

Product Manual



*vertical high pressure steam
sterilizer*



30 (L)

50 (L)

75 (L)

Thank you for using our products.

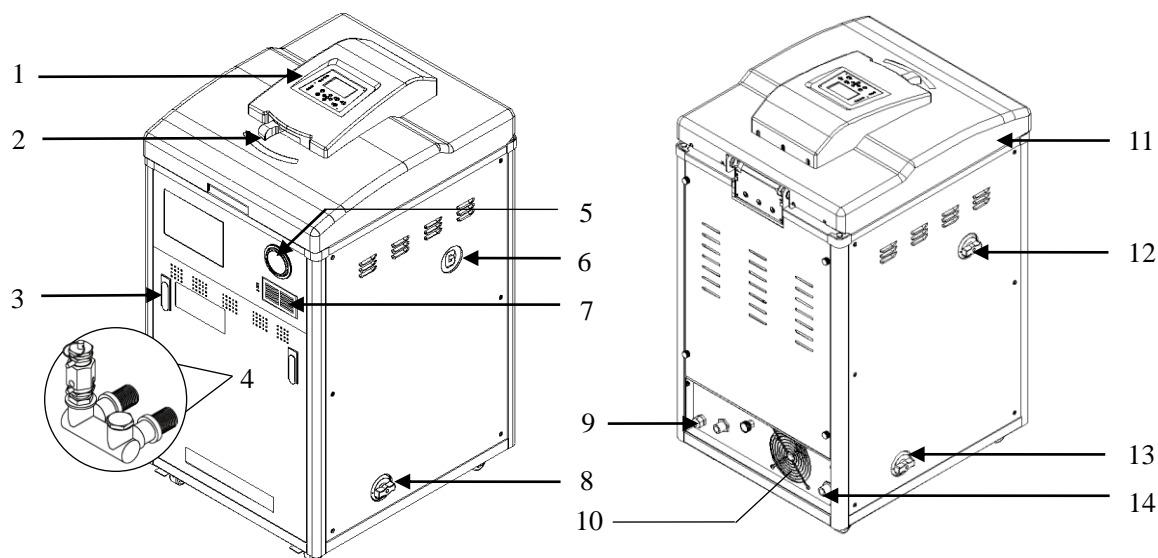
Content

Chapter 1: Overview	1
Chapter 2: Structural Drawing	1
Chapter 3: Signs of Safety Warnings.....	2
Chapter 4: Technical Characteristics	2
Chapter 5: Technical Parameters	3
Chapter 6: Requirements of Installation.....	3
Chapter 7: Description of Control Panel	4
Chapter 8: Getting Started	6
Chapter 9: Failures and Solutions	10
Chapter 10: Maintenance.....	12
Chapter 11: Packing List	13
Chapter 12: Electrical Diagram.....	13
Chapter 13: Information Appendix.....	14

Chapter 1: Overview




The vertical high pressure steam sterilizer (hereinafter referred to as sterilizer) is a non-medical device product, which is only suitable for scientific research institutions, chemical and other units. This product can be used for sterilization of high temperature resistant medium.

Chapter 2: Structural Drawing



1. Control Panel	2. Door Switch Handle
3. Door Handle	4. Safety Valve
5. Pressure Gauge	6. Power switch
7. Thermovent	8. Manual Vent Valve
9. Air-vent	10. Rapid Cooling Fan
11. Upper Lid	12. Water Valve
13. Drain Valve	14. Drainage Outlet

Chapter 3: Signs of Safety Warnings

	Warnings or Notes:	<p>1. It may indicate serious damage to human body and other situations.</p> <p>2. If the sterilizer is not used according to the methods specified in this manual, the protection provided by it may be impaired, which can cause injuries.</p>
	Avoid Burns:	<p>1. Please do not put your face and hands near the mouth of the sterilization chamber or the air-vent to avoid burns caused by a large amount of steam.</p> <p>2. At the end of each sterilization cycle, please wait a moment until the temperature of the sterilization chamber reduces to 60°C or less, and take out the sterilized objects after wearing the protective gloves.</p>
	Protective Earthing Terminal:	<p>The sterilizer is equipped with a protective earth wire. The outside earth wire must be firm and can't be connected with the neutral wire.</p>

