



“Sturdy” Autoclave Sterilizer

SA-230FA / SA-260FA SA-230FA-R / SA-260FA-R Instruction Manual

Please read manual carefully before using and keep it well.


CE₂₄₆₀


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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.


 **Warning:** The outer casing and metal surfaces of the sterilizer will be hot during operation, please do not touch it.


 **Warning:** Steam and hot water will be present when opening the door after a sterilizer cycle. Avoid contact.


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


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


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


 **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).


 **Warning:** Use only distilled water. Normal tap water contains minerals, especially chlorides, which have corrosive effects on stainless steel. Failure to use distilled water will invalidate the warranty.


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


 **Warning:** The door must be closed completely during operation of the unit. If the "DOOR" indicator light illuminates, it means that the door is not closed properly.

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



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


 **Warning:** Always check the water level in the reservoir before running a sterilization cycle. If the LOW WATER indicator light illuminates, add distilled water. If the water is sufficient, but the LOW WATER indicator light is still illuminating, refer to Troubleshooting.


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


 **Warning:** The ADD WATER indicator light (Figure 16 & Figure 18) will illuminate during the sterilization cycle. This is part of normal operation and no


action on the part of the user is required.


 **Warning:** If the ALARM indicator light  illuminates, the machine is over-pressure or overheated. The sterilizer will shut down automatically. Contact your supplier for service support.


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

 **Warning:** Always keep the sterilizer clean.














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

 **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.

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

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

2. Explanation of Safety Symbols and Notes

	Caution, consult instruction manual for use
	Protective earth (ground)
	Alternating Current
	Attention! Hot surface
	Caution, risk of electric shock.
	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 and the last 2 digits represent the month.
	Consult instruction manual for use
	On, connection to the mains
	Off, disconnection from the mains
	Open the door to this label.
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 to or destruction of the equipment or other property.
WARNING	Indicates correct operating or maintenance procedures in order to prevent damage to 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.

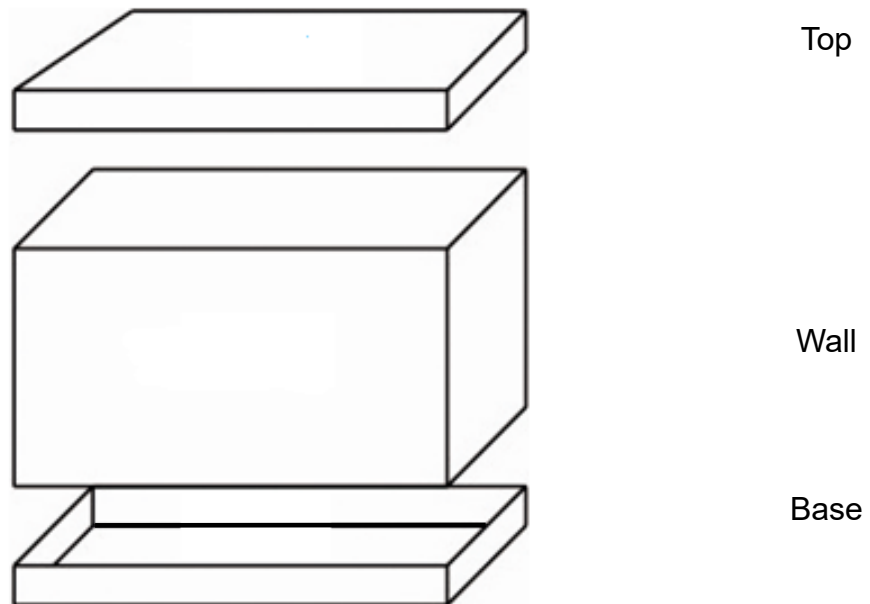


Figure 1

- 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
 - Sterilization Box × 1 (Standard)*
 - Tray Frame × 1 (Optional) *
 - Tray × 3 (Optional)*
 - Holder × 1 (Optional)*
 - Spring Pouch Rack (Optional)*

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

We recommend that all packaging material is retained for possible re-use.

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 “9. Specifications”.

4.2 Install the sterilizer



Caution: Please read and follow “5.2” on Page 12 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 “Specifications”.



Caution: Position the sterilizer on a stable laboratory 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.



CAUTION: The autoclave MUST BE earthed!



CAUTION: The circuit-breaker is also serves as a disconnect device for disconnecting the power, it should be so located that the circuit-breakers are not blocked by any other devices.

- A. Open the water reservoir cap; pour distilled water into the water reservoir as Figure 2.

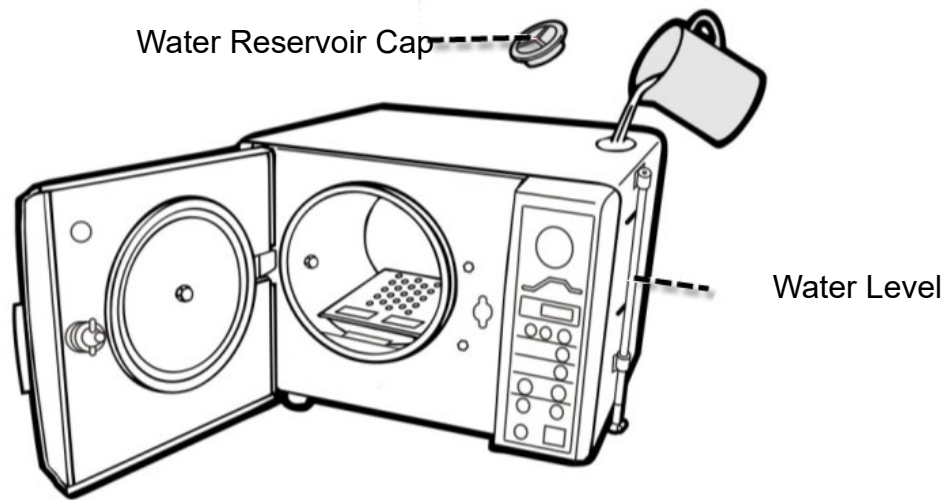


Figure 2

Caution: Please fill Distilled Water Only into the unit. Take care not to overfill the yellow water level mark as Figure 3 and Figure 8.

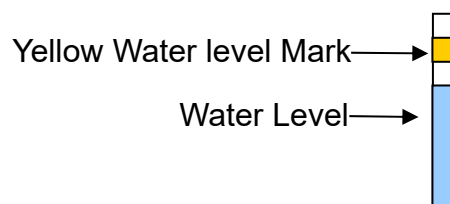


Figure 3

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 returned to the reservoir automatically. (*The water will remain in the chamber after Liquid program performed.)

- B. Install the heater cover to the chamber as Figure 4. (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.

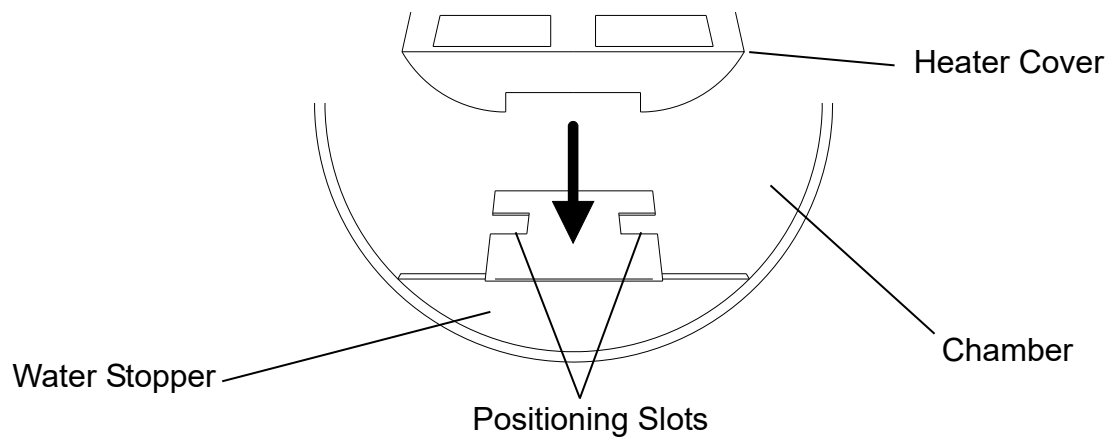


Figure 4

- C. Install the Sterilization Box as Figure 5. (standard accessory)

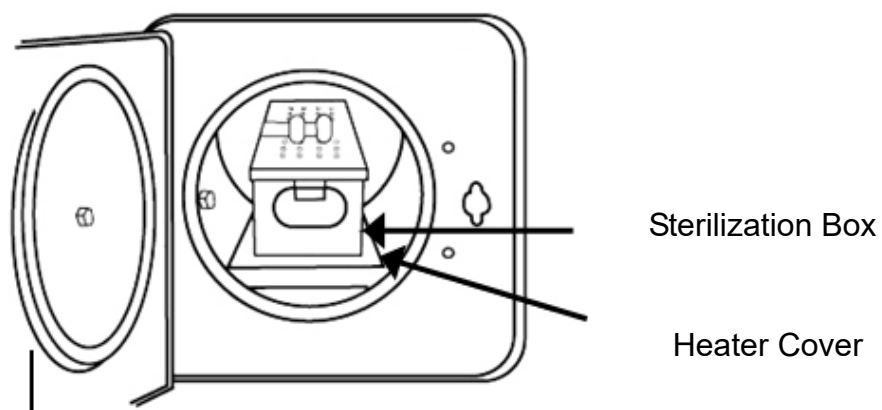


Figure 5

D. Install the tray frame as Figure 6. (optional accessory)

⚠ Caution: The frame should be installed as Figure 6 below. The indentation of the frame will pass the bushing in the chamber.

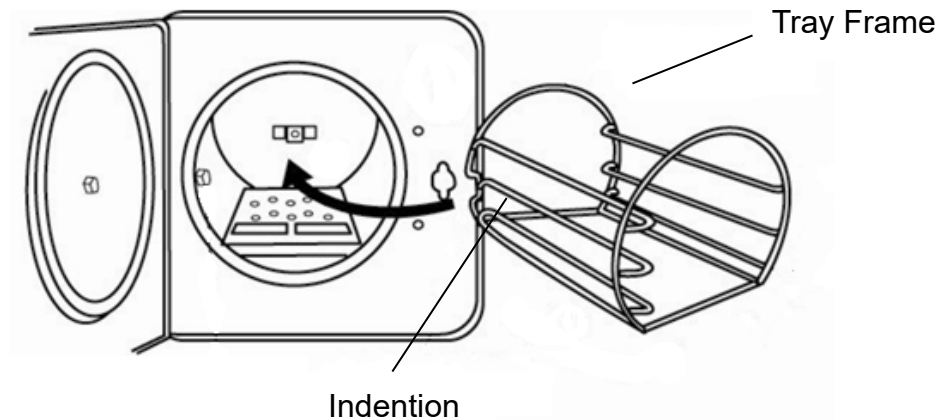


Figure 6

E. Install the tray as Figure 7. (optional accessory)

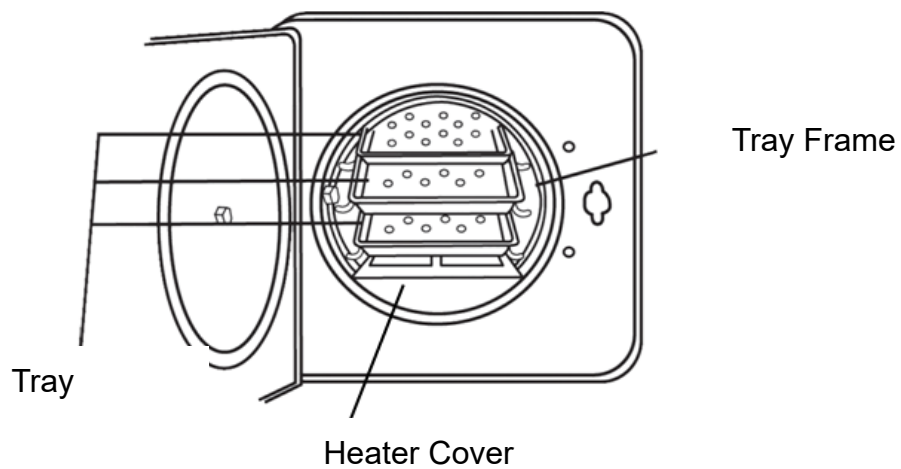


Figure 7

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

- G. 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 16 A / 230V AC.



