Sturdy
Wellell Group

“Sturdy” Autoclave Sterilizer

SA-260MB
Instruction Manual

Please read manual carefully before using and keep it well for future reference.

CE 2460

422-02052 v.03 16 September 2022

Contents

1. Important Safety Instructions

⚠**CAUTION:** Please install, operate and maintain the sterilizer in accordance with this Instruction Manual. Failure to do so could result in serious injury or damage to the unit.

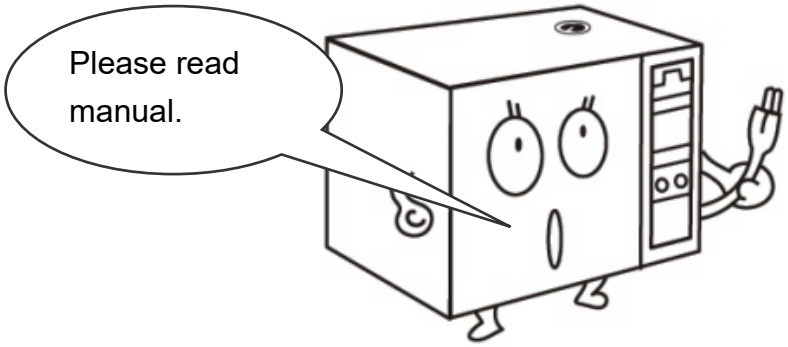


Figure 1

⚠**WARNING:** DO NOT place alcohol or other flammable items in the sterilizer. An explosion could occur, causing personal injury.

Gasoline
Alcohol
Gas
Chemical……

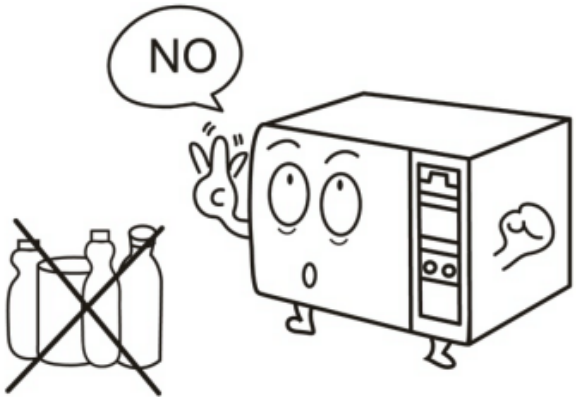


Figure 2

⚠**WARNING:** A separate (dedicated) circuit is recommended for the sterilizer. The sterilizer should not be connected to an electrical circuit with other appliances or equipment.

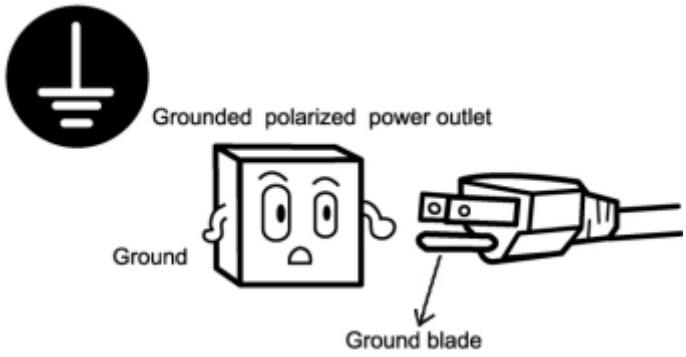


Figure 3

⚠**WARNING:** Always check the status of the electric wire; unplug the power cord if breakage comes up. Contact your supplier for service support.

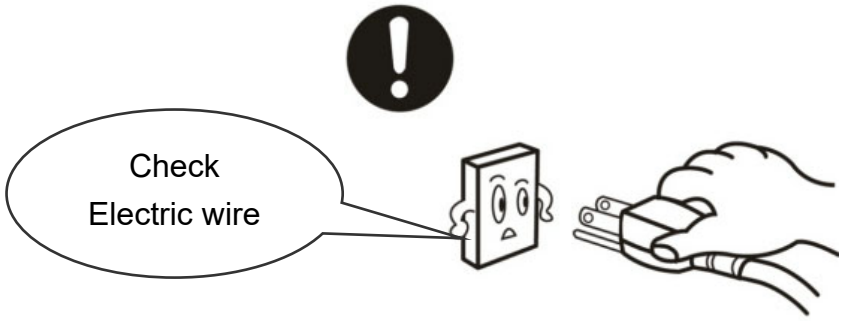


Figure 4

⚠**WARNING:** Children are not allowed to use or play with the unit.

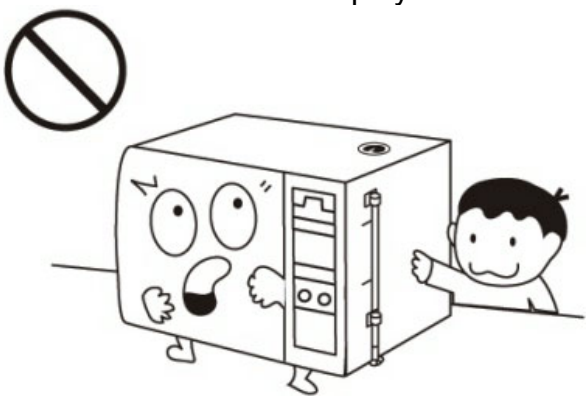


Figure 5

⚠**WARNING:** Do not put your fingers into the gap on the hinged side of the door.

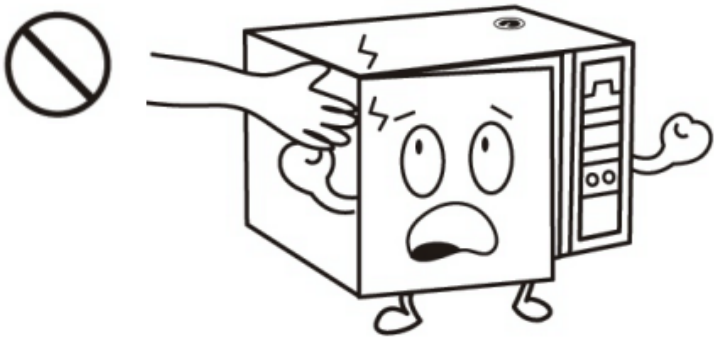


Figure 6

⚠**WARNING:** Always check the pressure gauge before opening the door. DO NOT attempt to open the door if the pressure is not at zero (0).

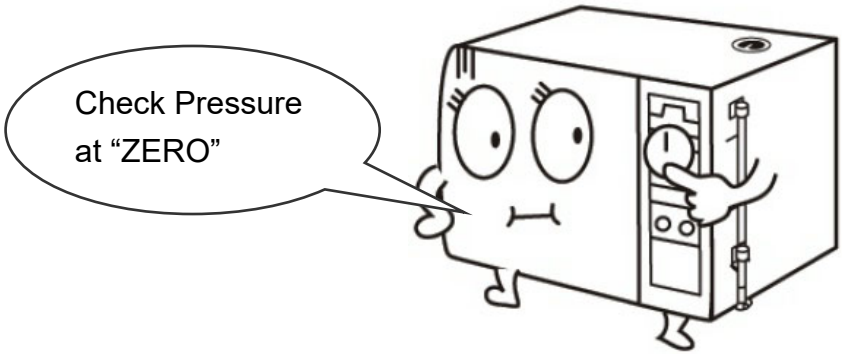


Figure 7

⚠**WARNING:** In an emergency, or before carrying out any maintenance, always disconnect the power cord from the outlet.

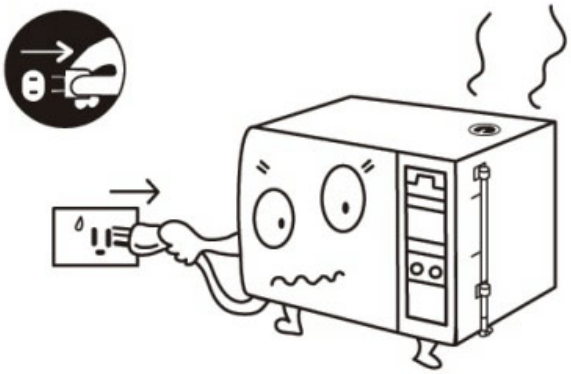


Figure 8

⚠**WARNING:** Use sterilization indicator test strips to check that sterilization has been successful.

Figure 9

⚠**WARNING:** Contact your supplier for service support if the safety valve is active for releasing the over-pressure

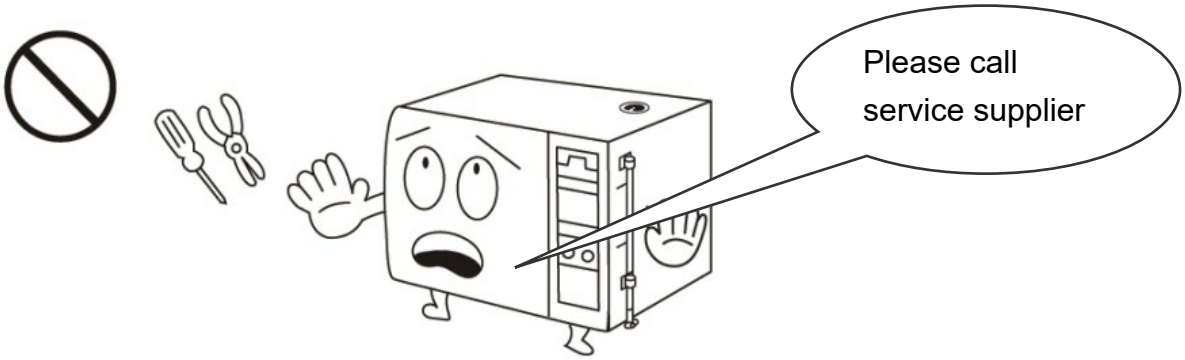


Figure 10

⚠**WARNING:** Use water for sterilization or distilled water. Normal tap water contains minerals, especially chlorides, which have corrosive effects on stainless steel. Failure to use water for sterilization or distilled water will invalidate the warranty.(refer to chapter 9.)

Pure Water
Tap Water
Groundwater
……

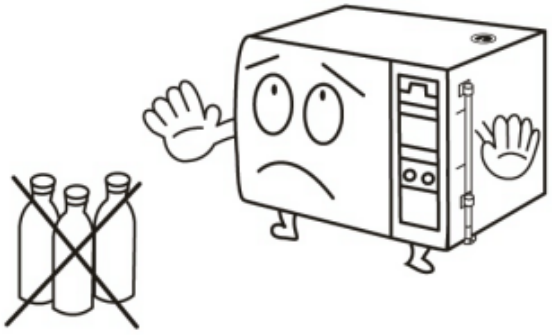


Figure 11

⚠**CAUTION:** Do not put objects on the power plug or power cord.

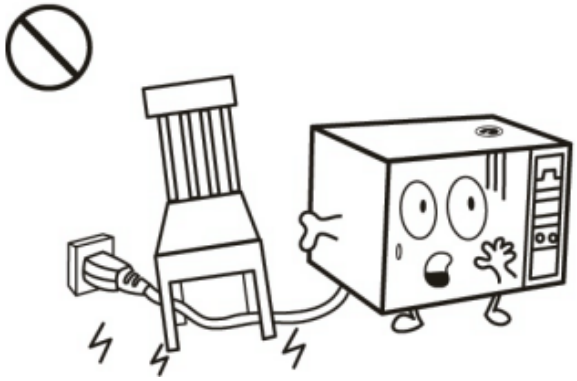


Figure 12

⚠**CAUTION:** The outer casing and metal surfaces of the sterilizer are hot during operation, please do not touch it.

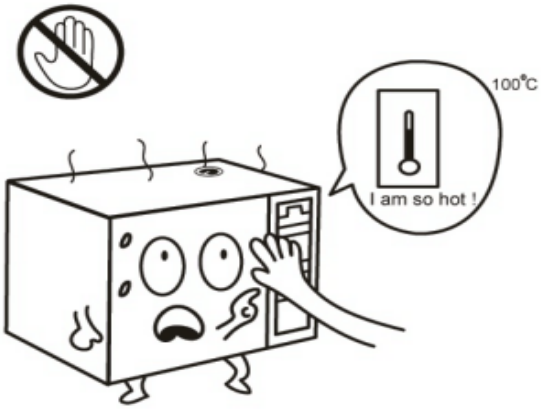


Figure 13

⚠**WARNING:** DO NOT place any objects on the water reservoir of the sterilizer.

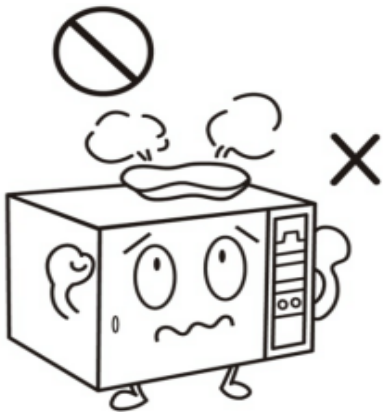


Figure 14

⚠**CAUTION:** Do not overfill the water reservoir. The water level must be maintained between the Full and Minimum labels on the right hand side of the sterilizer.

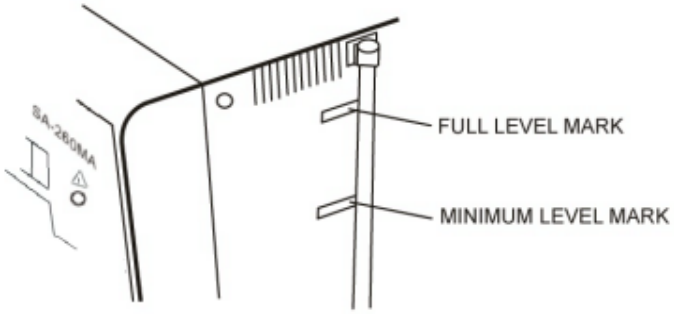


Figure 15

⚠**WARNING:** Steam and hot water may be present when opening the door after a sterilizer cycle.

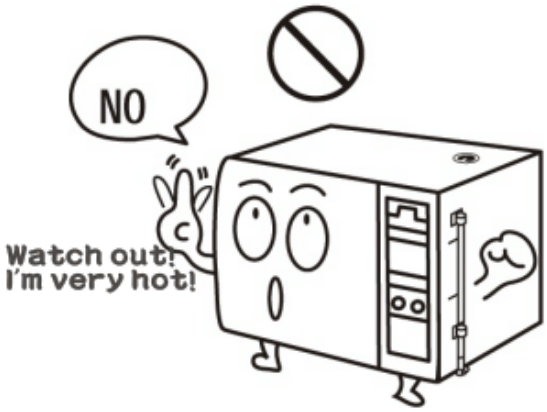


Figure 16

⚠**CAUTION:** DO NOT place any objects on the top of the sterilizer.

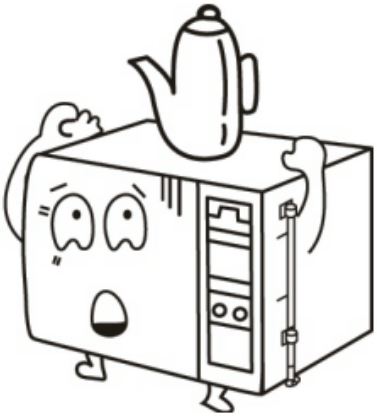


Figure 17

⚠**CAUTION:** Do not tip over the unit or allow it to fall on the power plug.

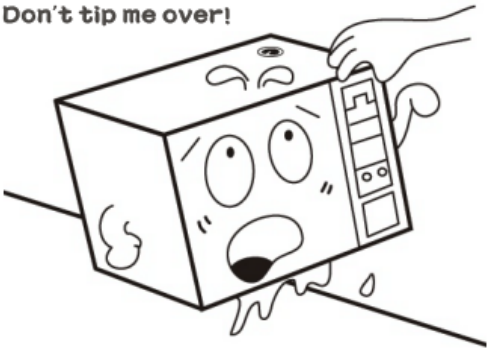


Figure 18

⚠**CAUTION:** It will require at least two (2) or more people to carry the sterilizer to avoid dropping it off by mistake.

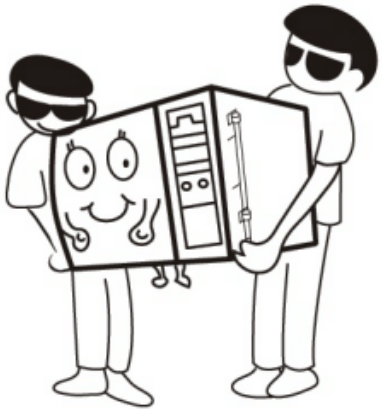


Figure 19

⚠**CAUTION:** Always allow a minimum of 20 minutes between each sterilization cycle.

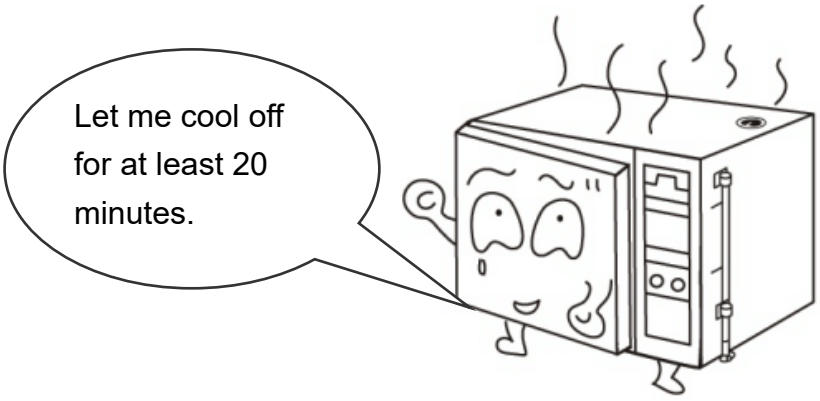


Figure 20

⚠**CAUTION:** Please unplug the power cord and drain off water from the reservoir if the sterilizer will not be used regularly.

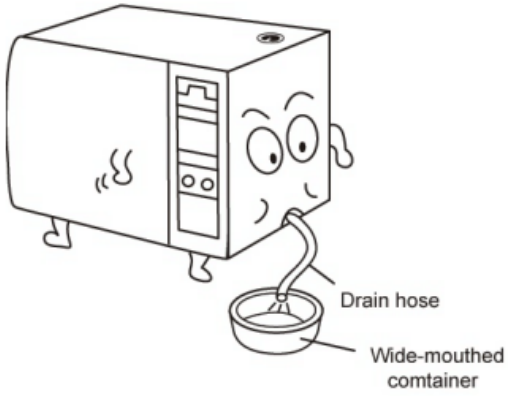


Figure 21

⚠**CAUTION:** Always keep the sterilizer clean.

Figure 22

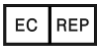
⚠**WARNING:** The door must be closed completely during operation of the unit. If the “Error No. 600” displayed, it means that the door is not closed properly.

⚠**WARNING:** Always check the water level in the reservoir before running a sterilization cycle. If the “Error No. 400” displayed, it means that the water in in the reservoir is not sufficient. Please fill the water for sterilization or distilled water as shown in “9 Water Quality”.

⚠**WARNING:** Clean the water filter located at the back of the unit at least once per month. Refer to Maintenance Instructions.

⚠**WARNING:** Failure to follow the Maintenance Instructions will adversely affect performance and lifespan of the sterilizer, and may invalidate the warranty.

2. Explanation of Safety Symbols and Notes

	Caution, consult instruction manual for use
	Protective earth (ground)
	Alternating Current
	Attention! Hot surface
	Disposal of Electrical & Electronic Equipment (WEEE): This product should be handed over to an applicable collection point for the recycling of electrical and electronic equipment. For more detailed information about the recycling of this product, please contact your local city office, household waste disposal service or the retail store where you purchased this product. (European community only)
	Authorised representative in the European community
	Manufacturer
	Date of manufacture It is a 6-digit number. The first 4 digits represent the year, followed by 2 digits of the month.
	Consult instruction manual for use
	ON, connection to the mains
	OFF, disconnection from the mains
POWER	Power switch
NOTE	Indicates information that user should pay special attention to.
CAUTION	Indicates correct operating or maintenance procedures in order to prevent damage or destruction of the equipment or other property.
WARNING	Indicates correct operating or maintenance procedures in order to prevent damage or destruction of the equipment or other property.

3. Unpacking

CAUTION: It will require at least two (2) or more people to carry the sterilizer to avoid dropping it off by mistake.

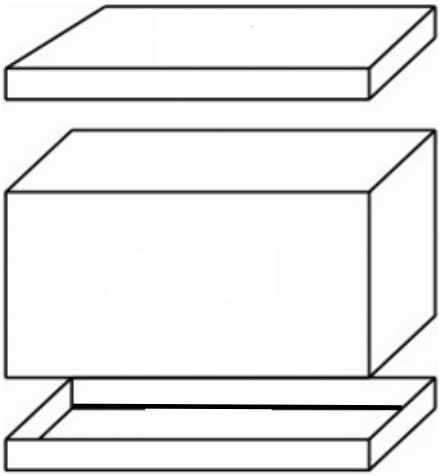


Figure 23 – Unpacking

A Cut the banding

B Lift off the top cover of the carton

C Remove the wall and the foam packaging inserts

D Carefully lift the sterilizer from the packaging base

E Check all accessories are present as follows (accessories are packed inside the sterilizer chamber):

- Instruction Manual ×1
- Heater Cover ×1
- Tray ×3 (Standard)
- Tray Set ×1 (Standard)
- Holder ×1 (Standard)
- Silicone Hose（2m）x2 (Standard)
- Printer paper ×1 set (5 pcs) (Standard)
- Sterilization Box × 1 (Optional)*
- Spring Holder (Optional)*
- Exhaust Tank (Optional)*

*The accessories will be different according to the order request.

NOTE: The manufacturer recommends that all packaging material is retained for possible re-use.

NOTE: The packing material is made by corrugating medium-catalogue AA for the purpose of Reduce, Reuse and Recycle.

4. Installation

4.1 Environment

This equipment has been designed for use in accordance with the International EMC (Electromagnetic Compatibility) Standards. In view of different environments, please follow the instructions given below to eliminate interference, if necessary.

- Move the equipment or rotate its direction;
- Enlarge the space between the equipment and other machines;
- Put the plug into other outlets;
- Please consult with the local distributor or qualified electrician.
- Regarding the environmental temperature for installation, please refer to “11. Specifications”.

4.2 Install the Sterilizer

⚠**CAUTION:** Please read and follow “5.2” in order to understand the operation of the sterilizer.

⚠**CAUTION:** While installation, please make sure that the bearing capacity of installation table is enough to carry the sterilizer. For the weight information of the sterilizer, please refer to “11. Specifications”.

⚠**CAUTION:** Position the sterilizer on a stable bench or work surface, ensuring at least 10 cm clearance between the wall or other pieces of equipment and the sides of the unit for free circulation of air.

⚠**CAUTION:** Make sure that the door can be opened freely after installation.

⚠**WARNING:** Do not install or operate the sterilizer in areas where flammable items or volatile substances are used or stored. An explosion could occur, causing personal injury. An installation site with good air circulation is required.

⚠**WARNING:** Be sure to install the sterilizer on a flat surface, otherwise it may not defect the water level correctly.

A. Open the water reservoir cap; pour water for sterilization or distilled water into the water reservoir as shown in Figure 24

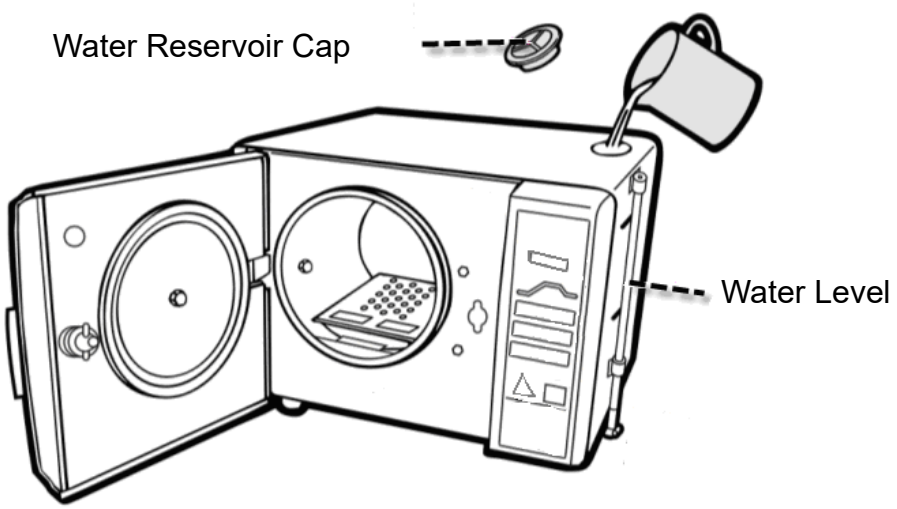


Figure 24

CAUTION: Please fill Water for Sterilization or Distilled Water Only into the sterilizer. Please do not fill water over the yellow water level mark as shown in Figure 25 and Figure 37 – Front View.

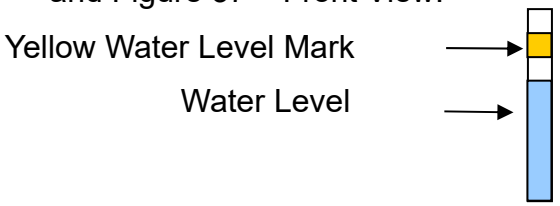


Figure 25

WARNING: Do NOT fill water into the reservoir during the sterilization process to avoid overflow. After each sterilization cycle is completed, any remaining water in the chamber will be drained automatically.

B. Connect an external water supply to the “WATER IN” on the rear side of the sterilizer by using the 2 m silicon hose for the “Auto add water” function as shown in Figure 26.

NOTE: The pressure of external water supply should be not less than 2 Bar. It is recommended to connect a suitable gauge.

CAUTION: Refer to “9 Water Quality”.

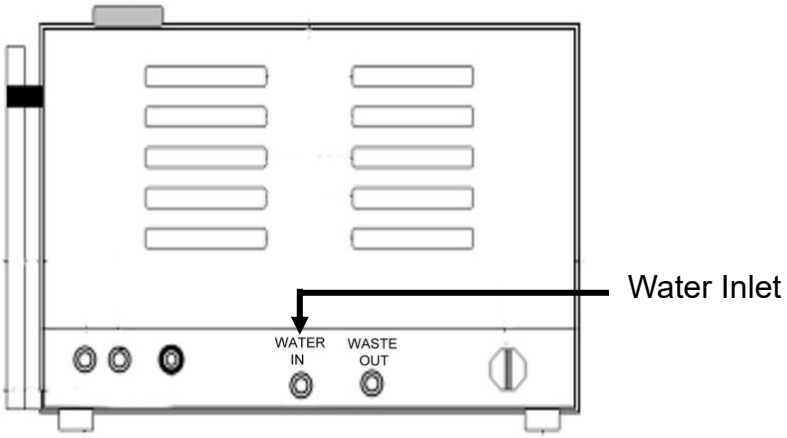


Figure 26

C. How to set the ” Auto add water”:
Select ”system setting” as shown in Figure 27 (Refer to “6.8.4” for detail operation.)

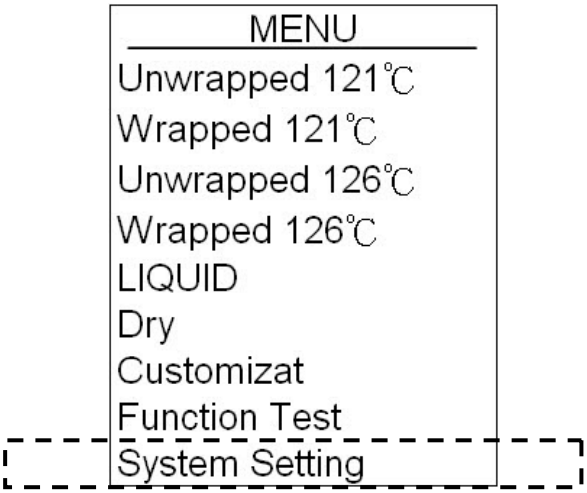


Figure 27

and then select ”Auto add water” as shown in Figure 28

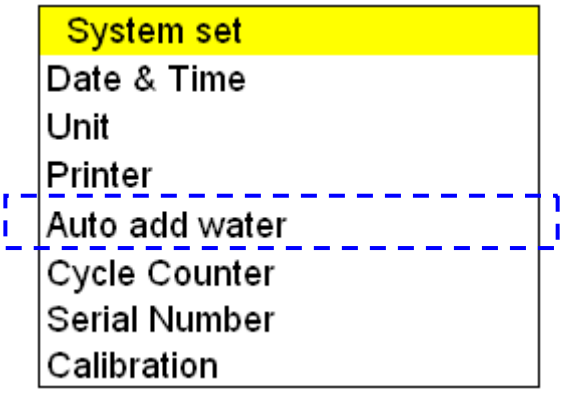


Figure 28

set to ”ON” as shown in Figure 29.

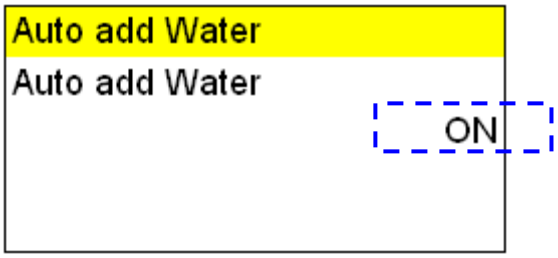


Figure 29

D. Heating water is drained from the chamber through this outlet. Connect the exhaust hose to the “WASTE OUT” as shown in Figure 30 to drain heating water according to the local national law.

⚠ **CAUTION:** The optional Exhaust Tank is capable of draining water for 3 cycles, you should then drain out the water according to the local national law.

⚠ **CAUTION:** Do not obsolete, block, or twist the exhaust hose.

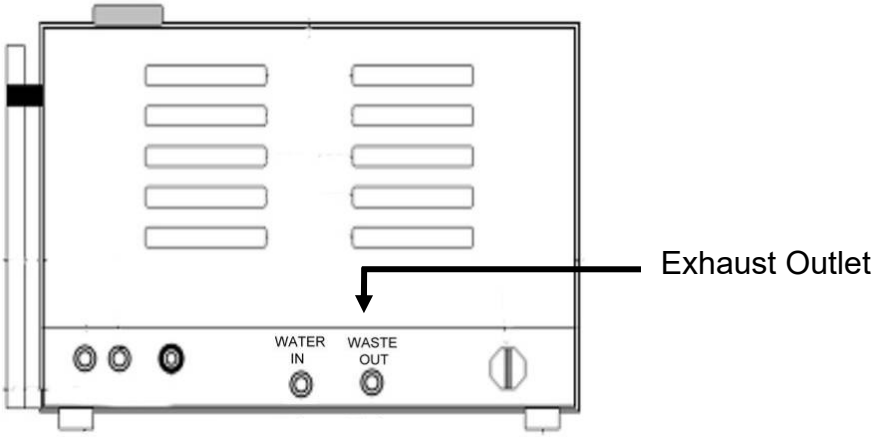


Figure 30

E. Install the heater cover to the chamber as shown in Figure 31 (standard accessory) Ensure the rounded edge is towards the back and the vertical front edge of the cover locates securely into the corresponding slots in the lower part of the chamber opening.