Chapter 4: Technical Characteristics

- 4.1 The working environment temperature of the sterilizer is 5~40°C. The relative humidity is ≤85%. The atmospheric pressure is 70~106KPa, and the altitude is ≤2000 meters.
- 4.2 The sterilizer is a permanent installation device, which is connected to the external power supply permanently. A circuit breaker with power greater than the total power of the sterilizer power supply must be installed on the building.
- 4.3 The type, size and basic parameters of the sterilizer conform to the requirements of the "Regulations for the Safety Technical Supervision of Fixed Pressure Vessels".
- 4.4 The sterilizer is equipped with a quick-open door and safety interlock device. Meanwhile, it has screen graphics, text display and warning lights.
- 4.5 The pressure indicator of the sterilizer is an analog type and the dial scale is from 0 to 0.4MPa. In addition, the pressure gauge is zero when the atmospheric pressure is between 70KPa and 106KPa.
- 4.6 The control system of the sterilizer is controlled by a microcomputer, which has the functions of water level, time, temperature control, water cut-off, over-temperature alarm and automatic power-off. When the device is in low water level, it has double protection.
- 4.7 The sterilizer is operated by digital keys and displayed as digital.
- 4.8 The sterilizer is marked with warnings, notes, and marks in a conspicuous place to inform the operator of the importance of grasping the operating essentials and observing safety precautions.
- 4.9 The maximum working pressure of the sterilizer is 0.217MPa, and the noise shall be less than 65dB (A Weighting).
- 4.10 The sterilizer is equipped with reliable earthing protection and has obvious earthing marks (refer to Chapter 3).

- 4.11 The sterilizer is equipped with a manual drainage valve (cooling water) and a manual steam exhaust valve. The sterilizer can be operated manually during the sterilization cycle to exhaust the cold air in the sterilization chamber to ensure the sterilization effect.
- 4.13 The sterilizer sterilizes the items with steam generated by water with a boiling point of 100°C.
- 4.14 The sterilizer is equipped with a temperature test connector (for temperature test), and is marked with "TT" symbol (see **Fig.1**), which is sealed with a cap.
- 4.15 The sterilizer is equipped with a loading basket.

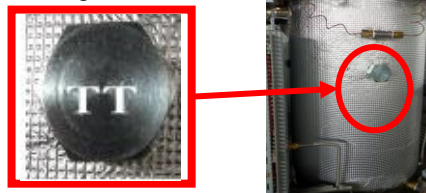


Fig. 1

Chapter 5: Technical Parameters

5.1 The power supply voltage and power of this product are shown in the following table.

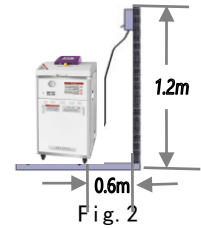
Inner Diameter of Sterilizer (mm)	Effective Working Volume (L)	Voltage Supply	Power (Kw)
φ 370	30	AC220V 50Hz	3.5
φ 370	50	AC220V 50Hz	3.5
φ 370	75	AC220V 50Hz	3.5

- 5.2 The maximum working pressure of the sterilizer is 0.217MPa.
- 5.3 The sterilizer is equipped with a safety valve.
- 5.4 The steam sterilizer is equipped with a pressure controller.
- 5.5 The effective setting range of sterilization time shall be as the following values: the indication error within 1min to 60min shall not exceed $\pm 1\%$ (display range of the time is 1~9999min).
- 5.6 The sterilizer is equipped with a circuit breaker (which is also called power switch) with the specification of TRN-32 (32) AC230V 32A.
- 5.7 The sterilizer is equipped with a door safety interlock device;
- 5.7.1 When the door of the sterilizer is closed, the light is always on. After press the Start/Stop key, the safety interlock will be locked and the door will be locked too with indicator light.
- 5.7.2 At the end of the sterilization cycle, when the steam pressure in the sterilization chamber is released, the pointer of the pressure gauge will return to zero, and the temperature drops below 95° C. At this moment, the safety interlock unlocks, so the door can be opened with the indicator light.
- 5.8 The service life of the sterilizer safety interlock device is about 3000 sterilization cycles.

Chapter 6: Requirements of Installation

- 6.1 The sterilizer must be installed in a separate building with bright light and ventilation, as well as smooth and firm ground. There must be a sewer to discharge the sterilizer water.

- 6.2 It is strictly prohibited to store the sterilizer in the same space with articles with strong corrosion, toxic, inflammable and explosive properties.
- 6.3 Sufficient space shall be left for operation and maintenance around the installation location of the sterilizer. The operator shall install a circuit breaker (with current $\geq 25A$, see **Fig.2**) at the position of 0.6 meters and height over 1.2 meters from the sterilizer to the building to facilitate operation.
- 6.4 After the sterilizer is installed and positioned, it shall be fixed so as to prevent the sterilizer from shifting and causing the operation failure or accidents.
- 6.5 If the sterilizer is connected with external power supply, the circuit breaker with AC220V and power $>3.5KW$ shall be installed in the building with marks of "For Sterilizer". There should be a reliable earthing wire connected to the sterilizer, and the neutral wire should not be connected to the earth wire.
- 6.6 The drain (steam) outlet of the device shall be connected with a hard metal pipe, and the connection pipe shall be properly fixed on the wall or floor, enabling the discharged water or steam enter into the safe outlet, thus avoiding scald caused by steam sputtering.



