# Operation Manual



# Vertical Steam Sterilizer

Thank you for choosing our products. Please read the "Operating Manual" before operating this unit to assure proper operation.

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## BRIEF

The steam sterilizer is the sterilization equipment that can sterilize medical equipment, surgical dressing, medicine liquid, glassware, etc by saturated steam. They enjoy the following merits such as fashionable and attractive appearance, reasonable frame, multiple functions, fast heating, and complete disinfection.

Purpose: they are used to sterilize following goods by medical treatment and public health, scientific research organization: medical equipment, labware, culture medium and non-sealed liquid or preparations.

## FEATURES

1. This is an automatic control steam sterilizer. This is made by shell, barrel, basket with netting on top, and control system.
2. Shapes are square vertical. The sterilization barrel's shell and themselves are made of stainless steel. Sterilization barrel（pressure vessel）and safety accessories conform to GB 150、《special equipment's safety regulation》 and nationality legal pressure vessel provisions by laws and regulations. They must have nameplates and quality certificates that were registered on the legal pressure vessel safety supervision organization.
3. The safety valve is fixed on the vessel's cover. It can release over pressure to ensure equipment's safety when inner pressure exceeds 0.24MPa.
4. During the heating process, the deflation valve, which is controlled by a temperature controller, will discharge cold air automatically. When the temperature on temperature controller exceeds 102℃, the deflation valve will auto-close after several minutes. The equipment goes into auto intermittent deflated function and raises the vessel's steam saturate degree, which can enhance the sterilization effect.
5. Operating front panel includes a pressure gauge that shows the pressure state clearly.
6. The machine has multiple safety protection. The circuit can automatically shut off when short water in the vessel, heater auto stops operating，protecting the equipment in effect. At the same time, the water indicator light turns red which reminds users to add water until enough.

## TECHNICAL PARAMETERS

| Seq. | Volume | Power | Sterilization Time Adjustment Range | Max. Working Pressure | Max. Working Temperature | Net Weight |
|---|---|---|---|---|---|---|
| 1 | 35L | 3.5kW | 4-120min | 0.22MPa | 134℃ | 58 kg |
| 2 | 50L | 3.5kW | | | | 75 kg |
| 3 | 75L | 4.5kW | | | | 82 kg |
| 4 | 100L | 4.5kW | | | | 103 kg |
| 5 | 120 | 4.5kW | | | | 108 kg |
| 6 | 150 | 6kW | | | | 116 kg |

1. Power supply：AC220V±22V ， 50Hz±1Hz.
2. Rated operating pressure：0.22MPa. Operating temperature range：116℃~134℃.
3. When operating normally during sterilization circles, noise shouldn't be more than 65dB.
4. Sterilizing time scope: 4～120min.
5. Safety class：class I.
6. Environmental temperature request：+5℃～+40℃；relative humidity：no more than 85%；atmospheric pressure 70kPa～106kPa.
7. The used water shouldn't affect sterilizing process, damage the vessel or sterilizing items.

## INSTALLATION REQUIREMENTS

1. **Please read the manual carefully before use.**
2. According to protection against electric shock, it belongs to class Ⅰ. No flammable and explosive, anesthetics air or articles exist in installation place.
3. Connect the power source always during the procedure. The sterilizer must keep a 60cm distance from the wall and the height must exceed 1.2m, make sure to operate the equipment safely in（must conform to GB 14048.1 and GB 14048.3 standard）sterilizer's power source. It must have obvious disconnecting device ON-OFF mark（such as special for sterilizer）. The power line must be fixed when it is connected to disconnectiong device to prevent from falling off. The power line's diameter is 2.5mm²×3. L is the power line. N is the zero line. The yellow-green G is protective grounding. When the procedure is over, please press OFF to close and disconnecting device.
4. Place the equipment on the level and fast floor. Users can connect the power supply correctly according to its nameplate and manual. The equipment must be sure of safety and ground protection（ground resistance shouldn't be more than 2Ω）
5. Connect the drainage pipe to the drainage port, ensuring that the drainage end of the pipe is not submerged in water to prevent water from being drawn back into the sterilization chamber bucket.
6. For a machine with automatic water inlet function, prepare one bucket (5 gallons) of distilled water (tap water is not recommended, and the water quality should meet the requirements specified in GB 8599 Appendix C). Connect one end of the water inlet pipe to the device's water inlet, and insert the other end into the bottom of the water bucket.

