STURDY
APEX GROUP

Autoclave Sterilizer

SA-382VMB
Instruction Manual

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

422-03043 v.03 08 October 2021

Index

1. Important notes and safety precautions

⚠**Attention:** Please follow instructions in this Manual for operation, so personnel injury or machinery damage can be avoided.

⚠**Warning:** During sterilization, high temperature will be generated at the metal part of casing, please do not touch the casing directly.

⚠**Warning:** During sterilization and just upon its completion, there might still be residual steam and hot water in the autoclave, please do not touch the casing directly.

⚠**Warning:** Please do not place volatile (e.g. alcohol) or inflammable object in the autoclave, so explosion can be prevented.

⚠**Warning:** It is prohibited to place any object on or above the autoclave.

⚠**Warning:** The moving of autoclave requires at least 3-4 people, so slippage can be avoided.

⚠**Warning:** Before opening the door, please do check the pressure gauge first. DO NOT open the door if the gauge indicates non-zero status.

⚠**Warning:** The machine is limited to use of sterilization water or distilled water as per request under Chapter 9 - Water Requirement. Should any other water be used, the product warranty will be void accordingly.

⚠**Warning:** Two sterilization processes carried out in series must be separated with at least 20 minutes in between.

⚠**Warning:** During sterilization, it must ensure that the door is completely close. If the message of “Door is open” appears, it means that the door is not close properly.

⚠**Warning:** Please keep the autoclave body tidy. The machine must be serviced regularly as per the Chapter of “Cleaning and Service”. If this is not done as per requirement, the sterilization result will be influenced and hence voiding the warranty.

⚠**Warning:** During emergency, cleaning or service, the power must be off to ensure safety.

⚠**Warning:** Please do use independent power supply designated.

⚠**Warning:** If the autoclave is not used for long time, please remove the power supply and drain away the water in the chamber.

⚠**Warning:** Frequently check the wiring for damage. If the damage exists, immediately plug the machine off and contact the distributor for repair.

⚠**Warning:** During installation, operation and service of the machine, please refer to this Manual to avoid machinery damage or personnel injury.

⚠**Warning:** Children's use or contact with the machine is prohibited.

⚠**Warning:** In case of exceeding temperature or pressure from the machine, please contact the distributor for handling.

⚠**Warning:** Normal tap water contains minerals, and chlorine in particular will erode the autoclave body. Therefore, please use sterilization water or distilled water, or the product warranty will be void.

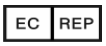
⚠**Warning:** Please do not bend and rest any object onto power line of the machine.

⚠**Warning:** After completion of sterilization, please open the door carefully and avoid scorching from the steam or hot water.

⚠**Warning:** When placing the machine, please maintain levelness and avoid any tilting.

⚠**Warning:** Wipe exterior and interior of the autoclave on frequent basis.

2. Warning Signs and Explanation

	Attention. The user must follow instructions in this Manual.
	Power earth terminal
	AC current
	High temperature warning
	Waste Electrical and Electronic Equipment (WEEE): The equipment must be recycled and disposed as per waste regulations of the governing country, no littering is allowed. Please contact local recycling facility or distributor on recycling matters.
	EU representative
	Manufacturer
	Date manufactured: Indicated in 4 digits for the year and 2 digits for the month.
	Please refer to the Manual.
	Power on (ON)
	Power off (OFF)
POWER	Power switch
Attention:	Remind the operator on items that require particular attention.
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

⚠**Warning:** The moving of autoclave requires at least 3-4 people, so slippage can be avoided.

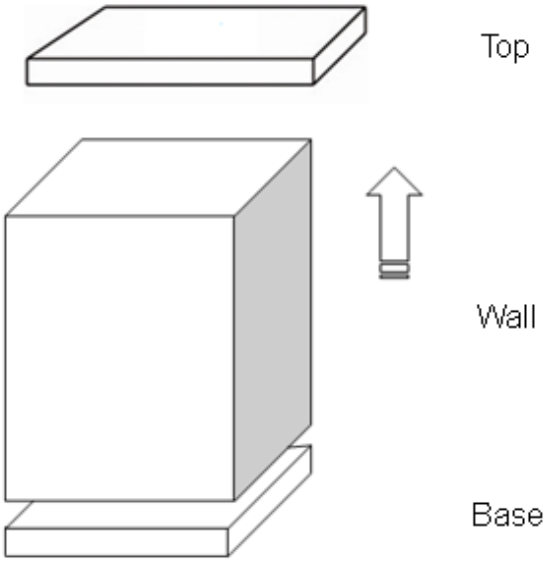


Figure 1

A. Cut off the packing strings.
B. Remove top of the carton first.
C. Remove the middle layer and other protective packaging.
D. Take out the machine from bottom layer.
E. Please check all content in the packaging (the accessories are normally placed inside the autoclave):
- User's manual x1
- Heater Cover x1
- Sterilization basket x2
- Tongs x1
- Yarn tube x2
- Base filter x1
- Printing paper x1 set (5pcs)

* This indicates that the content is subject to actual delivery.

Please keep the packaging at adequate location for use of moving in future.

4. Installation Description

4.1 Installation environment

1. Below altitude of 1000m;
2. Ambient temperature at 5°C to 40°C;
3. From 80% RH @31°C to 50% RH @40°C;
4. Single phase current AC voltage 230V ±10 % 20A;

⚠**Attention:** This equipment has complied with the international standard of Electromagnetic Compatibility (EMC), but there may still be mutual interference due to different environment of installation and utilization. Should such situation occur, please attempt to eliminate the interference according to the following steps:

- Move the equipment or turn its direction;
- Increase spacing between the equipment and adjacent equipment;
- Plug the power into other branch circuit;
- Please contact the distributor or professional electrician to assist with the elimination.
- For ambient temperature of installation, please refer to “10. Product Specifications”.

4.2 Installation

Step 1. Place the autoclave on even ground with no objects or walls around the machine within 10～20 cm, so well ventilation and heat radiation can be provided. Please maintain levelness, and then lock the brake wheel to secure the main body shown in Figure 2 Figure 3.

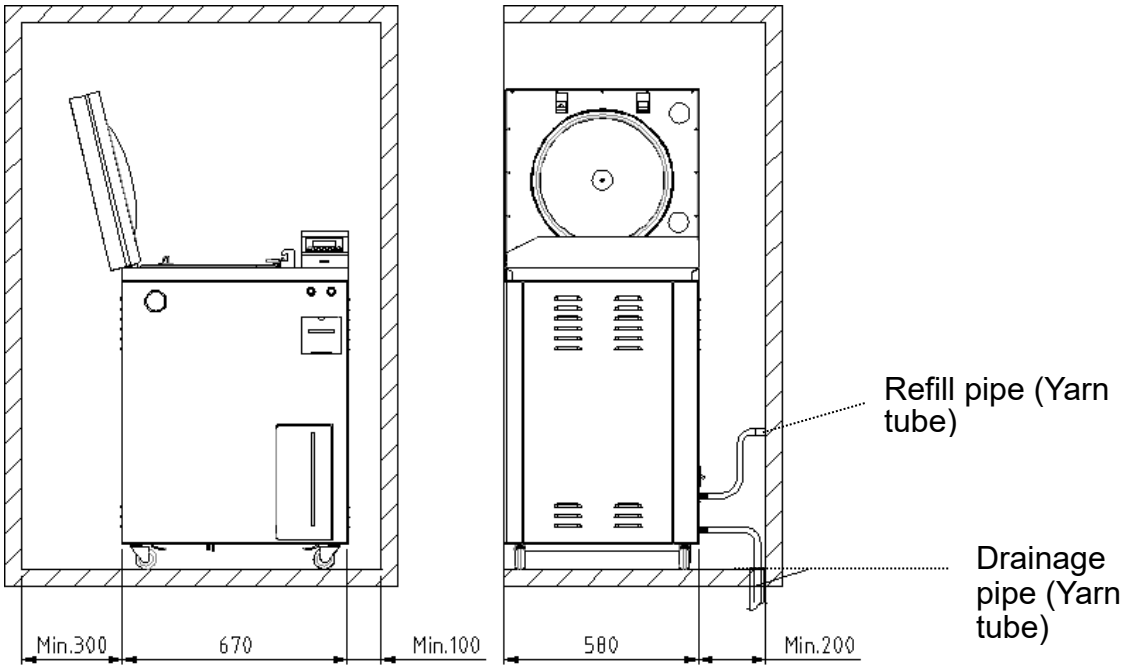


Figure 2.

⚠**Attention:** The installation premises must not obstruct normal opening of the door and placement of sterilizers.

⚠**Warning:** This machine is a high-temperature sterilization equipment with extreme heat during operation, thus the installation premises must be far away from any source of fire and inflammables including combustible gas and liquid. The machine must be installed at place with well ventilation.

Step 2. Piping installation:

2-1. Please secure the refill pipe (Yarn tube) onto the connector of refill inlet on the machine.

2-2. Secure one end of the drainage pipe (Yarn tube) onto drainage connector on the machine, and then connect the other end to the sewage disposal and secure properly.

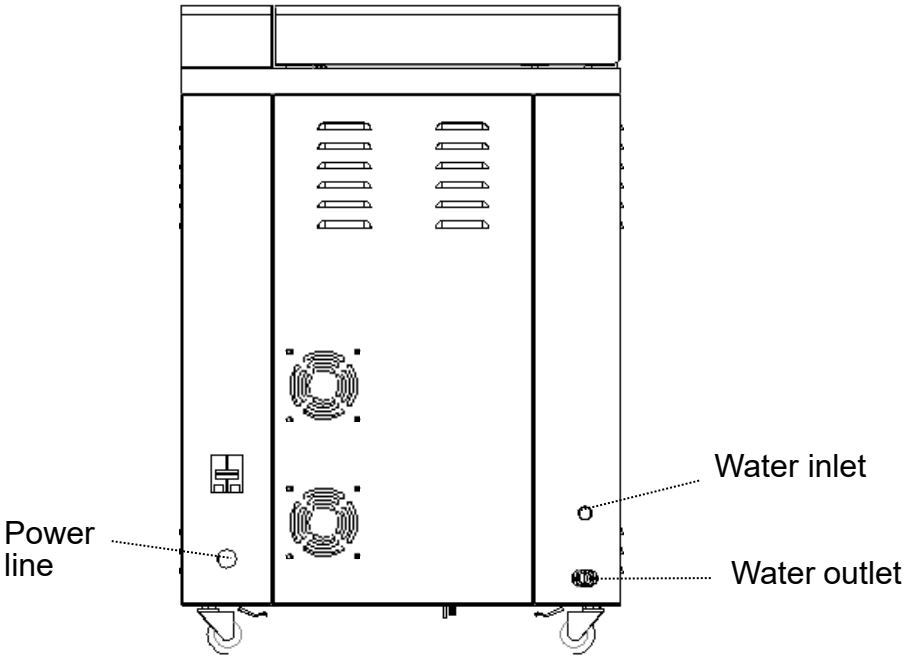


Figure 3.

⚠Attention: Please use pipe capable of resisting high temperature greater than 100℃ for drainage and keep the pipe running smooth.

⚠Attention: In case where hazardous substances are used, the drainage must be done according to requirements of local regulations.

Step 3. Open the door by pulling up the handle, and then secure the heater cover inside the inner chamber shown in Figure 4

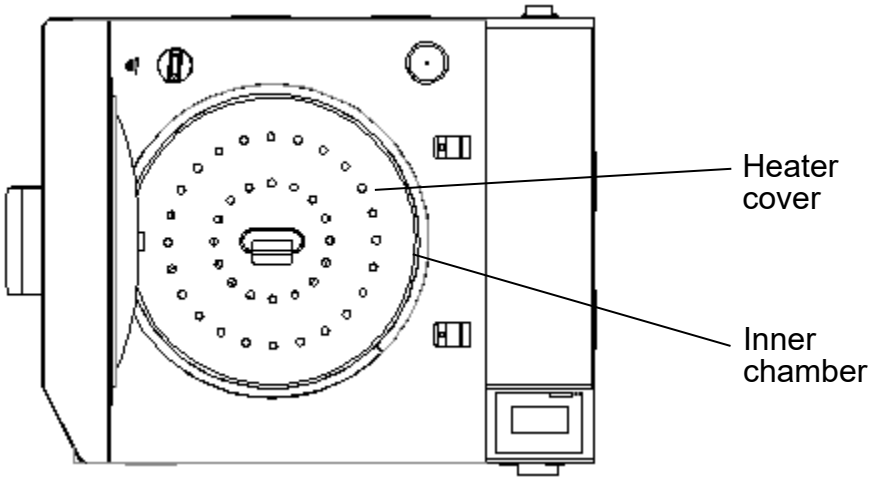


Figure 4.

Step 4. Install the sterilization basket into the inner chamber shown in Figure 5

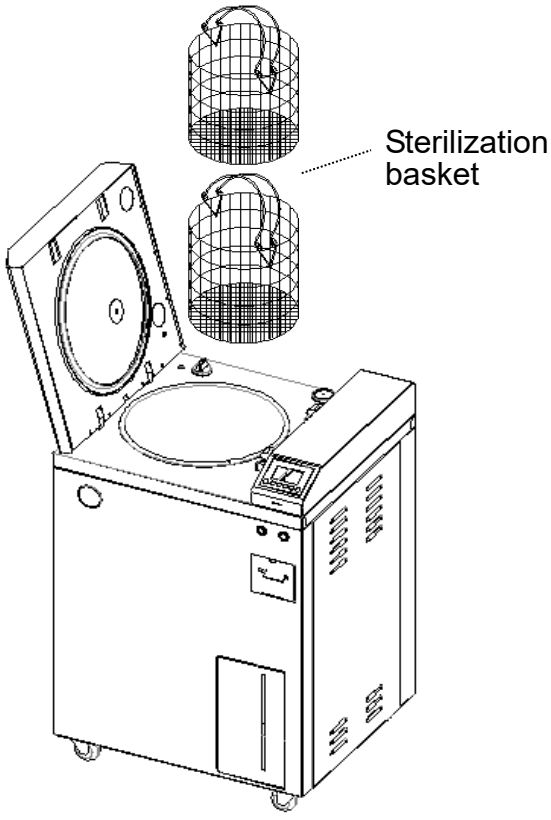


Figure 5.

Step 5. Place the bottom filter inside shown in Figure 6

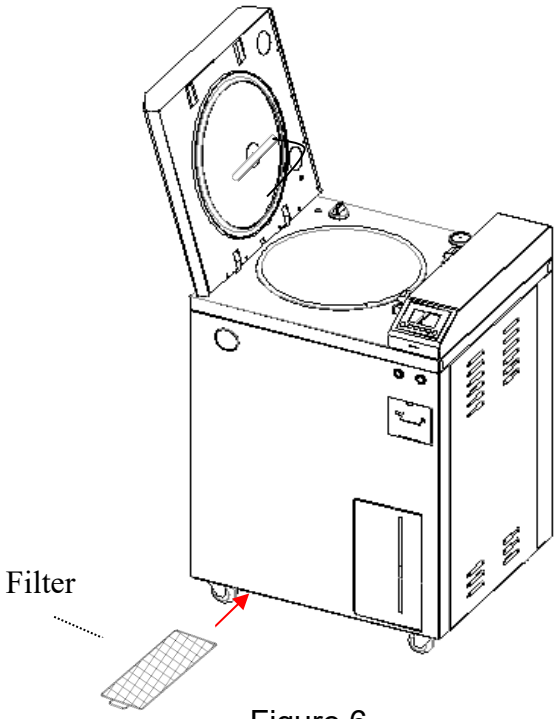


Figure 6.

1. Ensure that the power switch is at the “  ” “Off” position, and then install power line of the machine at specific non-fuse breaker.

⚠**Attention:** The autoclave must be directly connected onto the 30A non-fuse switch. It must be ensured that the electrical box is grounded and capable of providing 30A/230V of AC capacity.

⚠**Attention:** The ground connection must be done properly.

2. Turn on the earth leakage breaker and press the POWER button to be “  ” “ON” position. The power indicator shall lit up normally. In case of abnormality, please turn off the power switch immediately, confirm whether there is power feed and repeat Steps. If normal indication is still not available, please shut off the power immediately and contact the distributor for handling.

5. Product Introduction

5.1 Product application

The product is a ground-mounted Autoclave, which is used for general laboratory.

Standard and regulations of product design followed:

EMC: EN61326

LVD: EN61010-1、EN61010-2-040

PED: 2014/68/EU

5.2 Product description

5.2.1 Appearance

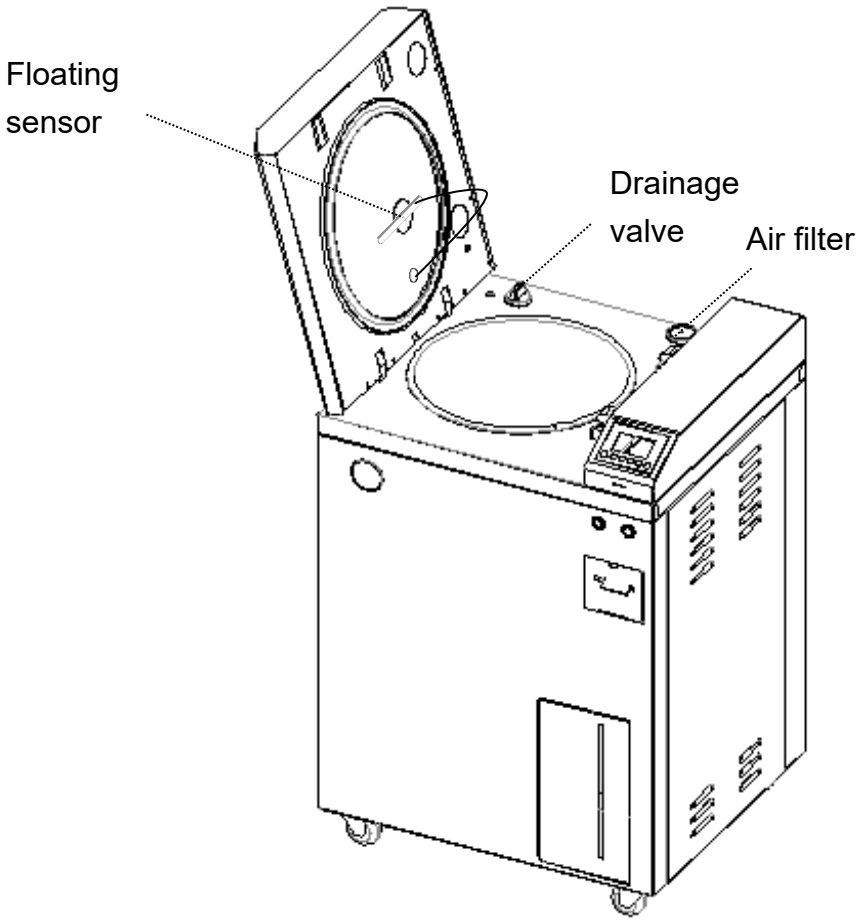


Figure 7

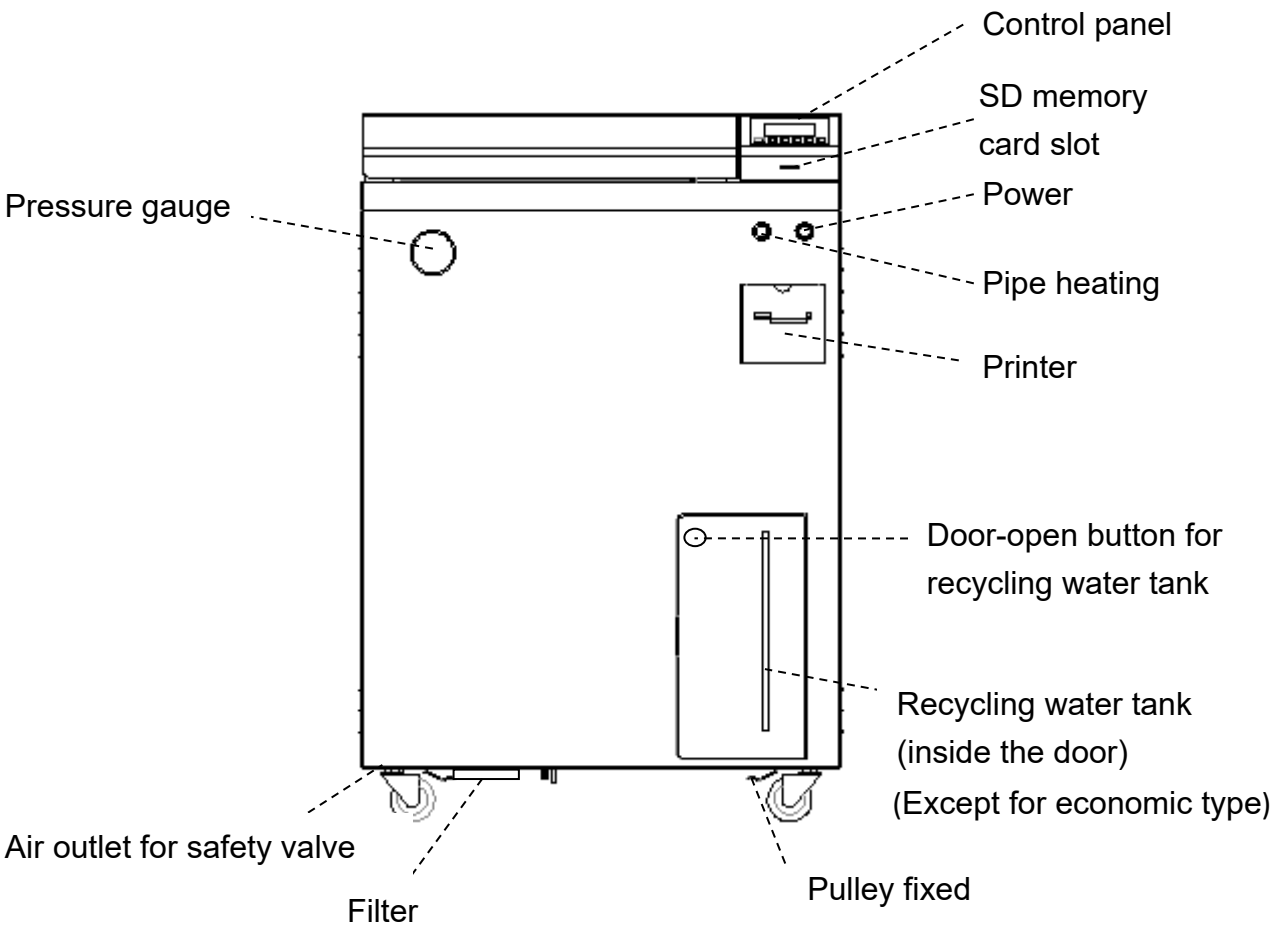


Figure 8

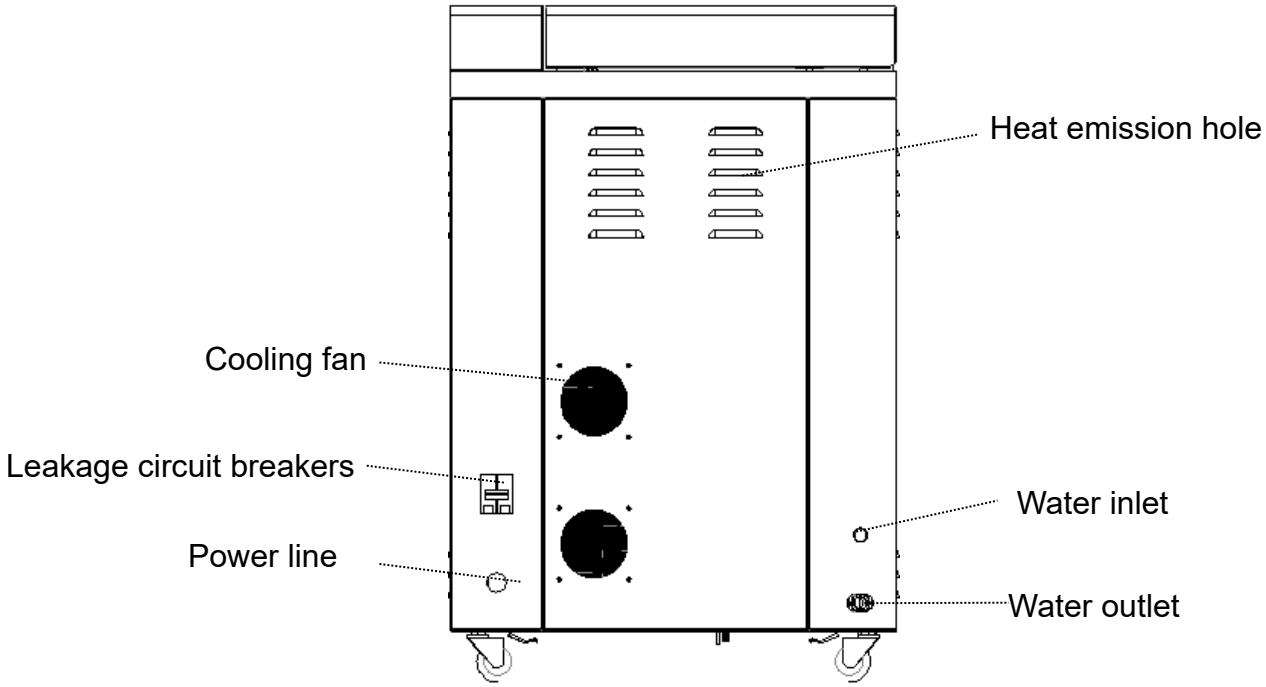


Figure9

5.2.2 Internal layout

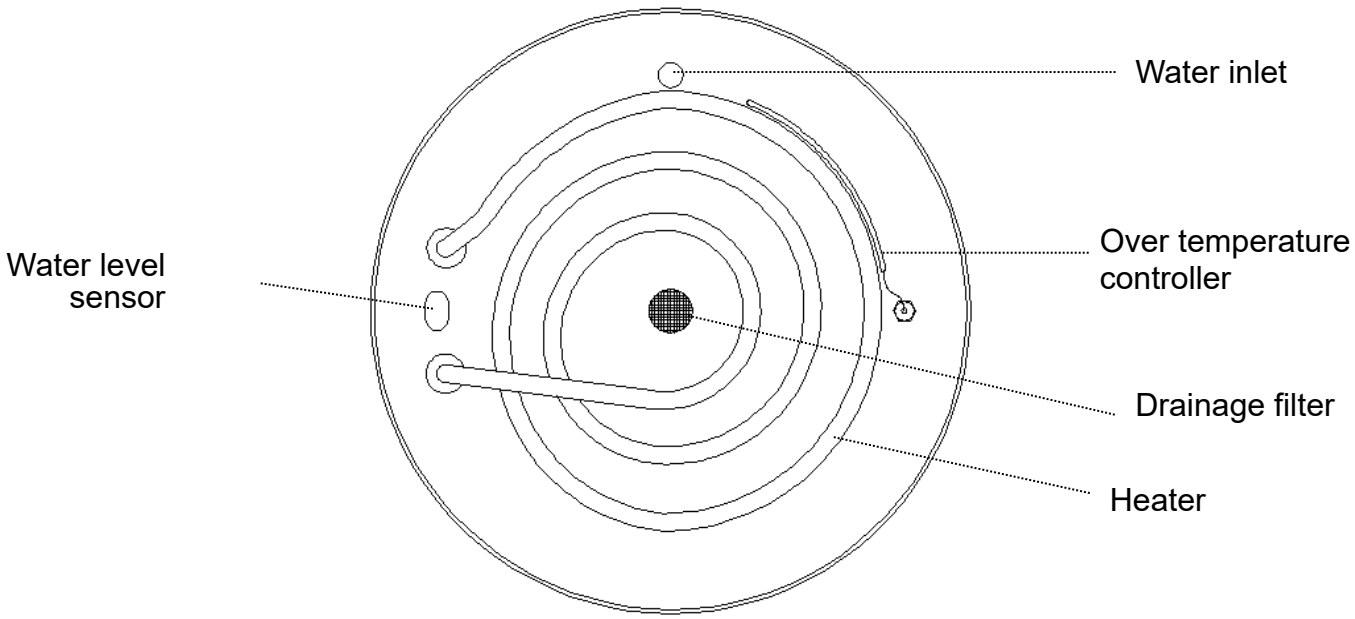


Figure 10

5.2.3 Control panel

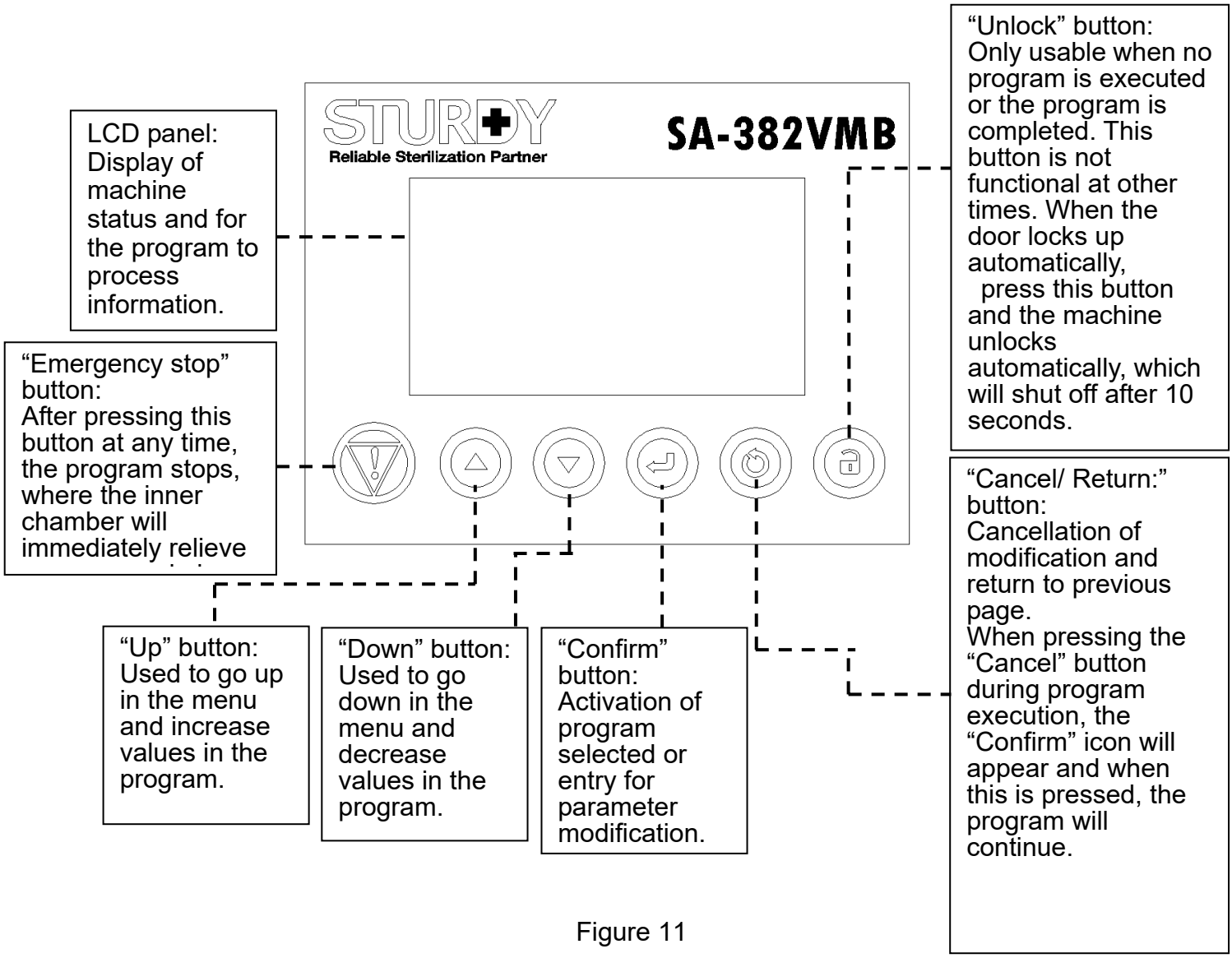


Figure 11

6. Operation Description

6.1 Operation Description

The available sterilization process for operation of the sterilization program is shown in table below, where various sterilization cycles and different types of loading are reflected.

Sterilization parameters and descriptions:

	Sterilization program							
	Liquid 1 Liquid 2	Solid 121ºC	Solid 135ºC	Agar	Dissolution	User1 Pre-vacuum (Optional)	User2 No-Vacuum	Dry (Optional)
Reservation (hour)	-	-	-	-	-	0-99		-
Sterilization temperature (℃)	105-135	121	135	121	-	119-135	105-135	-
Sterilization duration (minutes)	0-419	15	4	15	-	0-419		-
Pressure (bar)	0.2-2.1	1.1	2.1	1.1	-	0.9-2.1	0.2-2.1	-
Dissolving temperature (℃)	-	-	-	-	98	-	60-100	-
Dissolving duration (minutes)	-	-	-	-	0-179	-	0-179	-
Open temperature (℃)	60/70/80/85/90	97		60/70/80/85/90		60/70/80/85/90/97		110
Temperature of thermal retention (℃)	-	-	-	50		40-60		-
Duration of thermal retention (minutes)	-	-	-	1440		0-5999		-
Dry(minutes) (Optional)	-	1-60				0,1-60		1-60

Program	Description
Liquid 1、Liquid 2	Applicable for liquid sterilization
Solid 121ºC	Applicable for instrumental and non-packaged item to be sterilized. Note: ◎If the dry function (Optional) is activated(1-60 minute), there will be automatic drainage , must be connected to the drain pipe.

Program	Description
Solid 135ºC	Applicable for instrumental and non-packaged item to be sterilized. Note: ◎If the dry function(Optional) is activated(1-60 minute), there will be automatic drainage, must be connected to the drain pipe.
Agar	Applicable for Agar sterilization Automatic thermal retention for 24 hours where such retention can be stopped at will during the process.
Dissolution	Applicable for Agar sterilization. Automatic thermal retention for 24 hours where such retention can be stopped at will during the process. Note: ◎For sterilized item to increase temperature for dissolving, the program can be used. ◎ Should the dissolving effect cannot be achieved, increase of dissolving duration is recommended.
User1 User2	The program is set manually and the user may define the test parameters (i.e. temperature, time) to satisfy the demands. Note: ◎When the sterilization time is at “0”, no sterilization will be executed. ◎ If pre-vacuum set “ON” the sterilization temperature range will be 119℃-135℃ and no dissolution function. ◎ If the dry function is activated (1-60 minute), there will be not cooling and keep warm function. ◎If the dry function (Optional) is activated(1-60 minute), there will be automatic drainage, must be connected to the drain pipe. ⚠**Attention:** The manufacturer does not guarantee the sterilization effect. The user must confirm detailed information during operation of the sterilization program for determining whether the program does achieve user’s demands.
Dry (optional)	This sterilization program is a vacuum drying process: 1. After sterilization, this program can be used to increase the dryness. 2. Vacuum dry for 1-60 minutes.

The programming codes of sterilization process are as follows:

Wait	Reservation stage
H1-H4	Heating stage
PV1-PV4	Pre-vacuum stage (optional)
Ster	Sterilization stage (Holding Time)
Exhaust	Pulse stage (Air remove) or Air draining stage
Cooling	Cooling stage
Equilibrium	Liquid balancing stage
Dissolution	Dissolving stage
Warming	Thermal retention stage
Dry	Dry stage (optional)
Vrelease	Vacuum removed stage

SA-382VMB- Overview of sterilization parameters and carrying capacity:

		Sterilization program							
		Liquid 1	Liquid 2	Solid 121ºC	Solid 135ºC	Agar	Dissolution	User1	User2
Load type and maximum load (g, ml)	Instrument	NA		22,000g		NA	NA	22,000g	
	Liquid	19,000ml		NA		19,000ml	19,000ml	19,000ml	

◎ In order to ensure the sterilization effect, the user must please place the subject according to loads noted in the table above.

Overview on number of place able bottles as reference for SA-382VMB

		Model
	Volume (ml)	SA-382VMB
Flask	250ml	12 bottles/ 4 layer (12L)
	500ml	8 bottles/ 3 layer (12L)
	1000ml	5 bottles/ 2 layer (10L)
	2000ml	2 bottles/ 2 layer (8L)
	5000ml	1 bottle/ 1 layer (5L)
Serum bottle	250ml	19 bottles/ 4 layer (19L)
	500ml	12 bottles/ 3 layer (18L)
	1000ml	8 bottles/ 2 layer (16L)
	2000ml	4 bottles/ 2 layer (16L)
	5000ml	1 bottle/ 1 layer (5L)

6.2 Preparation for sterilization

1. Ensure that water level in the chamber is higher than the electric heating tube.
2. Press power switch to “▬▬” position.
3. Check if the pressure gauge indicates at position zero, press “  ” to unlock, pull the door handle shown in Figure 12, and then open the door.

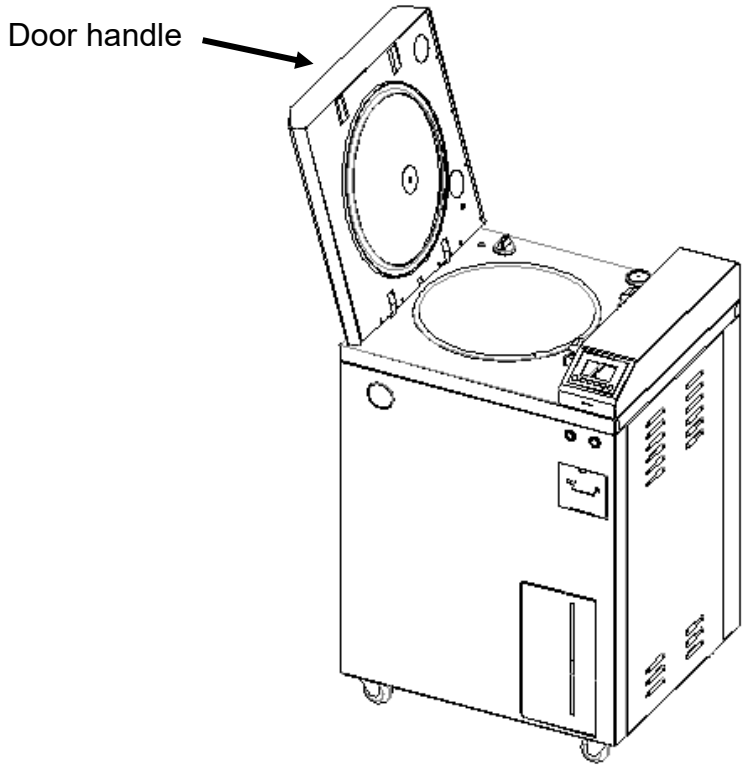


Figure 12

4. Program menu displayed on LCD screen. The machine is ready by then and available for running various programs.

⚠Attention: Please do ensure that the items to be sterilized are cleaned properly for best sterilization effect.

⚠Warning: With reference to the “Overview of sterilization parameters and carrying capacity”, input of excessive items to be sterilized will cause sterilization failure or incomplete sterilization.

⚠**Warning:** When entering the sterilization program or test, the door must be closed properly, so the program can be commenced; otherwise, the error message of “Door is open“ will appear as shown in Figure 13

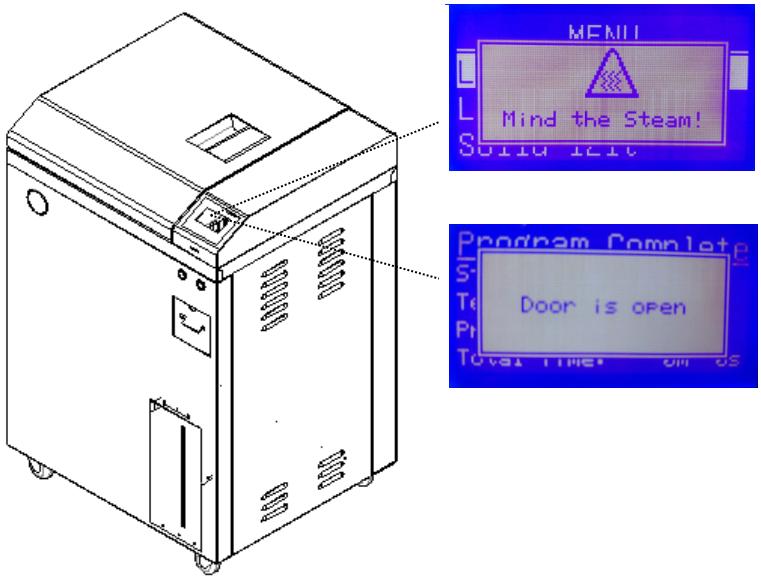


Figure 13

⚠**Attention:** A message of “Mind the steam!” will prompt on the LCD. If operator try to open the door by pressing the “  “ button. The door may not be opened due to the protection function to the hot temperature. Operator has to wait for 5-20 minutes until the chamber temperature has cooled down to the preset temperature.(See 6.1Operation Description for opening the door temperature)

⚠**Attention:** If the error message of “Remove water of Drain Bottle” appears when the program starts, please remove the water shown in Figure 14

(Please press top left corner of the condensed water bottle(For Standard & Advanced types only) gently to open the door, take out the drain bottle, remove water inside and place it back to original position.)

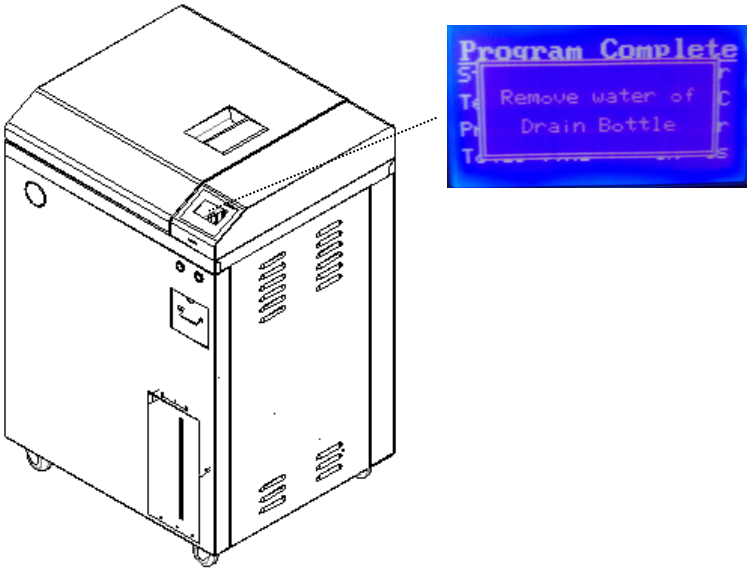
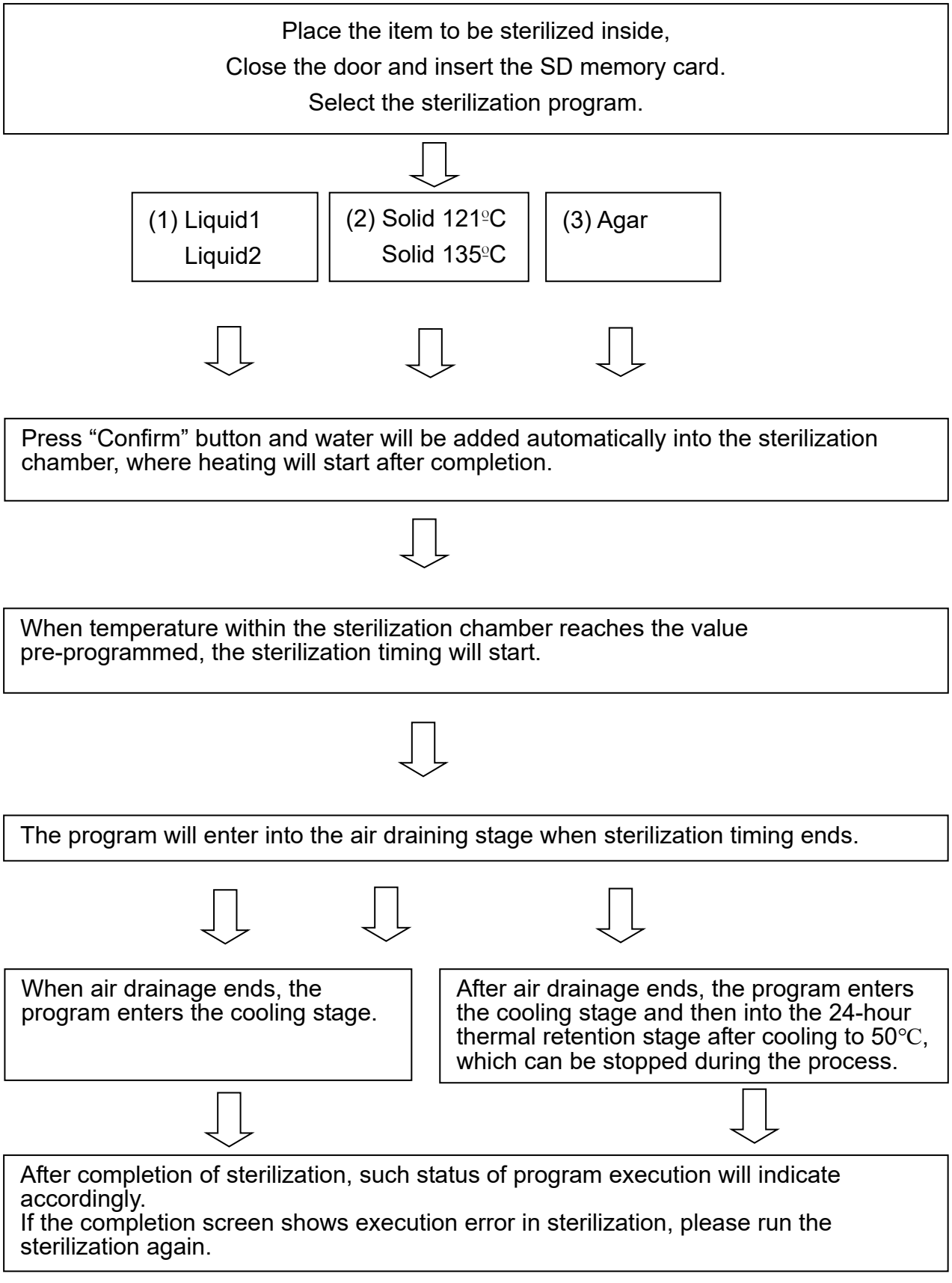


Figure 14

5. Insert SD memory card into the SD slot.

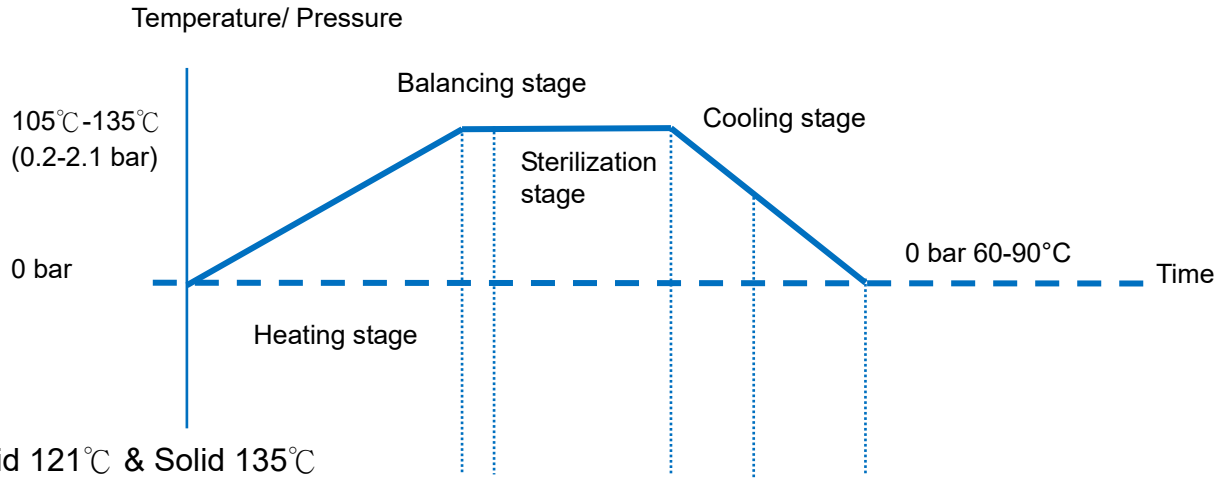
6.3 Operation process

6.3.1 Basic sterilization process

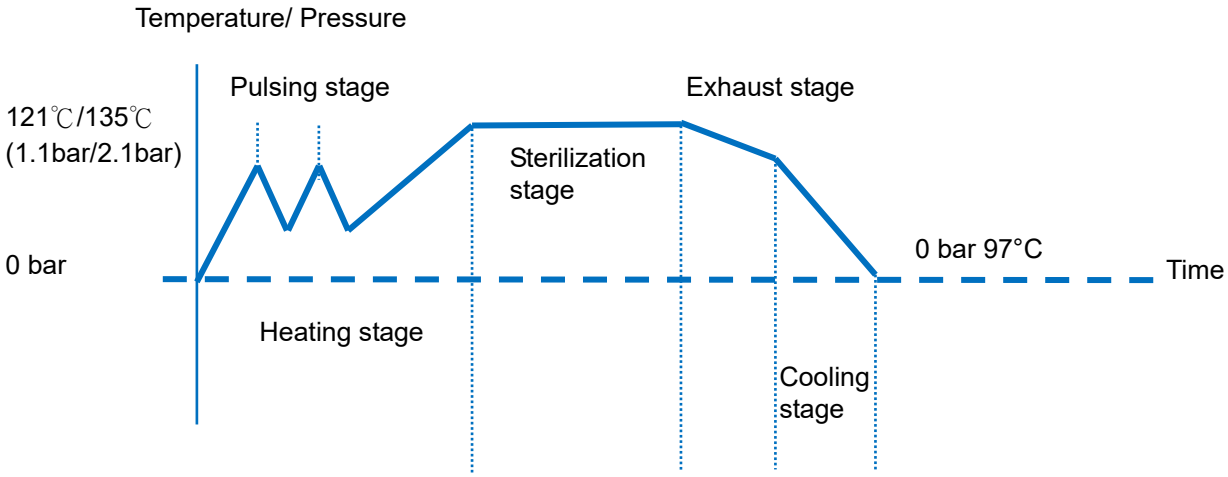


6.3.1.1 General sterilization chart

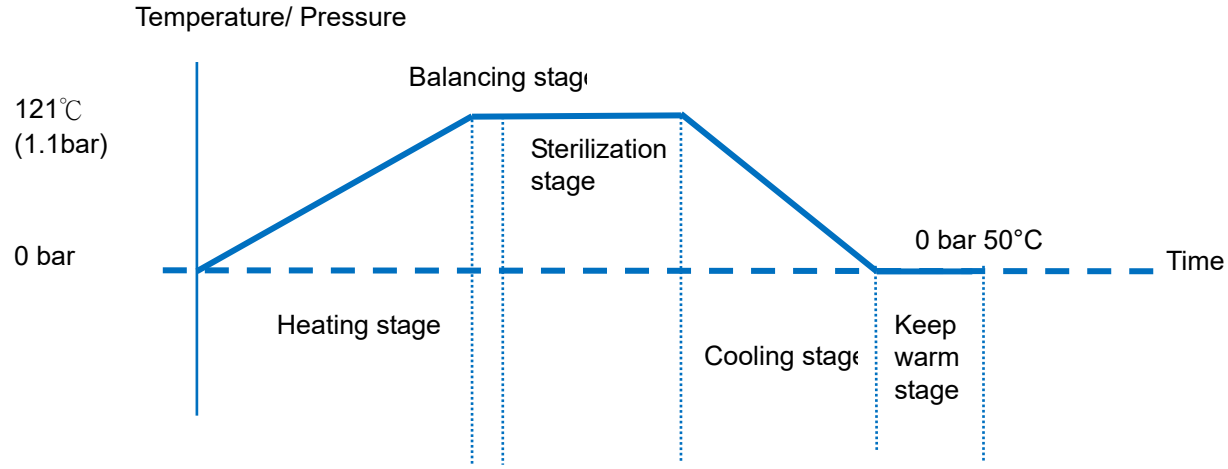
(1) Liquid 1 & Liquid 2



(2) Solid 121℃ & Solid 135℃



(3) Agar



6.3.1.2 General sterilization Parameters

Built-in parameters for the program are as follows:

	Liquid	Solid 121ºC	Solid 135ºC	Agar
Sterilization temperature (℃)	105-135	121	135	121
Sterilization duration (minutes)	0-419	15	4	15

6.3.1.3 Operating

The operation steps are as follows:

(1) Liquid 1 & Liquid 2

Use  or  button to select the program. After selection, press  button to enter into the basic sterilization program (e.g. Liquid sterilization program 1) shown in Figure 15

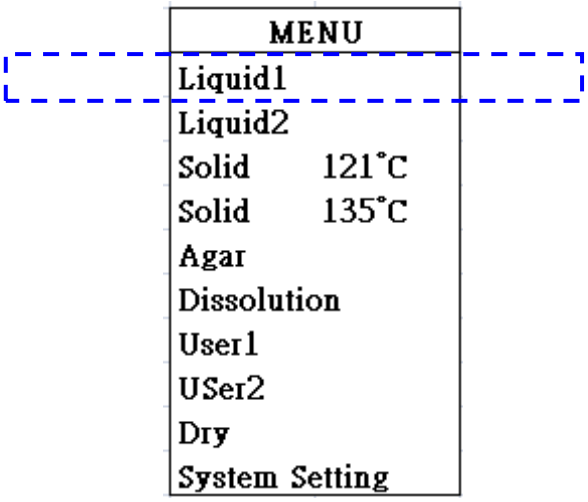
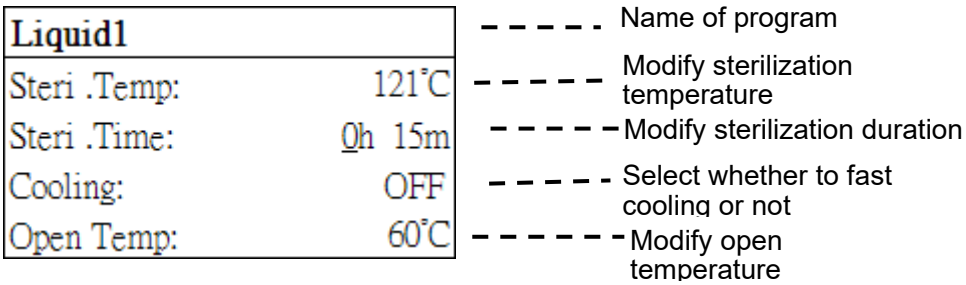


Figure 15



1. Press  to enter into the modification mode, and then change the sterilization temperature with  or  button. After that, press  button to confirm the setting result shown in Figure 16.

