

# Laboratory Vertical Autoclave

## (User's Manual)

SH-AC-150M



# Table of Contents

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Keep this manual on-hand so it can be used by all operators of the unit.  
Use the unit only in the way described in this manual.  
Failure to follow the instruction in this manual may cause wrong operation.

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# 1. General Description

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Thank you for purchasing our product. We know that in today's competitive marketplace, customers have many choices when purchasing laboratory equipment. We appreciate your choosing our quality product. We stand behind our products and want to let you know we are here if you need us.

Before you use the unit, read this entire manual carefully to understand how to install, operate and maintain the unit in a safe manner.

Your satisfaction with the unit will be maximized as you read this manual thoroughly.

Our capable products will satisfy you by the best performance with easy operation.

## 2. Graphic Symbols

BE SURE THAT YOU UNDERSTAND ALL OF THESE SYMBOLS BEFORE OPERATING THE UNIT.



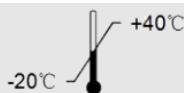
Fragile items (the transport package containing fragile items, handling with care)



Keep Up (the transport package should be straight up during transport)



Avoid wet (the transport packages should be kept in dry)



Temperature limit (the temperature range during the transport package should be maintained)



Alternating current



Protective grounding/ (Protection conductor terminal)



Disconnect (the main power supply) / (cut (power))



Switch on (main power) / (connect (power))



Caution, shock hazard / (electricity danger)



Caution scalds



Be careful, Dangerous / (NOTE! See random file)

PT/TT

Pressure/temperature test

### 3. Introduction

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The vertical autoclave consists of the shell, the sterilizing drum, the steam generator, the control system, and the power supply system.

The vertical autoclave is equipment that sterilizes articles through saturated steam.

The sterilization chamber is a single-layer structure and equipped with steam generator to create the steam itself. It discharges the steam at the lower side of the unit for the air exchange of the chamber, the tighten bolts seal the cover, and with digital controlled the whole cycle.

### 4. Scope of application

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For the clinical institutions using to sterilize the medical devices, dressings, glassware, and solution media throughout saturated steam.

### 5. Usable Water

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**YOU MUST USE DISTILLED WATER (OR DEIONIZED WATER) IN ANY CASE. NO TAP WATER WHICH WILL CAUSE TROUBLE OF CORROSION AND ILL-FUNCTION ON HEATING ELEMENTS AND SENSORS, WHICH IS OUT OF OUR WARRANTY RESPONSIBILITY.**

### 6. Normal working conditions

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- a) Ambient temperature  $+5^{\circ}\text{C} \sim +40^{\circ}\text{C}$
- b) Relative humidity  $\leq 85\% \text{RH}$
- c) Atmospheric pressure  $70\text{kPa} \sim 106\text{kPa}$

**Note: By using the vertical autoclave, the operator should consider the impact of the local atmospheric pressure on the parameter settings.**

- d) Power supply  $\text{AC } 220\text{V} \pm 22\text{V}$  ,  $50/60\text{Hz} \pm 1\text{Hz}$ .

## 7. Basic Parameters

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**Table 1. Basic parameter**

Code	Name	SH-AC-150M
1	Capacity	150L
2	Max. Work Pressure	0.12MPa
3	Max. Work Temp.	130°C
4	Heat average	$\leq \pm 1^{\circ}\text{C}$
5	Timer Range	0 ~ 99:59(HR:MIN)
6	Temp. Range	0 ~ 130°C
7	Power / Voltage	6Kw / AC220V.50Hz/60Hz
8	Safety	Water Lack, Over Current, Over Pressure
9	Dimension	670x690x1130mm
10	Trans Dim.	760x760x1270mm
11	Weight	G.W.135Kg / N.W.110Kg

## 8. Characteristics

- Equipped with a pressure/temperature controller, the pressure setting range is 0.07 to 0.12MPa(corresponding to a saturated steam temperature of 115 to 130C).
- Equipped with a timer to automatically control the sterilization time.
- Equipped with a safety valve, the relief valve would automatically releases the pressure when the sterilization pressure exceeds the maximum allowable value.
- The immersed type electric heating tube, which is with anti-dry function. When the water level is lower than the specified water level line, the sterilizer automatically cuts off the heating power and alarms at the same time.

