PRIMA

SERVICE MANUAL

VERSION B – (03/2023 upgrade images)

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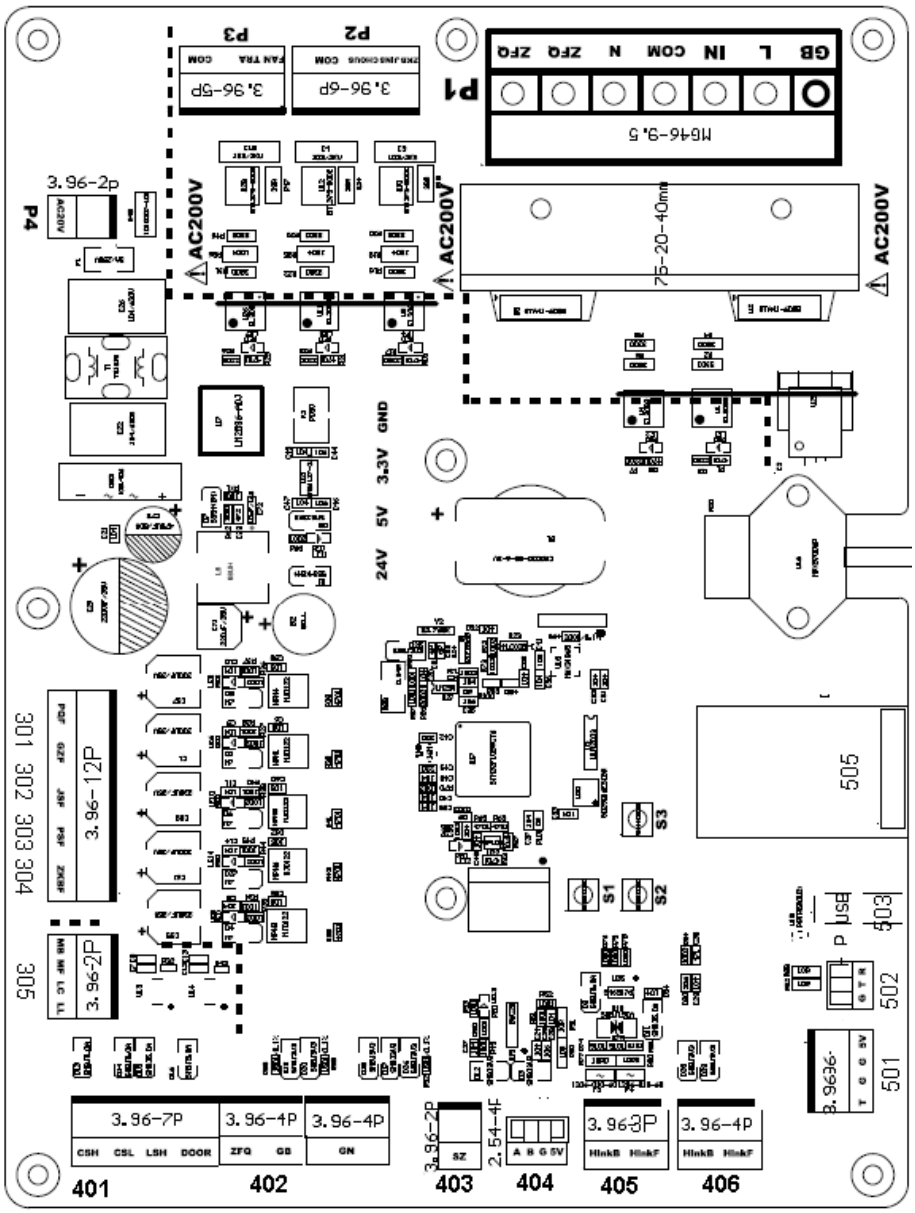
Part I. Basic Introduction



1. Electric Diagram

Wiring Classification

a) The high voltage area contains (AC 220V): water pump wire, vacuum pump wire, power switch wire, fuse wire, steam generator wire, heating ring wire and elementary transformer wire (red).

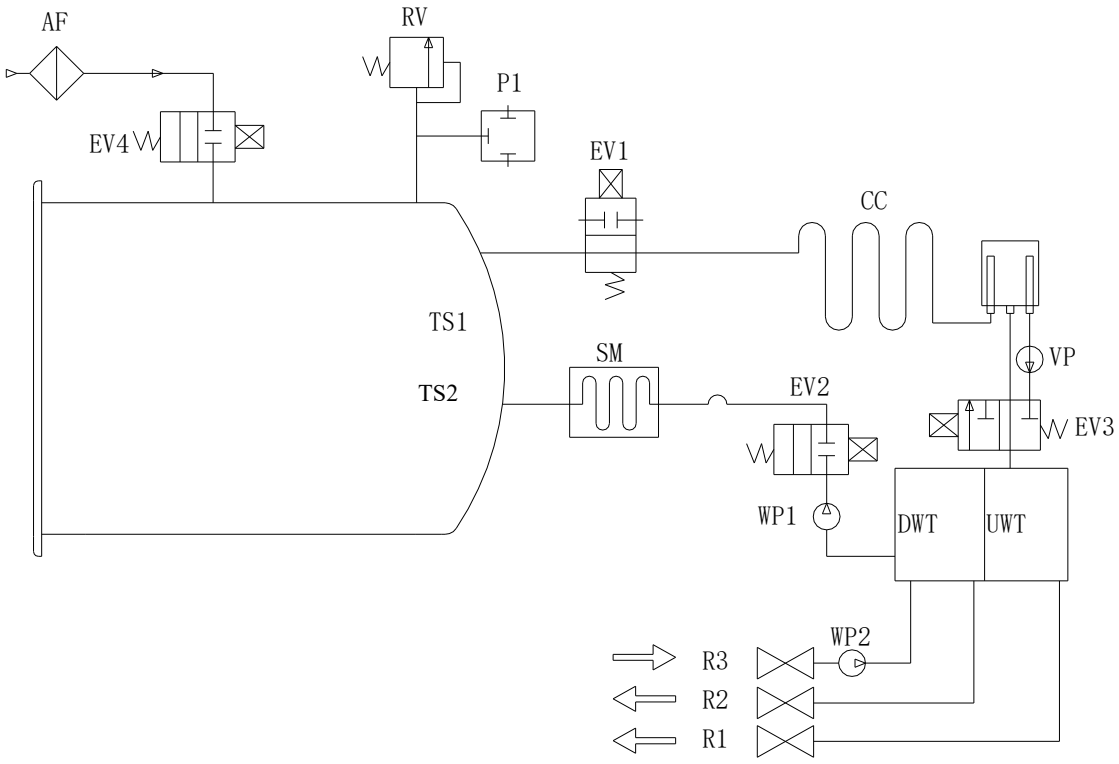
WARNING **DO NOT TOUCH THE HIGH VOLTAGE AREA WITHOUT ANY SECURE INSTRUMENTS WHEN THE POWER IS TURNED ON.**

b) The low voltage area contains: transformer second wire (green or blue).

c) Signal and low voltage wire contains: temperature sensor wire, control panel connecting wire, electromagnetic valve wire, printer connecting wire, door switch connecting wire and water lever sensor connecting wire.

WARNING **THE WIRES WHICH BELONG TO THE SAME CATEGORY CAN BE BUNDLED TOGHETHER.**

2. Pipeline Diagram



AF	Air Filter
UMT	Used Water Tank

WP1	Main Water Pump
WP2	Add Water Pump

DWT	Distilled Water Tank
EV1	Air Release Valve
EV2	Water Supply Valve
EV3	Vacuum Valve
EV4	Air Return Valve
P1	Pressure sensor
P2	Pressure sensor
CC	Condensate Collector

SM	Steam Maker
VP	Vacuum Pump
RV	Relief Valve
R1	Distilled Water Drain Port
R2	Used Water Drain Port
R3	Water Adding Port
TS1	Temperature Sensor 1
TS2	Temperature Sensor 2

3. Temperature and Pressure Table

The temperature of saturated steam (pure steam) can change temperature under different pressures, here is the comparison table between temperature (inside chamber) and pressure.

Pressure（Bar）	Temperature（℃）
0.0	100
0.2	105
0.7	115
1.1-1.2	122
1.7	130
2.1	135

Looking at the relationship between temperature and pressure under normal circumstances, you will find that, the lower the pressure, the larger the deviation between temperature and pressure. For instance, when pressure is 0.0bar, the temperature is about 97℃. But when pressure rises to 2.1bar, the temperature will be 134℃. Small tolerance (±1℃) is allowed under low-pressure.

4. Adjustment Notices

a. Each technician who tests or inspects the machine should know the working principle very well;

b. All technicians should know the exact position of the high and low voltage parts to avoid an electroshock;

c. Make sure the door is closed completely before running cycles;

d. When an alarm is heard, please record the error code, pressure and temperature values before turning off the machine;

5. Normal Cycling Status

a. No alarm is heard during the cycle;

b. At the beginning of sterilization cycle, when pressure is 2.1bar, the temperature should be at 134℃ (±1℃). When the pressure is 1.1bar, the temperature should be at 121℃ (±1℃);

c. During the sterilization cycle, the range of the pressure and the temperature values should be 300-320Kpa, 133~135℃, or 200-220 KPa bar, 120~123℃;

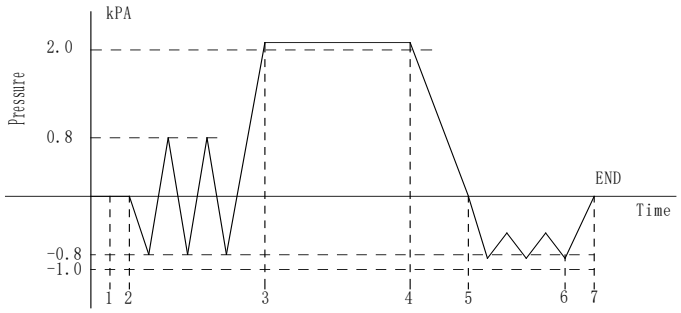
d. The temperature in the chamber should be 121~123℃, or 133~136℃;

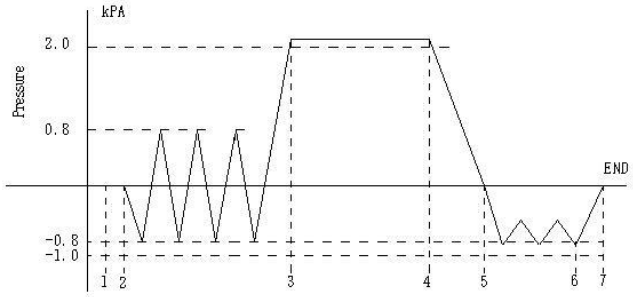
e. Once the program is finished, and there are no pipeline leakages, the machine can be restarted.

6. Programs and Working Condition of the Sterilizer

The technician must clearly know the working process and the display status of each cycle.