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

- H. Press the “POWER” switch to ON “I” position, the power indicator light should illuminate with a short beep. The “DOOR” indicator light should be off. If the sterilizer does not perform as above-mentioned, please turn off the power and unplug the sterilizer, repeat the steps from 4.2.A to 4.2.F. 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. It can also perform sterilization of liquid which is not for medical purpose*.

(*Liquid program is optional by order.)

5.2 Description of the Sterilizer

5.2.1 External View

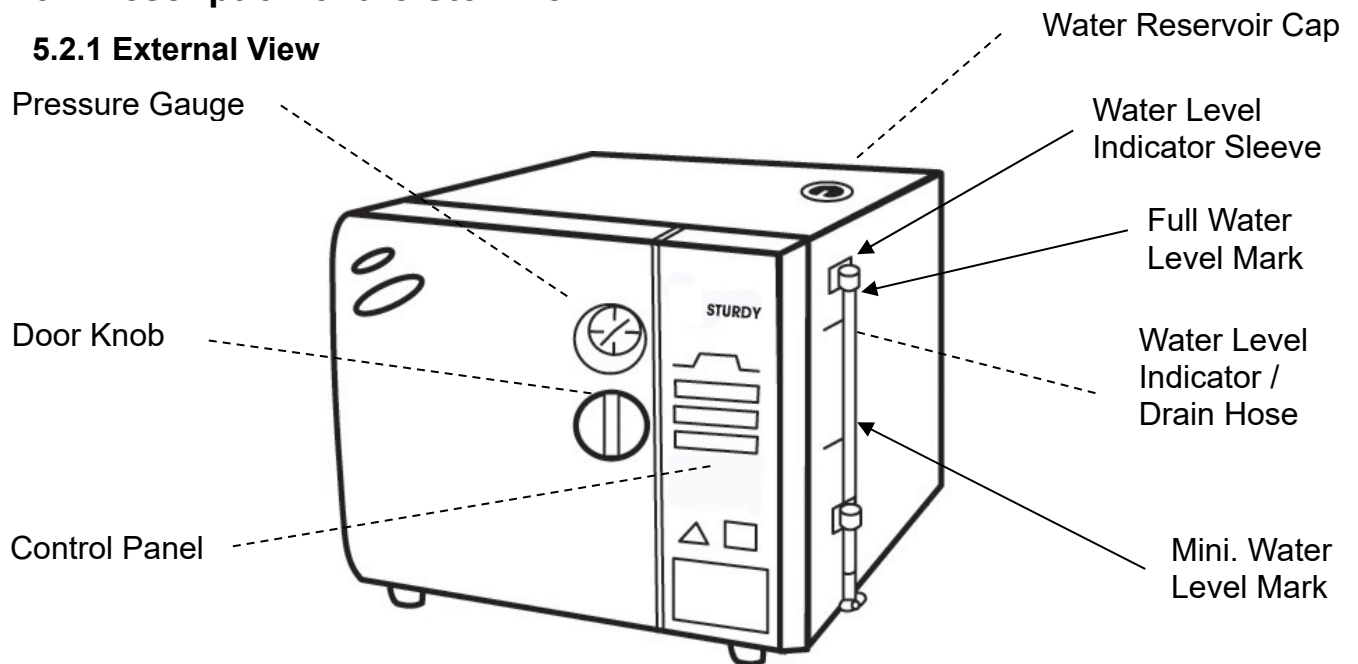


