mocom®
Sistemi innovativi di sterilizzazione

STEAM STERILIZER

millennium® B

SERVICE MANUAL

Rev. 1

1. UTILIZATION

GENERAL

APPLICABLE EUROPEAN DIRECTIVES

The product described in this manual is manufactured in accordance with the highest safety standards and doesn't represent any danger for the operator if used according to the following instructions.

The product is in accordance with the following European Directive as applicable:

73/23/CEE, for the approximation to the legislation of the Members States related to low voltage equipment (and following modifications).
2004/108/CEE, for the approximation to the legislation of the Members States related to the electromagnetic compatibility (and following modifications);
93/42/CEE, concerning the medical devices (and following modifications);

SYMBOLS USED THROUGH THE MANUAL

☞ Pay special attention to the paragraphs indicated by the pointing finger.

WARNING! This symbol indicates a potential danger of injury. Follow the procedures described in the manual to avoid injuring the user and/or others**.**

DANGER! This symbol indicates a potential danger of property damage. Follows the instructions in the manual to prevent potential damage to materials, equipment or other property**.**

CAUTION! This symbol indicates a potential danger due to the high temperature.

The material the sterilizer is composed of must be disposed according to the directive 2002/96/CEE

GENERAL NOTES

☞ The information included in this manual are subject to changes without any notice.
MO.COM. Ltd. Co. won't be responsible for direct, indirect, accidental, consequent damages or other damages related to the supply or the use of such information.
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INTENDED USE

The product described in this manual is exclusively intended for the sterilization of solid and hollow re-usable instruments and porous materials.

THE DEVICE MUST ONLY BE USED BY QUALIFIED PERSONNEL. IT MAY NOT BE USED OR HANDLED BY INEXPERT AND/OR UNAUTHORIZED PERSONNEL FOR ANY REASON.

This device must not be used for the sterilization of fluids, liquids or pharmaceutical products.

GENERAL WARNINGS

When using this product, **always** follow the instructions in the manual and never use for anything other than its intended purpose.

THE USER IS RESPONSIBLE FOR ALL LEGAL REQUIREMENTS RELATED TO THE INSTALLATION AND USE OF THIS PRODUCT. THE MANUFACTURER WILL NOT BE RESPONSIBLE FOR ANY BREAKAGE, MALFUNCTIONS, PROPERTY DAMAGE OR INJURY IN THE EVENT THAT THE PRODUCT IS NOT INSTALLED OR USED CORRECTLY.

Please observe the following precautions in order to avoid injury or property damage:

– Use **ONLY distilled water** of high quality.
The use of water of inadequate quality can severely damage the equipment. *See* ***Characteristics of the filling water***.

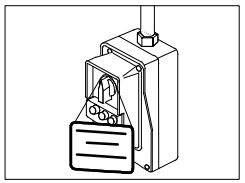
– Do not pour water or other liquids on the equipment;

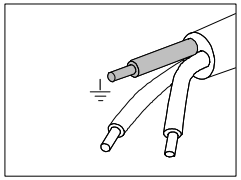
– Do not pour inflammable substances on the equipment;

– Do not use the equipment in the presence of gas or explosive or inflammable vapors;

– Before performing any maintenance or cleaning, **ALWAYS DISCONNECT** the electricity.

Whenever it is not possible to disconnect the electricity to the device, or if the external power grid switch is far away or, at any rate, not visible to the maintainer, place a WORK IN PROGRESS sign on the external power grid switch after turning it OFF.





– Make sure the electrical system is **grounded** conforming to current laws and/or standards;

– **Do not** remove any label or nameplate from the device; request new ones, if necessary.

– Use **only original replacement parts**.

The failure to observe the above, releases the manufacturer from all liability**.**

M.O.COM. CUSTOMER SERVICE

M.O.COM. Ltd. Co. is completely available to customers to provide any technical information about the product as well as to offer suggestions and advice on steam sterilization procedures.

In this regard, please refer to the following address:

M.O.COM. Srl
Customer Support
Via delle Azalee, 1
20090 Buccinasco (MI)
ITALY

Tel. (+39) 02-45701505
Fax (+39) 02-45701258
e-mail at@mocom.it

PRODUCT OVERVIEW

Millennium B is MO.COM.'s revolutionary type B (EN 13060) small steam sterilizer and a new de facto standard for safety, performance, flexibility and ease of use.

It is a sophisticated but, at the same time, easy to use device that, thanks to its wide range of configuration options and patented operating devices, satisfies every need for sterilizing medical devices, guaranteeing the maximum performance under all conditions.

It also features a better way of relating to users who, rather than having to adapt to the machine and its characteristics, are able to "converse" with it and configure it to meet their own needs.

Thanks to its remarkable ease of use, small size and pleasant appearance, it is the ideal partner for all professional who demand the maximum sterilization safety

Millennium B is a completely microprocessor-controlled steam sterilizer with a sterilization chamber (17-liter) made of stamped stainless steel.

It is characterized by an advanced fractionated vacuum system for the complete removal of air, even from hollow, porous materials, and an effective final vacuum drying phase capable of eliminating all traces of humidity from any load.

Its exclusive steam generation system, effective plumbing circuit and electronic management (supplemented by high-precision sensors) guarantees high process execution speeds and excellent thermodynamic parameter stability.
Moreover, its Process Evaluation System constantly monitors all the machine's “vital” parameters in real-time, guaranteeing absolute safety and a perfect result.

It offers users **11** sterilization programs (of which one completely programmable), all equipped with customizable, optimized drying for the fast, effective sterilization of the various types of loads (instruments and materials) used in a medical environment.
Four of these can be selected directly from the control panel, which has a new simplified, design.

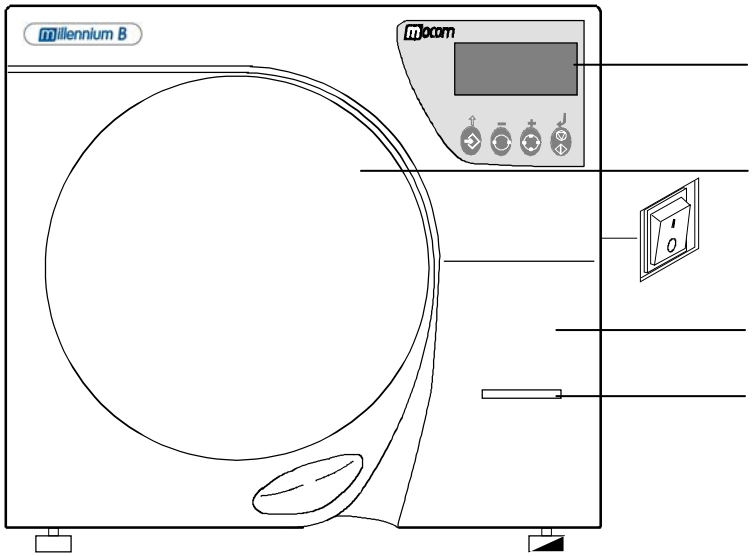
And then, there are interesting options for configuring the preheating mode (based on the sterilizer's frequency of use), printing the end of cycle report, methods for filling the water supply, draining the used water and more.

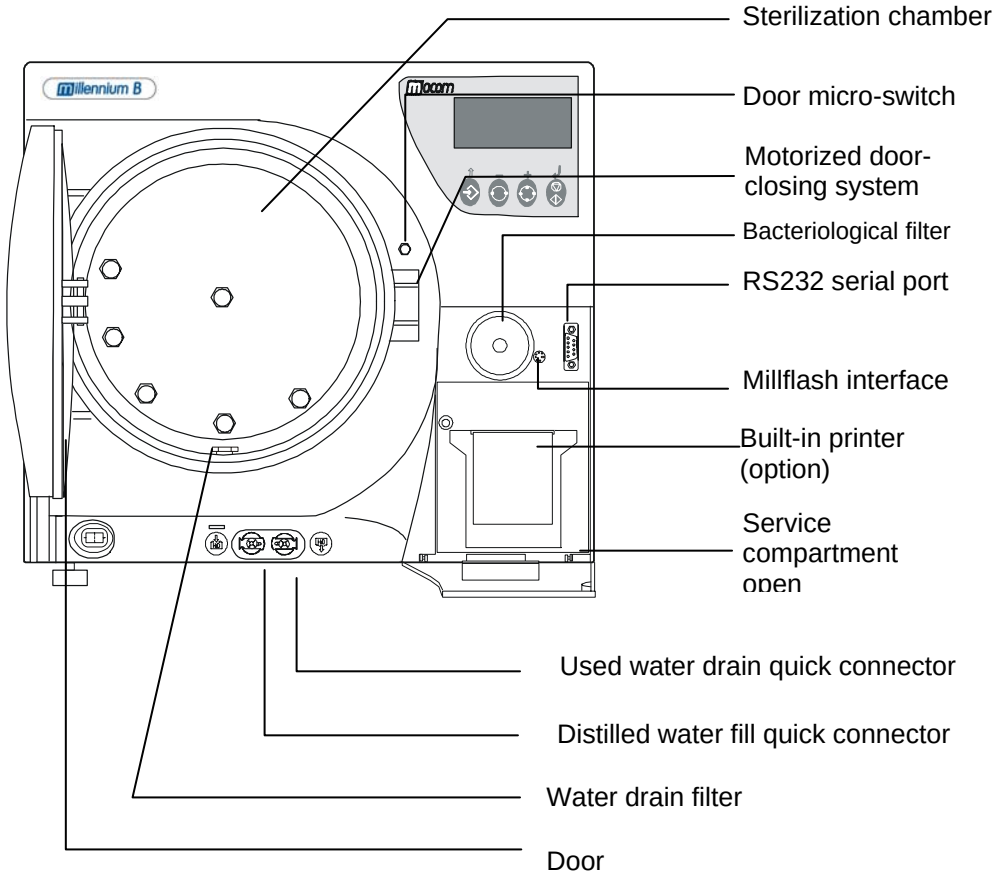
Please refer to the chapter, “**Setting**” for more detail.

Finally, **Millennium B** has one of the most complete, sophisticated and advanced safety systems available today to protect users in the case of any electrical, mechanical, thermal or biological operating anomaly.

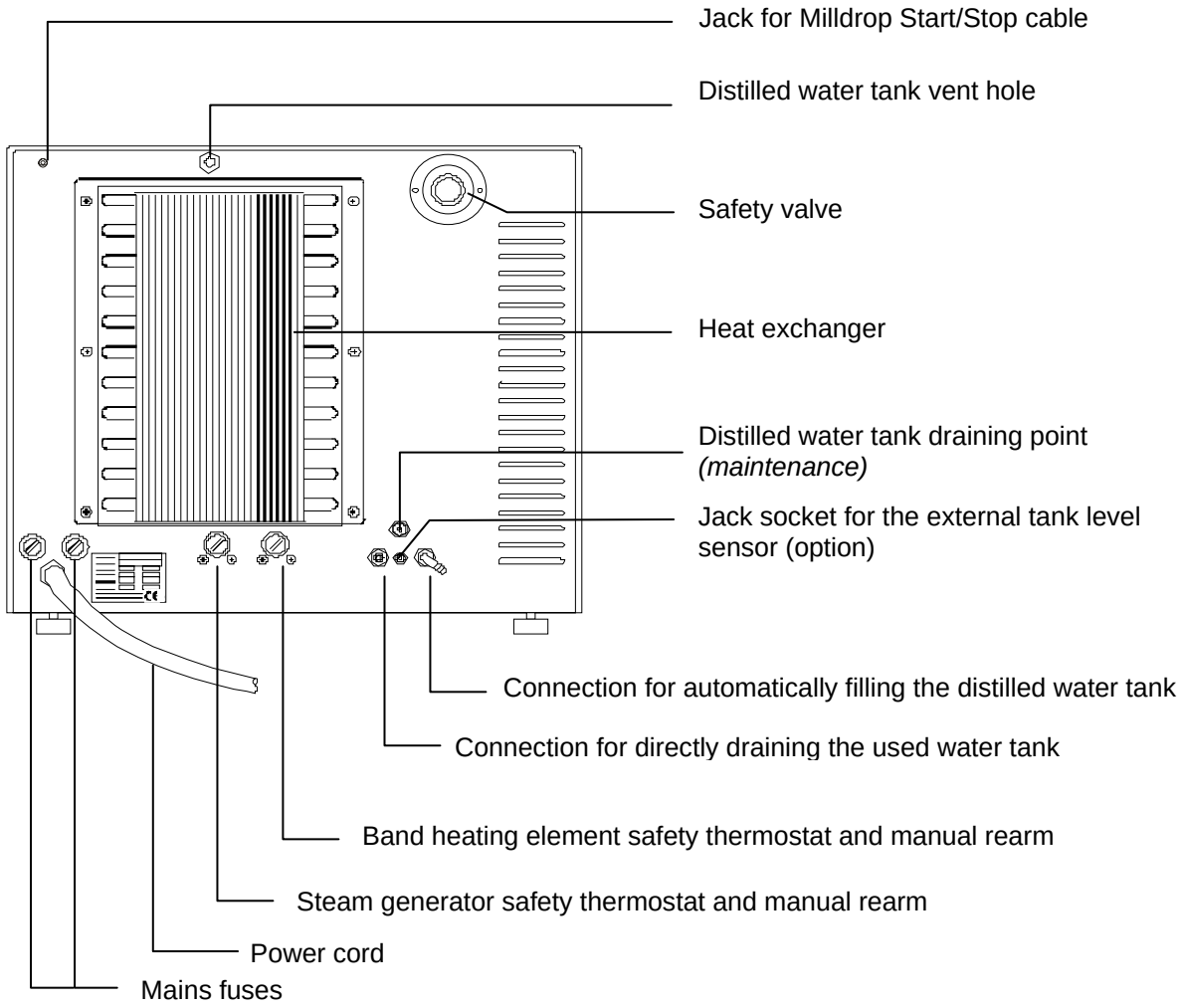
☞ Please refer to chapter ***Technical characteristics*** for a description of the safety devices.

FRONT VIEW

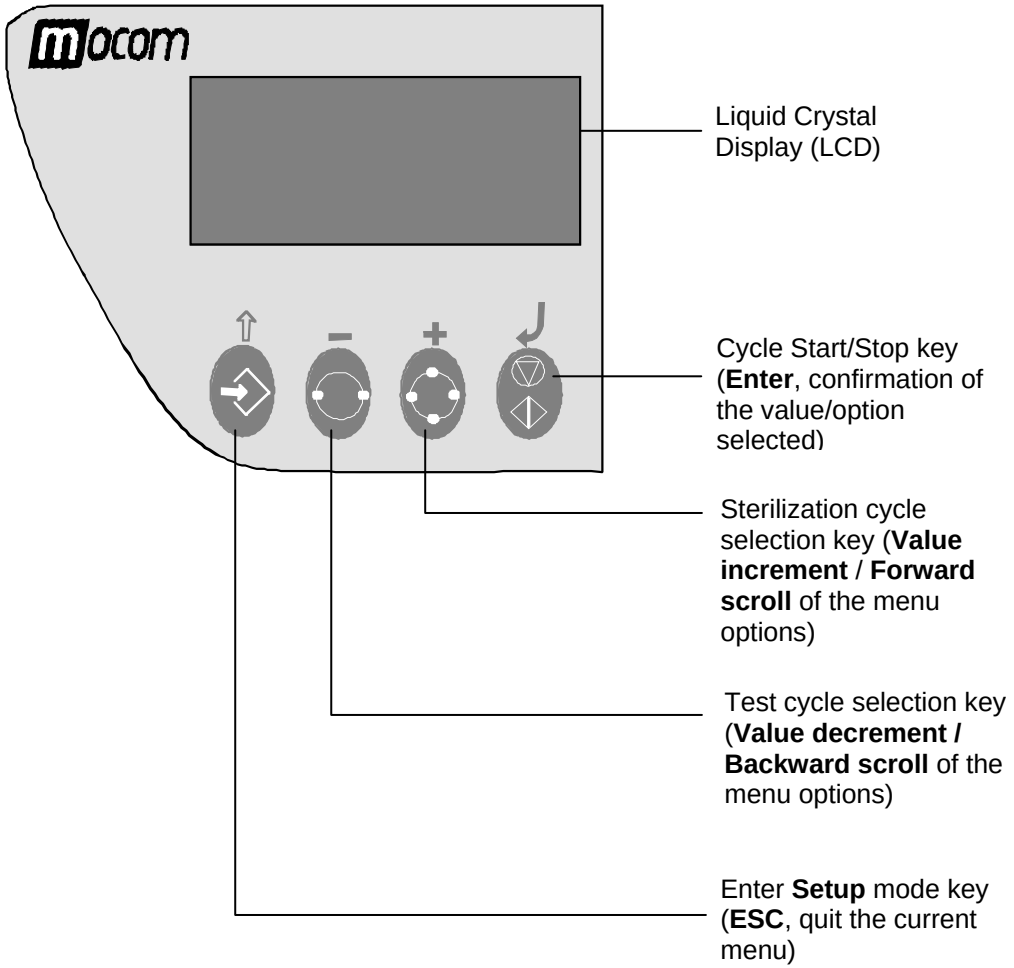

millennium B
LCD display and control panel
Door
on/off switch
Service compartment access panel
Printer paper output slot (option)


millennium B
Sterilization chamber
Door micro-switch
Motorized door-closing system
Bacteriological filter
RS232 serial port
Millflash interface
Built-in printer (option)
Service compartment open
Used water drain quick connector
Distilled water fill quick connector
Water drain filter
Door

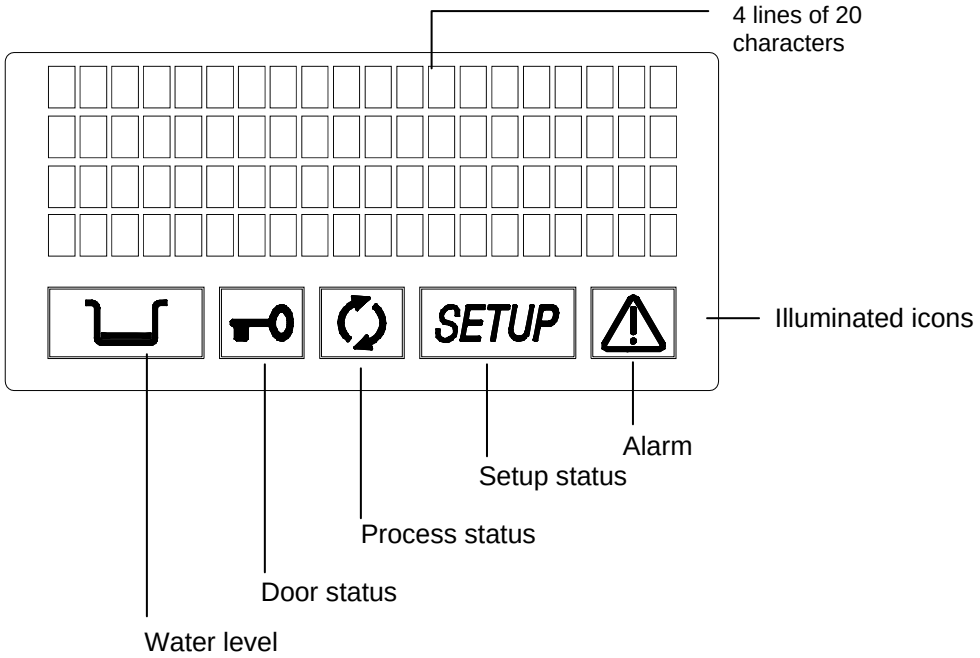
REAR VIEW


Jack for Milldrop Start/Stop cable
Distilled water tank vent hole
Safety valve
Heat exchanger
Distilled water tank draining point
(maintenance)
Jack socket for the external tank level
sensor (option)
Connection for automatically filling the distilled water tank
Connection for directly draining the used water tank
Band heating element safety thermostat and manual rearm
Steam generator safety thermostat and manual rearm
Power cord
Mains fuses

CONTROL PANEL



LCD DISPLAY



TECHNICAL CHARACTERISTICS

Equipment	Steam sterilizer
Classification (as per 93/42/CEE)	IIa
Manufacturer	M.O.COM. S.r.l. Via delle Azalee, 1 20090 BUCCINASCO (MI) - ITALY
Power supply	220/240 V
Frequency	50/60 Hz
Mains fuses *(6,3 x 32 mm)*	F 16A 250V
PCB fuses (board type "G") *(5 x 20 mm)*	F1: **T 5A 250V** *(trafo secondary winding – 24V)* F2: **T 2A 250V** *(digital signal 5V / analog 12V)* F3: **T 2A 250V** *(trafo primary winding – 230V)* F4: **F 200mA 250V** *(door-locking protection)* F5: **F 1.25A 250V** *(door-locking gear motor overload)* F1 PTR: **T 5 A** *(printer protection- optional)*
PCB fuses (board type "T") *(5 x 20 mm)*	F1: T 6,3A 250V *(trafo secondary winding)* F2: T 3.15A 250V (*trafo primary winding)* F1 PTR: T 3,15A 250V (*printer protection - optional)*
External dimensions *(LxDxH)*	480 x 560 x 420mm *(excluding rear connections)*
Nominal power	2300 W (10A)
Insulation class	Class I
Installation category	Cat. II
Environment of use	Internal use
Noise level	<60 db(A) max

Environmental operating conditions	Temperature: Relative Humidity: Altitude:	+15°C ÷ +40°C max 80%, non condensing max 3000 m *(a.s.l.)*
Net weight	approx. 50 kg approx. 55 kg approx. 59 kg	*(empty)* *(empty, with trays and support)* *(empty, with trays and supports and water at Max level)*
Sterilization chamber dimensions *(Ø x D)*	**250** x **350** mm	
Sterilization chamber total volume	about **17 l**	(0.017 m^3)
Sterilization chamber useful volume *(with tray supports inserted)*	about **10 l**	(0.010 m^3)
Distilled water tank capacity *(supply)*	about **4.6 l** about **0.8 l**	*(water at **MAX** level)* *(water at **MIN** level)*
Sterilization programs	Available: Pre-sets: *user)*	**11** **4** *(direct selection by*
Test programs	HELIX/BD Test Vacuum Test	
Preheating time *(from cold)*	about **10 minutes**	
RS232 serial interface	**DB-9 pin**	*(female) connector*
Bacteriological filter *(PTFE filtering element)*	Porosity: Connection:	**0.2** µm male **1/8" NPT** connector

SAFETY DEVICES

The sterilizer is equipped with the following safety devices for which we provide a brief description of their function:

– **Mains fuses** (see summary table data)
Protection inside the device against a fault in the heating elements.
Action: cuts the electricity.

– **Fuses protecting the electronic circuits** (*see summary table data*)
Protection against a fault in the primary transformer circuit and low voltage uses.
Action: cuts power to one or more low-voltage circuits.

– **Thermal circuit breakers on the mains voltage windings**
Protection against overheating of the vacuum pump motor and the primary transformer windings.
Action: temporary cut-off (until cooling) of the winding.

– **Safety valve**
Protection against overpressure in the sterilization chamber.
Action: release of the steam and restoration of the safety pressure.

– **Steam generator manual rearm safety thermostat**
Protection against steam generator overheating.
Action: cut-off of the electricity to the steam generator.

– **Heating element manual rearm safety thermostat**
Protection against overheating of the heating elements of the container under pressure.
Action: cut-off of the electricity to the chamber heating element.

– **Door position safety microswitch**
Confirmation of the correct closing position of the door of the container under pressure.
Action: signals wrong door position.

– **Mechanized door lock mechanism with electromechanical protection (pressure switch)**
Protection against accidental opening of the door (even in a blackout).
Action: prevents accidental opening of the door during a program.

– **Door lock mechanism safety microswitch**
Confirmation of the correct closing of the door lock.
Action: signaling the failure or incorrect operation of the door lock mechanism.

– **Self-leveling plumbing system**
Plumbing system structure for the spontaneous leveling of the pressure in the case of a manual interruption of the cycle, alarm or blackout.
Action: automatic restoration of atmospheric pressure in the sterilization chamber.

– **Integrated system for evaluating the sterilization process**
Continuous verification of the sterilization process parameters entirely managed by microprocessor.
Action: immediate interruption of the program (in case of anomaly) and generation of alarms.

– **Monitoring of the sterilizer's operation**
Real-time oversight of all significant parameters when the machine is powered.
Action: generation of alarm messages (in the case of anomaly) with possible interruption of the cycle.

CHARACTERISTICS OF THE FILLING WATER

DESCRIPTION	WATER SUPPLY VALUES	*VALUES IN CONDENSATE*
DRY RESIDUE	< 10 mg/l	*< 1 mg/l*
SILICON OXIDE SiO_2	< 1 mg/l	*< 0,1 mg/l*
IRON	< 0,2 mg/l	*< 0,1 mg/l*
CADMIUM	< 0,005 mg/l	*< 0,005 mg/l*
LEAD	< 0,05 mg/l	*< 0,05 mg/l*
HEAVY METAL RESIDUES (except iron, cadmium and lead)	< 0,1 mg/l	*< 0,1 mg/l*
CHORIDES	< 2 mg/l	*< 0,1 mg/l*
PHOSPHATES	< 0,5 mg/l	*< 0,1 mg/l*
CONDUCTIVITY AT 20°C	< 15 µs/cm	*< 3 µs/cm*
pH VALUE	5 - 7	*5 - 7*
APPEARANCE	colorless, transparent, without sediments	*colorless, transparent, without sediments*
HARDNESS	< 0,02 mmol/l	*< 0,02 mmol/l*

☞ When purchasing distilled water, always check that the quality and characteristics declared by the producer are compatible with those shown in the table.

The use of water for generating steam containing contaminants in levels exceeding those shown in the table will significantly shorten the sterilizer's life.
In addition, this may increase the oxidation of more sensitive materials and increase lime residues on the generator, boiler, internal supports and instruments.

INSTALLATION

GENERAL

The first and fundamental step in achieving good sterilizer operation, long life and complete use of its features is a correct, careful installation. Moreover, this precaution will avoid the danger of physical injury or property damage, not to mention malfunctions and damage to the machine. So, please follow the instructions in this chapter **scrupulously**.

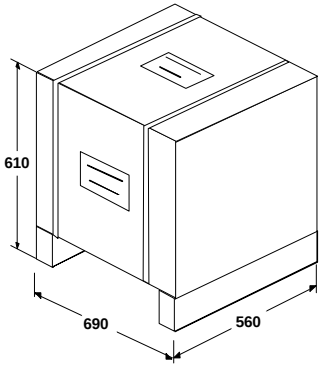
☞ ***M.O.COM. Customer Service*** will answer your questions and provide additional information

The sterilizer has passed all required inspections before being placed on the market. It does not require any additional calibration before being placed in service.

PACKING CONTENT

Dimensions and weight

Height	610 mm
Width	690 mm
Depth	560 mm
Total weight	ab. 67 kg

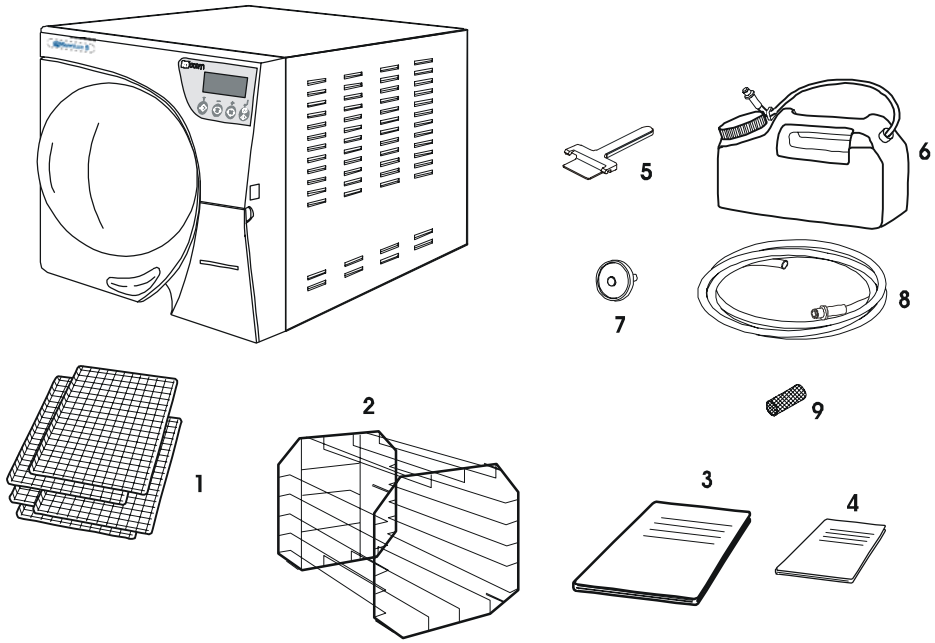


☞ Check the integrity of the package upon receipt.

Once the package is opened, check that:
- the supply matches the specifications of the order (see the accompanying document);
- that there is no obvious product damage.

☞ In the case of a wrong product, missing parts or any type of damage, immediately provide a detailed description to the reseller and the transporter that made the delivery.

Content



The package contains the following items:
- steam sterilizer;
- Stainless steel wire instrument tray (5 pcs.) (Ref. 1);
- Stainless steel wire tray support (Ref. 2);
- Instruction manual (Ref. 3);
- Warranty certificate (Ref. 4) (*see note*).
- Tray extractor (Ref. 5);
- Container with quick connector for adding distilled water (about 2 l) (Ref. 6);
- Extra bacteriological filter (Ref. 7).
- Silicone tube (2 m) for draining water, with quick connector (Ref. 8).
- Water drain filter (Ref. 9)

☞ The customer must keep the warranty certificate together with the receipt.

HANDLING THE PRODUCT

Where possible, the packaged product must be handled using suitable mechanical means (forklift truck, transpallet, etc.) and following the instructions shown on the package.
In the case of manual handling, the product must be lifted by two persons using the handles cut in the side of the box.

Once removed from the box, the sterilizer must be lifted by two persons and transported on a cart or other similar device.

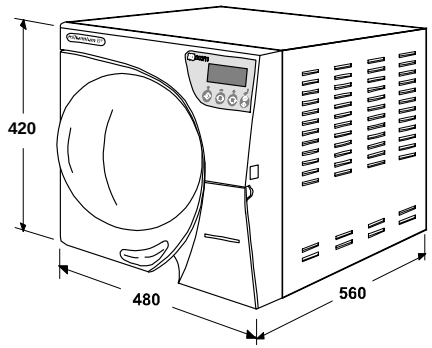
WE RECOMMEND THAT THE DEVICE BE TRANSPORTED AND STORED AT A TEMPERATURE NO LOWER THAN 5 °C. PROLONGED EXPOSURE TO LOW TEMPERATURE AN DAMAGE THE PRODUCT.

Keep the original packaging and use it whenever the device is to be transported. The use of different packaging could damage the product during shipment.

BEFORE TRANSPORT, LEAVE THE DEVICE TURNED-OFF FOR ABOUT 30 MINUTES AFTER THE LAST PROGRAM FINISHES AND DRAIN THE DISTILLED WATER AND USED WATER TANKS SO THAT THE ALL THE HOT INTERNAL PARTS WILL HAVE TIME TO COOL.

Dimensions and weight of the unit

- Height (total) 420 mm
- Width (total) 480 mm
- Depth (excluding rear connections) 560 mm
- Weight (total) 55 kg



GENERAL INSTALLATION PRECAUTIONS

Obey the following warnings for the correct operation of the device and/or to avoid **risky situations**:

- Install the sterilizer on a **flat surface**; if necessary, adjust the leveling feet to compensate for an irregular surface and to slightly tilt lower the front part of the sterilizer.
  Make sure that the support surface is strong enough to support the equipment weight (about 60 kg);
- **Leave adequate space for ventilation (at least 10 cm on each side) all around the sterilizer, especially in back.**
  If the device is built-in to a cabinet, be sure to respect the warnings in the preceding paragraph, avoiding an obstructions to the air intake;
- Do not install the sterilizer near tubs, sinks or similar places, to avoid contact with water or liquids. This could cause short circuits and/or potentially dangerous situations for the operator;
- Do not install the sterilizer in a place that is excessively humid or poorly ventilated;
- Do not install the machine were there is **gas** or inflammable and/or explosive **vapors**;
- Install the device so that the power cord is not bent or crushed. It must run freely all the way to the socket.
- Install the device that any external fill/drain tubing is not bent or crushed. They must run freely to the drain tank.

COMPARTMENT DIMENSIONS FOR BUILT-IN INSTALLATIONS

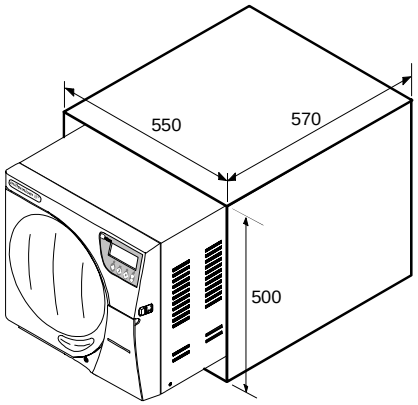
When installing the sterilizer inside a cabinet, you must provide adequate space all around the device (>10cm, specially in the rear part) to provide effective ventilation as well as a large enough opening in the back that, in addition to allowing the passage of the power cord will also provide an adequate air flow and the consequent optimum cooling of the heat exchanger.
It is indispensable that the built-in compartment have the following **minimum dimensions** shown in the figure:

COMPARTMENT DIMENSIONS LESS THAN THOSE SHOWN MAY COMPROMISE THE CORRECT CIRCULATION OF AIR AROUND THE DEVICE AND MAY NOT PROVIDE ADEQUATE COOLING, WITH THE CONSEQUENT DETERIORATION OF PERFORMANCE AND/OR POSSIBLE DAMAGE.

☞ If the main switch is inaccessible when installed in the compartment, use an electric plug that incorporates an on/off switch.

DO NOT REMOVE THE UPPER COVER OR ANY OTHER EXTERNAL PART. WHEN INSTALLED IN THE COMPARTMENT, THE DEVICE MUST BE COMPLETE WITH ALL ITS PARTS.

☞ Please refer to ***Technical Characteristics*** for complete technical data.

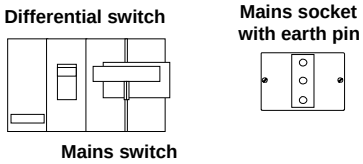


ELECTRICAL CONNECTIONS

The sterilizer's must be connected to a socket of the electrical system of adequate capacity for the device's absorption and ground provided, in conformity with current laws and/or standards.
The socket must be suitably protected by breakers having the following characteristics:

– Nominal current I_n **16 A**

– Differential current $I_{\Delta n}$ **0,03 A**



☞ **The manufacturer will not be liable for damages caused by installing the sterilizer on an inadequate electrical system and/or not equipped with a ground.**

If it is necessary to replace the plug on the power cord, use one with equal characteristics or, at any rate, adequate to the device's electrical characteristics. The user is entirely responsible for the selection and replacement of the plug.

☞ Always connect the power cord directly to the socket. Do not use extension cords, adapters or other accessories.

CONNECTING THE DATA RECORDING MILLFLASH

The sterilizer can be connected to MILLFLASH allowing the recording of the cycle data in .txt format file and its management by PC.

The connectors of the service box are used for interfacing; refer to MILLFLASH Operating Manual for the installation instructions.

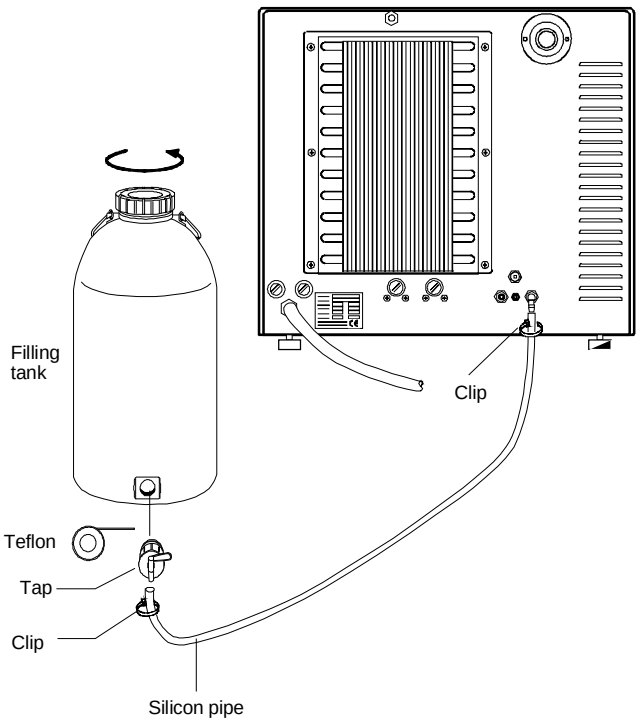
CONNECTING AN EXTERNAL WATER FILLING TANK

(OPTIONAL, automatic filling function)

To avoid having to periodically fill the water tank (see ***First start-up***), it is possible to connect the sterilizer to an external filling tank (supplied as an option), that the user will periodically fill, or to a commercially-available, reverse-osmosis water purification system with accumulation tank.

In that case, when the internal water tank reaches the MIN level, the autoclave activates a pump that automatically fills the internal tank.

Follow the instructions below for the correct connection of the external tank:



- Install the tap provided on the filling tank; use Teflon tape or connector sealant for a perfect seal .
- Use the filling tanks silicone tube (or other suitable tube, max length 2 m) and insert it on the filling connector taking care to push it completely on.
- Lock the tube to connector with the plastic tie provided.
- Insert the other end of the tube on the tap of the filling tank.
- Make sure that the tube runs freely from the device to the filling tank, without being bent, crushed or obstructed in any way.
- Loosen the upper plug to facilitate the flow of water (also remove any gasket or under-plug);
- Open the tap on the filling tank.

☞ For this option setting, refer to chapter "***Configuring the equipment –***filling option**"**).

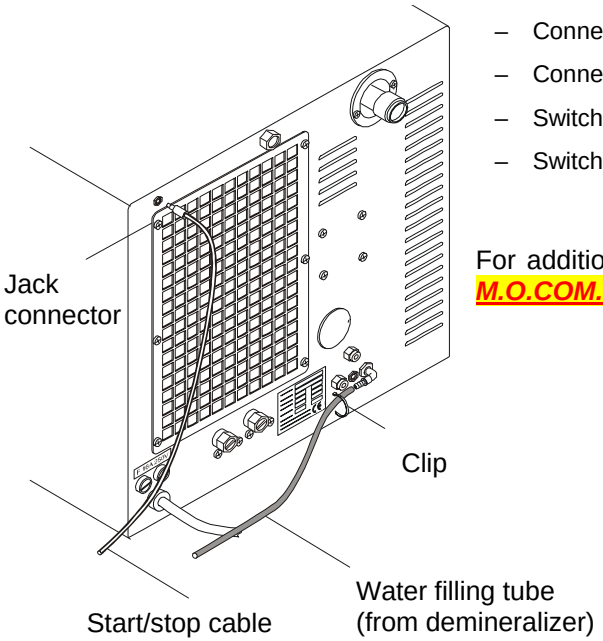
For additional information and advice about the correct connection of the sterilizer to the various water purification systems, contact ***M.O.COM. Customer Service***

CONNECTING DEMINERALIZER MILLDROP

(OPTIONAL, automatic filling option)

The sterilizer can be connected to MILLDROP (water treatment reverse osmosis system) warranting the automatic reservoir filling with high quality demineralized water.

Refer to MILLDROP operating manual for the installation instructions:



- Connect the supplied water filling tube to the rear fitting point; lock with clip.
- Connect the supplied START/STOP cable to the rear jack connector.
- Switch on the MILLDROP.
- Switch on the sterilizer and set the filling option (see chapter "Setting tank filling mode".

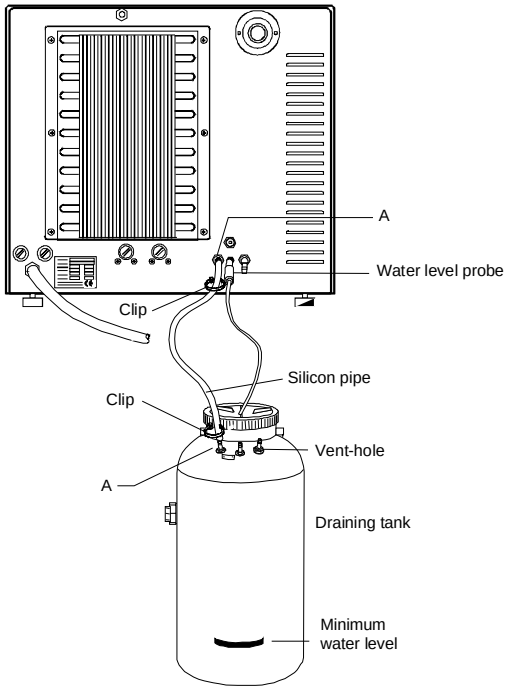
For additional information and advice about the correct connection of the sterilizer to the various water purification systems, contact ***M.O.COM. Customer Service*** .

CONNECTING AN EXTERNAL DRAIN TANK

(OPTIONAL, external drain function)

An external drain tank (supplied as an option) can be used to avoid having to periodically empty the internal used water tank, which is then manually emptied or connected to central drain system.

☞ Check that the drain silencer is correctly installed inside the tank, corresponding to connection “A”



Follow the instructions below for the **correct connection** of the tank:

– Insert the silicone tube (provided with the option) on connector A on the machine; push the tube all the way on and lock it with the plastic tie;

– Cut the silicone tube to measure, push the free end on connector A on the drain tank and lock it with the plastic tie;

☞ Make sure the tube is not bent, crushed or obstructed in any way

– Connect the plug of the level sensor to the jack (optional) on the back of the device (see figure);

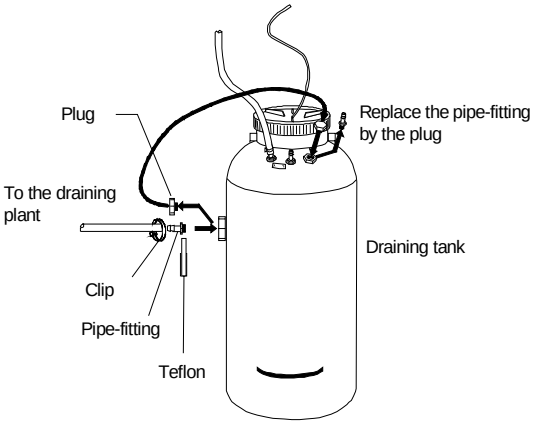
☞ Make sure the plug is correctly inserted. A poor connectin is interpreted as a MAX level signal, with a consequent alarm whenever you insist on starting the cycle.

– Fill the tank with normal tap water up to the level marked on the container.

☞ For this option setting, refer to chapter “**Configuring the Device** – Setting the water draining mode”.

HOT WATER AND STEAM UNDER PRESSURE COME OUT OF THE DRAIN CONNECTORS. CONNECT ALL THE ELEMENTS OF THE DRAIN CIRCUIT CAREFULLY TO AVOID PROPERTY DAMAGE AND/OR INJURY

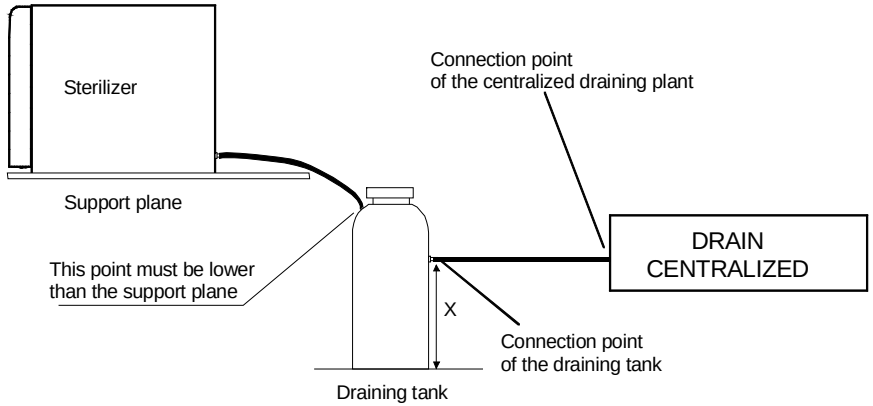
To avoid having to periodically empty the draining tank, it is possible to connect it directly to a central drain.



– Insert the screw plug in place of the free vent hose union on the side connector of the draining tank;
– Screw the 1/8" hose union, supplied, on the side connector; use a wrench to hold the connector to be tightened;
– Use Teflon tape or connector sealant for a perfect seal.
– On this tube union, insert a tube of suitable material and dimensions (NOT SUPPLIED); push the tube all the way on and lock with the plastic tie provided.
– Connect the other end of the tube to the centralized draining point, checking the seal.

☞ Make sure the tube is not bent, crushed or obstructed in any way.

The following diagram provides an indicative arrangement of the components:



Dimension **X** is the height of the side connector of the tank above the floor. The connection between the tank and the centralized draining point MUST no higher than x+30 mm. ***Higher connections could compromise the correct emptying of the tan.***

DIRECT CONNECTION TO A CENTRALIZED DRAINING POINT

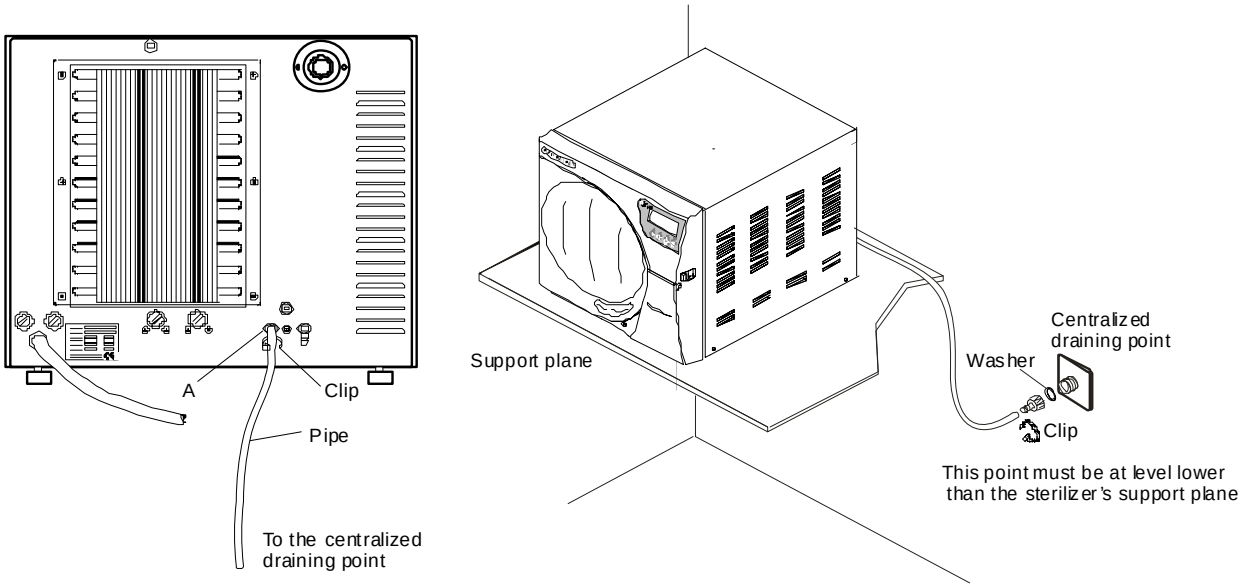
Follow the instructions shown below for a **correct direct connection** to a centralized draining point:

– Insert the silicone tube (provided) or other suitable plastic tube on hose union A; push the tube all the way on and lock with the plastic tie or other means;

– Cut the tube to measure, push the free end on the connection provided on the centralized draining point and lock with the plastic tie or other means;

☞ Make sure the tube is not bent, crushed or obstructed in any way.

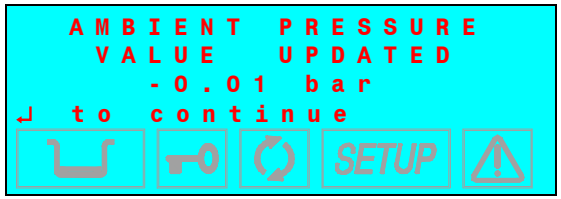
The following diagram provides an indicative arrangement of the components:



☞ The connection point to the central drain must be lower than the sterilizer's support surface. Otherwise, the tank may not empty correctly.

ACQUISITION AND UPDATING THE AMBIENT PRESSURE VALUES

The sterilizer measures the ambient pressure for the correct operation of several auxiliary devices. Whenever the difference between the value read and that previously stored (see the Chapter, **"Configuring the Device - Acquisition the ambient pressure**) is **higher** than a set value, the system **automatically** updates the stored value after a brief delay. Otherwise, the data remains unchanged without updating.
After updating, the device performs the initial automatic test procedure (see ***Initial self test***). At the end, the display shows the following **notice** (accompanied by a beep):



When ↵ is pressed, the device goes to ***STAND-BY mode*** .

CONFIGURATION

General

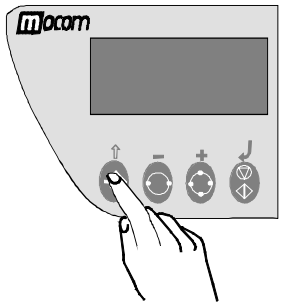
Millennium B offers personalization options never previously seen on any steam sterilizer. Users may configure the device to meet their own needs. For example, the device's performance may be adapted on the basis of the type of activity, the type of material to be sterilized or its frequency of use.

The SETUP program allows selecting from numerous options that users activate through an intuitive, easy-to-use menu.

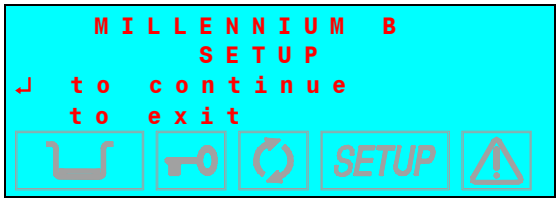
☞ Use the SETUP program whenever necessary. A correctly personalized device provides the best performance and the most satisfactory use.

☞ ***Customer Service by M.O.COM*** is available to help users by providing suggestions or advice on the best way to uses the options in the SETUP program.

Starting and entering the Setup Mode



To start the **SETUP** program, hold down the key on the control panel for several seconds, until the display shows:



☞ Icon SETUP on the display lights-up and stays on or the entire configuration phase.

When you press the ↵ key, you enter the SETUP mode. The screen shows the first-level menu items (see the paragraph ***SETUP Flowchart***).

Pressing the **ESC** key quits the SETUP program and takes you back to normal operation (stand-by mode).

☞ The SETUP program can only be started in STAND-BY mode. It is not accessible during sterilization or test cycles.

Meaning of the keys in Setup mode

In SETUP mode the control panel keys have different functions than in normal mode.

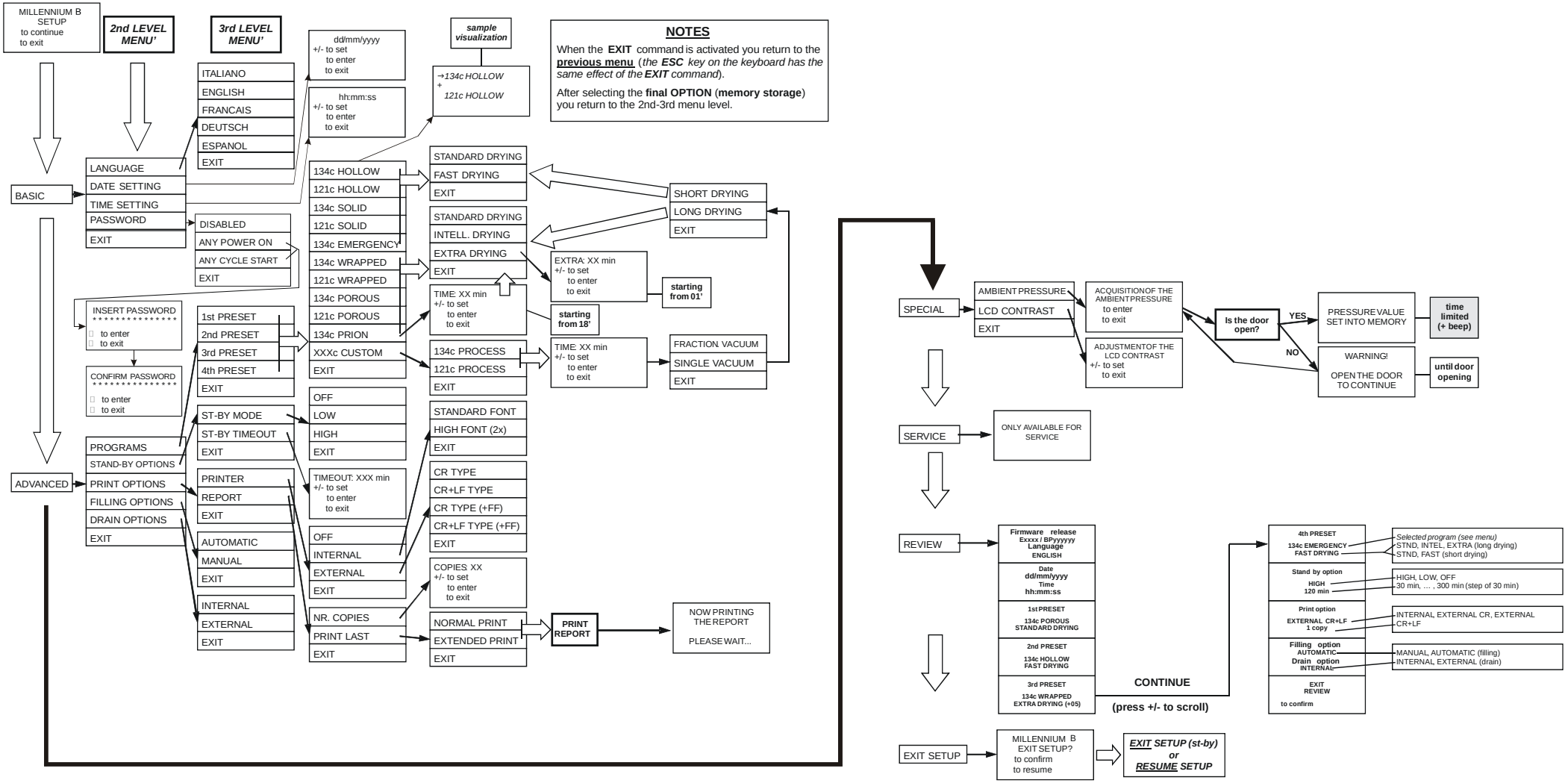
Symbol ↵ Function ENTER, confirm the selected option or value

Symbol **+** Increase the value /scroll down

Symbol **-** Decrease the value /scroll up the menu items

Symbol **ESC**, exit the selected menu option

Setup flow diagram



Menu items

Now, we describe the meaning of the various main menu and second-level menu items.

MAIN menu
The main menu has 6 entries that open additional (second-level) menus:

BASIC	(**basic** options)
ADVANCED	(**advanced** options)
SPECIAL	(**special** options)
SERVICE	*(menu **not accessible** to users)*
DATA REVIEW	(**summary** of options selected)
EXIT SETUP	(**exit** the SETUP program and return to normal operation. *See paragraph **Exiting the SETUP mode***)

BASIC menu
The Basic menu (basic options) consists of the items:

LANGUAGE	(**language** setting)
DATE SETTING	(setting the current **date**);
TIME SETTING	(setting the current **time**)
PASSWORD	(setting the **password**)
EXIT	(**exit** the BASIC menu and return to the main menu)

ADVANCED menu
The Advanced menu (advanced options) consists of the items:

PROGRAMMES	(setting preselected **sterilization programs**, shown on the LCD display)
STAND-BY OPTIONS	(**stand-by** mode settings)
PRINT OPTIONS	(setting **printer** and **printing options**)
FILLING OPTIONS	(setting modes for **filling** the distilled water tank)
DRAIN OPTIONS	(setting the modes for **emptying** the used water tank)
EXIT	(**exit** the ADVANCED menu and return to the main menu)

SPECIAL menu
The Special menu (special options) consists of the following items:

AMBIENT PRESSURE	(acquisition of the **ambient pressure**)
LCD CONTRAST	(adjusting the **contrast** of the Liquid Crystal Display
EXIT	(**exit** the SPECIAL menu and return to the main menu)

SERVICE menu
The Service menu can **ONLY** be accessed by the Service department:

COMPONENT TEST
TEST CYCLES
MOCOM *(only for the manufacturer)*
H2O CIRCUIT
COUNTER RESET
FACTORY DATA
TECHNICAL REPORT
PT1 CORRECTION
EXIT

DATA REVIEW menu
The Data Review displays a summary of the device's **current settings**, allowing users to verify their correctness.

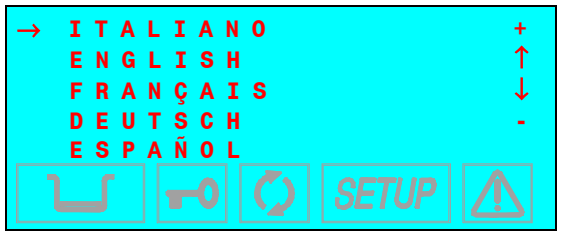
Now, we provide a detailed explanation of how to select the various available options.

ACTIVATING CONFIGURATION OPTIONS – BASIC MENU

Setting the language

(LANGUAGE on the BASIC menu)

Select **LANGUAGE** using the ↵ key. The following screen will appear :



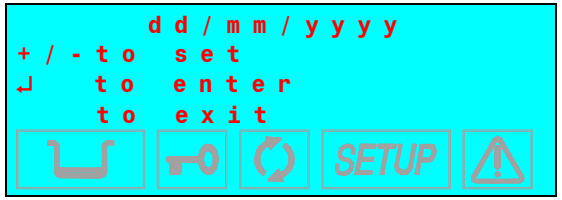
Select the desired language. Move using the **+** or **–** keys and confirm using the ↵ key to store the selection. After the data is confirmed, you return to the second-level menu.

☞ As soon as the selection is confirmed, all the menus of the SETUP program will be displayed in the language set.

Setting the Date

(DATE SETTING on the BASIC menu)

When **DATE SETTING** is selected with the ↵ key, you will see:



Proceed as follows:

– The day **flashes**: set the current date with the **+** and **-** keys. Confirm with ↵.

– The month **flashes**: set the current month with the **+** and **-** keys. Confirm with ↵.

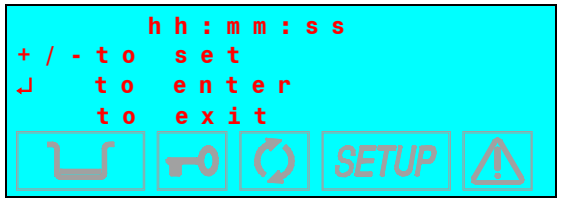
– The year **flashes**: set the current year with the **+** and **-** keys. Confirm with ↵.

The date is stored. Once the last confirmation is given, you return to the second-level menu.

Setting the Time

(TIME SETTING on the BASIC menu)

When **TIME SETTING** is selected with the ↵ key, you will see:



Proceed as follows:

– The hours **flash**: set the current hour with the **+** and **-** keys. Confirm with ↵.

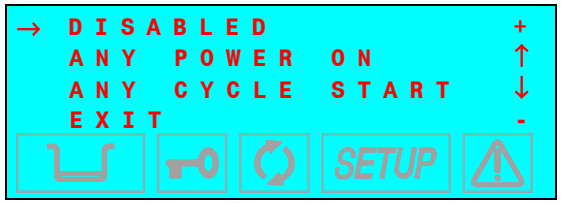
– The minutes **flash**: set the current value with the **+** and **-** keys. Confirm with ↵.

The time is stored. Once the last confirmation is given, you return to the second-level menu.

