

# SUN series Autoclave (class B)

## Operation Manual



This manual applies to SUN12- II 、 SUN16- II 、 SUN18- II 、 SUN23- II  
autoclave

# Content

|                                     |    |
|-------------------------------------|----|
| 1、 General Introduction .....       | 2  |
| 2、 Application Scope .....          | 2  |
| 3、 Tech. Parameter.....             | 2  |
| 4、 Diagram Specification .....      | 3  |
| 5、 Installation .....               | 3  |
| 6、 Control Panel.....               | 4  |
| 7、 Operation .....                  | 5  |
| 8、 Emergency Condition.....         | 8  |
| 9、 Maintenance and Service.....     | 9  |
| 10、 Transportation and Storage..... | 10 |
| 11、 Attention.....                  | 10 |
| 12、 Packing of accessory.....       | 11 |
| 13、 Appendix.....                   | 11 |

NO.1: The working status display table

NO.2: Vacuum and B&D test method

NO.3: Circuit diagram of sterilizer

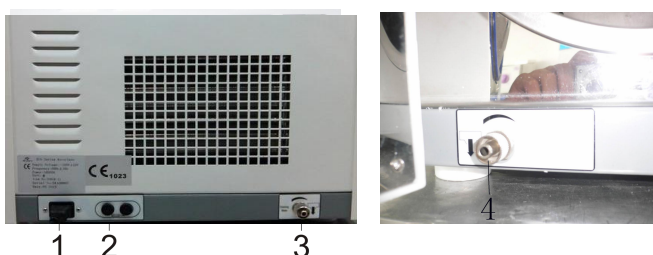
NO.4: Steam loop

# SUN series Autoclave(class B)

## 1. General Introduction

This Autoclave is a precision instrument specializing in the operation occasion in need of simple, fast and efficient sterilization by the doctor or his/her assistants, and the doctor shall take the responsibility for such work.

This Autoclave is specially designed for the occasions in use of frequent sterilizations. It is equipped with the microprocessor for intelligent control and man-machine interface for convenient operation. With the distinctions in displaying parameter and condition actively, evaluating malfunction automatically, shutting off for self-protection automatically in case of excessive temperature and pressure, this type autoclave is reliable product in sterilizing.



- |                             |                     |
|-----------------------------|---------------------|
| 1. Power source socket      | 2. Fuse             |
| 3. Water exit of water tank | 4. Waste water exit |

## 2. Application Scope

The autoclave could sterilize ( 121 °C or 134 °C ) the tooth & operation device, Sanitary material and other heat-resisting articles of the Dept. like Stomatology, Ophthalmology and Lab. Not for liquid & hermetical device's sterilization.

## 3. Tech. Parameter

|                                                           |                                                                 |
|-----------------------------------------------------------|-----------------------------------------------------------------|
| Chamber size of the autoclave (Diameter X Depth) 12L..... | 200mmX360mm                                                     |
| Chamber size of the autoclave (Diameter X Depth) 16L..... | 230mmX360mm                                                     |
| Chamber size of the autoclave (Diameter X Depth) 18L..... | 249mmX355mm                                                     |
| Chamber size of the autoclave (Diameter X Depth) 22L..... | 249mmX450mm                                                     |
| Rated Voltage.....                                        | 220V±22V, 50Hz±1Hz <input type="checkbox"/>                     |
| .....                                                     | 110V±11V, 60Hz±1Hz <input type="checkbox"/>                     |
| Rated Power.....                                          | 1800VA <input type="checkbox"/> 2000VA <input type="checkbox"/> |
| Sterilizing (Pressure/temp.).....                         | 100-120KPa/121° C                                               |
|                                                           | 200-220KPa/134° C                                               |
|                                                           | (Both of above are under Standard Atmospheric Pressure)         |
| Fuse-Melting pipe.....                                    | T15A <input type="checkbox"/> T30A <input type="checkbox"/>     |
| Capacity of water tank.....                               | 2L                                                              |
| Probable water consumption of one cycle .....             | .0.4L                                                           |
| Environment temperature of operate.....                   | 0-40° C                                                         |

