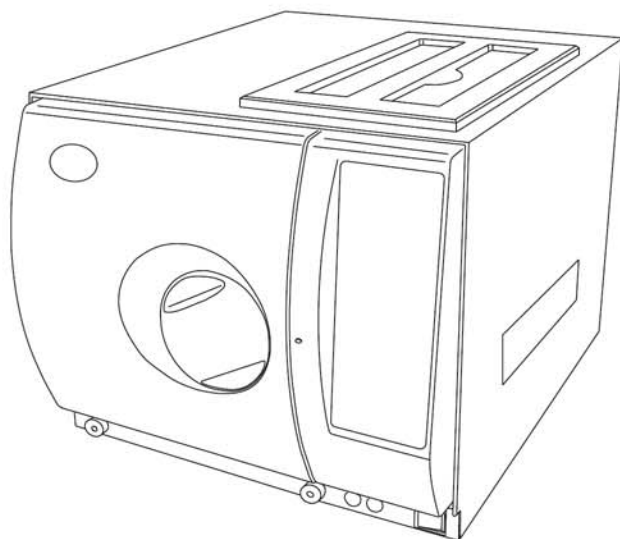


BioCLAVE

Operations Manual (V 1.0)



Benchmark
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Thank you for choosing the Biomega BioClave steam sterilizer.

Your steam sterilizer has been CE certified and designed with durability, reliability, and safety in mind. It is your responsibility to install this instrument in conformance with local electrical codes.

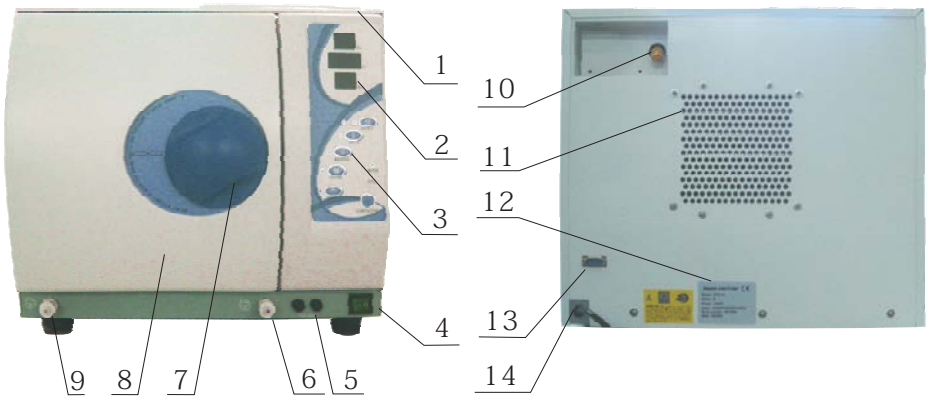
This manual contains important operating and safety information. Please read and understand the contents of this manual prior to operating this instrument.

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1. General

The sterilizer described in this manual is intended for the sterilization of research tools. It operates automatically with 134°C and 121°C sterilization temperatures. This sterilizer is in compliance with the European Directive 93/42/CEE and it has been produced in accordance with the EN 13060. In addition the chamber has been ASME certified.



- 1 Distilled (clean) water tank
- 2 Display
- 3 Control panel
- 4 Power switch
- 5 Fuses
- 6 Drain connector, clean water tank
- 7 Door handle

- 8 Door
- 9 Drain connector, used water tank
- 10 Safety valve
- 11 Condenser ventilation
- 12 Serial / Electrical Label
- 13 Printer port (printer is optional)
- 14 Power supply cord

For safe operation, please pay close attention to the alert symbols below which can be found throughout this manual. Please carefully read and understand the contents of this manual prior to operating this instrument.



This symbol represents an electrical caution - ground protection



HOT SURFACE.

