



Operation manual

Low Temp. Incubator

Model : ILP-02 / 12
Manual No. : 00HAA0001210 Version : 7.0



WARNING

Please read this user manual carefully before using the product. Users should operate the product according to the operating instructions contained in this user manual. Users should be aware of cautions and warnings for your safety. Failure to follow these guidelines may result in serious injury or damage to your property.

Thank you for purchasing JEIOTECH's products.

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Quality Management System ISO 9001



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You can download the above image by visiting the following JEIOTECH site.

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1.0 Safety

1.1 How to Use the User Manual

- (1) This user manual contains important information for maintaining product functionality and safe use. Be sure to carefully read all safety precautions and warnings before use.
- (2) Even after reading the user manual, please keep it handy and accessible at all times. Furthermore, when transferring or lending the product, please attach the user manual to a prominent location on the product to ensure the new user understands how to use it safely and correctly.

1.2 Warning signs for safe use of the product

- (1) The user manual uses caution and warning signs to ensure safe and correct use of the product and to prevent accidents or damage.
- (2) Information on safety precautions is classified and defined as warning signs and warning texts according to their importance and risk level.
- (3) Please read and understand the warning carefully before use.

Safety Signs	Contents
	Indicates a hazardous situation which, if not avoided, will result in death, fatal injury, or property damage
	Indicates a hazardous situation which, if not avoided, could result in death, serious injury, or property damage
	Indicates a hazardous situation which, if not avoided, may result in minor or moderate injury
	Notifies you careful actions that are not relevant to your injury

1.3 Product Disclaimer

- (1) We do not assume any warranty or responsibility for this product other than what is stipulated in our quality assurance terms.
- (2) We are not responsible for any direct or indirect damage suffered by the user or a third party due to an unforeseen defect or natural disaster while using this product.

1.4 For Safe Operation

Be fully aware of the safety since this product does not have a hydrostat.



DANGER

- Do not put inflammable substances like organic solvents. In case of operation for the high temperature, the samples might ignite and explode from vaporization in the chamber. Explosive materials are acetic acid ester, nitro compound, and etc. Inflammable materials are inorganic peroxides, acetates, organic solvents, and etc. This equipment does not have a hydrostat.
-

2.0 Introduction

2.1 Use and Feature

1) Purpose

- (1) Low temperature incubator is suitable for degeneration test of grain and meat (10°C ~ 14°C), cultivation of microbes and plants, COD/BOD measurement (20°C ~ 25°C), suspension of enzyme reaction, preservation of enzyme solution, and desalting of enzyme extract.

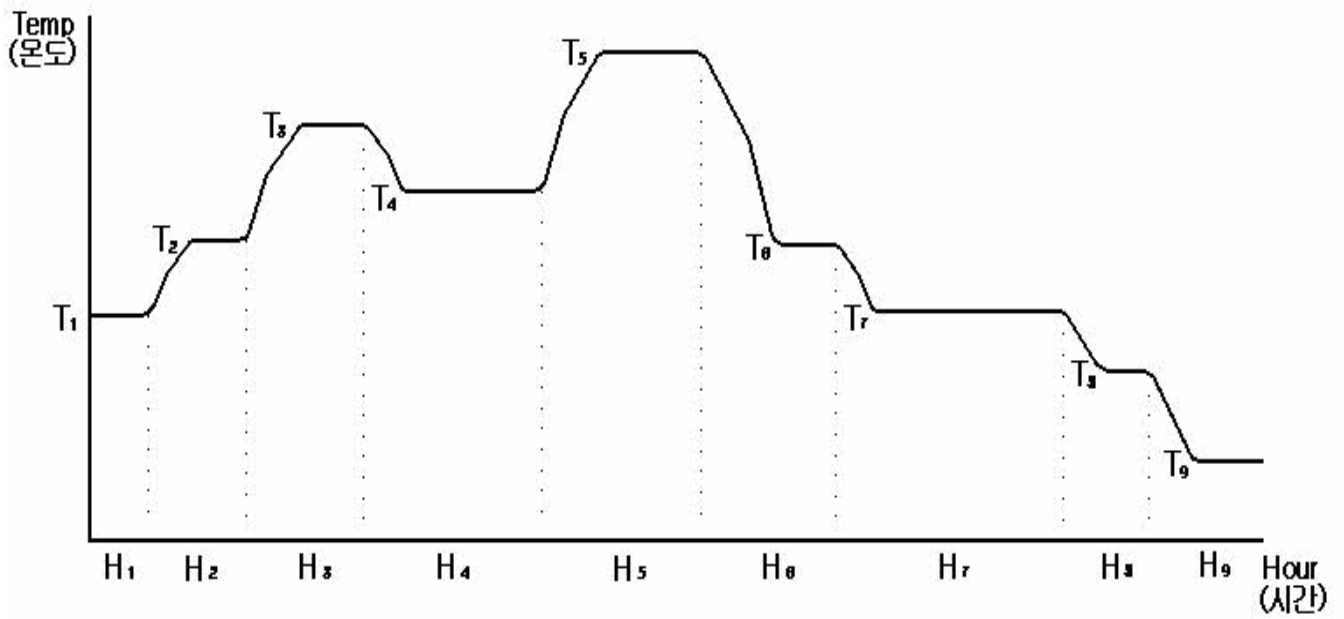
 WARNING

- Do not rebuild the equipment. Do not use it for other purposes. An electric shock or a mechanical trouble might be occurred from rebuilding or using it for other purposes.
-

2) Characteristics

- (1) This equipment is a multi-purpose low temperature incubator for biotechnology, pharmacy, medical science, chemistry, and biology. It has applied CLS (Custom Logical Safe) – Control System that JeioTech originally developed for the convenience in use and the safety.
- (2) CLS – Control System means “Control system which has a logical safety device specialized for an individual model.” Laboratory must have a thermal safety because there are a lot of inflammable reagents. This system is the highest safety control device (patent applied) and makes the equipment suitable for this kind of environment.
- (3) The unit can be connected to PC using the attached communication port. It is also possible to monitor and set the values using the Lab Tracer (CD included).
- (4) The unit is designed to stop the heater and blower in order to protect the user from heat when the door is opened during the operation.
- (5) The unit has insulation for high temperature in the outside of the inner chamber and inside of the door and also has a chamber silicone door for high temperature. Therefore, insulation is perfect, and the level of losing heat is very low.
- (6) The inner glass door is good for insulation and observation.
- (7) The door attached a magnetic packing has effects on impact relief and double secrecy.
- (8) Circulated fan of a cross type is attached for the distribution of uniform temperature and creates an indirect air-circulation.
- (9) Safety circuit has built-in to protect the equipment from an excess current and an overheating.
- (10) Development of exclusive controller allows the user to control the speed (3 steps) of the inner fan and defrosting (period and time). 9-Step Programmed Control allows the user to set and operate 9 different temperature and time (max: 99 hours 59 minutes). Operation is possible to be repeated from once to 999 rounds.

- Program Operation-



3.0 Installation

1) Notice while installation.

- (1) Please check the following contents after opening the package.

ILP-02, 12 common contents: Main body (1 set), Operation manual (1ea), Com. CD (1 ea), Com. Cable – (1ea), Power Cord – (1ea), Fuse (2EA)

ILP-02 Shelf components : Shelf (1ea), Shelf supporter (4ea)

ILP-12 Shelf components : Shelf (2ea), Shelf rack (4ea)

- (2) Be careful not to get the item shocked while transportation.

CAUTION

- Be aware of carrying since this unit is heavy.

- (3) This unit will work correctly on a proper power supply. Please check whether the power supply and ID Plate information are the same. User must use the power supply connected to earth, and power cord must be connected to wall outlet supplying ground point.

WARNING

- Connect the power properly with correct voltage, phase, and capacity. Improper connection causes a fire or an electric shock.

WARNING

- Use the grounded power supply. Ungrounded power can give a serious damage to the equipment and the user. For the safety, do not connect a grounding conductor to the gas and water pipes.

- (4) Outlet should be located near the unit and shall be easily accessible.

WARNING

- Do not use an ejected socket or a double tap. Cable damages or a fire can occur by an excess current.

- (5) Please install the unit in the flat place where prevents vibration and shock.

- (6) Please avoid heat sources and direct sun light, and locate the unit where ambient temperature range is 5°C ~ 40°C and relative humidity is lower than 80%.

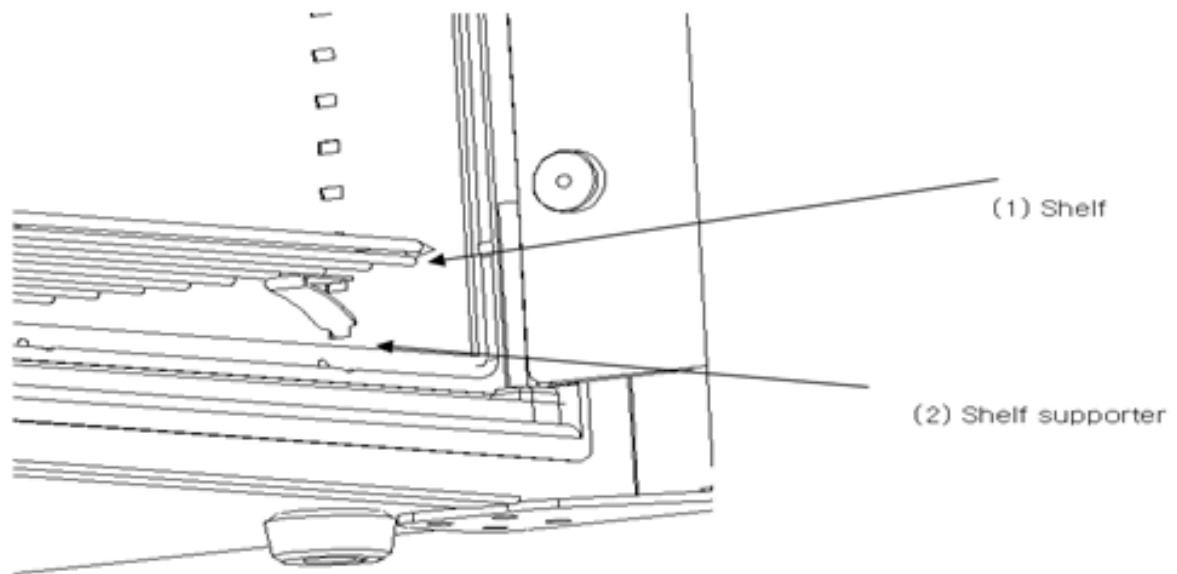
- (7) Please do not let moisture, organic solvents, dust, and corrosive gas enter into the control box.

