



Laboratory Equipment Manufacturer
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Operation Manual for **STE-TAN-18/23** AUTOCLAVES



PLEASE READ THIS MANUAL CAREFULLY BEFORE OPERATION

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MRC.VER.01-1.11

Thank you for choosing this Steam Sterilizer.

Please read the operating manual carefully in order to install the equipment and operate the equipment in an efficient manner.

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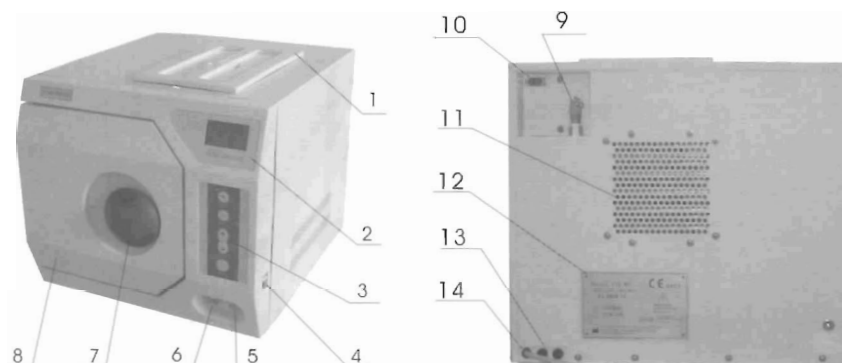
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1 General

This sterilizer described in this manual is intended for the sterilization of re-useable surgical instruments and material.

It operates automatically with 134°C and 121°C sterilization temperatures.

The sterilizer is a Medical device class II a, in accordance with article 15-Appendix IX of the European Directive 93/42/CEE and it has been produced in accordance with the EN 13060.



- | | |
|---|--------------------------|
| 1 Distilled water tank | 9 Safety valve |
| 2 LCD screen | 10 Printer port |
| 3 Control panel | 11 Condenser ventilation |
| 4 Main switch | 12 Rating plate |
| 5 Drain connector of distilled water tank | 13 Main fuses |
| 6 Drain connector of used water tank | 14 Power supply cord |
| 7 Door handle | |
| 8 Door | |

Security Notice

In order to proper use the sterilizer, please be sure to read the warning and attention carefully for safety.



This symbol is grounding protection inside the machine.



HOT SURFACE.

This symbol is visible on the front of the panel after open the door.



Important safety information.

This symbol is used to draw the attention of the reader to particularly important notions for operator safety.

2 Technical Parameters

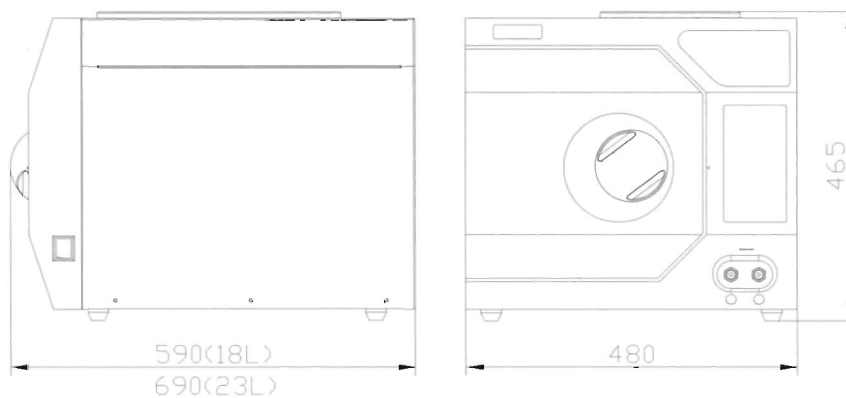
Item	18L	23L
Chamber	Φ247mmX350mm	Φ247mmX450mm
Rated Voltage	AC220V-240V(AC110V), 50-60Hz	
Main Fuses	T12A/250V(T20A/250V for 110V)	
Nominal power	1700VA	1900VA
Sterilization Temperature	121℃/134℃	
Capacity of the distilled water tank	Approx 2.5L (water at level MAX)	
	Approx 0.5L (water at level MIN)	
Operation temperature	5 - 40℃	
Outside size	480mm(width)X 465mm (height)X 590mm(depth)	480mm(width)X 465mm (height)X 690mm(depth)
Net weight	45kg	49kg
Noise	<60dB	
Relative Humidity	max 80%, non condensing	
Atmospheric pressure	76kPa -106kPa	

3 Packing Content

No	Item	Quantity
1	18L/23L Steam sterilizer	1
2	Instrument tray	3
3	Instrument tray rack	1
4	Instrument tray handle	1
5	Door adjustment tool	1
6	Draining hose	2
7	Instructions manual	1
8	Power fuse(^{T12A/ AC250V} T20A/ AC250V for 110V)	2
9	Fuse for valve (T3A/ AC250V)	2
10	Fuse for mainboard (T1A/ AC250V)	2
11	Door seal	1

4 Installation

- * There must be 10cm gap around sterilizer, and 20cm on top side. the clearance required for the movement of the door(s): leave an at least 450mm fan-shaped space in front of the door.
- * The place which sterilizer located must be ventilated, make sure that the radiator not being jammed.
- * The sterilizer should be placed on a level worktable.
- * Don't cover or block the door, ventilation or radiation openings on the sterilizer.
- * Don't place the sterilizer near a sink or in a location where it is likely to be splashed.
- * Keep away from all sources of heat.