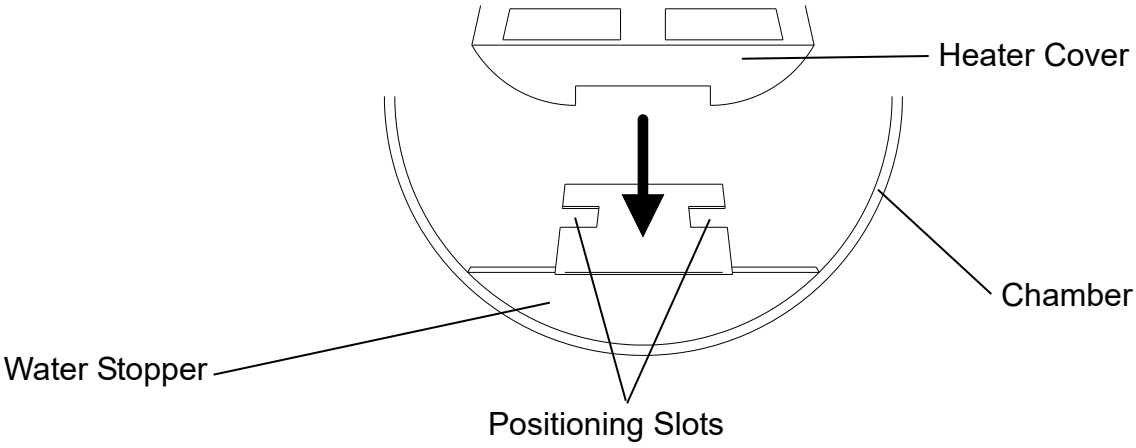


Figure 31 – Heater Cover

F. Install the tray frame as shown in Figure 32 (standard accessory)

CAUTION: The frame should be installed as in Figure 32 below. The indention of the frame will pass the bushing in the chamber.

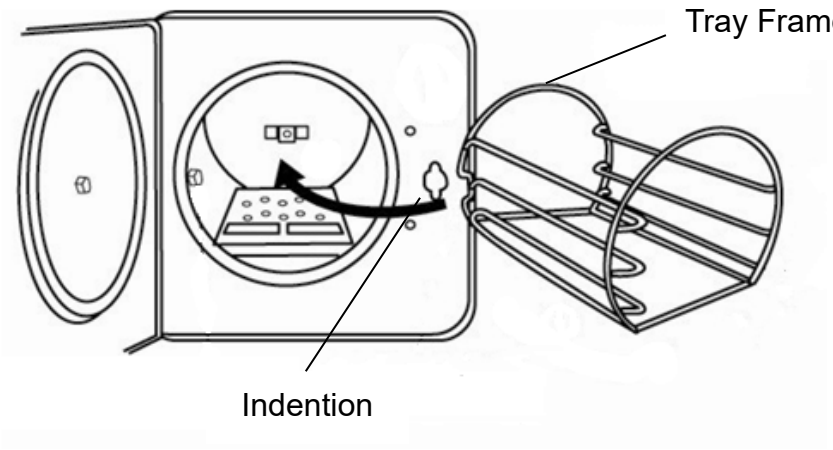


Figure 32

G. Install the tray as shown in Figure 33. (standard accessory)

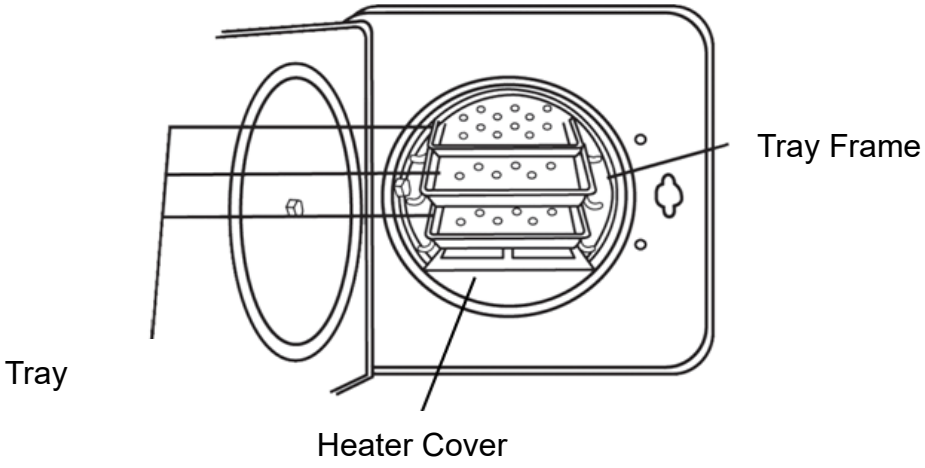


Figure 33 – Tray

H. Install the Sterilization Box as shown in Figure 34. (optional accessory)

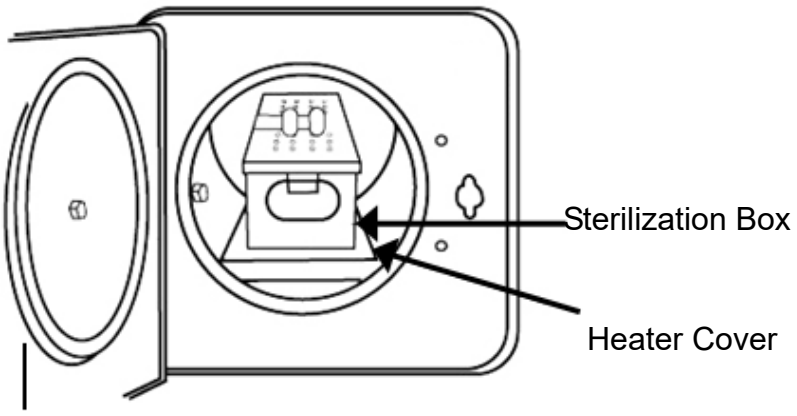


Figure 34 – Sterilization Box

I. The maximum useable space is 7.5L which is 156 mm (W) x 132.5 mm(D) x 356 mm(H).

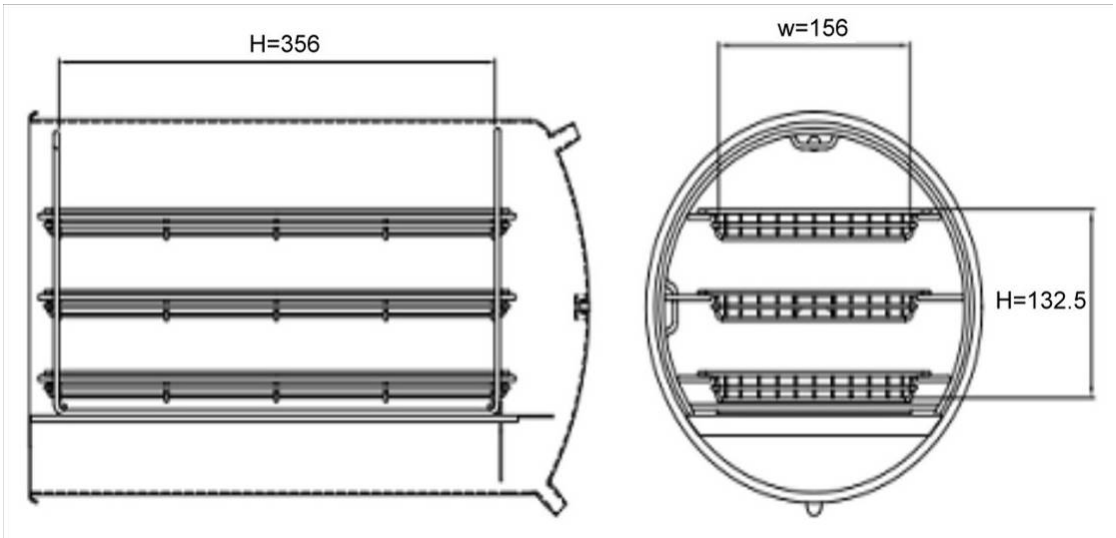


Figure 35

J. Close the door and turn the knob clockwise 90°in order to lock it 100%.

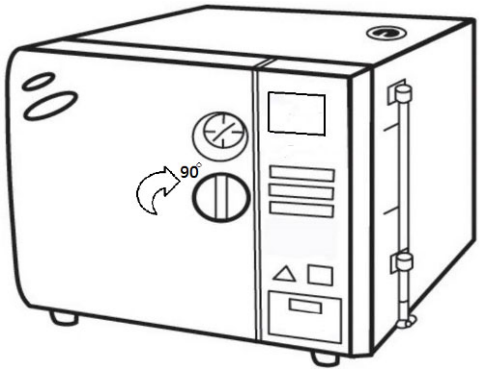


Figure 36

⚠**WARNING:** Please make sure to turn the knob 90 degrees completely, so the door lock will be closed automatically to avoid any problems on security.

K. Ensure the Power Switch is in OFF “O” position, and then plug the power cord into a separate (dedicated) mains socket.

⚠**WARNING:** A separate (dedicated) socket is required for the sterilizer. Make sure the socket is earthed and can offer the capacity of 15 A / 230V AC.

⚠**WARNING:** The plug is one of the measures of emergency cutoff; please make sure that the plug is accessible after installation.

L. Press the “POWER” switch to ON “I” position, the LCM should illuminate. If the sterilizer does not perform as mentioned above, please turn off the power and unplug the sterilizer, and then follow the “trouble shooting”. If the problem still presents, please turn off the power and unplug the sterilizer. Contact the local distributor for help.

5. Introduction

5.1 Intended Use

This product is a tabletop high pressure steam sterilizer which is designed and developed for the sterilization of wrapped and unwrapped items.
Suitable loads are those included in EN 13060 such as solid, porous, hollow loads type A, hollow loads type B; both single wrapped and double wrapped, and unwrapped loads.

5.2 Description of the Sterilizer

5.2.1 External View

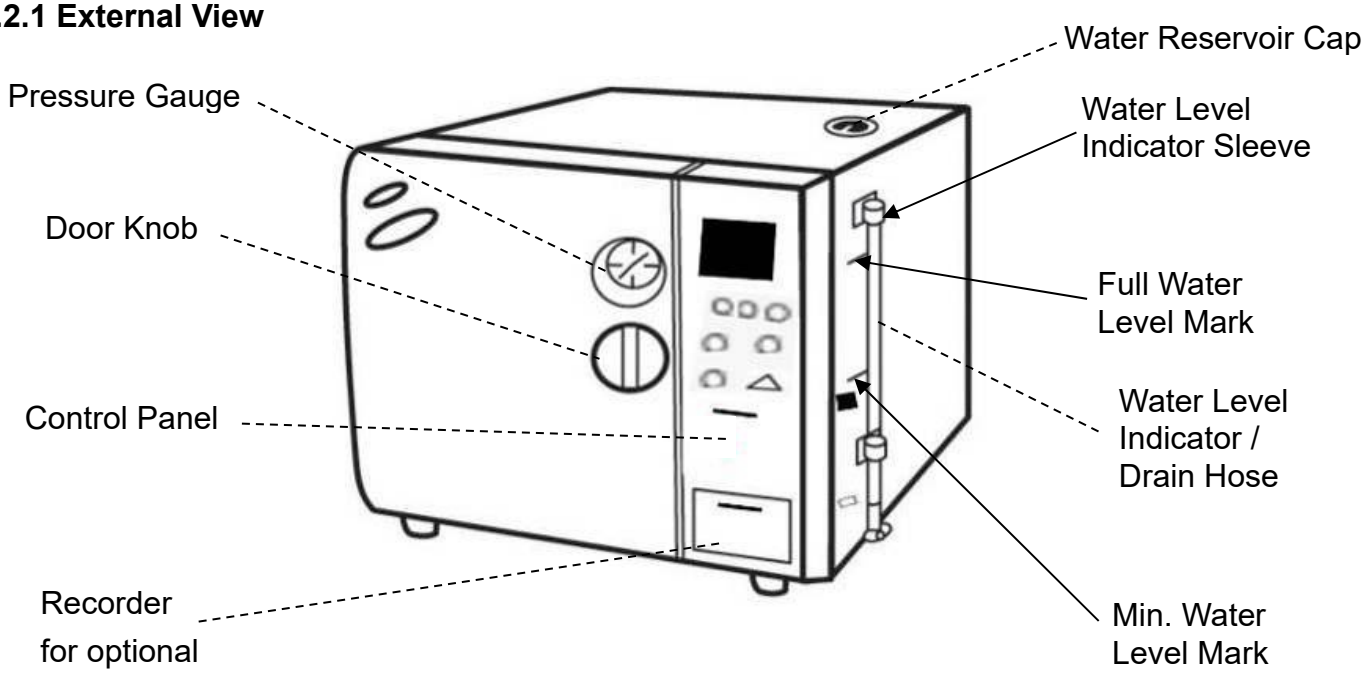


Figure 37 – Front View

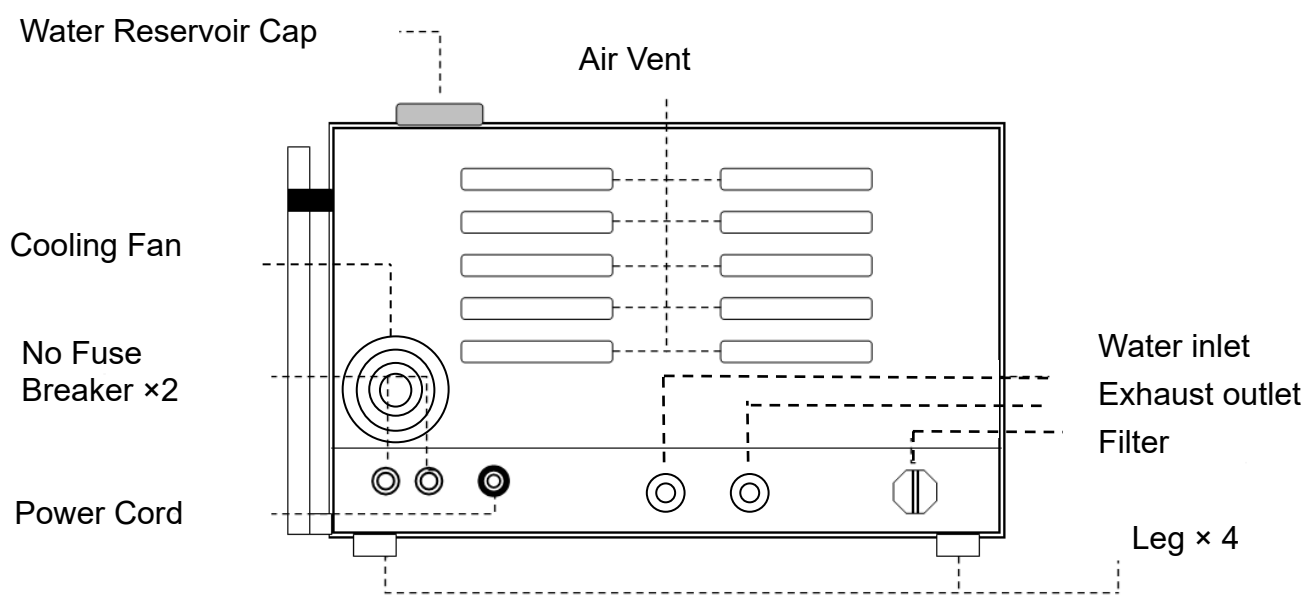


Figure 38 –Rear View

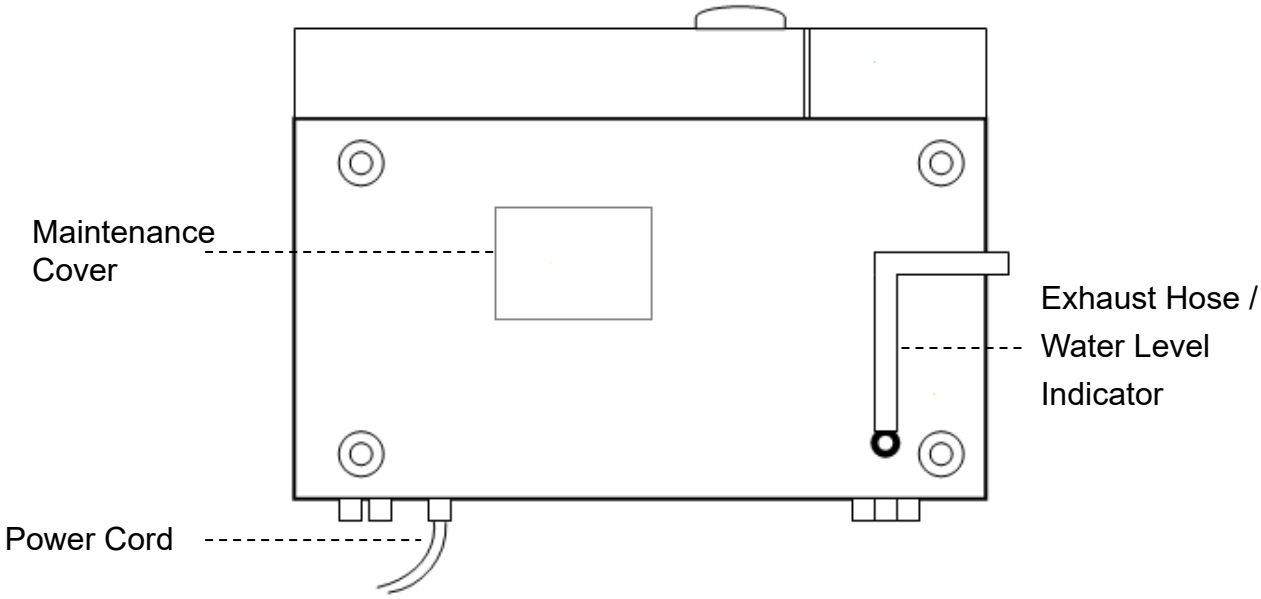


Figure 39 – Bottom View

5.2.2 Internal Configuration

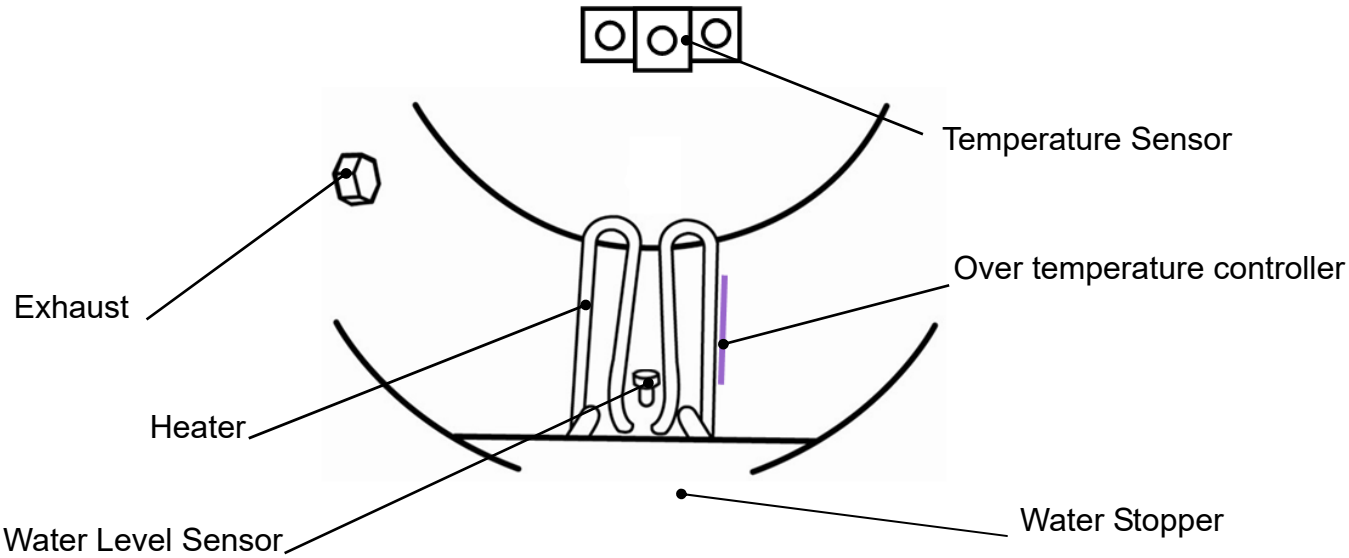
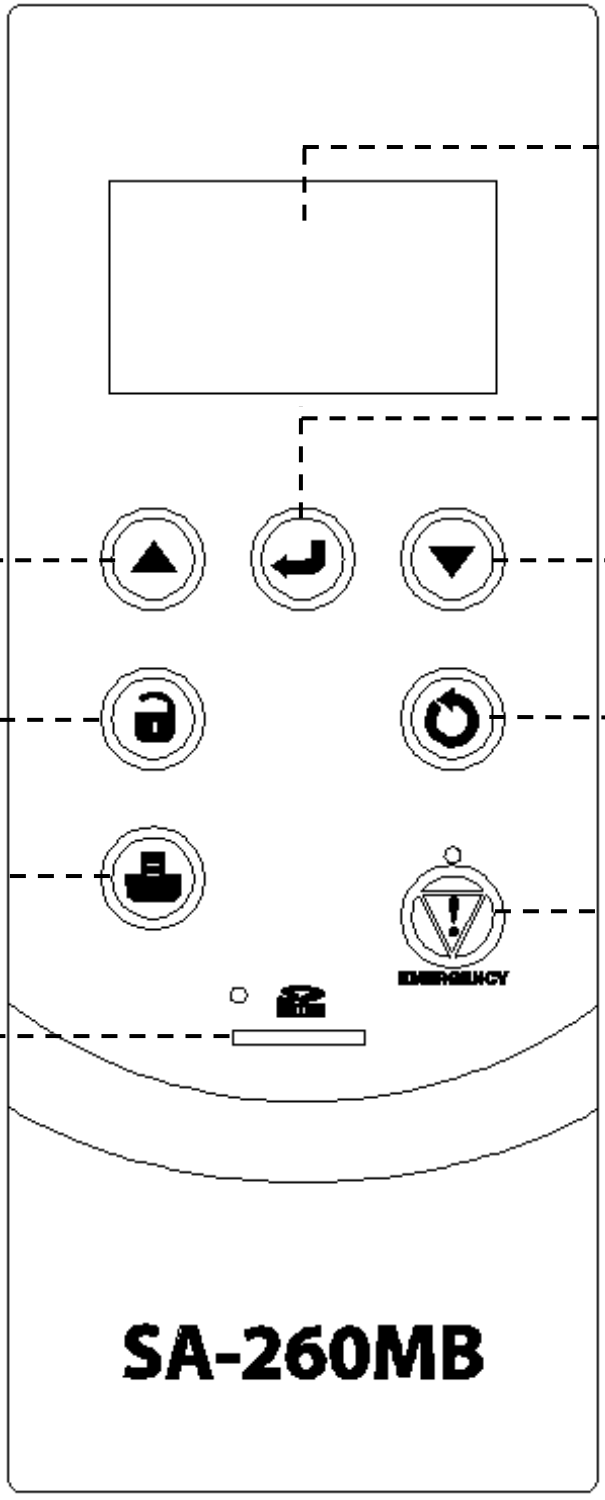


Figure 40 – Inside of Chamber

5.2.3 Control Panel



Up button:
Used for setting and changing the function and increasing the parameters.

Unlock button:
Press this button to release the lock status after completing a sterilization cycle or un-executing program.

Printer button:
Print the prompt message of each sterilization steps automatically or re-print the last sterilization steps.

SD slot:
To accept a formatted SD card for storing the process information of a sterilization cycle by text format (*.dat).

LCD Panel:
Display the information of sterilization status.

Enter Button:
Press this button to execute or confirm the input data.

Down button:
Used for setting and changing the function and decreasing the parameters.

Cancel button:
1. To abort the changing operation and return to previous step.
2. A “Confirm” message prompts during a sterilization cycle, press it again to continue the current cycle.

Emergency Stop Button:
Stop program and release pressure/vacuum .

Figure 41 – Control Panel

6. Operation

The “Table 1” describes the build-in programs that can be used by the sterilizer model SA-260MB.

<table>
<tr><th>Cycle Program</th><th>Description</th></tr>
<tr><td>UNWRAPPED 121℃
WARAPPED 121℃</td><td>Applicable to solid, porous, hollow loads type A, hollow loads type B; both single wrapped and double wrapped, and unwrapped loads.

<table>
<tr><th></th><th>UNWRAPPED</th><th>WARAPPED</th></tr>
<tr><td>vacuum pulses(Times)</td><td colspan="2">4</td></tr>
<tr><td>Sterilization temp (°C)</td><td colspan="2">121</td></tr>
<tr><td>Sterilization time (Minutes)</td><td>15</td><td>30</td></tr>
<tr><td>Dry time (Minutes)</td><td>15</td><td>30</td></tr>
</table>

Refer to “6.4” for detail operations.</td></tr>
<tr><td>UNWRAPPED 126℃
WARAPPED 126℃</td><td>Applicable to solid, porous, hollow loads type A, hollow loads type B; both single wrapped and double wrapped, and unwrapped loads.

<table>
<tr><th></th><th>UNWRAPPED</th><th>WARAPPED</th></tr>
<tr><td>vacuum pulses(Times)</td><td colspan="2">4</td></tr>
<tr><td>Sterilization temp (°C)</td><td colspan="2">126</td></tr>
<tr><td>Sterilization time (Minutes)</td><td>10</td><td>20</td></tr>
<tr><td>Dry time (Minutes)</td><td>15</td><td>30</td></tr>
</table>

Refer to “6.4” for detail operations.</td></tr>
<tr><td>LIQUID(Optional)</td><td>Applicable to LIQUID load.

This function allows the operator to define special sterilization cycle (such as temperature and time) within the specification of this autoclave.

Sterilization temp: 105-135℃,
Sterilization time: 1-60 minutes

⚠WARNING: Users who define the parameters should take their own responsibilities and obligations to undertaken the risk of sterilization uncertainty.</td></tr>
</table>

<table>
<tr><th>Cycle Program</th><th>Description</th></tr>
<tr><td>Dry</td><td>This dry program is designed for the following purpose:
1) To re-dry the loads, or
2) To pre-dry the loads for 10 to 30 minutes prior to perform a sterilization cycle, in case of the loads may store in a humidity and cold environment. This program is useful especially to the double wrapped loads.
Dry time 1 to 60 minutes.
Refer to “6.6” for detail operations.</td></tr>
<tr><td>Customization</td><td>This function allows the operator to define special sterilization cycle (such as temperature and time) within the specification of this autoclave.

<table><tr><th></th><th colspan="2">Customization</th></tr><tr><td>vacuum pulses(Times)</td><td>No</td><td>Yes</td></tr><tr><td>Sterilization temp (°C)</td><td>105-130</td><td>119-130</td></tr><tr><td>Sterilization time (Minutes)</td><td colspan="2">0-60 minutes 59 seconds</td></tr><tr><td>Dry time (Minutes)</td><td colspan="2">0-60 minutes.</td></tr></table>
Refer to “6.7” for detail operations.

