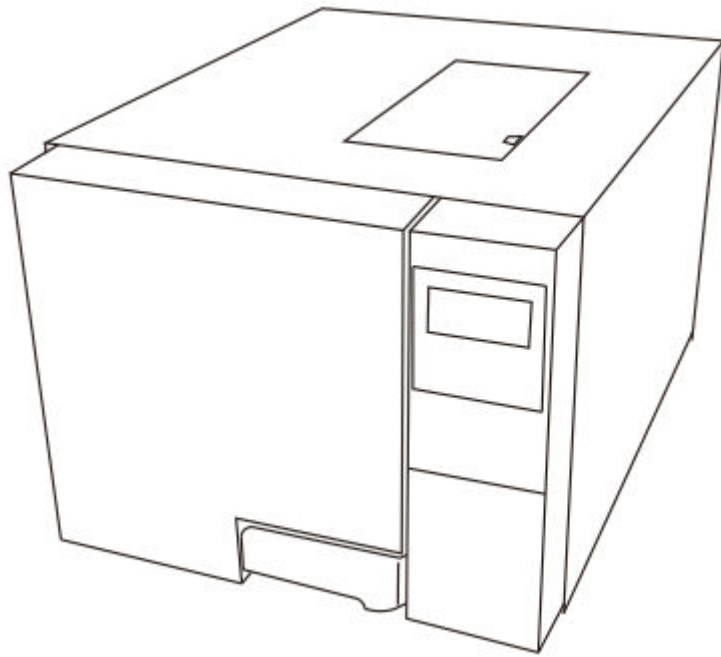


# STEAM STERILIZERS



## Instructions Manual

For Model: STE-8-D

STE-12-D

STE-18-D

STE-23-D



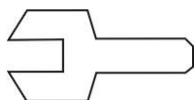
Thank you for choosing our steam sterilizers.

Prior to operating this instrument, please read the operations manual carefully and follow all installation instructions.

**IMPORTANT NOTICE:**

If you can't open the door, please unlock the door according to the instruction “How to open the door in the case of power outage” in the manual.

**Need Maintenance**



If this picture appears on the screen when power on or E88 appears on the report, please call your dealer or local service maintenance. Your steam sterilizer needs a regular maintenance.

Document: Version 00D40000 v2.9.0

Subjects to technical changes

# Table of Contents

|                                                            |           |
|------------------------------------------------------------|-----------|
| <b>1. General</b>                                          | <b>1</b>  |
| 1.1 Scope of manual                                        | 1         |
| 1.2 Intended use                                           | 1         |
| 1.3 General Safety Instructions                            | 1         |
| 1.4 Standards and directives                               | 1         |
| 1.5 Symbols                                                | 1         |
| <b>2. Description of the autoclave</b>                     | <b>2</b>  |
| 2.1 Autoclave views                                        | 2         |
| 2.2 Control panel                                          | 2         |
| 2.3 Technical Specifications                               | 3         |
| 2.4 Packing content                                        | 3         |
| <b>3. Installation</b>                                     | <b>4</b>  |
| 3.1 General conditions                                     | 4         |
| 3.2 Power supply connection                                | 4         |
| <b>4. Setup</b>                                            | <b>4</b>  |
| 4.1 Basic set                                              | 5         |
| 4.2 Fill the distilled Water Tank                          | 5         |
| 4.3 Preparation of the sterilization materials             | 5         |
| <b>5. Operation</b>                                        | <b>6</b>  |
| 5.1 Select the program                                     | 6         |
| 5.2 Running the sterilization program                      | 6         |
| 5.3 Start the sterilization program                        | 6         |
| 5.4 End of cycle                                           | 6         |
| 5.5 Manual abort the program                               | 7         |
| 5.6 Test Programs                                          | 7         |
| 5.7 Record of the cycle                                    | 7         |
| 5.8 Printer                                                | 9         |
| 5.9 Report                                                 | 9         |
| 5.10 Label (Optional)                                      | 9         |
| 5.11 About device                                          | 9         |
| <b>6. Advance settings</b>                                 | <b>10</b> |
| 6.1 Parameter                                              | 10        |
| 6.2 Unit                                                   | 10        |
| 6.3 Preheat                                                | 10        |
| 6.4 Expiry date                                            | 10        |
| 6.5 Water quality                                          | 11        |
| 6.6 Last error                                             | 11        |
| 6.7 Factory reset                                          | 11        |
| <b>7. Maintenance</b>                                      | <b>12</b> |
| 7.1 Clean the distilled water tank                         | 12        |
| 7.2 Replacement of the bacteriological filter              | 12        |
| 7.3 Clean Chamber, door seal, trays and tray Rack          | 12        |
| 7.4 Door adjustment                                        | 13        |
| 7.5 Replacement of the door seal                           | 13        |
| 7.6 The drain valve                                        | 13        |
| 7.7 How to open the door in the case of power outage       | 13        |
| <b>8. Error codes</b>                                      | <b>14</b> |
| <b>9. Transportation and storage</b>                       | <b>15</b> |
| <b>10. Safety devices</b>                                  | <b>15</b> |
| <b>Appendix 1 - Water properties / Characteristics</b>     | <b>16</b> |
| <b>Appendix 2 - Diagrams of the sterilization programs</b> | <b>17</b> |
| <b>Appendix 3 - Wiring diagram</b>                         | <b>22</b> |
| <b>Appendix 4 - Hydraulic diagram</b>                      | <b>23</b> |

## 1. General

### 1.1 Scope of Manual

This manual contains information concerning the installation, operation and maintenance of the steam sterilizers. To ensure proper performance of the autoclave, the instructions given in this manual should be thoroughly understood and followed. Keep the manual near to the sterilization in a readily accessible location for future reference.

### 1.2 Intended Use

The device designed for total elimination and/or inactivation of microorganisms from medical devices and related products, placed in sterilization wraps/package, using pressurized steam(i.e., moist heat) as the sterilizing agent; it is used for products non-sensitive to high temperature, water, or steam.

### 1.3 General Safety Instructions

- Read and understand this manual before attempting to install or operate the sterilizer.
- Make sure that all the installation conditions are fully complied with.
- Ensure that the supply voltage agrees with the supply voltage specified on the type plate of the sterilizer.
- This appliance must be grounded. Connect only to a properly grounded outlet.
- Do not cover or block any openings on this appliance.
- Use this appliance only for its intended use as described in this manual.
- Do not exceed the maximum weight limit of the loads specified in this manual.
- Do not operate this appliance if it has a damaged cord or plug, if it is not working properly, or if it has been damaged or dropped.
- Never must put into the sterilizer inflammables or explosives products.
- The sterilizer may not be operated in areas in which gas or any other explosive volatile substance is present.
- Installation and repair work should only be performed by authorized service technician. Work by unqualified persons could be dangerous and void warranty.

### 1.4 Standards and directives

The steam sterilizers were designed and has been produced in conformity with the following directives and standards:

Directives:

2014/68/EU Pressure equipment.

93/42/EEC Medical devices (Class II b).

Standards:

EN13060 Relative to small steam sterilizers.

EN61010-1 Safety regulations for laboratory devices-Part 1:General regulations.

EN61010-2-040 Safety regulations specific to sterilizers used in the processing of medical material.

EN61326-1 Electromagnetic compatibility regulations for laboratory devices.

### 1.5 Symbols

For safe operation, please pay close attention to the alert symbols below which can be found in the sterilizer or throughout this manual.



This symbol represents an electrical caution - ground protection.



Hot Surface

This symbol represents a warning of a potential hot surface.