1) Sterilization Process wrapped 134 °c:





1-2 pre-heating

2-3 pre-vacuum

3-4 sterilizing

4-5 air-discharging

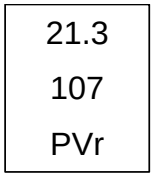
5-6 drying

6-7 stabilizing

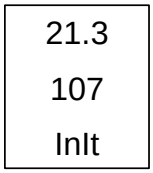
1-7 full cycle

7. Programs and Working Condition of the Sterilizer

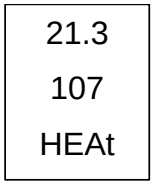
3-times pre-vacuum program example: Wrapped 134°C



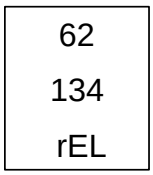
Selection



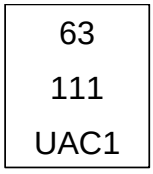
Start



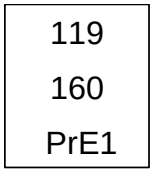
Heating



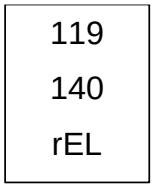
Release



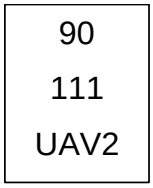
1° Vacuum



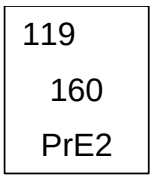
Pressure 1



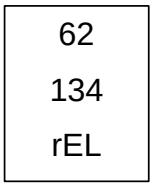
Release



2°Vacuum



Pressure 2

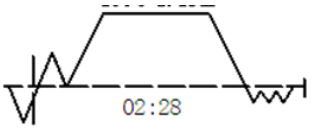


Release

If the temperature difference during the sterilization process exceeds ±4℃, the machine display will show a failure in the sterilization.

If the temperature between the two sensors inside the chamber exceeds ±3℃, the machine display will also show a failure in the sterilization.

All B cycles have the same function; the only difference is the sterilization temperature and the sterilization time. Only the S cycle unvrapped is dufferent because has only one fractionated vacuum as in the image:



The total time of the sterilization and the results are displayed alternately

If the temperature difference during the sterilization process exceeds ±4℃, the machine display will show a failure in the sterilization.

If the temperature between the two sensors inside the chamber exceeds ±3℃, the machine display will also show a failure in the sterilization.

Part II. Error Codes and Solutions

The sterilizer will show error codes when it breaks down.

Error Codes List

No.	Alarm Code	Sound	Error Information
1	Er01	Long “DI” sound	Steam generator over temperature
2	Er02	Long “DI” sound	Heating Ring over temperature
3	Er03	Long “DI” sound	Chamber over temperature
4	Er04	Long “DI” sound	Fail to maintain required temperature and pressure
5	Er05	Long “DI” sound	Pressure cannot be released
6	Er06	Long “DI” sound	Door is open during cycle
7	Er07	Long “DI” sound	Working overtime
8	Er08	Long “DI” sound	Over pressure
9	Er09	Long “DI” sound	In chamber sensors temperature is too high or too low (Dual Sensors)
10	Er10	Long “DI” sound	Temperature cannot match with pressure parameters
11	Er11	Long “DI” sound	Protection lock
12	Er12	Long “DI” sound	Vacuum test is failed
13	Er98	Long “DI” sound	Sudden “power off”
14	Er99	Long “DI” sound	Abnormal exit

WARNING **PRESS THE “START” BUTTON TO CANCEL THE ALARM WHEN THE ALARM OCCURS.**

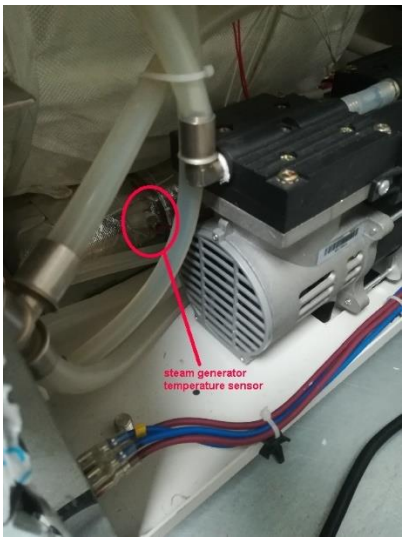
1. Er01: Steam generator over temperature

Problem Causes:

1. Inconsistent voltage.

2. The connection wire between the sensor and the master PCB is loose.

3. The temperature sensor of the steam generator is loose or badly connected. This does not allow to deliver heat.



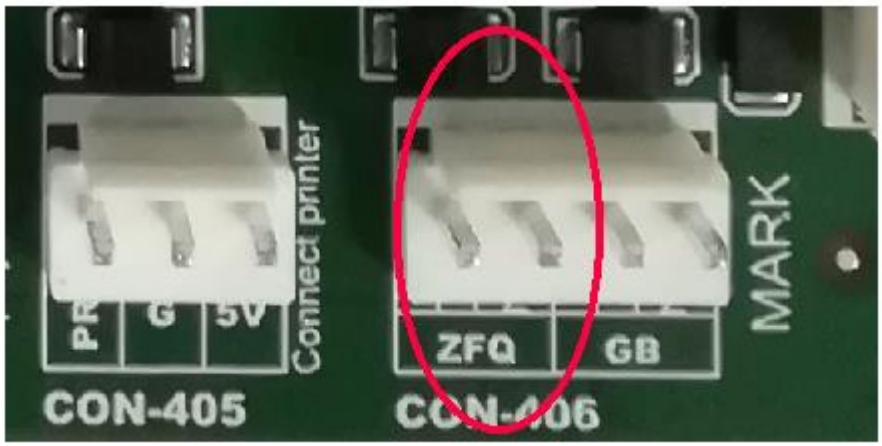
4. The temperature sensor or the thermostat is in short circuit, or damaged.

5.The Thermostat is loose or damaged.

Solution:

1. Restart the machine, and wait for it to cool down. Use a multimeter to check if the voltage is appropriate, if so, proceed by changing the power supply cable. If the voltage is unstable, connect the unit to a regular voltage.

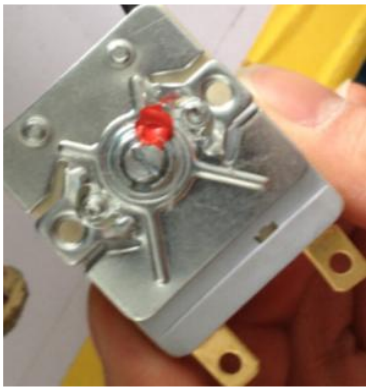
2. Make sure the sensor wire (4° couple) is well connected to the master PCB.



3. Check if the temperature sensor is tightened firmly. Tighten the sensor with a thermal coat. If the problem persists, replace the sensor with a new one.

4. Check or replace the steam generator temperature sensor.

5. Check the Thermostat, if loose, tighten it. If the problem persists, replace it.



2. Er02：Heating Ring over temperature

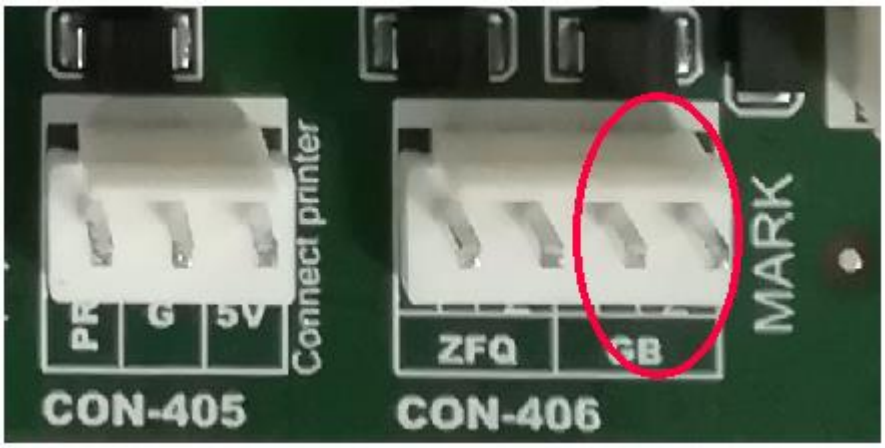
Problem Causes:

1. Inconsistent voltage.
2. The outer sensor is loose.
3. The connection wire between the outer sensor and the master PCB is loose, or not well connected with the Heating ring.
4. The outer sensor is in short circuit or damaged.

Solution:

1. Restart the machine, and wait for it to cool down. Use a multi-meter to check if the voltage is appropriate, if so, proceed by changing the power supply cable. If the voltage is unstable, connect the unit to a voltage regulator.

2. Check the mechanical and electric connection of the Sensor wire (#3) to the master PCB.



3. Use a multimeter to check if the sensor value is in short circuit or damaged according to the PT1000 Index table. If so, replace with a new sensor.

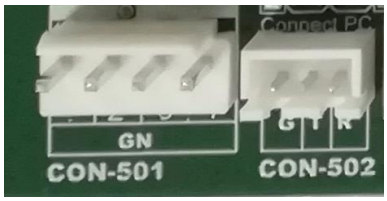
3. Er03：Chamber over temperature

Problem Causes:

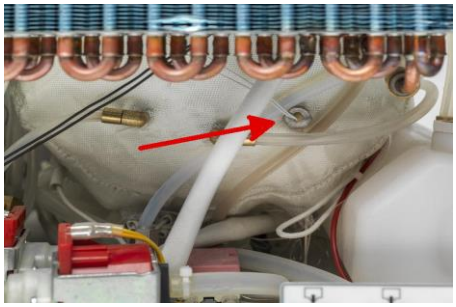
1. Inconsistent voltage.
2. The connection wire between the inner sensors and master PCB is loose
3. The inner sensors is in short circuit or damaged.

Solution:

1. Restart the machine, and wait for it to cool down. Use a multimeter to check if the voltage is appropriate, if so, proceed by changing the power supply cable. If the voltage is unstable, connect the unit to a regular voltage.
2. Make sure that the Sensors wire (#2 or #1) is well connected to the master PCB
3. Use a multimeter to check if the sensor value is in short circuit or damaged according to the PT1000 Index table. If so, replace it.



Sensor connector



Sensor position

Sensor

4. Er04：Failure to maintain required temperature and pressure

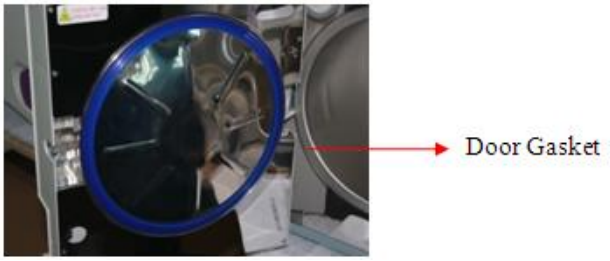
Description: Occurs after entering the Sterilizing process**.**

Problem Causes:

1. If the Door Gasket does not have a perfect contact with the rim of the chamber, there can be a steam leakage. This will force the machine to keep producing steam.
2. The water pump is broken or does not pump properly. This does not allow enough water to be supplied to the steam generator, making it unable to produce enough steam.
3. The steam generator is blocked, and it does not supply enough steam to the chamber. The reason for this is the use of inappropriate water.
4. The steam generator thermostat is damaged or it acts at a low level. The steam generator. temperature is too low to produce enough steam. Temperature and pressure values do not match.
5. Heating ring is not hot enough. Temperature and pressure values do not match.
6. Valves or pipelines have leaks. Temperature and pressure values do not match.
7. The pressure release valve (Blue wires) does not close on time. Chamber pressure drops, so temperature and pressure values do not match.

Solution:

1. Check that the door gasket has no problems, if needed change it using the steps below:



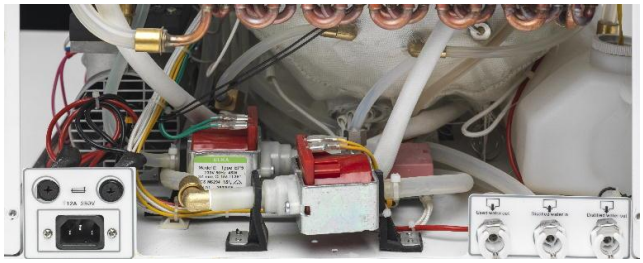
Switch off the machine, and ensure that it is cool and depressurized.