Figure 8

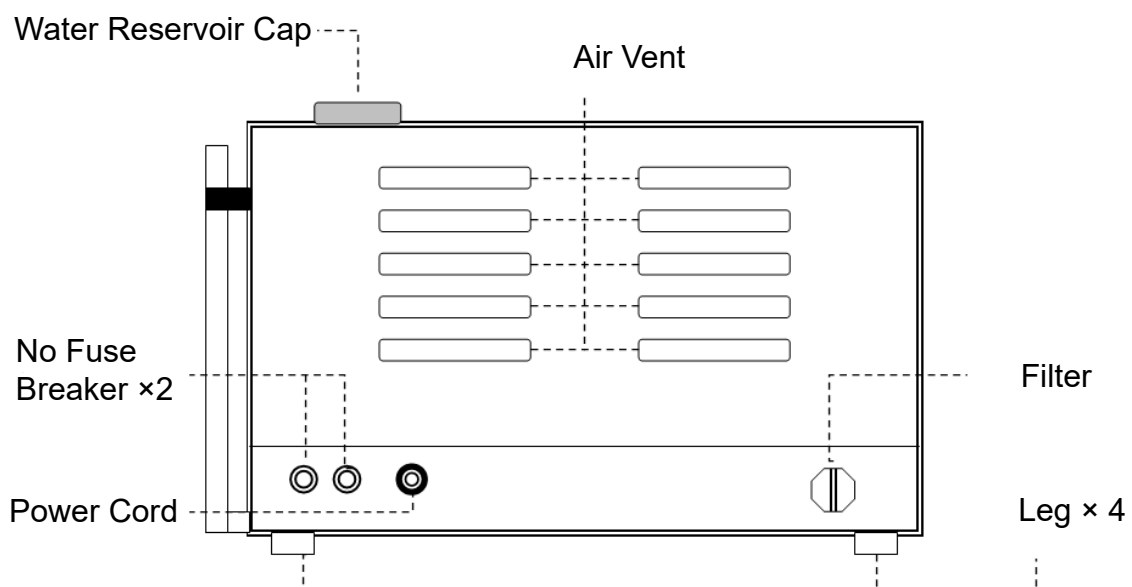


Figure 9

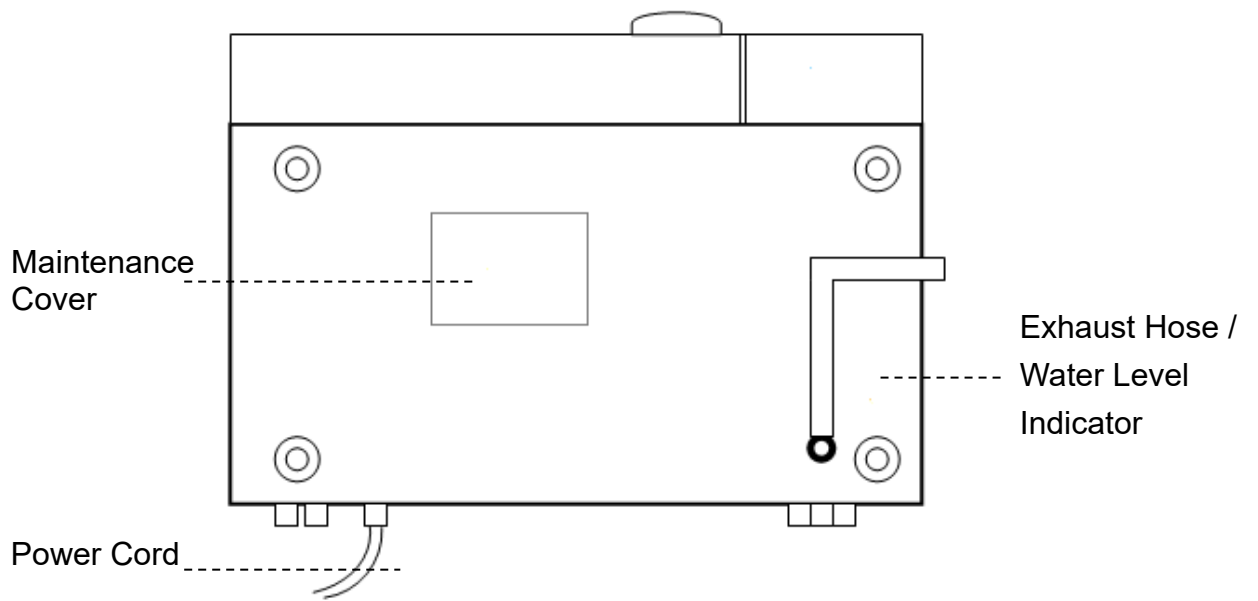


Figure 10

5.2.2 Internal Configuration

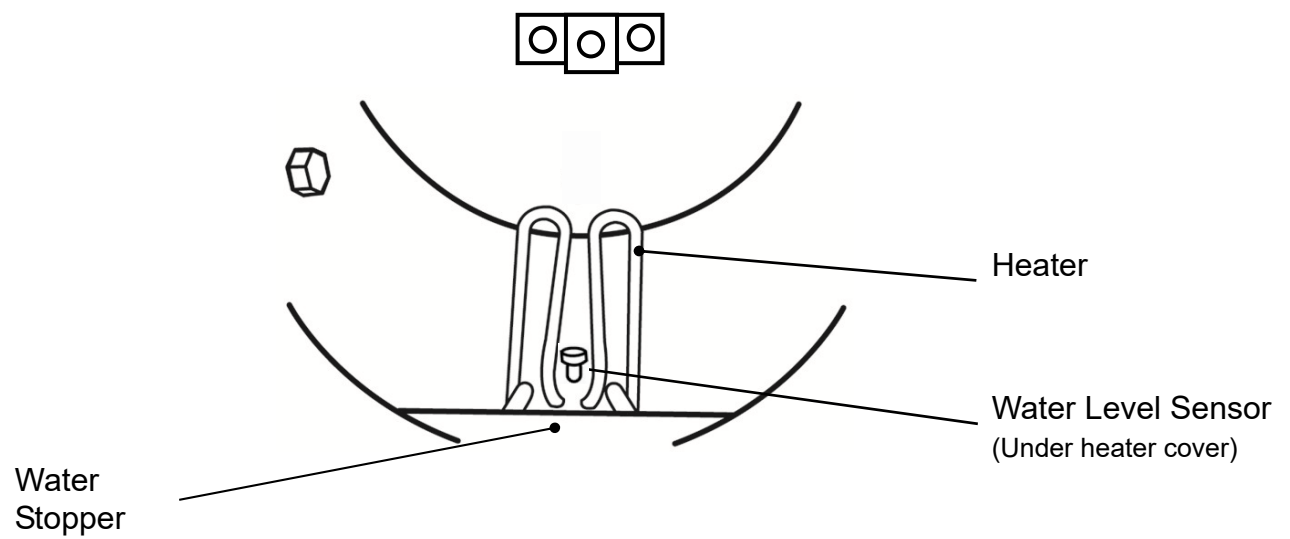


Figure 11

5.2.3 Control Panel (Re-Dry Program)

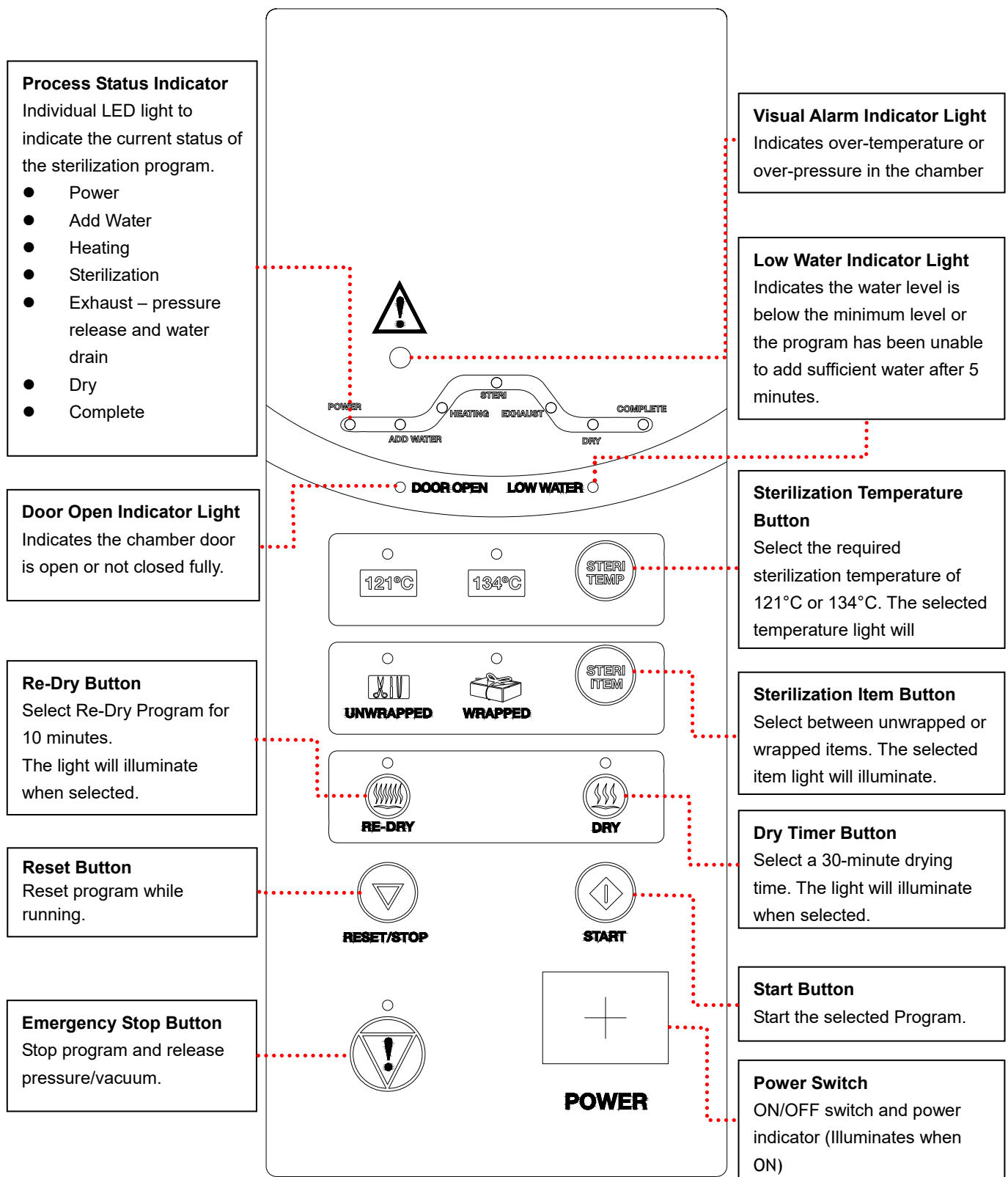


Figure 12

5.2.4 Control Panel (Liquid Program*) *Optional by order request.

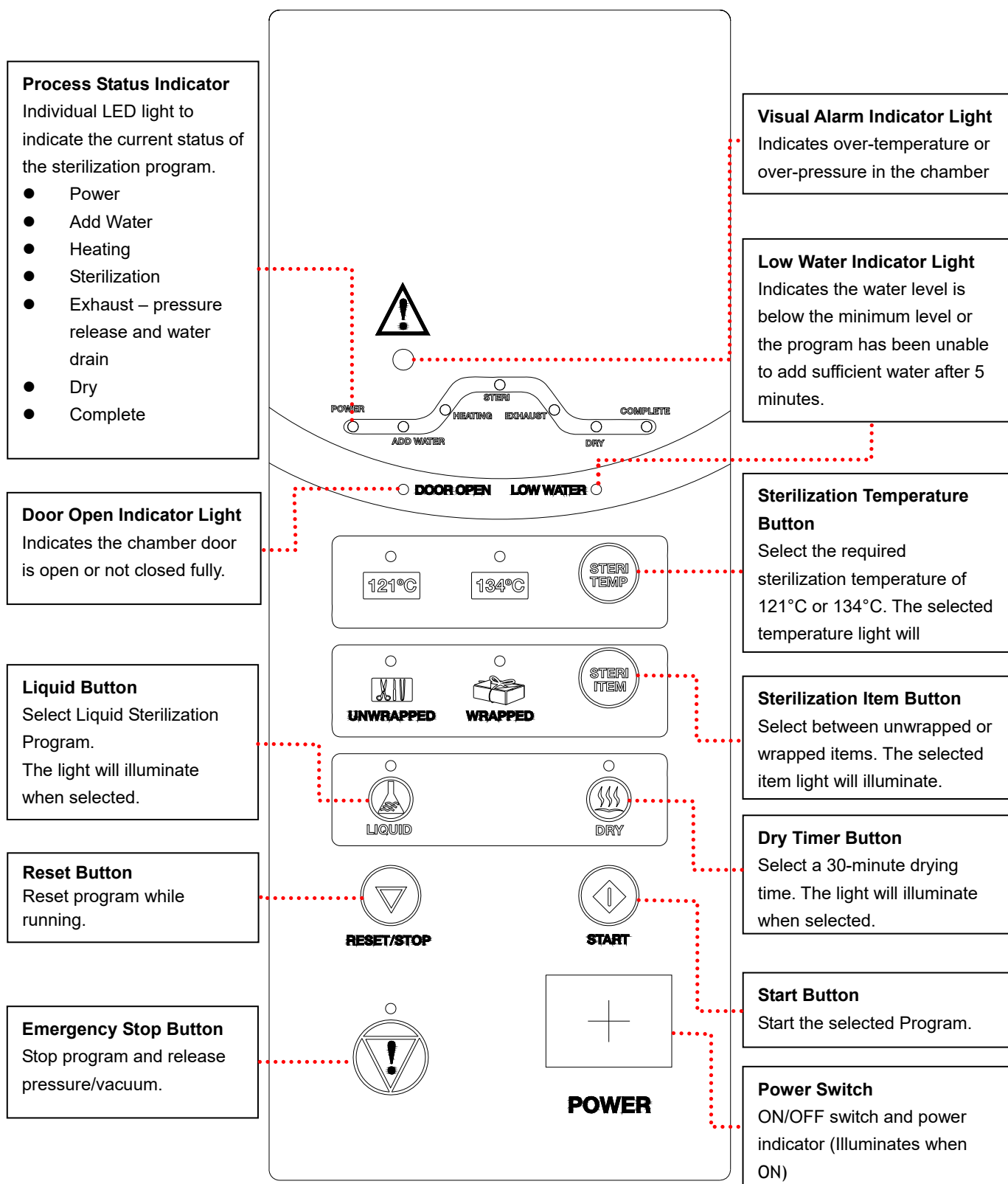
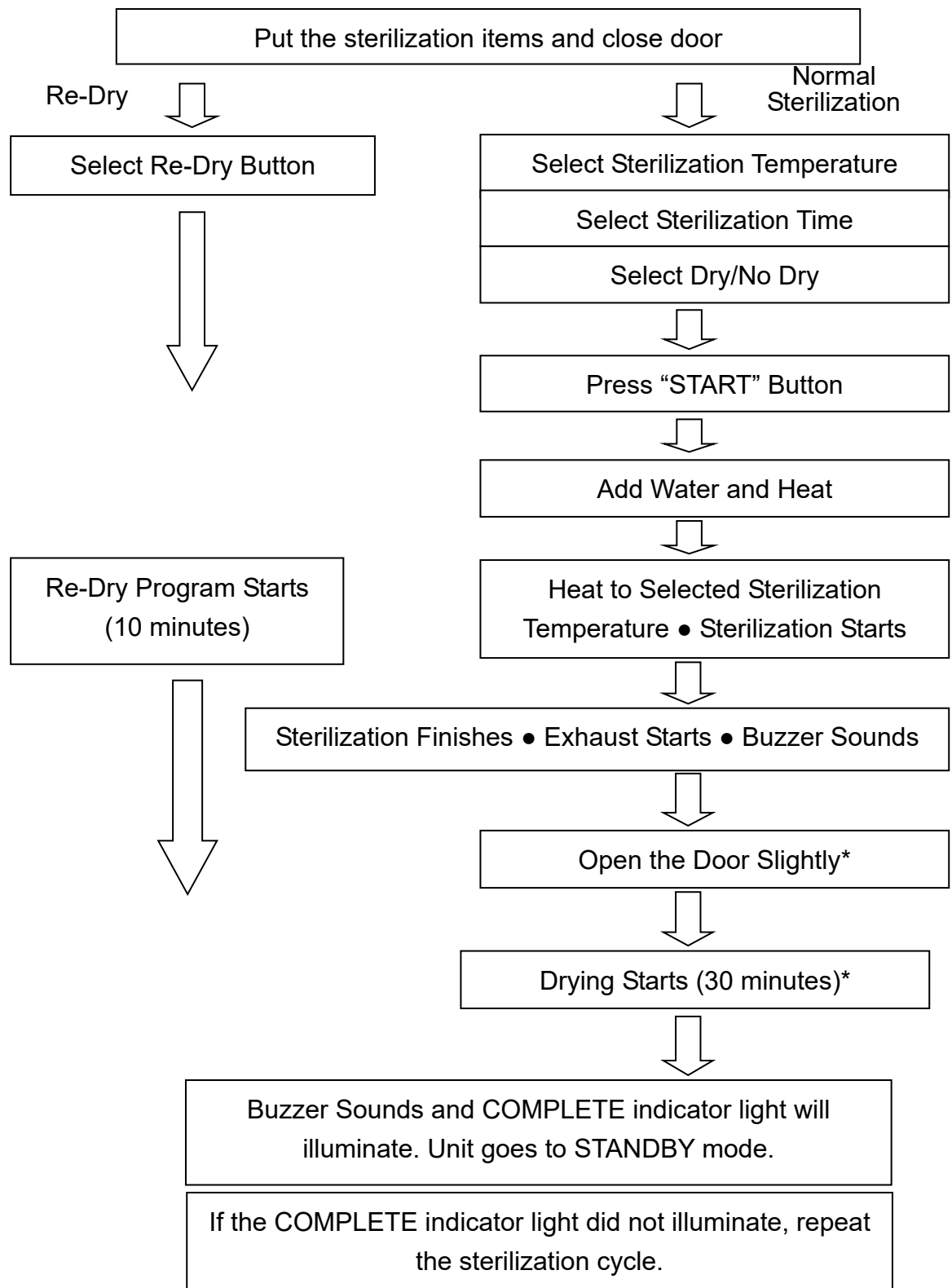


Figure 13

6. Operation

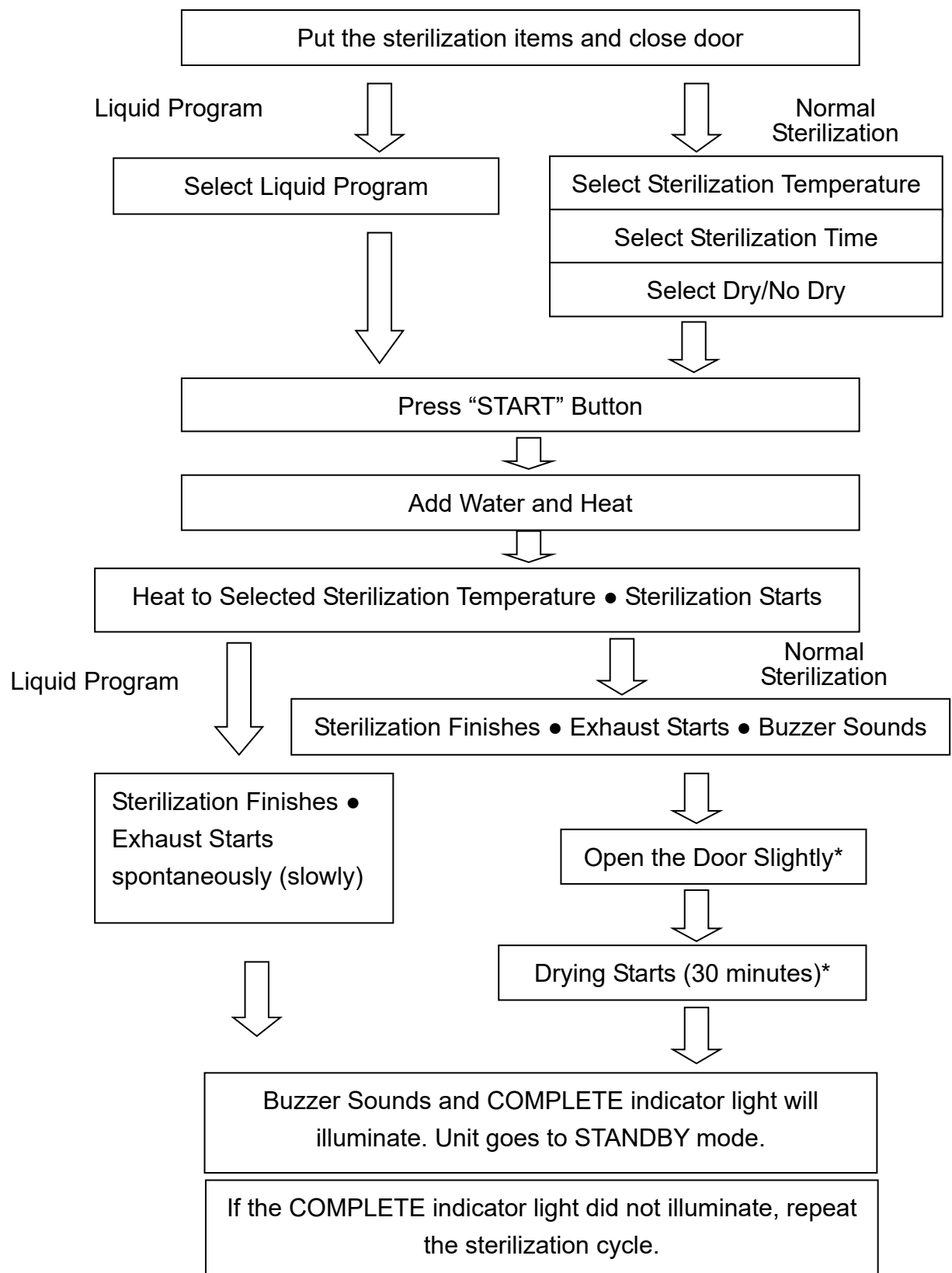
6.1 Operation Overview

6.1.1 Operation Overview (Re-Dry Program)



*If dry timer is selected.