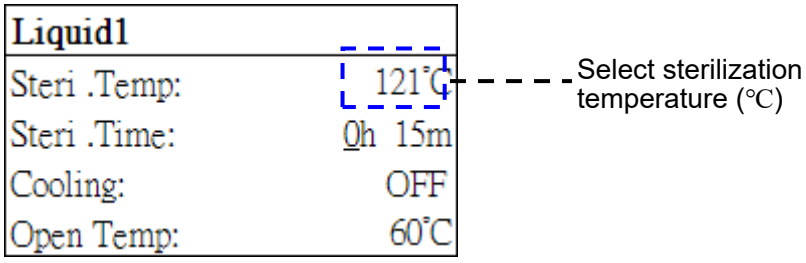


Figure 16

2. Move the cursor to next slot with  or  button. Press  first to enter into the hour modification mode, and then use  or  button to select time. After modification, press  button to confirm the setting result shown in Figure 17.

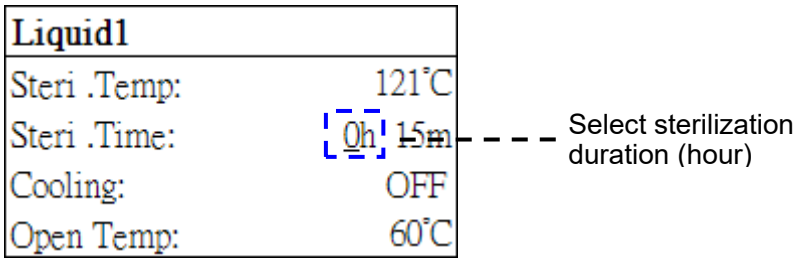


Figure 17

3. Move the cursor to next slot with  or  button. Press  first to enter into the minute modification mode, and then use  or  button to select time. After modification, press  button to confirm the setting result shown in Figure 18.

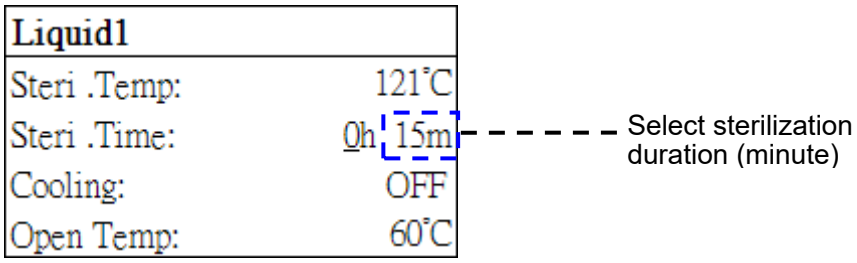


Figure 18

4. Move the cursor to next slot with  or  button. Press  first to enter into the modification mode, and then use  or  button to select ON/ OFF. After modification, press  button to confirm the setting result shown in Figure 19.

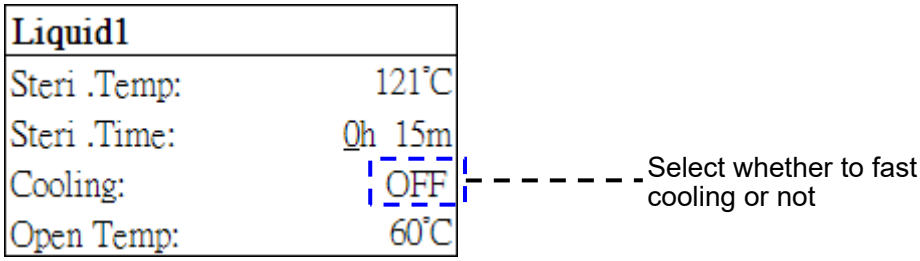


Figure 19

5. Move the cursor to next slot with  or  button. Press  first to enter into the modification mode, and then use  or  button to select open temperature. After modification, press  button to confirm the setting result shown in Figure 20.

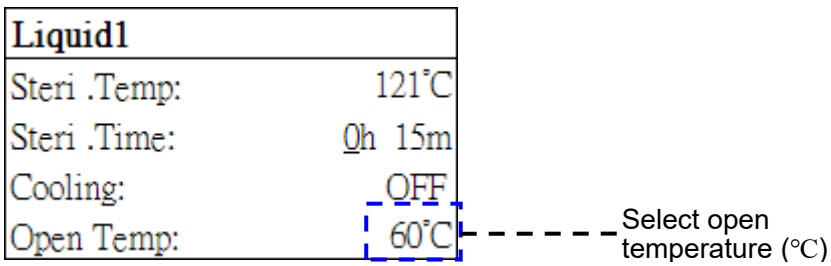


Figure 20

6. After completion of setting, move the cursor to next slot with  to enter into the

confirmation page. Press  button to commence the program shown in Figure 21

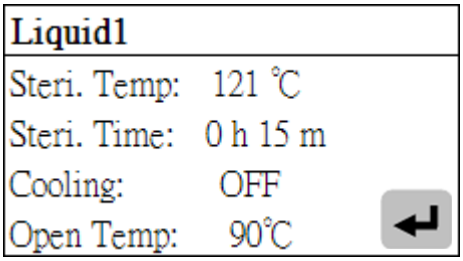


Figure 21

(2) Solid 121℃ & Solid 135℃

1. Solid sterilization program is standard program, it have no other sterilization parameters shown in Figure 22 and Figure 23.

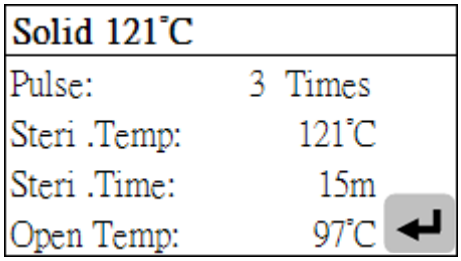


Figure 22

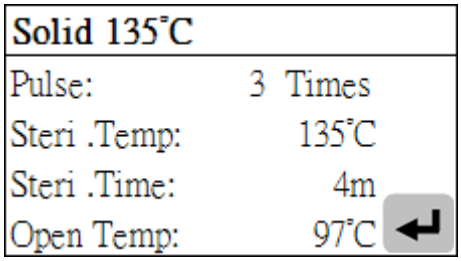


Figure 23

2. If Autoclave with vacuum pump will be addition pre-vacuum & dry function shown in Figure 24。

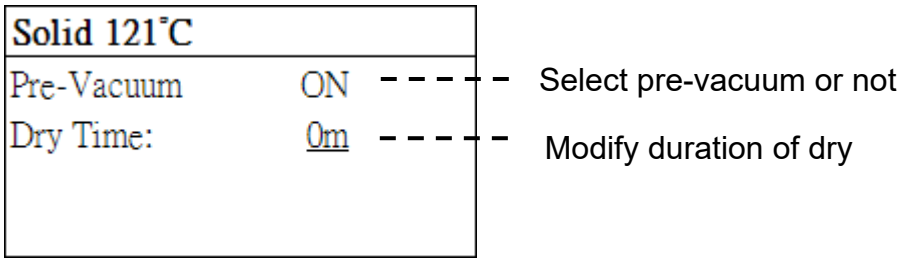


Figure 24

3. In Agar program, select items that require setting and press  to enter into the modification mode. Use  or  to select cooling setting ON/OFF, and then press  button to confirm the setting result shown in Figure 25.

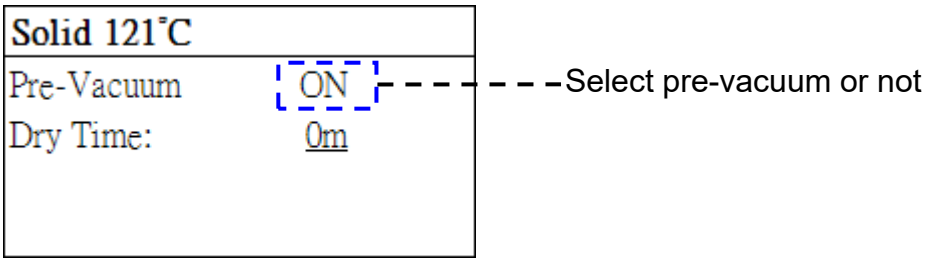


Figure 25

4. Use  or  to select in the “Dry time” column, and then press  button to enter into dry time setting, press  or  button select dry time. After that, press  button to confirm the setting result shown in Figure 26。

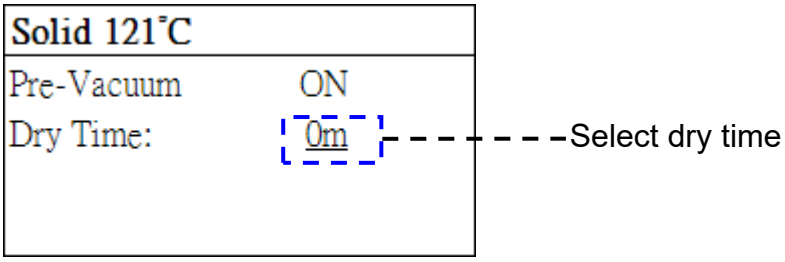
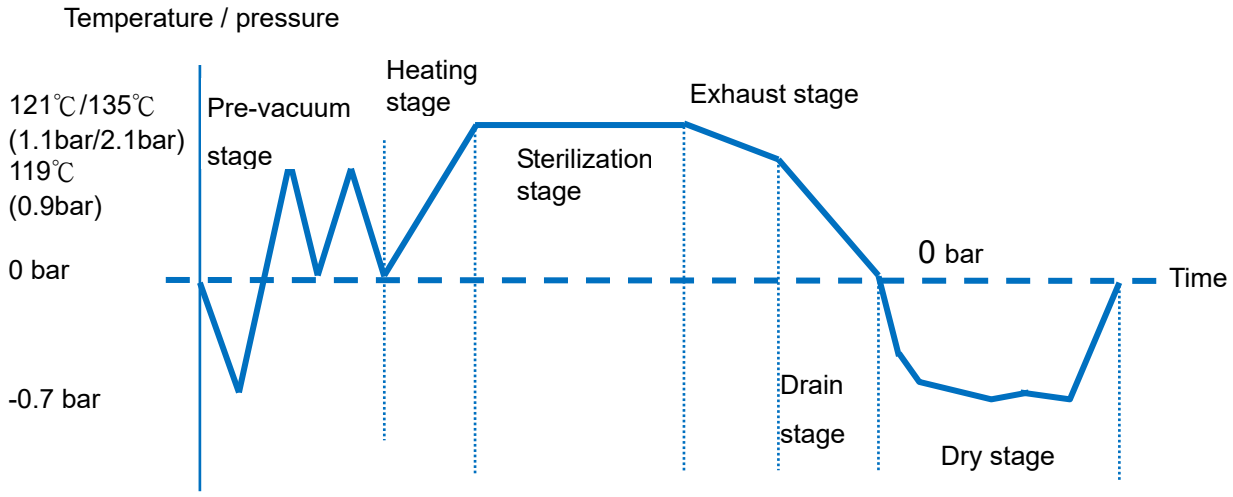


Figure 26

5. Move to the stroke confirmation page with  button, the program will run automatically after pressing  button.

6. The general sterilization chart with pre-vacuum and Dry



(3) Agar

1. Agar program, select items that require setting and press  to enter into the modification mode. Use  or  to select cooling setting ON/OFF, and then press  button to confirm the setting result shown in Figure 27, Figure 28.

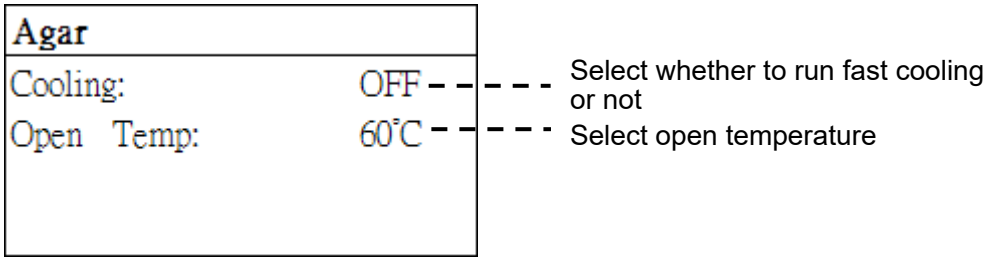


Figure 27

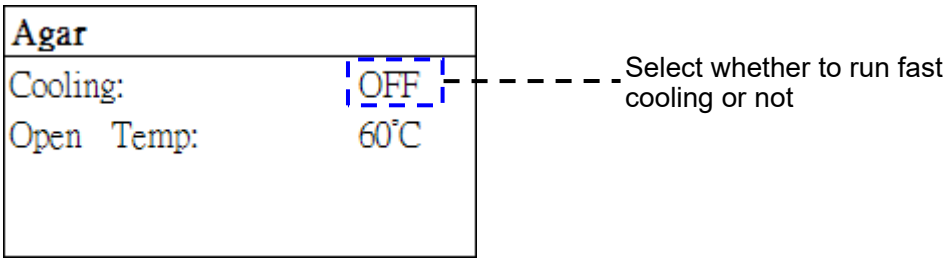


Figure 28

2. If Agar requires setting of open temperature, move the cursor to “Open Temp.” with  or  button. Press  to enter into the modification mode, and then use  or  button to select temperature. After modification, press  button to confirm the setting result shown in Figure 29.

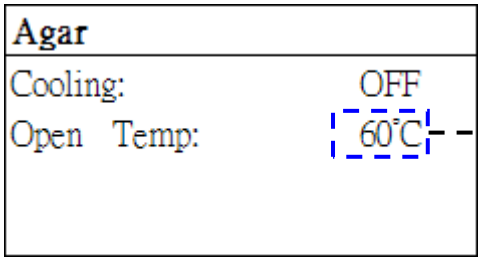


Figure 29

3. After completion of setting, move the cursor to next slot with  to enter into the confirmation page. Press  button to commence the program shown in Figure 30, Figure 31.

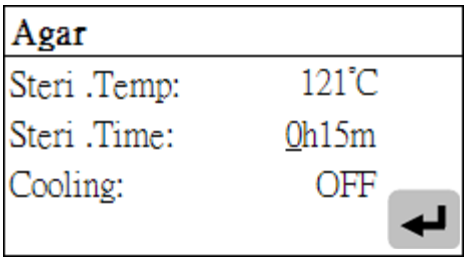


Figure 30

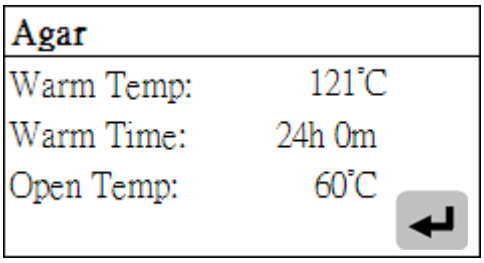


Figure 31

4. When reaching 50℃ in cooling stage, the program automatically executes the 24-hour thermal retention that can be stopped during the process. If this is desired for retrieving the object earlier, please press  and then press  to confirm.

5. The program will run automatically after pressing  button, where all information such as temperature, pressure and duration for the autoclave will show on the LCD screen by then (shown in Figure 32 or Figure 33).

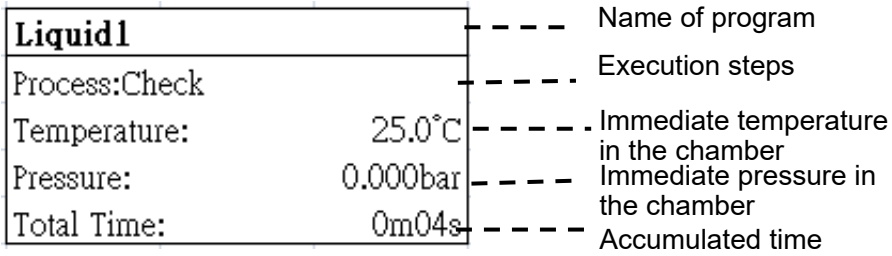


Figure 32

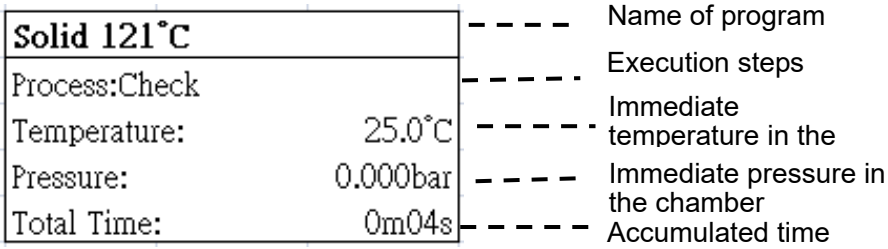


Figure 33

6. After completion of program execution, final information of sterilization will appear on the LCD screen shown in Figure 34

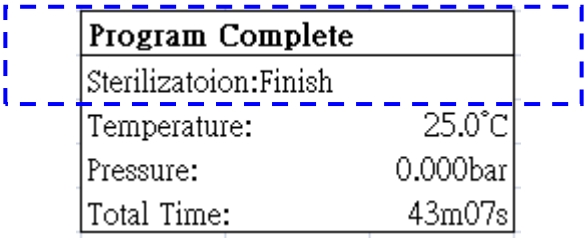


Figure 34

⚠**Warning:** If the Sterilization column in the LCD screen shows “ERROR”, it means that the sterilization was not thorough. Please run the sterilization again.

7. The message of “Mind The Steam” will appear when pressing  button and pressure in the chamber will be automatically balanced with the atmospheric pressure. The door can only be opened after pressure in the chamber reaches zero (0) and LCD screen indicates “Please Open Door”, where the item sterilized can then be removed. Please also check with chemical test strips or biological agent (please refer to the operation manual for chemical test strips or biological agent) to confirm thoroughness of the sterilization. If any problem exists, please contact the distributor.

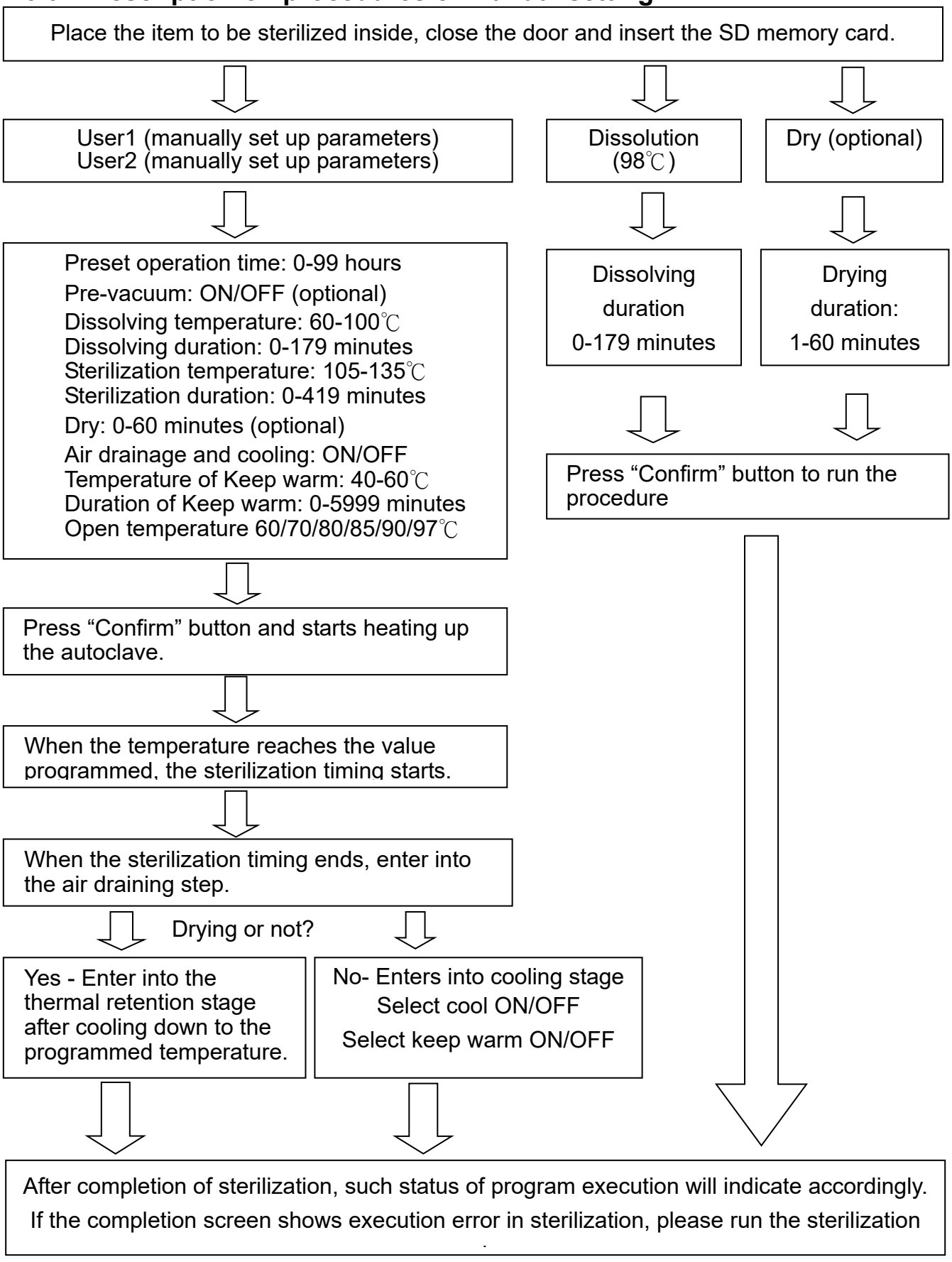
⚠**Warning:** Before opening the door, please ensure that the pressure gauge indicates at position zero first.

⚠**Warning:** When opening the door, be careful of the steam at high temperature to avoid scorching.

⚠**Warning:** When taking out the sterilized item, please wear protective gloves and use tools for taking it out.