Setting the Password

(PASSWORD on the BASIC menu)

When PASSWORD is selected with the ↵ key, you will see this menu:



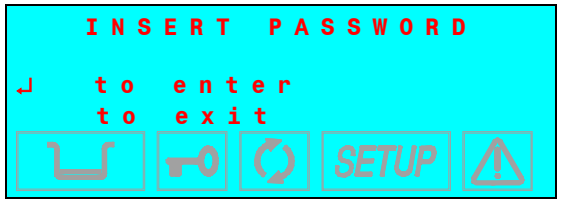
Select **DISABLED** to use the device freely, without any limitation on operator access.

Select **ANY POWER-ON** to protect the machine with a password at the time it is turned-on (power-on from the main switch).
This makes sure that the machine can only be powered-on by authorized personnel, but afterwards it can be used by others without limitation.

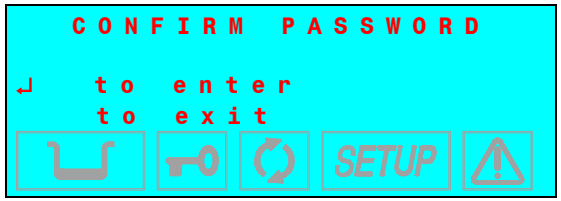
Select **ANY CYCLE START** to protect the autoclave with a password to be entered both at power-on and at the start of every sterilization program.
Only authorized personnel will be able to use it.

☞ Entering a password provides more controlled use of the product but, at the same time, inevitably makes it more cumbersome. So as not to overly complicate using the device, we recommend only activating this option when it is really needed.

When the **ANY POWER-ON** or **ANY CYCLE START** options are selected, the following screen is displayed:



Enter the password with the **+** and **–** keys (fixed length, **8 characters**). Confirm with the ↵ key. Then, the following message will appear:



Enter the password again using the **+** and **–** keys. Confirm with the ↵ key

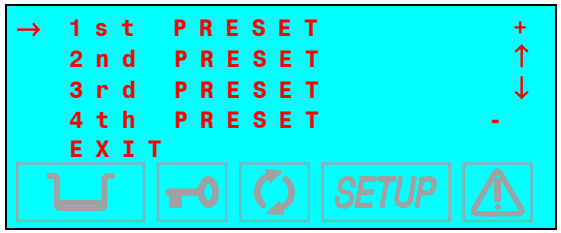
☞ To change the password, first select the DISABLE option, which cancels the previous password, and then select the ANY POWER-ON or ANY CYCLE START option, entering the new password as described above.

Setting the sterilization programs

(PROGRAMMES on the ADVANCED menu)

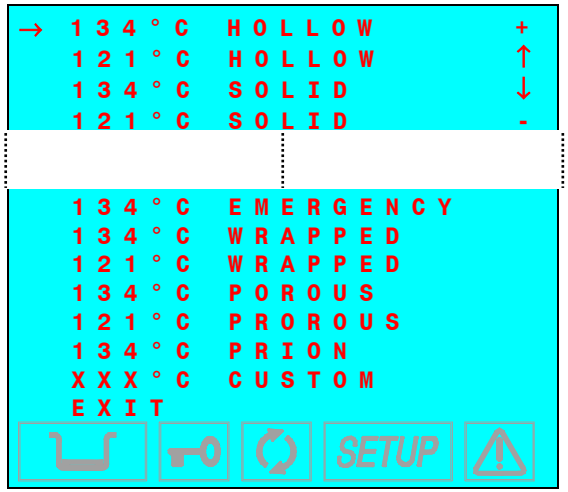
The program setting and their storing in four pre-set positions is achieved in various steps using several menus in sequence.
Each pre-set position can be associated to a **standard** or user configurable cycle (**CUSTOM**).
Let's look at the two cases separately.
To associate a **standard program** and define several of its parameters, proceed as follows:

1. Select **PROGRAMS** using the ↵ key; the following menu appears:



Define the position (**1**, **2**, **3** or **4**) to which the sterilization program will be associated using the **+** and **-** keys. Confirm with the ↵ key.

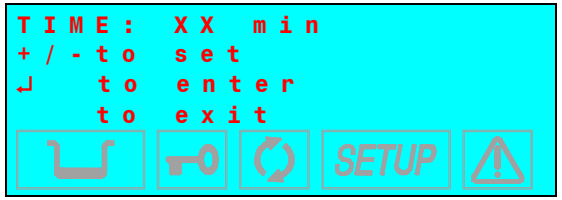
2. From here, you enter the list of available cycles:



Using the **+** and **-** keys, scroll the list until you identify the sterilization program desired.

3. Confirm the selection with the ↵ key.

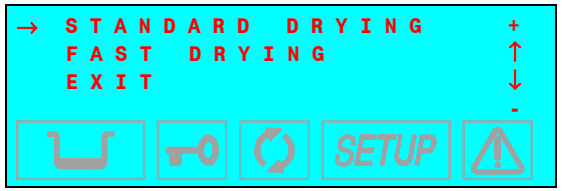
When the **PRION** program is selected, you will go to a screen for selecting the sterilization time.



A value can be set, starting from **18** minutes.

As a function of the choices made, you will go to one of two alternative menus that allow selecting the type of drying to associate to the selected program .

a) Programs with short drying (HOLLOW, SOLID, EMERGENCY):



It is possible to select **STANDARD** mode (the default setting) or **FAST** (reduced drying, recommended for light loads). Move using the **+** and **-** keys and confirm with the ↵ key.

☞ The EMERGENCY program provides only FAST drying

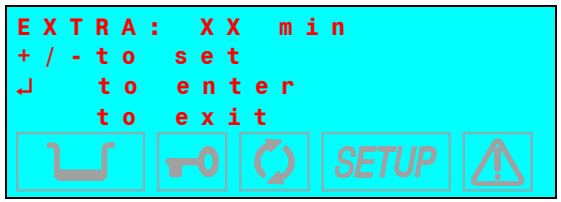
b) Programs with long drying (POROUS, WRAPPED, PRION):

It is possible to select **STANDARD** (default setting), **INTELLIGENT** (automatic drying that adjusts its duration longer or shorter than standard drying on the basis of the volume and/or quantity and type of load) or **EXTRA** (drying extended by a selectable value, recommended for critical loads). Move using the **+** and **-** keys and confirm with the ↵ key.

☞ With large loads or special materials, the STANDARD option may not provide a perfect result. In this case, extend the drying phase by using the EXTRA mode.

☞ With particularly complex types of loads (such as wrapped instruments in a "container" for sterilization) "intelligent" drying may not work correctly, with worse than expected results. In these cases, use the STANDARD or EXTRA options, depending on the need.

When the **EXTRA** option is activated, the following screen appears:



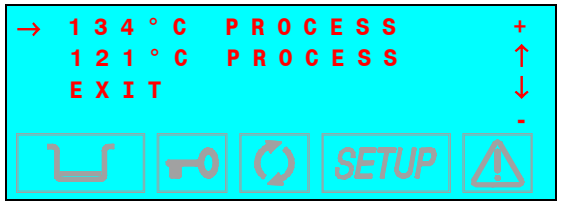
which permits setting the duration of extra drying from between **1** and **15** minutes (time to be added to the STANDARD DRYING time). Set the value using the **+** and **-** keys and confirm the selection with the ↵ key.

☞ The selection can be changed at any time by following the procedure described above.

☞ Whenever an identical sterilization program is already present in another position, the selection is not accepted. The following warning appears on the display, along with a beep:

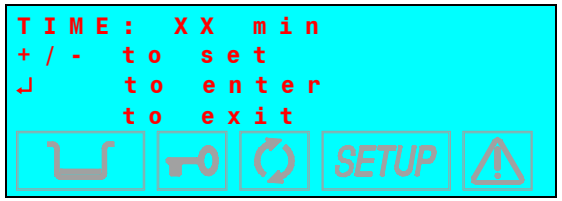
To define the **CUSTOM** program to associate to one of the pre-set position (**1**, **2**, **3** or **4**) proceed as follows:

1. Select **PROGRAMS**, select the program number to which the program is to be associated (see the previous description) and then select **CUSTOM** in the next screen; the following menu appears:



   Select **121 °C** to perform a custom program with a sterilization process at **121 °C** or **134 °C** for one at 134 °C. Move using the **+** and **-** keys and confirm with the ↵ key.

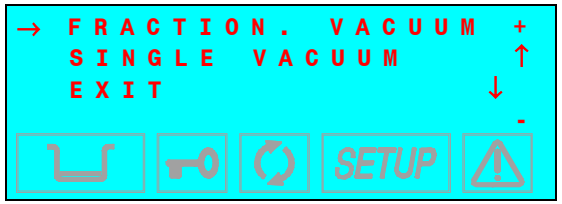
2. You will then go the screen:



   Use the + and - keys to set the duration of the sterilization process and confirm with the ↵ key.

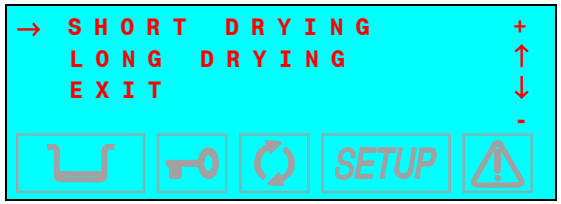
☞ The duration of the sterilization process is variable from 4 to 30 minutes for the program at 134 °C, and from 20 to 30 minutes for the program at 121 °C.

3. After selecting the time, you go to the menu where you specify the type of initial vacuum:



Select **FRACTION.** to perform a fractionated vacuum (indispensable for sterilizing hollow bodies and porous materials), or **SINGLE** for a single preliminary vacuum phase (solid instruments). Move using the **+** and **-** keys and confirm with the ↵ key.

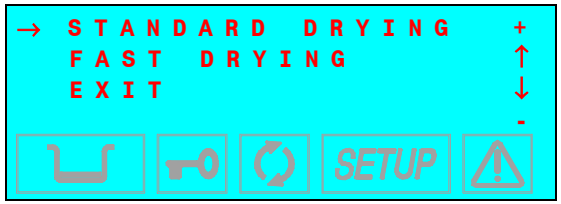
4. At this point, you come to another menu where you set the drying mode:



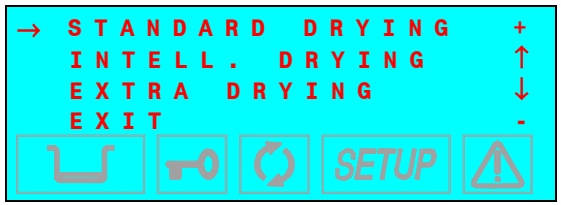
Select **LONG** drying suitable for porous and/or wrapped loads, or **SHORT** if you need to sterilize solid, loose materials (and even hollow so long as not wrapped). Move with the **+** and **-** , confirm with the ↵ key.

5. Depending on the selection (**SHORT** or **LONG**) one of two different menus will open (these menus are the same for the standard cycles), i.e..

In **SHORT** mode the following is displayed:



In **LONG** mode the following is displayed :



For the choice criteria, refer to the instruction.

Whenever the CUSTOM program is already present in another position, the selection is not accepted. The following warning appears on the display, along with a beep:

☞ The selection can be changed at any time by following the procedure described above.

☞ The list of available programs, their screens and the characteristics of sterilizable materials (in relation to the programs) are reported in the **section 2**.

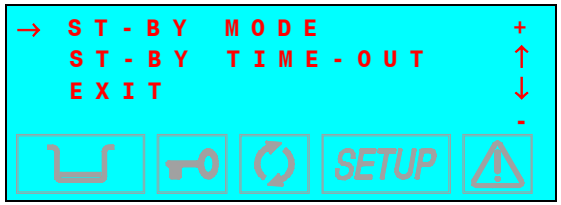
☞ Access to a CUSTOM cycle does not require a password. None of the combinations possible in the customization phase create any risks or dangers of injury to the operator or damage to the device.

Setting the STAND-BY modes

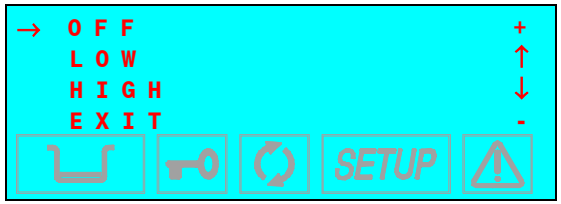
(STAND-BY OPTIONS on the ADVANCED menu)

Based on the equipment's frequency of use, or other considerations, it is possible to select the heating level during the STAND-BY (preheating) phase and the time beyond which STAND-BY is deactivated.

When you select **STAND-BY OPTIONS** with the ↵ key, you access the following menu:



When you select **STAND-BY MODE**, an additional menu appears where you can set the heating level:

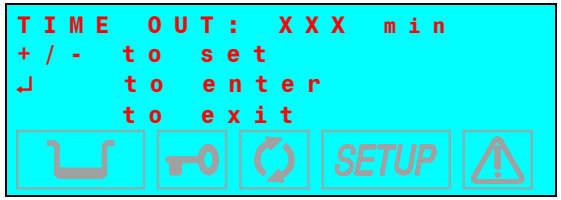


Select **HIGH** (high preheating level) for intense use or, at any rate, to reduce the wait time between one cycle and the next to a minimum.

Select **LOW** (low preheating) for normal use, since the wait time will be relatively shorter, in any case.

Select **OFF** (deactivate preheating) for occasional use. In this case, the wait time will be longer (up to about 10-12 minutes for a "cold start").
Move using the **+** and **-** keys; confirm with the ↵ key.

On the other hand, when the **ST-BY TIME-OUT** option is selected, it is possible to set the time for deactivating STAND-BY, i.e., how many minutes after the last cycle the heating elements are turned off.
The following screen appears:



It is possible to set a value between **0** and **300** minutes (in 30-minute increments), after which the heating elements are turned off (a condition analogous to STAND-BY OFF), avoiding the useless consumption of electricity.

Set using the **+** and **-** keys; confirm with the ↵ key.

☞ This option is also active with STAND-BY OFF. However, in this condition the timer value obviously has no effect since the heating elements are turned off anyway at the end of the sterilization program.

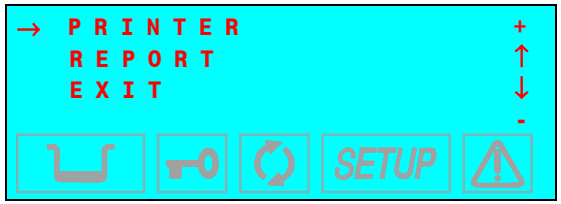
☞ When any cycle selection key (sterilization or test) is pressed, or the machine is turned off and on with the main switch, the original STAND-BY mode (HIGH or LOW) is immediately reactivated.

Setting the Printer mode

(PRINT OPTIONS on the ADVANCED menu)

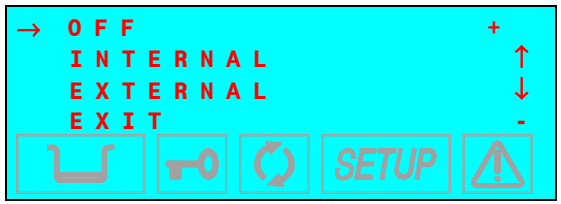
When the sterilizer is equipped with a printer (option) for recording sterilization program data; it is necessary to set the parameters required for its proper operation:

1. Select **PRINT OPTIONS** using the ↵ key and the following menu appears:



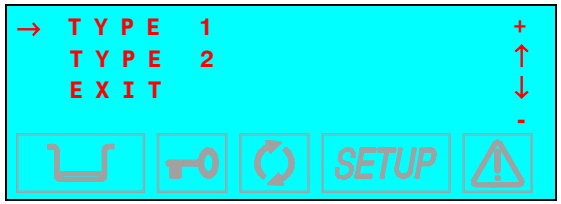
Select **PRINTER** to select the settings for the printer used, or **REPORT** to set the number of copies to print and to reprint data from the last program executed.

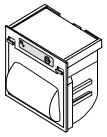
a) **Item PRINTER**
The following screen appears:



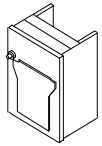
Select **OFF** to deactivate the printing of data at the end of a sterilization (or test) cycle.

Select **INTERNAL** to enable the thermal printer set inside the front of the sterilizer. In this case, another menu opens:



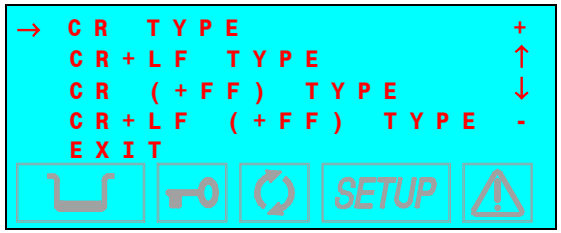


Select Type 1 for the model 1 of the printer installed.



Select Type 2 for the model 2 of the printer installed.

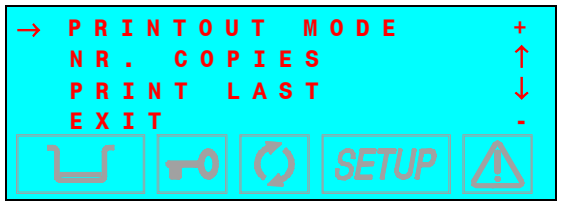
If, on the other hand, you choose **EXTERNAL**, the data will be printed on an external peripheral. Following this selection, another menu opens:



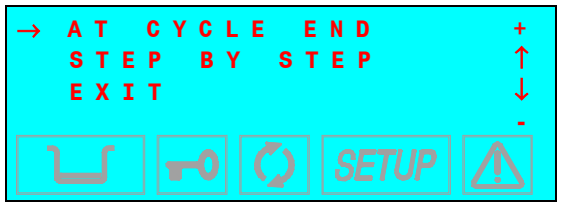
Activate **CR** to use printers that advance the paper only on the CR (*Carriage Return*) command, or **CR+LF** for that require the CR+LF (*Carriage Return* + *Line Feed*) commands, or with **+FF** (Form-Feed) for printers that require the addition of this command.

☞ Consult the printer manual to determine the type of command used. If this information is not available, try printing with the various options to identify the correct setting.

b) **Item REPORT**
The following screen appears:



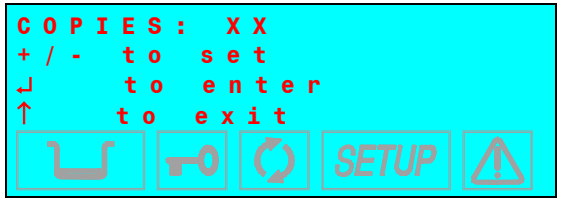
Select item PRINTOUT MODE to chose the mode the data are printed: The following options appear:



Select **AT CYCLE END** to print the report al the end of the cycle.
Select **STEP BY STEP** to print the data at each phase of the cycle, as result in the normal printout (see Printed report examples).

☞ The print of the Vacuum and Helix Test report is carried out only in mode “At Cycle End”.

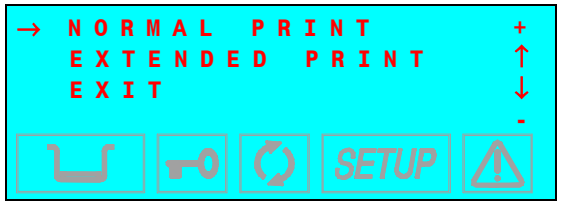
Activate **NR. COPIES** to set the number of copies of the cycle report to print at the end of the program. The following text appears:



Set the number of copies desired (up to a maximum of **5**). Confirm with the ↵ key.

☞ In STEP BY STEP mode is not possible more report copies.

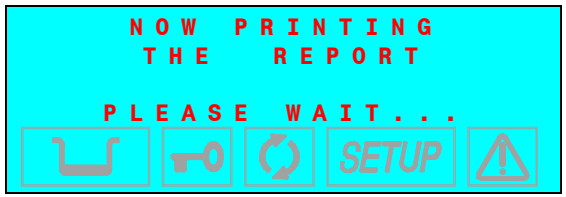
On the other hand, the selection **PRINT LAST** reprints the report for the last cycle executed (whether it terminated correctly or was interrupted by an alarm). The following screen appears:



The **NORMAL PRINT** command activates normal printing (that with salient cycle data produced at the end of a correctly executed cycle), while **EXTENDED PRINT** activates complete printing (including all the data typical of a cycle interrupted by an alarm).

☞ If the last cycle completed correctly (or was interrupted by MANUAL STOP) it will be possible to reprint it in either NORMAL or EXTENDED mode. If the last cycle was interrupted by an alarm (MANUAL STOP excluded) it only the EXTENDED mode will be available.

Following the reprint command, this message will be displayed:

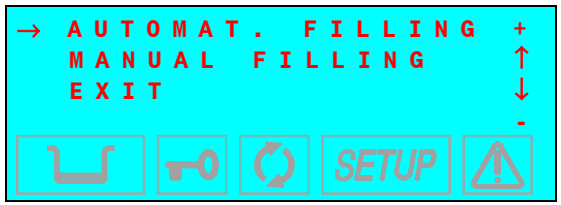


which will remain on the screen until printing is finished.

Setting the tank Filling mode

(FILLING OPTIONS on the ADVANCED menu)

The internal tank can be filled either manually or automatically, in the latter case, drawing water from an external device (tank or demineralizer Milldrop connected to the device- see **Chapter, "Installation"**).
After **FILL OPTIONS** is selected, the following menu appears:



When **AUTOMATIC FILL** is selected, automatic filling is activated.
In this case, as reached the minimum water level (icon MIN on) in the internal tank, the equipment enable the auxiliary water feeding pump for a pre-set time or a time needed to reach the maximum level (icon MAX on).
When the maximum level (MAX signal) is reached, the automatic system is deactivated.

☞ Only activate the automatic filling mode AFTER the external tank has been filled with high quality distilled water or the Milldrop has been turned on. Also remember to open the tap on the external tank or the Milldrop.

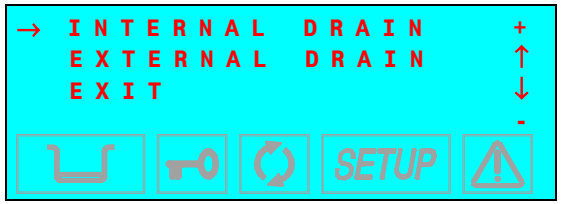
When **MANUAL FILL** is selected, the internal tank must be filled manually (see **the Chapter, "First Start-Up"**).
Scroll through the items with the **+** and **-** keys; confirm with the ↵ key.

Setting the Water Draining mode

(DRAIN OPTIONS from the ADVANCED menu)

The water used for the sterilization cycle can be collected into either the **internal** tank (standard configuration) or an **external** tank of greater capacity (offered as an option – see chapter “Installation”) so as to reduce the frequency of used water draining.

After **DRAIN OPTIONS** is selected, the following menu appears:



When **INTERNAL DRAIN** is enabled, the reading of the MAX level sensor in the internal tank is enabled.

The **EXTERNAL DRAIN** command also activates the MAX level sensor located in the external tank.

☞ The level sensor in the internal tank remains active in any case, to prevent a possible malfunction of the external tank or a missing or faulty connection of the optional external drain tank.

☞ In the case of an installation with the drain connected to the central system, select INTERNAL DRAIN.

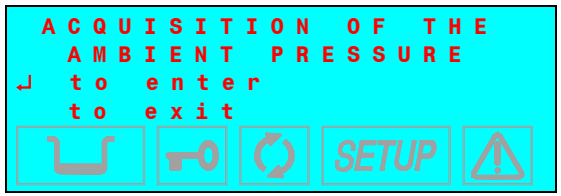
Scroll through the items with the **+** and **-** keys; confirm with the ↵ key.

Acquisition of the ambient pressure

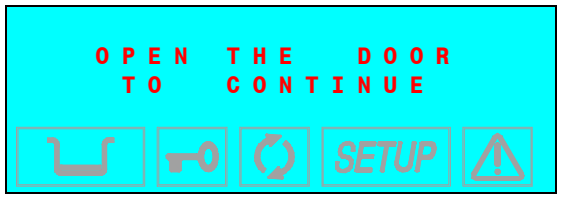
(AMBIENT PRESSURE on the SPECIAL menu)

The first time the sterilizer is used and after any reinstallation, the sterilizer must acquire the ambient pressure.
This operation is **necessary** or the correct operation of several of the device's auxiliary systems.

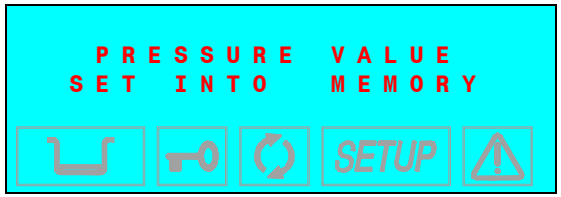
When **AMBIENT PRESSURE** is activated, the following screen appears:



☞ Check that the sterilizer door is completely OPEN. If you try to acquire the pressure with the door closed the following message will be displayed:



which remains until the door is opened. Confirm the acquisition of the data by pressing the ↵ key. This message appears:



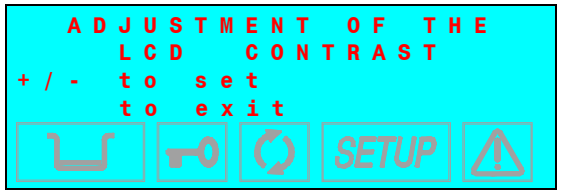
accompanied by a beep. The ambient data pressure has been acquired.

On the other hand, press the ↑ key to cancel the operation.

Adjusting the contrast of the liquid crystal display

(LCD CONTRAST on the SPECIAL menu)

The LCD contrast adjustment allow to obtain the screen reading as clear as possible, compensating different sterilizer positioning or ambient brightness. When **LCD CONTRAST** is activated, this screen appears:

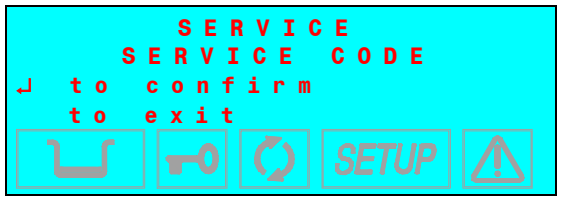


Press the **+** key increases the contrast while the **-** key decreases it.

Place yourself in your usual working position and adjust the contrast until the display is as clear and readable as possible.

ACTIVATING CONFIGURATION OPTIONS – SERVICE MENU

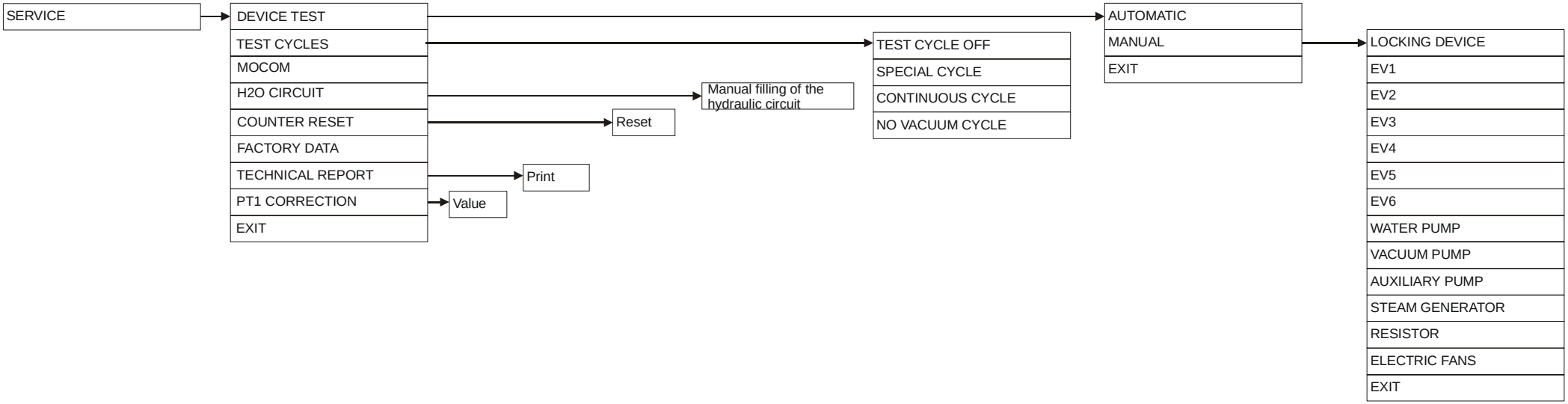
These menu options are only available to the authorized Service Technicians by entering of special code.
The following display is shown:



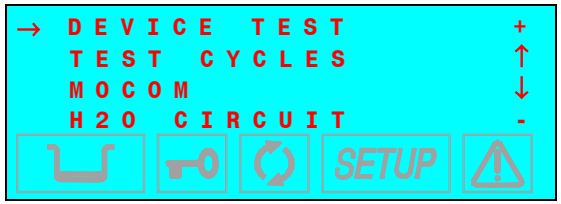
Type the code **+ + − − + + − −** by using the relevant symbol keys. SERVICE menu includes the following options:

DEVICE TEST
TEST CYCLES
MOCOM
H2O CIRCUIT
COUNTER RESET
FACTORY DATA
TECHNICAL REPORT
PT1 CORRECTION
EXIT

The layout of this option tree is shown in the figure.



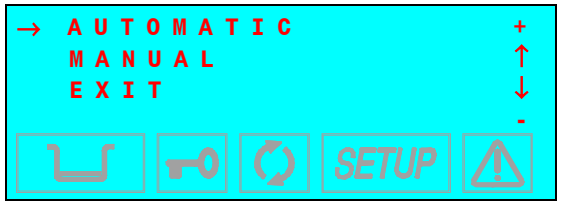
Use key **+** / **-** to scroll the options; push the ↵ key to confirm or to exit.



Device Test

(DEVICE TEST item on the SERVICE menu)

Through this option it is possible to check any device of the sterilizer. The following display is shown:



Use key **+** / **-** to select the test mode, push the ↵ key to confirm.

In **AUTOMATIC**, the unit requires a confirmation and then start the automatic test of the devices according to the following order:

LOCKING DEVICE	WATER PUMP
EV1	VACUUM PUMP
EV2	AUXILIARY PUMP (automatic water feeding)
EV3	STEAM GENERATOR
EV4	RESISTOR (heating)
EV5	ELECTRIC FANS
EV6	

During the automatic test sequence, the display will show **NOW TESTING ….**
and at the end of the procedure the message **AUTOMATIC TEST COMPLETE**.

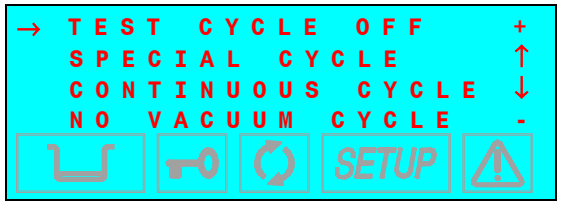
In **MANUAL** mode the display shows the device list; scroll the list and select the item on which the test must be performed.

Use key **+** / **-** to select the device, push the ↵ **key** to confirm.

Test cycles

(TEST CYCLES item on the SERVICE menu)

Through this option it is possible to set different test procedures according the technician needs. The following display is shown:



Use key **+** / **-** to select the test mode, push the ↵ key to confirm.

TEST CYCLE OFF mode allows to disable the test mode previously set.

SPECIAL CYCLE mode enable a full test of the sterilizer. As confirmed the choice, exit from the Setup menu, select a cycle and enter the START command. The sterilizer will start an automatic sequence of any available cycle.
At the end of each cycle the report will be printed.

CONTINUOUS CYCLE mode enable a test based on the continuous repetition of the cycle that will be selected after the exit from the Setup menu.

NO VACUUM CYCLE mode enable a test based on the cycle that will be selected after the exit from the Setup menu, and characterized only with pressure pulses and without pre-vacuum and vacuum drying phases.

☞ See ***Attachment O*** for the notes about the use of these test cycles.

MOCOM

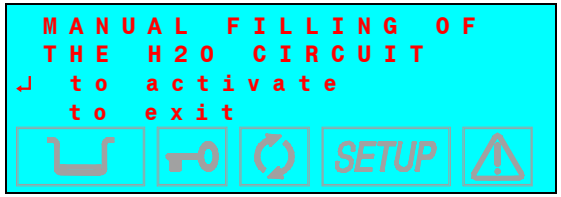
(MOCOM item on the SERVICE menu)

This item is only accessible and available to the manufacturer:

H2O circuit

(H2O CIRCUIT item on the SERVICE menu)

This option allows the check of the hydraulic circuit and water filling operation. The following display is shown:

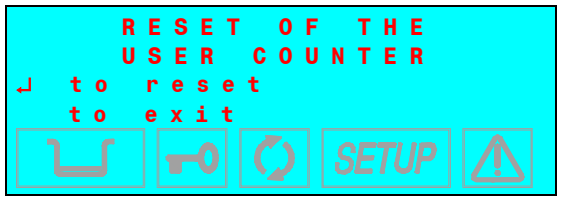


As confirmed by the ↵ key the water pump starts making possible to check the hydraulic circuit.

Counter reset

(COUNTER RESET item on the SERVICE menu)

This option allows to reset the counter (displayed on LCD) of the launched and completed cycles. The following display is shown:



Confirm by the ↵ key to reset the counter.

Use this option only in special case.

Factory Data

(FACTORY DATA item on the SERVICE menu)

This option allows to re-enter the default data in the case of data lost or damaged memory.

Technical report

(TECHNICAL REPORT item on the SERVICE menu)

This option allows to obtain the data printout of the history register stored in the sterilizer memory.

PT1 correction

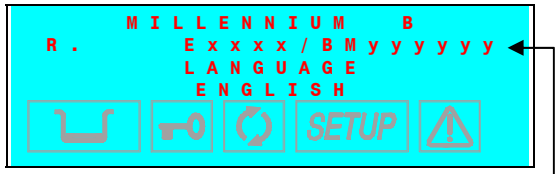
(PT1 CORRECTION item on the SERVICE menu)

This option allows to set the Ohm value of the internal probe replaced after a repair action. The following display is shown:

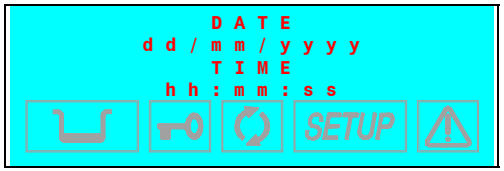
Use key **+** / **-** to change the value displayed, push the ↵ key to confirm.

DATA REVIEW

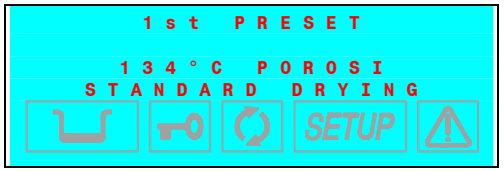
The Data Review displays a summary of the device's **current settings**, allowing users to verify their correctness.
It has the following screens (shown by way of example).

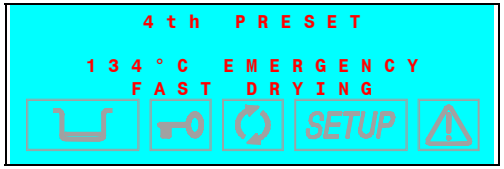


Firmware version

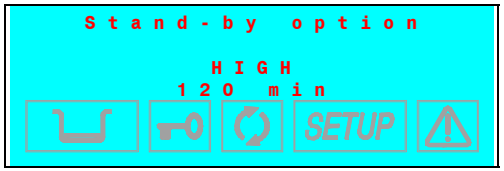


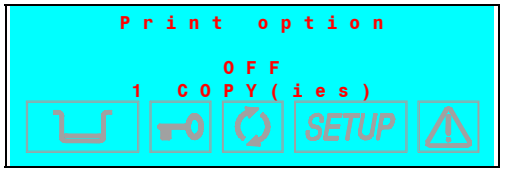
Use the keys **+** / **-** to scroll through the menu

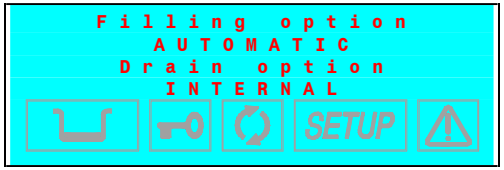




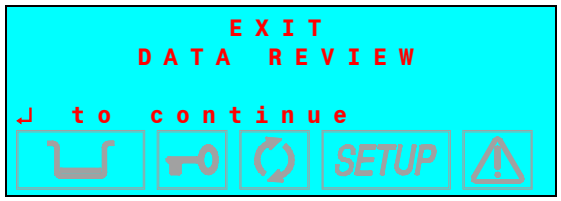
Use the keys **+** / **-** to scroll through the menu







Use the keys **+** / **-** to scroll through the menu



Press ↵ to confirm

☞ For the meaning of the terms shown, see the paragraph, Activating Configuration Options.

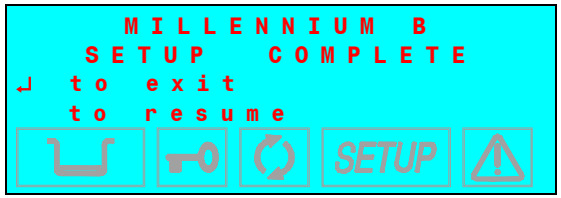
EXIT THE SETUP MODE

Completed the sterilizer configuration, proceed as follows to return in normal mode::

– Go to the first-level menu (see ***SETUP layout***).

☞ To return to the first level from any current menu level, just select item EXIT of the current menu and confirm by ↵ key. Alternatively, you can press ↑ (ESC) key one or more times.

– Select **EXIT** and confirm with the ↵ key. This text appears on the display:



After several seconds, the device returns to **normal operation** in **STAND-BY** mode.

DEFAULT SETTING

The sterilizer leaves the factory with the following settings:

DATE: ***current date***
TIME: ***current time***

PROGRAMMES: Preset **1**: ***134°C POROUS*** (***standard*** drying)
Preset **2**: ***134°C HOLLOW*** (***standard*** drying)
Preset **3**: ***134°C SOLID*** (***standard*** drying)
Preset **4**: ***134°C EMERGENCY***

☞ The programs indicated should be considered as preferential settings. However, other combinations are possible based on the destination market.

ST-BY MODE: ***HIGH*** (pre-heating)
PRINT OPTIONS: ***OFF (1 copy)***
FILLING OPTIONS: ***MANUAL***
DRAIN OPTIONS: ***INTERNAL***

PREPARING THE MATERIAL TO BE STERILIZED

General

The sterilization process can be considered effective, reliable and repeatable so long as the material is suitably treated first and then correctly arranged in the sterilization chamber in an orderly manner.

In fact, it should be emphasized that organic residues or deposits of substances used in medical practice are the inevitable receptacles of microorganisms and may obstruct contact between the steam and the walls of the instrument, deactivating, at least locally, the lethal process that sterilization normally provides.

On the other hand, an incorrect arrangement of the load can make the circulation and/or penetration of the steam into the material difficult and sometimes impossible with the imaginable consequences. Even the drying process can be strongly influenced by this factor.
For this reason, below we provide some **basic** suggestions regarding these aspects, leaving the user to study the subject further in the most suitable way.

Treating the material before sterilization

First of all, it should be recalled that, when **handling** and **managing** contaminated material, it is a good idea to take the following precautions:

- Wear rubber gloves of adequate thickness;
- Clean your gloved hands with a germicide detergent;
- Always carry the instruments on a tray.
- Never carry them in your hands;
- Protect your hands from contact with any sharp points or edges; this will avoid the risk of contracting a dangerous infection;
- Immediately remove any article that does not need to be sterilized or that is not capable of withstanding the process;
- Carefully wash your still gloved hands when done handling non-sterile material.

All materials and/or instruments to be sterilized must be perfectly clean, without any type of residue (deposits of organic/inorganic material, fragments of paper, cotton/gauze pads, lime, etc.).

☞ In addition to causing problems during sterilization, the failure to clean and remove residue can damage the instruments and/or the sterilizer, itself.

An effective **cleaning** consists of the following:

1. Rinse the instruments under running water **immediately** after use;
2. Separate metal instruments by type of material (carbon steel, stainless steel, brass, aluminum, chromium, etc.), to avoid electrolytic oxidation-reduction;
3. Wash in an ultrasound cleaner using a mixture of water and germicidal solution, carefully following the manufacturer's recommendations.
4. For best results, use a detergent specifically designed for ultrasound washing, with a neutral pH.

☞ Solutions containing phenols or quaternary ammonia compounds can cause corrosion on instruments and the metal parts of ultrasound devices.

5. After washing, carefully rinse the instruments and make sure that residues have been completely eliminated; if necessary, repeat the washing cycle or clean manually.

☞ To avoid the formation of lime spots, rinse with deionized or distilled water, if possible. Whenever very hard tap water is used, we recommend always drying the instruments.

For **handles** (turbines, contra-angles, etc.), supplement the above with treatment in suitable dedicated devices that provide effective internal cleaning (occasionally including lubrication).

☞ The end of the sterilization program, remember to lubricate the internal handle mechanisms using the special sterile oil. By taking these precautions, the instruments useful life will not be reduced in any way.

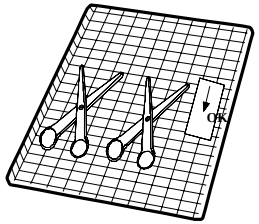
Consult the instructions provided by the manufacturer of the instrument/material to be sterilized before subjecting it to autoclave treatment, checking for any incompatibilities. Scrupulously follow the methods of using detergents or disinfectants and the usage instructions of the automatic devices for washing and/or lubricating them.

On the other, as regards **textile material** (or porous, in general), such as smocks, napkins, caps and other, carefully wash and then dry them before treating them in the autoclave .

☞ Do not use detergents with a high content of chlorine and/or phosphates. Do not bleach with chlorine-based products. These substances can damage the tray supports, trays and any metal instruments that may be present in the sterilization chamber.

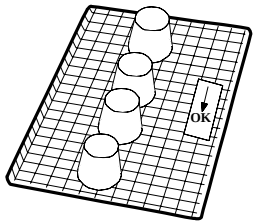
Arranging the load

Follow the instructions below for the most efficient sterilization process, preserve the material and increase its useful life.



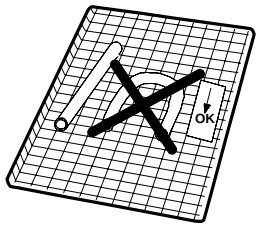
General notes for positioning on trays.

- Arrange instruments made of different metals (stainless steel, tempered steel, aluminum, etc.) on different trays or well separated from each other.
- In the case of instruments **not** made of stainless steel, place a paper sterilization napkin or a muslin cloth between the tray and the tool, avoiding direct contact between the two different materials;
- In any case, arrange the objects sufficiently distant from each other that they will remain so for the entire sterilization cycle;
- Make sure that all instruments are sterilized in an open position;
- Position cutting instruments, (scissors, scalpels, etc.) so they can **not** come into contact with each other during sterilization; if necessary, use a cotton or gauze cloth to isolate and protect them;



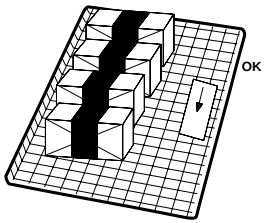
- Arrange recipients (glasses, cups, test tubes, etc.) resting on their side, or upended, so avoid pooling water ;
- Do not load trays beyond their indicated limit **(see *Technical Characteristics*).** *Since this value is understood to be the maximum allowed limit, it can be excessive in some cases, so always use **common sense**.*
- **Do not** stack trays **or** put them in direct contact with the walls of the sterilization chamber. **Always** use the tray support provided
- To insert and extract trays from the sterilization chamber, **always** use the extractor provided.

☞ Place a chemical sterilization indicator on every tray to indicate that the process has occurred: this avoids uselessly reprocessing the same load or, worse, using non-sterilized material. If processing *wrapped material*, place the indicator *inside* one of the wrappings.



Notes for rubber and plastic tubing

- Always rinse before use with pyrogen-free water; do not dry them;
- Arrange the tubing on the tray so that their ends are not obstructed or crushed.
- Do not bend or wind them, but allow them to lie as straight as possible.



Notes for packets and packages

– Arrange packages side-by-side, suitably spaced and absolutely **not** piled, to avoid their coming in contact with the walls of the chamber.
– Whenever it is necessary to wrap particular objects, always use suitably porous material (sterilization paper, muslin napkins, etc.), closing the wrapping with autoclave adhesive tape.

Notes for wrapped material

– Wrap instruments individually or, when more than one instrument are placed in the same wrapping, make sure that they are made of the same metal;
– Seal the wrapping with adhesive tape for autoclaves or heat-sealing machines.
– Do not use staples, pins or other fasteners since they can compromise the maintenance of sterility;
– Arrange the envelopes so as to avoid forming air pockets that obstruct the correct penetration and removal of the steam.
– **Orient the envelopes so as to leave the plastic side up and the paper side down (tray side).**
– In any case, check that they are correctly positioned, turning them over, if necessary.
– If possible, place the envelopes edgewise to the tray, with a suitable support.
– **Never** superimpose envelopes on top of each other.

WHENEVER YOU ANTICIPATE PROLONGED STORAGE, ALWAYS WRAP THE INSTRUMENTS. SEE THE CHAPTER "*Storing sterilized material*

STORING STERILIZED MATERIAL

General

The sterilized material must be adequately treated and stored to maintain its sterility over time, until its use.

Inadequate storage **can** cause **rapid recontamination**.

This leads to problems regardless of what you do since you will either be using recontaminated material (most of the time unconsciously), placing the user and patient at risk, or you will have to run the sterilization cycle again, with an inevitable waste of time and resources.

For this reason, we think it will be useful to provide several basic suggestions, leaving the operator the task of further study of specific texts.

Handling

Assuming that the sterilizer is located in a clean place, free of dust and not too damp, the following **precautions** should be taken when handling and/or carrying sterile material:

1. Remove the load from the sterilization chamber wearing gloves and a clean, or even better, sterilized smock. As an additional precaution, wear a protective mask on your face;
2. Rest the tray on a dry, suitably clean and disinfected surface. *Take care to distance or, at any rate, separate the sterile material from the area where contaminated material is kept waiting to be sterilized;*
3. Touch the material and/or instruments as little as possible, taking extreme care **not** to cut or damage the wrappings;
4. Let the instruments cool before any transport (and subsequent storage). If necessary for transport, transfer the material using dry, clean and disinfected containers. The containers must be closed or, if open, covered with clean cloths.

Storage

Sterile material waiting for used must be stored using the appropriate techniques. These will significantly **slow** recontamination:

1. Store the material and/or instruments in the protective wrappings that were used during sterilization. **Do not** wrap the instruments after sterilization since, in addition to being useless and completely senseless, is also potentially damaging;
2. Store the material in a dry, suitably clean and disinfected place, far from the area where infected material passes. If possible, use closed compartments equipped with ultraviolet light;
3. Identify the sterile material by attaching the sterilization data (attaching a copy of the printed report or an adhesive label);
4. First use the material that has been stored the longest (FIFO, "First In First Out"). This results in material that is homogeneously stored, avoiding storing for too long, with the consequent risks.
5. **Never** store material for too long. In fact, do not overlook the fact that materials will tend to degrade and be recontaminated in a finite time, even when the above instructions are followed.

☞ Consult the specifications provided by the manufacturer of the packaging material relative to the maximum allowed storage time.

Turning on

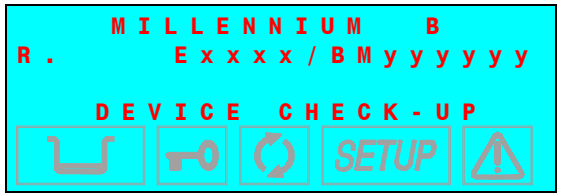
Once the sterilizer has been correctly installed, it may be turned on and prepared for use.

Turn on the equipment by the main (luminous) switch located on the right side of the machine.

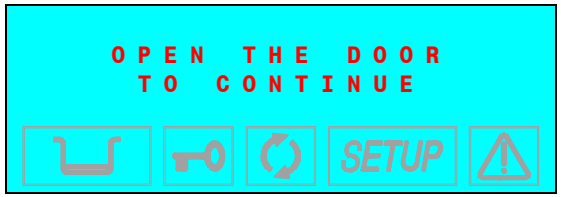
☞ Do this with the sterilizer's door open.

Initial automatic test

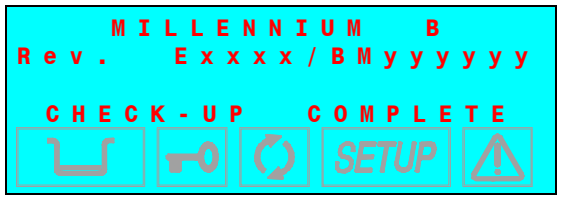
When turned on, the control panel lights up and beeps so you can visually check its correct operation. The panel then displays this message:



☞ If the door is closed, the test is interrupted. The panel then beeps and displays the following message:

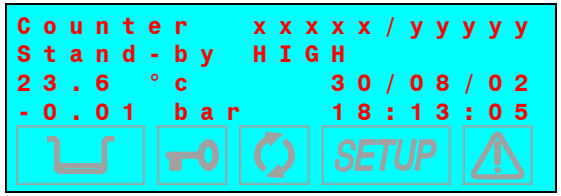


Open the door to allow the test to continue. At the end of the test you will see:



Stand-by mode

After the initial test, the sterilizer goes to **STAND-BY** mode and the display shows:

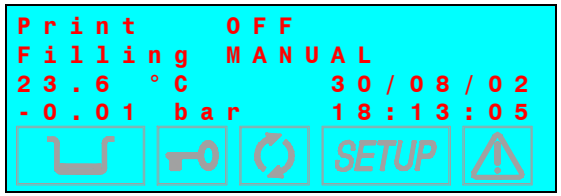


The upper line is the **cycle counter** for sterilizations performed, with the number of correctly completed cycles on the left and the total number started on the right. The line below shows the Stand-by status and the preheating mode (High-Low-Off). The two lower lines show the temperature and pressure of the sterilization chamber on the left and current **date** and **time** on the right.

☞ A cycle begins with the start of the sterilization cycle (first vacuum phase), excluding the preheating phase. A cycle ends at the end of the program (see Chapter "***Program execution***").

☞ To set the date and time as well as select the preheating mode, print the data and fill the tank, please refer to the Chapter, "Configuring the device".

At regular intervals, the first two lines on the display alternate with the modes set for printing (ON/OFF) and filling (Manual/Automatic).



The icons in the lower part of the LCD screen remain off with the exception of the door status and/or water level indicators, which light-up if the door is closed and/or the level in the filling tank reaches its MIN or MAX values (or the MAX value in the drain tank).
During the first start-up, the MIN water level icon in the filing tank is normally on.

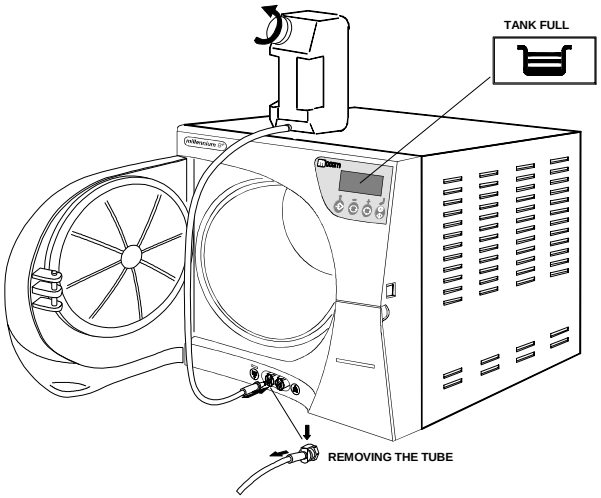
The device waits for the selection of the desired sterilization program (see Chapter "***Selecting the sterilization program***").

WHEN OPENING THE DOOR WITH STERILIZER IN STAND-BY MODE, A 30-SECONDS BEEP INDICATES THAT THE SURFACES INSIDE THE DEVICE ARE HOT. TO AVOID BURNS, TAKE CARE NOT TO TOUCH THE STERILIZATION CHAMBER, THE SUPPORTS PROVIDED OR THE INSIDE OF THE DOOR WITH YOUR BARE HANDS.

Filling distilled water

Manual filling

The first time the sterilizer is used, and later when the MIN water level indicator comes on, you will have to fill, or top-off, the internal distilled water tank.
With reference to the figure (and with the door open), proceed as follows:



1. Fill the manual container (2 l) with distilled water, keeping it horizontal;
2. Connect the tube's quick connector to the corresponding female connector under the chamber entrance (marked H2O), pushing until you hear a click;
3. Place the container in a vertical position, at the same time, loosening the plug and taking care not to spill water on the machine.
4. The water will begin to flow into the tank;
5. Continue filling until the MIN level indicator turns off.
6. Continue until the water is drained from the container;
7. At this point, lower the connector below the connection point, keeping it horizontal;
8. While pinching the tube with your fingers, press the metal lever located on the side of the connector and detach the quick connector;
9. Refill the container (2 l) and repeat the operations described in points 2, 3 and 4 a second time;
10. When the MAX level icon comes on (accompanied by a beep), stop filling and detach the quick connector as described in points 7 and 8.

☞ The icon MAX does not have to be on to start a sterilization program. The icon **MIN** indicator off is **sufficient**.

☞ Use ONLY high quality distilled water. For the specifications of the water supply, see ***Technical Characteristics***.

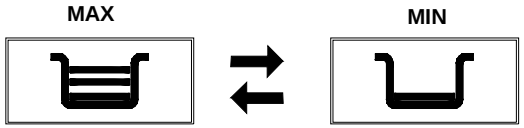
Automatic filling

In the event of sterilzer installation for automatic filling from an external tank or demineralizer Milldrop (see "Installation"), the filling will occur automatically after the automatic filling option has been selected. Obviously, for the correct operation, the user must fill the external tank or switch on the Milldrop in advance.
To set the automatic filling option, please refer to the Chapter "***Filling Option***".

THE AUTOMATICALLY FILLING SYSTEM MUST NEVER RUN DRY; THIS CAUSES PREMATURE WEAR TO THE AUXILIARY WATER-INJECTION PUMP. PERIODICALLY CHECK THE WATER LEVEL IN THE EXTERNAL TANK.

MAX level in the internal/ external drain tank

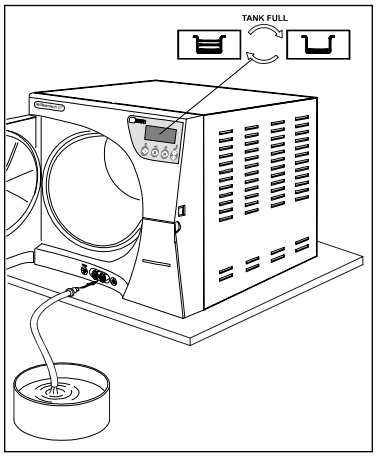
When the water level in the internal or external used water tank reaches the MAX level, the LCD display alternatively lights the MAX and MIN icons.



☞ In this condition the unit will generate an alarm indication as you attempt to launch a sterilization cycle.

In this case, empty the internal or external draining tank.

Emptying the internal tank



Referring to the figure, open the door and operate in the following way:

1. Arrange an empty tank on the floor near the sterilizer and put the free end of the supplied tube into the tank;
2. Connect the quick connector to the corresponding female connector under the chamber entrance (marked H_2O), pushing until you hear a click;
3. Wait for the complete empty of the internal tank; then while pinching the tube with your fingers, press the metal lever located on the side of the connector and detach the quick connector.

Emptying the external tank

Remove the top cap from the external tank and empty into a sink the water exceeding the signed level.

Do not empty the tank completely, but keep a quantity of water up to the marked level. Otherwise the water draining sound and the steam escape from the vent-hole will increase considerably.

Refer to chapter "CONNECTING AN EXTERNAL DRAINING TANK" for more details

MAINTENANCE

GENERAL

For better quality maintenance, supplement ordinary checks with regular periodic examinations by the service department (*see Appendix Z*).

It is also fundamental to perform a **periodic sterilizer validation**, i.e., a check of the thermodynamic parameters of the process, comparing them with the reference values provided with suitably calibrated instruments.

☞ Refer to the paragraph ***Periodic sterilizer validation***.

The ordinary maintenance described below consists in easy manual operations and preventive interventions involving simple instruments.

IN THE EVENT OF THE REPLACEMENT OF THE DEVICE'S COMPONENTS OR PARTS, REQUEST AND/OR USE **ORIGINAL REPLACEMENT PARTS ONLY**.

ORDINARY MAINTENANCE PROGRAM

Maintenance schedule

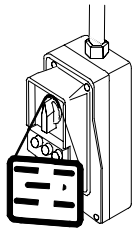
The table summarizes the maintenance required to keep the sterilizer operating at peak efficiency. In the case of **very intense use**, we recommend **shortening** maintenance intervals:

DAILY	Clean the gasket and the porthole Clean external surfaces	**Cleaning of the gasket and do** **Cleaning of the external**
WEEKLY	Clean the sterilization chamber and relative accessories Disinfect external surfaces	**Cleaning of the sterilization chamb** **Disinfection of the externa**
MONTLY	Clean the internal (and external - if installed) distilled water tank Safety valve maintenance Clean (or replace) the water drain filter	▪ Lubrication of the door locking mechanism ▪ Maintenance of the safety valve ▪ Cleaning (or replacement) of the draining ▪ Sterilization of the bacteriologic filter
EVERY 3/6 MONTHS **(depending on the frequency of use)**	Replace bacteriological filter	▪ Replacement of the bacteriologic filter
ANNUALLY	Validate sterilizer	▪ Validation of the sterilizer

General notes

- **Do not** wash the sterilizer with direct jets of water, either under pressure or sprinkled. Seepage into electrical and electronic components could damage the functioning of the device or its internal parts, even irreparably;
- **Do not** use abrasive cloths, metal brushes (or other aggressive materials) or metal-cleaning products, whether solids or liquids, to clean the device or sterilization chamber;
- **Do not** use chemical products or disinfectants to clean the sterilization chamber. In fact, these products can damage the sterilization chamber, even irreparably;
- **Do not** allow lime residue or other substances to accumulate in the sterilization chamber or on the door and its gasket, but periodically remove them. In fact, they can damage these parts over time in addition to *compromising* the operation of the components installed along the plumbing circuit.

☞ The formation of white spots on the base of the internal walls of the sterilization chamber means that you are using low-quality demineralized water.



BEFORE PERFORMING ORDINARY MAINTENANCE, MAKE SURE THAT THE POWER SUPPLY CORD IS REMOVED FROM THE MAINS SOCKET.

WHENEVER IT IS NOT POSSIBLE, PUT IN OFF THE EXTERNAL BREAKER OF THE EQUIPMENT POWER SUPPLY LINE.

IF THE EXTERNAL BREAKER IS FAR AWAY OR, AT ANY RATE, NOT VISIBLE TO THE MAINTAINER, PLACE A WORK IN PROGRESS SIGN ON THE EXTERNAL BREAKER AFTER TURNING IT OFF.

Maintenance description

Clean the gasket and porthole

To remove traces of lime, clean the gasket of the container under pressure and the porthole with a clean, cotton cloth soaked in a weak solution of water and vinegar (or similar product, after first checking its contents on the label).
Dry the surfaces and remove any residue before using the device.

Clean external surfaces

Clean all the external parts using a clean cotton cloth dampened with water and, possibly, the addition of a neutral detergent.
Dry the surfaces and remove any residue before using the device.

Clean sterilization chamber and accessories

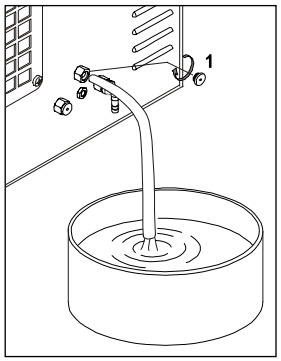
Clean the sterilization chamber, support and trays (and internal surfaces in general) with a clean cotton cloth soaked in water and, possibly, the addition of a small amount of neutral detergent. Carefully rinse with distilled water, taking care not to leave any type of residue in the chamber or on accessories.