## Usage Instructions

**All documents of the equipment must be supplied to the local inspection organization to register on record. Sterilizer operators must accept professional training and be familiar with pressure vessel operation according to manul strictly. Special operator must look after the equipment and record the operation state during the sterilizing process, to prevent accidents. Sterilizers must be checked one time per year at least by an inspection organization. The machine can be used after proving to be qualified.**

**NOTES：**

**Please don’t put inflammable goods into the sterilizer’s barrel.**

**Please don’t put following goods into the barrel: explosive goods, inflammable goods, oxidizing goods, incendive goods, or flammable goods. Otherwise, the equipment will explode, fire or breakdown.**

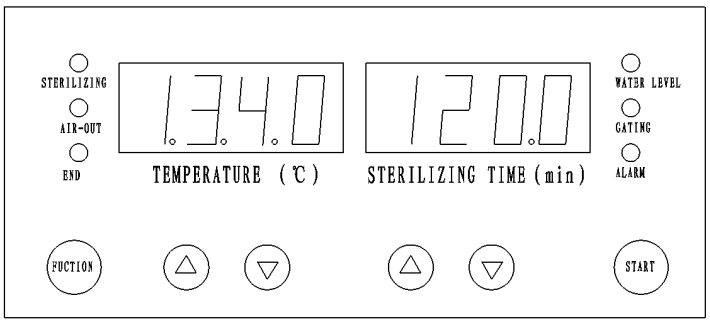
**Please don’t put the following goods into the barrel such as culture medium that can corrode stainless steel. Otherwise, the equipment will explode, fire, or breakdown.**

- **Please don’t touch the switch or circuit breaker with wet hands, to prevent electric shock or accident.**
- **Please don’t touch the vessel’s cover in the sterilizing state as it is high temperature.**
- **“Please don’t open the cover before releasing steam completely”: after sterilization, please don’t open the cover before the pressure gauge’s pointer doesn’t return to 0 place. Otherwise, high-temperature steam can burn the operator.**

## （I）SYMBOLS AND THEIR MEANING

| Symbol | Meaning | Symbol | Meaning |
|---|---|---|---|
| ～ | Alternating current |  | notice！check and review equipment’s documents carefully |
|  | Caution hot |  | Protective grounding |
|  | Test interface | | |

## （II）OPERATEING STEPS




(1) **Function**: press this button for 5s can choose a function, press one time to display the A model ( sterilization function); press again to B mode (sterilization, air release function); press again to display the A model, cycle like that.

(2) △ **button**: press this button to adjust the temperature display high-temperature setting (range: 116.0℃～134.0℃), the sterilization time (range: 4 ~ 120 minutes) can increase the

set time range.

(3) ▽ **button**: press this button to adjust the temperature display low-temperature setting (range: 116.0℃～134.0℃), the sterilization time (range: 4 ~ 120 minutes) can reduce the set time range.

(4) **START**: press this button can open the working function.

(5) **Water level indicator**: turn red when water is too little in the sterilizer. When the water reaches to a low water level, it turns flashing green. When the water is enough, it displays green light.

(6) **Alarm indicator light**: turns on when there is an over-temperature alarm or error occurs durning work.

(7) **Temperature display window**: set the state display of set temperature, the working state display current measuring temperature sterilizer.

(8) **Sterilization display window**: set state display of sterilizing time, display the current surplus of sterilization time working state.

## ◆METHOD OF FUNCTION SETTING

After turning on the power supply and the self-test, the control panel displays the current temperature in the container and the last run program. Press the "Function" button to select the program operation mode. Then you can use the corresponding △▽key to set temperature and sterilization time. After pressing the "start" button, sterilization indication light will flash (expressed in heating). Until temperature rises to the set value, the sterilization indicator light will turn bright and start the countdown (expressed in sterilization). Automatic bleed after sterilization and the deflation indicator lights. Bleeding after END, window display, the “End”indicator light turns on and a beep indicates the end. Then it allows to remove the goods.

**a、Setting Sterilization function**

(1) Press "FUNCTION" button. Display the currently selected working procedure of PROGROM A and sterilization temperature and sterilization time.

(2) Set the temperature by pressing the button△▽which is under the temperature display window.

(3) Set the sterilization time by pressing the button△▽which is under the sterilization time display window.

(4) Press START button after setting well.

**b、Setting sterilization, air release function:**

(1) Press the "Function" button. Display the currently selected working procedure PROGLAM B, temperature of sterilization and sterilization time.

(2) Set the temperature by press the button △▽ which is under the temperature display window.

(3) Set the sterilization time by press the button △▽which is under the sterilization time display window.

(4) Press “START” button to start work after setting well.

**A. Adding water and Stacking**

(1) Turn the ring nuts counterclockwise on each bolt for several turns to disengage them from the flange groove. Open the sterilizer cover after removing the bolts and take out the sterilization basket or inner cylinder.