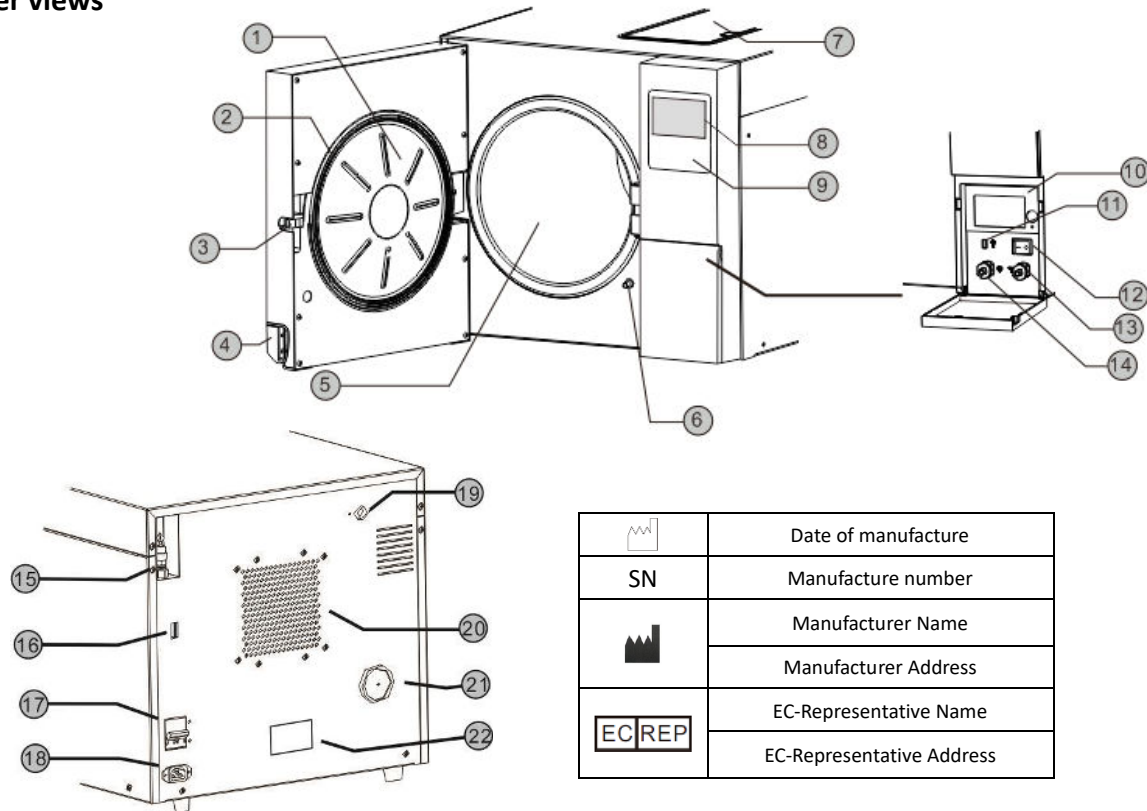


Important safety information.

This symbol represents a warning for extra caution.

## 2. Description of the sterilizer

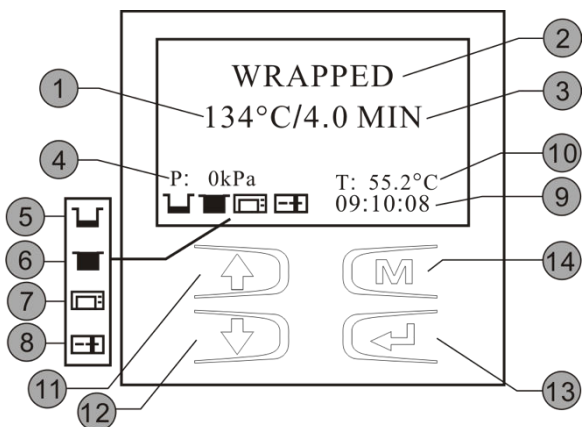
### 2.1 Sterilizer views



- |                         |                                            |                            |
|-------------------------|--------------------------------------------|----------------------------|
| 1. Door                 | 9. Control Panel                           | 17 Circuit breaker         |
| 2. Seal                 | 10. Printer (Optional)                     | 18. Power socket           |
| 3. Door lock            | 11. USB port                               | 19. Used water tank vent   |
| 4. Door handle          | 12. Main power switch                      | 20. Condenser vent         |
| 5. Chamber              | 13. Drain connector (Distilled water tank) | 21. Bacteriological filter |
| 6. Door spindle         | 14. Drain connector (Used water tank)      | 22. Rating plate           |
| 7. Distilled water tank | 15. Safety valve                           |                            |
| 8. LCD                  | 16. Label printer port (Optional)          |                            |

|        |                           |
|--------|---------------------------|
|        | Date of manufacture       |
| SN     | Manufacture number        |
|        | Manufacturer Name         |
|        | Manufacturer Address      |
| EC REP | EC-Representative Name    |
|        | EC-Representative Address |

### 2.2 Control panel

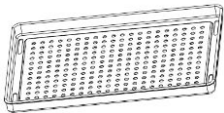
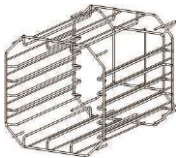
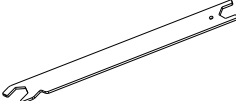
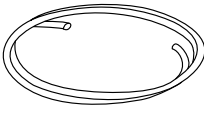


|    |                             |
|----|-----------------------------|
| 1  | Temperature of the cycle    |
| 2  | Program                     |
| 3  | Holding time                |
| 4  | Pressure                    |
| 5  | Fill distilled water tank   |
|    | The quality of water is bad |
|    | The water pump is working   |
| 6  | Drain used water tank       |
| 7  | Printer is connected        |
| 8  | Door opens                  |
|    | Door is closed              |
|    | Door is locked              |
| 9  | Time                        |
| 10 | Current temperature         |
| 11 | Up button                   |
| 12 | Down button                 |
| 13 | Enter button                |
| 14 | Menu button                 |

## 2.3 Technical specifications

| Item                                 | 8-D                               | 12-D        | 18-D        | 23-D        |
|--------------------------------------|-----------------------------------|-------------|-------------|-------------|
| Chamber(mm)                          | φ 170 x 320                       | φ 200 x 360 | φ 247 x 350 | φ 247 x 450 |
| Rated Voltage                        | 220-240 VAC; 50 Hz                |             |             |             |
| Circuit breaker                      | F16A/400V                         |             |             |             |
| Nominal power                        | 1750VA                            |             |             |             |
| Sterilization temperature            | 121°C /134°C                      |             |             |             |
| Capacity of the distilled water tank | Approx 2.5 L (Water at level Max) |             |             |             |
|                                      | Approx 0.5 L (Water at level Min) |             |             |             |
| Operation temperature                | 5°C-40°C                          |             |             |             |
| Operation relative Humidity          | Max. 80%, non condensing          |             |             |             |
| Overall dimensions WxHxD(mm)         | 420x370x525                       | 420x370x595 | 490x455x600 | 490x455x690 |
| Net weight                           | 37kg                              | 41kg        | 47 kg       | 52 kg       |
| Max. Noise level                     | <70 dB                            |             |             |             |
| Atmospheric pressure                 | 76 kPa - 106 kPa                  |             |             |             |

## 2.4 Packing content

| No. | Accessory                                                                                                  | Quantity |
|-----|------------------------------------------------------------------------------------------------------------|----------|
| 1   | Steam sterilizer                                                                                           | 1        |
| 2   | Instrument tray         | 3        |
| 3   | Instrument tray rack    | 1        |
| 4   | Instrument tray handle  | 1        |
| 5   | Door adjustment tool    | 1        |
| 6   | Draining hose           | 2        |
| 7   | Instructions manual                                                                                        | 1        |
| 8   | Door seal                                                                                                  | 1        |

## 3. Installation

### 3.1 General conditions

Position the device on a plane surface with minimum capacity 60 kgs.

The sterilizer should be placed on a level worktable.

Improper water level in the chamber could cause a sterilizer malfunction.

Leave at least 10cm between the device rear part and the wall. The clearance required to open the door is 40cm.

Position the autoclave at such a height as to make it possible for the operator to check the whole sterilization chamber and carry out the normal cleaning operations.

The room where the device is installed must be enough ventilated.

Do not install the device near washing basins, taps, etc. where it is likely to be splashed.

Do not lean on the door when it is opened.

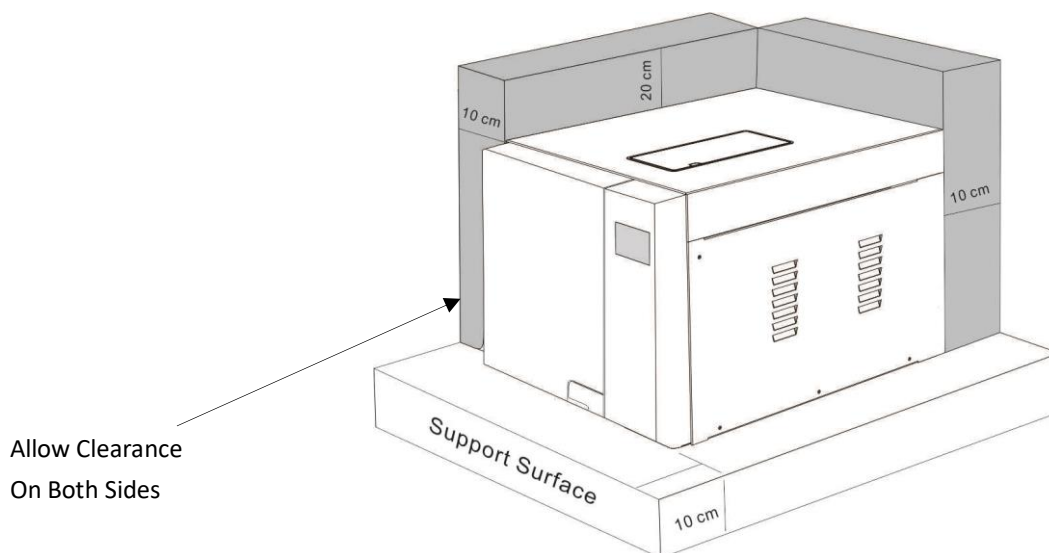
Do not place trays , papers, fluid containers, etc. on the sterilizer.

### 3.2 Power supply connection

Check the label on back panel o sterilizer to verify voltage rating for the unit. Failure to connect the autoclave to an appropriate power supply could result in damage to the unit, and electrical shock to personnel.

Plug power cord into a properly polarized and grounded receptacle rated. A dedicated circuit only used for the sterilizer is recommended.