#### 4. Diagram Specification



Attention and warning



I Sort B model device



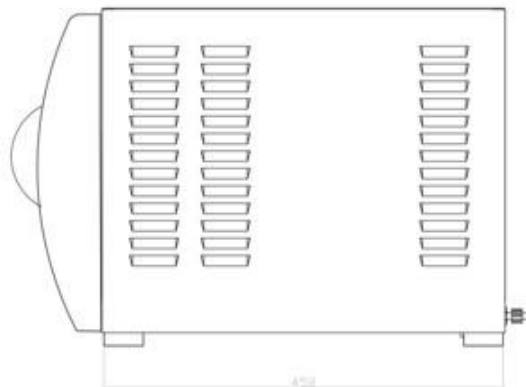
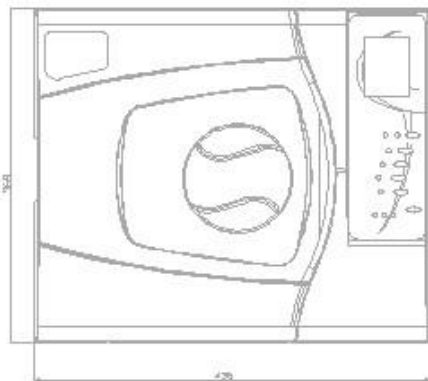
Protective Grounding

#### 5. Installation

The clearance between the exterior side surface of the autoclave and the ambient neighboring articles shall be 10cm as retained, and the top surface shall be 20cm retained.

The air-cooling window attached to the exterior surface of the autoclave shall be non-clog by dust or articles, and the autoclave shall be located in the proper air flowing environment by recommendation of the supplier.

**Autoclave shall be installed on the horizontal working base. 2pcs front feet can be adjusted the height to ensure the front of machine slightly higher than the back.**



## PREPARATION BEFORE OPERATION

Before operation, please connect well to the power. Connect the power source hole under the left back side of the autoclave by the attached plug inside the chamber, turn on the autoclave by the button at the front right bottom corner, when the switch indicator light is on, it means that the autoclave get through with the electric power, and the window would displaying “LD”.

## 6. Control Panel

### 1. Pressure display

Display on time the air pressure inside the chamber.

Unit:KPa

### 2. Temperature display

Display on time the temperature inside the cavity.

Unit: °C

### 3. Status/ Error code number display

Applied for displaying kinds of status of the autoclave during its working time. See more details in “Appendix working status display form”. When alarm occurs to the autoclave, the digital pipe of the display will show the alarm code number, the user can find out the malfunction part.(Once the malfunction occurring to the autoclave, please contact the service center or distributor immediately).