5 Operation

5.1 Filling the distilled water

5.1.1 Open the door and take out all the instrument tray and other accessories inside, unpack and clean them.

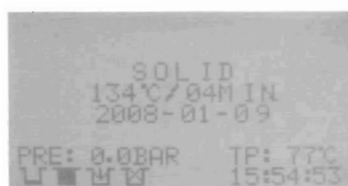
5.1.2 Connect the power, and connect the printer (See 6.5)

5.1.3 Switch on

Switch on the sterilizer through the mains switch mounted on the right side. At the switching on, the machine turns on the LCD display.

And it will show the door position, water level, working program, date, time and etc. .

The machine will alerts by beep sounds if there are problems. Over the test the following message will be shown:

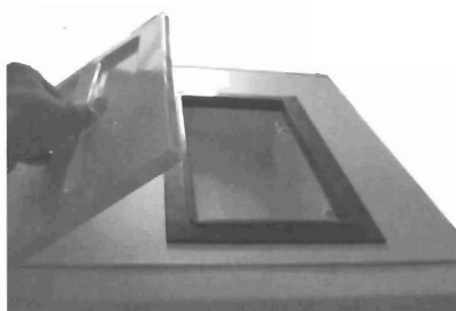


-  Distilled water tank is lacking of water.
-  Used water tank is full.
-  Filling water
-  Water quality test.
-  Door state.

Notice: Before using the sterilizer at the first start-up or any time the signal  blink, it is necessary to fill the distilled water tank with distilled water.

5.1.4 Fill the distilled water

Open the top lid, and fill the tank with distilled water by cup or tank. When you hear a beep signal, it means the water level is exceed the max. level. Please stop filling immediately.



5.2 Prepare the material to be sterilized

To get the better effectiveness of the sterilization process and to preserve the material in time, follow the indications below reported.

- * Arrange the tools of different metal (stainless steel, moderate steel, aluminum, etc.) on different trays or however well separate between them;
- * In case of not stainless steel tools, interpose a sterilization paper napkin or muslin cloth between tray and tool, avoiding direct contacts between the two different materials;
- * Verify all the tools are sterilized in open position;
- * Arrange the containers (glasses, cups, test-tubes, etc.) on one side or inverted position, avoiding possible water stagnation;
- * Don't overload the trays over the stated limit (see Appendix 1).
- * Don't stack the trays one above the other or put them in direct contact with the walls of the sterilization chamber.
- * Always use the instrument tray handle.
- * Wrap the tools one by one or, if more tools have to be set in the same wrap, verify that they are of the same metal;
- * Seal the wrap with sterilization adhesive ribbon or by a thermal sealer.
- * Don't use metallic clips, pins or other, as this jeopardizes the maintenance of the sterility;

* Turn the sterilization paper in order to set the plastic part downward (tray side) and the paper part upward.



Always wrap the tools in case of prolonged store.

5.3 Selecting the sterilization program

5.3.1 LCD display

Displays the cycle temperature, pressure, error code, sterilization state and program.



5.3.2 SELECT button

Program select button. Press this button for 5 seconds and select the program which you want.

5.3.3 SET button

For advanced set.

5.3.4 UP button

Select up button to select program or adjust and setup the parameter.

5.3.5 DOWN button

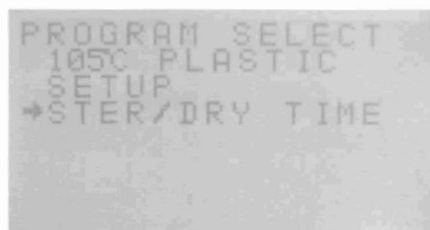
Select up button to select program or adjust and setup the parameter.

5.3.6 START/STOP button

Press this button to start the sterilization cycle, holding this button above 3 seconds to restart the system, and back to the initial state.

5.3.7 Select the program

Select the program by holding the SELECT button for 5 seconds, and then the display show the available sterilization program:



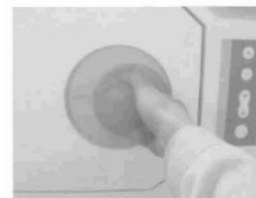
Select the program by UP/DOWN button and confirm it by press START button.

5.4 Running the sterilization program

After selecting program, put the instruments into the chamber by tray handle.



5.4.1 After the instruments are loaded, you may close and lock the door by turning the door handle clockwise.



Caution: You must turn the door handle to the maximum position, otherwise the machine will alarm and stop working during the cycle.

5.4.2 Start the sterilization program.

Press START button, the machine will start a cycle automatically. It will take 30-75 minutes. (See Appendix 2)

Caution: When you press the "Start" button the door handle has not been turned to the maximum position, you will see the  blinks on the screen, It means you can not start a cycle until you close the door completely and press the "Start" button again.