- (8) Please don't install the unit in the dangerous place where there are flammable gases, explosive materials, and organic solvents such as acetone and methylene chloride.

- (9) Please secure enough space for installation because the door opens 180° to the left.
- (10) Please do not install the unit near by the machines generating a strong high frequency noise.

2) How to fixate the shelf (ILP-02)

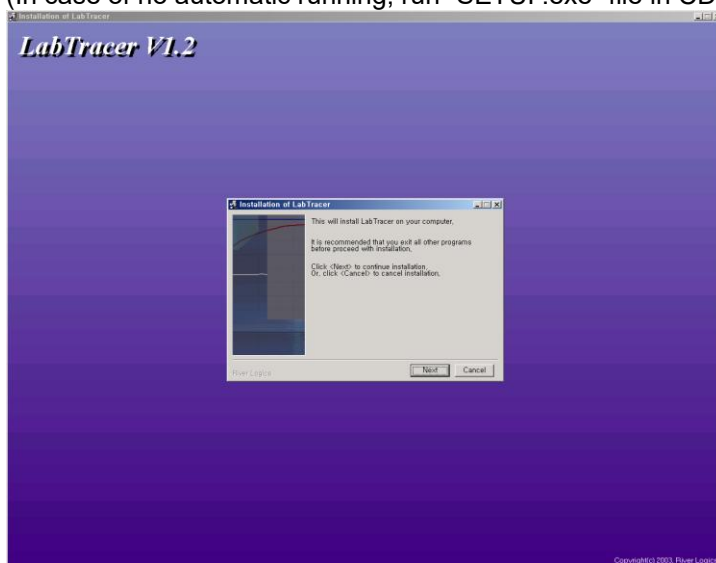
- (1) Check which is the upper-end, and lower-end of the shelf supporter.
- (2) Insert the upper-end of the shelf supporter into the hole inside of the chamber, and next insert the lower-end of the same into the hole at one step down by bending the whole shelf supporter. (Be cautious of bending the shelf supporter not to injury your finger.)
- (3) After finishing the fixation of 4 ea shelf supporters at the same height, put the shelf on the shelf supporter. Make sure that its horizontal level is correct, and re-fixate the shelf supporter if it's not correct.



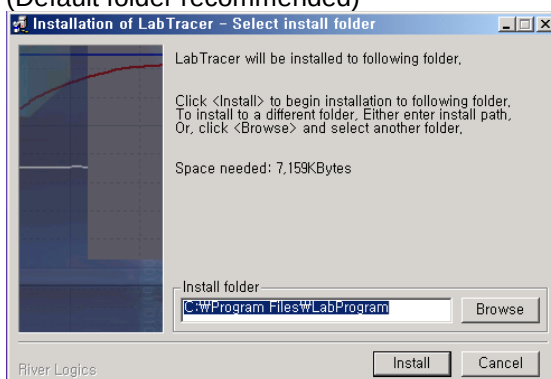
Shelf support and shelf setting

3.1 Install lab tracer

- (1) Insert Installation CD and the software starts installation automatically.
(In case of no automatic running, run "SETUP.exe" file in CD.)



- (2) Click "Next" button to choose destination of installation.
(Default folder recommended)



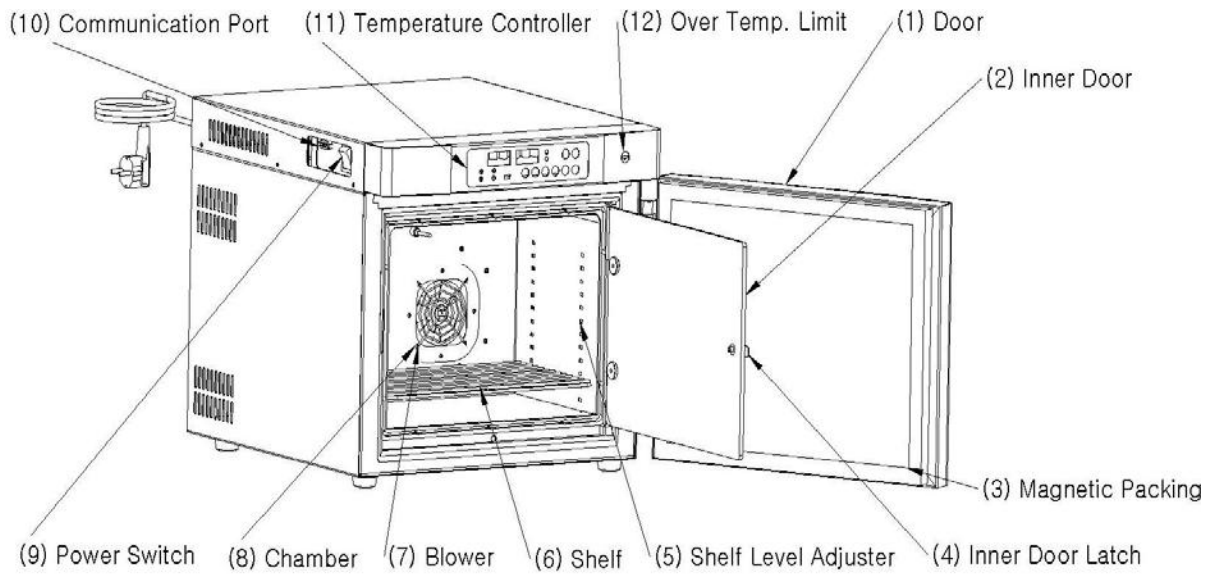
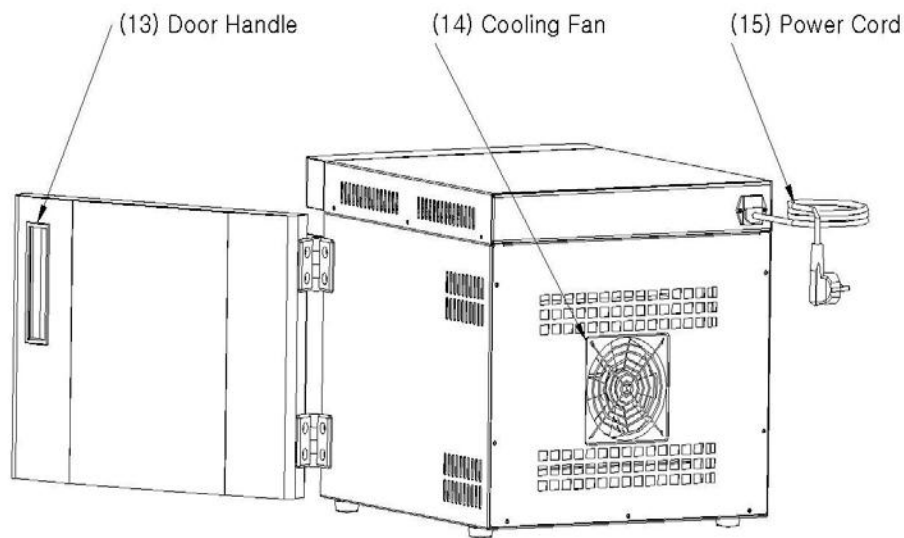
- (3) Click "Install" to start installation.
- (4) Lab Tracer icon will be created on desktop after installation successfully.
- (5) To start Lab Tracer, double click the icon.

Standard	Recommend
Microsoft Windows 98	Microsoft Windows 2000, XP
CPU : Beyond P-II 233	CPU : Beyond P-III 300
RAM : Beyond 32M Byte	RAM : Beyond 64M Byte

Caution : If Windows 95 or 98 OS system is installed, time delay can arise between measuring time.