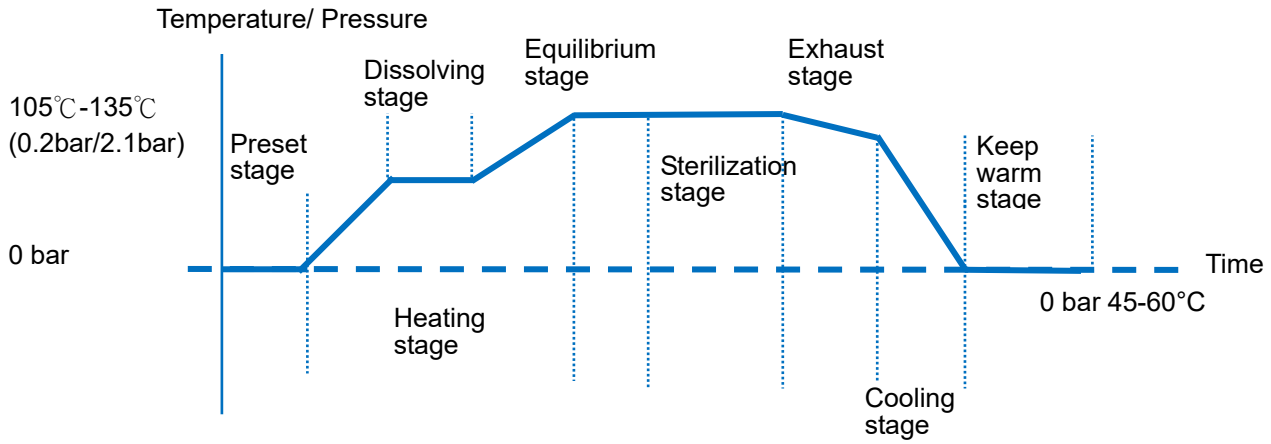
⚠**Warning:** In case of sterilization program carried out in series, each operation must be separated with at least 20 minutes in between.

6.3.2 Description on procedures of manual setting

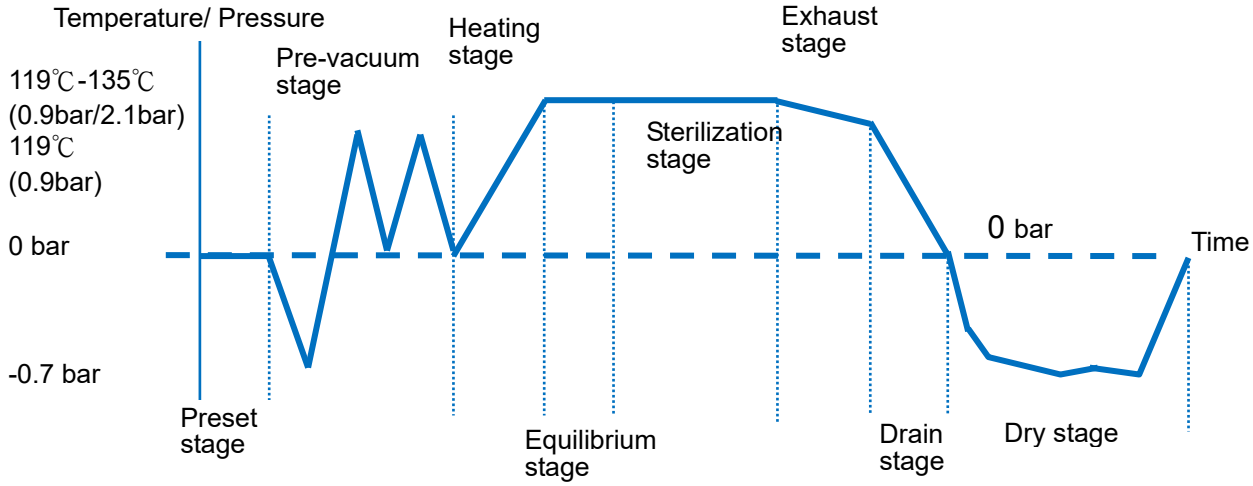


6.3.2.1 Manual setting chart

(1) User1/User2



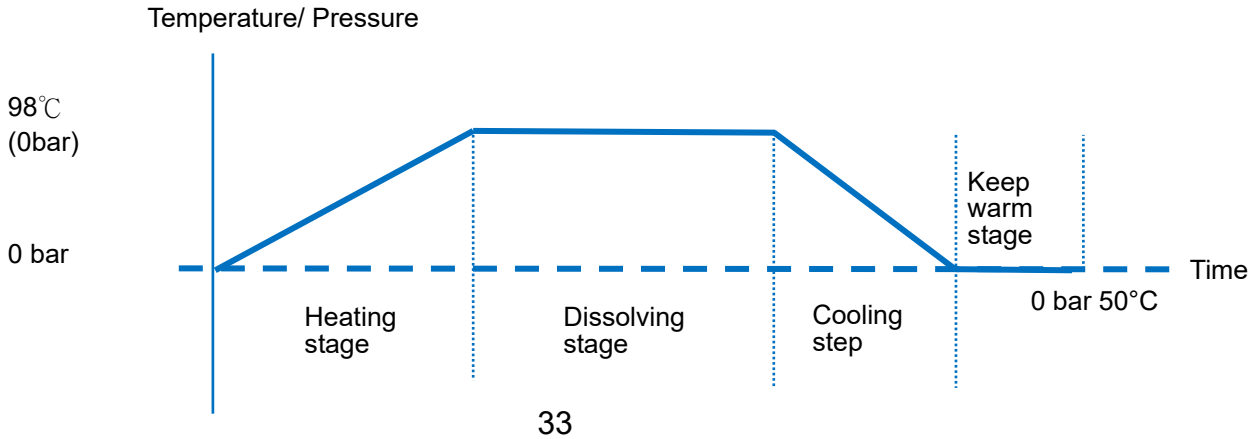
User1 & User2 (with pre-vacuum and dry / optional)



Note: Equilibrium stage is detect floating sensor value going to sterilization stage.

Attention: The manufacturer does not guarantee the sterilization effect. The user must confirm detailed information during operation of the sterilization program for determining whether the program does achieve user's demands.

(2) Dissolution



6.3.2.2 Manual setting Parameters

Built-in parameters for the program are as follows:

	User1/User2		Dissolution
	Pre-vacuum	No-vacuum	
Preset activation (time)	0-99		-
Dissolving temperature (℃)	60-100		98
Dissolving duration (minutes)	0-179		0-179
Sterilization temperature (℃)	119-135	105-135	-
Sterilization duration (minutes)	0-419		
Dry (optional) (minutes)	Select dry time		-
	1-60	0	
Air drainage	ON	ON/OFF	-
Fast cooling	OFF	ON/OFF	-
Temperature of thermal retention (℃)	-	40-60	50
Duration of thermal retention (minutes)	-	0-5999	1440
Open temperature	110	60/70/80/85/90/97	60/70/80/85/90

6.3.2.3 Operating

The steps are as follows:

◎ User 1 & User 2

1. Use  or  button to select the program ”User1/User2”. After selection, press  button to enter into parameter setting for customized program shown in Figure 35.

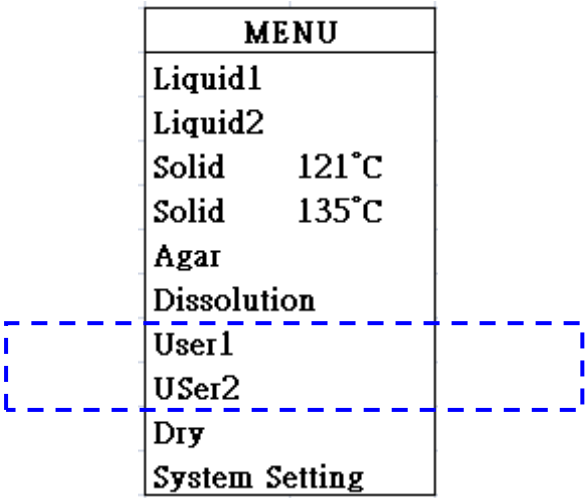


Figure 35

2. Press  button to enter into “Parameter modification” shown in Figure 36.

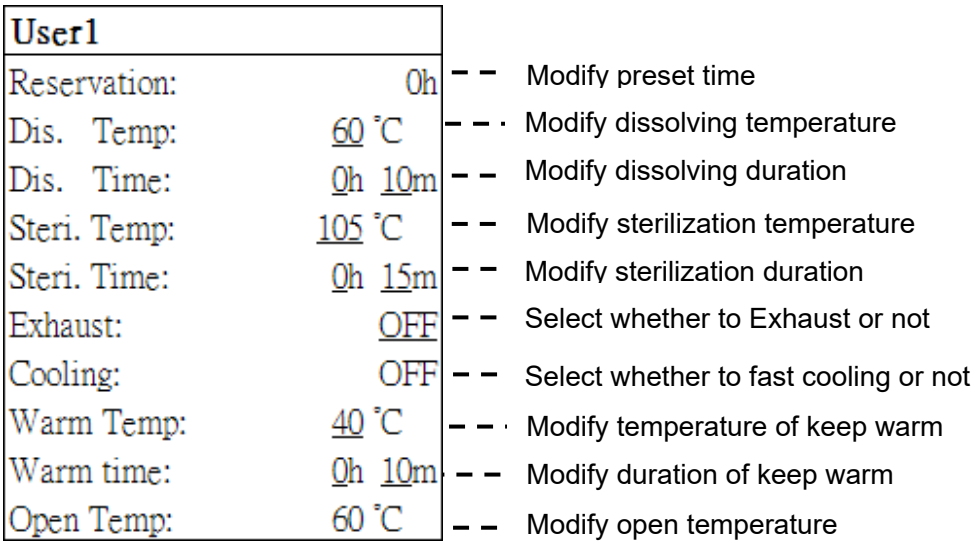


Figure 36

3. Press  to enter into the modification mode, and then change the preset time with  or  button. After that, press  button to confirm the setting result shown in Figure 37

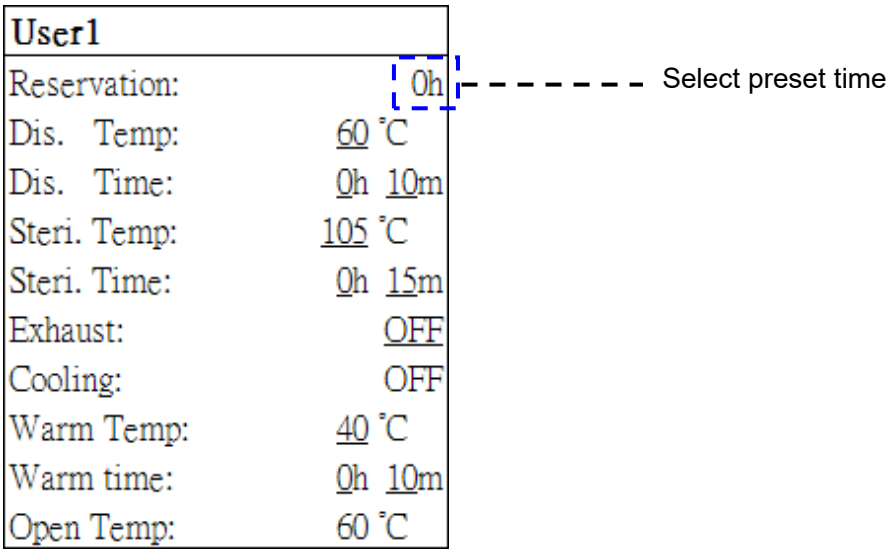


Figure 37

4. Move cursor to next slot with  or  button (Figure 38). Press  to enter into the modification mode, and then change the sterilization temperature with  or  button. After that, press  button to confirm the setting result shown in Figure 38.

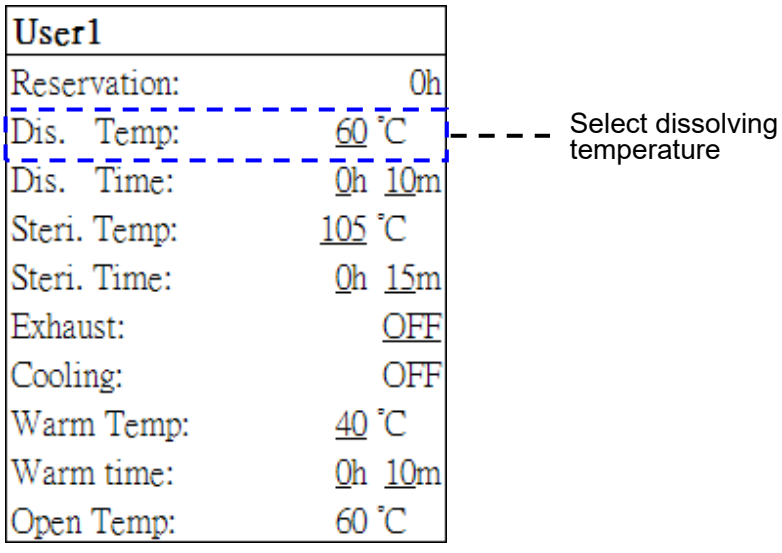


Figure 38

5. Move cursor to next slot with  or  button (Figure 39). Press  to enter into the modification mode, and then change the dissolving duration with  or  button. After that, press  button to confirm the setting result shown in Figure 39.

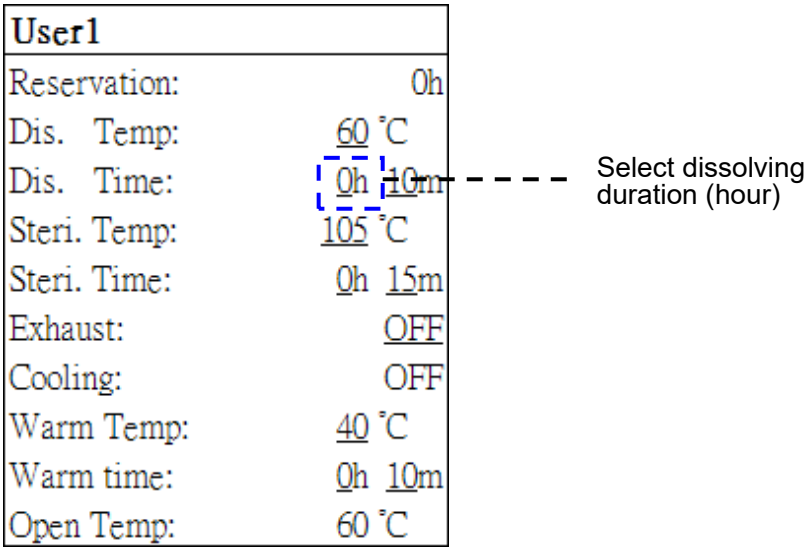


Figure 39

6. Move cursor to next slot with  or  button (Figure 40). Press  to enter into the modification mode, and then change the dissolving duration with  or  button. After that, press  button to confirm the setting result shown in Figure 40.

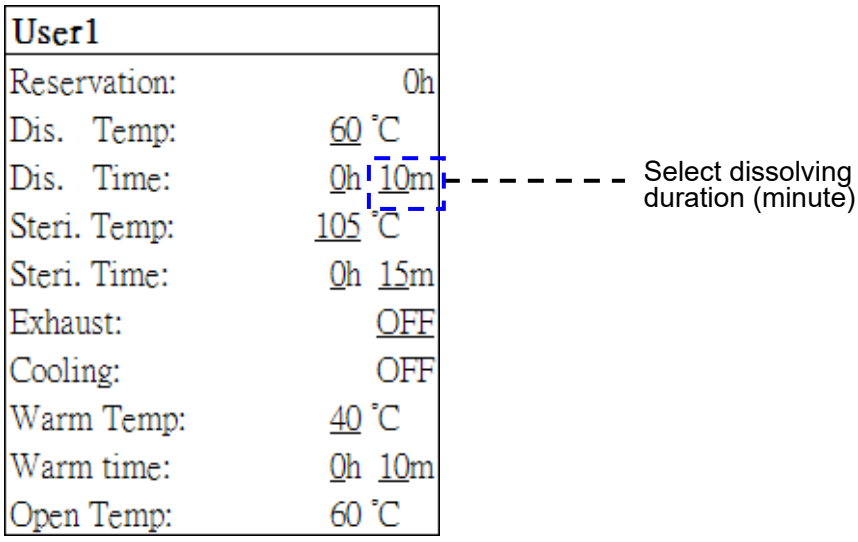


Figure 40

7. Move cursor to next slot with  or  button (Figure 41). Press  to enter into the modification mode, and then change the sterilization temperature with  or  button. After that, press  button to confirm the setting result shown in Figure 41.

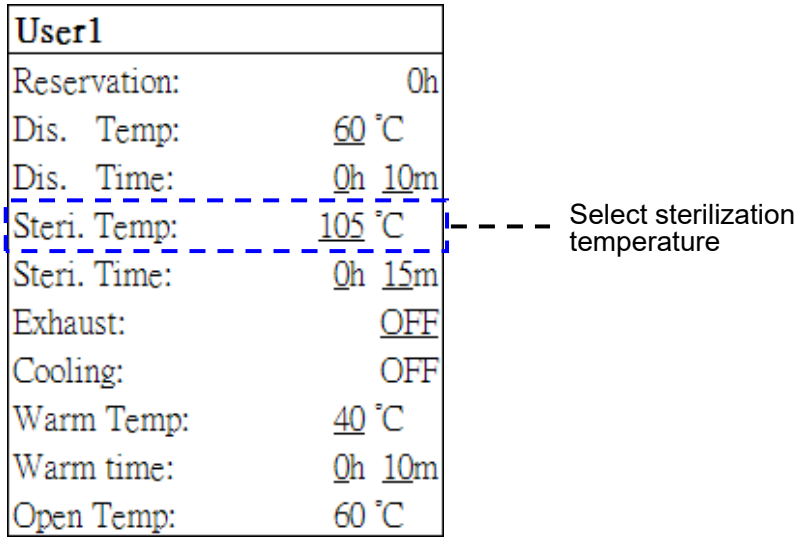


Figure 41

8. Move cursor to next slot with  or  button. Press  to enter into the modification mode, and then change the sterilization duration with  or  button. After that, press  button to confirm the setting result shown in Figure 42.

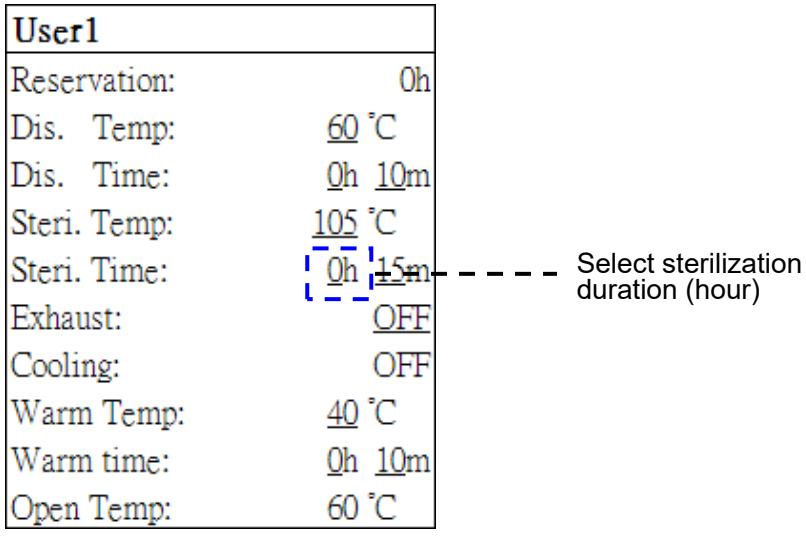


Figure 42

9. Move the cursor to next slot with  or  button. Press  first to enter into the minute modification mode, and then use  or  button to select sterilization duration. After modification, press  button to confirm the setting result shown in Figure 43.

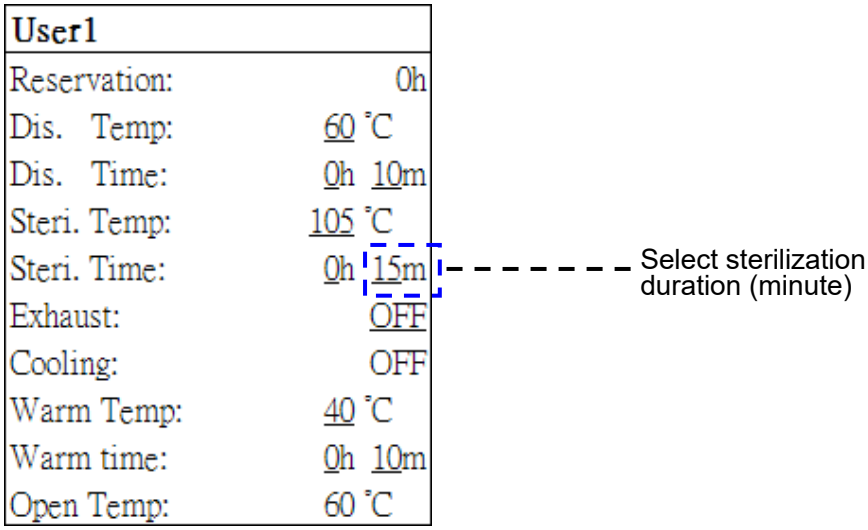


Figure 43

10. Move the cursor to next slot with  or  button. Press  first to enter into the modification mode, and then use  or  button to select whether to drain air or not. After modification, press  button to confirm the setting result shown in Figure 44

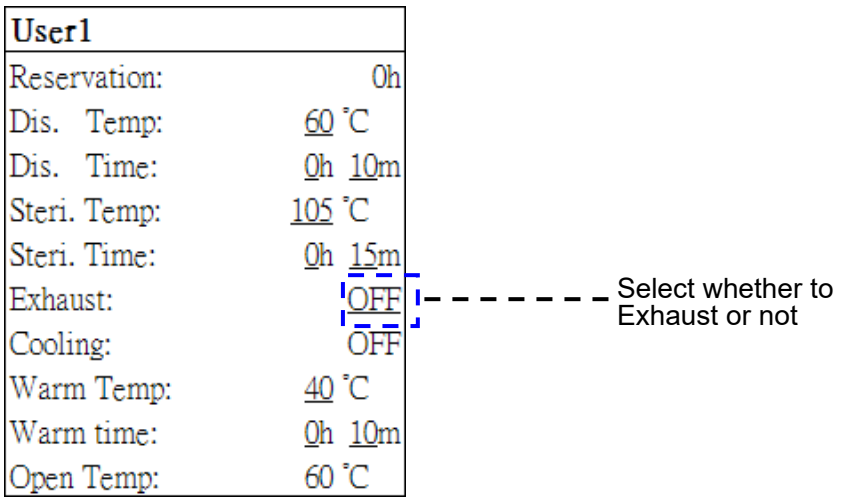


Figure 44

11. Move cursor to next slot with  or  button. Press  to enter into the modification mode, and then select whether to fast cool or not with  or  button. After that, press  button to confirm the setting result shown in Figure 45.

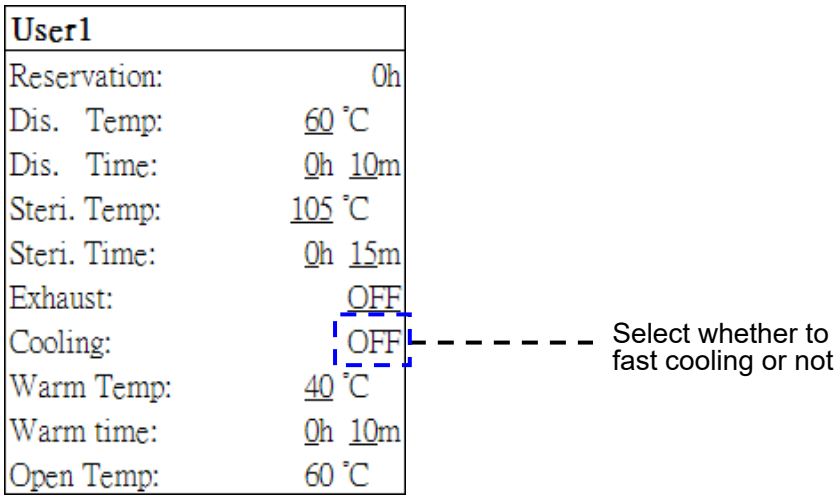


Figure 45

12. Move the cursor to next slot with  or  button. Press  first to enter into the modification mode, and then use  or  button to select temperature of thermal retention. After modification, press  button to confirm the setting result shown in Figure 46.

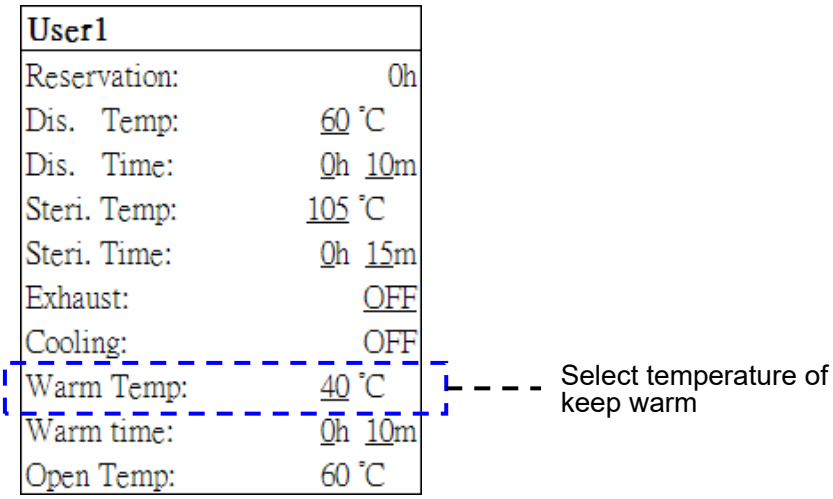


Figure 46

13. Move the cursor to next slot with  or  button. Press  first to enter into the hour modification mode, and then use  or  button to select duration of thermal retention. After modification, press  button to confirm the setting result shown in Figure 47.