### 4、UNWRAPPED button

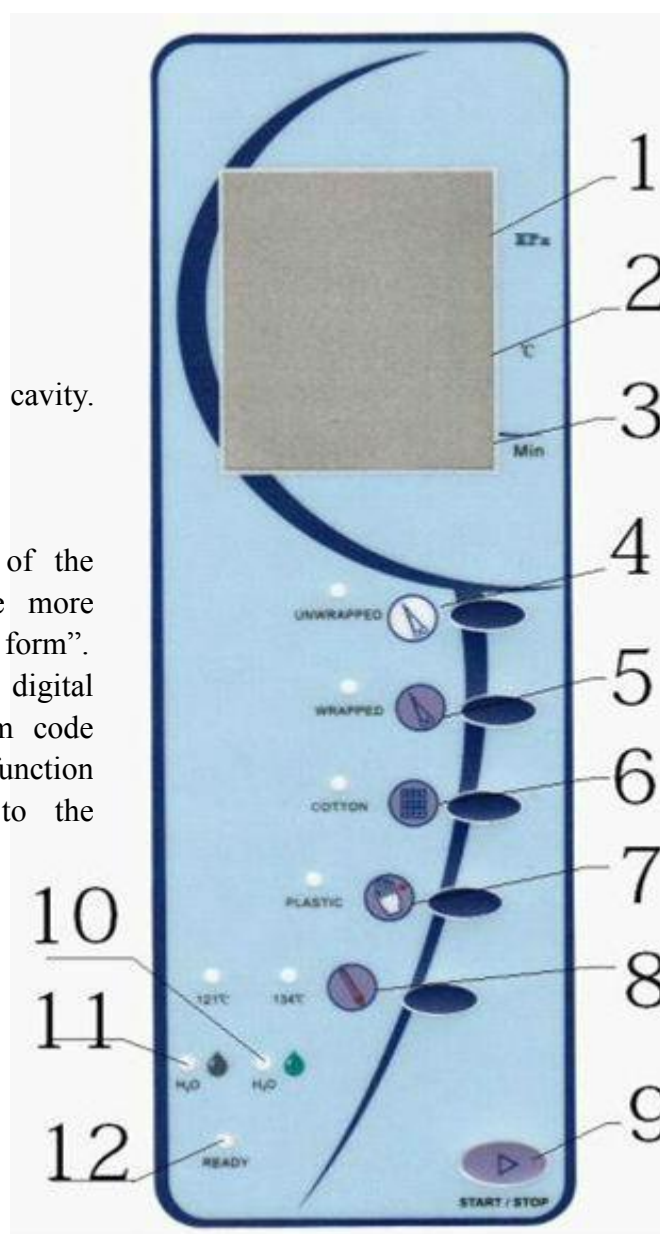
It's used to the sterilization choice especially for the unwrapped devices. The working temperature is 121°C or 134°C.

After having been selected, its indicator light is on.

### 5、WRAPPED button

It's used to be the sterilization choice especially for the wrapped devices. The working temperature is 121°C or 134°C.

After having been selected, its indicator light is on.



## 6、COTTON button

It's used to be the sterilization choice especially for the cotton yarn devices. The working temperature is 121°C.

After having been selected, its indicator light is on.

## 7、PLASTIC button

It's used to be the sterilization choice especially for the plastic and the rubber devices. The working temperature is 121°C.

After having been selected, its indicator light is on.

## 8、 button

It's used to be the choice especially for the working temperature. There are two working temperature for choice: 121°C or 134°C, whose light will on after being selected. 134°C could not be selected for COTTON and PLASTIC system.

## 9、START/STOP button

Press down the Starting button for starting the sterilizing process;

After having been pressed down for 5 seconds of the button, it will stop the sterilizing program.

## 10、Green light indicator

It's the light indicator for alarming the shortage of water in the distilled water tank and reminding for filling distilled water.

## 11. Gray light indicator

It's the light indicator for alarming the full of the waste water tank, and reminding for draining waste water.

## 12. READY light indicator

After closing the door, the READY lighting means can press START to working.

## 7. Operation

Before operation, please connect well to the power socket. Push down the main power green switch at the right bottom corner of the front side, when the indicator light is on, it means that the autoclave get through with the electric power, and the process then is in initialization status with “LD” being shown on the screen. The autoclave is not heating while under such initialization status. Press the “Start/Stop” button to start sterilizing work.

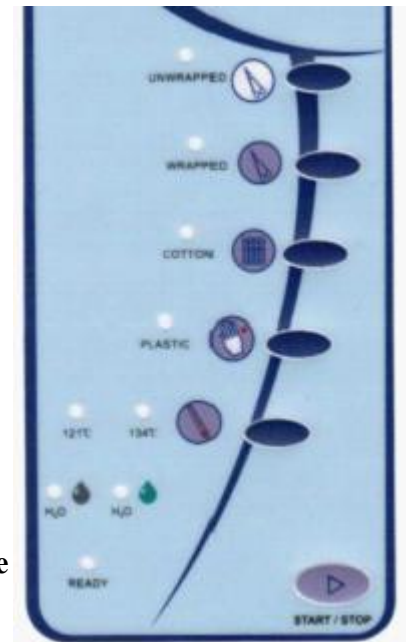


### 7.1 Water filling

After turning on the power to the autoclave, if the “Green” blob light is flashing, please fill more distilled water until the light is off and with a “du” sound. Fill about 1000-1500ml distilled water(3 cups) each time.