☞ Do not use sharp or pointed instruments to remove lime encrustation from the sterilization chamber. Whenever there are visible deposits, immediately check the quality of the distilled water used (see ***Water supply characteristics***).

Disinfect external surfaces

For the occasional disinfection of the external surfaces, you can use either denatured alcohol or detergents with a minimum percentage of sodium hypochlorite (or equivalent).

Clean internal distilled water tank



1. Arrange an empty container on the floor near the sterilizer and put the free end of a tube into it.
2. Unscrew the plug (1) from the rear draining point and plug-in the other end of the tube.
3. Wait until the internal tank is completely emptied; close the drain point with the plug.
4. Prepare 4 liter of distilled water mixed with 10% of pure alcohol and fill the supplied standard container
5. Now fill completely the internal tank with this solution (see chapter "***Filling distilled water***" for the procedure) and allow the solution to sit for 30 minutes.

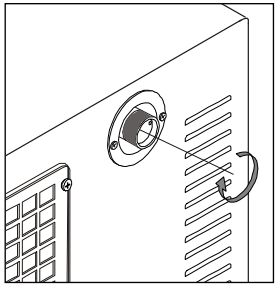
☞ Do not run any cycle during this period.

6. Drain again the internal tank and discard the solution. Close the drain point with the plug.

Clean external distilled water tank

1. Disconnect the external tank from the sterilizer; eventually recover the distilled water contained in it.
2. Fill the tank with a solution of distilled water and alcohol (10%)
3. Allow the solution to sit for 30 minutes.
4. Drain the tank and discard the solution.
5. Reconnect the tank to the sterilizer.

Safety valve maintenance



Access the safety valve located on the rear of the machine.

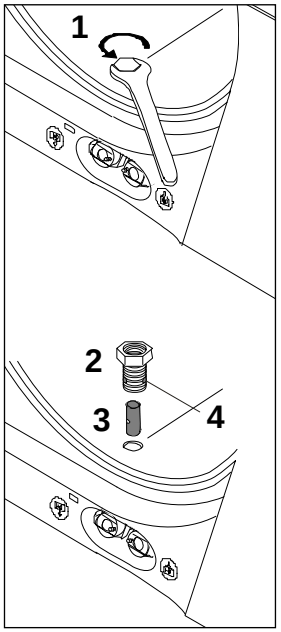
Loosen the knurled locking ring with your fingers (or a suitable tool inserted in the two holes in the ring itself), turning counter-clockwise until it reaches the end and turns loosely.

Retighten the locking ring and repeat the operation a couple of times .

Definitively tighten the locking ring all the way down.

THIS OPERATION IS NECESSARY TO GUARANTEE THE CORRECT FUNCTIONING OF THE VALVE OVER TIME.
AT THE END OF MAINTENANCE, MAKE SURE THAT THE LOCKING RING IS COMPLETELY SCREWED ON AND TIGHTENED.

Clean (or replace) the water drain filter



With use, various residues will probably tend to accumulate inside the filter, obstructing the lower drain tube over time.

For cleaning (or replace) the filter, open the door of the sterilizer and remove the nut (**1)** with a hexagonal wrench n. 14.

Then remove the fitting (**2)** and the filter (3).

Remove the filter from the support and carefully clean it under a throw of running water, using if necessary a pointed tool to remove possible material of greater dimensions.

If the filter cannot be reused, replace it with a new one.

Plug the filter in the support, block it with a drop of sealing (if available), having care to not obstruct the holes

Reassemble all parts following reversely the above procedure, paying attention on screwing down the fitting (2) so as to let the draining holes **(4)** at level of the chamber wall.

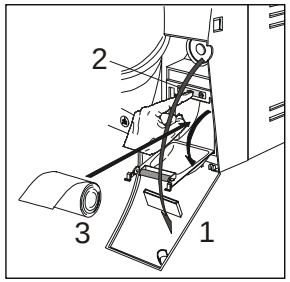
Replace bacteriological filter

When it is due to be changed, or when you notice visible clogging of the filter (indicated by a color markedly tending towards gray) unscrew the bacteriological filter from its support and replace it with a new one by screwing it all the way down on the connector on the front of the machine.

☞ A replacement bacteriological filter is supplied with the device.

Replace the printer paper

Printer type 1



To replace a used-up printer paper roll:

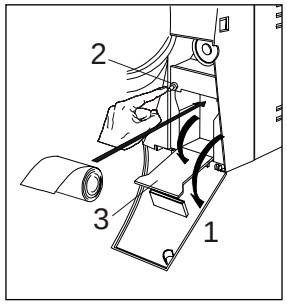
1. open the service compartment door to access the printer,
2. push the central button (2) to open the printer door and access the paper compartment,
3. remove the empty roll and place a new one so that the paper unrolls off the top;

   use thermal paper roll:
   - width 57 mm / diameter max 45 mm

4. unroll about 15 cm of paper and close the printer door,
5. thread the paper in the slot of the service compartment and close.

☞ The central button is lighted steady when the paper is regularly present, and is flashing when the paper rool is empty

Printer type 2



1. open the service compartment door to access the printer,
2. push the button on the left to access the paper compartment,
3. remove the empty roll and place a new one so that the paper unrolls off the top;

   use thermal paper roll:
   - width 57 mm / diameter max 45 mm

4. unroll about 15 cm of paper and close the printer door (the paper will automatically advance a few centimeters outside the window),
5. thread the paper in the slot of the service compartment and close.

Periodic sterilizer validation

As happens with all equipment, it is possible, and sometimes inevitable, to have a decrease in performance and the effectiveness of components along its lifespan, in a period of time dependent on its frequency of use.

To guarantee the safety of the process over time, it is periodically (possibly annually) necessary to **verify** the **thermodynamic process parameters** (pressure and temperature), to check if they continue to remain within allowed limits or not.

The requalification of the sterilizer's performance is the **responsibility of the user** of the product.

The reference European standards **EN 554** (*Sterilization of the medical devices - Method for the validation and systematic control of the steam sterilization*) and **EN 556** (*Sterilization of the medical devices – Requirements for the medical devices marked with "STERILE" indication*) supply an effective guide tool for carrying out the verifications on the steam sterilizers.

Since, in addition to specific experience and training, these controls require the use of special equipment (high-precision sensors and probes, data loggers, dedicated software, etc.) suitably verified and calibrated, it is necessary to contact a **company specializing** in these activities.

☞ *M.O.COM. customer service is available to provide any information relative to the periodic validation of steam sterilizers*

2. OPERATION

THE PROGRAMS AVAILABLE

GENERAL

The steam sterilizer is appropriate for almost all materials and instruments, so long as they are able to tolerate, without damage, a **minimum temperature of 121 °C** (otherwise, you will need to use other low-temperature sterilization systems).

The following material can normally be sterilized with steam:

- Stainless steel surgical instruments;
- Carbon steel surgical/generic instruments;
- Rotating and/or vibrating instruments driven by compressed air (turbines) or mechanical transmission (counter-angles, tooth scalers, etc.);
- Glass articles;
- Mineral-based articles;
- Articles made of heat-resistant plastic;
- Articles made of heat-resistant rubber;
- Heat-resistant textiles;
- Medication materials (gauze, pads, etc.);
- Other generic material suitable for autoclave treatment.

☞ Depending on the conformation of the material (solid, hollow or porous), any packaging (paper/plastic envelope, sterilization paper, container, muslin napkin, etc.) and its heat-resistance, it is indispensable that you choose the appropriate program (see **Program summary table**).

The device must not be used for sterilizing fluids, liquids or pharmaceutical products.

PROGRAM SUMMARY TABLE

PROGRAM DESCRIPTION	NOMINAL VALUES				BASIC PROGRAM PARAMETERS					STERILIZABLE MATERIAL				NOTES
	Temperature (°C)	Pressure (bar)	Holding time (min)	Cycle type (EN 13060: 2004)	Pre-vacuum (F=fractionated; S=single)	Standard drying (L=long; S=short)	Total cycle time (average load ÷ max load)	Average consumption H_2O (ml/cycle)	Average energy consumption (kWh/cycle)	TYPE	MAX TOTAL MASS (kg)	MAX MASS PER TRAY (kg)	MAX MASS PER ARTICLE (kg)	
134°C POROUS	134	2,10	4	B	F	L	39÷44	525	0,8	Porous, unpackaged material	**1,00**	0,30	0,30	For material and instruments in (single and double) packaging, we recommend using the 3-tray configuration
										Porous material in single package	**0,75**	0,25	0,25	
										Porous material in double package	**0,60**	0,20	0,20	
										Solid and hollow material in single package	**3,00**	1,00	0,25	
										Solid and hollow instruments in double package	**1,50**	0,50	0,25	
134°C PRION	134	2,10	>18	B	F	L	51÷56	550	0,9	Porous, unpackaged material	**1,00**	0,30	0,30	
										Porous material in single package	**0,75**	0,25	0,25	
										Porous material in double package	**0,60**	0,20	0,20	
										Hollow instruments in single package	**3,00**	1,00	0,25	
										Solid and hollow instruments in double package	**1,50**	0,50	0,25	
121°C POROUS	121	1,10	20	B	F	L	54÷59	550	0,8	Porous, unpackaged material	**1,00**	0,30	0,30	
										Porous material in single package	**0,75**	0,25	0,25	
										Porous material in double package	**0,60**	0,20	0,20	
										Hollow instruments in single package	**3,00**	1,00	0,25	
										Solid and hollow instruments in double package	**1,50**	0,50	0,25	
134°C HOLLOW	134	2,10	4	S	F	S	30÷33	525	0,7	Unpackaged hollow instruments	**6,00**	1,20	0,50	

PROGRAM DESCRIPTION	NOMINAL VALUES				BASIC PARAMETERS OF THE PROGRAM					STERILIZABLE MATERIAL				NOTES
	Temperature (°C)	Pressure (bar)	Holding time (min)	Cycle type (EN 13060: 2004)	Pre-vacuum (F=fractionated; S=single)	Standard drying (L=long; S=short)	Total cycle time (average load ÷ max load)	Average consumption H_2O (ml/cycle)	Average energy consumption (kWh/cycle)	TYPE	MAX TOTAL MASS (kg)	MAX MASS PER TRAY (kg)	MAX MASS PER ARTICLE (kg)	
121°C HOLLOW	121	1,10	20	S	F	S	44÷47	550	0,7	Unpackaged hollow instruments	**6,00**	1,20	0,50	
134°C WRAPPED	134	2,10	4	S	S	L	33÷36	300	0,6	Unpackaged hollow instruments	**3,00**	1,00	0,25	We recommend using the 3-tray configuration
121°C WRAPPED	121	1,10	20	S	S	L	47÷50	325	0,6	Solid instruments in single package	**3,00**	1,00	0,25	
134°C SOLID	134	2,10	4	N	S	S	25÷28	300	0,5	Solid instruments in single package	**6,00**	1,20	0,50	
121°C SOLID	121	1,10	20	N	S	S	39÷42	325	0,5	Unpackaged solid instruments	**6,00**	1,20	0,50	
134°C EMERGENCY	134	2,10	3	N	S	Fast	16	300	0,45	Unpackaged solid instruments	**0,50**	0,50	0,50	
XXX°C USER	134 or 121	2.10 or 1.10	> 4 or > 20	n.d.	F/S	L/S	n.d.	n.d.	n.d.	Unpackaged solid instruments	n.d.	n.d.	n.d.	*Variable paramet .*
HELIX/BD TEST	134	2.10	3.5	-	F	S	22	-	-	Unpackaged solid instruments	-	-	-	
VACUUM TEST	-	-0.80	-	-	-	-	22	-	-	Test device only *(no other load)*	-	-	-	

1) Fractionated = pre-vacuum with three vacuum pulses
   Single = pre-vacuum with single vacuum pulse

2) Long = 10 minutes vacuum drying (typical of POROUS and WRAPPED cycles)
   Short = 4 minutes vacuum drying (typical of HOLLOW and SOLID cycles)

3) Access to a CUSTOM cycle does not require a password. None of the combinations possible in the customization phase create any risks or dangers of injury to the operator or damage tot he device

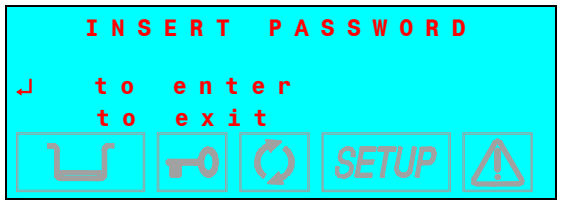
SELECTING THE STERILIZATION PROGRAM

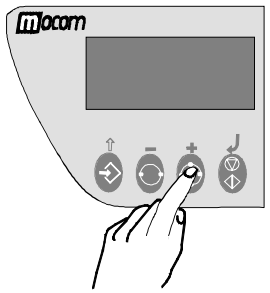
Program selection is fundamental for a successful sterilization process.

Since each instrument, or material in general, has different shape, consistency and properties, it is important **to identify the most suitable program for it**, both for preserving its physical characteristics (avoiding or, at any rate, limiting alterations) as well to guarantee the most effective sterilization.

Power-on the device.

☞ If a password has been enabled with the option ANY POWER ON or ANY CYCLE START (see ***Setting the Password***), you will be asked to enter the access code:





Enter the password using the **+** and **–** keys. Confirm with the ↵ key.

The display does not offer any active preselection. The device is waiting for the user to select a program.

Press the ***PROGRAM SELECTION*** key one or more times until you reach the desired program (1, 2, 3 or 4, also shown on the upper left of the display).

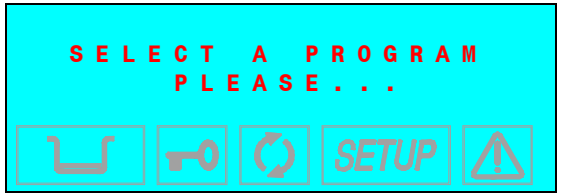
☞ When the selection key is pressed, the first sterilization program proposed is the one used for the last cycle executed.

In the two lines above the description, the display shows the description of the selected program and the type of drying set and, below, the set-point values for the temperature **(°C)**, pressure (**bar**) and time (**mm:ss**) of the cycle selected. By way of example, the display shows.

After a brief interval, the display changes and shows the temperature and pressure values of the chamber, with the current date and time.

To cancel the selection, press ESC ↑ on the control panel.

☞ If no sterilization program is selected, the equipment cannot start a sterilization cycle, and the following message appears on the display, with a beep:



If you use a program that is inappropriate for the type of material to be sterilized (*see Program summary table*) the effectiveness of the sterilization process is NOT GUARANTEED.

RUNNING THE STERILIZATION PROGRAM

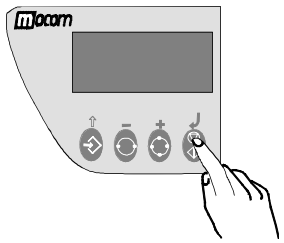
General

A sterilization cycle consists of a determined number of phases. The number and duration of the phases can differ for the programs, based on the type of air extraction, sterilization process and drying method.

The electronic control system monitors the various phases, at the same time checking that the various parameters are respected; if any type of anomaly is encountered during the cycle, the program is immediately interrupted, generating an alarm identified by a code, with a relative message explaining the nature of the problem.

With this type of control, when you select a suitable sterilization program, you are guaranteed perfect sterilization under any conditions.

Starting the program

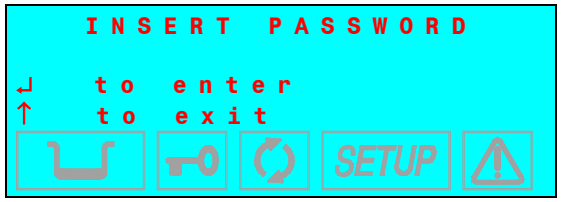


After placing the load in the sterilization chamber (with the precautions explained in the **Chapter, "*Preparing the material to be sterilized*"**) and selecting the desired program, **close the door until you hear the click** .

The Door Status icon **flashes** (door closed). Press the **START** button.

☞ If a password has been enabled with the option ANY CYCLE START (see the Chapter Configuration - Setting the password), you will be asked to enter the access code:

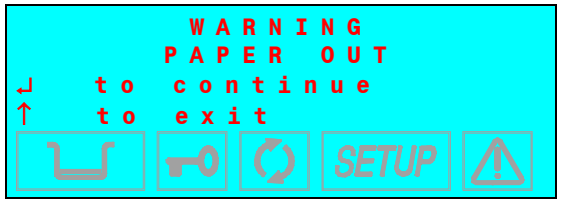
Password check



Enter the password using the **+** and **–** keys. Confirm with the ↵ key.

Printer paper-out check

The equipment checks the presence of the paper into the on-board printer; if out or ended the following message will be displayed:



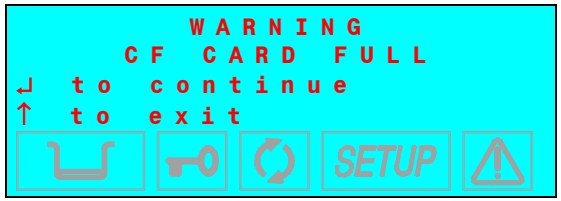
Push key ↵ to continue however (replace the paper during or at the end of the sterilisation cycle). Push key ↑ to return in Stand-by mode.

If Millflash is connected

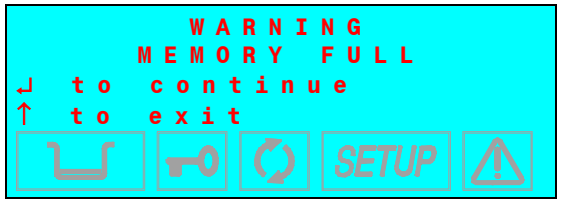
Dependent on the device connected, the equipment checks also the presence of the Compact Flash card. If not plugged in, the display shows:

Plug in the CF card in the recording device and press the key ↵ on the command panel.
Push the key ↑ to interrupt the start command and return in Stand-by mode.

In case of the card memory full or insufficient to store the new cycle data, the following message will be displayed:



or



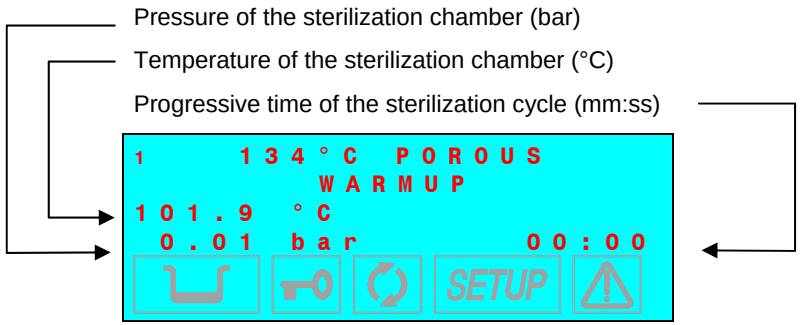
Push key ↵ to continue without recording the cycle data.
Push key ↑ to interrupt the start command; download the files on PC and delete the memory content according to the instructions of the Millflash Operating Manual.
Repeat the **Start** command.

Door locking

The equipment locks the door.

The door status icon  remains **steady on** (door locked).

When **START** is pushed, and for the entire sterilization cycle, the lower lines of the display will show the following parameters:

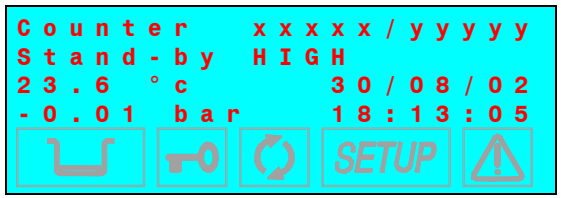


The time is counted from the start of the sterilization cycle (first vacuum phase), excluding the preheating phase.

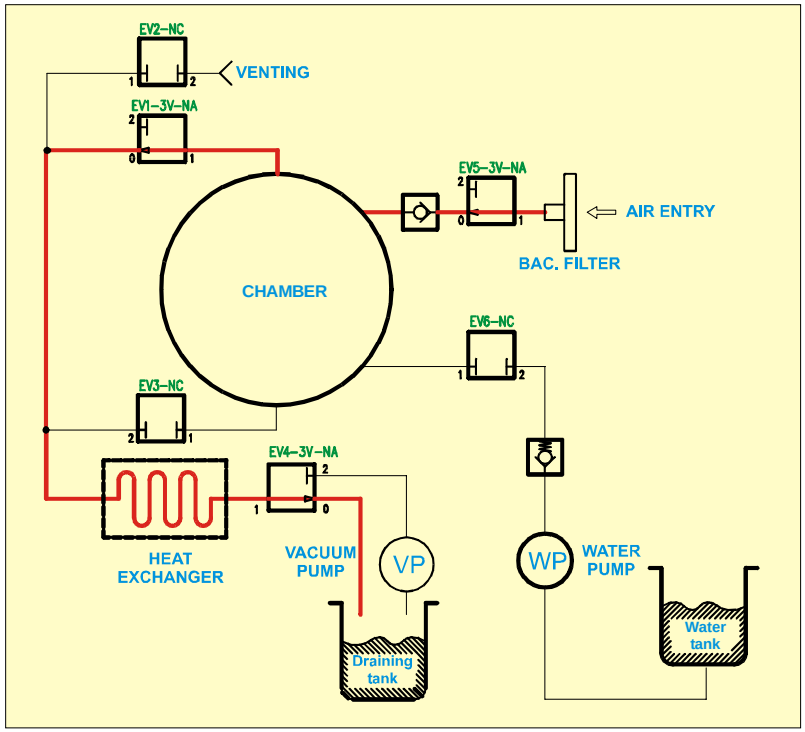
SEQUENCE OF THE PROCESS

It follows the description of the sterilization cycle, phase by phase. As example, we will use the most complete and meaningful cycle, i.e. the cycle relating the program **134°C POROUS** (preset 1 on the control panel), provided with fractionated pre-vacuum.

Standby status

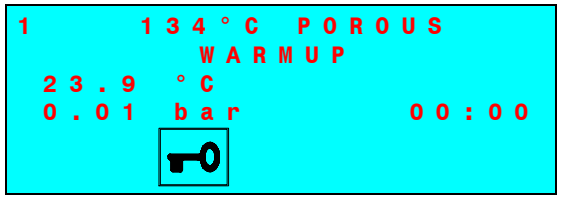


DESCRIPTION	STATUSES	PV	PA	EV1 (no)	EV2 (nc)	EV3 (nc)	EV4	EV5 (no)	EV6 (nc)	Fan
STAND-BY	Standby (door closed)	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	1' ON 6' OFF

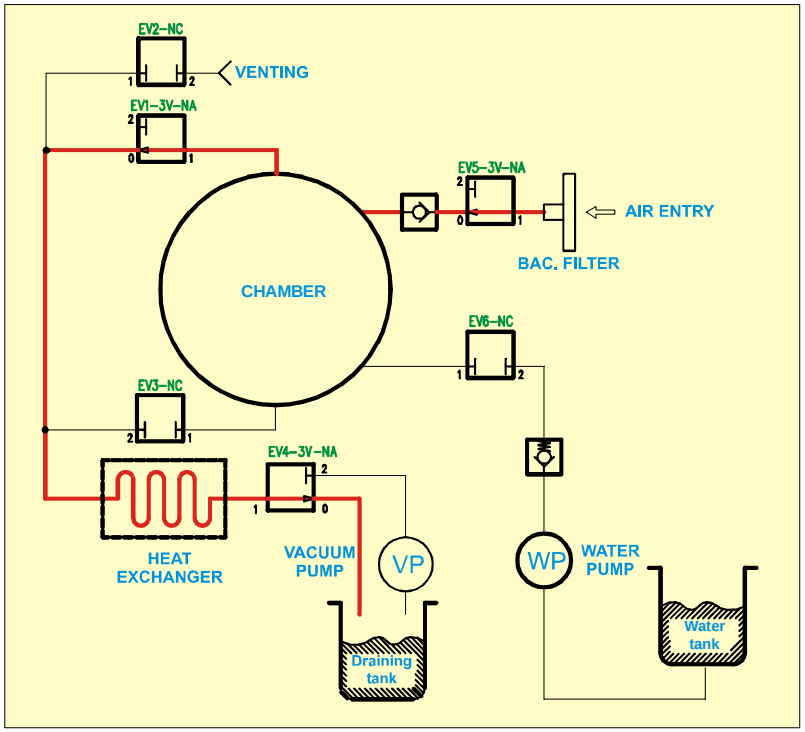


Warmup

When the **START** button is pressed, the first phase is **WARMUP**, which brings the chamber to temperature required for starting the cycle. The display shows the following:

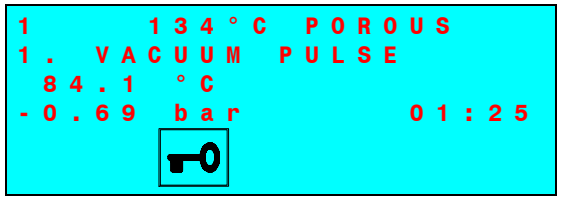


DESCRIPTION	STATUSES	PV	PA	EV1 (no)	EV2 (nc)	EV3 (nc)	EV4	EV5 (no)	EV6 (nc)	Fan
WARMUP	Standby (door closed)	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	1' ON 6' OFF

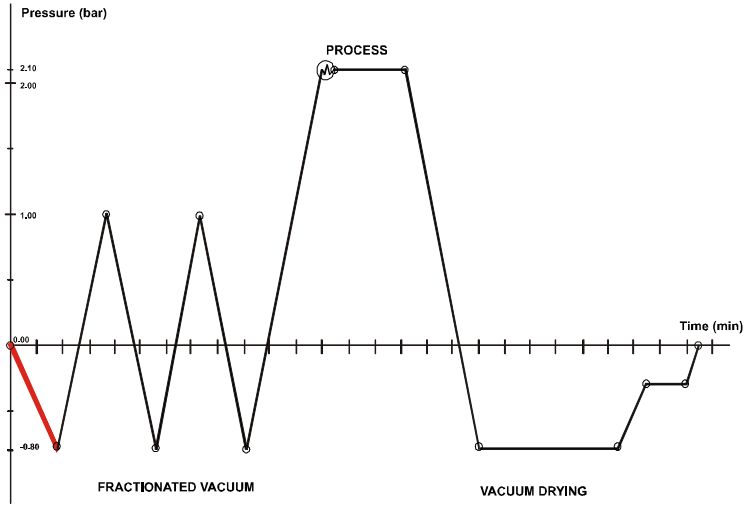


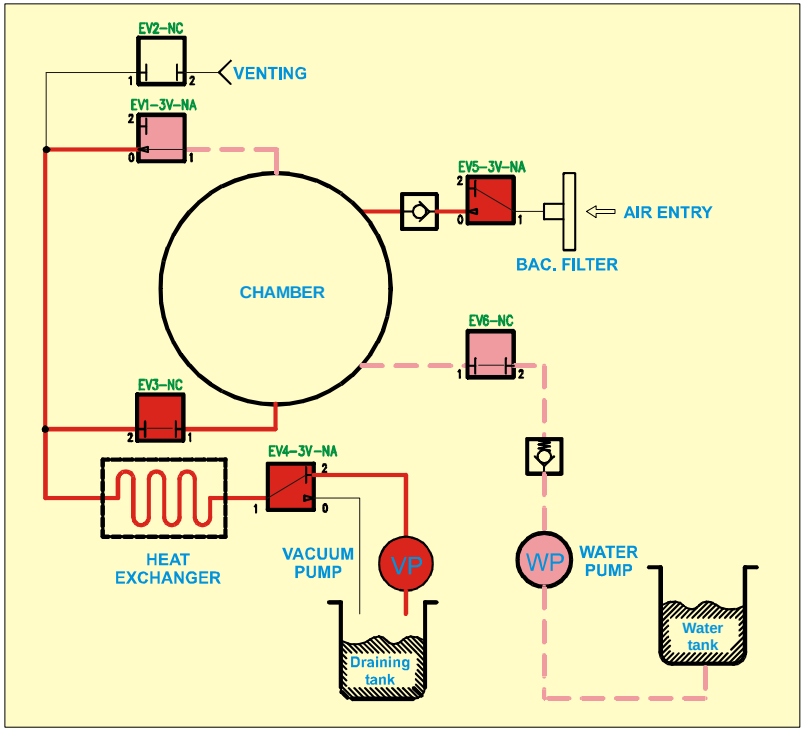
1st vacuum pulse – PV1

When the optimum temperature is reached, the first vacuum phase (**1st VACUUM PULSE**) is started and brings the chamber pressure down to the established value. The display shows :



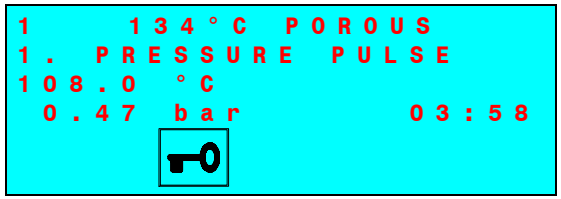
DESCRIPTION	STATUSES (P, t)	VP	WP	EV1 (no)	EV2 (nc)	EV3 (nc)	EV4	EV5 (no)	EV6 (nc)	Fan
1st vacuum pulse	from 0,00 to –0,70 bar	ON	OFF	OFF	OFF	ON	ON	ON	OFF	ON
	Water entry at –0,70 bar (0,5" x3)	ON	ON	ON	OFF	ON	ON	ON	ON	ON
	from -0,70 to –0,80 bar	ON	OFF	OFF	OFF	ON	ON	ON	OFF	ON
	Water enetry at –0,80 bar (0,3" x1) for P < -0,80 bar	ON	OFF	OFF	OFF	ON	ON	ON	OFF	ON



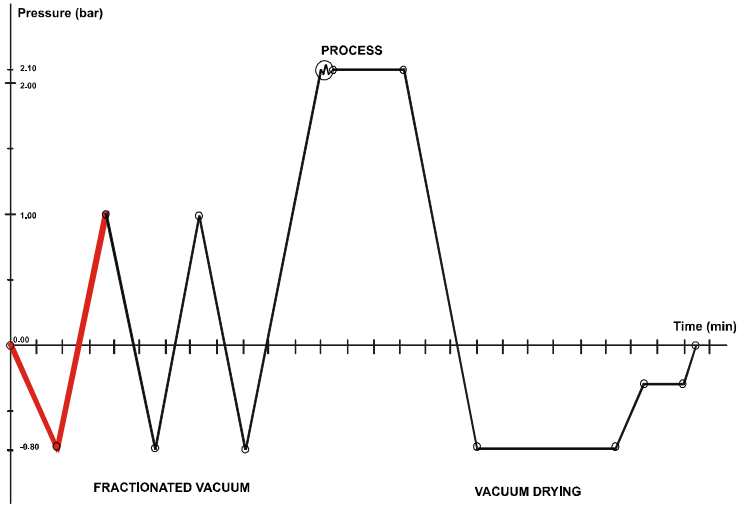


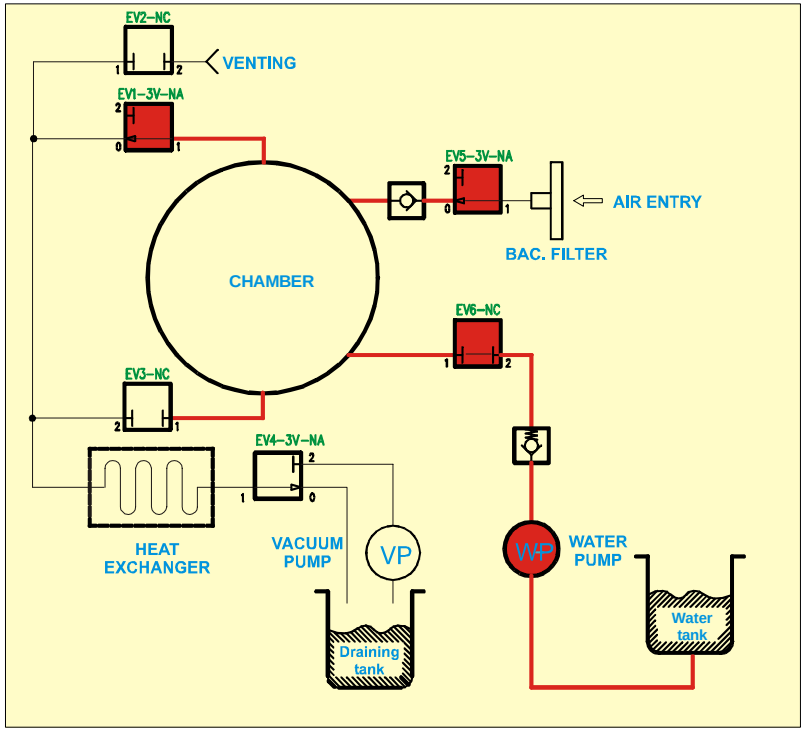
1st pressure pulse – PP1

When the pre-set vacuum value is reached, steam is injected and the pressure begins to rise (**1st PRESSURE PULSE**), until the established value is reached.



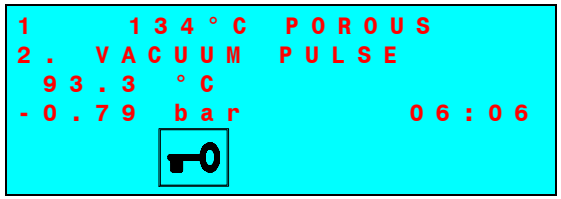
DESCRIPTION	STATUSES (P, t)	VP	WP	EV1 (no)	EV2 (nc)	EV3 (nc)	EV4	EV5 (no)	EV6 (nc)	Fan
1st pressure pulse from –0,88 to +0,50 bar	from –0,80 to 0,00 bar (water entry5" at –0,80 bar) from 0,00 to +0,50 bar	OFF	ON	ON	OFF	OFF	OFF	ON	ON	ON
1st pressure pulse from +0,50 to +1,00 bar	from +0,50 to +0,90 bar from +0,90 to +1,00 bar	OFF	ON	ON	OFF	OFF	OFF	ON	ON	ON



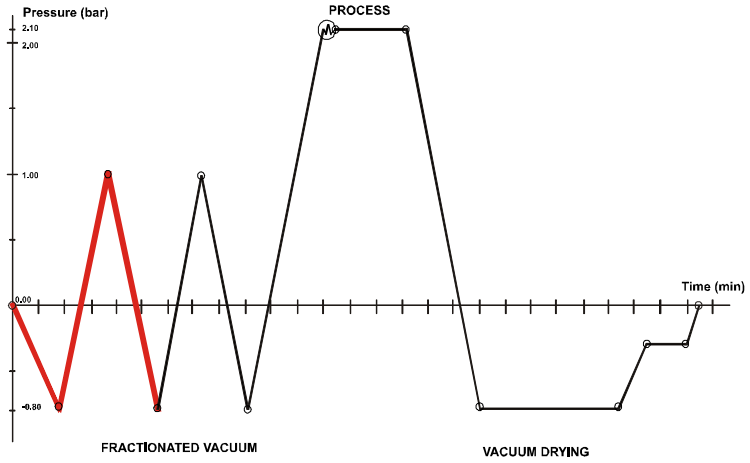


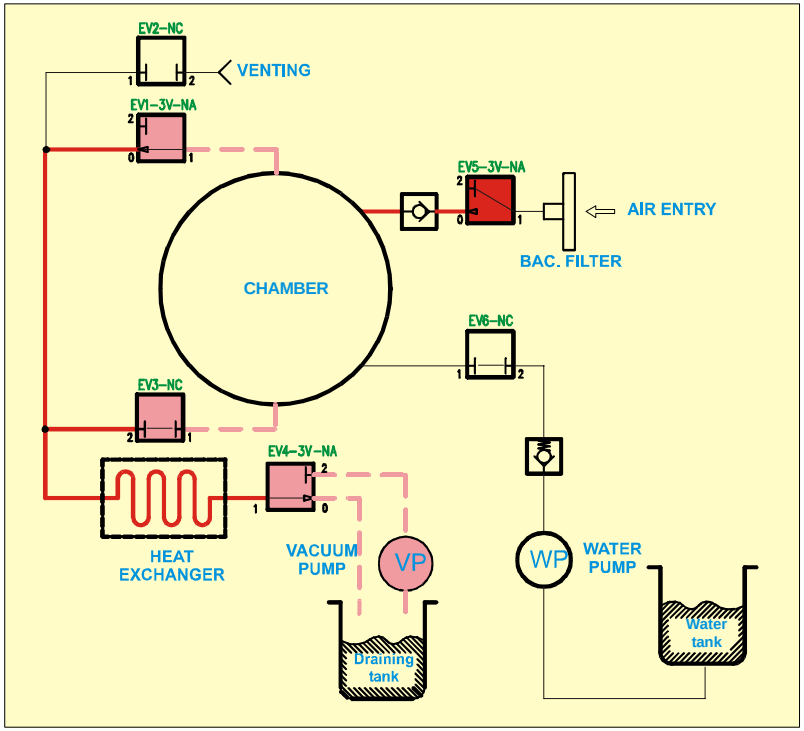
2nd vacuum pulse- PV2

At the end of the pressure rise, the steam, mixed with residual air, is discharged and the second emptying of the sterilization chamber begins (**2nd VACUUM PULSE**).



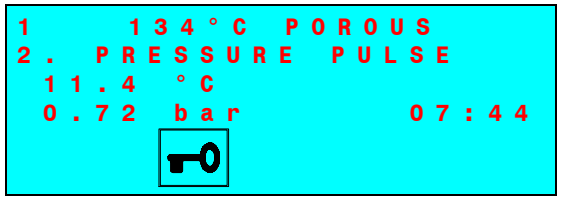
DESCRIPTION	STATUSES (P, t)	VP	WP	EV1 (no)	EV2 (nc)	EV3 (nc)	EV4	EV5 (no)	EV6 (nc)	Fan
2nd vacuum pulse	Steam discharge from +1,00 to +0,22 barr	OFF	OFF	ON	OFF	ON	OFF	ON	OFF	ON
	Transition phase of the charging circuit (1")	ON	OFF	ON	OFF	OFF	OFF	ON	OFF	ON
	Vacuum of the discharge circuit	ON	OFF	ON	OFF	OFF	ON	ON	OFF	ON
	Chamber discharge	ON	OFF	ON	OFF	ON	ON	ON	OFF	ON
	Chamber vacuum (up to -0,80 bar)	ON	OFF	OFF	OFF	ON	ON	ON	OFF	ON
	Chamber vacuum (up to PT2 =165°)									



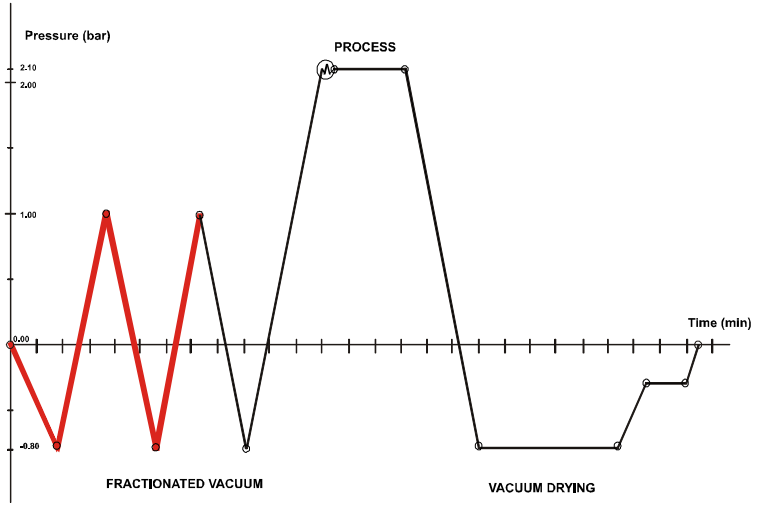


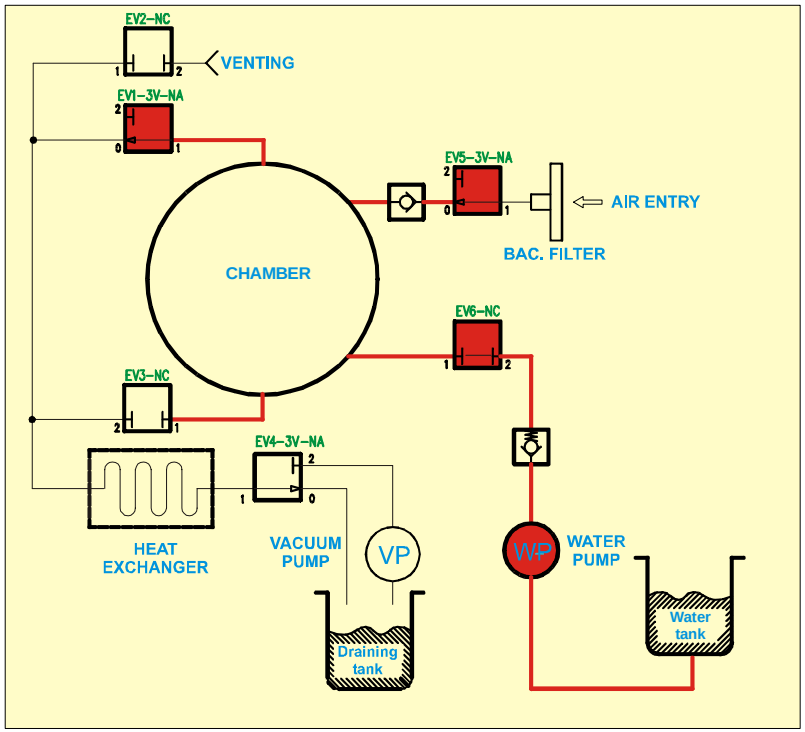
2nd pressure pulse – PP2

After the second vacuum phase, steam is again injected into the sterilization chamber, with a relative rise in pressure (**2nd PRESSURE PULSE**.



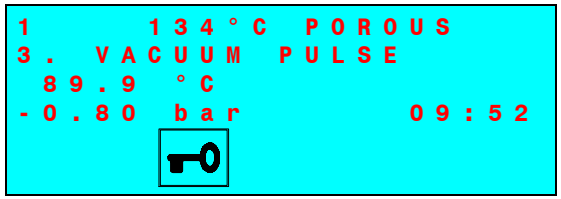
DESCRIPTION	STATUSES (P, t)	VP	WP	EV1 (no)	EV2 (nc)	EV3 (nc)	EV4	EV5 (no)	EV6 (nc)	Fan
2nd pressure pulse	from –0,80 to 0,00 bar (water entry 5" at –0,80 bar)	OFF	ON	ON	OFF	OFF	OFF	ON	ON	ON
	from +0,00 to +0,90 bar									
	from +0,90 to +1,00 bar									



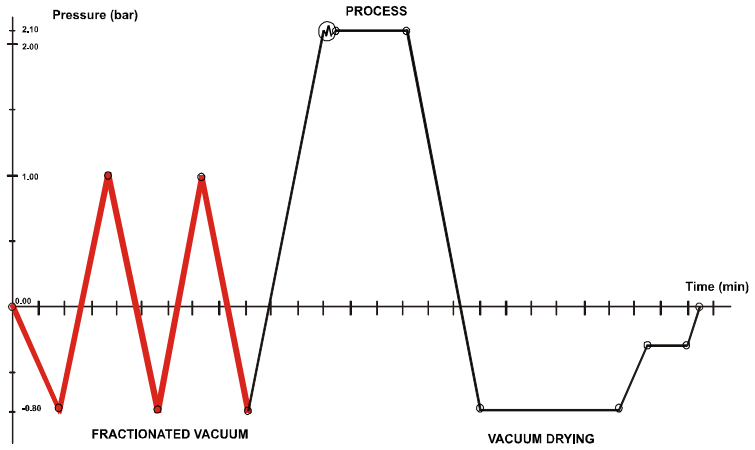


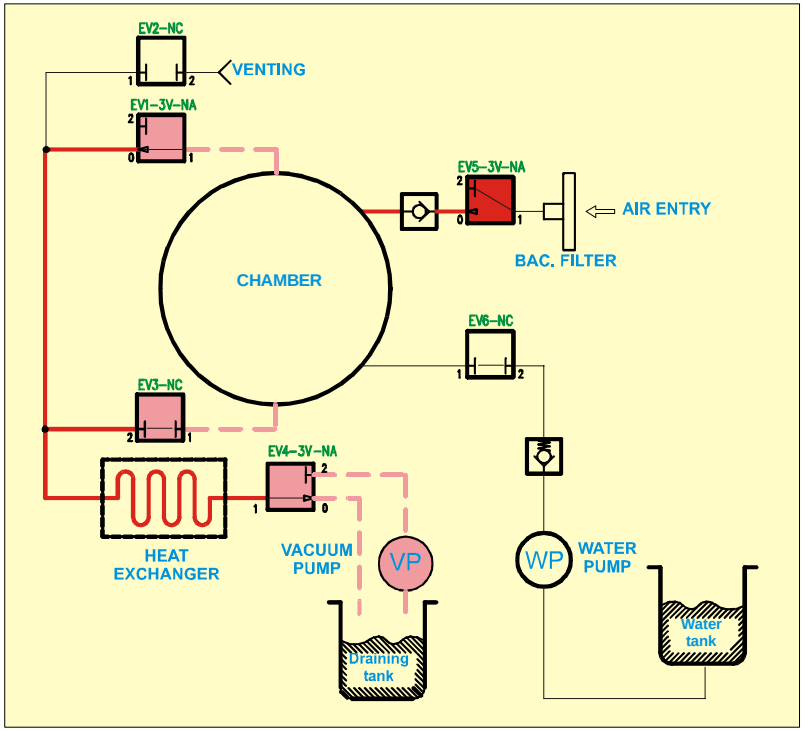
3rd vacuum pulse – PV3

At the end of the second pressure rise, there is another discharge and the last vacuum phase begins (**3rd VACUUM PULSE**).



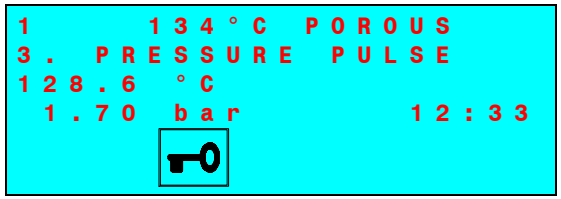
DESCRIPTION	STATUSES (P, t)	VP	WP	EV1 (no)	EV2 (nc)	EV3 (nc)	EV4	EV5 (no)	EV6 (nc)	Fan
3rd ° vacuum pulse	Steam discharge from +1,00 to +0,22 bar	OFF	OFF	ON	OFF	ON	OFF	ON	OFF	ON
	Transition phase of the charging circuit (1")	ON	OFF	ON	OFF	OFF	OFF	ON	OFF	ON
	Vacuum of the discharge circuit	ON	OFF	ON	OFF	OFF	ON	ON	OFF	ON
	Chamber discharge	ON	OFF	ON	OFF	ON	ON	ON	OFF	ON
	Vacuum of the chamber (up to -0,80 bar)	ON	OFF	OFF	OFF	ON	ON	ON	OFF	ON
	Chamber vacuum (up to PT2 =165°)									



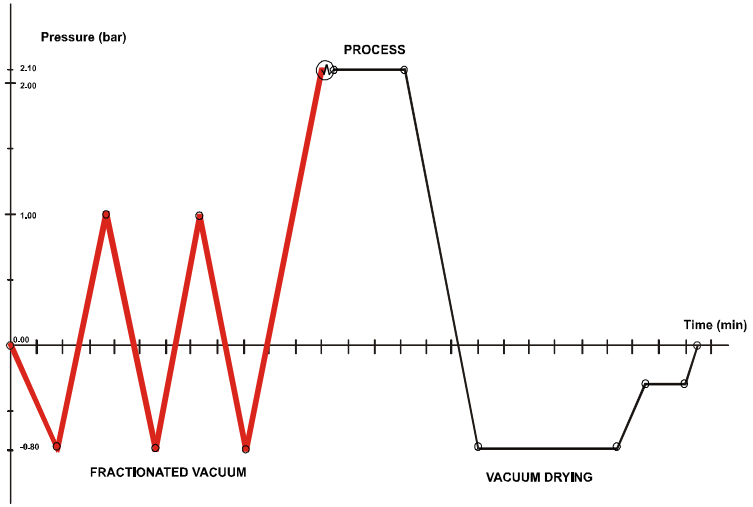


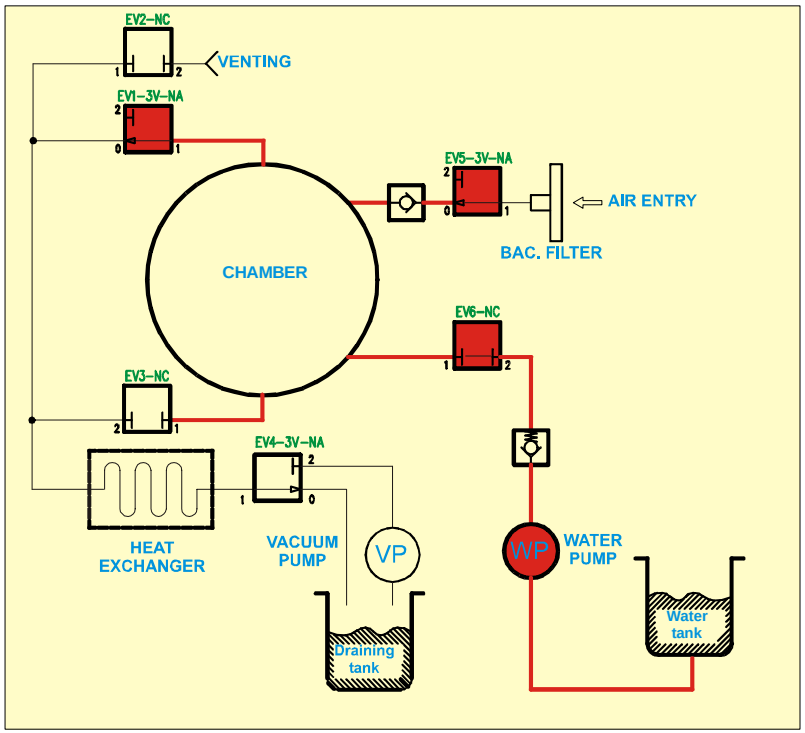
3rd pressure pulse – PP3

After the last vacuum phase, the pressure in the sterilization chamber must rise to the value set for the sterilization process (**3rd PRESSURE PULSE**), always through the injection of steam.



DESCRIPTION	STATUSES (P, t)	VP	WP	EV1 (no)	EV2 (nc)	EV3 (nc)	EV4	EV5 (no)	EV6 (nc)	Fan
3rd pressure pulse	from –0,80 to 0,00 bar (water entry5" at –0,80 bar)	OFF	ON	ON	OFF	OFF	OFF	ON	ON	ON
	from +0,00 to +0,90 bar									
	from +0,90 to +1,00 bar									

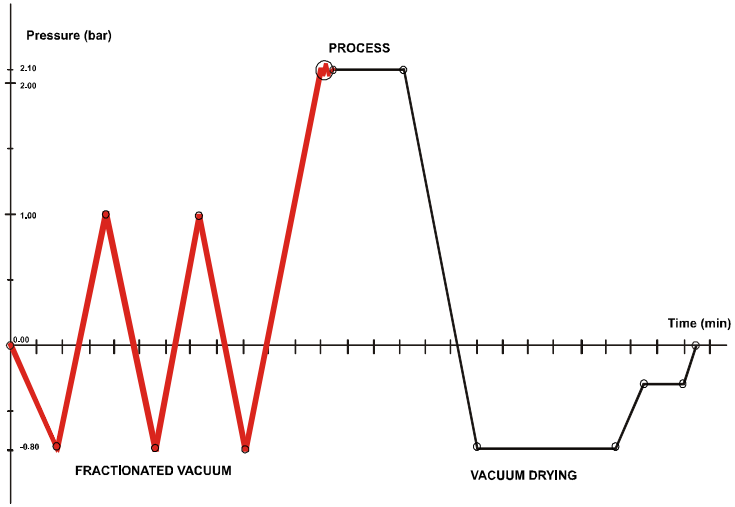


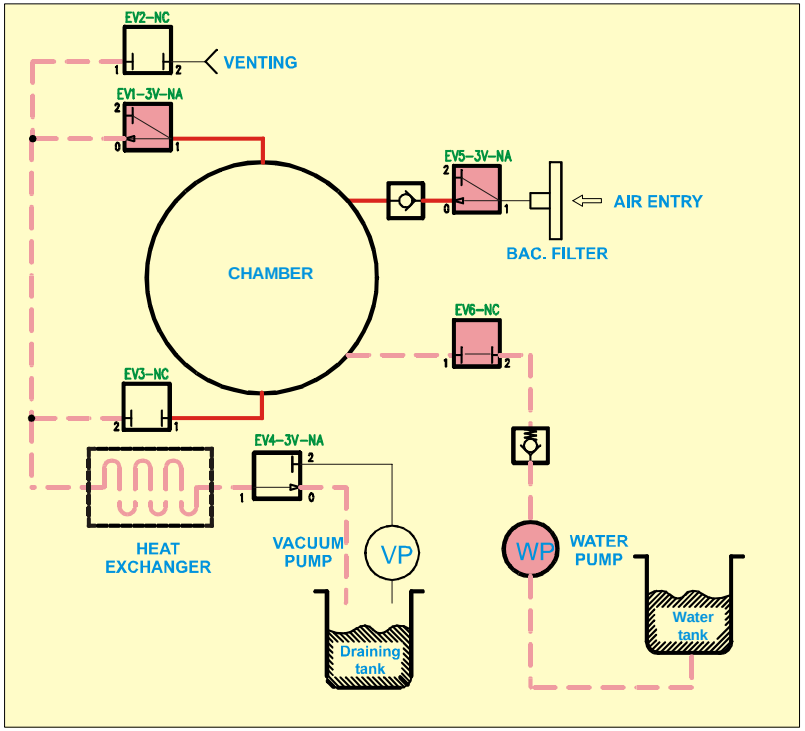


Thermodynamic equilibration

When the pressure and temperature values for the selected program have been reached, it is a good idea to wait a moment to allow the temperature in the chamber and the load to stabilize (**EQUILIBRATION**). The liquid crystal display shows:

DESCRIPTION	STATUSES (P, t)	VP	WP	EV1 (no)	EV2 (nc)	EV3 (nc)	EV4	EV5 (no)	EV6 (nc)	Fan
Equilibration	P > +2,15 bar x 15” (134°C) P > +1,12 bar x 15” (121°C)	OFF	ON	ON	OFF	OFF	OFF	ON	ON	ON

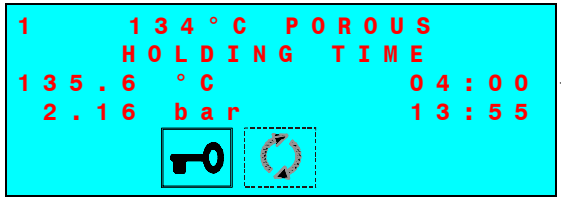




Process

When the thermodynamic parameters are balanced, the actual sterilization phase of the materials begins (**HOLDING TIME**).
Thanks to continuous monitoring of the thermodynamic parameters and sophisticated management of the plumbing circuit, the pressure and temperature are maintained **constant** within the limits required by the program. The display shows the following.

A countdown begins of the sterilization time.

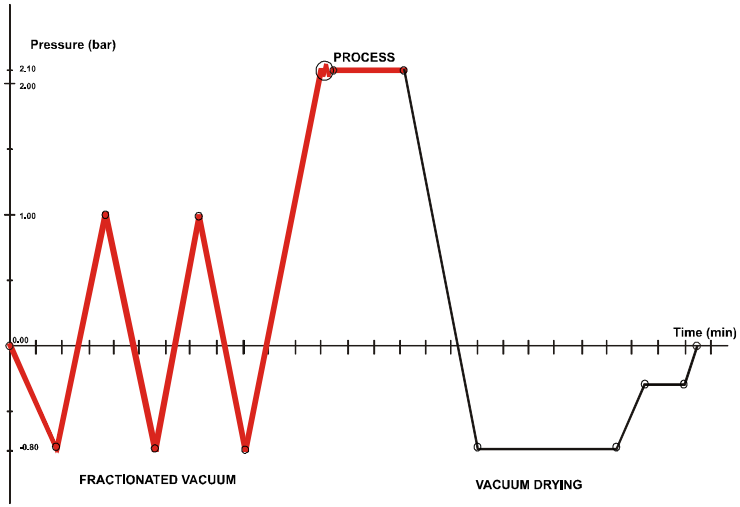


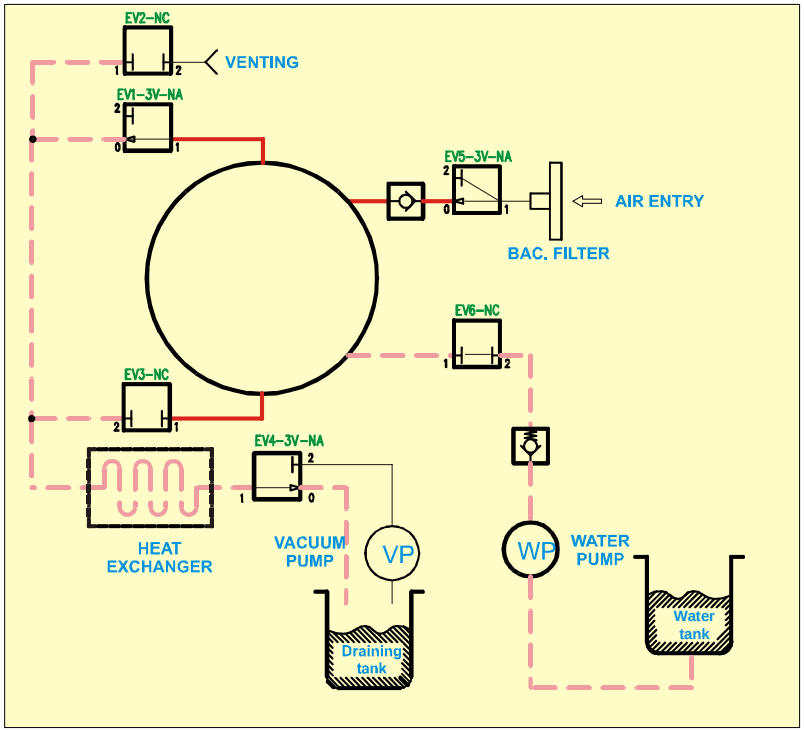
The icon for the sterilization process status **flashes** to indicate that the treatment of the load is in progress.

☞ At the end of the sterilization phase, the icon remains steady on to indicate the complete sterilization of the material in the sterilization chamber.

If, for some reason, the sterilization cycle has been interrupted before completion, the icon continues flashing. If, for some reason, the sterilization cycle has been interrupted before completion, the icon continues flashing.
In this case, the material cannot be considered sterile and MUST ABSOLUTELY NOT BE USED..