⚠WARNING: Users who define the parameters should take their own responsibilities and obligations to undertaken the risk of sterilization uncertainty.</td></tr>
</table>

Table 1 - Sterilization cycle

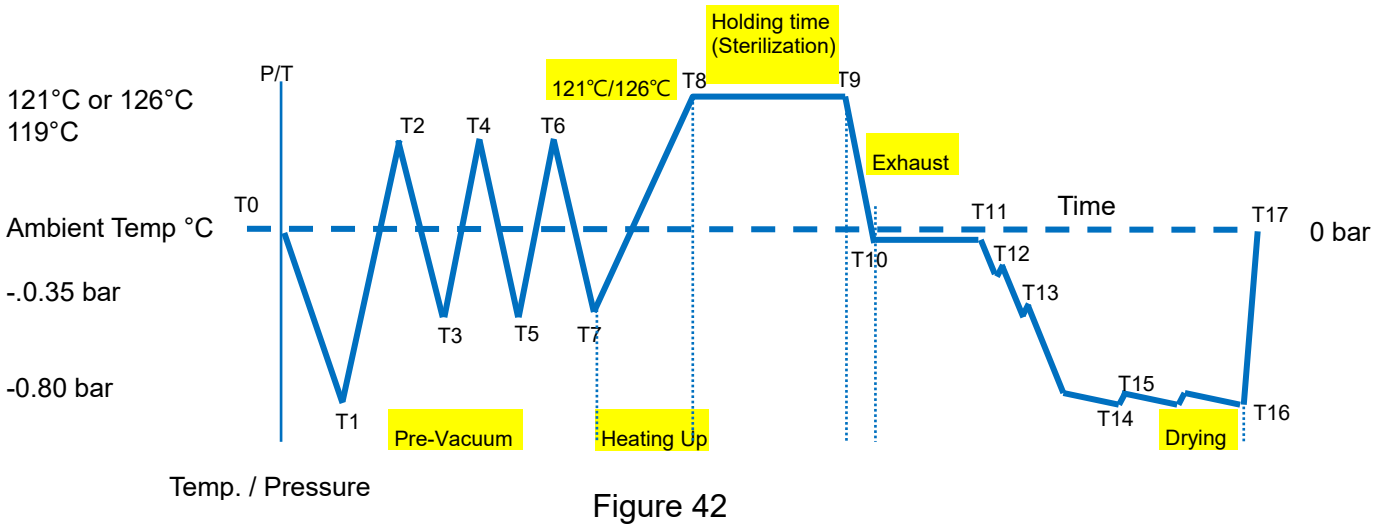


Figure 42

Legend of each cycle:

PV1- PV4	Vacuum stage (Air removal stage)	T0-T1，T2-T3，T4-T5，T6-T7
H1-H4	Heating stage	T1-T2，T3-T4，T5-T6，T7-T8
S0-S60	Sterilizing stage (Holding stage)	T8-T9
EX	Exhaust stage	T9-T10
D0-D1	Drying stage	T10-T16
VR	Vacuum release stage	T16-T17

Table 2

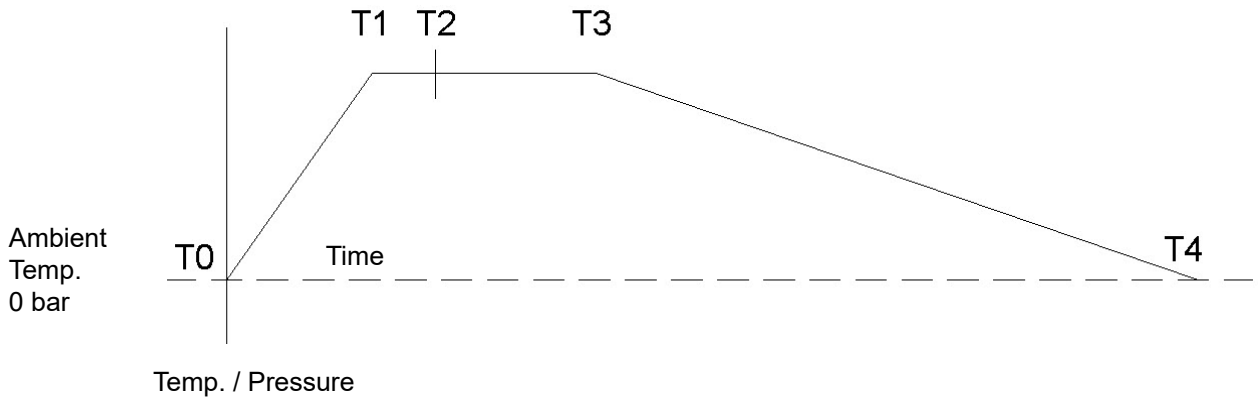


Figure 43

Legend of each cycle:

H1	Heating stage	T0-T1
ET	Equilibrium Time	T1-T2
S0-S60	Sterilizing stage (Holding stage)	T2-T3
CD	Cooling Down	T3-T4

Table 3

Maximum load of each build-in program:

<table>
<tr><td colspan="2" rowspan="2"></td><td colspan="8">Program</td></tr>
<tr><td>Unwrapped 121℃</td><td>Unwrapped 126℃</td><td>Wrapped 121℃</td><td>Wrapped 126℃</td><td>LIQUID</td><td>Dry</td><td>Customization</td></tr>
<tr><td colspan="2">Temperature (℃)</td><td>121</td><td>126</td><td>121</td><td>126</td><td>105-135</td><td>-</td><td>105-130</td></tr>
<tr><td colspan="2">Pressure (bar)</td><td>1.1</td><td>1.5</td><td>1.1</td><td>1.5</td><td>-</td><td>-0.8</td><td>-</td></tr>
<tr><td colspan="2">Sterilization time minutes)</td><td>15</td><td>10</td><td>30</td><td>20</td><td>1-60</td><td>-</td><td>-</td></tr>
<tr><td colspan="2">Dry time (minutes)</td><td>15</td><td>15</td><td>30</td><td>30</td><td>-</td><td>1-60</td><td>-</td></tr>
<tr><td colspan="2">Total time (minutes)</td><td>58</td><td>57</td><td>88</td><td>80</td><td>137-182</td><td>1-60</td><td>20-160</td></tr>
<tr><td rowspan="8">Max. load</td><td>Solid unwrapped (kg)</td><td colspan="4" rowspan="2">5.0</td><td rowspan="2">NA</td><td></td><td></td></tr>
<tr><td>Porous unwrapped (kg)</td><td></td><td></td></tr>
<tr><td rowspan="2">Solid wrapped(kg)</td><td rowspan="2">NA</td><td rowspan="2">NA</td><td>Single wrapped 1.5</td><td rowspan="2">NA</td><td rowspan="2"></td><td rowspan="2"></td></tr>
<tr><td>Double wrapped 1.2</td></tr>
<tr><td rowspan="2">Porous wrapped(g)</td><td rowspan="2">NA</td><td rowspan="2">NA</td><td>Single wrapped 900</td><td rowspan="2">NA</td><td rowspan="2"></td><td rowspan="2"></td></tr>
<tr><td>Double wrapped 900</td></tr>
<tr><td>LIQUID(Bottle)</td><td>NA</td><td>NA</td><td>NA</td><td>250ml × 10
500ml × 8</td><td></td><td></td></tr>
<tr><td rowspan="2">Hollow A&B(kg)</td><td colspan="2" rowspan="2">2.0</td><td>Single wrapped 1.5</td><td rowspan="2">NA</td><td></td><td></td></tr>
<tr><td>Double wrapped 1.2</td><td></td><td></td></tr>
</table>

Table 4

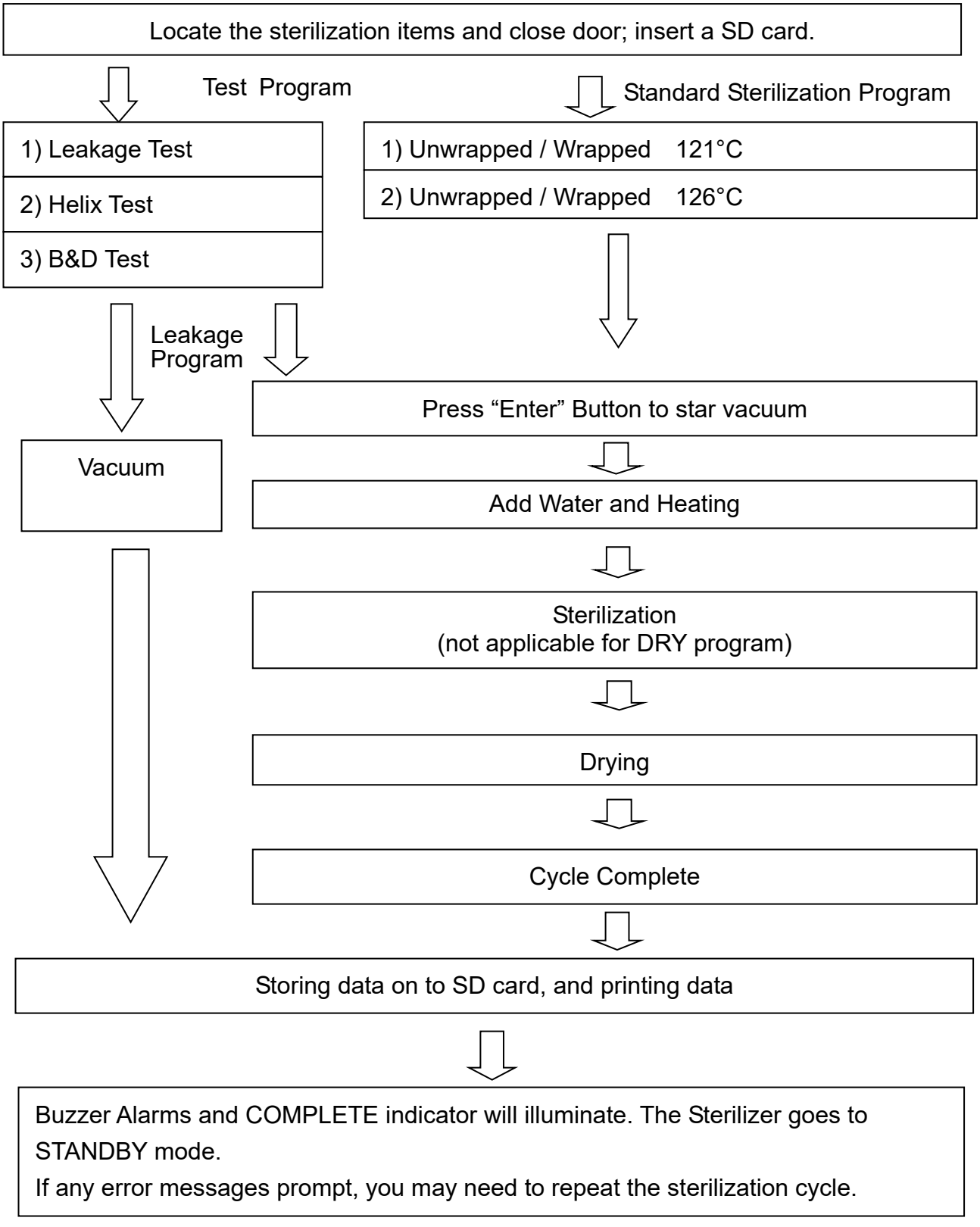
⚠**CAUTION:** The manufacturer does not guarantee any sterilization loads that exceed the above specifications.

Function test program:

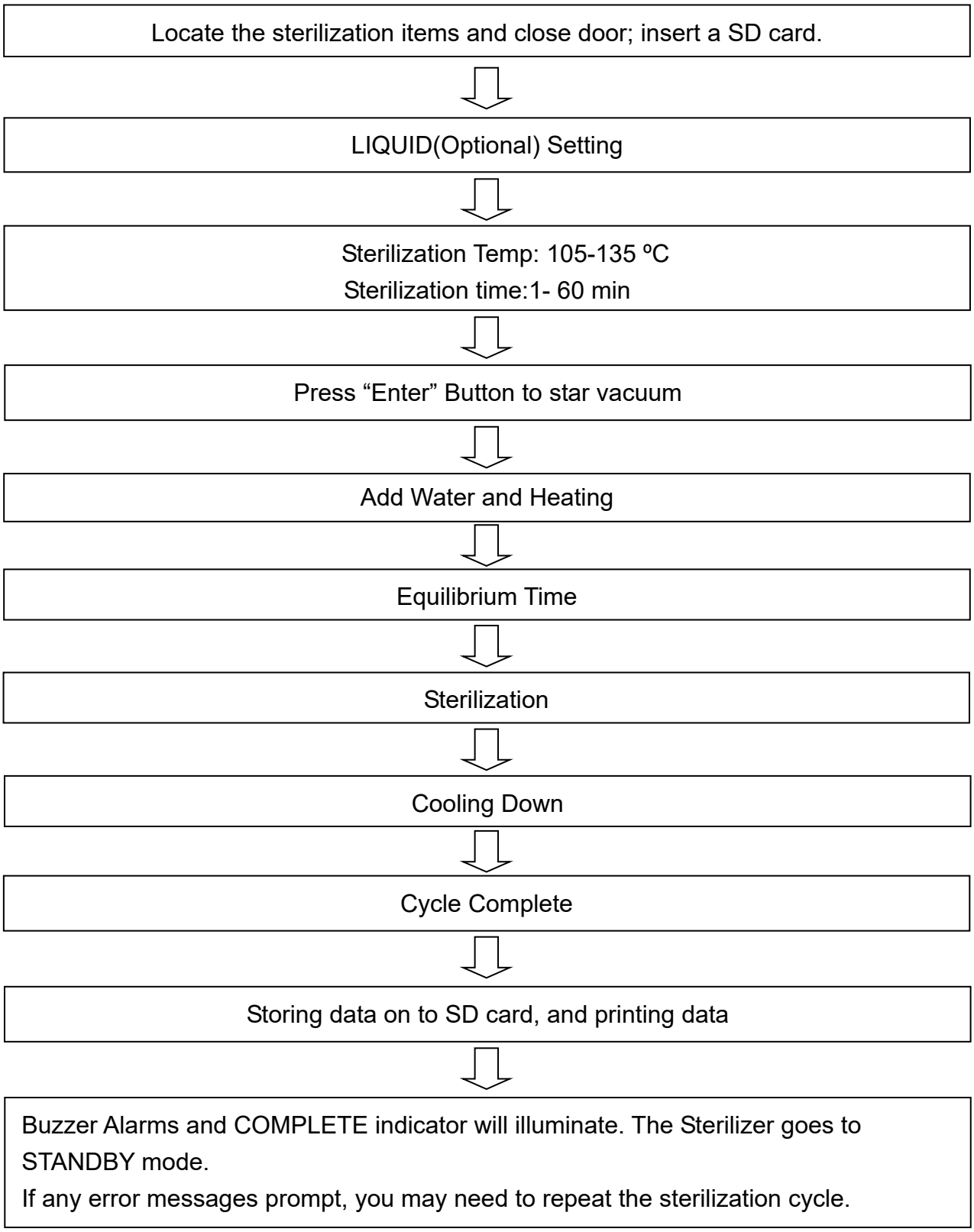
	Test program		
	Air leakage TEST	Helix TEST	B&D TEST
Temperature (℃)	-	134	134
Pressure (bar)	-0.8	2.1	2.1
Sterilization time (minutes)	10	3.5	3.5
Dry time (minutes)	-	-	-
Total time (minutes)	15	35	35
Type of load	Empty chamber	Test tool	

Table 5

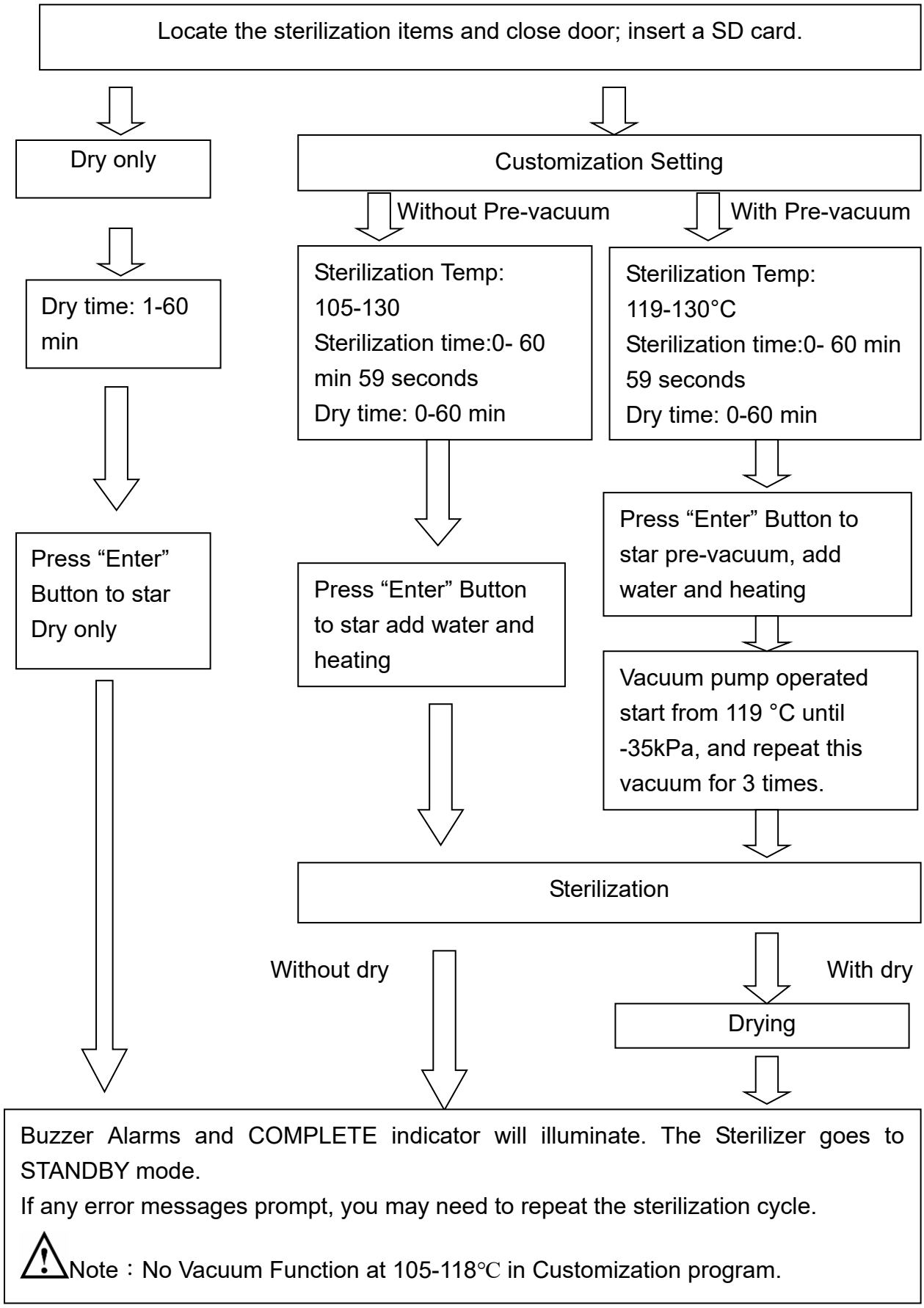
6.1 Flow Chart with Build-in Program



6.2 Flow Chart with LIQUID Program(Optional)



6.3 Flow Chart with Customization Program



6.4 Prepare Sterilization

A. Follow “4.2 Install the Sterilizer” to finish installation first.

B. Follow “4.2 Install the Sterilizer A” to make sure the water inside reservoir is sufficient.

C. Press the “POWER” switch to ON “I” position.

D. Check the Pressure Gauge is reading ZERO, and then press the “unlock button”  to open the door by turning the door knob 90° counterclockwise.

E. Place the items to be sterilized and the sterilization indicator strips （or biological indicator） into the box as required. Remember to open both side windows before placing the box into the sterilizer as shown in Figure 44. If use the sterilization box.

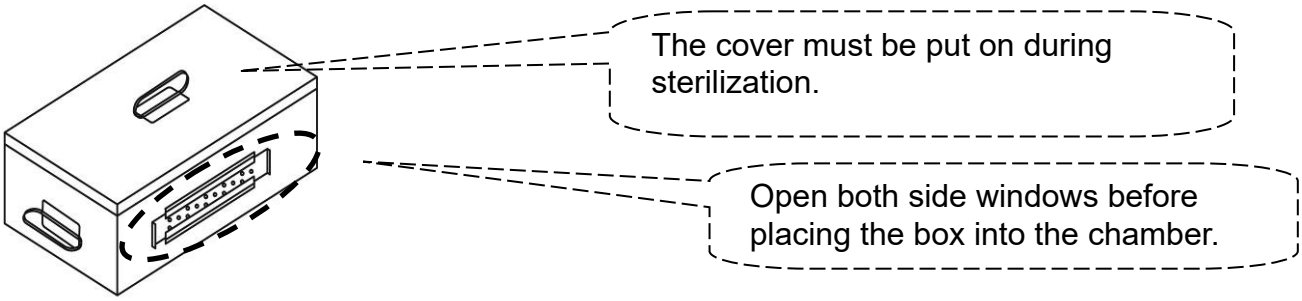


Figure 44

CAUTION: Before loading, ensure instruments are cleaned and rinsed.

WARNING: Refer to “Table 4” and “Table 5” for the maximum permissible load. Failure to follow these instructions may cause the sterilizer to malfunction and result in an unsuccessful sterilization cycle.

F. Close the door and turn the knob clockwise 90° to lock.

G. Select the suitable program cycle to start sterilization.

WARNING: The door must be closed completely during operation of the unit. If the “Error No. 600” displayed, it means that the door is not closed properly.

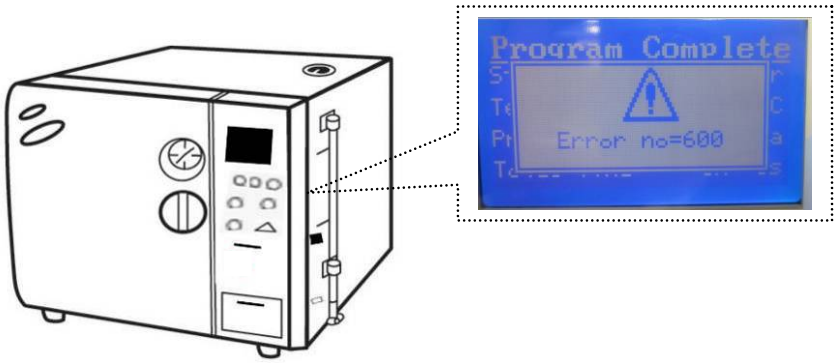


Figure 45

H. Insert a formatted SD card.

6.5 Standard Sterilization Program

A. Before start Sterilization program please refer to “6.3 Prepare Sterilization” section.

B. How to set the Standard Sterilization program:

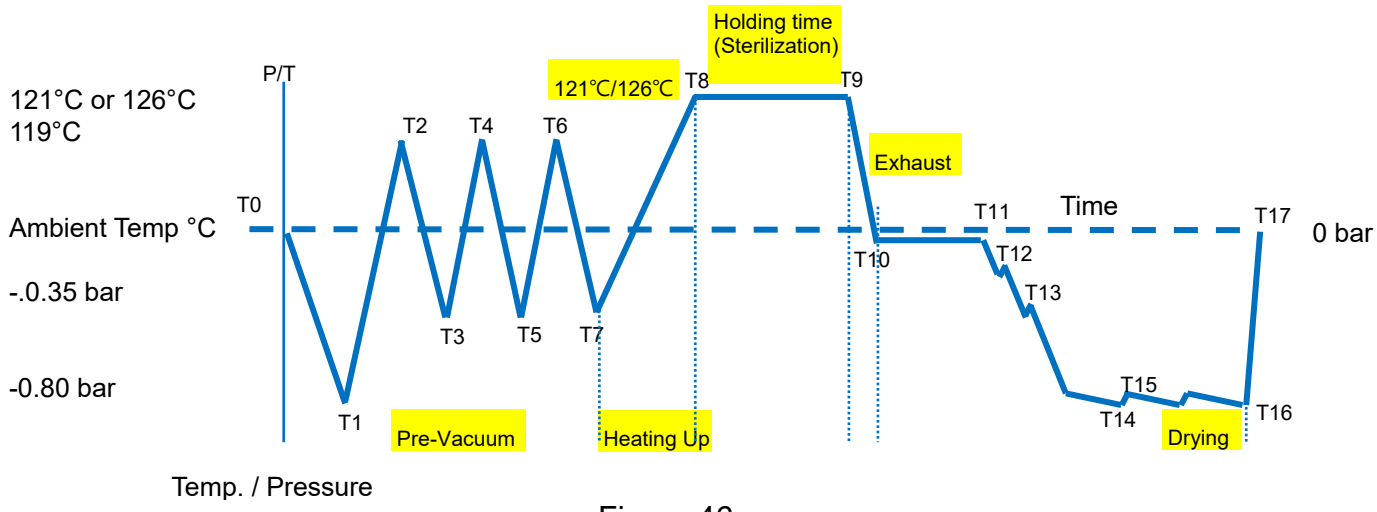


Figure 46

C. The built-in program have 4 standard sterilization program are 121℃ and 126℃ for wrapped and un-wrapped loads. Press  or  button to select the suitable program cycle such as “Unwrapped 121 ℃”(Figure 47) or ”Unwrapped 126℃” (Figure 48), and then press  button to confirm sterilization program, as shown in Figure 49 or Figure 50 respectively..

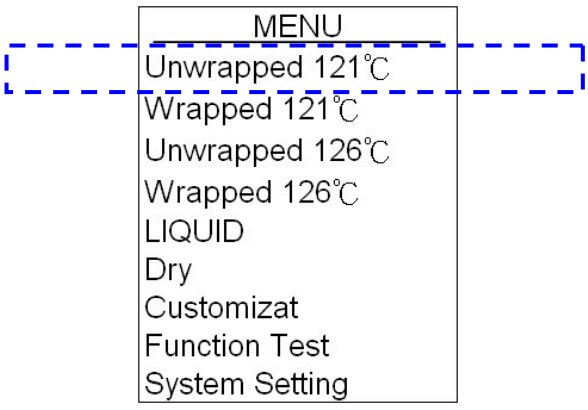


Figure 47

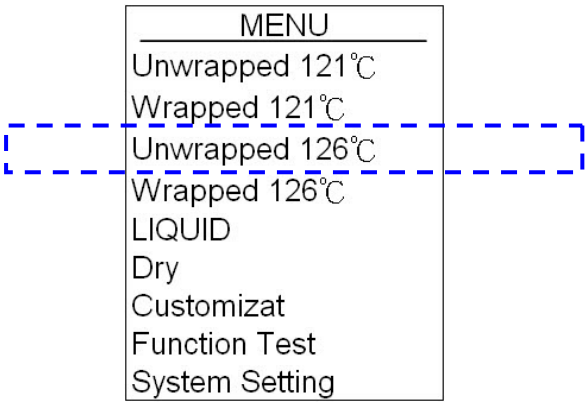


Figure 48

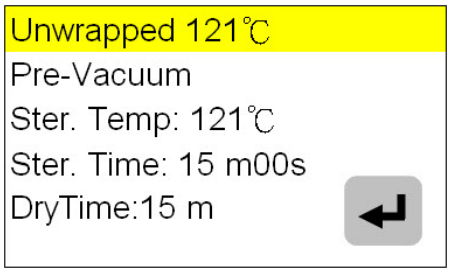


Figure 49

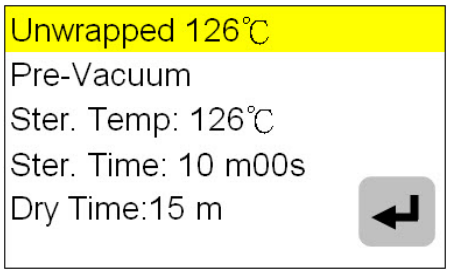


Figure 50

D. Parameters of the programs:

Table 6

	Unwrapped 121 ℃	Wrapped 121 ℃	Unwrapped 126 ℃	Wrapped 126 ℃
Sterilization Temperature	121 ℃	121 ℃	126 ℃	126 ℃
Sterilization Time	15 min.	30 min.	10 min	20 min.
Dry Time	15 min.	30 min.	15 min.	30 min.

E. Press  button again to star the selected program. The relative information such as program cycle, present process, temperature, pressure and time as shown in Figure 51 or Figure 52 will be displayed on the panel.

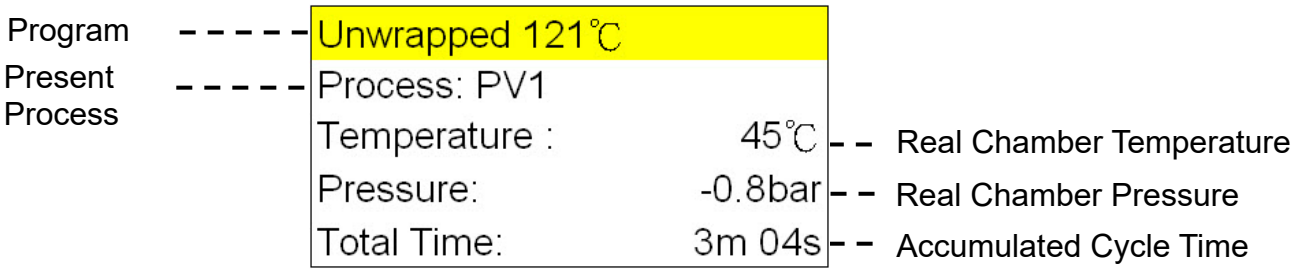


Figure 51 – Unwrapped 121 ℃

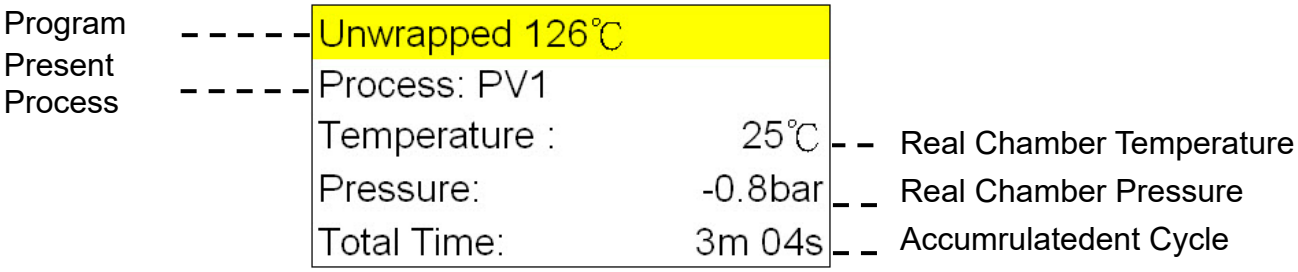


Figure 52 - Unwrapped 126 ℃

F. On completion, the buzzer will sound and the Program Complete message is displayed as shown in Figure 53.

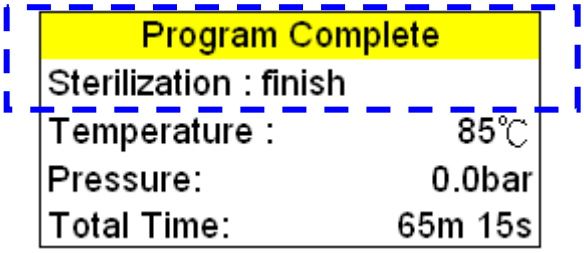


Figure 53 – Program Complete

⚠**WARNING:** If any error messages prompt, you may need to repeat the sterilization cycle.

G. When press the  button to open the door, a “Mind The Steam” will be prompted and then followed by “Please Open The Door.” message. Open the door and take out the sterilized items. Check the status of the indicators. If failed, repeat the cycle. Consult with the qualified technician for calibration if necessary. Please refer to “Troubleshooting” for further information.

⚠**WARNING:** Check the pressure gauge is reading ZERO before opening the door.

⚠**WARNING:** Beware of steam when opening door after a sterilization cycle.

⚠**WARNING:** Be careful when removing the sterilized items as the metal surfaces might still be hot. Always wear suitable hand protection to remove the box or use the appropriate aids (tray holder) to lift the trays.

⚠**WARNING:** If using the sterilizer continuously, it’s required to have a 20 min. interval between each sterilization cycle to allow the unit to cool.

6.6 LIQUID Program(Optional)

⚠**WARNING:** This is not a CE declared program and validation of sterility when using this program is the responsibility of the user.

⚠**WARNING:** Users who define the parameters should take their own responsibilities and obligations to undertaken the risk of sterilization uncertainty.

A. Before start Sterilization program please refer to “6.4 Prepare Sterilization” section.

B. How to set the LIQUID program:

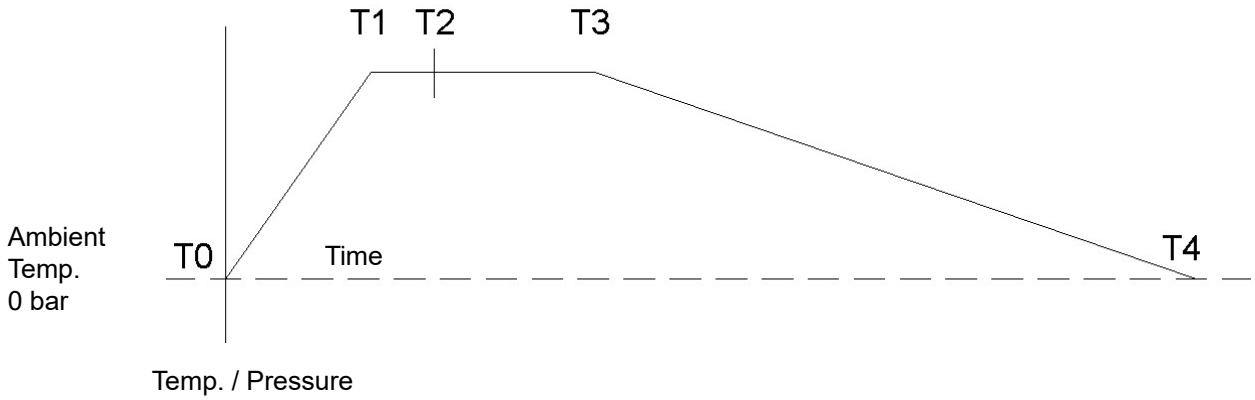


Figure 54

C. Press  or  button to select LIQUID program (Figure 55), and then press  button to select LIQUID program, as shown in Figure 56.