This symbol represents a hot surface



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

2. Technical Specifications

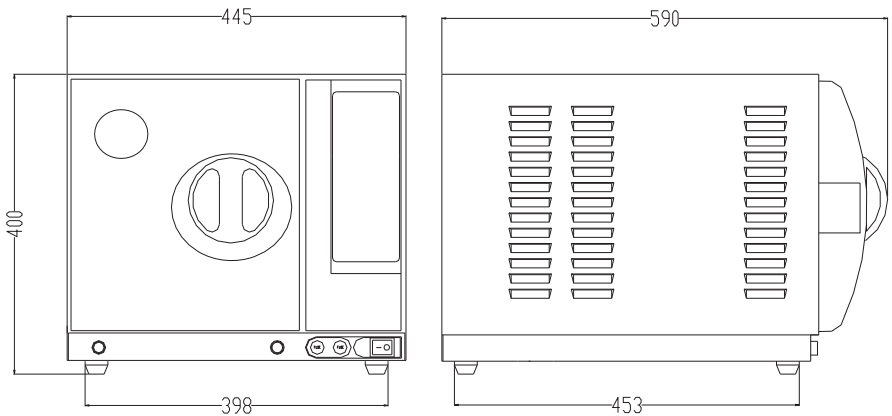
- (1) Chamber Dimensions: 9in. x 14.2in. / 230mm x 360mm
- (2) Rated Voltage: AC 110V-120V or 220-240V, 50-60Hz
- (3) Nominal power: 1600W (120V) 1250W(220V)
- (4) Sterilization Temperature: 121°C / 134°C
- (5) Main Fuses: T20A/250V
- (6) Capacity of the distilled water tank:
Approx 2.5L (water at level MAX)
- (7) Operating Environment: 5 - 40°C
- (8) External Dimensions:
17.5in. (width) x 16.7in. (height) x 23in. (depth)
445mm (width) x 400mm (height) x 590mm (depth)
- (9) Net weight: 99lbs. /45kg
- (10) Noise: <60dB
- (11) Relative Humidity: max 80%, non condensing
- (12) Atmospheric Pressure: 76kPa -106kPa

3. Packing Content

No	Accessory	Quantity
1	16L Steam sterilizer	1
2	Loading tray	3
3	Tray rack	1
4	Tray handling tool	1
5	Door adjustment tool	1
6	Draining hose	2
7	Instructions manual	1
8	Spare fuse power (20A)	2
9	Spare fuse for valve (3A)	2
10	Spare fuse for mainboard (1A)	2
11	Door seal	1

4. Installation

- * Ensure that the sterilizer is installed with 2.5in. (10cm) ventilation space on all sides of the sterilizer, and 5 in. (20cm) on top side. The clearance required to open the door is 15.5in. (40cm).
- * The sterilizer should be placed on a level worktable.
- * Do not cover or block the door, ventilation or radiation openings on the sterilizer.
- * Do not install the sterilizer near a sink or in a location where it is likely to be splashed.
- * Do not install the sterilizer nearby a heat source.



Above dimensions are shown in mm.

5. Control panel

5.1 Pressure display window.

Displays the current pressure (PSI) inside the chamber

5.2 Temperature display window.

Display the current temperature (°C) inside the chamber

5.3 Timer display window

Displays the cycle state (see below) or the remaining cycle time

5.4 TEMP button

Select the desired sterilization temperature according to your instrument.

5.5 Sterilization Cycles

- UNWRAPPED
- WRAPPED
- LIQUID
- DRY ONLY

(Please see Appendix 2)

5.6 WATER indication lamp

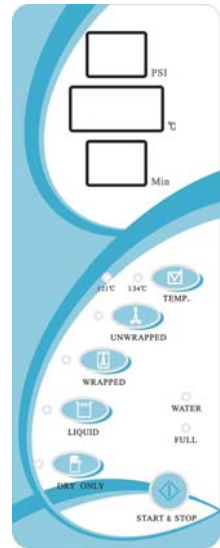
This lamp will illuminate when the distilled water tank is low on water. The tank should then be filled (with distilled water).

5.7 FULL indication lamp

This lamp will illuminate when the used water tank is full. The used water tank must be drained to continue operation.

5.8 START & STOP button

Once the parameters have been chosen, press this button to start the sterilization cycle. To cancel or stop the cycle, press and hold this button for 3 sec.