DESCRIPTION	STATUSES (P, t)	VP	WP	EV1 (no)	EV2 (nc)	EV3 (nc)	EV4	EV5 (no)	EV6 (nc)	Fan
Holding time	For the time set by the program	OFF	ON	ON	OFF	OFF	OFF	ON	ON	ON



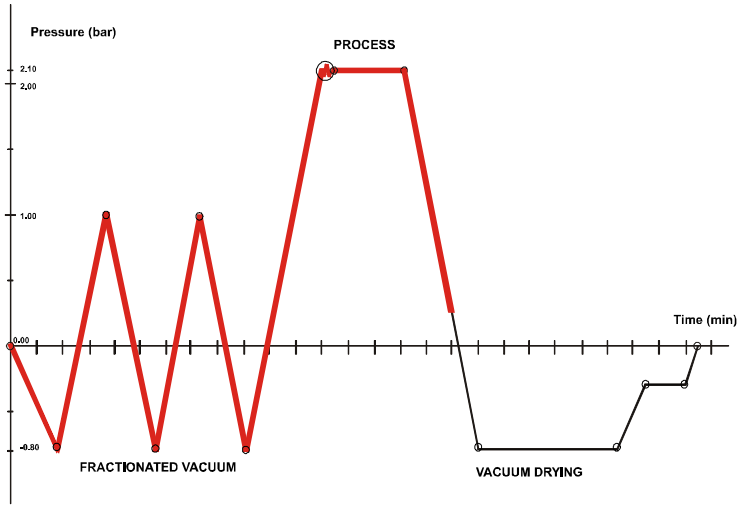


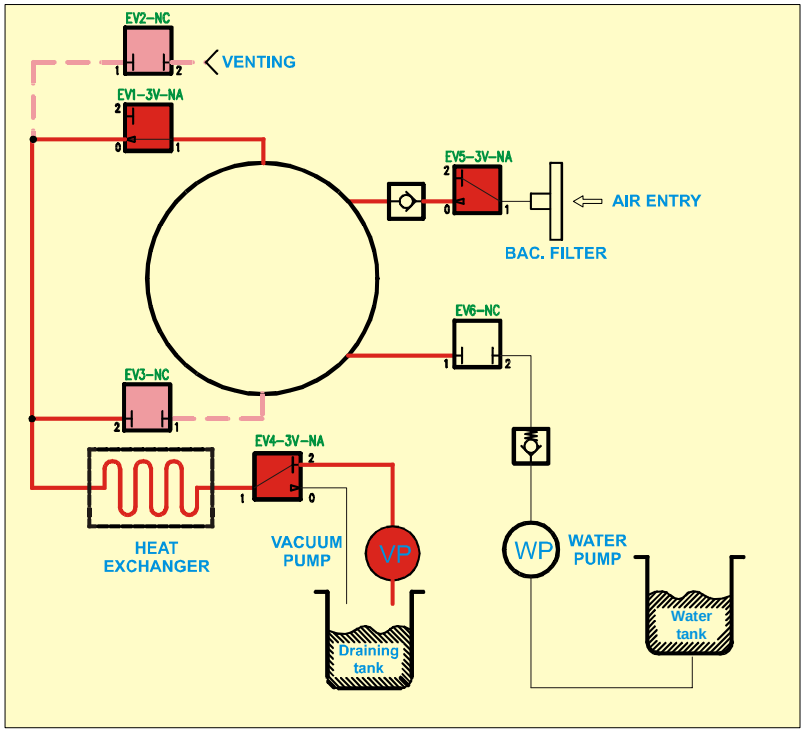
Steam discharge

At the end of the sterilization phase, the steam is released from the sterilization chamber (**STEAM DISCHARGE**). The liquid crystal display shows:

The icon for the sterilization process status  is **steady on**.

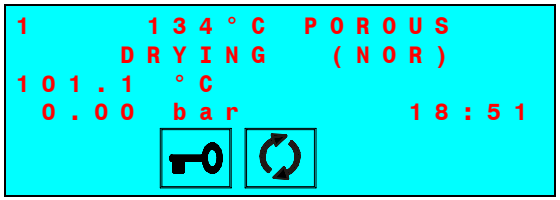
DESCRIPTION	STATUSES (P, t)	VP	WP	EV1 (no)	EV2 (nc)	EV3 (nc)	EV4	EV5 (no)	EV6 (nc)	Fan
Steam discharge	from +2,15/1,12 to +0,10 bar	ON	OFF	ON	ON	OFF	ON	ON	OFF	ON
	from +0,10 to +0,10 bar	ON	OFF	ON	OFF	OFF	ON	ON	OFF	ON
	from +0,20 to -0,00 bar	ON	OFF	OFF	OFF	ON	ON	ON	OFF	ON



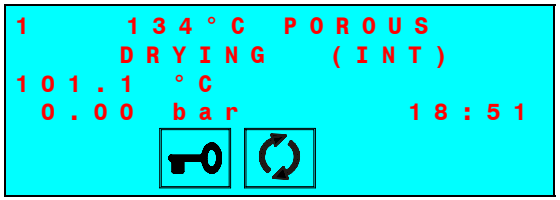


Drying

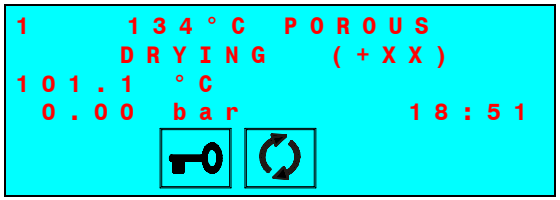
After the steam under pressure is released, its forced removal begins with the vacuum pump (**DRYING**): for this purpose, low pressure is created in the sterilization chamber to facilitate the evaporation of the steam and its consequent elimination. As a function of the type of drying set, one of the following screens will appear:



Standard drying

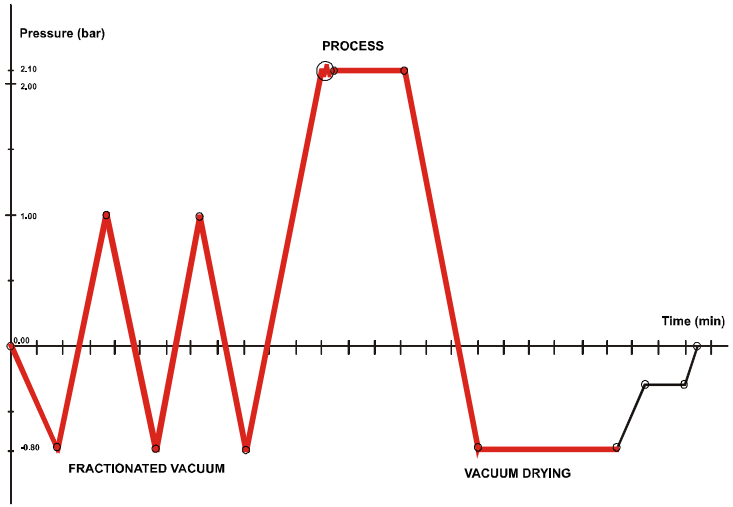


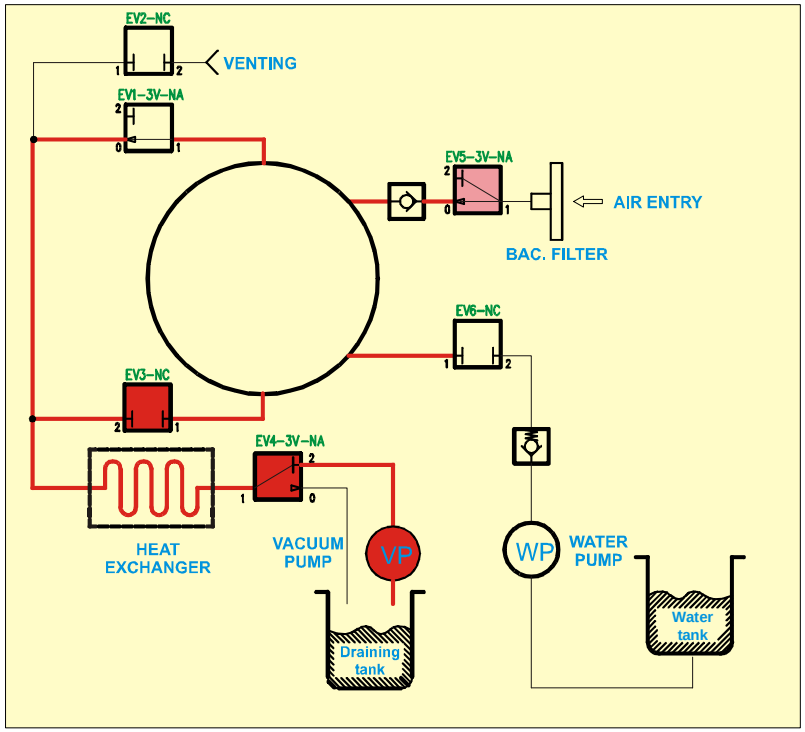
Intelligent drying



Extra drying
(+XX) = time set

DESCRIPTION	STATUSES (P, t)	VP	WP	EV1 (no)	EV2 (nc)	EV3 (nc)	EV4	EV5 (no)	EV6 (nc)	Fan
Drying	From 0,00 to –0,80 bar	ON	OFF	OFF	OFF	ON	ON	ON	OFF	ON
	From -0,80 to –0,50 bar	ON	OFF	OFF	OFF	ON	ON	ON	OFF	ON
	From -0,50 to –0,80 bar	ON	OFF	OFF	OFF	ON	ON	ON	OFF	ON

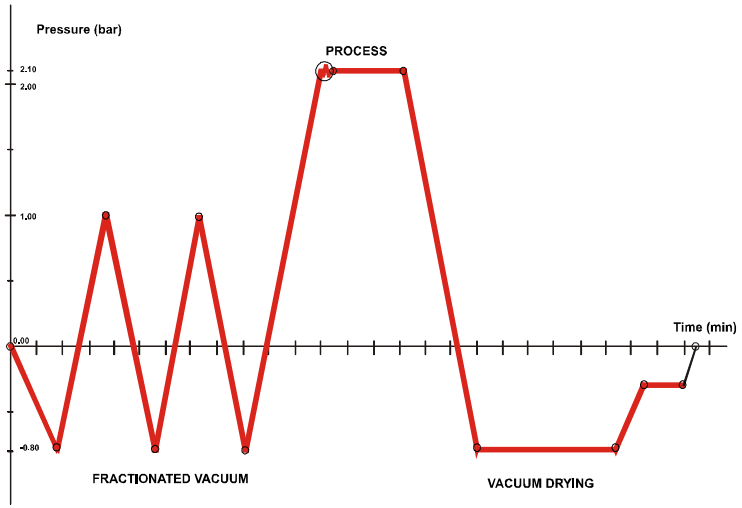


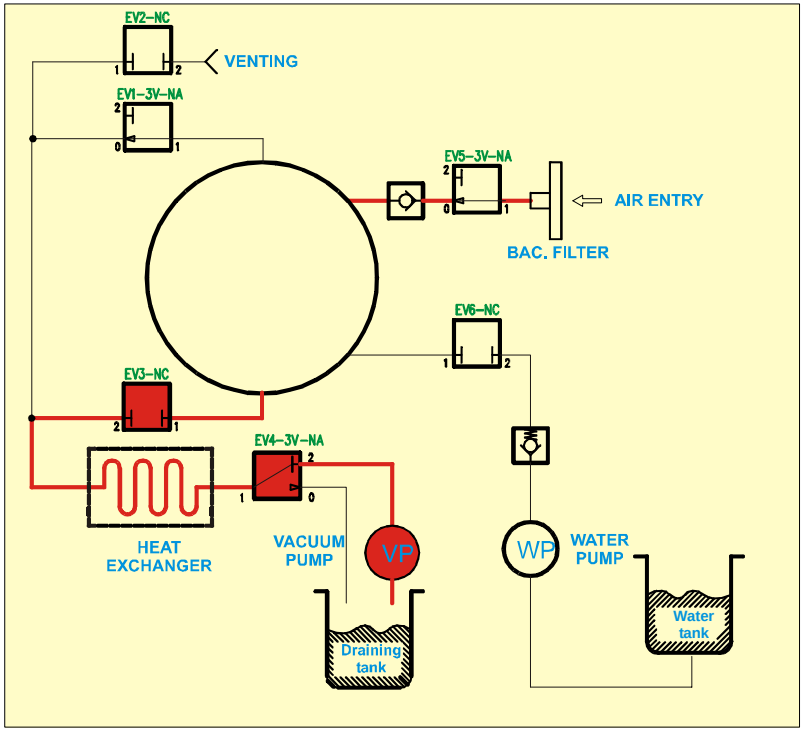


Ventilation

When the drying phase is finished, it is followed by a **VENTILATION** phase in which fresh sterile air is injected, while maintaining a vacuum in the chamber, to eliminate condensate and cool the load:

DESCRIPTION	STATUSES (P, t)	VP	WP	EV1 (no)	EV2 (nc)	EV3 (nc)	EV4	EV5 (no)	EV6 (nc)	Fan
Ventilation	from -0,50/0,80 to -0,45 bar	ON	OFF	OFF	OFF	ON	ON	OFF	OFF	ON

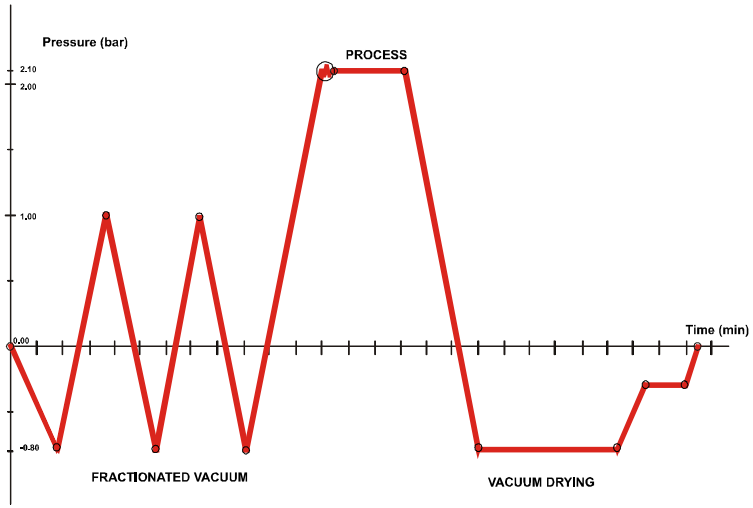


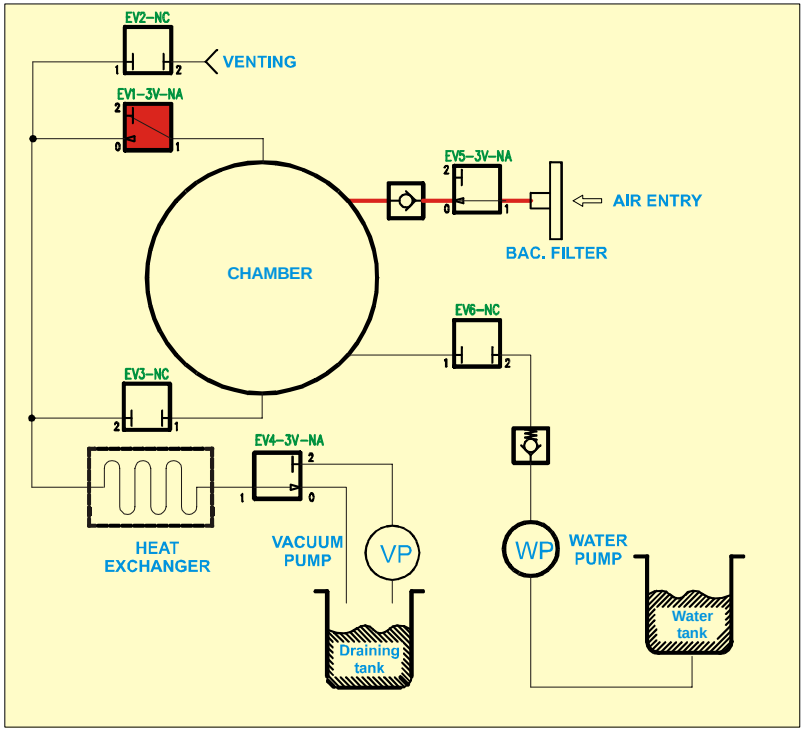


Levelling

At the end of the ventilation phase, the chamber is brought back to atmospheric pressure (**LEVELLING**) by injecting sterile outside air to allow the opening of the door and the retrieval of the load:

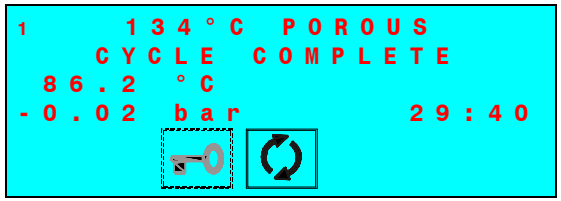
DESCRIPTION	STATUSES (P, t)	VP	WP	EV1 (no)	EV2 (nc)	EV3 (nc)	EV4	EV5 (no)	EV6 (nc)	Fan
Levelling (pressure)	from -0,45 to –0,10 bar (-0,10 bar to the value of 0 bar in the memory)	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF
Levelling (waiting time for the release of the locking door mechanism)	Waiting time = 15” (counting start from pressure–0,10 bar)	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF





Completion of the cycle

When the pressure in the sterilization chambers returns within the pre-set safety limits, the door lock system is released.
As a consequence, the door status icon **flashes**. At the same time, it also beeps.



The icon for the sterilization process status is **steady on**.

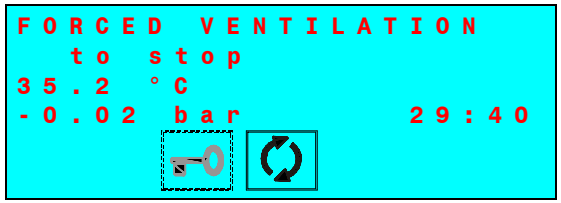
Open the door and retrieve the sterilized material, using the extractor provided.
The icon symbol **goes off**.

☞ When the door is opened, the report for the sterilization cycle executed is automatically produced (if the printer is installed and selected). Check and sign this report, file it in a suitable place. Refer to the ***Print report examples***.

☞ At the end of the cycle, and up to the opening of the door, the heating elements are off. As a consequence, the device is slowly cooling regardless of what the STAND-BY mode is.

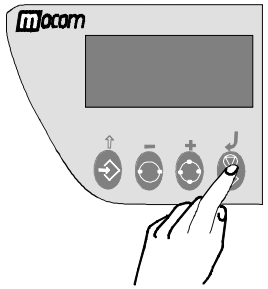
Now the equipment is **ready** to perform a **new cycle**. Repeat the procedures explained in the Chapter"***Selecting the program***".

☞ Whenever the sterilizer's' door is not opened at the end of the cycle, the vacuum pump is periodically activated to remove any traces of condensate from the sterilization chamber. The display shows:



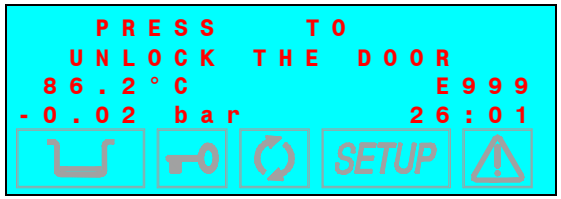
Press to interrupt ventilation and open the door.

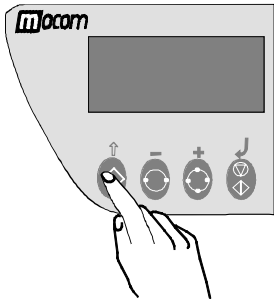
MANUAL CYCLE INTERRUPTION



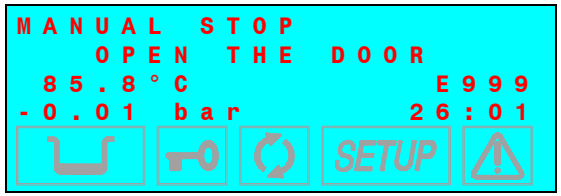
The operator can manually interrupt the cycle at any time by pressing the START/STOP key for three seconds.
The command generates the error **E999**, given that the cycle did not finish correctly. As a consequence, until safe conditions are reached, the display shows, along a beep:

When safe conditions are reached, the machine activates a special procedure, first asking the user to manually unlock the door by displaying the following instruction:

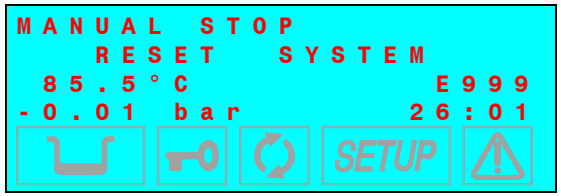


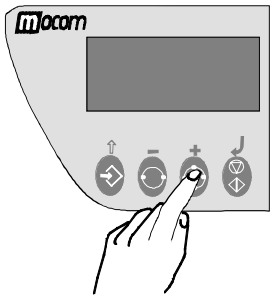


Press the key to unlock the door . The following message is then displayed:



Finally, when the door is opened, you will be asked to **reset** the device by the following message:





To **RESET** the system, **hold down, for at least three seconds,** the ***PROGRAM SELECTION*** key until you hear the confirming beep.

When the door is opened, the report for the sterilization cycle executed is produced, including the error code (**E999**). Check the report, initial it in the space provided and file it in a suitable place.
Refer to the ***Print report examples***.

After the **RESET**, the device goes to **STAND-BY** mode, ready to execute a **new program**.

☞ Whenever an alarm is generated in certain phases of the cycle, an automatic procedure is activated to clean the plumbing circuit. For a complete description of the alarms, see "***Alarm indication***".

After a program is manually interrupted (MANUAL STOP) always check the status of the icon before using the material in the sterilization chamber.

If the icon is STEADY ON, the material in the sterilization can be considered STERILE and, thus, be used. We recommend using it immediately.

However, if it is OFF, the material in the sterilization chamber CANNOT BE CONSIDERED STERILE and ABSOLUTELY MUST NOT BE USED..

RESULT OF THE CYCLE

After the cycle is finished, it is important to check the sterilization results.

Whenever a cycle finishes (message **CYCLE COMPLETE** and icon on), without, therefore, being interrupted by any type of alarm, you are guaranteed to have **completely aseptic** material.

The report of the sterilization parameters is an additional check tool.

PRINT OF THE CYCLE REPORT

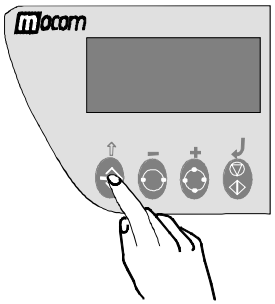
(optional printer)

However, it is a good practice to check that the print report issued at the end of the sterilization program, also specifies a positive outcome.

At the end of the cycle, the salient data for the thermodynamic parameters of the sterilization, temperature and pressure (°C and bar), and time (minutes) of the sterilization cycle, with particular attention to the sterilization phase true and proper, is printed by simply opening the door.
So, check the values on the print report and any additional indications for a further confirmation of the good outcome of the sterilization process.

The operator should sign in the space provided and file the document for possible future use.
If necessary, copies of the document can be used to identify the load (or parts of it) with the date/time of sterilization and details of the type of cycle performed.

To select the number of copies to print, refer to ***Printer Options***.



☞ The operator can also request an extended printout of the sterilization process data, including the recorded values of all the sensors installed on the machine. To start this print function, hold down the ↑ (ESC) key on the control panel while opening the door. For complete details about printing the summary, please refer to ***Print report examples***.

PRINT REPORT EXAMPLES

Normal program report

Model	MILLENNIUM B
S/N	02 BM 0001
Ver. SW	Exxxx/BMyyyyyy
Counter	0007/0015
Selection	134c SOLID
Temperature	134 °C
Pressure	2.10 bar
Process time	4 min
Stand-by	LOW
Pre-vacuum	SINGLE
Drying	FAST

CYCLE START 19/11/02 12:14

Time		C	bar
00:01	CS	079.4	+0.00
02:02	1PV	093.7	-0.80
05:48	ET	135.6	+2.15
06:02	SS	135.9	+2.17
07:02		135.6	+2.14
08:02		135.5	+2.14
09:02		135.4	+2.14
10:02	SE	135.5	+2.15
10:37	DS	104.1	+0.00
11:41	SPD	047.5	-0.90
16:08	DE	047.6	-0.84
17:12	CE	084.6	-0.04
06:32	MAX	136.0	
09:59	MIN	135.4	

Drying Pulses 01
CYCLE END 19/11/02 12:27

STERILIZATION: POSITIVE

OPERATOR

. . . . . .

Model	MILLENNIUM B
S/N	02 BM 0001
Ver. SW	Exxxx/BMyyyyyy
Counter	0007/0015
Selection	134c POROUS
Temperature	134 °C
Pressure	2.10 bar
Process time	4 min
Stand-by	HIGH
Pre-vacuum	FRACTIONATED
Drying	STANDARD

CYCLE START 19/11/02 09:52

Time		C	bar
00:01	CS	075.1	-0.00
01:57	1PV	047.S	-0.80
04:53	1PP	120.5	+1.00
07:00	2PV	061.1	-0.80
09:15	2PP	120.4	+0.98
11:22	3PV	061.1	-0.80
15:04	ET	135.5	+2.15
15:19	SS	135.9	+2.17
16:19		135.4	+2.14
17:18		135.5	+2.15
18:19		135.4	+2.14
19:19	SE	135.5	+2.15
19:53	DS	104.4	+0.00
20:57	SPD	048.4	-0.90
26:55	EPD	094.9	-0.86
29:15	DE	112.6	-0.47
29:43	CE	115.8	-0.04
16:20	MAX	135.9	
18:11	MIN	135.4	

Drying Pulses 05
CYCLE END 19/11/02 10:17

STERILIZATION: POSITIVE

OPERATOR

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Extended program report (required by operator)

Model	MILLENNIUM B
S/N	02 BM 0001
Ver. SW	Exxxx/BMyyyyyy
Counter	0007/0015
Selection	134c POROUS
Temperature	134 °C
Pressure	2.10 Bar
Process t ime	4 min
Stand-by	HIGH
Pre-vacuum	FRACTIONATED
Drying	STANDARD

CYCLE START 19/11/02 09:52

Time		T1	P	T2	T3	T4
00:01	CS	075.1	-0.00	130.9	115.2	093.4
00:11		074.9	-0.28	133.3	114.2	094.0
00:21		074.4	-0.46	146.3	113.2	094.5
00:31		074.3	-0.57	152.6	112.2	095.0
00:35	..	074.3	-0.59	154.2	111.9	095.2
00:51	..	078.9	-0.62	152.2	110.4	095.6
01:01	..	074.9	-0.73	146.6	109.6	095.7
01:27	..	047.8	-0.78	149.3	107.7	095.7
01:57	..	047.8	-0.80	155.3	105.8	095.4
02:07	..	076.5	-0.57	149.9	105.2	095.1
02:17	..	081.1	-0.49	142.1	104.6	094.6
		.....				
		.....				
08:15	...	068.4	-0.76	151.8	104.7	102.3
08:22	...	061.1	-0.80	153.6	104.5	101.7
08:32	...	097.4	+0.01	154.7	104.0	100.8
08:42	...	104.6	+0.24	148.9	103.7	101.0
		.....				
		.....				
15:04	...	135.5	+2.15	143.3	111.7	131.7
15:19	...	135.9	+2.17	148.5	113.5	132.6
15:28	...	135.3	+2.16	153.6	115.9	133.0
		.....				
		.....				
19:19	...	135.5	+2.15	157.4	126.5	132.5
19:34	...	134.4	+1.07	157.0	126.8	131.2
19:49	...	108.3	+0.25	156.4	126.8	119.9
19:53	..	104.4	+0.00	156.1	126.6	116.2
20:04	...	094.2	- 0.50	155.1	125.9	112.4
20:19	...	069.2	-0.73	153.7	124.5	112.9
20:34	...	059.2	-0.81	152.3	123.4	113.5
20:49	...	053.8	-0.87	151.2	122.9	113.6
20:57	...	048.4	-0.90	150.9	122.7	113.5
21:04	...	047.1	-0.80	151.0	122.5	113.5
23:31	...	042.3	-0.89	153.3	122.0	112.2
		.....				
		.....				
26:55	...	094.9	-0.90	153.3	121.7	112.3
27:10	...	101.4	-0.67	154.0	121.7	112.3
27:25	...	105.4	-0.57	153.7	121.5	112.3
		.....				
		.....				
29:15	...	112.6	-0.47	149.6	119.1	111.2
29:28	...	115.2	-0.10	143.0	118.4	110.7
29:43	CE	115.8	-0.04	147.4	110.1	110.7
16:20	MAX	135.9				
18:11	MIN	135.4				

Drying pulses 05
CYCLE END 19/11/02 10:17

STERILIZATION: POSITIVE

OPERATOR

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EXTENDED REPORT
REQUESTED BY THE OPERATOR

Report following a Manual Stop

Model	MILLENNIUM B
S/N	02 BM 0001
Ver. SW	Exxxx/BMyyyyyy
Counter	0007/0015
Selection	134c POROUS
Temperature	134 °C
Pressure	2.10 bar
Process time	4 min
Stand-by	HIGH
Pre-vacuum	FRACTIONATED
Drying	STANDARD

CYCLE START 19/11/02 11:13

Time		C	bar
00:01	CS	077.6	+0.01
01:40	1PV	088.7	-0.80
04:40	1PP	120.6	+1.00
05:40	2PV	062.9	-0.80
07:10	2PP	135.6	+1.00
08:20	3PV	135.5	-0.80
11:20	ET	135.4	+2.15
11:39	SS	135.5	+2.17
12:39		135.5	+2.14
13:39		104.1	+2.15
14:39		047.5	+2.15

STERILIZATION: NEGATIVE

OPERATOR

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ALARM CODE: E999
DESCRIPTION MANUAL STOP

Report following a Black-out

Model	MILLENNIUM B
S/N	02 BM 0001
Ver. SW	Exxxx/BMyyyyyy
Counter	0006/0012
Selection	134c CUSTOM
Temperature	134 °C
Pressure	2.10 bar
Process time	07 min
Stand-by	HIGH
Pre-vacuum	FRACTIONATED
Drying	FAST

CYCLE START 19/11/02 15:31

BLACK OUT 19/11/02 15:45

STERILIZATION NEGATIVE

OPERATOR

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ALARM CODE: E000
DESCRIPTION BLACK-OUT

Report following an Alarm

Model	MILLENNIUM B
S/N	02 BM 0001
Ver. SW	Exxxx/BMyyyyyy
Counter	0007~0015
Selection	134c POROUS
Temperature	134 °C
Pressure	2.10 bar
Process time	4 min
Stand-by	HIGH
Pre-vacuum	FRACTIONATED
Drying	STANDARD

CYCLE START 19/11/02 11:30

Time		T1	P	T2	T3	T4
00:01	CS	075.1	-0.00	130.9	115.2	093.4
00:11		074.9	-0.28	133.3	114.2	094.0
00:21		074.4	-0.46	146.3	113.2	094.5
00:31		074.3	-0.57	152.6	112.2	095.0
00:35	..	074.3	-0.59	154.2	111.9	095.2
00:51	..	078.9	-0.62	152.2	110.4	095.6
01:01	..	074.9	-0.73	146.6	109.6	095.7
01:27	..	047.8	-0.78	149.3	107.7	095.7
01:57	..	047.8	-0.80	155.3	105.8	095.4
02:07	..	076.5	-0.57	149.9	105.2	095.1
02:17	..	081.1	-0.49	142.1	104.6	094.6
		.....				
		.....				
08:15	...	068.4	-0.76	151.8	104.7	102.3
08:22	...	061.1	-0.80	153.6	104.5	101.7
08:32	...	097.4	+0.01	154.7	104.0	100.8
08:42	...	104.6	+0.24	148.9	103.7	101.0
		.....				
		.....				
15:04	...	135.5	+2.15	143.3	111.7	131.7
15:19	...	135.9	+2.17	148.5	113.5	132.6
15:28	...	135.3	+2.16	153.6	115.9	133.0
		.....				
		.....				
19:19	...	135.5	+2.15	157.4	126.5	132.5
19:34	...	134.4	+1.07	157.0	126.8	131.2
19:49	...	108.3	+0.25	156.4	126.8	119.9
19:53	DS	104.4	+0.00	156.1	126.6	116.2

STERILISATION NEGATIVE

ALARM CODE: A112
DESCRIPTION PTC SHORTCIRCUIT

CAUTION !
PLEASE REFER TO USER MANUAL

HELIX/BD TEST program report

Model	MILLENNIUM B
S/N	02 BM 0001
Ver. SW	Exxxx/BMyyyyyy
Counter	0011/0019
Selection	HELIX TEST
Temperature	134 °C
Pressure	2.10 bar
Process time	3.5 min

CYCLE START 19/11/02 16:38

Time		C	bar
00:01	CS	076.4	+0.00
02:06	1PV	089.3	-0.89
04:35	1PP	120.4	+0.99
05:45	2PV	062.5	-0.78
07:02	2PP	120.2	+0.97
08:15	3PV	061.1	-0.79
11:00	..	135.6	+2.15
11:14	..	136.0	+2.17
12:14		135.6	+2.14
13:14		135.6	+2.15
14:14		135.5	+2.14
14:45	..	135.4	+2.14
15:20	..	111.5	+0.00
16:34	…	047.8	-0.89
18:21	…	059.5	-0.86
19:21	..	075.4	-0.50
20:06	CE	078.7	-0.04
12:33	MAX	136.0	
14:44	MIN	135.4	

Drying pulses 01
CYCLE END 19/11/02 16:38

HELIX TEST COMPLETE
Please attach the indicator hereunder

OPERATOR

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VACUUM TEST program report

Model	MILLENNIUM B
S/N	02 BM 0001
Ver. SW	Exxxx/BMyyyyyy
Counter	0011/0019
Selection	VACUUM TEST

CYCLE START 19/11/02 11:37

Time		C	bar
00:00	CS	035.0	+0.00
01:39	E1F	037.4	-0.80
6:39	E2F	038.4	-0.79
16:39	E3F	042.0	-0.79
17:54	CE	045.5	-0.01

CYCLE END 19/11/02 11:41

VACUUM TEST: POSITIVE

OPERATOR

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TEST PROGRAMS

GENERAL

To protect the safety of users and patients, a fundamental process like sterilizing medical devices should be periodically checked.

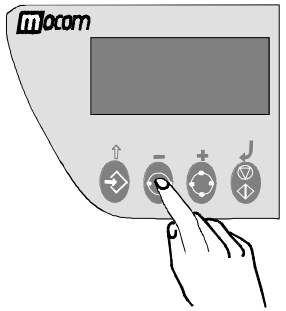
In this regard, **Millennium B** offers the possibility of, simply and automatically, executing two distinct test programs:

- Helix/BD Test
- Vacuum Test

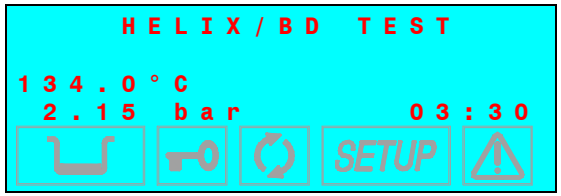
The **HELIX/BD Test** program executes a cycle at 134 °C characterized, however, by a sterilization phase of a particular duration (3.5 min); the cycle has a fractionated vacuum phase similar to that used in the POROUS and HOLLOW programs.
Using a suitable device, it is possible to evaluate the correct penetration of the steam inside hollow loads (see the following paragraph).
This cycle is also suitable for measuring the penetration of the steam inside porous loads (**Bowie & Dick** test pack).

On the other hand, the **Vacuum Test** program allows checking the perfect seal of the sterilizer's entire plumbing system.
By measuring the variation in the degree of vacuum in a certain span of time and comparing it with pre-set limit values, it is possible to determine the effectiveness of the seal of the sterilization chamber, the various tubes and the cut-off devices.

HELIX/BD TEST



To select the **HELIX/BD Test** program, press the **Test Selection** key one or two times until the display reads:

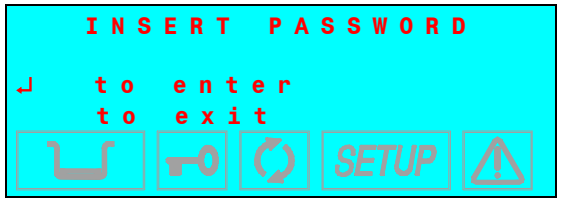


The test device is a 1.5-m tube made of PTFE with an internal diameter of 2 mm, with a small sealed screw capsule attached to one end, capable of holding a suitable amount of chemical. The other end of the tube is left free to allow the penetration of the steam and evaluate its effectiveness.
To execute the test insert the chemical indicator, which consists of a strip of paper with a special reagent ink, inside the capsule of the device (which is always to be used perfectly dry). Tighten the capsule so that seepage through the gasket seal will not be possible.

☞ The device and chemical indicators for running the Helix/BD Test program are not supplied with the device. To request information in this regard M.O.COM.'s Customer Support department.

Place the device on the device's central tray, approximately in the middle. **Do not** put any other material inside the chamber. Close the door and start the program with the **START** key.

☞ If a password has been set with the ANY CYCLE START option (see **Setting the password**), you will be asked to enter the access code.



In addition, the equipment checks the printer paper presence and, if MILLFLASH is connected, the presence of the Compact Flash card and its memory capacity. The possible warning messages, and the consequent actions to carry out, are the same as described for a standard sterilization cycle.

☞ The cycle phases are analogous to what is described in the Chapter "***Sequence of the process***".

At the end of the program, remove the test device, open the capsule and remove the indicator from its housing.

If the steam has correctly penetrated, the ink will have completely changed color from what it was before, along the entire length of the strip; if not (insufficient penetration) there will be only a partial variation or none at all.

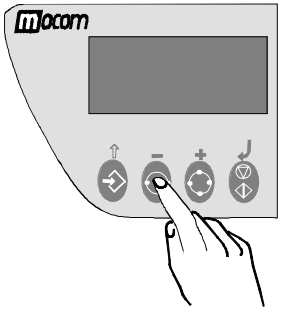
☞ Normally the color change is from a light color (beige, yellow, etc.) to a dark color (blue, violet or black). In any case, scrupulously follow the instructions provided by the indicator's manufacturer for its methods of use and indication and any other technical details.

The duration of the test is about **20 minutes**.

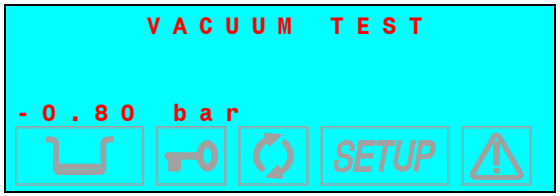
As the door is opened at the end of the cycle, a report will be printed of the salient data for the test cycle performed. (printer installed – option) Attach the chemical indicator in the space provided, initial the document and file it in a suitable place.

For complete details about printing summaries, please refer to the report examples shown in ***Print report examples***.

VACUUM TEST



To select the **VACUUM TEST** program, press the **Test Selection** key one or two times until the display reads:



The Vacuum Test program is run with the **sterilization chamber empty**, and only the trays and their supports.

☞ Run the Vacuum Test as the first cycle after powering-on the equipment.
To avoid the heating of the sterilization chamber influencing the variation of the vacuum value measured during the Vacuum Test, the system is programmed to prevent its execution when the temperature sensors of the sterilization chamber shows a value higher than 50° C.

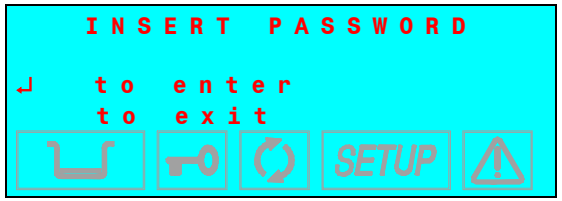
If you try to start the program with a higher temperature than indicated above, the liquid crystal display will read:

After a short time, the device will automatically return to STAND-BY mode, ready for use.

☞ To rapidly lower the temperature of the chamber and, thus, perform the Vacuum Test, leave the sterilizer's door open until the correct temperature is reached.

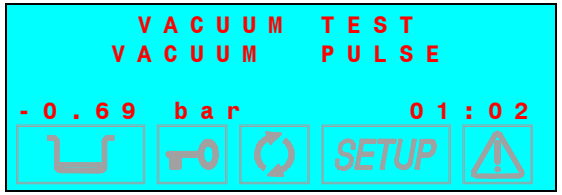
Close the door and start the program with the **START** key.

☞ If a password has been set with the ANY CYCLE START option (see chapter ***Setting the Password***), you will be asked to enter the access code.



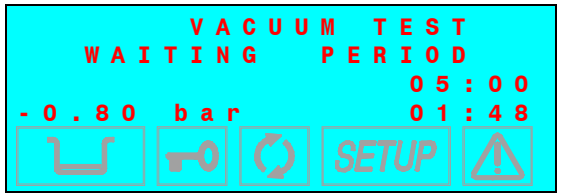
In addition, the equipment checks the printer paper presence and, if MILLFLASH is connected, the presence of the Compact Flash card and its memory capacity. The possible warning messages, and the consequent actions to carry out, are the same as described for a standard sterilization cycle.

The vacuum phase begins immediately and the display reads:



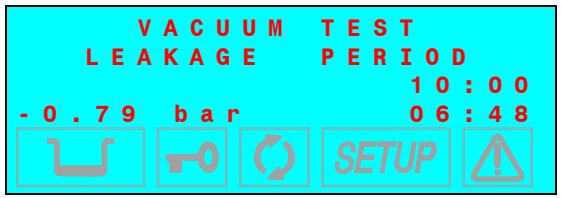
The display shows the pressure (**bar**), and the total time from the start of the program.

When the pre-set pressure is reached (**-0.80** bar) the pump stops and the pressure stabilization phase begins (**WAITING PERIOD**), which lasts 5 minutes (shown on the display as a scalar value):



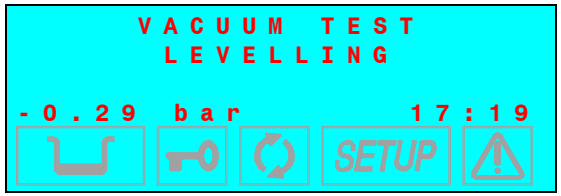
During this phase, a variation of the maximum low pressure is allowed of **not more than 10%**, without this causing the test to fail .

When the wait phase ends, the pressure verification phase, true and proper, begins (**LEAKAGE PERIOD**), with a duration of 10 minutes:

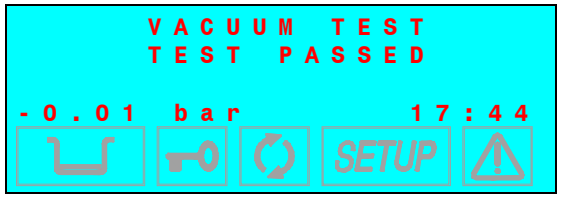


In this phase, a variation of **up to ±0.02 bar** is allowed, compared to the initial phase value.
Higher variations cause the test to fail. The time is counted down until the phase is completed.

When this phase is also completed, the pressure is brought back to atmospheric pressure.



When the program finishes, the display will read:



The end of the program is signaled with a beep.

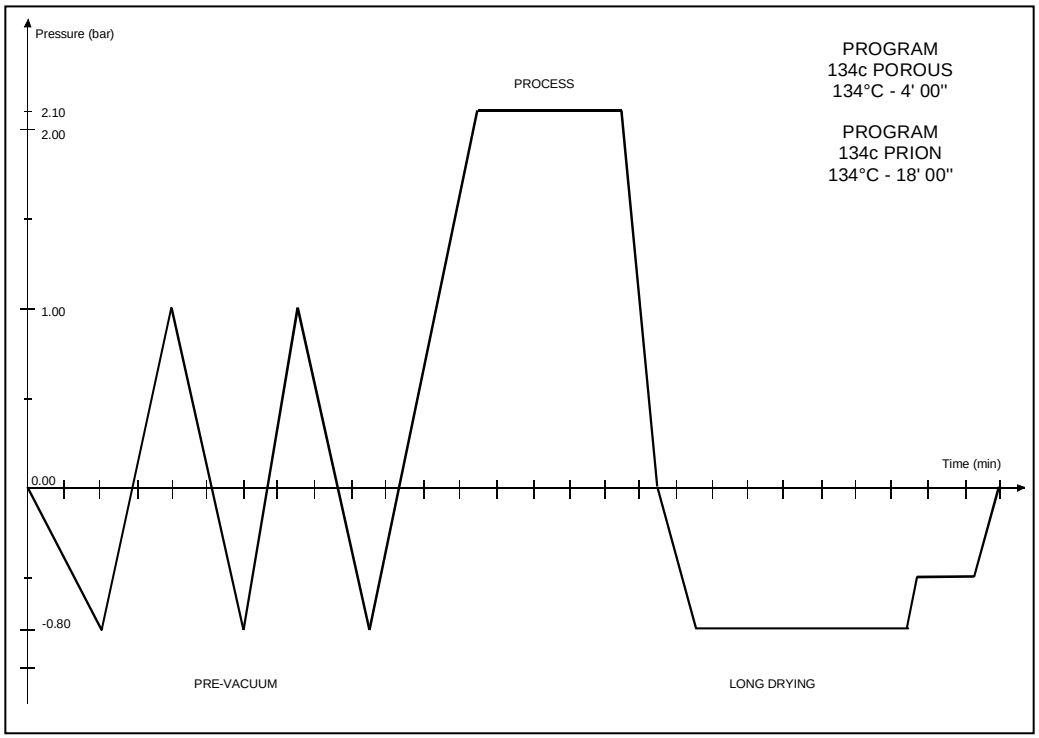
☞ If the pressure change exceeds the pre-set limit, the program is interrupted and alarm message is generated. See a complete description of the alarms in ***Problem solution***.

The duration of the test is about **18 minutes**.
When the door is opened at the end of the program, a report of the test cycle is printed with all the salient data.

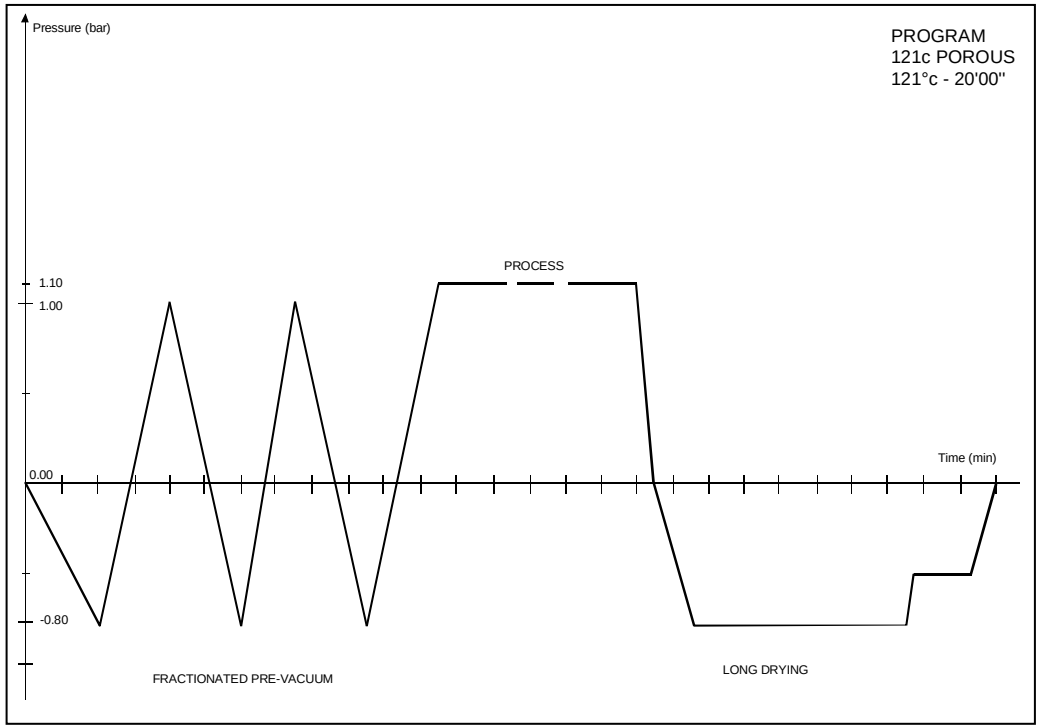
For complete details about printed reports, refer to ***Print report examples***.

