

**Clave 8+ Instruction Manual**  
**Serial numbers starting with 'Y' (3<sup>rd</sup> Gen)**  
**Steam Sterilizer**





Distributed by



Thank you for choosing our steam sterilizer.

Prior to operating this device, please read the instruction manual carefully and follow all installation instructions.

#### **Regular maintenance:**

If this symbol  appears on the screen when the device is powered on or if it shows E88 on the sterilization report, please contact your dealer or local service company for a maintenance service. This device requires regular maintenance. A  symbol or error code E88 will be displayed after 1 year of use or after a 1000 cycles, whichever comes first. This is programmed into the maintenance screen.

**\*\*USE ONLY DISTILLED WATER IN THIS DEVICE\*\***

**Do not re-use the used water from this machine.**

#### **Power on the unit with the door open.**


This will allow the unit to get an initial zero pressure reading. The machine will not start a cycle and only beep (3 times) when the start button is pressed if it has a non-zero pressure reading on powering up.

#### **General Safety Instructions:**

- Make sure that all the installation conditions are fully complied with.
- Ensure that the supply voltage agrees with the supply voltage specified on the rating plate of the sterilizer.
- This appliance must be grounded. Connect only to a properly grounded outlet.
- Do not cover or block any openings on this appliance.
- Use this appliance only for its intended use as described in this manual.
- Do not exceed the maximum weight limit of the loads specified in this manual.
- Do not operate this appliance if it has a damaged power cord or plug or if it is not working properly or if it has been damaged or dropped.
- Never put flammables or explosives products into the sterilizer.
- The sterilizer may not be operated in areas in which gas or any other explosive volatile substance is present.
- Installation and repair work should only be performed by an authorized service technician. Work by unqualified persons could be dangerous and will void any warranty.

#### **Clearing Error Code**

If an error is displayed, the unit will refuse to run a cycle until it is cleared. If an error persists or returns, contact your dealer. Most error codes can be cleared by taking the following steps:

1. Open door (assuming pressure has reached zero, and error isn't about the door)
2. Power cycle the unit (off, wait 5 seconds, on)
3. If error still present, press and hold the  button until error clears (about 5 seconds)

Canadian Representative

HR Dental Products Inc. o/a Flight Dental Systems

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CANADA

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Subjects to technical changes

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## 1 General

### 1.1 Scope of Manual

This manual contains information concerning the installation, operation and maintenance of the CLAVE8+ steam sterilizer. To ensure proper performance of the sterilizer, the instructions given in this manual should be thoroughly understood and followed.

Keep the manual near the sterilizer in an accessible location for future reference.

### 1.2 Intended Use

The steam sterilizer described in this manual is intended for the sterilization in all medical, dental, beauty, vet and tattoo fields of the following types of instrument loads: solid, porous, hollow loads type A and hollow loads type B, un-wrapped, single wrapped and double wrapped, and liquid, that are compatible with steam sterilization.

### 1.3 General Safety Instructions

- Read and understand this manual before attempting to install or operate the sterilizer.
- Make sure that all the installation conditions are fully complied with.
- Ensure that the voltage agrees with the supply voltage specified on the rating plate of the sterilizer.
- This appliance must be grounded. Connect only to a properly grounded outlet.
- Do not cover or block any openings on this appliance.
- Use this appliance only for its intended use as described in this manual.
- Do not exceed the maximum weight limit of the loads specified in this manual.
- Do not operate this appliance if it has a damaged cord or plug or if it is not working properly or if it has been damaged or dropped.
- Never put flammables or explosive products into the sterilizer.
- The sterilizer may not be operated in areas in which gas or any other explosive or volatile substance is present.
- Installation and repair work should only be performed by authorized service technicians. Work by unqualified persons could be dangerous and may void the warranty.

### 1.4 Standards and directives

The steam sterilizers were designed and produced in conformity with the following directives and standards:

**Directives:**

97/23/CE Pressure equipment.

93/42/EEC Medical devices (class II b).

**Standards:**

EN 13060 Relative to small steam sterilizers.

EN 61010-1 Safety regulations for laboratory devices - Part 1: General regulations.

EN 61010-2-040 Safety regulations specific to sterilizers used in the processing of medical material.

EN 61326-1 Electromagnetic compatibility regulations for laboratory devices.

## 1.5 Symbols

For safe operation, please pay close attention to the alert symbols below which can be found in the sterilizer or throughout this manual.



This symbol represents an electrical caution - ground protection.



Hot Surface

This symbol represents a warning of a potential hot surface.

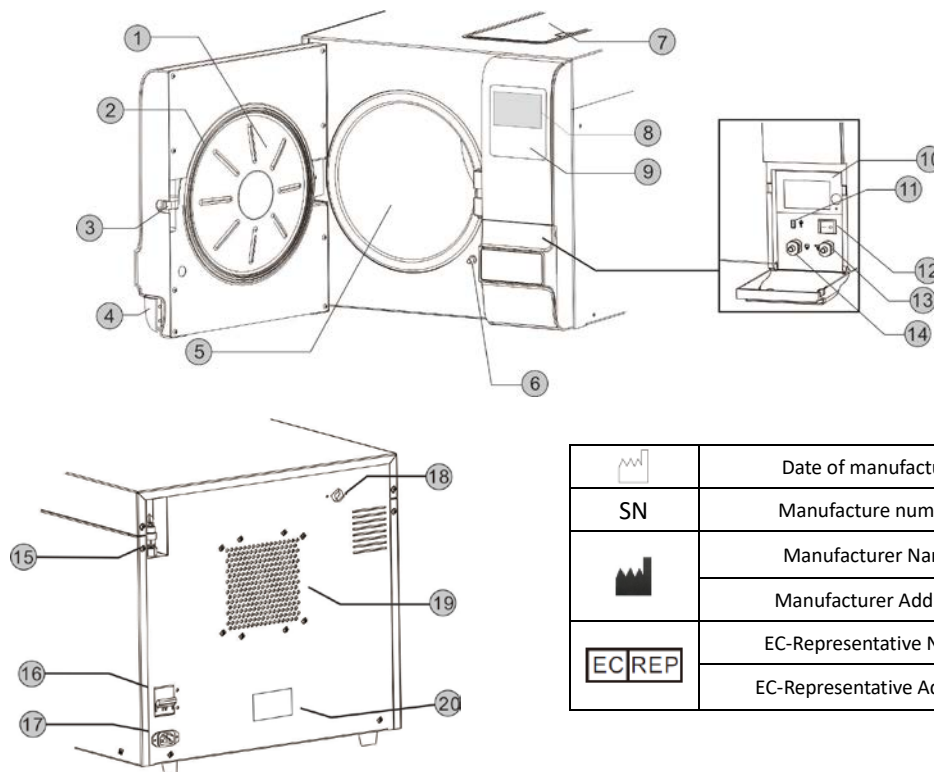


Important safety information.