A. Hold the verge of the gasket and slowly pull it out of its groove.
B. Once you pulled out one part of the gasket, you can draw it out slowly. After taking out the gasket, please check and clean both the groove and the gasket. Please replace it if there are any damages.
C. Fix the clean gasket back in the door groove. At first, equally insert the 4 spots into the groove.
D. Press the gasket using your thumb to make sure that it is completely placed into the groove.

A B

C D

2. Check if the water pump is functioning properly, if not replace it.



3. Water pump keeps pumping, but the display does not show the rise in temperature and pressure. This means that the steam generator is blocked. Initiate a cleaning program. If this program is not enough replace the steam generator.

4. Make sure the steam generator can function properly, if not replace it.

5. Check if the adjusting lever of the steam generator. protector is loose. If so, tighten it. If the problem persists, replace it.
6. Use a multi-meter to check if the heating ring is working correctly (see App.1). If not, replace it.
7. Check for any leaks in the water and stream flow. If any are found, fix or replace them if needed.
8. Open and clean the Pressure valve (Normal-open valve). If this does not work, replace it.

5. Er05：Failure to release pressure

Description:

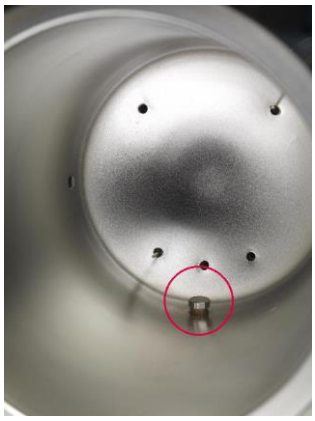
Failure to drop from “310 KPa” to “100 KPa”. The machine cannot enter the Drying program in the required time range.

Problem Causes:

1. The chamber filter is blocked.
2. The normally-open valve is blocked.
3. The wire connecting the normally-open valve to the PCB is loosed.
4. No electricity signal on the PCB for the normally-open valve.
5. 3-1 channel of 3-way valve is blocked.

Solution:

1. Clean or replace the chamber filer;



2. Check and clean the core of the normally-opened valve. If needed, replace it.

Normal-open Valve

Exploded View (Normal-open Valve)

3. Check if the signal line of the normally-open valve is connected well with the PCB.

4. Use a multimeter to check if there is the correct voltage on the solenoid and on the connector (normally-open valve and PCB). If not, replace the PCB with a new one.

5. Make sure that the 3-way valve (Black wires) is not blocked. If so, clean the valve. If the problem persists, replace it.

6. Er06：Open door during cycle

Description:

It may occur in every process of the cycle. Ensure that the door handle has been locked completely before each cycle.

Problem Causes:

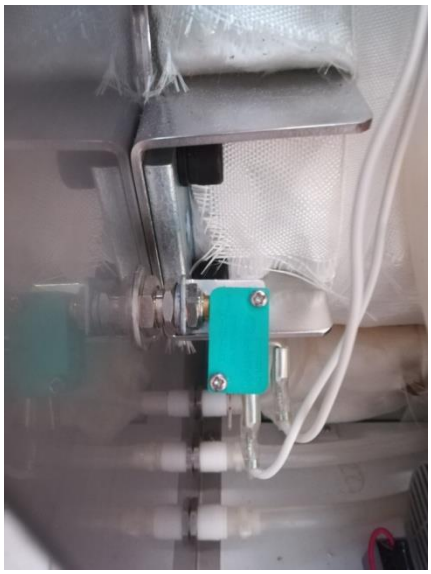
1. The door was not completely closed, or the strong pressures forced the door to open.
2. Door manually opened during the cycle.
3. The micro switch is loose.
4. The connection line which connects the micro switch and the PCB is loose.

Solution:

1.Ensure that the door and its handle are closed completely before beginning each cycle.

2. Do not open the door during cycle.

3. Check if the micro switch is loose, if so, tighten it.
4. Check if the connection line (White wires) of the micro switch is loose. If so, tighten it.



7. Er07：Working overtime

Description:

This occurs during the Heating process of the cycle. Check all steps during the Heating process. The standard checking procedures are as follows:

Problem Causes:

1. If the Door Gasket comes out or is damaged, there can be a steam leakage. This will force the machine to keep on producing steam.

2. Safety valve may have leaks, due to some loose bolts caused by the vibrations of the machine.

3. Heating ring does not heat or is too slow at doing so. This occurs when the wire connecting the heating ring to the PCB is loose, in short circuit or damaged or the ring thermostat is broken or the heating ring is interrupted; check that the thermostat (white/red wires) has a normal temperature of 0.1 Ohm and at normal temperature of the resistance of the heating ring must be around 33 Ohm (white/white wires)

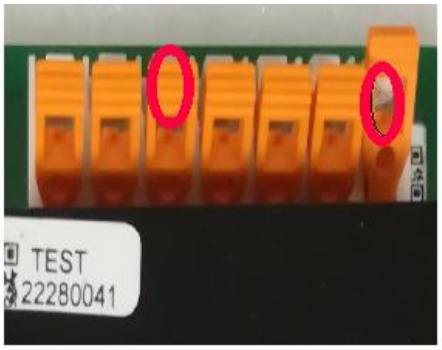
4. The vacuum pump fails to work (no sound) during the vacuum process. As a result, the pressure and the temperature values during the heating stage do not match, causing the machine to take longer than 10 minutes to adjust the conditions inside the chamber. This occurs when: 1) The wire pump is loose or damaged. 2) The vacuum pump performance is not enough. 3) The vacuum valve (Black wires) is blocked or cannot be opened.

5. The water supply valve is blocked or damaged, and fails to supply water to the steam generator.

6. The water pump is damaged, and fails to supply enough water to the steam generator.
7. The bacterial filter valve is broken or a leakage in the pipeline has occurred during the pressure stage.
8. The normally-open valve is damaged, causing a leakage in the pipeline, during the pressure stage.
9. The 3-way valve is damaged causing a leakage in the pipeline, during the pressure process.
10. The water supply valve is damaged causing a leakage in the pipeline, during the pressure process.
11. The temperature of steam generator is lower than 160℃ due to the damage of the heating stick in the steam generator. As a result, the water pump cannot to supply enough water.
12. The steam generator is blocked or not working properly, not being able to supply enough steam into the chamber. The reason for this is the use of inappropriate water, or not using the steam generator cleaning program.

Solution:
1.Check if the door gasket is in good conditions, if not, change it using the steps shown in Er04.
2. Check if the relief valve has leaked during the pressure stage. If so, tighten the switch on the valve, or change it if needed.

3. Forced the end of the cycle if the sterilizer fails to enter the vacuuming state after 15mins. Wear protective gloves to touch the surface of inside chamber. If the chamber is not hot enough, check if the lines connecting to the heating ring and the PCB are regularly connected. If the problem persists, change the heating ring.



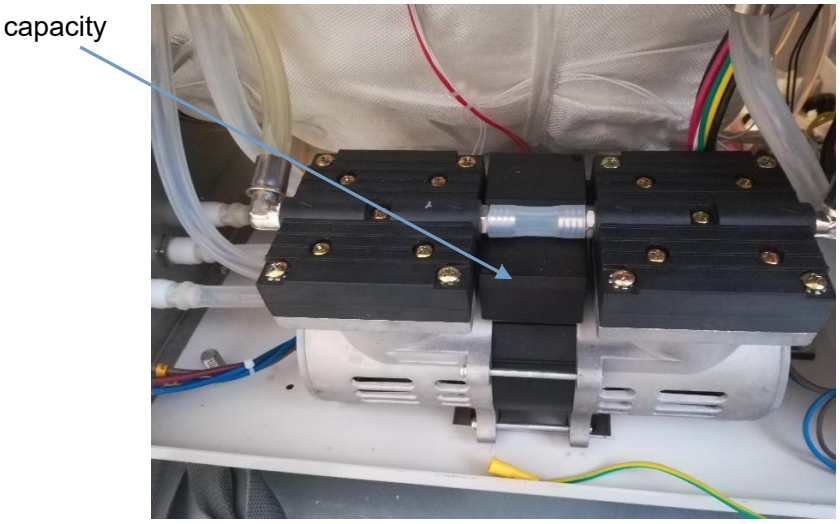
Connecting Port

(Heating ring- PCB)

Connecting Line

(Heating ring- Heating protector)

4. a) Check if the connecting lines from the vacuum pump are connected properly. If the problem persists, replace the capacitor and the vacuum pump.



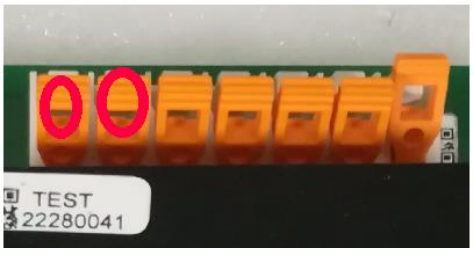
b) Check if the core of the 3-way valve (Black wires) is blocked, if so, clean it. If the problem persists, replace it.

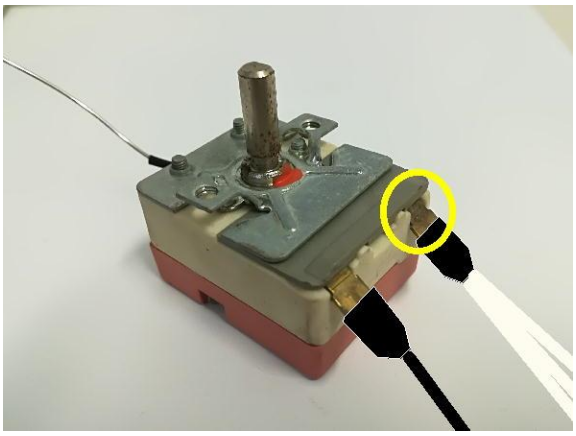
5. Abnormal sound of "*Trraa, Trraa*", caused by the water pump working without water during the heating and pressure stage. Clean the water supply valve or replace it if needed.

6. Use a multimeter to check if there are 220v of alimentation on the pump(green wires). If the problem persists, replace it.

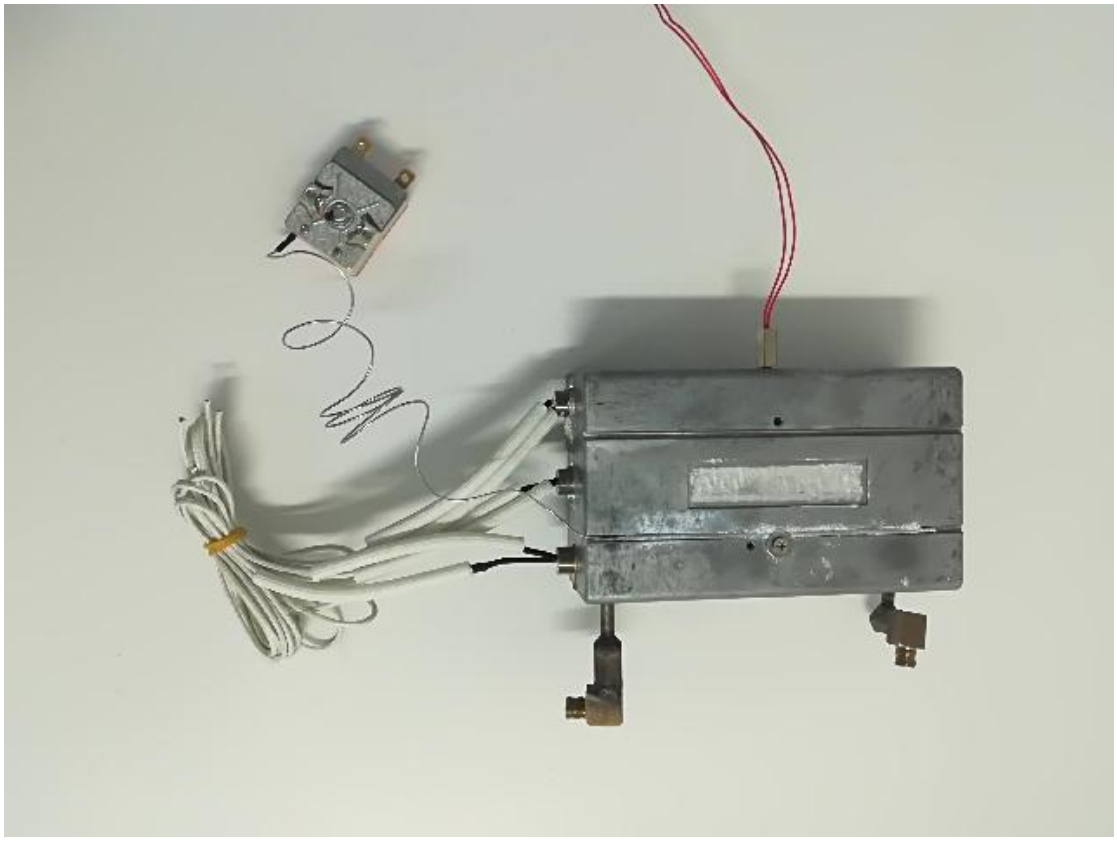
7. Check and clean inside the bacterial filter valve. If the problem persists, replace it.

