage (<http://www.labcompanion.com>),
or contact sales department or seller(Distributor)

8.1 Assembly of Support Rods

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

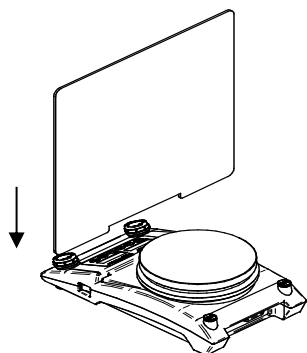
Step 2 : Set up the support rod, insert the thread groove of the screw into the holder of the body, and turn it clockwise using the 10mm groove of the wrench.

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

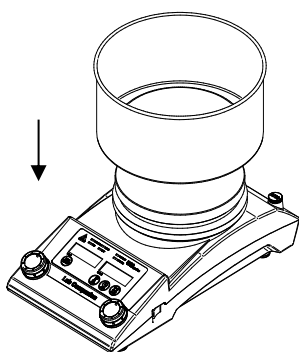
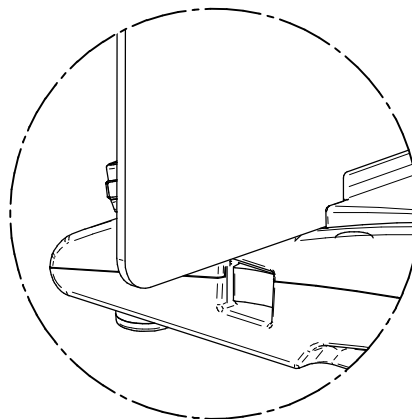


8.2 Assembly of Transparent Safety Shield and Non-slip Heating Bath

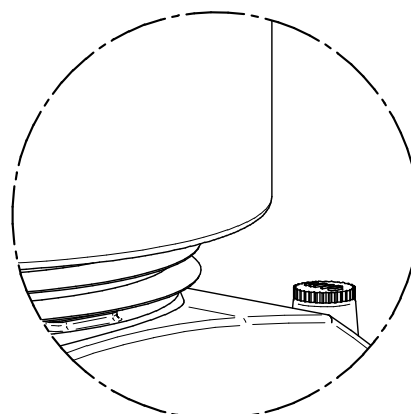
When necessary, you can easily assemble the transparent safety shield and/or the non-slip heating bath as shown below:



[Transparent Safety Shield]



[Non-slip Heating Bath]



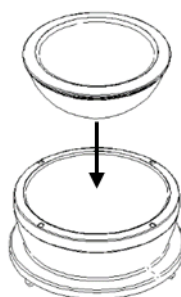
CAUTION



- 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.

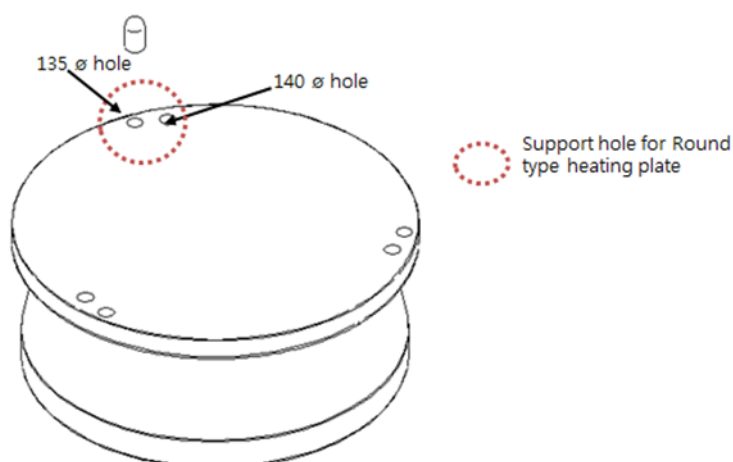
8.3 Heating block for round bottom flask

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.