This symbol represents a warning for extra caution.

## 2. Description of the sterilizer

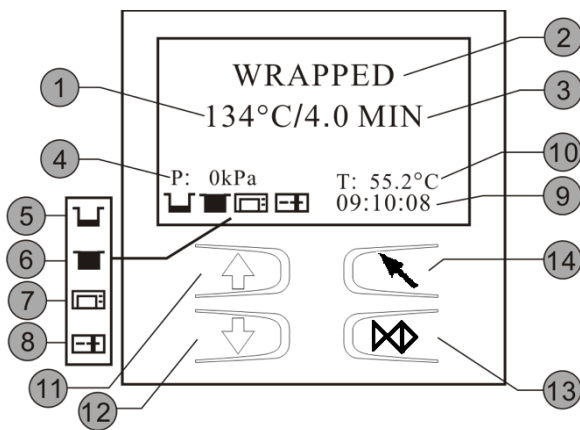
### 2.1 Sterilizer views



- |                         |                                            |                            |
|-------------------------|--------------------------------------------|----------------------------|
| 1. Door                 | 8. Display                                 | 15. Safety valve           |
| 2. Seal                 | 9. Control Panel                           | 16. Circuit breaker        |
| 3. Door latch           | 10. Printer (Optional)                     | 17. Power socket           |
| 4. Door handle          | 11. USB port                               | 18. Used water tank vent   |
| 5. Chamber              | 12. Main power switch                      | 19. Condenser vent         |
| 6. Door lock            | 13. Drain connector (Distilled water tank) | 20. Rating plate           |
| 7. Distilled water tank | 14. Drain connector (Used water tank)      | 21. Bacteriological filter |

	Date of manufacture
SN	Manufacture number
	Manufacturer Name
	Manufacturer Address
	EC-Representative Name
	EC-Representative Address

## 2.2 Control panel



1 Program temperature

2 Program

3 Holding time

4 Pressure

5 Distilled water / Fill if flashing.

6 Used water tank full / Drain if flashing

7 Printer status

8  Door Open

 Door Closed

 Door Locked

9 Time

10 Current internal temperature

11 Up button

12 Down button

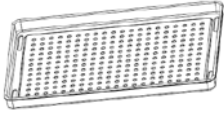

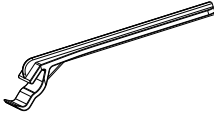
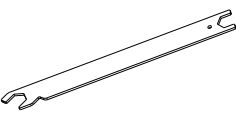
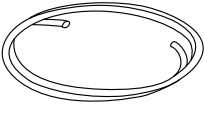
13 Start/Stop button

14 Menu button

## 2.3 Technical specifications

Item	Clave8+			
Chamber(mm)	φ170 x 320			
Rated Voltage	110-130 VAC,60Hz			
Circuit breaker	F16A/400V			
Nominal power	1600VA			
Sterilization temperature	121°C /134°C			
Capacity of the distilled water tank	Approx 2.5 L (Water at level Max)			
	Approx 0.5 L (Water at level Min)			
Operation temperature	5°C-40°C			
Operation relative Humidity	Max. 80%, non condensing			
Overall dimensions WxHxD(mm)	420x370x525			
Net weight	35kg			
Max. Noise level	<70 dB			
Atmospheric pressure	76 kPa - 106 kPa			

## 2.4 Packing content

No.	Accessory	Quantity	
1	Steam sterilizer	1	
2	Instrument tray 	2	For 8L/12L
3	Instrument tray rack 	1	
4	Instrument tray handle 	1	
5	Door adjustment wrench 	1	
6	Draining hose 	2	
7	Instructions manual	1	
8	Door seal	1	



## 3. Installation

### 3.1 General conditions

- Position the device on a solid surface with a minimum weight capacity of 60 kgs.
- The sterilizer should be placed on a level worktable.
- Leave at least 10 cm between the device rear part and the wall. The clearance required to open the door is 40 cm.
- Position the sterilizer at such a height as to make it possible for the operator to check the whole sterilization chamber and carry out the normal cleaning operations.
- The room where the device is installed must be sufficiently ventilated.
- Do not install the device near washing basins, taps, etc. where it is likely to be splashed.
- Do not lean on the door when it is opened.
- Do not place trays, papers, fluid containers or other objects on the sterilizer.

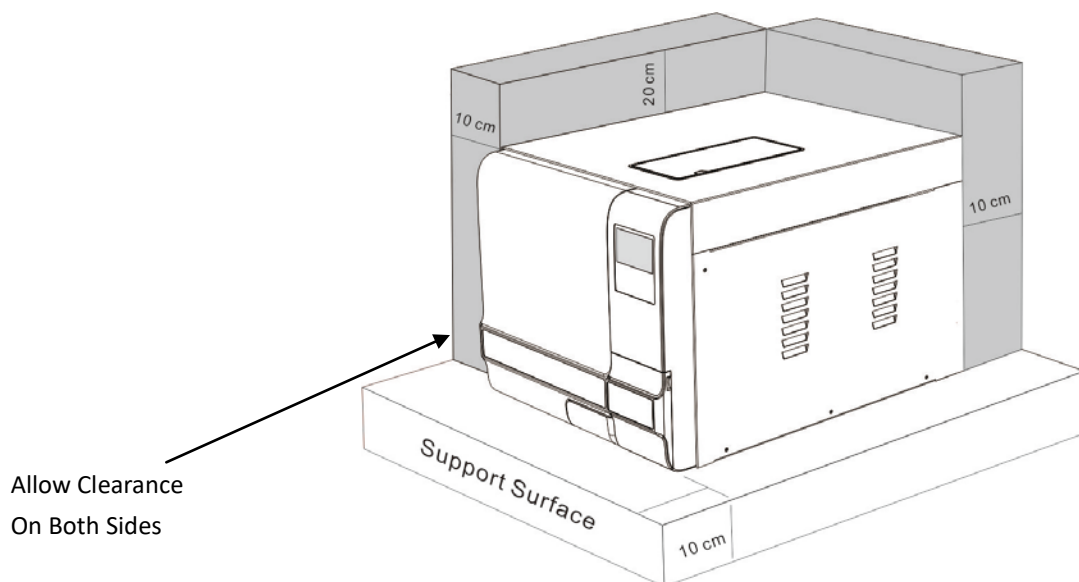
### 3.2 Power supply connection

Check the label on the back panel of sterilizer to verify the voltage rating for the unit. Failure to connect the sterilizer to an appropriate power supply could result in damage to the unit and electrical shock to personnel.

Plug the power cord into a properly polarized and grounded receptacle rated for the correct voltage and current. A dedicated circuit that is only used for the sterilizer is recommended. Never connect the device plug to adapters of any type.