Never connect the device pin to reductions of any type.



## 4 Setup

Open the door and remove all of the inner contents for unpacking.

Connect the power cord to an outlet of the appropriate voltage.

Turn on the main power switch on the right side. After switching on, the machine turns on the LCD and shows the door position, water level, working program, date, time and etc.

**Note:** The control panel will be locked for the initial 10 seconds after powering up for system initialization.

**Notice:** Before using the sterilizer or at any time the low water level icon  blinks, fill the distilled water tank with distilled water.

#### 4.1 Basic Set

The "Basic Set" Menu permits to set the following options:

\*Date \*Time \*Language

Select the "Basic Set" from the main menu and Tap **M** button.

Select the item by taping the **M** button. The unit you selected will be lighted.

Adjust the value by Taping **↑↓** button. Tap **M** button to the next item.

Tap **↵** button to save and exit after the data is set.

**Note:** The Counter (cycle No) can not be set by the operator.

Abbreviation of language options

|     |         |     |            |     |            |     |          |
|-----|---------|-----|------------|-----|------------|-----|----------|
| CHN | Chinese | ENG | English    | DEU | German     | ESP | Spanish  |
| PL  | Polish  | FR  | French     | HUN | Hungary    | ROM | Romanian |
| NL  | Dutch   | LTU | Lithuanian | LAT | Latvian    | CZE | Czech    |
| ITA | Italian | RUS | Russian    | PT  | Portuguese | HR  | Croatian |

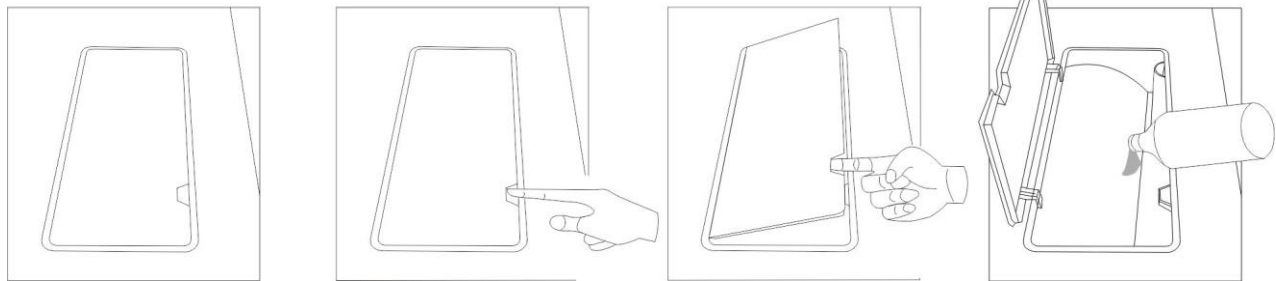
Program  
Basic Set  
Report  
Label

DATE:23-04-17  
TIME:09:10:08  
LANGUAGE:ENG  
Counter:12

#### 4.2 Fill the distilled water tank

Ensure that the drain valve is closed.

Press the button and open the water tank cover.



Use only high quality distilled water. (see Appendix 1)

#### 4.3 Preparation of sterilization materials

For the most effective sterilization and to preserve the sample, please follow below:

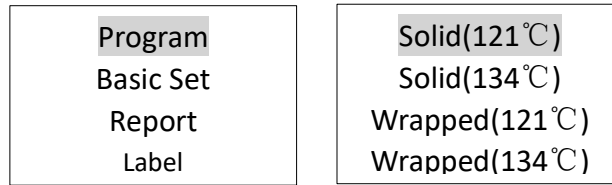
- \*Clean instruments immediately after use.
- \*Treat the instruments by ultrasound cleaner.
- \*Residual chemicals left over after cleaning and disinfecting process may damage and corrode parts of the autoclave, always rinse off the instruments using distilled water.
- \*Follow instrument manufacturer's guidelines and recommendations for handing and cleaning instruments prior to sterilization.
- \*Check the manufacturer's instructions as to proper procedure for sterilizing of each item.
- \*Arrange the samples of different materials on different trays or with at least 3cm of space between them.
- \*Clean and dry instruments thoroughly before placing them into tray.
- \*Always insert a sterilization paper or cloth between the tray and sample to avoid direct contact.
- \*Arrange the containers (glasses, cups, test-tubes, etc) on one side or inverted position, avoiding possible water stagnation.
- \*Don't stack the trays one above the other or put them in direct contact with the walls of the sterilization chamber.
- \*Always use the instrument tray handle.
- \*Wrap the samples one by one or, if more tools have to be set in the same bag, verify that these are made of the same material.
- \*Don't use metallic clips, pins or other, as this jeopardizes the maintenance of the autoclave.

\*Don't overload the trays over the stated limit (see appendix 2).

## 5. Operation

### 5.1 Select the program

Tap  button to the main menu, select "Program". You will see the available sterilization programs. See Appendix 2.



Select the program by   buttons and confirm it by taping  button. If you don't want to select a program you may tap  button to exit.

### 5.2 Running the sterilization program.

After selecting program, the instruments to be sterilized can now be placed on the tray placed inside the chamber.

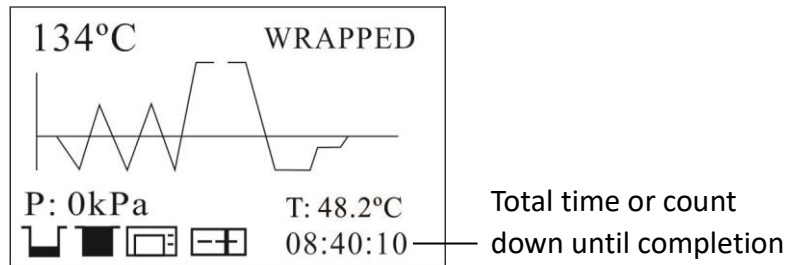
5.2.1 After the instruments are loaded, you may close the door.

Push the door to be closed, holding for about three seconds, it will lock automatically.

Caution: The door can not be lock if the pressure is higher than 0 kPa. Please wait for the chamber cooling down.

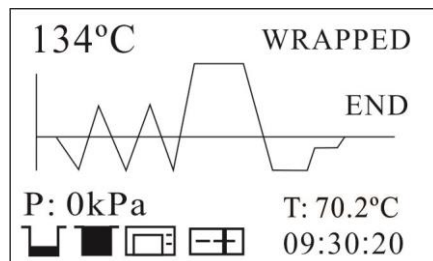
### 5.3 Start the sterilization program.

After the  button is taped, the stage and the status of the current cycle will appear on the display. The sterilizers will perform the program automatically. (See appendix 2).



### 5.4 End of cycle

After cycle is completed, the printer will be activated and print out a report of the cycle (if the optional printer has been connected) or save the report in the USB drive (optional).



Caution: Always use the tray handle to load or unload the tray into the autoclave.  
Failure to do so can result in burning.

## 5.5 Manual abort of the program

It is possible to interrupt a started cycle prematurely. If you need to interrupt a cycle and remove the items urgently, you may hold the  button for 3 seconds during the drying time to skip the dry cycle.

If you interrupt a cycle before it reaches the "Drying" step, the items inside the autoclave must be considered not be sterilized.



If you need to interrupt a cycle after the holding time of the sterilization cycle and during the drying step, the items inside the autoclave can be considered be sterilized.



Caution: Depending on the status of the Cycle, steam can escape from the sterilization chamber when you open the door.

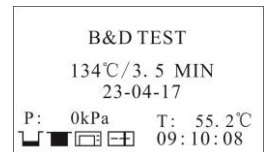
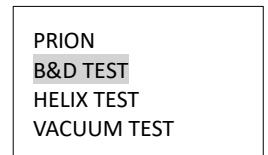
## 5.6 Test programs

### Bowie & Dick test

Select 'programs' from the main menu, Tap   button and select the "B&D" Test and Tap  button to confirm.

Put the Bowie-Dick pack in to the chamber and follow the instructions of the test pack manufacturer. Then close the door and Tap  button.

After the cycle is finished you may check the indicator and evaluate the result.



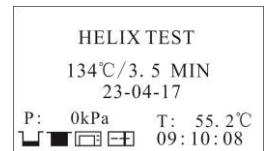
### Helix Test

Select the "Helix" test from the "Programs" menu.

Following the instructions of the Helix test manufacturer. Put the indicator paper in the capsule.

Put the Helix test into the chamber, then close the door and Tap  button.

After finish the cycle you may check the indicator and evaluate the result according with the instructions of the test manufacture.



### Vacuum Test

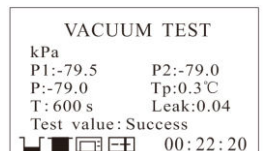
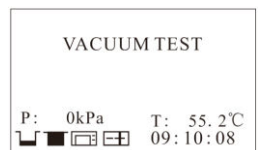
Select the Vacuum Test cycle from the "Programs" menu.

Close the door and tap  button.

In compliance with EN 13060, the test requires that the air leakage rate less than or equal to 0.13 kPa/min. During 10 minutes.

If leakage rate is not greater 0.13, it will show Success.