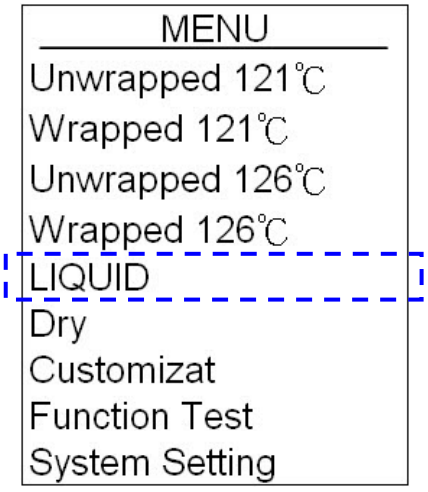


Figure 55

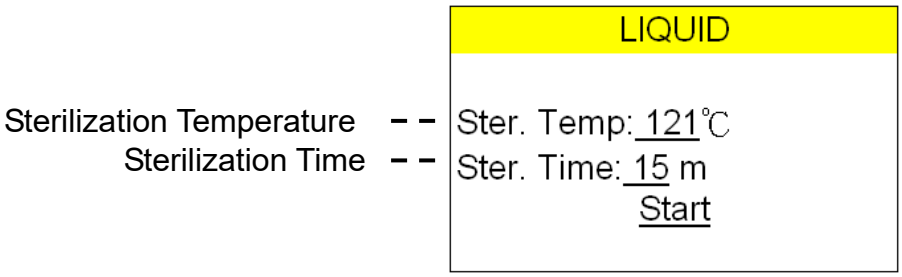


Figure 56

D. Press  or  button to move the cursor to the “Ster. Temp”.

Press  button to enter editing mode, and then press  or  button to change sterilization temperature.

Press  button to store sterilization temperature parameter as shown in Figure 57.

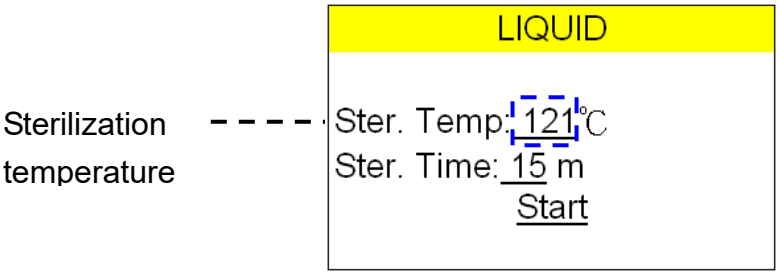


Figure 57

E. Press  or  button to move the cursor to the “Ster. Time”.

Press  button to enter editing mode, and then press  or  button to change sterilization time- minutes.

Press  button to store sterilization time parameter as shown in Figure 58.

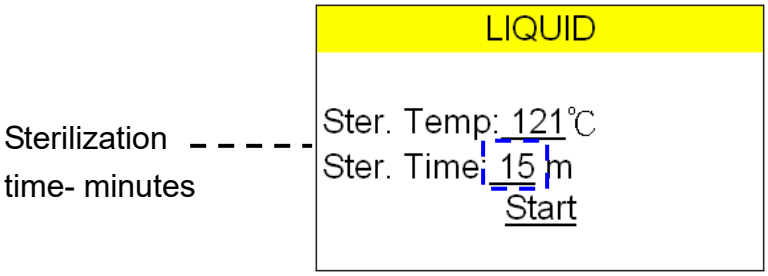


Figure 58

F. Parameters of the LIQUID programs:

	LIQUID
Range of Sterilization Temperature	105 - 135 ℃
Range of Sterilization Time	1 - 60 minutes

Table 7

G. Press  or  button until as shown in Figure 59.

Figure 59

H. Press  button again to star the selected program. The relative information such as program cycle, present process, temperature, pressure and time as shown in Figure 60 will be displayed on the panel.

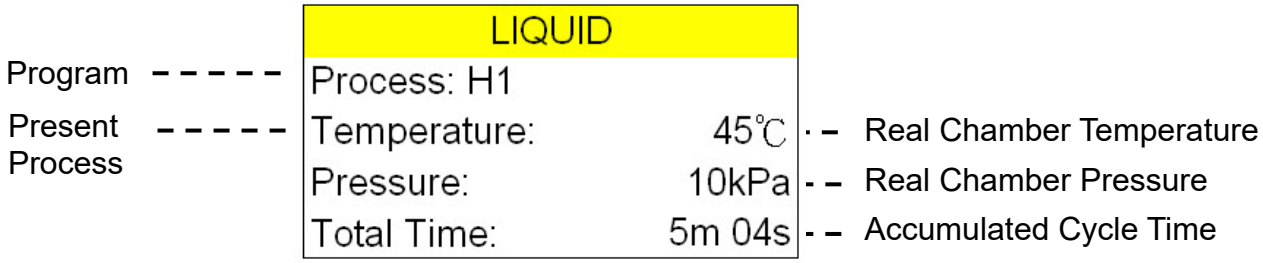


Figure 60

I. On completion, the buzzer will sound and the Program Complete message is displayed as shown in Figure 61– Program Complete.

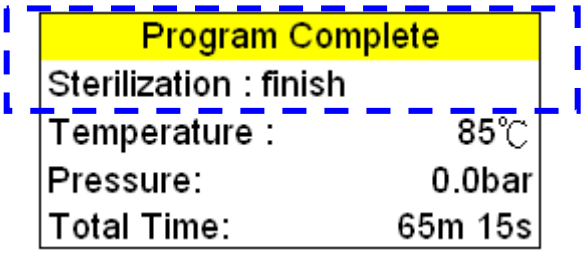


Figure 61– Program Complete

⚠**WARNING:** If any error messages prompt, you may need to repeat the sterilization cycle.

J. When press the  button to open the door, a “Mind The Steam” will be prompted and then followed by “Please Open The Door.” message. Open the door and take out the sterilized items. Check the status of the indicators. If failed, repeat the cycle. Consult with the qualified technician for calibration if necessary. Please refer to “Troubleshooting” for further information.

WARNING: Check the pressure gauge is reading ZERO before opening the door.

WARNING: Beware of steam when opening door after a sterilization cycle.

WARNING: Be careful when removing the sterilized items as the metal surfaces might still be hot. Always wear suitable hand protection to remove the box or use the appropriate aids (tray holder) to lift the trays.

WARNING: If using the sterilizer continuously, it’s required to have a 20 min. interval between each sterilization cycle to allow the unit to cool.

6.7 Dry Program

A. Before start Sterilization program please refer to “6.4 Prepare Sterilization” section.

B. How to set the Dry program:

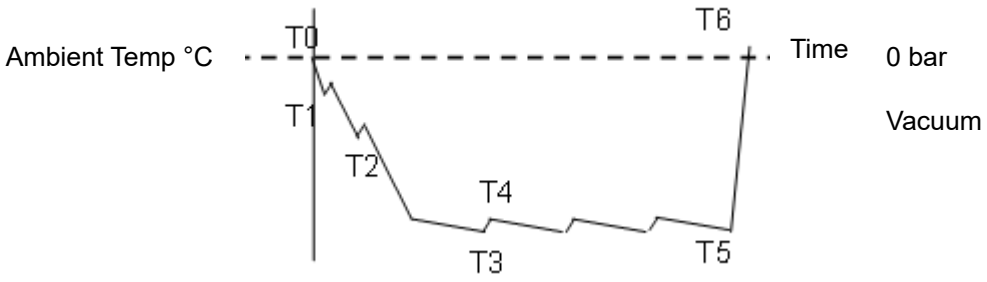


Figure 62

C. Press  or  button to select Dry program cycle (Figure 63).

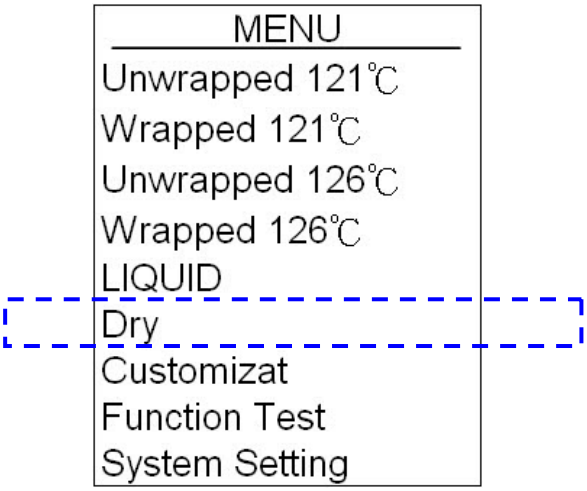


Figure 63

D. Press  button to enter the dry time mode, and press  or  button to change the dry time, and then press  button to confirm Dry time, as shown in Figure 64.

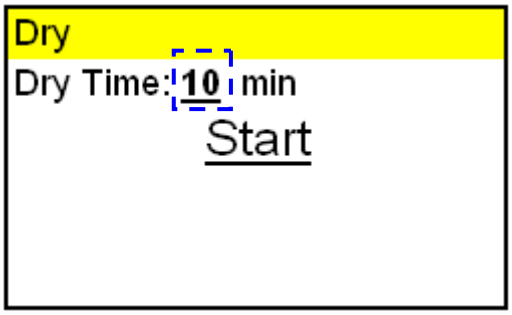


Figure 64

E. Press  or  button to move the cursor to the “Start” (Figure 65), change the dry time, and then press  button to confirm dry time, as shown in Figure 66.

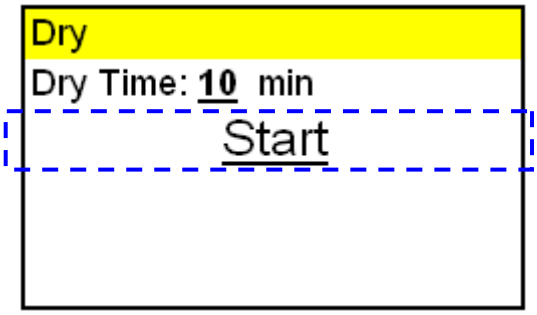


Figure 65

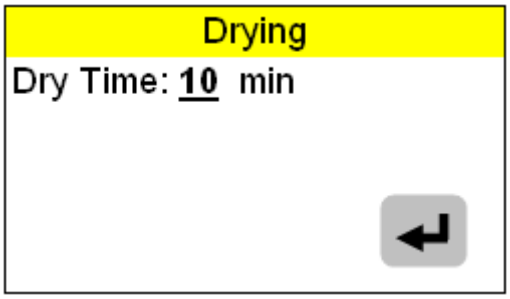


Figure 66

F. Parameters of the Dry programs:

Table 8

	Dry
Sterilization Temperature	-
Sterilization Time	-
Dry Time	1- 60 min.

G. Press  button again to star the selected program. The relative information such as program cycle, present process, temperature, pressure and time as shown in Figure 67 will be displayed on the panel.

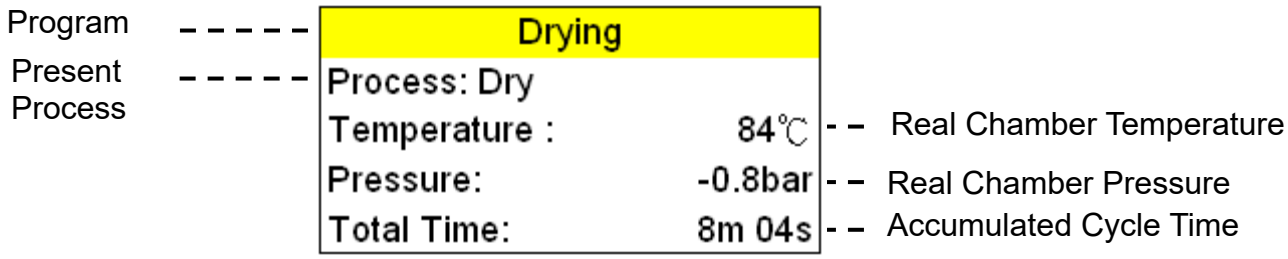


Figure 67

H. On completion, the buzzer will sound and the Program Complete message is displayed as shown in Figure 68.

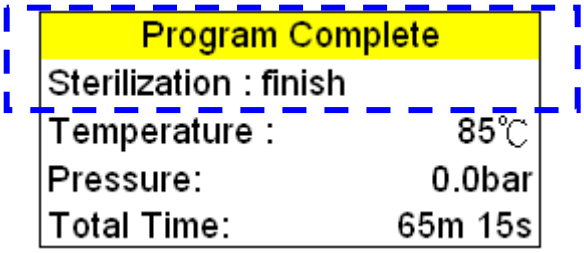


Figure 68 – Program Complete

⚠**WARNING:** If any error messages prompt, you may need to repeat the dry cycle.

I. When press the  button to open the door, a “Mind The Steam” will be prompted and then followed by “Please Open The Door.” message. Open the door and take out the sterilized items. Check the status of the indicators. If failed, repeat the cycle. Consult with the qualified technician for calibration if necessary. Please refer to “Troubleshooting” for further information.

⚠**WARNING:** Check the pressure gauge is reading ZERO before opening the door.

⚠**WARNING:** Beware of steam when opening door after a sterilization cycle.

⚠**WARNING:** Be careful when removing the sterilized items as the metal surfaces might still be hot. Always wear suitable hand protection to remove the box or use the appropriate aids (tray holder) to lift the trays.

⚠**WARNING:** If using the sterilizer continuously, it’s required to have a 20 min. interval between each sterilization cycle to allow the unit to cool.

6.8 Customization Program

WARNING: This is not a CE declared program and validation of sterility when using this program is the responsibility of the user.

WARNING: Users who define the parameters should take their own responsibilities and obligations to undertaken the risk of sterilization uncertainty.

6.8.1 Customization with pre-vacuum

A. Before start Sterilization program please refer to “6.4 Prepare Sterilization” section.

B. How to set the customization with pre-vacuum program:

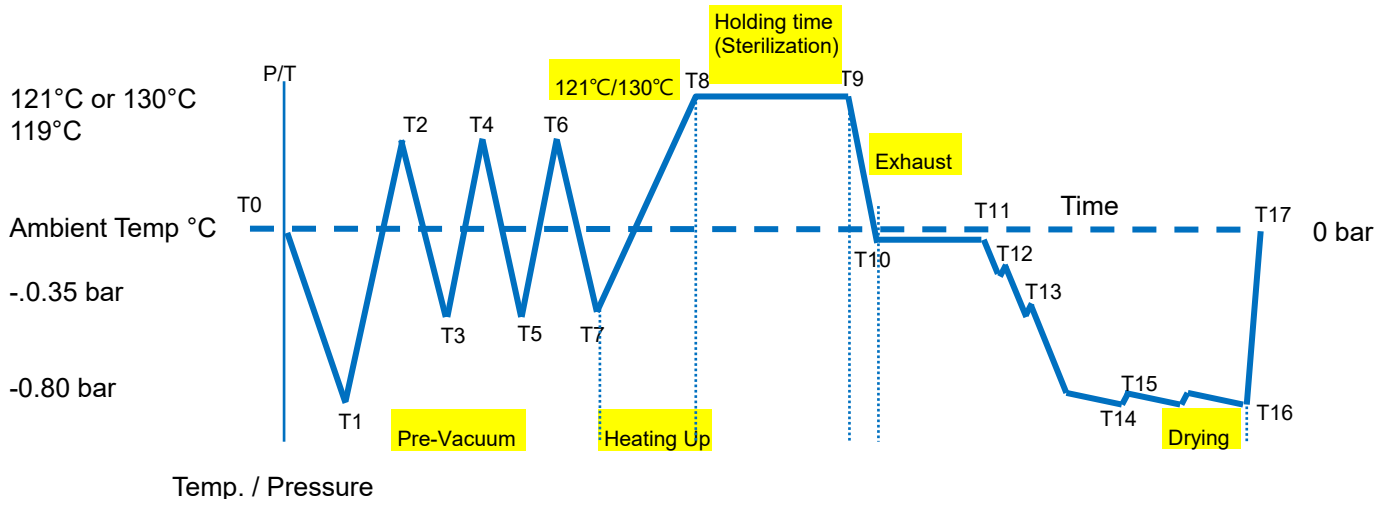


Figure 69

C. Press  or  button to select Customization program (Figure 70), and then press  button to select customization program, as shown in Figure 71.

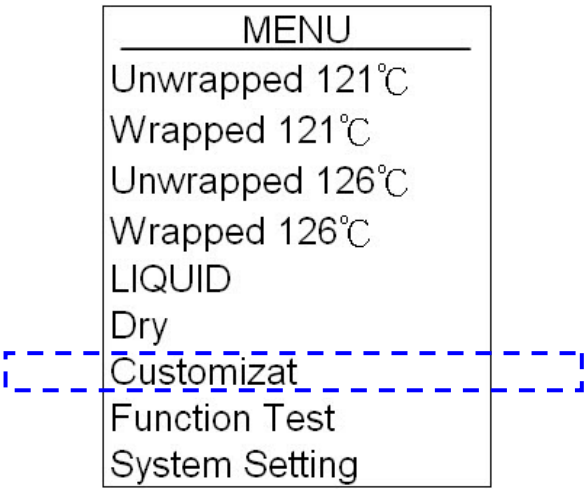


Figure 70

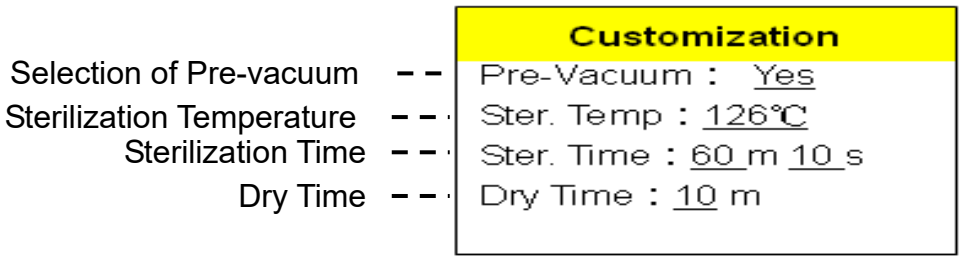


Figure 71

D. Press button to enter editing mode, and then press or button to select "Yes" or "No". Press button to store Pre-Vacuum parameter as shown in Figure 72.

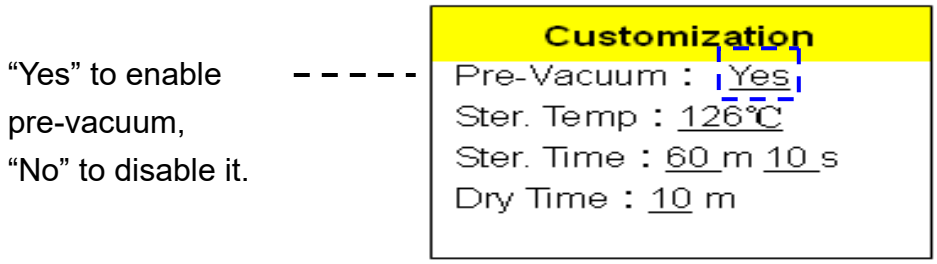


Figure 72

E. Press or button to move the cursor to the "Ster. Temp".

Press button to enter editing mode, and then press or button to change sterilization temperature.

Press button to store sterilization temperature parameter as shown in Figure 73.

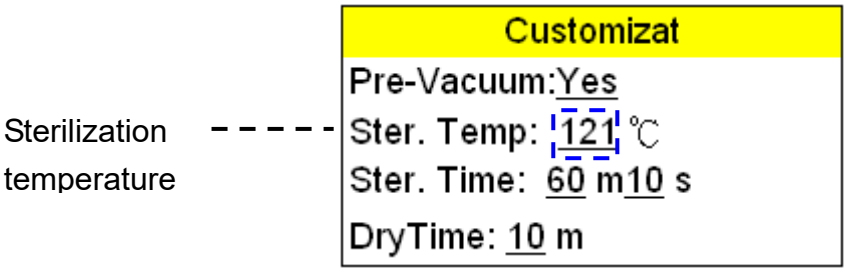


Figure 73

F. Press  or  button to move the cursor to the “Ster. Time”.

Press  button to enter editing mode, and then press  or  button to change sterilization time- minutes.

Press  button to store sterilization time parameter as shown in Figure 74.

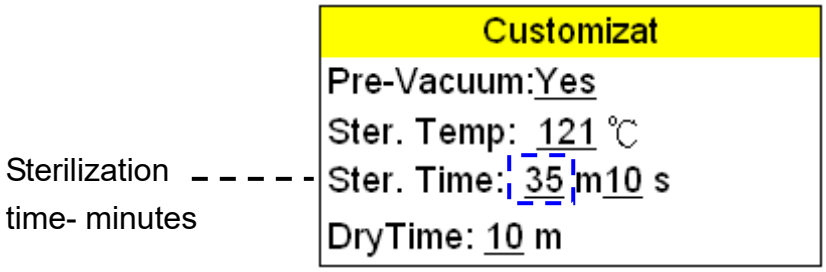


Figure 74

Press  or  button to move the cursor to the “Ster. Time”.

Press  button to enter editing mode, and then press  or  button to change sterilization time- seconds.

Press  button to store sterilization time parameter as shown in Figure 75.

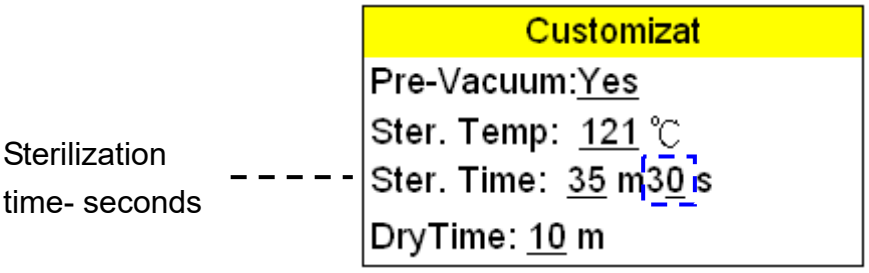


Figure 75

G. Press  or  button to move the cursor as shown in Figure 76

Press  button to enter editing mode, and then press  or  button to change dry time.

Press  button to store dry time parameter as shown in Figure 76.

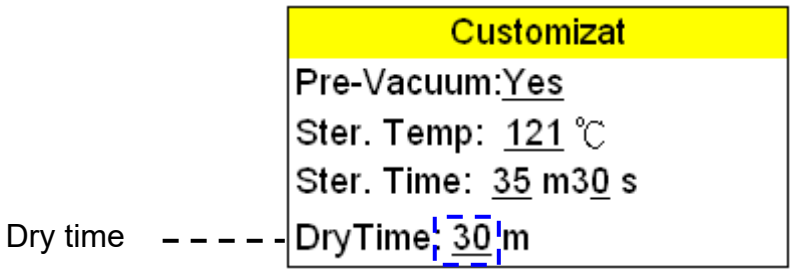


Figure 76

H. Parameters of the customization programs:

	Customization
Pre-vacuum	Yes
Range of Sterilization Temperature	119 - 130 ℃
Range of Sterilization Time	0 - 60 minutes 59 seconds
Range of Dry Time	0 - 60 min.

Table 9

I. Press  or  button until as shown in Figure 77.

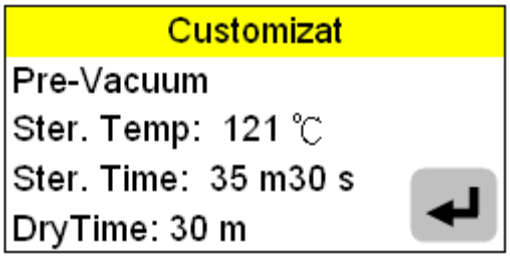


Figure 77

J. Press  button again to star the selected program. The relative information such as program cycle, present process, temperature, pressure and time as shown in Figure 78 will be displayed on the panel.

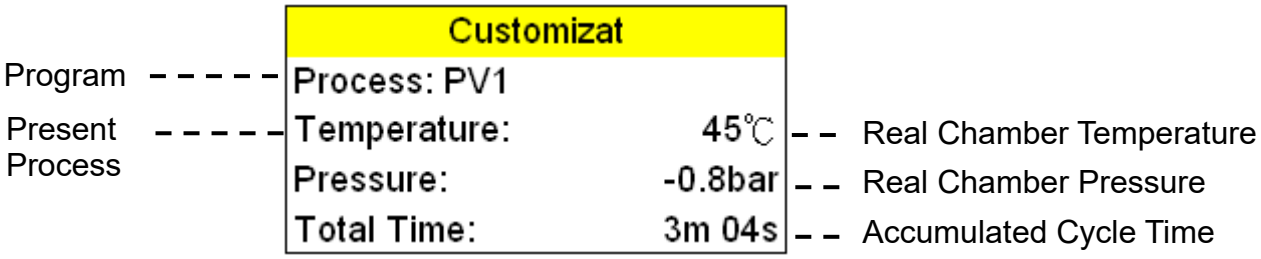


Figure 78

K. On completion, the buzzer will sound and the Program Complete message is displayed as shown in Figure 79– Program Complete.

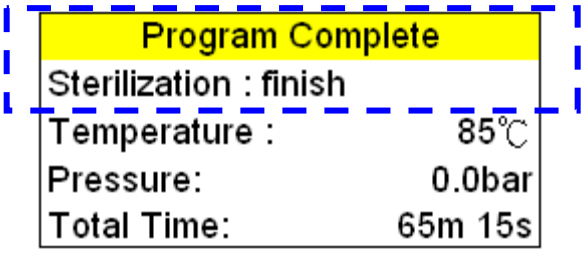


Figure 79– Program Complete

⚠**WARNING:** If any error messages prompt, you may need to repeat the sterilization cycle.

L. When press the  button to open the door, a “Mind The Steam” will be prompted and then followed by “Please Open The Door.” message. Open the door and take out the sterilized items. Check the status of the indicators. If failed, repeat the cycle. Consult with the qualified technician for calibration if necessary. Please refer to “Troubleshooting” for further information.

⚠**WARNING:** Check the pressure gauge is reading ZERO before opening the door.

⚠**WARNING:** Beware of steam when opening door after a sterilization cycle.

⚠**WARNING:** Be careful when removing the sterilized items as the metal surfaces might still be hot. Always wear suitable hand protection to remove the box or use the appropriate aids (tray holder) to lift the trays.

⚠**WARNING:** If using the sterilizer continuously, it’s required to have a 20 min. interval between each sterilization cycle to allow the unit to cool.

6.8.2 Customization without pre-vacuum

A. Before start Sterilization program please refer to “6.4 Prepare Sterilization” section.

B. How to set the customization with pre-vacuum program:

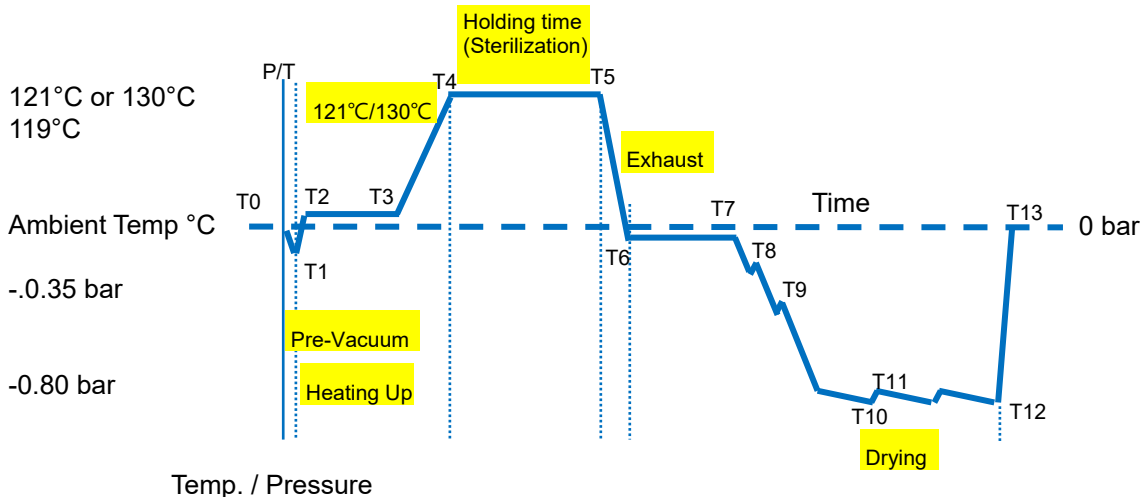


Figure 80

C. Press  or  button to select Customization program (Figure 81), and then press  button to select customization program, as shown in Figure 82

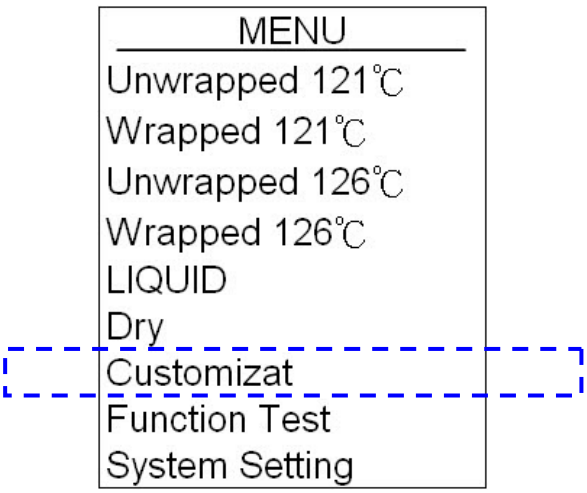


Figure 81

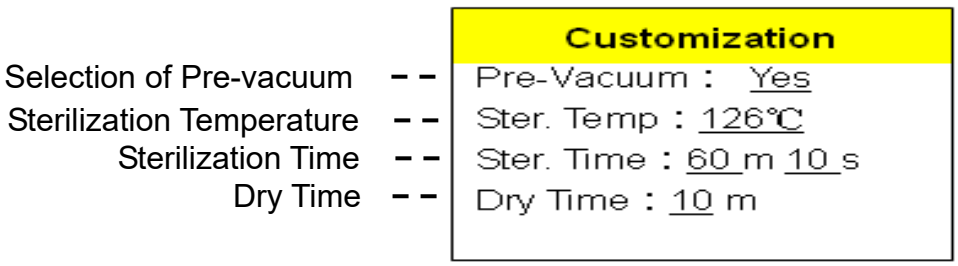


Figure 82

D. Press button to enter editing mode, and then press or button to select "Yes" or "No". Press button to store Pre-Vacuum parameter as shown in Figure 83.

