



Operation Manual Autoclave(Vertical type)

Model : ST-50G, ST-65G, ST-85G

Manual No. : L1011L002 Version : 0.0



⚠ WARNING

Before using this product, read this entire Operator's Manual carefully. Users should follow all of the Operational Guidelines contained in this Manual and take all necessary safety precautions while using this product. Failure to follow these guidelines could result in potentially irreparable bodily harm and/or property damage

Thank you for purchasing Jeio Tech's products.

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

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1.0 Safety

1.1 How to use the Manual

1.1.1 Introduction

This manual is intended for individuals requiring information about the use Autoclave. Use this manual as a guide and reference for installing, operating, and maintaining your Jeio Tech Autoclave. 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.

1.1.2 Chapter summary

The Functional Description chapter outlines models covered, standard features, and safety features. Additional sections within the manual provide instructions for installation, pre-operational procedures, operation, preventive maintenance, and corrective maintenance.

The Installation chapter includes required data for receiving, unpacking, inspecting, and setup of the unit.

The Operation chapter includes a description of controller features, key name, product operation information Maintenance sections are included a description of product cleaning, moving, storage.

The Troubleshooting chapter serves as a guide for identification of most common problems. Potential problems are listed, along with possible causes and related solutions.

The Appendix contains technical specifications, warranty and Jeio Tech technical support contact information

1.1.3 Model number nomenclature

This manual covers all 3 models of the Autoclave series. The following describes the model number nomenclature used in throughout the manual.

Autoclave	ST-G series		
Model	ST-50G	ST-65G	ST-85G

1.2 Safety Notice

Be sure that you are completely familiar with the safe operation of this Autoclave. This unit may be connected to other machinery, such as a temperature control unit. Improper use can cause serious or fatal injury.

Installation and repair procedures require specialized skills with laboratory equipment and electricity. Any person that installs or repairs this unit must have these specialized skills to ensure that this unit is safe to operate. Contact Jeio Tech or their local authorized distributor for repairs or any questions you may have about the safe installation and operation of this unit.

The precaution statements are general guidelines for the safe use and operation of this instrument. It is not practical to list all unsafe conditions. Therefore, if you use a procedure that is not recommended in this manual you must determine if it is safe for the operator and all personnel in the proximity to the Autoclave. If there is any question of the safety of a procedure please contact Jeio Tech before starting or stopping the Autoclave.

This equipment contains high voltages. Electrical shock can cause serious or fatal injury. Only qualified personnel should attempt the startup procedure or troubleshoot this unit.

- Documentation must be available to anyone that operates this equipment at all times.
- Keep non-qualified personnel at a safe distance from this unit.
- Only qualified personnel familiar with the safe installation, operation and maintenance of this unit should attempt start-up or operating procedures.
- Always stop the Autoclave before making or removing any connections.

1.3 Symbols used in this Manual

The following signal word panels, safety symbols and non safety symbols are used to alert you to potential personal injury hazards or information of importance. Obey all safety messages that follow these symbols to avoid possible personal injury or death.

1.3.1 Signal word panels

Signal word panels are a method for calling attention to a safety messages or property damage messages and designate a degree or level of hazard seriousness. It consists of three elements: a safety alert symbol, a signal word and a contrasting rectangular background. The following signal word panels are in accordance with ANSI Z535.4-2007 and ISO 3864 standards.



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



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



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



Indicates a property damage message.

1.3.2 Safety symbols

Safety symbols are graphic representations—of a hazard, a hazardous situation, a precaution to avoid a hazard, a result of not avoiding a hazard, or any combination of these messages—intended to convey a message without the use of words. The following safety symbols are used in this manual.

Mandatory



Read Manual.



Wear a face mask.



Wear gloves.



Wear goggles.

Prohibition



No direct sunlight.



No high frequency noise.



No corrosive fluids or cleaners.



No water.

Warning



Electrical shock.



Hand crush or pinch.



Flammable or fire could be caused.



Foot crush.



Safety Alert Symbol
General caution.



Sharp points.



Lifting hazard.



Do not take the device apart deliberately.



Hot surface.



Hot steam.

1.3.3 Non-safety symbols

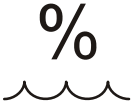
The following graphic representations are intended to convey a message without words or to bring your attention to important information about the use of the Autoclave or a feature.



Permissible
ambient
temperature



Altitude



Relative humidity



Earth Ground








Note

1.4 Safety Labels on the Autoclave


The safety labels are attached to the Autoclave to provide important information about potential hazards and how to avoid them. All users must read this operating instruction carefully to operate the product properly.

The following illustrations show where the safety labels should be attached to the chamber until service of the product is discontinued. If the safety labels are damaged, please contact your local Jeio Tech office or distributor to request new labels.

 		
경고 고온 증기 고온의 증기로 화상을 입을 수 있습니다. 문 개방 시 옆으로 비켜서세요.		WARNING Hot Steam Hot Steam may cause burn. Always step aside when opening sterilizer door.
경고 고장 위험 임의로 분해하지 마세요.		WARNING Breakdown Occurs Do not take the device apart deliberately.
주의 표면 고온 접촉 시 화상을 입을 수 있습니다. 작동 중 만지지 마세요.		CAUTION Hot surface Contact may cause burn. Do not touch during the operation.
주의 감전 위험 누전 시 전기적 충격을 받을 수 있습니다. 접지를 하세요.		CAUTION Hazardous Voltage Electric Leakage may cause electric shock. Require ground connection.
주의 손조심 문을 닫을 때 손이 끼지 않도록 주의하세요.		CAUTION Hand Injury Door may cause crush or pinch your hands.

작동 순서 (Operating Procedure)

- 배기통을 설치하고 배기통의 물을 확인합니다.
Install the Exhaust Tank and check the water level.
- 챔버 내에 가열할 물을 채웁니다.
Fill the heating water in the Chamber to the Heater Cover level.
- 챔버 내에 멸균 대상물을 적재합니다.
Place sterilizing objects inside.
- 문을 잠그고 수동 배기밸브를 잠급니다.
Close the Door and the Manual Exhaust Valve.
- 멸균 조건을 설정하고 START 버튼을 누릅니다.
Set the sterilization condition and press the START button.
- 멸균진행
Sterilization



1.5 Precautions for Your Autoclave

Our Autoclave is designed to provide safe and reliable operation when installed and operated within design specifications. Make sure you read and understand all instructions and safety precautions listed in this manual before installing or operating your unit. If you have any questions concerning the operation of your unit or the information in this manual, contact our Sales Department.

To avoid possible personal injury or equipment damage when installing, operating, or maintaining this auto clever, use good judgment and follow these safe practices:

1.5.1 Warning statements



- Observe all warning labels.
- DO NOT remove warning labels.
- Check the voltage, phase and capacity of the power supply and connect properly.
- Do not ground the Autoclave to gas pipes or water pipes.
- Do not insert multiple plugs into the outlet at the same time.
- DO NOT operate equipment with damaged line cords.
- DO NOT handle or touch electrical cord and electrical parts with wet hands.
- DO NOT move the Autoclave while it is plugged into the power source.
- DO NOT use or keep flammable gases near the Autoclave.
- Do not install the Autoclave near environments where flammable gas may leak.
- Do not use the machine near environments where explosion can occur due to organic evaporating gases.
- Do not put explosive and flammable chemicals (Alcohol, Benzene, and etc) into the chamber.
- DO NOT let moisture, organic solvents, dust, and corrosive gas enter the control panel.
- Do not expose the Autoclave to direct sunlight.
- Do not expose the Autoclave to direct heat sources.
- Do not use the Autoclave in places where moisture is high and flooding can occur.
- Do not install the Autoclave near machinery generating high frequency noise

- Do not use Autoclave in environments that contain industrial oil smoke and metallic dust.
- DO NOT operate damaged or leaking unit.
- DO NOT operate the Autoclave when there is strange sound, smell and smoke coming from the unit.
- Do not disassemble, fix or change the Autoclave other than for those items described in this operating manual.



1.5.2 Caution statements

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

- Please install on the sturdy surface laboratory which is set safety facility and make sure horizontal align correctly.
- Do not let the product take any strong shock or vibration.
- Do not touch it with wet hands and put the main plug correctly.
- After use, be sure to turn off the main power switch and unplug the power cord after.
- Do not put heavy things on the power line. Do not put the machine on the line.
- Installation power outlet near instrument and may be convenient.
- Do not sprinkle insecticide or flammable spray on the product
- Please power off while product cleaning.
- Do not pour water directly on the outside of product.
- Do not clean product by solvent and harsh detergents, please use neutral detergent and smooth cloths.
- Do not inject any flammable objects, and conductive objects outside of product hole or vent.
- After installation, please make sure the product do not move by use of wheel locker.
- Installation of the equipment if altitudes higher than 800m above sea level. Please contact with Jeitech.
- Please use distilled water to fill the chamber.
- Please keep clean, Steam emission solenoid valve vent.
- During operation or operating stop, the unite top surface will be high temperature condition because the risk of severe burns and avoid contact with the product.

- After sterilization operating, user should check the chamber condition(less than 100°C and, pressure level is less than atmospheric pressure(0.0 kg/cm², 0.0 MPa)). And when you open the door, the user face should be located far away as you possibly from product. Because the high temperature steam is caused burn.
- After operation when you put out the sterilization sample from chamber. Please wear safety protector like laboratory cloth, thermal block gloves, and safety shoes.
- Please make sure regularly whether sterilization perform or not by chemical, biological indicator.
- During operation, never open drain valve.
- Please throw away waste water in a chamber after enough to cool.
- Do not repeat the waste water. The waste water is caused the chamber corrosion and pipe is clogged.
- In case of sterilizing Salt liquid, Acid liquid, Alkali liquid or sterilizing culture media which is generated sulfured, chlorine gas. User should clean inside of chamber and remove wastewater.
- Because, the chemical substance is caused product malfunction, operation degradation, and chemical corrosion.
- Please, the loading product is less than 60% of chamber capacity to sterilization operation.
- In case of sterilizing liquid by erlenmeyer flask or other container, the sterilization liquid should be filled less than 75% of container volume. Because, if you fill liquid more than 75% of container volume, the container will be overflow or explosion.
- In case of sterilizing liquid, do not seal perfectly. It will be cause incomplete sterilization, container explosion because of increase inner container pressure. Please use exclusive stopper or sterilizing with gently closed the mouth of a bottle.
- In case of sterilizing small bottle with liquid, please do not open the product door immediately. It will be caused explosion. Please make cool off enough. Also, do not shake and shock the bottle when you take out bottle from chamber.
- In case of sterilizing liquid, please put out from chamber after natural cooling.
- Do not put liquid container on the product. In case of liquid leak will be damage the product.
- Do not install near other laboratory equipments, electric apparatus, terminal electricity. Because, the vapor will be caused the damage.



Safety symbols are graphic representations—of a hazard, a hazardous situation, a precaution to avoid a hazard, a result of not avoiding a hazard, or any combination of these messages—intended to convey a message without the use of words. The following safety symbols are used in this manual

2.0 Functional Description

2.1 Introduction

This vertical type autoclave is removed inner chamber air by gravity exhaust. Also, the product is sterilized short time by high temperature during saturated vapor pressure of the filling state.

This product offered excellent and safety performance for operator convenient. Such as, the precise temperature control, 8 program functions by managing automatic sterilization system with safe pressure control, check safe function, automatic exhaust system.

This product is made for research in the laboratory. The product can be used sterilization of instruments and glassware, preparation and dissolution media, and sterilization of cultures.

This product can be used in the field below.

- Sterilization of Laboratory Equipment
- Preparation of Culture Media for Microbiology
- Sterilization and Melting of Culture Media
- Sterilization of Waste Material
- Decontamination Potentially Biohazardous Waste
- Life Science Application
- Medical Science
- Research and Development for Pharmaceutical
- Mycology
- Veterinary science
- Food Production Facility
- Vulcanization of Rubber

2.2 Features

2.2.1 Excellent performance

- (1) The precise temperature control
PID Feedback control will be provided maximize the temperature stability and minimizes temperature variation during sterilization step
- (2) The temperature and time settings
User can set temperature (sterilization:110~123°C, dissolution: 60 ~100°C) and time (1~999 min.) depend on sterilizing objects type and loading..
- (3) Automatic sterilization system through micro process
All sterilization process will be managed by automatic sterilization system (heating, safety check, sterilization, alarm for sterilization finish, vapor emissions, and alarm for operation finish)
- (4) Provides a standard mode
Frequently using 4 programs- Decontamination, Solid Sterilization, Liquid Sterilization, Melting – is saved standard for quick and conveniently operating.
- (5) Program Features
Provide 4 program memories- Sterilization: 2ea, Liquid: 1ea, Melting: 1ea
- (6) VFD and Sterilization Process LEDs
VFD will be displayed operation set, temperature, control condition of pressure(option), time, warning , and etc. Ease to check sterilization process step by Sterilization Process LEDs.
- (7) VIEW function(Operating Condition Report Function)
Ease to check temperature and pressure(option) time conditions during Stand-by, Run, Stop states.
- (8) Auto Ventilation
After sterilization step finish, the inner vapor exhaust is operated by solenoid valves opened automatically. However, in case of sterilizing liquid, this product will be automatically vapor emissions after sterilization step finish and though the cooling process. Because of the liquid boiling up status prevented.
- (9) System Warning
Provide system warning functions : Over-Temperature, Low-Temperature, Low-Heat, Sterilization Fail.
- (10) Additional temperature sensor and temperature record (option)
You can set additional temperature sensor and record (Data Logger) for the validation of sterilization.
- (11) Temperature Offset
In case of the temperature recorder or validation temperature sensor is different with displayed temperature; you can correct the error temperature deviation.

2.2.2 Improved convenience

- (1) High Capacity and Top Loading method
Conveniently use mass sterilization by wide type and Top Loading method.
- (2) Easily to open door with less power, the door is designed to open same way with top hand wheel release direction.
- (3) Provide Exhaust Tank and Drain Bucket.

2.2.3 Improved safety

(1) Safety Door Cover

During the operation, the plastic door will be preventing burn caused by contact. Because of less thermal conductivity than steel door. Also, the sliding door is preventing the hot vapor over release.

(2) Overcurrent protection device

Two built-in fuse current can be automatically shuts off the current when overcurrent condition.

(3) Over temperature protection device

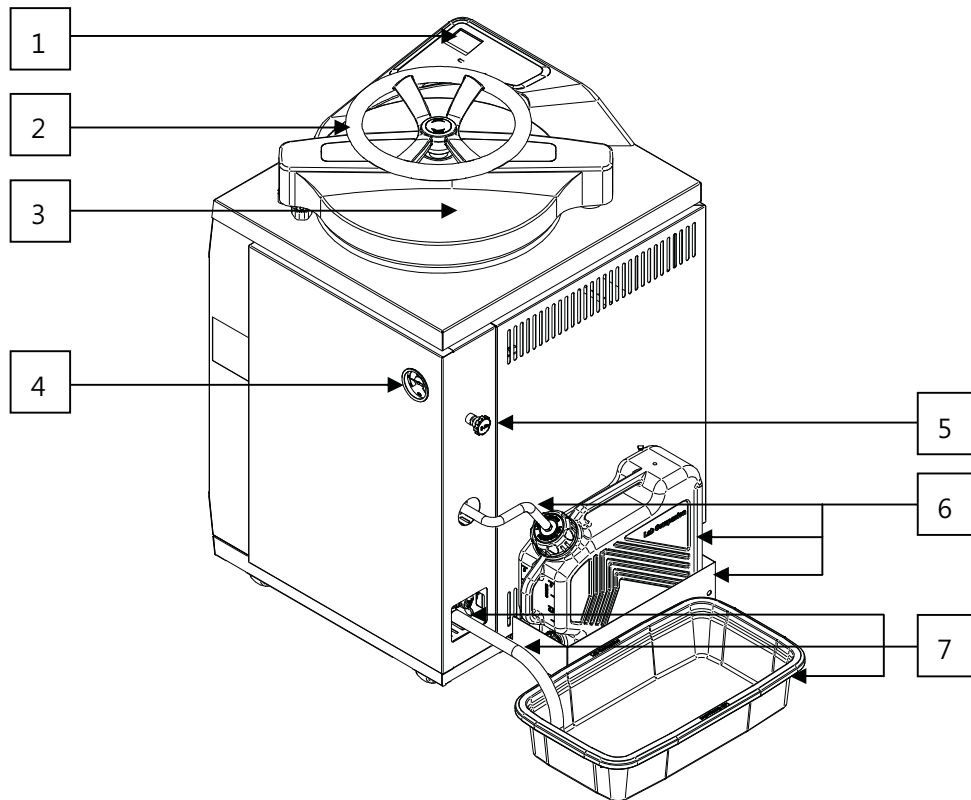
Built-in overtemp. Protector will be cut off automatically the power when the heater is overheating

(4) Overpressure safety device

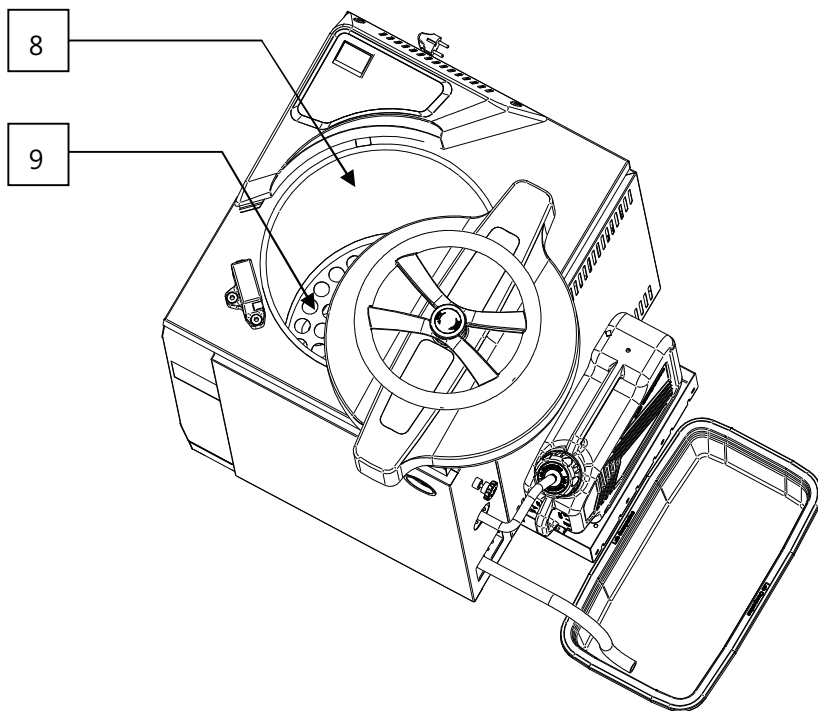
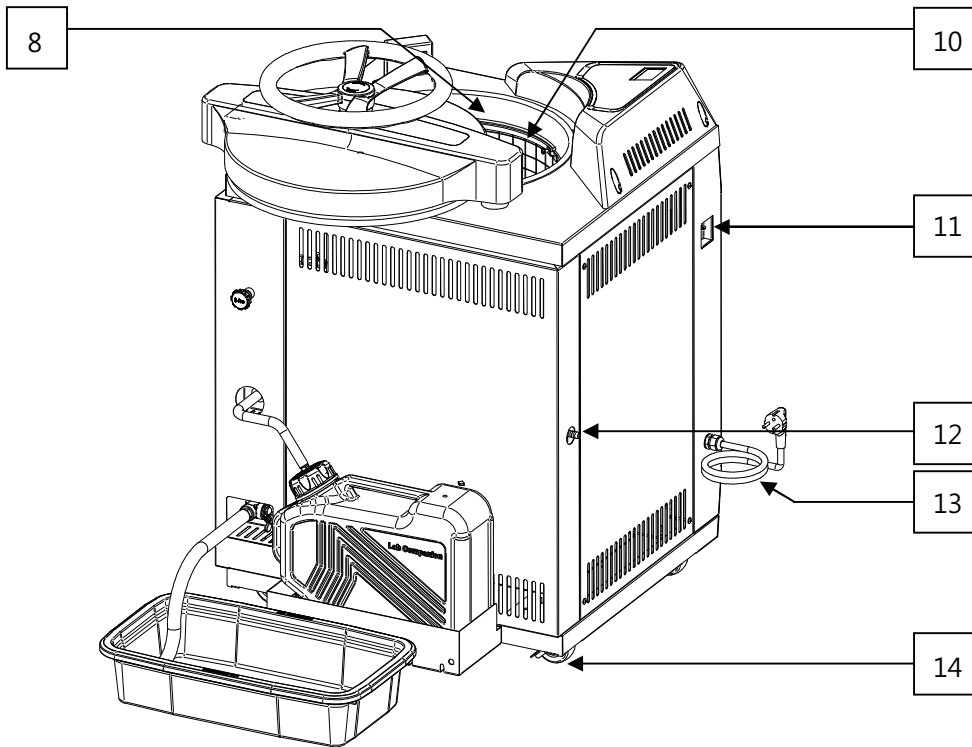
The safety valve will be open automatically and exhaust vapor when the pressure limit over (1.5kg/cm²) condition.