5.4.3 Sterilization cycle end

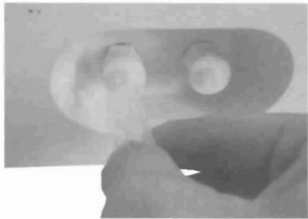
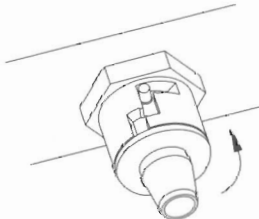
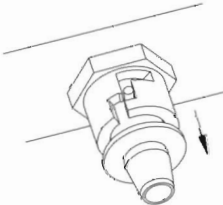
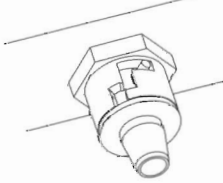
After a cycle completes, the printer will start work and print the report of the sterilization cycle data.

After the pressure is 0 ,you may open the door, and take out the sterilized instruments.



Always use the tray handle to load or unload the tray in order to avoid scald.

The drain connector

 1. Push the hose to the waterspout of the connector.	 2. Turn the waterspout anticlockwise.
 3. Pull the waterspout out . Then the tank will be drained.	 4. After finish draining water, push waterspout and turn clockwise to the position as fig.

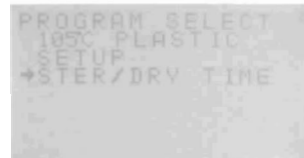
6 Advanced Setting

6.1 Adjust the sterilization time and drying time

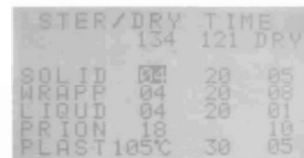
6.1.1 Hold SELECT button for 5 seconds, then enter program select ion menu.



6.1.2 Select the “STER/DRY TIME” program by Up/Down button and confirm it by press SELECT button, and then enter the next menu .



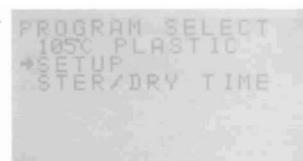
6.1.3 Move to the sterilization time or drying time setting position as you wish, press the Up/Down button to adjust the time. Then press START button to confirm it, the machine will work according to the new set time.



Notice: Setting time adjust range :3-60 minutes, press Up/Down button once can add/decrease one minute. We suggest the operator do not adjust the parameter if it is not necessary.

6.2 Setup

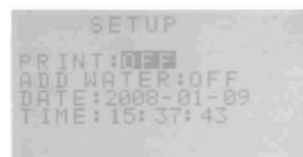
6.2.1 Hold "SELECT" button for 5 seconds, enter the program select menu.



6.2.2 Press Up/Down button, select SETUP, press SELECT button to confirm it and enter SETUP menu.

Press UP/DOWN button to choose the item you wish to set. If you chose a item, you may press SELECT button to enter the next menu, and you may adjust the parameter by press UP/DOWN button. You confirm it by press START button.

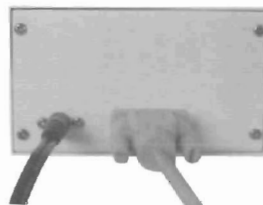
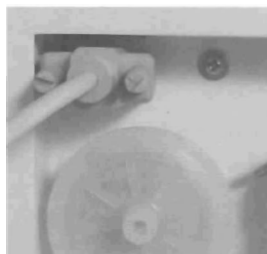
- a. PRINT is print function setup,
ON means the printer will print the
cycle data record after the cycle.
OFF means the printer is closed.
How to use printer (See 6.5)



- b. ADD WATER is filling water option (optional)
ON means when the reservoir lacking of water, the pump will fill the
reservoir automatically.
OFF means when the sterilizer check and find the water is not enough,
the pump will not work automatically. But the machine will alerts
with beep sound, asking for filling the reservoir .
- c. DATE
Adjust the Year/Month/Date
- d. Time
Adjust Hour/Minute/Second

6.3 Pinter (Optional)

- 6.3.1 Connect the printer cable to socket at the back
of the sterilizer.
- 6.3.2 Connect the printer power.
Then switch on the printer.
- 6.3.3 Switch on the sterilizer.
- 6.3.4 Make sure the option in advanced setting is correct.
(See 6.2.2 a)



Example of the print report

Program: wrapped
Temperature: 134°C
Pressure: 2.1bar
Vacuum Num: 0
Dry Time: 4min
Ster Time: 3min
Cycle No: 00009

MAX • Temp : 135.1°C
MIN • Temp: 134.1°C
AVE • Temp: 134.6°C
MAX • Pre: 2.18bar
MIN • Pre: 2.05bar
AVE • Pre: 2.11bar

Start Time: 22: 38
End Time: 23: 17
Date: 2006-07-19
Operator:

7 Maintenance

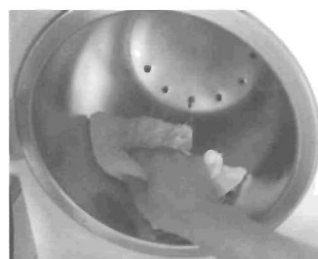
Frequency	Operation
Daily	Cleaning the door seal
	Cleaning the external surface
Weekly	Cleaning the reservoir
	Cleaning the chamber
Every year	Replacing the door seal

7.1 Clean the distilled water tank every week with medical disinfectant .



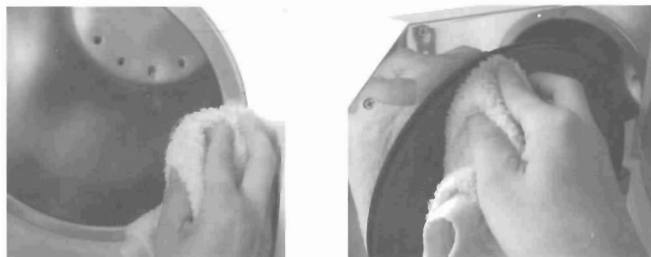
7.2 Clean the chamber weekly.