### 3.3 Location requirements and dimensions (mm)

To ensure proper air circulation, and to allow access to the reservoir fill port and drain coupling, adhere to the minimum clearance requirements listed below.



## 4 Setup

Open the door to remove all of the inner contents for unpacking. Connect the power cord to the rear of the unit, and to an outlet of the appropriate voltage. Turn on the main power switch on the right side. After switching on, the machine turns on the display and shows the door position, water level, working program, date, time, etc.

**\*\* THE DOOR MUST BE OPEN PRIOR TO TURNING ON THE POWER TO ALLOW THE UNIT TO CALIBRATE \*\***

### 4.1 Fill the distilled water tank

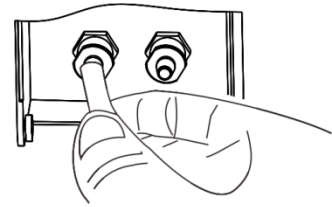
#### 4.1.1 Manual water filling

When the level of distilled water reaches a minimum level, the distilled water tank icon will flash and beep three times. Press the button on the tank lid and fully open the lid. Fill the tank carefully with distilled water. When the water level reaches full, the unit will beep. **DO NOT OVERFILL.**

### 4.2 Drain the used water tank

Attach the drain hose on the drain port connector located inside the service door. The left port is the drain port for the waste water tank.

Attention: The capacity of the used water tank is approximately 1.5 liters.




### 4.3 Preparation of materials for sterilization

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

- Clean instruments immediately after use.
- Clean the instruments with an ultrasonic cleaner.
- Residual chemicals left over after the cleaning and disinfecting process may damage and corrode parts of the sterilizer. Always rinse off the instruments using distilled water.
- Follow instrument manufacturer's guidelines and recommendations for handling and cleaning instruments prior to sterilization.
- Check the manufacturer's instructions as to proper procedure for sterilizing each item.
- Arrange the samples of different materials on different trays or with at least 3cm of space between them.
- Clean and dry instruments thoroughly before placing them into a tray.
- Always insert a sterilization paper or cloth between the tray and sample to avoid direct contact.
- Arrange the containers (glasses, cups, test-tubes, etc.) on one side or inverted position, to avoid water pooling.
- Don't stack the trays one atop the other or put them in direct contact with the walls of the sterilization chamber.
- Always use the instrument tray handle.
- Wrap the samples one by one or, if more tools have to be put in the same bag, verify that these are made of the same material and are not touching one another.
- Don't use metallic clips, pins or similar items, as this jeopardizes the maintenance of the sterilizer.
- Don't overload the trays over the stated limit (see appendix 2)
- Load packaged instruments with the paper side up as the steam and moisture inside the pouches can evaporate easier and thus allow for better drying.


#### 4.4 Basic Set


Press the  button to access the main menu. From the main menu, select "Basic Set".




Program <b>Basic Set</b> Report Label	Date: 11-07-2019 Time: 12:05:35 Language: ENG Counter: 00000
------------------------------------------------	-----------------------------------------------------------------------


The "Basic Set" menu permits to set the following options:

- Date
- Time
- Language

Select (with  ) "Basic Set" from the main menu then press .

Select the item by pressing  button. The item you selected will be highlighted.

Adjust the value by pressing   buttons. Press  button to select the next item.




Press  button to save and exit.


Abbreviation of language options

CHN	Chinese	ENG	English	DEU	German	ESP	Spanish
PL	Polish	FR	French	HUN	Hungary	ROM	Romanian
NL	Dutch	LTU	Lithuanian	LAT	Latvian	CZE	Czech
ITA	Italian	RUS	Russian	PT	Portuguese	HR	Croatian

Note: The Counter (cycle number) cannot be changed by the operator.

#### 4.5 About device

Select (with  ) "About device" from the main menu then press .




Press  button to exit.




Basic Set Report Label <b>About device</b>	Device Info. 3BB12B 11111110 V2.9.0.1-00 SN: A09999B12
-----------------------------------------------------	-----------------------------------------------------------------

#### 4.6 Advance Set

The "Setup" menu allows you to set the following options:

- Parameter
- Unit
- Preheat
- Expiry date (labels)(Optional)
- Water quality (sensor) (optional)
- Last error (view only)

Select (with  ) "Setup" from the main menu by pressing .

Input the password one at a time by pressing   and  button to go next.

Password: 1111

Password 1111	<b>Parameter</b> Unit Preheat Expiry date	Water quality Last error Factory Reset
------------------	----------------------------------------------------	----------------------------------------------

## 4.7 Parameter

The “Parameter” menu allows you to set the following options:

- Holding time
- Dry time

Select (with ↑↓ buttons) “Parameter” from the menu by pressing ↵ button.

Select the program by pressing ↑↓ then press ↵ button.

Select the parameter by pressing ↵ button. Adjust it by pressing ↑↓.

Press ⏏ button to save and exit.

<div>Parameter</div> <div>Unit</div> <div>Preheat</div> <div>Expiry date</div>	<div>Unwrapped 121°C</div> <div>Unwrapped 132°C</div> <div>Wrapped (121°C)</div> <div>Wrapped (134°C)</div>	<div>Holding time: 20.0</div> <div>Dry time: 10.0</div>
--------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------	---------------------------------------------------------

## 4.8 Unit

Select (with ↑↓ buttons) “Unit” from the menu by pressing ↵ button.

Select the parameter by pressing ↵ button. Adjust it by pressing ↑↓.

Press ⏏ button to save and exit.

<div>Parameter</div> <div>Unit</div> <div>Preheat</div> <div>Expiry date</div>	<div>Pressure: kPa</div> <div>Temperature: °C</div>
--------------------------------------------------------------------------------	-----------------------------------------------------

## 4.9 Preheat

When this mode is activated, the chamber and steam generator start to warm until it reaches the minimum temperature to begin a sterilization cycle. This helps to reduce the total cycle time and improve the drying efficiency. The “Preheat” mode will be deactivated after one hour of inactivity.

Select (with ↑↓ buttons) “Preheat” from the menu by pressing ↵ button.

Adjust it by pressing ↑↓.

Press ⏏ button to save and exit.

<div>Parameter</div> <div>Unit</div> <div>Preheat</div> <div>Expiry date</div>	<div>Preheat</div> <div>On</div>
--------------------------------------------------------------------------------	----------------------------------

## 4.10 Expiry date (Optional)

To modify the expiration date of the labels, select (with ↑↓ buttons) “Expiry date” from the menu by pressing ↵ button.

Adjust it by pressing ↑↓.

Press ⏏ button to save and exit.