(2) Close the drain valve, inject approximately 6 liters of water into the sterilization chamber, and the water level indicator light will illuminate. Generally, fill the water level to the foot of the sterilization chamber (below the baffle). For continuous use, the water level must be replenished after each sterilization cycle.

(3) Properly wrap and orderly place the items to be disinfected into the inner cylinder or basket, leaving gaps between them. This facilitates steam penetration and enhances sterilization effectiveness. When stacking sterilization packages, ensure there is a gap for the safety valve vent. Otherwise, if the vent is blocked and cannot release pressure, it may lead to a pot bursting incident.

**B. Power On**

Connect the power supply that corresponds to the sterilizer label. Set the switch on the control panel to the "On" position. The control panel should display a complete illumination, and a self-check status will be shown for 3 seconds.

**C. Sealing**

Cover the container and lift each bolt into the corresponding slot on the upper cover flange. Tighten the ring nuts in a clockwise direction (it is recommended to tighten diagonally), making sure the sterilizer cover is pressed tightly against the lower flange. Apply force to ensure a complete and tight seal.

**D. Function Setting**

Users should select the appropriate buttons to set the required sterilization temperature and time based on the type of sterilized items.

<Refer to the operation panel instructions. Different items have specific sterilization temperature and time requirements according to the Ministry of Health's "Disinfection Technical Specifications.">

| |
|---|
| Confirm sterilization performance: Sterilization performance varies based on the type of items, quantity, loading method, and container type. Therefore, use indicators such as OK cards to confirm sterilization. Failure to do so may result in accidents or poor sterilization effectiveness. |

**E. Heating**

After pressing the start button, the equipment begins operation. The heating indicator on the control panel blinks, indicating the start of heating. The pressure relief valve automatically closes after the temperature reaches 102°C.

**F. Sterilization**

Once the temperature reaches the set level, the sterilization indicator on the control panel

stops blinking (remains solid), indicating the start of sterilization.

**G. Pressure Relief (Strictly prohibited when sterilizing glassware and solution culture media)**

After sterilization, automatic pressure relief begins (applies to programs in setting mode b). After sterilization, no pressure relief is needed (applies to programs in setting mode a). Allow for natural cooling and pressure reduction.

**H. Completion**

The display window on the panel shows "END," accompanied by a prompt sound, indicating the end. Wait until it cools until the pressure gauge pointer returns to zero, then open the lid and remove the items (be sure to wear protective gloves during retrieval. Due to the temperature drop, extra caution is advised during retrieval. Direct contact with hands may cause burns.) One sterilization cycle is complete. For sterilized glassware and items like solution culture media, open the lid slightly after the pressure gauge returns to "0," wait for 10-15 minutes, and then fully open the lid to remove the sterilized items.

**I. Manual Water Drainage**

When necessary, manually open the side drain valve for water drainage. Caution: Be careful to avoid burns during water drainage.

**Caution: Be careful of scalding when draining. Do not immerse the end of the drainage pipe in water to prevent backflow**

During the program execution, if an alarm sounds, the alarm light is on, and the digital display shows a warning symbol (refer to Section VII, Common Fault Analysis and Troubleshooting in this manual for resolution methods), it indicates an error. The errors are as follows: [Missing information about specific errors].

ERR—2: indicates that the water level is below the low water level.
ERR—3: indicates that the sterilization temperature is too high.
ERR—5: indicates a protection mode for the heating element.
ERR—6: indicates excessive pressure.
ERR—7: indicates an unexpected interruption during the sterilization process.
ERR—8: indicates a manual interruption during the sterilization process.
ERR—9: indicates indoor temperature sensor malfunction.
ERR—10: indicates pot wall temperature sensor malfunction.
ERR—20: indicates a timeout during the heating process.
ERR—21: indicates sterilization failure.

If incorrect settings are noticed after running, press and hold any adjustment key (except "Function" and "Start") for 5 seconds to interrupt the program. Alternatively, turn the switch to the "Off" position, then back to the "On" position, and reselect the desired sterilization temperature and time settings.

**NOTE:**

**For the sterilization temperature correction/sterilization intermittent discharge time and cycle adjustment during the sterilization process: The parameters of this step are related to the equipment working performance. The user should not change the setting easily. If the user does need to adjust the parameters, please adjust as follows：**

**Temperature Correction Adjustment:** Press and hold the start button while turning on the switch. Press the start button once, and the temperature window will flash. Use the plus or minus keys below the temperature window to make corrections. Press the start button again, and the sterilization time window will flash. Use the plus or minus keys below the sterilization time window to adjust the upper limit of the emission gas temperature (105-120℃). Press the start button three or more times, turn off the switch, then turn it on again to complete the correction or adjustment.