## 9. Construction

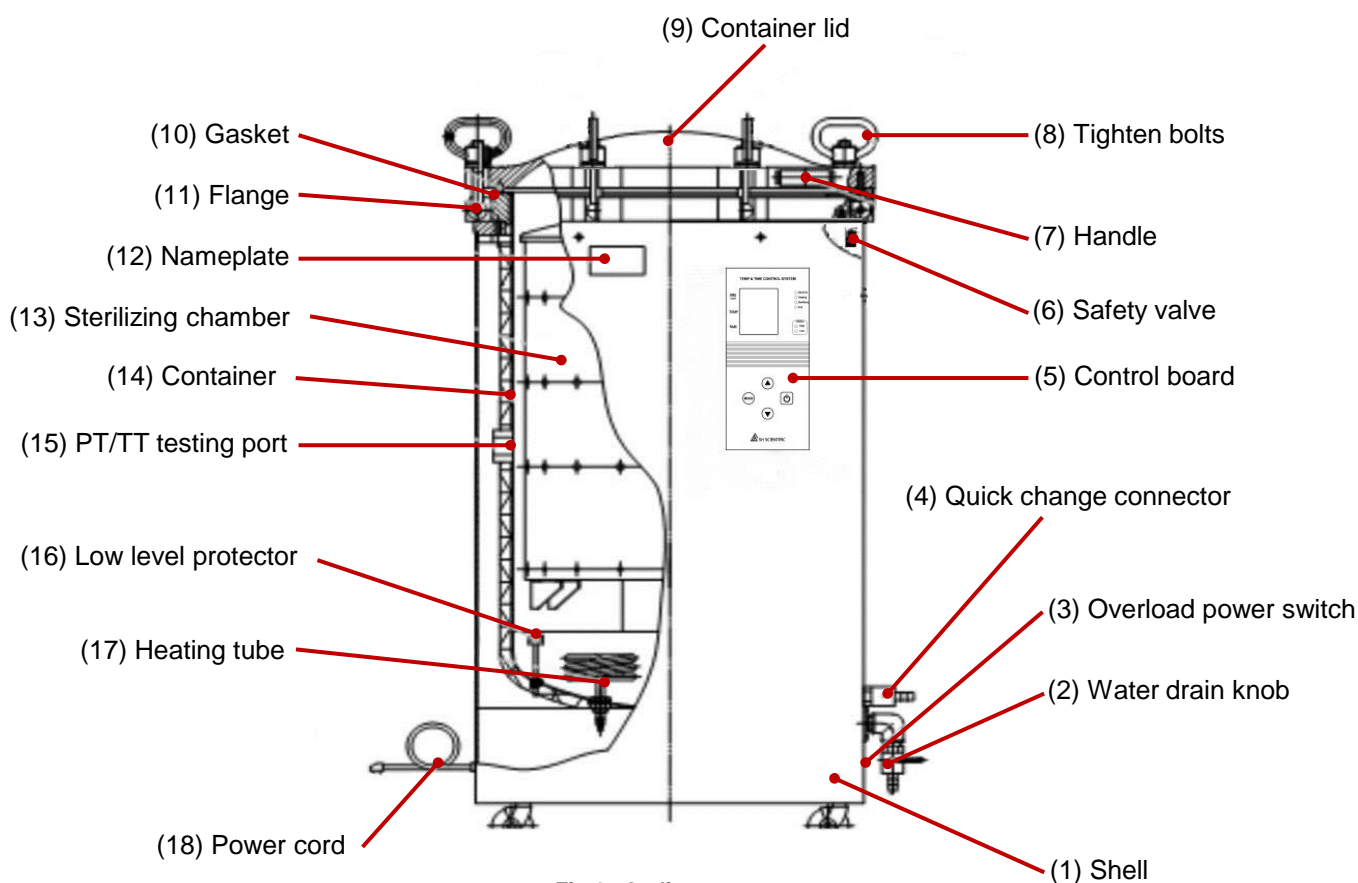


Fig.1 Outline structure

## 10. The preparation

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### 10.1 The installation

#### ***Equipment placement***

- a. The equipment should be placed on a flat surface.
- b. The equipment should be kept at a certain distance from the wall, 30 cm from the left wall, 20 cm from the back wall, and 80 cm from the right wall.
- c. DO NOT place the steam vent of the safety valve too close to the power outlet, and DO NOT be blocked by anything.