In case of emergency, user can stop and vapor emissions by Manual Ventilation Valve.

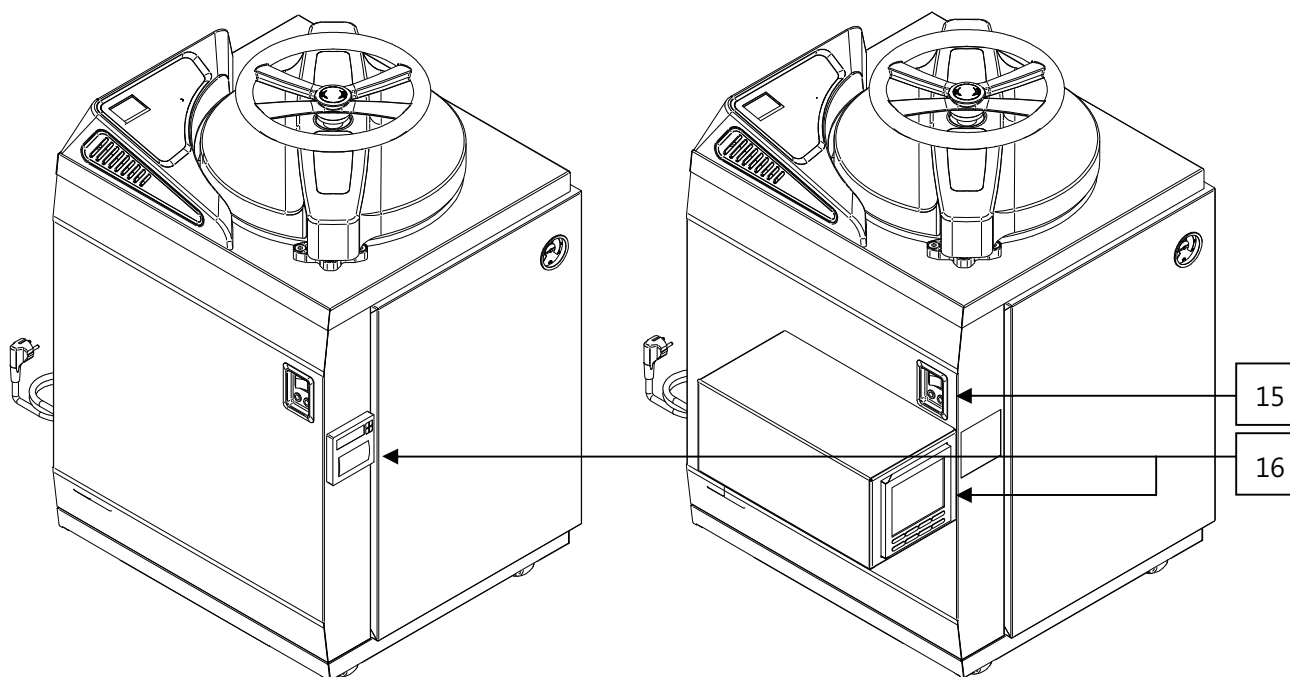
2.3 Structure



- (1) Control Panel
- (2) Hand Wheel
- (3) Door & Safety Door Cover
For perfect sealing, there is silicone door gasket on inner door.
Plastic safety door cover prevents from burning.
- (4) Pressure Gauge
It is Analog Type Pressure Gauge to see pressure of inner chamber.
Unit of pressure is MPa. (air pressure, 1atm = 0.0 MPa (Analog gauge) = 0.0kg/cm² (Digital display))
- (5) Manual Exhaust Valve
User can eliminate pressure arbitrarily by using it manually.
It can be used to eliminate pressure after sterilization completely or in case of happening over-pressure in operation.
- (6) Exhaust, Exhaust Tube, Exhaust Tank and support bracket
Exhaust tube should be under water in Exhaust tank.
- (7) Drain, Drain Tube, Drain Bucket, Drain Valve
You have to close the drain valve after cleaning..



- (8) Chamber
- (9) Heater Cover
- (10) Basket
It is made of stainless steel.
- (11) Circuit breaker
- (12) Safety(Relief) Valve
If pressure is over limited pressure, Safety valve is supposed to release pressure.
- (13) Power plug
- (14) Lockable caster

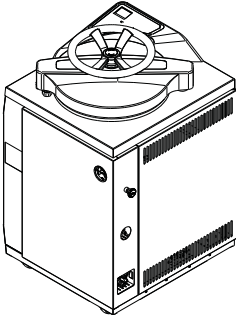
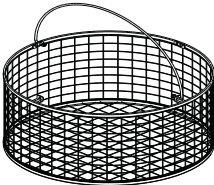
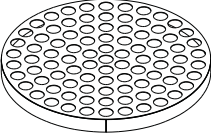
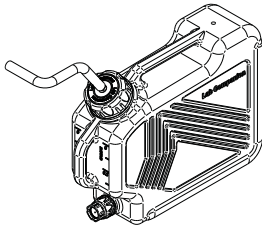


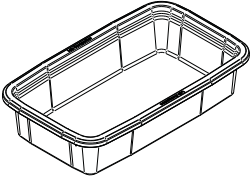

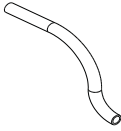

- (15) Power Switch, fuses
There are 2 fuses to protect the unit from overcurrent.
- (16) Data Logger (Option)
You can record temperature value on real time during operation.
There are 2 type of data logger as option(refer to 7.0 accessories)

3.0 Installation

3.1 Components

After unpacking, please check the contents to ensure you have received all of the following unit components. Also, check the identification plate on the side of the unit to make sure you received the model number your ordered. If you didn't receive one or more of the components or if the model is incorrect, contact your local Jeio Tech office, or the distributor from which the unit was purchased.

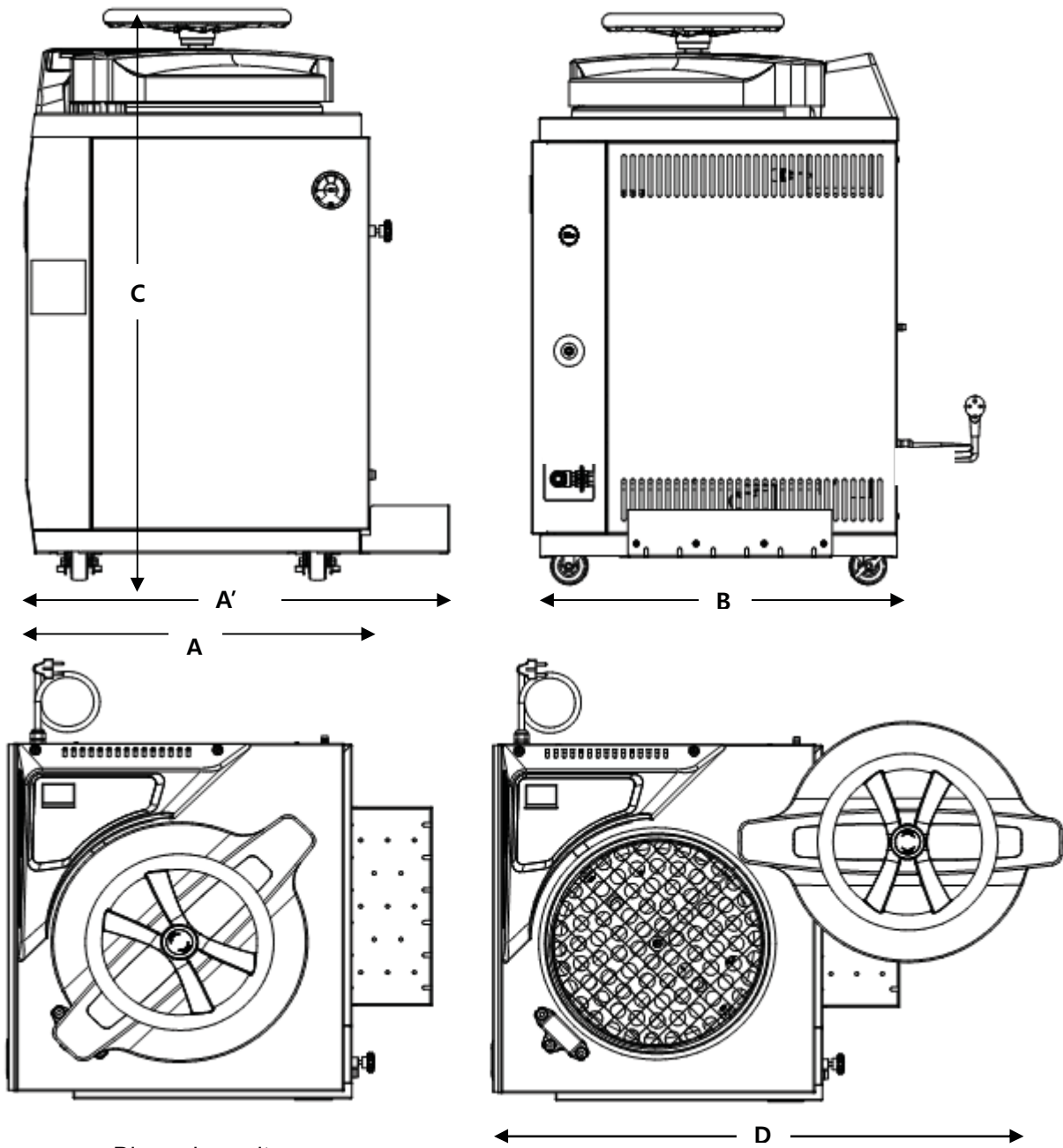
Item	Figure	Quantity	Description
Main Body		1	-
Basket		2	-
Heater Cover		1	-
Exhaust Tank & Exhaust Tube		1	-

Drain Bucket		1	-
Fuse: 250V, 20A		2	-
Drain Tube		1	-
Operation Manual		1	-

3.2 Preparing before installation

3.2.1 Space requirements

When you install it, minimum space is required as below features.



Dimension unit : mm

Model	A	A'	B	C	D
ST-50G	624	723	672	870	1010
ST-65G	624	723	672	971	1010
ST-85G	624	723	672	1083	1010

3.2.2 Environmental setting

The unit can be operated properly under the following environmental conditions for a long time running without any problem.



No direct sunlight on Autoclave.



Please keep Ambient temperature 5°C~40°C



Relative humidity not to exceed 80%



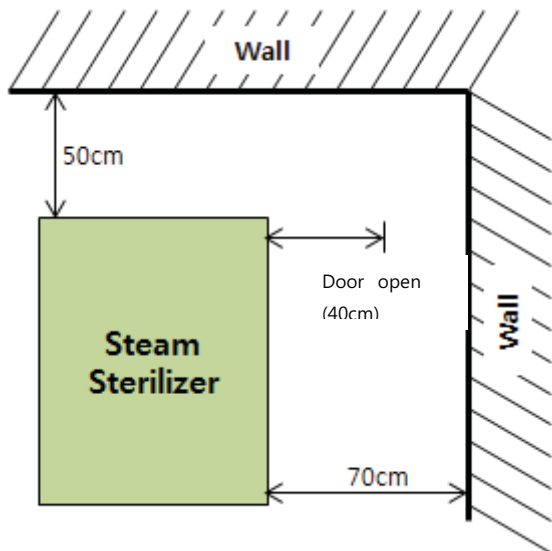
Altitude not to exceed 2000m (6,562 feet)



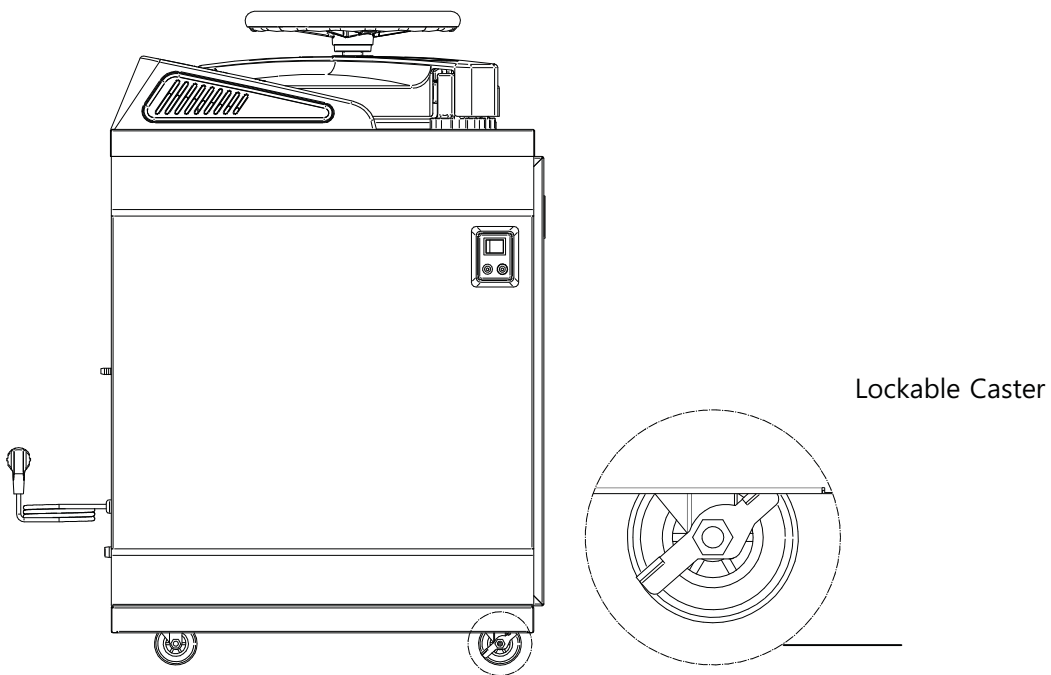
Connect the Autoclave to earth grounded terminals only.

3.3 Installation

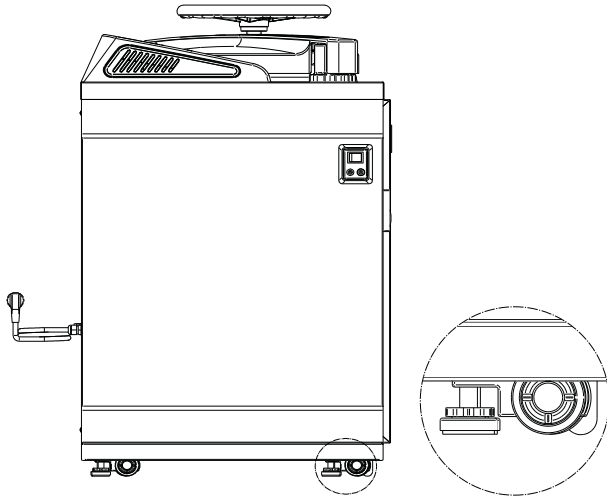
- (1) Please install the unit inner side of room where people do not access that area often.
- (2) Please make the unit horizontality on the flat floor.
- (3) Please do not install it where is from direct sunlight
- (4) Please install it where is not influenced on water or steam.
- (5) Please install it far from Air conditioner, Fan, Heater which can give affect on refrigeration system.
- (6) Please keep some distance from wall or other equipments,
Please secure right side space for opening door



- (7) You have to fix lockable caster after installation.
 Fix Locker move to under direction, the wheel will be lock.
 Fix Locker move to up direction, the wheel will be release. (ST-50G, ST-65G Model)



In case of the ST-85G model, the stopper is already equipped on the wheel.
 The stopper is turning to clockwise, the wheel is fixed.
 The stopper is turning to clockwise, the wheel is fixed.
 The stopper is turning to counterclockwise, the wheel is released (Refer to below picture)



Wheel fix stopper

⚠ WARNING



- Please do not put some materials which are flammable or explosive
- Please follow this manual's 1.5.1 warning

⚠ CAUTION

- Please install it as far as where people do access!
 - Please make the unit horizontality on the flat floor to prevent from leaking steam.
 - Please check required minimum space to operate specially on the right side for opening door.
 - Please do not put electric outlet or other electric equipments on the right side of the unit because of steam releasing..
 - Please be careful electric shock on the right side because of darning water.
 - Please do not install the unit under Smoke or fire detector to avoid activatation when door is open after finishing with working.
 - Please do not install the unit where is too dust, powder and etc.
 - Please do not install the unit where is enclosed area or small area.
 - Please do not install the unit Outdoor
 - Please fix the lockable caster after installation.
 - Please ask manufacture in case the place where is installed is over altitude 800m.
 - Please follow this manual's 1.5.2 caution completely.
-

3.4 Connection to the electric power

Check to make sure that the line voltage & Hertz matches the supply voltage & Hertz specified on the identification plate before connecting to the main power.

Check to make sure that power code matches outlet connection on electrical consent which should be properly grounded

Make sure your electrical service conforms before making any electrical connections. Deviations of $\pm 10\%$ are permissible.

Compare voltage on unit's identification plate, wall outlet connection on electrical cord and the wall outlet to ensure proper connection before making any electrical connections.

Please connect Power as follow.

Step 1 : Make sure to check between required voltage, current and capacity and ID Label.

Step 2 : Make sure to check electric outlet where the unit will be placed.

Step 3 : Make sure to power off before power supply.

Step 4 : Connect Power plug to outlet.

WARNING



Electrical Shock
Hazard.

- Check to make sure that the correct line voltage, phase and capacity correspond to them specified on the identification plate.
- Incorrect line voltages will cause the risk of fire, electric shock, and personal injury.
- Do not touch the unit or plug with wet hands.



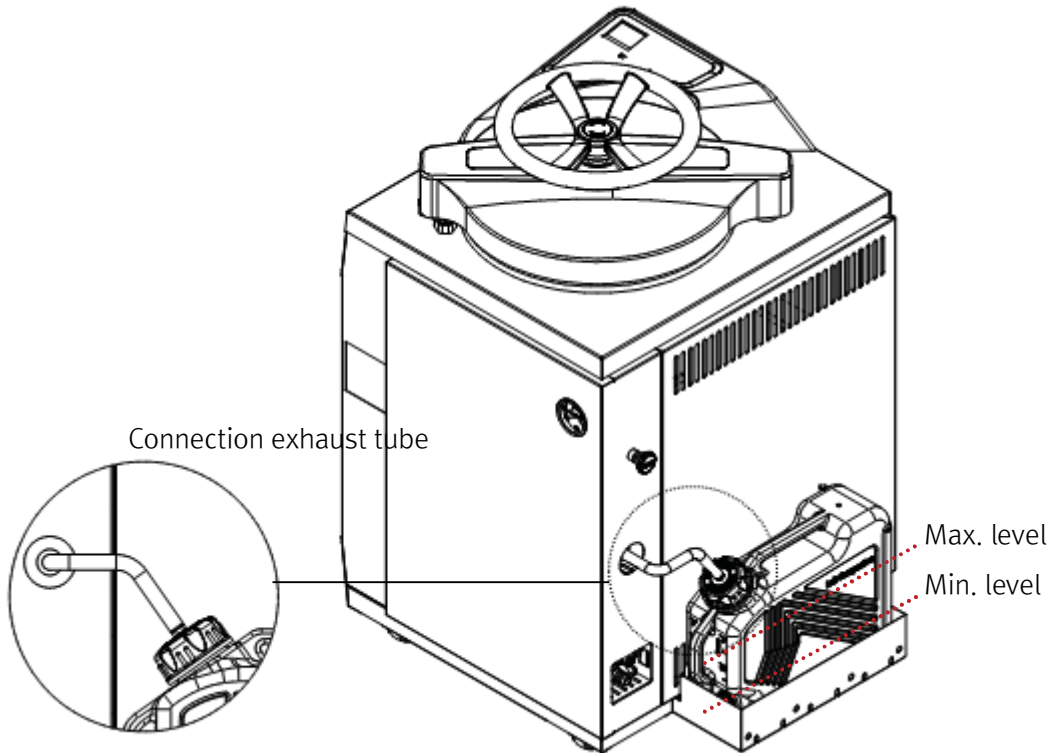
- Make sure your earth connection is duly executed

WARNING

- When you connect plug to outlet, Please connect only one ST-G model to the outlet. Because high capacity heater will be used for long time. If you use another instrument to the outlet, overcurrent could happen.
-

3.5 Water supply to Exhaust Tank

- (1) Before operation, please supply water to exhaust tank if the water is less than Min. Level. (refer to below features)
- (2) Please release the water in the Exhaust tank if water is over the Max. level.
- (3) Please connect between exhaust and exhaust tube.