"Yes" to enable pre-vacuum, "No" to disable it.

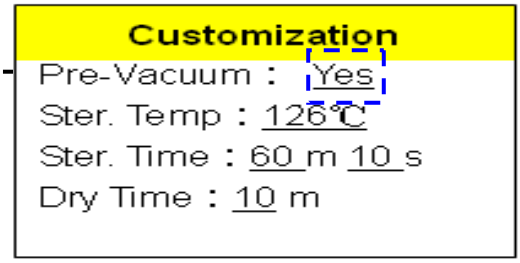


Figure 83

E. Press or button to move the cursor to the "Ster. Temp".

Press button to enter editing mode, and then press or button to change sterilization temperature.

Press button to store sterilization temperature parameter as shown in Figure 84.

Sterilization temperature

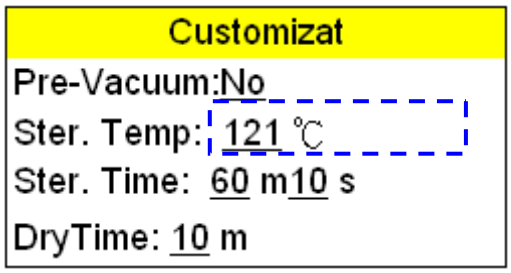


Figure 84

F. Press or button to move the cursor to the "Ster. Time".

Press button to enter editing mode, and then press or button to change sterilization time- minutes.

Press button to store sterilization time parameter as shown in Figure 85.

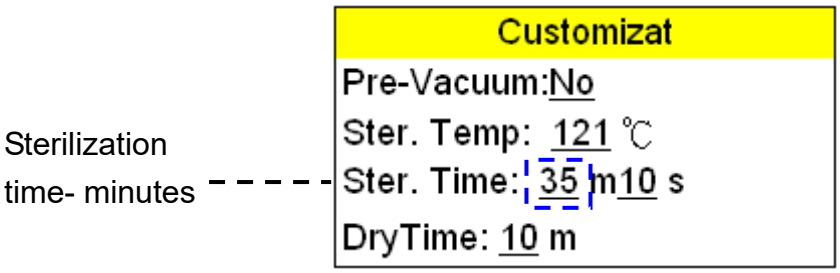


Figure 85

Press or button to move the cursor to the “Ster. Time”.

Press button to enter editing mode, and then press or button to change sterilization time- seconds.

Press button to store sterilization time parameter as shown in Figure 86.

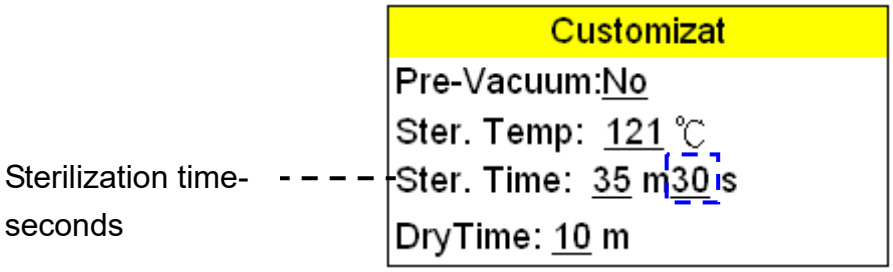


Figure 86

G. Press or button to move the cursor as shown in Figure 87

Press button to enter editing mode, and then press or button to change dry time.

Press button to store dry time parameter as shown in Figure 87.

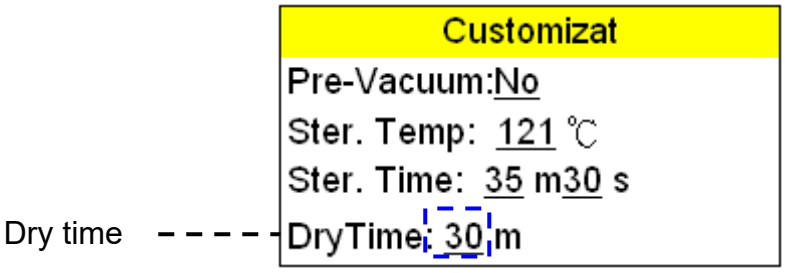


Figure 87

H. Parameters of the customization programs:

Table 10

	Customization
Pre-vacuum	No
Range of Sterilization Temperature	105 - 130 ℃
Range of Sterilization Time	0 - 60 minutes 59 seconds
Range of Dry Time	0 - 60 min.

I. Press  or  button until as shown in Figure 88.

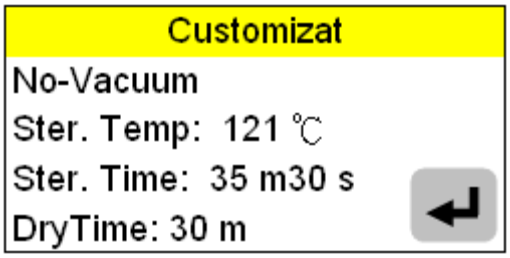


Figure 88

J. Press  button again to star the selected program. The relative information such as program cycle, present process, temperature, pressure and time as shown in Figure 89 will be displayed on the panel.

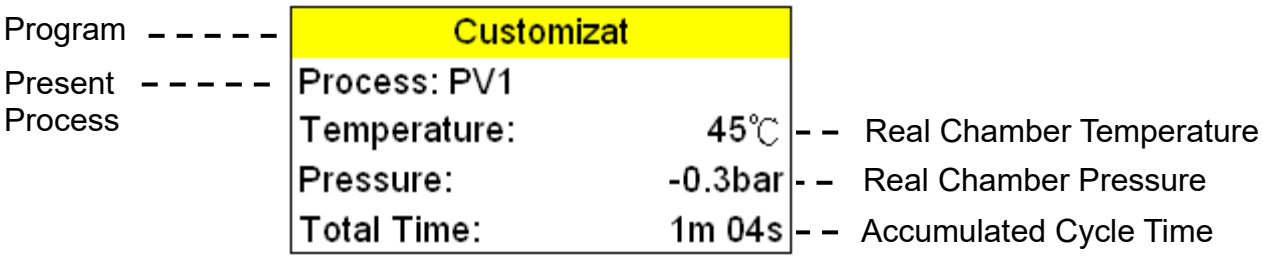


Figure 89

K. On completion, the buzzer will sound and the Program Complete message is displayed as shown in Figure 90– Program Complete.

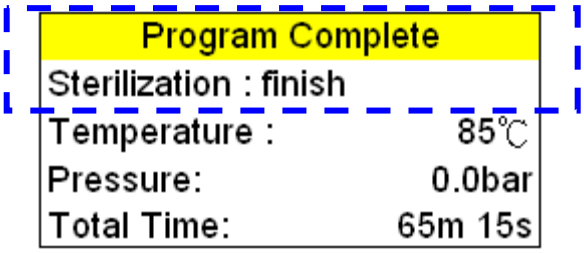


Figure 90– Program Complete

WARNING: If any error messages prompt, you may need to repeat the sterilization cycle.

L. When press the  button to open the door, a “Mind The Steam” will be prompted and then followed by “Please Open The Door.” message. Open the door and take out the sterilized items. Check the status of the indicators. If failed, repeat the cycle. Consult with the qualified technician for calibration if necessary. Please refer to “Troubleshooting” for further information.

WARNING: Check the pressure gauge is reading ZERO before opening the door.

WARNING: Beware of steam when opening door after a sterilization cycle.

WARNING: Be careful when removing the sterilized items as the metal surfaces might still be hot. Always wear suitable hand protection to remove the box or use the appropriate aids (tray holder) to lift the trays.

WARNING: If using the sterilizer continuously, it’s required to have a 20 min. interval between each sterilization cycle to allow the unit to cool.

WARNING: No Vacuum Function at 105-118℃ in Customization program.

6.9 Function Test Program

There are 3 built-in test programs for checking the basic performance of the sterilizer as following.

6.9.1 Leakage Test

The leakage test is used to demonstrate that the quantity of air leakage into the sterilizer chamber during the periods of vacuum does not exceed a level which will inhibit the penetration of steam into the sterilizer load and will not be a potential cause of re-contamination of the sterilizer load during drying. See Figure 91 for the cycle diagram.

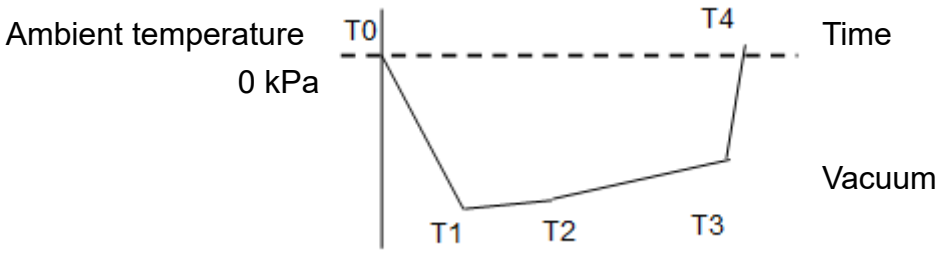


Figure 91

Legend of each cycle:

Table 11

T0-T1:	Pre-vacuum to -80kPa
T1-T2:	P1: Hold the pressure for 300 s
T2-T3:	P2: Pressure after a leakage time of 600 s
T3-T4:	P3: Complete the test cycle and release the pressure

The leakage will be automatically calculated by the system, and the test result will be displayed and printed.

A. Before start Sterilization program please refer to “6.4 Prepare Sterilization” section.

B. How to set the leakage test program:

Press  or  button to select Function Test program (Figure 92), and then press  button to confirm, as shown in Figure 93.

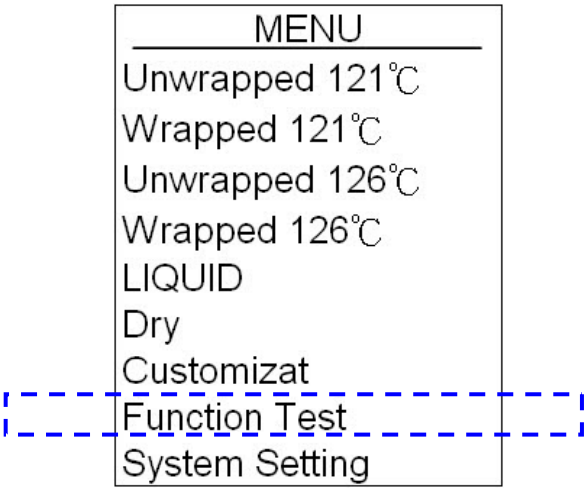


Figure 92

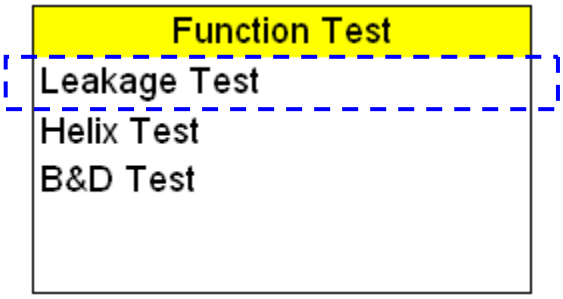


Figure 93

C. Press  button to confirm the selection of Leakage Test Program, as shown in Figure 94.

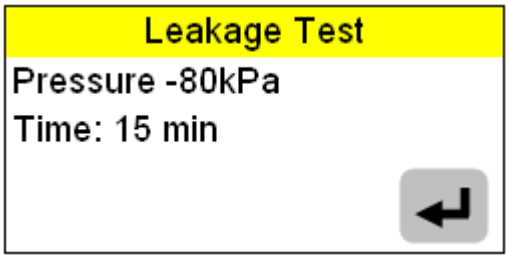


Figure 94

D. Press  button to star the Leakage Test Program, as shown in Figure 95.

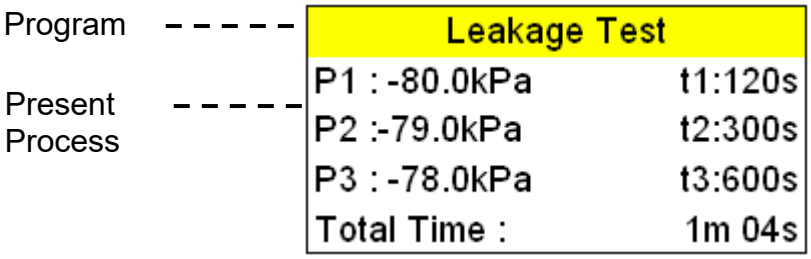


Figure 95

E. On completion, the buzzer will sound and the Program Complete message is displayed as shown in Figure 90– Program Complete.

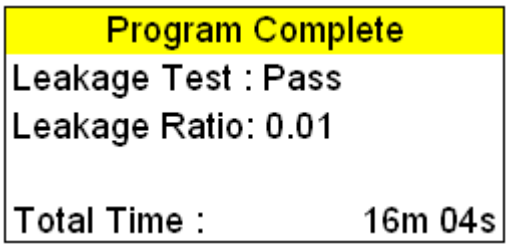


Figure 96- Program Complete

⚠**WARNING:** Check the pressure gauge is reading ZERO before opening the door.

⚠**WARNING:** If using the sterilizer continuously, it's required to have a 20 min. interval between each sterilization cycle.

⚠**NOTE:** For the test result to be valid, you may carry out with an empty sterilization cycle without any load at ambient temperature.

6.9.2 Helix Test

⚠WARNING: This program is running at under 1,000m altitude.

A. Before start Sterilization program please refer to “6.4 Prepare Sterilization” section.

B. Please refer to “(Helix test)” and follow the test tool supplier’s instructions.

C. How to set the Helix test program:

Press  or  button to select Function Test program (Figure 97), and then press  button to confirm, as shown in Figure 98.

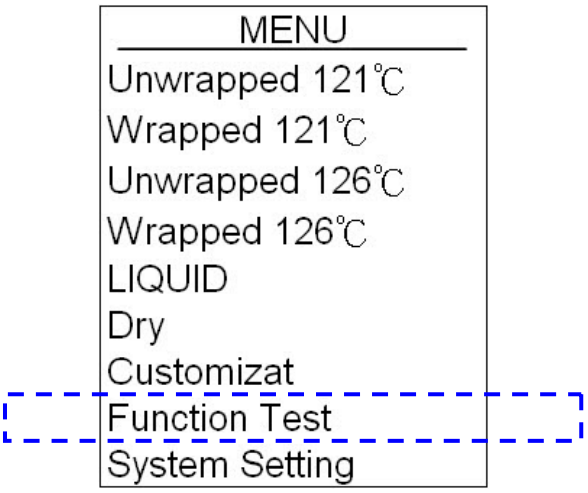


Figure 97

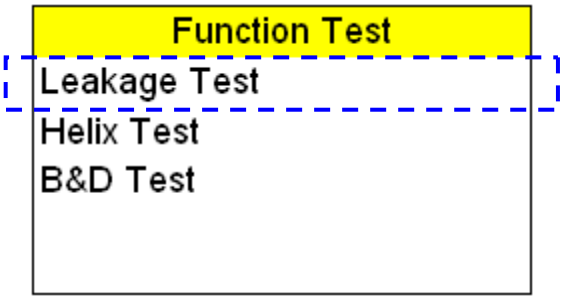


Figure 98

D. Press  or  button to select Helix Test program (Figure 99).

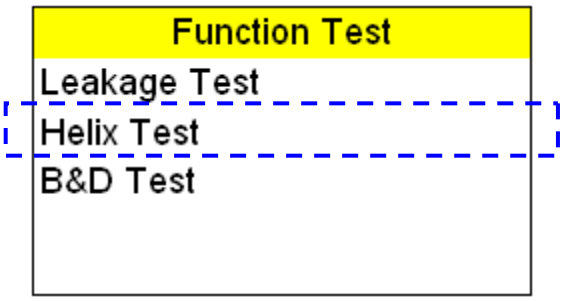


Figure 99

E. Press  button to confirm the selection of Helix Test Program, as shown in Figure 100.

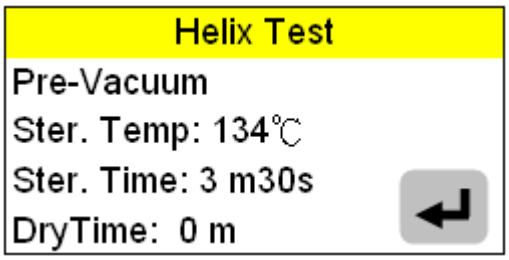


Figure 100

F. Press  button to star the Helix Test Program, as shown in Figure 101.

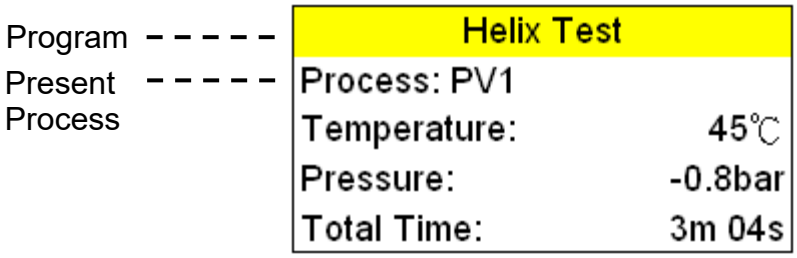


Figure 101

G. On completion, the buzzer will sound and the Program Complete message is displayed as shown in Figure 102- Program Complete.

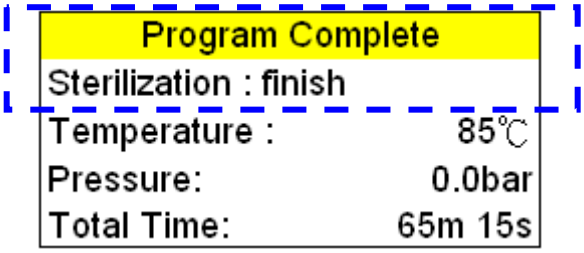


Figure 102- Program Complete

⚠**WARNING:** If any error messages prompt, you may need to repeat the sterilization cycle.

H. When press the  button to open the door, a “Mind The Steam” will be prompted and then followed by “Please Open The Door.” message. Open the door and take out the Helix load. Check the status of the indicators. If failed, repeat the cycle. Consult with the qualified technician for calibration if necessary. Please refer to “Troubleshooting” for further information.

WARNING: Check the pressure gauge is reading ZERO before opening the door.

WARNING: Beware of steam when opening door after a sterilization cycle.

WARNING: Be careful when removing the sterilized items as the metal surfaces might still be hot. Always wear suitable hand protection to remove the box or use the appropriate aids (tray holder) to lift the trays.

WARNING: If using the sterilizer continuously, it’s required to have a 20 min. interval between each sterilization cycle to allow the unit to cool.

6.9.3 B&D Test

⚠WARNING: This program is running at under 1,000m altitude.

A. Before start Sterilization program please refer to “6.4 Prepare Sterilization” section.

B. Please refer to “(B &D Test)” and follow the B&D supplier’s instructions.

C. How to set the B&D test program:

Press  or  button to select Function Test program (Figure 103), and then press  button to confirm, as shown in Figure 104.

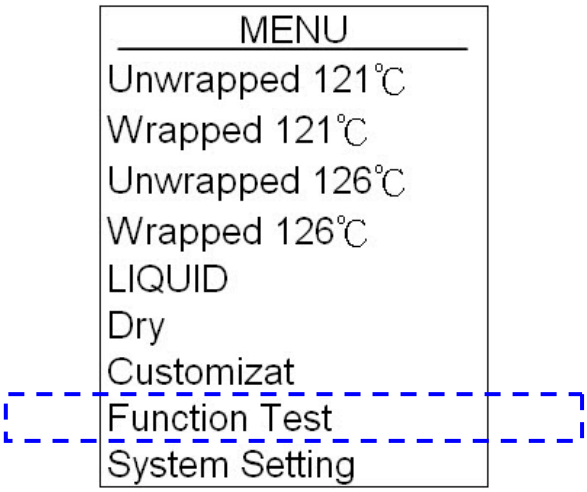


Figure 103

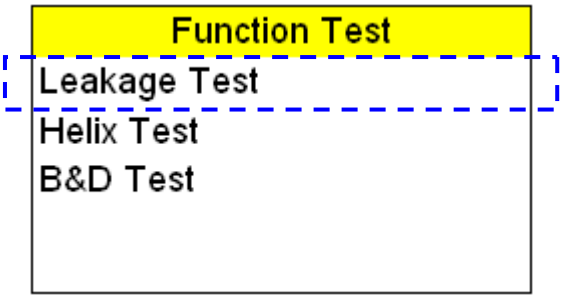


Figure 104

D. Press  or  button to select B&D Test program (Figure 105).

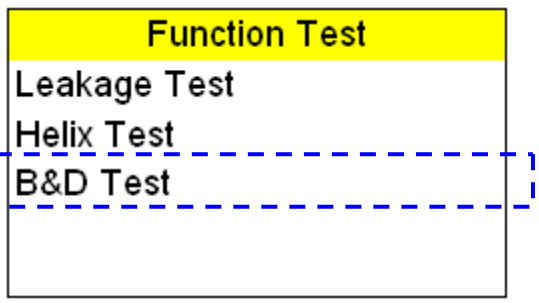


Figure 105

E. Press  button to confirm the selection of B&D Test Program, as shown in Figure 106.

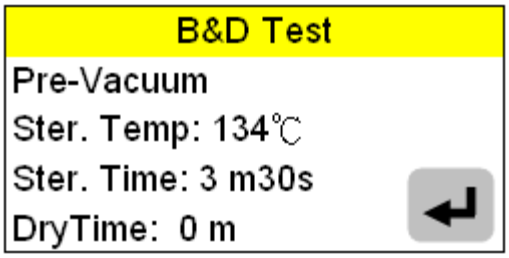


Figure 106

F. Press  button to star the Helix Test Program, as shown in Figure 101.

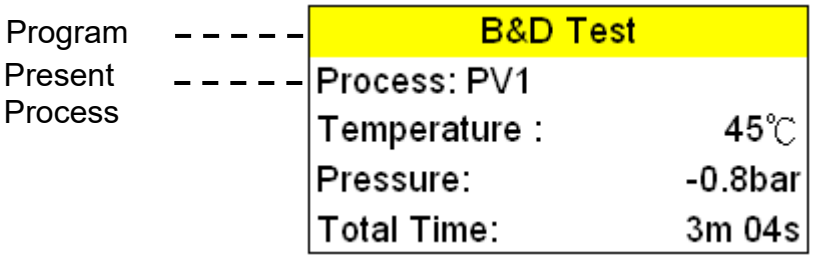


Figure 107

G. On completion, the buzzer will sound and the Program Complete message is displayed as shown in Figure 108- Program Complete.

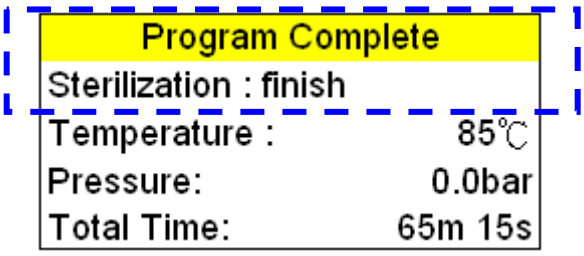


Figure 108- Program Complete

⚠**WARNING:** If any error messages prompt, you may need to repeat the sterilization cycle.

H. When press the  button to open the door, a “Mind The Steam” will be prompted and then followed by “Please Open The Door.” message. Open the door and take out the Helix load. Check the status of the indicators. If failed, repeat the cycle. Consult with the qualified technician for calibration if necessary. Please refer to “Troubleshooting” for further information.

WARNING: Check the pressure gauge is reading ZERO before opening the door.

WARNING: Beware of steam when opening door after a sterilization cycle.

WARNING: Be careful when removing the sterilized items as the metal surfaces might still be hot. Always wear suitable hand protection to remove the box or use the appropriate aids (tray holder) to lift the trays.

WARNING: If using the sterilizer continuously, it’s required to have a 20 min. interval between each sterilization cycle to allow the unit to cool.

6.10 System Setup

6.10.1 Date and Time

A. Press  or  button to select System Setting program (Figure 109), and then press  button to select Date &Time setting, as shown in Figure 110.

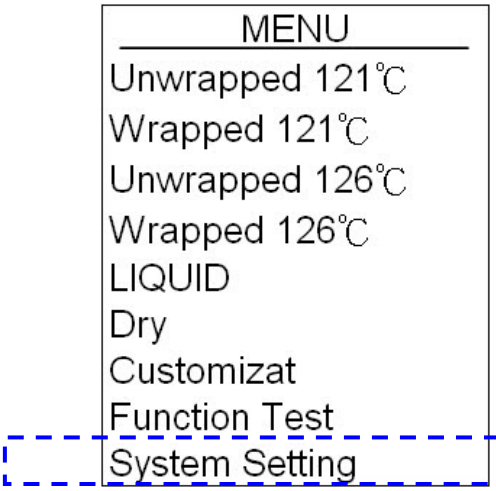


Figure 109

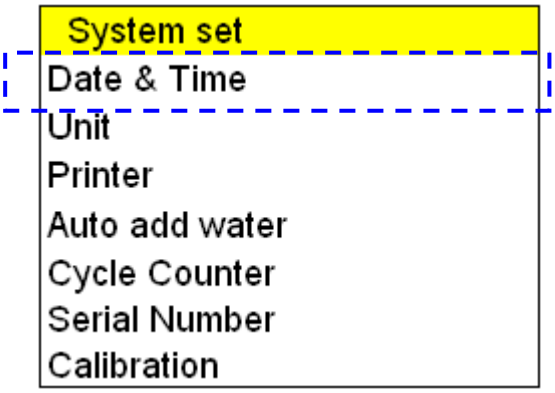


Figure 110

B. Press  button to the editing mode as shown in Figure 111. Press  or  button to change the Month. Press  button to store the parameter.

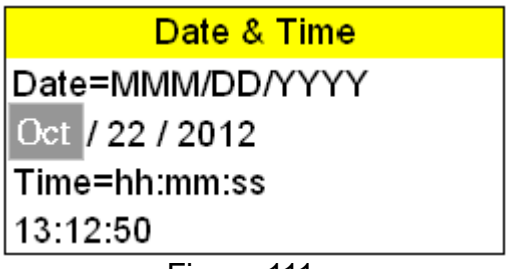


Figure 111

C. Press  button to shift the cursor to date. Press  or  button to change the contents, and press  button to store the parameter as shown in Figure 112.

Figure 112

D. Press  button to shift the cursor to year. Press  or  button to change the contents, and press  button to store the parameter in Figure 113.

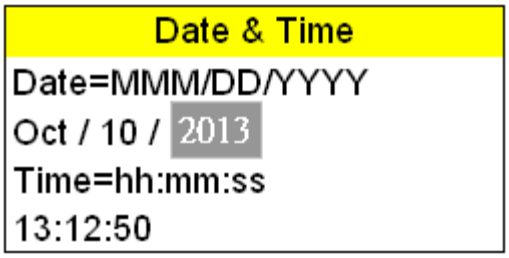


Figure 113

E. Press  button to shift the cursor to hour. Press  or  button to change the contents, and press  button to store the parameter in Figure 114.

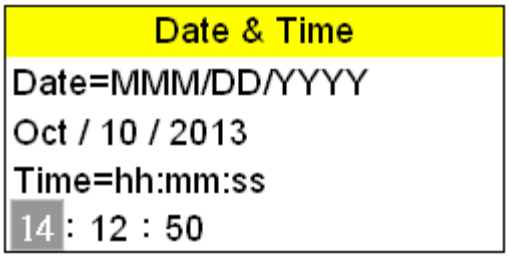


Figure 114

F. Press  button to shift the cursor to minute. Press  or  button to change the contents, and press  button to store the parameter in Figure 115.

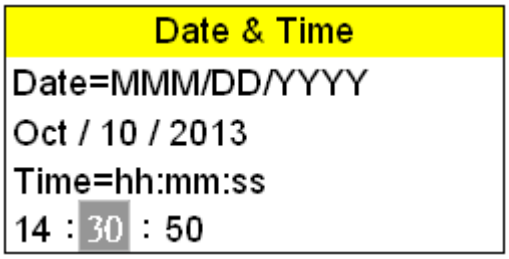


Figure 115

G. Press  button to shift the cursor to second. Press  or  button to change the contents, and press  button to store the parameter in Figure 116.

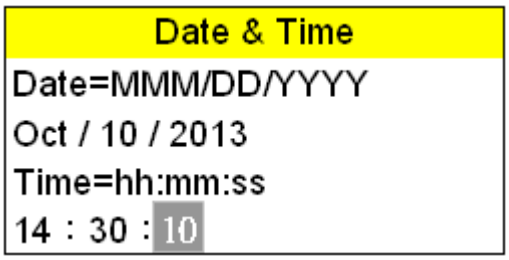


Figure 116

H. Press  button returns to System setting.

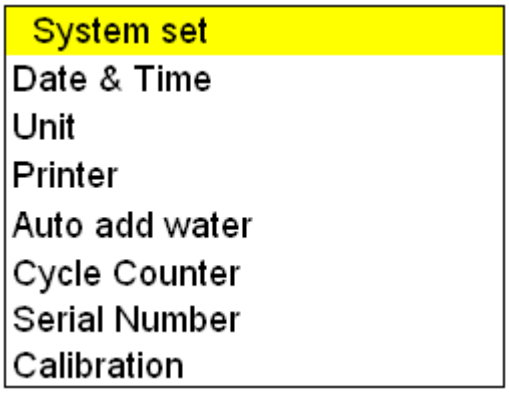


Figure 117

6.10.2 Units

Temperature unit and pressure unit are set to ℃ and bar respectively as default; however, you can change these units as following:

- Temperature unit: ℃, ℉
- Pressure unit: bar, kPa, MPa, psi, kgf/cm^2

To change the unit:

A. Press  or  button to select System Setting program (Figure 118), and then press  button to select Unit setting, as shown in Figure 119.