Chapter 7: Description of Control Panel

- 7.1 Display Mode: 8-digit LED display
- 7.2 Temperature Display Range: $0\sim150^{\circ}\text{C}$
- 7.3 Time Range: $0\sim9999$ minutes (actually used for $0\sim60$ minutes)
- 7.4 Basic Error of Displayed Value: $\pm 1.0\%$
- 7.5 Resolution: 0.1°C
- 7.6 Panel Display Part: (Refer to **Fig.3**)

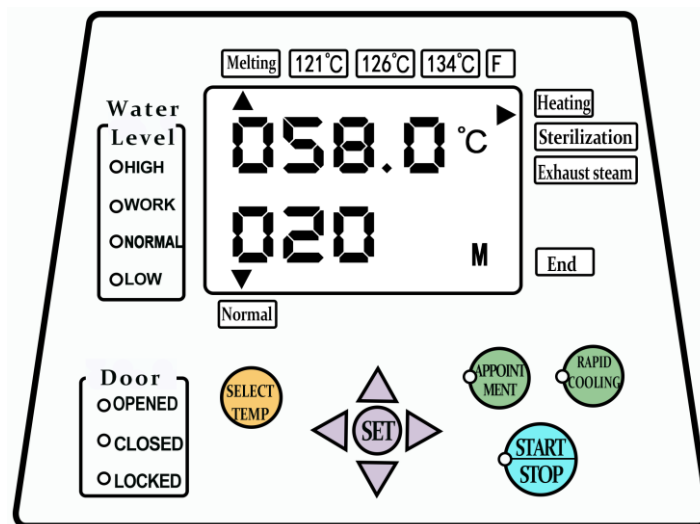


图 3

- 1) **Heating**: After the sterilizer starts working, it enters the heating up stage;
- 2) **Sterilization**: When the sterilization chamber reaches the set temperature, it enters the sterilization stage;
- 3) **End**: After the end of the sterilization cycle, when the temperature of the sterilization chamber drops to 95°C , the interlock will be unlocked, and the lid can be opened to take sterilized products;

- 4) **Water level light**: When the light is on, it shows the water level (if there is too much water, the "High" water level light is on, so reduce the water level to the operating water level);
- 5) **OPENED**: When the door (cover) is opened, this light is on;
- 6) **CLOSED**: when the door (cover) is closed in place, this light is on;
- 7) **LOCKED**: When the sterilizer door is closed in place, the interlock is locked after pressing the start key and the light is on. When the temperature of the sterilization chamber drops to 95°C, the interlock is unlocked and the light is off.
- 8) **Melting**: The temperature setting range is 40~100°C, and the time can be set by yourself.
- 9) **121° C, 126° C, and 134° C keys**: These three temperatures cannot be set, you can only increase time, and can't reduce the time. The factory settings are 121° C-20min, 126° C-15min, and 134° C-4min;
- 10) **F key**: Press [F] key to set the temperature and time;
- 11) **SELECT TEMP**: Press this key to select any sterilization temperature of melting, 121°C, and 126°C keys as well as F key;
- 12) **SET key**: Press this key first, and then press the up, down, left or right keys to modify the parameters. After this, press this key again to confirm the setting;
 - ▲ **Key**: This key is the count-up key. When setting the parameter, press this key once, and the setting value flashing bit will plus 1;
 - ▼ **Key**: This key is the subtraction key. When setting the parameter, press this key once, and the setting value flashing bit will decrease by 1;
 - **Key**: This key is the right shift key. When setting parameters, press this key once, and the setting parameter flashing bit moves to the right by one bit;
 - ◄ **Key**: This key is the left shift key. When setting parameters, press this key once, and the setting parameter flashing bit moves to the left by one bit;

After the modification is completed, press the "Setting" key to write the parameters into the memory and exit the setting state.
- 13) **START/STOP key**: When closing the upper lid, press the start key after setting the required sterilization temperature and sterilization time, and the sterilizer starts to heat up and run. When the temperature of the sterilization chamber is lower than 90°C, press and hold the Stop key for more than 3s to stop the sterilizer. The safety interlock will be unlocked, and the sterilization temperature and time can be reset or the upper lid can be opened.
- 14) **APPOINTMENT**: Appoint the working time of the sterilizer. After setting the sterilization temperature and time, close the lid to set the appointment time, and select the start key after this. The Start key flashes and when the time comes to the preset Beijing time, the device will run.
- 15) **RAPID COOLING**: This function can reduce the temperature **in the sterilizer pot when exhausting steam**. Before the end of the sterilization time, you can choose this function freely.