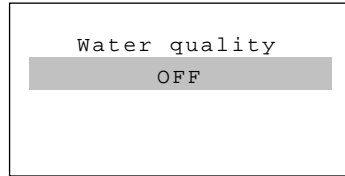
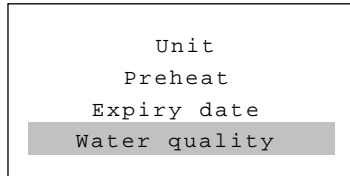
<div>Parameter</div> <div>Unit</div> <div>Preheat</div> <div>Expiry date</div>	<div>Month: 03</div>
--------------------------------------------------------------------------------	----------------------

#### 4.11 Water Quality (optional)

If your sterilizer is equipped with a water quality sensor and you want to deactivate it, select (with ↑↓ buttons) "Water quality" from the menu by pressing ↵ button.

Adjust it by pressing ↑↓.

Press ⏏ button to save and exit.

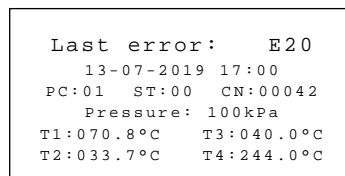
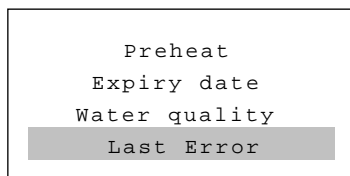


#### 4.12 Last Error

In order to help the technical troubleshooting process, the most relevant information corresponding to the last error can be displayed on the screen.

Select (with ↑↓ buttons) "Last error" from the menu by pressing ↵ button.

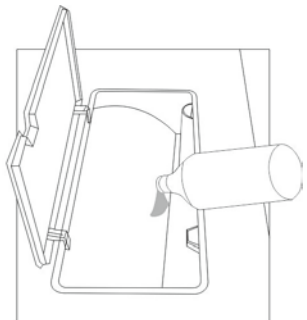
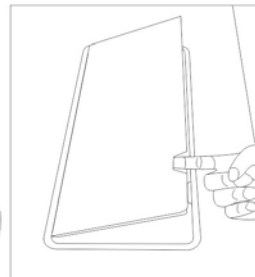
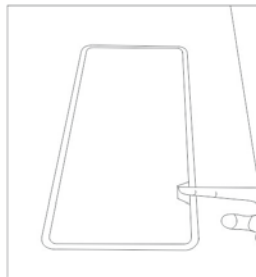
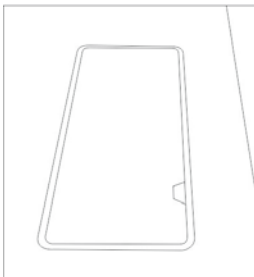
Press ⏏ button to exit.



#### 4.13 Fill the distilled water tank

Ensure that the drain valve is closed.

Tap the button and open the water tank cover.



Use only high quality distilled water. (see Appendix 1)

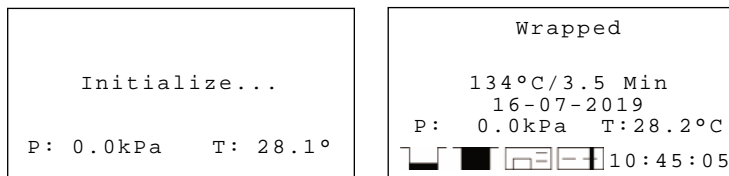
## 5. Operation

### 5.1 Prerequisites

Switch On.

Check the status of the icons in the screen, . (Refer to section 2. Description of the sterilizer)

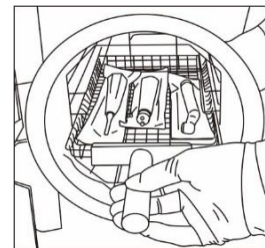
**\*\* THE DOOR MUST BE OPEN PRIOR TO TURNING ON THE POWER TO ALLOW THE UNIT TO CALIBRATE \*\***






### 5.2 Load

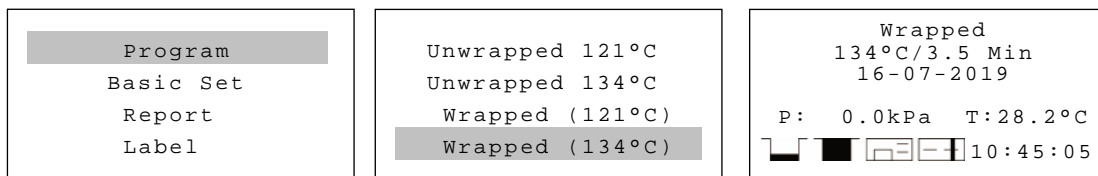
Open the door then place the trays inside the chamber by the tray handle.

After the instruments are loaded, you may close the door.




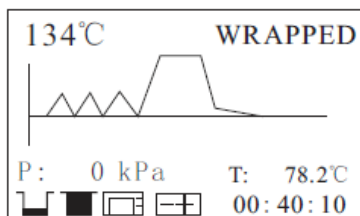
### 5.3 Select the program

Enter the main menu by pressing  button, Select "Program". Select the program by pressing  then press  to confirm program, in the screen will appear the information of selected program as the temperature and sterilization time (holding time), also the date, time, current pressure and current temperature.



### 5.4 Start the sterilization program

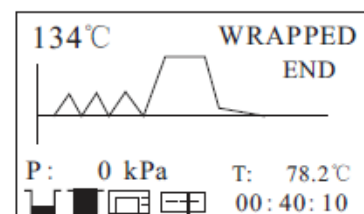
Press  to start the cycle. The stage, conditions and the status of the cycle will appear on the display. The sterilizer will perform the program automatically. (see appendix 2).



Total time or count down until completion

### 5.5 End of the cycle


Once the cycle is completed, "End" will appear on the display. The cycle report will be printed, and a digital report will be saved to the USB flash drive (if these are connected).





Caution: Always use the tray handle to load or unload the tray into the sterilizer. Failure to do so can result in burns.

## 5.6 Manual interruption of the cycle

To interrupt a cycle prematurely, hold  for 3 seconds. If the cycle is manually interrupted after it reaches the drying phase, the items inside the sterilizer may be considered sterile and since the cycle has been interrupted during the drying phase the materials and instruments inside the chamber may be wet.

Note: If the cycle is manually interrupted before it reaches the drying phase, the items inside the sterilizer must be considered **not sterile**. N20 will appear on the screen. (see Error code description).



Caution: Depending which phase of the cycle you interrupt the cycle, steam and water can escape from the sterilization chamber when you open the door.

## 5.7 Data

The internal memory will store the information of the last 9999 cycles.

## 5.8 USB Flash memory (Optional)

A USB drive can be used to store a digital report of the cycle. To do so, insert the USB flash drive into the slot located on the service door of the sterilizer. The information will automatically be written to the USB flash drive after the cycle has completed. The name of the file is determined by the serial number of the machine, the cycle number, and the error code.

For example:

The serial number is Y12345. The cycle number is 00012. The cycle was successful (no error).

The file name in the USB flash drive will be:

Y12345\_ 00012E00.TXT

Cycle reports will stored in a folder named 'REPORT'. If the folder doesn't exist, it will be created.