NOTICE

- There is nipple which is mounted with cover of exhaust tube to prevent from flowing backward to exhaust.
- There is ventilation hole to prevent from expanding of exhaust from hot steam.

CAUTION

- Please keep water level from Min. Level to Max. Level.
- Please place the exhaust tank on the support bracket.
- Please operating it on the conditions that exhaust tube is under water of exhaust tank.
- Please be careful of exhaust tank which is very hot. Do not touch the exhaust tank just in case of burning. Ventilation hole can be hot from releasing hot steam.
- Please throw the water in the exhaust tank after cooling.

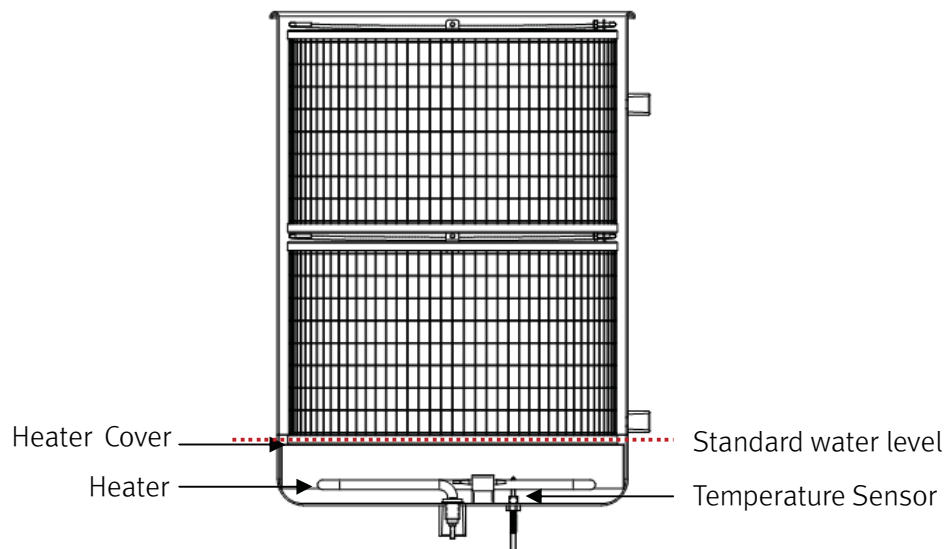
⚠ WARNING



- Do not close to the exhaust tank when it releases hot steam in case of burning.

3.6 Water supply to Chamber

- (1) Please check if Drain valve is closed on the right side.
- (2) Please supply water up to standard water level.
Standard water level is around 50mm and standard capacity is 6L.
Please supply water around heater cover and heater & temperature sensor should be flooded as below feature.



- (3) If the water is over standard water level, please release some water by opening drain valve to meet standard water level.
- (4) If there is dirty, please cleaning it and supply water.
- (5) Please notice below thing when supplying water.

CAUTION

- Please use distilled water or mineral-free water, deionized water.
 - Please supply water up to standard water level.
Standard water level is around 50mm and standard capacity is 6L.
Please supply water around heater cover and heater & temperature sensor should be flooded.
 - You can operate it 2 or 3 times continuously (it can be different from model, working condition and environmental condition) but to prevent from overheat of heater in advance, please supply water after finishing working once.
It is principle to supply water after once sterilization or melting
 - Do not supply water immediately after stopping because of lack of water. Hot steam can generated. Please supply water after temperature of chamber is cooled sufficiently.
-

3.7 Loading objects for sterilization

- (1) Please secure enough space between objects which steam go into all objects.
- (2) Please attach sterilization indicator uniformly.
- (3) Do not put too much objects in the basket.. (refer to 7.2 Baskets loading capacity)
- (4) Please check arrangement of objects.
- (5) Please notice below cautions when you put objects.

NOTICE

- Please adjust time and arrange the objects because the sterilization performance can be different from kinds of objects, quantity, and arrangement and sterilization time.
-

⚠ CAUTION

- Do not load too much objects and follow Max. Loading Weight of basket and Max. Loading Capacity of basket.
Max. loading weight is 10kg for each basket and Max. loading capacity is 60%
 - Please place the object in the center of basket.
 - Please place object well and arrange objects well to be passed through steam.
 - Please do not stack object too much.
 - Please make object not to touch inner wall of chamber or not to cover ventilation hole or temperature sensor.
 - Please lie on its side or turn over for beaker, flask, test tube rack like empty deep container
 - Please must use basket for sterilization and dot not put objects into the chamber directly.
 - When you sterilize different material metal, please use each basked after solting out.
 - Please spread paper or towel not to touch basket directly in case objects which is made of Carbon steel.
 - Please put packed objects or cloths on the upper side of basket not to avoid wet or incomplete sterilization.
 - Please make liquid not to be over 75%(3/4) of vessels like Conical flask, Erlenmeyer flask and etc. and in case of Test tube, please make the liquid not to be over 50%(1/2) of test tubes. If thre is much liquid in the those kind of vessels,it can be overflowed or exploded.
 - Please check complete sterilization from Sterilization Indicator.
Try to make the sterilization indicator on objects uniformly.
-

-
- Do not sterilize object on the conditions that it is in container or bag which can not be passed through steam.
 - In case of Waste disposal bag, please open top as long as not to touch inner chamber. By the way, it is open to much, it can prevent from circulating steam and cause incomplete sterilization.
 - In case of liquid, Do not close the entrance of container. It causes incomplete sterilization and can be exploded from high pressure. Please use vented cap, breathable cap or close the cap crossly.
 - Please use definitely heat-resistant glass container in case of glass.
 - In case of Agar media, please melt it less than 1L. If it is over 1 L, it causes incomplete melting. And 50% media of container is suitable. (refer to below table)

Coagulated media volume (L)	Container with media's volume (L)
1	2
0.5	1

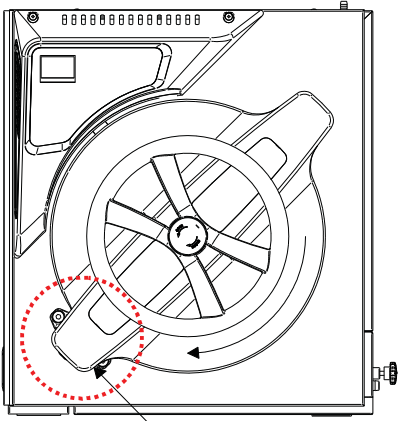
3.8 Lock door

- (1) Please check state of clean or damage about Door Gasket.
- (2) Please lock the door tightly by turning hand wheel clockwise.
- (3) Please check if the door is closed completely.
- (4) Please check if Manual Exhaust Valve is closed completely
- (5) Please notice below things when you lock the door.

CAUTION



- Please close the door by grabbing hand wheel.
 - Please check if hand wheel is turned to counter clock wise then close the door
 - When you close the door, please turn hand wheel to clockwise holding locking rod by one hand.
 - Please turn Hand Wheel to clockwise tightly. If door does not close completely, steam can leak and temperature and pressure do not increase.
There can be some risk for burning from Leaked steam.
Water can be evaporated too much and heater can be overheated.
But if you turn hand wheel too much, door gasket or hand wheel can be damaged.
 - Please keep clean the state of cleanness of door gasket and remove foreign substance. And please replace in case door gasket get damage because it causes incomplete sterilization or leakage of steam in case of damaged door gasket.
-



Locking rod

⚠ CAUTION

- You must check if Manual Exhaust Valve is close completely before starting operation. If you do operate by opening Manual Exhaust Valve, Steam can be released. And temperature & pressure do not increase, and cause Low Heat. Also in case that the water is consumed by releasing steam for long time, overheat can be happened due to expose heater.
-

3.9 Operating – Turning On

Plug in main cords and turn on the main switch, the machine will operate as below.

- (1) Turn on the Main switch at the left side.
- (2) Lights on the power switch and show the JEIO TECH screen in VFD.

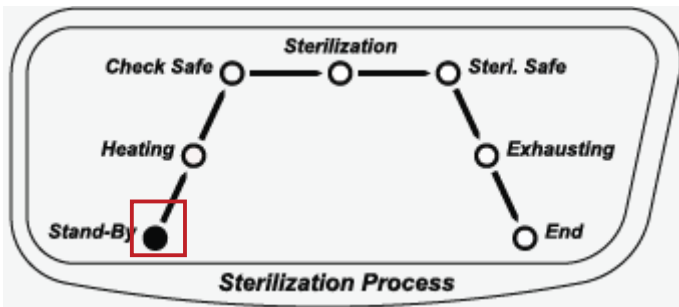


- (3) You can see the stand by screen in VFD and lights on Stand-By LED lamp. Stand by screen indicate the 121 °C and 15 minute as sterilization condition.



Sterilization Temperature

Sterilization time (minute:second)



NOTICE

- Sterilization condition 121 °C and 15 minute is saved as standard (factory programmed), and you can change it in Initial Value Setting Mode. If you turn off and turn on the main switch, always the initial setting value is stored. (refer to 4.9.1)
- Temperature can indicate as Celsius (°C) or Fahrenheit (°F). Standard temperature is Celsius (°C), you can change it in Temperature Unit Selection Mode. (refer to 4.9.2)
- Time can indicate as [minute : second] or [hour : minute]. Standard time is [minute: second], you can change it in Timer Scale Selection Mode. (refer to 4.9.3)

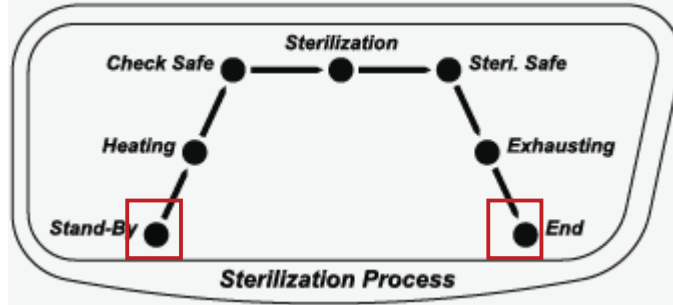
3.10 Operating – Turning Off

After sterilization, VFD indicate the safety temperature '100°C' and 'END' with end alarm. Also lights on the End and Stand-By LED, lights on all LED.

[VFD display]



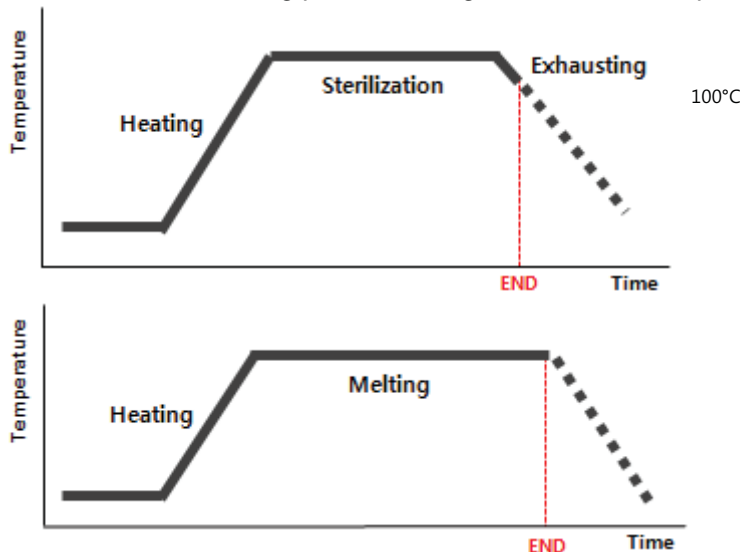
[LEDs]



After sterilization, door open, take out the object and Drain off the heating water as below step.

NOTICE

When you operate the Sterilization, end temperature is 100°C. Only for operate the Melting, after the finish the melting process during the set time, the operation will END.



3.10.1 Door open

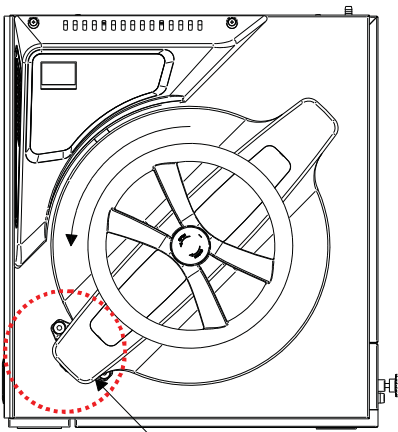
- (1) Do not open the door right after the sterilization. Please check the Pressure gauge as (0MPa, 0kg/cm²) and temperature as below 100°C in VFD(option).
- (2) Turn the Hand Wheel counterclockwise and push the door at right direction if you want to open the door. To avoid the excess emission for residue steam in chamber, please open the door slowly.
- (3) If needed, you can exhaust the residue steam to use hand operated Manual Exhaust Valve which placed in right side of the machine.
- (4) After sterilization, if you leave it for a long time and try to open the door, you could not it. Because inside chamber can be the low pressure condition. In this case, you can open the Manual Exhaust Valve and open the door.

NOTICE

- When the chamber is high pressure condition and as a result of unavoidable circumstance, if you want to discontinue the sterilization and after sterilization, you can remove the residue steam as Manual Exhaust Valve.
 - In front of the pressure gauge is analog type and MPa. In VFD is kg/cm². 0MPa of analog pressure gauge and 0kg/cm² of VFD means 1atm.
-

CAUTION

- Door will open at right side direction. Please secure the right side space.
 - When you open the door, please hold the locking rod as one hand and turn the Hand Wheel counterclockwise. If you do not fully turn the Hand Wheel and open the door, Door Gasket can be damaged or on the machine surface can be scratched.
-



Locking rod

WARNING



- When you open the door, never to near your face and body at entrance of the chamber. Please open the door slowly. You can get a burn at high temperature steam.
 - After sterilization and open the door, certainly you should check the Pressure gauge as below 0MPa, 0kg/cm² and temperature as below 100°C. (Pressure indicate in VFD is option). If you open the door of forced in condition of high temperature and high pressure, the steam can explode. So you can be damaged any material or personnel.
-

3.10.2 Take out the object

Using the handle of the Basket and you have to protect the contacting the object inside of the chamber and take out the object.

Especially if you sterilize liquid, please check the temperature under boiling point and take out the object.

⚠ CAUTION



- When you take out the object, you should wear the experiment clothes, heat blocking gloves and safety shoes.

⚠ CAUTION

- After liquid sterilization, please check the temperature under boiling point and take out the object. Especially, when you use narrow entrance bottle, if you open the cap of the bottle immediately, the liquid can be boiled or exploded. So you should make the liquid cool and never to near your face and body at entrance of the chamber. Also do not shake or shocked the liquid immediately after take out in chamber.
-

3.10.3 Drain off the heating water

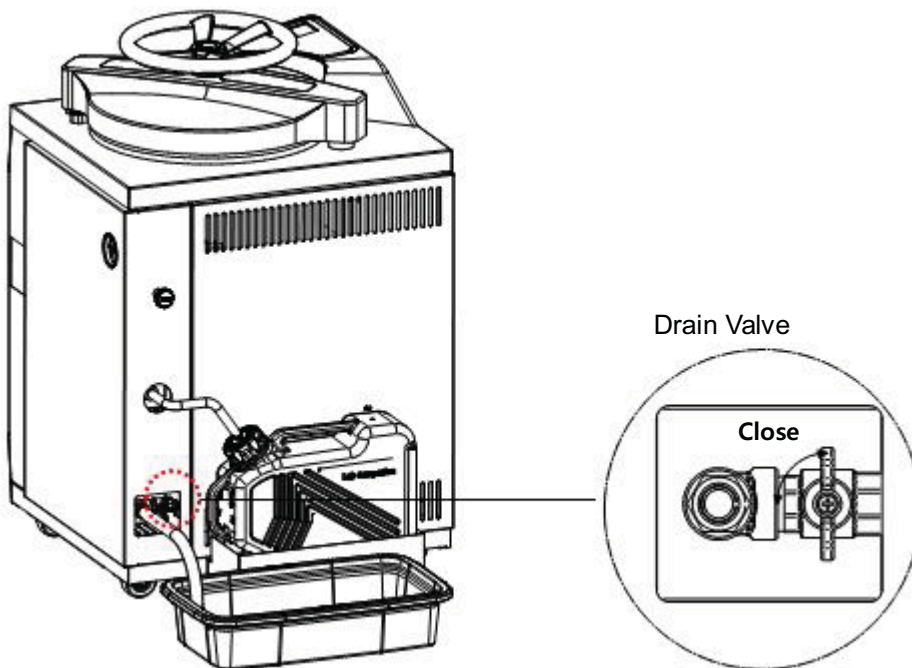
You can open the Drain Valve and drain off the heating water after cooling it. Only after sterilize agar media and if it flows out and coagulated, Drain line can be stopped up. So you should drain off the water immediately.

Drain Valve placed in right side of machine. If you want to open it, turn to counterclockwise(—) and if you want to close it, turn to clockwise(|).

You can use the Drain tube as 14mm diameter in Drain. Also when you drain off the heating water, you can use Drain Bucket.

If you use this machine continually, you can check the remaining water in chamber. After checking the water level and you can supply the water. But if the water is dirty, please drain off the dirty water and fill up the clean water.

You can clean the drain valve. After drain off the dirty water and open the drain valve and supply the clean water continually. After cleaning, please close the drain valve.



CAUTION

- Regularly you should check the drain valve condition.
- After 30 minute the sterilization and cool off the water, you can drain off the dirty water. If you open the valve in high pressure condition, you can get a burn due to the high temperature water and high pressure steam.
- If you use dirty water continually, chamber will corrode and pipe will be stopped up. To avoid the corrosion and stopped up the pipe, do not use the water over 1 day and change the clean water. Also do not keep the water in chamber long time.
- If you sterilize the liquid of Salt, Acid and Alkali or sterilize the culture media making the sulfured gas and chlorine gas, you should drain off the remaining water. Chemistry material in chamber can cause the malfunction or the performance will be fallen off.
- If you release the dirty water, it can cause the water pollution. You have to use Drain Bucket and drain off the cool water.
- If you use other bucket and it is higher than our Drain Bucket, the dirty water can remain the chamber. So you should use our Drain Bucket or lower bucket. And you should use over 7L volume bucket.

3.10.4 Plug out

After final using the machine, please power off.

If you do not use the machine for a long time, power off and plug out.

3.11 Summing-up the operating Procedure.

We will make a long story short 3.0 and 4.0.

When you use the Autoclave, you can refer to the label at the side of Manual Exhaust Valve and use safety.

Operating Procedure
<ol style="list-style-type: none">1. Install the Exhaust Tank and check the water level.2. Fill the heating water in the Chamber to the Heater Cover level.3. Place sterilizing objects inside.4. Close the Door and the Manual Exhaust Valve.5. Set the sterilization condition and press the START button.6. Sterilization

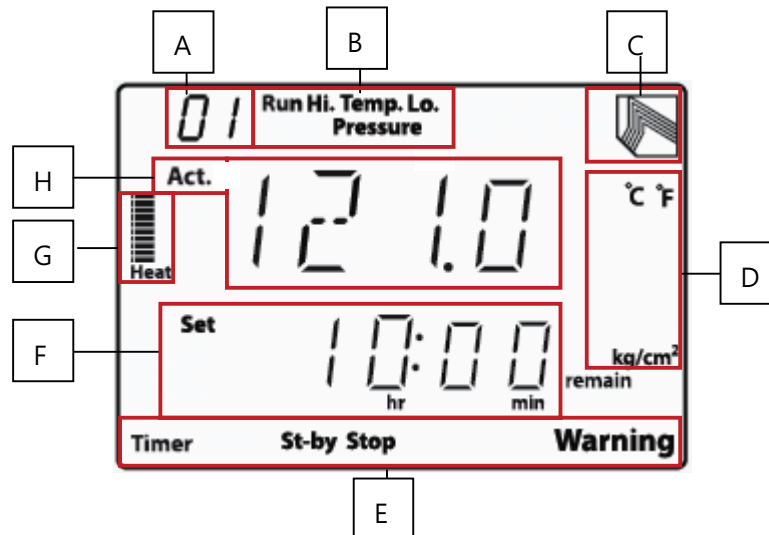
4.0 Operation

4.1 Name and function of control panel

Control panel consist of VFD, LED Lamp and button.

4.1.1 VFD(Vacuum Fluorescent Display)

VFD can check the control condition in machine.