6.1.2 Operation Overview (Liquid Program) *Optional



*If dry timer is selected.

6.2 Normal Sterilization Program

- A. Follow “4. Installation” on Page 7 to finish installation first.
- B. Follow “4.2 Install the sterilizer” on Page 7 to make sure the water inside reservoir is sufficient.
- C. Check the Pressure Gauge is reading ZERO, and then open the door by turning the door knob 90° counterclockwise.
- D. Place the items to be sterilized and the sterilization indicator strips into the box as required. Remember to open both side windows before placing the box into the sterilizer as Figure 14.

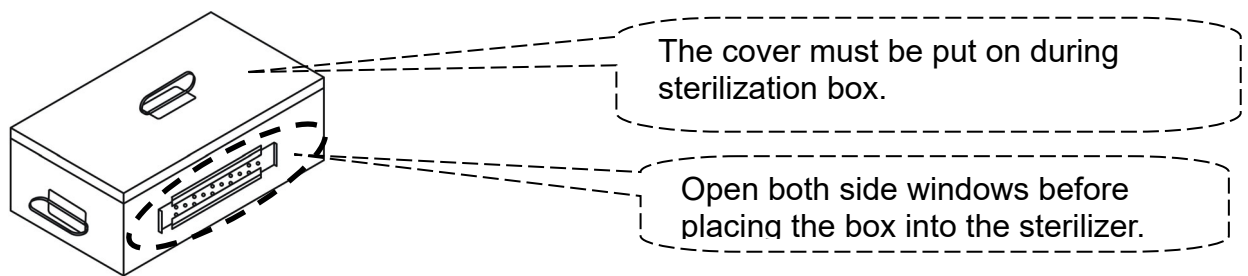


Figure 14



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



Warning: Refer to “10. Specifications” for the maximum permissible load. Failure to follow these instructions may cause the sterilizer to malfunction and result in an unsuccessful sterilization cycle.

- E. Close the door and turn the knob clockwise 90° to lock.
- F. Press the “POWER” switch to ON “I” position, the power indicator light should illuminate with a short beep. The “DOOR” indicator light should be off.
- G. How to set the normal program:

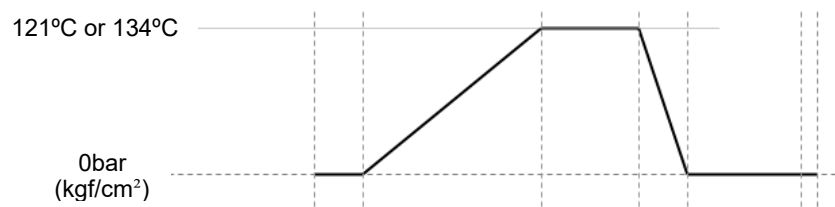



Figure 15


G.1 Press “STERI TEMP”



to select 121°C or 134°C

G.2 Press “STERI ITEM”  to select unwrapped instruments or wrapped items. The corresponding parameters will be:

	Sterilization Temperature 121°C	Sterilization Temperature 134°C
Unwrapped	22 Mins	4 Mins
Wrapped	30 Mins	15 Mins

G.3 Press Dry Timer Button  **DRY** to select a 30-minute drying time. (*If drying is required.)





G.4 Press the START Button  and the sterilizer will automatically run through the selected program. The current progress of the sterilization cycle is indicated by the illuminated LED on the Process Status Indicator (Figure 16).




Figure 16


G.5 Operations Sequence


- ADD WATER: Add water from water tank into chamber automatically until water reach to preset level.
- HAET: Heating chamber by heater.
- STER.: Sterilization temperature is maintained for the preset sterilization time.
- EXHAUST: Steam is exhausted out of the chamber until pressure drops to zero after STER. step.
- Buzzer sounds to remind operator to open the door slightly to this mark  “”. Leftover moisture is then removed by dry function for 30 minutes.
- On completion, buzzer will sound (long beep). The program has finished when buzzer stops alarm and the COMPLETE indicator light is illuminated.


 **Warning:** If the COMPLETE indicator light was not lit, the cycle has failed and should be re-run.

G.6 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 “9. 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-minute interval between each sterilization cycle to allow the unit to cool.

6.3 Re-Dry Program


Press Re-Dry  button and the indicator light will illuminate. Then press START

button  to run a 10-minute re-dry program. During the re-dry process, the DRY indicator light will flash on the Process Status Indicator.

On completion, the buzzer will sound (long beep). The program has finished when the buzzer STOPS and the COMPLETE indicator light is illuminated on the Process Status Indicator.

6.4 Liquid Program (Optional)

- A. Follow “4. Installation” on Page 7 to finish installation first.
- B. Follow “4.2 Install the sterilizer” on Page 7 to make sure the water inside reservoir is sufficient.
- C. Check the Pressure Gauge is reading ZERO, and then open the door by turning the door knob 90° counterclockwise.
- D. Place the items to be sterilized into the container as required.

 **Warning:** Refer to “10. Specifications” for the maximum permissible load. Failure to follow these instructions may cause the sterilizer to malfunction and result in an unsuccessful sterilization cycle.

- E. Close the door and turn the knob clockwise 90° to lock.
- F. Press the “POWER” switch to ON “I” position, the power indicator light should illuminate with a short beep. The “DOOR” indicator light should be off.
- G. How to set the Liquid program

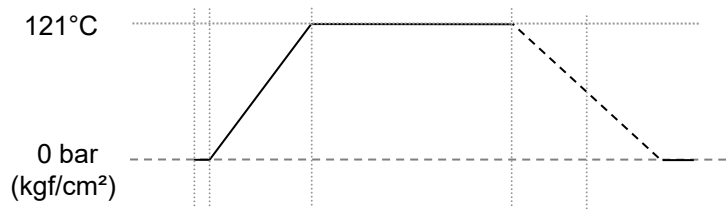


Figure 17

Caution: After the sterilization phase finished, the unit will take 20 minutes to exhaust spontaneously. Then the COMPLETE indicator light is illuminated on the Process Status Indicator.



G.1 Press **LIQUID** to start “Liquid Program”. The corresponding sterilization time will be:

Sterilization Time	40 Minutes
Sterilization Temperature	121°C
Dry Time	N/A



G.2 Press the START Button **START** and the sterilizer will automatically run through the selected program. The current progress of the sterilization cycle is indicated by the illuminated LED on the Process Status Indicator. (Figure 18)

Note: The DRY phase won't be performed.



Figure 18

G.3 Operations Sequence


- ADD WATER: Add water from water tank into chamber automatically until water reach to preset level.
- HAET: Heating chamber by heater.
- STER.: Sterilization temperature is maintained for the preset sterilization time.
- EXHAUST: Steam is exhausted slowly out of the chamber until pressure drops to zero after STER. step.

- Buzzer sounds to remind operator to open the door slightly to this mark





“. Leftover moisture is then removed by dry function for 30 minutes.


- On completion, buzzer will sound (long beep). The program has finished when buzzer stops alarm and the COMPLETE indicator light is illuminated.


 **Warning:** If the COMPLETE indicator light was not lit, the cycle has failed and should be re-run.


G.4 Open the door and take out the sterilized items.

 **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-minute interval between each sterilization cycle to allow the unit to cool.


 **Caution:** After the Liquid program, please take out the sterilized items, and then re-run the “Normal” program to let the water inside chamber return to the water reservoir.

6.5 Emergency Stop

Press the Vacuum/Pressure Release Button  3 seconds during a cycle to stop the program and release the pressure/vacuum. The sterilizer will sound to alert. Please wait till the pressure gauge is reading ZERO, and then the Reset Button


 **RESET/STOP** can be pressed to reset the program.

 **Warning:** The Vacuum/Pressure Release Button can only be 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.

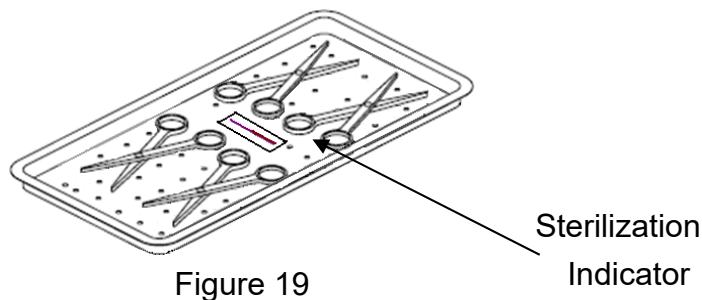
6.6 Placement for items to be sterilized

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.

6.6.1 Sterilization for Implements

Place implements on the tray evenly according to Figure 19. Do not pile up nor overlap each implement.




 **Warning:** If implements are packed with sterilizing pouches, please make sure not to pile them up. Follow Figure 20 for correct placement and do not overlap pouches like Figure 21 to ensure the sterilization quality.



Figure 20



Figure 21

Warning: We suggest using Spring Holder for items with sterilizing pouches to assure sterilization result. Follow Figure 22 or Figure 23 to place each pouch separately. Spring holder is available as an optional accessory.

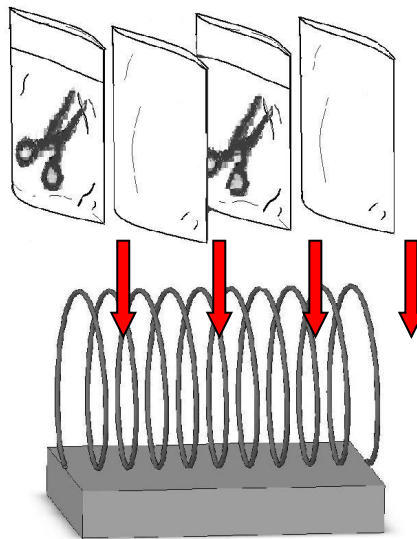


Figure 22

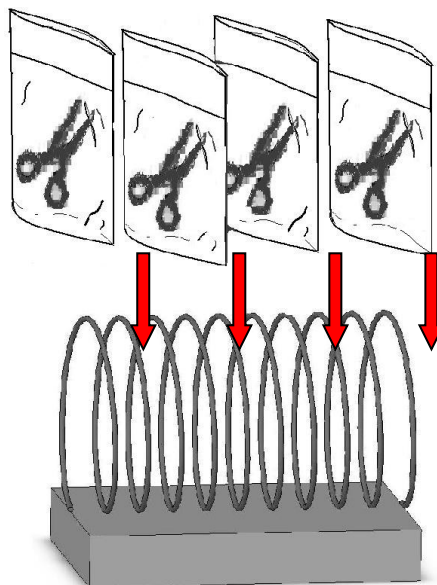



Figure 23

 **Warning:** If implements are packed with sterilizing pouches and placed inside a sterilization box, make sure to display items as Figure 24.

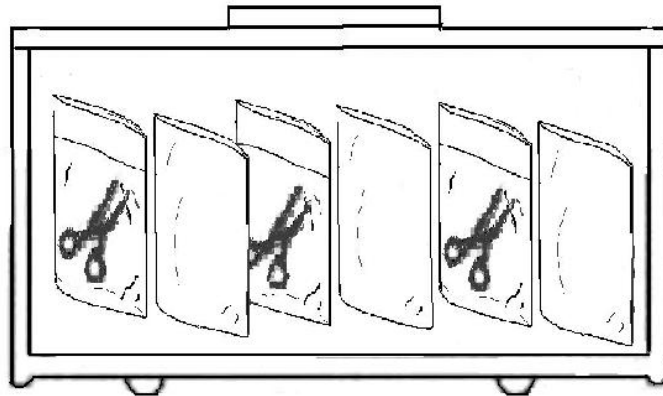



Figure 24

6.6.2 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 25.