During working time, if the “Green” blob indicator is on, the user shall filling water after the autoclave finished working in time, and same time drain out of the used water in time. Or it would have the abnormal voice to effect the working.

**Clean the copper filter inside the chamber by brush or ultrasonic cleaner in time, or it would effect the pressure releasing, please clean it one time once 3 days.**



Note: **Be sure to fill the distilled water**

1. The autoclave must connecting the power socket well, and turn on the switch before filling the distilled water.
2. Do not fill the distilled water too much, when there is a "DU" sound, please stop to filling more water.
3. If there is a mark on the lack of source distilled water, please fill distilled water only after the autoclave finished working!

### 7.2 Working

Start the sterilizing work when the two blob indicators of water tank are both off.

7.2 (A) Select the program and temperature for coming sterilizing.

7.2 (B) Put the cleaned instrument onto the mesh trays inside the chamber.



Note: the object apparatus to be sterilized shall be placed on the device trays with enough clearance retained in favor of the air circulation inside the sterilizing room. Please put the device trays into the autoclave by the attached hand-support holder.

7.2(C) Close the door after putting in the apparatus to be sterilized, and revolve the handle to the right MAX position.





Note: Due to the heat air and steam inside the autoclave room, it's reasonable if there is resistance force from the door when you close it. Please heavily close the door and revolve the handle to and push the door a little bit while close the door.

7.2(D) Press the START/STOP button to start work. When display "HE", it means the autoclave start its automatic sterilizing process. During the process, you can enjoy the leisure by its automatic function, or you can pay your attention to other work because autoclave runs automatically during the process of heating, sterilizing and drying, and display "ED" means finished sterilizing.

The working time of the whole process is determined by the total quantity of apparatus inside the sterilizing room, the initial temperature of autoclave and the sterilizing process the user chooses.



Note: If the door is not completely closed, a "LD" is showing when press down "START/STOP" button. Please close the door again, otherwise the autoclave can not start work. If the door is releasing during working, the status display will show "E6" as error and the autoclave will stop working, you need to turn off the autoclave firstly, then restart the machine.

7.2(E) When "ED" displaying after sterilizing process, you can open the door and take the sterilized apparatus out.



Note: Take out the sterilized apparatus together with the device trays by the attached hand-support plate in case of scald.

After opening the door of autoclave, the process is reset at "LD" state, which means the autoclave is under heat preservation status and waiting for another sterilizing procedure. Before starting the new sterilizing procedure, the autoclave will always keep in the status of heat preservation.

7.2(F) Please turn off the autoclave by the switch when the autoclave is not working.



**Warning:** Please don't open the door when the pressure not reaches "0".

During each time's sterilizing process, we recommend you put the special testing paper or bags into the room together with the object apparatus to ensure the liability of the sterilizing.

## 8. Emergency Condition

During the running time, the autoclave will automatically raise the alarm, release pressure, stop heating and display the warning code(The definition of the warning code is as the below table: malfunction code and resolving method )for ensuring the safety of the operator if the emergencies occur.

Any emergencies happen, please check the warning code table for resolving the according malfunctions. If not possible to resolve, please contact the dealers. We will try our best to provide help to you in short time.