Cycle State

Time Display	State	State description
Ld	preheating / loading	The machine is prepared for sample loading
Do	Door state	Door is open
Po	vacuuming	The machine is vacuuming during a cycle
HE	heating	The machine is in heating mode
Time in Min.	sterilization/drying	Time remaining in program
PL	exhaust	The machine is cooling and releasing steam.
Ed	end	The cycle is completed, you can open the door and take out the sterilized sample.
E1 - E9	Error state	Error - Please see section 12

6. Operation

6.1 Power on

6.1.1 Open the chamber door and remove all inner packing and accessories.

6.1.2 Plug the power cord into the proper electrical outlet. (Please check that the power source is in accordance to the electrical specifications of the machine (listed on the power label).

6.1.3 Power on - The switch is located underneath the control panel on the front side of the machine.

Following power up, the control panel illuminates.

The Time window will display “Ld” .



6.2 Filling the water tank

Open the top lid, and fill the tank with *distilled* water. The water should be filled within approximately 1 inch of the black seal. If you hear a beep signal, the max water level is exceeded. Please stop filling immediately.



6.3 Sample Preparation

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

- * Arrange the samples of different material on different trays or with at least 2in. of space between them.
- * Always insert a sterilization paper or cloth between the tray and sample, to avoid direct contact between the different materials.

-
- * Verify all samples are not sealed, capped or closed.
 - * Don't overload the trays above 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.
 - * When handling the trays, always use the tray removal tool.
 - * Wrap each sample separately, if samples are wrapped together verify that they are of the same material.
 - * Seal the wrap with sterilization adhesive ribbon or by a thermal sealer.
 - * Never seal with metallic clips, pins, etc. as this jeopardizes the maintenance of the sterility;
 - * When using sterilization paper, set the plastic part downward (tray side) and the paper side facing upward.



Always wrap samples.

6.4 Select the sterilization program

Select the appropriate sterilization temperature and cycle. (For additional information, see appendix 2.)



6.5 Running the sterilization program

After selecting the appropriate sterilization settings, load the samples onto the loading tray and insert the tray into the autoclave using the tray handling tool.



-
- 6.6 After the samples are loaded, close and lock the door by turning the door handle clockwise until it stops.



Caution: You must turn the door handle to the maximum position, otherwise the machine will alarm and an error message will be displayed during the cycle.

6.7 Starting the sterilization program.

Press the START button, the machine will begin the sterilization cycle and complete all phases (fill, sterilize, exhaust and dry) automatically. The cycle will complete in 12-65 minutes. (See **Appendix 2**)



Caution: When you press the "Start" button and the door handle has not been turned to the maximum position, "do" will flash on the Time display window. The cycle will not begin until the door has been completely closed and the "Start" button is pressed again.

6.8 Sterilization cycle completion

After a cycle is completed the time display will show "Ed". Once the pressure has reached 0 PSI on the display the door can be opened and samples can be removed.

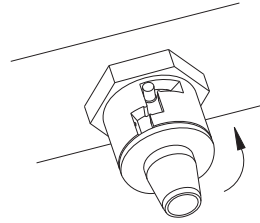


Always use the tray removal tool to load or unload the tray in order to avoid touching the hot surface of the trays.

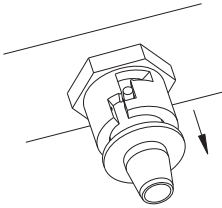
7. Draining the water tanks



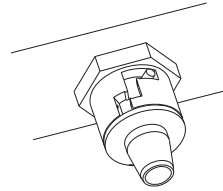
1. Connect the supplied drain hose to the drain valve by pressing it on firmly.



2. Set the drain valve to the open position by turning it counter clockwise



3. Pull the drain valve outward, the tank will begin to drain through the hose.



4. After you have completed draining the water, push the drain valve inward and set to the closed position

The sterilizer includes two draining valves. The left valve is used for draining the used water tank. The right valve is used for draining the clean water tank. Always be sure that the hose is draining into a vessel with at least 2L capacity.