CYCLE DIAGRAMS

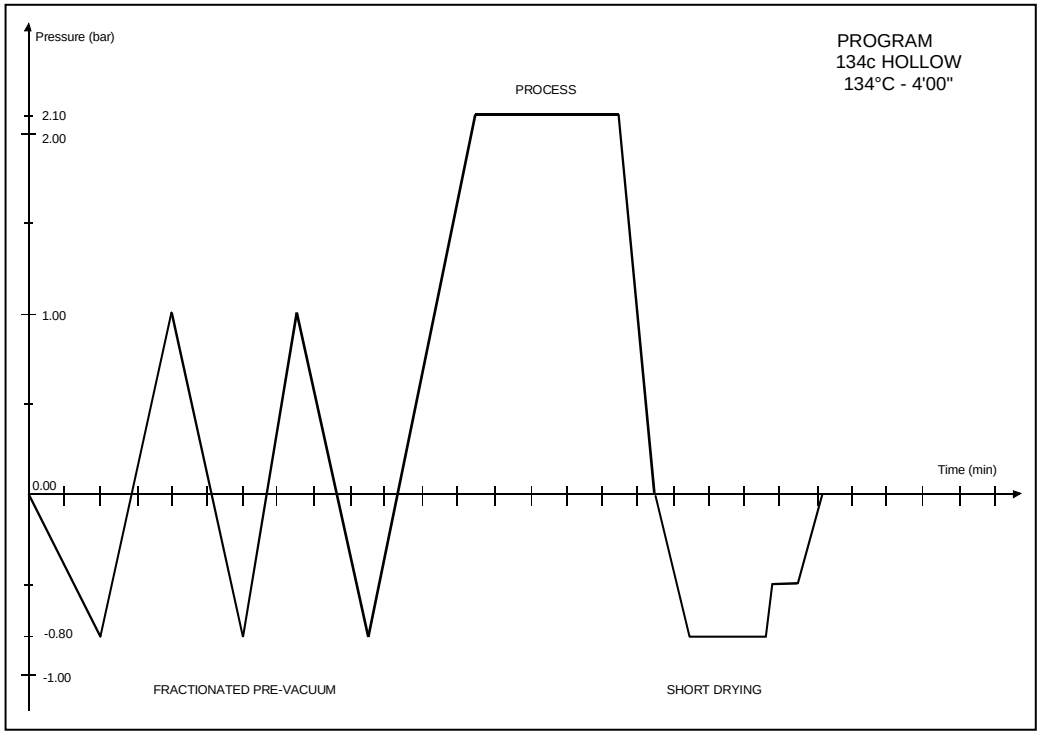
134° POROUS & PRION



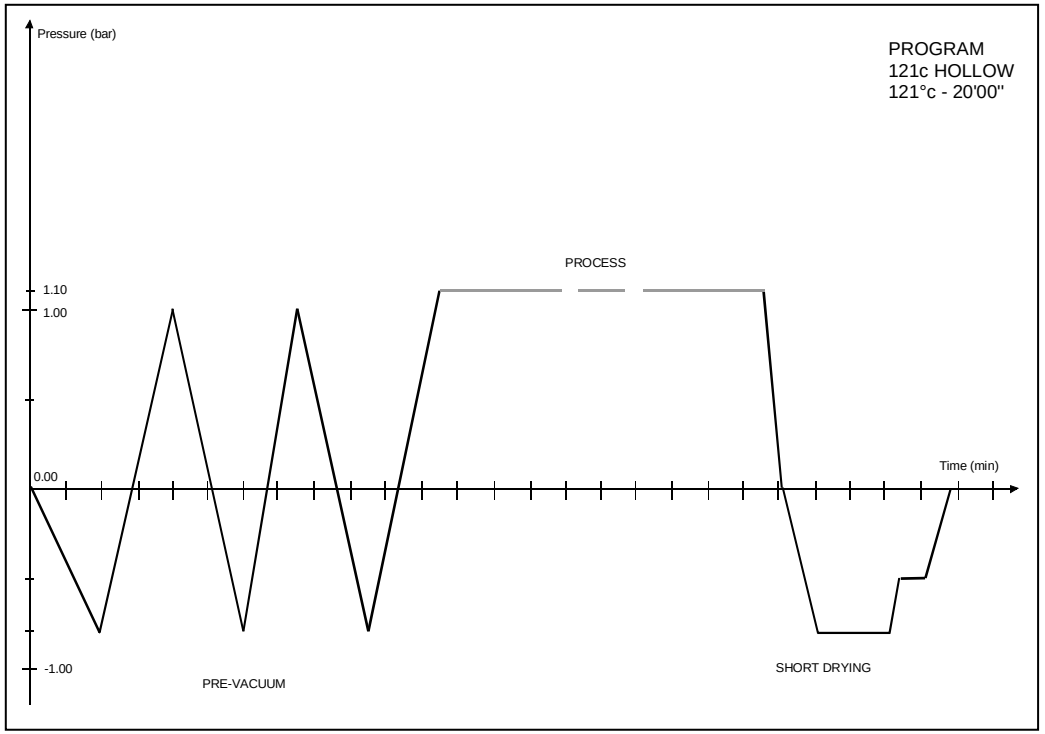
121° POROUS



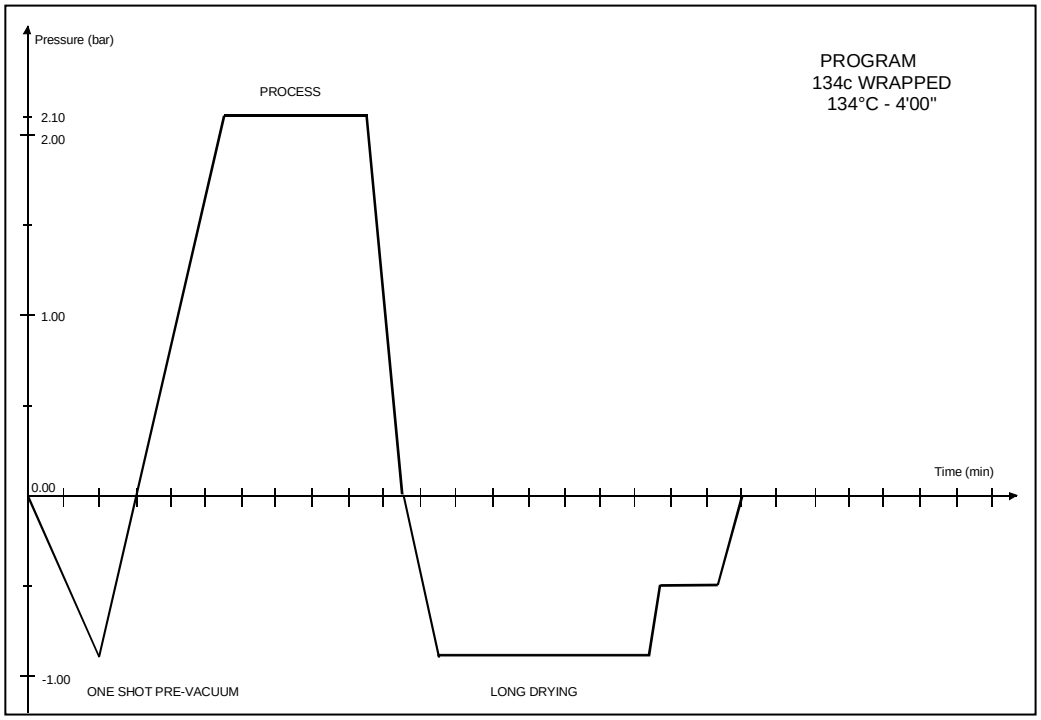
134° HOLLOW



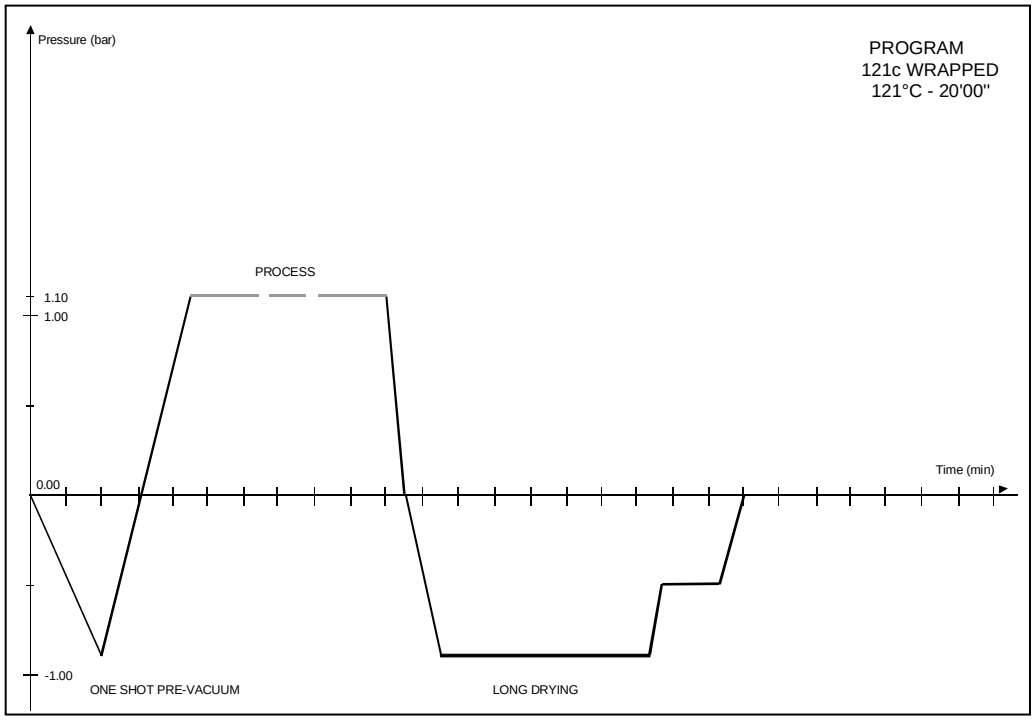
121° HOLLOW



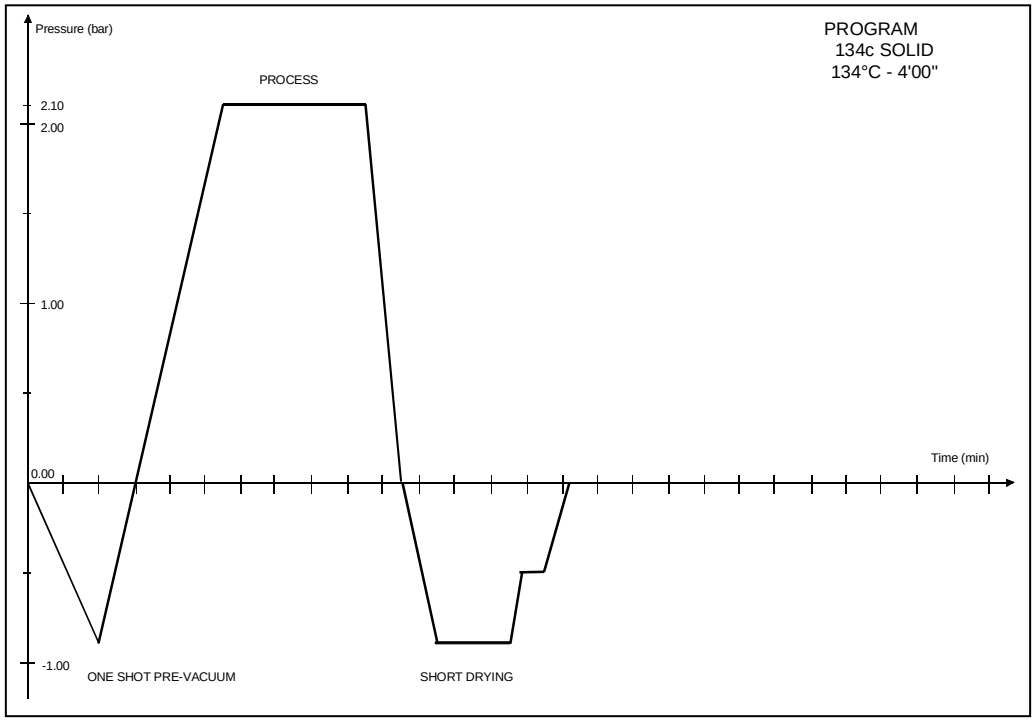
134° WRAPPED



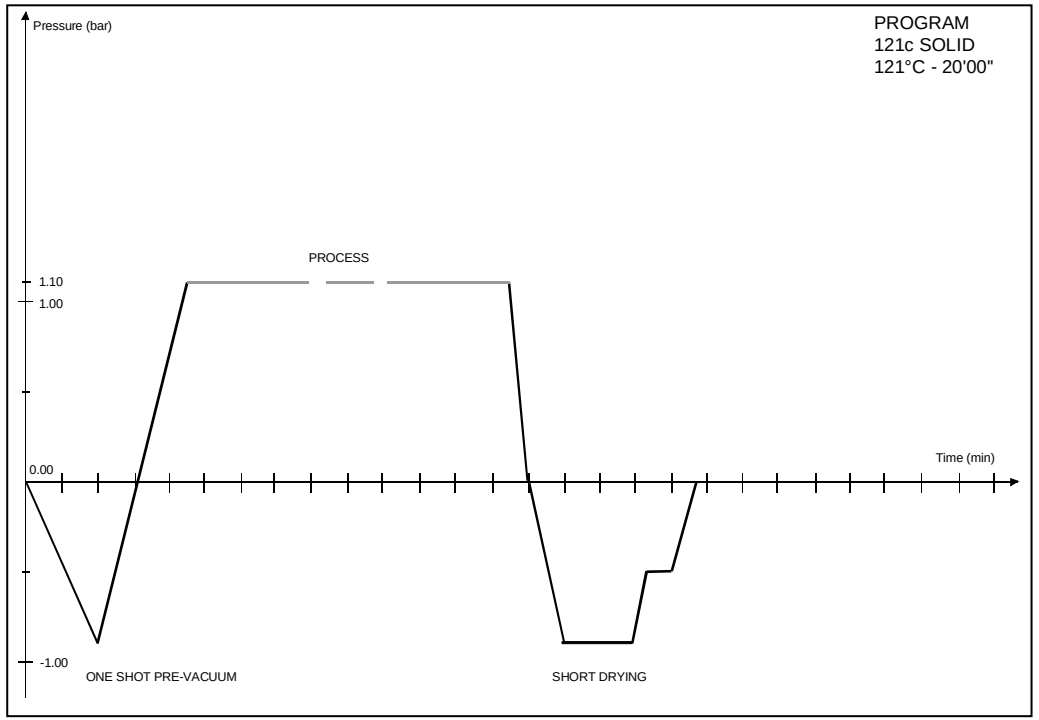
121° WRAPPED



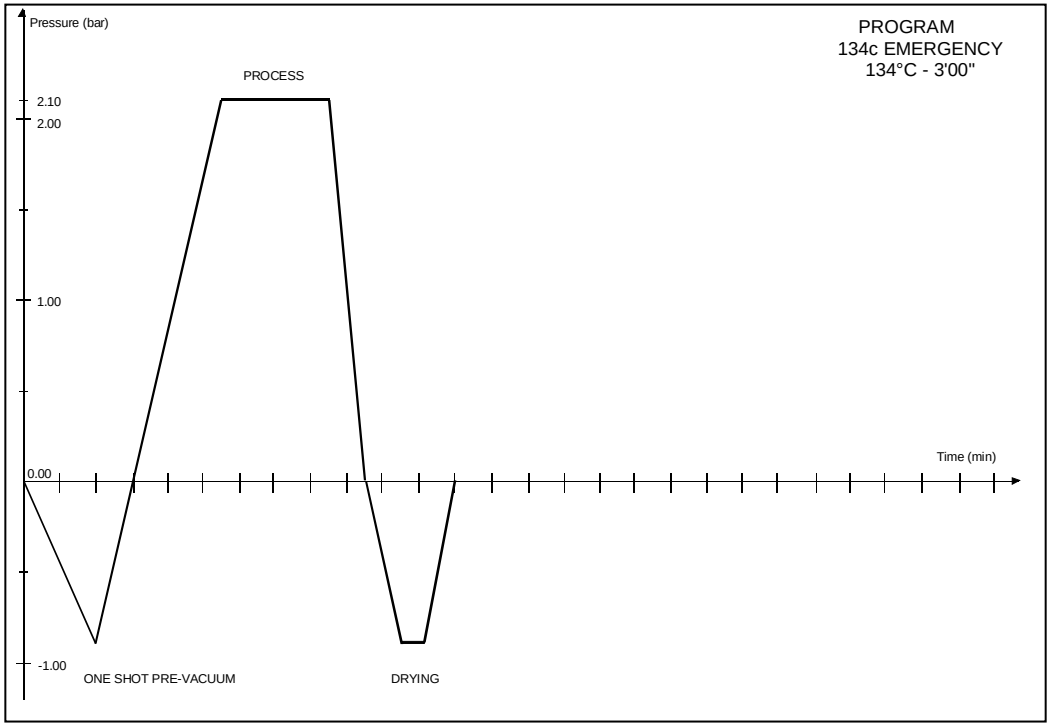
134° SOLID



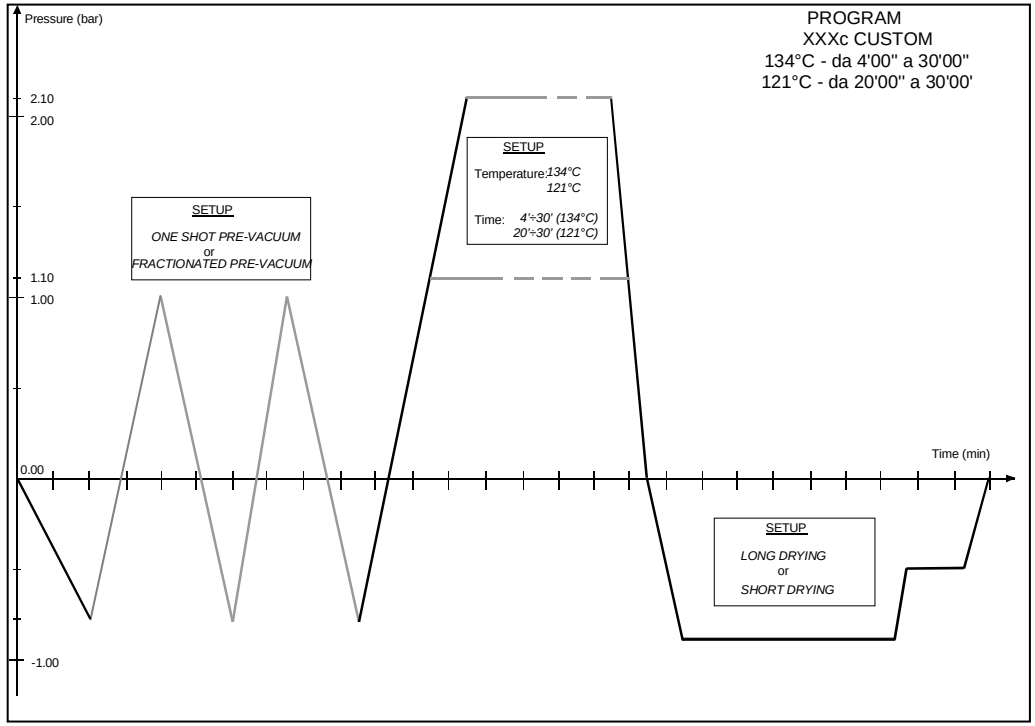
134° SOLID



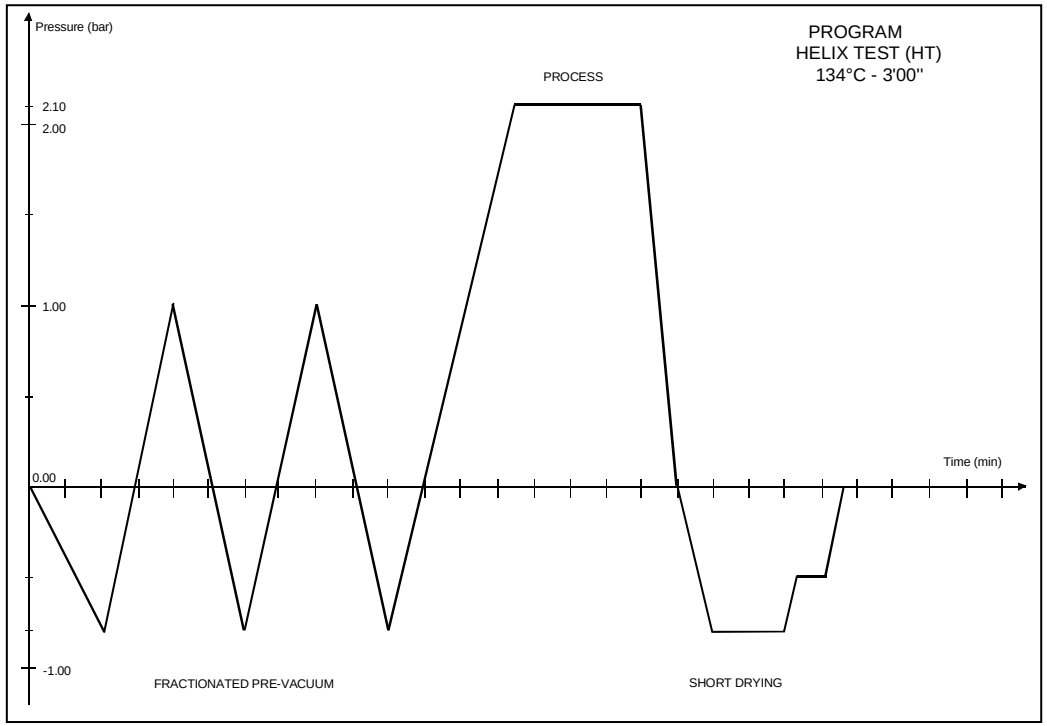
134° EMERGENCY



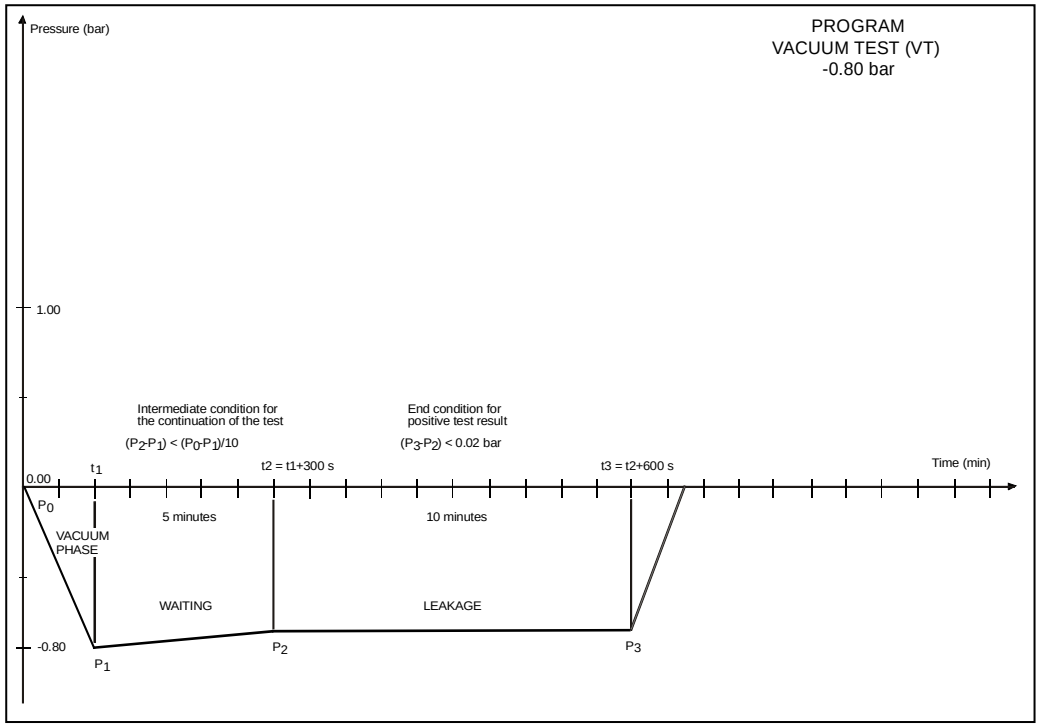
XXX° CUSTOM



HELIX B/D TEST



VACUUM TEST



3. TROUBLESHOOTING AND REPAIR

TROUBLESHOOTING

GENERAL

Every time an **anomalous condition** occurs during the operation of the sterilizer, an alarm is generated, identified by a specific code (consisting of a letter followed by a 3-digit number).

Alarm codes are divided into **three categories**:

- **E** = **ERROR**
  Wrong maneuver and/or use, or a cause external to the device.
  A problem that can generally be fixed by the user.
  Code format: **Exxx** **(xxx = identifying number 000 ÷ 999)**

- **A** = **ALARM**
  First-level fault, **not linked** to safety.
  A problem that normally is fixed by a specialized technician on-site.
  Code format: **Axxx** **(xxx = identifying number 000 ÷ 999)**

- **H** = **HAZARD**
  Second-level fault, **linked** to safety.
  A problem generally fixed by the Technical Support Center.
  Code format: **Hxxx** **(xxx = identifying number 000 ÷ 999**

ALARM INTERVENTION

☞ In the case of an alarm, please only remove voltage from the device after executing a reset *(see "**System reset**").*

The intervention of the **alarm** causes the **interruption of the cycle** (or the normal equipment operation) with the relative appearance of an **alarm code** and a **message** on the display, accompanied by a **beep** and the **lit alarm icon** (intermittent)**.**

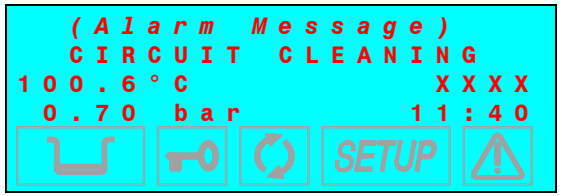
☞ During the alarm procedure, the display always shows the current temperature and pressure in the sterilization chamber.

This procedure is designed so as **not** to allow the user to **mistake** an anomalous cycle for a correctly completed cycle and, as a consequence, **involuntarily using non-sterile material**.
The alarm procedure is **differentiated** depending on whether it occurs **during** the execution of the program or **outside**, and is structured to guide the user to the necessary **RESET** of the sterilizer .

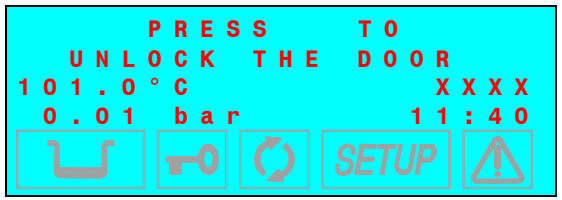
Alarm during a cycle

If the alarm intervenes **during a program**, the display will show the message:

Whenever an alarm is generated in certain phases of the cycle, an automatic procedure is activated to clean the internal water circuit. The display will contain the notice:

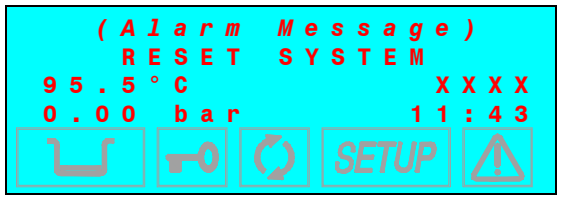


At the end of what has been described and having reached safe conditions, the machine activates a special procedure, that asks the user to manually unlock the door:



Press the key to unlock the door lock mechanism; the following message appears:

Once the door is open, the user is finally asked to **reset** the system:



Perform a **RESET** (described below) and then turn-off the equipment and check the error or make the repair.

☞ When the door is opened, the report (normal or extended depending on the type of alarm) will be printed for the interrupted sterilization program and the alarm that intervened. Check the document, initial it in the space provided and file it in a suitable place. Refer to ***Print report examples***.

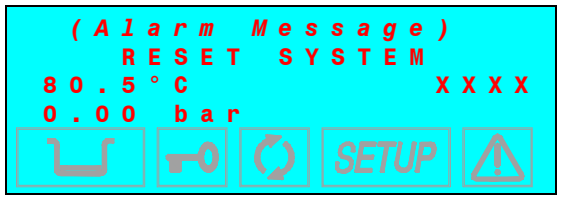
Alarm outside the cycle

If the alarm intervenes **outside the sterilization or test program** the display will show:

Turn-off the equipment and check the alarm.

Or, depending on the type of alarm:

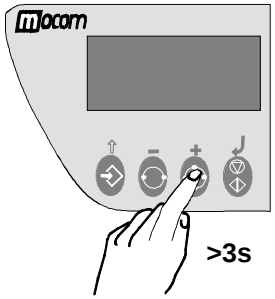
which is automatically transformed to the message:



Perform a **RESET** (described below) and then turn-off the device and check the alarm.

☞ Alarms that intervene outside of a program do not produce a printed report.

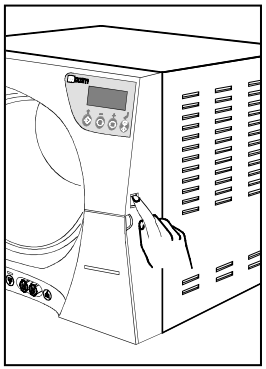
RESETTING THE SYSTEM



The system is **RESET** in two **alternative** ways, depending on the alarm that occurred:

1. Press the *PROGRAM SELECTION* key for about 3 seconds.
   A beep confirms the RESET;

Never turn the device off before executing a RESET.



2. Turn-off the device and then power-on using the main switch.
   Upon power-up, the sterilizer will perform its normal initial test.

After RESET, and any technical intervention necessary to eliminate the fault, the device will go to STAND-BY mode, ready to execute a new program.

ERROR LIST - “E” CODES

CODE	ERROR DESCRIPTION	LCD INDICATION	RESET MODE
E 000	Blackout	BLACK-OUT	Press key  ***(> 3 seconds)***
E 010	Door open	DOOR OPEN	
E 020	Exceeded timeout for activating door lock system ***(closing)***	DOOR UNLOCKED	
E 021	Exceeded timeout for activating door lock system ***(opening)***	DOOR LOCKED	
E 030	Water in the fill tank at minimum (MIN) level	WATER MIN	
E 031	Water in the drain tank at maximum (MAX) level	EXHAUST MAX	
E 041	Filling the tank too frequently (*automatic filling*)	FILLING PROBLEM	
E 900	Vacuum Test failed (*during the **LEAKAGE PHASE***)	TEST FAILED	
E 901	Vacuum Test failed (*during the **WAITING PHASE***)	TEST FAILED	
E 902	Vacuum Test failed (*vacuum pulse timeout exceeded*)	TEST FAILED	
E 999	Manual cycle interruption	MANUAL STOP	

ALARM LIST - “A” CODES

CODE	ALARM DESCRIPTION	LCD INDICATION	RESET MODE
A 022	System door lock microswitches failed ***(OFF-OFF)***	LOCKING PROBLEM	Turning off the equipment
A 023	System door lock microswitches failed ***(ON-ON)***	LOCKING PROBLEM	
A 024	System door lock microswitches failed ***(ON-OFF)***	LOCKING PROBLEM	
A 032	Sensor-level problem	LEVEL PROBLEM	
A 040	Failure to fill the tank (*automatic filling*)	FILLING PROBLEM	
A 101	PT1 broken (*sterilization chamber*)	PTC BROKEN	
A 102	PT2 broken (*steam generator*)	PTC BROKEN	
A 103	PT3 broken (*heating element*)	PTC BROKEN	
A 104	PT4 broken (*sterilization chamber wall*)	PTC BROKEN	
A 111	PT1 short-circuited (*sterilization chamber*)	PTC SHORTCIRCUIT	
A 112	PT2 short-circuited (*steam generator*)	PTC SHORTCIRCUIT	
A 113	PT3 short-circuited (*heating element*)	PTC SHORTCIRCUIT	
A 114	PT4 short-circuited (*sterilization chamber wall*)	PTC SHORTCIRCUIT	
A 200	Pre-heating not performed within the timeout (*heating resistor problem*).	HEATING PROBLEM	

CODE	ALARM DESCRIPTION	LCD INDICATION	RESET MODE
A 250	1st vacuum pulse not reached within timeout	PV1 TIMEOUT	Press key  ***(> 3 seconds)***
A 251	1st rise to ambient pressure not reached within timeout	ATM1 TIMEOUT	
A 252	1st pressure pulse not reached within timeout	PP1 TIMEOUT	
A 253	2nd vacuum pulse not reached within timeout	PV2 TIMEOUT	
A 254	2nd rise to ambient pressure not reached within timeout	ATM2 TIMEOUT	
A 255	2nd pressure pulse not reached within timeout	PP2 TIMEOUT	
A 256	3rd vacuum pulse not reached within timeout	PV3 TIMEOUT	
A 257	3rd rise to ambient pressure not reached within timeout	ATM3 TIMEOUT	
A 258	3rd pressure pulse not reached within timeout	PPP TIMEOUT	
A 259	Phase of PROCESS not started within timeout	PROCESS TIMEOUT	
A 260	Chamber depressurization not completed within timeout	TIMEOUT PPD	

HAZARD ALARM LIST - “H” CODES

CODE	ALARM DESCRIPTION	LCD INDICATION	RESET MODE
H 150	MPX pressure sensor broken	MPX BROKEN	Turning off the equipment
H 160	MPX pressure sensor short-circuited/not connected	MPX SHORTCIRCUIT	
H 400	Ratio P_{conv}/T not balanced (P_{conv}>T) (*Phase **PROCESS***)	P/T PROBLEM	Hold down  ***(> 3 seconds)***
H 401	Ratio T/P_{conv} not balanced (T>P_{conv}) (*Phase **PROCESS***)	T/P PROBLEM	
H 402	Temperature above MAX limit (*Phase **PROCESS***)	T OVER LIMIT	
H 403	Temperature below MIN limit (*Phase **PROCESS***)	T UNDER LIMIT	
H 404	Temperature fluctuating over the limit (*Phase **PROCESS***)	PT1 FLUCTUATING	
H 405	Pressure above MAX limit (*Phase **PROCESS***)	P OVER LIMIT	
H 406	Pressure below MIN limit (*Phase **PROCESS***)	P UNDER LIMIT	
H 410	Wrong maintenance time *(Phase **PROCESS**)*	TIMER PROBLEM	
H 990	Excessive pressure (*sterilization chamber, MPX*)	OVERPRESSURE	
H 991	Overheating (*sterilization chamber, PT1*)	OVERHEATING PT1	
H 992	Overheating (*steam generator, PT2*)	OVERHEATING PT2	
H 993	Overheating (*band heating element, PT3*)	OVERHEATING PT3	

E 000

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
BLACK-OUT	Black-out	Mains voltage < 160V	Sudden power failure (**black-out**)	Wait for electricity to return, open the door and follow the instructions on the LCD. Reset the alarm and repeat the sterilization cycle.
			Accidentally turning-off the main switch	Switch on the equipment, open the door and follow the instructions on the LCD. Reset the alarm and repeat the sterilization cycle.
			Accidentally pulling the plug out of the socket.	Reconnect the plug, open the door and follow the instructions on the LCD. Reset the alarm and repeat the sterilization cycle.
			Mains fuses blown.	Replace the burned fuse (16A), switch on the equipment, open the door and follow the instructions on the LCD. Reset the alarm and repeat the sterilization cycle.
			Pay attention during the occurring of the alarm and find the component causing the fault	Use the repair layout for the involved component
			The alarm occurs each time the equipment is turned on	Check that the operator resets correctly the alarm. Explain the correct procedure to be used. Check the main switch. **Replace the main switch - see card Gr1-17** Check for possible water or steam on electric components. Check the steam generator cartridges. **Replace the steam generator cartridge – see card Gr1-19 .**
			The alarm occurs when opening the door and starts the report printout.	Check and replace the fuse on the power supply printer board. **Replace the filter/PS printer board – see card Gr1-1.**

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
			One or both the steam generator cartridges failed	Check the steam generator cartridge. **Replace the failed cartridge – see card Gr1-19.**
			Band heater in short-circuit.	Check the band heater. **replace the band heater – see card Gr1-18.**
			Damage during the equipment transport.	**Replace the damaged part.**

E 010

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
DOOR OPEN	Door open	The door micro-switch is not activated and remains in OFF position	Door **not** properly closed.	Explain the proper procedure on closing and opening the door.
			The door does not close completely	Check the positioning pin. **- Adjust the positioner – see Attachment A** **- Replace the positioner – see card Gr6-4**
			The door opens by oneself	**- Adjust the positioner – see Attachment A** **- Replace the positioner – see card Gr6-4**
			After the door gasket replacement, the door rebounds.	Call the Service, communicate the serial number of the sterilizer and follow the indications suggested. **- Replace the door gasket - see card Gr6-1** **- Replace the parabola- see card Gr6-2**
			Door properly closed but the door icon remains off.	Check the door microswitch. **Unlock the door microswitch.** **Replace the door microswitch – see card Gr6-5.**
			Damage during the equipment transport	**Replace the damaged part.**

E 020

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
DOOR UNLOCKED	Exceeded the timeout for the operation of door locking mechanism (closing)	At the start of the cycle the door locking mechanism exceeds the timeout of 2.5 seconds.	Push on the door micro-switch pin, start the cycle and check the operation of the door locking mechanism.	If the door locking mechanism operates correctly and the LCD displays the message “WARMUP”: - Check that the bushes on the fork turn freely. - **Replace the blocked bush - see card Gr6-3** - Explain the operator for the correct procedure to start the cycle. If the mechanism operates correctly and the LCD shows the alarm: - Check the integrity of the release micro-switch . - **Replace the release micro-switch - see card Gr6-5** - Check the integrity of the locking micro-switch. - **Replace the locking micro-switch - see card Gr6-5** - Check on the motherboard the wiring of the release micro-switch (white) and eventually restore the connection. - Unlock the door– **see Attachment H or Attachment I**. If the mechanism blocks at the half of the stroke between locking and release micro-switches: - Check for possible motor failure (noisy during the operation). **- Replace the motor - see card G6-6.** - Check for possible step-running of the locking mechanism. - Replace the pin coupling the motor and locking mechanism **- see card G6-6**.

Continue

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
				- Check for possible loosening of the motor mounting screws. - Fasten the motor. - Replace the motor - see card Gr6-6. - Do not use any sealant on these screws. - Check for the correct power supply during the motor operation. - Replace the motor - see card Gr6-6. - Replace the motor wiring - see card Gr5-3. - Replace the power supply board- see card Gr1-1. If the mechanism does not work and remains in open position: - Check for the correct motor power supply. - Replace F5 fuse 1,25A - see card Gr1-16. - Replace the motor - see card Gr6-6. - Replace the motor wiring - see card Gr5-3. - Check the board connector. - Replace the tip of the motor wiring. - Check the pressure switch. - Disconnect and connect again the pressure switch wiring. - Replace the pressure switch - see card Gr1-5 - Replace the CPU board. - see card Gr1-1
			Close the door, start the cycle and check the operation of the door locking mechanism.	Check as above.
			Check for the correct connection of the wiring on the release micro-switch .	Restore the wiring and try a new cycle. - Replace the wiring - Replace the release micro-switch - see card Gr6-5 .
			Check for the correct connection of the wiring on the locking micro-switch .	Restore the wiring and try a new cycle. - Replace the wiring - Replace the locking micro-switch - see card Gr6-5 .
Continue			Check for possible block of the release micro-switch pin.	- Replace the release micro-switch - see card Gr6-5.

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
			Check manually the operation of the locking micro-switch pin.	- Adjust the micro-switch. - Replace the micro-switch- see card Gr6-5.
			Check with a tester the 1,25 A fuse	- Replace the fuse (same value). - Replace the electronic board - see card Gr1-1.
			Check for the correct fastening of the motor mounting screws.	- Restore the correct mounting. - Replace the motor - see card Gr6-6. - Replace the motor pin- see card Gr6-6.
			Check for the free turning of the fork bushes.	- Replace the blocked bush- see card Gr6-3.
			Check that the motor runs normally.	- Replace the pin- see card Gr6-6. - Replace the motor- see card Gr6-6.
			The locking mechanism is step-working.	
			Check the 2 A fuse on the power board	- Replace the fuse - see card Gr1-16.
			Enter the setup, go to SERVICE and then select the option LOCKING DEVICE in order to check the door locking mechanism.	- Replace the burned fuse- see card Gr1-16. - Replace the power board- see card Gr1-1.
			Door gasket replacement by the user.	- Remove and mount properly the gasket. - Replace the door gasket - see card Gr6-1 - Check the parabola adjustment. - Replace the parabola- see card Gr6-2

E 021

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
DOOR LOCKED	Exceeded the timeout for the operation of door locking mechanism (opening)	At the end of the cycle the door locking mechanism exceeds the timeout of 2.5 seconds.	Use the procedure to open the door.	The door opens: - Check for the free turning of the fork bushes. - replace the blocked bush **- see card Gr6-3**. - Check for the regular mechanism operation. - Replace the motor pin **- see card Gr6-6**. - Replace the motor **- see card Gr6-6**. The door does not open: - Check the 1,25 A fuse - Replace the fuse **- see card Gr1-16**. - Check the pressure switch. - Disconnect and connect again the pressure switch wiring. - Replace the pressure switch**- see card Gr1-5**. - Disassemble the motor and unlock the mechanism. - Check the locking micro-switch. - Replace micro-switch **- see card Gr6-5**
			Wiring loosen during the operation.	Reconnect the wiring.
			Failure of the locking black micro-switch.	Replace locking micro-switch **- see card Gr6-5**.
			The fuse 1,25 A burns during the cycle.	Replace the fuse **- see card Gr1-16**.
			A fork bush is blocked.	Replace the bush **- see card Gr6-3**.
			The pressure switch reads a wrong pressure and impedes the door opening.	Disconnect and connect again the pressure switch wiring. - Replace the pressure switch **- see card Gr1-5**.

E 030

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
WATER MIN	Water at minimum level in the main tank	The cycle does not start.	Cycle started with water level under the minimum threshold.	Fill-up the tank until the MAX icon comes on (or at least until MIN icon goes off).
			Check for possible failure of the float wiring.	**Replace the float - see card Gr4-2** **Restore the float wiring**
			Failure of the float	**Replace the float - see card Gr4-2**
			Check the wiring of the level sensor for the external used water tank.	**Disconnect the wiring on the CPU board**
			Check the ground connection of the sterilizer.	**Clean the ground connections.** **Replace the damage ground connection.**
			Sterilizer connected through a power strip.	**Remove the power strip and connect the sterilizer as recommended (see Operating Manual).**
			Check the electrical system of the room	**Conform the ground connection to the standard.** **Conform the electrical system to the standard.**

E 031

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
EXHAUST MAX	Water at maximum level in the recovery tank .	The cycle does not start	Cycle started with water level over the maximum threshold.	Empty completely the recovery tank.
			Check for possible failure of the float wiring.	**Restore the float wiring**
			Failure of the float.	**Replace the float - see card Gr4-2**
			Check the wiring of the water level sensor for the external used water tank.	**Disconnect the wiring on the CPU board**
			Check the water level sensor connection on the CPU board.	**Restore the connection.** **Replace the float - see card Gr4-2** **Replace the CPU board – see card Gr1-1**
			Sterilizer configuration set on external water drain.	**Restore the connection of the external water level sensor.** **Empty the external used water tank.** **Replace the external water level sensor.** **Replace the wiring of the external water level sensor.**
			Wrong water drain sterilizer configuration.	**Set the proper water drain option in the SETUP menu.**

E 041

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
FILLING PROBLEM	Automatic tank filling too frequent.	Two automatic fillings every 2 cycles.	Check for water in the external tank.	Fill the tank and switch on the sterilizer to enable the automatic water filling.
			Check the correct pipe connection between tank and sterilizer.	Restore the connection and check the correct automatic filling operation.
			Check for possible break of the pipe connecting tank and sterilizer.	**Replace the external pipe**
			Check that the entry filter is not dirty.	**Replace the entry filter**
			Check for possible break of the internal pipe.	**Replace the internal pipe**
			Check that the water pump works regularly.	**Replace the fuse - see card Gr1-16**
			Check for possible failure of the water pump.	**Replace the water pump- see card Gr3-1**
			Check the float (minimum level)	**Replace the float (minimum level) - see card Gr4-2**
			Check the integrity of the pipe from the Milldrop device	**Restore the pipe.**
			Check the START/STOP cable connection between sterilizer and MILLDROP.	**Restore the connection.** **Replace the START/STOP cable.**
			Check the MILLDROP operation.	**Perform the maintenance on the Milldrop device – See Operating Manual**

E 900

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
TEST FAILED	Vacuum test failed	Pressure change over the limit of 0,02 bar.	Check that the Vacuum test was not launched with chamber too hot.	Advise to carry out the Vacuum test at the beginning of the working day, with chamber empty and temperature lower than 50°C; never just after an alarm occurring .
			Leakage from the door gasket.	Clean carefully the gasket and the parabola's board; try a new Vacuum test. **Replace the gasket - see card Gr6-1**
			Leakage from a valve.	Find the valve and clean it. **Replace the valve causing the leakage - see cards Gr2**
			The pipe of the pressure transducer is loosen.	Disconnect and connect again the pipe.
			Leakage from the heat exchanger	**Replace the heat exchanger - see card Gr4-3**
			Sterilizer not used for a long time.	**Startup the hydraulic circuit of the steam generator – see Attachment G.** **Perform cycles without load.** **Replace the water pump – see card Gr3-1**

E 901

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
TEST FAILED	Vacuum test failed during the waiting time.	Pressure rising over the value -.71 bar.	Too much humidity in the sterilization chamber.	Dry carefully the chamber , reset the alarm, start a new Vacuum test. The chamber temperature must be lower than 50°C.
			Leakage from the door gasket.	Clean carefully the gasket and parabola's board , reset the alarm, start a new Vacuum test. The chamber temperature must be lower than 50°C **Replace the gasket - see card Gr6-1**
			Leakage from a valve.	Find the valve and clean it; reset the alarm and start a new Vacuum test.. **Replace the valve causing the problem - see cards Gr2**
			Check that the Vacuum test was not launched with chamber too hot	Advise to carry out the Vacuum test at the beginning of the working day, with chamber empty and temperature lower than 50°C. Reset the alarm and start a new Vacuum test Never start the Vacuum test just after an alarm occurring .
			Check that the Vacuum test was not launched just after an alarm occurring .	Advise for the correct execution of the Vacuum test
			Check that the transparent pipe of the pressure transducer is nor loosened.	Disconnect and connect again the transparent pipe.
			Leakage from the heat exchanger	**Replace the heat exchanger - see card Gr4-3**
			Sterilizer not used for a long time.	**Startup the hydraulic circuit of the steam generator – see Attachment G.** **Perform cycles without load.** **Replace the water pump – see card Gr3-1**

E 902

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
TEST FAILED	Vacuum test failed as the maximum vacuum is not reached within the set time	Vacuum -.80 not reached within 4'.	Vacuum pump not started regularly.	**Replace the vacuum pump - see card Gr3-3** **Replace the fuse - see card Gr1-16** **Replace the CPU board - see card Gr1-1**
			Vacuum pump wiring broken	Restore the vacuum pump, reset the alarm and try a new Vacuum test.
			Vacuum pump running in irregular way and is very noisy	**Fasten the dowel of the internal rod by a sealant - see card Gr3-3** **Replace the large membranes- see card Gr3-3** Clean the vacuum pump
			The dam filter in the sterilization chamber is clogged	Clean the dam filter and advice the user to clean regularly this filter as described in the Operating Manual (Ordinary operation).
			Leakage from the door gasket.	Clean carefully the gasket and the parabola's board, reset the alarm and try a new Vacuum test. **Replace the gasket - see card Gr6-1**
			Leakage from an internal pipe.	**Replace the pipe causing the problem** Reset the alarm e try a new Vacuum test

Continue

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
			Leakage from a valve.	Find and clean the valve
				Replace the valve - see cards Gr2
			Leakage from the heat exchanger.	**Replace the heat exchanger - see card Gr4-3**
			Leakage from the pressure transducer pipe.	Remove and connect again the pipe on the pressure transducer, reset the alarm and try a new Vacuum test.
			Pressure transducer uncalibrated.	Calibrate the pressure transducer
			Pressure transducer broken.	**Replace the pressure transducer - see card Gr1-4**
			Load into the sterilization chamber	**Remove any load from the chamber**

E 999

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
MANUAL STOP	Manual interruption of the cycle	START/STOP key pushed for more than 3'' during the cycle process	The user pushed the START/STOP key.	Advice the user to do not use the manual stop function when you need to load an additional items to be sterilized. Suggest to use the Emergency cycle.
			The START/STOP key is blocked down.	Replace the keyboard - see card Gr1-3 Replace the CPU board - see card Gr1-1

A 022

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
LOCKING PROBLEM	Failure on the micro-switches (OFF-OFF)	During the initial self test the two micro-switches are ON	At the switching on with door open, the micro-switch is broken.	Replace the micro-switch - see card Gr6-5
			At the switching on with door open, the micro-switch wiring is broken.	Replace micro-switch wiring
			At the switching on with door open, the micro-switch is blocked.	Release the micro-switch Replace the micro-switch - see card Gr6-5
			At the switching on with door closed, the wheel-pin micro-switch is broken.	Replace the micro-switch - see card Gr6-5 Go to Attachment H or Attachment I
			At the switching on with door closed, the micro-switch is blocked.	Release the micro-switch Replace the micro-switch - see card Gr6-5 Go to Attachment H or Attachment I
			Fuse burned during the previous cycle	Replace the fuse - - see card Gr1-16 Go to Attachment H or Attachment I
			Alarm occurred during the previous cycle; sterilizer turned off before completing the safety procedure	Go to Attachment H or Attachment I Advice the user for the correct operation in case of alarm
			The alarm continues to occur	replace the CPU board – see card Gr1-1.

A 023

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
LOCKING PROBLEM	Failure on the micro-switches (ON-ON).	During the initial self test the two micro-switches are OFF	Blackout during the opening	Go to Attachment H or Attachment I
			Power supply problem during the opening .	

A 024

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
LOCKING PROBLEM	Failure on the micro-switches (ON-OFF).	During the initial self test the closing micro-switch is ON and the opening micro-switch is OFF	Locking mechanism fuse burned during a cycle	Replace the fuse - see card Gr1-16
				Go to Attachment H or Attachment I.
			Alarm occurred during the previous cycle; sterilizer turned off before completing the safety procedure	Go to Attachment H or Attachment I
				Advice the user for the correct operation in case of alarm
			Locking mechanism broken	Replace the motor - see card Gr6-6
				Replace the motor coupling pin - see card Gr6-6
			Burned fuse.	Replace the fuse – see card Gr1-16.

A 032

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
LEVEL PROBLEM	Problems of the water level floats on the main tank	Lighting of both MIN and MAX signaling Led's .	Wiring of the water level floats disconnected.	Restore the connection and check the signals on the wires.
			Wiring failure of the water level floats	**Replace the wiring of the water level floats**
			Fault in the water level floats.	**Replace the fault float - see card Gr4-2**
			Connector of the water level floats unplugged from the board.	Restore the right connection.
			The board does not correctly read the signals from the water level floats.	**Replace the CPU board - see card Gr1-1**
			Check the wiring of the level sensor for the external used water tank.	**Disconnect the wiring on the CPU board**
			Check the ground connection of the sterilizer.	**Clean the ground connections.** **Replace the damage ground connection.**
			Sterilizer connected through a power strip.	**Remove the power strip and connect the sterilizer as recommended (see Operating Manual).**
			Check the electrical system of the room	**Conform the ground connection to the standard.** **Conform the electrical system to the standard.**

A 040

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
FILLING PROBLEM	Fail of the automatic filling from the external tank.	The MIN level signaling is not turned off within 2' from the start command of the automatic filling.	Check for water into the external filling tank.	Fill the external tank, reset the alarm and let the sterilizer's main tank to be filled.
			Check that the tap in the external filling tank is in open position.	Open the tap in the external filling tank.
			Check for possible obstruction in the external filling tank pipe.	Free the external filling tank pipe and shorten it if too long.
			Check for possible dirty in the Saeco filter.	**Replace the filter in the filling pipe path**
			Verify that the water pump works properly.	**Replace the fuse - see card Gr1-16** **Replace the water pump wiring** **Replace the water pump - see card Gr3-1** **Replace the power board - see card Gr1-1**
			Verify that the water pump is not blocked	Beat on the pump body to help the start of water pump. **Replace the water pump - see card Gr3-1**
			Fault of the water pump	**Replace the water pump - see card Gr3-1**

Continue

A 040 (continue)

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
FILLING PROBLEM	Fail of the automatic filling from the external tank.	The MIN level signaling is not turned off within 2' from the start command of the automatic filling.	Water pump not powered.	Replace the fuse - see card Gr1-16 Replace the power board - see card Gr1-1
			Break in the water pump wiring.	Replace the water pump wiring
			Error in the water pump wiring connection.	Restore the right connection of the water pump wiring.
			Leak in the internal pipe.	Replace the broken pipe
			Perforation in the main tank	Replace the main tank - see card Gr4-1
			Disconnection of the level MIN float wiring.	Restore the float wiring connection.
			Fault in the level MIN float.	Replace the level MIN float - see card Gr4-2
			Check the integrity of the pipe from the Milldrop device	Restore the pipe.
			Check the START/STOP cable connection between sterilizer and MILLDROP.	Restore the connection. Replace the START/STOP cable.
			Check the MILLDROP operation.	Perform the maintenance on the Milldrop device – See Operating Manual

A 101

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
PT1 BROKEN	PT1 faulty	The temperature detected by the PT1 is higher than 250°C	PT1 broken	**Replace the PT1 - see card Gr1-8**
			PT1 uncalibrated.	**Perform the calibration – see Attachment N**
			Check the temperature value on the display.	If = the room temperature: **- turn off and on the sterilizer more times;** **- Replace PT1 – see card Gr1-8.** If differs for many °C: **- turn off and on the sterilizer more times;** **- Replace PT1 – see card Gr1-8;** **- Reset and calibrate the CPU board – see Attachment N.**
			Check the calibration.	**Perform the PT1 calibration– see Attachment M.** **Complete sterilizer calibration – see Attachment N** **Replace the CPU board – see card Gr1-1**
			Reset or failure on the data memory.	**Reset and calibrate CPU board – see Attachment N** **Replace the CPU board – see card Gr1-1**

A 102

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
PT2 BROKEN	PT2 faulty	The temperature detected by the PT2 is higher than 250°C	PT2 broken	Replace PT2 - see card Gr1-9
			PT2 uncalibrated.	Perform the calibration – see Attachment N
			Steam generator clogged.	Replace lower section of the steam generator - see card Gr4-6 Advice the user to change the type of distilled water used for the sterilization.
			No water feeding the steam generator.	Fill the main tank Replace the water pump - see card Gr3-1 Replace valve EV6 - see card Gr3-1
			Check the temperature value on the display.	If = the room temperature: - turn off and on the sterilizer more times; - Replace PT2 – see card Gr1-9. If differs for many °C: - turn off and on the sterilizer more times; - Replace PT2 – see card Gr1-9; - Reset and calibrate CPU board – see Attachment N.

Continue

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
			Check the calibration.	**Perform the PT2 calibration– see Attachment M.** **Complete sterilizer calibration – see Attachment N** **Replace the CPU board – see card Gr1-1**
			Reset or failure on the data memory.	**Reset and calibrate CPU board – see Attachment N** **Replace the CPU board – see card Gr1-1**

A 103

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
PT3 BROKEN	Fault in the PT3	The temperature detected by the PT3 is higher than 250°C	PT3 broken	**Replace the PT3 - see card Gr1-10**
			PT3 uncalibrated.	**Perform the calibration – see Attachment N**
			Check the temperature value on the display.	If = the room temperature: **- turn off and on the sterilizer more times;** **- Replace PT3 – see card Gr1-10.** If differs for many °C: **- turn off and on the sterilizer more times;** **- Replace PT3 – see card Gr1-10;** **- Reset and calibrate the CPU board – see Attachment N.**
			Check the calibration.	**Perform the PT3 calibration– see Attachment M.** **Complete sterilizer calibration – see Attachment N** **Replace the CPU board – see card Gr1-1**
			Reset or failure on the data memory.	**Reset and calibrate CPU board – see Attachment N** **Replace the CPU board – see card Gr1-1**

A 104

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
PT4 BROKEN	Fault in the PT4	The temperature detected by the PT44 is higher than 250°C	PT4 broken	**Replace the PT4 - see card Gr1-11**
			PT4 uncalibrated.	**Perform the calibration – see Attachment N**
			Check the temperature value on the display.	If = the room temperature: **- turn off and on the sterilizer more times;** **- Replace PT4 – see card Gr1-11.** If differs for many °C: **- turn off and on the sterilizer more times;** **- Replace PT4 – see card Gr1-11;** **- Reset and calibrate the CPU board – see Attachment N.**
			Check the calibration.	**Perform the PT4 calibration– see Attachment M.** **Complete sterilizer calibration – see Attachment N** **Replace the CPU board – see card Gr1-1**
			Reset or failure on the data memory.	**Reset and calibrate CPU board – see Attachment N** **Replace the CPU board – see card Gr1-1**

A 111

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
PT1 SHORTCIRCUIT	Short-circuit in the PT1 probe	The PT1 probe reads a temperature lower than 1°C	Unstable connection of the PT1 wiring.	Restore the wiring connection.
			PT1 wiring out from the board connector.	Restore the wiring connection on the board.
			PT1 probe in short-circuit	**Replace the PT1 probe - see card Gr1-8**
			PT1 probe uncalibrated	**Perform the calibration – see Attachment N**
			Too low environmental temperature in the installation or storage site.	Move the sterilizer in a different installation or storage site with higher environmental temperature.
			Check the wiring of the level sensor for the external used water tank.	**Disconnect the wiring on the CPU board**
			Check the ground connection of the sterilizer.	**Clean the ground connections.** **Replace the damage ground connection.**
			Sterilizer connected through a power strip.	**Remove the power strip and connect the sterilizer as recommended (see Operating Manual).**
			Check the electrical system of the room	**Conform the ground connection to the standard.** **Conform the electrical system to the standard.**
			Possible data memory fail.	**Perform CPU board calibration – see Attachment N** **Replace CPU board – see card Gr1-1**
			Data memory reset.	**Replace CPU board – see card Gr1-1 -**
			CPU board replaced without performing the calibration.	**Perform CPU board calibration – see Attachment N** **Replace CPU board – see card Gr1-1**
			Lost of calibration	**Perform CPU board calibration – see Attachment N** **Replace CPU board – see card Gr1-1 -**

A 112

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
PT2 SHORTCIRCUIT	Short-circuit in the PT2 probe	The PT2 probe reads a temperature lower than 1°C	Unstable connection of the PT2 wiring.	Restore the wiring connection.
			PT2 wiring out from the board connector.	Restore the wiring connection on the board.
			PT2 probe in short-circuit	**Replace the PT2 probe - see card Gr1-9**
			PT2 probe uncalibrated	**Perform the calibration – see Attachment N**
			Too low environmental temperature in the installation or storage site.	Move the sterilizer in a different installation or storage site with higher environmental temperature.
			Check the wiring of the level sensor for the external used water tank.	**Disconnect the wiring on the CPU board**
			Check the ground connection of the sterilizer.	**Clean the ground connections.** **Replace the damage ground connection.**
			Sterilizer connected through a power strip.	**Remove the power strip and connect the sterilizer as recommended (see Operating Manual).**
			Check the electrical system of the room	**Conform the ground connection to the standard.** **Conform the electrical system to the standard.**
			Possible data memory fail.	**Perform CPU board calibration – see Attachment N** **Replace CPU board – see card Gr1-1**
			Data memory reset.	**Replace CPU board – see card Gr1-1 -**
			CPU board replaced without performing the calibration.	**Perform CPU board calibration – see Attachment N** **Replace CPU board – see card Gr1-1**
			Lost of calibration	**Perform CPU board calibration – see Attachment N** **Replace CPU board – see card Gr1-1 -**

A 113

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
PT3 SHORTCIRCUIT	Short-circuit in the PT3 probe	The PT3 probe reads a temperature lower than 1°C	Unstable connection of the PT3wiring.	Restore the wiring connection.
			PT3 wiring out from the board connector.	Restore the wiring connection on the board.
			PT3 probe in short-circuit	**Replace the PT3 probe - see card Gr1-10**
			PT3 probe uncalibrated	**Perform the calibration – see Attachment N**
			Too low environmental temperature in the installation or storage site.	Move the sterilizer in a different installation or storage site with higher environmental temperature.
			Check the wiring of the level sensor for the external used water tank.	**Disconnect the wiring on the CPU board**
			Check the ground connection of the sterilizer.	**Clean the ground connections.** **Replace the damage ground connection.**
			Sterilizer connected through a power strip.	**Remove the power strip and connect the sterilizer as recommended (see Operating Manual).**
			Check the electrical system of the room	**Conform the ground connection to the standard.** **Conform the electrical system to the standard.**
			Possible data memory fail.	**Perform CPU board calibration – see Attachment N** **Replace CPU board – see card Gr1-1**
			Data memory reset.	**Replace CPU board – see card Gr1-1 -**
			CPU board replaced without performing the calibration.	**Perform CPU board calibration – see Attachment N** **Replace CPU board – see card Gr1-1**
			Lost of calibration	**Perform CPU board calibration – see Attachment N** **Replace CPU board – see card Gr1-1 -**

A 114

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
PT4 SHORTCIRCUIT	Short-circuit in the PT4 probe	The PT4 probe reads a temperature lower than 1°C	Unstable connection of the PT4 wiring.	Restore the wiring connection.
			PT4 wiring out from the board connector.	Restore the wiring connection on the board.
			PT4 probe in short-circuit	**Replace the PT4 probe - see card Gr1-11**
			PT4 probe uncalibrated	**Perform the calibration – see Attachment N**
			Too low environmental temperature in the installation or storage site.	Move the sterilizer in a different installation or storage site with higher environmental temperature.
			Check the wiring of the level sensor for the external used water tank.	**Disconnect the wiring on the CPU board**
			Check the ground connection of the sterilizer.	**Clean the ground connections.** **Replace the damage ground connection.**
			Sterilizer connected through a power strip.	**Remove the power strip and connect the sterilizer as recommended (see Operating Manual).**
			Check the electrical system of the room	**Conform the ground connection to the standard.** **Conform the electrical system to the standard.**
			Possible data memory fail.	**Perform CPU board calibration – see Attachment N** **Replace CPU board – see card Gr1-1**
			Data memory reset.	**Replace CPU board – see card Gr1-1 -**
			CPU board replaced without performing the calibration.	**Perform CPU board calibration – see Attachment N** **Replace CPU board – see card Gr1-1**
			Lost of calibration	**Perform CPU board calibration – see Attachment N** **Replace CPU board – see card Gr1-1 -**

A 200

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
HEATING PROBLEM	Preheating phase not performed within the preset time	Pre-vacuum phase PV1 not started within 30' from the cycle start	Intervention of the steam generator safety thermostat	Restore the safety thermostat and repeat the sterilization cycle.
			Intervention of the heating resistor safety thermostat	Restore the safety thermostat and repeat the sterilization cycle.
			Steam generator clogged	**Replace the lower section of the steam generator - see card Gr4-6**
			Fault in the board	**Replace the board - see card Gr1-1**
			CPU board uncalibrated	**Send the sterilizer to the Mocom Service department**
			Software release before E0008 / BP00320	**Update the software – see Attachment K**
			Lack of water during the previous cycle	**Advice the user on the correct water level check**
			Check the cartridges of the steam generator	**Restore the connections** **Replace the failed cartridge – see card Gr1-19** **Replace the CPU board –see card Gr1-1**

A 250

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
PV1 TIMEOUT	1st vacuum pulse (from 0.00 to -.88) not performed within the preset time	1st vacuum pulse not completed within 6' timeout	Excessive humidity into the sterilization chamber.	Wipe carefully the chamber, reset the alarm and restart the cycle; verify that the temperature in the sterilization chamber is lower than 50°C.
			Vacuum pump not correctly started	**Replace the vacuum pump - see card Gr3-3**
				Replace the fuse - see card Gr1-16
				Replace the power board - see card Gr1-1
			Break in the vacuum pump wiring	Restore the wiring of the vacuum pump, reset the alarm and repeat the sterilization cycle
			The vacuum pump does not work correctly and is too much noisy	**Fixe by sealant the grain of the connecting rod on the vacuum pump - see card Gr3-3**
				Replace the larger membranes of the vacuum pump - see card Gr3-3
				Clean the vacuum pump
			Clogging in the water stopper filter of the sterilization chamber	Perform the cleaning procedure of the water drain filter; this procedure must be performed regularly by the operator as described in the user manual
			Air leakage from the door gasket	Clean carefully the gasket and the parabola board, reset the alarm and restart the Vacuum test
				Replace the door gasket - see card Gr6-1
Continue			Air leakage from the internal pipes	**Replace the pipe causing the leakage**
				Reset the alarm and restart the sterilization cycle

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
			Air leakage from a valve	Identify the valve and clean it **Replace the valve - see cards Gr2**
			Air leakage from the heat exchanger	**Replace the heat exchanger - see card Gr4-3**
			Air leakage from the pipe of the pressure transducer	Unplug and plug again the pipe correctly on the pressure transducer, reset the alarm and restart the Vacuum test
			Pressure transducer uncalibrated	**Send the sterilizer to the Mocom Service department**
			Preset values changed	
			Check the water drain hole into the chamber	**Clean by using compressed air.**
			Check the steam generator	**Replace the Saeco filter – see card Gr4-8.** **Replace the water pump – see card Gr3-1.** **Replace valve EV6 – see card Gr3-1.** **Replace the lower section of the steam generator (O-Ring included) – see card Gr4-6.**
			Performed more than 2000 cycles without a overall control or check	**Replace the door gasket – see card Gr6-1** **Replace filter LP1 – see card Gr4-9** **Clean the chamber** **Replace the pipes** **Overhaul of the vacuum pump – see card Gr3-3** **Clean the electric valves** **Replace the bacteriologic filter – see card Gr4-7**
Continue			Check the type and the mass of the load arranged in the chamber	**Advice the user on loading and arranging the material in the chamber as indicated on the Operating Manual**

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
			Air leakage from fitting	Seal the fitting
			Check the integrity of the chamber	Replace the sterilization chamber

A 251

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
ATM1 TIMEOUT	1st pressure pulse (from -.88 to 0.00) not performed within the preset time	1st pressure pulse not performed within 3' timeout	The water pump of the steam generator does not work properly	**Replace the water pump - see card Gr3-1** **Replace the power board - see card Gr1-1**
			Incorrect operation of the EV6 valve	Clean the valve **Replace EV6 valve - see card Gr3-1**
			Fault in the pipe connecting the steam generator	**Replace the pipe**
			Sterilization chamber overloaded	Advice the operator for properly loading of the sterilization chamber.
			Intervention of the steam generator safety thermostat	Restore the safety thermostat and repeat the sterilization cycle **Replace the safety thermostat - see card Gr1-12**
			Steam generator clogged	**Replace the lower section of the steam generator - see card Gr4-6** Different distilled water must be used
			Fault in the board	**Replace the board - see card Gr1-1**
			CPU board uncalibrated	**Send the sterilizer to the Mocom Service department**
			Check the continuity of the steam generator cartridge	**Replace the failed cartridge**

A 252

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
PP1 TIMEOUT	1st pressure pulse (from 0.00 to +1.00 bar) not performed within the preset time	First pressure pulse not performed within 3' timeout	Sterilization chamber overloaded	Advice the operator for properly loading of the sterilization chamber.
			Intervention of the steam generator safety thermostat	Restore the safety thermostat and repeat the sterilization cycle **Replace the safety thermostat - see card Gr1-12**
			Steam leakage from the door gasket	Clean properly the gasket and the parabola board **Replace the door gasket - see card Gr6-1**
			Steam leakage from a valve	Identify the valve and clean it **Replace the valve causing the problem - see cards Gr2**
			Steam leakage from a pipe	**Replace the pipe causing the problem**
			Steam generator clogged	**Replace the lower section of the steam generator - see card Gr4-6** Different distilled water must be used
			Fault in the CPU board	**Replace the CPU board - see card Gr1-1**
			CPU board uncalibrated	**Send the sterilizer to the Mocom Service department**
			Check the continuity of the steam generator cartridge	**Replace the failed cartridge - see card Gr1-19**
			Check the maintenance status	**Advice the operator on the proper maintenance**

A 253

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
PV2 TIMEOUT	2nd vacuum pulse (from +1.00 to -.80 bar) not performed within the preset time	2nd vacuum pulse not performed within 7' timeout	Excessive humidity into the sterilization chamber.	Wipe carefully the chamber, reset the alarm and restart the cycle; verify that the temperature in the sterilization chamber is lower than 50°C.
			Vacuum pump not correctly started	**Replace the vacuum pump - see card Gr3-3** **Replace the fuse - see card Gr1-16** **Replace the board - see card Gr1-1**
			Break in the vacuum pump wiring	Restore the wiring of the vacuum pump, reset the alarm and repeat the sterilization cycle
			The vacuum pump does not work correctly and is too much noisy	**Fixe by sealant the grain of the connecting rod on the vacuum pump - see card Gr3-3** **Replace the larger membranes of the vacuum pump - see card Gr3-3** Clean the vacuum pump
			Clogging in the water stopper filter of the sterilization chamber	Perform the cleaning procedure of the water drain filter; this procedure must be performed regularly by the operator as described in the user manual
			Air leakage from the door gasket	Clean carefully the gasket and the parabola, reset the alarm and restart the cycle **Replace the door gasket - see card Gr6-1**
			Air leakage from the internal pipes	**Replace the pipe causing the leakage** Reset the alarm and restart the sterilization cycle

Continue

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
			Air leakage from a valve	Identify the valve and clean it **Replace the valve - see cards Gr2**
			Air leakage from the heat exchanger	**Replace the heat exchanger - see card Gr4-3**
			Air leakage from the pipe of the pressure transducer.	Unplug and plug again the pipe correctly on the pressure transducer, reset the alarm and restart the cycle
			Pressure transducer uncalibrated	**Send the sterilizer to the Mocom Service department**
			Check the type and the mass of the load arranged in the chamber	**Advice the user on loading and arranging the material in the chamber as indicated on the Operating Manual**
			Check the quality of the distilled water	**Advice the user** **Clean the hydraulic circuit** **Replace the damaged components**
			Check the current arrangement of the equipment	**Change as necessary**
			Check the electric system of the room	**Eliminate any possible power strip** **The equipment must be powered through one's own supply line**
			Check the fan of the heat exchanger	**Clean the fans – see card Gr4-4** **Replace the damaged fan – see card Gr4-4**

A 254

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
ATM2 TIMEOUT	2nd pressure pulse (from -.80 to 0.00 bar) not performed within the preset time	2nd pressure pulse not performed within 3' timeout	The water pump of the steam generator does not work properly	**Replace the water pump - see card Gr3-1** **Replace the power board - see card Gr1-1**
			Incorrect operation of the EV6 valve	Clean the valve **Replace the EV6 valve - see card Gr3-1**
			Fault in the pipe connecting the steam generator	**Replace the pipe**
			Sterilization chamber overloaded	Advice the operator for properly loading of the sterilization chamber.
			Intervention of the steam generator safety thermostat	Restore the safety thermostat and repeat the sterilization cycle. **Replace the safety thermostat - see card Gr4-6**
			Steam generator clogged	**Replace the lower section of the steam generator - see card Gr4-6** Different distilled water must be used
			Fault in the board	**Replace the board - see card Gr1-1**
			CPU board uncalibrated	**Send the sterilizer to the Mocom Service department**
			Check the continuity of the steam generator cartridge	**Replace the failed cartridge - see card Gr1-19**