4.0 Operation

4.1 Names



ILP-02

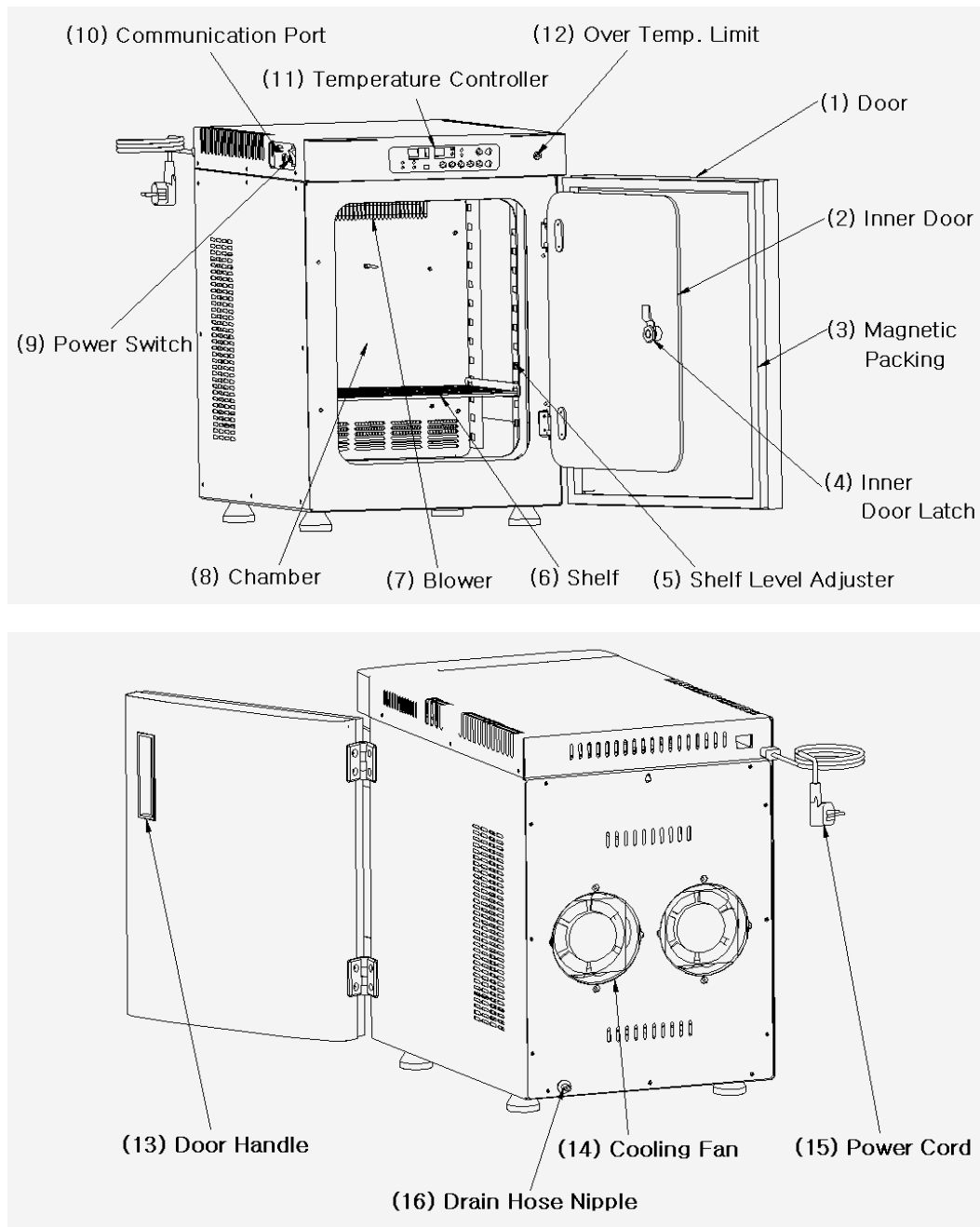


Figure2. ILP-12

- (1) Door
For using adiabatic material, we removed dewdrops on the surface of the door.
- (2) Inner Door
User can observe the inside of the chamber through this transparent and made of reinforced glass inner door.
- (3) Magnetic packing
It absorbs the impact and protects the samples doubly when door opens and closes.
- (4) Inner door latch.
Fixing Inner door.

- (5) Shelf level adjustor
Shelf level is easily adjustable by the size of samples
- (6) Shelf
It's made of stainless steel wire. It's easy to clean, and ventilation is good. The surface is electrically polished therefore it has a beautiful view and a good anti-corrosion.
- (7) Blower
Air from the heater or Cold sink is ventilated out of the chamber (Indirect ventilation)
- (8) Chamber
It's made of stainless steel. There are a blower, a heater, a temp. sensor and a temp. regulator inside of the chamber.
- (9) Power Switch
This is for Power On/Off and protects the instrument from sudden excess current.
- (10) Communication port
User can monitor and control this unit by PC. Data print out through PC printer is also available. The unit can be connected to PC's com1 and com2 port through a RS-232C protocol cable.
- (11) Temperature Controller
This has a microprocessor (CPU) which has a digital PID auto tuning function. It also has the highest level of safety control system such as a temperature compensational function for temperature sensor and a heating volume controller.
- (12) Over temp. Limit
If a heater temperature rises higher than a set temperature, the unit cuts the power of the temperature controller, makes the over temperature LED blink, and warns with a beep sound. To resume the operation, please turn the knob clockwise to set about 15% higher than a set temperature and press a Start/Stop switch ones. Then, check whether the run LED of temperature controller is on.
- (13) Door Handle
This is for opening and closing the door.
- (14) Cooling fan
This is a fan for cooling heat sink.
- (15) Power Cord
This is for connecting power code to rating voltage
- (16) Drain Hose Nipple
Drain hose nipple is for draining the moisture in evaporator.

4.2 Precaution

- (1) Please do not touch the power cord and electric parts with wet hands.
- (2) Please do not put explosive and flammable chemicals (Alcohol, Benzene, and etc) into the incubator.
- (3) The samples inside of the unit are very hot when the unit operates and for a while after it stops. Please put on safety gloves when you touch samples.
- (4) Please do not place flammable materials near by the unit.
- (5) Please do not pour water on the unit directly when you clean it.
- (6) Please do not put conductive and flammable materials through ventilation or power supply port. It is dangerous and might cause fire and electric shock.
- (7) Circuit and electric components used in this unit are developed by JeioTech. Please do not try to repair by yourself. Incorrect combination of electric parts may cause a fire. You must ask an official JeioTech dealer or a distributor in your region.



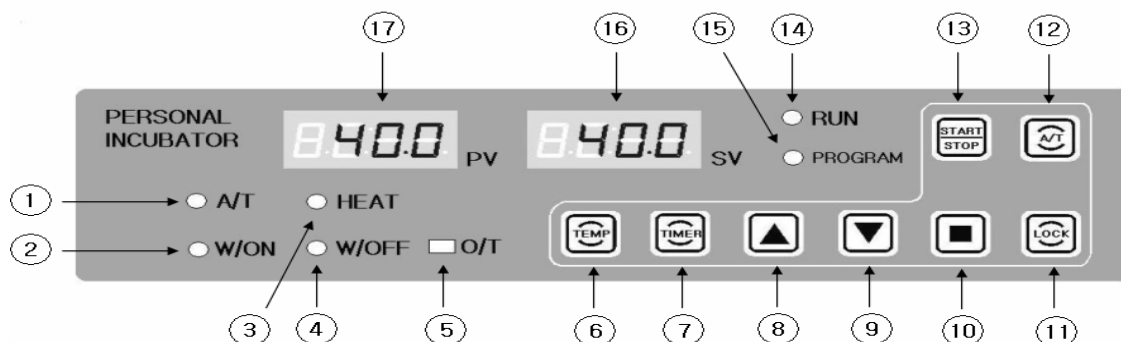
- Do not put explosive and flammable materials inside of the chamber.
-

4.3 Operating Controller

1) Characteristics

- (1) CLS-Control System carries out temperature control of equipment and heating control in the Main CPU where precise PID algorithm is possible. All actions for safety are conducted by a selective functional Logic IC which is installed separately. This is designed to conduct safety performance against any electric and electronic shock on the unit.
- (2) CLS-Control System shuts down all 2 phase power supply to each part immediately and informs user instability by audible and visual device, and then it keeps in safety mode until all instability conditions are removed.
- (3) CLS-Control System has wait on/off timer function for the user's convenience. The function starts or stops the operation after the set time.
- (4) CLS-Control System gives user two choices when the unit's operation is terminated by a power failure and then the power recovers. One is a resume of the unit's operation. Another one is to keep the unit in standstill.
- (5) CLS-Control System is composed that feeble electric current streams down to only 5V, 10mA at a point of contact of a used safety device. There is no damage of a point of contact in use of a long time. So, the durability is very long. After it stops the control of the Thyristor which controls electric current stream of the heater that uses a large electric current when a safety device is operated, it shuts down the power through Magnet Switch's disconnection of a point of contact. It prevents the point of contact from damaging and a noise revelation of a power switch. It enforced with the mentioned objection order above when an operation of equipment starts, and it also prevents the point of contact from damaging and a noise revelation of Magnet Switch.

2) Name and Function



Main CPU of this unit has certified S/W which allows Digital PID-Auto tuning. The unit has a temperature deviation/correction function for the Pt-100 sensor and the highest safety level of control system.

(1) Auto Tune LED

It blinks during auto-tuning.

(2) Wait On Timer LED

This LED shows when the unit is on a timed 'on' function. The LED blinks when the timer is activated, and it is completely turned on when the timer is on stand by.

(3) HEATER LED

It shows whether heating function is on.

(4) Wait Off Timer LED

This LED shows when the unit is on a timed 'off' function. The LED blinks when the timer is activated

and is completely turned on when the timer is on stand by.

(5) Over temp. LED

If the heater temperature rises higher than set temperature, it cuts the power of the temperature controller, makes the over temperature LED blink, and an alarming beep rings. To resume the operation, please turn the knob about 15% higher than a set temperature and press a Start/Stop switch once. Then, check whether the run led of temperature is on.

(6) Temp Button

This button is for temperature setting.

(7) Timer Button

This button is for timer setting.

(8) Up Button

This button is for increasing the set value.

(9) Down Button

This button is for decreasing the set value.

(10) Enter Button

This button is for saving value after changing the set value.