### Error code and resolving measures

| NO | Code display | Alarm Tone | Malfunction content                                      | Resolving Measures                                                                       |
|----|--------------|------------|----------------------------------------------------------|------------------------------------------------------------------------------------------|
| 1  | E1           | long "du"  | Fault of temperature sensor inside the chamber           | Inspect if anything effected the sensor or wire not connecting well or sensor was broken |
| 2  | E2           | long "du"  | Pressure over 240 KPa                                    | Inspect pressure sensor or vacuum pump working                                           |
| 3  | E3           | long "du"  | Fault of temperature sensor outside the chamber          | Inspect the temperature sensor outside of the chamber                                    |
| 4  | E4           | long "du"  | Super high inner temperature when pressure rising        | Inspect inside temperature sensor or pressure sensor                                     |
| 5  | E5           | long "du"  | Pressure releasing slowly                                | Inspect the filter inside the chamber keep it clean and no jam                           |
| 6  | E6           | long "du"  | Problem of door switch or door being opened when working | Inspect door switch or if door handle were revolved to the right MAX position            |
| 7  | E7           | long "du"  | Fault of temperature senor on steam generator            | Inspecting the temperature sensor on steam generator                                     |
| 8  | E8           | long "du"  | Fail on pressure rising                                  | Inspect water flowing road and steam leaking.                                            |
| 9  | EH           | long "du"  | Steam generator not heating                              | Inspect connecting wire or resistance of steam generator                                 |
| 10 | EF           | long "du"  | Pressure not over than 0 KPa                             | Inspect water pump/steam generator                                                       |
| 11 | EL           | long "du"  | Pressure not over than 20 KPa                            | Inspect if electric valve causing steam leak, or replace water pump                      |
| 12 | Eo           | long "du"  | Pressure not over than 65 KPa                            | Inspect if the water pump working weakly. Or replace it                                  |
| 13 | E9           | long "du"  | Fail on keeping pressure and temperature                 | Inspect the steam leaking                                                                |

## **9. Maintenance and Service**

9.1 Clean the distilled water tank by medical once a month.

9.2 Clean the interior surface of the chamber by alcohol once a month.

9.3 Replace the fuse.

(1) Shut off the power

(2) Revolve the fuse base by counter-clockwise by screwdriver to bring out the melting fuse to be replaced;

(3) Replace the new fuse and reset the fuse base on the original position, then use the screwdriver to fasten the base by clockwise.

(4) Check the correctness of the parameter of the new fuse replaced.

9.4 Clean the sealing ring periodically

The user shall clean the sealing ring periodically for avoiding the influence to the seal caused by the dust/dirt left due to the long period use. Use the smooth cloth with distilled water to wipe the surface of the sealing ring or sealing cap gently. The user shall discharge the sealing ring for further cleaning or replacement if the air-leaking problem can not be resolved after the above process (The user shall discharge the sealing ring periodically for cleaning and inspection as recommendation by the supplier).

9.5 The replacement work for sealing ring

Tool: One flat screwdriver (No sharp edge at the head)

A. One hand catches the lip of the sealing ring, the other hand insert the screwdriver into the clearance between the sealing ring and the door for raise up the sealing ring.

B. After raising up part of the ring, you can use hand to draw the whole ring out. Wash its groove after drawing out the ring and pay attention to see whether it's spoiled or not in consideration of the necessity of replacement.

C. Put back the ring to the original door groove after cleaning. Most Important: the inset work must be done equably to the groove During the installation, the laid four equal points of the ring must be inserted to the groove firstly, later for the same work for the remaining segments of the ring. After finishing, press the sealing ring equally by the force of hand.

D. Note: The inner circle of the ring may be raised up when insert the ring into the groove. Please press it to the groove by using the screwdriver carefully.

Shut off the power and cooling the autoclave sufficiently before inserting the ring for avoiding scald.

9.6 Shut off the power before service or components' replacement, and the service or replacement work shall be done by the supplier or his designated technician.

## 10. Transportation and Storage

10.1 The preparatory work before transportation and storage

Shut off the power, draw out the plug and cool the autoclave down.