A 255

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
PP2 TIMEOUT	2nd pressure pulse (from 0.00 to +1.00 bar) not performed within the preset time	2nd pressure pulse not performed within 3' timeout	Sterilization chamber overloaded	Advice the operator for properly loading of the sterilization chamber
			Intervention of the steam generator safety thermostat	Restore the safety thermostat and repeat the sterilization cycle. **Replace the safety thermostat - see card Gr1-12**
			Steam leakage from the door gasket	Clean carefully the gasket and the parabola borad, reset the alarm and restart the cycle **Replace the door gasket - see card Gr6-1**
			Steam leakage from a valve	Identify the valve and clean it **Replace the valve - see cards Gr2**
			Steam leakage from a pipe	**Replace the pipe causing the problem**
			Steam generator clogged	**Replace the lower section of the steam generator - see card Gr4-6** Different distilled water must be used
			Fault in the board	**Replace the board - see card Gr1-1**
			CPU board uncalibrated	**Send the sterilizer to the Mocom Service department**
			Check the continuity of the steam generator cartridge	**Replace the failed cartridge - see card Gr1-19**
			Check the maintenance status	**Advice the operator on the proper maintenance**

A 256

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
PV3 TIMEOUT	3rd vacuum pulse (from +1.00 to -.80 bar) not performed within the preset time	3rd vacuum pulse not performed within 7' timeout	Excessive humidity into the sterilization chamber..	Wipe carefully the chamber, reset the alarm and restart the cycle; verify that the temperature in the sterilization chamber is lower than 50°C
			Vacuum pump not correctly started	**Replace the vacuum pump - see card Gr3-3** **Replace the fuse - see card Gr1-16** **Replace the CPU board - see card Gr1-1**
			Break in the vacuum pump wiring	Restore the wiring of the vacuum pump, reset the alarm and repeat the sterilization cycle
			The vacuum pump does not work correctly and is too much noisy	**Fixe by sealant the grain of the connecting rod on the vacuum pump - see card Gr3-3** **Replace the larger membranes of the vacuum pump - see card Gr3-3** Clean the vacuum pump
			Clogging in the water stopper filter of the sterilization chamber	Perform the cleaning procedure of the water stopper filter; this procedure must be performed regularly by the operator as described in the user manual
			Air leakage from the door gasket	Clean carefully the gasket and the parabola, reset the alarm and restart the cycle **Replace the door gasket - see card Gr6-1**
			Air leakage from the internal pipes	**Replace the pipe causing the leakage** Reset the alarm and restart the sterilization cycle

Continue

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
			Air leakage from a valve	Identify the valve and clean it **Replace the valve - see cards Gr2**
			Air leakage from the heat exchanger	**Replace the heat exchanger - see card Gr4-3**
			Air leakage from the pipe of the pressure transducer	Unplug and plug again the pipe correctly on the pressure transducer, reset the alarm and restart the cycle
			Pressure transducer uncalibrated	**Send the sterilizer to the Mocom Service department**
			Check the type and the mass of the load arranged in the chamber	**Advice the user on loading and arranging the material in the chamber as indicated on the Operating Manual**
			Check the quality of the distilled water	**Advice the user** **Clean the hydraulic circuit** **Replace the damaged components**
			Check the current arrangement of the equipment	**Change as necessary**
			Check the electric system of the room	**Eliminate any possible power strip** **The equipment must be powered through one's own supply line**
			Check the fan of the heat exchanger	**Clean the fans – see card Gr4-4** **Replace the damaged fan – see card Gr4-4**

A 257

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
ATM3 TIMEOUT	3rd pressure rising (from -.80 to 0.00 bar) not performed within the preset time	3rd pressure rising not performed within 3' timeout	The water pump of the steam generator does not work properly	**Replace the water pump - see card Gr3-1** **Replace the power board - see card Gr1-1**
			Incorrect operation of the EV6 valve	Clean the valve **Replace the EV6 valve - see card Gr3-1**
			Fault in the pipe connecting the steam generator	**Replace the pipe**
			Sterilization chamber overloaded	Advise the operator for properly loading of the sterilization chamber.
			Intervention of the steam generator safety thermostat	Restore the safety thermostat and repeat the sterilization cycle. **Replace the safety thermostat- see card Gr1-12**
			Steam generator clogged	**Replace the lower section of the steam generator - see card Gr4-6** Different distilled water must be used
			Fault in the CPU board	**Replace the CPU board - see card Gr1-1**
			CPU board uncalibrated	**Send the sterilizer to the Mocom Service department**
			Check the continuity of the steam generator cartridge	**Replace the failed cartridge - see card Gr1-19**

A 258

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
PPP TIMEOUT	3rd pressure pulse (from 0.00 to +1.12/2.15 bar) not performed within the preset time	3rd pressure pulse not performed within 7' timeout	Sterilization chamber overloaded	Advice the operator for properly loading of the sterilization chamber
			Intervention of the steam generator safety thermostat	Restore the safety thermostat and repeat the sterilization cycle. **Replace the safety thermostat - see card Gr1-12**
			Steam leakage from the door gasket	Clean properly the gasket and the parabola board **Replace the door gasket - see card Gr6-1**
			Steam leakage from a valve	Identify the valve and clean it **Replace the valve causing the problem - see cards Gr2**
			Steam leakage from a pipe	**Replace the pipe causing the problem**
			Steam generator clogged	**Replace the lower section of the steam generator - see card Gr4-6** Different distilled water must be used
			Fault in the board	**Replace the CPU board - see card Gr1-1**
			CPU board uncalibrated	**Send the sterilizer to the Mocom Service department**
			Check the continuity of the steam generator cartridge	**Replace the failed cartridge - see card Gr1-19**
			Check the maintenance status	**Advice the operator on the proper maintenance**

A 259

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
PROCESS TIMEOUT	Process phase (from PV1 to PROCESS) not reached within the preset time	Process phase not reached within 35' timeout	Sterilization chamber overloaded	Advice the operator for properly loading of the sterilization chamber
			Intervention of the steam generator safety thermostat	Restore the safety thermostat and repeat the sterilization cycle. **Replace the safety thermostat - see card Gr1-12**
			Steam leakage from the door gasket	Clean properly the gasket and the parabola board **Replace the door gasket - see card Gr6-1**
			Steam leakage from a valve	Identify the valve and clean it **Replace the valve causing the problem - see cards Gr2**
			Steam leakage from a pipe	**Replace the pipe causing the problem**
			Steam generator clogged	**Replace the lower section of the steam generator - see card Gr4-6** Different distilled water must be used
			Fault in the board	**Replace the CPU board - see card Gr1-1**
			CPU board uncalibrated	**Send the sterilizer to the Mocom Service department**

A 260

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
PROCESS TIMEOUT	Depressurization not performed within the preset time	Problem on switching the valves during the steam discharge	EV3 interrupted	Replace the EV3 shaft - see card Gr2-3
			EV3 Shaft blocked	Clean or replace the shaft - see card Gr2-3
			EV3 dirty	
			EV3 not powered	Replace the wiring Replace the fuse - see card Gr1-16 Replace the CPU board - see card Gr1-1
			Check the arrangement of the sterilizer (slope)	Change as necessary (adjust the feet for the proper slope)

H 150

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
MPX BROKEN	Pressure transducer broken	Pressure reading by the transducer higher than 2.35 bar	Fault in the wiring connecting the pressure transducer to board	
			Fault in the pressure transducer	Replace the pressure transducer - see card Gr1-4
			Steam leakage from the pressure transducer	
			Pressure transducer uncalibrated	Send the sterilizer to the Mocom Service department

H 160

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
MPX SHORTCIRCUIT	Short-circuit in the pressure transducer	Pressure reading by the transducer lower than –1.01 bar	Fault in the pressure transducer wiring..	Replace the pressure transducer - see card Gr1-4
			Short-circuit in the pressure transducer	
			Steam leakage from the pressure transducer	Seal the pipe fitting Replace the pressure transducer - see card Gr1-4
			Fault in the pressure transducer	Replace the pressure transducer - see card Gr1-4
			Pressure transducer uncalibrated	Send the sterilizer to the Mocom Service department
			Check for the jumper X21 on the CPU board	Set the jumper on its position Reset the data memory and calibrate the CPU board – see Attachment N Calibrate the CPU board – see Attachment N

H 400

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
P/T PROBLEM	Ratio P_{conv}/T not correctly balanced (P_{conv} greater than T) during the process phase	The difference value between P_{conv} and T is greater of 2°C	Problem in the water pump of the steam generator	**Replace the water pump - see card Gr3-1**
			EV6 does not open correctly	Clean the valve and repeat the sterilizaztion cycle **Replace EV6 - see card Gr3-1**
			Steam leakage from a valve	Identify the valve causing the problem and clean it **Replace the valve causing the problem - see cards Gr2**
			The discharge valve does not open correctly	**Replace the discharge valve**
			Fault in the board	**Replace the CPU board - see card Gr1-1**
			Stored calibration values changed	**Send the sterilizer to the Mocom Service department**
			Steam leakage from the door gasket	**Replace the door gasket - see card Gr6-1**
			Check the quality of the distilled water	**Clean the hydraulic circuit** **Replace the damaged components** **Advice the user**
			Check the PCB filter board	**replace the board – see card Gr1-1**

H 401

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
T/P PROBLEM	Ratio T/P_{conv} not correctly balanced (T greater than P_{conv}) during the process phase	The difference value between P_{conv} and T is greater of 2°C	Problem in the board	**Replace the CPU board - see card Gr1-1**
			Problem in the water pump of the steam generator	**Replace the water pump - see card Gr3-1**
			EV6 valve does not open correctly	**Replace EV6 - see card Gr3-1**
			Steam generator clogged	**Replace the lower section of the steam generator - see card Gr4-6** Different distilled water must be used
			Stored calibration values changed	**Send the sterilizer to the Mocom Service department**
			Steam leakage from the door gasket	Clean the gasket **Replace the door gasket- see card Gr6-1**
			Pressure transducer broken	**Replace the pressure transducer - see card Gr1-4**
			Check the type and the mass of the load arranged in the chamber	**Advice the user on loading and arranging the material in the chamber as indicated on the Operating Manual**
			Check the PT1	**Replace PT1 – see card Gr1-8** **Calibrate PT1 – see Attachment N**

H 402

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
T OVER LIMIT	Temperature over the MAX threshold during the process phase	The temperature detected by PT1 probe is +3°C greater than T_{nom} value (PT1 greater than 124/137)	Steam generator clogged	**Replace the lower section of the steam generator - see card Gr4-6** Different distilled water must be used
			Problem in the water pump of the steam generator	**Replace the water pump - see card Gr3-1** **Replace the fuse - see card Gr1-16**
			EV6 valve does not open correctly	**Replace EV6 - see card Gr3-1**
			Water leak from the steam generator circuit	Identify the component and replace it
			Problem in the board	**Replace the CPU board - see card Gr1-1**
			Steam leakage from a valve	Replace the valve causing the problem
			Stored calibration values changed	**Send the sterilizer to the Mocom Service department**
			PT1 failure	**Replace PT1 - see card Gr1-8**

H 403

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
T UNDER LIMIT	Temperature under the MIN threshold during the process phase	The temperature detected by PT1 probe is lower than T_{nom} value (PT1 lower than 121/134°C)	Intervention of the steam generator safety thermostat	Restore the safety thermostat and repeat the sterilization cycle. **Replace the safety thermostat - see card Gr1-12**
			Problem in the steam generator	Dismount and replace the O-ring in the steam generator **Replace the lower section of the steam generator - see card Gr4-6**
			Steam leakage from the hydraulic circuit	Identify the component and replace it
			Fault in the board	**Replace the CPU board - see card Gr1-1**
			Steam leakage from the door gasket	Clean properly gasket and parabola board **Replace the door gasket - see card Gr6-1**
			Steam leakage from a pipe	**Replace the pipe causing the problem**
			Stored calibration values changed	**Send the sterilizer to the Mocom Service department**
			Check the type and the mass of the load arranged in the chamber	**Advice the user on loading and arranging the material in the chamber as indicated on the Operating Manual**

H 404

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
PT1 FLUCTUATING	Temperature fluctuating around the threshold during the process phase	Difference between PT1max and PT1min greater than 2°C	Steam leakage from the door gasket	Clean properly gasket and parabola board **Replace the door gasket - see card Gr6-1**
			Steam leakage from a valve	Identify the valve and clean it **Replace the valve causing the problem - see cards Gr2**
			Steam leakage from a pipe	**Replace the pipe causing the problem**
			Problem in the water pump of the steam generator	**Replace the water pump - see card Gr3-1**
			EV6 valve does not open correctly	**Replace EV6 - see card Gr3-1**
			Problem in the steam generator	Dismount and replace the O-ring in the steam generator **Replace the lower section of the steam generator - see card Gr4-6**
			Fault in the board	**Replace the CPU board - see card Gr1-1**
			PT1 failure	**Replace PT1 - see card Gr1-8**

H 405

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
P OVER LIMIT	Pressure value over the MAX threshold during the process phase	Pressure value greater than 1.24 or 2.31 bar (depending on the cycle type: 121 or 134°C)	Fault in the board	**Replace the CPU board - see card Gr1-1**
			Stored calibration values changed	**Send the sterilizer to the Mocom Service department**
			Discharge valve does not open correctly	Clean the valve **Replace the valve - see cards Gr2**
			Pressure transducer uncalibrated	**Send the sterilizer to the Mocom Service department**
			Pressure transducer broken	**Replace the pressure transducer - see card Gr1-4**

H 406

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
P UNDER LIMIT	Pressure value under the MIN threshold during the process phase	Pressure value lower than 1.03 or 2.02 bar (depending on the cycle type: 121 or 134°C)	Intervention of the steam generator safety thermostat	Restore the safety thermostat and repeat the sterilization cycle **Replace the safety thermostat - see card Gr1-12**
			Problem in the steam generator	Dismount and replace the O-ring in the steam generator **Replace the lower section of the steam generator - see card Gr4-6**
			Steam generator clogged	**Replace the lower section of the steam generator - see card Gr4-6** Different distilled water must be used
			Fault in the board	**Replace the CPU board- see card Gr1-1**
			Steam leakage from the door gasket	Clean properly gasket and parabola board **Replace the door gasket - see card Gr6-1**
			Steam leakage from the hydraulic circuit	**Replace the component causing the problem**
			Stored calibration values changed	**Send the sterilizer to the Mocom Service department**
			Special trays in the chamber	Advice the user to use one special tray per cycle and arrange it on the middle area.
			The steam generator cartridges don't heat	**Replace the broken cartridge – see card Gr1-19** **Replace the CPU board – see card Gr1-1** **Replace the power supply board – see card Gr1-1**
			Steam leakage from the pipes	**Replace the pipe**
			Check the wiring connecting the external used water tank	**Remove the wiring**

H 410

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
TIMER PROBLEM	Wrong hold time during the process phase	Countdown time mismatches the setpoint value	CPU board failed	Replace the CPU board - see card Gr1-1

H 990

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
OVER PRESSURE	Overpressure in the sterilization chamber	Pressure value greater than 2.32 bar	Fault in the board	Replace the CPU board - see card Gr1-1
			Fault in the pressure transducer	Replace the pressure transducer - see card Gr1-4
			Stored calibration values changed	Send the sterilizer to the Mocom Service department

H 991

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
OVERHEATING PT1	PT1 overheating	PT1 detects a temperature value greater than 138°C	Fault in the board	Replace the CPU board- see card Gr1-1
			Fault in the pressure transducer	Replace the pressure transducer - see card Gr1-4
			Stored calibration values changed	Send the sterilizer to the Mocom Service department
			Fault in the PT1	Replace PT1 - see card Gr1-8
			Check the wiring connecting the external used water tank	Remove the wiring

H 992

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
OVERHEATING PT2	PT2 overheating	PT2 detects a temperature value greater than 230°C	Fault in the board	Replace the CPU board- see card Gr1-1
			Fault in the pressure transducer	Replace the pressure transducer - see card Gr1-4
			Steam generator clogged	Replace the lower section of the steam generator - see card Gr4-6
			Stored calibration values changed	Send the sterilizer to the Mocom Service department

H 993

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
OVERHEATING PT3	PT3 overheating	PT3 detects a temperature value greater than 160°C	Fault in the board	Replace the CPU board- see card Gr1-1
			Fault in the pressure transducer	Replace the pressure transducer - see card Gr1-4
			Stored calibration values changed	Send the sterilizer to the Mocom Service department

REPAIR PROCEDURES

The repair procedures consist of cards grouped as follows:

GROUP 1	**ELECTRONIC DEVICES AND ASSEMBLIES**
GROUP 2	**ELECTROVALVES**
GROUP 3	**PUMPS**
GROUP 4	**PLUMBING CIRCUIT**
GROUP 5	**WIRINGS**
GROUP 6	**DOOR LOCKING MECHANISM**
GROUP 7	**COVERS**
ATTACHMENTS	

GROUP 1

ELECTRONIC COMPONENTS AND ASSEMBLIES

ELECTRONIC BOARD ASSEMBLY (GAM VERSION)
A#5BP5410000

PRINTER POWER SUPPLY BOARD
C#5BP1430000

MAINS FILTER BOARD
C#5BP1420000

POWER SUPPLY BOARD
C#5BP1400000

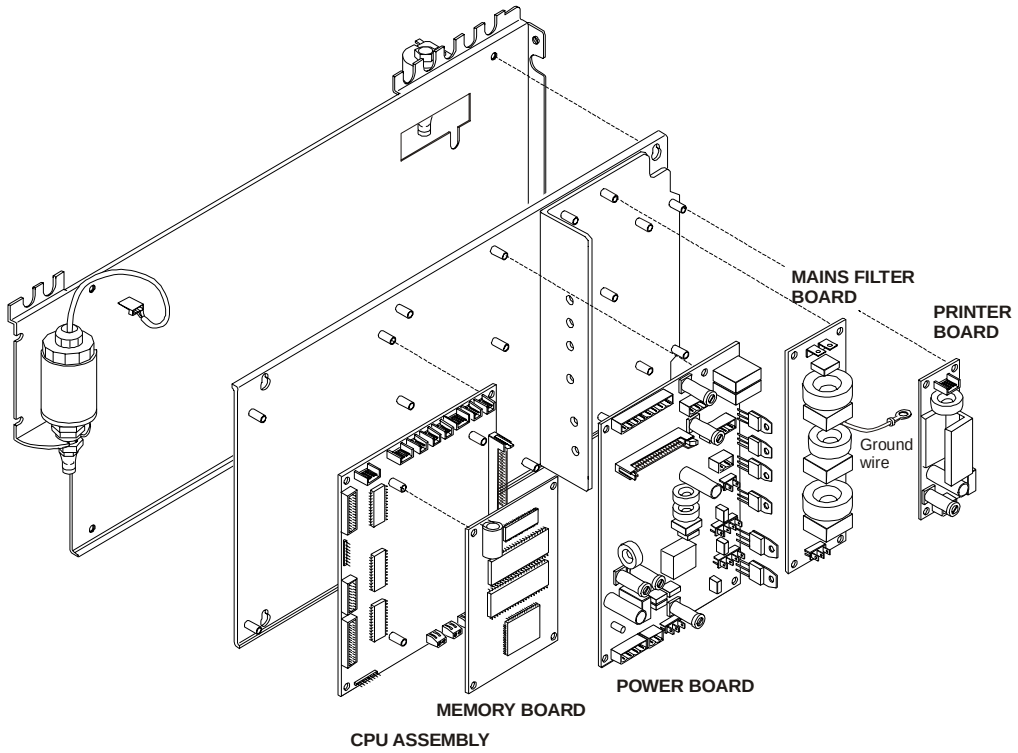
CPU BOARD
A#5BP1410000

MEMORY BOARD

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket.

1. Remove the covers (see card ***Gr7-1***);
2. Unplug connectors and wirings from the board;
3. Remove the screws fixing the board;
4. Mount the new board, restore connections and assembly all items proceeding in reverse order as above;
5. Run a sterilization cycle.

Note: in case of power supply printer board replacing, perform a printout check selecting the menu Setup, option NORMAL (see **Setting the printer options)**.



ELECTRONIC BOARD ASSEMBLY (TROLL VERSION)
A#0BM4760000

PRINTER POWER SUPPLY BOARD
C#5BM1430000

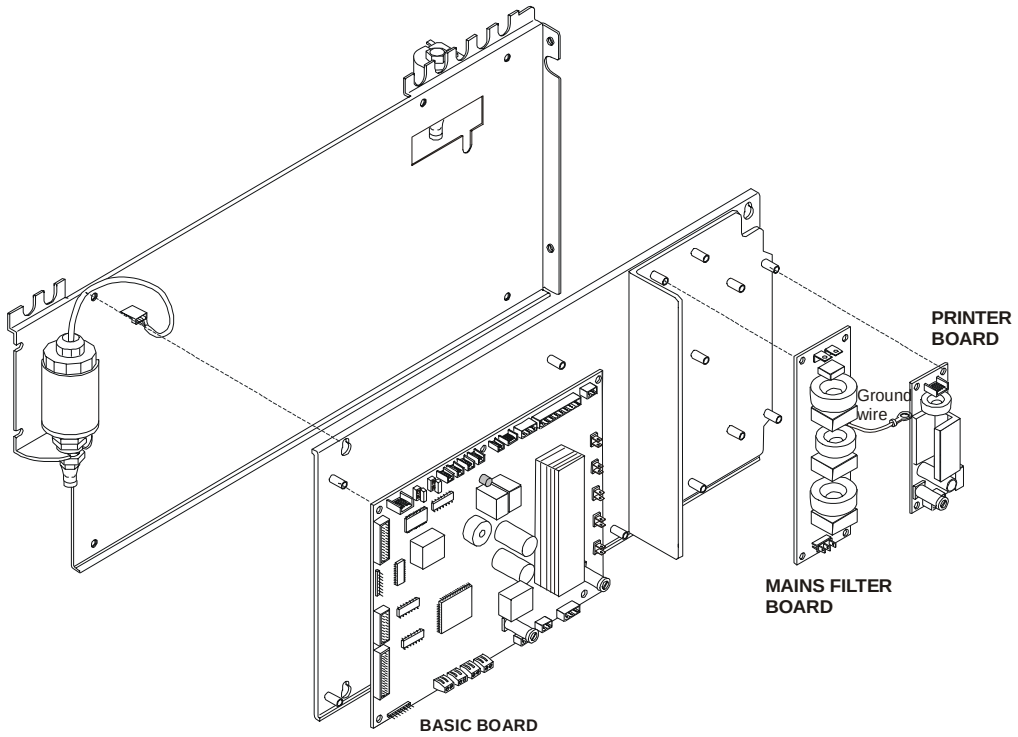
MAINS FILTER BOARD
C#5BM1420000

BASIC BOARD
A#5BM1400000

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket.

1. Remove the covers (see card ***Gr7-1***);
2. Unplug connectors and wirings from the board;
3. Remove the screws fixing the board;
4. Mount the new board, restore connections and assembly all items proceeding in reverse order as above;
5. Run a sterilization cycle.

Note: in case of power supply printer board replacing, perform a printout check selecting the menu Setup, option NORMAL (see **Setting the printer options)**.

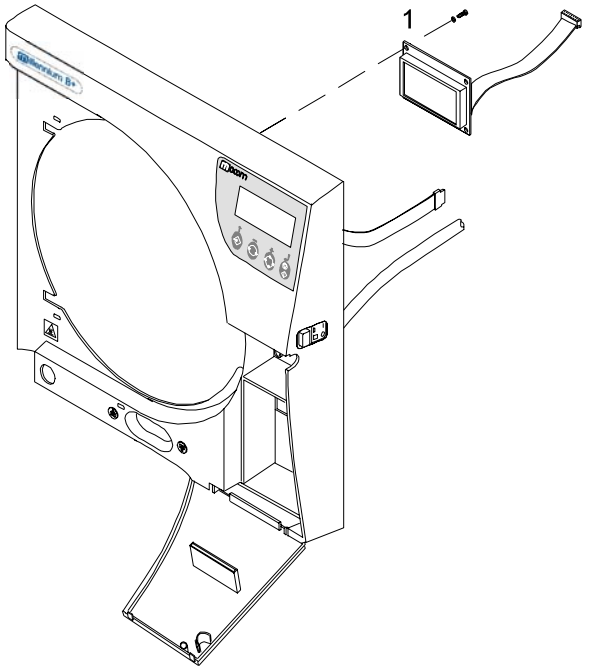


LCD BOARD

C#5BP1230000

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket.

1. Unlock the fixing pins of the front cover and move it as much as possibile from the frame (see card ***Gr7-3***);
2. Remove the interface connector from CPU board;
3. Access the fixing screws and remove the LCD display (1);
4. Remove the protective film from the new LCD;
5. Mount the new LCD, assembly all items and restore connections proceeding in reverse order as above;
6. Run a sterilization cycle.

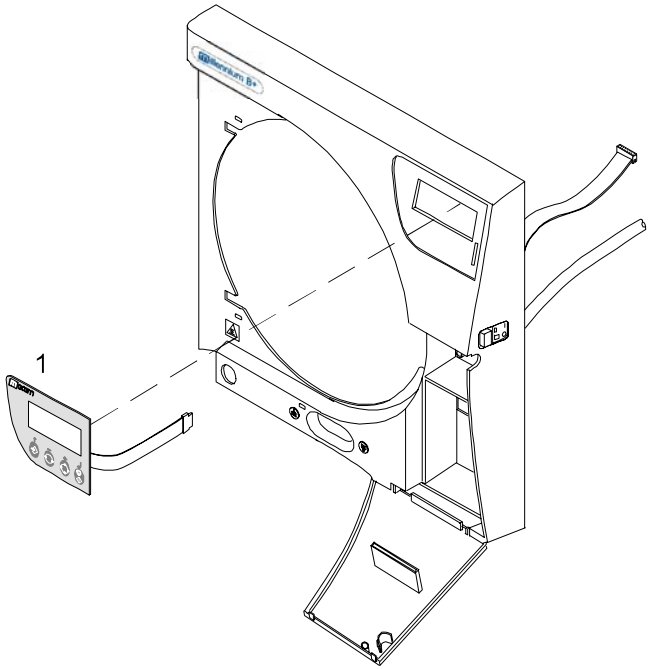


KEYBOARD

C#6BM1630000

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket.

1. Remove the covers (see card ***Gr7-1***);
2. Remove the keyboard flat cable from the CPU board;
3. Detach carefully the keyboard (1);
4. Remove the protective film from the new keyboard;
5. Attach the new keyboard;
6. Restore connections and assembly all items proceeding in reverse order as above;
7. Run a sterilization cycle.

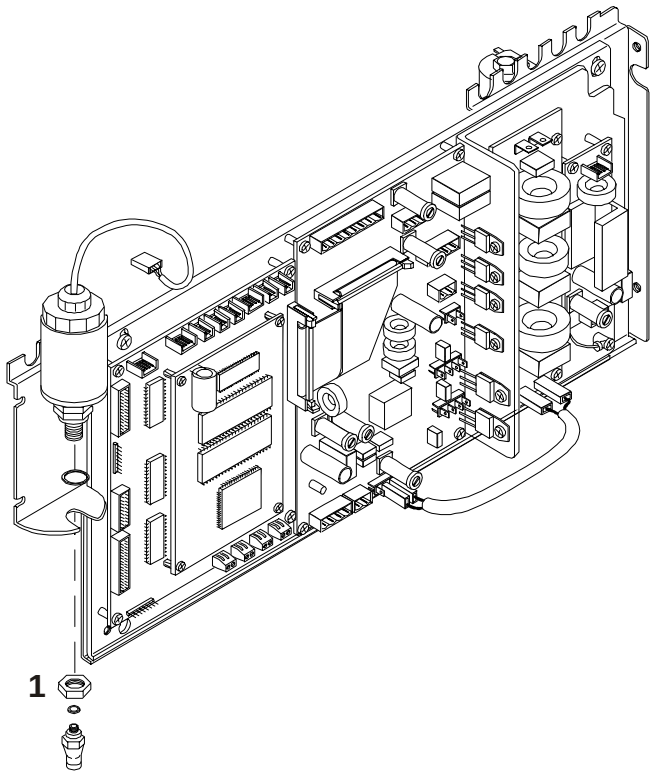


PRESSURE TRANSDUCER

431#00080000

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket.

1. Remove the covers ((see card ***Gr7-1***);
2. Remove the pressure transducer wiring from the CPU board;
3. Withdraw the pipe from the pressure transducer;
4. Remove the nut (1) fixing the pressure transducer to the bracket;
5. Remove the pressure transducer;
6. Mount the new pressure transducer, restore connections and assembly all items proceeding in reverse order as above;
7. Calibrate the pressure transducer – ***see Attachment N***
8. Run a sterilization cycle.

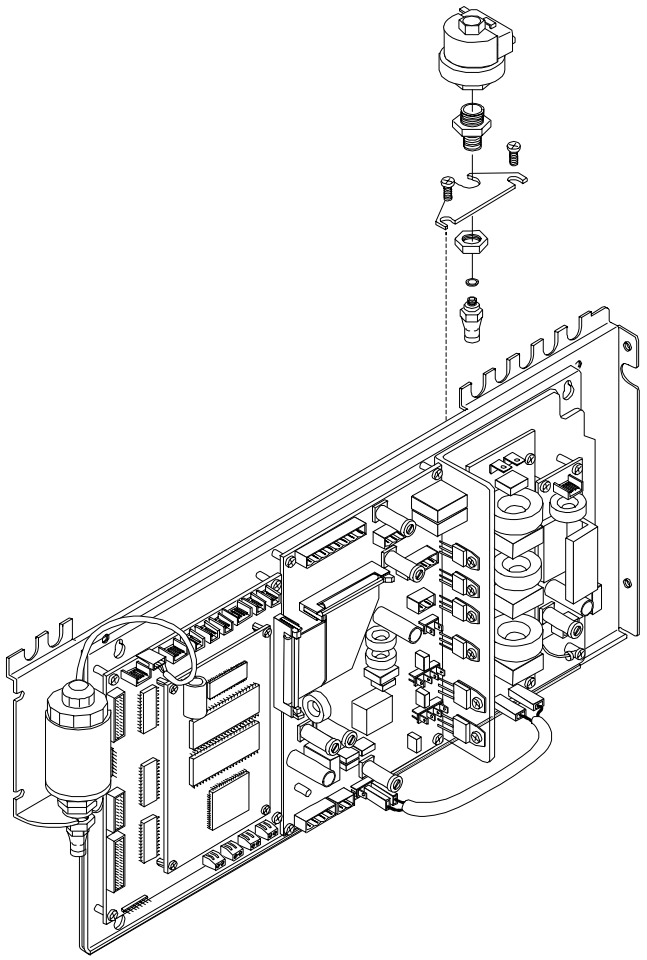


PRESSURE SWITCH

431#00060000

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Remove the covers (see card ***Gr7-1***);
2. Remove the wiring from the pressure switch;
3. Remove the two screws fixing the pressure switch to the plate;
4. Mount the new pressure switch, restore connections and assembly all items proceeding in reverse order as above;
5. Run a sterilization cycle.

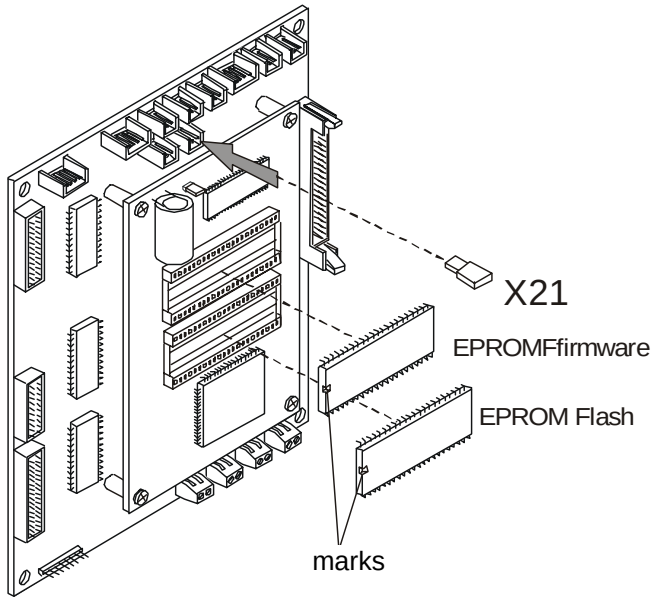


FIRMWARE EPROM
440#00300000

FLASH EPROM
440#00290000

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Remove the covers (see card ***Gr7-1***);
2. Remove carefully the two EPROM's;
3. Replace EPROM's observing the mounting orientation;
4. Plug off the jumper **X21**;
5. Switch on the unit;
6. "*Release Software update*" will appear on the LCD, followed by the message "*Release Software update OK*";
7. Switch off the unit;
8. Restore the jumper X21;
9. Switch on the unit;
10. Restore the covers;
11. Run a sterilization cycle.

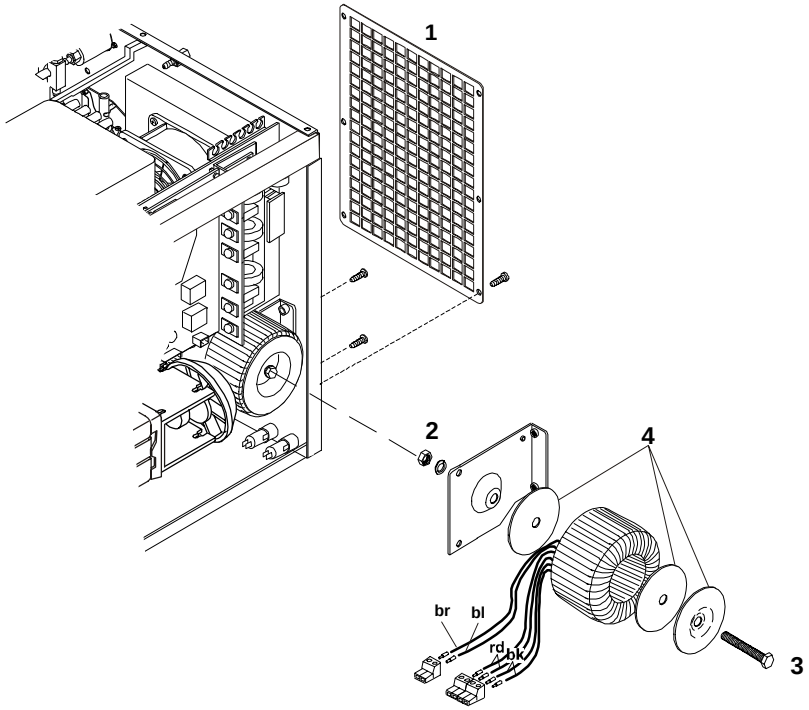


TRANSFORMER ASSEMBLY
A#0BP3060000

TRANSFORMER
412#00040000

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Remove the covers (see card ***Gr7-1***);
2. Remove the transformer wiring from the boards;
3. Remove the grid (1) from the rear frame to access the mounting screws of the transformer bracket;
4. Remove the bracket with the transformer, and unscrew the fixing screw (3) maintaining the rear nut (2) blocked;
5. Remove transformer and disks (4);
6. Arrange the disks on the new transformer;
7. Mount the transformer, restore connections and assembly all items proceeding in reverse order as above;
8. Run a sterilization cycle.

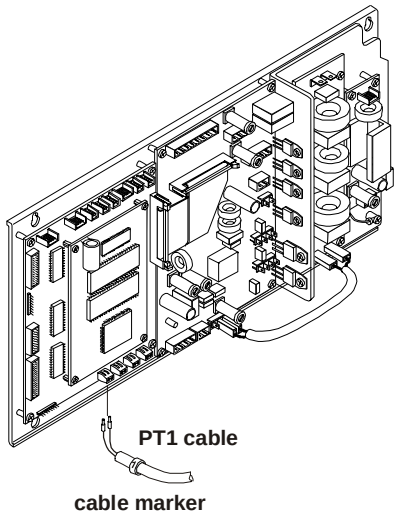


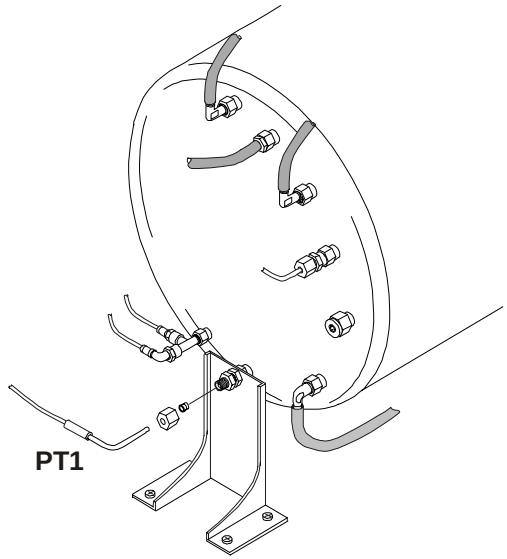
PT1 PROBE

430#00190000

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Remove the covers (see card ***Gr7-1***);
2. Remove the PT1 wiring from the CPU board;
3. Remove the cable marker no. 1 to be used on the new probe;
4. Withdraw the wiring up to the thermal device,
5. Access to the left side of the machine and rear side of the chamber;
6. Remove the nut and PT1 from its seat;
7. Measure the ohm value of the new PT1 and write the value on the next row of the label attached on the right rail;
8. Mount the new PT1 device, restore connections and assembly all items proceeding in reverse order as above;
9. Switch on the unit and enter the SETUP mode;
10. Move to SERVICE, enter the code “++--++--“ and select the option “PT1 CORRECTION”
11. Enter the new value (Ohm);
12. Exit the SETUP mode;
13. Run a sterilization cycle.



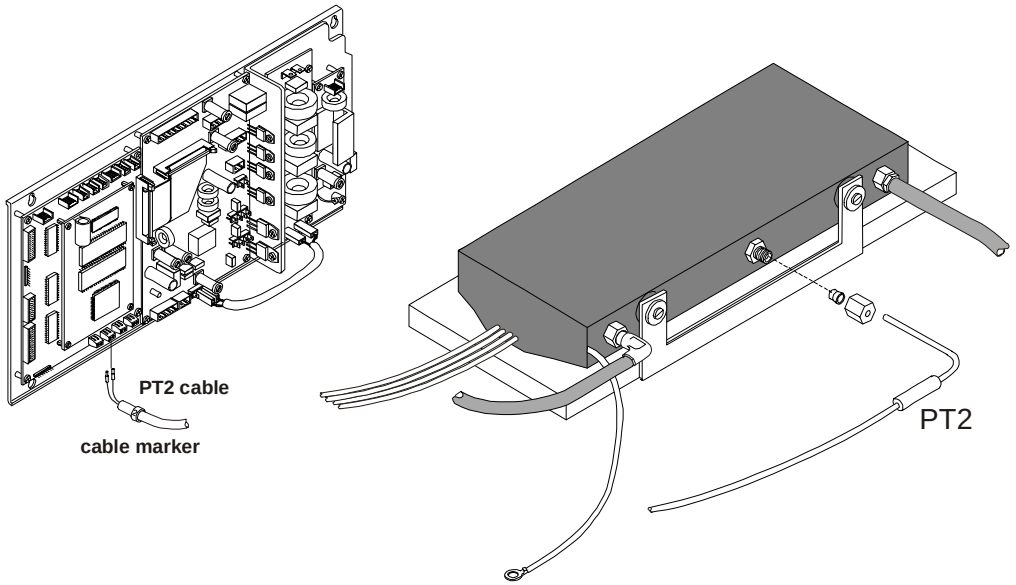


PT2 PROBE

430#00180000

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Remove the covers (see card ***Gr7-1***)
2. Remove the PT2 wiring from the CPU board;
3. Remove the cable marker no. 2 to be used on the new probe;
4. Access to the left side of the machine and withdraw the wiring up to the thermal device;
5. Remove the nut and PT2 from its seat;
6. Measure the ohm value of the new PT2 and write the value on the next row of the label attached on the right rail;
7. Mount the new PT2 device, restore connections and assembly all items proceeding in reverse order as above;
8. Run a sterilization cycle.

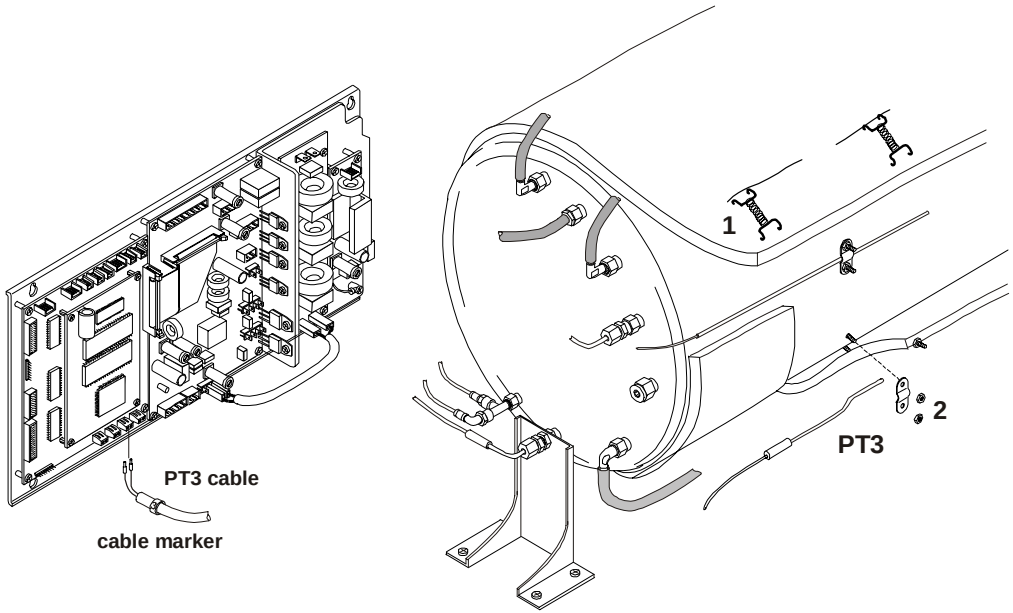


PT3 PROBE

430#00180000

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Remove the covers (see card ***Gr7-1***);
2. Remove the PT3 wiring from the CPU board;
3. Remove the cable marker no. 3 to be used on the new probe;
4. Access to the left side of the machine and withdraw the wiring up to the thermal device;
5. Unlock the spring (1) of the chamber's insulation layer to access the PT3 fixing;
6. Loosen the nuts (2) and withdraw the prove;
7. Shape the new probe as in figure and mount it, restore connections and assembly all items proceeding in reverse order as above;
8. Switch on the unit;
9. Run a sterilization cycle.

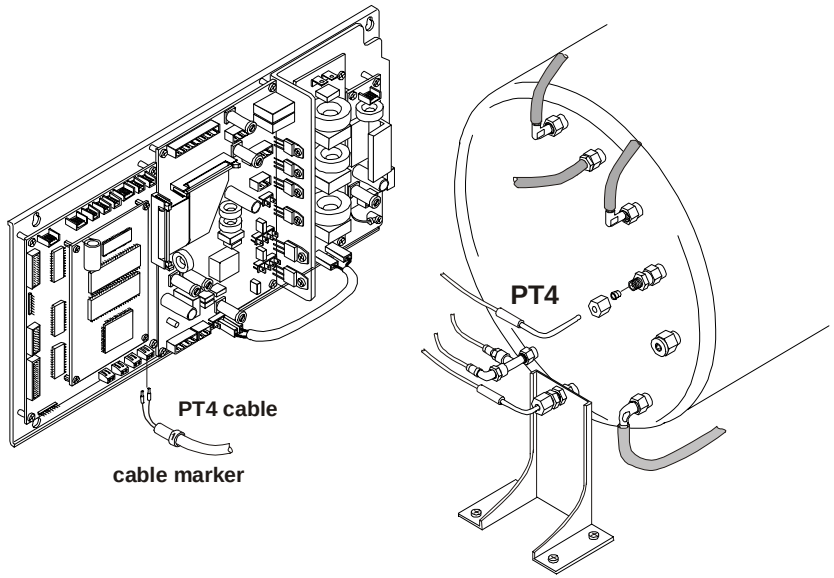


PT4 PROBE

430#00180000

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Remove the covers (see card ***Gr7-1***);
2. Remove the PT4 wiring from the CPU board;
3. Remove the cable marker no. 4 to be used on the new probe;
4. Access to the left side of the machine and rear side of the chamber;
5. Remove the nut and the PT4, withdraw the probe from the chamber;
6. Shape the new probe as in figure and mount it, restore connections and assembly all items proceeding in reverse order as above;
7. Switch on the unit;
8. Run a sterilization cycle.

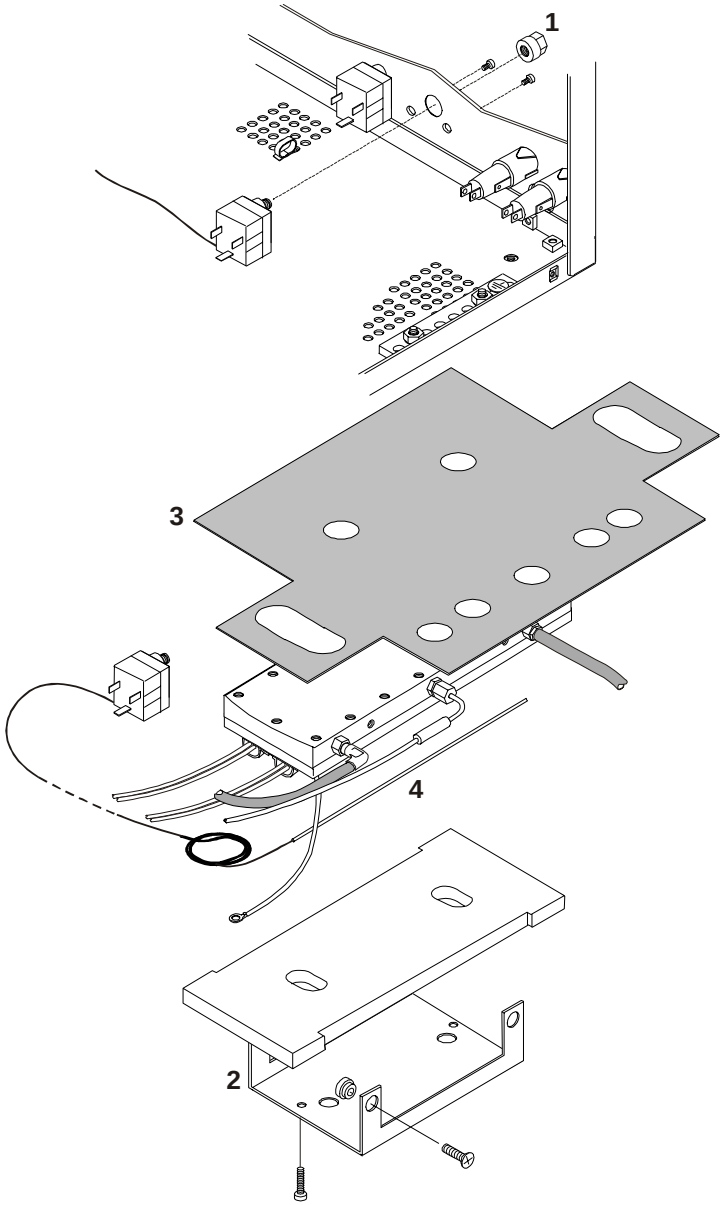


STEAM GENERATOR THERMOSTAT

430#00150000

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Remove the covers (see card ***Gr7-1***);
2. Remove the water pump from the base frame (see card ***Gr3-1***);
3. Remove the steam generator (see card ***Gr4-6***);
4. Unscrew the cap (1) and the screws from the rear frame;
5. Remove the support (2) and thermal insulation layer (3) of the steam generator to access the probe's bulb;
6. Loosen screws and withdraw the bulb (4) with the thermostat;
7. Mount the new thermostat, restore connections and assembly all items proceeding in reverse order as above;
8. Run a sterilization cycle.

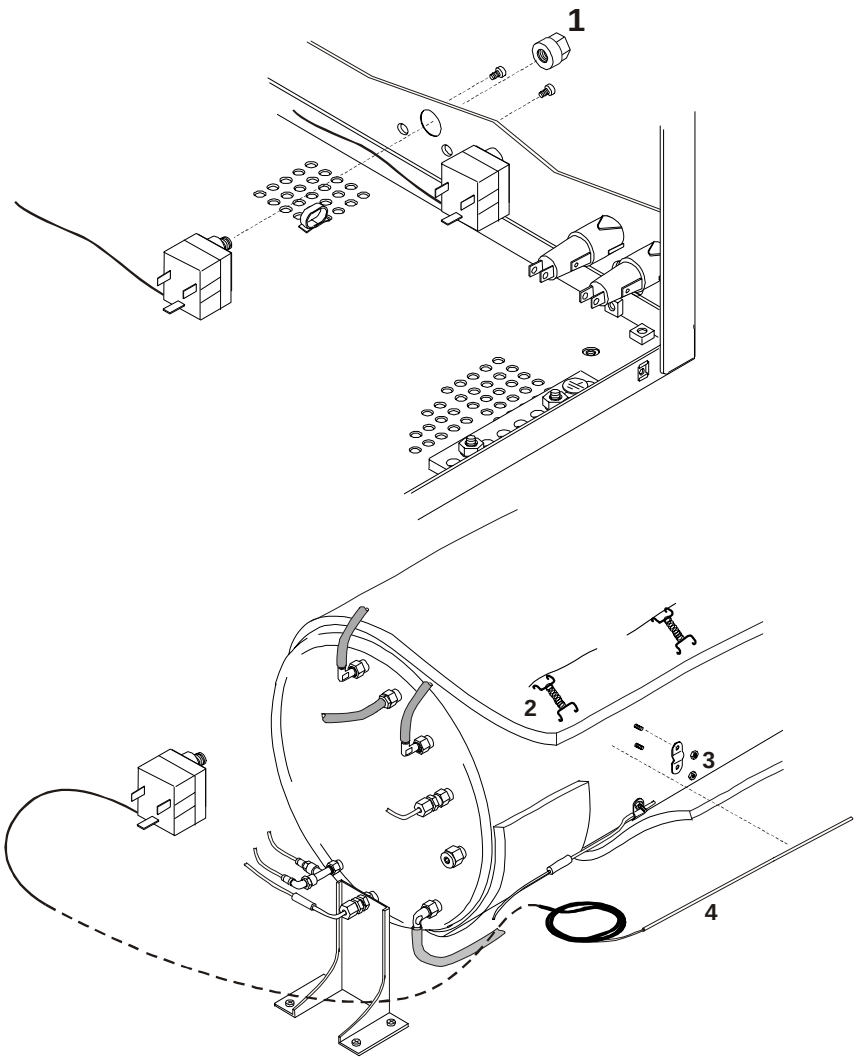


CHAMBER HEATER THERMOSTAT

430#00140000

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Remove the covers (see card ***Gr7-1***);
2. Unscrew the cap (1) and the screws from the rear frame;
3. Access to the left side of the frame and withdraw the cable up to the probe;
4. Unlock the spring (2) on the insulation layer to access the he probe's bulb;
5. Loosen the nuts (3) and withdraw the bulb (4) with the thermostat;
6. Mount the new thermostat, restore connections and assembly all items proceeding in reverse order as above;
7. Run a sterilization cycle.

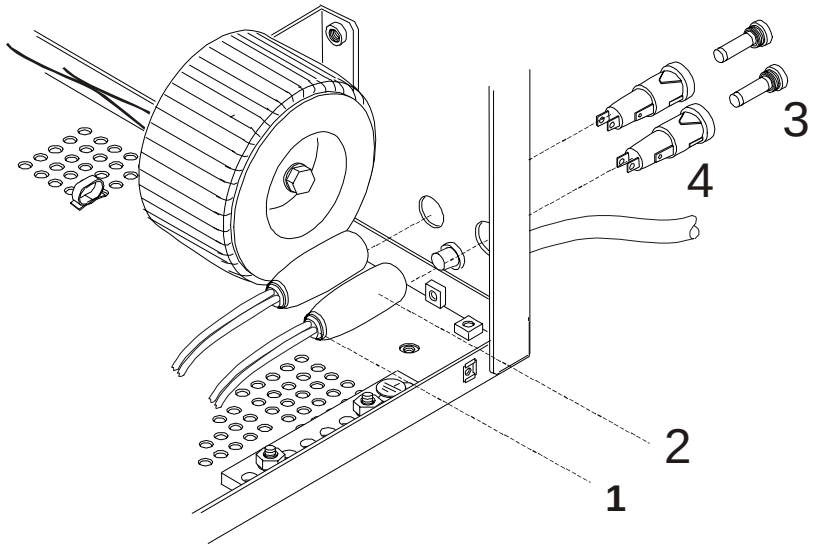


MAINS FUSE HOLDERS

417#00060000

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Remove the covers (see card ***Gr7-1***);
2. Remove the clamp (**1**) from the sheath (**2**) of the fuse holder; move the sheath to access the wiring, then disconnect it from the fuse holder;
3. Unscrew the cap with the fuse (**3**) and remove the fuse holder (**4**);
4. Mount the new fuse holder, restore connections and assembly all items proceeding in reverse order as above;
5. Run a sterilization cycle.

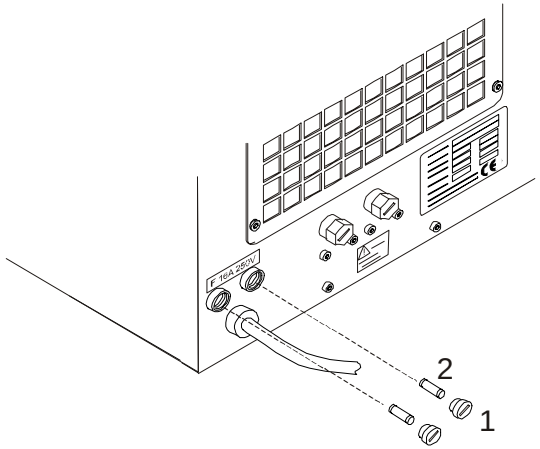


MAINS FUSES

417#00040000

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Remove the cap (1) by using a flat screwdriver;
2. Remove the fuse (2);
3. Replace the fuse (same type and rating);
4. Run a sterilization cycle.



ON-BOARD PCB FUSES

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

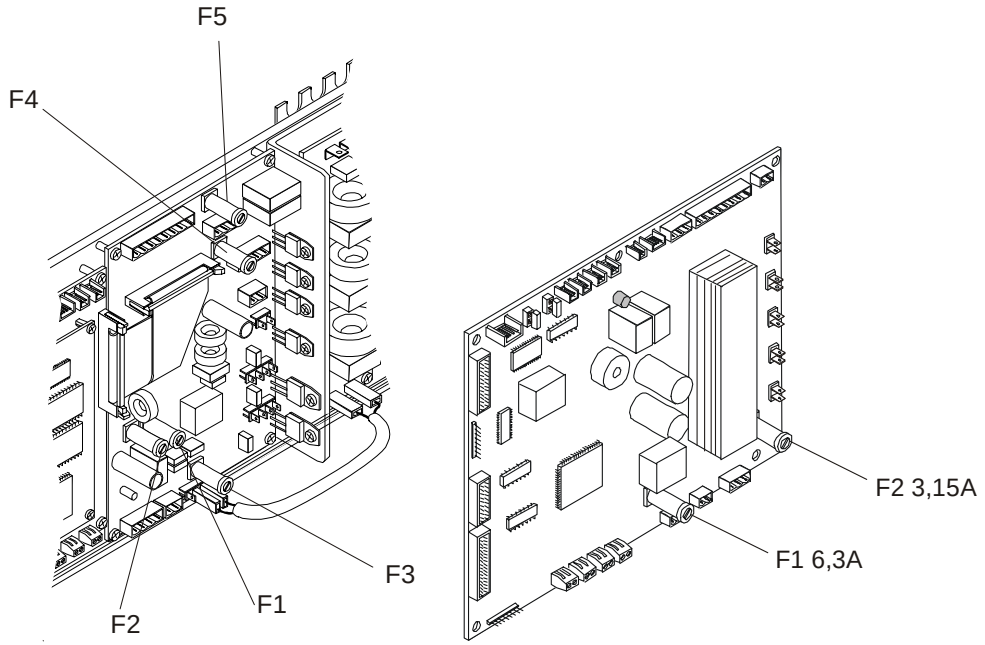
1. Remove the cover (see card ***Gr7-1***);
2. Refer to the figure and remove the burned fuse;
3. Mount the new fuse (same type and rating), and assembly all items proceeding in reverse order as above;
4. Run a sterilization cycle.

GAM version

F1: **T 5A 250V**	*(trafo's secondary winding – 24V)*
F2: **T 2A 250V**	*(5V digital circuit / 12V analogue circuit)*
F3: **T 2A 250V**	*(trafo's primary winding – 230V)*
F4: **F 200mA 250V**	*(door-locking protection)*
F5: **F 1.25A 250V**	*(door-locking motor overload)*

TROLL version

F1: **T 6,3A 250V**	*(trafo's secondary winding– 24V)*
F2: **T 3,15A 250V**	*(trafo's primary winding)*

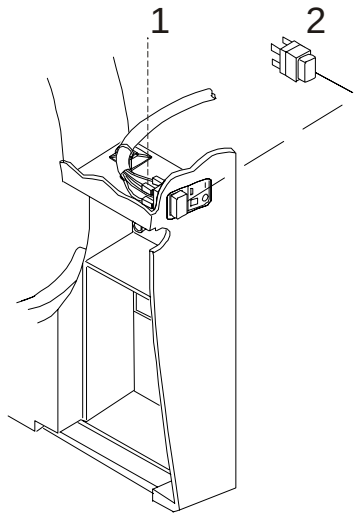


MAIN SWITCH

420#00070000

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Remove the covers (see card ***Gr7-1***);
2. Remove the wiring (1) from the switch;
3. Remove the mains switch (2);
4. Mount the new switch, restore connections and assembly all items proceeding in reverse order as above;
5. Run a sterilization cycle.

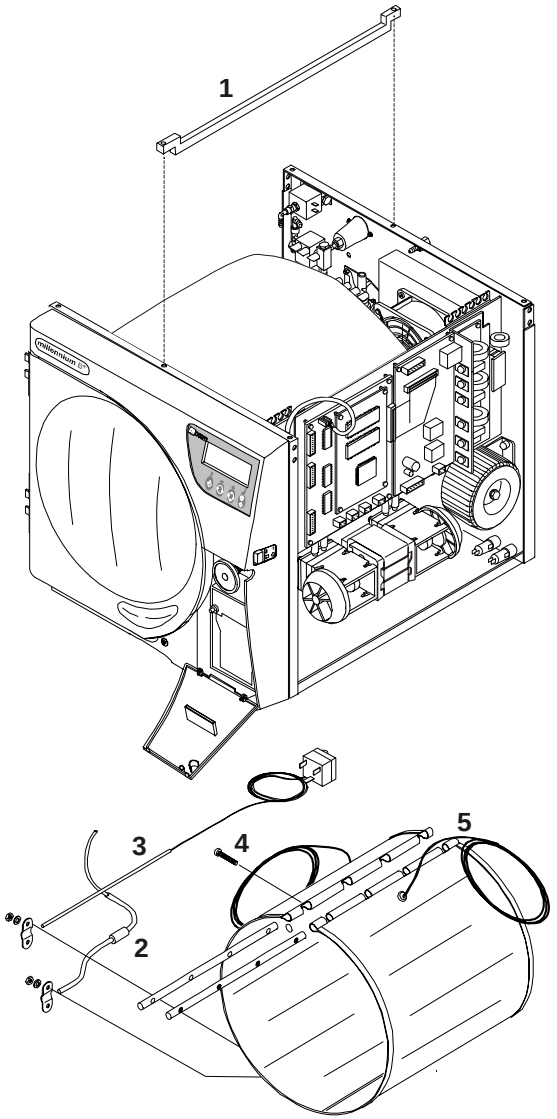


BAND CHAMBER HEATER

410#00140000

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Remove the covers (see card ***Gr7-1***);
2. Remove the reservoir assembly – see card ***G4-1***;
3. Unscrew the central rail (1);
4. Remove the thermostat probe (2) from the heater – see card ***Gr1-13***;
5. Remove PT3 probe (3) – see card ***Gr1-10***;
6. Remove the insulation layer covering the chamber heater;
7. Disconnect the heater wiring from the power board;
8. Remove the screws (4) fixing the heater (5) and withdraw it carefully out the chamber surface;
9. Mount the new chamber heater, restore connections and assembly all items proceeding in reverse order as above;
10. Run a sterilization cycle.