#### ***Power connection***

- a. Power requirements: single-phase AC 220V  $\pm 10\%$ , 50/60Hz
- b. The equipment MUST be reliably grounded. If the outlet does not have a ground end, the equipment must be grounded with a separate grounding conductor before connecting the power.

#### ***Warning:***

- 1) The power cord must be connected to the power switch for only use. Do not twist or pull the power cord, which might cause damages and looseness to the wires, and bring fire hazard or electric shock.
- 2) The equipment must be grounded reliably. Do not connect the ground wire to plastic pipes, gas pipes, water pipes, etc.

### 10.2 The preparation before using

- a. Check if the power supply parameters are consistent with product requirements.
- b. After piling the items, place them on a sieve plate sequentially, and leave some appropriate gaps between the packages. We suggest to make the packages into 20cm x 20cm x 10cm. The dressing and the textile should not be tightly packed.
- c. Prepare a sterilizing indicator (chemical indicator card or biological indicator).

## 11. The operation instruction

### 11.1. The control board instruction

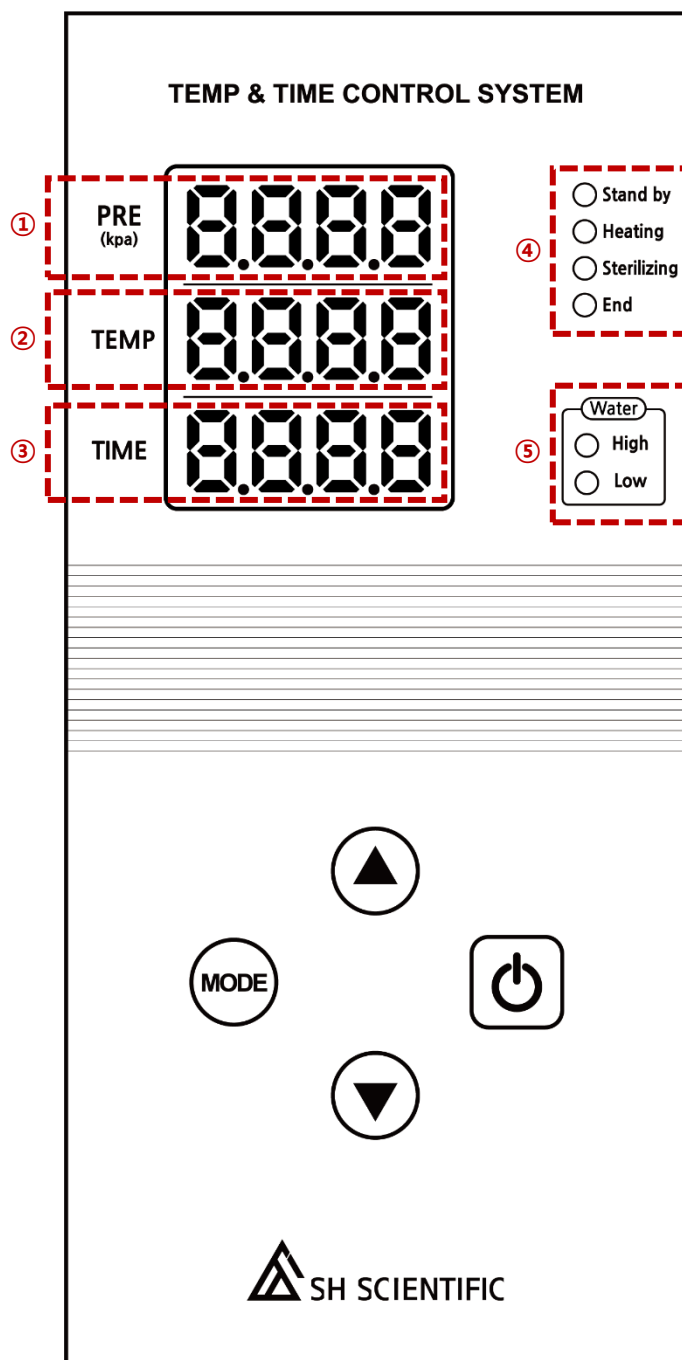


Fig.2 Control panel

#### \* Display instruction

- ① PRE : Pressure display screen(Kpa)
- ② TEMP: Temperature display screen(°C)
- ③ TIME: Time display screen(min)
- ④ Cycle indicator: Indicate the working cycle of the sterilization cycle Including 'standby' , 'heating' , 'sterilizing' , 'end' four indicators.
- ⑤ Water level: Indicating the water level status. Including the 'high' and 'low' indicators. If it is at low water level, the 'low' indicator lights up. If it is at the high level, the 'high' indicator lights up. If it is between the high and low water level, the 'low' indicator light flashes.