8. Check and clean inside the normally-open valve. If the problem persists, replace it.
9. Check and clean inside the vacuum valve. If the problem persists, replace it.
10. Check and clean inside the water supply valve. If the problem persists, replace it.
11. Use a multimeter to check if the heating elements of the steam generator are broken (normaly they have 2-3 Ohm for each). First disconnect the wires, then check the value between the connectors on the board (A) and the connection on the thermostat (B). Check the thermostat: at room temperature the resistance between the connectors must be zero (0 ohm) and over 200 °c it must be infinity (∞ ohm). Make sure that the pin is fully turned to the right.

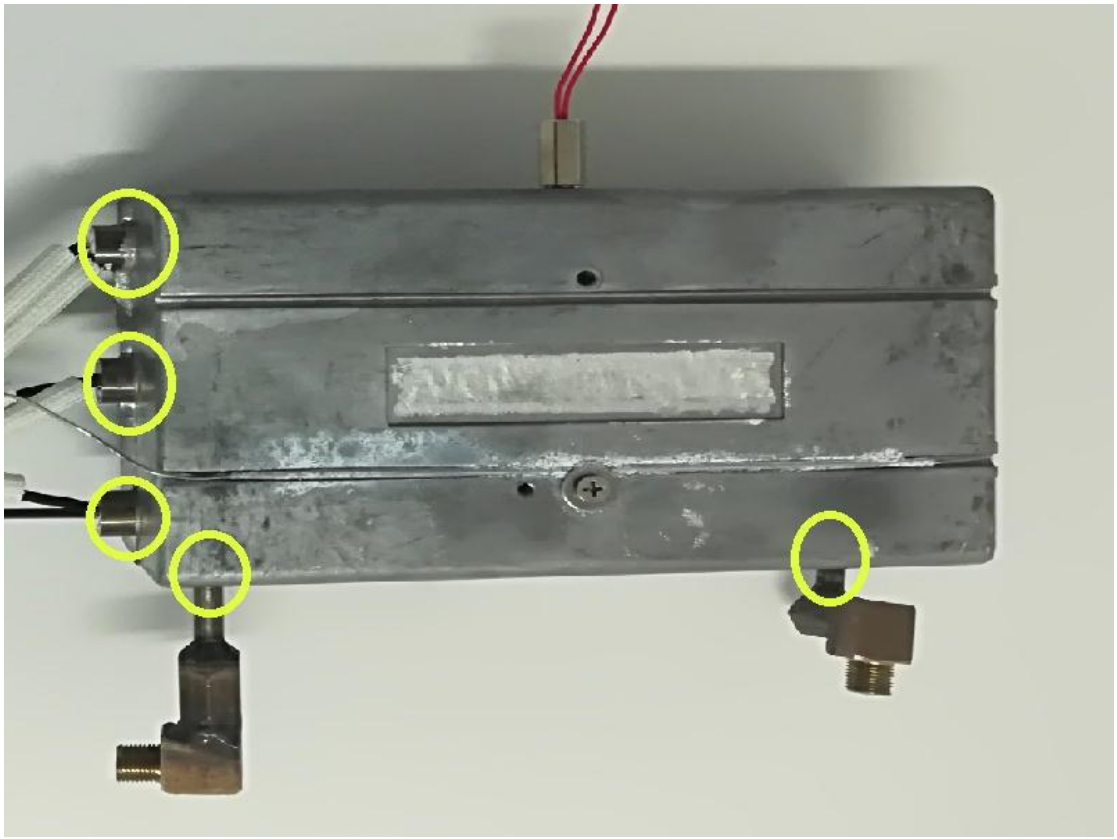




In the case of broken heating elements to replace them, remove the screw (yellow arrow) on the top and pull the element.



12. If water is found on the bottom of the sterilizer during the pressure process it means that there is a possible loss of steam from the generator.
13. check if there are no leaks around the heating elements or the inlet and outlet connections during the steam creation phase



8. Er08：Over pressure

Description:

The pressure in the chamber is higher than the set value in the Heating or Sterilization process.

Problem Reason:

1. The inner part of the pressure sensor (connection or tube) is blocked.

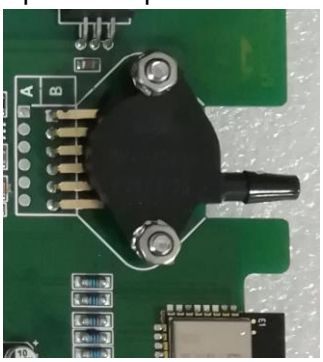
2. Inconsistent power supply voltage.

3. The machine cannot release pressure due to the normally-open valve being blocked;

4. The pressure sensor is broken.

Solution:

1. Check if the connection or tube on the sensor is free of any dirt. If not, clean it.
2. Check if the local power supply voltage 220v is regular.
3. Check and clean inside the normally-open valve. If the problem persists, replace it.
4. Replace the pressure sensor.



9. Er09：Detect Inner sensor over or lower temperature (Dual Sensors)

Problem Description:

There are two temperature sensors.
The chamber temperature is controlled by inner sensors; in the sterilization process if one sensor find a temperature in the chamber over 140℃ or lower 134℃, the machine cannot be tested in correct mode.

Problem Causes:

1. Unstable voltage.

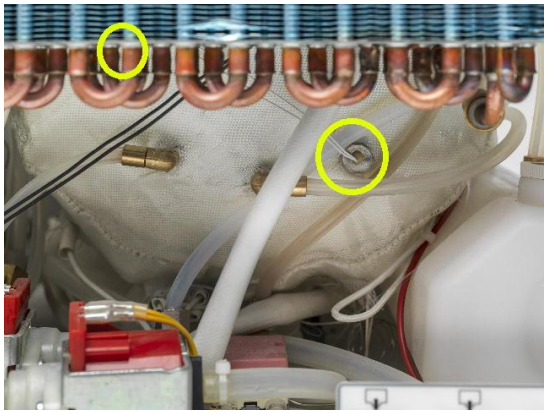
2. The connection wire line of the inner sensor and the PCB is loosed.

3. The inner sensor is damaged.
4. The PCB is damaged.

Solution:

1. Restart the machine, and wait for it to cool down. Use a multimeter to check if the power supply voltage is appropriate, if so, proceed by changing the power supply cable. If the voltage is unstable, connect the unit to a voltage regulator.
2. Check if the connection wire line between the inner sensor and the PCB is well connected.
3. Check the value of the inner sensor with a multimeter, according to the PT1000 table. If the value is abnormal, replace the sensor.

NB In normal condition of 24°C the resistance value of a pt1000 is 1.093 – 1.1 kOhm



4. Replace the PCB.

10. Er10：Temperature and Pressure do not match

Problem Causes:

1. If the door Gasket is damaged, there can be a steam leakage. This will force the machine to keep on producing steam.
2. The water pump is damaged and cannot supply enough water to the steam generator.
3. The steam generator is blocked, weakening the heating effect not supplying enough steam to the chamber. As a result, the pressure and the temperature values displayed on the panel will be abnormal. This occurs when inappropriate water is used, or the machine is not cleaned regularly.
4. The steam generator protector is damaged or incorrectly regulated. This causes the temperature of the steam generator to be low.
5. The water pump does not work properly, causing less steam to enter the chamber.

6. The solenoid valve or pipeline is blocked;
7. The valve that releases air cannot close properly.
8. The heating ring or the temp. protection are broken.

Solution:

1. Replace the door gasket according to Er01;
2. Check if the water pump is damaged, if so, replace it.
3. Check and clean the steam generator, and replace it if needed.
4. Check if the adjusted lever of the protector is loose, if so, tighten it. If the problem persists, replace it.
5. Use a multi-meter to check if the heating ring of the steam generator is working properly. If the value is abnormal, replace the heating ring;
6. Check and clean the core of the solenoid valve. Check for any leaks in the pipeline and if needed, replace it.
7. Check and clean the core of the normally-open solenoid valve. If the problem persists, replace it.
8. Check the resistance value of the heating ring and of the temp. protection.
9. Use a multi-meter to check the resistance of the single inner temperature sensors. If the temperature is 0℃ or abnormal, replace it.
10. If the temperature difference inside the chamber is too big and the sensors are good, there is a problem with the PCB, and it must be replaced.

11. Er11: Protection lock

Problem Description:

When you press the “START” button to start the cycle, the display will immediately show the error Er11 along with a continuous “DI” sound, blocking all programs.

Problem Causes:

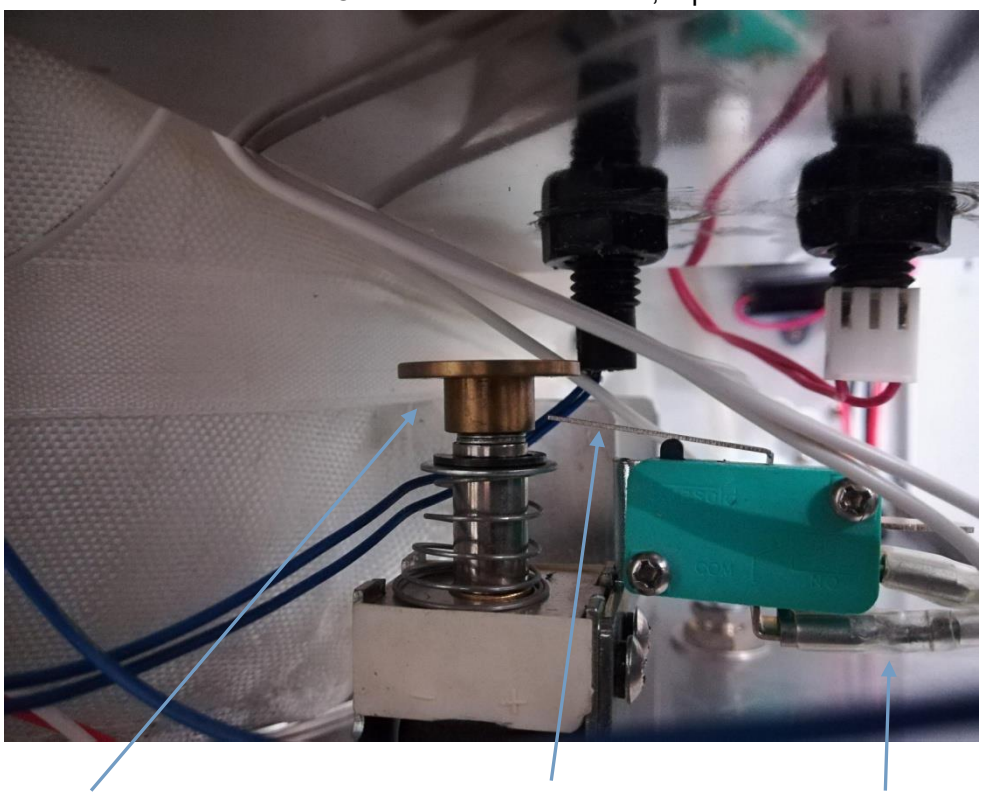
1 The solenoid valve (the security closer system) is not activated
2 The switch on the security system is not activated

Solution:

1.Using a multimeter, check (for the solenoid) the voltage on the connectors on the main board (see the electrical diagram). If a voltage is present, check, (first disconnect

the wires from the connector) the resistance value of the solenoid in “ohm”. (the value must be a few ohms). If no voltage is present on the connector, replace the CPU or the main board. If there is the voltage but the problem persists, check the mechanical movement of the solenoid by using mineral oil.