If the temperature difference between the max. Temperature and the Min. is above 3°C, it will show void. That means the result of the test is fail. You need run the vacuum test again after the chamber has cooled down.



Caution: The "Vacuum" test must be carried out with the chamber of the sterilizer dry and cold.

## 5.7 Record of the cycle

USB Flash memory (Optional)

A USB drive can be used as a method of storing a report of the cycle. To do so, insert the USB drive into the slot located on the service door of the sterilizer.

The information will automatically output directly to the USB drive after the cycle has completed. The name of the file is determined by the serial number of the machine and the cycle number.

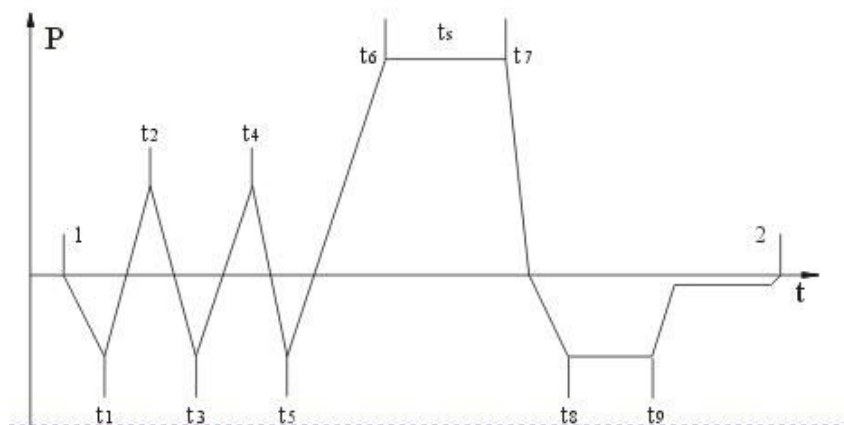
For example:

The serial number is A12345. The cycle number is 00012.

The file name in the USB stick is A12345\_00012E00.txt.

The last three numbers represent error code.

For example, E00 means no error. E01 means error E01.



=====

Program: Wrapped

Temperature: 134 C

Pressure: 2.04 bar

Drying Time: 20.0 MIN

Holding Time: 04.0 MIN

-----

|                  | Time<br>HH:MM:SS | Temp.<br>C | Pressure<br>bar |
|------------------|------------------|------------|-----------------|
| Start            | 14:48:10         | 077.7      | 0.00            |
| T1:              | 14:52:29         | 072.1      | -.769           |
| T2:              | 14:53:30         | 107.4      | 0.58            |
| T3:              | 14:57:22         | 078.8      | -.796           |
| T4:              | 14:58:40         | 112.1      | 0.60            |
| T5:              | 15:01:39         | 080.5      | -.764           |
| T6:              | 15:05:32         | 134.3      | 2.10            |
| TS:              | 15:05:36         | 134.9      | 2.22            |
| Max Temperature: | 136.1            |            |                 |
| Min Temperature: | 134.9            |            |                 |
| Max Pressure:    | 2.26             |            |                 |
| Min Pressure:    | 2.15             |            |                 |
| T7:              | 15:11:37         | 136.0      | 2.24            |
| T8:              | 15:14:58         | 092.2      | -.716           |
| T9:              | 15:33:08         | 091.2      | -.015           |
| End              | 15:33:10         | 091.2      | -.005           |

-----

Cycle No.: 00012

Ster. Value: Success

Date: 11-09-2019

SN:A00001

Operator:

3BB23D 11100110V2.9.1.2

0000

=====

=====

Program: Vacuum test

TP:1°C

P1:-75.0kPa

P2:-74.0kPa

rate of pressure rise:

0.10 kPa/min

Start Time:08:22

End Time:09:01

Date:2017-07-19

Test Value:Success

SN:E00001

Operator:

3AB16B 11100110V2.9.1.2

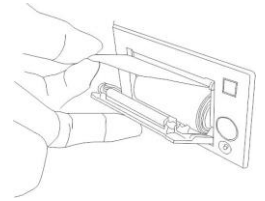
0000

=====

## 5.8 Printer (Optional)

If the printer installed correctly you can see the Icon in the screen stop flashing.

The printer (Optional) will print a report of the cycle that just ended. At the end of each cycle the printer will print out a report of the cycle.



## 5.9 Report

Internal Memory

In this menu you can read the latest information of the last 20 cycles stored in the internal memory of the sterilizer.

5.9.1 Select "Report" from the main menu and tap **M** button, you will see the list of records.

5.9.2 Select the records by tapping **↑↓** button.

5.9.3 Tap **M** button.

Then the record is printed(if the optional printer has been connected) the report or/and is saved in the USB drive (optional).

Note: It can save in the internal memory only the reports of the last 20 cycles.

Note: The storage system is based on the principle of "first In-first-out".

Tap **←** button to exit.

Report

Label

About device

Setup

00012

00013

00014

00015

## 5.10 Label(Optional)

5.10.1 Connect the label printer and switch on.

5.10.2 Select the "Label" and tap **M** button, you will see the list of the records.

5.10.3 Select the records by tapping **↑↓** button.

5.10.4 Tap the **M** button to the interface for setting the quantity.

5.10.5 Change the quantity of the label that you want to print by tapping **↑↓** button.

The range is 1-99.

5.10.6 Tap the **M** button to print the label.

5.10.7 Tap the **←** button to exit.

Quantity

13

Operator:

Program: Wrapped 134 C

Cycle No.: 00022

SN: A00001N23

Date: 20-05-2019 12:17:47

Expiry date: 20-08-2019



## 5.11 About device

5.11.1 Select the "About device".

5.11.2 Tap the **M** button to enter the interface.

5.11.3 There is the version of the firmware.

5.11.4 Tap the **←** button to exit.

About device

3BB23Z 11110010

V2.9.0.0 - - 00

SN: A23456B45

## 6. Advance setting

The advance setting interface permits to set the following

Options:

**\*Parameter:** Permits to change the time of holding time and drying time.

**\*Unit:** Permits to change the unit of measure temperature and pressure.

**\*Preheat:** This option allows you to maintain the required temperature in the sterilization chamber and the steam generator to start a new cycle immediately for the next 60 minutes so to run a new cycle should expect preheating time from 3 to 5 minutes upon start.

If the option is disabled (OFF) once the sterilization cycle end immediately the Autoclave is no longer heated, so when you start a new cycle should expect a preheating time between 3 to 5 minutes upon start.

**Note:** To maintain the temperature for longer time it is recommended that after each cycle hold the door closed.

### Enter the setting

Select the "Setup", tap the  button to the password interface.

Input the password "1111" by tap   button, tap  button to select the position.

Tap the  button will enter the setting interface after inputting the 4 passwords.

Password  
1111

### 6.1 Parameter

Tap   button to select Parameter. Tap  button to enter the menu.

Select the program that you need to change by Taping   button. Tap  button to enter the setting.

Parameter  
Unit  
Preheat  
Expiry date

Adjust the parameter by taping the   button.

Drying time: 0-30 minutes

121°C holding time: 20-60 minutes

134°C holding Time: 4-20 minutes

After you finish adjusting the parameter Tap  button to save and return to the above menu.

Solid(134°C)  
Wrapped(121°C)  
Wrapped(134°C)  
Prion(134°C)

Holding Time: 20.0  
Dry Time: 02

### 6.2 Unit

Select the "Unit" to adjust the unit of temperature and pressure.

Tap  button to enter the menu.

Select the item by Taping  button.

Change the unit by Taping   button.

Pressure: kPa/bar/psi

Temperature: °C/°F

Tap  button to save and exit.

Pressure: kPa  
Temperature: C

### 6.3 Preheat

Select the "Preheat" to adjust the preheat setting.

Tap  button to enter the menu.

If you don't want to preheat after switch on, set the value to OFF by Taping   button.

Tap  button to save.

Preheat: ON

### 6.4 Expiry date

Select the "Expiry date" to adjust the expiry date that be printed on the label.

Tap  button to enter the menu.

Adjust the value by taping the   button. The range is 1-12.

Month: 03

Tap  button to save and exit.

## 6.5 Water quality(Optional)

Select the “Water quality” to change the function.

Tap  button to enter the menu.

If you don't want to have a alarm if the quality of water is bad, set the value to Off by Taping

  button.

Tap  button to save and exit.

Expiry date  
Water quality  
Last error  
Factory reset

Water quality  
On

## 6.6 Last error

Select the “Last error” to see the information of the last cycle that is failure.

Tap  button to enter the interface.

It will record the parameters of the sensors when the alarm appears.

Tap  button to save and exit.

LAST ERROR: E30  
2019-06-06 13:40  
PC:13 ST:03 CN:00011  
Pressure: 101kPa  
T1:153.9 T3: 093.2℃  
T2:028.1 T4: 220.5℃

## 6.7 Factory reset

Select the “Factory reset” to recover the parameters of the programs.

Tap  button to enter the interface.

Change Yes/No by taping   button.

Tap  button to confirm and exit ..

The value of holding time and drying time will restore the default value if you confirm “Yes”..