- 7.2.1 Remove the trays and rock from the chamber.
- 7.2.2 Clean the chamber with non-plush cloth saturated with distilled water.
- 7.2.3 Apply the same procedure for the trays and rock.



7.3 Cleaning the door seal

Clean the door seal weekly, with non-plush cloth saturated with the distilled water.



7.4 Door adjustment

On normal circumstance the chamber door lock don't need to adjust.

Once steam leaking occurs (the seal fails), you may use the spanner to adjust door seal.

7.4.1 Open the door first

7.4.2 Insert the spanner in the gap beneath the plastic cover; use the spanner to lock on the adjusting nut (Fig 1). Turn the nut counter clockwise as the figure below (Fig 2). This will tighten the sealing plate.

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

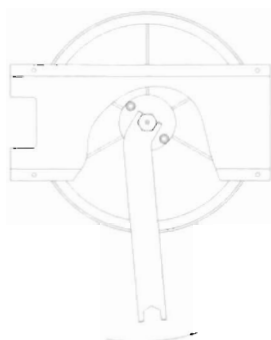


Fig 1

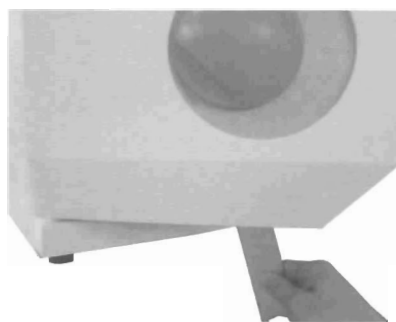


Fig 2

Caution:

Never try to readjust the chamber door while the door is locked.

7.5 Replacement of the door seal

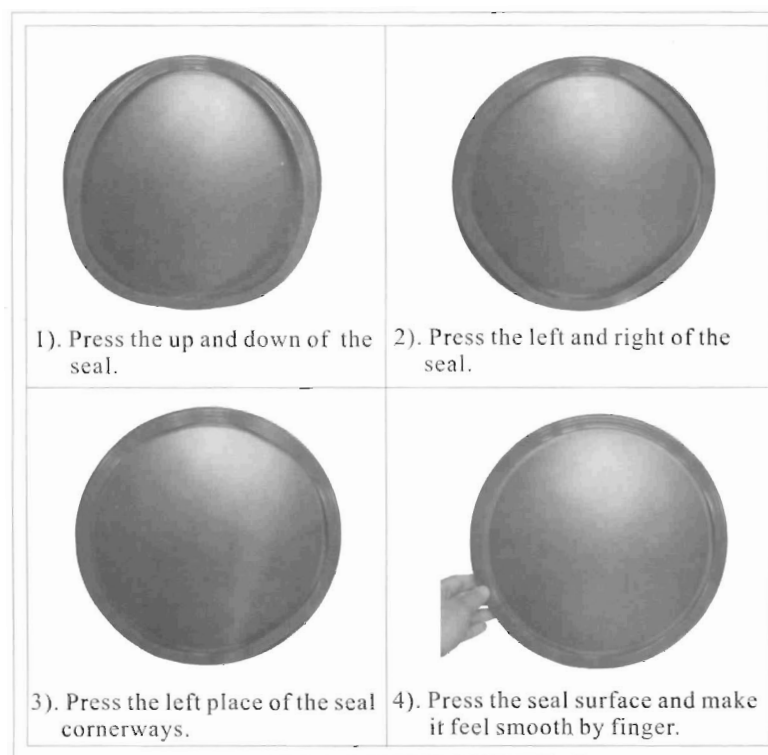
7.5.1 Fully open the door.

7.5.2 Remove the door seal carefully by hand.

7.5.3 Clean the door seat carefully with a non-plush cloth saturated with distilled water.

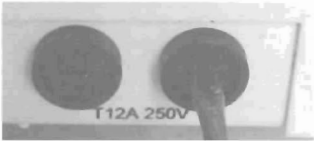
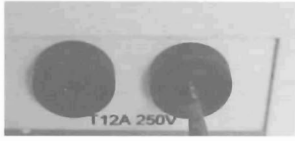
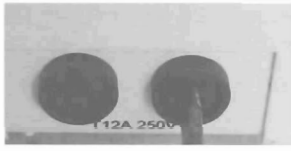
7.5.4 Moisten the new seal with medical disinfectant .

7.5.5 Insert the new seal and press in sequence as the following.



Caution: Please ensure the chamber and the door has been cool down before you change the seal.