8 Advanced adjustment settings

8.1 Adjustment of sterilization time and drying time

- 8.1.1 Hold the **UNWRAPPED** button for 30seconds. The machine will beep to signify that you have entered the advanced settings mode.
- 8.1.2 The pressure display window shows “0” and the temperature display window shows - - -. The timer display window will show the pre-programmed sterilization time parameter.
- 8.1.3 Select the sterilization program that you wish to adjust. For example, If you want to adjust the parameter of **WRAPPED**. Press the **WRAPPED** button. Press the button again, the time display shows “1”.
- 0 means the 121 sterilization time. (The range from 3 to 40 min.)
- 1 means the 134 sterilization time. (The range from 3 to 40 min.)
- 2 means the drying time. (The range from 3 to 20 min.)
- 8.1.4 Press **TEMP** button, the value of time parameter will plus one.
- 8.1.5 After finishing the adjustment, press **START** button to confirm it.
- 8.1.6 When adjusting the **DRYING** program, there is only one option, 2. This is to adjust the drying time.



Caution: Always ensure that the sample being sterilized can withstand the sterilization time that is being programmed.

9. Printer (Optional)

- 9.1 If you have purchase the BioClave printer device, you can connect the printer cable to the back of the sterilizer.
- 9.2 Connect the printer power cord to the socket with the proper electrical specifications.
- 9.3 Power on the sterilizer and press the “sel” button.
- 9.4 After the sterilization cycle has completed, the printer will begin printing the details of the sterilization cycle (see below).

Example of the print report

```
.....  
Program:          wrapped  
Temperature:     134  
Pressure:        39 PSI  
Vacuum Num.:    3  
Dry Time:        15min  
Ster Time:       12min  
Cycle No:        00009  
.....  
MAX. Temp:       135.1  
MIN. Temp:       134.1  
AVG. Temp:       134.6j  
MAX. Pres.:      41PSI  
MIN. Pres.:      38PSI  
AVG. Pres.:      39 PSI  
.....  
Start Time:      22:38  
End Time:        23:17  
Date:            2008-07-19  
.....
```

10 Maintenance

Frequency	Operation
Daily	Clean the door seal
	Wipe dry the inner chamber
Weekly	Clean the clean water reservoir
	Clean the inner-chamber
Annually	Replace the door seal

8.1 Cleaning the door seal

Clean the door seal daily with a soft cloth saturated in distilled water



8.2 Cleaning the clean water tank

Clean the clean water tank every week with medical disinfectant .



10.3 Cleaning the inner-chamber, weekly

- Remove the trays and tray rack from the inner-chamber
- Wipe the inner chamber with a soft cloth saturated in distilled water
- Apply the same procedure to the trays and tray rack.



10.4 Door adjustment

Below are the instructions for the door adjustment. This should only be performed if the door is not providing the proper seal or if the door seal has just been replaced.

- 10.4.1 Open the door and insert the door adjustment tool in the gap beneath the plastic cover (Fig. 2).
- 10.4.2 To tighten the door seal, use this tool to adjust the door adjustment nut counter clockwise (Fig. 1).
- 10.4.3 If the door seal is too tight (it is difficult to lock/unlock the door), you may also adjust the door adjustment nut clockwise to loosen it.

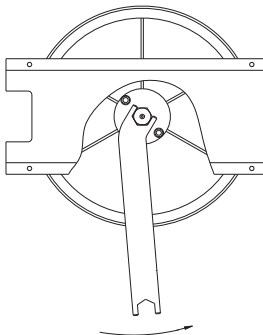


Fig. 1



Fig. 2

Caution:

Never attempt to adjust the door seal when the door is in the closed position.