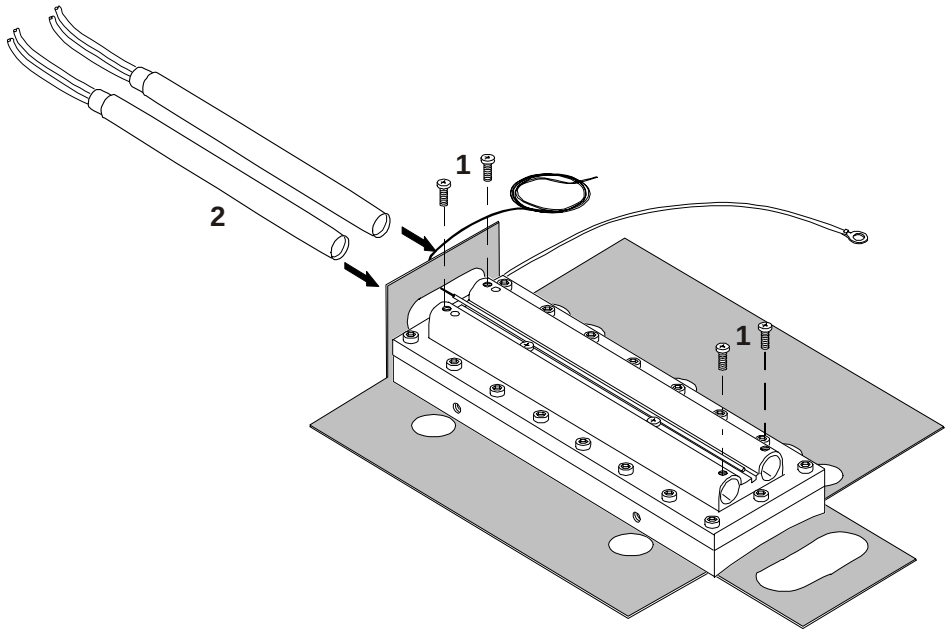


CARTRIDGE RESISTORS

410#00130000

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Remove the covers (see card ***Gr7-1***);
2. Remove the water pump from the base frame (see card ***Gr3-1***);
3. Remove the cartridge wiring from the power board;
4. Remove the steam generator (see card ***Gr4-6***);
5. Remove the support and the thermal insulation of the steam generator;
6. Loosen the screws (1) locking the cartridges (2) and take out it;
7. Apply the dissipation paste on the new cartridges and mount them;
8. Restore connections and assembly all items proceeding in reverse order as above;
9. Run a sterilization cycle.

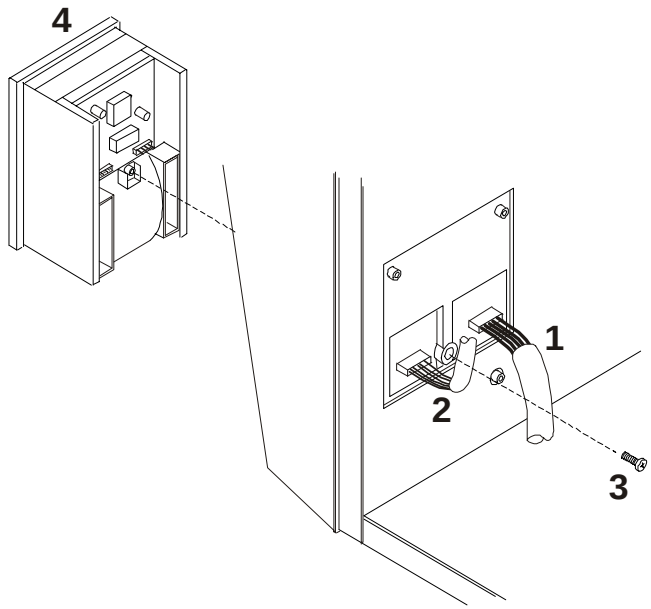


CUSTOM PRINTER UNIT
C#5BP4630000

FENIX PRINTER UNIT
C#5BP2550000

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Remove the covers (see card ***Gr7-1***);
2. Remove the power (1) and interface (2) wiring from the printer unit;
3. Unscrew the rear fixing screw (3) and remove the printer (4);
4. Mount the new printer unit, restore connections and assembly all items proceeding in reverse order as above;
5. Perform a printout of the last cycle;
6. Run a sterilization cycle.



GROUP 2

ELECTROVALVES

EV1 VALVE / COIL / SHAFT

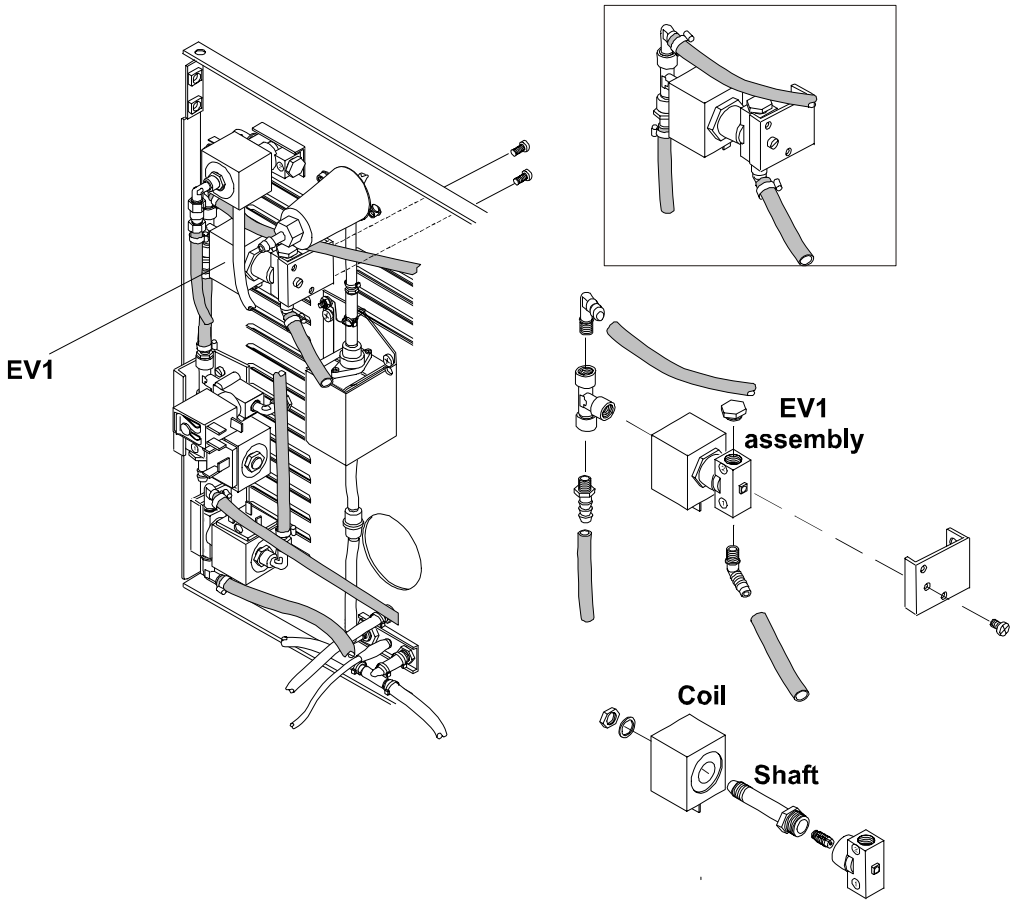
401#00240000

EV1 ASSEMBLY

A#0BP2820000

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Remove the covers (see card *Gr7-1*);
2. Remove the wiring and the sheathed pipes from the valve;
3. Remove the rear screws and the EV1 assembly;
4. Disassembly the group as necessary (see figure) and replace the involved part;
5. Remount all parts, restore connections proceeding in reverse order as above;
6. Run a sterilization cycle.



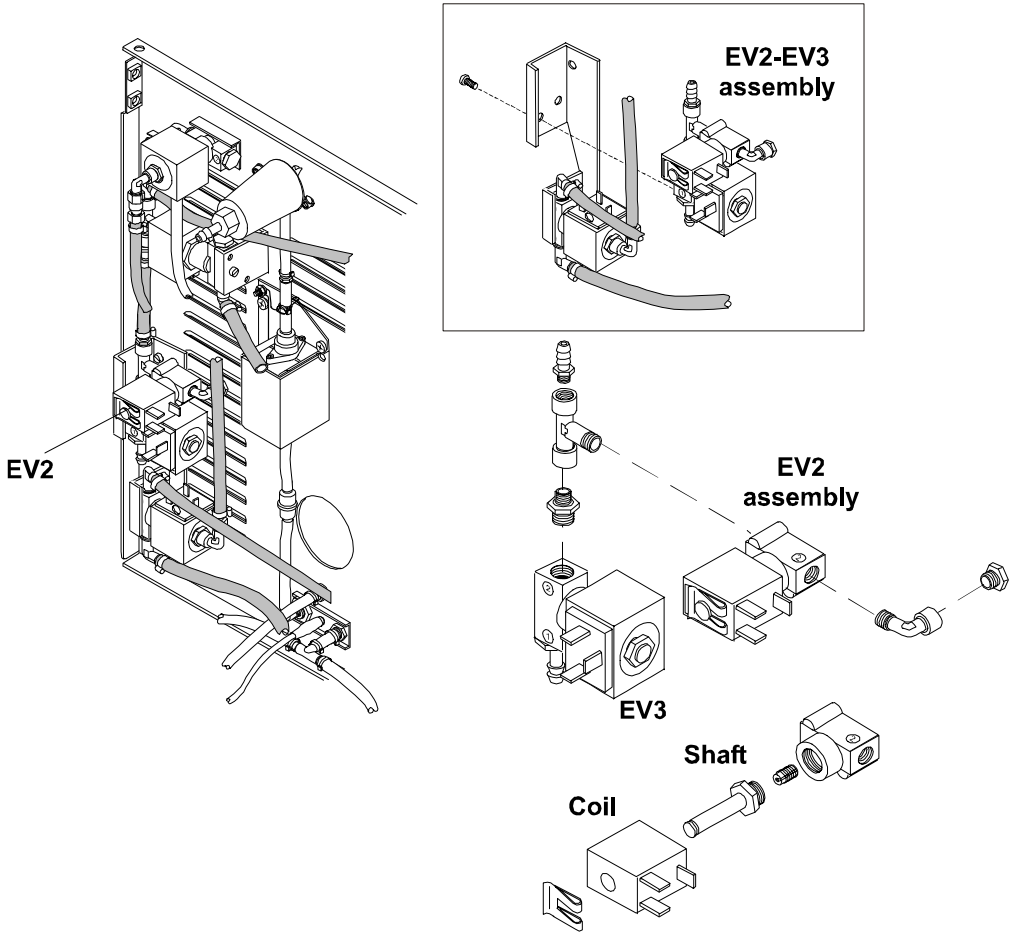
EV2 VALVE / COIL / SHAFT
401#00030000

EV2 ASSEMBLY
A#0BP2910000

EV2 – EV3 ASSEMBLY
A#0BP2830000

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Remove the covers (see card *Gr7-1*);
2. Remove the wiring and the sheathed pipes from the valve;
3. Remove the group EV2/EV3 from the support;
4. Disassembly the group EV2 as necessary (see figure) and replace the involved part;
5. Remount all parts, restore connections proceeding in reverse order as above;
6. Run a sterilization cycle.



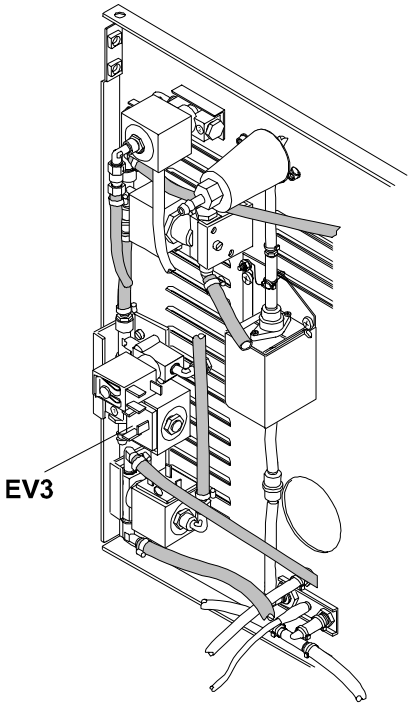
EV3 VALVE / COIL / SHAFT
401#00230000

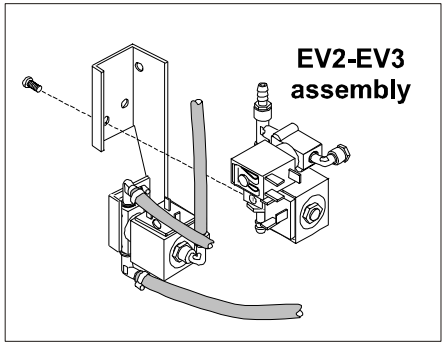
EV3 ASSEMBLY
A#0BP2910000

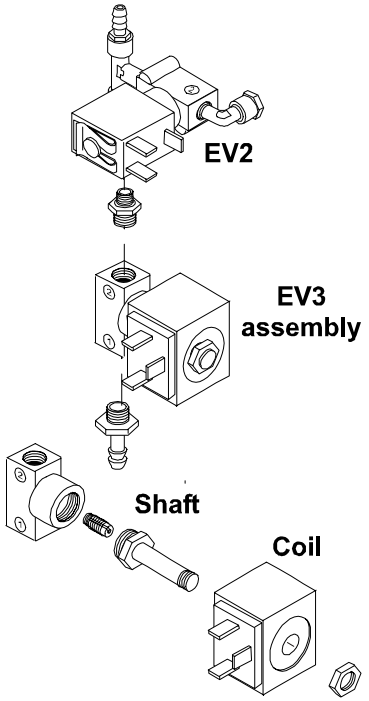
EV2 – EV3 ASSEMBLY
A#0BP2830000

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Remove the covers (see card ***Gr7-1***);
2. Remove the wiring and the sheathed pipes from the valve;
3. Remove the group EV2/EV3 from the support;
4. Disassembly the group EV3 as necessary (see figure) and replace the involved part;
5. Remount all parts, restore connections proceeding in reverse order as above;
6. Run a sterilization cycle.







EV4 VALVE / COIL / SHAFT

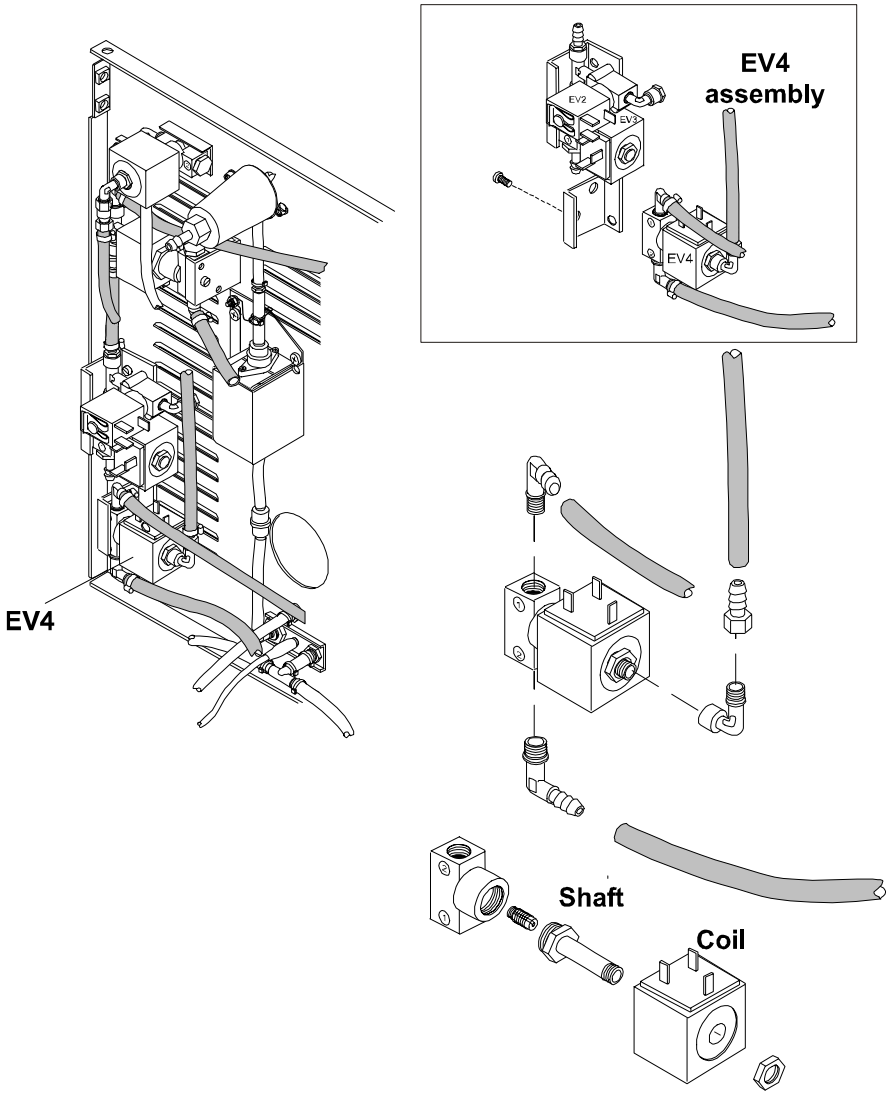
401#00260000

EV4 ASSEMBLY

A#0BP2840000

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Remove the covers (see card *Gr7-1*);
2. Remove the wiring and the sheathed pipes from the valve;
3. Remove the EV4 group from the support;
4. Disassembly the group as necessary (see figure) and replace the involved part;
5. Remount all parts, restore connections proceeding in reverse order as above;
6. Run a sterilization cycle.



EV5 VALVE / COIL / SHAFT

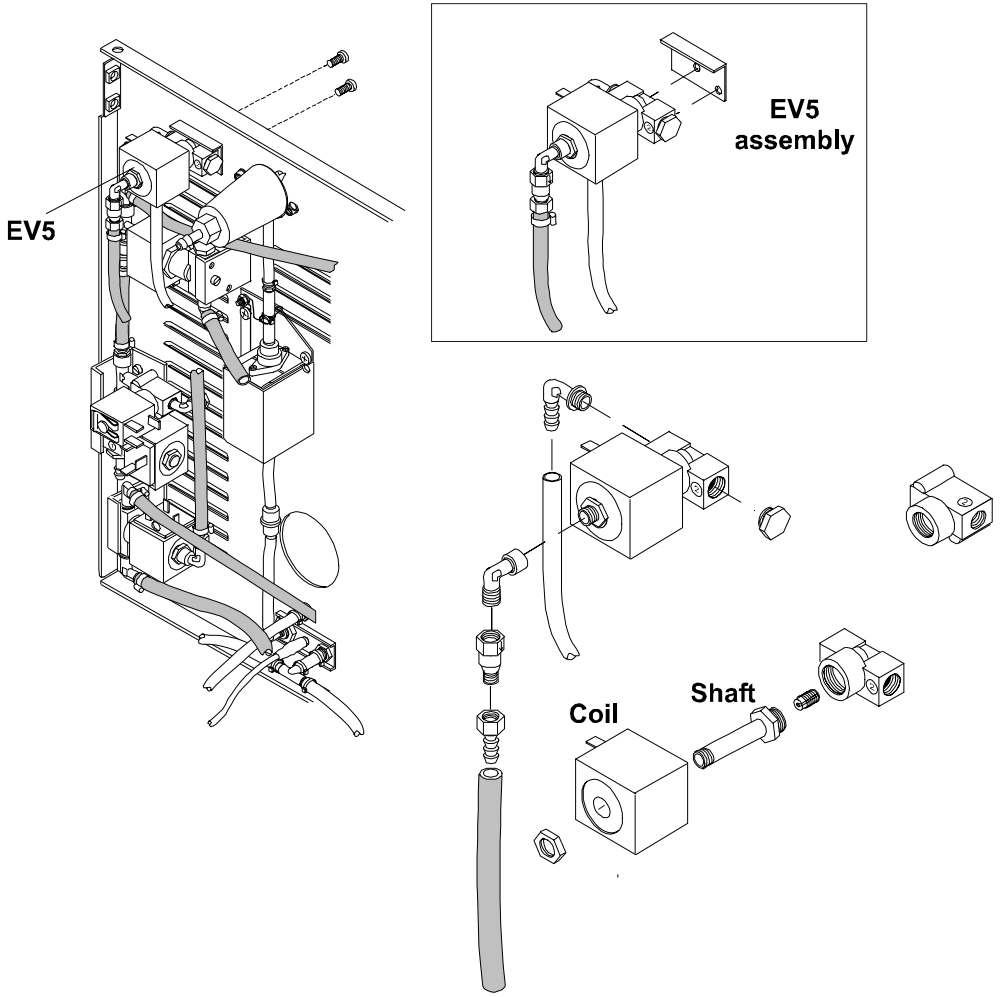
401#00240000

EV5 ASSEMBLY

A#0BP2850000

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Remove the covers (see card *Gr7-1*);
2. Remove the wiring and the sheathed pipes from the valve;
3. Remove the EV5 group from the rear frame;
4. Disassembly the group as necessary (see figure) and replace the involved part;
5. Remount all parts, restore connections proceeding in reverse order as above;
6. Run a sterilization cycle.



GROUP 3

PUMPS

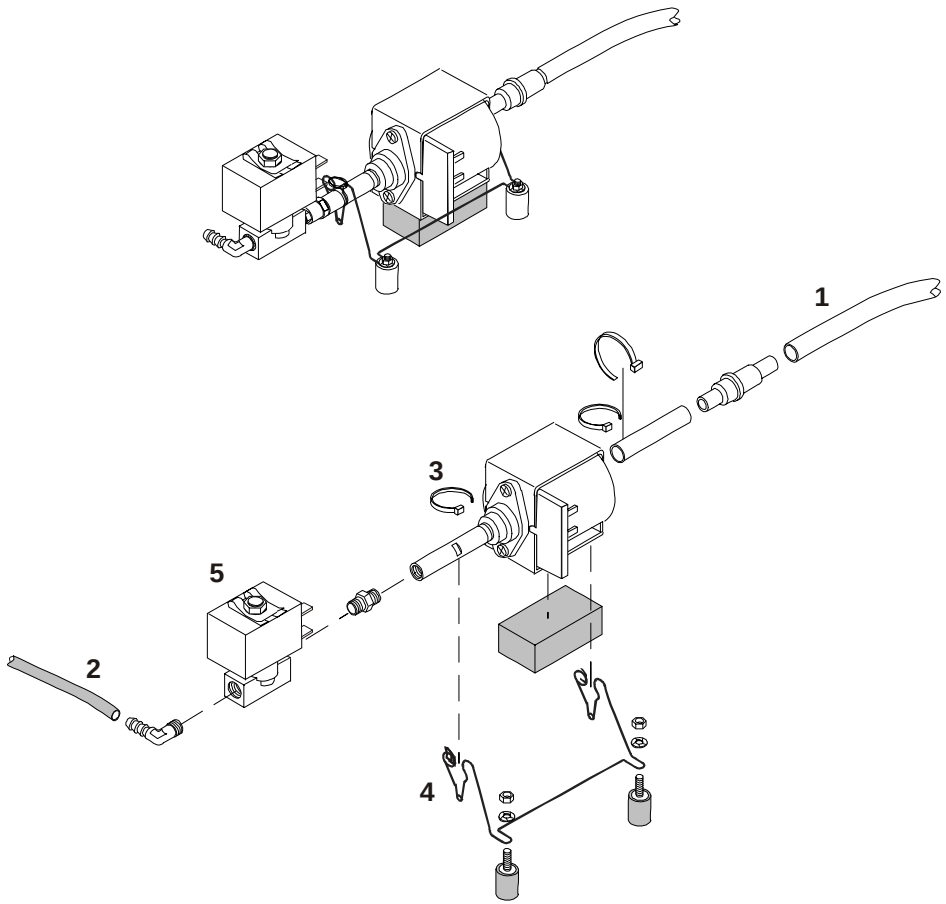
STEAM GENERATOR WATER PUMP ASSEMBLY
A#0BP2860000

STEAM GENERATOR WATER PUMP
400#00220000

WATER PUMP VALVE (EV6)
401#00030000

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Remove the covers (see card *Gr7-1*);
2. Empty the main reservoir by removing the bottom plug;
3. Remove the transparent and sheathed pipes (1 and 2);
4. Remove the wiring from the pump;
5. Remove the clamps (3) fixing the water pump to the wire-bracket (4) and remove the pump;
6. Maintain steady the pump shaft, unscrew the valve (5);
7. Mount the new pump, restore connections and assembly all items proceeding in reverse order as above;
8. Run a sterilization cycle.

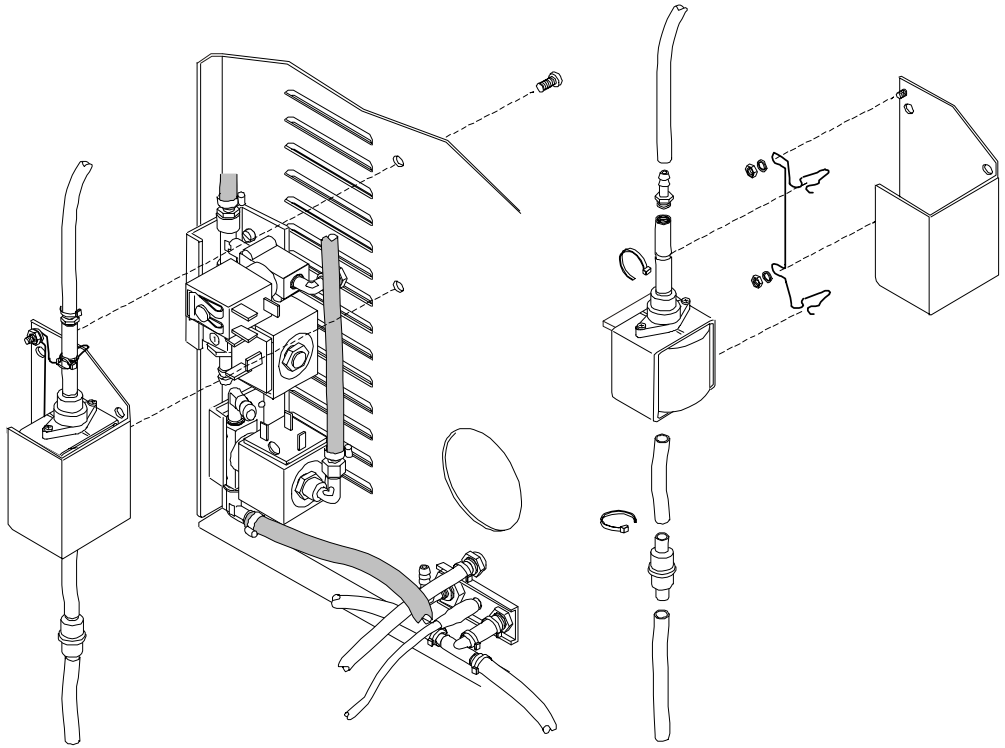


AUTOMATIC WATER FILLING PUMP ASSEMBLY
A#0BP2870000

AUTOMATIC WATER FILLING PUMP
400#00200000

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Remove the covers (see card ***Gr7-1***);
2. Remove the pipes and the wiring from the automatic water feeding pump;
3. Remove the screws fixing the water pump assembly to the rear frame;
4. Disassembly the pump as necessary (see figure);
5. Mount the new pump assembly, restore connections and assembly all items proceeding in reverse order as above;
6. Perform an automatic water feeding;
7. Run a sterilization cycle.



VACUUM DOUBLE PUMP ASSEMBLY
A#0BM3100000

VACUUM DOUBLE PUMP
400#00290000

CENTRAL GASKET
400#00150000

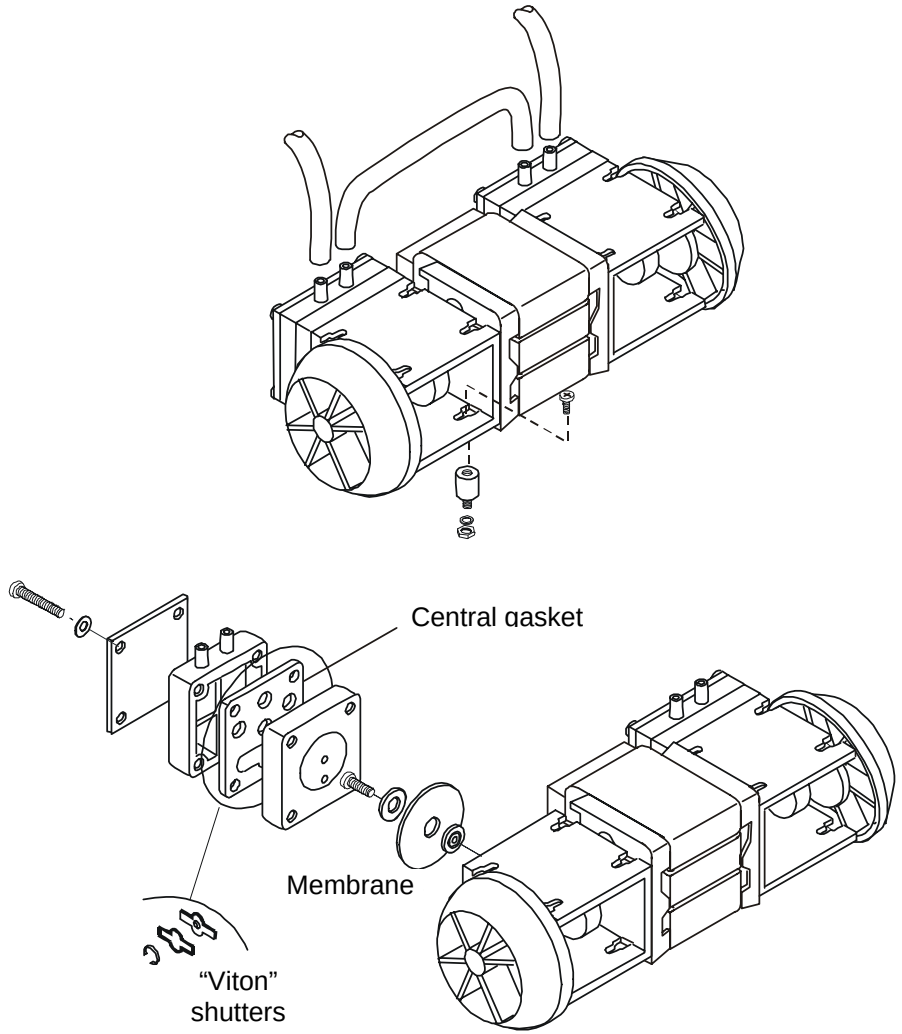
MEMBRANE
400#00240000

“VITON” SHUTTERS
400#00180000

VACUUM PUMP HEAD
400#00120000

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Remove the covers (see card ***Gr7-1***);
2. Remove, from the bottom frame, the screws fixing the vacuum pump;
3. Remove the sheathed pipes and the wiring from the pump;
4. Remove the pump and disassembly it as necessary (see figure);
5. replace the part, restore connections and assembly all items proceeding in reverse order as above;
6. Perform a vacuum test;
7. Run a sterilization cycle.



GROUP 4

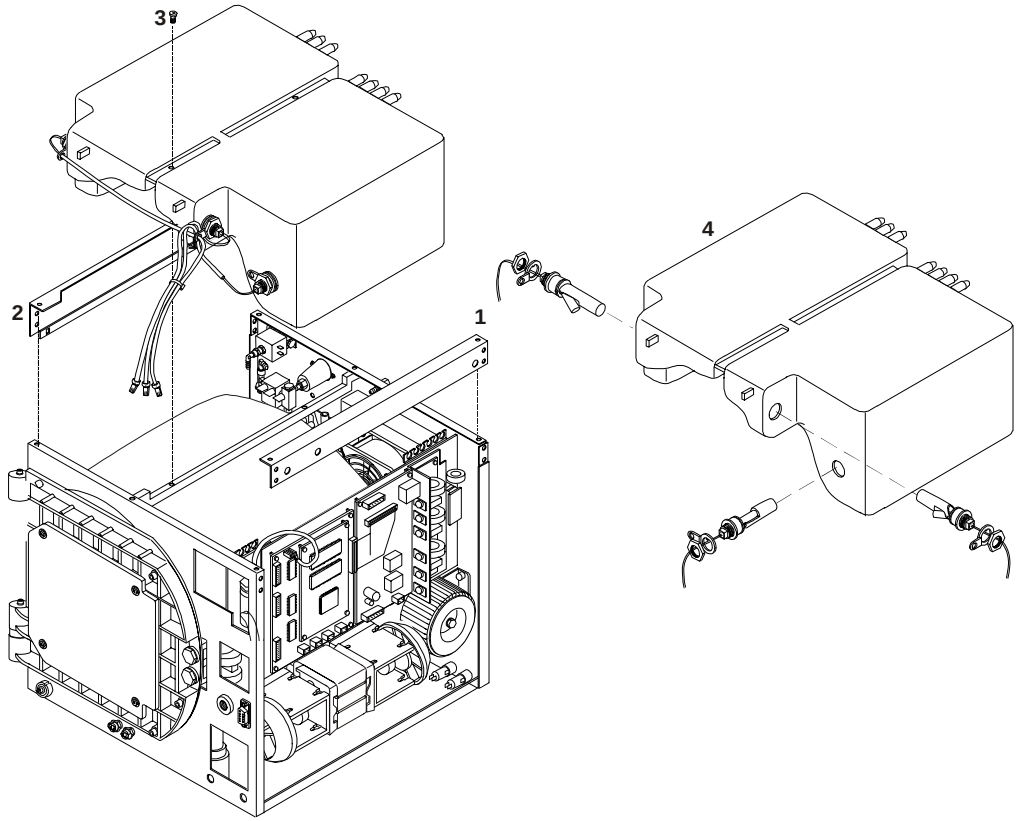
PLUMBING CIRCUIT

WATER TANK ASSEMBLY
A#0BP2900000

WATER TANK
C#3BP1700000

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Remove the covers (see card ***Gr7-1***);
2. Empty both reservoirs;
3. Remove the wiring from the water level probes and the rear pipes from the reservoirs;
4. Remove the right (1) and left (2) rail;
5. Remove screws (3) fixing the reservoir;
6. Lift the reservoir (4) and remove the bottom pipes;
7. Mount the new reservoir, assembly all items and restore connections proceeding in reverse order as above;
8. Run a sterilization cycle.



MIN AND MAX WATER LEVEL PROBES (DISTILLED WATER TANK)

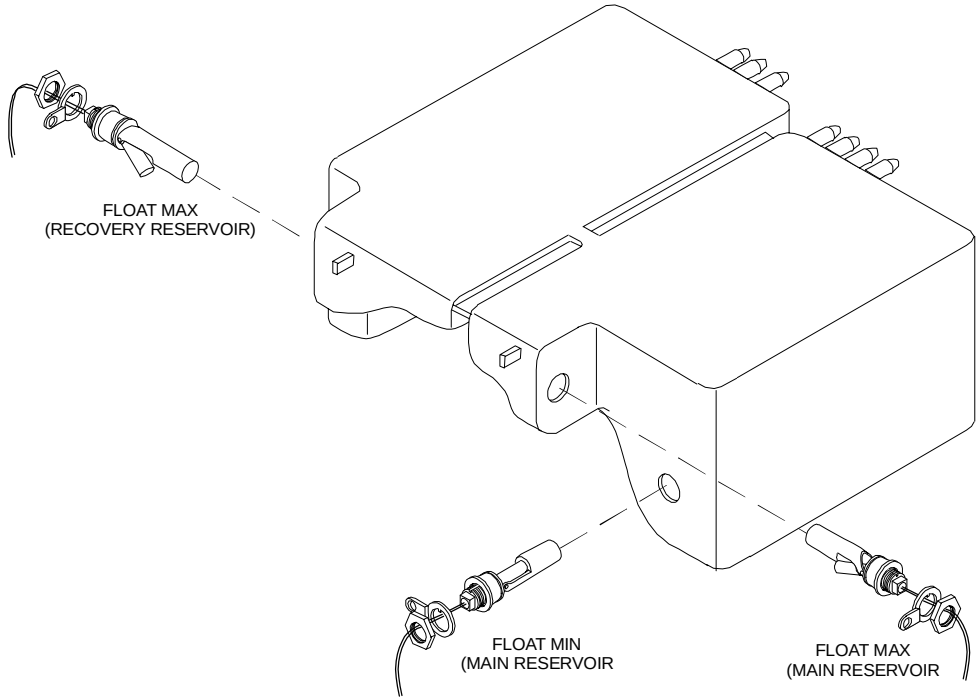
432#00050000

MAX WATER LEVEL PROBE (USED WATER TANK)

432#00060000

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Remove the covers (see card ***Gr7-1***);
2. Remove the wiring of the water level probe from the CPU board;
3. Maintaining steady the probe body, loosen the ring nut and remove the probe;
4. Mount the new probe, assembly all items and restore connections proceeding in reverse order as above;
5. Run a sterilization cycle.

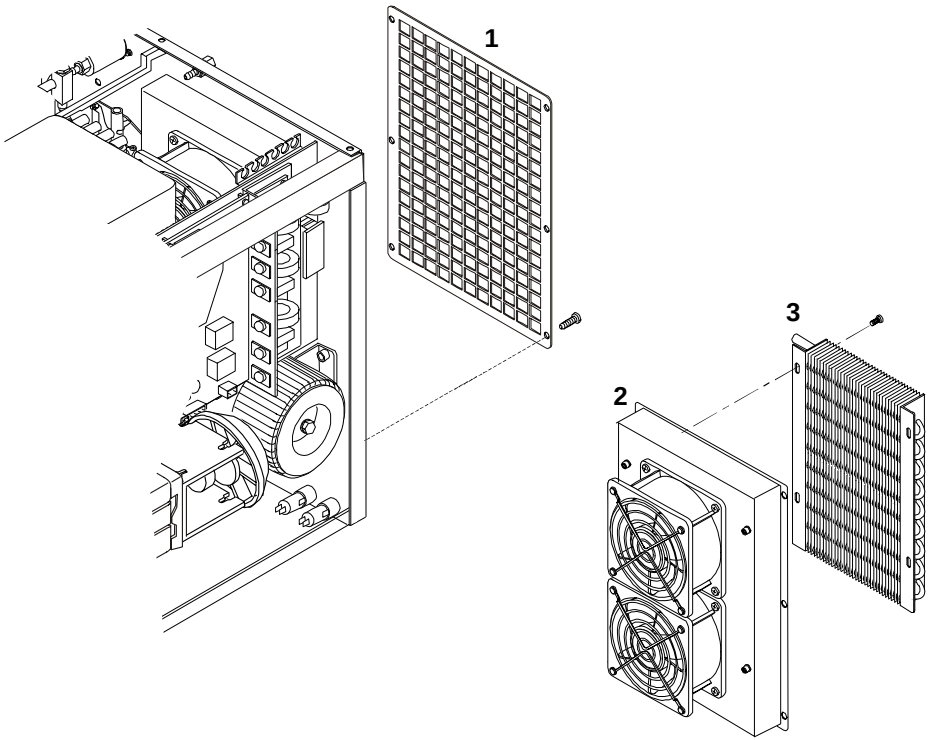


HEAT EXCHANGER

C#1BP1600000

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Remove the covers (see card *Gr7-1*);
2. Remove the rear grid (1);
3. Move out the group as possible and remove the sheathed pipes;
4. Separate the heat exchanger (3) from the its frame (2);
5. Mount the new heat exchanger, assembly all items and restore connections proceeding in reverse order as above;
6. Run a sterilization cycle.

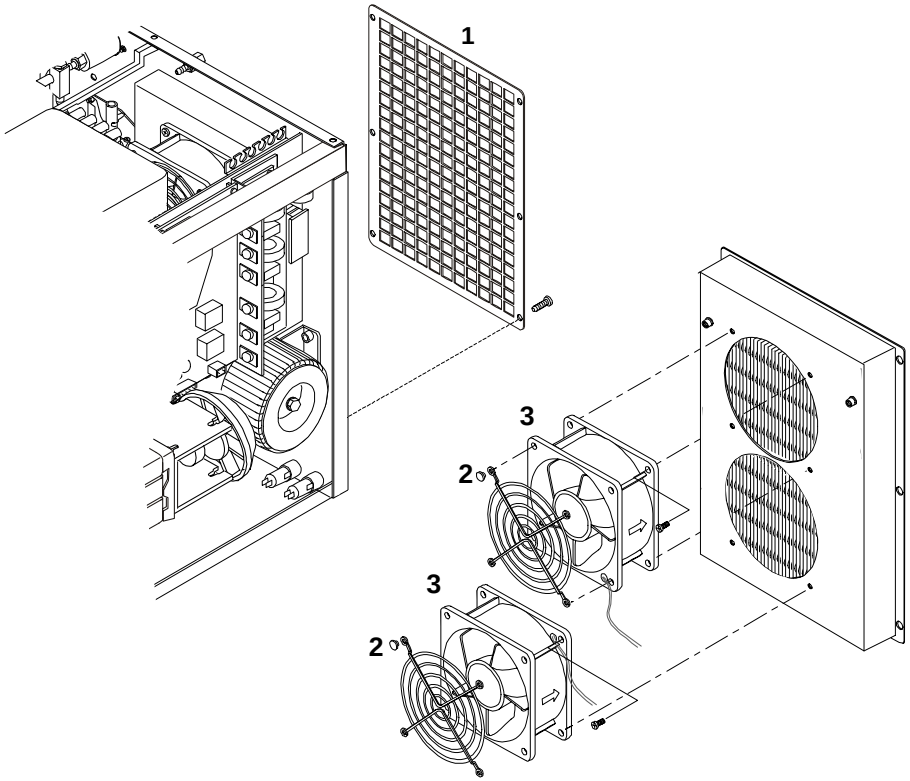


ELECTRIC FAN

404#00030000

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Remove the covers (see card *Gr7-1*);
2. Remove the rear grid (1);
3. Move out the group as possible and remove the sheathed pipes and the fan wiring from the CPU board;
4. Remove the cap (2) and remove the fan (3);
5. Mount the new electric fan, assembly all items and restore connections proceeding in reverse order as above;
6. Run a sterilization cycle.

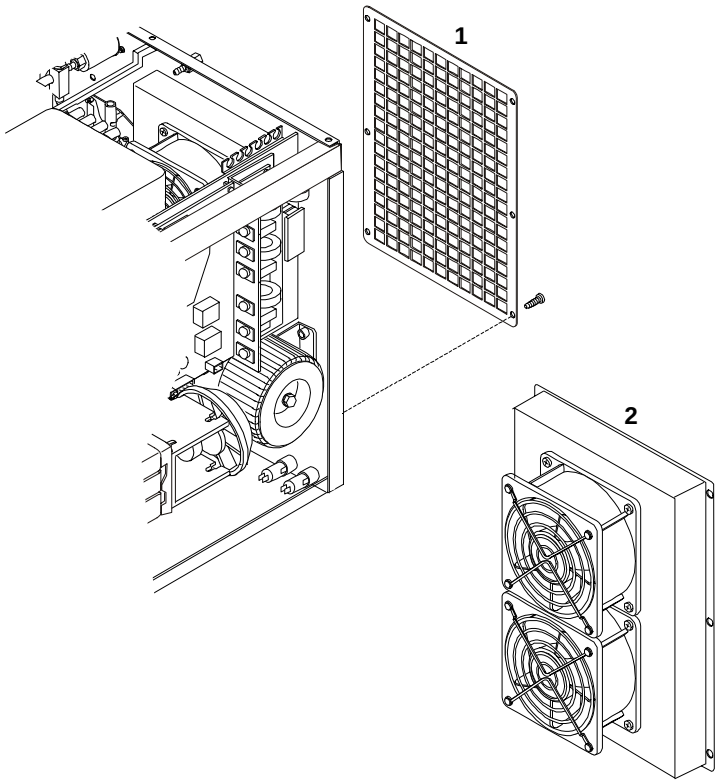


HEAT EXCHANGER ASSEMBLY

A#1BP1640000

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Remove the covers (see card ***Gr7-1***);
2. Remove rear grid (1);
3. Move out the group (2) as possible and remove the sheathed pipes and the fan wiring from the CPU board;
4. Mount the new group, assembly all items and restore connections proceeding in reverse order as above;
5. Run a sterilization cycle.



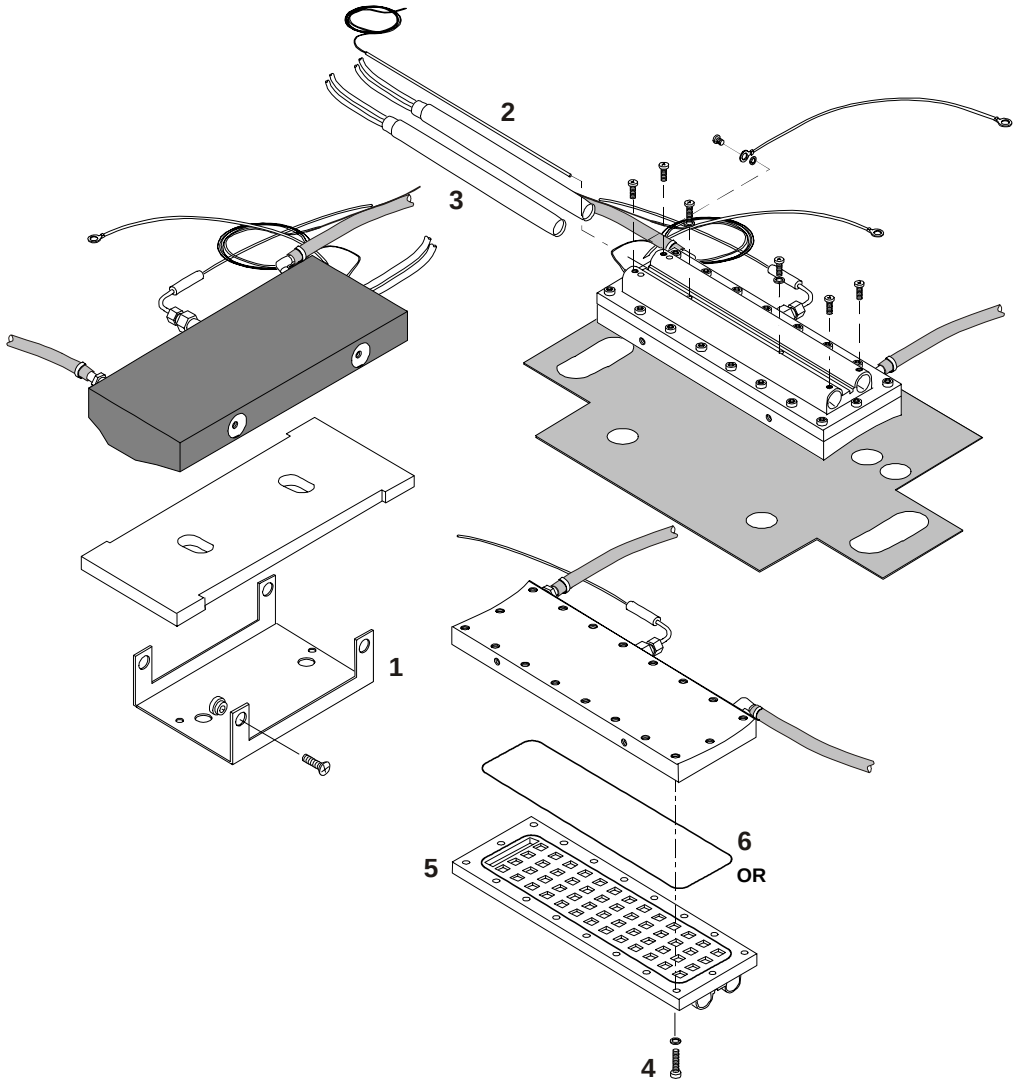
STEAM GENERATOR ASSEMBLY
A#0BP2810000

BOTTOM SECTION
C#0XP007000P

O-RING
481#00080000

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Remove the covers (see card *Gr7-1*);
2. Empty both reservoirs;
3. Remove the water pump assembly - see card *Gr3-1*;
4. Remove, under the bottom frame, the fixing screws and move out the steam generator as possible;
5. Remove the steam generator from its support (1) and remove the thermal insulation layer;
6. Remove the bulb of the thermostat (2);
7. Loosen the screws and remove the cartridge resistors (3);
8. Remove the screws (4) and separate the base section (5) from the upper section;
9. Clean the upper section of the steam generator;
10. Replace the base section, mount a new O-R (6) between the sections and assembly all items and restore connections proceeding in reverse order as above;
11. Run a sterilization cycle.

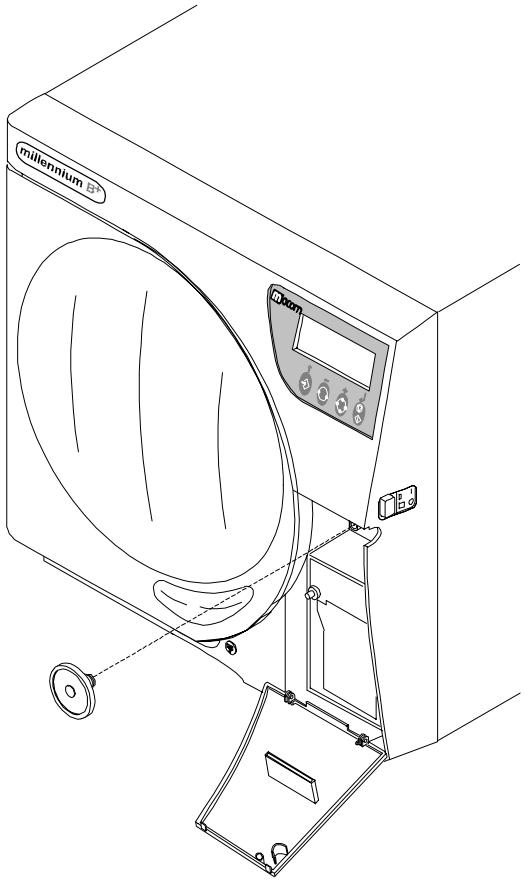


BACTERIOLOGICAL FILTER

472#00010000

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Open the service door;
2. Unscrew the bacteriologic filter;
3. Replace with a new filter.

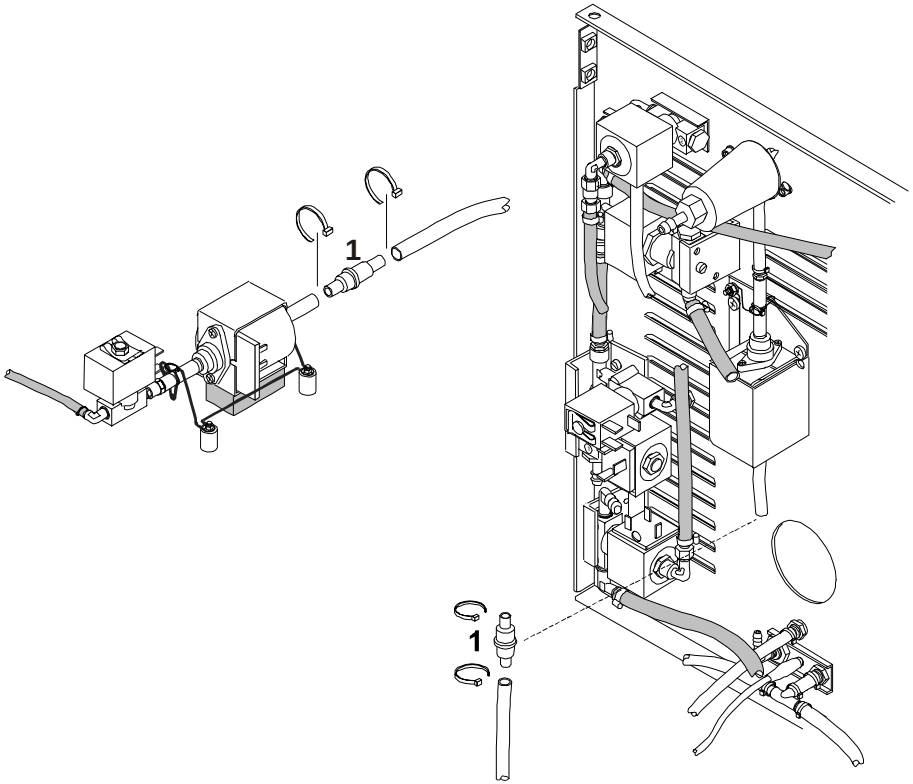


SAECO FILTER ON THE WATER PUMPS

472#00020000

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Remove the covers (see card ***Gr7-1***);
2. Empty the distilled water reservoir;
3. Cut the nylon clamp on the Saeco filter (1) and remove it;
4. Mount the new filter, assembly all items and restore connections proceeding in reverse order as above;
5. Run a sterilization cycle.

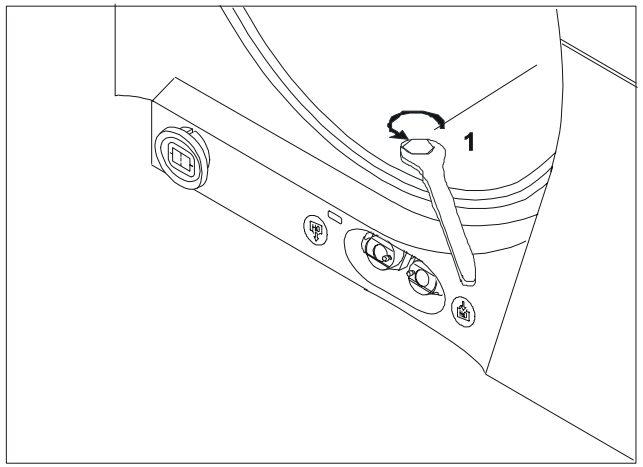


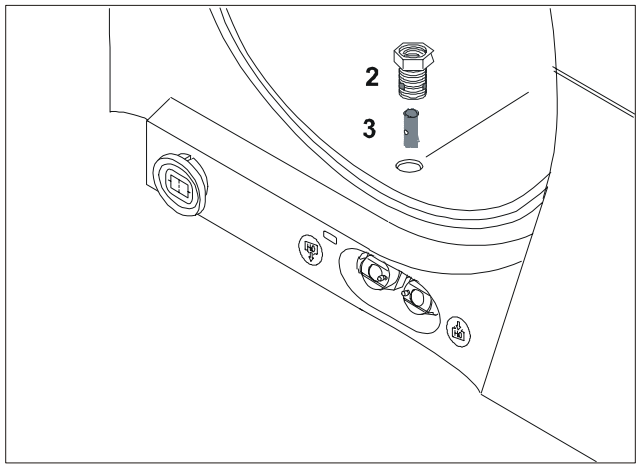
FILTER HOLDER
286#00290000

LP1 FILTER
472#00030000

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. For cleaning (or replace) the filter, open the door of the sterilizer and remove the nut (**1)** with a hexagonal wrench n. 14.
2. Then remove the fitting (**2)** and the filter (3).
3. Remove the filter from the support and carefully clean it under a throw of running water, using if necessary a pointed tool to remove possible material of greater dimensions.
4. If the filter cannot be reused, replace it with a new one.
5. Plug the filter in the support, block it with a drop of sealing (if available), having care to not obstruct the holes
6. Reassemble all parts following reversely the above procedure, paying attention on screwing down the fitting (2) so as to let the draining holes **(4)** at level of the chamber wall.
7. Run a sterilization cycle





PIPES AND FITTINGS

- **6x12 sheathed** **110#000005W0**
- **6x10 transparent** **110#000003W0**
- **4X7 transparent** **110#000011W0**
- **6x12 sheathed** **110#000014W0**
- **4X2,5 PFTE** **110#000002W0**

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

TRANSPARENT PIPES

The replacement of transparent pipes should be performed by taking care to follow the previous pipe path in order to not change its performance.
Fasten the pipe with plastic clips.

SHEATHED PIPES

The replacement of sheathed pipes should be performed by taking care to follow the previous pipe path and length.
Fasten the 6x12 pipes by metallic clips.
The 2.5x5 pipes are used to connect fitting provided with locknut.

FITTING

Unplug the pipe from the fitting before removing the latter, and clean the thread.

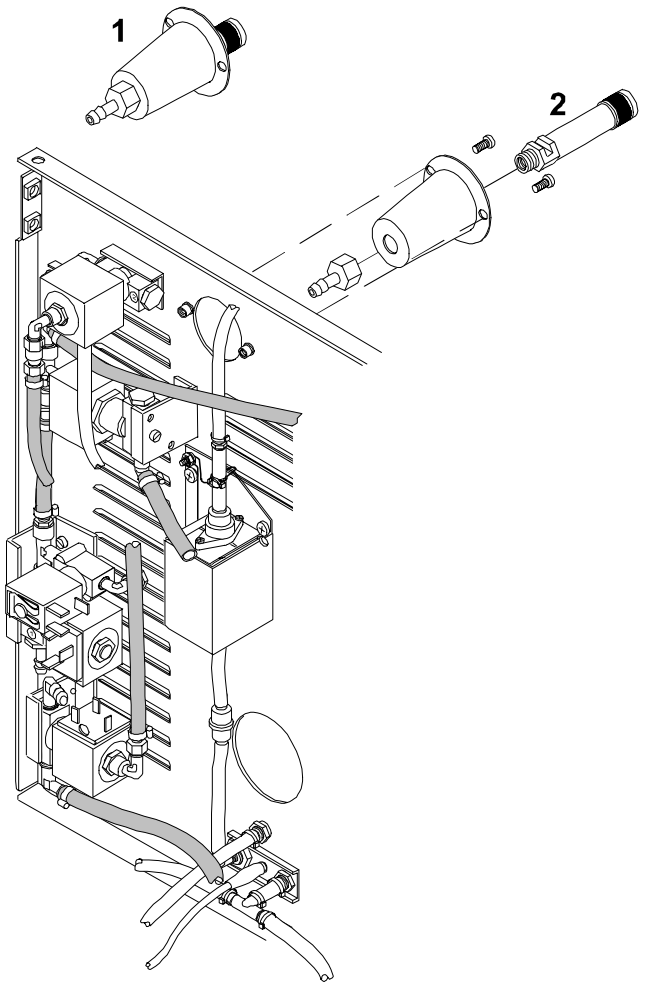
Use a sealing product on the thread before screwing again the fitting in its seat.

SAFETY VALVE ASSEMBLY
A#0BS0520000

SAFETY VALVE
470#00020000

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Remove the covers (see card ***Gr7-1***);
2. Remove the sheathed pipe from the safety valve fitting;
3. Remove the safety valve assembly (1);
4. Remove the safety valve (2) from the assembly;
5. Mount the new valve, assembly all items and restore connections proceeding in reverse order as above;
6. Run a sterilization cycle.