2.Check the electric connection of the connectors. Check the switch (by using a multimeter) when in the “ON” and “OFF” position. Check the position of the metal part of the solenoid attached to the spring. The metal part should press on the switch lever when the switch is turned “ON”. If there is no contact, replace the switch.



Fix the metal ring switch level connectors

12. Er12：Vacuum failure

Problem Description:

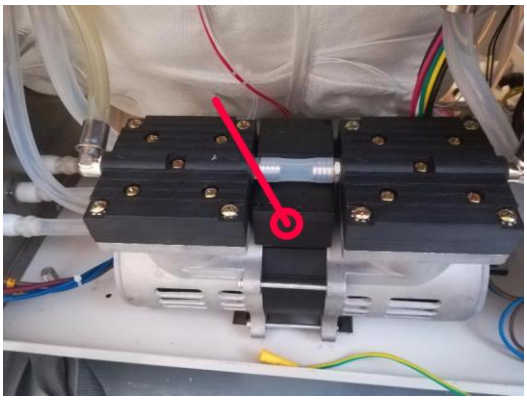
The vacuum cannot reach the minimum value of -0.4kpa after 4minutes, and cannot reach -0.6kpa during the vacuum test.

Problem Causes:

1. The vacuum pump is out of order
2. Too many wet objects which give out steam as the temperature within the chamber rises.
3. The normally-opened valve is blocked.
4. The 2-1 channel of the 3-way valve is blocked.

Solution:

1. Check or replace the vacuum pump.



2. Turn off the machine, and reduce the number of objects.

3. Check and clean the internal of the normally-open valve. If the problem persists, replace it.

4. Check and clean the internal of the 3-way valve (black wire). If the problem persists, replace it.

5. Check the tube from the steam generator. If it is broken, change it.

6. Check or replace the capacity of the pump

13.Er98：Power Shortage During Cycle

The interface will display the writing “Er98” after the power is restored from a sudden power cut. Press the “START” button to clean the alarm, and the machine will automatically enter into a 4 minutes drying program. When the drying program is finish, the standard interface will be displayed.

In case press the “START” button for 3 seconds to stop the drying program, directly returning to the standard interface. When the pressure in the chamber falls to 0 or 100 KPa, open the door and restart the machine.

WARNING **DO NOT OPEN THE DOOR IF THE PRESSURE IN THE CHAMBER IS NOT “0 or 100 KPa”.**

14.Er99：Forced exit

Keep pressing the “START” button to force exit the selected program. When appear error 99 on the display, automatically entering into a 4 minutes drying program. When the drying program, is over, the standard interface is displayed.

Press the “START” button to stop the drying program, directly returning to the standard interface. When the pressure in the chamber falls to 0 or 100KPa, opens the door and restart the machine.

WARNING **DO NOT OPEN THE DOOR IF THE PRESSURE IN THE CHAMBER IS NOT “0 or 100 KPa”.**

Part III. Other Malfunctions

1. No lights on the Display

Problem Description:

There are no lights or numbers on the front panel of the display when the machine is turned on (the buttons are not illuminated).

Problem Causes:

1. The fuse is burnt;
2. The connecting line between the PCB of the front panel and the main board is loose;
3. The PCB of the front panel is damaged;
4. The power supply is unstable;
5. The transformer is damaged.

Solution:

1. Check if the power switch lights up when the power is turned on. Also check if the fuse is burnt, if so replace it.
2. Check if the connecting line is connected properly;

3. If there are not lights and information on the display , replace the front panel PCB;
4. Messy codes or discontinuous flickering, means that the power supply is unstable. If the voltage is unstable, connect the machine to a voltage regulator. If the problem persists at a steady voltage, replace the power supply cable.
5. If the power switch does not light up, there is no power input. Replace the transformer.

2. Fail to Enter and start the Cycle

Problem Description:

When pressing the “START” button, the program cannot be started. There are two main reasons:

(1)”LOAD” message on the display but the machine failed to start the program.

a. Used water tank is full, “” light turns on.

b. Distilled water tank is empty, “” light turns on.

c. The quality of the water is over the limit

Other problems:

a. Connection problem: the buttons are out of order without any sound.

b. The front panel PCB is damaged.

Solution:

a. Drain water from the used water tank, “” light turns off automatically.

b. Fill distilled water tank, “” light turns off automatically.

c. Drain the clean water tank and replace the water by new good water

a. Check if the connecting line between the PCB of the front panel and the main PCB is connected properly.

b. Replace the Master PCB.

3. Failure to Open the Door

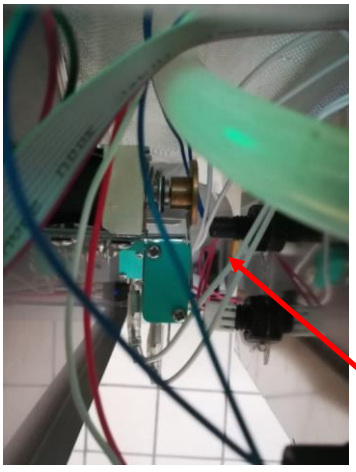
Problem Causes:

1. Negative pressure inside the chamber after the cycle, caused by the air being unable to return inside the chamber;
2. If the door is kept closed after sterilization, it will cause the chamber to seal as the hot air cools down. This creates negative pressure, locking the door.
3. The security system closer is blocked.

CAUTION **OPEN THE DOOR WHEN THE STERILIZATION CYCLE IS OVER. DO NOT CLOSE IT, ESPECIALLY AFTER THE LAST CYCLE OF THE DAY.**

Solution:

1. Turn on the power switch, opening the air return valve. Now try to open the door;
2. Look for the relief valve on the rear cover of the machine. Turn it counter-clockwise to allow the air to return inside the chamber.
3. If the door has frequent problems with the opening, clean or replace the air return valve.
4. Check the functioning of the security system closer.



Solenoid Pin

NB When there is pressure or vacuum inside the chamber and all valves are closed and the security closer system is disactivated is hard or impossible to open the door. In the last version of the software when the handle of the door is opened is activate the inlet air valve so the internal pressure in the chamber return in few seconds to 0 or 100 KPa and is possible to open the door.

4. Water Level Sensor Out of Order

Problem Description:

When the clean water tank is empty or at a low level, the "  " icon will show that, distilled water needs to be added.

When the used water tank is full, the "  " icon will show that the used water tank must be drained.

Problem Causes:

1. "  " The following light is always on, or always off. This means the high or low water level sensor is out of order (Clean water tank).

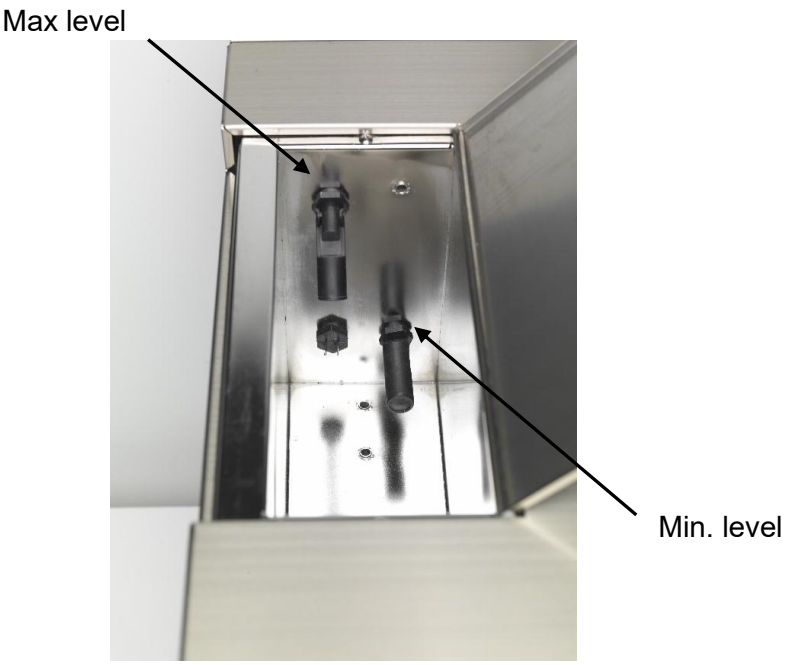
2. "  " The following light is always on, or always off. This means the water level sensor is out of order (Used water tank).

3. The indicator light is damaged.

Solution:

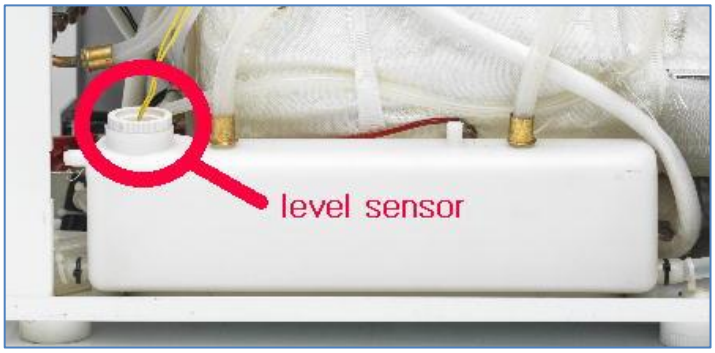
Make sure that the water level sensor wiring is well connected to the circuit board.

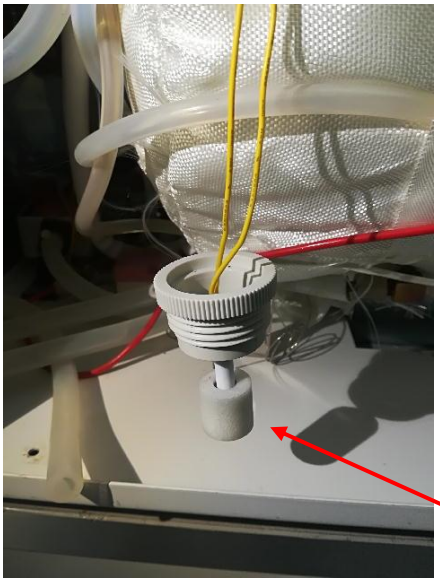
1. The distilled water tank has a high and low water sensor. the "  " light will flash when distilled water must be added. If the distilled water tank is full, and the light still flashes, this means the sensor is clogged or damaged. Open the distilled water tank, as shown below:



Check if the water level sensor is working regularly. It is normal to hear a “BI” sound when the water level is above the maximum, or below the minimum. If the machine makes no sound, replace the sensors.

2. Lift the float of the water level sensor in the temporary used tank up to the top. The screen will now display the “ ” icon. If this does not occur, replace the water level sensor.





Level Sensor

5. Drainage/Adding Connection Leakage

Problem Causes:
1. Drainage or adding connection is blocked;
2. The valve core seal value of the connection is damaged.