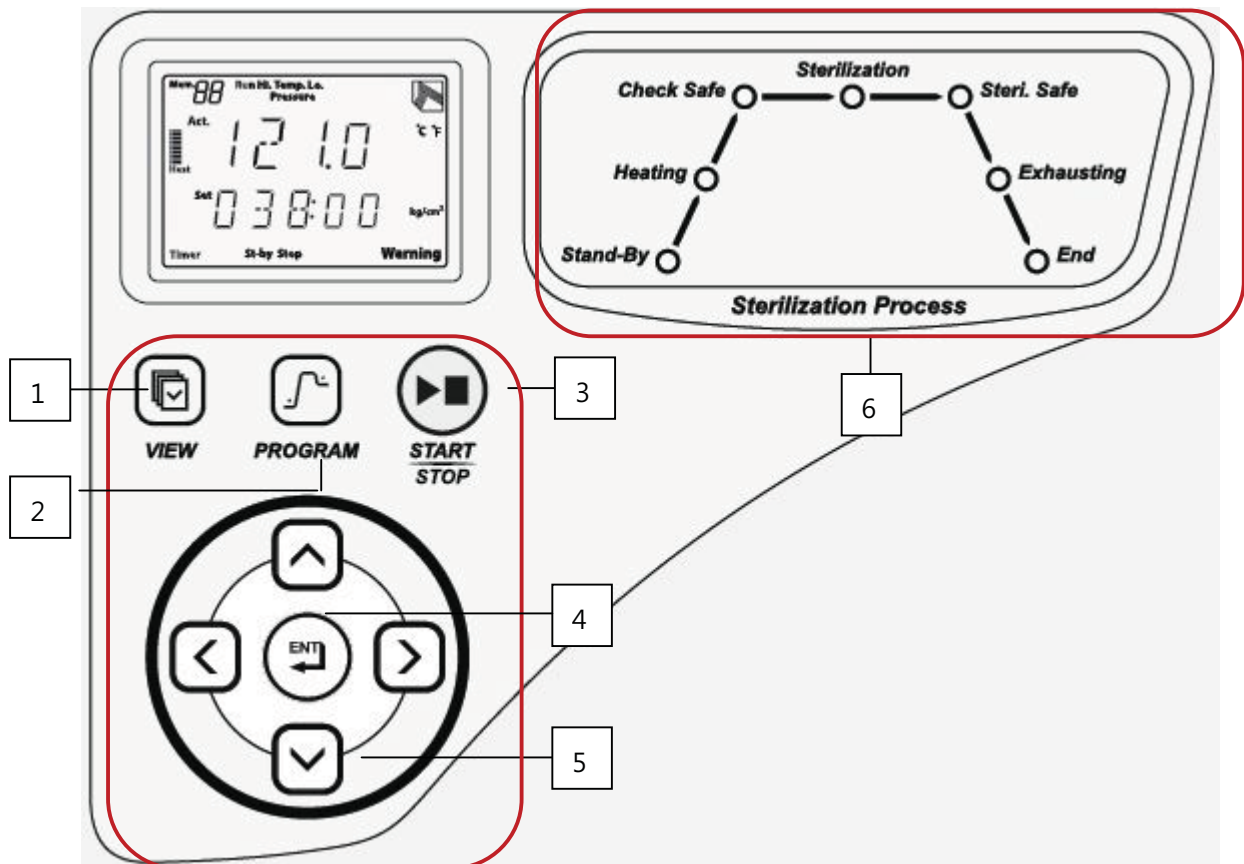


A	Memory	Mode display	Mode classification
	01, 02	S	Sterilization 1, 2 / Decontamination / Solid
	03	L	Liquid
	04	M	Melting
B	Run		Operating
	Hi.		<ul style="list-style-type: none"> If the temperature exceeds over 100°C in stand by and stop condition. during the operation, when happen 'Over Temperature' warning
	Temp.		<ul style="list-style-type: none"> Present temperature Set the sterilization and melting temperature
	Lo.		<ul style="list-style-type: none"> during the operation, when happen 'Low Heat' warning during the operation, when happen 'Low Temperature' warning
	Pressure		Present pressure (option)
C	Lab companion		Our Logo
D	°C °F		Temperature unit (Celsius/Fahrenheit)
	Kg/cm2		Pressure unit

E	Timer	<ul style="list-style-type: none"> • during the timer operation • set the sterilization time
	St-by	Stand by condition
	Stop	Stop condition
	Warning	Warning condition
F	Time	<ul style="list-style-type: none"> • Time unit – [000minute : 00 second] or [000hour : 00minute] • Time – remaining sterilization or melting time, operating time
	Temperature	Set temperature
G	During the operation the heater, heat power level display	
H	Present temperature display	

4.1.2 Control button and LED Lamp

8 button can control the machine and 7 LED lamp indicate the sterilization step.



1	VIEW	<ul style="list-style-type: none"> • Check the Set Value • Check the present temperature and pressure (option) • Check the step and total progress time 	
		<ul style="list-style-type: none"> • Stand by display – enter and cancel for set the initial value, temperature unit and time unit 	
2	PROGRAM	<ul style="list-style-type: none"> • Enter the program mode • Save the program in stand by condition • Cancel the program mode 	
3	START	Operation start	
	STOP	Operation stop	
4	ENTER	<ul style="list-style-type: none"> • Enter the set value • Enter the select program 	
5	Direction Key	Right/Left Key	<ul style="list-style-type: none"> • Enter the standard mode • Move to standard mode and program mode • save or not the changed the program mode • Move to display in VIEW mode • Stand by display – select the set mode for set the initial value, temperature unit and time unit • Select the temperature unit and time unit
		Top and bottom Key	<ul style="list-style-type: none"> • Enter the set mode for temperature and time • Set temperature and time value

6	Sterilization Process LEDs	Stand-By	Stand by condition
		Heating	Heating condition
		Check Safe	Check the sterilization temperature condition
		Sterilization	Sterilization step, timer operation
		Steri. Safe	Finish the Sterilization timer
		Exhausting	Reduce pressure step
		End	finish

NOTICE

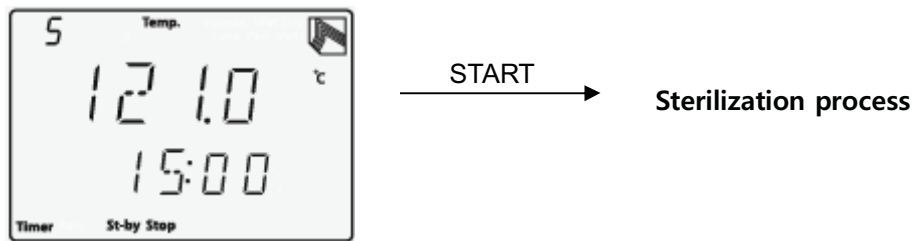
- LED lamp colors are green for St-by & End and others are orange.
-

4.2 General Mode

121°C, 15minute is factory programmed condition. In general mode, you can change the temperature and time. Also you can operate it. But the changed condition will not save and will not change the factory programmed setting value 121°C, 15minute. If needed to change the value, you can change it specific setting mode. (Refer to 4.9.1)

4.2.1 Operate the General Mode

If you want to sterilize the standard mode (121°C, 15minute) in displayed (St-by), you can press the START button and machine will operate directly.



4.2.2 Set the General Mode

In accordance with user working condition and a kind of object and quantity, you can set the temperature and time as you want.

The range of sterilization temperature is 110~123°C, The range of sterilization time is 1~999minute. If you press the top and bottom button in standby mode, you can set the temperature and time in set mode.

Normally, if the temperature is high and the time would be decreased and if the temperature is low and the time would be increased.

Also, in accordance with a kind of object and quantity, required time for sterilization will be different in same temperature (for example: 121°C).

Standard of most common sterilization temperature 121°C, Sterilization time can refer to below table for a kind of object. You can refer to below table for time condition. But in accordance with user working condition and a kind of object and quantity, you can set the temperature and time properly.

Loading Material		Sterilization temperature (°C)	Sterilization Time (min)
Solid	Glass	121	15
	Rubber	121	20
	Metal	121	25
	Fabric	121	30

[Table] required time for sterilization in accordance with object

You can follow up below step for set the temperature and time.

STEP 1 : Press the top and bottom button in standby mode.
Set, Temp., temperature value will on and off..



STEP 2 : You can change the temperature and time value by using the top, bottom and ENTER button.
But if you do not change the temperature and press the ENTER button, you can set the time step (STEP 3).



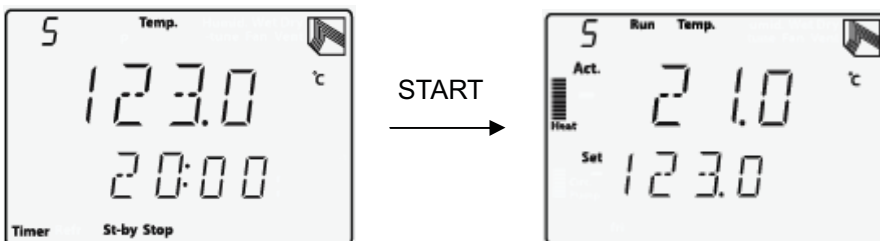
[Enter the sterilization temperature as 123°C]

STEP 3: in condition of on and off at Set, Temp., temperature value, you can change 시간값의 점멸 the time by using the top and bottom button and press the ENTER button. But if you don't want to change the temperature, press the ENTER button.
Changed condition will be saved and come back to standby display.



[enter the sterilization time 20 minute]

STEP 4: If you press the START button in standby display, Sterilization process will start. (Refer to 4.5)



NOTICE

- In normal condition, changed value will not save and if you want to save the changed condition in Standard Mode, you can move to Program mode and save it. (refer to 4.4.3).
- In setting Mode condition, if you do not anything about 20 seconds, 'INPUT CANCL' will display and come back to stand by condition automatically.
- If the value will deviate from standard range – sterilization temperature(110~123°C) and sterilization time(1~999minute), alarm will ring twice and you cannot enter that value.

⚠ CAUTION

- Please follow the sterilization temperature and time in accordance with Loading Material. If the temperature is too low and time is too short, it causes the incomplete sterilization. Or if the temperature is too high and time is too long, the object can damage.

4.3 Standard Mode

ST-G series provide 4 Standard Program for convenience using.

You can select the below 4 option as refer to table : –

Decontamination, Solid Sterilization, Liquid Sterilization and Melting.

Standard Mode			Program mode	
Program		Display	Temperature(°C)	Time(min)
01	Decontamination	'DECON STD'	121	35
02	Solid Sterilization	'SOLID STD'	121	20
03	Liquid Sterilization	'LIQUID STD'	121	15
04	Melting	'MELT STD'	100	30

[Table] Standard Mode

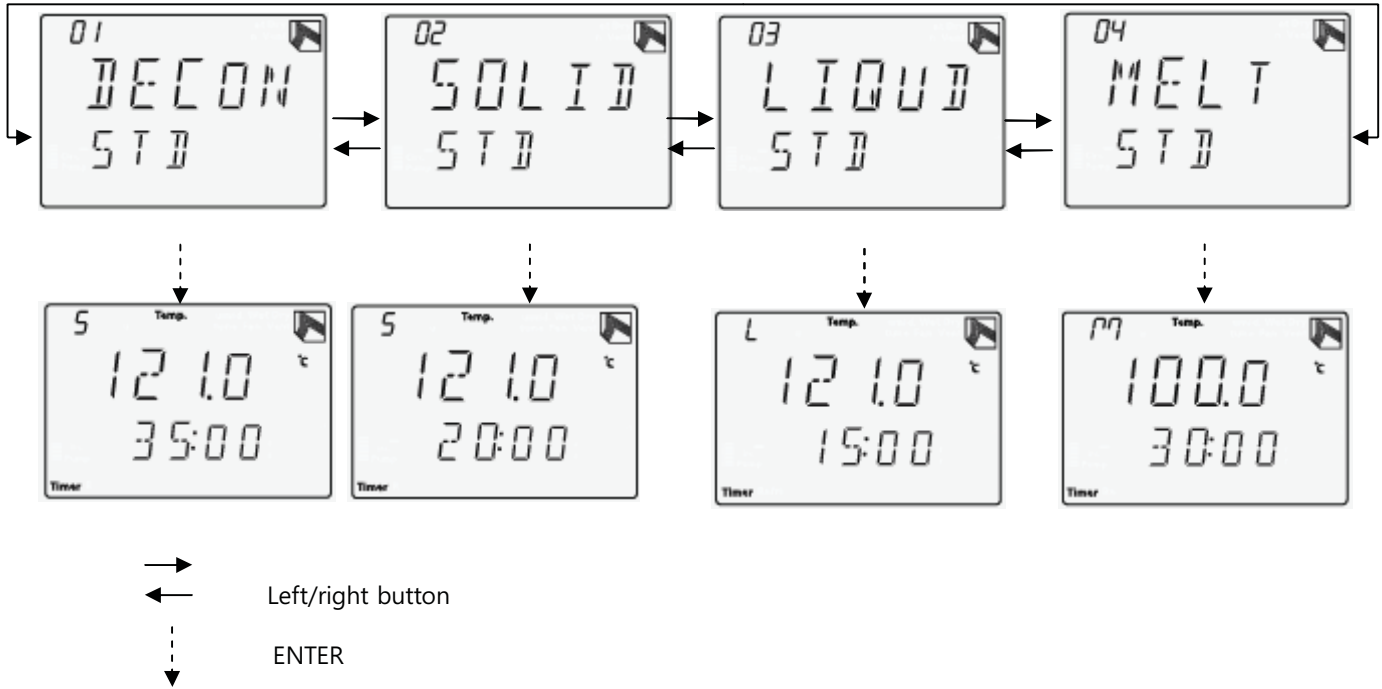
Below table is purpose and operation process for Standard Mode program.

Program	Purpose	Operation process
Decontamination	Remove the contamination of Biohazard and Waste	Heating - Sterilization – Exhausting – End
Solid Sterilization	Non packing materials of glass, plastic, rubber and metal Sterilization.	
Liquid Sterilization	Liquid or media Sterilization.	Heating - Sterilization – Cooling & Slow exhausting – End
Melting	After sterilization and melting for re-congested media	Heating - Melting – End

[Table] purpose and operation process for Standard Mode program

But if you need more time for sterilization, you can reset the time condition.

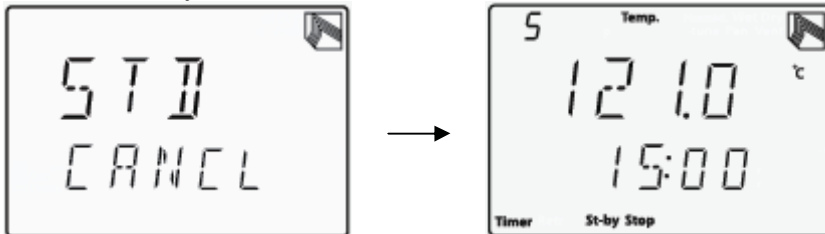
If you press the left or right button in stand by condition, you can enter the Standard Mode and select the program by using the left or right button. And if you press the ENTER button at each program name, temperature and time will display.



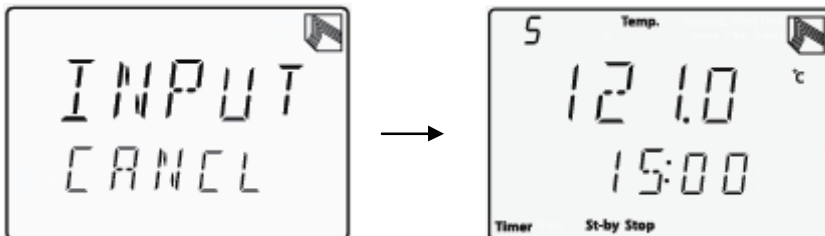
[Picture] Standard Mode

After select the Standard Mode program and you can start as set condition (refer to 4.3.1) or you can reset the program condition.(refer to 4.3.2)

In Standard Mode condition, if you press the PROGRAM button one more, 'STD CANCL' will display and come back to stand by condition.



In Standard Mode condition, if you do not anything about 20 seconds, 'INPUT CANCL' will display and come back to stand by condition automatically.



4.3.1 Start the Standard Mode

If you press the left or right button in stand by condition, you can enter the Standard Mode and you can select the Standard Program the following method and start the operation..

STEP 1: Press the left or right button in stand by condition.
 No.1 Decontamination Program : 'DECON STD'



STEP 2: You can select the program by using the left or right button.

STEP 3: If you press the ENTER button, set condition will display.

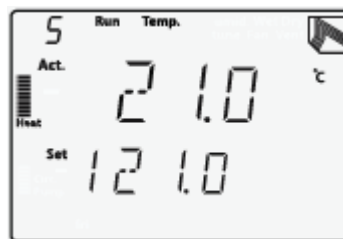


['DECON STD']

STEP 4: Press the ENTER button and come back to stand by display. If you press the START button, Sterilization will start.



START →



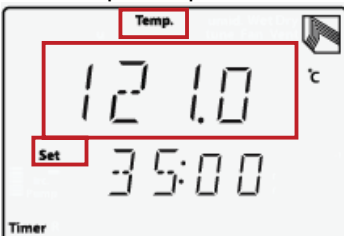
4.3.2 Reset the condition in Standard Mode

You can change the Temperature and time in Standard Mode program.

At the set condition in Standard Mode program, if you press the top and bottom button, you can change the condition. But this condition will not save and if you want to save the changed condition in Standard Mode, you can move to Program mode and save it. (refer to 4.4.3)

STEP 1: If you press the left or right button in stand by condition, you can enter the Standard Mode and select the program. (refer to 4.3.1)

STEP 2: Press the top and bottom button and you can change the condition. Set, Temp., temperature value will on and off.



['DECON STD']

STEP 3: You can change the temperature and time value by using the top, bottom and ENTER button.



[set 122°C]

ENTER →



[set 25minute]

STEP 4 : Press the ENTER button.
You can see the changed set value.



STEP 4 : Press the ENTER button and come back to stand by display. If you press the START button, Sterilization will start.



START →



4.4 Program Mode

ST-G series of four for the convenience of the user program storage capabilities. Primarily for users of the solid and liquid sterilization and soluble conditions can be used to save the program. It consist of General sterilized 2 (Sterilization 1 & 2), sterile liquid (Liquid Sterilization), and soluble (Meting), total 4 memories of program.

Default setting conditions and temperature range of program are shown as below;

Program Mode			Default Conditions	Program setting range	
Program	Display	Temp (°C)		Time (min)	
01	Sterilization 1	'STREI PROG 1'	121°C, 35min	110~123	1~999
02	Sterilization 2	'STERI PROG 2'	121°C, 20min	110~123	1~999
03	Liquid Sterilization	'LIQUID PROG'	121°C, 15min	110~123	1~999
04	Melting	'MELT PROG'	100°C, 30min	60~100	1~999

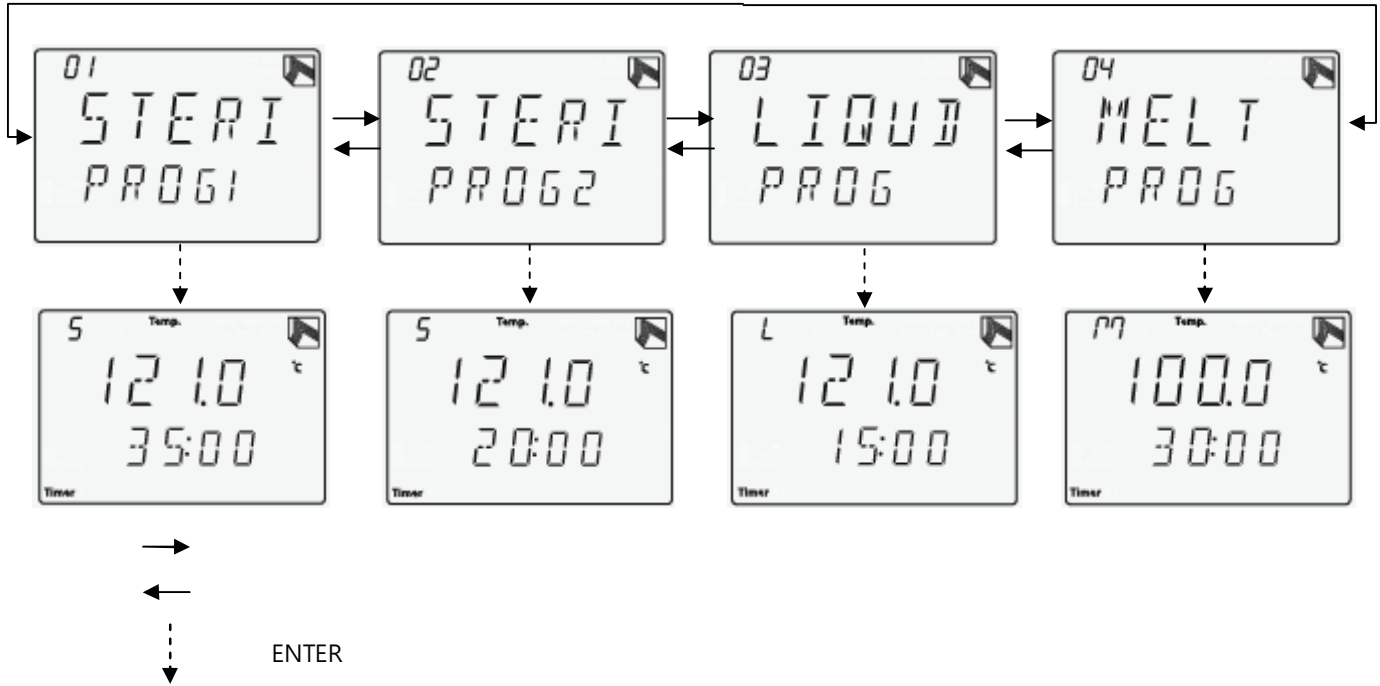
[Sheet #1] Program Mode

The purpose and operation process of the standard mode are shown below;

Program	Purpose	Operation process
Sterilization 1 & Sterilization 2	Sterilization of solids	Heating - Sterilization – Exhausting – End
Liquid Sterilization	Sterilization of liquids and medium	Heating - Sterilization – Cooling & Slow exhausting – End
Meting	Melting for re-solidification of the medium	Heating - Melting – End

[Sheet #] The purpose and operation process of the standard mode

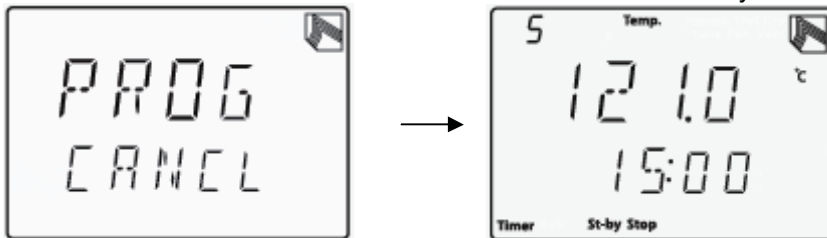
In the standby mode, press the program button to the program mode to enter. After entering the program mode, by using the left / right arrow keys to select the program, and in the program displays, press the ENTER button, then goes to displays of the temperature and time conditions.