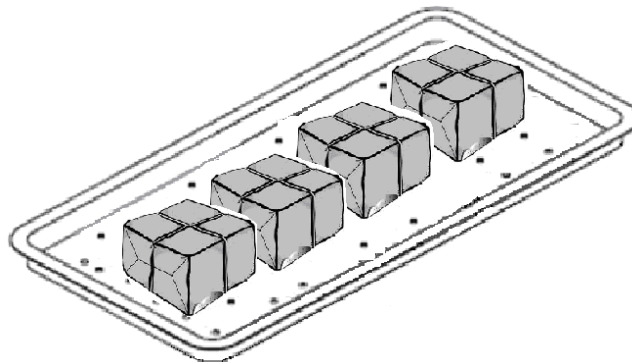


Figure 25

- 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.

6.6.3 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 26



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

6.6.4 Glassware

- Use only heat-proof glass.
- Verify that the beaker is only filled 2/3 full and the lid is on loosely to allow for expansion.
- Items should not be allowed to touch the walls of the Chamber as the hot metal can damage the item.

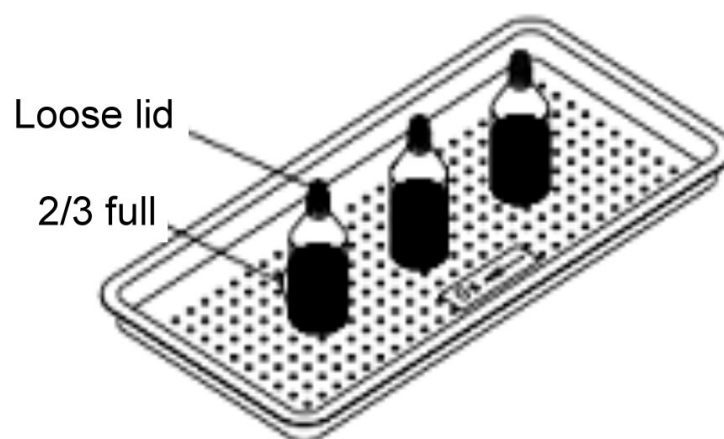


Figure 27

7. Recorder (SA-230FA-R / SA-260FA-R)

7.1 Intended use

This paperless Recorder records the sterilization temperature, theoretical steam pressure and real time information during each cycle as an optional method of printer. It records the specified information onto a USB flash drive, in the Excel csv (Comma Separated Values) format which is compatible with Microsoft® Office Excel or Windows® WordPad.



Note: Insert a formatted USB flash drive before commencing a sterilization cycle.



Note: Microsoft Office Excel and Microsoft WordPad are registered trademarks of Microsoft, Inc. Microsoft is a registered trademark.



Note: A minimum 20 minutes is recommended between each sterilization cycle, and be sure of “Data transfer complete” has been completed to a USB before starting a new sterilization cycle.

7.2 Recording contents

Description of recording contents:

Two types of recording files will be created for each sterilization cycle. One is Detail Contents in the format of “YYMMDD_HHMMSS.csv”, and the other is the Summary Contents in the format of “SYYMMDD_HHMMSS.csv”.

7.2.1 Description of Detail Content

Printer output	Description		
MODEL:SA-260FA-R	Model number		
Version:V0.99	Software version installed in this autoclave		
SN : 141005204-001	Series number		
Program : 134 Wrapped	Program selected		
Ster. Temp : 134 °C	Sterilization temperature		
Ster. Time : 15 m	Sterilization duration		
Dry Time : 30 m	Dry duration		
Date : 2016/06/13 Time : 11:45:57 AM	Date and Time of sterilization		
Cycle Counter : 59	Cycles that had been started		
StepTimeTemp.Pres. mm:ss°Cbar Start000:0025.40.07 000:0125.40.07 000:0225.40.07 ~ H1002:1628.40.07 002:1728.60.07 002:1728.60.07 ~ S00016:13136.92.34 016:141372.35 ~ S01017:13136.92.3 017:14136.92.29 ~ S02018:13136.92.26 018:14136.82.26 018:15136.82.26 ~ Ex031:31136.72.26 031:32136.62.25 ~ D0034:35990.08 034:3699.10.08 ~ D1065:06111.30.07 End065:07111.20.08	Step	action	
	Time mm:ss	mmm: minutes starting record, ss: seconds starting record	
	Temp(°C)	chamber temperature in °C	
	Pres(bar)	Chamber pressure in bar	
	Start	start time	
	H1	1st heating	
	S00	start of sterilization	
	S02	sterilization time recorded every 1 minutes after “S00”; and also the last sterilization time	
	EX	exhaust of water and steam	
	D0	dry time-started	
	D1	dry time-finished	
	End	end of recording	
	Ster. Temp : 134.7 ~ 136.8 °C		The maximum and minimum temperature detected during sterilization period
	Ster. Pres : 2.12 ~ 2.26 bar		The maximum and minimum pressure detected during sterilization period
	Ster. Time : 015:16		Sterilization period
	Total time : 065:08		Time elapsed between start and program complete
	Program complete		Message of ending recording
	Signature:_____		Signature office

7.2.2 Description of Summary Contents


Printer output	Description																																																																																																																								
MODEL:SA-260FA-R	Model number																																																																																																																								
Version:V0.99	Software version installed in this autoclave																																																																																																																								
SN : 141005204-001	Series number																																																																																																																								
Program : 134 Wrapped	Program selected																																																																																																																								
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Dry Time : 30 m	Dry duration																																																																																																																								
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Cycle Counter : 59	Cycles that had been started																																																																																																																								
<table><tr><th>Step</th><th>Time mmm:ss</th><th>Temp. °C</th><th>Pres. bar</th></tr><tr><td>Start</td><td>000:00</td><td>25.4</td><td>0.07</td></tr><tr><td>H1</td><td>002:16</td><td>28.4</td><td>0.07</td></tr><tr><td>S00</td><td>016:13</td><td>136.8</td><td>2.26</td></tr><tr><td>S01</td><td>017:13</td><td>136.8</td><td>2.26</td></tr><tr><td>S02</td><td>018:13</td><td>136.8</td><td>2.26</td></tr><tr><td>S03</td><td>019:13</td><td>136.8</td><td>2.25</td></tr><tr><td>S04</td><td>020:13</td><td>136.6</td><td>2.25</td></tr><tr><td>S05</td><td>021:13</td><td>136.7</td><td>2.26</td></tr><tr><td>S06</td><td>022:13</td><td>136.6</td><td>2.24</td></tr><tr><td>S07</td><td>023:13</td><td>136</td><td>2.2</td></tr><tr><td>S08</td><td>024:13</td><td>135.6</td><td>2.23</td></tr><tr><td>S09</td><td>025:13</td><td>135.3</td><td>2.11</td></tr><tr><td>S10</td><td>026:13</td><td>135.6</td><td>2.14</td></tr><tr><td>S11</td><td>027:13</td><td>135.9</td><td>2.18</td></tr><tr><td>S12</td><td>028:13</td><td>136.4</td><td>2.22</td></tr><tr><td>S13</td><td>029:13</td><td>136.3</td><td>2.21</td></tr><tr><td>S14</td><td>030:13</td><td>136.8</td><td>2.26</td></tr><tr><td>S15</td><td>031:13</td><td>136.6</td><td>2.25</td></tr><tr><td>S16</td><td>031:29</td><td>136.8</td><td>2.26</td></tr><tr><td>Ex</td><td>031:31</td><td>136.6</td><td>2.24</td></tr><tr><td>D0</td><td>034:35</td><td>93.6</td><td>0.08</td></tr><tr><td>D1</td><td>065:06</td><td>111.3</td><td>0.07</td></tr><tr><td>End</td><td>065:07</td><td>111.2</td><td>0.08</td></tr></table>	Step	Time mmm:ss	Temp. °C	Pres. bar	Start	000:00	25.4	0.07	H1	002:16	28.4	0.07	S00	016:13	136.8	2.26	S01	017:13	136.8	2.26	S02	018:13	136.8	2.26	S03	019:13	136.8	2.25	S04	020:13	136.6	2.25	S05	021:13	136.7	2.26	S06	022:13	136.6	2.24	S07	023:13	136	2.2	S08	024:13	135.6	2.23	S09	025:13	135.3	2.11	S10	026:13	135.6	2.14	S11	027:13	135.9	2.18	S12	028:13	136.4	2.22	S13	029:13	136.3	2.21	S14	030:13	136.8	2.26	S15	031:13	136.6	2.25	S16	031:29	136.8	2.26	Ex	031:31	136.6	2.24	D0	034:35	93.6	0.08	D1	065:06	111.3	0.07	End	065:07	111.2	0.08	<table><tr><th>Step</th><th>action</th></tr><tr><td>Time mmm:ss</td><td>mmm: minutes starting record, ss: seconds starting record</td></tr><tr><td>Temp(°C)</td><td>chamber temperature in °C</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>H1</td><td>1st heating</td></tr><tr><td>S00</td><td>start of sterilization</td></tr><tr><td>S02</td><td>sterilization time recorded every 1 minutes after “S00”; and also the last sterilization time</td></tr><tr><td>EX</td><td>exhaust of water and steam</td></tr><tr><td>D0</td><td>dry time-started</td></tr><tr><td>D1</td><td>dry time-finished</td></tr><tr><td>End</td><td>end of recording</td></tr></table>	Step	action	Time mmm:ss	mmm: minutes starting record, ss: seconds starting record	Temp(°C)	chamber temperature in °C	Pres(bar)	Chamber pressure in bar	Start	start time	H1	1st heating	S00	start of sterilization	S02	sterilization time recorded every 1 minutes after “S00”; and also the last sterilization time	EX	exhaust of water and steam	D0	dry time-started	D1	dry time-finished	End	end of recording
	Step	Time mmm:ss	Temp. °C	Pres. bar																																																																																																																					
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	S00	016:13	136.8	2.26																																																																																																																					
	S01	017:13	136.8	2.26																																																																																																																					
	S02	018:13	136.8	2.26																																																																																																																					
	S03	019:13	136.8	2.25																																																																																																																					
	S04	020:13	136.6	2.25																																																																																																																					
	S05	021:13	136.7	2.26																																																																																																																					
	S06	022:13	136.6	2.24																																																																																																																					
	S07	023:13	136	2.2																																																																																																																					
	S08	024:13	135.6	2.23																																																																																																																					
	S09	025:13	135.3	2.11																																																																																																																					
	S10	026:13	135.6	2.14																																																																																																																					
	S11	027:13	135.9	2.18																																																																																																																					
	S12	028:13	136.4	2.22																																																																																																																					
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	S15	031:13	136.6	2.25																																																																																																																					
	S16	031:29	136.8	2.26																																																																																																																					
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D0	034:35	93.6	0.08																																																																																																																						
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End	065:07	111.2	0.08																																																																																																																						
Step	action																																																																																																																								
Time mmm:ss	mmm: minutes starting record, ss: seconds starting record																																																																																																																								
Temp(°C)	chamber temperature in °C																																																																																																																								
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Ster. Time : 015:16	Sterilization period																																																																																																																								
Total time : 065:08	Time elapsed between start and program complete																																																																																																																								
Program complete	Message of ending recording																																																																																																																								
Signature:	Signature office																																																																																																																								


7.3 Storage medium

Use only recommended storage medium by the manufacturer such as USB (2.0) flash drive.