7.6 Replace fuse

1). Switch off the power.	
	
2). Push the fuse by a screw driver first, then unscrew the fuse holder counter clockwise.	3). Pull the fuse holder out.
	
4). Make sure to replace the correct fuse.	5). Put back the fuse holder and push it, then screw it clockwise with a screw driver.

8 Transportation and Storage

8.1 Switch off the sterilizer before transportation or storage. Pull out the plug to let the machine cool down.

8.2 Drain the distilled water tank and the used water tank

8.3 Conditions for transportation and storage:

Temperature: $-20^{\circ}\text{C} \sim +55^{\circ}\text{C}$

Relative humidity: $\leq 85\%$

Atmospheric pressure: $50\text{kPa} \sim 106\text{kPa}$

9 Alarm

Code	Description	Proposed solution
E1	Steam generator temperature sensor error	Check steam generator temperature sensor
E2	Inner temperature sensor error	Check inner temperature sensor
E3	Temperature sensor of chamber wall error	Check temperature sensor of chamber wall
E4	Fail to rise temperature	Check water pump or the seal of the machine
E5	Fail to release the steam	Check the air release valve
E6	Door is opened during working	Make sure you have turned the door handle to the max. Position or check the door switch
E7	Overtime	Check the water pump Check the air release valve
E8	Steam generator overheat	Check steam generator temperature sensor
E9	Holding temperature is failed.	Check the reservoir if the water is not enough or ask authorized people to check the heating system and temperature sensors.
EE	Program manually interrupted	Shut off the power and restart the power
EF	System have not initialized	Shut off the power and restart the power

10 Safety devices

(1) Main fuses

Protection of the whole equipment against possible failures of the heating resistor .

Action: Interruption of the electric power supply.

(2) Thermal cutouts on the mains transformer windings

Protection against possible short circuit and mains transformer primary winding overheating .

Action: Temporary interruption (up to the cooling) of the winding.

(3) Safety valve

Protection against possible sterilization chamber over-pressure .

Action: release of the steam and restoration of the safely pressure.

(4) Safety micro-switch for the door status

Comparison for the correct closing position of the door .

Action: signal of wrong position of the door.

(5) Manually reset thermostat on chamber heating resistors

Protection for possible overheating of the chamber heating resistors .

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

(6) Manually rest thermostat on steam generator

Protection for possible overheating of the steam generator .

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

(7) Door safety lock

Protection against accidental opening of the door.

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

(8) Self-leveling hydraulic system

Hydraulic system for the natural pressure levelling in case of manual cycle interruption, Alarm or black-out .

Action: automatic restoration of the atmospheric pressure inside chamber.

APPENDIX 1

Characteristics of the feeding water

DESCRIPTION	FEED WATER	CONDENSATE
Evaporate residue	≤10 mg/l	≤1.0 mg/kg
Silicium oxide SiO_2	≤1 mg/l	≤0.1 mg/kg
Iron	≤0.2 mg/l	≤0.1 mg/kg
Cadmium	≤0.005 mg/l	≤0.05 mg/kg
Lead	≤0.05 mg/l	≤0.1 mg/kg
Rest of heavy metals, excluding iron, cadmium, lead	≤0.1 mg/l	≤0.1 mg/kg
Chloride	≤2 mg/l	≤0.1 mg/l
Phosphates	≤0.5 mg/l	≤0.1 mg/l
Conductivity (at 20°C)	≤15 $\mu\text{S/cm}$	≤3 $\mu\text{S/cm}$
pH value	5-7.5	5-7
Appearance	Colorless, clean, without sediments	Colorless, clean, without sediments
Hardness	≤0.02 mmol/l	≤0.02 mmol/l