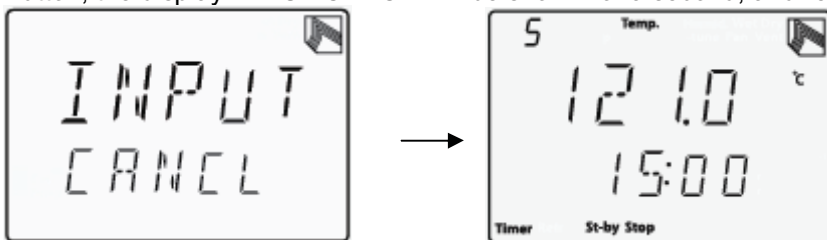
[Picture] The structure of the program mode

After selecting the program mode, you immediately proceed with pre-defined conditions (see 4.4.1), or proceed with other conditions by changing the conditions. (See 4.4.2)

In Program mode, by pressing the PROGRAM button again to cancel the program mode, then, the display 'PROG CANCL' will be shown for a second and returned to the standby.



In Program mode, the pause of 20 seconds of entering the state without the input of the Button, the display 'INPUT CANCL' will be shown for a second, and returned to the standby mode.

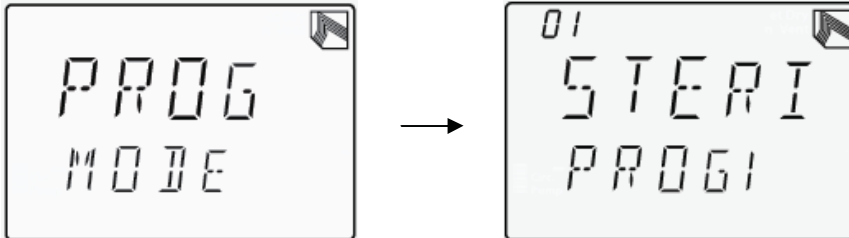


4.4.1 The execution of the program mode

In the standby mode, press the PROGRAM button to program mode and You can also select the program mode easily by the same way.

STEP 1: Press the program mode in the standby mode.

The display 'PROG MODE' will be shown for a second, and then the display #1 'STERI PROG1' will be shown next.



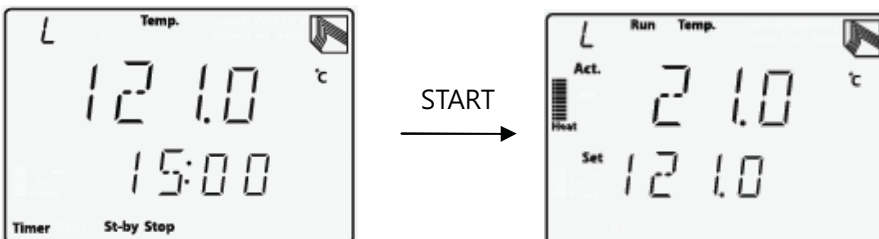
STEP 2: Select the program mode you want by using the left/right arrow keys.

STEP 3: the display of condition of the program will be shown by pressing " ENTER button.



[example: LIQUID PROG]

STEP 4: Press " ENTER " button to Standby mode, and press " Start " button to start the sterilization operation.



4.4.2 Changes in program mode

User can use the stored conditions like temp. And time frequently saved.

To save the desirable conditions, select temperature and time in order by using the up/down arrow keys in program display of conditions

This is the way to save in the following instructions.

STEP 1: Select the program by using the left/right arrow keys in standby mode.(See 4.4.1)

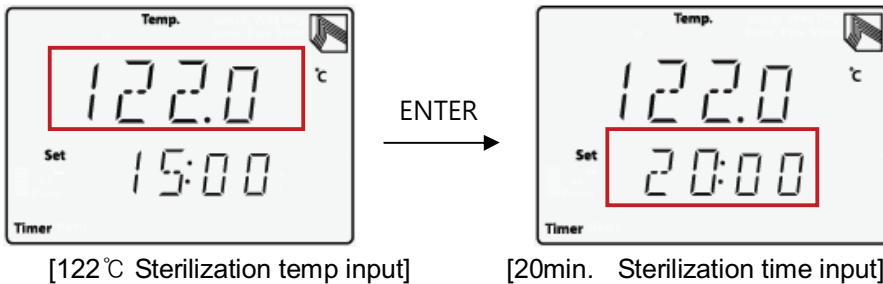
STEP 2 : Press the up/down arrow keys.

The value of temp. is flashing on the display after entering temp. setting stage.

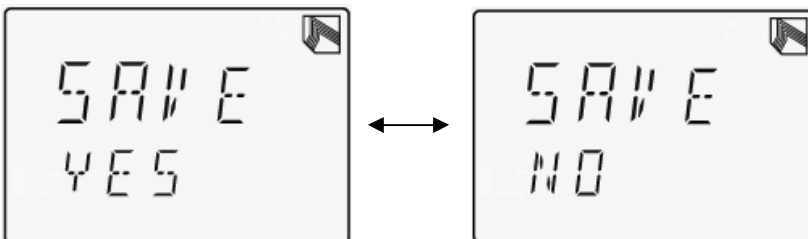


[Example: 'LIQUID PROG']

STEP 3 : Change the value of Temp and time in order by using the up/down arrow keys and ENTER button.

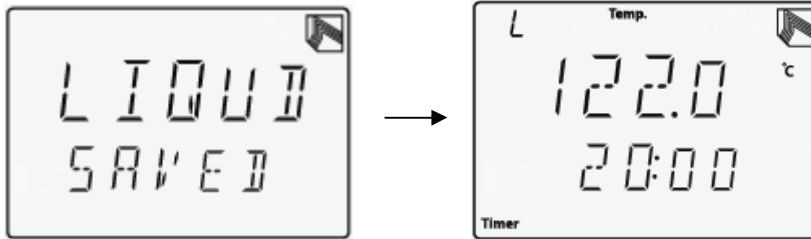


STEP 4 : Decide whether to save the value or not by using the left/right arrow keys after pressing “ Enter “ button.



STEP 5 : Press “ ENTER “ button.

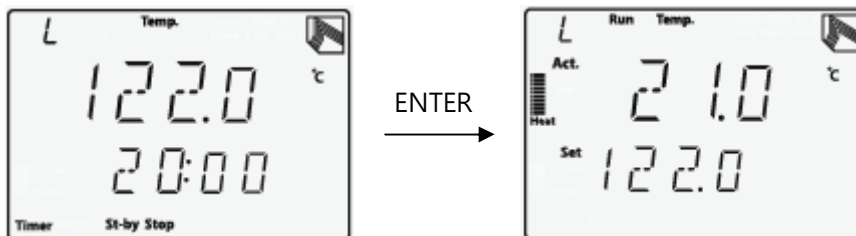
If 'SAVE YES' is selected, and then the display 'LIQUID SAVED' will be shown/disappeared for a second, and goes to the program mode of temperature and time changed.



On the contrary, If 'SAVE NO' is selected, then goes to the program mode of temperature and time unchanged.



STEP 6 : Press " ENTER " button to Standby mode, and press " Start " button to start the sterilization operation.



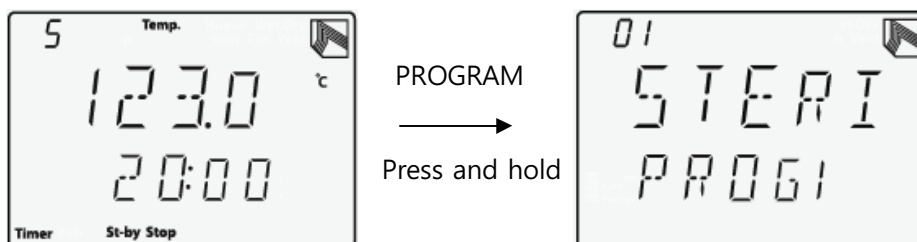
4.4.3 In the standby mode, the program storage function (press and hold the program button)

This is the function to save the program setting in the standby mode. Just press and hold the program button litter bit longer if you want to use the pre-defined setting which is related to a specific sterilization condition in the normal mode, or the other conditions in the standard mode. In the normal mode, program mode STERI PROG1 / 2, and in the standard and the program mode, the value of each of the STERI PROG1 / 2, LIQUID PROG, MELT PROG can be saved respectively.

(1) Saving the program in the normal mode.

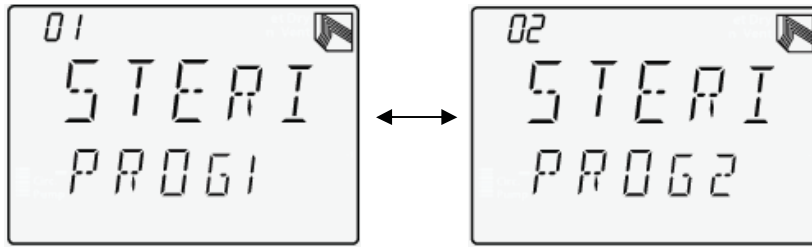
STEP 1 : Press and hold the program button in the standby mode after changing the setting value of temperature and time.

The display 'STERI PROG 1' will be shown on the screen with moving to program mode.



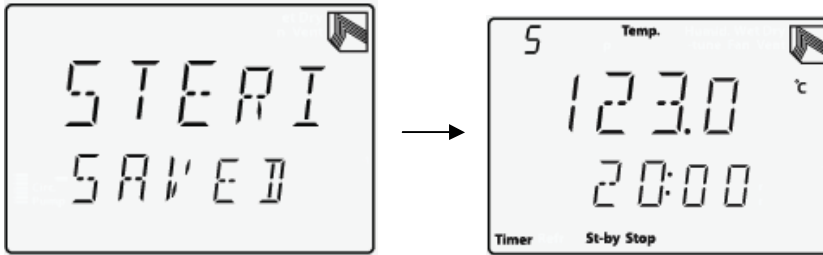
STEP 2 : Select the program by using the left/right arrow keys.

'STERI PROG 1' or 'STERI PROG 2' only in sterilization program can be saved.



STEP 3 : Press “ Enter “ button after selecting the program.

The display ‘STERI SAVED’ will be shown and disappeared, then it moves to the standby mode.

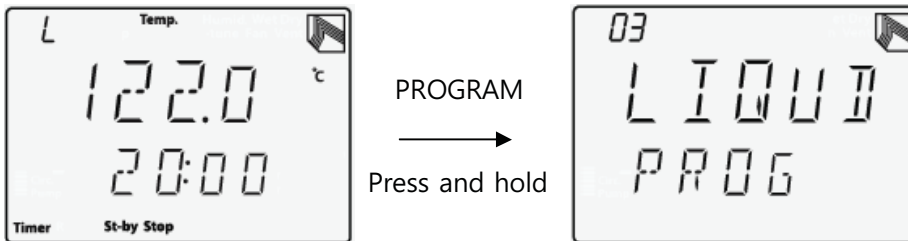


STEP 4 : Press “ START “ button, then the sterilization process starts.

(2) Saving the program in the standby mode and in the program mode.

STEP 1 : Press and hold the program button in the standby mode after changing the setting value of temperature and time in the standard mode or in the program mode.

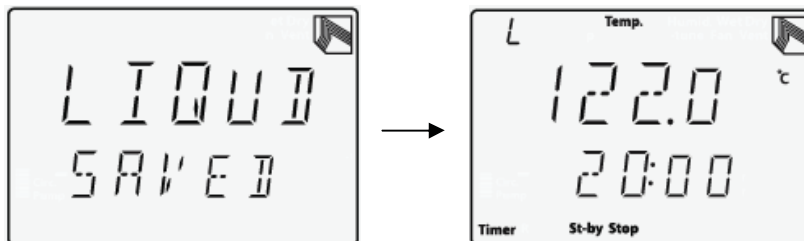
Press and hold the program in the liquid sterilization, then the display ‘LIQUID PROG’ will be shown with moving to the related program.



[LIQUID the sample mode]

STEP 2 : Press “ ENTER “ button.

The display ‘LIQUID SAVED’ will be shown/disappeared with moving to the standby screen.



STEP 3 : Press “ START” button, then, Sterilization Process of Liquid starts.

4.4.4 The program cancellation

Press the program button once at any stage of the program, then it can be cancelled with going back to the standby display.

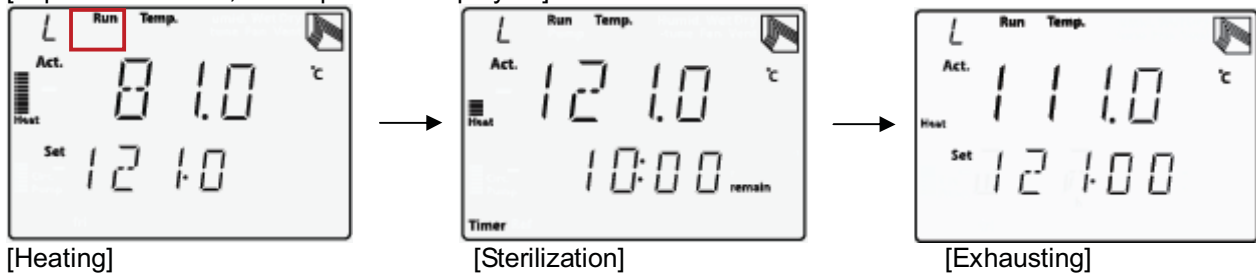
4.5 Sterilization Process

If you press START button in the standby display, the Sterilization process(Heating —Check Safe - Sterilization - Sterilization Safe - Exhausting – End)will proceed automatically.

You can easily find the present status of the sterilization process and operation of the unit by seeing through Sterilization Process LEDs and VFD. You can also see the heating capacity, the current temperature, set temperature and the remaining time in the VFD operation display. In addition, in order to more easily find the present program mode, there will be shown Sterilization into 'S', and Liquid Sterilization into 'L', Melting into 'M' on VFD display.

Program	VFD display	VFD Operation display		
		heating	sterilization(melting)	exhausting
Sterilization	S	Current temperature and Sterilization set temperature	Current temperature and the remaining time	Current temperature and Sterilization set temperature
Liquid sterilization	L	Current temperature and melting set temperature	Current temperature and the remaining time	Current temperature and melting set temperature
Melting	M	Current temperature and Sterilization set temperature	Current temperature and the remaining time	Current temperature and melting set temperature

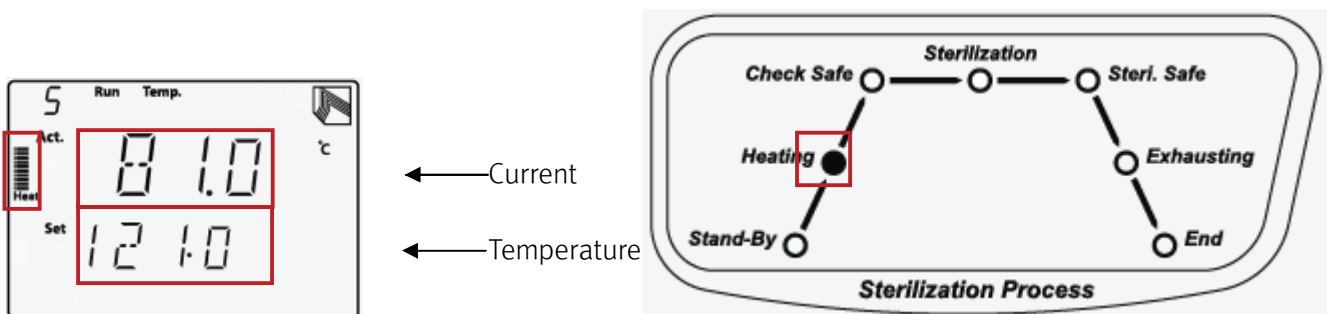
[Liquid Sterilization, VFD operation display ex]



4.5.1 Heating

If you press START button after setting the sterilization conditions, the heating starts.

The current heating temperature and set temperature and heating capacity will be shown on the display with flashing of heating LED.



During the heating phase, Solenoid Valve is open in certain conditions in order to effectively remove the air in the chamber and keep the pressure constant.

The heating process processes up to the sterilization set temperature(121°C).

In case it does not reach the sterilization or dissolving temperature in a certain period of time(50min), the warning of

Low Heat will occur. (4.10 Warning alert see)

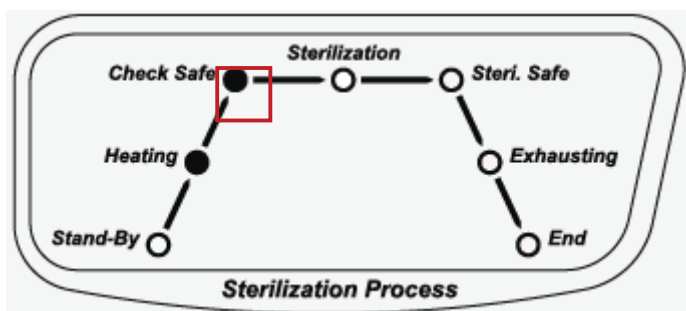
NOTICE

- START button cannot be activated in the view mode of standby stage.
 - Stand-by LED will go out when the Sterilization or Melting Process starts.
 - There can be the exhaust noise when the air in the chamber is discharged to the outside through the exhaust pipe.
 - It may cause the non-uniform temperature distribution and the interference with a normal rise in temperature in the chamber when the air inside the chamber remains not being fully discharged. ST – G series provides a uniform temperature distribution inside by effectively emitting the air inside of chamber through an automatic air exhaust.
-

4.5.2 Check Safe

The sterilization process will proceed to the next step after the temperature inside of chamber should be satisfied with a certain temperature of sterilization.

LED lights and alert occurs in the Check Safe stage If not satisfied.

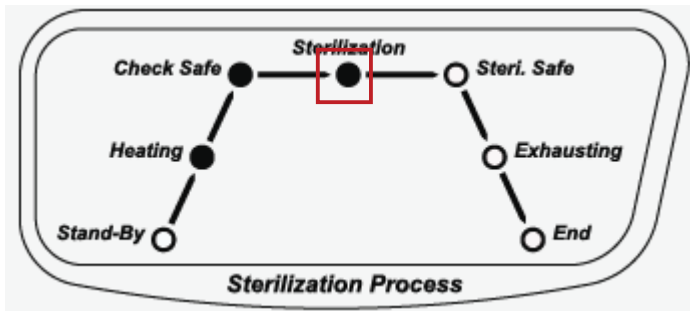
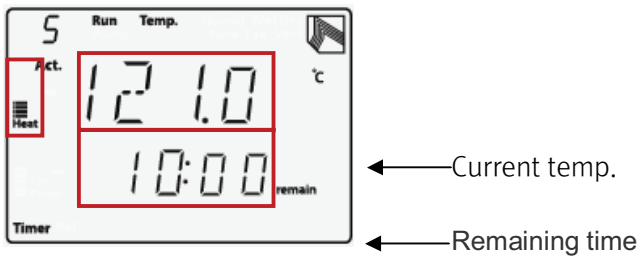


4.5.3 Sterilization

It's done by the specified sterilization temperature and time.