Solutions:
1. Check and clean the connections. If the problem persists, replace it.

2. Check if the core seal is working properly, and clean it using an air compressor. If the problem persists, replace the core seal.

The connector on the autoclave

the quick connector on the drain tube

6. Negative Drying Effect

Problem Description:

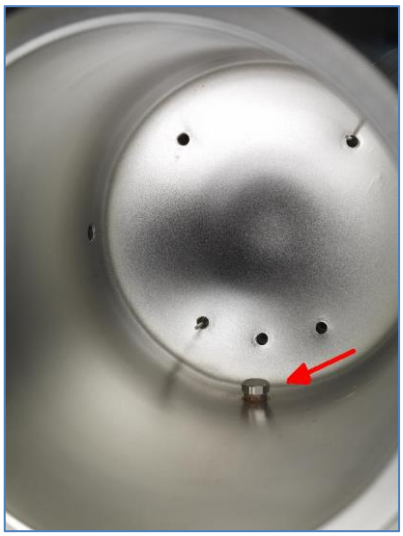
Small amounts of water left inside the chamber after sterilization.

Problem Causes:

1. The inner filter is blocked or not attached properly to the bottom of chamber;
2. The sterilizer is not placed properly. When the rear of the machine is higher than the front, most of the water will remain in the front.

Solutions:

1. Clean or replace the chamber filer;



Air Filter in the Chamber

Exploded View

WARNING REGULARLY CLEAN THE FILTER TO GUARANTEE A REGULAR PERFORMANCE OF THE MACHINE.

2. Adjust the machine front feet to keep the machine at the right angle.

   Check that the difference front-rear must be 2-3 cm.

7. The printer does not print out

Problem Description:

Sterilizer has an internal printer. Make sure that the printer is used appropriately and correctly.

Problem Causes:

(1) The user did not install the paper correctly.

(2) The printer power plug is not connected to the power supply, or the voltage is unstable.

(3) The printer is not well connected to the PCB of the sterilizer.

(4) The PCB board output signal is unstable.

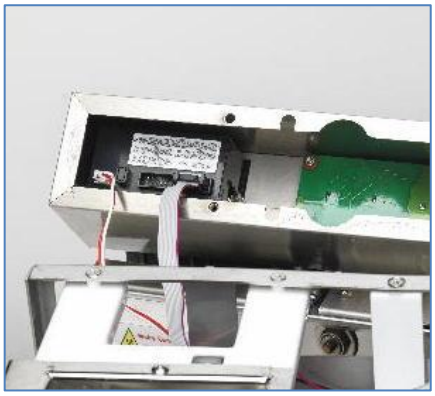
Solutions:

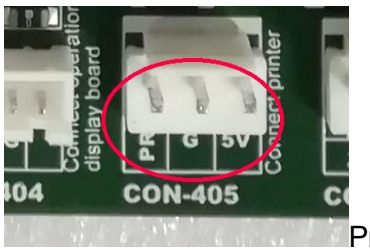
(1) The paper should be installed correctly. Open the front cover of the printer, raise the lever with a finger and pull it open. Remove the roll of the paper, and insert a new one if needed. Please pay attention to how the paper is positioned: the shiny side of the paper should be on top. ***Figure 7a***

In normal condition the green light is on but if it flashing the internal sensor is not able to see the paper inside the printer or the paper is finish. Please check that the paper is positioned properly, and clean the sensor if needed. ***(Figure 7a)***

(2) Ensure that the power plug is connected to the power supply and that the voltage is stable

WARNING **PLEASE ENSURE THAT ALL INTERFACES, ESPECIALLY THE DATA INTERFACE, IS WELL CONNECTED. NOT DOING SO WILL CAUSE THE PRINTER TO NOT WORK PROPERLY.**


Printer Connections



Printer Signal

(3) Make sure there is full contact between the printer and the PCB board. If the problem persists, then re-connect the printer to the PCB.

Part IV. Appendix

Appendix 1: Helix Test

The main purpose is to identify if the machine is in accordance with the B Class sterilization standards.
For the Helix test the condition of the autoclave should be as follow:

A. The sterilizer must be cold (this must be the first test cycle done when the machine is switched on)

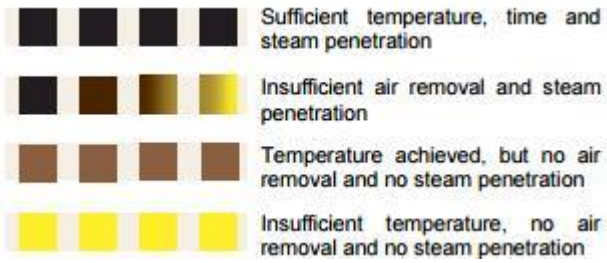
1. Test Tools:

2. Put the unused helix paper into the helix tube, lock it and ensure that it is well sealed.

Insert the paper to the test pipe head

set back the pipe head

3. Place the helix tube into the chamber, and start the Helix Test: 134℃, 3.5mins of sterilization, 3-times vacuum, 8mins drying. If the color changes into black, it means that the test has been passed.



Appendix 2 B&D Test

A B&D test is performed to show the effects of pre-vacuum and exhausting air of the Class B autoclave. It is only used for test if there is enough pressure and penetration of steam in the chamber during the cycle, not for the sterilization results.

Put a test bag in the chamber, and start the test at: 134℃, 3.5mins of sterilization, 3-times vacuum, 8mins drying. If the color changes into black, it means that the test has been passed.

Package

Appendix 3 Setting the time

In standby mode, keep pressing the two buttons “PROG. + TEST” for 5 seconds to enter the time settings. Press “PROG.” button to select a specific setting.

year month day hour min

SET	year	month	day	hour	minute	second	exit
TIMESET	T. SET	T. SET	T. SET	T. SET	T. SET	automatic	PROG for 5 sec.
STEP	-1-	-2-	-3-	-4-	-5-		
VALUE	--14-	--05-	--24-	--15-	--45-		

Press “TEST” to increase and “START” to decrease the values. Once finished, to exit, keep pressing “PROG.” For 5 seconds for exit and save or press TEST button for 5 seconds for exit without saving.

Appendix 4 Parameter Control

1. To read the parameters in real time Keep, in standby mode, pressing “PROG. + START” for 5 seconds or press PROG one time during the cycle. On the display appear the message READ and the value of the relative parameter.

2. Press “PROG.” to switch between the parameters as below:

T1 – T2 – T3 – T4 – CO

Note: This function does not change any parameters!

Parameter Items:

T1 (temp. sensor chamber n.1):
First line: T1
Second line: value - temperature value - correct value (-2.0°c ~ 2.0°c)
Third line: PArA

T2 (temp. sensor chamber n.2):
First line:T2
Second line: value - temperature value - correct value (-2.0°c ~ 2.0°c)
Third line: PArA

T3 (temp. sensor heating ring)
First line: T3
Second line: value - temperature value - correct value (-2.0°c ~ 2.0°c)
Third line: PArA

T4 (temp. sensor steam generator)
First line: T4
Second line: value - temperature value - correct value (-2.0°c ~ 2.0°c)
Third line: PArA

Water quality reading (conductibility):
First line: CO
Second line: value - correct value (-99us/cm2 ~ 99us/cm2)
Third line: PArA

Number of cycles (next version)
First line: ---0
Second line: number of cycles
Third line: CYCL

For save and exit press PROG button for 5 sec or press the TEST button for 3 seconds only for exit.

Appendix 5: Function Setting

1. Keep pressing “TEST” for 5 seconds to enter the setting function in the standard interface.

2. Press “PROG.” to switch functions (as shown below).

   POT1 – PrIn – USB – PumP – CO – PrES – DrY – LOAd – tESt – PtPA -

3. For change the values or the setting press “TEST” or “START” .

4. For start the functions read the annex to the manual.

5. Once finished, to exit, save the new setting press “PROG” button for 5 seconds or press TEST button only for exit; than appear on standby interface;

   NB. For save the consumption of electricity the autoclave has the “sleeping mode” activate always; by the setting POT1 is possible to set the activation time of the function after the cycle.

Function Items:

Time setting for the sleeping mode:
First line: POT1
Second line: current value (30min, 60min, 120min, 240min)

Printer activation:
First line: PrLn
Second line: on/off

USB activation:
First line: USb
Second line: on/off

Water quality Testing:
First line: CO
Second line: on/off

Activation Water Pump for the automatic load of clean water :
First line: PumP.
Second line: on/off

Drying time Setting:
First line: dry.
Second line: 1, 2, 3

Internal pressure – select the internal initial pressure 0 or 100 KPa
First line: PRES
Second line : 0 or 100

Save data on the Memory- insert the usb key and then press START for 3 sec.
First line: LOAD
Second line: START

Print parameters – press START 3 sec. for start the function - final report on the printer
Firs line: PTPA
Second line: START

TEST components on the device –press STARt for 3 sec. - final report on the printer
First line: TESt
Second line: START

Appendix 6: Parameter Setting

1. Press “TEST + START” together for 5 seconds to check or change the parameters of the autoclave

2. Press “PROG.” or “TEST” to switch temperatures as shown below:

   T1– T2 – P1 – PHI --PH – PU – HIGH - CO – VA

3. Press “TEST” to increase and “START” to decrease the values.

4. Once finished, to exit, save the new setting press “PROG” button for 5 seconds or press TEST button only for exit; than appear on standby interface;

Parameters:

T1 adjustment(inner): factory setting don't change it
First line: - t1-
Second line: current value (-2.0℃ ~ 2.0℃)

T2 adjustment(inner): factory setting don't change it
First line: - t2-
Second line: current value (-2.0℃ ~ 2.0℃)

Pressure adjustment: factory setting don't change it
First line: - P1-
Second line: current value (-20kpa ~ 20kpa)

Pressure First Vacuum adjustment: factory setting don't change it
First line: - PHI
Second line: current value (60kpa ~ 90kpa)

Pressure others vacuum: factory setting don't change it
First line: PH
Second line: current value (50-90 kpa)

Minimum Vacuum Alarm adjustment: factory setting don't change it
First line: - PV-
Second line: current value (40kpa ~ 70kpa)

Positive pressure setting
First line: HIGH
Second line: current value (120-180 kpa)

Water quality adjustment: factory setting is 25-35 uS
First line: - CO-
Second line: current value (-99us/cm2 ~ 99us/cm2)

Number of fractionated vacuum of the cycle:
First line: -VA-
Second line: 1 -3 -5

After the modify for save the new setting press PROG for 3 seconds or not to save and exit press TEST for 3 seconds.

Appendix 7: Bluetooth or Wifi Setting (function not activated)

2. User Defined Settings (user program):

For enter in the setting of the USER program open the door and press PROG button for 5 seconds.

In the setting is possible to set:

Sterilization time: 4-30 min
Sterilization temperature: 121 or 134 °c
Number of the fractionated vacuum: 0,1,3,4,5
Drying time: 0,1,2,3 (zero min., 9min., 14min, 19min.)

Press “TEST” to switch between the items. Press “PROG.” to increase and “START” to decrease the values. Once the setting is chosen, press “TEST” to confirm and save and to return to the standard interface.

Appendix 8: Cleaning Program

It is possible to clean the water valve, steam generator, along with the water pipes and all the internal circuits.

When the cleaning cycle start, all the valves will be open, the vacuum pump is ON and the machine produce pressure and vacuum so is possible to remove the dirty parts inside the circuit. The vacuum pump push the water and the impurities to the used water tank.

Time of cycle:4 minutes

Description:

Press “TEST” and then press the “  ” symbol which represents the cleaning program. Press “START” to begin the program.

As the program is finished, the machine will automatically return to the standard interface.

Repeat this program if necessary.