7.7 Meaning of Buzzer Alarm:

- (1) If the sensor is broken or short circuit, the actual temperature exceeds 160° C or below -10° C, the buzzer will sound for 0.5s and stop for 0.5s.
- (2) If the device is seriously short of water, that is, the water level can not be detected or it is the wrong level, the buzzer will sound all the time.
- (3) Before the exhaust is finished, the buzzer will sound for 0.2s and stop for 0.8s.

- (4) During sterilization, if the measured temperature is over the setting temperature $+2.0^{\circ}\text{C}$, the buzzer will sound 0.5s and stop 0.5s.
- (5) At the end of operation, the buzzer will sound 20s continuously.
- (6) When the water level before sterilization reaches "Too High" water level, the buzzer will sound for 0.1s and stop for 0.4s.

Chapter 8: Getting Started

1. Preparation for start-up

You must check the condition of the electrical components and whether the sterilizer door can be open and closed normally before using the sterilizer. (especially for the first use of the new sterilizer). Run the device before everything is checked.

2. Power on

Close the external power circuit breaker on the wall, and turn on the sterilizer to control the power switch (see **Fig.4**).



Fig. 4

3. Open the lid

Fully draw the door switch handle of the upper cover to the unlocking position (see Figure 5), pull the two sides of the upper cover and open the upper cover upward (see Fig.6).

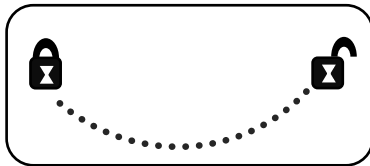


Fig. 5



Fig. 6

4. Add water

Open the water filling valve on the left door panel (**Fig.8**), and remove the top lid of the water filling port. Then add pure water into the water filling port (**Fig.9**) to make the water level at the running water level (**Fig.10**). After close the water filling valve, this process finishes.



Fig. 7

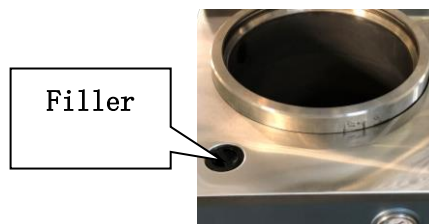


Fig. 8

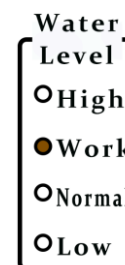


Fig. 9

5. Pile up items

The packed items (preferably with a volume of not more than $200 \times 200 \times 100\text{mm}$) are piled up in the sterilization basket in turn. There should be some space between each two packs so that the steam can penetrate thoroughly to achieve better sterilization results.



i Remember that the packed items should not block the release holes of safety valve, or else the steam pressure can not be released easily that there might be an explosion in the pan.

6. Setting of sterilization parameters

① Set the sterilization temperature: Select the sterilization cycle according to the sterilization. This product presets three one-key operation modes of "121° C", "126° C", and "134° C". Press "Temperature Selection" key to select the desired One-key temperature (Fig.10). **Note: In the one-key mode, the sterilization temperature has a corresponding sterilization default time, including 121° C-20min, 126° C-15min, and 134° C-20min.** Regarding the melting function, please refer to Chapter 7 "Instructions of Control Panel".

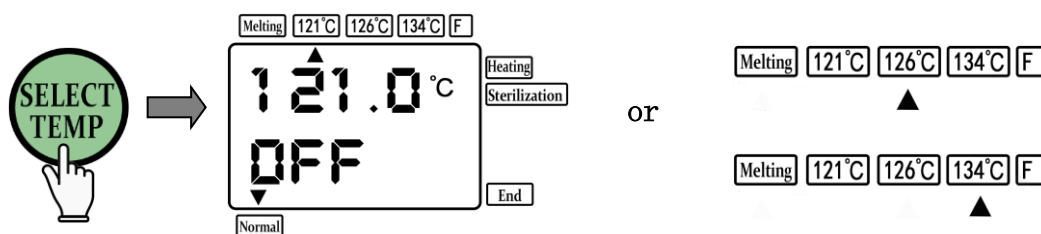


Fig. 10

② Set the sterilization time: Press the "Setting" key to the sterilization time setting interface (Fig.11). You can press the left and right keys to position the cursor, and then press the "Add" key to set. The value is only can be added but not reduced. After setting, please press the "Setting" key to save the modification.