**Emission Gas Frequency / Intermittent Emission Time and Cycle Adjustment:** For Program A: Hold the function button and the temperature window plus or minus key. Press the start button once, and the temperature window digits will flash. Use the plus or minus keys below the flashing digits to adjust the emission frequency (1-3 times). Press the start button again to adjust the emission time (0-5s). Press the start button once more to adjust the emission cycle (1-60s). Press the start button again to adjust the emission time during gas release (0-10s). Press the start button once more to adjust the emission cycle during gas release (0-10s). Press the start button again to adjust the emission end temperature (110-120℃).

For Program B: Hold the function button and the temperature window plus or minus key. Press the start button once, and the temperature window digits will flash. Use the plus or minus keys below the flashing digits to adjust the emission frequency (1-3 times). Press the start button again to adjust the emission time (0-5s). Press the start button once more to adjust the emission cycle (1-60s).

## Caution and Maintenance

1. When stacking sterilized items (with the upper cover completely open), the basket should be placed at the center of the barrel (the baskets should be concentric and stacked up and down). It is strictly prohibited to block the vent holes of the safety valve. Sufficient space must be left to ensure smooth ventilation of the equipment. Otherwise, if the vent holes of the safety valve are blocked, it cannot function, leading to accidents.
2. Before each use, check whether the water level in the sterilization barrel is maintained at the specified level.
3. When the sterilizer is in continuous operation and a new sterilization operation is to be performed, allow a 5-minute interval and open the upper cover to give the equipment time to cool down.
4. When sterilizing liquids (only for program A), the liquid container should be placed in a heat-resistant glass bottle, not exceeding 3/4 of its volume. Use a cotton plug for the bottle mouth, and avoid using rubber or cork plugs without holes.

   Special note: Do not release steam immediately after the sterilization of liquids. The residual air can only be discharged after the pressure gauge pointer returns to zero.
5. When sterilizing containers such as beakers, flasks, and test tubes, the opening must face

downward or be placed horizontally. Placing the opening upward not only makes it difficult to vent but also hinders steam from penetrating the interior, resulting in poor sterilization effectiveness.

6. For items with different types and sterilization requirements, such as dressings and liquids, do not sterilize them together to avoid damage.
7. Confirm sterilization performance: Sterilization performance varies depending on the type of items, quantity, loading method, and container type. Therefore, use sterilization indicators such as an OK card to confirm. Failure to do so may result in accidents or poor sterilization effectiveness.
8. Do not leave sterilized items in the product: This product does not have a storage function for sterilized items. To prevent recontamination, after sterilizing items such as culture media and instruments, promptly remove them and store them in a dedicated safe box.
9. At the end of sterilization (or in case of malfunctions), the pressure gauge pointer must return to zero. Open the manual vent valve (or place the vent valve lever in the vent position) to allow outside air into the sterilizer. Once the vacuum is eliminated, the container lid can be opened (do not approach the lid with your face). When fully opening the lid and removing the mesh basket, be cautious of burns and pinching fingers. (Be sure to wear protective gloves when removing items. Due to the time required for the liquid temperature to decrease, extra care is needed during removal. Direct contact with hands after the operation may cause burns.)
10. After prolonged use, if the pressure gauge shows inaccuracies or cannot return to zero, it should be promptly inspected. Regular checks are recommended (ideally every 6 months) by comparing it with a standard pressure gauge. If abnormalities are found, a new gauge should be replaced. Every six months, apply an appropriate amount of high-temperature grease to the horizontal beam screw.
11. Keep the equipment clean and dry at all times. The rubber sealing gasket may age over time and should be replaced regularly (recommended every 12 months).
12. During operation, if the pressure gauge indicates over 0.24 MPa and the safety valve does not activate, immediately cut off the power, open the manual vent valve, wait for the pressure gauge to indicate 0 MPa for 1-2 minutes, then open the container lid and promptly replace the safety valve.
13. When troubleshooting requires the replacement of components, it must be done by qualified personnel with professional training or authorized personnel from the manufacturer. Disconnect the power circuit breaker, release the residual air in the container, zero the pressure gauge pointer, and send the safety valve for inspection at least once a year. Lift and lower the handle on the safety valve core several times each week to prevent valve core scaling and air leakage.
14. Do not modify for use: Unauthorized disassembly or repair is strictly prohibited, except for maintenance technicians. Otherwise, injuries may occur due to fire or abnormal operation. If screws or nuts are found to be loose during routine use, tighten them promptly to ensure normal operation.
15. Cleaning (recommended monthly): Empty the water from the container and disconnect the power circuit breaker. After the container has cooled, remove the shelves and mesh basket from the container. Use a brush to remove scale deposits on the inner walls, heating

elements, and water level probes. Then, use a towel dipped in alcohol or distilled water to wipe the inner surfaces. After drying, place the shelves and mesh basket back into the container. Store the equipment in a well-ventilated room with non-corrosive gases.