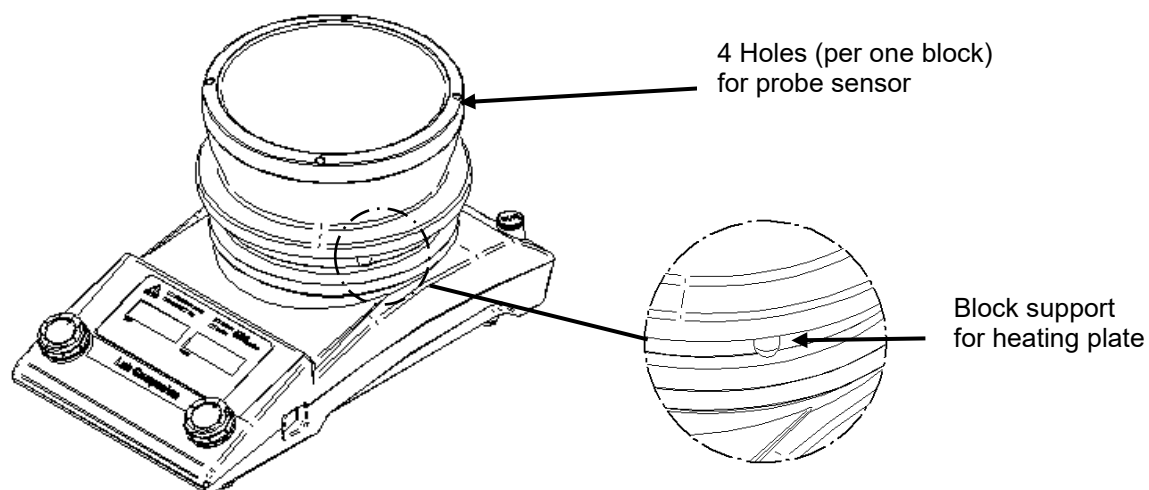
[Combination of Heating plate for round bottom flask and Insert]

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.



[T-17SG combined with heating block for round bottom flask]

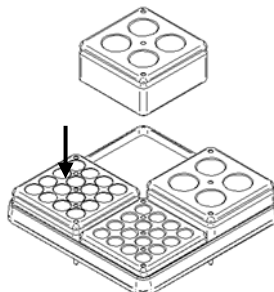
CAUTION



- 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.

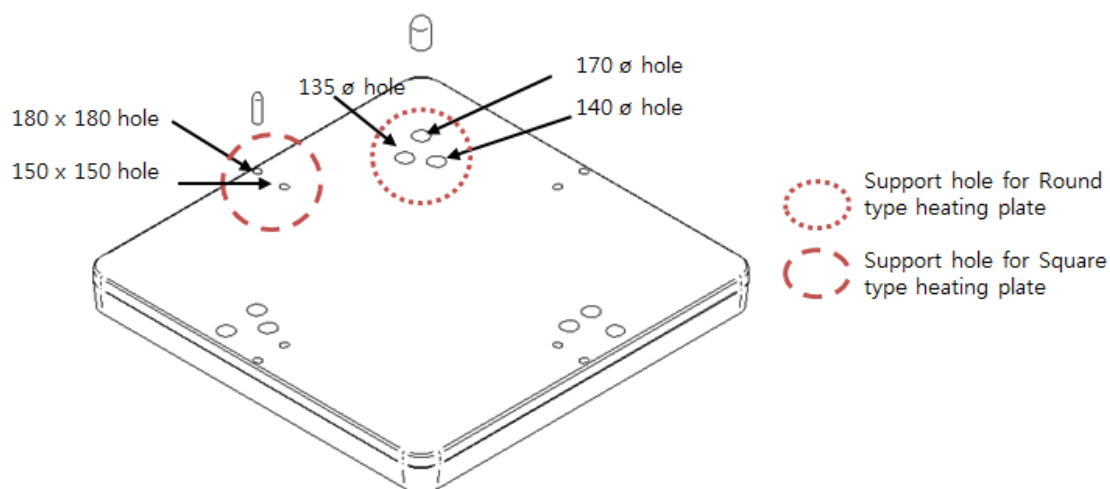
8.4 Heating block for vial

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.