During the sterilization process, the sterilization temperature and pressure are kept constant (ex: 121°C, 1.1~1.2kg/cm²)

The sterilization temperature, time and the heating capacity is shown on the VFD display with flashing LED of sterilization.

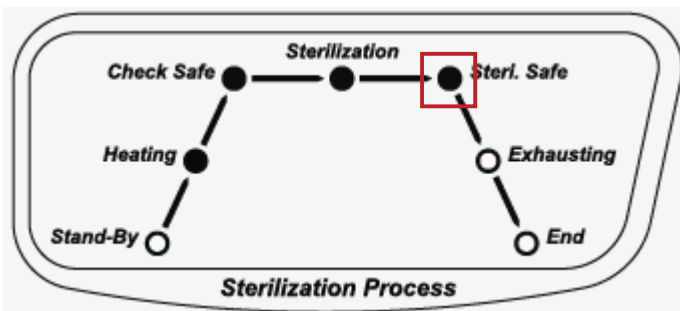


The warning of Low Temperature will occur when the sterilization temperature stays at the below set temperature for over 5 seconds..

The warning of Over temperature will also occur when the sterilization temperature stays at the over set temperature(125°C) for more than 10 seconds. (4.10 Warning alert see)

4.5.4 Sterilization Completion

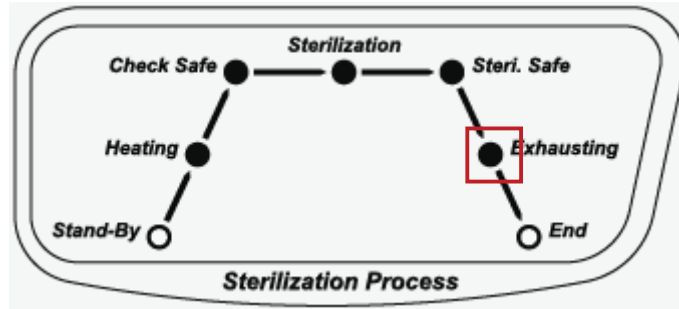
Once the sterilization is complete for the specified set time, the alert sounds and Steri. Safe LED's lights as a notification of sterilization completion.



4.5.5 Exhausting

The solenoid valve is automatically open with a beep sound in order to emitting the saturated steam when the sterilization is complete.

The current temperature and the set temperature of the unit will be shown on VFD display with flashing LED at the exhausting phase.



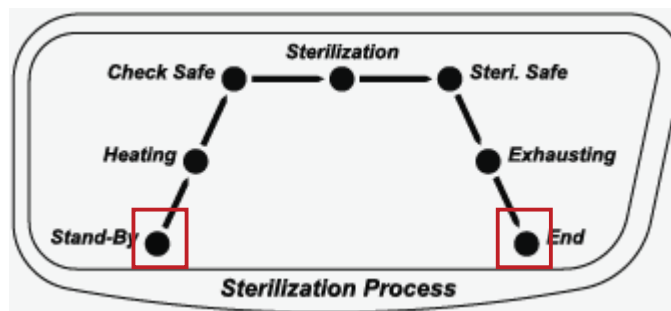
The exhausting process proceeds with emitting the steam until the temperature and pressure of the chamber is lowered to the safety level.

NOTICE

- In case of liquid sterilization, the solenoid valve is not open when the sterilization is complete. It is open after the temperature and pressure of the chamber is lowered to the safety level in order to prevent boiling up of the liquid. (4.6 Liquid sterilization process see)

4.5.6 Finish

If the temperature inside the chamber reach to safe temperature (100 ° C) when the sterilization operation will end with a notification sound on VFD '100 ° C 'and' END 'is displayed, and the End of Stand-by LED will light.



When the operation is finished, you can check each operated time and go to stand-by mode. After finishing the door will be released for safety.

(1) Sterilization time for each step

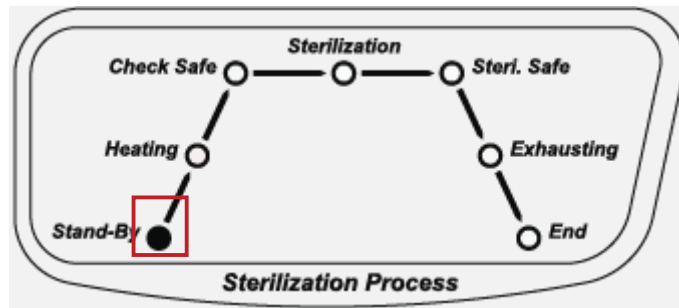
After finishing sterilization, if push the view button, you can find every sterilization time and total operated time.(refer to 4.8 view)

In view mode, if press view buttons the display goes back to End mode, If press Enter buttons the display go to stand-by mode.

(2) Stand-by Mode

After finishing the operation, if press Enter button display goes to stand-by mode.

When the display go back to stand-by mode, it displays initial value and Stand-by LED will light.



[After finishing Display sample]

NOTICE

- If you go back to stand-by mode, you can not find operated time so that if you want to see operated time, you should keep in mind not touch the Enter button.

CAUTION

- If various materials should be sterilized together, please set timer along with the material which requires the longest time.
- Please use single-use wrap for sterilization and waste.
- Never open the Drain valve during operation.
- Please use Sterilization Indicator(Indicator Tape, Strip) to check perfect for Sterilization.
- Please use Biological Indicator to check Auto clave performance timely.
- When you sterilize liquid material, it may possible overflow due to extreme steam coming out along with opening solenoid valve (4.6 Liquid Sterilization)
- Please take interval time between two jobs to cool down at least 10 ~ 15 minutes.

CAUTION

- During operation, the unit surface and door area are very hot. Please take care of handling.
- During operation, if there is strange noise / smell / smog, stop the unit and turn off the power instantly. Then contact to your local service agent.
- If VFD display and LED lamp indicate differently, stop the unit and turn off the power. And turn on again, check display indicate same symptom. If the unit is still not working please ask to your local service agent.

⚠ WARNING



- Substances and gases that contain volatile components are prohibited to sterilize. An outbreak of toxic substances or risk of explosion



- Sterilization of flammable or toxic substances is prohibited.
 - Substances that can be corrosive Stainless steel is prohibited.
-

4.6 Liquid Sterilization Process

Standard mode or program mode is selected sterilization of liquid up to a sterilization program to go through the same process, but the pressure-control solenoid valves for the process, unlike the normal sterilization process is in progress. In other words, after the completion of the liquid sterilization under reduced pressure sterilization process directly without opening the solenoid valve, and allow it to cool to a safe temperature and then open the valve (natural cooling and slow exhausting) emissions by the vapor of the liquid to prevent boiling up.

⚠ CAUTION

- To sterilize liquid, must liquid sterilization program is selected in the the standard mode and program mode. If it works in normal mode after the completion of sterilization steps, it can overflow or explosion due to rapid reducing the pressure.
 - When selecting liquid sterilization process compared to normal sterilization decompression (cooling process), because the longer time required for the total time spent, in a sterile liquid little longer.
-

4.7 Melting Process

When you do Liquefaction of coagulated agar media, it should be selected Melting program in the standard mode and program mode. Melting process is comprised Heating – Melting –End steps

Heating : Heating stage is heated to melting temperature.

Melting : After reaching the melting temperature, dissolved badge Agar during set hours.

End : When the setting time is over, Melting process will be closed.

Melting process indicates in the same manner as the LED light displays of sterilization process.

NOTICE

- Agar badge Melting program is under 1L condition contained in 2L container. If the media can cause the incomplete dissolution due to put more than 1L.
 - At least more than 1.5 bigger volume container recommended. If the container volume is too small compare to badge full filled in the container cause the incomplete dissolution.
-

4.8 Monitoring(Temperature, Pressure, Time)

Stand-by and operating conditions can be checked with view button for unit status and step-by-step elapsed time. In particular, after finishing the operation, the elapsed time for each step can be checked so that the sterilization process can check whether it was proper operation.

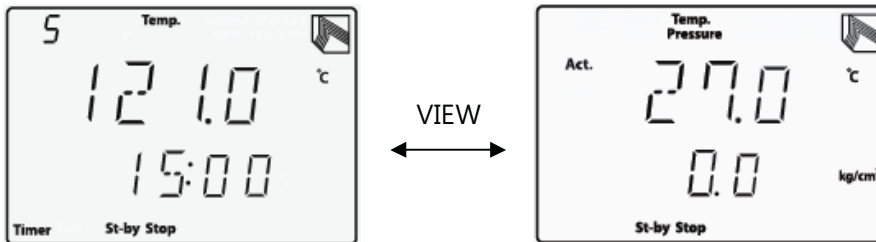
View mode for each step can be found in the information shown in the table below

Step	View Mode
Stand-by(St-by)	Present Temperature, Pressure(option)
Sterilization	Set condition, Present Temperature, Pressure(option), Elapsed time for each step, Total elapsed time
END	Elapsed time for each step, Total elapsed time

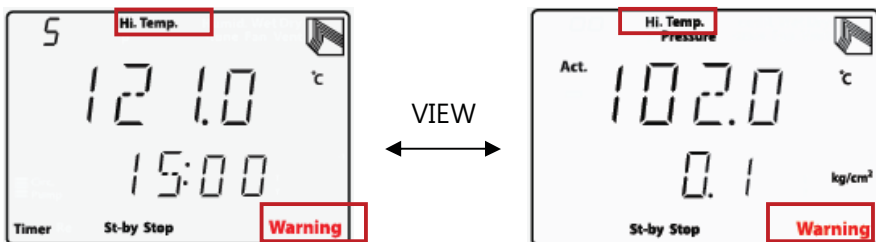
In View mode entry state, If VIEW button is pressed again or not the 20 seconds of the button input, View mode is canceled and return to the previous screen automatically.

4.8.1 Temperature / Pressure(optional) checking

In stand-by state, if VIEW button is pressed, the present temperature and pressure will be displayed. But Pressure value displays only for Pressure sensor optioned units.

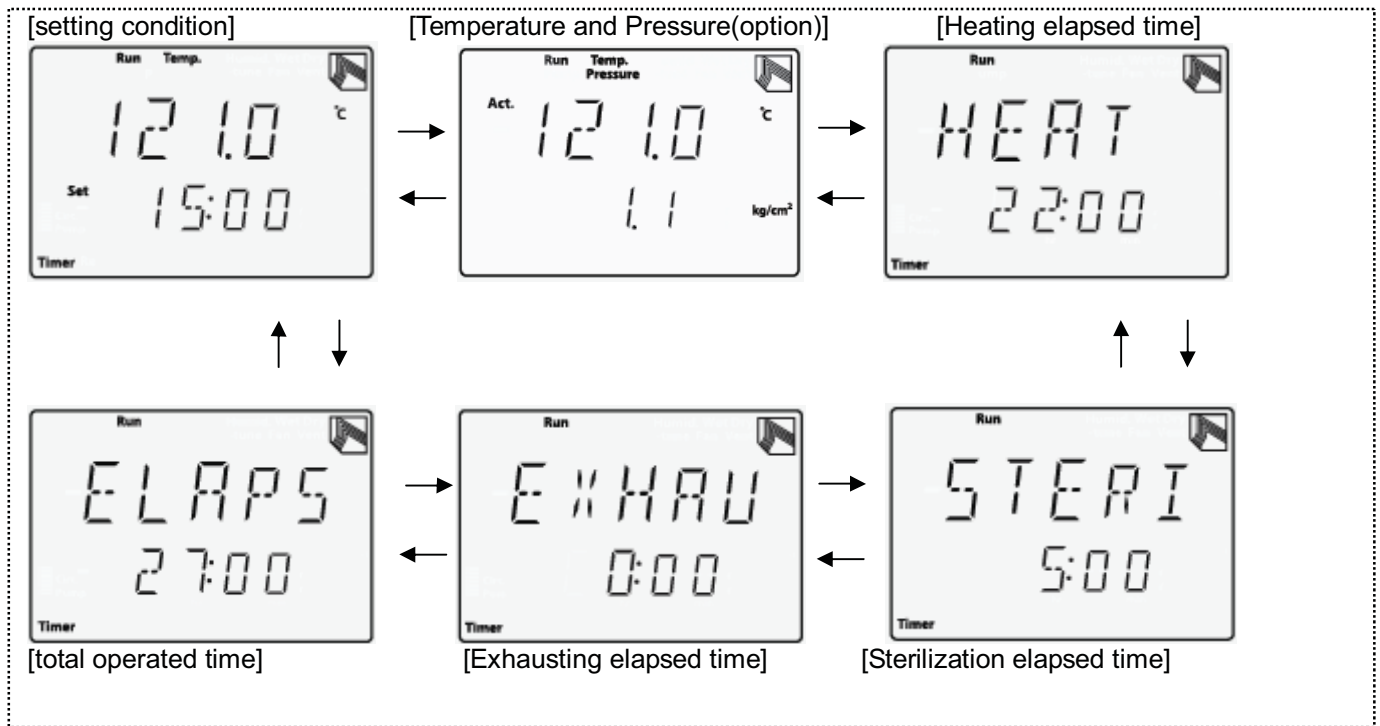
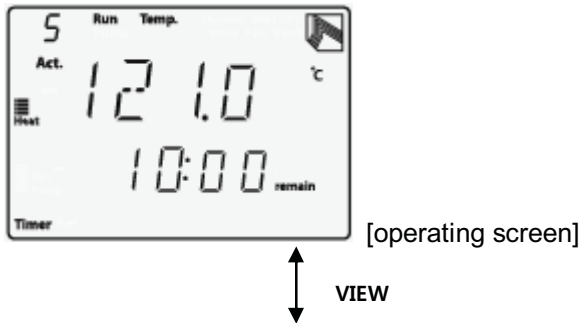


Also, if the chamber temperature inside raise more than safety temperature(100°C), 'Hi Temp' will be displayed.



4.8.2 How to check during Sterilization

During Sterilization Process, press view button to enter view mode. Use left, right key, to control. You can check setting condition, present temperature and pressure (option), each step of Heating –Sterilization – Exhausting, elapse time and total operated time. (To see Temperature and Pressure, pressure sensor should be required)

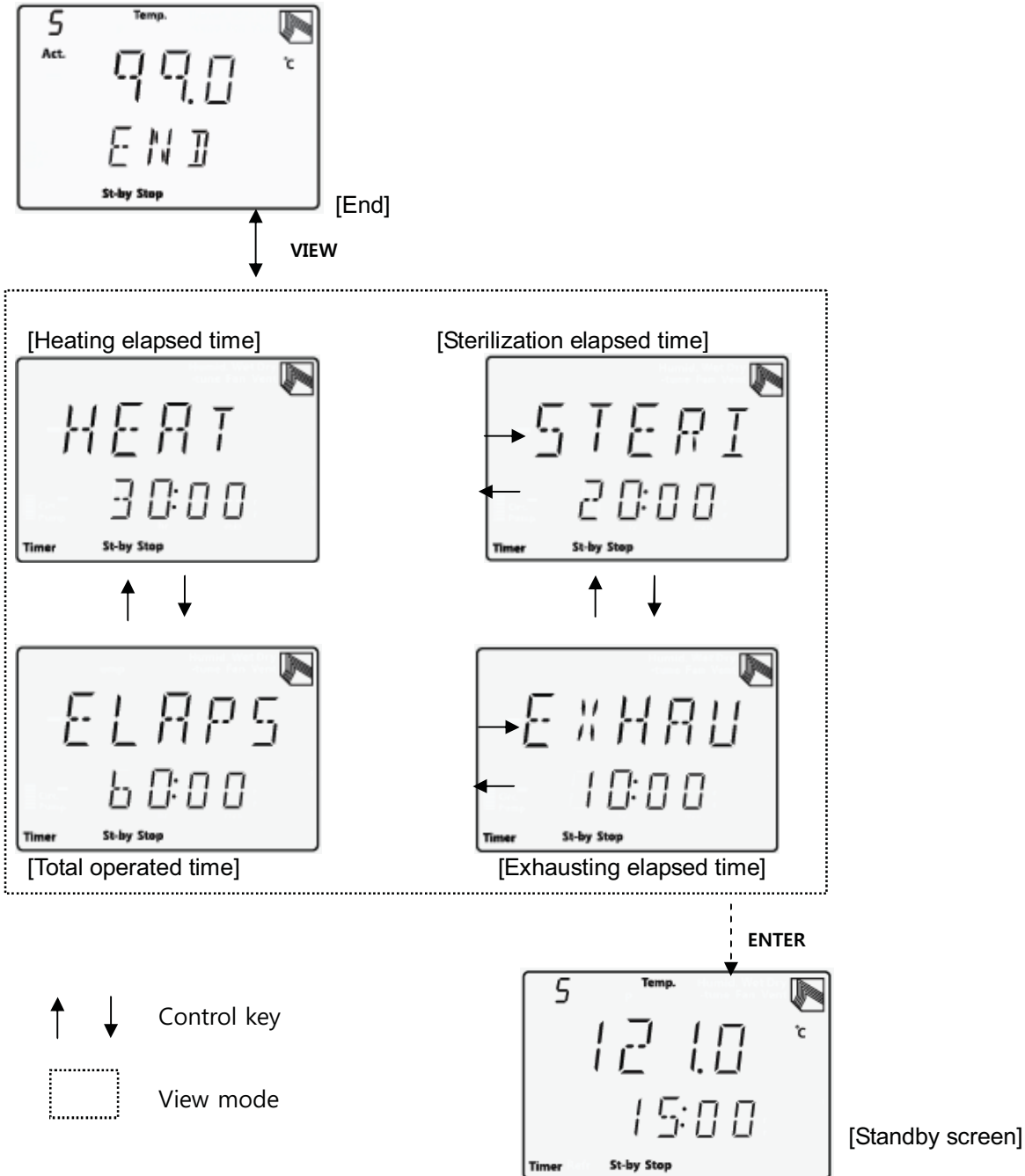


↑ ↓ Control Key

□ View mode

4.8.3 How to check after sterilization

After sterilization, press view button then each step elapsed time and total operated time will be displayed. It displays initial heating step and all the other information as below are checkable by using control(direction) key.