## 5.9 Printer (Optional)

If the printer is installed, a cycle report will be printed at the end of each cycle .

If the printer is not installed, or if the paper has run out, the printer icon on the display will blink..


## 5.10 Report

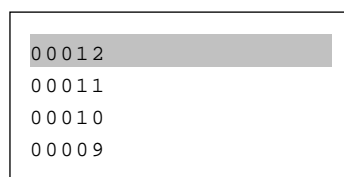
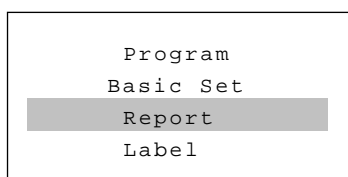
In this menu you can get the information of all the cycles stored in the internal memory of the sterilizer.

Select (with ↑↓ buttons) "Report" from the main menu and press ↵ button, you will see the list of records.

Select the record by pressing ↑↓ button.

Press ↵ button to print and save the report.

Press  button to exit.



### Example report:

```

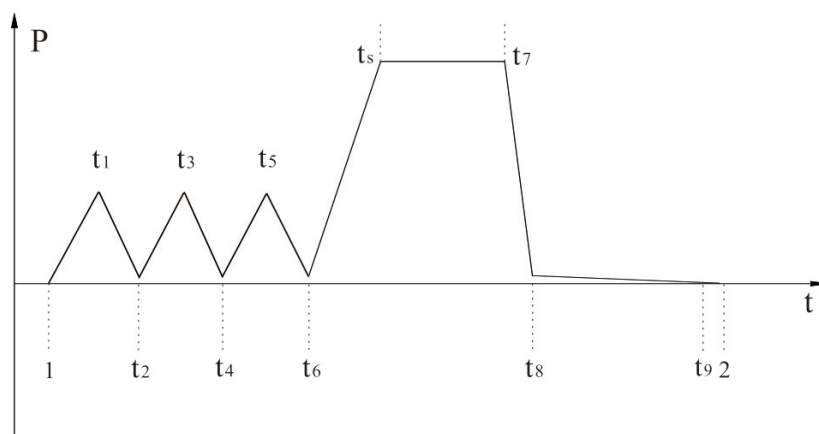
=====
Program:      Wrapped
Temperature:  134 C
Pressure:     204 kPa
Drying Time:  2.0 MIN
Holding Time: 04.0 MIN
-----

          Time    Temp. Pressure
          HH:MM:SS    C      kPa
Start    11:38:02  028.2  002.5
T1:      11:50:46  115.9  081.0
T2:      11:51:17  107.2  020.6
T3:      11:51:29  111.0  058.8
T4:      11:51:52  107.3  020.1
T5:      11:52:26  112.8  069.3
T6:      11:52:52  107.5  020.1
TS:      11:57:47  134.5  211.9
Max Temperature: 135.4
Min Temperature: 134.2
Max Pressure:    221.1
Min Pressure:    210.7
T7:      12:01:48  135.2  218.8
T8:      12:08:01  100.6  000.1
T9:      12:17:45  098.7  001.1
End      12:17:47  098.7  001.6
-----

Cycle No.: 00022
Ster. Value: Success
Date: 20-05-2019
SN:A00001
Operator:
3BN23D 11100010V2.9.1.3
0000
=====

```

### Meaning of 'T' time values:





### 5.10 Label printer (Optional)

5.9.1 Connect the label printer and switch on.

5.9.2 Select "Label", press ↵ button.

5.9.3 Select the records with ↑↓ buttons.

5.9.4 Press ↵ button to set the quantity.

5.9.5 Change the quantity of labels that you want to print with ↑↓ buttons.

The range is 1-99.

5.9.6 Press ↵ button to print.

5.9.7 Press ⏏ button to exit.

Operator :

Program: Wrapped 134 C

Cycle No.: 00022

SN: A00001N23

Date: 20-05-2019 12:17:47

Expiry date: 20-08-2019



Report

Label

About device

Setup

00012

00013

00014

00015

Quantity

1

## 6. Maintenance

To ensure proper operation and maximum steam sterilizer life, carefully follow all recommendations for periodic maintenance. One of the most important steps you can take to prevent problems with your sterilizer is to use only distilled water.

Frequency	Number of cycles	Maintenance operation
Daily		Clean the external surface
		Drain used water tank
		Clean the door seal
Weekly	25	Clean the chamber, trays and rack
		Clean distilled water tank (drain tank)
Monthly	100	Clean the filter inside the chamber and in the distilled water tank
Every 6 months	500	Replace the bacteria filter
Every year	1000	Replace door seal, tubing, filters, check valves

### 6.1 Clean the distilled water tank

Unplug the power cable, or turn the circuit breaker to the off position at the back of the unit.

Drain the tank completely using the drain connector at the front of the sterilizer and leave it connected to a tube in an open position.

Clean the internal surface with a soft sponge and a small soft brush for the areas difficult to reach using distilled water.

Remove the filter and clean it with a small soft brush and mild soap, rinse it with distilled water, and put it back in to the position.

### 6.2 Replacement of the bacteria filter.

The bacteria filter is at the back of the sterilizer. Unscrew the filter by hand by turning the filter counter-clockwise.

Replace the bacteria filter with a new one. Screw the new filter by turning the filter clockwise.

Note: Do not operate sterilizer without filters in place.

### 6.3 Clean chamber, door seal ring, trays, and tray rack.

Remove the trays and tray rack from the chamber. Clean the trays, rack and the inside of the chamber with mild soap.

Rinse the trays, rack and inside of the chamber with a smooth cloth and distilled water.

Examine door seal for possible damage. Clean door seal and mating surfaces with a damp cloth.

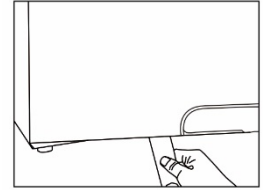
Note: Do not use bleaching agents or any abrasive materials or substances in the chamber. Failure to comply may cause damage to the chamber and/or other components.



Caution: To prevent burns, let the unit cool before cleaning gaskets and touching the surface.

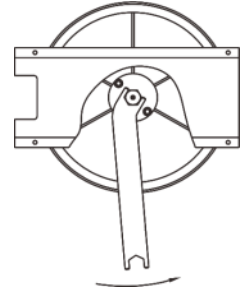
## 6.4 Door adjustment

Under normal circumstances, the chamber door does not require adjustments. However, if the seal fails (resulting in steam leaking from the front of the chamber), you may need to adjust the door tension.



Open the door.

Insert the door adjustment wrench in the gap on the underside of the door. Fit the wrench onto the adjusting nut in the centre of the door. Pull the wrench away from the door hinge to increase door tension. Turn the nut until the sealing plate is tight. If the door knob is too tight, push the wrench towards the door hinge.