User1	
Reservation:	0h
Dis. Temp:	60 ℃
Dis. Time:	0h 10m
Steri. Temp:	105 ℃
Steri. Time:	0h 15m
Exhaust:	OFF
Cooling:	OFF
Warm Temp:	40 ℃
Warm time:	0h 10m
Open Temp:	60 ℃

Select duration of keep warm (hour)

Figure 47

14. Move the cursor to next slot with  or  button. Press  first to enter into the minute modification mode, and then use  or  button to select duration of thermal retention. After modification, press  button to confirm the setting result shown in Figure 48.

User1	
Reservation:	0h
Dis. Temp:	60 ℃
Dis. Time:	0h 10m
Steri. Temp:	105 ℃
Steri. Time:	0h 15m
Exhaust:	OFF
Cooling:	OFF
Warm Temp:	40 ℃
Warm time:	0h 10m
Open Temp:	60 ℃

Select duration of keep warm (minute)

Figure 48

15. Move cursor to next slot with  or  button. For selection of open temperature, press  to enter into the modification mode, and then select "temperature" with  or  button. After that, press  button to confirm the setting result shown in Figure 49.

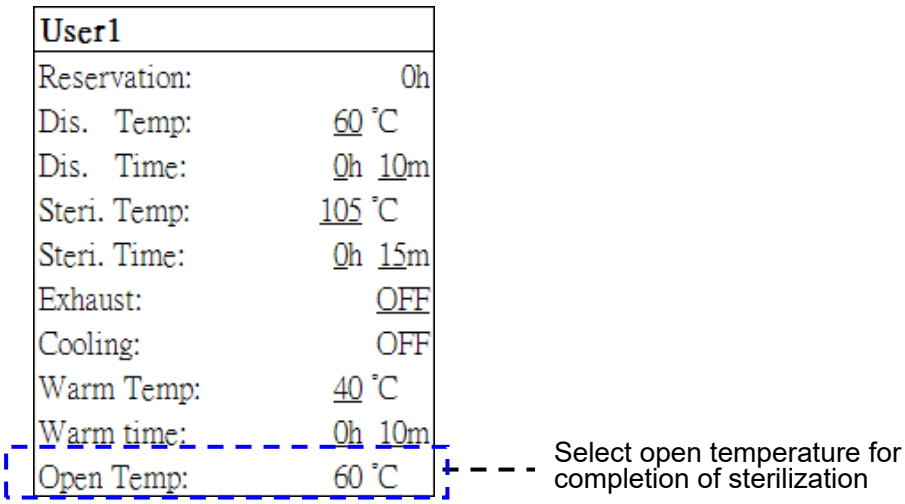


Figure 49

16. If Autoclave with vacuum pump the User1 & User2 setting page be addition items shown in Figure 50.

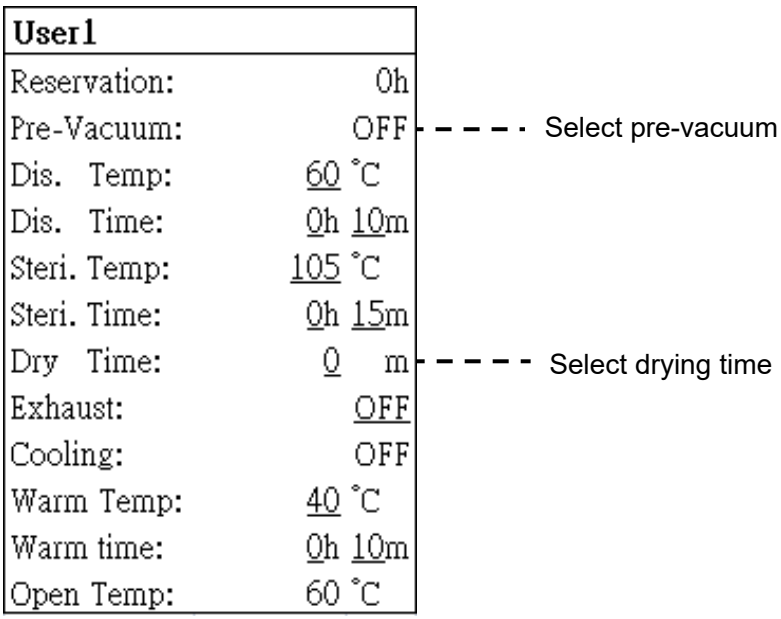


Figure 50

Note: ◎ If pre-vacuum set “ON” the sterilization temperature range will be 119℃-135℃ and no dissolution function.

◎ If the dry function is activated, there will be drain, not cooling and keep warm function.

17. Move to the stroke confirmation page with  button shown in Figure 51

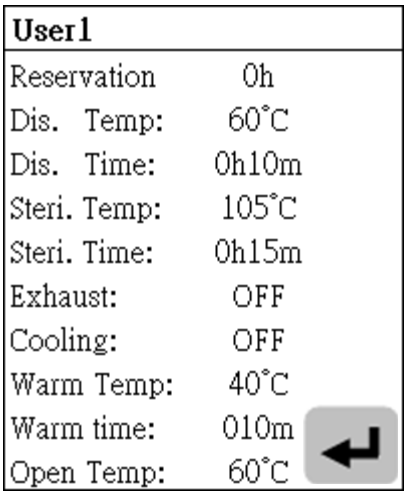


Figure 51

18. The program will run automatically after pressing  button, where all information such as temperature, pressure and duration for the autoclave will show on the LCD screen by then (shown in Figure 52).

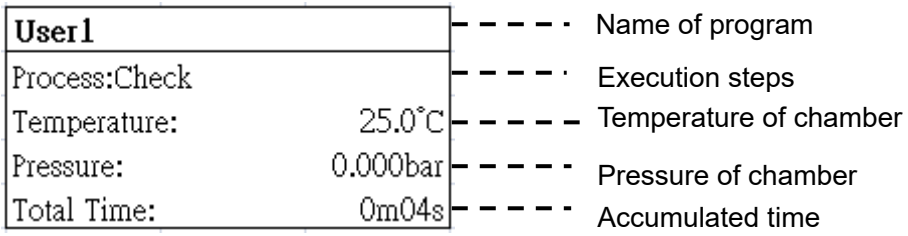


Figure 52

19. After completion of program execution, final information of sterilization will appear on the LCD screen shown in Figure 53.

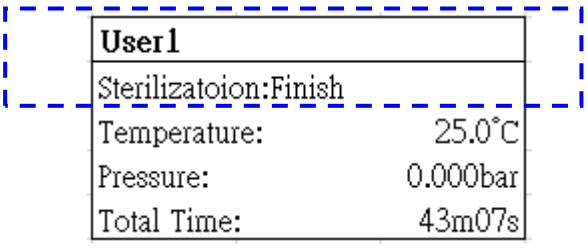


Figure 53

◎ Dissolution (Melting)

1. Use  or  button to select the program ”Dissolution”. After selection, press  button to enter into parameter setting for customized program shown in Figure 54.

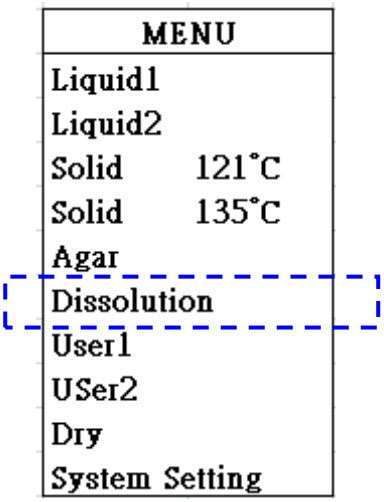


Figure 54

2. Press  button to enter into “Parameter modification” shown in Figure 55.

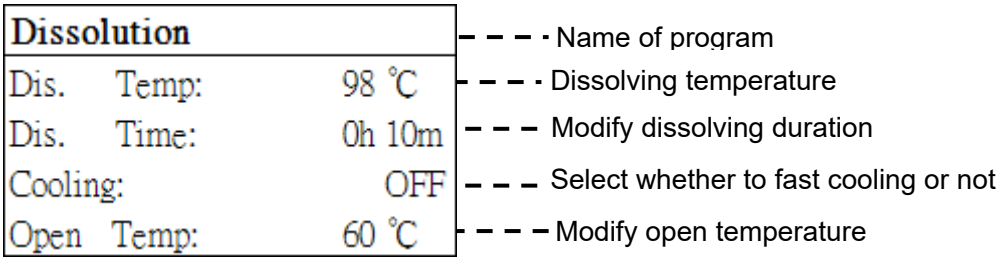


Figure 55

3. Press  to enter into the modification mode, and then change the dissolving duration with  or  button. After that, press  button to confirm the setting result shown in Figure 56.

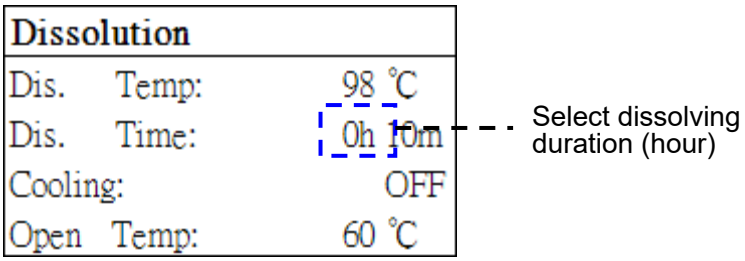


Figure 56

4. Move cursor to next slot with  or  button. Press  to enter into the modification mode, and then change the dissolving duration with  or  button. After that, press  button to confirm the setting result shown in Figure 57.

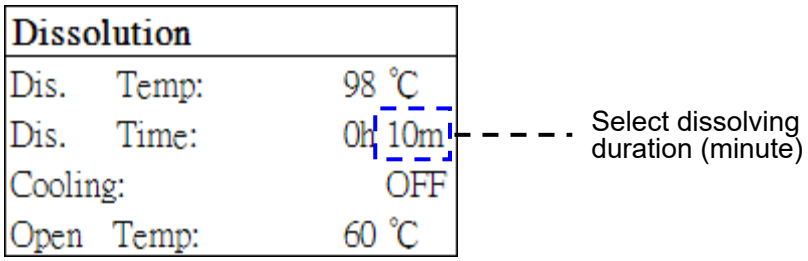


Figure 57

5. Move cursor to next slot with  or  button. Press  to enter into the modification mode, and then select whether to fast cool or not with  or  button. After that, press  button to confirm the setting result shown in Figure 58.

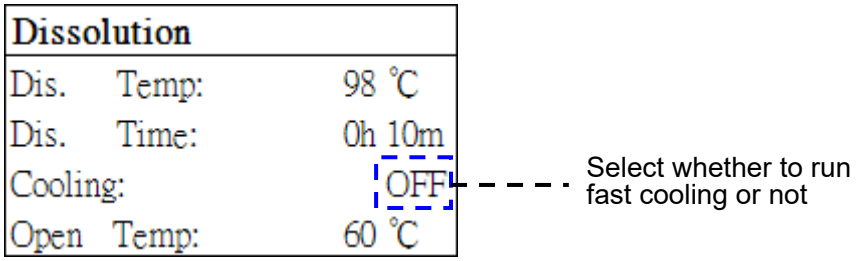


Figure 58

6. Move cursor to next slot with  or  button. Press  to enter into the modification mode, and then change the open temperature with  or  button. After that, press  button to confirm the setting result shown in Figure 59.

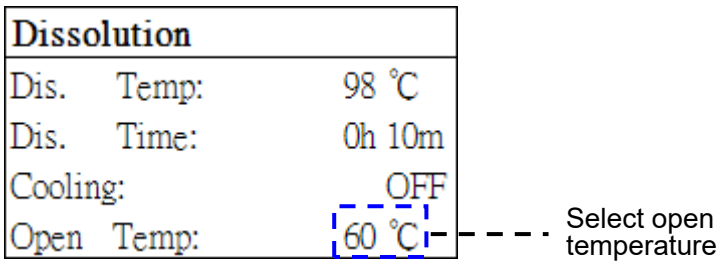


Figure 59

7. Move to the stroke confirmation page with  button shown in Figure 60, Figure 61.

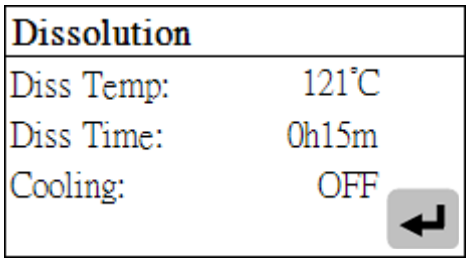


Figure 60

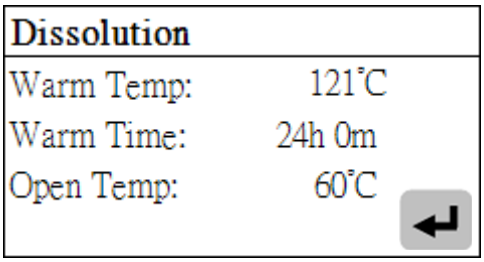


Figure 61

8. The program will run automatically after pressing  button, where all information such as temperature, pressure and duration for the autoclave will show on the LCD screen by then (shown in Figure 62).

Diissolution	
Process:Check	
Temperature:	25.0℃
Pressure:	0.000bar
Total Time:	0m04s

Figure 62

9. The temperature will cool down to 50℃ after completion of program execution and dissolving, where the program will automatically execute the 24-hour thermal retention that can be stopped during the process. If this is desired for retrieving the object earlier, please press  and then press  to confirm.

Warning: If the Sterilization column in the LCD screen shows “ERROR”, it means that the sterilization was not thorough. Please run the sterilization again.

10. The message of “Mind The Steam” will appear when pressing  button and pressure in the chamber will be automatically balanced with the atmospheric pressure. The door can only be opened after pressure in the chamber reaches zero (0) and LCD screen indicates “Please Open Door”, where the item sterilized can then be removed. Please also check with chemical test strips or biological agent (please refer to the operation manual for chemical test strips or biological agent) to confirm thoroughness of the sterilization. If any problem exists, please contact the distributor.

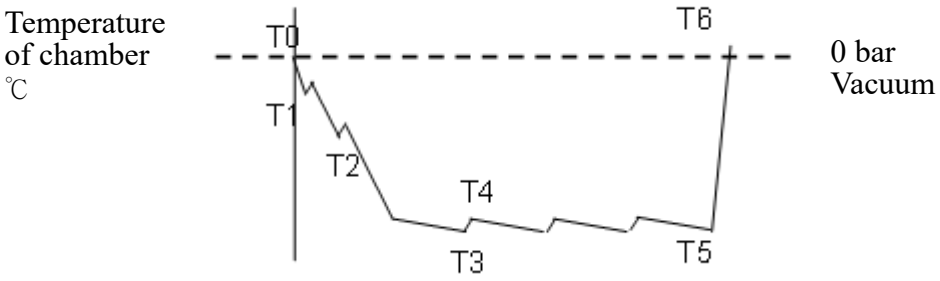
Warning: Before opening the door, please ensure that the pressure gauge indicates at position zero first.

Warning: When opening the door, be careful of the steam at high temperature to avoid scorching.

Warning: When taking out the sterilized item, please wear protective gloves and use tools for taking it out.

Warning: In case of sterilization program carried out in series, each operation must be separated with at least 20 minutes in between.

6.3.3 Dry program (Optional)



1. Use  or  button to select the program “Dry”. Figure 63. After selection, press  button to enter into parameter setting of the program shown in Figure 64.

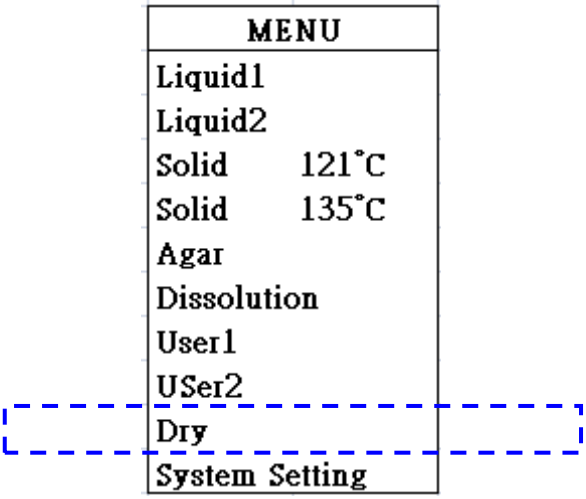


Figure 63

2. Press  button to enter into the parameter modification mode (blinking in white), and then use  or  button to modify the drying duration. After that, press  button again to confirm completion of setting drying value.

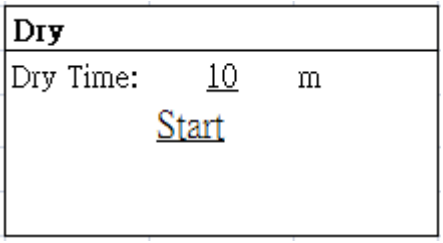


Figure 64

3. Move the cursor to next slot “Start” (blinking in white) with  or  button as shown in Figure 65, and then press  button to enter into the program confirmation screen as shown in Figure 66. After that, press  button to commence the program.

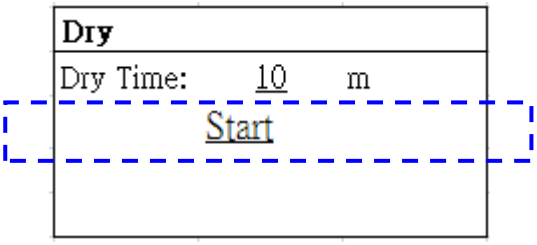


Figure 65

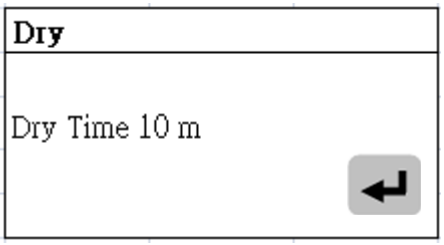


Figure 66

6.4 System setting

6.4.1 Date and time

1. Use  or  button to select the program “System Setting” as shown in Figure 67. After that, press  button to enter into the system setting, and then use  or  button to select “Date & Time” for entering into the setting screen shown in Figure 68.

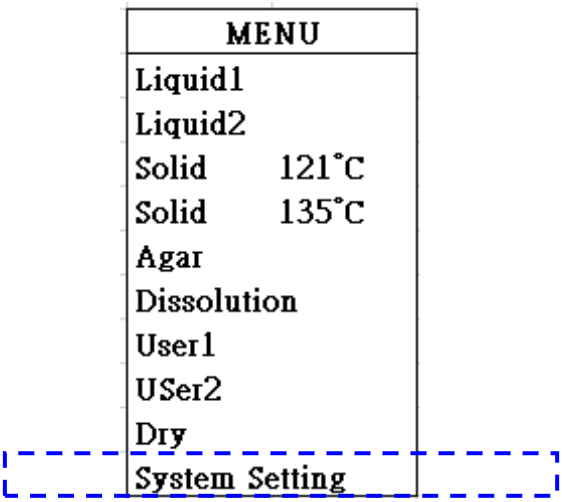


Figure 67

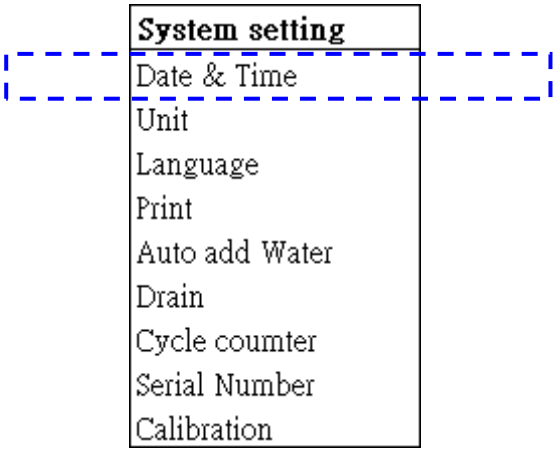


Figure 68

2. Press  button to enter into the month setting. Use  or  button to select “Month” shown in Figure 69, modify and then press  button to save the setting.

Figure 69

3. Move the cursor to column “Date” with  or  button, and then press  button to enter into the date setting shown in Figure 70. After that, use  or  button to set the “Date”, and then press  button to save the setting.

Figure 70

4. Move the cursor to column “Year” with  or  button, and then press  button to enter into the year setting shown in Figure 71. After that, use  or  button to set the “Year”, and then press  button to save the setting.

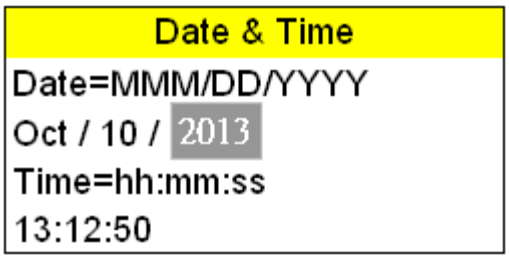


Figure 71

5. Move the cursor to column “Time” with  or  button, and then press  button to enter into the hour setting shown in Figure 72. After that, use  or  button to set the “Hour”, and then press  button to save the setting.

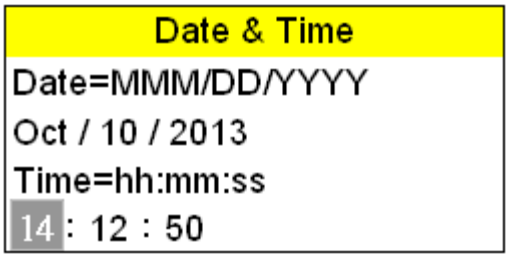


Figure 72

6. Move the cursor to column “Minute” with  or  button, and then press  button to enter into the minute setting shown in Figure 73. After that, use  or  button to set the “Minute”, and then press  button to save the setting.

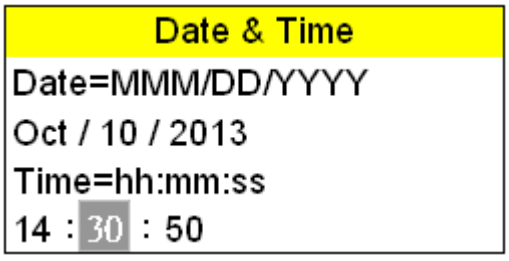


Figure 73

7. Move the cursor to column “Second” with  or  button, and then press  button to enter into the second setting shown in Figure 74. After that, use  or  button to set the “Second”, and then press  button to save the setting.

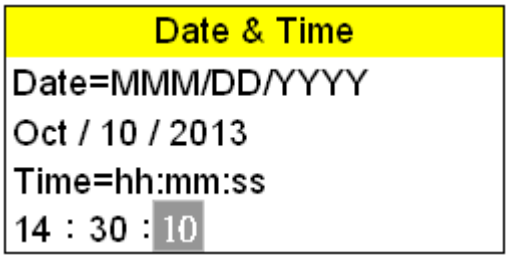


Figure 74

8. After completion of all modifications, press  button and return to the System Setting screen shown in Figure 75.

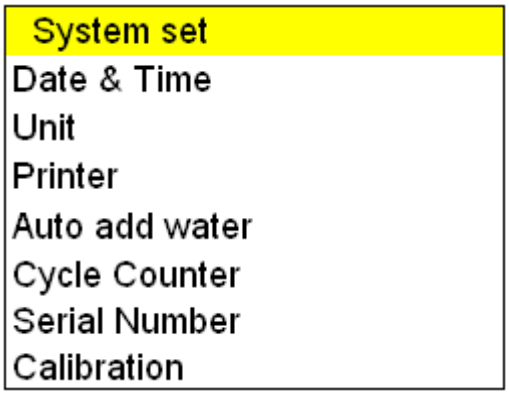


Figure 75

6.4.2 Adjustment of temperature and pressure unit

The default unit for temperature and pressure are ℃ and bar respectively. The unit can be changed as follows:

1. Unit setting for temperature: ℃, ℉
2. Unit setting for pressure: bar, kPa, MPa, psi, kgf/cm^2.

The steps are as follows:

1. On the system setting page shown in Figure 76, use  or  button to select in the “Unit” menu, and then press  button for key-in on the unit setting page sown in Figure 77.

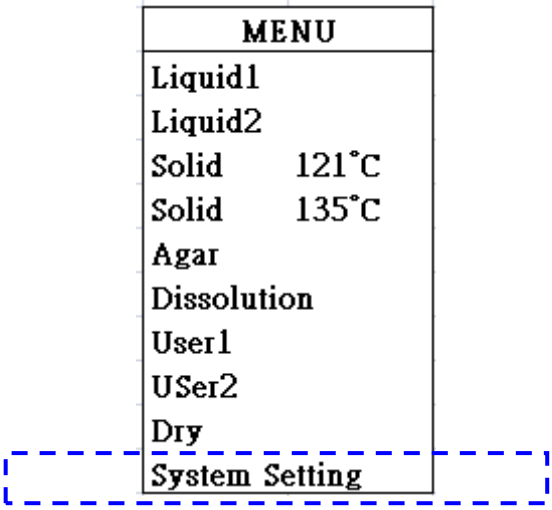


Figure 76

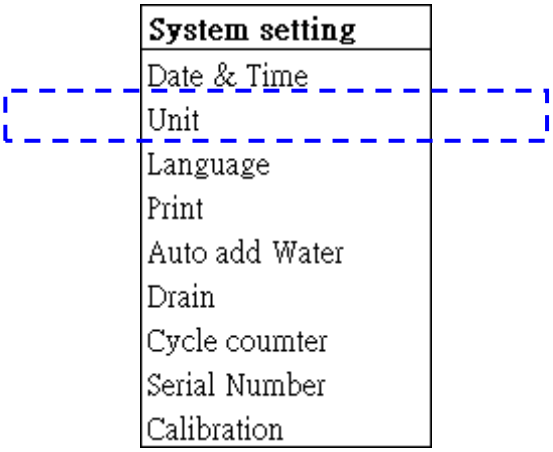


Figure 77

2. Use or button to select in the “Temperature” column, and then press button to enter into unit setting for temperature shown in Figure 78.