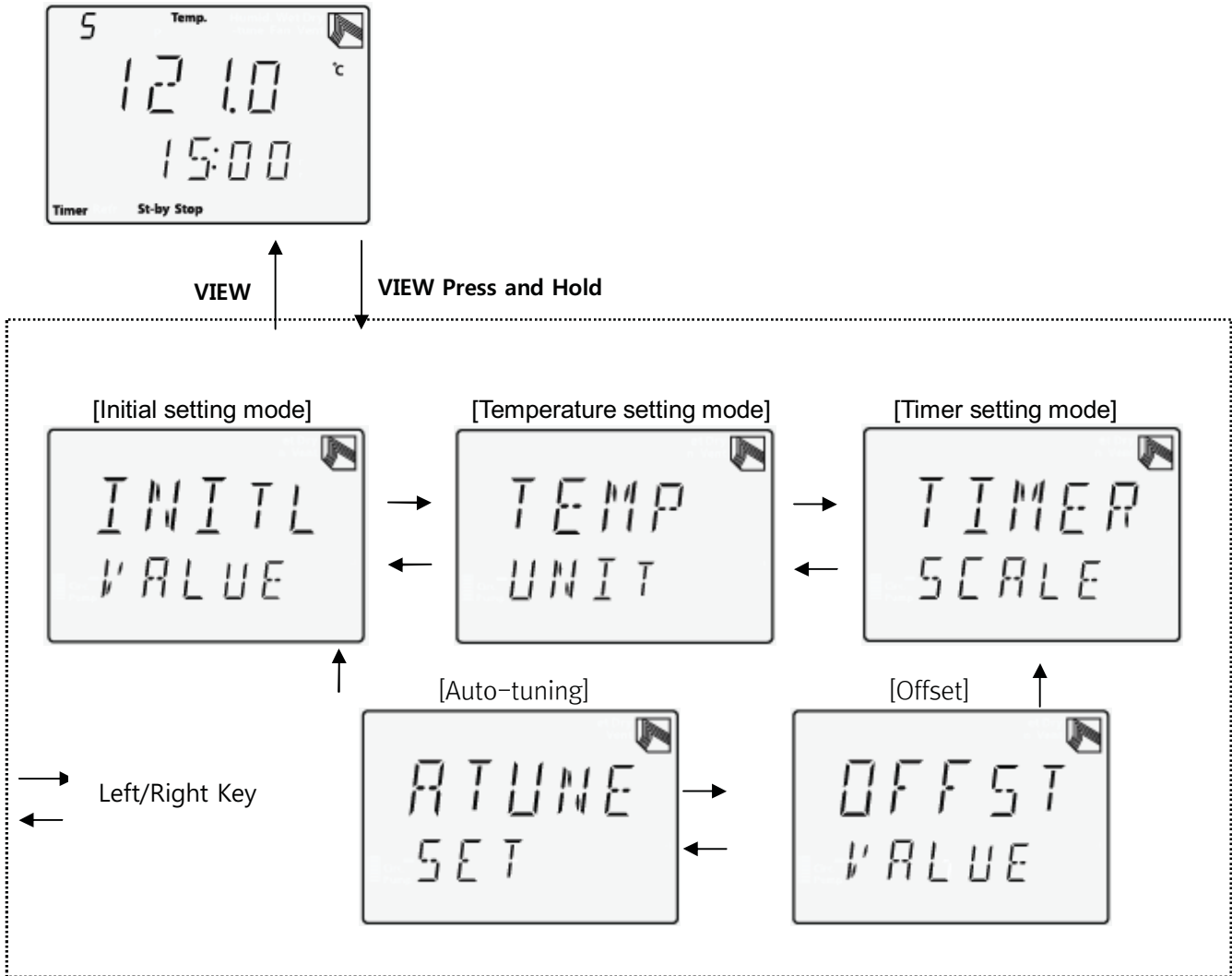


NOTICE

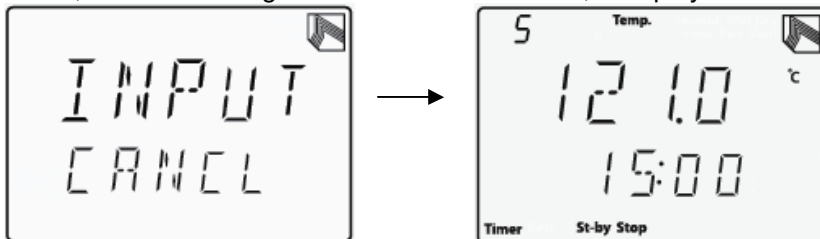
- In View mode, Press VIEW to return to End screen, press ENTER button to go to Stand-by screen.
- After returning to stand-by screen, you can't check each elapsed time any more.

4.9 Initial Value(Temp. Timer setting)

In Stand-by more, if press View button long, the screen displays Temperature unit and Timer Unit. Left/Right key can control Temperature unit and Timer unit.



In mode status, if you press view button again, then it will be canceled and back to Stand-by mode. Or in mode status, if there is no signal more than 20 seconds, it displays 'INPUT CANCEL' and back to stand-by screen.



4.9.1 Initial Value setting

When returning after the completion of any action or cancel, always the initial value is displayed to return to standby mode. The initial value of ST-G series is 121°C and 15 minutes. In initial value setting mode, the user can set the initial values to suit one's environment and set the initial value of the instrument is always saved when you turn the power off

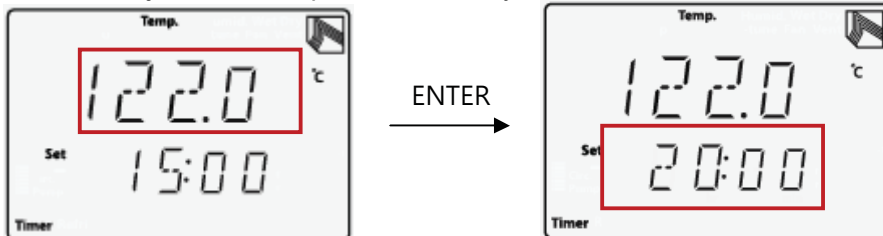
STEP 1 : Press view button long in stand-by mode
The screen displays INITL VALUE



STEP 2 : Press enter button.
Temperature value will display



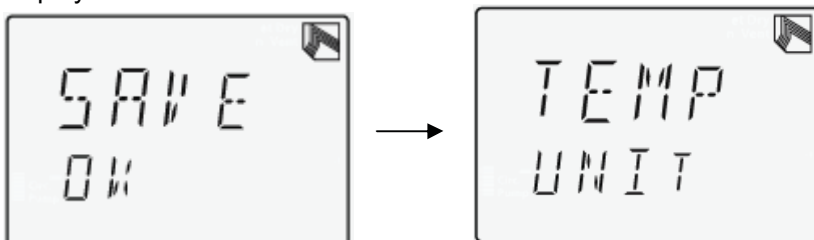
STEP 3 : Adjust initial temperature value by using control key and enter button.



[122°C temp. input]

[20min input]

STEP 5 : After adjusting if press Enter button, it beeps and display 'SAVE OK' as saved it. Then the screen displays 'TEMP UNIT'



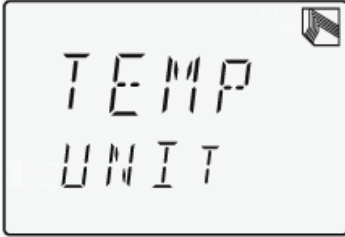
If user does not want to adjust temperature unit, press view button to go to stand-by mode.

4.9.2 Temperature unit setting

ST-G series temperature default value is °C
In temperature setting, the unit is selected (°C) or (°F)
The order is as following steps.

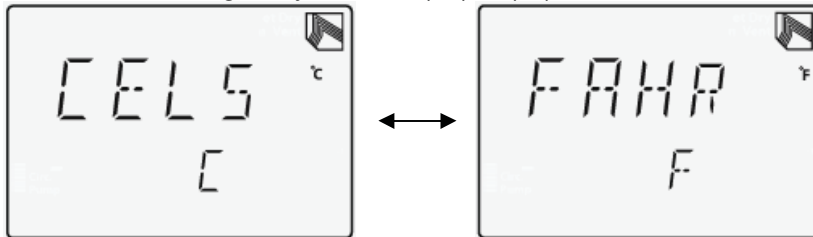
STEP 1 : Press View button in stand-by mode
The screen displays 'INITL VALUE'

STEP 2 : Use Left/Right key and select temperature unit setting
The screen displays 'TEMP UNIT'

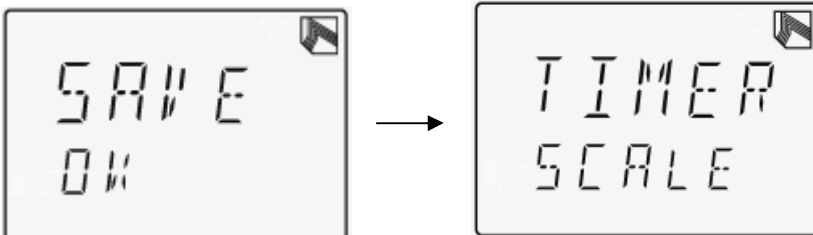


STEP 3 : Press ENTER button
It displays default value
Normal ST-G series default value is (°C)

STEP 4 : Use Left/Right key to select (°C) or (°F)



STEP 5 : After adjusting press 'ENTER' button to save.
It displays 'SAVE OK' and then displays 'Timer Scale' again to go to time unit setting mode.



If user does not want to adjust Timer unit, press view button to go to stand-by mode.

4.9.3 Timer unit setting

ST-G series default timer value is 'Min' ; 'sec'. However User can change to 'Hour' 'Minute" or customizing in timer unit setting mode. But if the timer default value has been changed, sterilization timer unit and setting time unit are not changed.

Timer Scale	Display	Sterilization timer unit range	Timer setting unit
[Timer:Min]	999hr 59min	1~999min	1 min
[Min:Sec]	999min 59sec	1~999min	1 min

These are adjustable as follows.

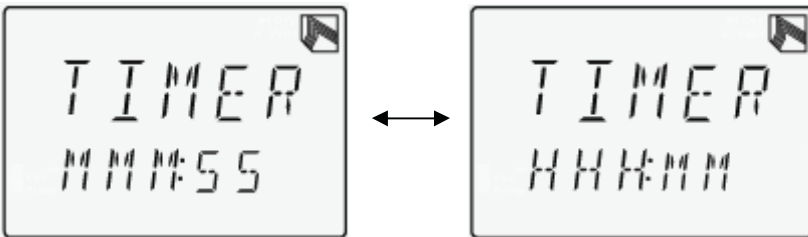
STEP 1 : Press View button in stand-by mode.
The Screen displays 'INITL VALUE'

STEP 2 : Used Left/Right key to select timer unit setting mode
It displays 'TIMER SCALE'

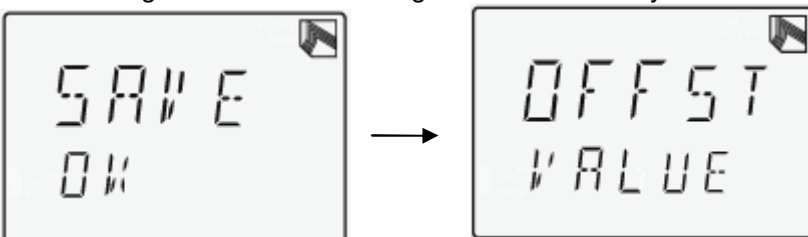


STEP 3 : Press ENTER button.
It displays default value.
Normal ST-Gseries timer default unit is (MMM:SS)

STEP 4 : Use Left/Right key to select (MMM:SS) or (HHH:MM)



STEP 5 : After adjusting press Enter button to save.
It displays 'SAVE OK' and 'OFFSET VALUE' is shown up later.
The screen go to initial value setting mode automatically.



If user does not want to adjust OFFSET value, press view button to go to stand-by mode without any change.
Operation stop & Warning

4.9.4 Setting Offset

The Autoclave provides offset function to calibrate error tolerance between external temperature sensor and display of unit.

Offset can be set as below.

STEP 1 : Pressure VIEW button for long time at stand-by condition.

'INITL VALUE' will show up

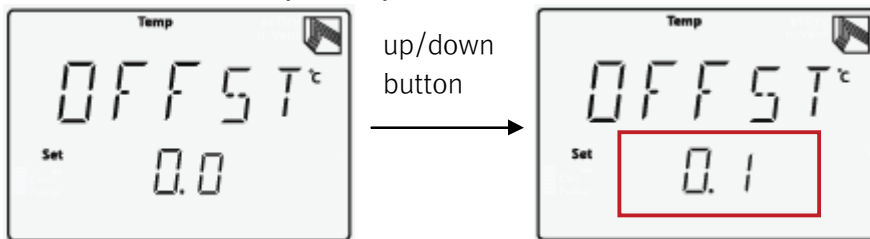
STEP 2 : press right/left direction button -> enter to Offset mode.

'OFFST VALUE' will show up



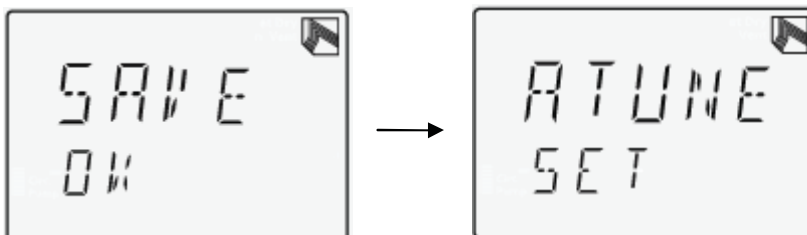
Step 3 : Setting offset value by using up/down key after press ENTER button

Offset is set 0.0 basically, when you set Offset , the unit is 0.1°C.



Step 4 : Press ENTER button after setting Offset value

'SAVE OK' mark will indicate and disappear. Then it will enter the Auto-tuning mode.



If you do not precede the Auto-tuning operation, you can return the stand-by screen by using VIEW button.

4.9.5 Auto-tuning

This machine is applied to PID temperature control method, as manufacturing processes standard, optimal PID coefficient value has been set in factory. But if the operating environment (temperature of surroundings, atmospheric pressure, and voltage) will change, it can be impossible to delicate temperature control as standard P.I.D coefficient value. So you need to re-set the P.I.D coefficient value to meet the operating environment.

Auto tuning function of this machine is self tuning of the P.I.D coefficient value for the optimal temperature control as operating environment. So when the temperature control is instable due to the changed operating environment, you can use it.

For the auto tuning, you need to target temperature of optimal coefficient value. At first time, the target temperature of this machine is initial temperature.

You can operate the Auto-tuning as below method.

STEP 1 : At the stand-by condition, press the VIEW button about 3 seconds.

'INITL VALUE' mark will indicate

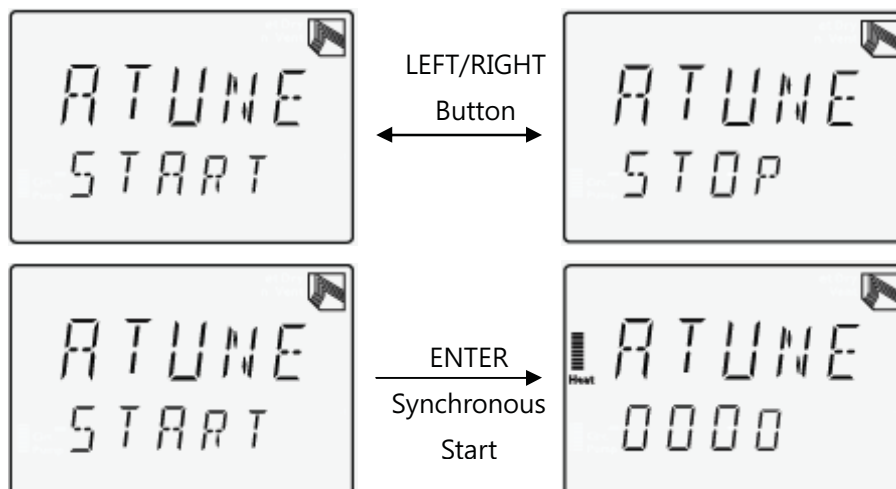
STEP 2 : Using the right/left button, you can move to Auto-tuning mode.

'ATUNE SET' mark will indicate



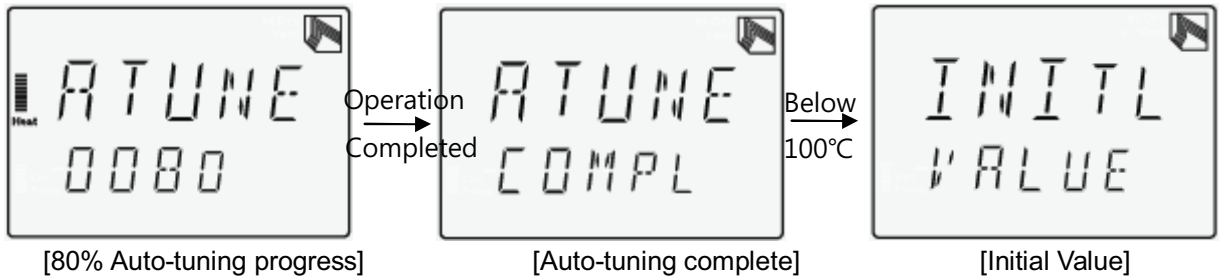
Step 3 : Press ENTER. 'ATUNE START' will be displayed. You can control left/right key to select 'ATUNE START' or 'ATUNE STOP'

Press Enter to start Auto-tuning when 'ATUNE START' is displayed.

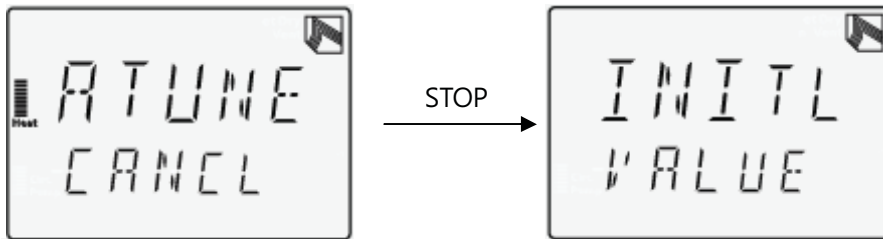


As Auto-tuning is running, the progress rate (%) is displayed. After completion of Auto-tuning, 'ATUNE COMPL' is displayed and the operation is stopped.

After the unit's temperature cools down to below 100°C, the set value comes back to Initial Value. After Auto-tuning, set P. I. D value is automatically saved.



If you want to stop Auto-tuning progress, pressed STOP button->displayed 'ATUNE CENCL' -> move to initial setting mode.



In case of user do not set an initial value, return to the standby screen when you press VIEW button.

⚠ CAUTION

- During the Auto –tuning progress, please check again the Initial value is your working target temperature. After then, do Auto-tuning process.

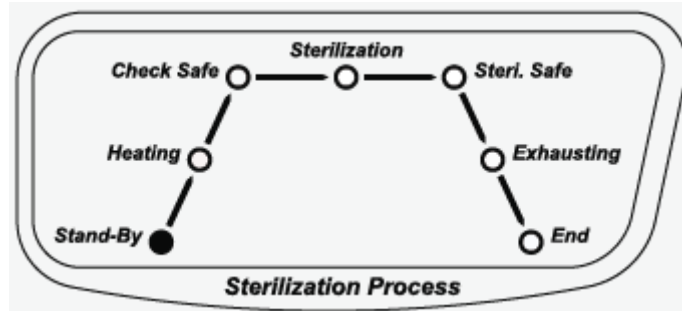
⚠ CAUTION

- The voltage supplying is provided out of range voltage which the equipment is not required voltage, the equipment will be caused problems operation or temperature control. In this case, temperature control parameters can be changed by Auto-tuning But, after Auto-tuning if user can not solved temperature control problem. Please contact our company or sales manager

4.10 Operating stop and Warning

4.10.1 Stop(Emergency)

During operation, press stop button to stop the machine in a certain situation. Stop the operation of the unit, at the same time, the solenoid valve automatically open and discharge steam and the home screen will be displayed. if the temperature inside the chamber is more than safe temperature (100 ° C), the 'Hi. Temp' and 'Warning' sign will be flashed.



After that if the temperature goes down less than safe temperature(100° C), the sign of 'Hi. Temp.' & 'Warning' will be disappeared.

CAUTION

- When sterilizing liquids at high temperatures suddenly stop working may overflow
 - After stopping the operation of the unit, the solid can be re-enabled immediately but in the case of sterile liquid to prevent ebullient, please cool slowly to atmospheric pressure to re-activate
-

4.10.2 Warning

If the error occurs during operation of the equipment, warning shows to protect the equipment, Samples and the user and the operation will be stop in accordance with situation.

Generations of a kind of warning conditions are shown in the table below.

Warnings	Condition	Display
Low Heat	Fail of reaching Sterilization and melting temperature Within the time	Warning Alarm & Warning Display Stop operation
Over Temperature	In Sterilization stage, the temperature keep raising more than 125°C(more than 10 sec.)	Warning Alarm & Warning Display Stop operation
Low Temperature	In Sterilization stage, the temperature keep continuing lower than safe temperature(more than 5 sec.)	Warning Alarm & Warning Display Stop operation
Sterilization Fail	Fail of completing Sterilization by power leakage & Etc.	Warning Alarm & Warning Display

(1) Low Heat Warning

After the start of heating, a certain amount of time (50 minutes) even after sterilization, and if they do not reach the melting temperature Low Heat warning is issued. During warning, the operation is stop and beep with 'LOW HEAT' 'CHECK' 'MANU CH.6' displayed screen.

This means to check chapter 6. Of Trouble shooting



If press 'ENTER' or 'STOP' button the screen displays stand-by mode.



[100°C less warning]



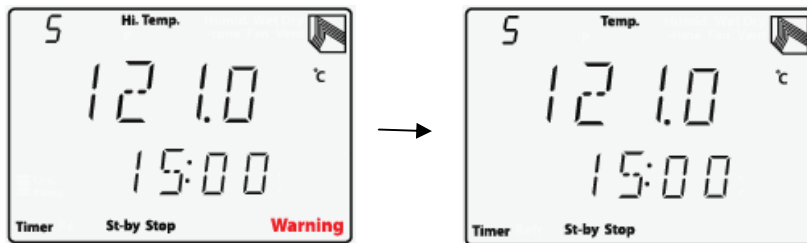
[100°C over warning]

(2) Over Temperature Warning

Sterilization phase to temperatures above 125 ° C persists for more than 10 seconds warning is issued if the Over Temperature During warning, the operation is stop and beep with 'OVER TEMP' 'CHECK' 'MANU CH.6' displayed screen



In warning mode, press ENTER or STOP button then go to stand-by mode flashing 'Hi. Temp.' And 'Warning'. If the temperature Falls below 100 ° C after the 'Hi.' And 'Warning' disappears



[After warning]

[100°C below stand-by]

(3) Low Temperature Warning

In Sterilization stage, the temperature keep continuing lower than safe temperature(more than 5 sec.) warning beeps. After warning, VFD display and a warning screen and operation screen will be displayed alternatively. Warning screen and sound will be stopped after backing to Sterilization temperature mode. During warning, the unit will be operated so that user should decide to stop or continue.