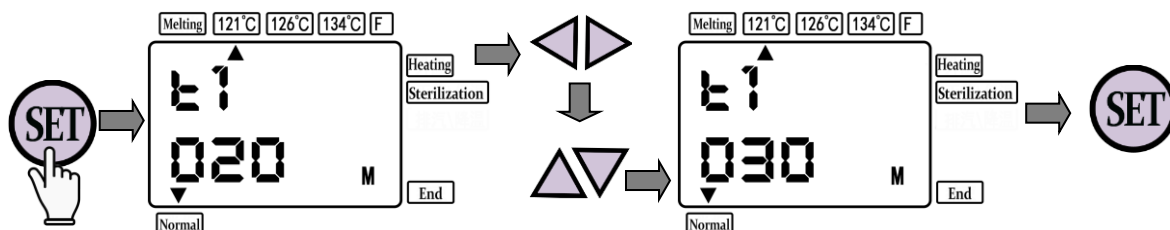


Fig. 11

③ Melting temperature setting: Press the "Temperature Selection" key to the melting state (Figure 12), then press the "Setting" key to set the melting temperature. You can press the left and right keys to position the cursor, then press plus, or minus key to set the desired melting temperature (Fig.13). After setting, press the "Setting" key to save the modification.

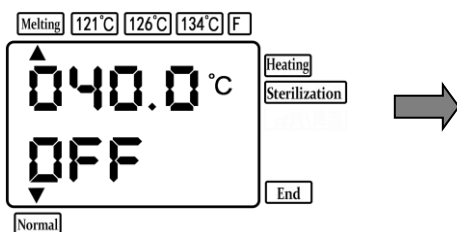


Fig. 12

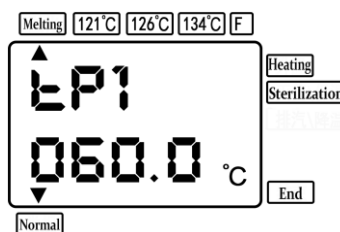


Fig. 13

④ Melting time setting: You can refer to the operation steps in section ② (Set sterilization time) (Fig.14). After setting, press the "Setting" key to save the modification.

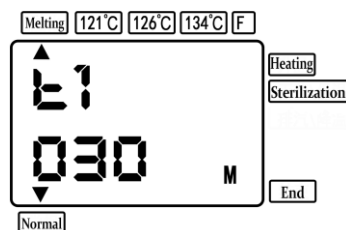


Fig. 14

⑤ Reservation setting: Press the "Reservation" key to the interface shown in **Fig.15**, and then follow the steps in section ② (setting sterilization time) above to set the reservation time. After setting, press the "Start" key to enter the reservation countdown state.

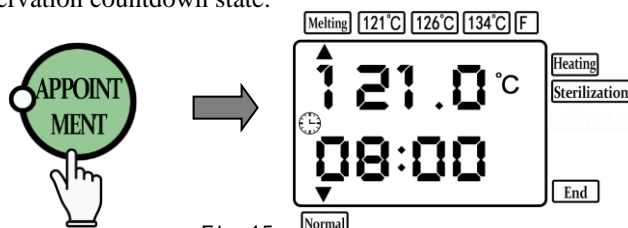


Fig. 15

⑥ Rapid cooling setting: It can be set by pressing the "Rapid Cooling" key before pressing the "Start" key or before the end of the sterilization program. Select this function, the device will start the rapid cooling fan to accelerate the exhaust.

7. Sterilization

(1) Close the upper lid and pull the door switch handle to the lock position fully. Then press the "Start" key to initiate the sterilization cycle and the heating. The control panel will display the temperature and sterilization time in the sterilization chamber (**Fig.16**), and the status is "Heating".

(2) After the temperature in the pot rises to the sterilization temperature, it is in the state of sterilization and enters the sterilization countdown interface (**Fig.17**).

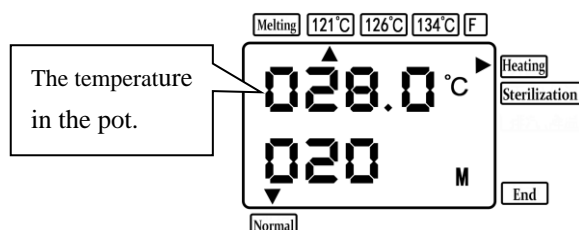


Fig. 16

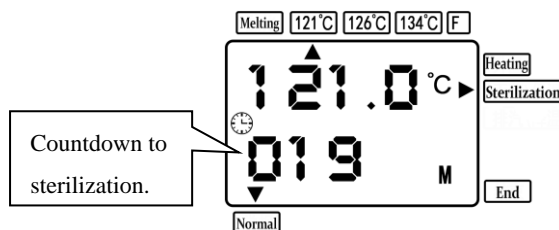


Fig. 17

8. Steam Exhaust

(1) After the countdown of sterilization, the device will enter steam exhaust mode. Open the exhaust valve to the maximum position manually (see **Fig.18**) to exhaust the steam and cool the machine quickly. If the sterilized item is liquid, you can only wait for the machine to cool down naturally and unlock without the right to choose manual steam exhaust operation.