**Caution:** Never adjust the chamber door while the door is closed.

## 6.5 Replacement of the door seal ring

Open the chamber door. Remove the old door seal ring carefully by hand.

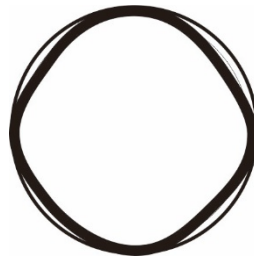
Clean the seal groove in the door carefully with a smooth cloth and distilled water.

Moisten the new seal with distilled water.

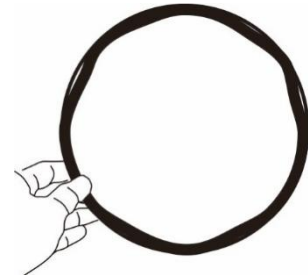
Insert the new seal and press in sequence as follows:



Press in the top and bottom of the door seal.



Press in the left and right sides of the door seal.



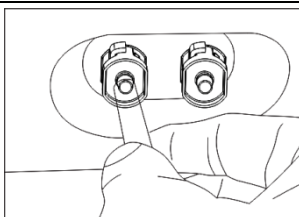
Press the remaining sections of the seal.

Ensure the entire circumference of the seal is firmly and completely pressed into the groove.

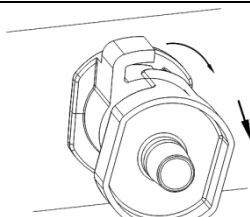


**Caution:** Please ensure the chamber and the door are cold prior to replacing the seal ring.

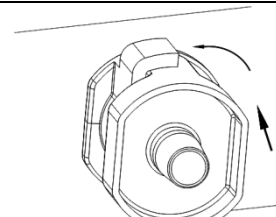
## 6.6 The drain valves



**1. Press the hose onto the drain valve firmly**




**2. Turn clockwise, then pull out to drain the tank**



**3. Push & turn counter clockwise to close the valve**

## 7 Troubleshooting

If an error is displayed, the unit will refuse to run a cycle until it is cleared. If an error persists or returns, contact your dealer. Most error codes can be cleared by taking the following steps:

1. Open door (assuming pressure has reached zero, and error isn't about the door)
2. Power cycle the unit (off, wait 5 seconds, on)
3. If error still present, press and hold the  button until error clears (about 5 seconds)

If an error persists, contact your dealer.

Code	Description	Proposed solution
E01	Steam generator temperature sensor error.	Clear error & run a new cycle.
E02	Inner temperature sensor error.	Clear error & run a new cycle.
E03	Temperature sensor of the chamber wall error.	Clear error. Carefully check if chamber wall is heated. Run a new cycle.
E05	Fail to release the pressure.	Clear error & run a new cycle.
E06	Door lock problem during the cycle.	Make sure you had closed the door properly. Check the door switch.
E07	Error between temperature and pressure correlation.	Clear error & run a new cycle.
E08	Error between temperature and pressure correlation.	Clear error & run a new cycle.
E09	Failure to hold temperature.	Ensure the distilled tank isn't empty. Check the inner temperature sensor. Check for leaks.
E10	The door lock didn't engage / disengage.	Was the door handle being pulled at start or end of cycle?
E11	Failure to preheat the steam generator.	Clear error & run a new cycle.
E12	Failure to preheat the chamber.	Clear error & run a new cycle.
E16	Pressure error	Air filter clogged/dirty? Replace.. Clear error & run a new cycle.
N20	Program manually interrupted	Clear error.
E24	It takes too long time to enter the next stage..	Check for leaks. Clear error & run a new cycle.
E28	The pressure is too high.	Power off. Contact your dealer if error persists.
N29	Power failure during cycle	Restore power and run new cycle.
E34	Pressure is over 50kpa during drying	Power off. Release air from unit and run another test.

## 8 Transportation and storage

Switch off the sterilizer, unplug power cord, and let the machine cool down.

Drain the distilled water tank and the used water tank.

Conditions for transport and storage

- Temperature:  $-20^{\circ}\text{C} \sim +50^{\circ}\text{C}$
- Relative humidity:  $\leq 85\%$
- Atmospheric pressure:  $50\text{kPa} \sim 106\text{kPa}$ .

## 9 Safety devices

1. Main breaker: Protection of the instrument against possible failures of the heating elements.  
Action: Interruption of the electric power supply.
2. Thermal cutouts on the main transformer winding: protection against possible short circuit and main transformer primary winding overheating  
Action: Temporary interruption of winding.
3. Safety valve: Protection against possible sterilization chamber over-pressure.  
Action: Release of steam and restoration of the pressure to a safe level.
4. Safety micro-switch for the door status: Comparison for the correct closing position of the door.  
Action: Signal of the wrong position of the door.
5. Thermostat on chamber heating elements: Protection for possible overheating of the chamber heating elements.  
Action: Interruption of the power supply of the chamber elements.
6. Thermostat on steam generator heating elements: Protection for possible overheating of the steam generator heating elements.  
Action: Interruption of the power supply of the steam generator elements.
7. Door safety lock: Protection against accidental opening of the door.  
Action: Prevents the accidental opening of the door during the cycle.
8. Self-leveling hydraulic system: Hydraulic system for the natural pressure leveling in case of manual cycle interruption, alarm or blackout.  
Action: Automatic restoration of the atmospheric pressure inside the chamber. (valve opens to release internal pressure)

## Appendix 1

### Water properties / Characteristics

Description	Feed water	Condensate
Evaporate residue	$\leq 10\text{mg/l}$	$\leq 1.0\text{mg/kg}$
Silicon oxide sio2	$\leq 1\text{mg/l}$	$\leq 1.0\text{mg/kg}$
Iron	$\leq 0.2\text{mg/l}$	$\leq 0.1\text{mg/kg}$
Cadmium	$\leq 0.005\text{mg/l}$	$\leq 0.05\text{mg/kg}$
Lead	$\leq 0.05\text{mg/l}$	$\leq 0.1\text{mg/kg}$
Rest of heavy metals	$\leq 0.1\text{mg/l}$	$\leq 0.1\text{mg/kg}$
Chloride	$\leq 2\text{mg/l}$	$\leq 0.1\text{mg/kg}$
Phosphates	$\leq 0.5\text{ mg/l}$	$\leq 0.1\text{mg/kg}$
Conductivity	$\leq 15\mu\text{s/cm}$	$\leq 3\mu\text{s/cm}$
PH Value	5 – 7.5	5 - 7
Appearance	Colorless, clean	Colorless, clean
Hardness	0.02 mmol/l	0.02 mmol/l