NOTICE

- Melting of Low Temperature during the progress of the warning does not occur

(4) Sterilization Fail Warning

If the power failure occurs during Sterilization and soluble Work in progress, Sterilization fail will be operated and warn you have not completed the task. During warning, warning beeps and VFD displays 'STERI FAIL' AND 'CHECK MANU CH.6'



Press Enter or stop button to go to stand-by mode.

⚠ CAUTION

- Safe operation of the unit of work in operation is stopped, the unit do not work immediately. Cool down lower than safe temperature to work again.
 - During operation, if the unit stop due to high-temperature power shorted, Do not open the door unless the unit cool down to Safety temperature (100 ° C)In addition, even if the power is restored immediately, do not operate the unit but then re-operate it has sufficiently cooled down.
-

4.11 Safety

For safety purpose, over temperature protection device, safety valve, over-current protection devices are adopted so that user can perform the work safely.

4.11.1 Over Temperature Protection

The temperature inside the chamber during operation of the device constant temperature above Overheating, over-temperature protection device works automatically to block the mains to stop the operation of the heater and equipment

WARNING

- Sterilization of overheating due to lack of water, if they stop the operation immediately, do not replenish the water in the chamber. Occurs in high-temperature steam can cause burns. Cool down more than 30 minute and replenish the water.
-

4.11.2 Over Pressure Protection

Sterilization of overpressure due to Operation of the unit value of a constant internal pressure of the chamber (1.5kg/cm²) than in case of overpressure, the operation of the unit is stopped and the pressure relief valve open automatically discharged to the outside of the chamber and the pressure of steam decreases

4.11.3 Over Current Protection

When the over current is inputted to the equipment in operation, built-in fuses are cut automatically to turn off the power.

CAUTION

- Safe operation of the unit of work in operation is stopped, the unit do not work immediately. Cool down lower than safe temperature to work again or please contact to its service team.
-

5.0 Maintenance

5.1 Inspection Cycle

Classification	Inspection time frame			
	Daily	Weekly	Monthly	Yearly
General				
Power cord	●			
Power cord's connection with the unit	●			
Power cord's sheath condition	●			
Inner chamber's cleanliness	●			
Door gasket's cleanliness and condition	●			
Accessories(Basket, Heater Cover)' cleanliness		●		
Surface cleanliness		●		
System				
Leak test		●		
Electrical wiring defect		●		
Warning operation		●		
Power switch, VFD, Control button		●		
Caster condition		●		
Drain blockage		●		
Safety valve's operation		●		
Measuring instrument correction (Temperature sensor and pressure sensor's correction)				●
Automatic control inspection				●
Thermometric test				●
Load test				●
Door Gasket replacement				●

CAUTION

- Make sure to check inner chamber's cleanliness and condition before use.
 - Be cautious not to damage to inner components and system.
 - Don not allows corrosion solvent such as high-grade nitric acid, sulfuric acid, caustic soda, acetone, benzene, chloroform, cresol, acetic acid, chloric acid to reach the unit at all.
-

5.2 Cleaning

Always make sure to keep the equipment and accessories clean. Dirt and other foreign substance can cause fire or electric shock. The surface should be cleaned weekly and the inner chamber should be cleaned daily. Before cleaning, disconnect the power cord from the power outlet and ensure that the equipment is cool enough.

5.2.1 Cleaning in case of liquid spill

- (1) If liquid overboiled to inner chamber during sterilization process, remove all of sterilization sample and accessories and drain dirty water. Clean the chamber with neutral detergent and distilled water.
- (2) Switch power off and disconnect the power cord from the power outlet.
- (3) Remove all of sterilization sample and accessories(Basket, heater cover, etc.).
- (3) Drain dirty water.
- (4) Wipe the inner chamber and accessories with a soft cloth and neutral detergent.
- (5) Rinse chamber, basket, heater cover with clean water.
- (6) Dry chamber and accessories and relocate heater cover back.

5.2.2 Cleaning of the surface

- (1) Switch power off and disconnect the power cord from the power outlet.
- (2) Wipe the surface with a soft dry cloth first to remove any foreign matter and, if not enough, Wipe the surface with a soft damp cloth or sponge soaked in water or neutral detergent when necessary. Clean controller part also same as described way above.
- (3) Wipe the surface with a dry cloth at last.

5.2.3 Cleaning of the inside of unit

(1) Cleaning for door and gasket.

- ① Wipe the inner door and gasket with a soft damp cloth or sponge soaked in water or neutral detergent when necessary.
- ② Wipe the surface with a dry cloth at last.

CAUTION

- Dirt and other foreign substance on gasket can cause steam leakage. Wipe the gasket with a soft cloth daily.
 - Damaged or physical property changed gasket can also cause steam leakage. Replace the gasket immediately.
-

(2) Cleaning of the inside of chamber

- ① Drain all of dirty water.
- ② Remove heater cover.
- ③ Wipe the inner chamber with a soft cloth or use nylon brush when necessary.
- ④ Rinse chamber, heater cover with clean water
- ⑤ Wipe the surface with a dry cloth and relocate heater cover.

CAUTION

- Do not use chlorine detergent. That can cause oxidation of chamber. Do not use volatile material such as detergent, abrasant, benzene, acid, solvent.
 - Do not use organic solvent such as sulfuric acid and hydrochloric acid.
 - Use soft cloth or sponge as cleaning tool.
 - Do not sprinkle water on the unit.
 - Do not disassemble the unit for cleaning.
 - Be cautious not to damage to temperature sensor or scratch the surface during cleaning the inner chamber.
 - Wipe the inner chamber, basket, heater cover with neutral detergent weekly. If normal detergent used, make sure to rinse the unit with the distilled water immediately.
 - Rinse the inner chamber with drain valve opened after cleaning the inner chamber. Make sure to close drain valve after finishing cleaning.
-

CAUTION

- Make sure to clean the inside chamber after sterilization chemical samples. If chemical ingredient is remained, it can cause malfunction or degradation.
 - After sterilization of salt, acid, alkali liquid or culture media which produces sulfured gas, chlorine gas, drain all water from the chamber. Chemical corrosion can cause leak of the chamber.
-

5.2.4 Cleaning of Accessories

(1) Cleaning of basket and heater cover

Clean basket and heater cover periodically.

Wipe the accessories with soft cloth or brush and neutral detergent. Make sure to rinse them with clean water enough.

(2) Cleaning of exhaust tank

If exhaust tank is contaminated or filled with water more than the max. level, then throw out all the water and clean it with neutral detergent and rinse it with clean water enough.

5.3 Accessory replacement

Switch the power off and disconnect the power cord before accessory replacement.
Please refer to 7.1 accessory lists.

5.3.1 Fuse replacement

Two fuses are provided for each equipment. Please replace the breakage fuse with new one.
If you need more fuses, contact your local agent.

Model	Voltage (V)	Power consumption (A)	Fuse (A)
ST-50G	250	13.2	20
ST-65G	250	13.2	20
ST-85G	250	13.2	20

5.3.2 Door Gasket replacement

Door gasket should be replaced yearly due to safety.
If door is not sealed tightly due to damaged or aged door gasket, replace gasket immediately.

5.3.3 Other accessories replacement

For replacement of below accessories, contact your local agent.

Model	Basket	Heater Cover
ST-50G	380x180 (ØXH)mm	395x30 (ØXH)mm
ST-65G	380x230 (ØXH)mm	
ST-85G	380x330 (ØXH)mm	

For replacement of below accessories, contact your local agent.

Model	ST-G series
Exhaust Tank	114x387x281 (WXDXH)mm, 5L
Exhaust Tube	8x350 (ID ØxL)mm, 10x250 (ID ØxL)mm
Drain Bucket	490 x 291 x 107 (WXDXH)mm
Drain Tube	14 x500 (ID ØxL)mm

5.4 Relocation and Storage

- (1) When movement, disconnect the power cord from the power outlet
- (2) Take out all of the stuff from inside of the chamber.
- (3) Drain all the water from the chamber.
- (4) Close the door firmly and move the equipment.
- (5) Do not lift or move the equipment with holding the door or plastic part.
- (6) Pack the equipment and accessories into the original packaging or any other suitable container before moving. Raise caster's stopper for moving.
- (7) If you don't use this equipment for an extended period of time, disconnect the power cord from the power outlet and clean the equipment with soft cloth. Pack the equipment properly and make sure to store it in dry place.

CAUTION

- Disconnect the power cord from the power outlet when the equipment is not in use.
 - Do not move the equipment by the power cord connected.
 - Pay attention to avoid mechanical shock or vibration while moving the equipment. Damages caused by mechanical shock or vibration may result in injury or fire.
 - If you don't use this equipment for an extended period of time, disconnect the power cord from the power outlet and clean the equipment with soft cloth. Dehumidifying agent may be used if necessary.
-

6.0 Troubleshooting

6.1 Troubleshooting

Please follow below guidelines for troubleshooting. For problems which are not listed below, contact with your local agent or Jeiotech for service.

6.2 Power Troubles

Symptoms	Causes	Solutions
The equipment is not on	The plug is not inserted completely	Put a plug into the socket again.
	Socket/plug/power lines are damaged	Check the socket/plug/power lines and replace with new one if they are damaged.
	Wrong electric standard	After check the ID plate on the unit whether it is fit to the socket power, supply proper voltage and frequency for the power.
	Circuit breaker is off or power failure	Check if the power is off. If the circuit breaker is off, fix it and operate the equipment again.
	Fused are disconnected.	Open electrical wiring panel to confirm fuse's breakage and replace the included fuse
	Inner circuit malfunction	Request service.
Circuit breaker is often shorted	Too many plugs are connected	1. Check the voltage capacity supplied t the circuit breaker. 2. Check many similar equipments are connected on the socket. Use separate socket not exceeded of te voltage capacity.
	Inner circuit malfunction	Request service.

6.3 Operation Troubles

Symptoms	Causes	Solutions
The equipment is not operated	Circuit breaker OFF	Turn circuit breaker ON
	Power switch OFF	Turn power switch ON
	Inner circuit malfunction	Request service.
Control panel is not operated	VFD malfunction or LED lamp ran out of lifespan	Request service.
	Control panel circuit malfunction	Request service..
Temperature does not reach at sterilization temperature(121°C) after having enough heating time.	Melting program is selected	Set sterilization process or select program
	Heater's malfunction or heating power is too low.	Request service..
	Supply voltage is too low	Supply optimal voltage.
	The door is not closed completely	Close the door completely
	Dirt and other foreign sustenance on gasket or any damage or aging can cause steam leakage.	Wipe the gasket with a soft cloth or request service to replace gasket
	Solenoid valve is not closed completely.	Request service to replace solenoid valve.
	Manual exhaust valve is opened	Close exhaust valve completely
	Temperature sensor malfunction	Request service...
	Inner circuit malfunction	Request service..
The equipment is overheated	Water level is too low	Fill the chamber with water at optimal level.
	Drain valve is not closed completely.	Close drain valve completely
	Heater is in the air because the equipment is not level	Adjust the equipment level
	Manual exhaust valve is opened	Close exhaust valve completely
	Inner circuit and heater malfunction	Request service.
	Air exhausting in bad condition due to solenoid valve malfunction	Request service to replace solenoid valve
Steam leakage	Dirt and other foreign sustenance on door gasket	Clean door gasket
	Door gasket does not fit to the door properly	Request service to replace door gasket

	Damage or aging of door Gasket	Request service to replace door gasket
	The opening part of beaker or other vessels are not placed upside down	Place beaker or other vessels upside down for sterilization
	When using sterilization bag, The bag is closed	Open the bag for sterilization
	When using sterilization bag, no water is inside the bag	Fill water(300ml) in the sterilization bag for sterilization
	Exhaust tube is folded	Unfold exhaust tube
	Boiling point is too low due to high altitude	Place the equipment under Altitude 800m Or request service
	Inner circuit malfunction	Request service.
Incomplete sterilization	Sterilization temperature is too low	Request service.
	Temperature sensor malfunction	Request service.
	Short sterilization time due to timer malfunction	Request service.
Noise	Solenoid valve or exhaust system malfunction	Request service.
	Seam leakage due to damaged exhaust tube	Request service.
Door is not closed	Malfunction of hand Wheel or components of the door	Request service.
	The equipment is unlevelled	Adjust the equipment level
Door is not open	Inner chamber is under the high pressure or sound pressure	Open the manual exhaust valve to lower inner pressure and open the door
	Malfunction of hand Wheel or components of the door	Request service.
Dirt water is not drained	Drain valve is blocked	Clean drain valve or request service
Data recorder malfunction	Recorder sheet is out of stock	Replace the sheet
	Inner circuit malfunction	Request service.

7.0 Accessories

7.1 Accessories

Designation		Model	Order No.	Description
Pressure Sensor (option)		ST-G series	AAAL1511	0~3.5 bar
Basket		ST-50G	ATC0002	380x180 (ØxH)mm, 2ea, Stainless steel
		ST-65G	ATC0003	380x230 (ØxH)mm, 2ea, Stainless steel
		ST-85G	ATC0004	380x330 (ØxH)mm, 2ea, Stainless steel
Door Gasket		ST-G series	00ATC0000011	421.16x11.44 (ØxH)mm, Silicone
Drain Bucket		ST-G series	ATC0091	490 x 291 x 107 (WXDXH)mm, PP
Exhaust Tank		ST-G series	AAAL1521	114x387x303 (WXDXH)mm, 5L HDPE/PP/Silicone
Data Logger (option)	Thermal line type Recorder	ST-G series	AAAL1502	Graph/Digital mode
	Thermal line type Recorder with Additional Sensor		AAAL1501	Graph/Digital mode, PT100 Ω
	Dot type recorder		-	Graph mode, 6 pins 201x414x183(WxDxH)mm
	Dot type recorder with Additional Sensor		-	Graph mode, 6 pins 201x414x183(WxDxH)mm, PT100 Ω
Recorder paper	Thermal line type recorder	ST-G series	AAA8T509	3ea per pack
	Dot type recorder		-	-

7.2 Baskets

Standard and maximum loading weight per each basket is as below.

Model	ST-50G	ST-65G	ST-85G
Dimension (ØXH, mm)	380x180	380x230	380x330
Hold Capacity per Unit	2	2	2
Max. Loading Weight (kg)	10	10	10

7.3 Data Recorder (Option)

You can attach data logger for real time recording temperature change during operation.

Two types of recorder are optional accessories for you to select. As soon as sterilization process starts, temperature change by time is recorded real time.

7.4 Accessory setting and replacement

Refer to 5.3 Accessory replacements

8.0 Appendix

8.1 Technical Specifications

Model		ST-50G	ST-65G	ST-85G
Dimensions	Volume (Capacity) (L/ cu ft)	50/1.8	65/2.3	85/3.0
	External (W x D x H, mm/inch)	624x672x870/ 24.6x26.5x34.2	624x672x971/ 24.6x26.5x38.2	624x672x1083/ 24.6x26.5x42.6
	Chamber (Ø x H, mm/inch)	400x458/ 15.7x18.0	400x558/ 15.7x21.9	400x758/ 15.7x29.8
	Weight (kg/lbs)	94.5 / 208.3	99.5 / 219.4	104 / 229.3
Temperature	Sterilization Temperature(°C/°F)	110~123 / 198 to 221.4		
	Melting Temperature (°C/°F)	60~100 / 108 to 180		
	Controller	PID Control Microprocessor		
	Sensor (ea)	PT100 (1), Additional PT100 (1) - option		
Pressure	Sterilization Pressure at 121°C (kg/cm ²)	1.1~1.2 (0.108~0.118 MPa)		
	Gauge Range (MPa)	-0.1~0.6		
Safety Device		Over-Temperature Protector, Pressure Safety Valve, Over Current Protector		
System	Timer & Programs	1min~ 999min		
		4 Standard Mode (Decontamination, Solid Sterilization, Liquid Sterilization, Melting) 4 Program Mode (Sterilization 1, Sterilization 2, Liquid Sterilization, Melting)		
	Function	Check Safe, Auto Ventilation, Sterilization Process Report (Pressure option), Temperature Offset		
	Warning (Alarm)	Over Temperature, Low Temperature, Low Heat. Sterilization Fail		
	Display	Vacuum Fluorescent Display(VFD) & LED Lamp		
	Data output	Analog		
Electricity	Electrical Requirement (230V, 50/60Hz, A)	14.3		
	Electrical Requirement (120V, 60Hz, A)	27.4		
Accessories Included (ea)		Basket (2), Heater Cover (1) Drain Tube (1), Drain Bucket(1), Exhaust Tank (1),		
Exhaust Tank (Volume)		HDPE Tank (5L)		
Materials		Powder Coated Steel Stainless Steel 304, PC, Silicone, Brass		
Permissible Environmental Condition		Temperature 5°C to 40°C, Relative Humidity 10% to 80% Altitude up to 2,000m		

※ All specifications are under ambient temperature 25°C, 60%R.H.

※ Above specifications can be changed without prior notice.

8.2 Loading Capacity

(1) Media Bottles

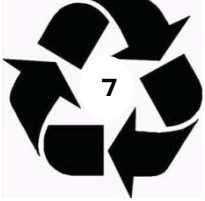
Bottle capacity (ml)	ST-50G (ea x floor)	ST-65G (ea x floor)	ST-85G (ea x floor)
250	20x3	20x3	20x5
500	14x2	14x3	14x4
1000	8x1	8x2	8x3
2000	5x1	5x1	5x2

(2) Erlenmeyer Flasks

Flask capacity (ml)	ST-50G (ea x floor)	ST-65G (ea x floor)	ST-85G (ea x floor)
250	14x3	14x4	14x5
500	8x2	8x3	8x4
1000	5x2	5x2	5x3
2000	3x1	3x2	3x2

Loading Capacity, partially without Baskets

8.3 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.

First, check with your laboratory or organization to ensure that you are following all the policies and procedures for disposal of laboratory equipments.

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

8.4 Warranty

8.4.1 General

The warranty period of twelve four (24) months, covering for defects in workmanship and material when used recommended conditions, as set forth in the operating manuals for such equipment.

8.4.2 Warranty exception

- This warranty does not cover any unit even under warranty period.
- Fire, water, power outage, power surge, lighting, or other acts of nature.
- Damage as the result of not following operational voltage.
- Abuse, misuse, neglect, accident.
- Surface damage as the result of organic solvent such as thinner, benzene.
- Damage as the result of not being complied by manual.
- Improper application, repair or attempt repair not authorized by Jeio Tech.
- Damage as the result of user's mistake.

8.4.3 Service request

- Please fill out and submit the form with below information included for immediate service.
- Date of purchase
- Name / Address / Phone / E-mail
- Serial Number(refer to the ID plate on the side of the unit)
- Damage condition

8.5 Technical assistance

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

#1005, Byucksan Digital Valley 6-cha, 219, Gasan digital 1-ro, Geumcheon-gu, Seoul, Korea
153-704

Tel: +82 2 2627 3816 **E-mail:** overseas@jeiotech.com

FAX: +82 2 3143 1824

➤ **The Americas (U.S.A. Branch)**

19 Alexander RD Unit#7, Billerica MA 01821, U.S.A.

Tel: +1 781 376 0700 **E-mail:** info@jeiotech.com

FAX: +1 781 376 0704

➤ **Europe (U.K. Branch)**

Unit 3, Tower Business Park, Warpsgrove Lane, Chalgrove, Oxfordshire, OX44 7XZ, United Kingdom

Tel: +44 1865 400321 **E-mail:** labcompanion@medlinescientific.com

FAX: +44 1865 400736

➤ **China (Shanghai Branch)**

A-2113 Oriental International Plaza, 85 LouShanGuan Rd, Changning District, Shanghai, China
200336

Tel: +86 21 3251 1086 **E-mail:** longjuncao@jeiotech.com

FAX:+86 21 3251 1083

➤ **South East Asia (Malaysia Branch)**

No 57-59, Jalan Adenium 2G/6, Pusat Perniagaan Adenium, 48300 Bandar Bukit Beruntung, Selangor
Darul Ehsan , Malaysia

Tel: +60 3 6021 6880 **E-mail:** lcomp99@po.jaring.my

FAX: +60 3 6021 7880

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