Fig. 18

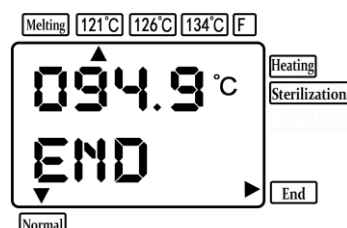


Fig. 19

(2) When the temperature in the sterilization chamber drops below 95° C, the display shows "END" (see **Fig.19**). The status arrow points to the end, and the interlock is unlocked, indicating that the sterilization cycle finishes.

★ Note: During the heating process, when the temperature in the pot is less than 90° C, you can press the Stop key for more than 3 seconds to unlock the door (see **Fig.20**).



Fig. 20

9. Take out the items

After all procedures are completed, please make sure that the pointer of the pressure gauge (see **Fig.21**) has been reset to zero and the status of the display indicates "End" before taking out the sterilized items.

★ Note:

1. After the sterilization is completed, the safety interlock indicator on the operation panel is strictly forbidden to turn off the power without turning off. (Warning: Turning off the power in advance will prevent the safety interlock from being released.)
2. If you need to add items after close the lid, please make sure to release the safety interlock before turning the hand-wheel. (Warning: During the heating process, the forced unlocking must be performed when the digital display temperature of the device is below 90°C.)
3. After the operation, please do not take the items immediately after opening the lid to avoid burns by the steam from the pot (see **Fig.22**).
4. Don't open the sterilizer lid forcibly before the sterilization cycle is finished.

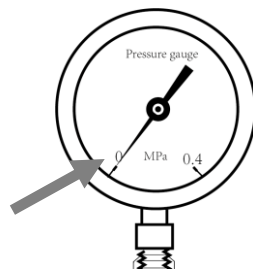


Fig. 21

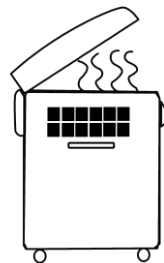


Fig. 22

10. Shutdown Operation

- (1) If you want to start the next sterilization cycle, please add water to the required level.
- (2) At the end of the sterilization cycle, if you stop using it, please open the drainage valve to release the remaining water in the device, and turn off the power switch as well as the circuit breaker.

11. Built-in Parameter Settings

- (1) Calibration of Beijing time:

Press and hold the "Setting" key for more than 5 seconds, so that the display shows LOCK 0001 (built-in lock code) as **Fig.23**. Please modify "0001" to "0168". You can press the left and right shift keys and plus (minus) number keys to set (see **Fig.24**). Enter the year setting interface first (**Fig.25**), and then enter the month, day, and time interfaces (see **Fig.26-28**) in sequence. After setting, press the "Setting" key to confirm the modification.

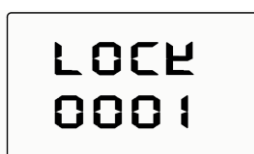


Fig. 23

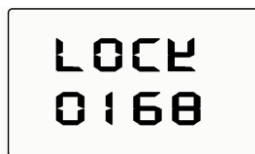


Fig. 24



Fig. 25

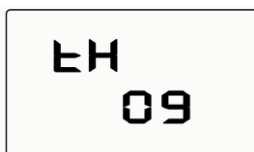


Fig. 26



Fig. 27

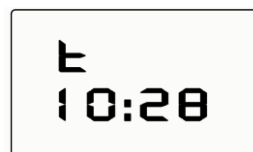


Fig. 28

(2) Printer settings: (You need to buy a printer)

Press and hold the "Setting" key for more than 5 seconds so that the display shows LOCK 0001. Please modify "0001" to "0000" to enter the printer opening interface. You can press ▲ ▼ to set the value (see Fig.29). Here 0001 means the printer is on, while 0000 means the printer is closed. After setting, press the "Setting" key to confirm the modification.

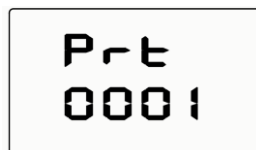


Fig. 29

Chapter 9: Failures and Solutions

9.1 Meanings of failure codes or error messages that occur during sterilizer startup and sterilization process and their solutions:

Error Code	Error Content	Simple Solutions
Err01	Temperature sensor is disconnected or the temperature is below -10°C	Please check the temperature sensor
Err07	Water level sensor has errors	Please check whether the water level sensor wiring is correct or the water level sensor is damaged according to the water level status displayed on the LCD
Err08	1. The door is not open or closed fully to the right position. 1、 2. The water filling valve is not closed in place.	Please check whether the door is open or closed correctly.
Err10	Communication error	Please check whether the connecting wire between the two control panels is intact.