Factory reset  
Yes

## 7. Maintenance

To assure proper operation and maximum autoclave life, carefully follow all recommendations for periodic maintenance. One of the MOST important steps you can take to prevent problems with your sterilizer is to use ONLY distilled water.

| Frequency      | Number of cycles | Maintenance operation                                           |
|----------------|------------------|-----------------------------------------------------------------|
| Monthly        | 50               | Clean the door seal                                             |
|                |                  | Clean the filter inside the chamber and in the clean water tank |
|                |                  | Clean the chamber the trays and the rack                        |
|                |                  | Clean the external surface                                      |
| Every 3 months | 200              | Clean the distilled water tank                                  |
|                |                  | Replace the bacteriological filter.                             |
| Every year     | 800              | Replace the door seal                                           |

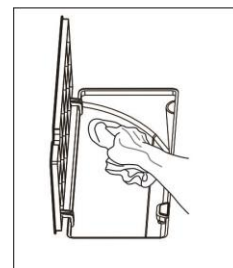
### 7.1 Clean the distilled water tank

Disconnect the main cable.

Drain the tank completely using the drain tube and leave it connected into the connector in a open position.

Clean the internal surface with a soft sponge and a small soft brush for the areas that are difficult to reach using and a mild soap.

Remove the filter and clean it with a small soft brush and mild soap, rinse it with distilled water and put it back in to the position.



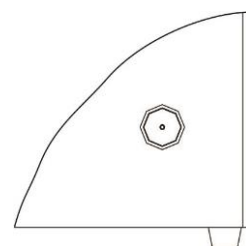
### 7.2 Replacement of the bacteriological filter.

The bacteriological filter is in the back of the sterilizer. Unscrew the filter by hand anti-clockwise.

Place the new bacteriological filter.

Screw the new filter by hand clockwise.

Note: Do not operate sterilizer without filters in place.



### 7.3 Clean Chamber, door seal, trays and tray Rack.

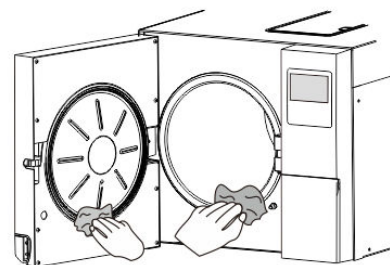
Remove the trays and tray rack from the chamber.

Clean trays, rack and inside of chamber with mild soap.

Rinse the trays, rack and inside of chamber with a smooth cloth and distilled water.

Examine door seal for possible damage.

Clean door seal and mating surfaces with a damp cloth.



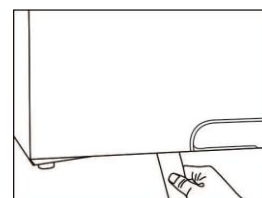
Note: Do not use bleaching agents or any abrasive materials / substances in chamber. Failure to comply may result in damage to the chamber and/or other components.



Caution: To prevent burns, let unit to cool before cleaning gaskets and touch the surface.

### 7.4 Door adjustment

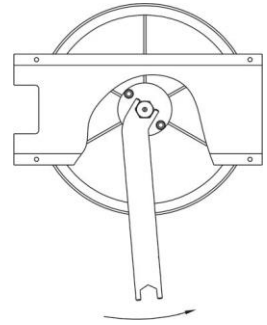
Under normal circumstances the chamber door does not require adjustments. However, if the seal fails (resulting in steam leaking from the front of the chamber), you may use the spanner tool to tighten the door seal.



Open the door.

Insert the spanner tool in the gap beneath the plastic cover; use the spanner to grip the adjusting nut. Turn the nut counter clockwise as the figure below. This will tighten the sealing plate.

Turn the nut until the sealing plate is tight. If the door knob is too tight, you may also turn the nut clockwise to loosen it.



Caution: Never adjust the chamber door while the door is closed.

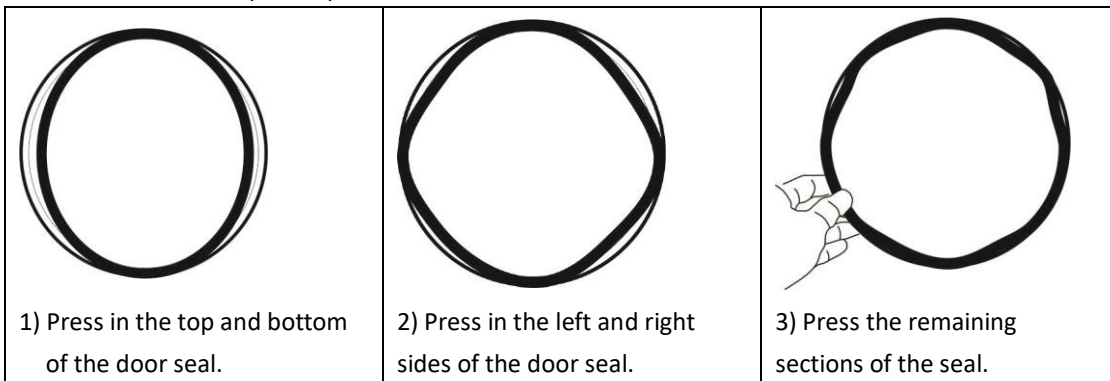
## 7.5 Replacement of the door seal

Open the chamber door. Remove the door seal ring carefully by hand.

Clean the door seal ring carefully with a smooth cloth with distilled water.

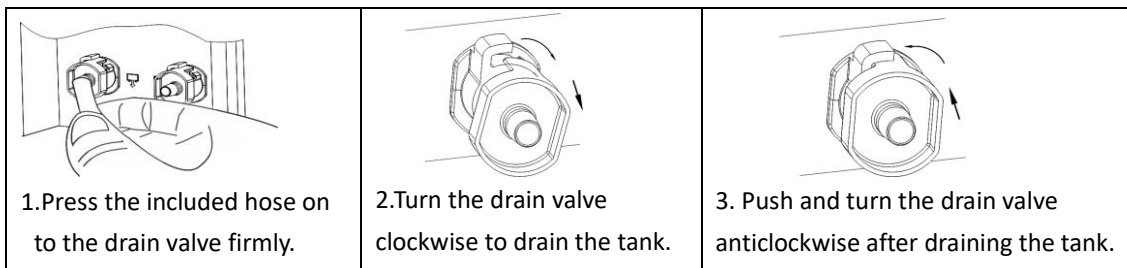
Moisten the new seal with distilled water.

Insert the new seal and Tap in sequence as follows:

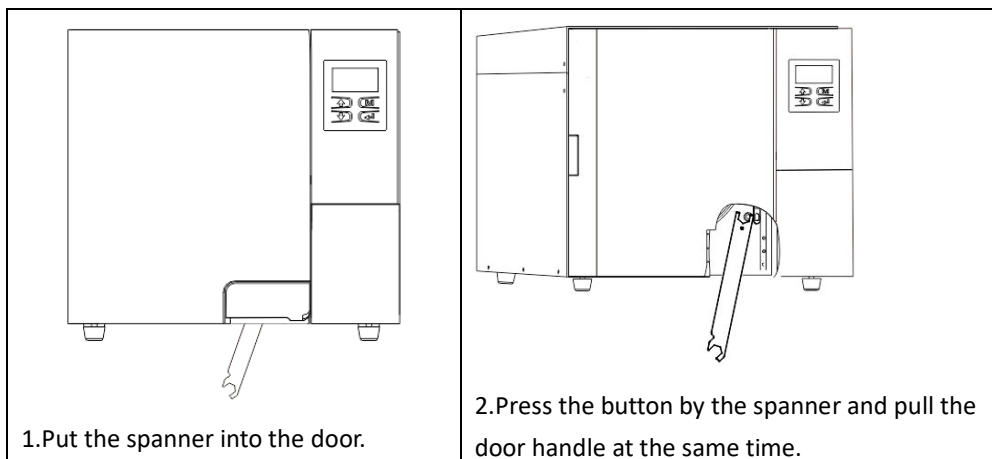


Caution: Please ensure the chamber and the door are cooled prior to replacing the seal ring.