## Appendix 2

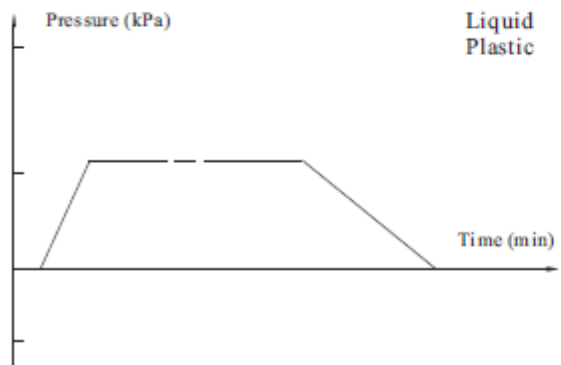
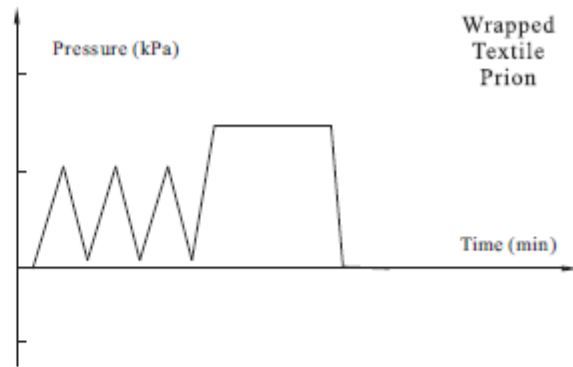
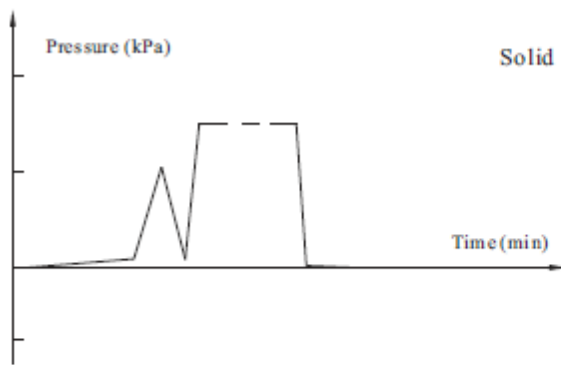
Diagrams of the sterilization programs

Programs (CLAVE 8+ STE-8-K)	Temperature (°C)	Pressure (kPa)	Holding time (min)	Total time (min)	Type	Max load (kg)	Max load per tray (kg)
FLASH	134	210	4	10-20	Unwrapped solid material	2.00	0.60
	121	110	20	20-35			
WRAPPED	134	210	4	15-25	Unwrapped solid material	2.00	0.60
	121	110	20	25-30	Single-wrapped solid or hollow material	1.50	0.50
TEXTILE	134	210	8	19-29	Unwrapped porous material	0.50	0.15
					Single-wrapped porous material	0.35	0.10
					Dual-wrapped porous material	0.25	0.10
	121	110	30	35-40	Single-wrapped hollow material	1.50	0.30
					Dual-wrapped solid and hollow material	1.00	0.30
PRION	134	210	18	29-39	Unwrapped porous material	0.50	0.15
					Single-wrapped porous material	0.35	0.10
					Dual-wrapped porous material	0.25	0.10
					Single-wrapped hollow material	1.50	0.30
					Dual-wrapped solid and hollow material	1.00	0.30
LIQUID (optional)	134	210	10	20-30	Liquid	0.60	0.20
	121	110	30	25-35			
Drying (optional)	—	—	—	1-20	—	—	—

The time required for sterilizer to be ready for routine use after the power is switched on is less than 15 minutes.

The maximum temperature of the 134°C sterilization cycle is 137°C

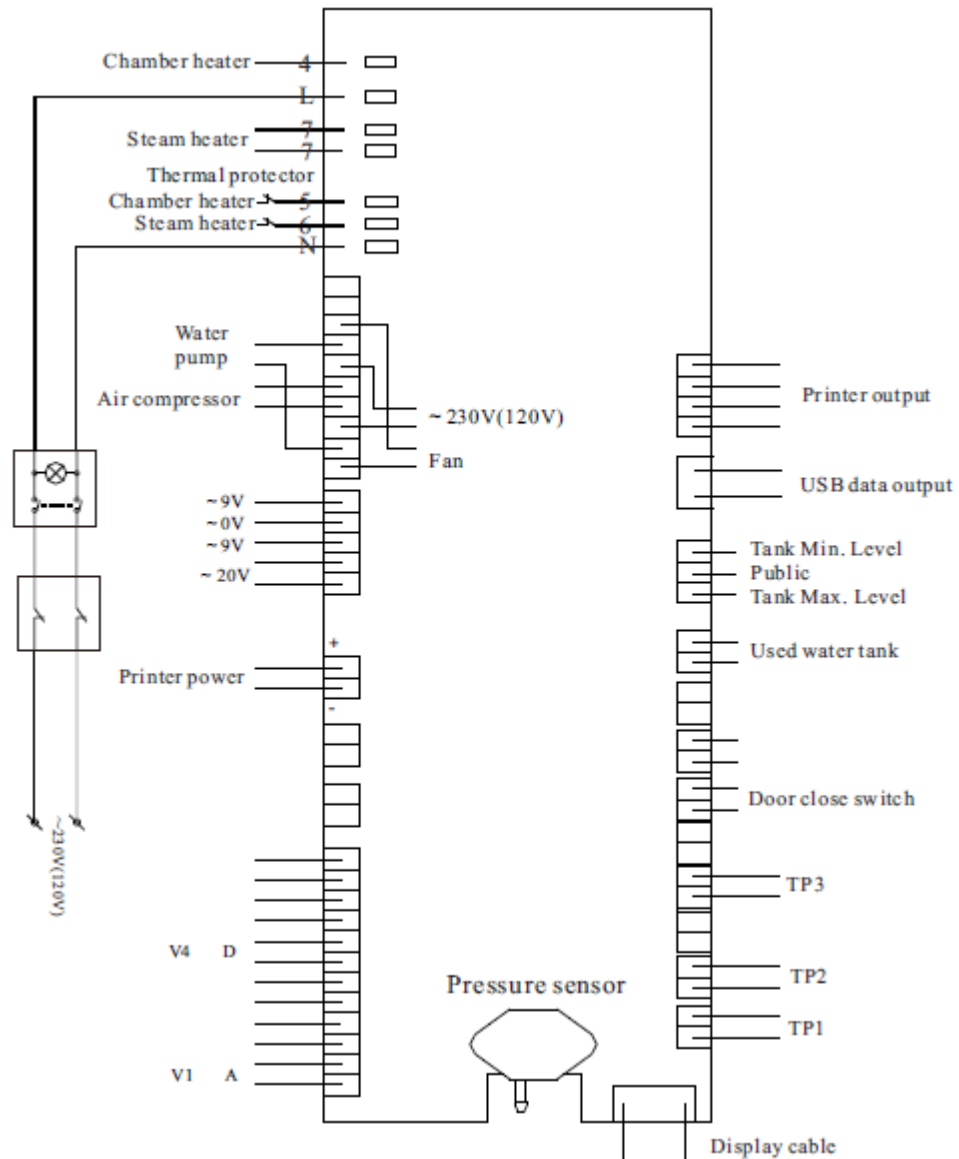
The maximum temperature of the 121°C sterilization cycle is 124°C