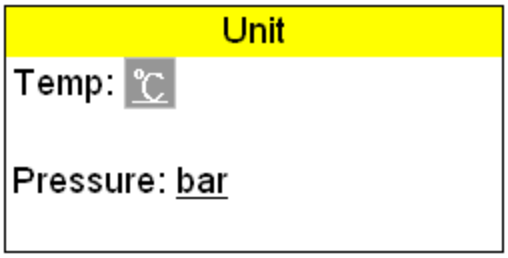


Figure 78

3. Enter into unit setting for temperature and use or button to select ”℃ or ℉” shown in Figure 79. After modification, press button to exit the setting mode.

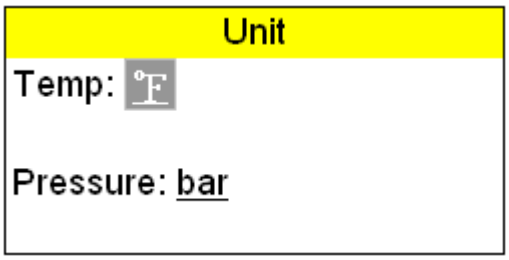


Figure 79

4. Use or button for moving to the “Pressure” column, and then press button to enter into unit setting for pressure shown in Figure 80. The unit order of “bar, kPa, MPa, psi, kgf/cm^2” is selected with or button. After completion of setting, press button to exit the setting mode.

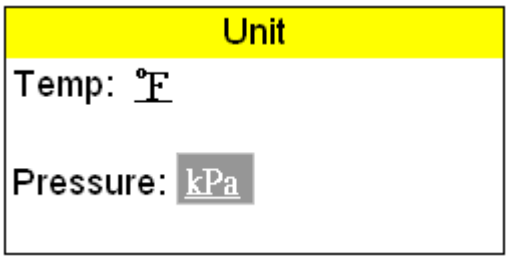


Figure 80

5. Press  button and return to the System Setting page shown in Figure 81

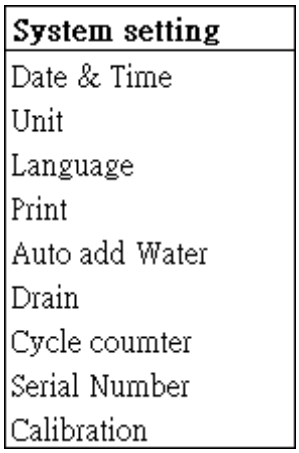


Figure 81

6.4.3 Language

1. On the system setting page shown in Figure 82, move the cursor to column “Language” with  or  button shown in Figure 83, and then press  button to enter into the language setting.

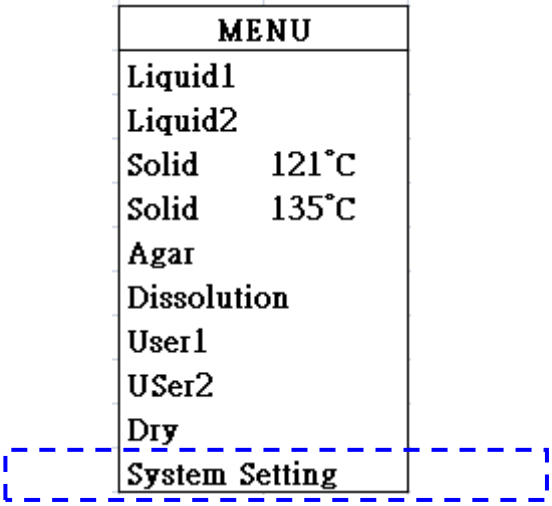


Figure 82

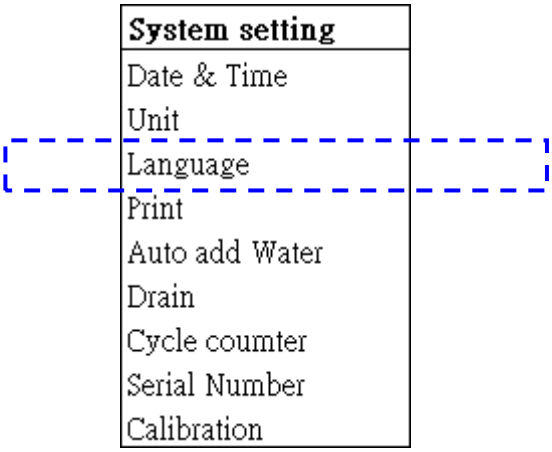


Figure 83

2. Press  or  button to set Language “English” or Española shown in Figure 84, and after completion of setting press 

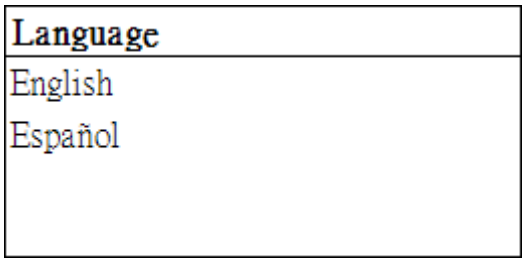


Figure 84

3. Press  button and return to the System Setting page shown inFigure 85

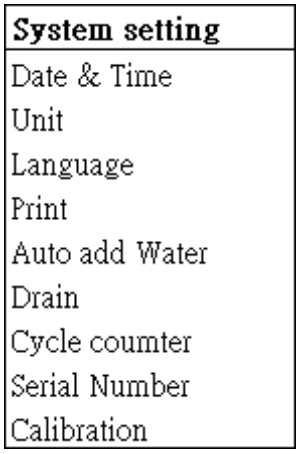


Figure 85

6.4.4 Printer

The information of steps executed by the program can be printed and stored in the SD memory card, which can used as reference of determining records of each process. The default value is “ON”, where activating or stopping the printer can be set as follows:

1. On the system setting page shown in Figure 86, move the cursor to column “Printer” with  or  button shown in 87, and then press  button to enter into the Printer Setting screen shown in Figure 88.

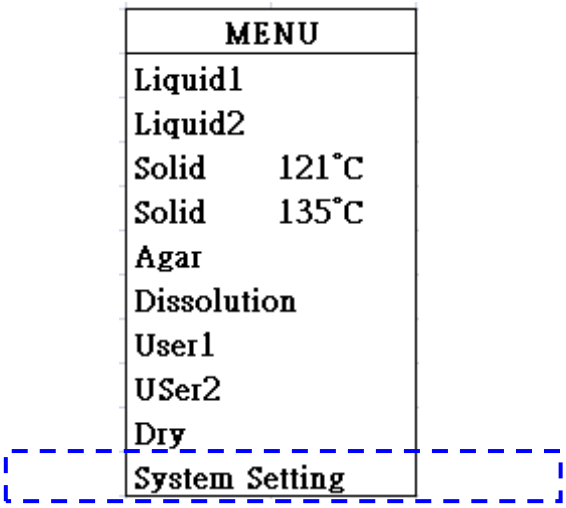


Figure 86

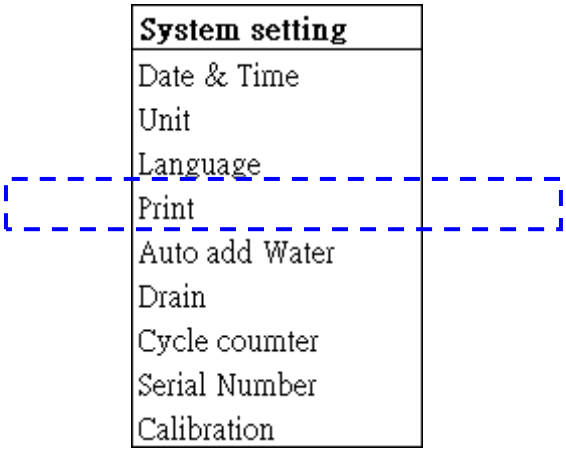


Figure 87

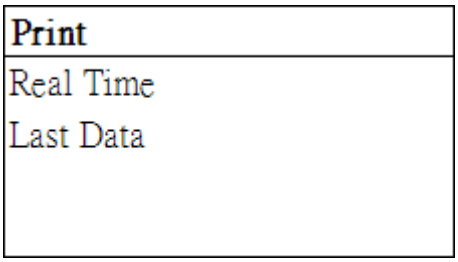


Figure 88

2. Select “Real time” press  button to enter into the Printer Setting shown in Figure 89, and press  button then use  or  button to set printer “ON” or “OFF”. After completion of setting, press  button shown in Figure 89.

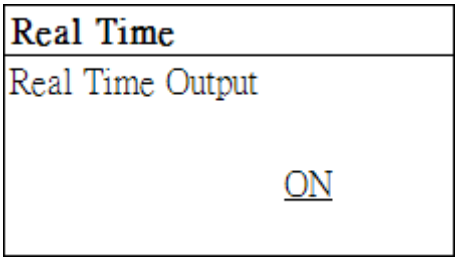


Figure 89

3. Select “Last Data” press  button to enter into the last data print confirmation page, press  button to print or press  return to the previous layer shown in Figure 90.

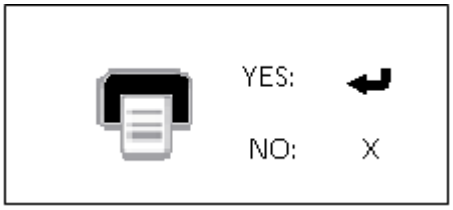


Figure 90

4. Press  button and return to the System Setting page shown in Figure 91.

System setting
Date & Time
Unit
Language
Print
Auto add Water
Drain
Cycle coumter
Serial Number
Calibration

Figure 91

6.4.5 Auto add water

1. On the system setting page shown in Figure 92, move the cursor to column “Auto add water” with  or  button shown in Figure 93, and then press  button to enter into the Auto add water screen shown in Figure 94.

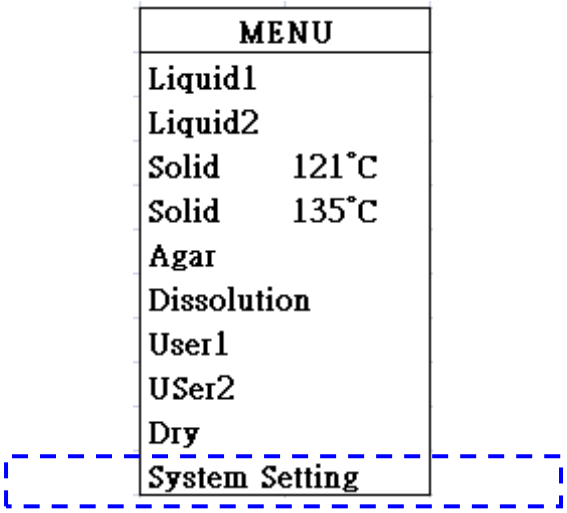


Figure 92

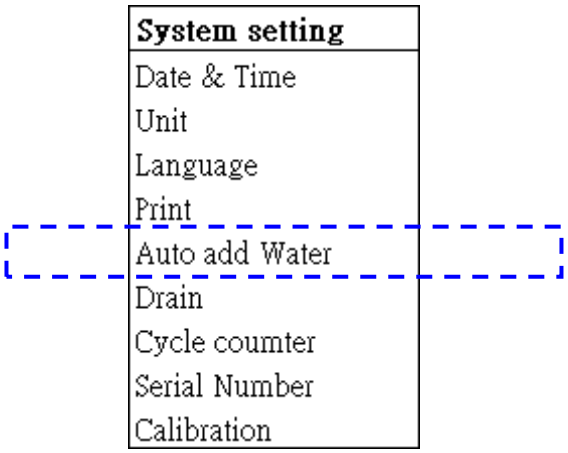


Figure 93

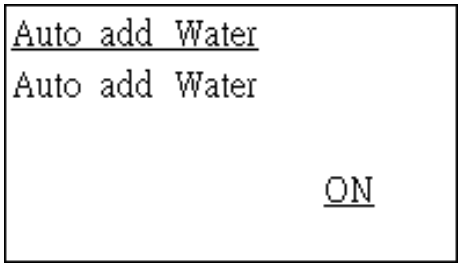


Figure 94

2. Press  button to enter into the “Auto add water” setting, and then use  or  button to set “ON” or “OFF”. After completion of setting, press  button shown in Figure 95.

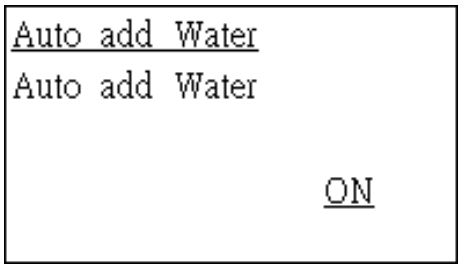


Figure 95

3. Press  button and return to the System Setting page shown in Figure 96.

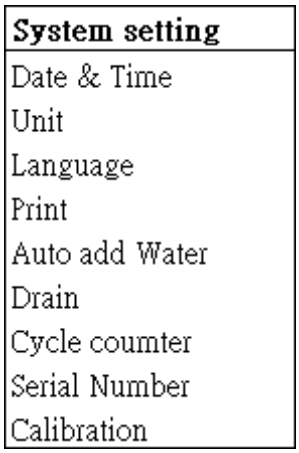


Figure 96

6.4.6 Drain (optional)

1. On the system setting page shown in Figure 97, move the cursor to column “Drain” with  or  button shown in Figure 98, and then press  button to enter into the Drain screen shown in Figure 99。

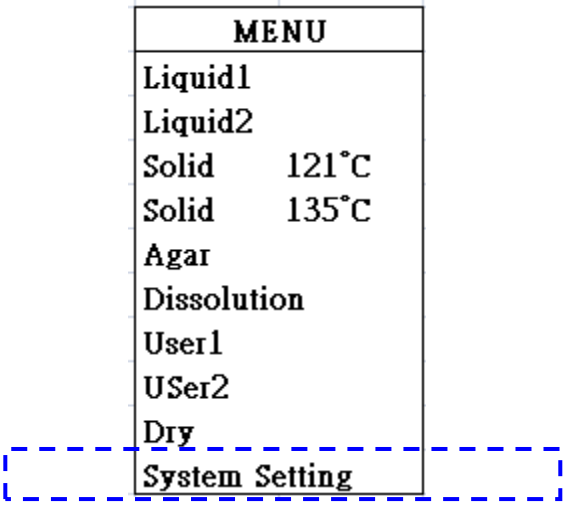


Figure 97

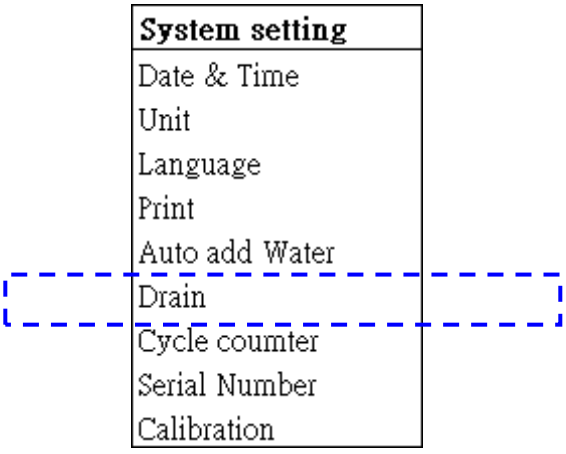


Figure 98

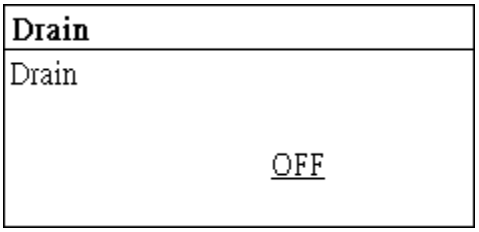


Figure 99

2. Press  button to enter into the setting page of “Drain”，and use  or  button to set “ON” or “OFF”. After completion of setting, press  button shown in Figure 100。

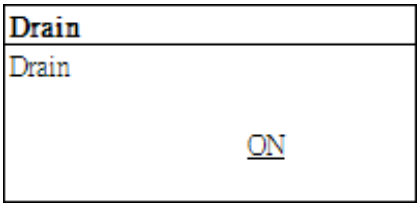


Figure 100

3. Set “ON” and press  button will be automatic drain out of the chamber.

4. Press  button and return to the System Setting page and stop drain out water shown in Figure 101。

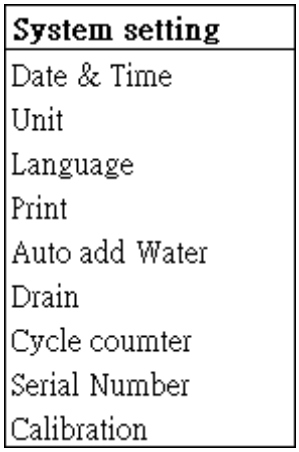


Figure 101

6.4.7 Next service

In order to ensure feasibility of the autoclave, relevant service must be carried out after certain period of use (default value at 5000 times). The main purpose of such function is to notify the user that the machine status needs to be confirmed for service, where the distributor shall be noted to confirm and ensure best condition of the machine. When the machine shows warning message of “Error no=010” (maintenance and service), the notification can still be canceled by pressing any button. However, please still contact the distributor promptly for inspection.

⚠**Attention**: Regarding problems based on safety and performance, it is strongly recommended to contact the distributor for service. Failure in service according to the Manual will lead to sterilization that endangers performance and lifetime of the machine, which may further cause void warranty.

⚠**Attention**: Unless for the authorized technician, the user may not modify the “Number to next service”.

1. On the system setting page shown in Figure 102, move the cursor to column “Cycle Counter” with  or  button shown in Figure 103, and then press  button to enter into the counter screen shown in Figure 104.

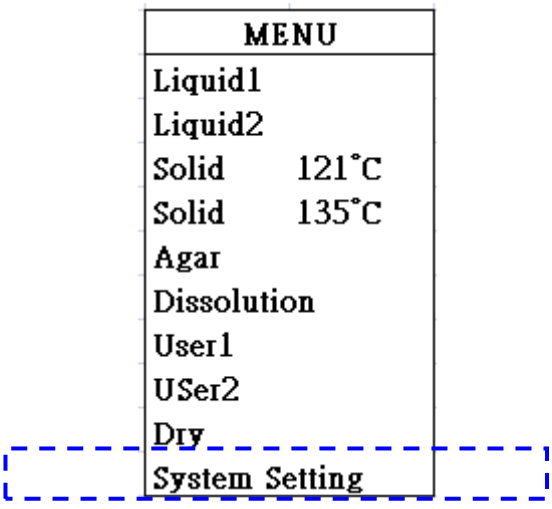


Figure 102

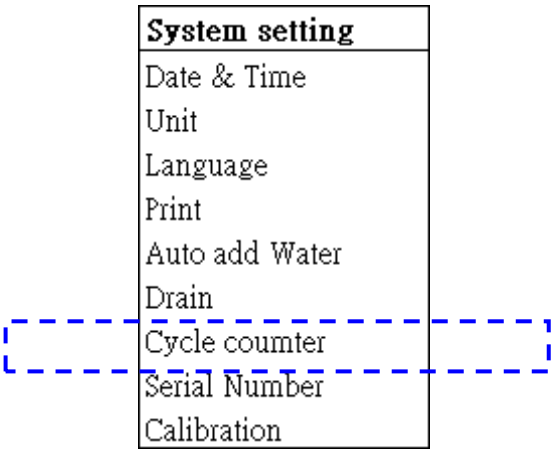


Figure 103

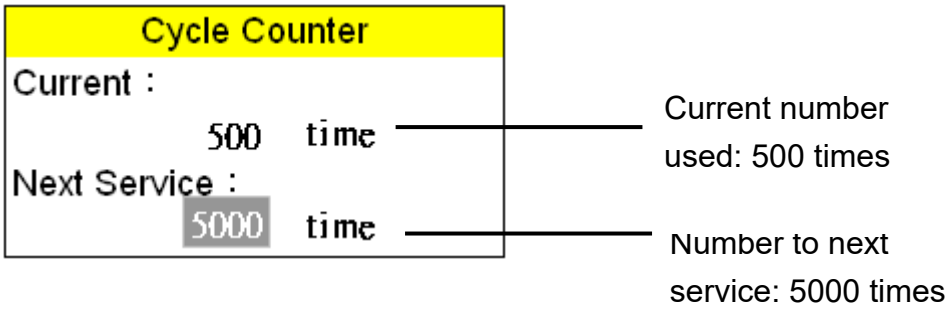


Figure 104

2. Press  button to enter into the setting page of “Number to next service” shown in Figure 105 and use  or  button to set the number (hold pressing on the button will speed up the setting). After completion of setting, press  button to exit the setting mode shown in Figure 105.

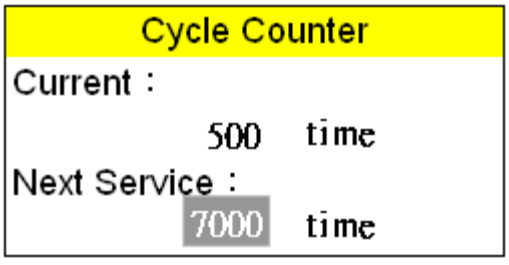


Figure 105

3. Press  button and return to the System Setting page shown in Figure 106.

System setting
Date & Time
Unit
Language
Print
Auto add Water
Drain
Cycle coumter
Serial Number
Calibration

Figure 106

6.4.8 Serial number

Attention: This is the only tag preset for each autoclave to be delivered from the factory. The number consists of 9-digit number and a 3-digit number connected with a dash to give a 12-digit serial number. The serial number cannot be modified by the user.

Check serial number of the autoclave:

1. On the system setting page shown in Figure 107, move the cursor to column "Serial Number" with  or  button shown in Figure 108, and then press  button to enter into the search screen for serial number shown in Figure 109.

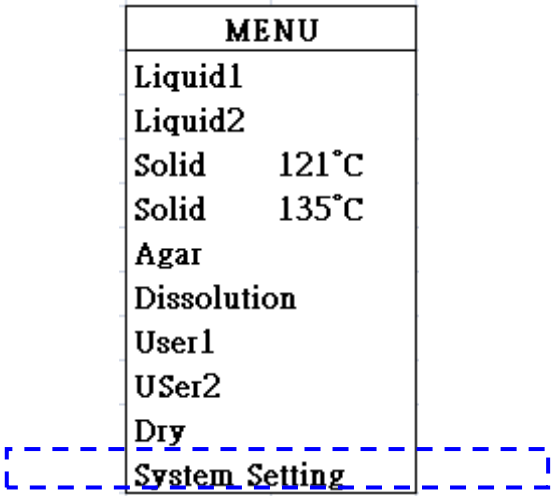


Figure 107

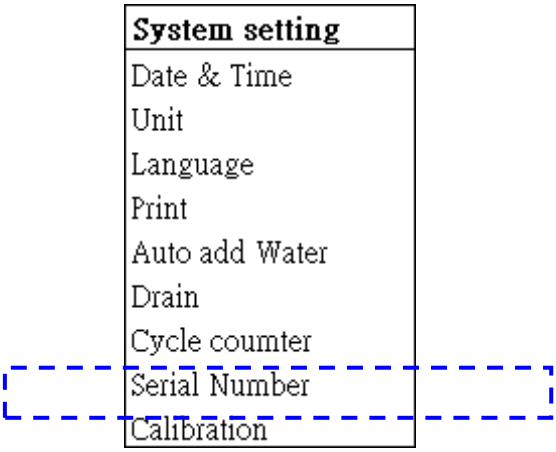


Figure 108

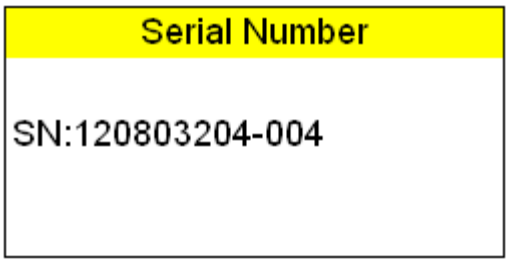


Figure 109

2. Press  button and return to the System Setting page shown in Figure 110.

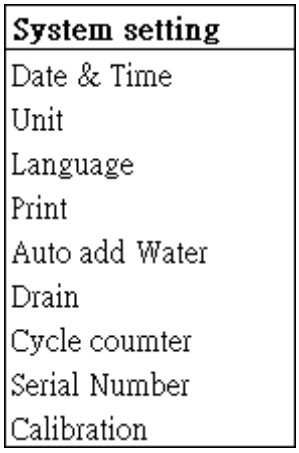


Figure 110

6.4.9 Calibration (Engineer mode)

⚠**Warning:** The “Calibration (Engineer mode)” is only implementable by engineer qualified from training, the user must not modify the machine to avoid damage or failure in normal operation. If calibration is needed, please contact the distributor or service personnel.

6.5 Description on print page

6.5.1 Paper size of print

The printing is done by a thermal printer. Please use thermal paper of the following size:

Paper width	57 mm
Maximum OD (Outer Diameter)	50 mm
Maximum length	12 M

6.5.2 Paper installation

There are two ways of providing new papers, namely the automatic feeding mode and the manual feeding mode with the following description:

⚠**Attention**: Please contact the distributor for purchasing suitable type of thermal paper.

⚠**Attention**: The preservation of thermal paper is very sensitive to warm and moist environment, thus please store the thermal paper at cold dry place. The manufacturer strongly recommends to copy the content immediately after completion of each sterilization cycle.