## 7.6 The drain valve



## 7.7 How to open the door in the case of power outage



## 8. Error codes

| Code | Description                                                    | Proposed solution                                                                                       |
|------|----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| E1   | Steam generator temperature sensor error                       | Power off & run a new cycle<br>Contact your supplier if error persists                                  |
| E2   | Inner temperature sensor error                                 | Power off & run a new cycle<br>Contact your supplier if error persists.                                 |
| E3   | Temperature sensor of the chamber wall error                   | Carefully ensure that the chamber wall is heated and contact your supplier                              |
| E5   | Fail to release the pressure                                   | Power off & run a new cycle<br>Contact your supplier if error persists.                                 |
| E6   | Door lock problem during the cycle                             | Check the door close switch.                                                                            |
| E7   | The pressure is too lower during holding time.                 | Contact your supplier if error persists.                                                                |
| E8   | The pressure is too high during holding time.                  | Contact your supplier if error persists.                                                                |
| E9   | Failure to hold temperature                                    | Ensure the distilled tank isn't empty. Check the inner temperature sensor. Check somewhere for leaking. |
| E10  | The door locking system doesn't work.                          | The electromagnet of locking system doesn't work.<br>The switch of locking system doesn't work.         |
| E11  | Failure to preheat the steam generator                         | Power off & run a new cycle<br>Contact your supplier if error persists.                                 |
| E12  | Failure to preheat the chamber                                 | Power off & run a new cycle<br>Contact your supplier if error persists.                                 |
| E13  | Vacuum failed                                                  | Power off & run a new cycle<br>Contact your supplier if error persists.                                 |
| E16  | The pressure doesn't reach 0 in 5 minutes after drying period. | Contact your supplier if error persists                                                                 |
| E18  | The filling water pump working time is overime                 | Check the water pump or Contact your supplier if error persists                                         |
| N20  | Program manually interrupted                                   | holding the <b>M</b> button for 3 seconds after the pressure is lower than 10kPa.                       |
| E22  | Vacuum test failure                                            | Somewhere is leaking. Check the door seal.<br>Or contact your supplier if error persists.               |
| N23  | Result of vacuum test is void                                  | The temperature of the chamber is high.<br>Try again after the chamber has cooled down.                 |
| E24  | It takes too long time to enter the next status.               | Check somewhere leaking.<br>Or contact your supplier if error persists.                                 |
| N27  | The vacuum test is forbade                                     | Switch off. Then switch on after the chamber cool down and try again.                                   |
| E28  | The pressure is over 240kPa                                    | Power off and contact your supplier if error persists                                                   |
| N29  | Power failure during working.                                  | A notification message.                                                                                 |
| E30  | Vacuum test failure during the first 300 seconds               | Somewhere is leaking. Check the door seal.<br>Or contact your supplier if error persists.               |

| Code | Description                                                                   | Proposed solution                                                        |
|------|-------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| N32  | The pressure is not lower than -1 kPa in 30 seconds during locking the door.  | Open the door and try again. Or contact your supplier if error persists  |
| N33  | The pressure is not lower than 1 kPa in 30 seconds during unlocking the door. | Open the door and try again. Or contact your supplier if error persists. |
| E34  | The pressure is higher than 50kPa during drying.                              | The solenoid valves are blocked.                                         |

Caution: You may cancel the voice of alarm by pressing any button. And cancel the alarm by holding the  button for 3 seconds after you repair it and the pressure is lower than 10kPa.

## 9. Transportation and storage

9.1 Switch off the sterilizer before transportation or storage.

9.2 Pull out the plug. Let the machine cool down.

9.3 Drain the distilled water tank and the used water tank.

Condition for transport and storage

Temperature: -20°C ~ +50°C

Relative humidity: ≤ 85%

Atmospheric pressure: 50kPa~ 106kPa.

## 10. Safety devices

1.Main fuses: Protection the instrument against possible failures of the heating resistor.

Action: Interruption of the electric power supply.

2.Thermal cutouts on the main transformer windings: protection against possible short circuit and main transformer primary winding overheating

Action: Temporary interruption of winding.

3.Safety valve: Protection against possible sterilization chamber over-pressure.

Action: Release of the steam and restoration of the safety pressure.

4.Safety micro-switch for the door status: Comparison for the correct closing position of the door.

Action: Signal of the wrong position of the door

5.Thermostat on chamber heating resistors: Protection for possible over heating of the chamber heating resistors.

Action: Interruption of the power supply of the chamber resistors.

6.Thermostat on steam generator heating resistors: Protection for possible overheating of the steam generator heating resistors.

Action: Interruption of the power supply of the steam generator resistors.

7.Door safety lock: Protection against accidental opening of the door.

Action: Impediment of the accidental opening if the door during the program.

8.Self-leveling hydraulic system: Hydraulic system for the natural pressure leveling in case of manual cycle interruption, alarm or black-out.

Action: Automatic restoration of the atmospheric pressure inside chamber.

## Appendix 1

### Water properties / Characteristics

| Description                   | Feed water              | Condensate              |
|-------------------------------|-------------------------|-------------------------|
| Evaporate residue             | $\leq 10\text{mg/l}$    | $\leq 1.0\text{mg/kg}$  |
| Silicium oxide $\text{SiO}_2$ | $\leq 1\text{mg/l}$     | $\leq 1.0\text{mg/kg}$  |
| Iron                          | $\leq 0.2\text{mg/l}$   | $\leq 0.1\text{mg/kg}$  |
| Cadmium                       | $\leq 0.005\text{mg/l}$ | $\leq 0.05\text{mg/kg}$ |
| Lead                          | $\leq 0.05\text{mg/l}$  | $\leq 0.1\text{mg/kg}$  |
| Rest of heavy metals          | $\leq 0.1\text{mg/l}$   | $\leq 0.1\text{mg/kg}$  |
| Chloride                      | $\leq 2\text{mg/l}$     | $\leq 0.1\text{mg/kg}$  |
| Phosphates                    | $\leq 0.5\text{ mg/l}$  | $\leq 0.1\text{mg/kg}$  |
| Conductivity                  | $\leq 15\mu\text{s/cm}$ | $\leq 3\mu\text{s/cm}$  |
| PH Value                      | 5 – 7.5                 | 5-7                     |
| Appearance                    | Colorless, clean        | Colorless, clean        |
| Hardness                      | 0.02 mmol/l             | 0.02 mmol/l             |

## Appendix 2

## Diagrams of the sterilization programs(STE-23-D)

| Programs          | Temperature (°C) | Pressure (kPa) | Holding time (min) | Total time (min) | Type                                    | Max load (kg) | Max load per tray (kg) |
|-------------------|------------------|----------------|--------------------|------------------|-----------------------------------------|---------------|------------------------|
| SOLID             | 134              | 210            | 4                  | 25-45            | Unwrapped solid material                | 5.00          | 1.50                   |
|                   | 121              | 110            | 20                 | 30-60            |                                         |               |                        |
| WRAPPED           | 134              | 210            | 4                  | 35-60            | Unwrapped solid material                | 5.00          | 1.50                   |
|                   | 121              | 110            | 20                 | 35-65            | Single-wrapped solid or hollow material | 4.00          | 1.20                   |
| TEXTILE           | 134              | 210            | 8                  | 45-65            | Unwrapped porous material               | 1.25          | 0.40                   |
|                   |                  |                |                    |                  | Single-wrapped porous material          | 1.10          | 0.30                   |
|                   |                  |                |                    |                  | Dual-wrapped porous material            | 0.75          | 0.25                   |
|                   | 121              | 110            | 30                 | 50-75            | Single-wrapped hollow material          | 4.00          | 1.25                   |
|                   |                  |                |                    |                  | Dual-wrapped solid and hollow material  | 2.00          | 0.60                   |
| PRION             | 134              | 210            | 18                 | 50-75            | Unwrapped porous material               | 1.25          | 0.40                   |
|                   |                  |                |                    |                  | Single-wrapped porous material          | 1.10          | 0.30                   |
|                   |                  |                |                    |                  | Dual-wrapped porous material            | 0.75          | 0.25                   |
|                   |                  |                |                    |                  | Single-wrapped hollow material          | 4.00          | 1.25                   |
|                   |                  |                |                    |                  | Dual-wrapped solid and hollow material  | 2.00          | 0.60                   |
| LIQUID (optional) | 134              | 210            | 10                 | 35-60            | Liquid                                  | 1.20          | 0.40                   |
|                   | 121              | 110            | 30                 | 35-65            |                                         |               |                        |
| Drying (optional) | —                | —              | —                  | 1-20             | —                                       | —             | —                      |
| B&D test          | 134              | 210            | 3.5                | 28-35            | —                                       | —             | —                      |
| Helix test        | 134              | 210            | 3.5                | 28-35            | —                                       | —             | —                      |
| Vacuum test       | —                | —              | —                  | 20-25            | —                                       | —             | —                      |

## Diagrams of the sterilization programs(STE-18-D)

| Programs          | Temperature (°C) | Pressure (kPa) | Holding time (min) | Total time (min) | Type                                    | Max load (kg) | Max load per tray (kg) |
|-------------------|------------------|----------------|--------------------|------------------|-----------------------------------------|---------------|------------------------|
| SOLID             | 134              | 210            | 4                  | 15-30            | Unwrapped solid material                | 4.50          | 1.20                   |
|                   | 121              | 110            | 20                 | 30-40            |                                         |               |                        |
| WRAPPED           | 134              | 210            | 4                  | 30-45            | Unwrapped solid material                | 4.50          | 1.20                   |
|                   | 121              | 110            | 20                 | 45-60            | Single-wrapped solid or hollow material | 3.50          | 1.10                   |
| TEXTILE           | 134              | 210            | 8                  | 35-50            | Unwrapped porous material               | 1.00          | 0.30                   |
|                   |                  |                |                    |                  | Single-wrapped porous material          | 0.80          | 0.25                   |
|                   | 121              | 110            | 30                 | 55-70            | Dual-wrapped porous material            | 0.60          | 0.20                   |
|                   |                  |                |                    |                  | Single-wrapped hollow material          | 3.50          | 1.00                   |
|                   |                  |                |                    |                  | Dual-wrapped solid and hollow material  | 1.50          | 0.50                   |
| PRION             | 134              | 210            | 18                 | 45-60            | Unwrapped porous material               | 1.00          | 0.30                   |
|                   |                  |                |                    |                  | Single-wrapped porous material          | 0.80          | 0.25                   |
|                   |                  |                |                    |                  | Dual-wrapped porous material            | 0.60          | 0.20                   |
|                   |                  |                |                    |                  | Single-wrapped hollow material          | 3.50          | 1.00                   |
|                   |                  |                |                    |                  | Dual-wrapped solid and hollow material  | 1.50          | 0.50                   |
| LIQUID (optional) | 134              | 210            | 10                 | 40-55            | Liquid                                  | 1.00          | 0.30                   |
|                   | 121              | 110            | 30                 | 45-60            |                                         |               |                        |
| Drying (optional) | —                | —              | —                  | 1-20             | —                                       | —             | —                      |
| B&D test          | 134              | 210            | 3.5                | 15-30            | —                                       | —             | —                      |
| Helix test        | 134              | 210            | 3.5                | 15-30            | —                                       | —             | —                      |
| Vacuum test       | —                | —              | —                  | 19-22            | —                                       | —             | —                      |