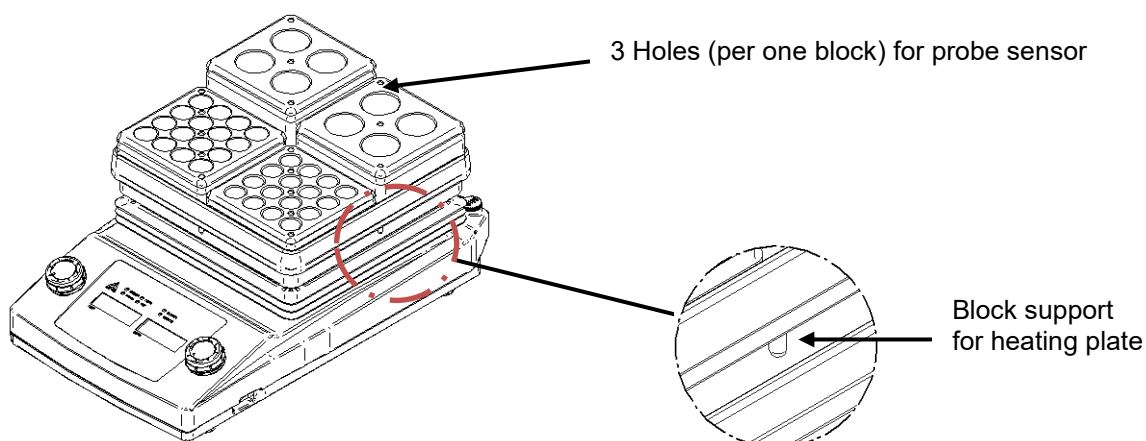
[Combination of Heating block for vial and Insert]

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.



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

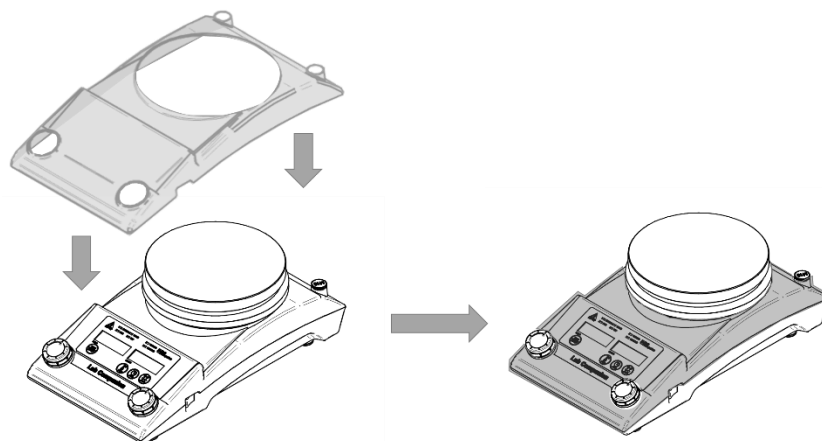
⚠ CAUTION



- 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 Protective Silicone cover

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



[T-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

Item / Model		T-14SG	T-17SG	T-18QG
Heater	Heating temperature range(°C/°F)	Max. 350/662		
	Heating rate (%)	0 ~ 100 (1% scale)		
	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		
Safety	Operation	Button Lock		
	Hot top 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)		140/5.5	170/6.7	180 x 180/ 7.08 x7.08
Overall Dimensions (W x D x H, mm / inch)		161 x 290 x 100/ 6.34 x 11.42 x 3.94	191 x 330 x 101/ 7.52 x 12.99 x 3.98	209 x 326 x 102/ 8.22 x 12.83 x 4.0
Weight (kg/lbs)		2.2/4.9	2.9/6.4	3.8/8.37
Electrical requirements (230V, 50/60Hz)		3A	4A	
Electrical requirements (120V, 60Hz)		5.0 A	6.7 A	
Material	Heating plate	Molded aluminum alloy, white ceramic coated		
	Main body	Cast aluminum alloy, powder coated		
Maximum load (kg/lbs)		25/55.1		

- ※ 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 equipment.
2. If not possible, contact your local governing body for regulations regarding disposal of laboratory equipment. Jeio Tech highly recommends you to find a local service provider that can properly dispose of your instrument.

9.3 Warranty and Disclaimer

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.

- Date of purchase:
- Customer name / address / phone number / E-mail:
- Fault status
- Model
- Serial number

9.3.2 Technical Service Contact Points

Technical Services

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