(11) Lock Button

This is lock the controller buttons.

(12) Auto Tune Button

The auto tune begins if you press this button for 1 second.

(13) Start/Stop Button

This button is for start/stop of unit and for resuming operation after removing some unstable factors when operation is terminated.

(14) RUN LED

This LED indicates Work/Stop state of unit. It turns on when the unit runs and turns off when the unit stops.

(15) PROGRAM LED

This LED indicates whether the operation is in program or normal status. The LED blinks when the operation is in program status, and it turned off when the operation is in normal status.

(16) SV Display

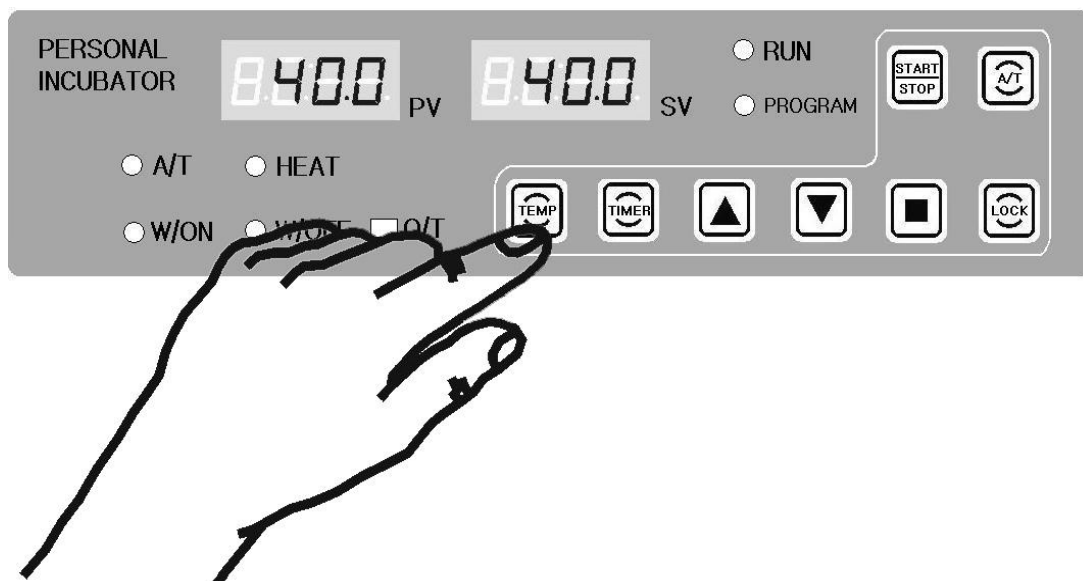
This display is for showing set temperatures and remaining time when the timer function is activated.

(17) PV Display

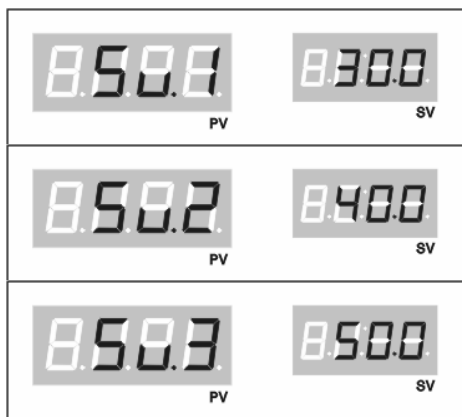
This display is for showing present temperatures.

3) Temperature Setting Method

- (1) Press  button. A set temperature value (SV) blinks. This means you can change the set value.
- (2) Press   button to change the digit number and then press  button when you save the value.
- (3) It goes back to the previous state without saving if you don't touch any button for 10 seconds.
- (4) Press  button again when SV display blinks, then following additional functions will be activated.



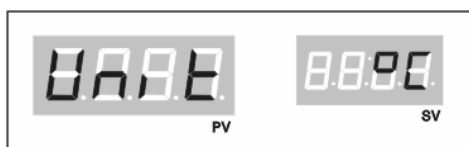
4) Additional function of button



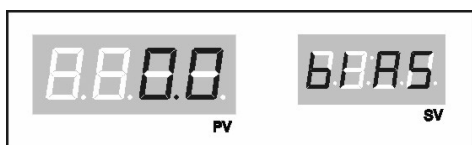
- (1) Favorite values can be stored at Sv.1, Sv2, Sv3 for each operation.

Press  2 times and set temp. values by pressing  and  , and conclude the setting by pressing .

Set temperature is saved on memory and set temperature varies Sv1, Sv 2, Sv 3 are applied the same. Press  button repeatedly then Sv1, Sv2, Sv3 are shown and temperature unit set mode shown by pressing 5 times repeatedly.

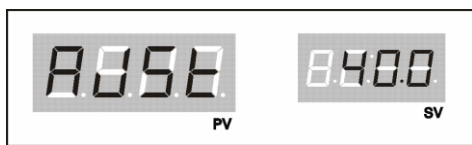


- (2) This is a function vary the unit of temperature value. Initial display is °C and it can be varied °C and °F by pressing  and  buttons.

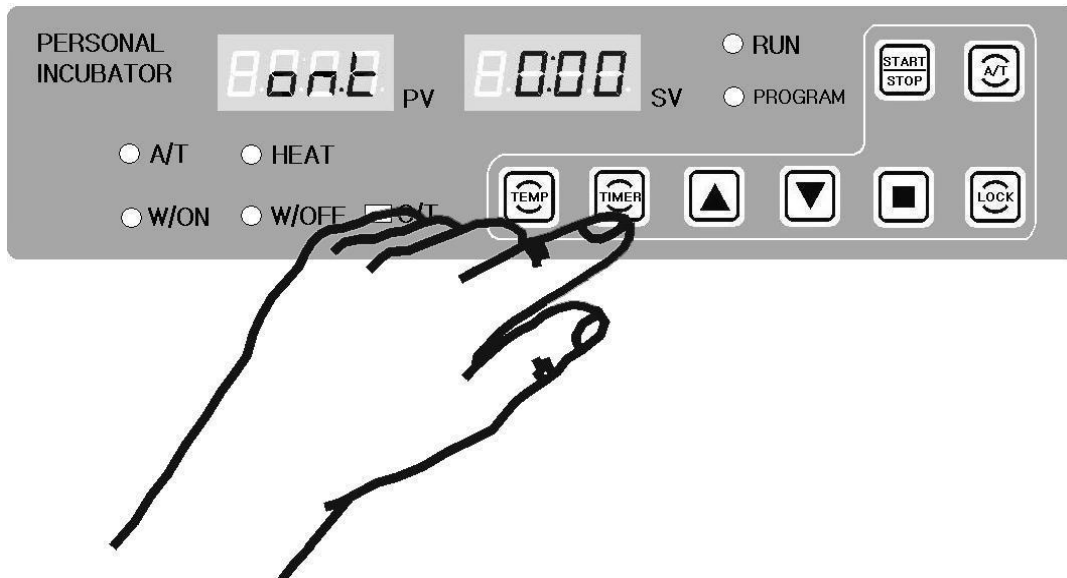


- (3) Next mode is shown by pressing  6 times. This compensates the temp. value errors. Requested values are put on PV display. Move to the next mode by pressing  and  buttons.

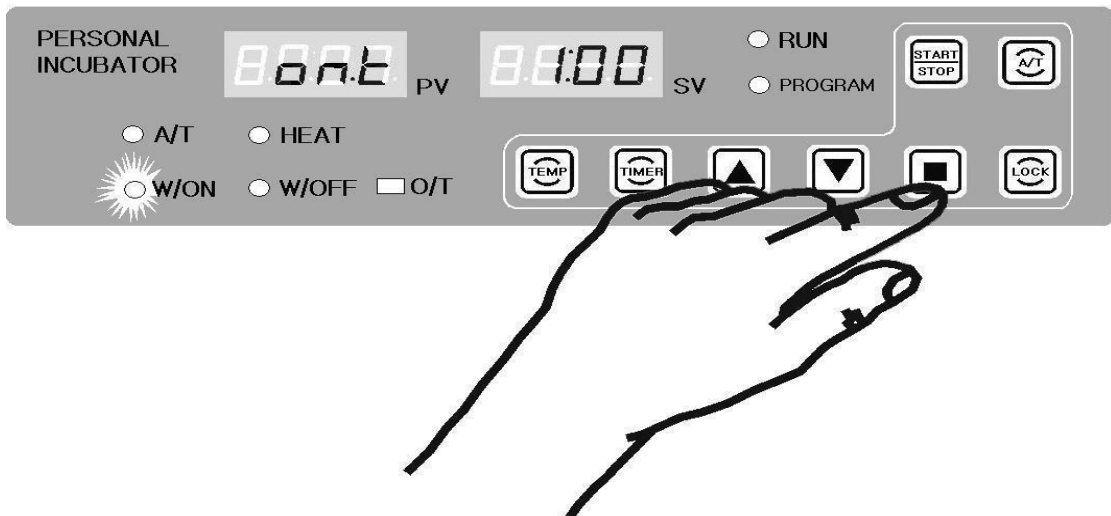
PV is put on the SV display and can be set as exactly as shown on thermometer. Set the value by pressing  and  , and conclude the setting by pressing .