10.5 Replacement of the door seal

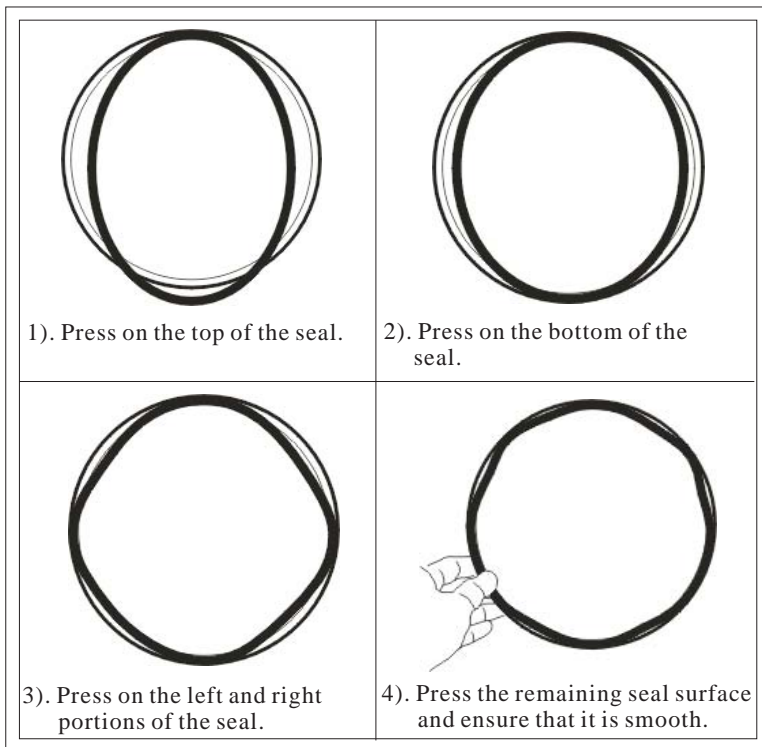
10.5.1 Fully open the door.

10.5.2 Remove the door seal carefully by pulling it by hand away from the door

10.5.3 Clean the new door seal carefully with a soft cloth saturated with distilled water.





10.5.4 Moisten the new seal with medical disinfectant .

10.5.5 Insert the new seal following the instruction below:



Caution: Always ensure the chamber and the door have been cooled down before attempting to change the seal.

10.6 Replace fuse

<p>1). Switch off the power.</p>	
	
<p>2). Push inward with a flat head screw driver, then unscrew the fuse holder (counter clockwise).</p>	<p>3). Pull out the fuse holder by hand.</p>
	
<p>4). Replace the fuse with a fuse of the proper electrical requirements (see pg.2).</p>	<p>5). Place the fuse holder back in place and use a flat head screw driver to fully push it in. Then tighten (clockwise).</p>

11. Transport and Storage

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

11.2 Drain both the clean and the used water tank.

11.3 Conditions for transportation and storage:

Temperature: -20 C /~ +55C

Relative humidity: 85%

Atmospheric pressure: 50kPa~106kPa

12. Error Codes

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	Failure to raise temperature	Check the water pump or the door seal
E5	Failure to release steam	Check the air release valve
E6	Door has opened during the cycle	Make sure you have turned the door handle to the max. position or check the door switch
E7	Time Error	Check the water pump and the air release valve
E8	Steam generator overheat	Check steam generator temperature sensor
E9	Failure to hold temperature	Ensure that the clean water tank is not empty or contact your dealer to check the heating system and temperature sensors.
EE	Program manually interrupted	Shut off the power and restart the machine
EF	Failure to initialize	Shut off the power and restart the machine

13. Service and Contact

For additional information on any of the error codes listed in section 10, please contact your sales representative, or contact Biomega Research Products Service Department at 1-908-769-5555. Please have the unit's serial number (located on the back panel of the instrument) available when calling. Do not send in a unit for service without first calling to obtain a repair authorization number and a decontamination form. The unit should be properly packed to avoid damage. Any damage resulting from improper packing shall be the responsibility of the user.