16. Do not forcibly open the container cover until the pressure inside the container has been released to zero.
17. Do not allow children to use or play with the equipment: Otherwise, it may result in burns, electric shock, or injuries.
18. Do not open the drainage valve while the equipment is in operation: When draining the heated water, wait for at least 2 hours after sterilization is complete and ensure that the lid is open before starting the drainage operation. Failure to do so may result in burns or accidents due to the release of high-temperature hot water.
19. Fuse replacement: If the power indicator light does not illuminate after connecting the sterilizer power cord to the power source, disconnect the circuit breaker. Using a Phillips screwdriver, open the back cover of the sterilizer to inspect the fuse (specifications: R015, 10×38, 32A). If the fuse is damaged, replace it immediately.
20. Before moving, transporting, or storing, drain the water from the container, seal the sterilizer lid, disconnect the circuit breaker, and remove the power cord. When moving (release the caster locks first), push the sterilizer on a flat surface. During transportation and storage (secure the sterilizer in the packaging box), prevent loosening and abrasion. Avoid tipping to prevent injuries or accidents.
21. Transportation and storage environmental conditions:
    Ambient temperature: -40°C to +55°C
    Relative humidity range: 10% to 80%
    Atmospheric pressure range: 500 hPa to 1060 hPa
22. At the end of its service life (8 years from the production date indicated on the product label), this product and its accessories should be voluntarily handed over to qualified entities or individuals for recycling and disposal.

## Common Fault Analysis and Troubleshooting

| Seq | Fault Symptoms | Cause Analysis | Troubleshooting Methods |
|---|---|---|---|
| 1 | Water level light on, temperature not rising on display | a.The sterillization time is not set<br>b.Circuit board damaged<br>c.Heat tube damaged | Set the sterillization time<br>Be replaced by professional personnel<br>Be replaced by professional personnel |
| 2 | Operating status, shell electrified | a.Heat tube damaged<br>b.Power supply without grounding line. | Be replaced by professional personnel<br>Grounding wires by professionals. |
| 3 | Temperature display shows - - - - | a.The temperature sensor damaged<br>b.Circuit board damaged | Be replaced by professional personnel<br>Be replaced by professional personnel |

| | | | |
|---|---|---|---|
| 4 | Digital display shows - O O O or garbled characters | Circuit board damaged | Be replaced by professional personnel |
| 5 | Pressure gauge with water vapor inside | The pressure gauge spring tube leak | Be replaced by professional personnel |
| 6 | Pressing the shift key, no blinking in the corresponding position | The control panel damaged | Be replaced by professional personnel |
| 7 | Display ERR-2 | Water level below low water level | Add enough water |
| 8 | Display ERR 3 | Sterilization temperature too high | SCR failure and the temperature sensor failure |
| 9 | Display ERR 5 | Heating element overheating protection | Temperature control switch failure (Professional repair) |
| 10 | Display ERR 6 | Pressure too high | Pressure switch, safety valve failure (Professional repair) |
| 11 | Display ERR 7 | Power outage during sterilization process | Manually unlock by pressing the function key |
| 12 | Display ERR 8 | Manual reset during sterilization process | Manually unlock by pressing the function key |
| 13 | Display ERR 9 | Indoor temperature sensor malfunction | Replace the sensor (to be done by a professional). |
| 14 | Display ERR 10 | Wall temperature sensor malfunction. | Replace the sensor (to be done by a professional). |
| 15 | Display ERR—20 | Timeout for heating | Replace heating element |
| 16 | Display ERR—21 | Sterilization temperature lower than set temperature, temperature sensor damaged; heating element damaged | a. Replace heating element (Professional replacement)<br>b. Replace temperature sensor (Professional repair) |

**PACKING LIST**

| Seq | Item | Quantity | Note |
|---|---|---|---|
| 1 | Vertical Steam Sterilizer | 1 | |
| 2 | Operating Manual | 1 | |
| 3 | Gloves | 1 pair | |
| 4 | Bucket/Basket | 1 | |
| 5 | Air releasing tube | 1 | 2m |