5) Setting Timer

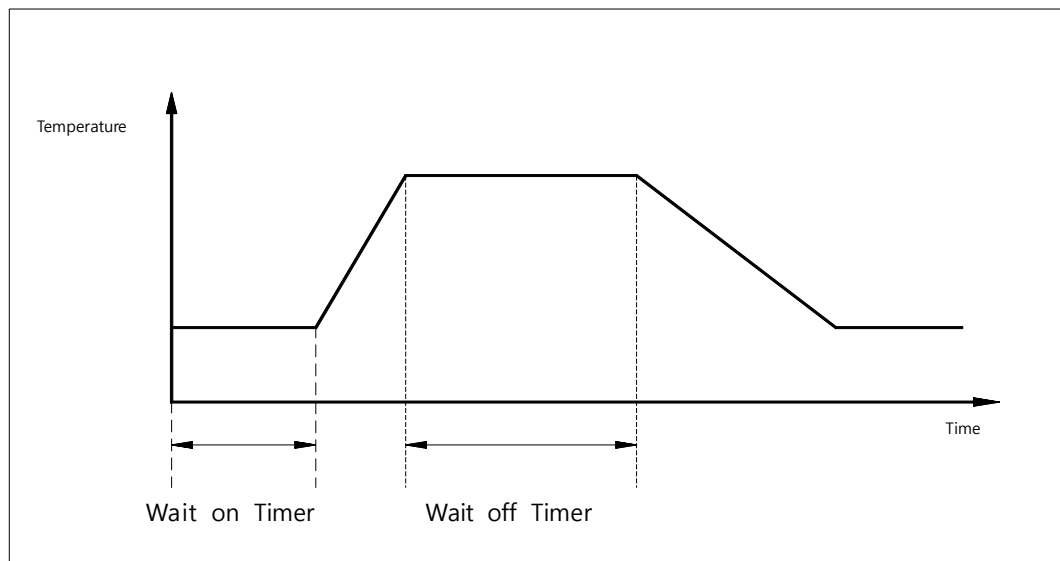


- (1) Button  1 time at early stage.
(On Timer / Off Timer) can be displayed on PV display and Time can be displayed on SV display. Input necessary time by buttoning  and  and store by buttoning .
- (2) W/ON LED is on with Beep sound after setting



- (3) Press  button one more time. You can set the wait off timer. Set the time by pressing   button and save and finish by pressing  button.
- (4) After the setting is done, a beep sound and W/OFF LED inform that setting has been completed.

(5) The function of Timer is shown below.



① Wait on Timer

- The unit begins to work after the time programmed on Wait On Timer passes.
- The maximum of adjustable value is 99 hrs 59 min, and the minimum is 1min.

② Wait off Timer

- The unit stops after the time programmed on Wait Off Timer passes since SV and PV meet.

③ Wait on Timer 와 Wait Off Timer의 혼용

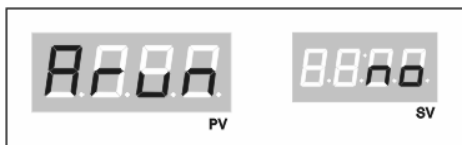
- The unit works as a picture above.

(6) Timer set deactivation

Press  button in order to deactivate timer function (Both on/off timer). In order to cancel only one of the timers, set the value of the timer to 0.

6) Additional Function of Button (Auto Run)

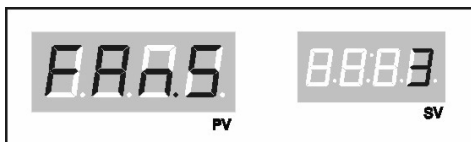
When you press  button three times from the initial state, following function operates.



- (1) This is to select the machine mode in case of a power failure. This function operates the equipment automatically after a power recovery in case of a block out during operation or a power cut by mistakes. When the user sets to 'Yes', the equipment operates the moment the power is recovered.

7) Additional Function of Button (Fan speed control).

When you press  button four times from the initial state, following function operates.

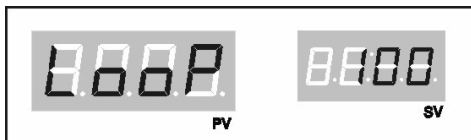


- (1) This function is to control the speed of inner circulating fan. It is recommended to be set as a third stage since slow speed does not contribute the temperature distribution. (0 to 3 stage is possible.) 3 stage recommended.

8) Additional Function of Button (Programmed Control)

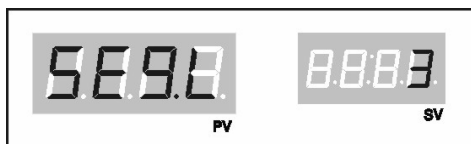
9-Step Programmed Control allows the user to set and operate 9 different temperature and time (max: 99 hours 59 minutes). Operation is possible to be repeated from once to 200 rounds. When you press

 button five times from the initial state, following function operates.

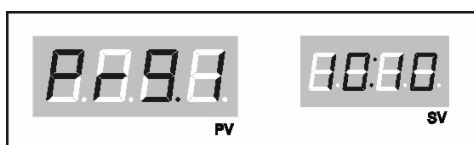


- (1) It indicates the entire repetitive number of program. Loop 100 means that it will operate 100 times. Set the number by pressing   button and save by pressing  button.

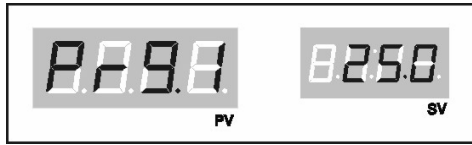
The next function operates when you input more than 1. Input 0 when you do not want to operate this program.



- (2) SEg.L is a segment logic that divides the section's boundary. When you input 3 here, third program is repeated from second repetition. Set the section by pressing   button and save by pressing  button.



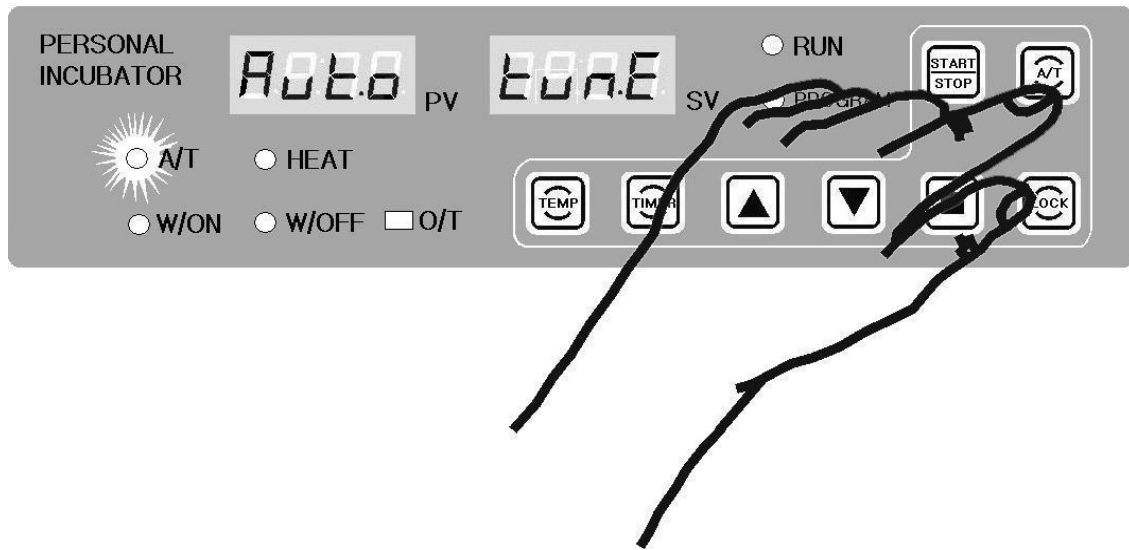
- (3) This function is to set the maintaining time of the first program. When you input 10:10, operation maintains for 10 hours and 10 minutes (max: 99 hours 59 minutes). Set the time by pressing   button and save by pressing  button.



- (4) This function is to set the maintaining temperature of the first program (4°C ~ 60°C). Set the temperature by pressing   button and save by pressing  button.
- (5) You can set the 9 step program by operating (3) ~ (4). That is, you can set time 2 and temperature 2 at program 2 and set the time 3 and temperature 3 at program3 and so on (till program 9). You can input 0 to cancel the setting.

9) Operating Auto Tune

Auto Tuning is performed for more exact and faster temp. controlling. PID values are stored automatically after tuning.



(1) Set Temp. 

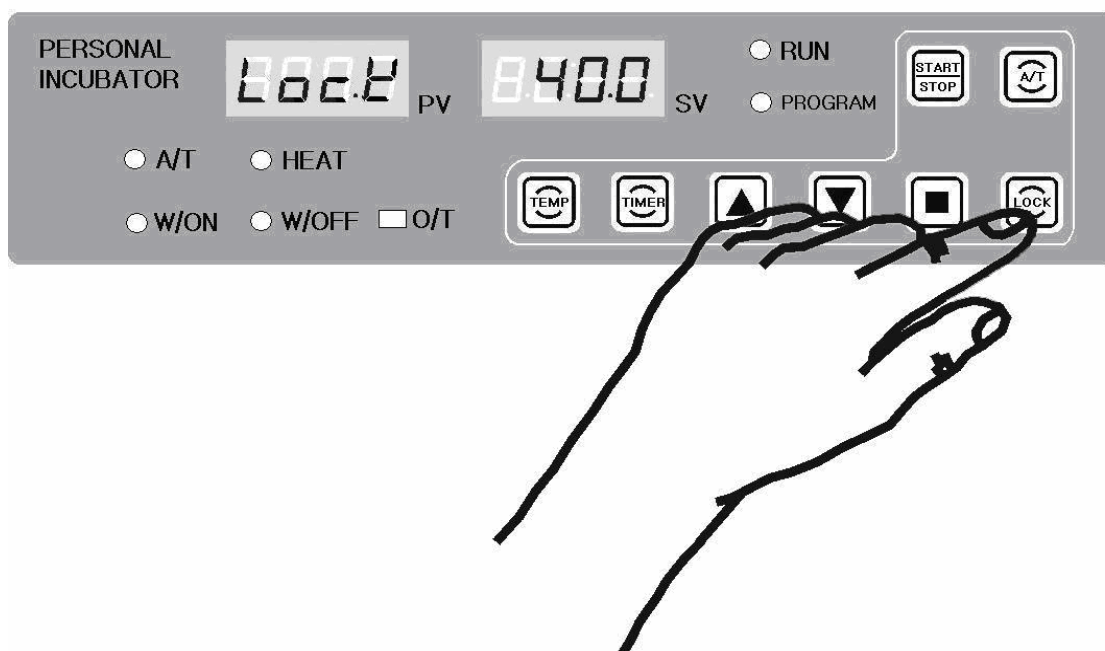
(2) A/T LED is on with Auto Tune signal on displays by buttoning  for 1 second.