APPENDIX 2

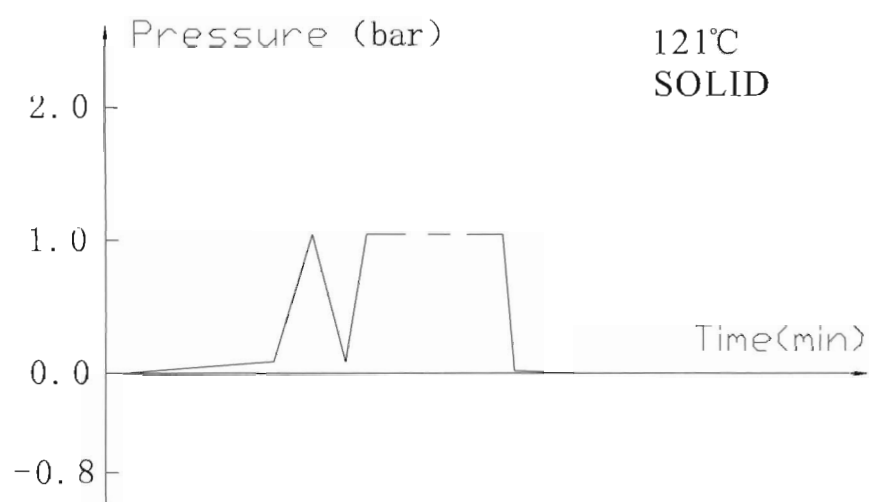
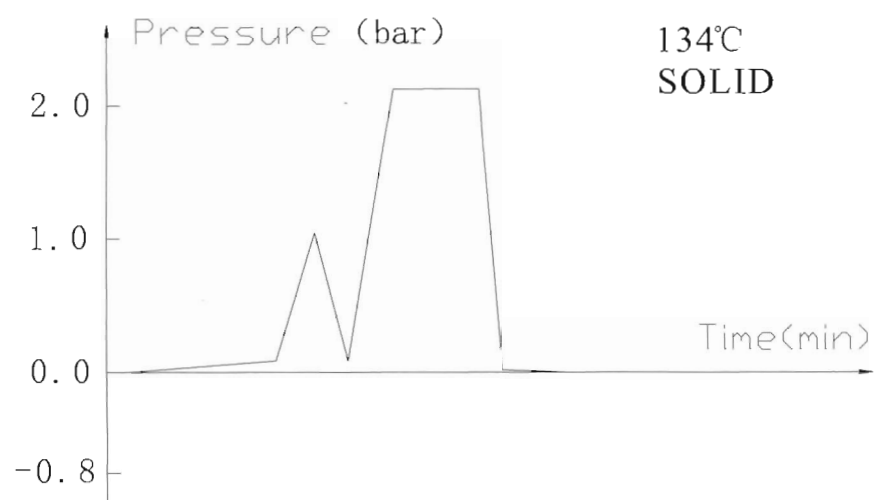
DIAGRAMS OF THE STERILIZATION PROGRAMMES

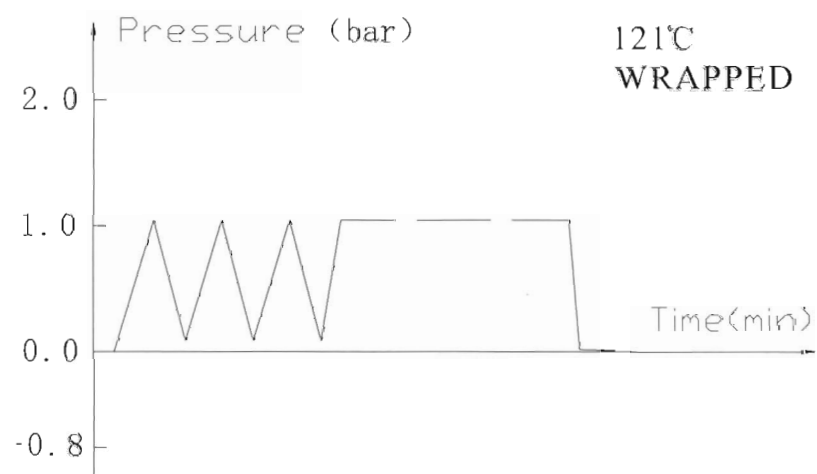
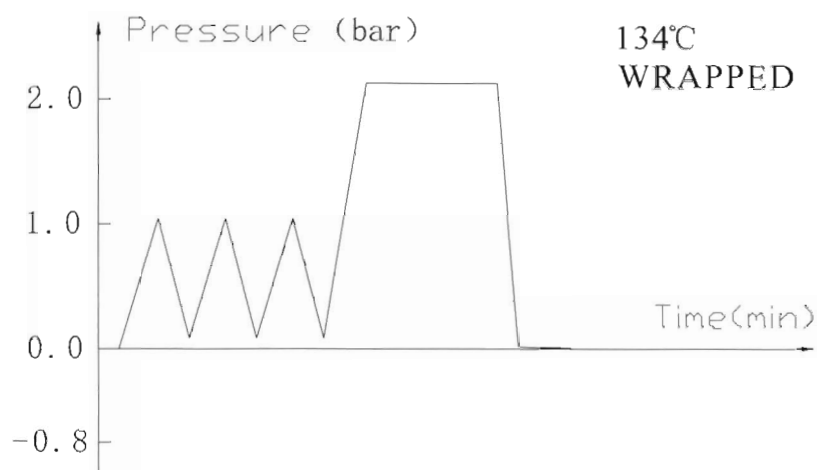
PROGRAM	Temperature (°C)	Pressure (bar)	Holding time (min)	Total time (min)	TYPE	MAXLOAD total (kg)	MAXLOAD per tray (kg)
SOLID	134	2.10	4	18~30	Unwrapped solid material	5.00	5.00
	121	1.10	20	30~45		5.00	5.00
WRAPPED	134	2.10	6	30~40	Unwrapped hollow material	5.00	5.00
	121	1.10	20	35~50	Single-wrapped solid material	4.00	4.00
LIQUID	134	2.10	8	45~65	Wrapped liquid	0.50	0.50
LIQUID	121	1.10	30	50~75	Wrapped liquid	0.50	0.50
PRION	134	2.10	18	45~70	Unwrapped porous material	1.25	1.25
					Single-wrapped porous material	1.00	1.00
					Dual-wrapped porous material	0.75	0.75
					Single-wrapped Hollow material	4.00	4.00
					Dual-wrapped solid and hollow material	2.00	2.00
PLASTIC	105	0.20	30	50~65	Unwrapped plastic material disinfection	3.00	3.00