#### \* Other instruction

##### - Overload protection power switch

At the lower side of the sterilizer, which is used during the equipment is under standby status(see Fig.1).

##### - Drain knob

At the lower part of the vertical autoclave, which is used for the discharge of water from the chamber. (see Fig.1).

## 11.2 parameter setting and the operation

### \* The setting:

- ① By the unit is standby (The standby indicator is on), press the 'MODE' button and then TEMP screen on controller will flash.
- ② Set sterilization temperature value by pressing '▲' or '▼' button.
- ③ After setting sterilization temperature value, press the 'MODE' button and then TIME screen on controller will flash.
- ④ Set sterilization running time by pressing '▲' or '▼' button.
- ⑤ After setting sterilization time, press 'MODE' button and then PRE screen on controller will flash.
- ⑥ Set pressure type of 'exhaust' or 'no exhaust' after sterilizing by pressing the '▲' or '▼' button. Press 'MODE' button again to save the parameter.

Parameter	Minimum value	Maximum valve	Defaults	Remark
Sterilizing temperature	105°C	130°C	130°C	
Sterilizing time	0	99mins	30mins	
Exhaust	0	1	1	0-no exhaust , 1-exhaust

### \* Parameter maintenance setting method:

While the unit is standby, press '▼' button five times to set the parameters.

On PRE screen, parameter number is displayed.

On TEMP screen, parameter setting value is displayed.

Press '⏻' button to enter into parameter number.

Parameter Number. P1.	Parameter	Minimum value	Maximum value	Default	remarks
2	Cold air releasing temperature	100	110	103°C	
3	Cold air releasing time	0	5	1 second	
4	Cold air releasing cycle	0	180	60 seconds	
5	The second time for release the cold air	0	500	120 seconds	
6	The interval time between two times releasing the cold air	0	600	120 seconds	
13	The temperature for open the exhausting valve	90	105	102°C	
16	The time limit of the pressure release	1	20	10mins	
21	Pressure compensation	-20.0	20.0	0KPa	
22	Temperature compensation	-20.0	20.0	0°C	
23	If with the pressure sensor	0	1	1	0- no ,1- yes
24	Model selection	0	5	0	0-vertical electro-mechanical

## 11.3 Sterilization Work Process Description


### 11.3.1 Preparation

- 1) Open the lid of the chamber, take out the wire basket and add water manually till it reach the high level. (Use distilled water)
- 2) Turn on the power and turn on the power break switch.
- 3) Standby indicator light is on. The high water level indicator lights up.
- 4) After piling the items, place them on a sieve plate sequentially, and leave some appropriate gaps between the packages. We suggest to make the packages into 20x20x10cm. The dressing and the textile should not be tightly packed. And don't forget to place the sterilizing indicator.
- 5) After placing the wire basket in the chamber, close the lid and tighten the hand wheel in clockwise till the lid is fixed. Don't fix it too tight as which might bring damage to the rubber gasket.
- 6) Set sterilization parameters (see parameter settings for details).

The Sterilizing time can be set by the followed table 2, please set the sterilizing time and temperature according to different item required.

Items	Sterilizing time ( min )	Pressure ( MPa )	Temperature ( °C )
Rubber	15	0.1~0.11	121
Textile	15~50	0.1~0.22	121~134
Instrument	8~40	0.1~0.22	121~134
Glass ware	10~40	0.1~0.22	121~134
Bottled fluid	20 ~ 40	0.145	121 ~ 126

### 11.3.2 Heating

Press the '  ' button and then the autoclave starts to heat. The 'Heating' indicating lamp would be on.  
(Attn: It is only allowed to heat only the water is in high level).