(3) Auto Tune works with being on of RUN LED and flashing A/T LED by buttoning 

(4) Auto Tune time can be changed by working condition. LED is off by finishing Auto Tune and control Auto Tune temp continually

Ref) While operating, if buttoning  for 1 second, the machine auto tunes by itself with display shows Auto Tune on it.

10) Lock Function



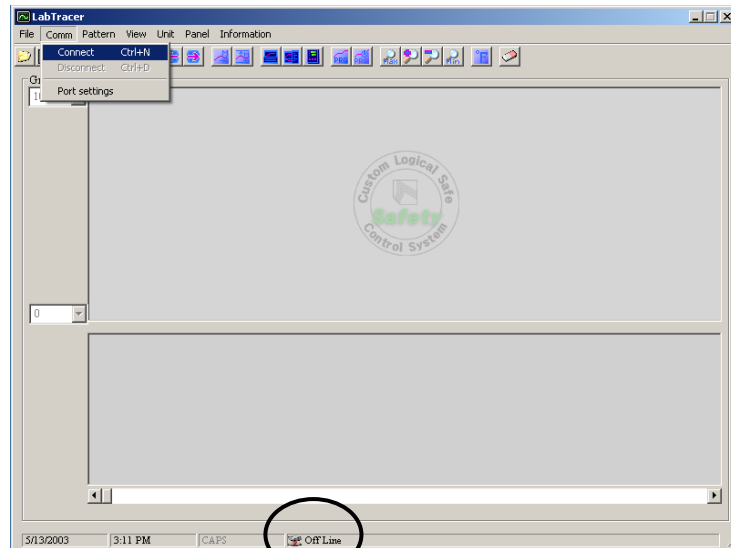
This is to lock controller buttons.

- (1) Press  button for a while (3seconds), then Lock function is set with Beep sound and the unit wouldn't corresponding any more key pressing.
- (2) In order to deactivate this function please Press  button for 3 seconds again.
- (3) This protects improper pressing of the controller buttons while operation.

4.4 How to use Lab Tracer.

(1) Connection for communication

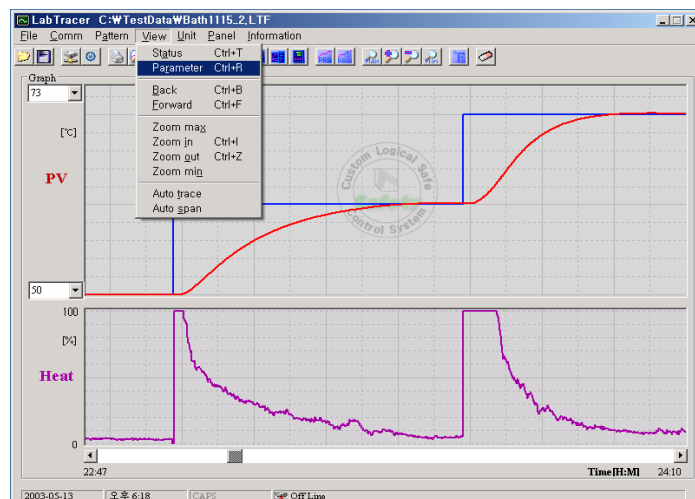
Click **Comm** → **Connect** and your PC and equipment start connection of communication. (In case of no connection, click **Comm** → **Port** and try to other ports.)



“On Line” displays on the bottom of the software, once communication is connected successfully. The window consists of 2 separate windows. Window on the top displays Temperature set point and actual temperature and window on the bottom displays output value of heating in graph mode.

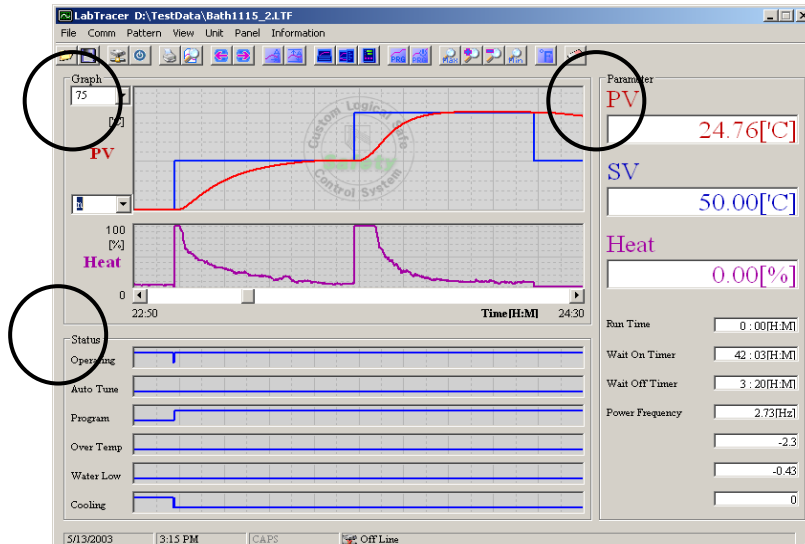
(2) View

- ① If you click **View** → **Parameter**, window displays actual temperature, temperature set point and output of heating by graph and figures.



- ② If you click **View** → **Status**, additional separate window appears below showing actual temperature and set point window. Operating, Auto Tune, Program, Over Temp., Level, and etc display on this window.

The following picture is a monitoring window after choosing Status and Parameter in View menu.



User can monitor operating process through three divided interfaces. (Graph, Parameter, Status)

→ **Graph** displays;

Actual temperature (Red line) and set point (Blue line) on the top of separate interfaces.

→ **Status** says that;

- **Operating** represents the unit is Running.
If blue line is Hi, the unit is On(operating). If blue line is Low, the unit is Off.
- **Auto Tune** displays whether the unit performs Auto Tuning or not.
- **Program** displays whether the unit is in programmable mode or not.
- **Over Temp.** displays over heating condition of a unit.
- **Water Low** displays whether Water Level works or not.
In case water is at the low level, blue line is Hi position and low position under normal condition.
- **Cooling** displays whether compressor works or not.

③ Parameter interface has following values;

- PV is actual temperature.
- SV is temperature set point.
- Heat is output value of heating element.
- Run Time says operating time after you press  button.
- Wait On Timer, Wait Off Timer displays remained time from setting time.
- Power Frequency displays frequency of current power.

(3) Menu icon



Ⓐ File Open (Ctrl + O)

- To open saved graph.

Ⓑ File Save (Ctrl + S)

- To save proceeding graph.

Ⓒ Connect (Ctrl + C)

- To connect unit and PC via RS-232 communication.

Ⓓ Disconnect (Ctrl + D)

- To disconnect RS-232 communication.

Ⓔ Exit (Ctrl + X)

- To terminate Lab Tracer.

Ⓕ Print (Ctrl + P)

- To print saver graph or proceeding graph. (refer to p30)

Ⓖ Preview

- To preview before printing.

ⒽⒾ Scroll icon

- To scroll graph.

ⒿⓀ Auto Trace On/Off

- If you want to fix and monitor the last point of graph on the center of windows, Click Auto Trace.

ⓁⓂ Auto Span On/Off

- Set Y axis(temperature range) of graph manually or automatically. You can put values of range if you choose manual.



① To display Status interface. (Ctrl + T)

② To display Parameter interface. (Ctrl + R)

③ Panel View

- When you click Panel View, the same appearance of display panel of unit pops up and you can control the unit by the pop-up window.

④ Set Pattern of Program Run.

- Set Pattern of Program Run and makes unit in a programmable operation.
- Maximum number of pattern is 100 during 99hour.

⚠ CAUTION

- Program function can be controlled only by PC.

⑤ Program Run.

- Program Run must be set in the main unit.

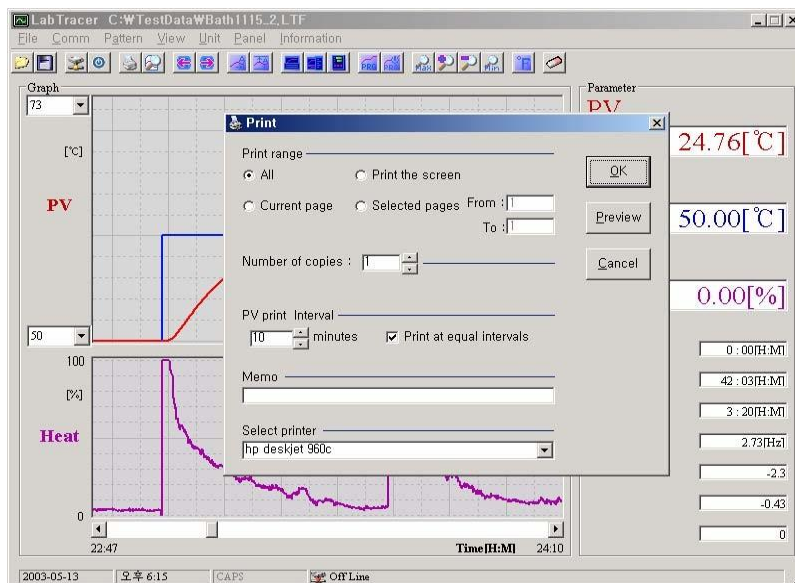
⑥ ~ ⑦ Zoom In/Out.