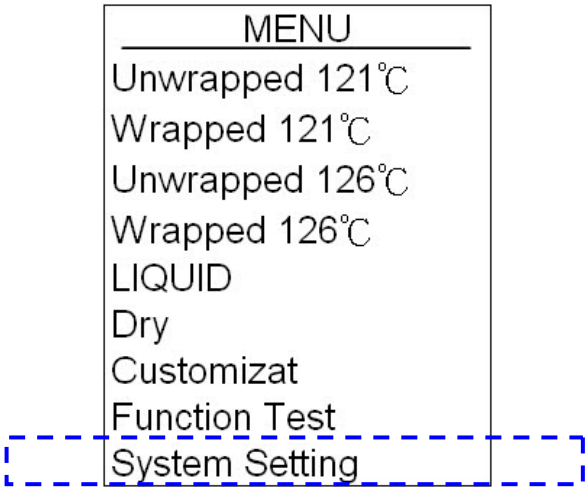


Figure 118

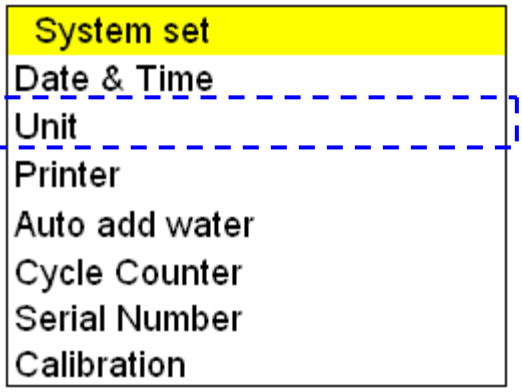


Figure 119

B. Press  button to the editing mode as shown in Figure 120.

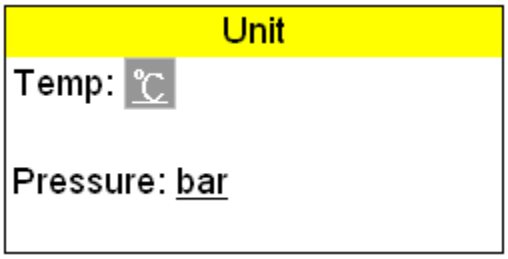


Figure 120

C. Press  or  button to change the unit, and press  button to store the parameter in Figure 121.

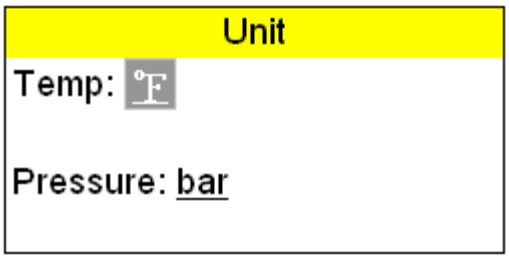


Figure 121

D. Press  button to shift the cursor to Pressure. Press  or  button to change the contents, the “bar, kPa, MPa, psi, kgf/cm^2” is displayed in sequence, and press  button to store the parameter in Figure 122.

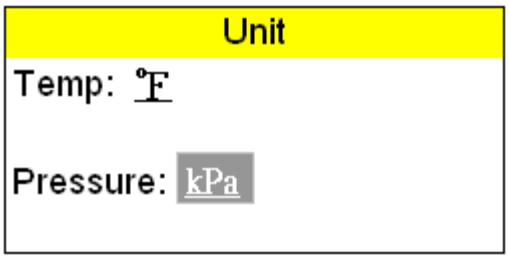


Figure 122

E. Press  button returns to System setting.

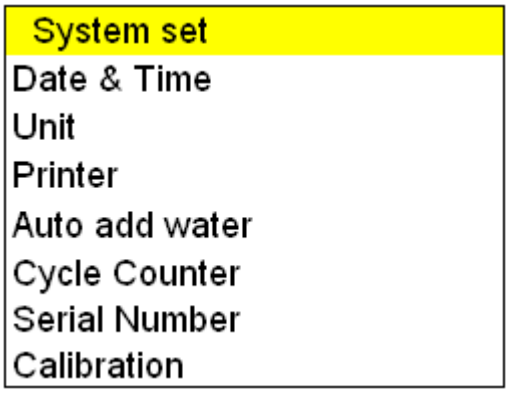


Figure 123

6.10.3 Printer

The real time program steps could be printed by the printer and also stored on a SD memory. The values of the sterilization steps are used as a reference record of each sterilization process. It is set to “ON” as default. However, you may enable or disable the printer as following:

A. Press  or  button to select System Setting program (Figure 124), and then press  button to select Printer setting, as shown in Figure 125.

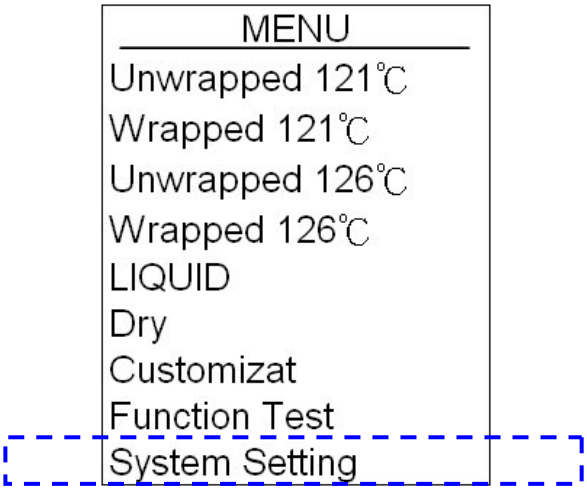


Figure 124

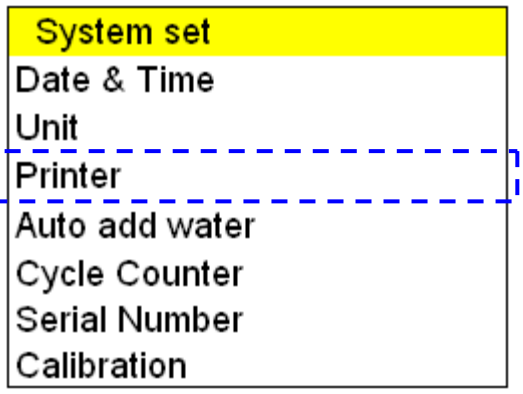


Figure 125

B. Press  button to the editing mode as shown in Figure 126.

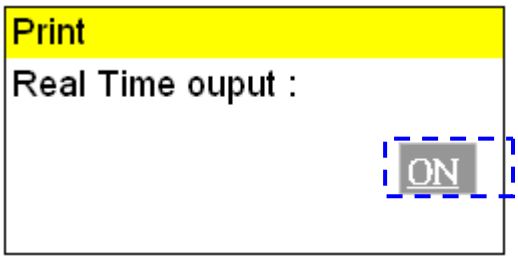


Figure 126

C. Press  or  button to enable or disable the real time printout, and press  button to store the parameter in Figure 127.

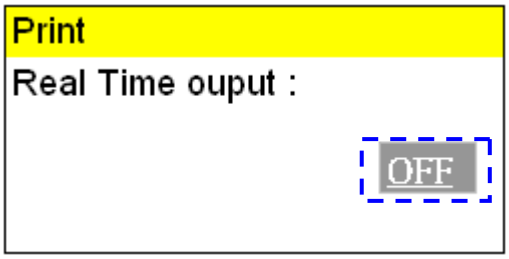


Figure 127

D. Press  button returns to System setting.

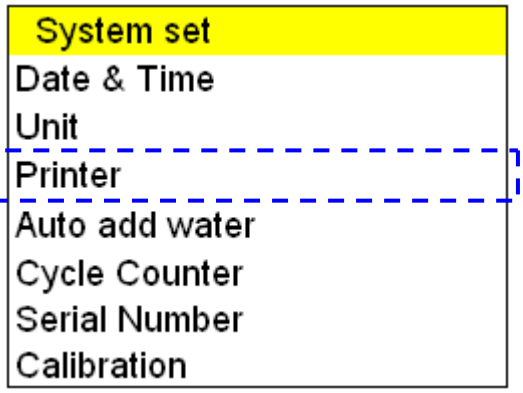


Figure 128

6.10.4 Auto Add Water

When the Auto Add Water is set to "ON" and start the sterilization program, it will check the water level of the water tank automatically. If water level of the water tank is not sufficient for running a sterilization cycle, it will supply the external water into the water tank until full level is reached.

If the Auto Add Water is set to "OFF" for manual add water, a “Error no = 400” will be displayed while detecting low water level.

It is set to “OFF” as default. However, you may enable or disable the Auto Add Water as following:

A. Press  or  button to select System Setting program (Figure 129), and then press  button to select Auto add water setting, as shown in Figure 130.

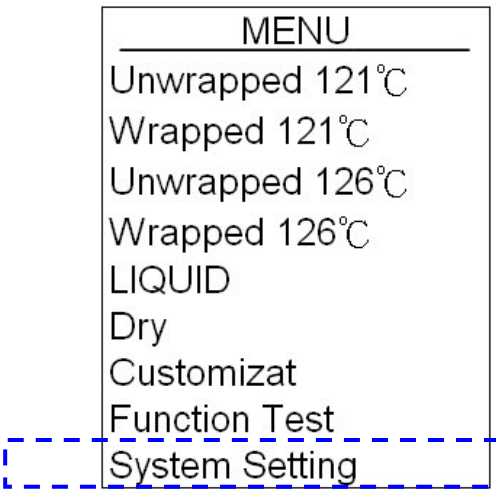


Figure 129

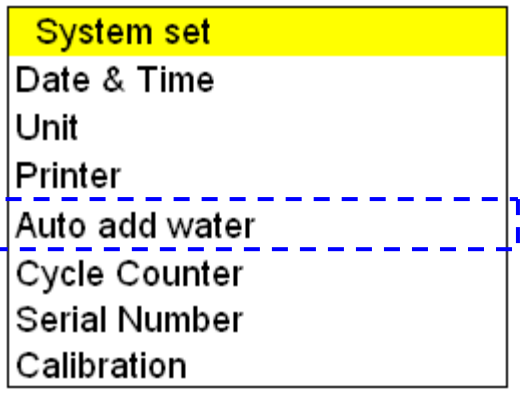


Figure 130

B. Press  button to the editing mode as shown in Figure 131.

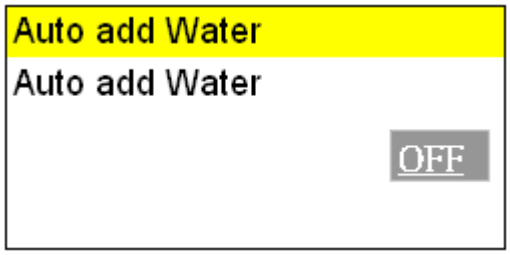


Figure 131

C. Press  or  button to enable or disable the Auto add water, and press  button to store the parameter in Figure 132.

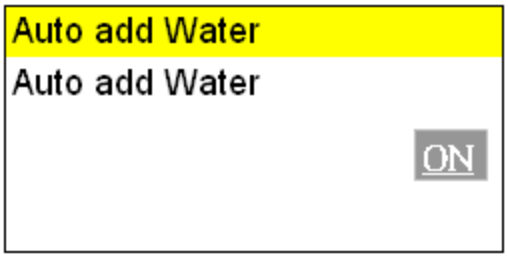


Figure 132

D. Press  button returns to System setting.

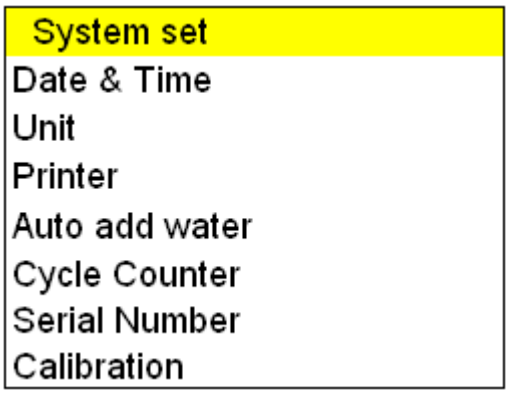


Figure 133

6.10.5 Cycle Counter

The autoclave required to be inspected and examined after pre-determinate cycles (default value 5,000 cycles) for its safety and performance by qualified persons.

A “Error no=010” will be displayed to remind operator for the servicing work. Press any key to ignore the error message.

⚠**CAUTION:** It is highly recommended by the manufacturer to call servicing work as soon as possible due to safety and performance reasons. Failure to follow the Maintenance Instructions will adversely affect performance and lifespan of the sterilizer, and may invalidate the warranty.

⚠**CAUTION:** The user should not change this parameter unless authorized by service personnel.

To change the next Maintenance cycle:

A. Press  or  button to select System Setting program (Figure 134), and then press  button to select Cycle counter setting, as shown in Figure 135.

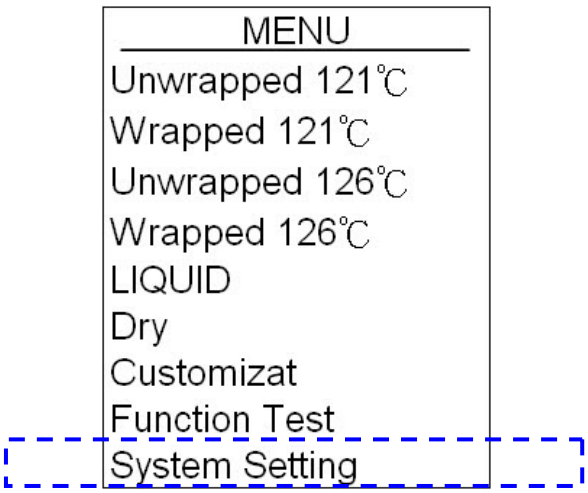


Figure 134

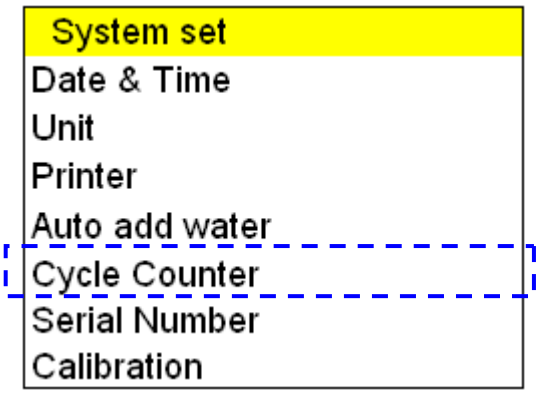


Figure 135

B. Press  button to the editing mode as shown in Figure 136.

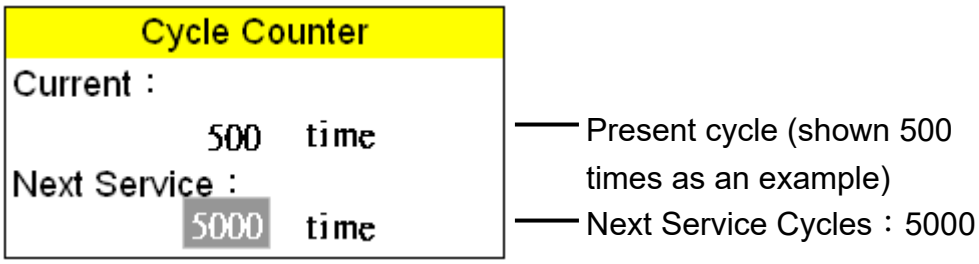


Figure 136

C. Press  or  button to change next service times, and press  button to store the parameter in Figure 137.

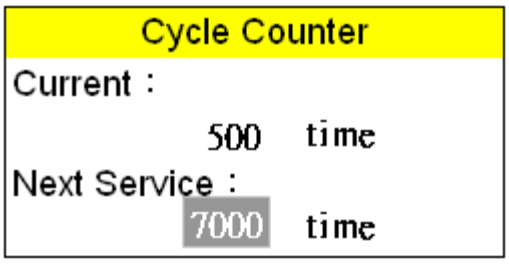


Figure 137

D. Press  button returns to System setting.

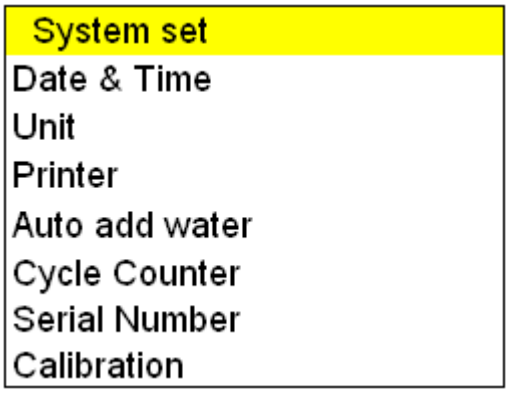


Figure 138

6.10.6 Series Number

NOTE: The 12 digits series number, compose by 9 digits followed by a dash "–" and 3 digits, is the unique identification of each autoclave, which is factory default.

To view the series number:

A. Press  or  button to select System Setting program (Figure 139), and then press  button to view the Series Number, as shown in Figure 140.

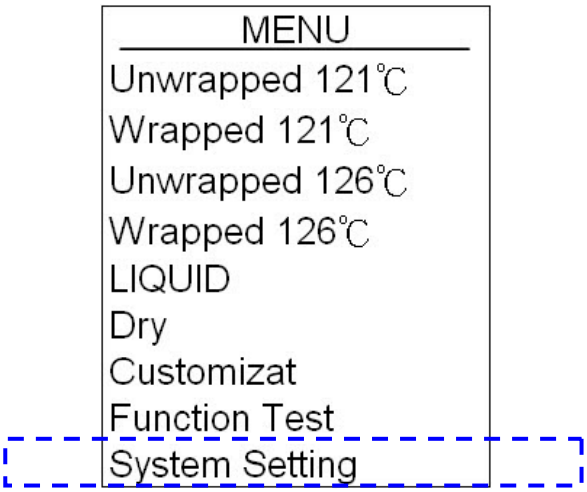


Figure 139

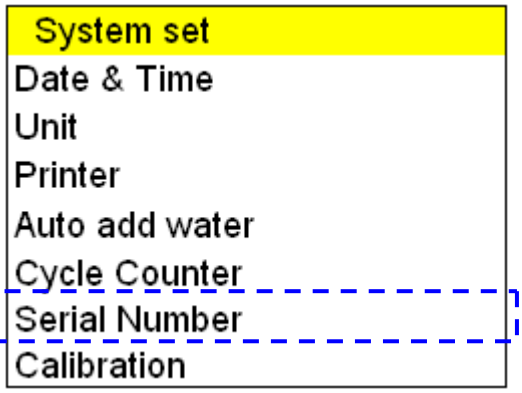


Figure 140

B. Press  button to the viewing mode as shown in Figure 141.

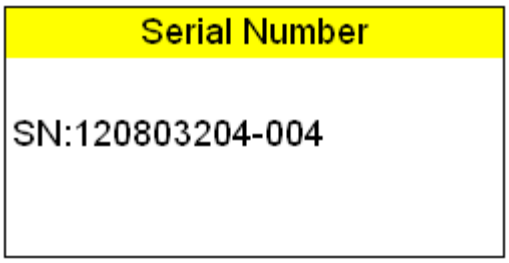


Figure 141

C. Press  button returns to System setting.

Figure 142

6.10.7 Calibration (Engineering Mode, Authorized Personnel Only)

⚠**CAUTION:** This autoclave had been calibrated before shipment, and this Calibration function is password protected to prevent improper operation by the user. Only well-trained personnel can perform the calibration work. Failure to do calibration could result in serious injury or damage to the autoclave. However, the autoclave may need to be re-calibrated if necessary, such as the replacement of components. The following information is aimed for operating by authorized technicians, not by the operator.

A. Press  or  button to select System Setting program (Figure 143), and then press  button to select the Calibration, as shown in Figure 144.

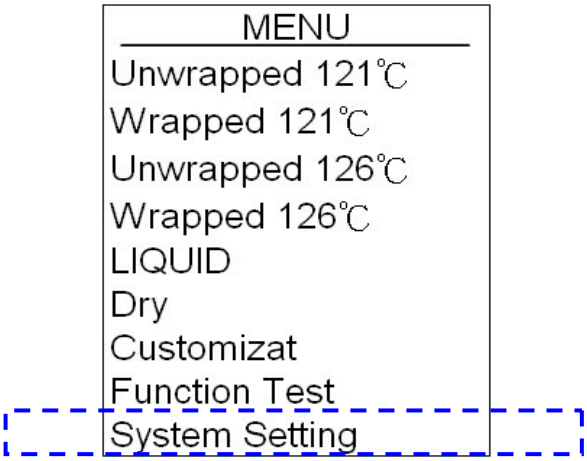


Figure 143

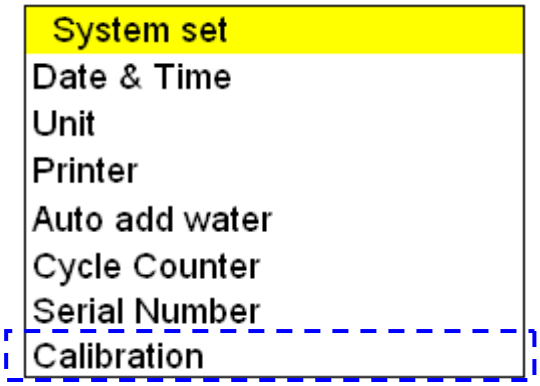


Figure 144

B. Press  button to the editing mode as shown in Figure 145.

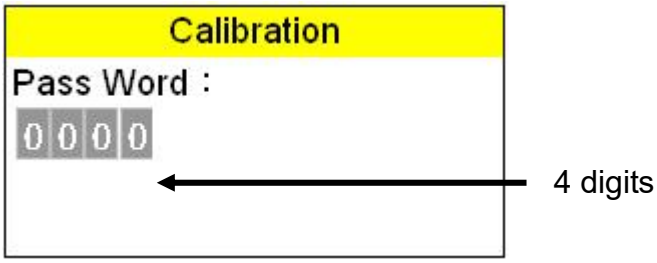


Figure 145

6.11 Description of Printer

6.11.1 Dimensions of Printer Paper

Thermal printer is installed in this sterilizer, and the dimension of thermal printer paper is 57 mm in wide, 50 mm in outside diameter, and 12 meter in length.

6.11.2 Installation of Printer Paper

There are two ways for feeding paper, one is automatic feeding and the other is manual feeding.

⚠**NOTE:** Please contact your service agent for the suitable type of thermal printer papers.

⚠**NOTE:** The thermal printer papers are very sensitive to the hot-wet conditions. Always store the paper in cold-dry ambient conditions. The manufacturer highly recommended a hard copy of the contents immediately after completing each sterilization cycles.

6.11.2.1 Automatic Feeding Paper

A. Turn on the Power.

B. Press down and then pull outward the rim of the printer cover (See Figure 146).

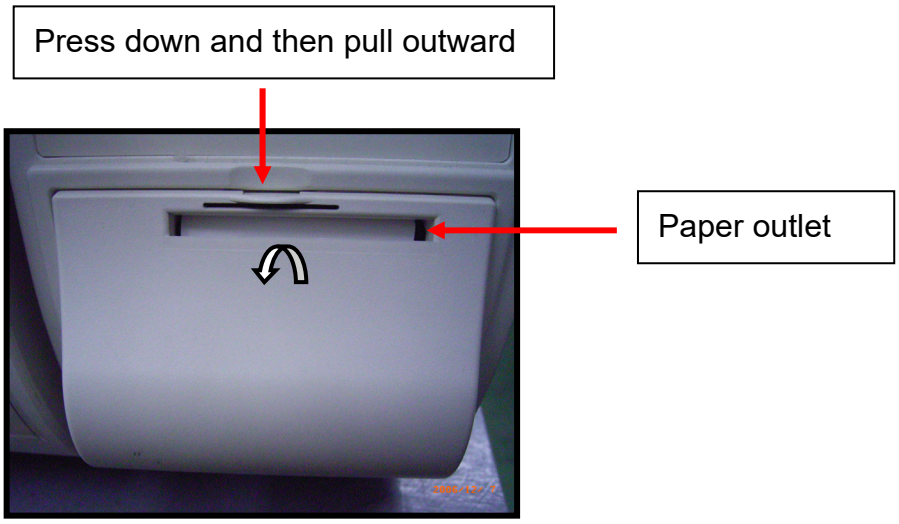


Figure 146

C. Take out the empty roll from the compartment (See Figure 147), and replace with a new one. In order to print correctly, please load the thermal paper according to the instruction of the thermal paper for the printing side.

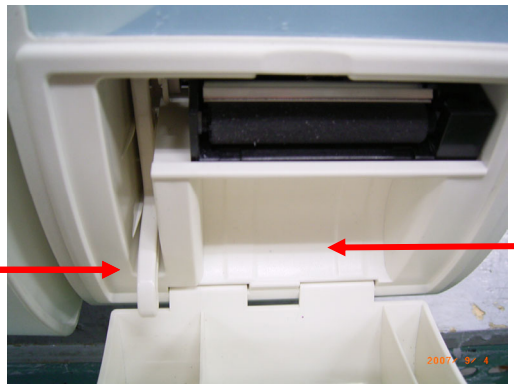


Figure 147

D. Replace with a new one thermal paper in the compartment, and position the lever in the “downward position” as shown in Figure 149. Locate the thermal paper near to the sensing inlet (Figure 148), the thermal paper will be detected and then fed automatically (See Figure 149)

⚠**NOTE:** Refer to the instruction of the thermal paper supplier for the printing face.

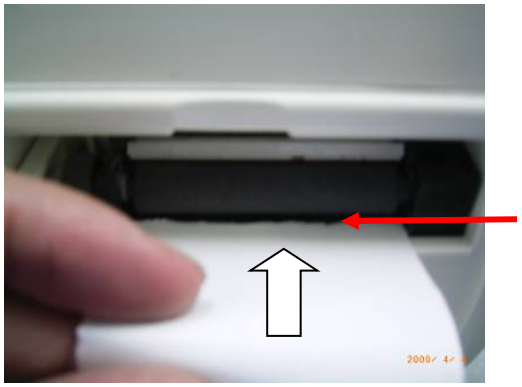


Figure 148

Figure 149

E. Align the thermal paper matching with the paper outlet of the printer cover. Close the printer cover to complete the replacement.

Figure 150

6.11.2.2 Manual Feeding Paper

A. Turn on the Power. (Not necessary for manual replacement)

B. Press down and then pull outward the rim of the printer cover (See Figure 151).

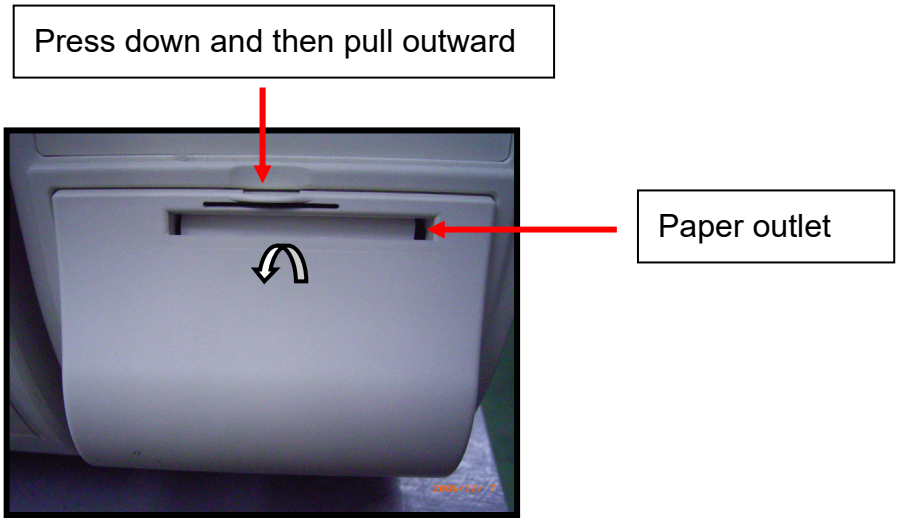


Figure 151

C. Take out the empty roll from the compartment (See Figure 152), and replace with a new one. In order to print correctly, please load the thermal paper according to the instruction of the thermal paper for the printing side.

Figure 152

D. Position the lever in the “upward position” as shown in Figure 153.

Figure 153

E. Replace with a new one thermal paper in the compartment, and. Locate the thermal paper to the paper inlet as shown in Figure 154, and then push the thermal paper until you can pull it out. Position the lever in the “downward position” as shown in Figure 155.

⚠**NOTE:** Refer to the instruction of the thermal paper supplier for the printing face.

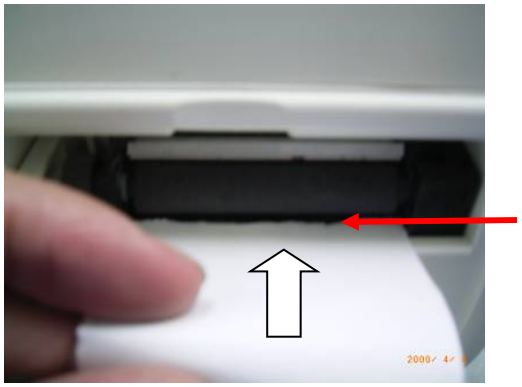


Figure 154

Figure 155

F. Align the thermal paper matching with the paper outlet of the printer cover. Close the printer cover to complete the replacement.

Figure 156

6.11.3 Printout of Printer

There are three types of printout as following:

1) General Program, 2) LIQUID Program(Optional), 3)Dry Program, 4)Leakage Test

6.11.3.1 Printout of General Program

The following printout is applicable to programs of Unwrapped 126 ℃, Wrapped 126 ℃, Unwrapped 121 ℃, Wrapped 121 ℃, Customization, Helix test, and B &D test.