6.5.2.1 Automatic feeding mode

The operation of automatic feeding mode is executed as follows:

1. Firstly, open up outer cover of the printer on the autoclave.
2. Press paper outlet down and flip outwards at the same time to open the cover as shown in Figure 111.

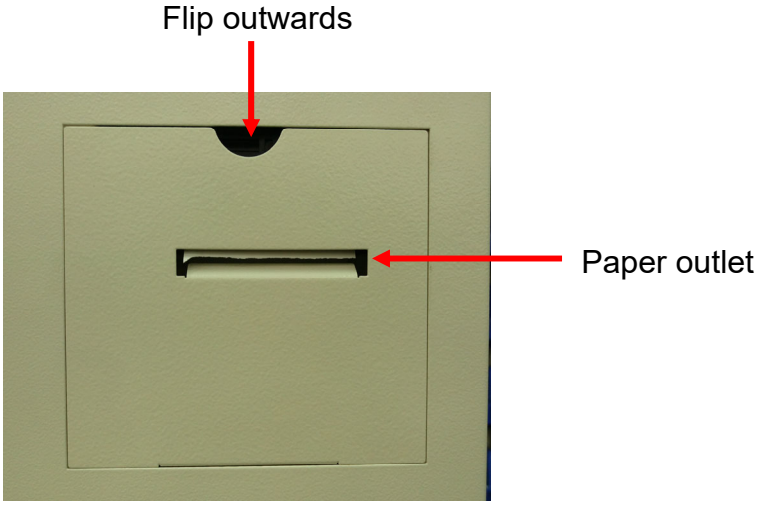


Figure 111

3. Place paper at the position indicated in figure below. If empty paper shaft exists, please take it out as shown in Figure 112.

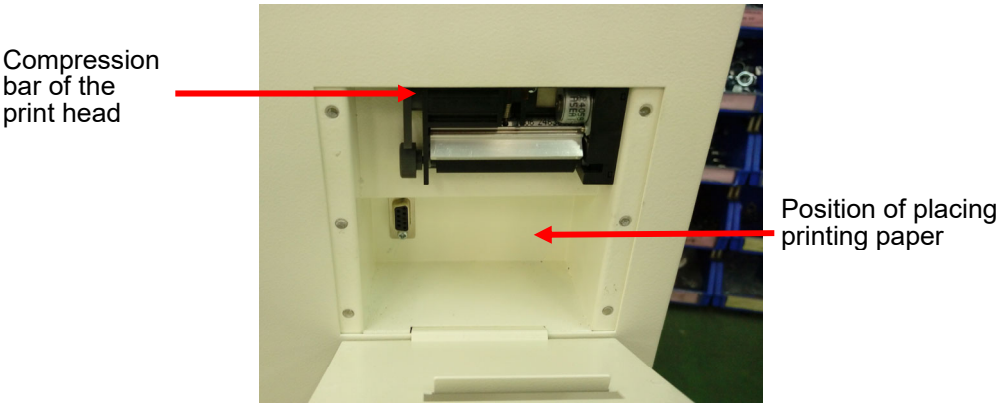


Figure 112

4. Tear open the package and place paper into paper inlet of the printer horizontally as shown in Figure 113. The printer will automatically take in the paper when detecting it, and then put out paper at adequate length as shown in Figure 114.

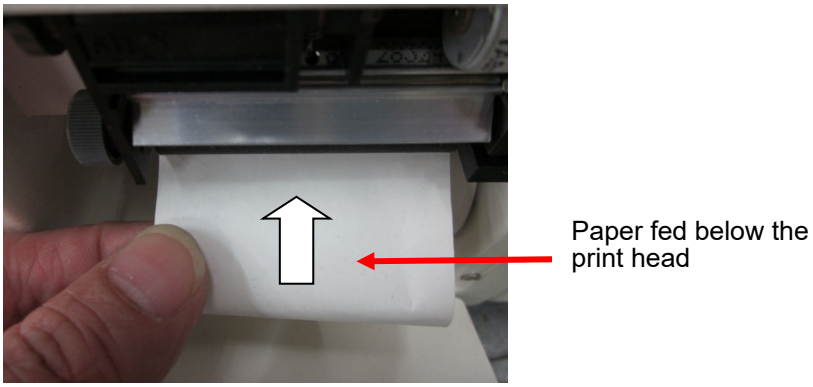


Figure 113

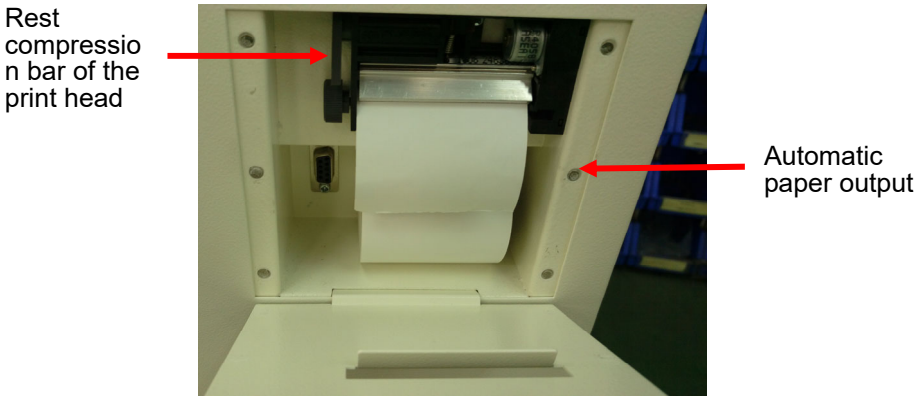


Figure 114

5. Finally, put the outer cover back onto the printer. At the same time, certain length of paper must be out of the printer cover , where excessive paper is torn off (as shown in Figure 115) and the paper replacement is completed.

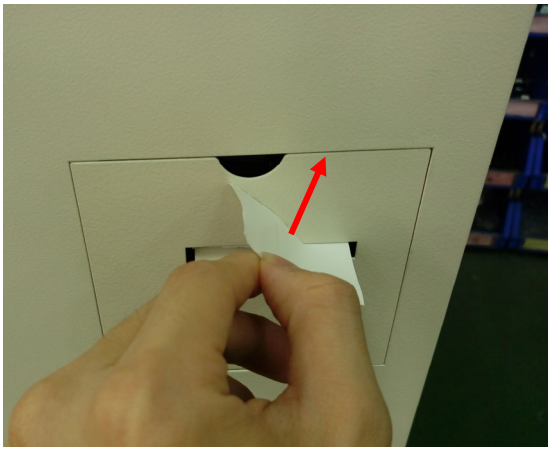


Figure 115

6.5.2.2 Manual feeding mode

The operation of manual feeding mode is executed as follows:

1. Firstly, open up outer cover of the printer on the machine.
2. Press paper outlet down and flip outwards at the same time to open the cover as shown in Figure 116.

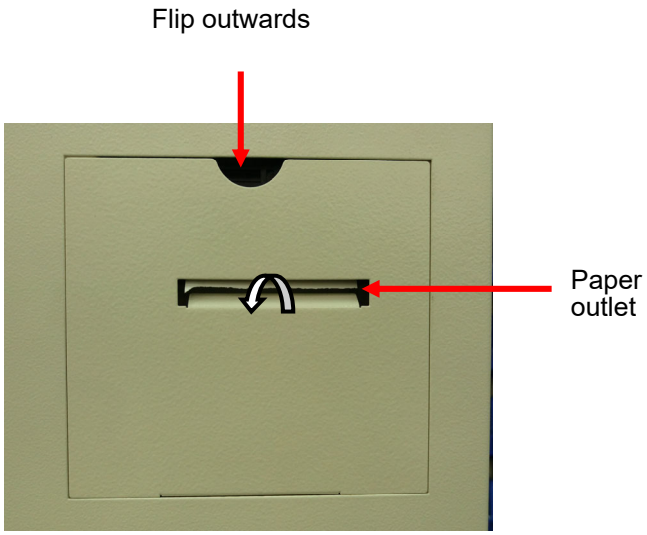


Figure 116

3. Place paper at the position indicated in figure below. If empty paper shaft exists, please take it out as shown in Figure 117.

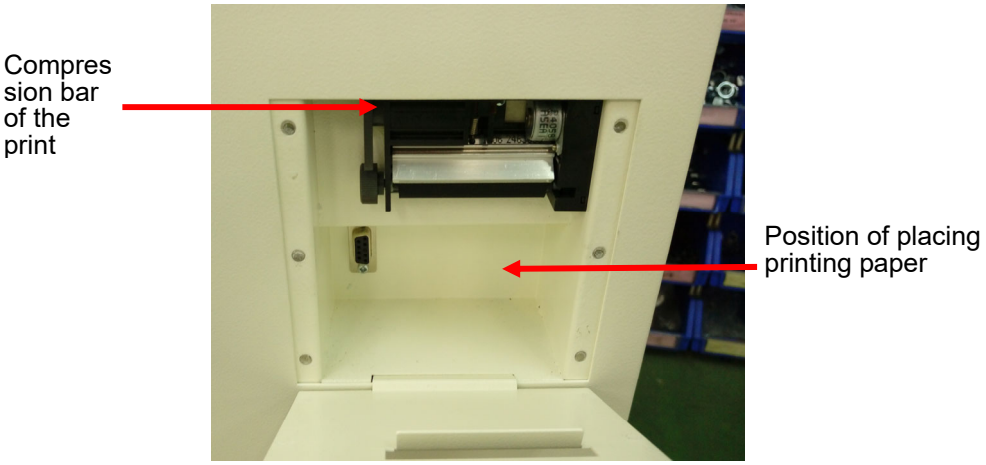


Figure 117

4. Lift up compression bar of the print head shown in Figure118.

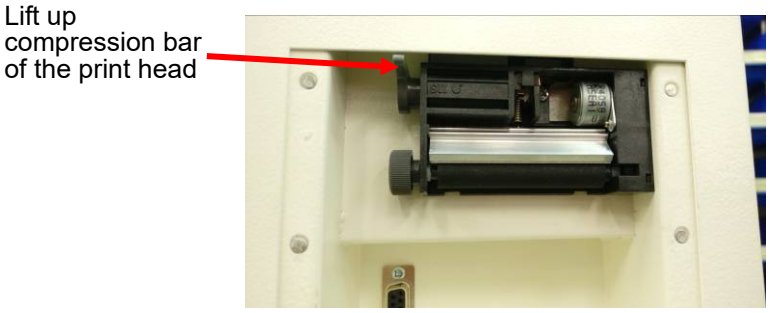


Figure118

5. Tear open the package and place paper into paper inlet of the printer horizontally as shown in Figure 119. Keep pushing paper further into the paper inlet as shown in Figure 120 , and then press down compression bar of the print head.

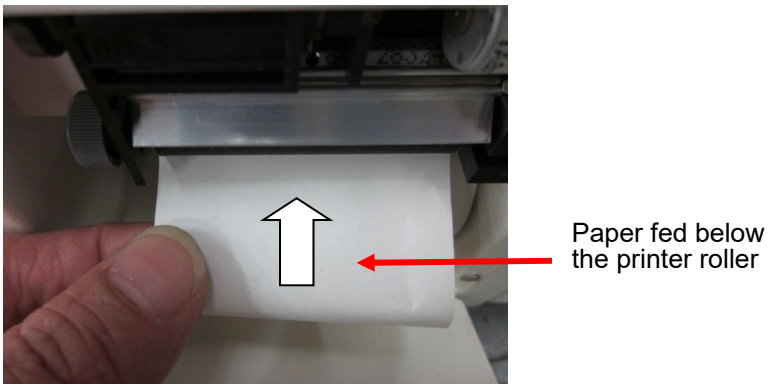


Figure 119

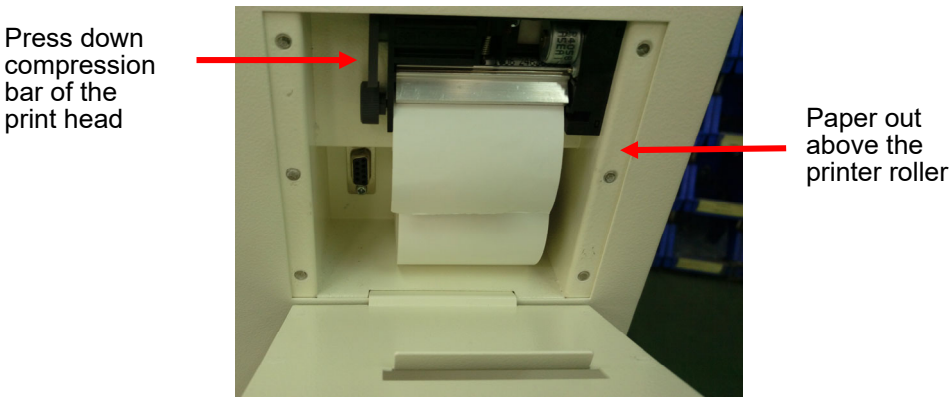


Figure 120

6. Finally, put the outer cover back onto the printer. At the same time, certain length of paper must be out of the printer cover, where excessive paper is torn off (as shown in Figure 121) and the paper replacement is completed.

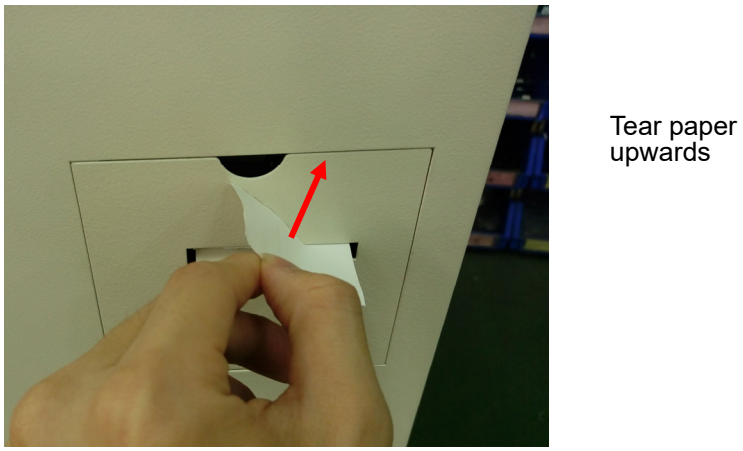


Figure 121

6.5.3 Description of printer output format

There are two formats of printer output, namely

1) Sterilization program output.

2) Dry program output.

which are described as follows:

6.5.3.1 Sterilization program

This is the general sterilization output with applicable programs including Liquid 1, Liquid 2, Solid 121℃, Solid 135℃, Dissolution, Agar, User1 and User2.

Information printed	Description
Model：SA-382VMB	Machine model: SA-382VMB
Software version：V1.00	Software version: v1.00
SN：110805202-005	Serial number: 110805202-005
Program：Solid 135 ℃	Sterilization program: Solid 135 ℃
Pulse:　3 times	PPS (Pulse Per Second): 3
Ster. Temp: 135 ℃	Sterilization temperature: 135℃
Ster. Time:　4 m 00 s	Sterilization duration: 4 minutes 0 seconds
Exhaust:　ON	Air drainage: ON
Cool Level:　ON	Cooling: ON
Open Temp: 97 'C	Open temperature: 97℃
Date：Mar. 21. 2017　14：10：27	Date: Mar. 21. 2017 Time: 14：10：27
Cycle Counter　：000019	Total number of circulation: Accumulated 19 program executions

<table>
<tr><th>Information printed</th><th>Description</th></tr>
<tr><td>
<pre>
Step   Time   Temp. Pres.
        mmm:ss   'C   bar
Start   000:00   28.2 0.012
H1   014:46   119.1 1.002
Exh   016:34   109.1 0.303
H2   018:47   119.1 0.909
Exh   020:31   109.4 0.303
H3   026:45   135.0 2.118
S00   026:45   135.0 2.120
S02   028:53   136.0 2.152
S04   030:52   136.1 2.130
Exh   033:58   110.4 0.303
CD   043:08   97.0 0.951
End   043:08   97.0 -0.017
</pre>
</td><td>From activation to completion of detailed records from program execution, the
<table>
<tr><td>Step</td><td>Execution steps</td></tr>
<tr><td>Time
mm：ss</td><td>Execution duration.
mm (minute), ss (second)</td></tr>
<tr><td>Temp.(℃)</td><td>Inside temperature (℃)</td></tr>
<tr><td>Pres.(bar)</td><td>Inside pressure (bar)</td></tr>
<tr><td>start</td><td>Activation</td></tr>
<tr><td>H1</td><td>1st heating</td></tr>
<tr><td>Exh</td><td>1st air drainage</td></tr>
<tr><td>H2</td><td>2nd heating</td></tr>
<tr><td>Exh</td><td>2nd air drainage</td></tr>
<tr><td>H3</td><td>3rd heating</td></tr>
<tr><td>S00</td><td>Sterilization starts</td></tr>
<tr><td>S02</td><td>2 minutes of sterilization passed</td></tr>
<tr><td>Exh</td><td>Air drainage</td></tr>
<tr><td>CD</td><td>Cooling</td></tr>
<tr><td>End</td><td>Completion</td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
</table>
meaning for each line of information is explained accordingly.</td></tr>
<tr><td>Ster. Temp. ： 135.5 – 136.6 ℃</td><td>Sterilization temperature: 121.7 – 122.9 ℃</td></tr>
<tr><td>Ster. Pres. ： 2.128 – 2.242 bar</td><td>Sterilization pressure: 2.128 – 2.242 bar</td></tr>
<tr><td>Ster. Time ： 0 h 04 m</td><td>Sterilization duration: 0 hour 4 minutes</td></tr>
<tr><td>Total Time ： 43 m 08 s</td><td>Total stroke duration: 43 minutes 08 seconds</td></tr>
<tr><td>Program complete</td><td>Completion of program execution</td></tr>
<tr><td>Signature：_____</td><td>Signature office</td></tr>
</table>

6.5.3.2 Dry program

The dry output is described as follows:

<table>
<tr><th>Information printed</th><th>Description</th></tr>
<tr><td>Model：SA-382VMB</td><td>Machine model: SA-382VMB</td></tr>
<tr><td>Software version：V1.00</td><td>Software version: v1.00</td></tr>
<tr><td>SN：120803204-004</td><td>Serial number: 120803204-004</td></tr>
<tr><td>Program：Dry</td><td>Sterilization program: Dry</td></tr>
<tr><td>Date：Mar. 21. 2017　14：10：27</td><td>Date: Mar. 21. 2017
Time: 14：10：27</td></tr>
<tr><td>Cycle Counter　：000352</td><td>Total number of circulation: Accumulated 352 program executions</td></tr>
<tr><td>
Step　Time　Temp.　Pres.
　　mmm:ss　'C　bar
Start　000:00　27.8　0.004
D0　000:41　27.5　-0.067
D1　002:41　28.2　-0.296
VR　002:55　28.3　-0.242
End　002:55　28.3　-0.059
</td><td>From activation to completion of detailed records from program execution, the meaning for each line of information is explained accordingly.
<table>
<tr><td>Step</td><td>Execution steps</td></tr>
<tr><td>Time
mmm：ss</td><td>Execution duration.
mm (minute), ss (second)</td></tr>
<tr><td>Temp. (℃)</td><td>Inside temperature (℃)</td></tr>
<tr><td>Pres. (bar)</td><td>Inside pressure (bar)</td></tr>
<tr><td>start</td><td>Activation</td></tr>
<tr><td>D0</td><td>Drying starts</td></tr>
<tr><td>D1</td><td>Drying ends</td></tr>
<tr><td>VR</td><td>Vacuum removal</td></tr>
<tr><td>End</td><td>Completion</td></tr>
</table>
</td></tr>
<tr><td>Total time　：　2 m 55 s</td><td>Total stroke duration: 2 minutes 55 seconds</td></tr>
<tr><td>Program complete</td><td>Completion of program execution</td></tr>
<tr><td>Signature：_____</td><td>Signature office</td></tr>
</table>

6.6 Description on storage device- SD Card

6.6.1 Description on use of SD Card

The SD/ HC memory card is used as the storage device, which can automatically record program steps, temperature, pressure and duration of various sterilization cycles in the autoclave. The information of each sterilization cycles will be stored in the SD memory device. When recording the sterilization program, the SD device generates file in “DAT” (Data) format, where the content can be accessed via “Notepad” in general computer program or Microsoft (R) WordPad.

The SD memory card shall be formatted before first use on the autoclave. The SD memory card supports FAT system and SD/HC memory card supports FAT32 system.

⚠**Attention**: The storage device (e.g. SD, SD/HC card with maximum capacity of 32GB) recommended by the manufacturer shall be formatted prior to commencement of sterilization cycle. If this is not done and records are written into the SD memory card, the message of “E520 Insert a SD card” will appear.

⚠**Warning**: Please do not directly remove the SD memory card during operation of any stroke cycle, otherwise the data will not be recorded properly or the recorded values will be damaged.

General computer with SD memory card slot or card reader with SD memory device can access the files recorded for operation. The data of records are stored under root directory of the SD memory card. Recording machine of the machine will automatically record data during each execution of sterilization program, the file will be named with starting time of each sterilization cycle, i.e. “YYMMDDnn.DAT”, the file name format is described as follows:

- YY indicates last 2 digits of the Western year.
- MM indicates the month in 2 digits.
- DD indicates the date in 2 digits.
- nn indicates number of activation on the same day.

By using WordPad or Notepad in general computer to open up the file, the path is “SD device:\Western year\Month\YYMMDDnn.dat”.

⚠**Warning**: It is recommended to backup data in the SD memory card every once for a while, so intact preservation of electronic records on sterilization can be ensured.

⚠**Attention**: WordPad is the product from Microsoft (R).

⚠**Attention**: Please insert the SD, SD/HC memory device into the slot before executing sterilization, and then activate the program to ensure thoroughness of information recorded.

⚠**Warning**: Please do not insert the SD, SD/HC memory device during the sterilization process since this will generate incomplete records of sterilization information.

6.6.2 Description on content of file recorded

There are two formats of file export, namely 1) Sterilization program output and 2) Dry program output, which are described as follows:

6.6.2.1 Sterilization program

This is the general sterilization output with applicable programs including Liquid 1, Liquid 2, Solid 121℃, Solid 135℃, Dissolution and Agar.

Information exported	Description
Model：SA-382VMB	Machine model: SA-382VMB
Software version：V1.00	Software version: v1.00
SN：110805202-005	Serial number: 110805202-005
Program：Solid 135 ℃	Sterilization program: Solid 135 ℃
Pulse:　3 times	PPS (Pulse Per Second): 3
Ster. Temp: 135 ℃	Sterilization temperature: 135℃
Ster. Time:　4 m 00 s	Sterilization duration: 4 minutes 0 seconds
Exhaust:　ON	Air drainage: ON
Cool Level:　ON	Cooling ON
Open Temp: 97 'C	Open temperature : 97℃
Date：Mar. 21. 2017　14：10：27	Date: Mar. 21. 2017 Time: 14：10：27

<table>
<tr><td>Cycle Counter ：000019</td><td>Total number of circulation: Accumulated 19 program executions</td></tr>
<tr><td>

Step	Time mmm:ss	Temp. 'C	Pres. bar
Start	000:00	27.5	0.017
H1	014:46	119.1	1.002
Exh	016:34	109.1	0.303
H2	018:47	119.1	0.909
Exh	020:31	109.4	0.303
H3	026:45	135.0	2.118
S000-00	026:45	135.0	2.120
S000-01	026:46	136.0	2.152
≈			
S003-59	030:51	135.5	2.170
S004-00	030:52	136.1	2.130
Exh	033:58	110.4	0.303
CD	043:08	97.0	0.951
End	043:08	97.0	-0.017

</td><td>From activation to completion of detailed records from program execution, the meaning for each line of information is explained accordingly.
<table>
<tr><td>Step</td><td>Execution steps</td></tr>
<tr><td>Time
mmm：ss</td><td>Execution duration.
mm (minute), ss (second)</td></tr>
<tr><td>Temp (℃)</td><td>Inside temperature (℃)</td></tr>
<tr><td>Pres(bar)</td><td>Inside pressure (bar)</td></tr>
<tr><td>start</td><td>Activation</td></tr>
<tr><td>H1</td><td>1st heating</td></tr>
<tr><td>Exh</td><td>1st air drainage</td></tr>
<tr><td>H2</td><td>2nd heating</td></tr>
<tr><td>Exh</td><td>2nd air drainage</td></tr>
<tr><td>H3</td><td>3rd heating</td></tr>
<tr><td>S00</td><td>Sterilization starts</td></tr>
<tr><td>Smmm-ss</td><td>One data is recorded per second till completion of sterilization, where mm represents sterilization record at a specific minute and ss represents sterilization record at a specific second.</td></tr>
<tr><td>EX</td><td>Air drainage</td></tr>
<tr><td>CD</td><td>Cooling</td></tr>
<tr><td>End</td><td>Completion</td></tr>
</table>
</td></tr>
<tr><td>Ster. Temp. ： 135.5 – 136.6 ℃</td><td>Sterilization temperature: 121.7 – 122.9 ℃</td></tr>
<tr><td>Ster. Pres. ： 2.128 – 2.242 bar</td><td>Sterilization pressure: 2.128 – 2.242 bar</td></tr>
<tr><td>Ster. Time ： 0 h 04 m</td><td>Sterilization duration: 0 hour 4 minutes</td></tr>
<tr><td>Total Time ： 43 m 08 s</td><td>Total stroke duration: 43 minutes 08 seconds</td></tr>
<tr><td>Program complete</td><td>Completion of program execution</td></tr>
<tr><td>Signature：_____</td><td>Signature office</td></tr>
</table>

6.6.2.2 Dry

The following export is applicable for dry program.