### 11.3.3 Sterilizing

- The sterilizing indicating lamp is on.
- When the temperature of the inner chamber reaches the set value, it starts to timing and decremented by 'seconds'.



By the value of the temperature reach the setting parameter, It start to clock wisely timing.

### 11.3.4 End

When the sterilization time is reduced to 0, the transfer is completed, the internal chamber starts exhausting, the temperature drops and the buzzer sounds when the temperature drops to 102°C, indicating that the sterilization is completed. Wait a minute before opening the lid and take out the sterilized item after 20-30 minutes. After opening the lid, turn off the power.

## 11.4 Problems with the sterilization cycle

### 11.4.1 Possible Problems in the Sterilization Cycle

- During the sterilization cycle, the operating parameters can be queried.
- During the process of sterilization, press the '  ' or '  ' button to reset the program and return the 'Stand by' status.
- When the current is overloaded, the overload protection power switch will automatically cut off the power, eliminate the fault first and then turn on the overload protection power switch again to perform the sterilization operation.

**Note: When sterilizing the fluid or the fluid in the glass container, do not exhaust the steam immediately after the sterilization is finished. The rapid exhaustion will cause the liquid boil and over flow, even cause the glass into burst.**

### 11.4.2 Common faults and troubleshooting

Faults	Troubleshooting	Remark
01	The sensor in the chamber is in malfunction.	
02	The pressure sensor in the chamber is broken.	

## 12. Safety Features

This sterilizer has the following safety features.

### 12.1 Water lack overheat protection

Water shortage or no water is in the container, which would lead to the heating tube is under over heat, the sterilizer would automatically cut off the power supply by then. At this point, please cut off the power directly. The cover can not be open till the pressure inside the chamber is back to zero. Then open the cover, add the water into the chamber, close it and screw each of the tighten bolts tightly. Turn on the power break switch until the high level is displayed, the sterilizing can be proceed.

### 12.2 Over voltage Protection

When the inlet line supply voltage >AC280V, the vertical autoclave will automatically cut off the heating power. At this point, turn off the power and check that the power supply is normal (AC 220V) before restarting.

## 13. Precautions and maintenance

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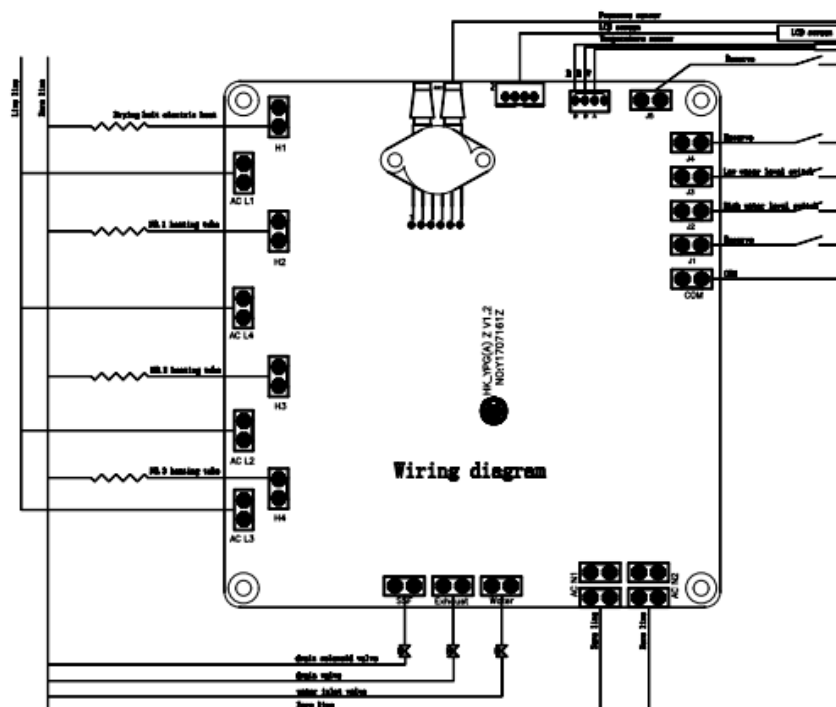


Alarm: the operator should observe the relevant provision of The Regulation On Safety Inspection Of Special Equipment and Inspection Procedure For Pressure Vessel In use.