Table 12

Printer output	Description
Model：SA-260MB	Model number
Software version：V1.00	Software version installed in this autoclave
SN：120803204-004	Series number
Program：Unwrapped 126 'C Pre-Vacuum Ster. Temp：126 'C Ster. Time： 10 m 0 s Dry Time： 15 m	Program selected Pre-vacuum function enabled Sterilization temperature Sterilization duration Dry duration
Date：Dec.13.2012 14：10：.27	Date and Time of sterilization
Cycle Counter ：000351	Cycles that had been started

Step	Time mmm:ss	ts mm:ss	Temp. 'C	Pres. bar
Start	000:00	00:00	26.0	0.000
PV1	002:50	02:50	29.3	-0.832
H1	013:23	10:33	118.3	0.853
PV2	015:43	02:11	89.9	-0.328
H2	020:42	04:58	118.5	0.874
PV3	022:54	01:51	90.4	-0.328
H3	027:27	04:33	118.4	0.853
PV4	029:35	02:08	92.3	-0.328
H4	037:59	08:24	127.0	1.433
S00	037:59	00:00	127.0	1.434
S02	039:59	02:00	127.8	1.430
S04	041:59	04:00	127.5	1.413
S06	043:59	06:00	127.5	1.405
S08	045:59	08:00	127.2	1.403
S10	047:59	10:00	127.3	1.400
EX	052:59	05:00	108.9	0.205
D0	053:35	00:36	95.8	-0.296
D1	068:35	15:00	96.5	-0.715
VR	069:50	01:15	96.7	-0.057
END	069:50	00:00	96.7	-0.057

Step	action
Time mmm:ss	mmm: minutes starting record, ss: seconds starting record
ts mm:ss	duration of each step, mm: minutes, ss: seconds
Temp(℃)	chamber temperature in ℃
Pres(bar)	Chamber pressure in bar
start	start time
PV1	1st pre-vacuum pulse
H1	1st heating pulse
PV2	2nd pre-vacuum pulse
H2	2nd heating pulse
PV3	3rd pre-vacuum pulse
H3	3rd heating pulse
PV4	4th pre-vacuum pulse
H4	4th heating pulse
S00	start of sterilization
S02	sterilization time recorded every 2 minutes after "S00"; and also the last sterilization time
EX	exhaust of water and steam
D0	dry time-started
D1	dry time-finished
VR	vacuum release

Printer output	Description
	End: end of recording
Ster. Temp ： 126.9 - 127.7 ‘C	The maximum and minimum temperature detected during sterilization period
Ster. Pres ： 1.391 – 1.470 bar	The maximum and minimum pressure detected during sterilization period
Ster. Time ： 10 m 0 s	Sterilization period
Total time ： 69 m 50 s	Time elapsed between start and program complete
Program complete	Message of ending recording

6.11.3.2 Printout of LIQUID Program(Optional)

The following printout is applicable to programs of LIQUID.

Table 13

<table>
<tr><th>Printer output</th><th>Description</th></tr>
<tr><td>Model：SA-260MB</td><td>Model number</td></tr>
<tr><td>Software version：V1.00</td><td>Software version installed in this autoclave</td></tr>
<tr><td>SN：120803204-004</td><td>Series number</td></tr>
<tr><td>Program：LIQUID
Ster. Temp：121 ’C
Ster. Time： 15 m</td><td>Program selected
Pre-vacuum function enabled
Sterilization temperature
Sterilization duration
Dry duration</td></tr>
<tr><td>Date：Dec.13.2012 14：10：.27</td><td>Date and Time of sterilization</td></tr>
<tr><td>Cycle Counter ：000351</td><td>Cycles that had been started</td></tr>
<tr><td>
<pre>
Step   Time   ts   Temp. Pres.
       mmm:ss mm:ss 'C   bar
Start 000:00 00:00 28.2   0.001
PV1   000:54 00:54 28.4 -0.110
H1   034:03 33:09 122.2   1.093
ET   044:03 10:09 122.5   1.120
S00   044:03 00:00 122.5   1.120
S02   046:03 02:00 122.1   1.088
S04   048:03 04:00 122.6   1.132
</pre>

<pre>
S14   058:03 14:00 122.5   1.125
S15   059:03 15:00 122.3   1.195
CD   094:03 35:00 85.0 -0.015
End   094:03 00:00 85.0 -0.015
</pre>
</td><td>
<table>
<tr><td>Step</td><td>action</td></tr>
<tr><td>Time
mmm:ss</td><td>mmm: minutes starting record,
ss: seconds starting record</td></tr>
<tr><td>ts
mm:ss</td><td>duration of each step,
mm: minutes,
ss: seconds</td></tr>
<tr><td>Temp(℃)</td><td>chamber temperature in ℃</td></tr>
<tr><td>Pres(bar)</td><td>Chamber pressure in bar</td></tr>
<tr><td>start</td><td>start time</td></tr>
<tr><td>PV1</td><td>1st pre-vacuum pulse</td></tr>
<tr><td>H1</td><td>1st heating pulse</td></tr>
<tr><td>ET</td><td>Equilibrium Time</td></tr>
<tr><td>S00</td><td>start of sterilization</td></tr>
<tr><td>S02</td><td>sterilization time recorded every 2 minutes after “S00”; and also the last sterilization time</td></tr>
<tr><td>CD</td><td>Cooling Down</td></tr>
<tr><td>End</td><td>end of recording</td></tr>
</table>
</td></tr>
<tr><td>Ster. Temp ： 121.2 – 122.8 ‘C</td><td>The maximum and minimum temperature detected during sterilization period</td></tr>
<tr><td>Ster. Pres ： 1.088 – 1.220 bar</td><td>The maximum and minimum pressure detected during sterilization period</td></tr>
<tr><td>Ster. Time ： 15 m</td><td>Sterilization period</td></tr>
<tr><td>Total time ： 94 m 03 s</td><td>Time elapsed between start and program complete</td></tr>
<tr><td>Program complete</td><td>Message of ending recording</td></tr>
</table>

6.11.3.3 Printout of Dry Program

The following printout is applicable to Dry Program:

Table 14

<table>
<tr><th>Printer output</th><th>Description</th></tr>
<tr><td>Model：SA-260MB</td><td>Model number</td></tr>
<tr><td>Software version：V1.00</td><td>Software version installed in this autoclave</td></tr>
<tr><td>SN：120803204-004</td><td>Series number</td></tr>
<tr><td>Program：Dry</td><td>Program selected</td></tr>
<tr><td>Date：Dec.13.2012　　14：10：.27</td><td>Date and Time of sterilization</td></tr>
<tr><td>Cycle Counter ：000351</td><td>Cycles that had been started</td></tr>
<tr><td>
Step　Time　ts　Temp.　Pres.
mmm:ss　mm:ss　'C　bar
Start　000:00　00:00　27.8　-0.067
D0　000:41　00:41　27.5　-0.296
D1　002:41　02:00　28.2　-0.242
VR　002:55　00:14　28.3　-0.059
End　002:55　00:00　28.3　-0.059
</td><td>
<table>
<tr><td>Step</td><td>action</td></tr>
<tr><td>Time
mmm:ss</td><td>mmm: minutes starting record,
ss: seconds starting record</td></tr>
<tr><td>ts
mm:ss</td><td>duration of each step,
mm: minutes,
ss: seconds</td></tr>
<tr><td>Temp(℃)</td><td>chamber temperature in ℃</td></tr>
<tr><td>Pres(bar)</td><td>Chamber pressure in bar</td></tr>
<tr><td>start</td><td>start time</td></tr>
<tr><td>D0</td><td>dry time-started</td></tr>
<tr><td>D1</td><td>dry time-finished</td></tr>
<tr><td>VR</td><td>vacuum release</td></tr>
<tr><td>End</td><td>end of recording</td></tr>
</table>
</td></tr>
<tr><td>Ster. Temp ： 0 ‘C</td><td>The maximum and minimum temperature detected during sterilization period</td></tr>
<tr><td>Ster. Pres ： 0 bar</td><td>The maximum and minimum pressure detected during sterilization period</td></tr>
<tr><td>Total time ： 2 m 55 s</td><td>Time elapsed between start and program complete</td></tr>
<tr><td>Program complete</td><td>Message of ending recording</td></tr>
</table>

6.11.3.4 Printout of Leakage Test

The following printout is applicable to Leakage Test:

Table 15

<table>
<tr><th>Printer output</th><th>Description</th></tr>
<tr><td>Model：SA-260MB</td><td>Model number</td></tr>
<tr><td>Software version：V1.00</td><td>Software version installed in this autoclave</td></tr>
<tr><td>SN：120803204-004</td><td>Series number</td></tr>
<tr><td>Program：Leakage Test</td><td>Program selected</td></tr>
<tr><td>Date：Dec.13.2012　　14：10：.27</td><td>Date and Time of sterilization</td></tr>
<tr><td>Cycle Counter　：000351</td><td>Cycles that had been started</td></tr>
<tr><td>----------
P0:　　1.5 kPa,t0:　0 s
P1:　-79.6 kPa,t1: 228 s
P2:　-79.4 kPa,t2: 300 s
P3:　-79.4 kPa,t3: 600 s
----------</td><td><table>
<tr><td>Step</td><td>action</td></tr>
<tr><td>P0</td><td>ambient atmospheric pressure</td></tr>
<tr><td>t0</td><td>start of the test</td></tr>
<tr><td>P1</td><td>lowest pressure level</td></tr>
<tr><td>t1</td><td>time when the pressure level is reached</td></tr>
<tr><td>P2</td><td>pressure after a period of 300 s</td></tr>
<tr><td>t2</td><td>start of the leakage period</td></tr>
<tr><td>P3</td><td>pressure after a leakage time of 600 s</td></tr>
<tr><td>t3</td><td>end of the test</td></tr>
</table></td></tr>
<tr><td>Program complete</td><td>Message of ending recording</td></tr>
<tr><td>Total time: 19m 31s</td><td>Time elapsed between start and program complete</td></tr>
<tr><td>Leakage Rate：0.00 (kPa/min)</td><td>The rate of air leakage into the sterilizer chamber during periods of vacuum,
Pass if the value nor grater than 0.13 kPa/min</td></tr>
<tr><td>Leakage Test：Pass</td><td>Test result Pass</td></tr>
</table>

6.11.4 Printout Button

Press  button to reprint the last message that had been recorded in the memory.

6.12 External storage medium – SD Card

6.12.1 Using a SD card

The sterilization temperature, steam pressure and real time information during each cycle can be stored to an onto a SD memory card (hereinafter referred to as SD card) automatically if a SD card is inserted. It records the specified information in *.dat format, and the file can be read by the WordPad or Notepad.

A. You should format your storage medium prior insert into the sterilizer for the first time. SD card supports FAT file system, and SD/HC card support FAT32 file system.

⚠**NOTE:** Use only recommended storage medium by the manufacturer such as SD, SD/HC (up to 32GB).

B. Insert a formatted SD card before commencing a sterilization cycle. A error code=400 will be displayed and recorded onto the memory if missing a SD card.

⚠**CAUTION:** DO NOT remove SD card while any cycle is running, otherwise the data will not be recorded correctly, and may damage to the data and sterilizer.

C. You can operate on the files in this SD card in PC via a card reader or SD card interface. Data will be stored under the root directory only.
The recording files will be created for each sterilization cycle in the format of "YYMMDDnn.DAT", where:
- nn represents the cycle sequence of the recording date,
- YY represents the last 2 digits of the year,
- MM represents the 2 digits of the month,
- DD represents the 2 digits of the date.

You should open WordPad or Notepad and then open the file by File -> Open File-> (file path\YYYY\MM\YYMMDDnn.dat), to view the contents.

⚠**CAUTION:** You should backup your storage medium to a safe medium periodally.

⚠**NOTE:** WordPad and Notepad are registered trademarks of Microsoft, Inc. Microsoft is a registered trademark.

6.12.2 Readout of a SD card

There are three types of readout as following:

1) General Program, 2)Dry Program, 3)Leakage Test

6.12.2.1 Readout of General Program

The following readout is applicable to programs of Unwrapped 126 ℃, Wrapped 126 ℃, Unwrapped 121 ℃, Wrapped 121 ℃, Customization, Helix test, and B &D test.

Table 16

Printer output	Description
Model：SA-260MB	Model number
Software version：V1.00	Software version installed in this autoclave
SN：120803204-004	Series number
Program：Unwrapped 126 'C Pre-Vacuum Ster. Temp：126 'C Ster. Time： 10 m 0 s Dry Time： 15 m	Program selected Pre-vacuum function enabled Sterilization temperature Sterilization duration Dry duration
Date：2012/12/06 13：44：09	Date and Time of sterilization
Cycle Counter ：000464	Cycles that had been started

Step	Time mmm:ss	ts mm:ss	Temp. 'C	Pres. bar
Start	000:00	00:00	26.0	0.000
PV1	002:50	02:50	29.3	-0.832
H1	013:23	10:33	118.3	0.853
PV2	015:43	02:11	89.9	-0.328
H2	020:42	04:58	118.5	0.874
PV3	022:54	01:51	90.4	-0.328
H3	027:27	04:33	118.4	0.853
PV4	029:35	02:08	92.3	-0.328
H4	037:59	08:24	127.0	1.433
S00-00	037:59	00:00	127.0	1.434
S00-01	038:00	00:01	127.8	1.430
S00-02	038:01	00:02	127.5	1.413
≈				
S09-58	047:57	09:58	127.5	1.405
S09-59	047:58	09:59	127.2	1.403
S10-00	047:59	10:00	127.3	1.400
EX	052:59	05:00	108.9	0.205
D0	053:35	00:36	95.8	-0.296
D1	068:35	15:00	96.5	-0.715
VR	069:50	01:15	96.7	-0.057
END	069:50	00:00	96.7	-0.057

Step	action
Time mmm:ss	mmm: minutes starting record, ss: seconds starting record
ts mm:ss	duration of each step, mm: minutes, ss: seconds
Temp(℃)	chamber temperature in ℃
Pres(bar)	Chamber pressure in bar
start	start time
PV1	1st pre-vacuum pulse
H1	1st heating pulse
PV2	2nd pre-vacuum pulse
H2	2nd heating pulse
PV3	3rd pre-vacuum pulse
H3	3rd heating pulse
PV4	4th pre-vacuum pulse
H4	4th heating pulse
S00-00	start of sterilization
Sxx-xx	sterilization time recorded every 1 second after "S00"; until the last sterilization time
EX	exhaust of water and steam
D0	dry time-started
D1	dry time-finished
VR	vacuum release

Printer output	Description
	End: end of recording
Ster. Temp ： 126.9 - 127.7 ‘C	The maximum and minimum temperature detected during sterilization period
Ster. Pres ： 1.391 – 1.470 bar	The maximum and minimum pressure detected during sterilization period
Ster. Time ： 10 m 0 s	Sterilization period
Total time ： 69 m 50 s	Time elapsed between start and program complete
Program complete	Message of ending recording

6.12.2.2 Printout of LIQUID Program(Optional)

The following printout is applicable to programs of LIQUID.

Table 17

<table>
<tr><th>Printer output</th><th>Description</th></tr>
<tr><td>Model：SA-260MB</td><td>Model number</td></tr>
<tr><td>Software version：V1.00</td><td>Software version installed in this autoclave</td></tr>
<tr><td>SN：120803204-004</td><td>Series number</td></tr>
<tr><td>Program：LIQUID
Ster. Temp：121 ’C
Ster. Time： 15 m</td><td>Program selected
Pre-vacuum function enabled
Sterilization temperature
Sterilization duration
Dry duration</td></tr>
<tr><td>Date：Dec.13.2012 14：10：.27</td><td>Date and Time of sterilization</td></tr>
<tr><td>Cycle Counter ：000351</td><td>Cycles that had been started</td></tr>
<tr><td>
<pre>
Step   Time   ts   Temp. Pres.
       mmm:ss mm:ss 'C   bar
Start 000:00 00:00 28.2   0.001
PV1   000:54 00:54 28.4 -0.110
H1   034:03 33:09 122.2   1.093
ET   044:03 10:09 122.5   1.120
S00:00 044:03 00:00 122.5   1.120
S00:01 044:04 00:01 122.1   1.088
S00:02 044:05 00:02 122.6   1.132
</pre>
≈
<pre>
S14:59 059:02 14:59 122.5   1.125
S15:00 059:03 15:00 122.3   1.195
CD   094:03 35:00 85.0 -0.015
End   094:03 00:00 85.0 -0.015
</pre>
</td><td>
<table>
<tr><td>Step</td><td>action</td></tr>
<tr><td>Time
mmm:ss</td><td>mmm: minutes starting record,
ss: seconds starting record</td></tr>
<tr><td>ts
mm:ss</td><td>duration of each step,
mm: minutes,
ss: seconds</td></tr>
<tr><td>Temp(℃)</td><td>chamber temperature in ℃</td></tr>
<tr><td>Pres(bar)</td><td>Chamber pressure in bar</td></tr>
<tr><td>start</td><td>start time</td></tr>
<tr><td>PV1</td><td>1st pre-vacuum pulse</td></tr>
<tr><td>H1</td><td>1st heating pulse</td></tr>
<tr><td>ET</td><td>Equilib Time</td></tr>
<tr><td>S00-00</td><td>start of sterilization</td></tr>
<tr><td>S15-00</td><td>sterilization time recorded every 15 minutes after “S00”; and also the last sterilization time</td></tr>
<tr><td>CD</td><td>Cooling Down</td></tr>
<tr><td>End</td><td>end of recording</td></tr>
</table>
</td></tr>
<tr><td>Ster. Temp ： 121.7 – 122.8 ‘C</td><td>The maximum and minimum temperature detected during sterilization period</td></tr>
<tr><td>Ster. Pres ： 1.091 – 1.135 bar</td><td>The maximum and minimum pressure detected during sterilization period</td></tr>
<tr><td>Ster. Time ： 15 m</td><td>Sterilization period</td></tr>
<tr><td>Total time ： 94 m 03 s</td><td>Time elapsed between start and program complete</td></tr>
<tr><td>Program complete</td><td>Message of ending recording</td></tr>
</table>

6.12.2.3 Readout of Dry Program

The following readout is applicable to Dry Program:

Table 18

<table>
<tr><th>Printer output</th><th>Description</th></tr>
<tr><td>Model：SA-260MB</td><td>Model number</td></tr>
<tr><td>Software version：V1.00</td><td>Software version installed in this autoclave</td></tr>
<tr><td>SN：120803204-004</td><td>Series number</td></tr>
<tr><td>Program：Dry</td><td>Program selected</td></tr>
<tr><td>Date：2012/12/06 13：44：09</td><td>Date and Time of sterilization</td></tr>
<tr><td>Cycle Counter ：000464</td><td>Cycles that had been started</td></tr>
<tr><td>
Step Time ts Temp. Pres.
mmm:ss mm:ss 'C bar
Start 000:00 00:00 27.8 -0.067
D0 000:41 00:41 27.5 -0.296
D1 002:41 02:00 28.2 -0.242
VR 002:55 00:14 28.3 -0.059
End 002:55 00:00 28.3 -0.059
</td><td>
<table>
<tr><td>Step</td><td>action</td></tr>
<tr><td>Time
mmm:ss</td><td>mmm: minutes starting record,
ss: seconds starting record</td></tr>
<tr><td>ts
mm:ss</td><td>duration of each step,
mm: minutes,
ss: seconds</td></tr>
<tr><td>Temp(℃)</td><td>chamber temperature in ℃</td></tr>
<tr><td>Pres(bar)</td><td>Chamber pressure in bar</td></tr>
<tr><td>start</td><td>start time</td></tr>
<tr><td>D0</td><td>dry time-started</td></tr>
<tr><td>D1</td><td>dry time-finished</td></tr>
<tr><td>VR</td><td>vacuum release</td></tr>
<tr><td>End</td><td>end of recording</td></tr>
</table>
</td></tr>
<tr><td>Ster. Temp ： 0 ‘C</td><td>The maximum and minimum temperature detected during sterilization period</td></tr>
<tr><td>Ster. Pres ： 0 bar</td><td>The maximum and minimum pressure detected during sterilization period</td></tr>
<tr><td>Ster. Time ： 0 m 0 s</td><td>Sterilization period</td></tr>
<tr><td>Total time ： 2 m 55 s</td><td>Time elapsed between start and program complete</td></tr>
<tr><td>Program complete</td><td>Message of ending recording</td></tr>
</table>

6.12.2.4 Readout of Leakage Test

The following readout is applicable to Leakage Test:

Table 19

Printer output	Description
Model：SA-260MB	Model number
Software version：V1.00	Software version installed in this autoclave
SN：120803204-004	Series number
Program：Leakage	Program selected
Date：2012/12/06 13：44：09	Date and Time of sterilization
Cycle Counter ：000464	Cycles that had been started
---------- P0: 1.5 kPa,t0: 0 s P1: -79.6 kPa,t1: 228 s P2: -79.4 kPa,t2: 300 s P3: -79.4 kPa,t3: 600 s ----------	Step / action P0 — ambient atmospheric pressure t0 — start of the test P1 — lowest pressure level t1 — time when the pressure level is reached P2 — pressure after a period of 300 s t2 — start of the leakage period P3 — pressure after a leakage time of 600 s t3 — end of the test
Total time: 19m 31s	Time elapsed between start and program complete
Leakage Rate：0.00 (kPa/min)	The rate of air leakage into the sterilizer chamber during periods of vacuum, Pass if the value nor grater than 0.13 (kPa/min)
Leakage Test：Pass	Test result : Pass

6.13 Emergency Stop

A. Press the Emergency Button 

to interrupt the program and release the pressure inside the chamber.

B. The sterilizer will sound to alert, and the Error message “E002” will be displayed to notify an emergency operation. Please wait till the pressure gauge is reading ZERO,

WARNING: The Emergency Button can only been pressed when there’s an unusual event or emergency. The sterility of the sterilized items should be verified again.

WARNING: Disposal of the items which is sterilized by unfinished cycle should be in accordance with the local laws. Do not handle them as general waste.

NOTE: If the Emergency Button had been pressed without opening the door, you may require repeating this emergency to release the pressure.

C. Press the  button to open the door, a “Mind The Steam” will be prompted and then followed by “Please Open The Door.” message. Open the door and take out the sterilized items. Check the status of the indicators. If failed, repeat the cycle. Consult with the qualified technician for calibration if necessary. Please refer to “8. Troubleshooting”.

WARNING: Check the pressure gauge is reading ZERO before opening the door.

WARNING: Beware of steam when opening door after a sterilization cycle.

WARNING: Be careful when removing the sterilized items as the metal surfaces might still be hot. Always wear suitable hand protection to remove the box or use the appropriate aids (tray holder) to lift the trays.

WARNING: If using the sterilizer continuously, it’s required to have a 20 min. interval between each sterilization cycle to allow the unit to cool.

6.14 Placement for items to be sterilized

Please place items to be sterilized on the tray properly in order to have the best drying result.

⚠**WARNING:** To sterilize absorbent cotton or woolen, please wrap it with sterilizing pouch to avoid piping clog.

6.14.1 Sterilization for Implements

Place implements on the tray evenly according to Figure 157. Do not pile up nor overlap each implement.

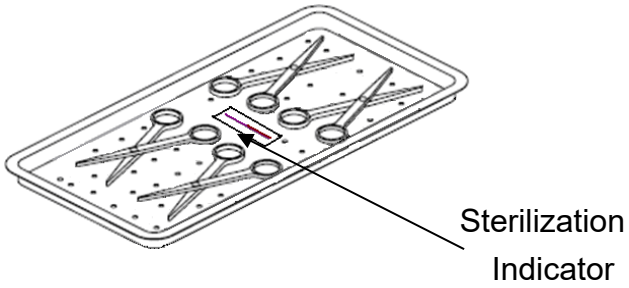


Figure 157

⚠**WARNING:** If implements are packed with sterilizing pouches, please make sure not to pile them up. Follow Figure 158 for correct placement and do not overlap pouches like to Figure 159 ensure the sterilization quality.

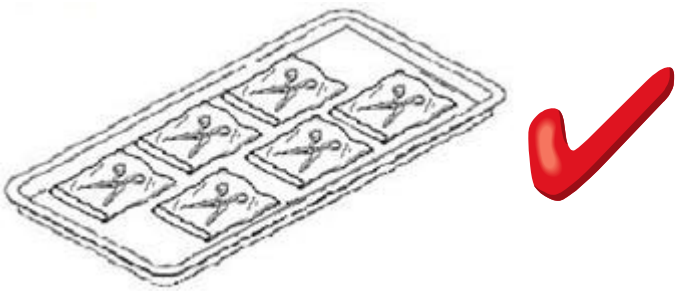


Figure 158

Figure 159

WARNING: We suggest using Spring Holder for items with sterilizing pouches to assure sterilization result. Follow Figure 160 or Figure 161 to place each pouch separately. Spring holder is available as an optional accessory.

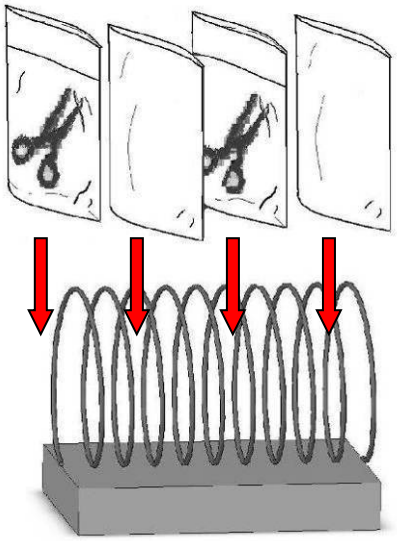


Figure 160

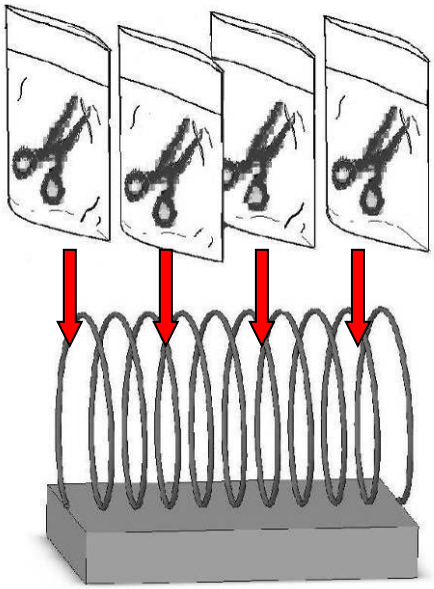


Figure 161

WARNING: If implements are packed with sterilizing pouches and placed inside a sterilization box, make sure to display items as shown in Figure 162.

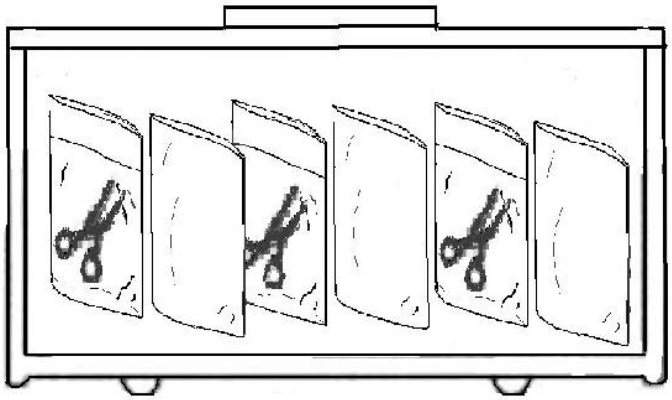


Figure 162

6.14.2 Sterilization for Wrap

WARNING: To sterilize absorbent cotton or woolen, please wrap it with a thin towel, covering cloth, linen, or sterilizing pouch to avoid piping clog according to Figure 163.

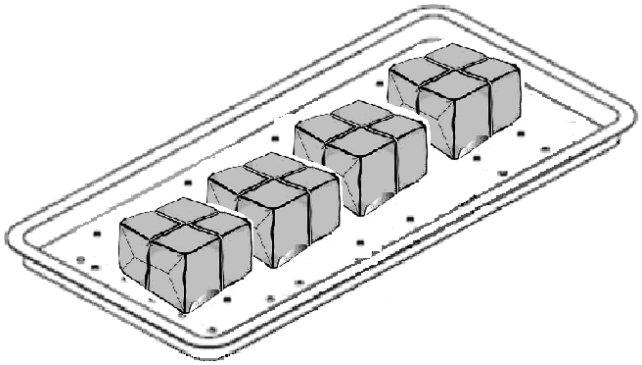


Figure 163

- Place wrap upright on the tray.
- Be careful not to let wrap touching the inner side of chamber.
- Make sure the openings of wraps are perpendicular to the tray in order to improve sterilization performance.
- Arrange openings of wraps toward same direction.
- When place sterilizing pouch on the sterilization box or tray, make sure the medical grade paper is facing upward.

6.14.3 Placement for Sterilization box

- Insert chemical indicator into wrap, then place wrap inside the sterilization box.
- Be sure there will be enough space between each wrap for better air flow.
- Make sure to close the cover of sterilization box properly.

Figure 164

WARNING: Please follow above Figure 164 and place wrap vertically inside the sterilization box.

7 Error Messages and Troubleshooting

7.1 System Error Message

Code	Error message	Description and Solution
002	Emergency stop	1) The EMERGENCY button was pressed to interrupt the program. Please wait until the pressure been release to 0 reading and then pressure the “unlock button”  to open the door by turning the door knob 90° counterclockwise. 2) The sterility of the sterilized items should be verified again. 3) Consult your service agent for maintenance service as soon as possible.
003	Stop	Cancel button  was pressed to stop a program; press enter button  to confirm the stop operation, and press  again to continue program.
010	Service time	1) The default 5,000 cycles or preset service cycles have been reached. 2) You can press any key to continue your operation, but this message will be displayed every time to remind service. 3) Consult your service agent for maintenance service as soon as possible.
031	Chamber temperature higher than 97ºC	1) Please wait until chamber temperature cool down. 2) Press any key to continue, and your sterilization work will start automatically after the preset time reached.
040	Wrong password	Consult your service agent and re-input again.

7.2 Component Error Message

Code	Error message	Description and Solution
101	SSR1 error	1) SSR1 fault, press any key to terminate operation. 2) Consult your service agent.
102	SSR2 error	1) SSR2 fault, press any key to terminate operation. 2) Consult your service agent.
110	Pressure gauge error (P1)	1) Pressure gauge P1 fault, press any key to terminate operation. 2) Consult your service agent.
111	Pressure gauge error (P2)	1) Pressure gauge P2 fault, press any key to terminate operation. 2) Consult your service agent.
120	Temperature sensor error (environment)	1) Consult your service agent.
121	Temperature sensor (heater) error (T1)	1) Temperature sensor T1 fault, press any key to terminate operation. 2) Consult your service agent.
123	Temperature sensor in the chamber error (T3)	1) Temperature sensor T3 fault, press any key to terminate operation. 2) Consult your service agent.
130	Keyboard error	1) Keyboard fault, press any key to terminate operation. 2) Consult your service agent.
140	Air Filter error	1) Replace a new Air Filter, press any key to terminate operation. 2) Consult your service agent.
150	System Fan error (F1)	1) System Fan F1 fault, press any key to terminate operation. 2) Consult your service agent.
151	System Fan error (F2)	1) System Fan F2 fault, press any key to terminate operation. 2) Consult your service agent.
160	Heater error	1) Band heater fault, press any key to terminate operation. 2) Consult your service agent.
161	Band heater error	1) Band heater fault, press any key to terminate operation. 2) Consult your service agent.