<table>
<tr><th>Information exported</th><th>Description</th></tr>
<tr><td>Model：SA-382VMB</td><td>Machine model: SA-382VMB</td></tr>
<tr><td>Software version：V1.00</td><td>Software version: v1.00</td></tr>
<tr><td>SN：120803204-004</td><td>Serial number: 120803204-004</td></tr>
<tr><td>Program：Dry</td><td>Sterilization program: Dry</td></tr>
<tr><td>Date：2015/04/22　15：10：27</td><td>Date: 2015/04/22
Time: 15：10：27</td></tr>
<tr><td>Cycle Counter ：000052</td><td>Total number of circulation:
Accumulated 52 program executions</td></tr>
<tr><td>
<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>27.8</td><td>0.004</td></tr>
<tr><td>D0</td><td>000:41</td><td>27.5</td><td>-0.067</td></tr>
<tr><td>D1</td><td>002:41</td><td>28.2</td><td>-0.296</td></tr>
<tr><td>VR</td><td>002:55</td><td>28.3</td><td>-0.242</td></tr>
<tr><td>End</td><td>002:55</td><td>28.3</td><td>-0.059</td></tr>
</table>
</td><td>From activation to completion of detailed records from program execution, the meaning for each line of information is explained accordingly.
<table>
<tr><td>Step</td><td>Execution steps</td></tr>
<tr><td>Temp (℃)</td><td>Inside temperature (℃)</td></tr>
<tr><td>Pres（bar）</td><td>Inside pressure (bar)</td></tr>
<tr><td>start</td><td>Activation</td></tr>
<tr><td>D0</td><td>Drying starts</td></tr>
<tr><td>D1</td><td>Drying ends</td></tr>
<tr><td>VR</td><td>Vacuum removal</td></tr>
<tr><td>End</td><td>Completion</td></tr>
</table>
</td></tr>
<tr><td>Total time　：　2 m 55 s</td><td>Total sterilization duration: 2 minutes 55 seconds</td></tr>
<tr><td>Program complete</td><td>Completion of program execution</td></tr>
<tr><td>Signature：_____</td><td>Signature office</td></tr>
</table>

6.7 Emergency stop

1. Pressing the 

button will stops the operation immediately and automatically drain off pressure in the chamber.
2. The Autoclave will sound off the alarm and indicate message of “EMERGENCY(Error no=002)”. Please wait until the pressure indicates at “zero”.

Warning: When pressing the emergency button upon abnormal incident or emergency situation, the sterilization thoroughness of item executed shall be re-verified.

Warning: The object not completed with sterilization cycle shall be disposed according to local law; please do not dispose it as general waste.

Attention: In case where the door cannot be opened after emergency stop, please press the emergency stop button again. There may be possible needs of pressing the emergency stop button repeatedly to relieve pressure in the chamber.

3. When pressing the  button, the message of “Mind The Steam” will appear and then the message of “Please Open The Door” follows. Check if the pressure gauge indicates “Zero”. If the door fails to open, please press “Unlock” button repeatedly. In case where pressure calibration is necessary, please consult with qualified technician. Please refer to “7.6 Trouble-shooting”.

Warning: Check if the pressure gauge indicates “Zero” before opening the door.

⚠**Warning**: When opening the door after completion of sterilization cycle, please "mind the steam" to avoid scorching.

⚠**Warning**: Be careful prior to taking sterilized item out of the autoclave since there may still be high temperature on the metal surface. Please wear suitable hand protective device or use appropriate tools to take out the sterilized item.

⚠**Warning**: In case of sterilization program carried out in series, each operation must be separated with at least 20 minutes in between.

7. Error Codes and Simple Handling

7.1 System

Item	Code	Name of error	Solution
1	002	Emergency stop (Emergency)	1) Wait for the inside pressure restoring to atmospheric pressure and the door can be opened. 2) Try the program again. 3) Confirm if the parts are normal and contact the distributor.
2	003	Operate stop (Stop)	When the program stops during the process (real-time monitoring) and the message of “Stop program?” appears, press “Enter” to execute or press “Return” to cancel.
3	010	Maintenance and service (Service time)	1) Use for more than 5000 times or reaching number for next service. 2) Press any button to stop alarm or the alarm sounds automatically stop; but the reminding icon will appear when the program continues with each activation. 3) Please contact the distributor.
4	031	Inside temperature too high (Over Temp. 90℃)	1) Please wait till the inside temperature drops to below 97°C and the program will execute automatically. 2) Press any button to stop alarm or the alarm sounds automatically stop. Wait until the set value of temperature and the program will execute.
5	040	Wrong password (Pass Word Error)	Please re-enter the password or inform the administrator.

7.2 Component

Item	Code	Name of error	Solution
6	101	SSR1 FAIL	1) SSR1 is out of order. Press any button to eliminate the Error. 2) Please contact the distributor.
7	102	SSR2 FAIL	1) SSR2 is out of order. Press any button to eliminate the Error. 2) Please contact the distributor.
8	110	Absolute pressure gauge (P1) is out of order. (AP sensor fail)	1) Absolute pressure gauge (P1) is out of order. Press any button to eliminate the Error. 2) Please contact the distributor.
9	111	Absolute pressure gauge (P2) is out of order. (P2 fail)	1) Relatively pressure gauge (P2) is out of order. Press any button to eliminate the Error. 2) Please contact the distributor.
10	121	Temperature probe (T1) is out of order (heater). (T1 fail)	1) Temperature probe (T1) is out of order. Press any button to eliminate the Error. 2) Please contact the distributor.
11	124	Temperature probe (PT1) is out of order (PT1 fail)	1) Temperature probe (PT1) is out of order. Press any button to eliminate the Error. 2) Please contact the distributor.
12	125	Temperature probe (PT2) is out of order (PT2 fail)	1) Temperature probe (PT2) is out of order. Press any button to eliminate the Error. 2) Please contact the distributor.
13	130	PCB button abnormal (Switch fail)	1) PCB button is out of order. Press any button to eliminate the Error. 2) Please contact the distributor.

14	140	Vacuum release fail	1) The air filter is dirty, please replace the air filter and press any button to eliminate the Error. 2) Vacuum removal solenoid valve failure, please contact the dealer. 3) Pressure sensor failure or no return to zero, please contact the dealer.
15	160	Insulation film failure (BH fail)	1) Heating 10 ℃ exceeds 300 seconds. Press any button to eliminate the Error. 2) Please contact the distributor.
16	161	Thermostat fail	1) Temperature exceed set value by ± 20 ℃ within 600 seconds. Press any button to eliminate the Error. 2) Please contact the distributor.

7.3 Process

Item	Code	Name of error	Solution
17	200	Altitude is too high (Altitude over)	1) Altitude exceeds 2000M. Press any button to eliminate the Error. 2) Please contact the distributor.
18	201	Ambient temperature is too low. (Ambient temp low)	1) The ambient temperature is lower than 5℃. Stop the operation and wait for the ambient temperature rising back to room temperature. 2) Please contact the distributor.
19	202	Ambient temperature is too high. (Ambient temp High)	1) The ambient temperature is greater than 50℃. Stop execution, drain the air and wait for the ambient temperature dropping back to room temperature. 2) Please contact the distributor.
20	210	Inner chamber is heated empty (Over Heat)	1) There is no water in the inner chamber and the EGO protection for over temperature activates. Press any button to eliminate the Error. 2) Confirm if there is leakage. 3) Please contact the distributor.
21	211	Pressure of inner chamber is too high. (Over pressure)	1) Pressure of inner chamber is too high. Press any button to eliminate the Error. 2) Please contact the distributor.

Item	Code	Name of error	Solution
22	220	1st section of vacuum is insufficient. (PV1 fail)	1) 1st section of vacuum is insufficient (-70 kPa). Press any button to eliminate the Error. 2) Confirm if the vacuum pump is functional. 3) Confirm if the vacuum piping is damaged or blocked. 4) Please contact the distributor.
23	230	Pressure of sterilization stage is too high (Pres. over rang (+)).	1) Pressure of sterilization stage is too high. Press any button to eliminate the Error. 2) Please contact the distributor.
24	231	Pressure of sterilization stage is too low (Pres. over rang (-)).	1) Pressure of sterilization stage is too low. Press any button to eliminate the Error. 2) Please contact the distributor.
25	232	Dynamic pressure is excessive. (DP over)	1) The change of pressure change is greater than 10 bar/min. Press any button to eliminate the Error. 2) Please contact the distributor.
26	233	Air draining duration is too long. (Exhaust over time)	1) Air draining duration exceeds 60minute. Press any button to eliminate the Error. 2) Please contact the distributor.

Item	Code	Name of error	Solution
27	240	Heating duration is too long. (Heating too low)	1) Heating duration exceeds 600 seconds. Press any button to eliminate the Error. 2) Please contact the distributor.
28	242	Sterilization temperature is too low. (Temp. over rang(-))	1) Sterilization temperature is lower than the value set. Press any button to eliminate the Error. 2) Please contact the distributor.
29	243	Temperature rises too fast. (DT over)	1) Temperature rises at 8°K/min before sterilization. Press any button to eliminate the Error. 2) Please contact the distributor.
30	246	Sterilization temperature is too high. (Temp. over rang(+))	1) Sterilization temperature exceeds set value of 4℃. Press any button to eliminate the Error. 2) Please contact the distributor.

7.4 Test

Item	Code	Name of error	Solution
31	401	Low water level inside the chamber (Chamber no water)	1) Manual water mode is not enough water, please press any key to release, the program is terminated 2) Check if there is enough sterile water in the chamber. 3) Water level sensor scale cannot detect water level, clean water level sensor. 4) Water level sensor wire break, please contact the dealer for maintenance.
32	403	Drain bottle is full	1) Remove the water from the recovery tank. 2) If the water inside the recovery tank is still covered with water warning, it may be damaged sensor, please contact the dealer

7.5 Memory

Item	Code	Name of error	Solution
33	500	EEPROM cannot be written (EPROM fail)	1) Press any button to cancel the program. 2) Please contact the distributor.
34	520	SD card cannot be written (SD fail)	1) Please insert the SD card. 2) Please contact the distributor.
35	522	SD card format error. (SD fail(2))	1) Press any button to cancel the program. 2) Please contact the distributor.
36	530	Printer is out of paper (No paper)	1) Press any button to stop alarm or the alarm sounds automatically stop. 2) Replace with new paper.
37	531	Printer installation is in error. (Printer fail)	The print head is not in position. Press down the print head.
38	533	Printer connection is overtime. (Printer fail(2))	1) Press any button to cancel and the program continues. 2) Please contact the distributor.
39	600	Door is open (Door open)	1) Press any button or wait 5 seconds for automatic cancellation and the program stops. 2) Close the door and try again. 3) Please contact the distributor.

7.6 Trouble-shooting

Situation	Possible cause	Solution
LCD screen not on.	The main power wires was pulled off or the plug switch was off.	Check main power and plug switch for the autoclave.
	Main switch not on	Press position "▂▃▂" on the power switch.
	Earth leakage breaker tripped	Please wait for the autoclave back to room temperature, press down the leakage breaker switch behind the autoclave and try again after reset.
	LCD is out of order	Please contact the local distributor.
Steam leaks out of the door	The gasket is dirty or damaged.	Clean up the silicone packing. If the packing has been used for more than a year, please replace according to Chapter 8.5.
The door cannot open	Pressure (vacuum) in the autoclave still exists.	1. Wait for the pressure going to "zero". 2. Press  button to open the door. 3. Please contact the local distributor.
Water in the chamber cannot be drained	1. The water filter is blocked 2.Agar jelly in the tube 3.drain valve is failed	1. Clean water filter or contact the distributor. 2. Turn on piping heater and waiting about 10-15 minutes to dissolve the Agar in the tube. 3. Replace drain valve, Please contact the local distributor.
Greater strength is required when pulling the safety valve	1. Inappropriate tool was used.	1. Please use appropriate tool to pull the safety valve open.
	2. Safety valve is out of order	2. Please contact the local distributor for repair and service.

Situation	Possible cause	Solution
Warning for over temperature or over pressure	1. Water shortage in the chamber	Check if the machine is leaking air. Please contact the distributor.
	2. Pressure of inner chamber is too high.	Confirm incorrect temperature in the chamber. Please contact the distributor.
Pressure cannot increase	1. There is object stuck in the solenoid valve.	Clean up the piping of solenoid valve.
	2. The main heating tube is out of order	Replace with new pipe. Please contact the distributor.
	3. The machine keeps relieving pressure	1. The steam trap is out of order. Please contact the distributor. 2. The piping is leaking air. Please contact the distributor.

⚠**Warning**: If the situation still exists, please contact local distributor for repair and service. Please do not dismantle the autoclave yourself since it may cause explosion and scorching.

8. Cleaning and Service

⚠**Warning:** Before cleaning and service, the power and plug must be off. The temperature cooling to room temperature must be confirmed.

⚠**Warning:** Before opening the door, please ensure that the pressure gauge indicates at “zero”.

⚠**Attention:** Before cleaning and service, it must be confirmed that there is no sterilized item in the chamber.

In order to ensure proper operation of the autoclave, there shall be correct and regular cleaning and service. Failure in execution according to requirements of the Manual will cause unexpected damage.

8.1 Daily service

- Wipe exterior of the autoclave with soft cloth. Do not clean with volatile liquid.
- Wet the soft cloth that leaves no cotton fiber with clean water, and then clean the chamber, gasket and the door. Do not clean with volatile liquid.
- Check if “Figure9 ” vent is blocked by foreign object.
- Check if the wiring is damaged.

8.2 Weekly service

- Take out the sterilization basket and heater cover. Soak them with detergent or stainless steel cleaning agent and then clean with small brush or soft cloth.
- Filter cleaning:

  Carefully pull out filter located on the heater cover and then put it back after washing (as shown in Figure 122

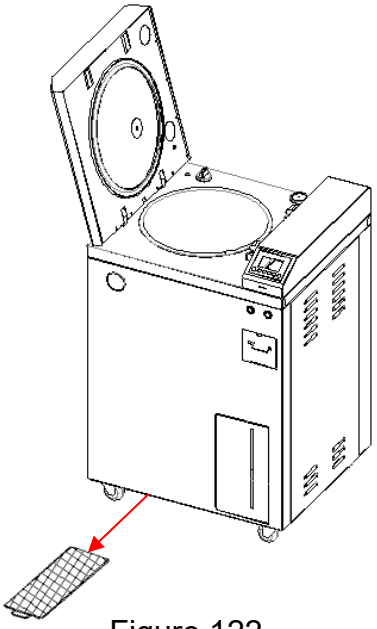


Figure 122

8.3 Monthly service

- Use “CHAM-MATE” to clean the inner chamber and heater. Please follow user’s instruction for “CHAM-MATE”.
- Use small brush to lightly clean water level sensor in the chamber with neutral cleaning agent.
- Confirm if the air filter is clean or not:

  Open up the autoclave door and confirm if the air filter above the machine body is dirty (gray color in general). If yes, please replace it with the same specifications and model shown in Figure 123.

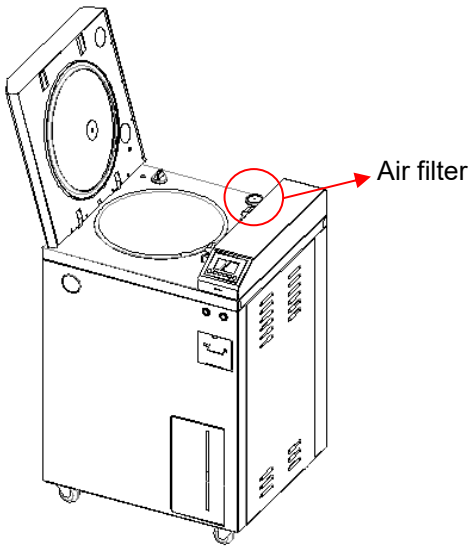


Figure 123

Warning: If the dirty air filter is not replaced, it will cause bad dryness and even contamination of sterilized item under severe situation.

8.4 Annual service

Attention: This service shall be implemented by technician from the distributor or manufacturer.

- Verify the sterilization cycle and temperature.
- Check if the piping is leaking water or air.
- Check if the indicator is abnormal.
- Test the safety valve.
- Check if the gasket is cracked or aging. The gasket is consumable and recommended to be replaced after one year of use under normal circumstances. The steps of replacement are as follows:

8.5 Replacement of Gasket

The steps of replacement are as follows:

1. Remove the door screws first, take off old gasket from the door with both hands, and then dismantle the packing panel. Slot the new gasket onto the packing panel described above (as shown in Figure 124.

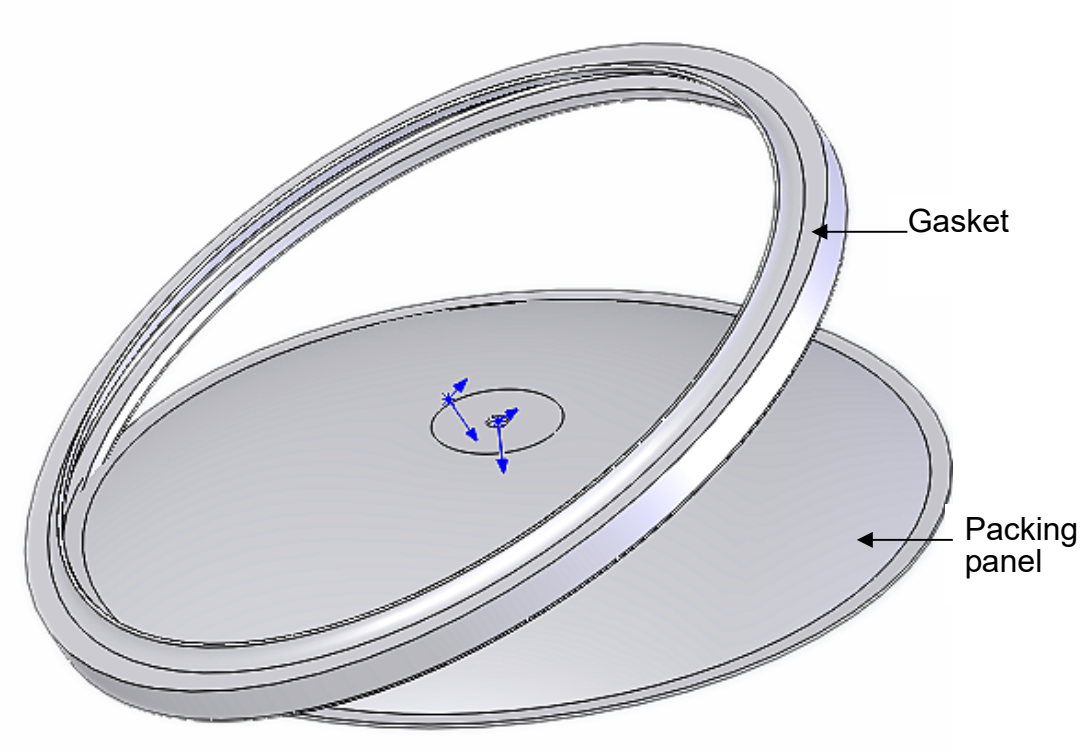


Figure 124

2. Check if the gasket is slotted in completely and positioned as shown in Figure 125.

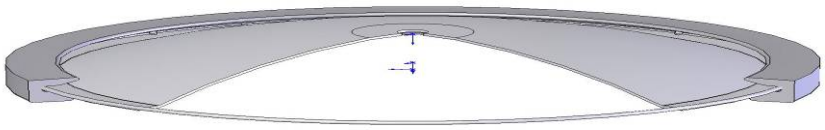


Figure 125

3. Evenly press the gasket into the door grove with both hands as shown in Figure 126. Please note the direction of assembly when pressing.

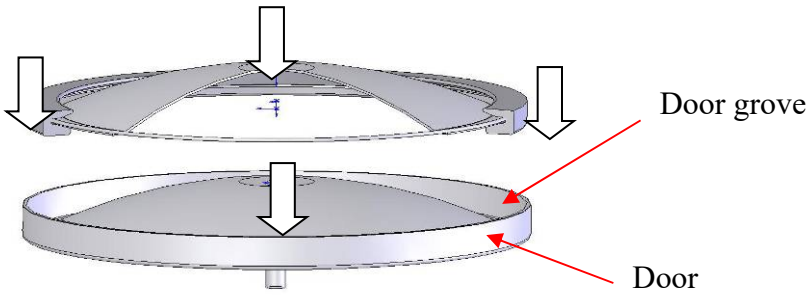


Figure 126

⚠**Attention:** The old gasket must be disposed as per regulation of local law.

9. Requirement on Water Quality

The quality of sterilization water will affect result of sterilization and lifetime of the autoclave. The use of inferior water will reduce efficiency of heater and increase energy consumption. Therefore, the water sterilization water must be selected with caution. It is recommended to follow table below from Attachment C under EU regulation EN 13060 for requirement on water quality. This is necessary for the sterilization quality and lifetime of the autoclave. Please use water compliant with the table below when executing sterilization to ensure result of sterilization and lifetime of the autoclave.

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

Contaminants of condensate and feed water

	Feed water	Condensate
Evaporate residue	≦10mg/l	≦1.0mg/kg
Siliceous oxide,Sio2	≦1mg/l	≦0.1mg/kg
Iron	≦0.2mg/l	≦0.1mg/kg
Cadmium	≦0.005mg/l	≦0.005mg/kg
Lead	≦0.05mg/l	≦0.05mg/kg
Rest of heavy metals, excluding iron, cadmium, lead	≦0.1mg/l	≦0.1mg/kg
Chloride	≦2mg/l	≦0.1mg/kg
Phosphate	≦0.5mg/l	≦0.1mg/kg
Conductivity(at 20℃)	≦15μs/l	≦3μs/l
pH value	5 to 7.5	5 to 7
Appearance	Colorless, clean, without sediment	Colorless, clean, without sediment
Hardness	≦0.02mmol/l	≦0.02mg/kg
NOTE1 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 autoclave and can invalidate the manufacturer’s warranty of guarantee. NOTE2 The condensate is produced from steam that has been taken from the empty autoclave chamber.		

Compliance should be tested in accordance with acknowledged analytical methods

Attention: It is recommended to test the water quality once per month. If sterilization water is not supplied according to table mentioned above when using the high-pressure steam autoclave, lifetime of the autoclave may possibly be affected severely and cause void warranty from the manufacturer.

10. Specifications

Name of machine	SA-382VMB		
Type	Economic	Standard	Advanced
Volume of chamber (L)	82		
Appearance and dimensions (mm)	670WX580DX1010H		
Dimensions of chamber (mm)	Ø380 X756H		
Vacuum Pump & B-Heater & Automatic draining	N/A	N/A	S
Automatic Adding Water	N/A	S	S
Printer	N/A	S	S
SD Card	N/A	S	S
P-Heater	S	S	S
Condenser	S	S	S
Condensed water bottle	N/A	S	S
Gross weight (kg)	150	153	158
Net weight (kg)	125	128	133
Maximum depth of sterilized item (mm)	695		
Maximum load for non-packaged instrument (g)	22,000		
Maximum load of liquid	19,000		
Power	AC 230V AC, 50/60Hz		
	21A		
	M-Heater 3,600W B-Heater 900W(Option)		

Name of machine	SA-382VMB
	P-Heater 43W(Option) Vacuum Pump 100W(Option)
Earth leakage breaker	Nominal current at 30A
	Nominal current sensitivity at 30mA
Water consumption for sterilization stroke (ml)	1200±10%
Sterilization temperature (°C)	105-135
Operation environment	Indoor: Below altitude of 1000m; Ambient temperature at 5°C to 40°C; From 80% RH @31°C to 50% RH @40°C; Power variation rate ±10 %; Transient overvoltage category II Pollution degree 2
Transportation condition	-10°C to 70°C and 10%RH to 90%RH
Storage condition	-10°C to 50°C and 10%RH to 70%RH
Design temperature (°C)	140°C
Design pressure (bar)	2.6 bar
Over-pressure protection (bar)	2.5 bar
Air filter	≦0.3μm
Over-pressure warning	Pressure protection switch and indication of abnormality
Over-temperature warning	Temperature protection switch and indication of abnormality
Water indication	Water sensor and indication of water shortage
Door-open warning	Sensor switch and indication of abnormality
Pressure indication	Analogical pressure gauge and digital display
Function indication	LCD screen
Stroke used	Liquid1 Liquid2 Solid 121°C

Name of machine	SA-382VMB
	Solid 135°C Agar Dissolution User1 User2 Dry(Optional)
Dry function(Optional)	1-60 minutes
Other functions	Emergency button Electronic records Auto water filling Instant printing function(optional) Drain (optional) Counter Service reminder Conversion of temperature and pressure unit Date and time Temperature and pressure calibration (Engineer mode)
Printer(Optional)	Thermal printer
Memory card	SD/HC with maximum capacity of 32GB (memory card is optional purchase)

11. Warranty

This product was delivered under strict quality control. In case of failure under normal circumstances, one-year warranty with this certificate as proof is provided from the date of purchase. Malfunction caused by natural wear and tear will be charged at cost expense considerably. The product is not covered by warranty if falling under any of the following situations:

Abnormal use, improper use, improper storage, unauthorized modification, unauthorized repair, accidental use, negligence, abusive use and incorrect adjustment on control switch by the user, as well as act of God, malfunction caused by careless operation and failure of regular cleaning and service according to product manual.

Full names:			
Address:			
Tel.:		Fax:	
Name of machine:		Country:	
Date of purchase:		Serial number:	
Distributor:			

Please keep this card at safe place. Lost card will not be re-issued.

Product name	:	Autoclave Steam Sterilizer
Model	:	SA-382VMB
Manufacturer 	:	Sturdy Industrial Co., Ltd.
Manufacturer address	:	No. 168, Sec. 1, Zhongxing Road, Wugu District, New Taipei City

422-03043-03