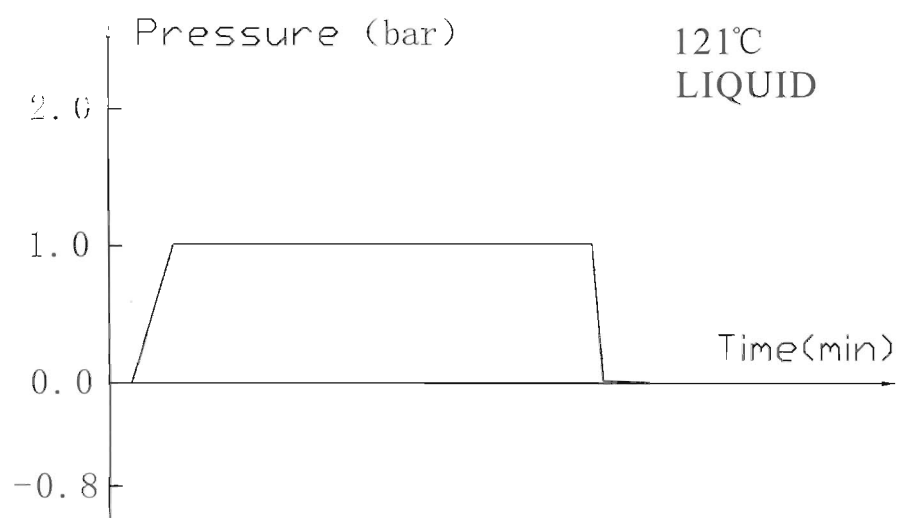
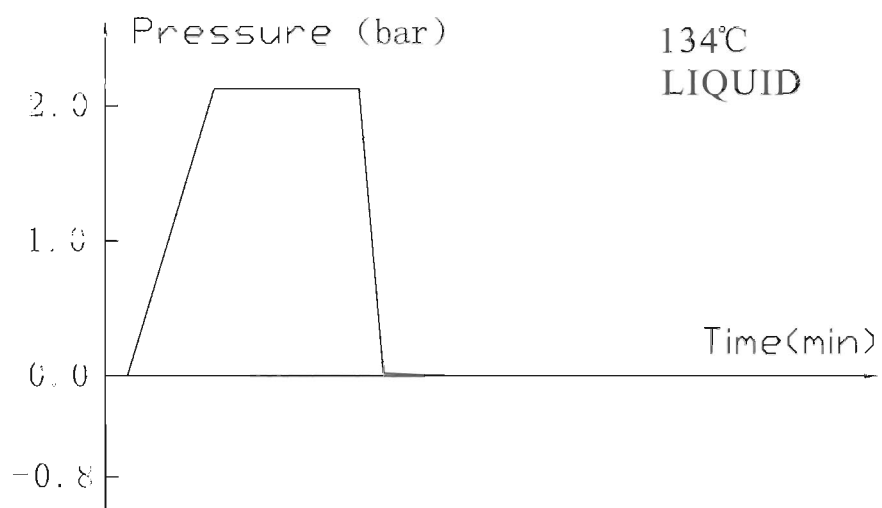
The time required for sterilizer to be ready for routine use after the power is switched on less than 5 minutes.

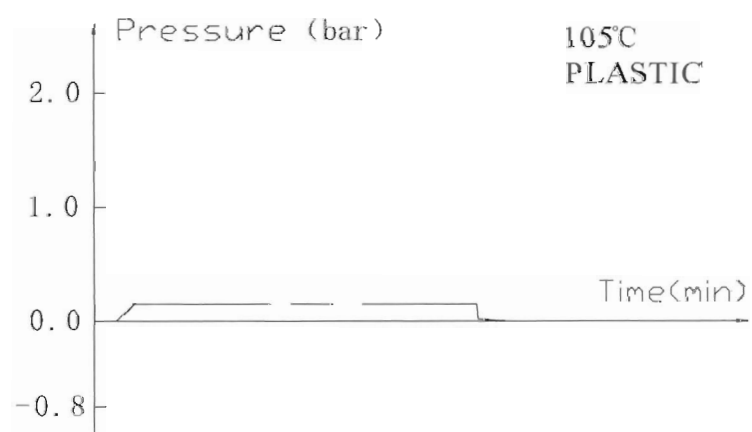
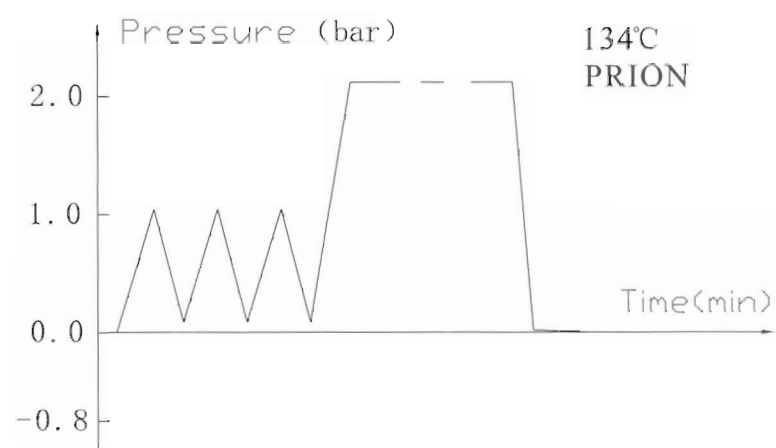
The max. temperature of the 134°C sterilization cycle is 136°C