## Diagrams of the sterilization programs(STE-12-D)

| Programs          | Temperature (°C) | Pressure (kPa) | Holding time (min) | Total time (min) | Type                                    | Max load (kg) | Max load per tray (kg) |
|-------------------|------------------|----------------|--------------------|------------------|-----------------------------------------|---------------|------------------------|
| SOLID             | 134              | 210            | 4                  | 16-21            | Unwrapped solid material                | 3.00          | 1.00                   |
|                   | 121              | 110            | 20                 | 32-42            |                                         |               |                        |
| WRAPPED           | 134              | 210            | 4                  | 27-42            | Unwrapped solid material                | 3.00          | 1.00                   |
|                   | 121              | 110            | 20                 | 42-52            | Single-wrapped solid or hollow material | 2.50          | 0.80                   |
| TEXTILE           | 134              | 210            | 8                  | 31-46            | Unwrapped porous material               | 0.75          | 0.25                   |
|                   |                  |                |                    |                  | Single-wrapped porous material          | 0.50          | 0.15                   |
|                   |                  |                |                    |                  | Dual-wrapped porous material            | 0.30          | 0.10                   |
|                   | 121              | 110            | 30                 | 52-62            | Single-wrapped hollow material          | 2.50          | 0.80                   |
|                   |                  |                |                    |                  | Dual-wrapped solid and hollow material  | 1.20          | 0.40                   |
| PRION             | 134              | 210            | 18                 | 41-56            | Unwrapped porous material               | 0.75          | 0.40                   |
|                   |                  |                |                    |                  | Single-wrapped porous material          | 0.50          | 0.15                   |
|                   |                  |                |                    |                  | Dual-wrapped porous material            | 0.30          | 0.10                   |
|                   |                  |                |                    |                  | Single-wrapped hollow material          | 2.50          | 0.80                   |
|                   |                  |                |                    |                  | Dual-wrapped solid and hollow material  | 1.20          | 0.40                   |
| LIQUID (optional) | 134              | 210            | 10                 | 35-55            | Liquid                                  | 0.80          | 0.25                   |
|                   | 121              | 110            | 30                 | 40-50            |                                         |               |                        |
| Drying (optional) | —                | —              | —                  | 1-20             | —                                       | —             | —                      |
| B&D test          | 134              | 210            | 3.5                | 20-25            | —                                       | —             | —                      |
| Helix test        | 134              | 210            | 3.5                | 20-25            | —                                       | —             | —                      |
| Vacuum test       | —                | —              | —                  | 18-21            | —                                       | —             | —                      |

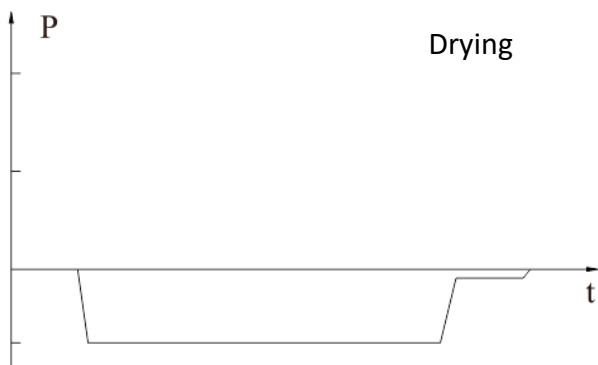
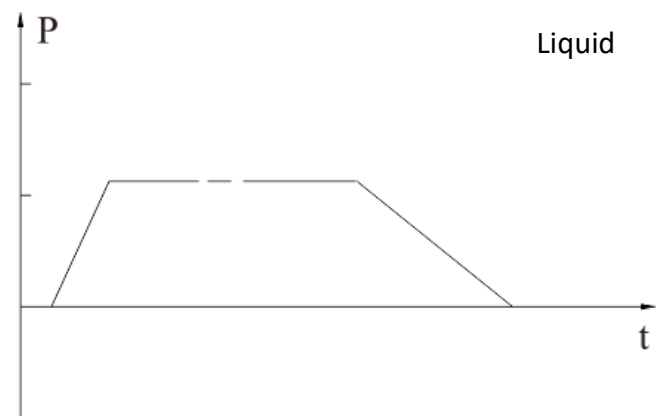
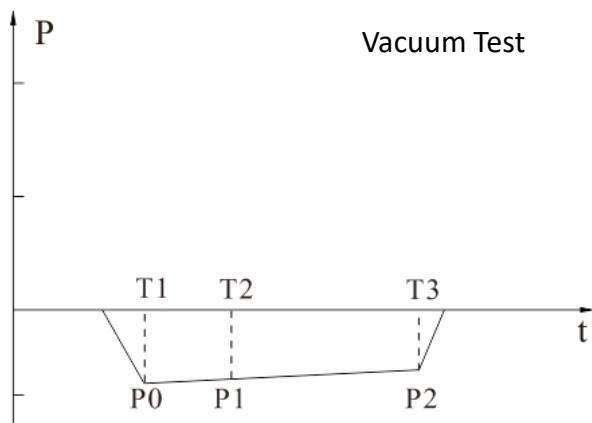
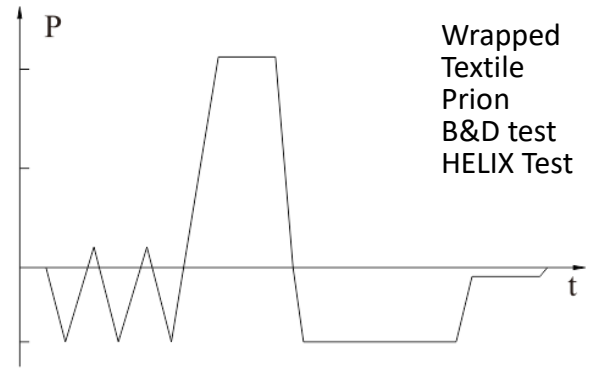
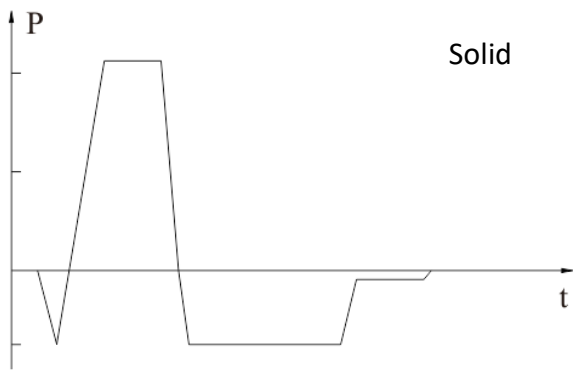
## Diagrams of the sterilization programs(STE-8-D)

| Programs             | Temperature (°C) | Pressure (kPa) | Holding time (min) | Total time (min) | Type                                    | Max load (kg) | Max load per tray (kg) |
|----------------------|------------------|----------------|--------------------|------------------|-----------------------------------------|---------------|------------------------|
| SOLID                | 134              | 210            | 4                  | 15-20            | Unwrapped solid material                | 2.00          | 0.60                   |
|                      | 121              | 110            | 20                 | 30-35            |                                         |               |                        |
| WRAPPED              | 134              | 210            | 4                  | 25-40            | Unwrapped solid material                | 2.00          | 0.60                   |
|                      | 121              | 110            | 20                 | 40-50            | Single-wrapped solid or hollow material | 1.50          | 0.50                   |
| TEXTILE              | 134              | 210            | 8                  | 30-45            | Unwrapped porous material               | 0.50          | 0.15                   |
|                      |                  |                |                    |                  | Single-wrapped porous material          | 0.35          | 0.10                   |
|                      | 121              | 110            | 30                 | 50-60            | Dual-wrapped porous material            | 0.25          | 0.10                   |
|                      |                  |                |                    |                  | Single-wrapped hollow material          | 1.50          | 0.30                   |
|                      |                  |                |                    |                  | Dual-wrapped solid and hollow material  | 1.00          | 0.30                   |
| PRION                | 134              | 210            | 18                 | 40-55            | Unwrapped porous material               | 0.50          | 0.15                   |
|                      |                  |                |                    |                  | Single-wrapped porous material          | 0.35          | 0.10                   |
|                      |                  |                |                    |                  | Dual-wrapped porous material            | 0.25          | 0.10                   |
|                      |                  |                |                    |                  | Single-wrapped hollow material          | 1.50          | 0.30                   |
|                      |                  |                |                    |                  | Dual-wrapped solid and hollow material  | 1.00          | 0.30                   |
| LIQUID<br>(Optional) | 134              | 210            | 10                 | 35-55            | Liquid                                  | 0.60          | 0.20                   |
|                      | 121              | 110            | 30                 | 40-50            |                                         |               |                        |
| Drying<br>(Optional) | —                | —              | —                  | 1-20             | —                                       | —             | —                      |
| B&D test             | 134              | 210            | 3.5                | 10-20            | —                                       | —             | —                      |
| Helix test           | 134              | 210            | 3.5                | 10-20            | —                                       | —             | —                      |
| Vacuum<br>test       | —                | —              | —                  | 17-20            | —                                       | —             | —                      |

The time required for sterilizer to be ready for routine use after the power is switched is less than 5 minutes.