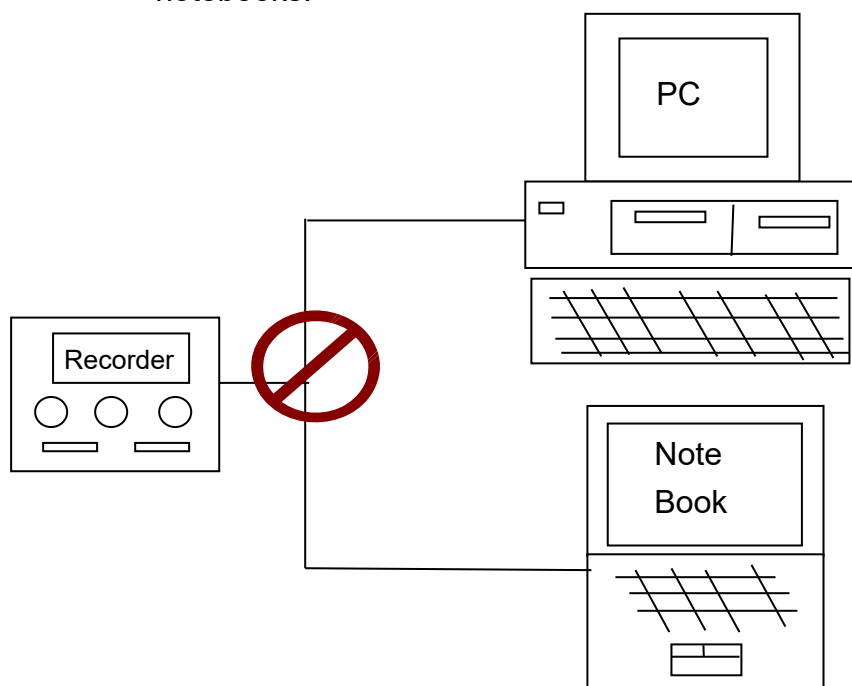
You should format your storage medium prior insert into the Recorder for the first time. You can operate on the files in this card in PC via a card reader. Data will be stored under the root directory only.

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

 **CAUTION:** External hard drive is not allowed for connecting to the recorder.



 **CAUTION:** Do not connect the Recorder to a PC or mobile devices such as notebooks.



7.4 Recorder panel

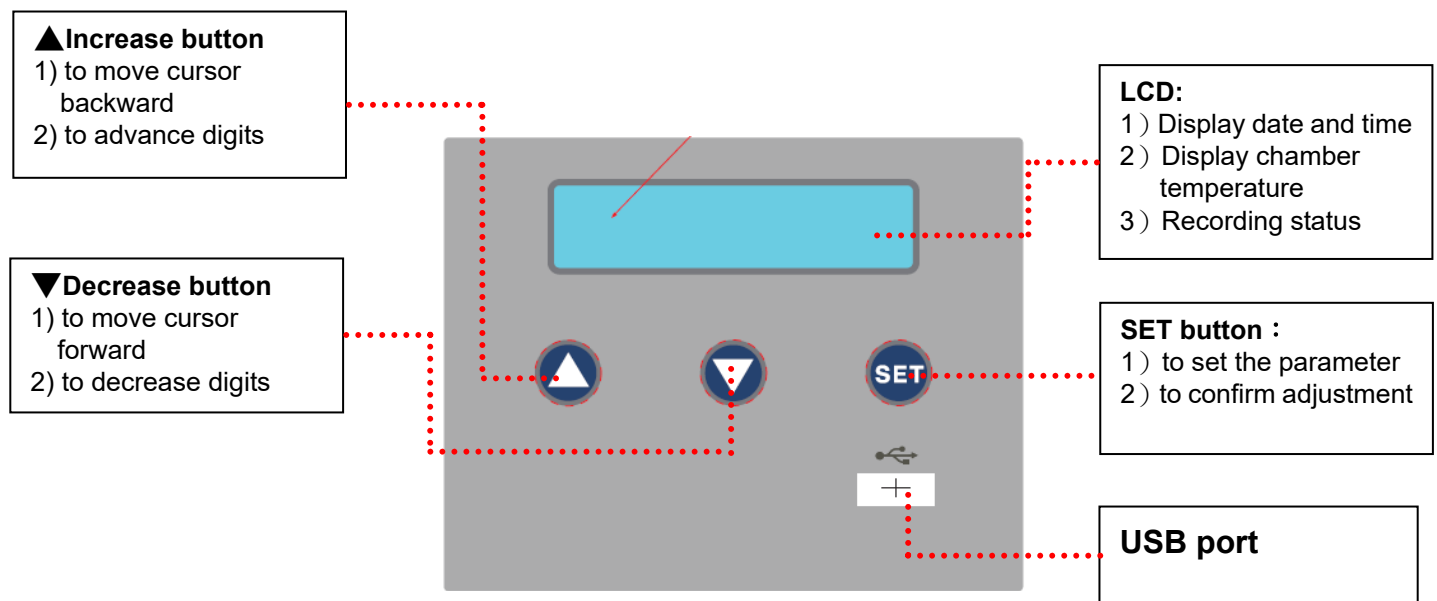


Figure 28

7.5 Function description of the recorder

Refer to Figure 29 for the flow chart of recorder.

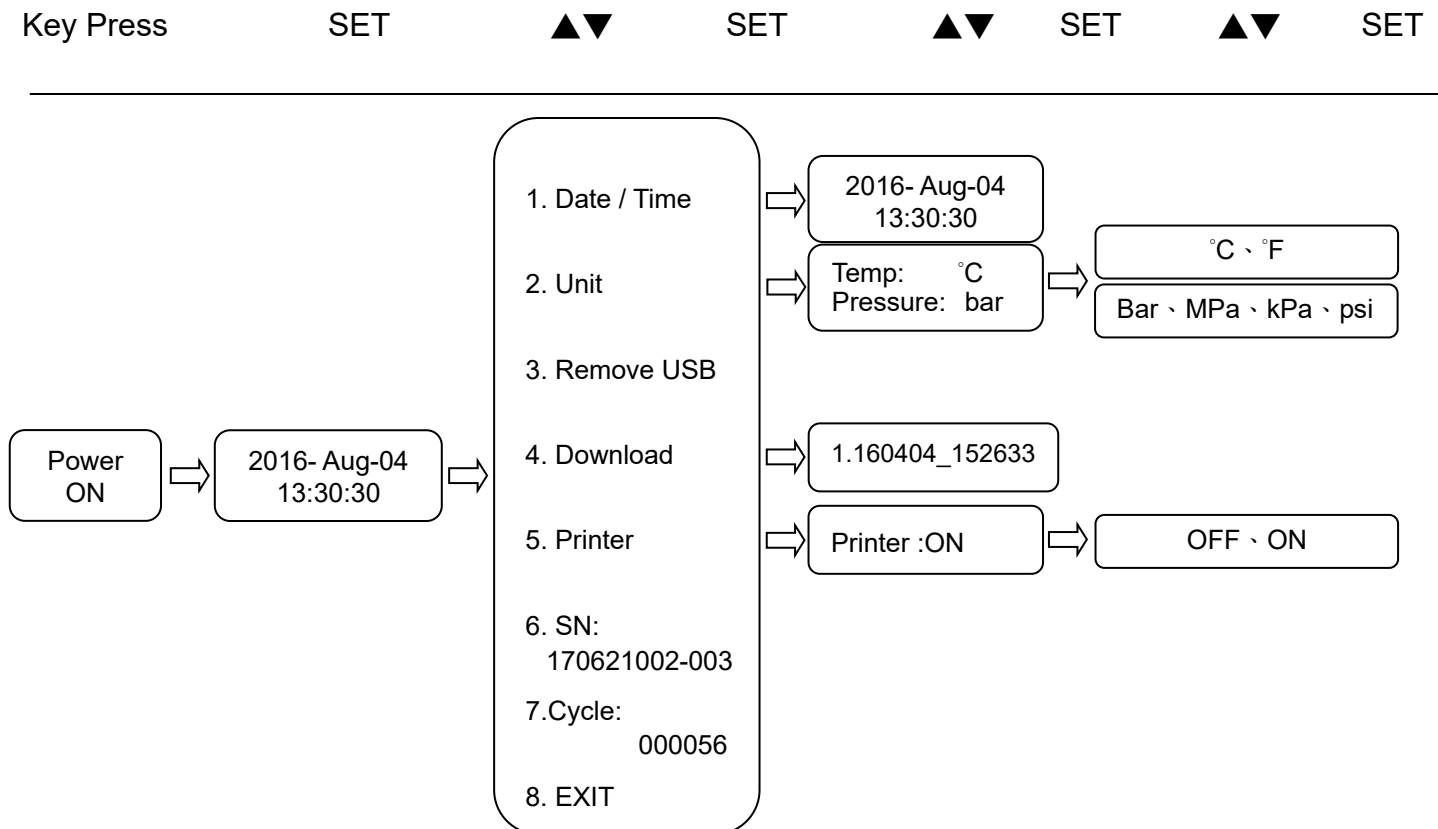


Figure 29

7.5.1 General

There are 3 types of operation modes for the recorder, they are stand-by mode, recording mode, and adjusting mode.

7.5.1.1 Stand-by mode

The date and time will be displayed after turn on the main power, and low battery symbol will flash for charging and/or low battery as shown in Figure 30.

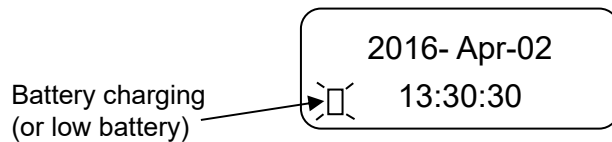



Figure 30



Note: Call for service to replace the rechargeable battery if the exhaust battery symbol “” presented after some cycles. After replacing and servicing, you have to set the date, time and unit again.

7.5.1.2 Recording mode

- a) Recording of the sterilization data is activated automatically after press “Start” button on autoclave panel, and then the chamber temperature and flashing message “Rec” will be displayed.

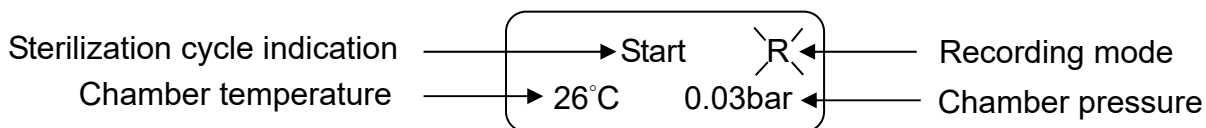


Figure 31



Note 1: Insert a formatted USB flash drive before commencing a sterilization cycle.



Note 2: If none of the USB flash drive being detected before commencing a sterilization cycle, the warning message “E105: No USB memory” is presented and the buzzer alarmed. This message will not affect the operation of sterilization work because the data will be stored onto the built-in memory for one cycle. Refer to “7.5.2.4 Download” for the further instructions to download the data onto a USB flash drive.

- b) After completing a sterilization cycle, the data will be stored to USB flash drive; and the recorder returns to stand-by mode. The sequences of storage message are shown in the Figure 32.

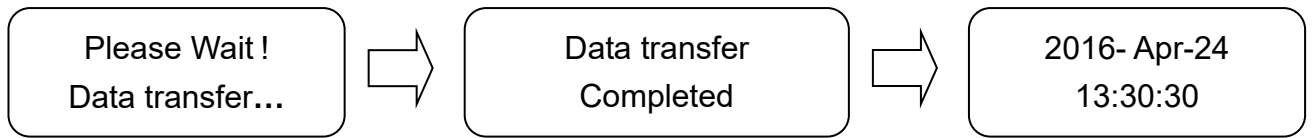


Figure 32



Note 1: If none of the USB flash drive being detected before completing a sterilization cycle, 2 warning messages “E105: No USB memory” followed by a buzzer alarm are presented. The warning messages do not affect the operation of recording work. Refer to “7.5.2.4 Download” for the further instructions to download the data onto a USB flash drive.



Note 2: You may insert a USB flash drive before completing a sterilization cycle. Use a USB flash drive as the storage medium is highly recommended by the manufacturer, and always backup your USB flash drive to a secure zone.

7.5.1.3 Adjusting mode

Press “SET” button for adjusting the parameters of the recorder while in the stand-by mode.

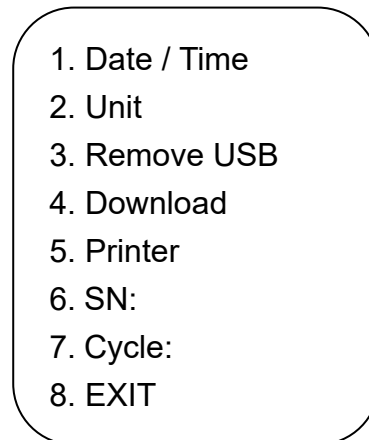


Figure 33 – Set manual



Note: 1. The recorder returns to default stand-by mode after 15 seconds without any key been pressed in the “Set” manual.
2. The recorder returns to Set manual after 15 seconds without any key been pressed.

7.5.2 Set up

7.5.2.1 Set up date and time

Press “SET” button for adjusting the parameters of the recorder while in the stand-by mode. Press increase (▲) or decrease (▼) until “1. Date / Time” displayed as shown in Figure 34.