NB Factory advice is use the cleaning program evry week and start 2 or 3 cleaning program before any technical action because many times the problems are micro particles of limestones of the normal water on the surface of the handpieces and oil inside the handpieces.

Appendix 9: The report

This sterilizer is able to save the report for any cycle by an internal printer and a USB key in digital format (.txt format). ***(Figure AP8a)***

Figure AP8a

Please insert the USB key that you find in the accessories in the special port that is on the upper left side of the autoclave like in the picture.

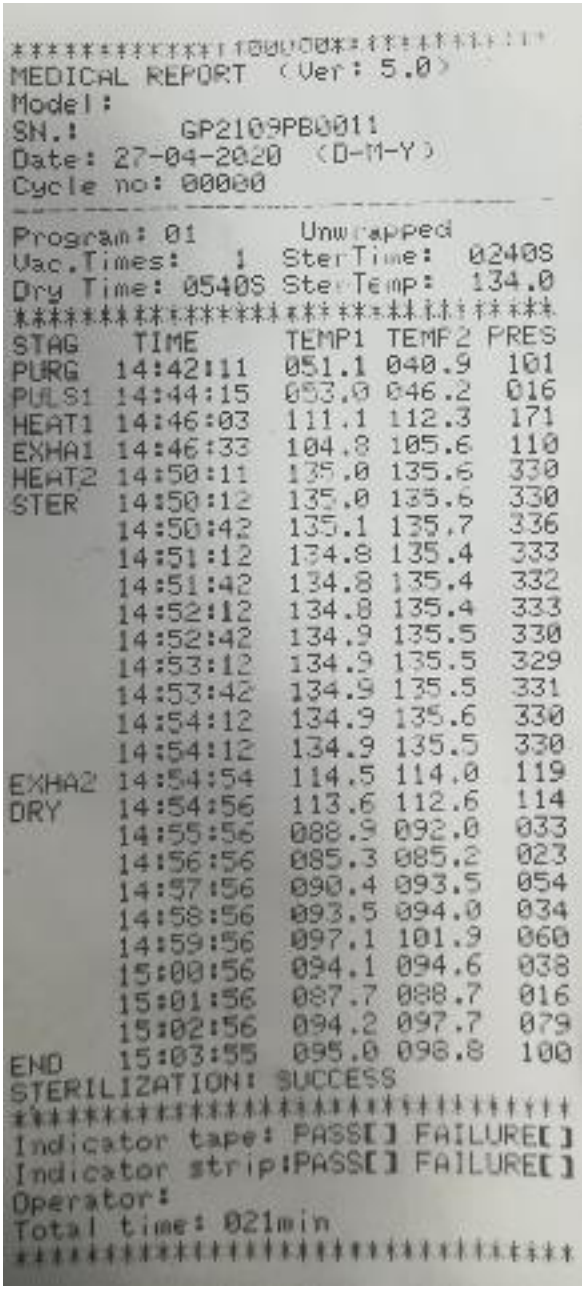
Do not insert or remove the key when the autoclave is on! There is the risk of losing all data files.

The machine is able to save a lot of reports (depends of the kind of cycle example is able to save 999 B cycle reports).

For save and read on the USB key, insert the key in the lateral port, enter in setting mode (press TEST for 5 seconds), by the button PROG go to the function “Copy all” and press START button. On the display will appear a number counter; when all reports are saved on the key the display returns in standby mode.

All reports are saved on a single file that is on TXT format.
Inside the file there is a vertical list of the reports exactly the same of the reports on the roll paper.

Appendix 10: Printer Report



```
MEDICAL REPORT  (Ver: 5.0)
Model:
SN.:       GP2109PB0011
Date: 27-04-2020  (D-M-Y)
Cycle no: 00000
--------------------------------
Program: 01        Unwrapped
Vac.Times:    1  SterTime:  0240S
Dry Time: 0540S SterTemp:  134.0
**********************************
STAG    TIME      TEMP1 TEMP2 PRES
PURG  14:42:11  051.1 040.9  101
PULS1 14:44:15  053.0 046.2  016
HEAT1 14:46:03  111.1 112.3  171
EXHA1 14:46:33  104.8 105.6  110
HEAT2 14:50:11  135.0 135.6  330
STER  14:50:12  135.0 135.6  330
      14:50:42  135.1 135.7  336
      14:51:12  134.8 135.4  333
      14:51:42  134.8 135.4  332
      14:52:12  134.8 135.4  333
      14:52:42  134.9 135.5  330
      14:53:12  134.9 135.5  329
      14:53:42  134.9 135.5  331
      14:54:12  134.9 135.6  330
      14:54:12  134.9 135.5  330
EXHA2 14:54:54  114.5 114.0  119
DRY   14:54:56  113.6 112.6  114
      14:55:56  088.9 092.0  033
      14:56:56  085.3 085.2  023
      14:57:56  090.4 093.5  054
      14:58:56  093.5 094.0  034
      14:59:56  097.1 101.9  060
      15:00:56  094.1 094.6  038
      15:01:56  087.7 088.7  016
      15:02:56  094.2 097.7  079
END   15:03:55  095.0 096.8  100
STERILIZATION: SUCCESS
**********************************
Indicator tape: PASS[ ] FAILURE[ ]
Indicator strip:PASS[ ] FAILURE[ ]
Operator:
Total time: 021min
**********************************
```

Version
Model
Serial number of the autoclave
Date
Number of the cycle

Program selected
Information about the program

Value of the vacuum moment (in this case 1-time Vacuum process)

Pressure process and values

Sterilization process and value time, pressure and temperature

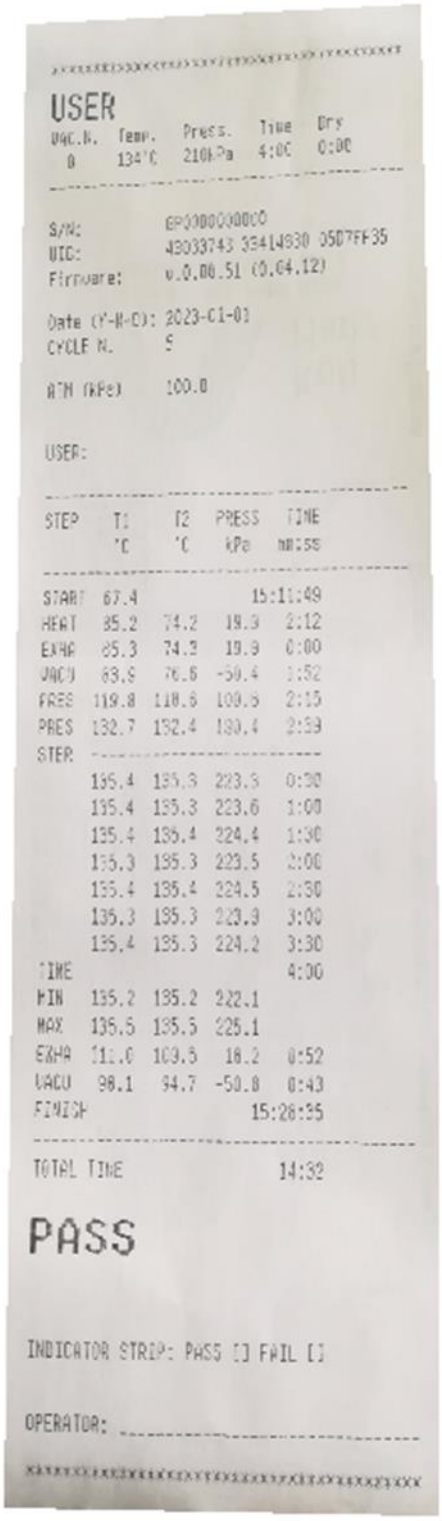
Exhaust process

Drying process and values

Final result (positive or negative)
Space for the user signatures

Time of the cycle

Last kind of report



USER

VAC.N.	Temp.	Press.	Time	Dry
0	134°C	210kPa	4:00	0:00

S/N: GP0000000000
UID: 43033743 39414830 050FFF35
Firmware: v.0.00.51 (0.04.12)

Date (Y-M-D): 2023-01-01
CYCLE N. 5

ATM (kPa) 100.0

USER:

STEP	T1 °C	T2 °C	PRESS kPa	TIME hh:ss
START	67.4			15:11:49
HEAT	85.2	74.2	18.9	2:12
EXHA	85.3	74.2	18.9	0:00
VACU	83.5	76.6	-50.4	1:52
PRES	119.8	118.6	109.6	2:15
PRES	132.7	132.4	130.4	2:39
STER				
	135.4	135.3	223.5	0:30
	135.4	135.3	223.6	1:00
	135.4	135.4	224.4	1:30
	135.3	135.3	223.5	2:00
	135.4	135.4	224.5	2:30
	135.3	135.3	223.9	3:00
	135.4	135.3	224.2	3:30
TIME				4:00
MIN	135.2	135.2	222.1	
MAX	135.5	135.5	225.1	
EXHA	111.0	109.5	18.2	0:52
VACU	98.1	94.7	-50.8	0:43
FINISH				15:26:35
TOTAL TIME				14:32

PASS

INDICATOR STRIP: PASS [] FAIL []

OPERATOR: _____

INFO ABOUT THE KIND OF PROGRAM

SERIAL NUMBER OF THE MACHINE
SERIAL NUMBER OF THE CPU
VERSION OF THE FIRMWARE
DATE
NUMBER FO THE CYCLE
ATMOSPHERIC PRESSURE
NAME OF USER

HEATING PHASE
VACUUM PHASE
PRESSURE

STERILIZATION PHASE

DRYING PHASE

TIME

FINAL RESULT

STRIP INDICATOR RESULT

OPERATOR SIGN

New report

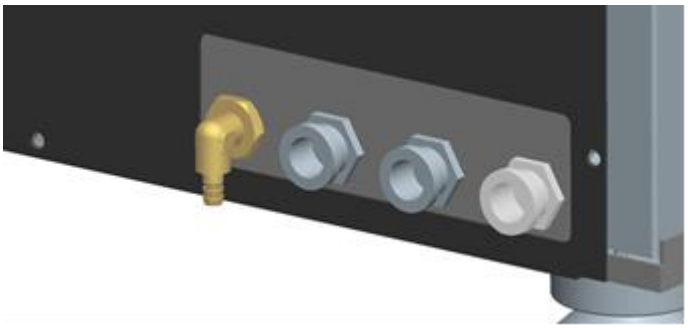
Appendix 11 Drain pressure tube for the tank of used water.

On the lower rear side of the autoclave there is a quick connector for a tube.

This tube is the drain pressure tube; during the cycle the chamber releases pressure some time (three times for the B class cycle and one times for the S class cycle).

To drain the pressurized air from the used water tank, use the drain tube and insert it in the fitted drain of the clinic.

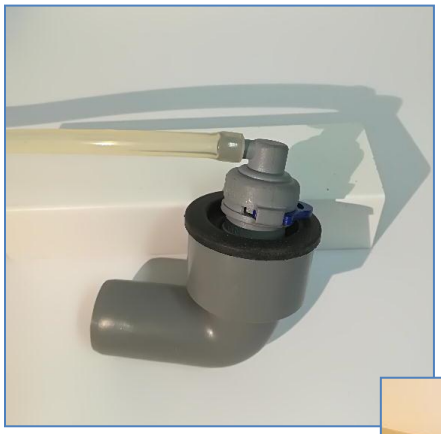
The staff working in the sterilization area must not breathe this steam. For this reason, it is sent through a tube directly into the nearest outlet (drain to the wall or floor, or a sink drain).



rear connection

Pressure drain – water in – water out (drain) - osmosis system

Here are three connection examples for the drain :



Appendix 12 : replacing the steam generator

Normally replacing the steam generator, is a long and difficult process.