A



B

10.2 Draining water

Empty the water storing tank and the cooling water collecting tank; The terminal side of the attached pipe with no connecting joint shall be inserted into the water exiting joint pipe. As the above picture showing, B is the water exiting mouth for cooling water collecting tank, A is the water exiting mouth of the water storing tank. Revolving the water exit button by anticlockwise direction so as to release the water.

10.3 The autoclave shall be transferred and stored with the below conditions:

Ambiance temperature:  $-5^{\circ}\text{C} \text{ --- } +45^{\circ}\text{C}$

Relative humidity:  $\leq 85\%$

Atmospheric pressure: 500HPA-1060HPA



Note: Don't drag during transportation. handle it carefully and no inversion.

## 11. Attention

1. The autoclave must be placed on the horizontal working base.
2. Must use the distilled water for the purpose of lasting the working life.
3. Clean the chamber and brass filter in time.
4. The object apparatus to be sterilized shall be put onto the trays and with enough space for the steam flowing inside the chamber.
5. Drain the used water y the water inside the cooling water in time, Usually, drain the used water once the distilled water were finish.
6. Confirm to revolve the door handle to the right MAX position.
7. Don't open the door only after the pressure indicator displaying 0.
8. Caution scald, not be close to the door of the chamber when open the door.
9. Shut off the power before discharging/installing the sealing ring, and the work shall be carried out after further sufficient cooling in case of scald.
10. Don't drag or drop the autoclave, handle it carefully and no inversion..
11. The protecting ground shall be reliable.
12. Equipment must be used away from the magnetic field.
13. Equipment life end, dealing with to local environmental protection laws and regulations

## 12. Packing of accessory

|    |                    |        |
|----|--------------------|--------|
| 1. | Draining pipe      | 1pc    |
| 2. | Sterilizing trays  | 2-3pcs |
| 3. | Plug               | 1pc    |
| 4. | Sterilizing holder | 1pc    |
| 5. | Handle             | 1pc    |
| 6. | Fuse               | 2pcs   |
| 7. | Manual             | 1pc    |
| 8  | Measuring cup      | 1pc    |
| 9  | Sealing gasket     | 1pc    |
| 10 | O rings of tap     | 2pcs   |