## Appendix 3

### Wiring Diagram

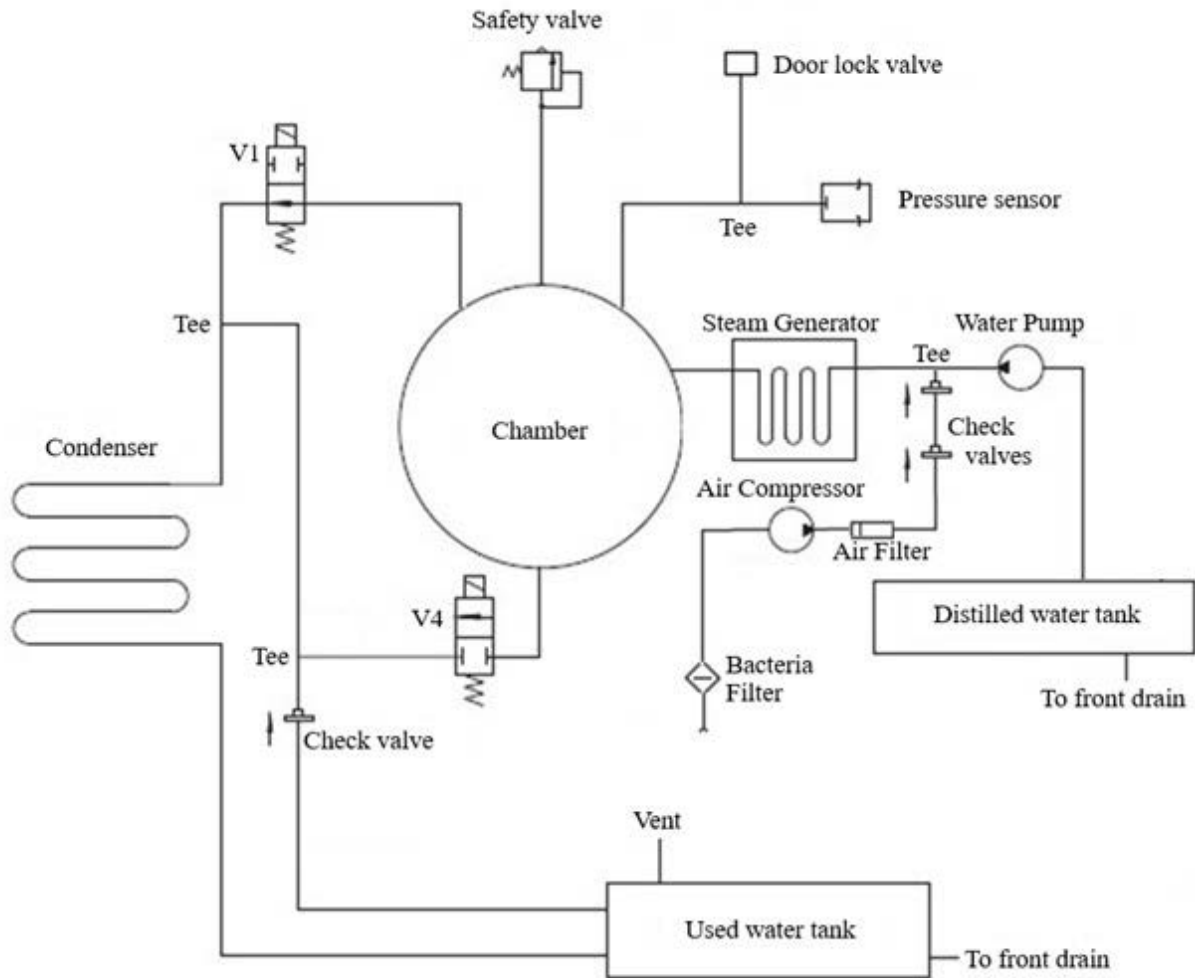


TP1: Steam generator temperature sensor  
 TP2: Inner temperature sensor  
 TP3: Temperature sensor of chamber wall

V1: Air release valve (normally open)  
 V4: Water release valve (normally closed)

## Appendix 4

## Hydraulic Diagram



V1: Air release valve (normally open) P/N 90012077

V4: Water release valve (normally closed) P/N 90012025



Alternate V1, p/n 90012024



Air release valve  
V1



Water release valve  
V4



## Certificate of Warranty

All new Clave16 or Clave 23 or Class B autoclaves installed by a Flight Dental Systems authorized dealer for a period of two (2) full year from the time of purchase. The warranty covers defects in parts, workmanship and materials for two (2) year except door gaskets and filters which are wear and tear items. This warranty does not include labor or installation. This warranty does not apply to any device that has been subjected to improper use or accident; nor shall it extend to autoclaves that have been repaired or altered by an unauthorized Flight dealer or technician. The warranty also does not include routine cleaning or preventive maintenance.

Flight's obligation is limited to the repair or replacement of parts for the autoclave. No other warranties or obligations are expressed or implied. The user must follow the instructions for use as outlined in the user manual. To activate the warranty, the registration card must be completed and mailed or faxed to Flight within fourteen (14) days of purchase or you may call our customer service department at the number listed below. Products will only be received and accepted for repair from an authorized dealer and only with prior return authorization from Flight.

All Transportation charges to and from Flight must be paid by the owner of the Autoclave. Flight will not accept COD shipments. If repairs are needed during the first 90 days after purchase of their autoclave and a local authorized service dealer is not available. Flight will arrange pick up of the unit at Flight's expense. This will be on an individually evaluated basis and ONLY with pre-approval. Note: If you have any questions or there are any difficulties with this instrument and the solution is not covered in this manual, please contact your dealer or Flight Dental Systems. Do no attempt to service this device yourself.

Authorized Dealer: \_\_\_\_\_

Installed by: \_\_\_\_\_

Product Serial Number: \_\_\_\_\_

Product Description: \_\_\_\_\_

Product Model: \_\_\_\_\_

Purchased Date: \_\_\_\_\_ Invoice Number: \_\_\_\_\_

End User Name: \_\_\_\_\_

Telephone: \_\_\_\_\_ Fax: \_\_\_\_\_

Email: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State/Province: \_\_\_\_\_

Zipcode: \_\_\_\_\_ Country: \_\_\_\_\_

A division of HPR Dental Products

## **Contact Information**

Thank you for taking the time to review the Flight Dental Unit's Instruction Manual. Your feedback or comments regarding the document is welcomed. For any comments and concerns please mail, e-mail or phone us at:

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