⑧ ~ ⑨ To convert temperature scale from °C to °F or vice versa.

- (Note: Temperature scale of main body is not changed even though you convert temperature scale from Lab Tracer. To changer temperature scale of main body, you must change setting value of controller in main body.)

⑩ To erase graph.

(4) Print



① Print range

- All : Print a total page
- Print the screen : Print the current screen. (In case Graph, Status, Parameter Frame on the window, they are printed. If not, they are not printed.
- Current page : Print a page of the currently main screen.
- Selected pages : Print selected page(s).

② Number of copies

- Maximum number of copies are 100 by scrolling up and down button.

③ PV print interval

- If you tick this option, PV and SV are printed in text mode.

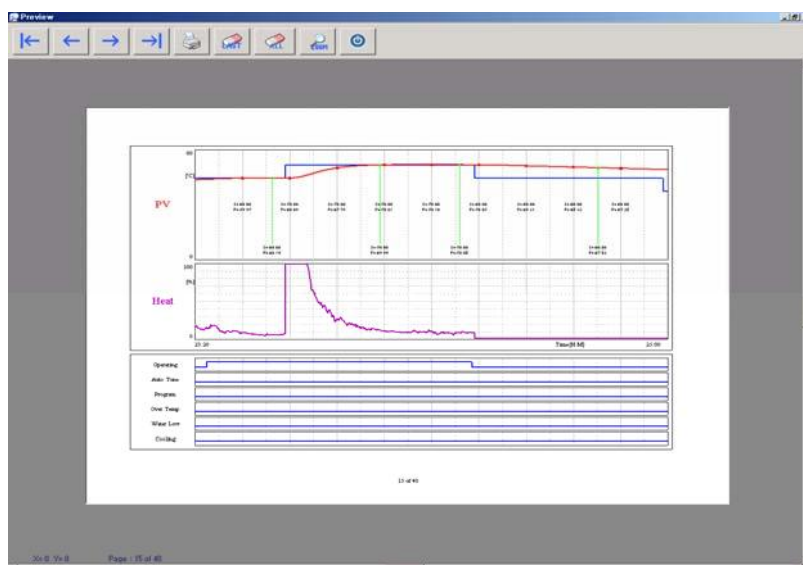
④ Memo

- Can write brief memo on print. Maximum to 60characters.

⑤ Select Print

- Can choose a printer.

(5) Preview and print



In case Print at equal intervals is ticked, PV and SV is printed in a regular interval(see above) when you see preview and printing. If user wants to check a certain point, move cursor to the point and click. Green line with PV and SV will be printed on the copies. (see above)

① Last Point Delete



- Delete last set point.

② All Point Delete



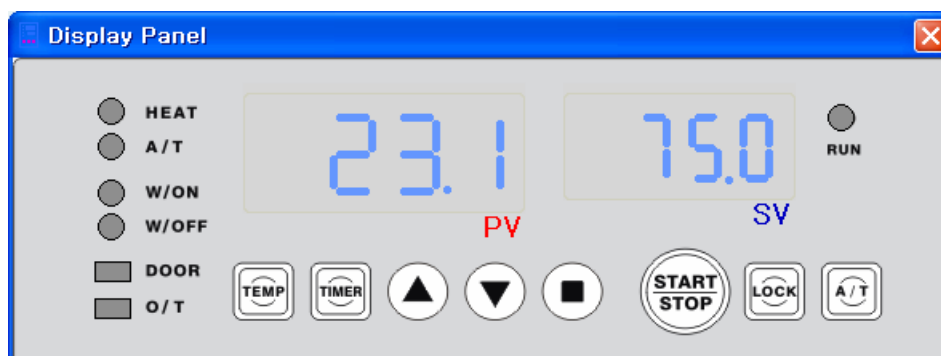
- Delete all set points.

③ Zoon in / out



- Zoon in or Zoon out.

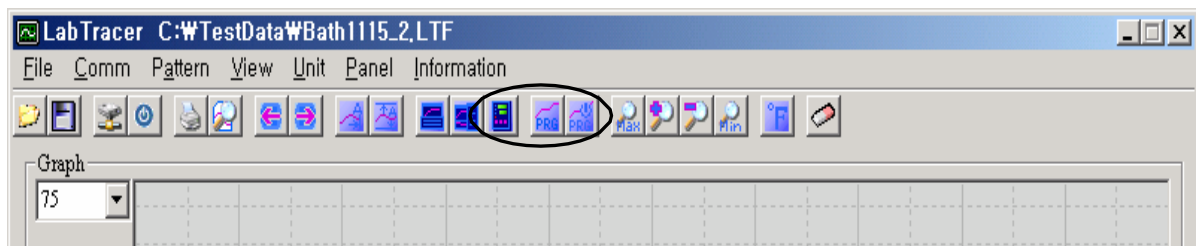
(6) Display



Performance of Display window is same as that of main display panel.

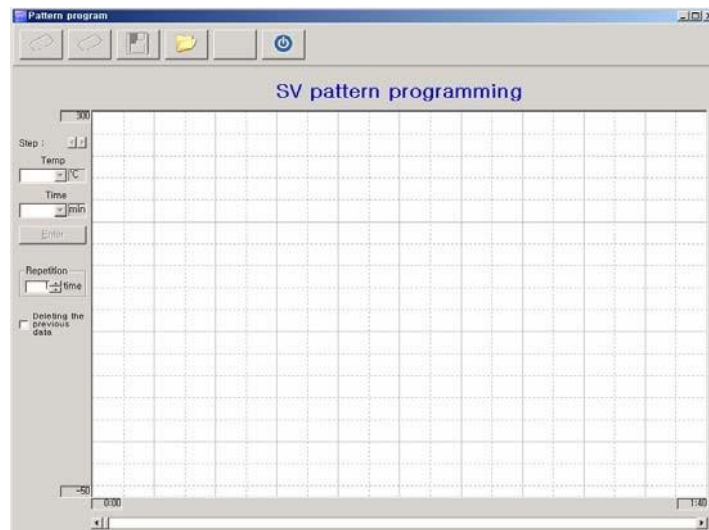
If communication via RS-232 between PC and main body is successful, user can control main body with your PC at a distance.

(7) Pattern Program



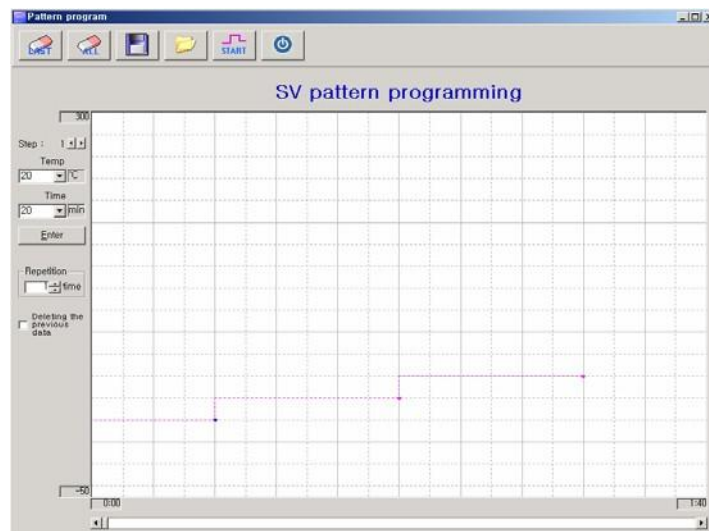
Pic 1. Main Lab Tracer

The following window will be open in case click PRG icon or **Pattern -> Pattern settings in menu.**



Pic 2 Pattern Program

In case you move mouse and click a certain point like pic 3., temperature set point and time, step number display on left side of window.



Pic 3. SV Pattern after clicking a certain point of window

If you want to edit the selected point, Drag & Drop the selected step (blue color). It is very convenient to use short-keys when you want to change temperature and time. Because temperature can be adjusted 1 degree unit and time adjusted one minute unit.

① Short-key

↑ : Increase temperature by 1 degree Alt + ↑ : Move an edit point to the right (the following step)
 ↓ : Decrease temperature by 1 degree Alt + ↓ : Move an edit point to the left (a previous step)
 ← : Decrease time by 1 minute Alt + ← : Move an edit point to the left (a previous step)
 → : Increase time by 1 minute Alt + → : Move an editing point to the right (the following step)

② Last step delete

- Delete last set step.

③ All step delete

- Delete all set steps.

④ Pattern save

- Save programmed pattern.
- File extension is PIT
- Choose a folder and write file name. Then, click save button.