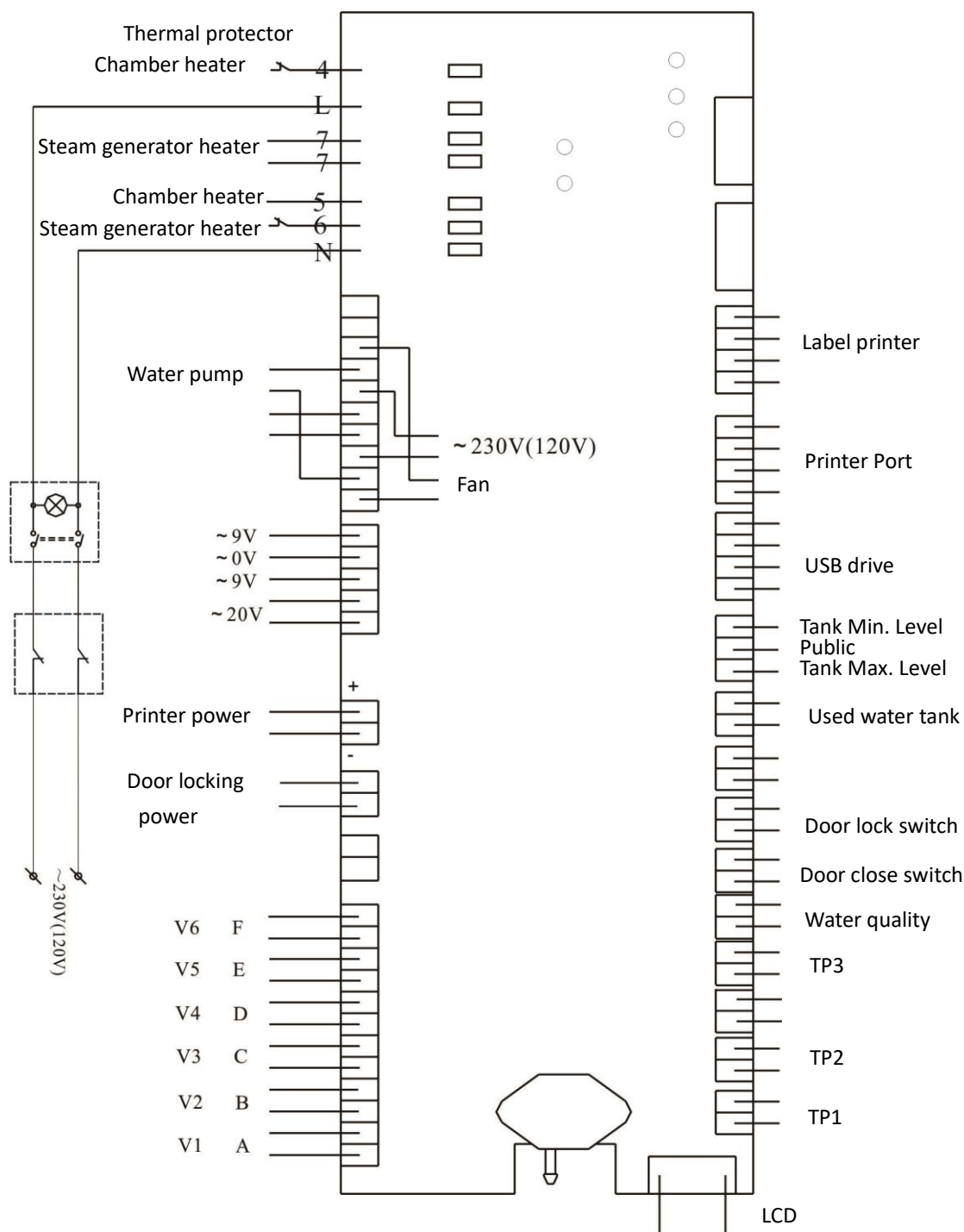
The max. Temperature of the 134°C sterilization cycle is 137°C

The max. Temperature of the 121°C sterilization cycle is 124°C



## Appendix 3

### Wiring diagram



TP1: Steam generator temperature sensor

TP2: Inner temperature sensor 1

TP3: Temperature sensor of chamber wall

V1: Vacuum pump valve

V2: Air filter valve

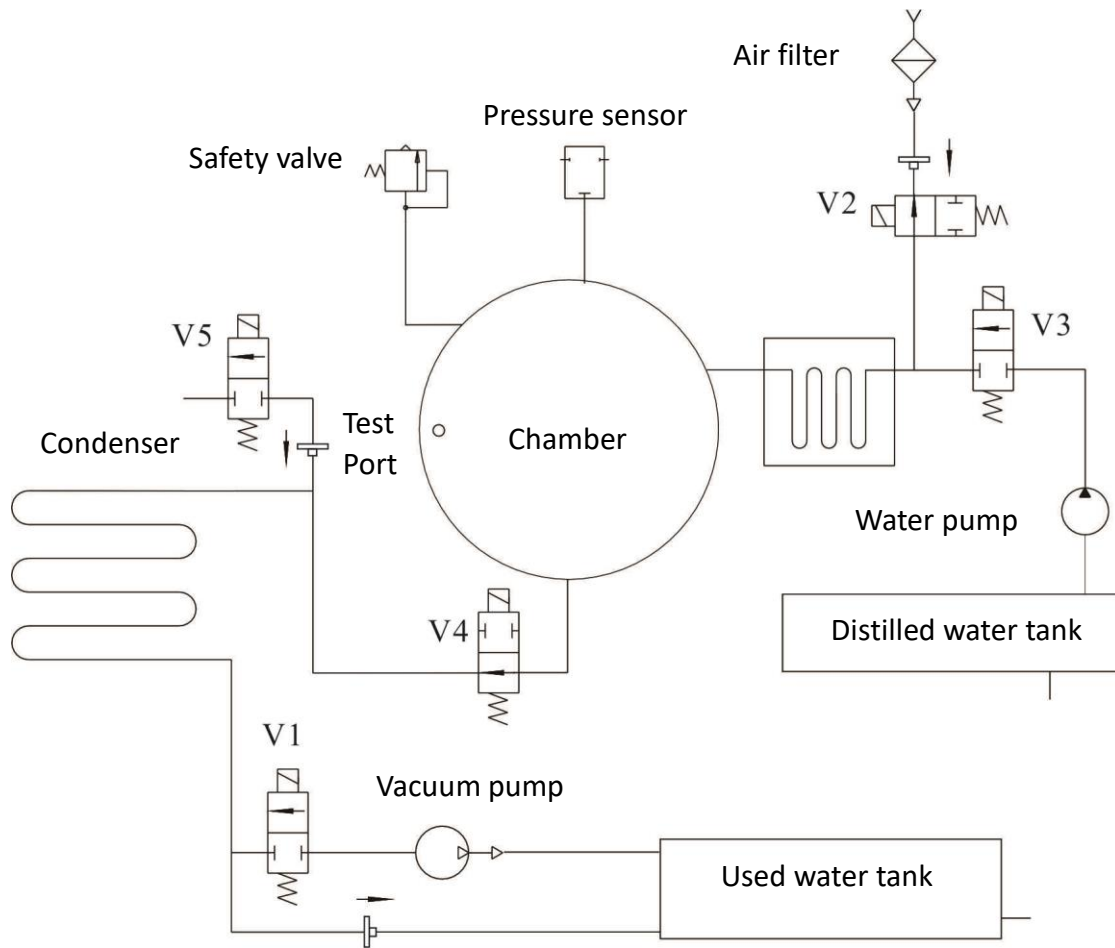
V3: Water pump valve

V4: Water release valve

V5: Vacuum pump start valve

## Appendix 4

### Hydraulic diagram



V1: Vacuum pump valve

V2: Air filter valve

V3: Water pump valve

V4: Water release valve

V5: Vacuum pump start valve