APPENDIX 1

Water Properties/Characteristics:

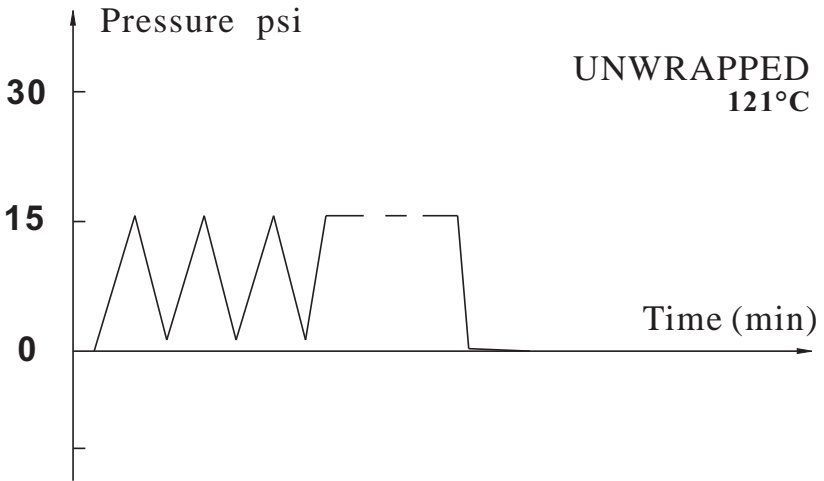
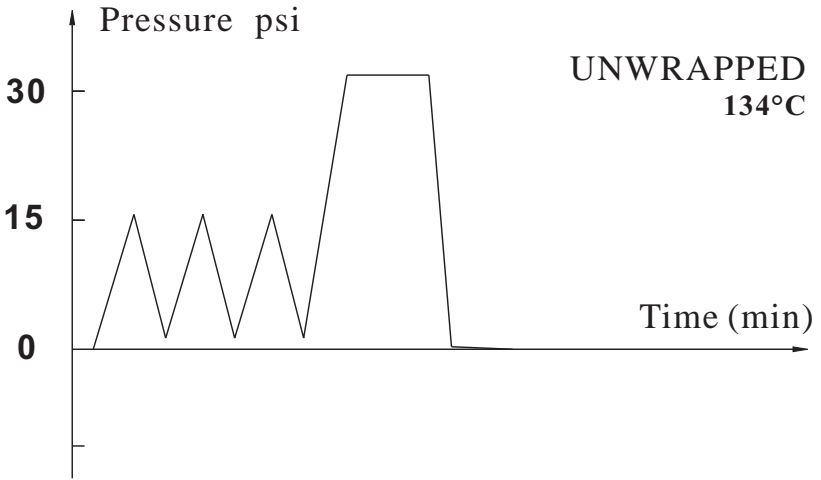
DESCRIPTION	WATER	CONDENSATE
<i>Evaporate residue</i>	◦ 10 mg/l	◦ 1.0 mg/kg
<i>Silicium oxide SiO_2</i>	◦ 1 mg/l	◦ 0.1 mg/kg
<i>Iron</i>	◦ 0.2 mg/l	◦ 0.1 mg/kg
<i>Cadmium</i>	◦ 0.005 mg/l	◦ 0.05 mg/kg
<i>Lead</i>	◦ 0.05 mg/l	◦ 0.1 mg/kg
Rest of heavy metals, excluding iron, cadmium, lead	◦ 0.1 mg/l	◦ 0.1 mg/kg
<i>Chloride</i>	◦ 2 mg/l	◦ 0.1 mg/l
<i>Phosphates</i>	◦ 0.5 mg/l	◦ 0.1 mg/l
<i>Conductivity (at 20◦)</i>	◦ 157s/cm	◦ 37s/cm
<i>pH value</i>	5-7.5	5-7
<i>Appearance</i>	<i>Colorless, clean, without sediments</i>	<i>Colorless, clean, without sediments</i>
<i>Hardness</i>	◦ 0.02 mmol/l	◦ 0.02 mmol/l