- 13.1** The operator should read carefully this manual before using, who should have the operation knowledge and intensify the sense of responsibility, strictly operate the unit according to the step of the manual said the is required to do the maintenance as below, to ensure the unit is in good condition and normally running, to prevent the accident from happening.
- 13.2** Ensure there is enough water in the container, keep the water is at the high level and the corresponding lamp is always on. NOTE: Over much water would affect the drying of the textile.
- 13.3** Before the heating, MUST strictly follow the provision to eliminate the cold air from the chamber, or the sterilizing result would be affected.
- 13.4** Don't sterilize the different kinds of items at the same time, such as textile and solutions, rubber and instrument. Otherwise, the sterilizing result would be affected.
- 13.5** For sterilizing the solution, it should be filled into a glass bottle (or vessel) that is resistant to the high temperature. Caution the overflow, generally, it is advisable to fill the glass bottle (or vessel) with a volume of 1/2 to 3/4. And the bottle mouth should be tightly filled with the gauze. Do not use a stopper (such as a rubber stopper or cork stopper) which is without a through hole to fill the bottle mouth. The glass bottle (or vessel) should be placed in a protective container and put into the sterilization chamber, which is important to prevent the glass bottle from the burst or damage.
- 13.6** Every day after sterilizing, drain the water from the chamber. Dry the vertical autoclave and scrub the water stain frequently to ensure the sterilizing result and prolong the service life.
- 13.7** If there is much water incrustation that cannot be clean, the followed solution is suggested to use: add 0.75 kg of caustic soda and 0.25kg of kerosene into 10L clean water and mix them. Pour the solution into the chamber and let it soak for 10~12hours, then the water incrustation can be cleared and then finally rinse with clean water.

- 13.8** Test the sterilizing temperature, sterilizing time and sterilizing result by the stationary point thermometer, sterilizing indicator or other biological method, to ensure the reliable and best sterilizing result.
- 13.9** The equipment is a kind of pressure vessel, Must avoid the impact during working, and forbidden to use over pressure. If the pressure displayed is exceed the maximum allowable value but the safety valve doesn't open to release, the unit should immediately pause to use. The safety valve might have been failed, please check and exchange it. Don't start to use the unit again until the safety valve is qualified. The safety valve should have to be verified every year at the local Technical Supervision Bureau.
- 13.10** The gasket is wearing part, which should have to check frequently. If the feature is changed or deformed or aging hardening, the gasket should be changed with spares immediately.
- 13.11** The replaced fuse should be complied with the provision as the manual said, the model and the specification should be same as the old one.
- 13.12** Ensure the safety grounding of the unit, Ensure the power socket grounding well.
- 13.13** Keep clean of the unit.
- 13.14** No special requirement for the transportation and storage. If long time no using, which should have to store in a shady, dry and ventilated place, and make the necessary dust proof work.

## 14. Electric scheme



## 15. The breaker and the fuse capacity

- Breaker rating current: above 30A
- Fuse specification : F1 250V/0.5A  $\phi 5 \times 20$ mm

## 16. Manufacturer Warranty

1 year warranty in case of parts' defect.

## 17. Producing date





See the nameplate

## 18. Accessories and the package list

NO.	Name	Quantity	Marks
1	Main body	1	
2	Sterilizing baskets	2	
3	Chamber handle	1	
4	Exhausting tube	1	
5	User's manual	1	

### Appendix 1:

#### BRIEF OPERATION STEPS

1. Insert the air faucet into the quick-change connector.
2. Connect the power(220V) and turn it on, add the water till the high level lamp is on.( the water floating ball should be immersed into water)
3. While the unit is standby, the parameter could set as below:  
 Press '  ' button: TEMP screen is flashing to set the sterilizing temperature (132°C~134°C)  
 Press '  ' button: TIME screen is flashing to set the sterilizing time( for example 30 mins)  
 Press '  ' button: PRE screen is flashing to set if the air exhausting after the sterilizing.
4. Press '  ' button.( The equipment defaults to the last mode, it is only required to finished the second step then directly go to step four to proceed the sterilizing.)
5. After the sterilizing, it would exhaust the air directly, open the cover when the temperature display 102°C, then disconnect the power.

#### \* Attention

1. The exhausting tube should be reliable fixed from the both sides.
2. It is suggested to use distilled water and to change the tap water every day.
3. Read the manual carefully before using.

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