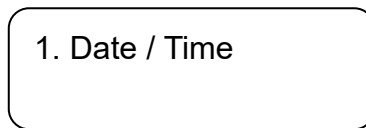


Figure 34

Press “Set” button for editing the contents, and then press increase (▲) and/or decrease (▼) button until current Date and Time presented.

The “Set” Button should be press for entering the parameter that you have changed, and shift to next parameter.

The sequence is in the order of Year-Month-Date-Hour-Minute-Second each time you press the “Set” button.

After entering the current Date and Time, press “Set” button returns to the Set manual, and then to choose “8 EXIT” press “Set” button again returns to the stand-by mode as shown in Figure 35.

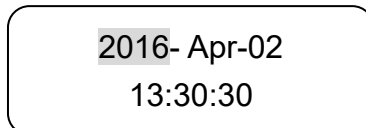


Figure 35

7.5.2.2 Set up unit (temperature and pressure)

Press “SET” button for adjusting the parameters of the recorder while in the stand-by mode. Press increase (▲) or decrease (▼) until “2. Unit” displayed as shown in Figure 36.



Figure 36

Press “Set” button for editing the temperature unit or pressure unit, and then press increase (▲) and/or decrease (▼) button until the desired temperature unit or pressure unit presented as shown in Figure 37.

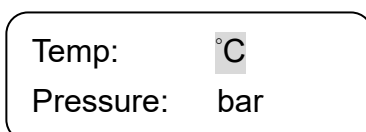


Figure 37

The sequence is in the order of Temperature - Pressure each time you press the “Set” button. After entering the unit, press “Set” button returns to the Set manual, and then to choose “8. EXIT” press “Set” button again returns to the stand-by mode as shown in Figure 35.

7.5.2.3 Remove USB



Caution: The data may be damaged if not follow this operation to detach the USB flash drive properly.

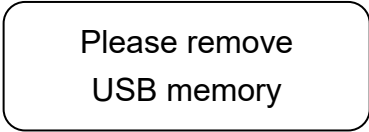
Press “SET” button in the stand-by mode and then press increase (▲) or decrease (▼) until “3. Remove USB” displayed as shown in Figure 38.



3. Remove USB

Figure 38

Press “SET” button, you will be prompt “Please remove USB Memory”, and then remove the USB memory safely. This message will be lasted until you have detached the USB memory.



Please remove
USB memory

Figure 39

Press "Settings" to return to the previous page, as shown in Figure 38. Then select "8. Exit" and press "Set" to return to standby mode.

7.5.2.4 Download



Warning: The recorder can operate without a USB flash drive, but the data stored in the recorder will be overwritten by the next sterilization data if the recorder memory is full. Manufacturers strongly recommend that you use a USB flash drive as a storage medium and always back up the USB flash drive to a secure area.
If you must perform sterilization without a USB flash drive, you must follow the steps below to download the data.

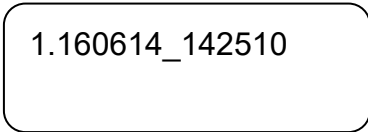
Insert a formatted USB flash drive to appropriate port as shown in. Press “SET” button in the stand-by mode and then press increase (▲) or decrease (▼) until “4. Download” displayed as shown in Figure 40



4. Download

Figure 40

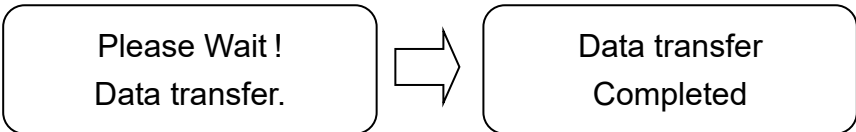
Press the "SET" button, then press the increase (▲) or decrease (▼) to select the file to download, as shown in Figure 41.



1.160614_142510

Figure 41

Press “SET” button, you will be prompt “Please Wait ! Data transfer.” and then followed by “Data transfer completed” as shown in Figure 42.



Please Wait !
Data transfer.

Data transfer
Completed

Figure 42



Note: If none of the storage medium been detected, an message “E105: No USB memory” is presented and buzzer alarmed, the recorder than returns to previous manual after 15 seconds.

7.5.2.5 Printer

Press “SET” button in the stand-by mode and then press increase (▲) or decrease (▼) until “5. Printer” displayed as shown in Figure 38.



5. Printer

Figure 43

Press the Setup button to select the printer contents, then press the (▲) and/or (▼) buttons to select as shown in Figure 38.



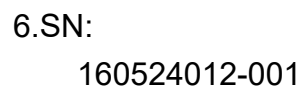
Printer: ON

Figure 44

Press "SET" button returns to the Back to previous page.

7.5.2.6 SN:

Press the "SET" key in the standby mode, and then press the increase (▲) or decrease (▼) until the "6. SN:" shows the machine serial number as shown in Figure 38.

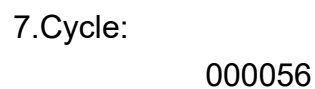


6.SN:
160524012-001

Figure 45

7.5.2.7 Cycle:

Press the "SET" key in the standby mode, and then press the increase (▲) or decrease (▼) until the "7. Cycle:" shows the number of machine uses, as shown in Figure 46.



7.Cycle:
000056

Figure 46

7.5.2.8 Exit

Press "SET" button in the stand-by mode and then press increase (▲) or decrease (▼) until the "8. Exit" displayed as shown in Figure 47.



8. Exit

Figure 47

Press "SET" button returns to the stand-by mode.

7.6 Message and troubleshooting (for recorder)

Symptom	Solution
No display	<ul style="list-style-type: none">- Turn on the main switch.- Plug the power cable.- Check if bad connection.- Contact local distributor for service
E101: Temp. Sensor fail	<ul style="list-style-type: none">- Contact local distributor for service
E103: Pressure sensor fail	<ul style="list-style-type: none">- Contact local distributor for service
E105: No USB memory	<ul style="list-style-type: none">- Insert a USB flash drive.- Detach and re-insert memory card again
E107: USB is full	The data stored on the medium have reached its maximum limit, please backup the storage medium onto a secure zone immediately, and then followed the procedure “7.5.2.4 Download” to download the last record.
E108: USB formatter error	<ul style="list-style-type: none">- Re-format the USB flash drive.- Replace another USB flash drive.- Contact local distributor for service
E109: EEPRM fail	<ul style="list-style-type: none">- Replace another USB flash drive.- Contact local distributor for service
E125: Keyboard fail	Contact local distributor for service
E135: Abnormal of the cycle	<ul style="list-style-type: none">- Check the power supply to the Autoclave.- Contact local distributor for service
E155: Password fail	Authorized person only. This function is reserved for diagnostic purpose by the manufacturer, users are password protected. Contact local distributor or manufacturer for information.



Caution: Contact local distributor for service if encountered any other problems. Do not attempt to disassemble the sterilizer or recorder by yourself. Failure to do so could result in serious injury or damage to the unit.

8. Maintenance Instructions



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

- 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 distilled water only.
- Ensure the vent holes in the water reservoir cap (Figure 8) are not blocked.
- Check the status of the power cord. Call for service if breakage comes up.

8.2 Weekly

- Clean the box, tray frame and trays with detergent, or a non-corrosive stainless steel cleaner and water, using cloth or sponge.
- Replace the distilled water in water reservoir:
Drain water from the water reservoir using Drain Hose (Figure 8) located on the right side of the unit. Fill clean distilled water.

- Clean the filter
- Use a wrench to unscrew the filter nut counterclockwise as Figure 48 & Figure 49.

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

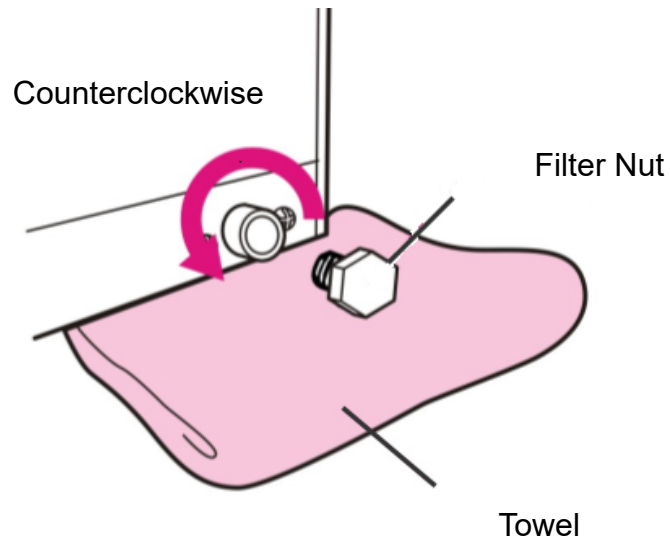


Figure 48

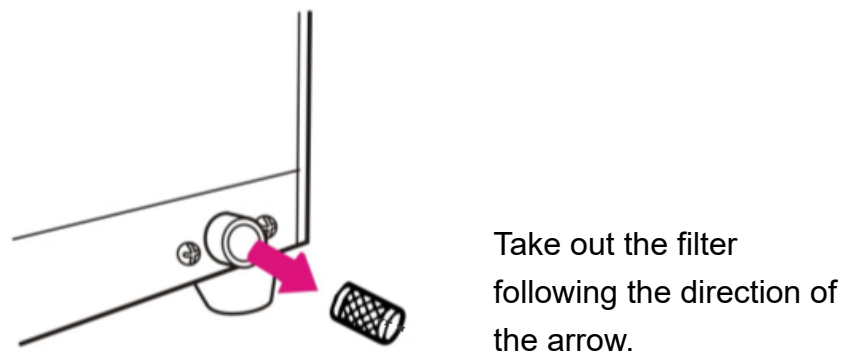


Figure 49

Take out the filter carefully, and flush it with water to clean it. Assemble it back as Figure 50.

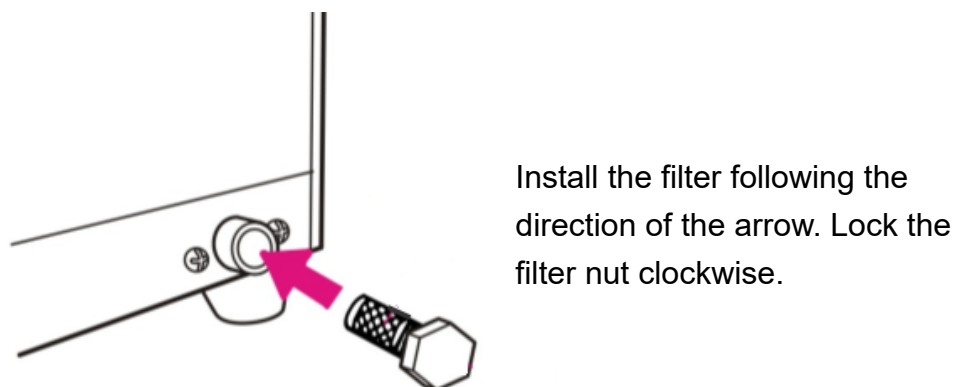


Figure 50

8.3 Monthly

- Use the non-corrosive cleaner and stiff bristled brush or sponge to clean the water level sensor at the front of the chamber as Figure 51.

⚠ 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.

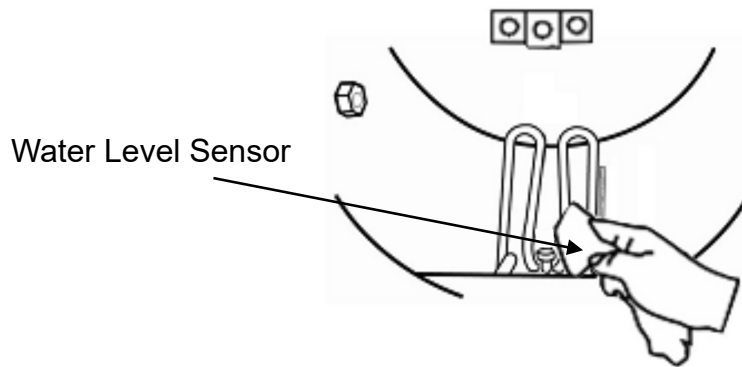


Figure 51

- 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 Figure 52. 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.