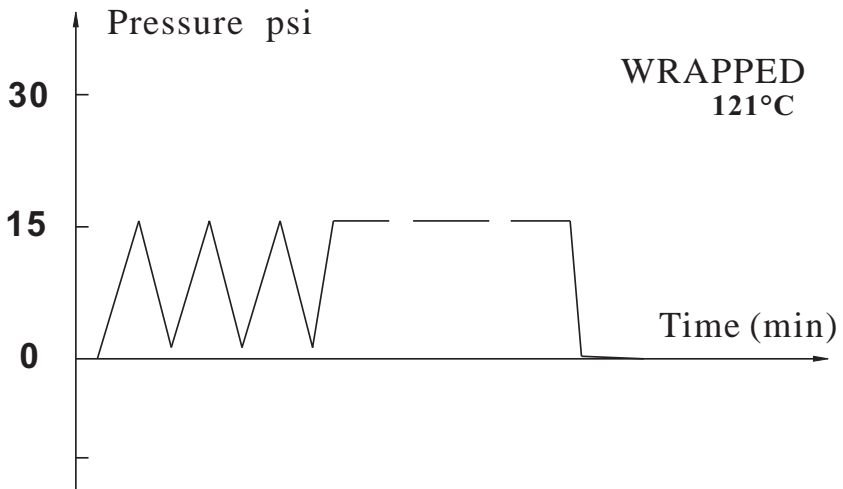
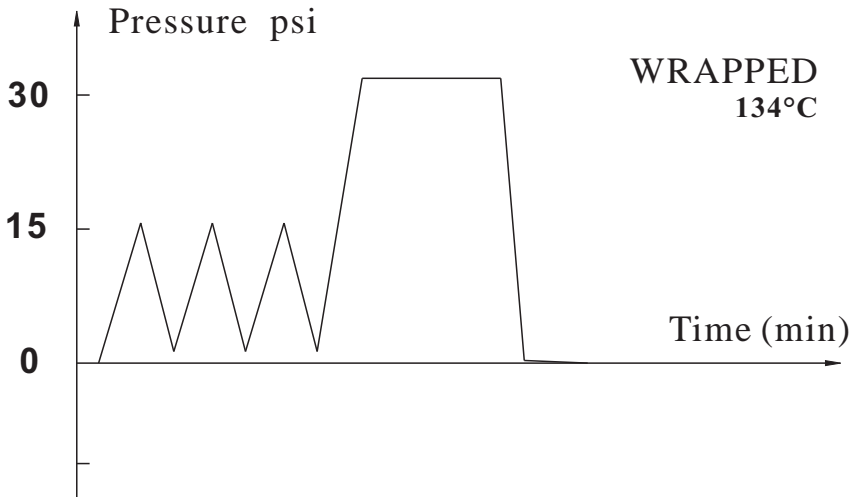
APPENDIX 2

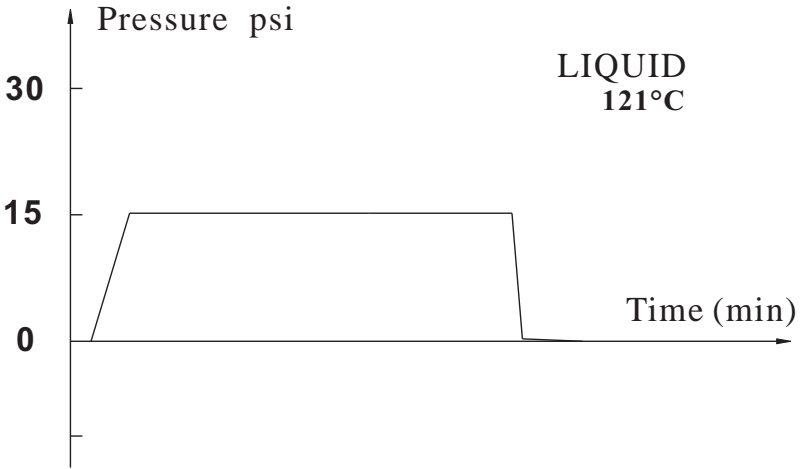
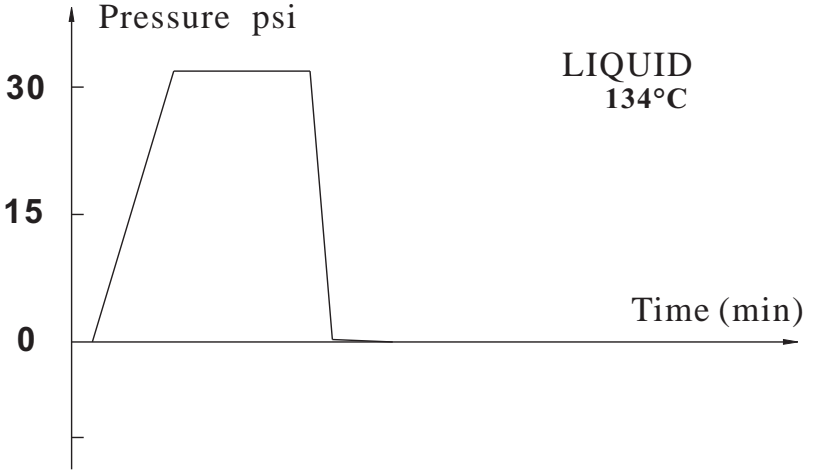
DIAGRAMS OF THE STERILIZATION PROGRAMMES