However, in this autoclave the steam generator is fixed to an opening on the bottom of the machine; this allows the process to be faster and easie .

Caution : remember that the steam generator is directly attached to the thermostat .

When removing the steam generator, you ‘ll also remove the thermostat.

Steps for the sostitution :

Switch off the machine

Make sure the tanks are emptied

Rotate the machine on its side (A)

Unscrew the two screws of the used water tank supports (B)

Disconnect the connectors of the enter and exit tubes of the steam generator (C)

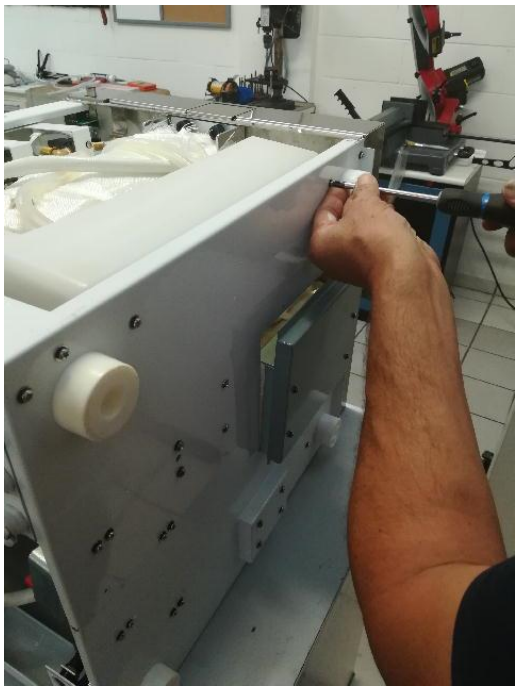
Unscrew the four screws of the opening. (D)

Disconnect the alimentation wires of the heating elements from the thermostat and from the main board and the black power supply wire from the thermost. (E)

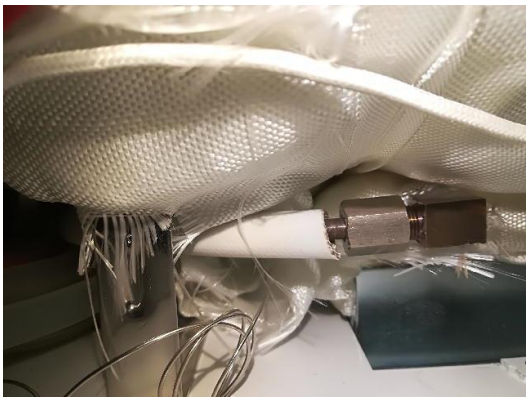
Unscrew the two screws of the thermostat. (E)

Pull out the steam generator. (F)

A. BOTTOM SIDE



B. USED WATER TANK SCREWS

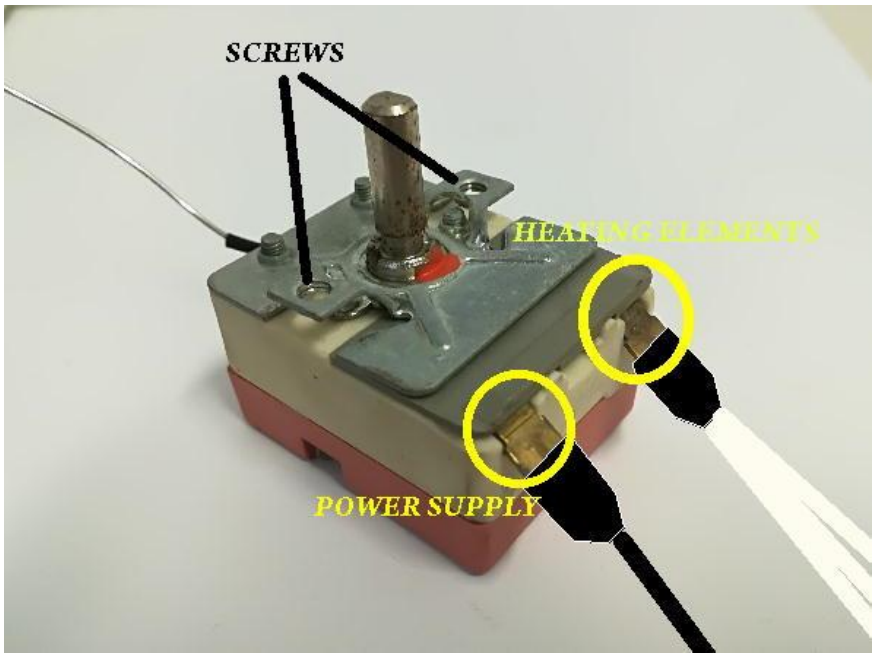


C.

ENTER CONNECTOR

EXIT CONNECTOR

D. OPENING SCREWS



E. THERMOSTAT CONNECTIONS

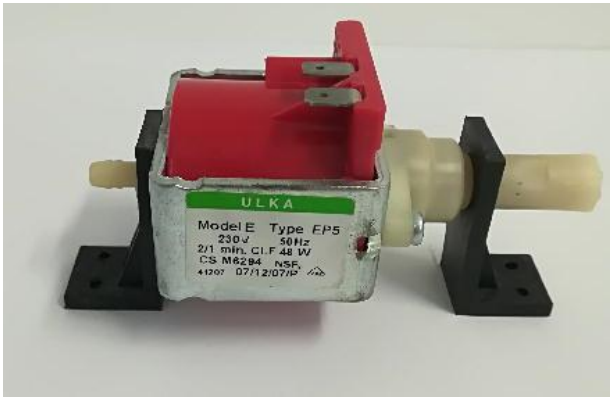
F. OPEN VIEW

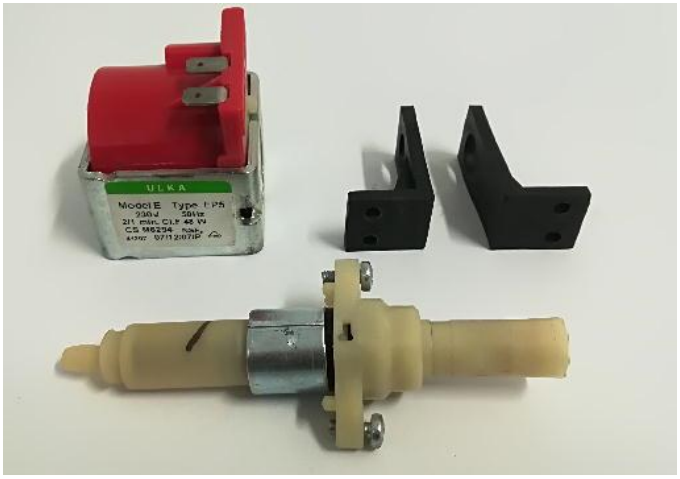
Appendix 13: ULKA pump cleaning

In case of any problem with the ULKA pumps, our advice to clean the internal parts.

To do so please follow the steps below:

- Unscrew the four screws that fix the rubber support of the pump.
- Remove the rubber supports from the pump
- Unscrew the two side screws and pull out the inner nylon core of the pump.
- To open, slightly rotate (check the connector in the picture) and pull apart the two sections.
- Clean the ball and the black oring inside, clean and control the internal tube and reassemble it.


ULKA
Model E Type EP5
230 V 50 Hz
2/1 min. Cl. F 48 W
CS M6294 NSF


ULKA

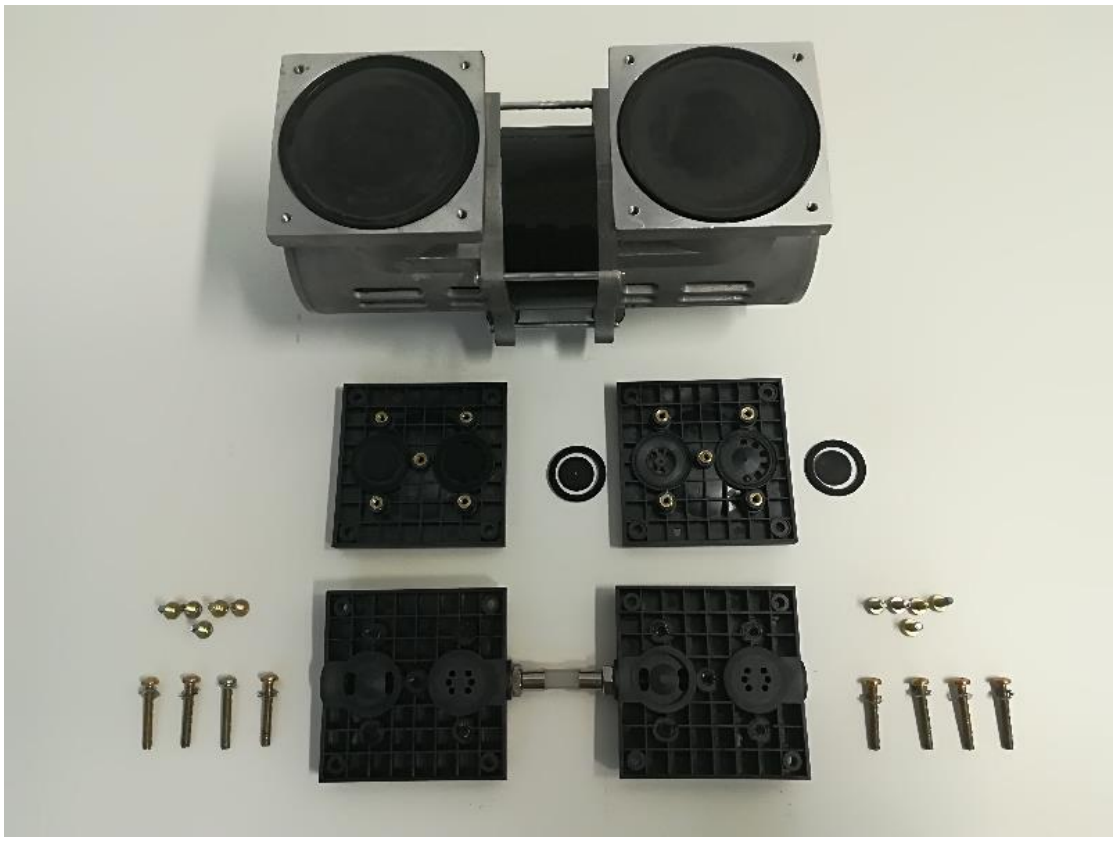
Appendix 14: replace the head membrane of the vacuum pump

If the vacuum values during the cycle are not respected, check the efficiency of the pump.

We advise to clean the membrane of the heads of the pump.

- To remove the pump with the rubber support, unscrew the four screws on the bottom of the machine.

- Disconnect the two tubes (in and out)
- Disconnect the electrical connections
- Unscrew the five screws on each head and open it.
- Wash and Clean thoroughly, with no alcohol product, the membrane.



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PRIMA Service Manual

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Technical Document

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SINCE 1935

Company Profile

Over 80 years of Italian design and technology of the world's finest dental instruments.
Quality and passion since 1935

For tears Galbiati has satisfied the professional requirements of its clients, especially in Italy and in Europe. The new challenge is to move the brands to a world level. Global, dynamic, with an international profile but Italian soul, Galbiati still makes of innovation and quality the successful drivers for its future.

Our History

In 1935 Gaetano Galbiati founded the Galbiati company.
Innovation, reliability and versatility would have been the undisputed keys to success.

Beta (1952), Glenos (1056), G65 (1965), Sintomatic (1974) and the most recent Scout Lux, Fox, Smart, Ego (2006) and Fox New (2007) were the key of Galbiati Success.

Today, Galbiati continues to bring together the same care and the same spirit of the past.

It is now our pleasure to welcome you to the vibrant and advancing Galbiati Family