## 13. APPENDIX

### NO.1: The working status display table:

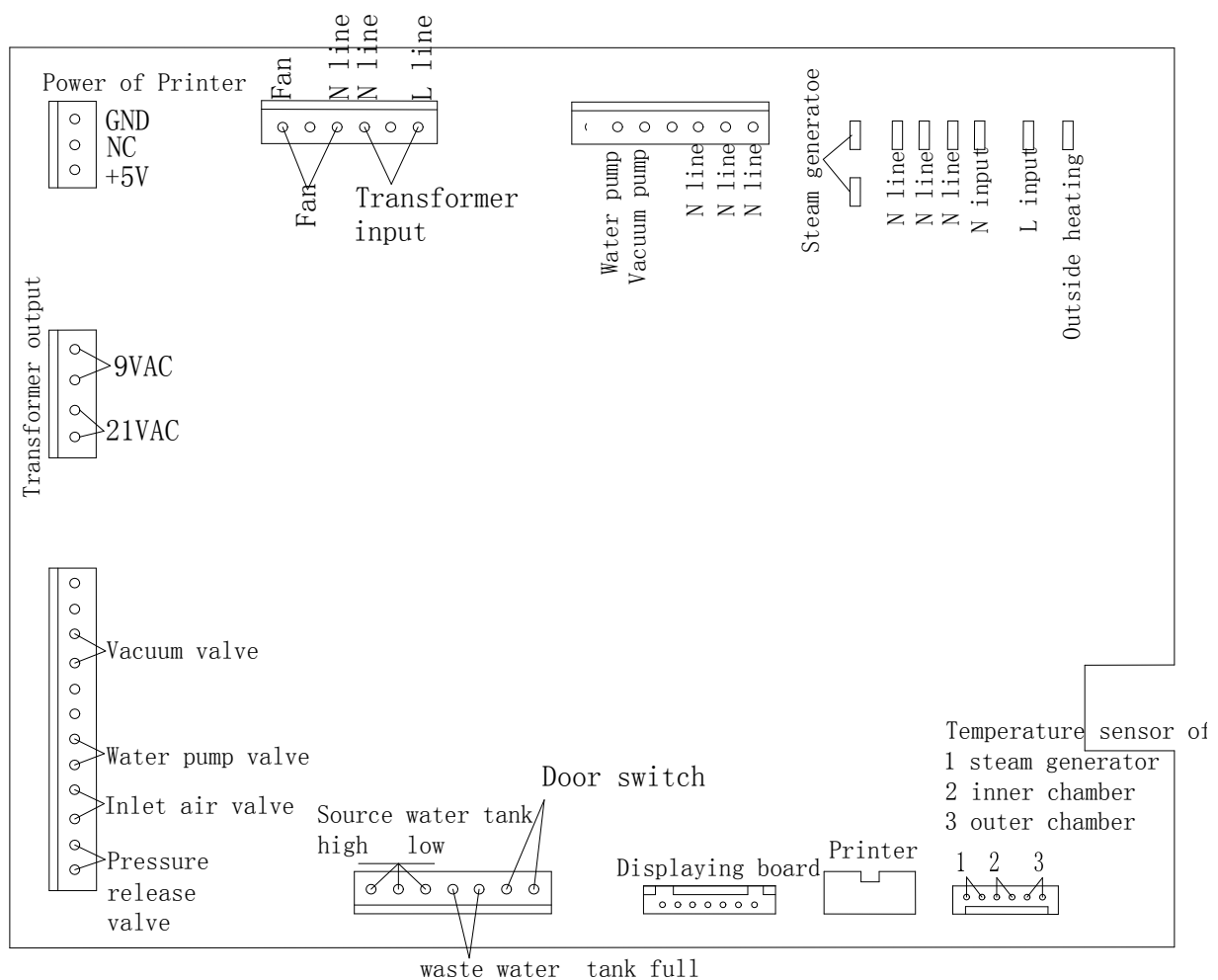
| No | Digital display                 | Working status name       | Working status specification                                              |
|----|---------------------------------|---------------------------|---------------------------------------------------------------------------|
| 1  | Ld                              | Prepare/preheating status | In this status, prepare to start working.                                 |
| 2  | HE                              | Heating status            | In this status, the pressure and temperature increasing                   |
| 3  | Displaying the working pressure | $\pm$ pressure data       | In this status, the chamber have $\pm$ pressure                           |
| 4  | Displaying the working time     | Sterilizing status        | In this status. the working time and the count down figure are displaying |
| 5  | PL                              | Drying status             | In this status, the autoclave dries on the object apparatus.              |
| 6  | Ed                              | Working finished          | In this status, the process is finished and the door can be opened.       |
| 8  | bd                              | BD Testing                | BD testing program                                                        |
| 9  | Error code                      | Any error code            | Displaying the error code                                                 |

## NO. 2 Vacuum test and "B&D" test methods

**Vacuum test:** connecting well the pressure meter(if necessary) from the backing test connector, turn on the power by the green switch, close the door, keeping press the temperature choice button around 10s, the board would displaying "nn", and then it would start the vacuum testing automatically. After vacuum pulse, it would holding the vacuum status and end by displaying "Ed".

**B&D test:** when put the test material onto the tray inside the chamber firstly, turn on the power by the green switch, close the door, keeping press the "UNWRAPPED" button around 10s, When the board displaying "bd", then press start/stop button, the autoclave would start the BD test automatically and end by displaying "Ed".

## NO.3: Circuit diagram of sterilizer



## NO.4: Steam Loop