7.3 Process Error Message

Code	Error message	Description and Solution
200	Sea level over 2000M (Altitude over)	1) Sea level above 2000M detected, press any key to terminate operation. 2) Consult your service agent.
201	Room temperature too low (Ambient temp low)	1) Room temperature lower than 5ºC, press any key to terminate operation. 2) Consult your service agent.
202	Room temperature too hight (Ambient temp High)	1) Room temperature higher than 50ºC, press any key to terminate operation. 2) Consult your service agent.
210	Over heat	1) No water in the chamber causing EGO operated to protect heater, press any key to terminate operation. 2) Consult your service agent.
211	Over pressure	1)Over pressure in the chamber, press any key to terminate operation. 2) Consult your service agent.
220	Pre-vacuum error (PV1 fail)	1) The pre-vacuum is not reach to preset value during the first air removal step, press any key to terminate operation. 2) Consult your service agent.
221	Pre-vacuum error (PV2 or PV3 or PV4 fail)	1) The pre-vacuum is not reach to preset value during the second and/or third air removal steps, press any key to terminate operation. 2) Consult your service agent.
224	Dry vacuum error	1) The dry-vacuum is not reach to preset value during the drying steps, press any key to terminate operation. 2) Consult your service agent.
230	High pressure during sterilization step	1) The pressure is higher than preset value during sterilization step, press any key to terminate operation. 2) Consult your service agent.
231	Low pressure during sterilization step	1) The pressure is lower than preset value during sterilization step, press any key to terminate operation. 2) Consult your service agent.
232	Dynamic pressure error (DP over)	1) The pressure fluctuation is higher than 10 bar/min, press any key to terminate operation. 2) Consult your service agent.
233	Exhaust over time	1) The exhaust time exceed preset value during exhaust step, press any key to terminate operation. 2) Consult your service agent.

Code	Error message	Description and Solution
240	Pre-heat over time	1) The pre-heat time exceed preset value during pre-heat step, press any key to terminate operation. 2) Consult your service agent.
241	High temperature during sterilization step	1) The sterilization temperature exceed preset value during sterilization step, press any key to terminate operation. 2) Consult your service agent.
242	Low temperature during sterilization step	1) The sterilization temperature lower than preset value during sterilization step, press any key to terminate operation. 2) Consult your service agent.
243	Temperature rise too fast	1) The sterilization temperature higher than preset value, 8°K/min, before sterilization step, press any key to terminate operation. 2) Consult your service agent.
246	Sterilization temperature over rang (+4)	1) The sterilization temperature high than 4ºC.

7.4 Test Error Message

Code	Error message	Description and Solution
302	Air leakage error	1) The rate of air leakage into the chamber during periods of vacuum exceed 0,13 kPa/min. 2) Consult your service agent.
304	Chamber temper higher than 40ºC (Temp out)	1) The chamber temperature higher than 40ºC, press any key to terminate operation. 2) Please, waitting the chamber temperature cooldown to 40ºC.
400	Low water level in the tank (Tank no water)	1) The water level is insufficient for running a sterilization cycle. 2) Fill water into the water tank.
401	Low water level in the chamber	1) The water level in the chamber is insufficient for running a sterilization cycle. 2) Check water tank have water. 3) Consult your service agent.

7.5 Storage Medium Error Message

Code	Error message	Description and Solution
500	EEPROM write error	1) EEPROM write error, press any key to terminate operation. 2) Consult your service agent.
520	SD card write error (SD Error)	1) SD card write error or write protected, press any key to terminate operation. 2) Consult your service agent. 3) Please insert a SD card.
522	SD card format error	1) Wrong SD card format, press any key to terminate operation. 2) Refer to “6.12.1 Using a SD card”. 3) Consult your service agent.
530	No printer paper (No paper)	1) No printer paper, press any key to continue operation. 2) Refer to “6.11 Description of Printer “ to install printer.
531	Printer error	1) The Printer Level is not positioned to downward. 2) Consult your service agent.
533	Printer error	1) Printer time out, press any key to continue operation. 2) Consult your service agent.
600	Door open	1) press any key to terminate operation or wait for 5 seconds to terminate operation. 2) Close the door and continue your operation again. 3) Consult your service agent.

7.6 General Troubleshooting

Symptoms	**Possible Cause**	**Solution**
LCD not Illuminated	The main cable is unplugged or the socket switch is off.	Plug in the sterilizer and turn on the socket switch.
	Main switch not turn on.	Press the Power switch to ON ”I” position.
	No Fuse Breaker tripped.	Wait until the sterilizer cool down to room temperature. Press the buttons of two No Fuse Breakers on rear of unit to reset.
	LCD display fail.	Consult your service agent.
Steam leaks from the door	Dirty or worn silicone door gasket	Clean the silicone door gasket. If the silicone door gasket was used over one (1) year, please follow “8.4 Annually Maintenance” to replace it.
Door cannot be opened	Pressure persists inside chamber	1. Press  button to open the door. 2. Consult your service agent.
Water inside chamber doesn’t automatically return to outside.	Piping system of filter blocked, or faulty exhaust solenoid valve.	Contact local distributor for service.
Excessive force is required to pull the safety valve	1. Do not use suitable tool.	1. Please use a tool (e.g. screw driver or pliers) to pull the ring.
	2. Faulty safety valve	2. Contact local distributor for service.

⚠**WARNING:** Contact local distributor for service. DO NOT disassemble the sterilizer by yourself if the symptoms still exists, as explosion and scald may occur.

8. Maintenance Instructions

⚠**WARNING:** Failure to follow the Maintenance Instructions will adversely affect performance and lifespan of the sterilizer, and may invalidate the warranty.

⚠**WARNING:** Before conducting maintenance, please turn off the sterilizer and disconnect from the power supply. Check the sterilizer has cooled down to room temperature.

⚠**WARNING:** Make sure that pressure gauge is reading ZERO before opening the door.

⚠**CAUTION:** Before conducting maintenance, confirm that the chamber is empty without loads.

Correct and regular maintenance is required to optimize the performance of the sterilizer. Failure to follow the Maintenance Instructions will adversely affect performance and lifespan of the sterilizer.

8.1 Daily Maintenance

- Perform B & D test.
- Perfor Helix Test.
- Clean the external surfaces with soft cloth.

⚠**NOTE:** Use only quaternary disinfectants to clean the units. Use of alcohol cleaner containing substantial of alcohol in the formula may damage the faceplate.

- Wipe the inside of the chamber, door and the gasket with a damp, lint-free cloth.
- Check the water level. Top up with water for sterilization or distilled water only.
- Ensure the vent holes (Figure 38 –Rear View) are not blocked.
- Check the status of the power cord. Call for service if breakage comes up.

8.2 Weekly Maintenance

- Clean the box, tray frame and trays with detergent, or a non-corrosive stainless steel cleaner and water, using cloth or sponge.
- Replace the water for sterilization or distilled water in water reservoir:
  Drain water from the water reservoir using Water Level/Drain Hose (Figure 37) located on the right side of the unit. Fill clean water for sterilization or distilled water.
- Clean the filter
  Use a wrench to unscrew the filter nut counterclockwise as shown in Figure 165 and Figure 166.

CAUTION: Place a towel underneath the filter tap to avoid leakage.

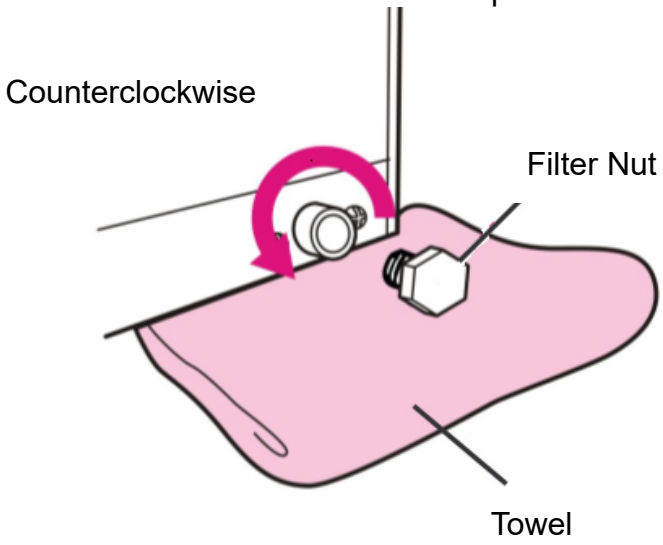


Figure 165

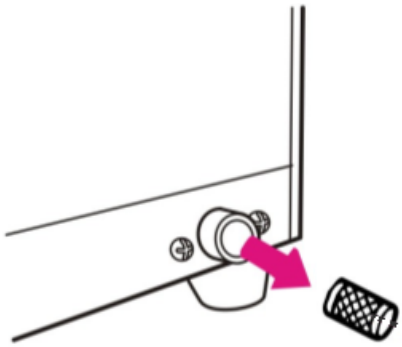


Figure 166

Take out the filter carefully, and flush it with water to clean it. Assemble it back as shown in Figure 167.

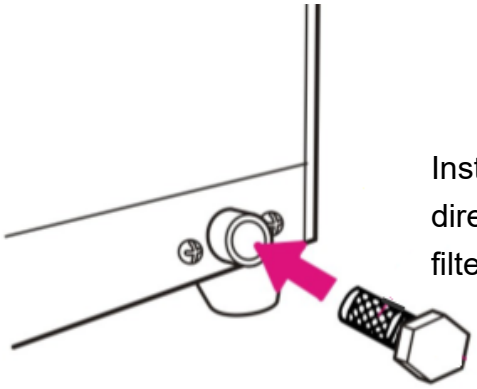


Figure 167

8.3 Monthly Maintenance

- Use the non-corrosive cleaner and stiff bristled brush or sponge to clean the water level sensor at the rear of the chamber as shown in Figure 168.

⚠**CAUTION:** Clean the dirt off from the sides of the sensor is more important than the tip. Use a damp cloth to wipe the surface after cleaning.

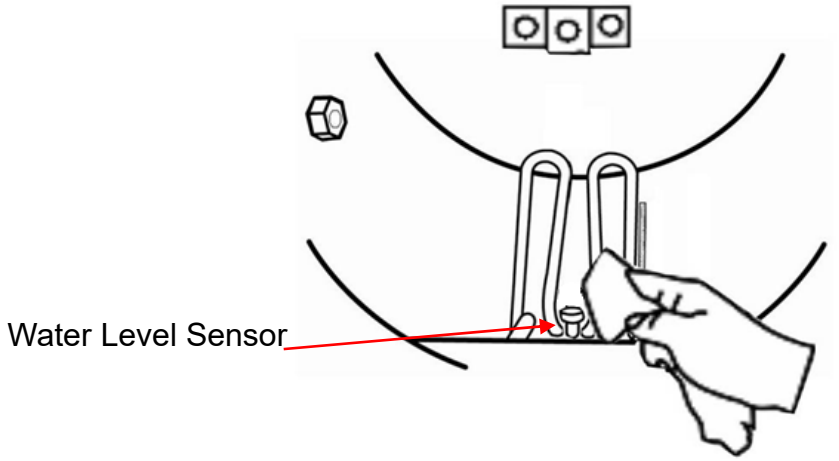


Figure 168

- Clean the chamber and piping system with “CHAM-MATE” following the instructions on the sachet.
- Check the safety valve

  Turn off the power and unplug the sterilizer. Remove the water reservoir cap as shown in Figure 169. Use a screw driver to pull the metal ring of the safety valve for approx. 3 seconds; then release. Perform the check 3 times. Put the water reservoir cover back.

⚠**WARNING:** If excessive force is required to pull the safety valve, it must be replaced. Call for service.

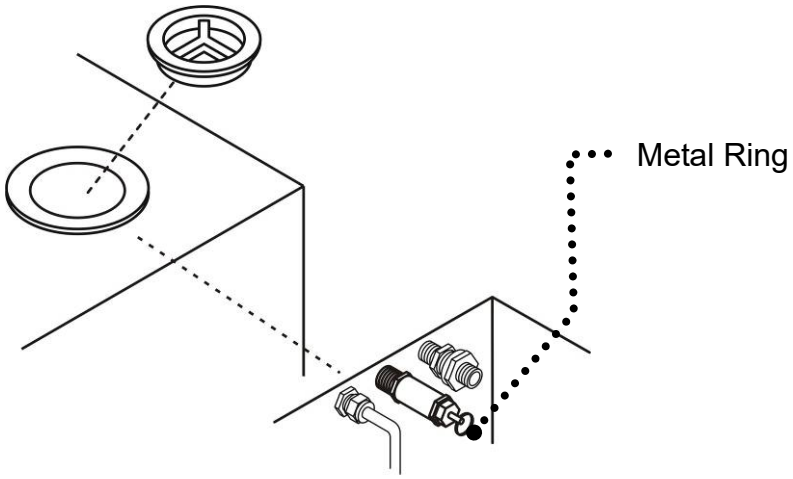


Figure 169

- Check if the Air Filter too dirty.

Figure 170

Open the door and visual inspect if the Air Filter become dark-grey. Replace with a new Air Filter (HEPA) with the same part number.

⚠**WARNING:** If excessive force is required to pull the safety valve, it must be replaced. Call for service.

To replace the filter proceed as follows:

1. Remove the old filter by turning the Air Filter counterclockwise until it is released.
2. Replace a new one by turning clockwise. Verify that the New Air Filter has fastened well in its place.

8.4 Annually Maintenance

CAUTION: An annual maintenance service by a trained engineer is necessary. Contact your distributor for details. The following maintenance instructions are for your reference only.

- Calibrate the temperature during sterilization process. (Use biological indicators to test the validity of sterilization)
- Check if there's any leakage of the piping.
- Check if the Process Status Indicator lights are functioning normally.
- Check the working status of steam trap, safety valve, and heater.
- Check if the silicone door gasket is chapped or worn. Silicone door gaskets are consumable parts, replace the silicone door gasket every year is recommended.

How to replace the silicone door gasket:

1. Remove the old gasket from the door, and then take out the gasket o-ring from the gasket. Install the gasket o-ring to the new gasket as shown in Figure 171.

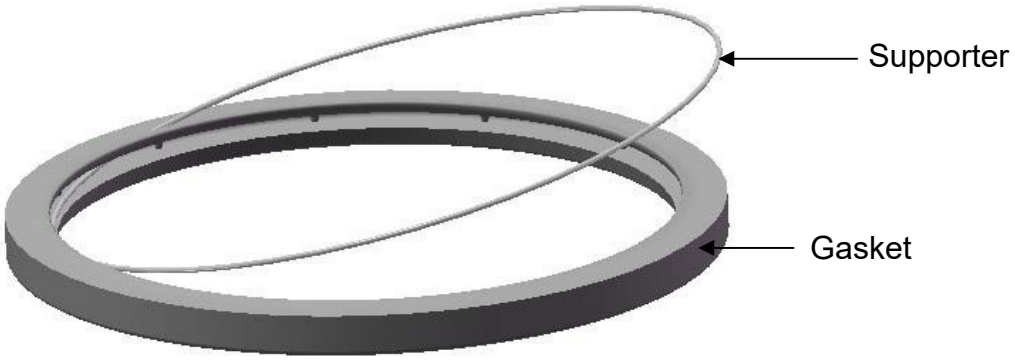


Figure 171

2. Check if the supporter is installed into the gasket completely as shown in Figure 172.

Figure 172

3. Install the gasket with the supporter inside to the door groove. Press the gasket into the door groove evenly as shown in Figure 173. Take notice of the installation direction while pressing the gasket into the groove as the gasket is designed with a trapezoidal section. Refer to Figure 174 for the correct direction.

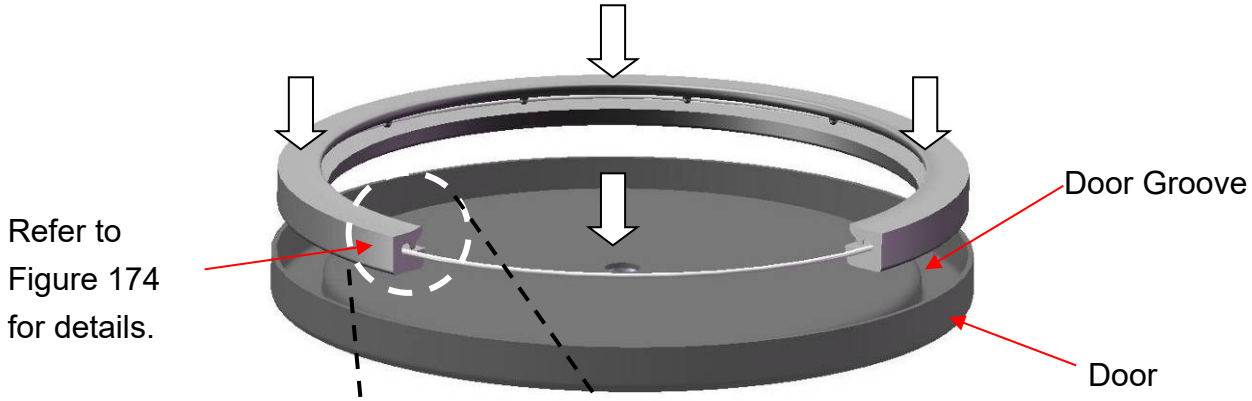
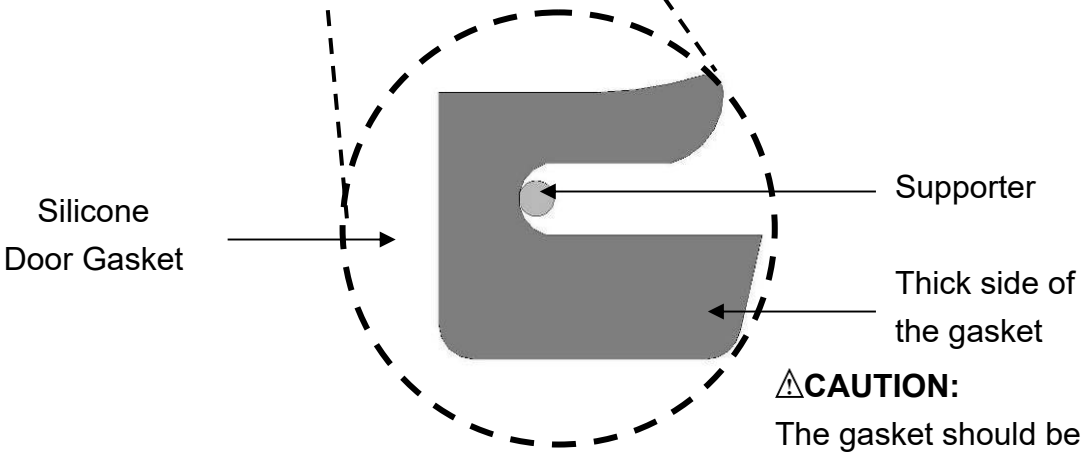


Figure 173



⚠**CAUTION:**
The gasket should be installed with the thick side towards the door groove.

Figure 174

⚠**CAUTION:** The old gasket should be disposed in accordance with the local laws.

9 Water Quality

Suggested maximum limits of contaminants in and specification for water for steam sterilization:

	Feed water	Condensate
Evaporate residue	≤ 10 mg/l	≤ 1,0 mg/kg
Silicium oxide, SiO_2	≤ 1 mg/l	≤ 0,1 mg/kg
Iron	≤ 0,2 mg/l	≤ 0,1 mg/kg
Cadmium	≤ 0,005 mg/l	≤ 0,005 mg/kg
Lead	≤ 0,05 mg/l	≤ 0,05 mg/kg
Rest of heavy metals, excluding iron, cadmium, lead	≤ 0,1 mg/l	≤ 0,1 mg/kg
Chloride	≤ 2 mg/l	≤ 0,1 mg/kg
Phosphate	≤ 0,5 mg/l	≤ 0,1 mg/kg
Conductivity (at 20 °C)	≤ 15 µs/cm	≤ 3 µs/cm
pH value	5 to 7,5	5 to 7
Appearance	colourless, clean, without sediment	colourless, clean, without sediment
Hardness	≤ 0,02 mmol/l	≤ 0,02 mmol/l
NOTE 1 The use of water for steam generation with contaminants at levels exceeding those given in this Table can greatly shorten the working life of a sterilizer and can invalidate the manufacturer's warranty of guarantee.		
NOTE 2 The condensate is produced from steam that has been taken from the empty sterilizer chamber.		

Compliance should be tested in accordance with acknowledged analytical methods.

Table 20

CAUTION: We recommend testing the water quality once a month. The use of water for autoclaves that does not comply with the table above may have severe impact on the working life of the sterilizer and can invalidate the manufacturer’s guarantee.

10 Test Instructions

10.1 Biological performance of sterilizers

It is commonly used as a challenge organism for sterilization validation studies and periodic check of sterilization cycles. The biological indicator contains spores of the organism on filter paper inside a vial. After sterilizing, the cap is closed, an ampoule of growth medium inside of the vial is crushed and the whole vial is incubated. A color and/or turbidity change indicates the results of the sterilization process; no change indicates that the sterilization conditions were achieved; otherwise the growth of the spores indicates that the sterilization process has not been met.

An example of Raven ProTest (that is Mesa Laboratories, Inc) is description as following:

1. Please one or more Raven ProTest units in a horizontal position in the most difficult to sterilize locations. Run Cycle.

   ⚠**WARNING:** After sterilization, handle unit with care.

   ⚠**NOTE:** Ravon ProTest is registered trademarks of Mesa Laboratories, Inc..

2. After the Biological indicator has cooled, crush the media ampoule by squeezing the sides of the plastic tube or by using the tool provide.
3. Place processed unit(s) and one unprocessed (control) unit in a vertical position in an incubator at 58-62℃ for steam (Geobacillus steaothermophilus) for 24 houurs.
4. Begin monitoring the incubated units after 24 hours. Record observations.
5. The control unit should exhibit turbidity and/or color change to or toward yellow.
6. A fail sterilization cycle is indicated by turbidity and/or color change to or toward yellow. A test unit that retains its original color indicates the sterilization parameters have been met.
7. More detail information please asks your dealer of biological test.

10.2 Air removal (Bowie-Dick type test pack)

A commercially available Bowie-Dick type test pack that is of a size appropriate to the chamber being tested. The indicator is a heat sensitive sheet that is placed in the middle of a packet made up of various layers of paper and foam rubber.

The packet for the B&D test must be inserted on it own, preferably on the lowest tray, with the label facing up. After performing the cycle, immediately verify the test. Being careful while handling the packet (It is still hot), remove the indicator sheet and follow the instructions given in the package for evaluating the result of test.

An example of B&D test (that is SPS medical company) is description as following:

⚠**NOTE:** SPS is registered trademarks of SPS medical company.

1. Assembly of the cube is reference.

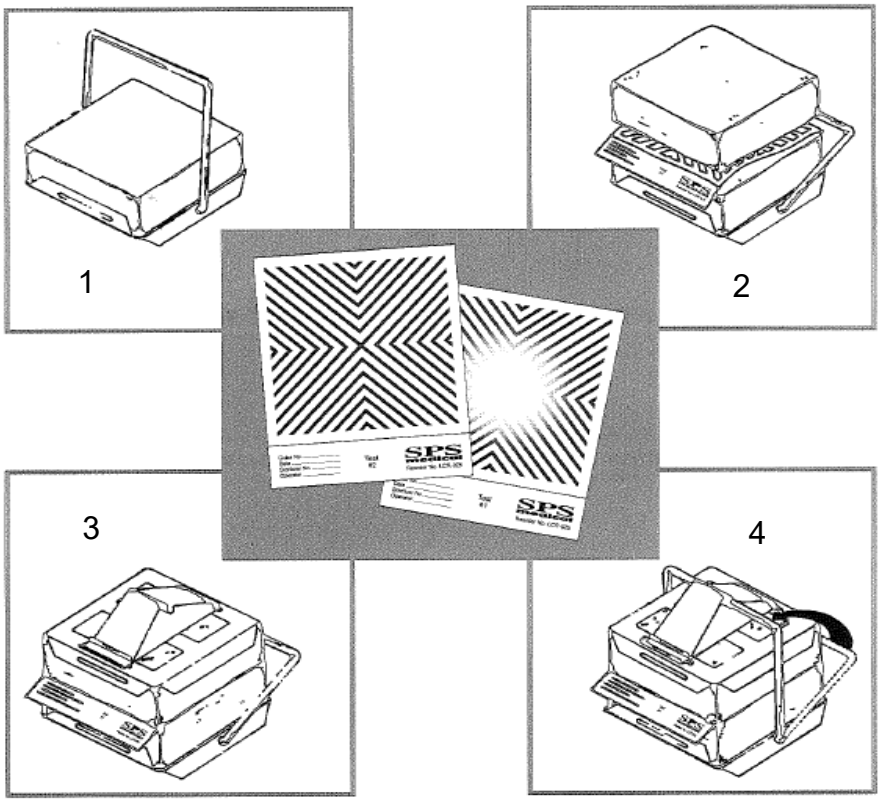


Figure 175

2. Place the pre-assembled Cube in the bottom section of the sterilizer rack, over the drain, in an otherwise empty chamber.
3. Running a steam cycle by sterilizer.

4. After processing, wear heat-resistant glover to remove the Cube from the sterilizer and allow to cool.

⚠**WARNING:** The metal clamp is hot at this stage of test.

5. Unlock the swing-bar and remove the indicator sheet from the center of the Cube.
6. The indicator test sheet should show a uniform color change. An incomplete color change may indicate sterilizer malfunction and should be immediately reported to the supervisor for review.
7. Complete the information on the test sheet and retain as permanent record.
8. More detail information please asks your dealer of B&D test.

10.3 Helix test

The Helix test represents a hollow A-type load, i.e. the load with the most critical characteristics.

Carry out the test as follows (Example of TST LOADCHEK OF BROWNE):

1. Place a test strip (product code : 3783) inside the capsule.

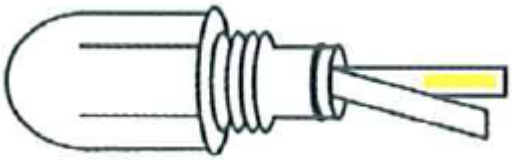


Figure 176

Figure 177

2. Close the capsule.
3. Place the test on the lower tray in the chamber.
4. Select and start B&D cycle at control panel.
5. Once the cycle is complete, open the door and remove the test.

⚠**WARNING:** The HELIX Test will be very hot!

6. Open the capsule and remove the test strip.
7. More detail information please ask your dealer of HELIX test.

8. The result is as follows:

Incorrect result:

Figure 178

Incorrect result:

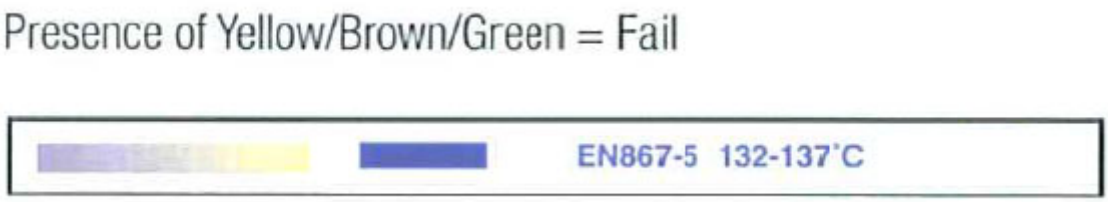


Figure 179

correct result:

Figure 180

11. Specifications

Model	**SA-260MB**
Chamber Capacity (L)	24
Maximum Instrument Length (mm)	350
Maximum Load (unwrapped, solid) (g)	5,000
Maximum Load (wrapped) (g)	1,500
External Dimensions (mm)	553 (W) ×440 (H) × 665 (D)
Chamber Size (mm)	260 Diameter × 450 Depth
Gross Weight (kg)	54
Voltage/Wattage (Heater)	230V AC, 50/60Hz, 12A
Heater	1800W for main heater. 870W for band heater
Fuses	15A × 2, No Fuse (circuit) Breaker
Water Reservoir Capacity (ml)	4200
Water Capacity per Cycle (ml)	1270
Sterilization Temperature (°C)	105 – 130
Working Environment	● Indoor use; ● Under 3,000m (altitude); ● Temperature 5°C to 40°C; ● Relative Humidity 80%RH@31°C to Relative Humidity 50%RH@40°C; ● Voltage fluctuation ±10 %; ● Transient overvoltages category II; ● Pollution degree 2
Transportation Conditions	-10°C to 70°C, 10%RH to 90%RH
Storage Conditions	-10°C to 50°C, 10%RH – 70%RH
Designed Temperature(°C)	142
Designed Pressure	2.76 kgf/cm^2 (2.7 bar)
Over Pressure Protection	2.55 kgf/cm² (2.5 bar)
Air Filter Efficiency	$\leqq 0.3\ \mu m$
Over Pressure Indication	Yes
Over Temperature Indication	Yes
Water Level Indication	Yes
Door Lock Indication	Micro switch sensor with warning LCD
Pressure Display	Analog pressure gauge, LCD display
Function Display	LCD
Sterilization Program	Unwrapped 121°C Wrapped 121°C Unwrapped 126°C Wrapped 126°C LIQUID 105-135°C(Optional) Customization 105-130°C
Test Program	Leakage test, Helix test, Bowie-Dick test
Dry Program	1-60 minutes
Others Function	Cancel, Emergency. Sterilization process recording, Auto add water, Real-time Printer, Cycle counter, Next Service cycles remind, Unit Setting for Pressure and Temperature, Date and time setting Calibration Mode/Engineering Mode
Printer	Thermal Printer
Max. capacity of SD card	SD/HC (Max. 32GB)

WARRANTY

"**STURDY**" product has one (1) year warranty from the date of purchase that covers any defects in materials and quality under regular use.

This warranty does not apply to any product damaged by accident, misuse, abuse, neglect, improper line voltage, drop, fire, flood or alteration/ repair by non-qualified service personnel.

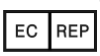
The liability of Sturdy Industrial Co., Ltd. is limited to repair of replacement and under no circumstances shall "**STURDY**" be liable for any collateral consequential damages or loss. This guarantee excludes explicitly the expendables and consumable.

All warranty claims must be directed to the distributors or agents that Sturdy Industrial Co.,Ltd. authorized. Whom is responsible for the sales of this equipment. The customers are responsible for shipping expense.

User's Name:
Address:

Country: _____ Tel: _____ Fax:
Date of Purchase: _____ Model No.:
Series No.:
Distributor:

Manufacturer: Sturdy Industrial Co.,Ltd. (ISO 13485 Approved)

Name	Sturdy Autoclave Sterilizer
Model	SA-260MB
Manufacturer 	Sturdy Industrial Co. Ltd.
Address	No. 168, Sec. 1, Zhongxing Rd., Wugu District, New Taipei City, 24872, Taiwan
EC Representative 	APEX MEDICAL S.L. Elcano 9, 6 ª planta 48008 Bilbao. Vizcaya SPAIN