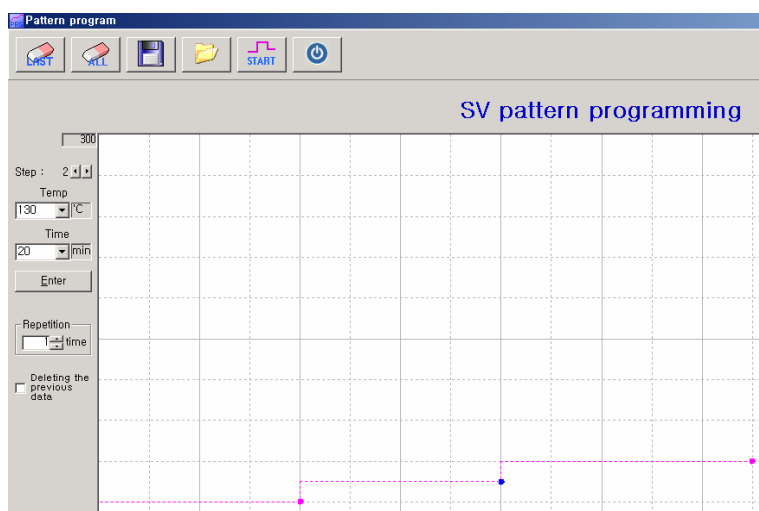
⑤ Pattern open

- Choose a pattern file and click open.

⑥ Start

- Click the START icon to operate unit after Pattern is set.

Note: i) If the main body is under abnormal condition such as Door Open, Over Temp. and etc, the main unit will not work.



Pic 4. Step information and control option.

- If you put and set number of pattern repetition, the main body will work as programmed.
- If you tick "Deleting the previous data" and press start icon, previous data will be erased. Please, be cautious

※ Caution

- Maximum operating time is up 99 hours.
- If you program total working time over 99 hours, the unit does not perform in Program Mode. Especially be cautious when you program pattern repetition.
- Please, be aware of specification and program time and temperature.
- If you program pattern over equipment performance, the units can not work properly.

5.0 Maintenance

CAUTION

- Pull out a power plug from the outlet before the cleaning and inspection.
 - Turn off the main power switch and pull out the power plug before the cleaning and inspection. An electronic shock or damages on the unit might occur.
-

- (1) When you clean the unit, pull out the power cord from the outlet and wipe it with a soft and dry cloth. Wipe the dirt with a cloth containing the solvents that have a low boiling point (methanol and ethanol).
 - (2) Do not use acid solvents, benzene, sharp materials, soapy water, washing solvents, and hot water. They can cause the damage or discoloration of the unit. Parts with rubber and plastic can be changed, degenerated, or discolored. Wipe the unit with a dry cloth after using a natural detergent. Then, dry it completely.
-

CAUTION

- Use proper methods and materials for cleaning and inspection.
 - Do not pour the water directly or use polishing powder, kerosene, acid on the unit. An electronic shock or damages on the unit might occur.
-
- (3) Use appropriate safety gloves for harmful chemicals and a safety mask for harmful gasses in the event of cleaning accidental chemical spills from the unit.
 - (4) Do not pour the water directly on the equipment (especially control panel). Short-circuit can be occurred.
 - (5) If the user tries to clean this unit with other method not mentioned on this manual, please contact us in order not to damage the unit.
 - (6) Only authorized technician can treat the electronic parts inside of the equipment.
 - (7) Use only the original parts for replacing.
-

WARNING

- Do not disassemble the equipment. An electronic shock or an injury might occur when you disassemble since there are parts where high voltage flows and high temperature locates inside of the equipment.
-
- (8) The mechanical trouble that is deviated from normal limit cannot be repaired.
 - (9) When you do not use the equipment for a long period of time, keep it in the dry place after pulling out the plug and packing.

6.0 Trouble Shooting

6.1 Dealing with abnormal Condition

- 1) If the unit does not work. Use the following procedure.
 - (1) Check if use on proper voltage or current.
 - (2) Check if RUN LED is lighting up. If it's turned off, press Start/Stop for restart.
 - (3) Check if the power supplied.
- 2) Malfunction check list

Symptom	Check	What to Do
Even when the unit is turned on, the display does not appear on the panel.	It is likely that power cord is not fully connected or plugged out.	Turn Power switch on, fully plug in power consent.
	Fuse is disconnected by electric leakage or line surge.	ILP-02 : Replace the fuse installed on the power cord socket of the rear part of the equipment with a new one. ILP-12 : Replace the fuse on the fuse holder located on the left side of the power switch with a new one.
	Power switch broken.	Stop the operation immediately, contact your local dealer.
	Temperature controller broken.	
The temperature can not be increased or decreased.	Check whether RUN LED is on or off.	If Run LED is turning off, press Start/Stop .
The temperature can not be controlled.	" Err.S " message displayed on the PV panel.	Stop the operation immediately, contact your local dealer.
	" Err.S " message not displayed on the PV panel.	Perform Auto Tune.
The unit does not operate with beep sound constantly.	" Err.S " message displayed on the PV panel.	Stop the operation immediately, contact your local dealer.
In case operation stopped by the Over temp. limit.	Check the followings 1) If O/T LED is turning on in red. 2) If there is beep sound constantly.	1) Rotate the red knob of the Over temp. limit clockwise to the position which is greater 15% than that of PV (present value). Press Start/Stop once more, red light of O/T LED and beep sound will disappear simultaneously. 2) Press Start/Stop once more, the unit will restart with RUN LED and Heater LED lighting up.

Symptom	Check	What to Do
Without any signal as not described above, or touching the keyboard, all the system has been broken down.	A strong high frequency noise affected in the power supply. Check if high frequency welder, or high frequency sawing machine, massive SCR controllers have been installed in the vicinity of the unit.	Move or relocate the equipment in question.
Decreasing time for temperature top long.	Check if use on proper voltage.	Use on correct voltage for the best performance and life of the unit.
	Poor radiation of heat due to narrow space between the rear fan and the wall.	The gap between the equipment and the wall should be more than 20cm.
	Check if rear cooling fan is rotating.	Stop the operation immediately, contact your local dealer.
	Check if the circulation fan in the chamber is rotating.	Check whether Fan.S set values is "O" if the circular fan doesn't work. (Circular fan doesn't work if Fan.S set value is "0"). If the circular fan doesn't work with values except for "O", the circular fan or SMPS are broken. Stop the operation immediately, contact your local dealer.
Decreasing time for temperature top long.	In case temp. decrease is slow or it rater increases without the above symptoms.	It is something wrong of SMPS or Cooling module. Stop the operation immediately, contact your local dealer.

WARNING

- Please turn the power switch off immediately if the unit does not function properly.
- Do not attempt to disassemble the unit by yourself because replacement and adjustment of parts require advanced skill and specialized equipment.
- Please contact JeioTech, or your local dealer in the event of request for repairs.
- Handling the electric parts for the unit should be serviced only by the qualified persons.
- Replacement parts should be sourced only by on standard specification.
- Damage caused by an abnormal operation can not be covered with the Warranty.

7.0 Appendix

7.1 SPECIFICATION

Model		ILP-02	ILP-12
Chamber volume		14L	48L
Permissible environmental condition		Temperature 5°C to 40°C Maximum relative humidity 80% Altitude up to 2,000m	
Temperature	Range	+5~40°C(at ambient temperature 20°C) +10~40°C(at ambient temperature 25°C) +15~40°C(at ambient temperature 30°C)	
	Fluctuation ¹⁾	±0.1°C at 25°C	
	Variation ¹⁾	±0.5°C at 25°C	±0.4°C at 25°C
	Controller	Digital PID auto tuning	
	Sensor type	Pt 100 Ω	
	Timer	Wait on time, Wait off time (Max. 99hr 59min, Min. 1min)	
Material	Internal	Stainless steel, 0.6t	
	External	Steel, 0.8t, powder coating	
	Shelves	Stainless steel wire, electro polished	
	Refrigerator	Thermoelectric element 48W(at 25°C) X 2ea	Thermoelectric element 48W(at 25°C) X 6ea
	Heater	Cartridge Fin type 200W	Cartridge Fin type 400W
	Over temp. limit	Hydraulic over temp. limit	
	Insulation	Nonflammable EPDM 19t	
	Inner door	Tempered safety glass, 5t	
Safety device		CLS(Custom Logical Safe)-control system	
Printer interface		RS232	
Dimensions (W×D×H)	Interior(mm)	315 × 200 × 230	334 × 334 × 430
	Exterior(mm)	430 × 495 × 400	430 × 665 × 620
	Inner door(mm)	5t × 330 × 248	5t × 337 × 433
Electric requirements	AC230V, 50/60Hz	1.8A	4.0A
	AC120V, 60Hz	3.4A	6.7A
Weight(net)		27.5kg	49 kg

※ 1) Technical data (according to DIN 12880)

7.2 Warranty

7.2.1 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 |
|---|

7.2.2 Technical Service Contact Points

Technical Services

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

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

Website : <https://www.jeitech.com/eng/>

E-mail : overseas@jeitech.com

7.2.3 Certificate of Product Warranty

This is a guide to the product quality warranty and service terms provided by JeioTech 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, JeioTech 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, JeioTech's liability under this warranty is limited to replacing the product or refunding the original purchase price at JeioTech'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 JeioTech Co., Ltd. Additionally, the warranty period is not extended due to free repairs. JeioTech 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 JeioTech Co., Ltd.
- * Malfunctions caused by using consumables or optional components not specified by JeioTech Co., Ltd.
- * Repairs performed by personnel other than JeioTech 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 JeioTech 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.
- JeioTech 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.
- JeioTech 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 JeioTech unless explicitly labeled as a "Warranty Amendment" and signed by an authorized representative of JeioTech.

- 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 JeioTech.
- 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 JeioTech.