9.2 Failures and Solutions:

Failure Analysis and Solutions

No.	Failures Phenomenon	Cause Analysis	Solutions
1	The temperature of the pressure gauge is inconsistent with the digital display	A There is cold air in the sterilization chamber B Temperature sensor SC value deviation	A. Manually open the exhaust valve B. Correct the temperature sensor SC value
2	Excessive water level reminder, there is no reflection after lowering the water level	A. There is objects at the water level probe	A. Remove foreign objects at the water level probe
3	The heating lamp is on and the temperature does not rise	A. The heating preservation time is not set B. Solid state relay is abnormal C. The electric heating pipe is damaged	A. Set the heating preservation time B. Check solid state relay C. Check electric heating pipe
4	No temperature display on LCD SV window	A. Abnormal temperature sensor B. Forget to confirm the modification after setting the temperature	A. Check the temperature sensor B. Reset the temperature and press the set key to confirm
5	There is no water in the sterilizer, while the heating lamp is off	A. Water level needle end contacts the chassis B. Solid state relay is abnormal	A. Check the signal cable connection B. Check the solid state relay
6	There is water vapor in the pressure gauge	Leakage of steam of spring pipe	Replace the pressure gauge by professional personnel
7	Leakage of the seal ring	A The seal ring is damaged B The seal ring of the door is not in place	Check the seal ring and door condition
8	Sterilizer door cannot be opened after sterilization	A. The sterilization program is not ended before the power is cut off B. When the pointer of the pressure gauge returns to zero, the temperature in the pot is $\geq 95^{\circ}\text{C}$, and the interlocking device is not unlocked.	A. Turn off the power and turn it on again B. The temperature in the sterilization chamber must be less than 95°C , press the stop key to unlock
9	The safety valve keeps jumping	A. The cold air in the sterilizer is not exhausted. The pressure is too high and the temperature does not rise. B. Failure of safety valve	A. Open the lower exhaust valve to eliminate cold air in the fungus appropriately B. If the safety valve fails, replace it

10	High temperature alarm	A. The temperature in the sterilization room exceeds the set value by 2° C B. Deviation of temperature sensor SC value setting	A. Adjust the SC value of the temperature sensor appropriately B. If the adjustment is invalid, replace the temperature sensor
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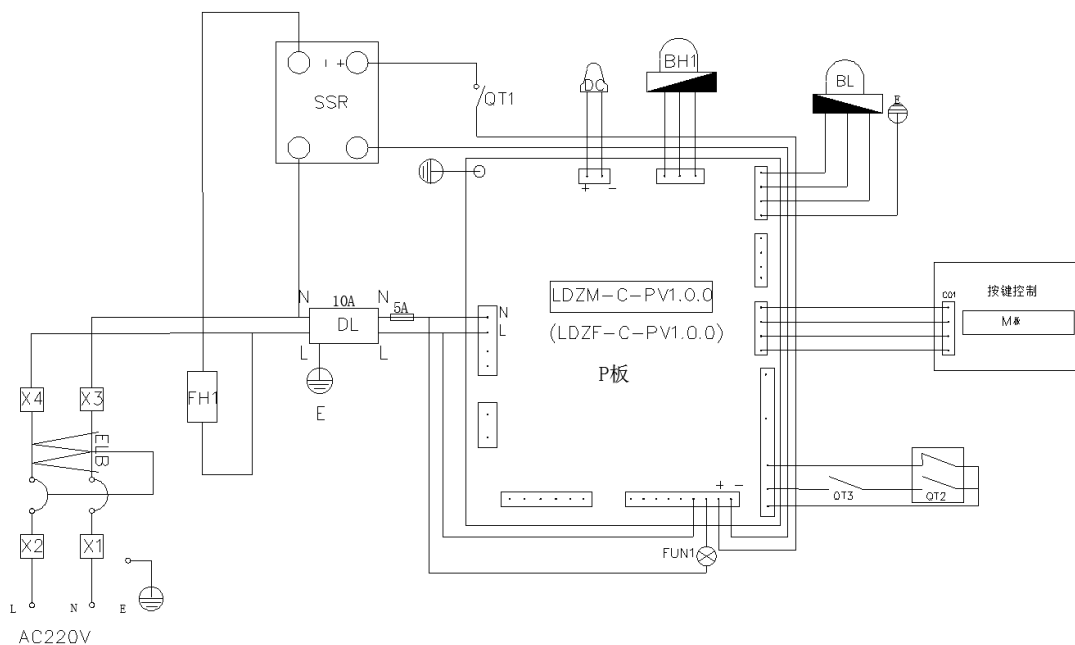
Chapter 10: Maintenance