PROGRAM	Temperature (°C)	Pressure (PSI)	Holding time (min.)	Total time (min.)	TYPE	MAXLOAD (kg)
UNWRAPPED	134	30	4	12~30	Unwrapped solid material	5.00
	121	16	15	30~45		5.00
WRAPPED	134	30	6	30~40	Unwrapped hollow material	5.00
	121	16	15	35~50	Single-wrapped solid material	4.00
LIQUID	134	30	12	30~65	Wrapped liquid	0.50
	121	16	30	45~65	Wrapped liquid	0.50
DRY ONLY	<100	0	15			

The max. temperature of the 134 C sterilization cycle is 136C
 The max. temperature of the 121 C sterilization cycle is 123C

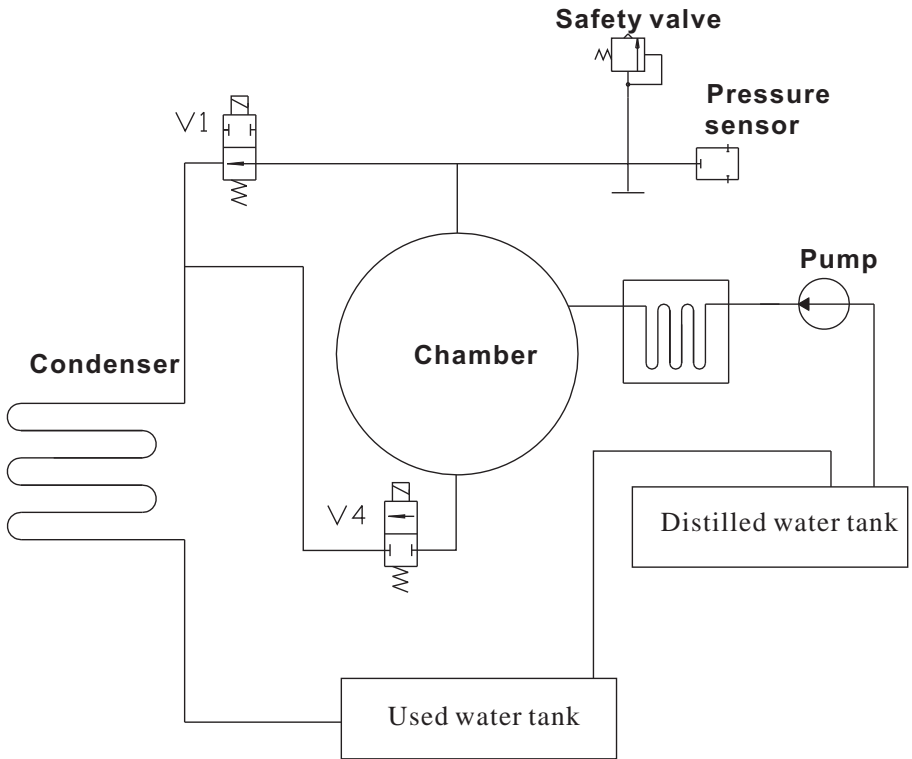






APPENDIX 4

HYDRAULIC DRAWING



V1: Air release valve

V4: Water release valve

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