The max. temperature of the 121°C sterilization cycle is 123°C



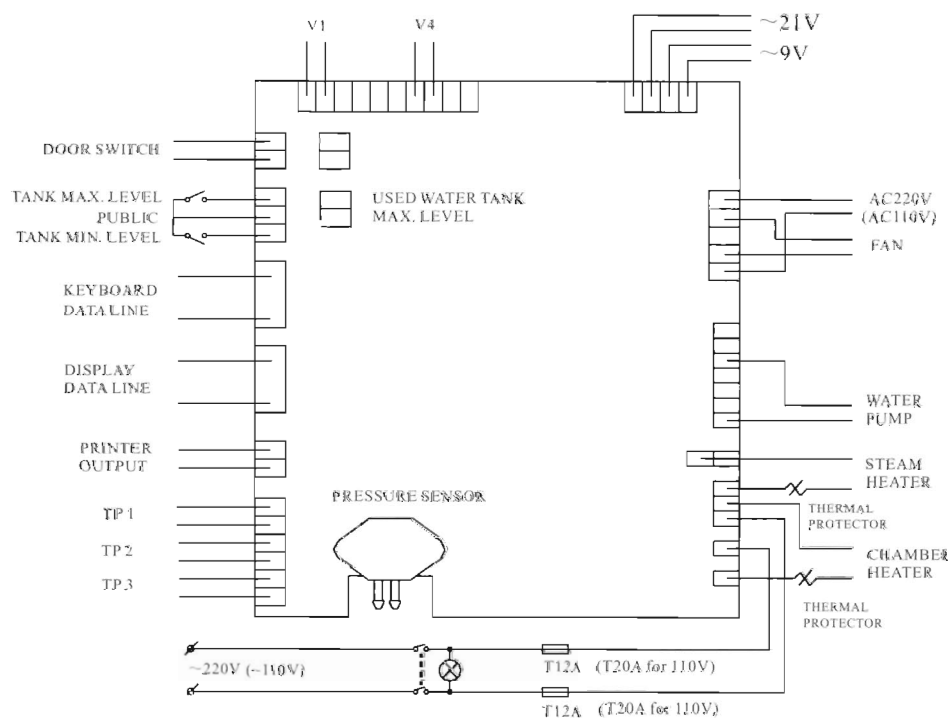






APPENDIX 3

ELECTRICAL DRAWING



TP1: Steam generator temperature sensor

TP2: Inner temperature sensor of chamber

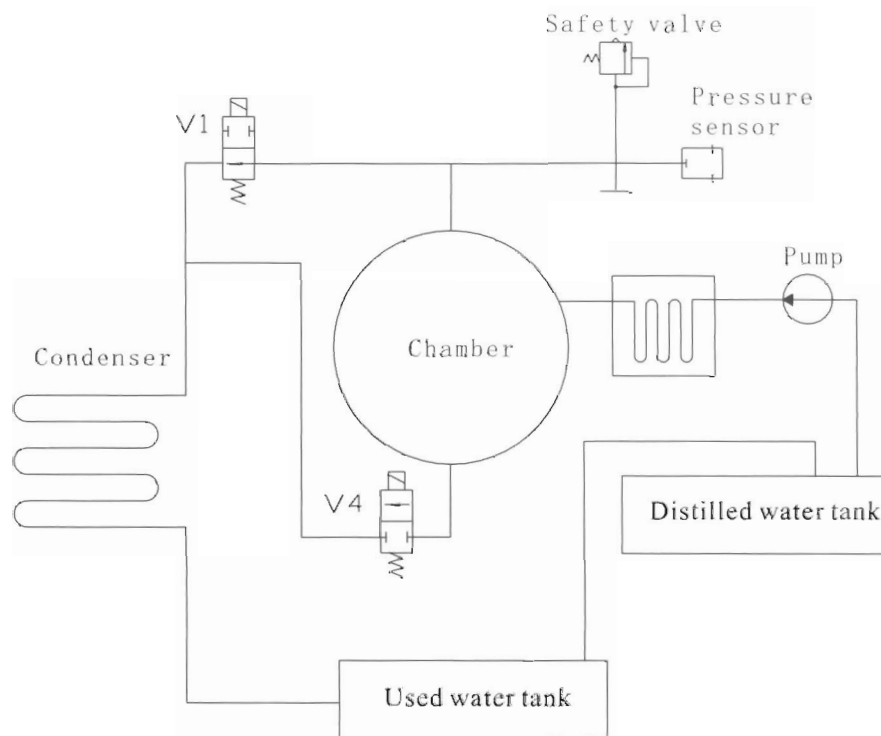
TP3: Temperature sensor of chamber wall

V1: Air release valve

V4: Water release valve

APPENDIX 4

HYDRAULIC DRAWING



V1: AIR RELEASE VALVE
V4: WATER RELEASE VALVE