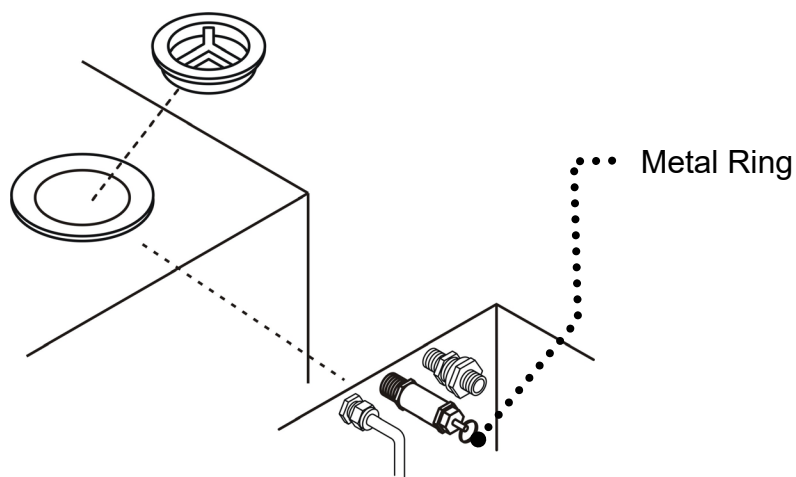


Figure 52

8.4 Annually



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.

8.4.1 SA-230FA / SA-260FA-R

How to replace the silicone door gasket:

Install the gasket to the door groove following the order of Figure 53, Figure 54 and Figure 55.

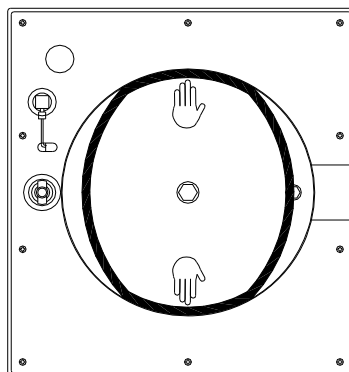


Figure 53

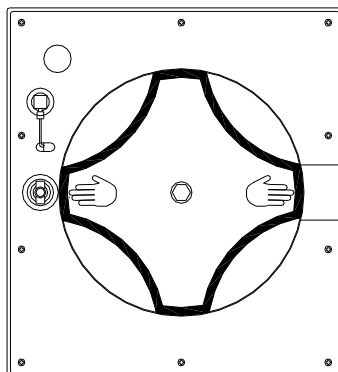


Figure 54

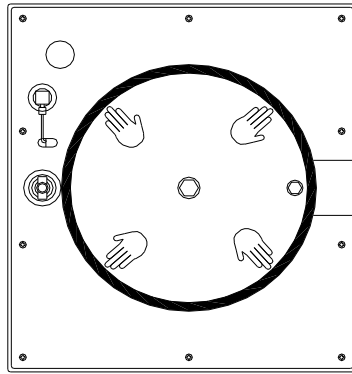



Figure 55

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

8.4.2 SA-260FA / 260FA-R

How to replace the silicone door gasket:

1. Remove the old gasket from the door, and then puff off the gasket o-ring from the gasket. Install the gasket o-ring to the new gasket as Figure 56.

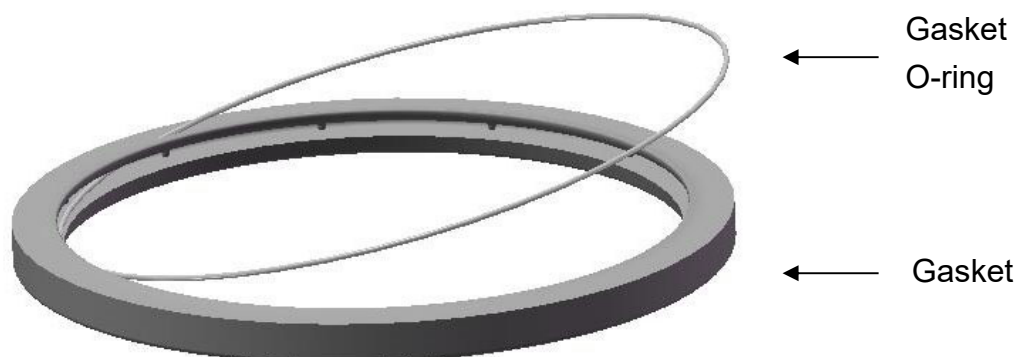


Figure 56

2. Check if the o-ring is installed into the gasket completely as Figure 57.



Figure 57

3. Install the gasket with the o-ring inside to the door groove. Press the gasket into the door groove evenly as Figure 58. 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 59 for the correct direction.

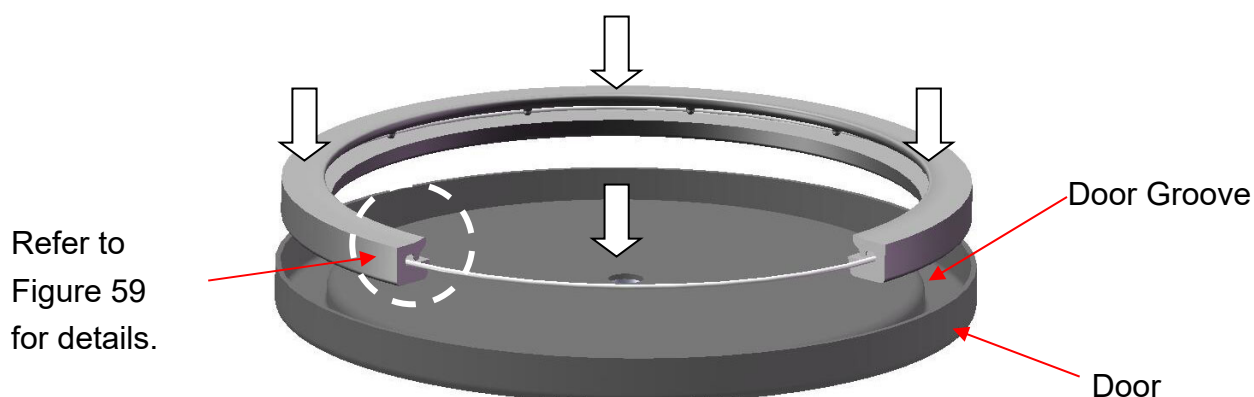


Figure 58

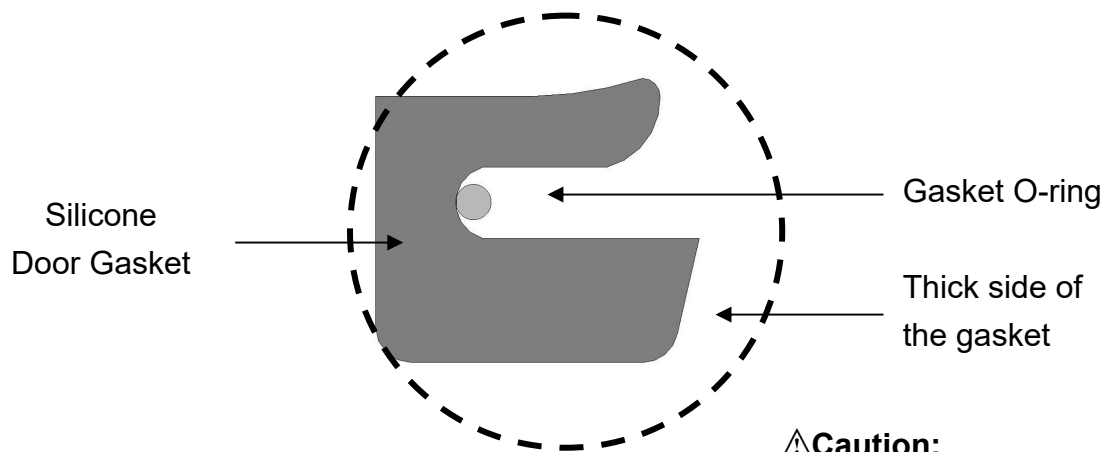


Figure 59

⚠ Caution:

The gasket should be installed with the thick side towards the door groove.

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

9. Troubleshooting (for autoclave)

Problem	Possible Cause	Solution
Power indicator isn't Illuminated	The main cable is unplugged or the socket switch is off.	Plug in the sterilizer and turn on the socket switch.
	Forget to turn on the switch.	Press the Power switch to ON "I" position.
	No Fuse Breaker tripped.	Wait till the sterilizer cool down the room temperature. Press the buttons of two No Fuse Breakers on rear of unit to reset.
Low water indicator light ON and buzzer sounds	Insufficient water inside the water reservoir	Follow "4.2 " to refill distilled water.
	Dirty water level sensor	Follow "7.3 Monthly" maintenance to clean the sensor.
	Filter blocked	Follow "7.2 Weekly" maintenance to clean the filter.
	Dirty water level sensor inside water reservoir	Contact local distributor for service.
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 "7.4 Annually" maintenance to replace it.
Door cannot be opened	Pressure persists inside chamber	Follow "6.5 " to press "Vacuum/Pressure Release Button" and release the pressure. Contact local distributor for service if problem persists.
Water inside chamber doesn't automatically return to the reservoir	1. Piping system of filter blocked.	1. Contact local distributor for service.
	2. Faulty exhaust solenoid valve.	2. Contact local distributor for service.
	3. Liquid program performed. (*Optional program)	3. Run "Normal" program to let the water inside chamber return to the water reservoir.
Excessive force is required to pull the safety valve	1. Do not use the tool.	1. Please use the tool (e.g. screw driver or pliers) to pull the ring.
	2. Faulty safety valve	2. Contact local distributor for service.



Caution: Contact local distributor for service anytime if encountered other any other problems. Please do not attempt to disassemble the sterilizer by yourself Failure to do so could result in serious injury or damage to the unit.

10. Specifications

Model	SA-230FA	SA-230FA-R	SA-260FA	SA-260FA-R
Chamber Capacity (L)	16		24	
Maximum Instrument Length (mm)	300		350	
Maximum Load (unpouched) (g)	5,000		7,000	
Maximum Load (pouched) (g)	1,000		1,300	
External Dimensions (mm)	594 (D) x 522 (W) x 410 (H)		655 (D) x 533 (W) x 442 (H)	
Chamber Size (mm)	230 Diameter × 410 Depth		260 Diameter × 450 Depth	
Gross Weight (kg)	48		51	
Voltage/Wattage	230V AC, 50/60Hz 1926W		230V AC, 50/60Hz 2670W	
Fuses	10A x 2, No Fuse (circuit) Breaker			
Water Reservoir Capacity (ml)	4200			
Water Capacity per Cycle (ml)	250		300	
Sterilization Temperature (°C)	121 / 134			
Working Environment	<ul style="list-style-type: none">● Indoor use;● Under 1,000m (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			
Over Pressure Protection	Safety valve 2.6 kgf/cm² (2.55 bar)			
Over Pressure Indication	Pressure protection switch with warning LED			
Over Temperature Indication	Independent temperature protection device with warning LED			
Water Level Indication	Water level sensor in reservoir and chamber with warning LED			
Door Lock Indication	Micro switch sensor with warning LED			
Pressure Display	Analog Pressure and Thermo gauge			
Function Display	LED			
Program Selections	Wrapped/unwrapped, Dry/no dry, Re-Dry (or Liquid)			
Temperature Selection	121°C/134°C			
Drying Function	30 mins (Re-Dry: 10 mins)			
Recorder	—	Yes	—	Yes
Additional controls	Start, Reset, Vacuum/Pressure release			

11. Warranty

WARRANTY

Your “**STURDY**” product has a one (1) year guarantee of defective in materials and workmanship under normal use from the date of purchase.

This warranty does not apply to any product damaged by accident, misuse, abuse, neglect, improper line voltage, drop, fire, flood. Or the products were altered or repaired by anyone other than qualified service personnel.

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

All warranty claims must be directed to the distributors or agents authorized by Sturdy Industrial Co.,Ltd. whom are 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 Certificated Firm)

Name	Sturdy Autoclave Sterilizer		
Model	SA-230FA / SA-260FA / SA-230FA-R / SA-260FA-R		
Manufacturer 	Sturdy Industrial Co. Ltd.		
Address	168, Sec. 1, Zhongxing Rd., Wugu District, New Taipei City, 24872, Taiwan		
EC Representative <table border="1" data-bbox="229 1771 325 1812"> <tr> <td>EC</td> <td>REP</td> </tr> </table>	EC	REP	APEX MEDICAL S.L. Elcano 9, 6 ^a planta 48008 Bilbao. Vizcaya SPAIN
EC	REP		