- 10.1 Before starting the machine every day, you should check whether the electrical components and the safety interlock device of the sterilizer are normal firstly. In addition, check whether the mechanical structure is damaged. You can turn on the power before everything is normal.
- 10.2 At the end of each day of sterilization, close the locked power key on the front door, the water source shut-off valve, and disconnect the power circuit breaker on the building. In addition, the surroundings of the sterilizer should be kept clean.
- 10.3 Drain the water in the sterilizer everyday to prevent the accumulated water from affecting the normal heating of the electric heating pipe and the steam quality, as well as the sterilization effect.
- 10.4 The sterilizer will produce scale and sediment after long-term use. The water level device and the barrel should be cleaned regularly to remove the attached scale.
- 10.5 The sealing ring is fragile relatively, please prevent it from cuts of sharp objects. With long-term cooking at high temperature and pressure, it will slowly age. Please check it frequently and replace if it is damaged.
- 10.6 The sterilizer should be operated by trained professionals, and the operation records should be made, especially the on-site conditions and elimination records of abnormal conditions, so as to trace and improve the device.
- 10.7 Damage and replacement of components:
- 10.7.1 When components need to be replaced, there must be qualified trained personnel or personnel designated by the manufacturer to replace them.
- 10.7.2 Before operation, the circuit breaker must be opened to release the residual steam in the pot, and the pointer of the pressure gauge should be reset to zero before operation.
- 10.7.3 When repair the device, the maintenance personnel should confirm the chip model, and he/she can't change the model at will to avoid damage to the device.
- 10.8 List of Main Components and Points for Attention:

No.	Description	Specification	Quantity	Verification Cycle
1	High Voltage Control	0.05-0.25Mpa	1 piece	
2	Solid State Relay	40A	1 piece	
3	Power Switch	TRN-32 (D)	1 piece	
4	Heating Electric Pipe	3.5KW	1 piece	
5	Safety Valve	0.217-0.24MPa	1 piece	1 year
6	Pressure Gauge	Grade of 1.6	1 piece	Half a year
7	Silicone Ring		1 piece	

10.8.2 After the pressure gauge has been used for a long time, the pointer cannot return to zero position, so it should be repaired in time. Please compare the pressure gauge with the standard pressure gauge on a regular basis. If something is abnormal, it should be replaced in time to prevent accidents.

No.	Name	Quantity	Remark
1	Vertical High-pressure Steam Sterilizer	1 set	
2	Product Manual	1 piece	
3	Product Certificate and Warranty Card	1 set	
4	The loading frame	It is subject to the actual unpacking	



Symbol	Component Name	Symbol	Component Name
BL	Water Level Sensor	BH1	Temperature Control Probe
DC	Magnetic Holding Electromagnet	DL	Filter
FUN1	Fan	FH1	Electric Heating Pipe
ELB	Power Switch	SSR	Solid State Relay
X1-X4	Wiring Row	QT1	High Voltage Control
QT2	Door Interlock Switch	QT3	Micro Switch
P Panel	Power Panel	M Panel	Display Panel

Chapter 13: Information Appendix

13.1 Please refer to Table for quality indexes of water supply.

Quality Indexes of Water Supply

Items	Indexes
Evaporation residue	≤10 mg/L
Silicon chloride (SiO ₂)	≤1 mg/L
Iron	≤0.2 mg/L
Cadmium	≤0.005 mg/L
Lead	≤0.05 mg/L
Other heavy metals except iron, cadmium and lead	≤0.1 mg/L
Chloride ion (Cl ⁻)	≤2 mg/L
Phosphate (P ₂ O ₅ ⁻⁵)	≤0.5 mg/L
Conductivity (25°C)	≤5 μS/L
pH value	5~7.5
Appearance	Colorless and clean without sediment
Hardness (total amount of alkaline metal ions)	≤0.02 mmol/L

Note: The consistency test results shall comply with the known analytical methods.

13.2 See Table for quality indexes of steam condensate.

Quality Indexes of Steam Condensate

Items	Indexes
Silicon chloride (SiO ₂)	≤0.1 mg/L
Iron	≤0.1 mg/L
Cadmium	≤0.005 mg/L
Lead	≤0.05 mg/L
Other heavy metals except iron, cadmium and lead	≤0.1 mg/L
Chloride ion (Cl ⁻)	≤0.1 mg/L
Phosphate (P ₂ O ₅ ⁻⁵)	≤0.1 mg/L
Conductivity (25°C)	≤3 μS/L
pH value	5~7
Appearance	Colorless and clean without sediment
Hardness (total amount of alkaline metal ions)	≤0.02 mmol/L
Note: Please refer to Chapter 22 of EN-285:2006 for test method of steam quality.	