GROUP 5

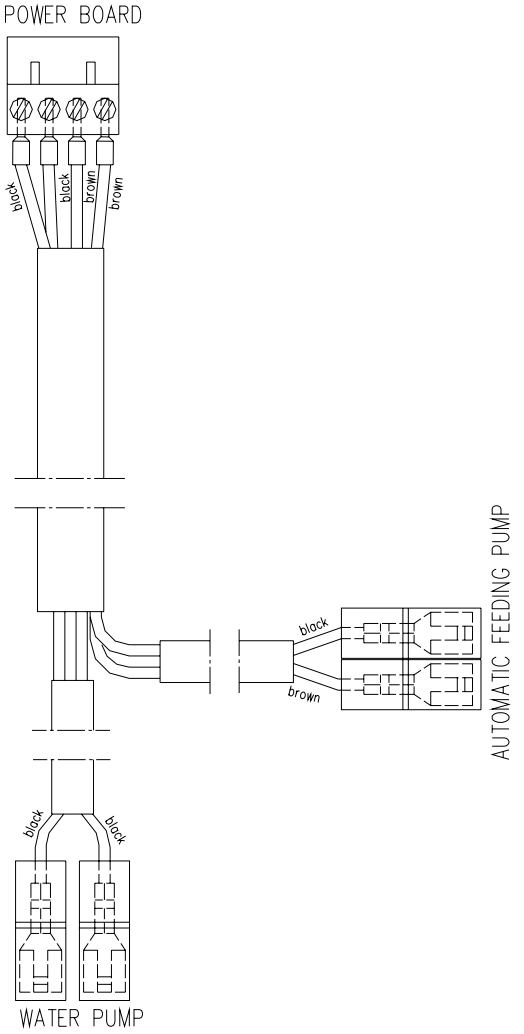
WIRING

WATER PUMPS

A#2BP2270000

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Remove the covers (see card ***Gr7-1***);
2. Disconnect the wiring from the water pumps and power board;
3. Replace the wiring, restore connections and assembly all items proceeding in reverse order as above;
4. Run a sterilization cycle.

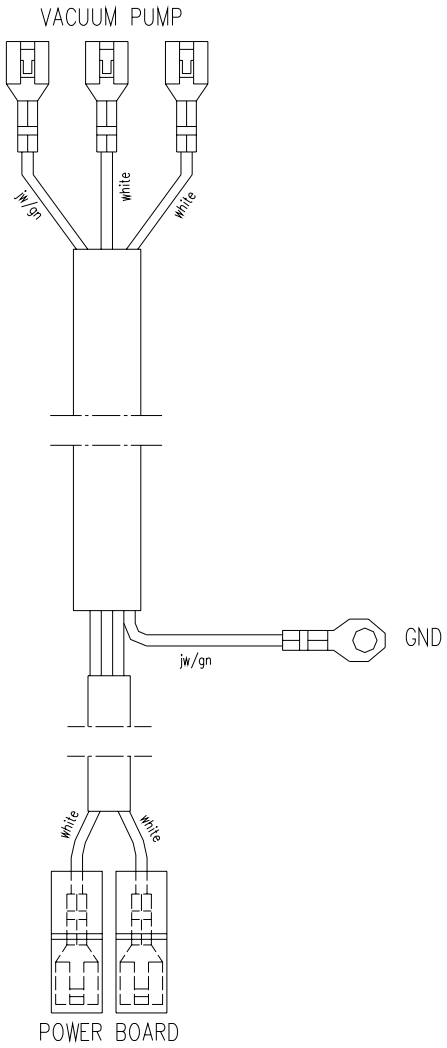


VACUUM PUMP

A#2BP4030000

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Remove the covers (see card ***Gr7-1***);
2. Disconnect the wiring from the vacuum pump and power board;
3. Replace the wiring, restore connections and assembly all items proceeding in reverse order as above;
4. Run a sterilization cycle.

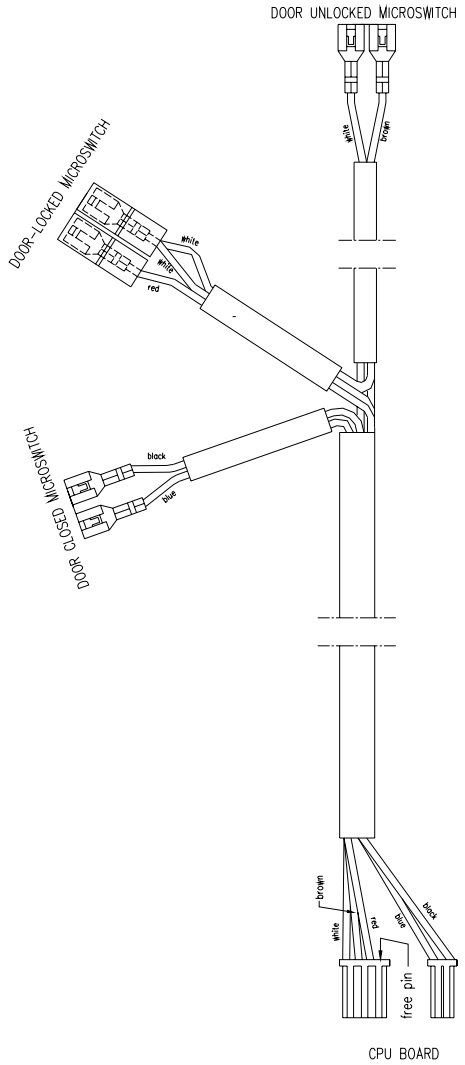


DOOR MICROSWITCH

A#2BP2220000

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Remove the covers (see card ***Gr7-1***);
2. Disconnect the wiring from the micro-switches and power board;
3. Replace the wiring, restore connections and assembly all items proceeding in reverse order as above;
4. Run a sterilization cycle.

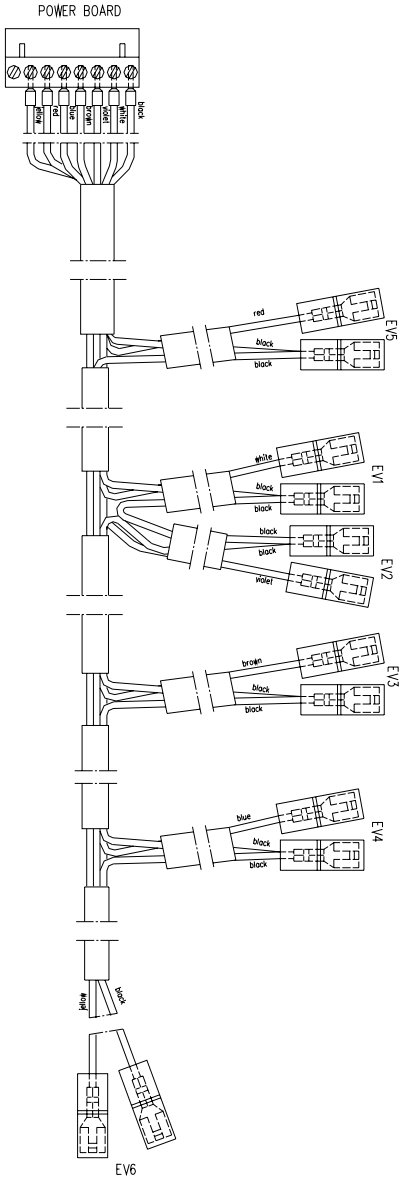


ELECTROVALVES

A#2BP2280000

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Remove the covers (see card ***Gr7-1***);
2. Disconnect the wiring from the electro-valves and power board;
3. Replace the wiring, restore connections and assembly all items proceeding in reverse order as above;
4. Run a sterilization cycle.



PRINTER SIGNAL

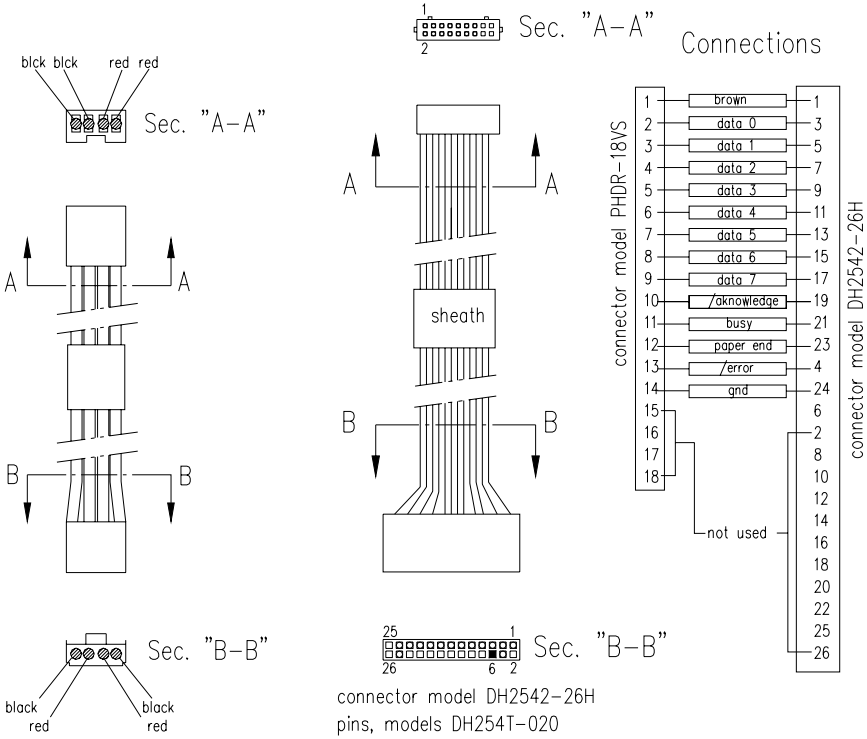
A#2BP2570000

PRINTER POWER SUPPLY

A#2BP2580000

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Remove the covers (see card ***Gr7-1***);
2. Disconnect the signal and power supply wirings from the printer, CPU board and printer board;
3. Replace the wiring, restore connections and assembly all items proceeding in reverse order as above;
4. Run a sterilization cycle.

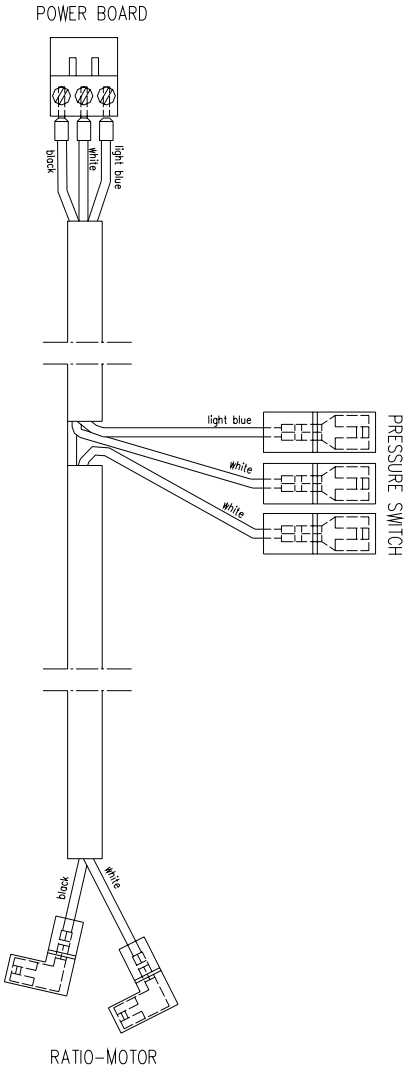


MOTOR AND PRESSURE SWITCH

A#2BG3520000

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Remove the covers (see card ***Gr7-1***);
2. Remove the cover plate under the frame to access the ratio-motor;
3. Disconnect the wiring from the ratio-motor, pressure switch and power board;
4. Replace the wiring, restore connections and assembly all items proceeding in reverse order as above;
5. Run a sterilization cycle.

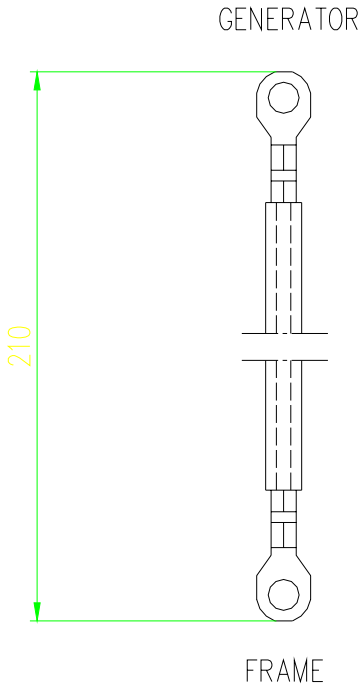


STEAM GENERATOR GROUND WIRE

A#2BP2310000

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Remove the covers (see card ***Gr7-1***);
2. Remove the steam generator (see card ***Gr4-6***);
3. Disconnect the grounding wire from the steam generator and frame;
4. Replace the wiring, restore connections and assembly all items proceeding in reverse order as above;
5. Run a sterilization cycle.

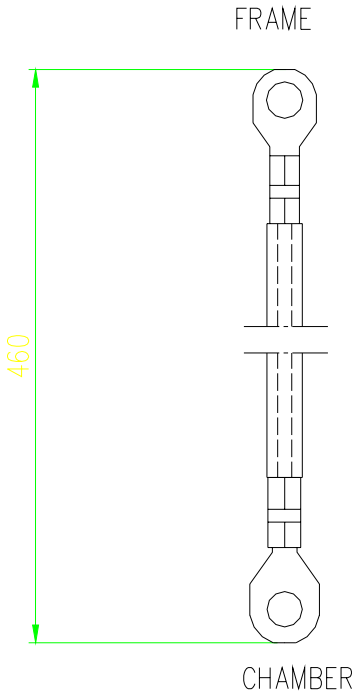


CHAMBER GROUND WIRE

A#2BP2300000

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Remove the covers (see card ***Gr7-1***);
2. Disconnect the grounding wire from the mounting bracket of the chamber and frame;
3. Replace the wiring, restore connections and assembly all items proceeding in reverse order as above;
4. Run a sterilization cycle.

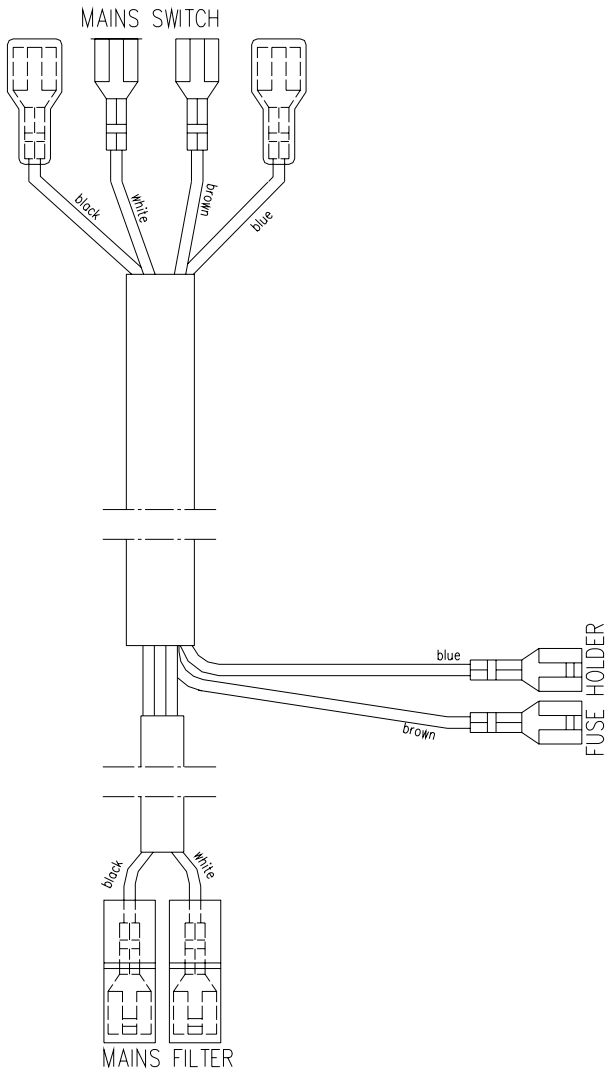


MAINS SWITCH

A#2BP22400000

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Remove the covers (see card ***Gr7-1***);
2. Disconnect the wire from the mains switch, fuse and mains filter board;
3. Replace the wiring, restore connections and assembly all items proceeding in reverse order as above;
4. Run a sterilization cycle.

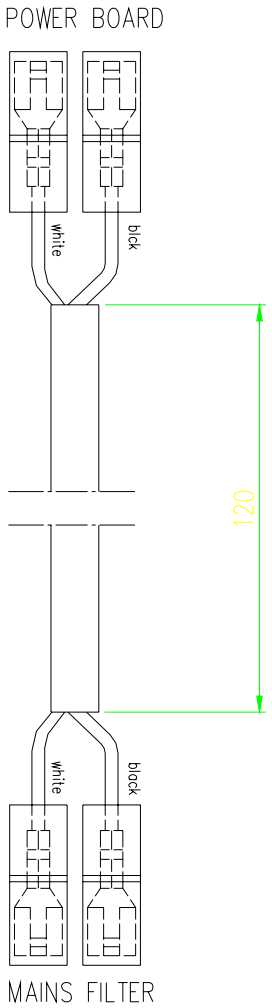


POWER SUPPLY

A#2BP22900000

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Remove the covers (see card ***Gr7-1***);
2. Disconnect the wire from the power and filter boards;
3. Replace the wiring, restore connections and assembly all items proceeding in reverse order as above;
4. Run a sterilization cycle.

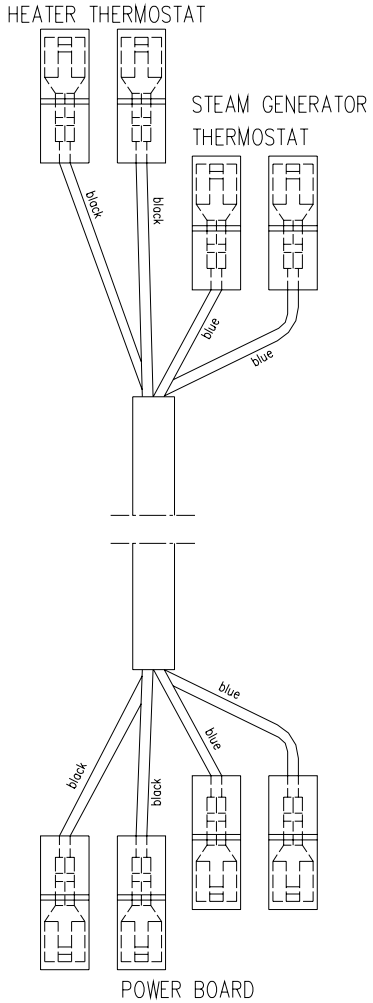


THERMOSTAT

A#2BP22300000

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Remove the covers (see card ***Gr7-1***);
2. Disconnect the wire from the thermostat devices and power board;
3. Replace the wiring, restore connections and assembly all items proceeding in reverse order as above;
4. Run a sterilization cycle.



GROUP 6

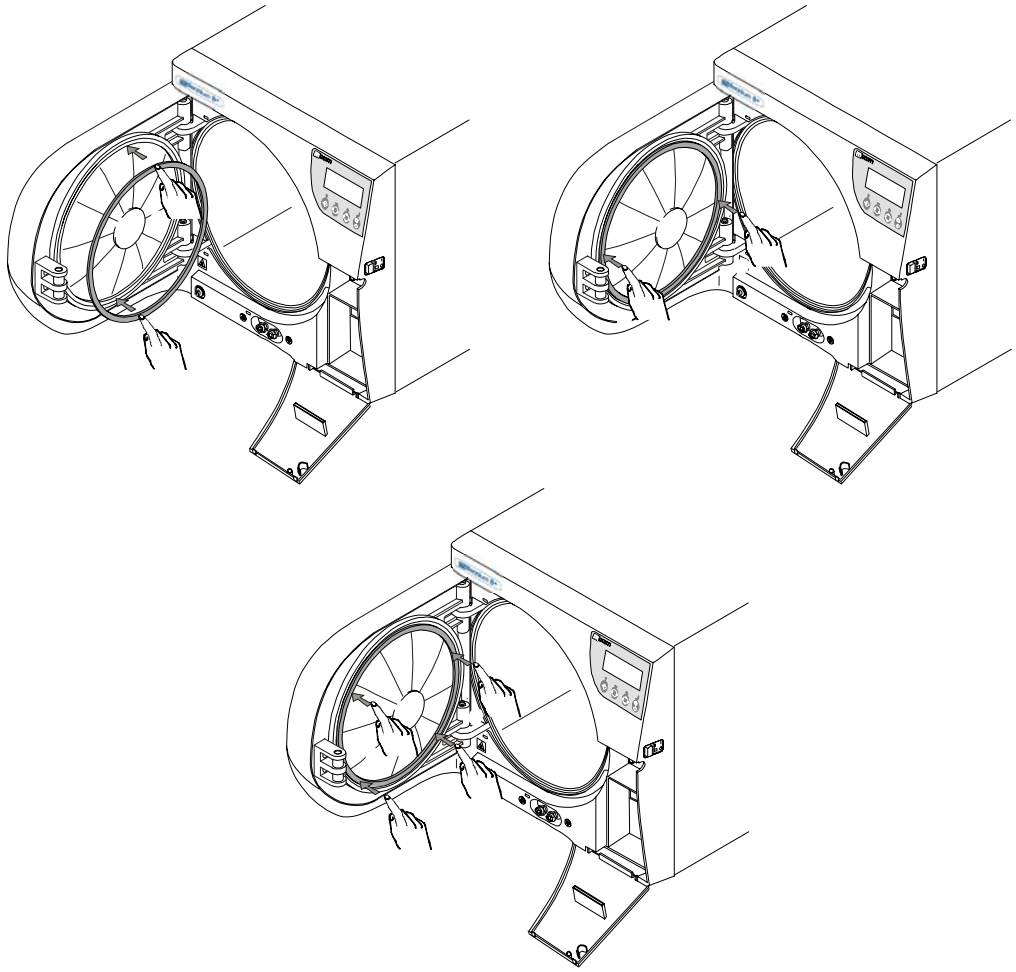
DOOR-LOCKING MECHANISM

DOOR GASKET

480#00050000

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Open the door;
2. Remove the gasket by hands;
3. Clean the gasket seat;
4. Arrange the new gasket as shown in the figure (top/bottom, left/right, intermediate points);
5. Perform a sterilization cycle.

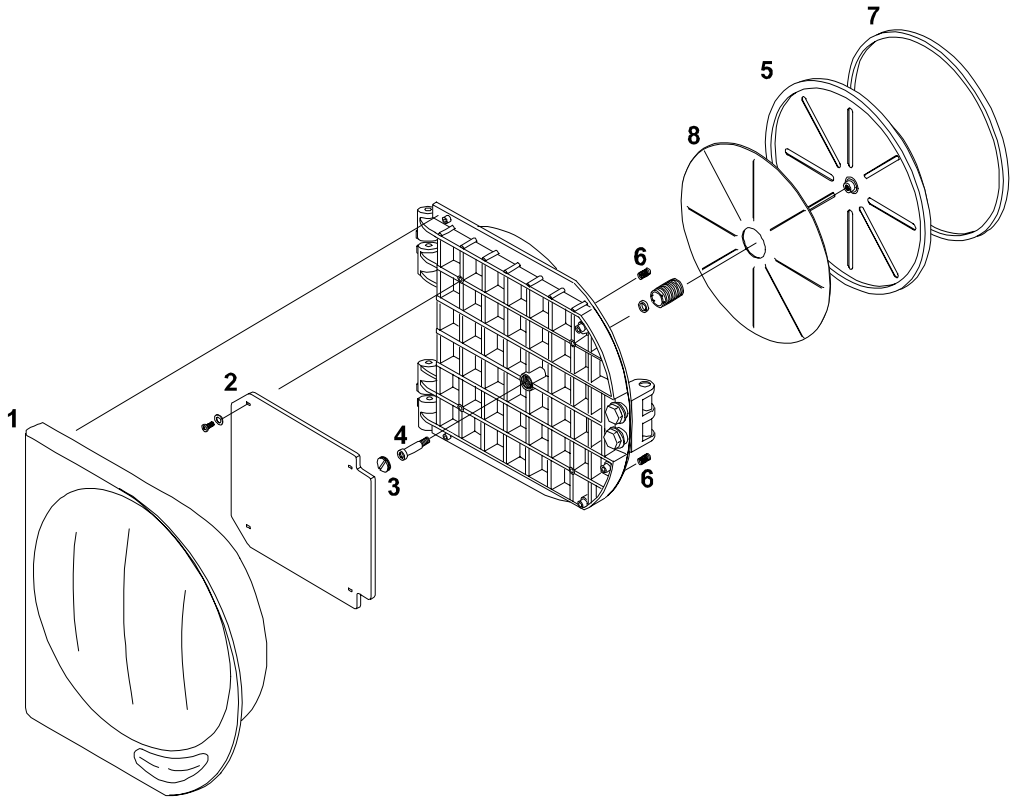


PARABOLA

A#1BP027000Y

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Open the door and remove the plastic door cover (1) (see card *Gr7-2*);
2. Remove the insulating panel (2);
3. Remove the screw-plug (3) at the center of the door and the parabola fixing screw (4);
4. Remove parabola (5), gasket (7), the insulating sheet (8) taking care for the spring (6);
5. Mount the new gasket and insulating sheet on the new parabola;
6. Mount the new assembled parabola and all items proceeding in reverse order as above
7. Perform a sterilization cycle.



DOOR BUSH
490#00050000

DOOR FORK AND PIN
C#0BP0500000

DOOR NITRIDED FORK
C#0BP060000Z

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Open the door;

Bushes / Pin

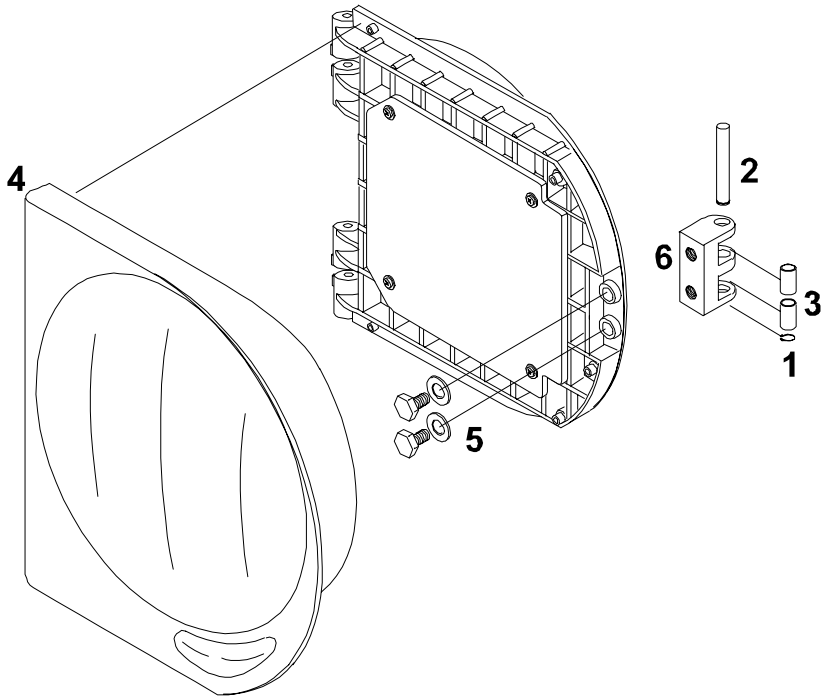
2. Remove the Seiger (1) from the bottom of the pin;
3. Withdraw the pin (2);
4. Remove the bushes (3);

Fork

5. Remove the door cover (4) (see card ***Gr7-2***);
6. Remove screws and washers (5) and remove the fork (6);
7. Mount the new part, assembly all items proceeding in reverse order as above;
8. Perform a sterilization cycle.

WARNING

The pin must result with the lowered side on top of the fork.

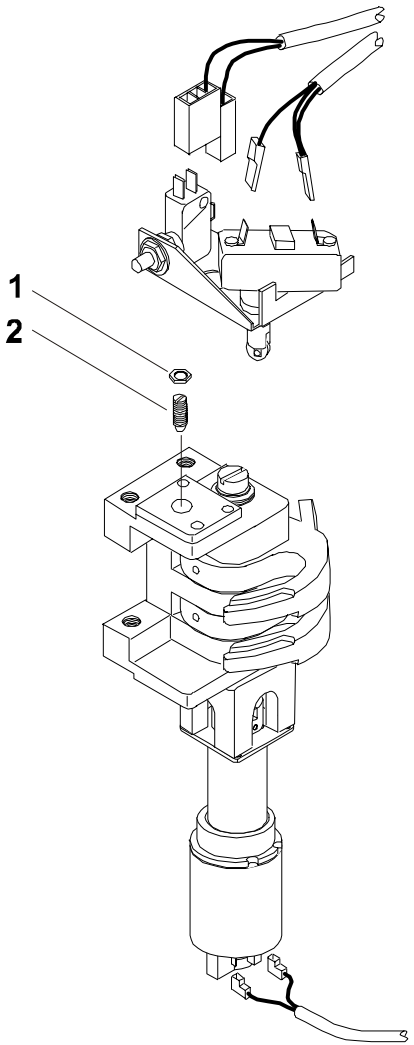


DOOR POSITIONER

251#000003K0

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Remove the covers (see card ***Gr7-1***);
2. Access from the top and unscrew the nut (1) and remove the positioner (2);
3. Mount the new positioner, assembly all items proceeding in reverse order as above;
4. Adjust the positioner, see ***Attachment A***;
5. Perform a sterilization cycle.



DOOR-CLOSED SWITCH
433#00010000

DOOR-UNLOCKED SWITCH
433#00010000

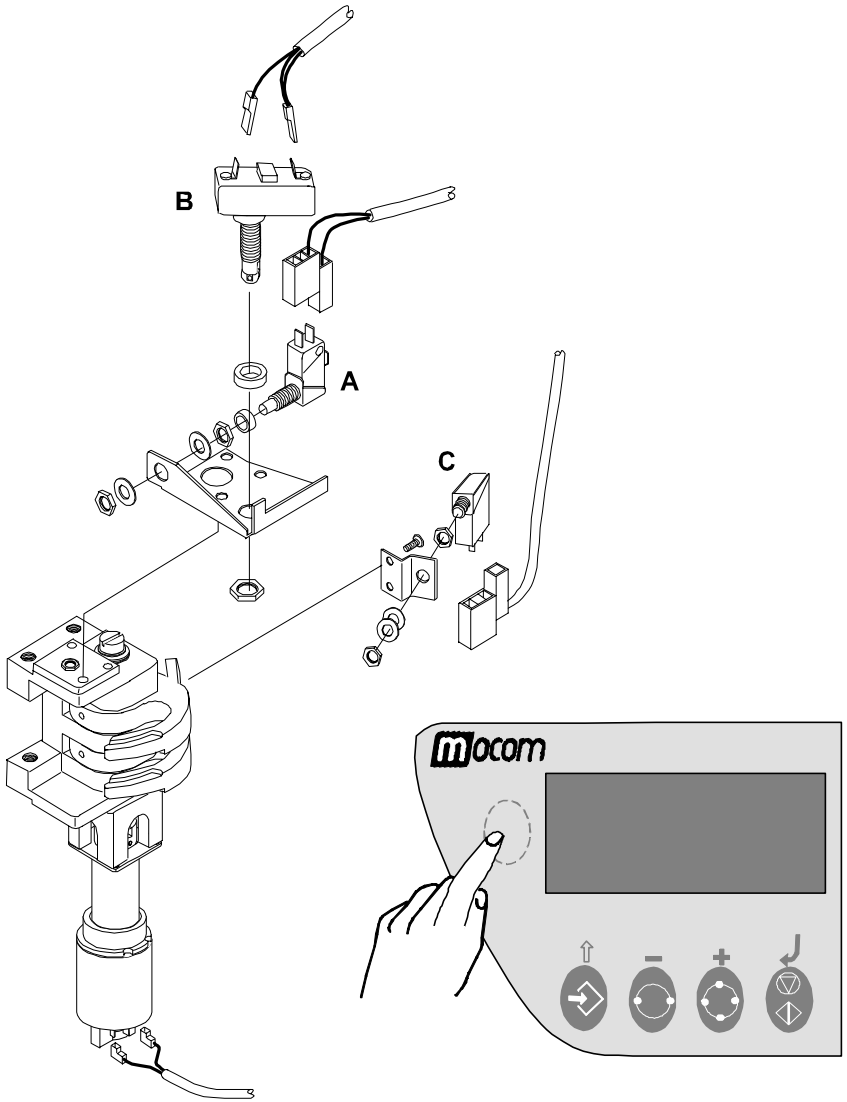
DOOR-LOCKED SWITCH
433#00040000

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Remove the left-side and top covers (see card *Gr7-1*);
2. Remove the wiring of the switch involved;
   - **A) Door-closed switch;**
   - **B) Door-unlocked switch;**
   - **C) Door-locked switch**
3. Remove the screws of the bracket and switch involved;
4. Replace the switch, assembly all items proceeding in reverse order as above;
5. Perform a sterilization cycle.

Note: To release the door-unlocked switch proceed as follows:

- Enter the **Setup**; **Service**, digit the code "++--++--", go to **Device Test**, **Manual** and **Locking Device**, push key START to enable/disable.
- After the switch replacement, check its correct operation. Remove the jumper X21 from the CPU board, **push the hidden key** on the keyboard and switch on the sterilizer. As message "LOCKING DEVICE" appears on the display, release the hidden key and push the **Start** key to enable the unlocking of the closing mechanism; exit the Setup, switch off the sterilizer and restore the jumper X21.

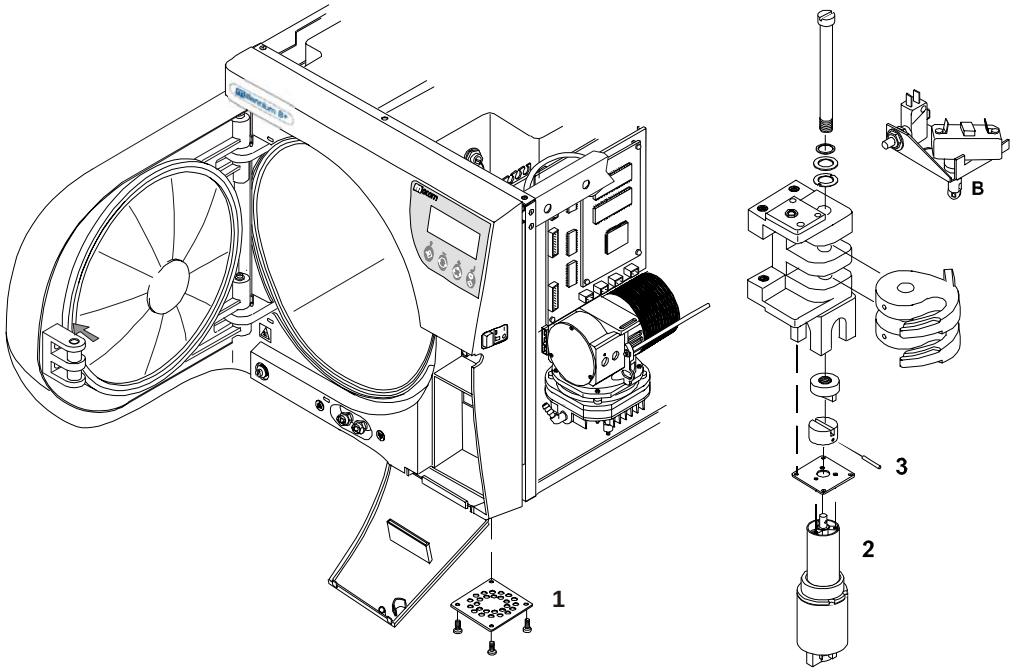


GEAR-MOTOR
403#00010000

PIN
232#A03L25K0

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Remove the covers (see card ***Gr7-1***);
2. Empty both reservoirs;
3. Turn on the left side the unit and remove the ratio-motor access plate (1) from the bottom frame;
4. Remove the motor wiring and the motor itself (2);
5. Block the motor in a vise and remove the pin (3) by using proper tools;
6. Mount the new pin, the motor taking care to couple two bushes, connect the wiring (white = + / black = -) and mount the small plate (1) proceeding in reverse order as above;
7. By means of a large screwdriver, push on the pin (B) of the door-unlocked switch (do not release it until explicitly indicated) and turn on the unit;
8. Wait for the end of the Self test, then enter the SETUP mode;
9. Go to SERVICE option, enter the code “++--++--“, then select DEVICE TEST, MANUAL and LOCKING DEVICE option;
10. Push the **Start** key to enable the locking mechanism, then **release the pin of the door-unlocked switch**;
11. Push again the **Start** key to release the locking mechanism;
12. Switch off/on the unit;
13. Perform a sterilization cycle.



GROUP 7

COVERS

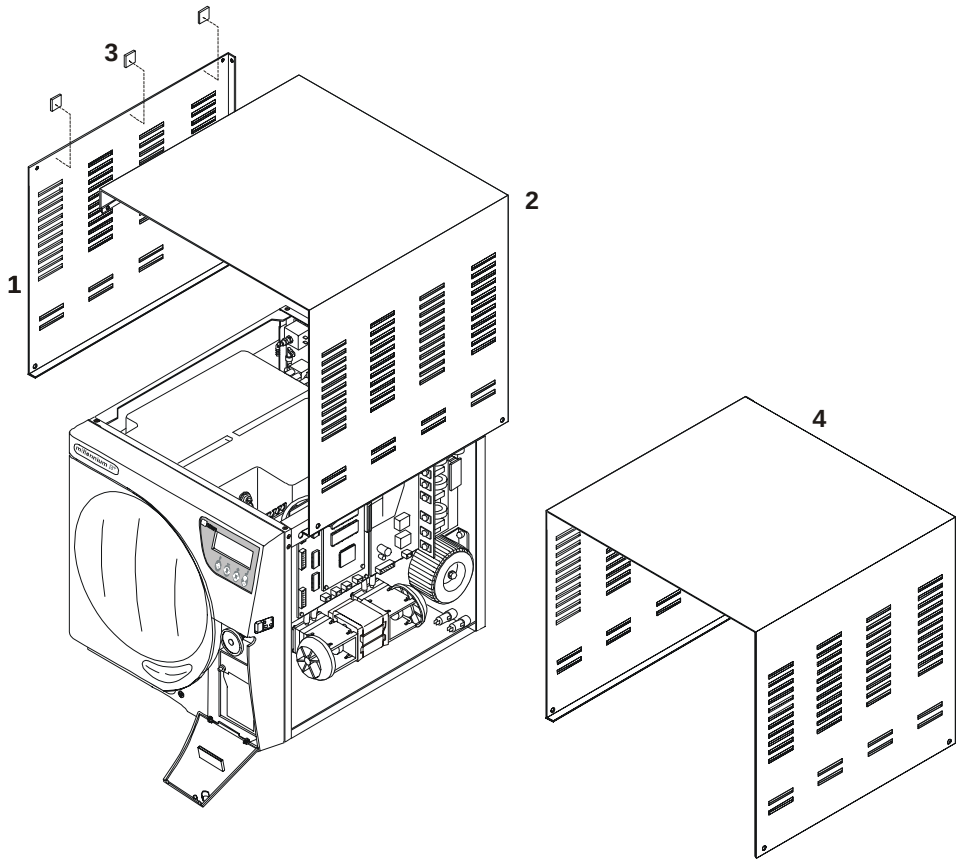
LEFT-SIDE COVER
C#1BP1660001

TOP COVER
C#1BP1650001

SINGLE COVER
C#1BH0060001

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Remove the screws of the left-side cover (1);
2. Remove the screws of the top cover (2)
3. Attach new adhesive strips (3);
4. Remove the four screws of the single cover (4);
5. Remount the new covers;
6. Perform a sterilization cycle.

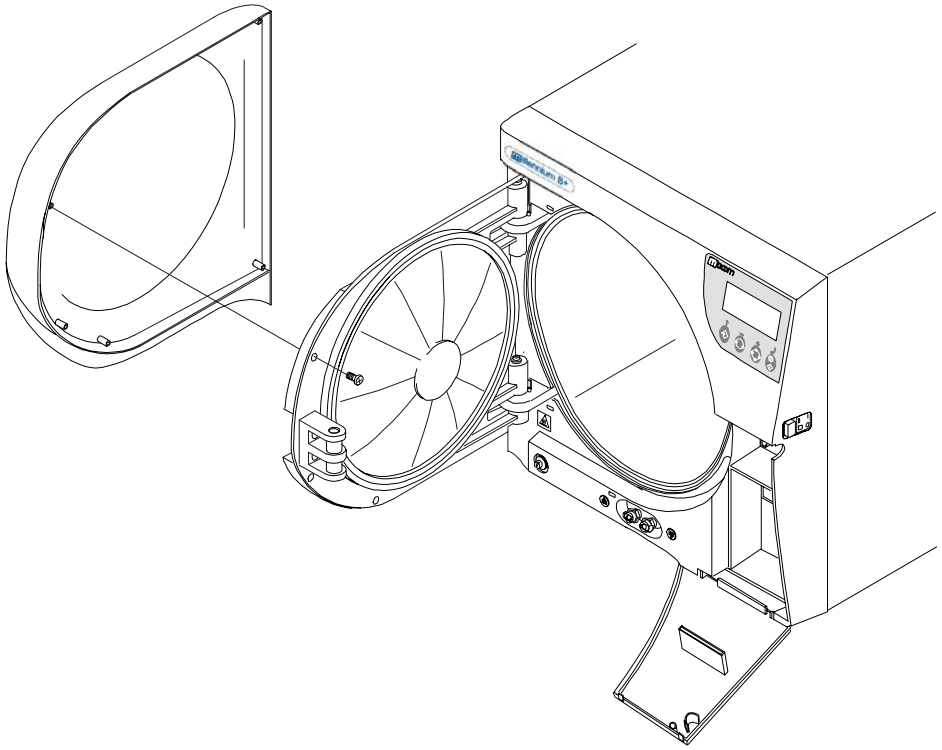


DOOR COVER

C#3BP1850000

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Open the door;
2. Unscrew the five rear screws fixing the plastic front cover;
3. Remove the plastic cover;
4. Mount the new cover;
5. Perform a sterilization cycle.

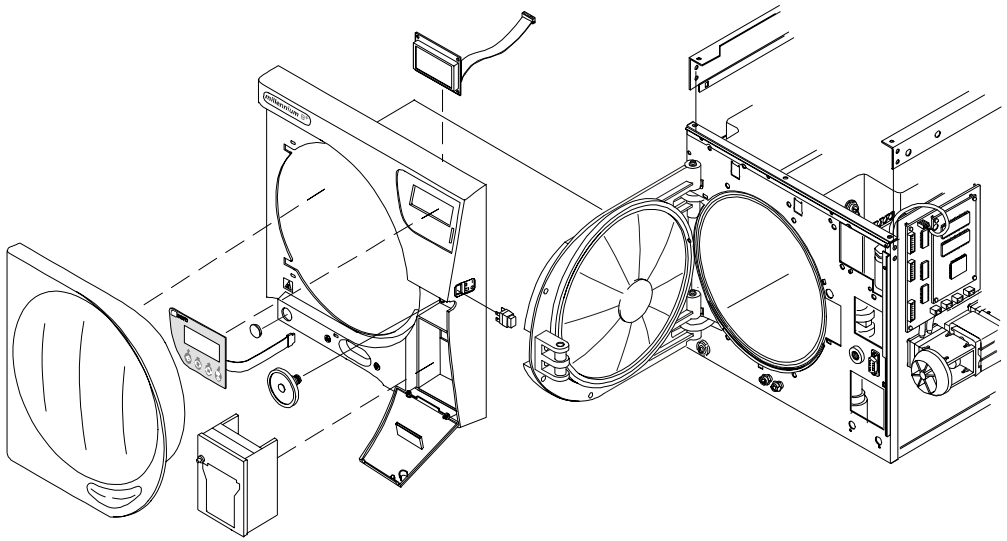


FRONT FRAME ASSEMBLY
A#0BP3000000

PLASTIC FRONT FRAME
C#3BP1830000

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Remove the covers (see card *Gr7-1*);
2. Remove plastic door cover (see card *Gr7-2*);
3. Remove the printer unit (see card *Gr1-20*);
4. Cut the nylon clamp on the mains switch wiring and disconnect it from the switch;
5. Remove the LCD and keyboard connections from the CPU board;
6. Remove the bacteriologic filter;
7. Remove left and right rails;
8. Unscrew the screws fixing the plastic front cover; the screws are found rear the front frame and printer compartment;
9. Unlock the four tabs of the plastic cover from the front frame slots around the chamber circumference;
10. Carefully move left side the front plastic cover and remove it though the door;
11. Remove labels, LCD, keyboard, mains switch, plastic cap from the front cover and mount them on the new cover;
12. Mount the new front cover, assembly all items and restore connections proceeding in reverse order as above;
13. Perform a sterilization cycle.

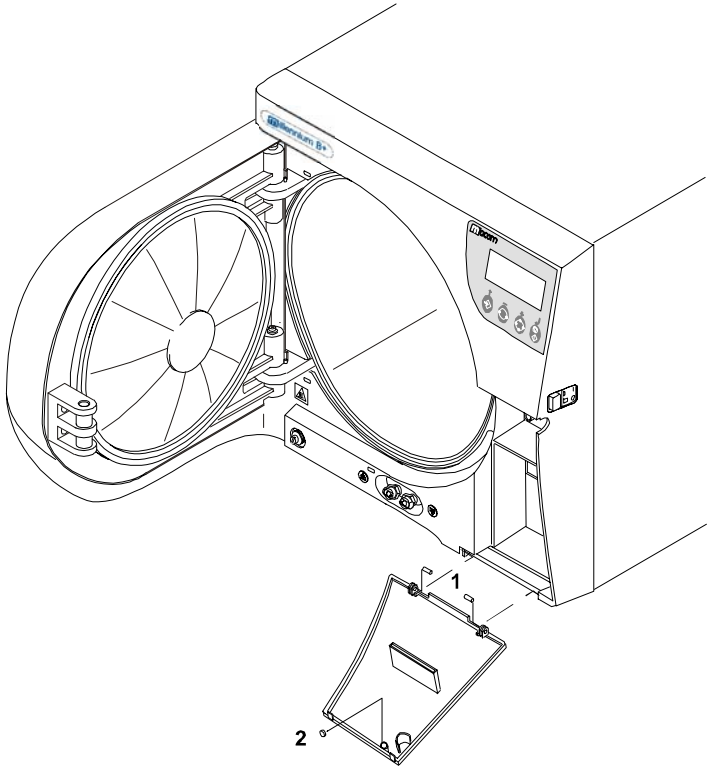


SERVICE DOOR

C#3BP1840000

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Open the service cover and remove the two pins (1);
2. Replace the cover, mount the pins and seal them;
3. Close the service door and check the correct closing by the adhesive magnet button;
4. Do not open the service door for 2/3 hours;
5. Perform a sterilization cycle.

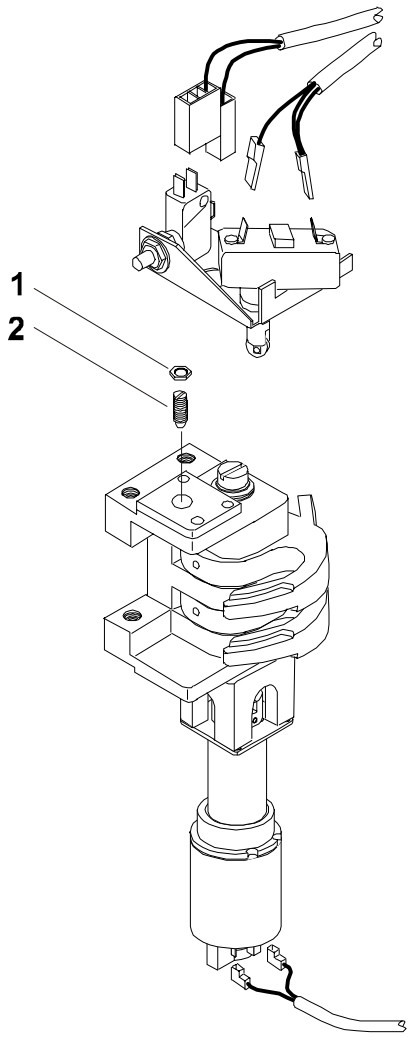


ATTACHMENTS

ATTACHMENT A -
ADJUST DOOR POSITIONER

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

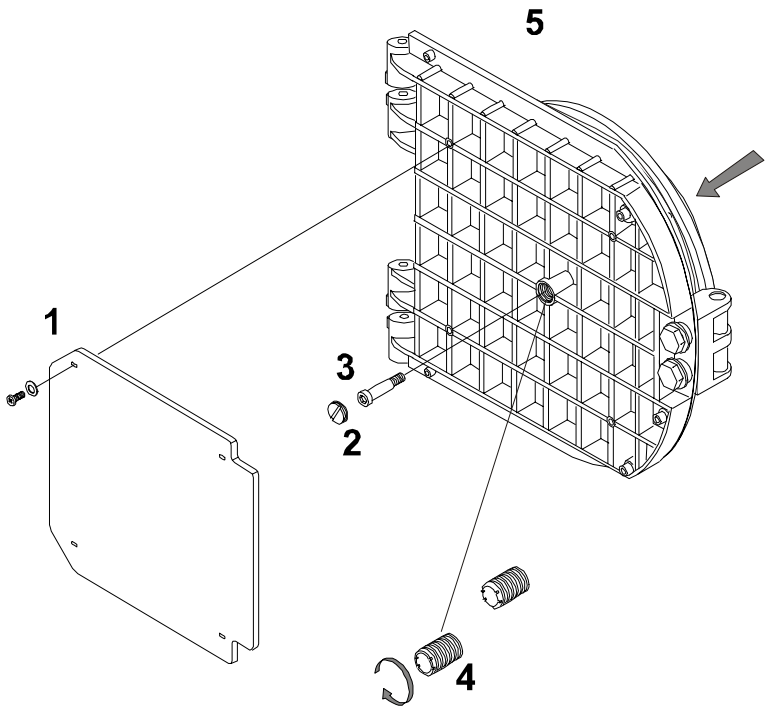
1. Remove the covers (see card ***Gr7-1***);
2. Open and close the door to check its operation;
3. In case the door does not remain close (no click at the stroke end), loosen the nut (1) and turn clockwise the positioner (2);
4. In case of resistance on closing/opening the door, loosen the nut and turn anti-clockwise the positioner;
5. Tighten the nut;
6. Perform a sterilization cycle.



ATTACHMENT B -
ADJUST PARABOLA

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Open the door;
2. Remove the plastic door cover (see card *Gr7-2*);
3. Remove the insulating panel (1);
4. Remove the screw-plug (2) at the center of the door;
5. Loosen the central screw (3) and loosen the threaded bush (4);
6. Maintaining the parabola panel against the door, turn completely clockwise the central threaded bush (4), then turn it ¾ anti-clockwise;
7. Fix the parabola panel by means of the central screw (3);
8. Remount all items proceeding in reverse order as above;
9. Perform a sterilization cycle.

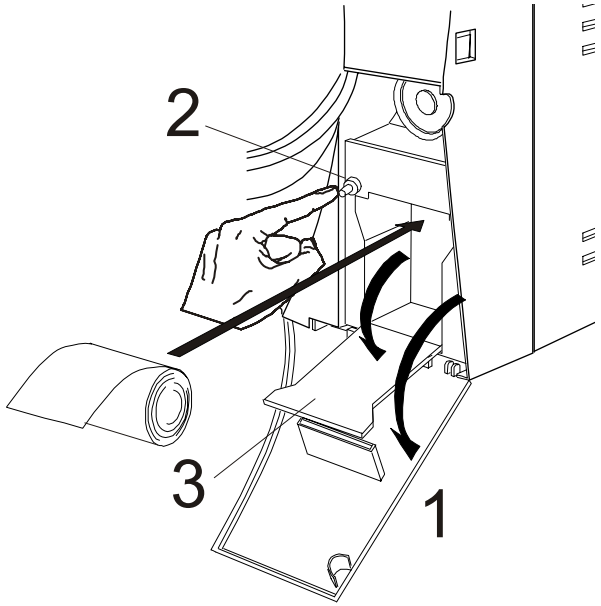


ATTACHMENT C -
REPLACE PRINTER PAPER ROLL

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

Fenix type

1. open the service compartment door (1) to access the printer;
2. push the button (2) to open the printer door and access the paper compartment;
3. remove the empty roll and place a new one so that the paper unrolls off the top;
   use thermal paper roll:
   - width 57 mm / diameter max 45 mm
4. unroll about 15 cm of paper and close the printer door (the paper will automatically advance a few centimeters outside the window;
5. thread the paper in the slot of the service compartment and close;
6. switch on the equipment;
7. perform a sterilization cycle.



WARNING

- Use only thermal paper;
- Arrange the paper roll with the correct direction (see figure).

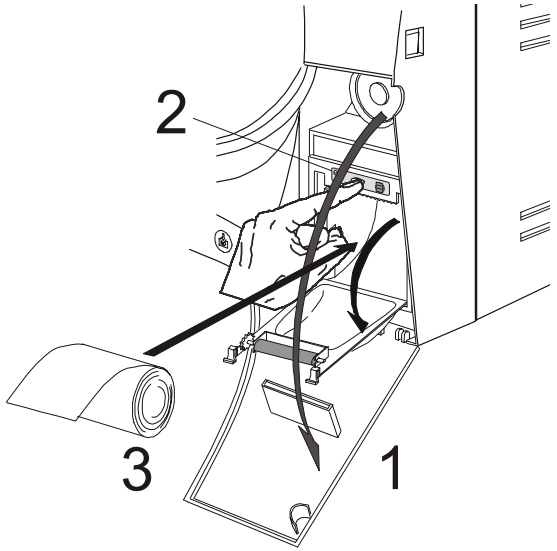
Custom type

1. open the service compartment door (1) to access the printer;
2. push the central button (2) to open the printer door and access the paper compartment;
3. remove the empty roll and place a new one so that the paper unrolls off the top;
   use thermal paper roll:
   - width 57 mm / diameter max 45 mm
4. unroll about 15 cm of paper and close the printer door;
5. thread the paper in the slot of the service compartment and close;
6. switch on the equipment;
7. perform a sterilization cycle.

N.B. The central button is lighted steady when the paper is regularly present, and is flashing when the paper rool is empty

WARNING

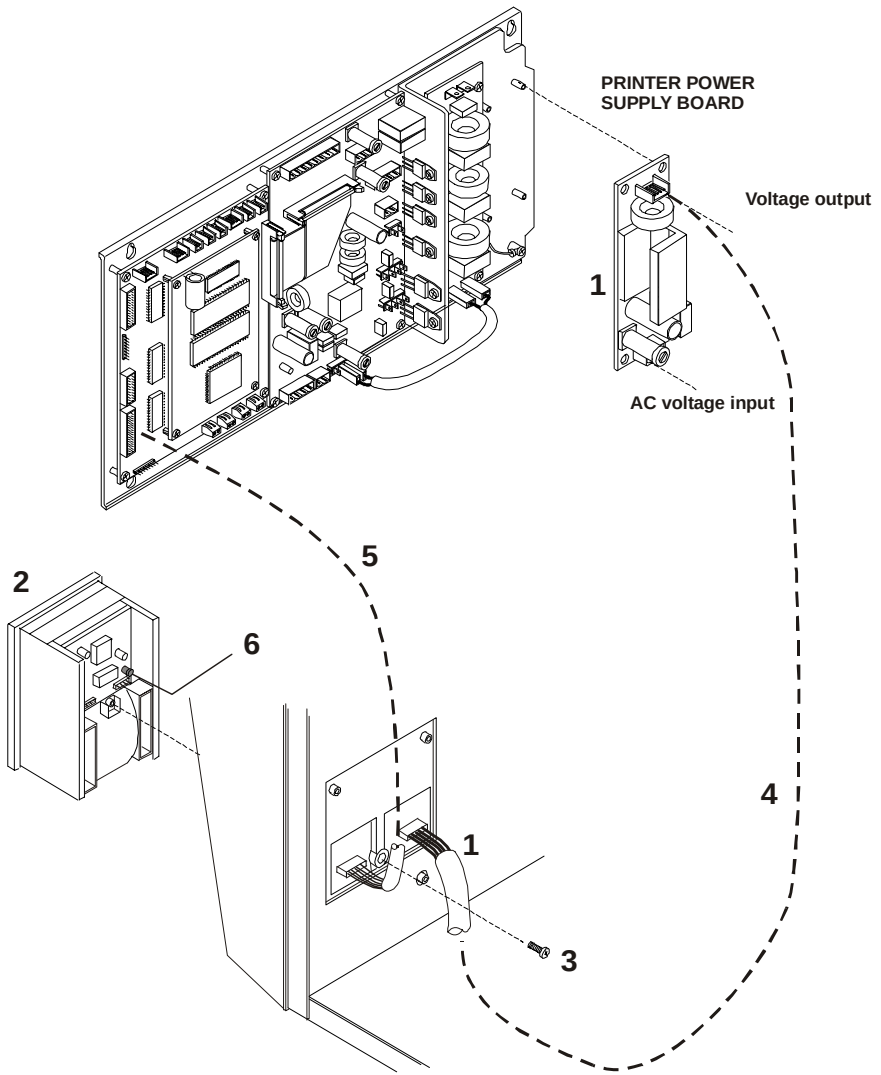
- Use only thermal paper;
- Arrange the paper roll with the correct direction (see figure).



ATTACHMENT D -
INSTALL PRINTER KIT

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

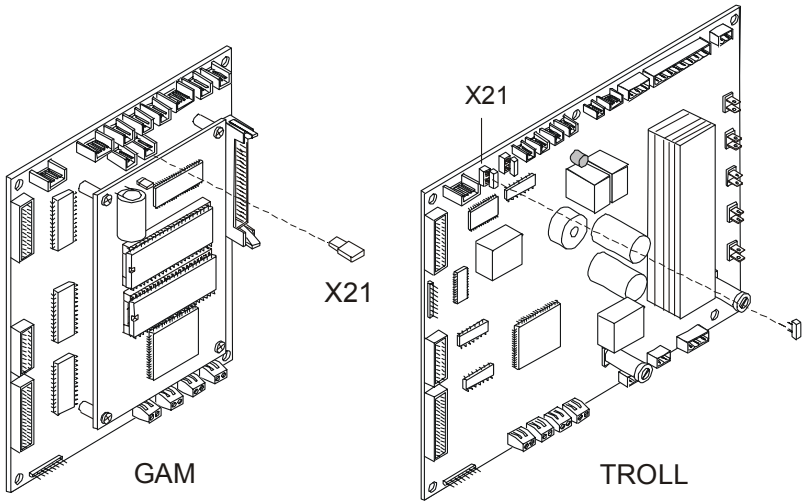
1. Remove the covers (see card ***Gr7-1***);
2. Use the printer power supply board (1) of the printer kit and mount it on the support of the electronic boards;
3. Cut the clamp on the transformer wiring and connect the free wiring on the AC voltage input connector;
4. Open the service box cover and mount printer unit (2) on the plastic front cover by means of the screw (3);
5. Connect the printer cable (4) between the ps output connector of the power supply board and the ps connector of the printer unit; arrange the cable path on the top of the support of the electronic boards and lock it by nylon clamps;
6. Connect the signal cable (5) between CPU and printer unit interface connectors;
7. Switch on the sterilizer, and push the red button (6) located on the rear of the printer unit; the paper moves forward from the slot;
8. Enter the SETUP mode, ADVANCED menu, PRINT OPTIONS, PRINTER, and select the option INTERNAL;
9. Exit the SETUP mode;
10. Perform a sterilization cycle; at the end of the cycle check the correct printout.

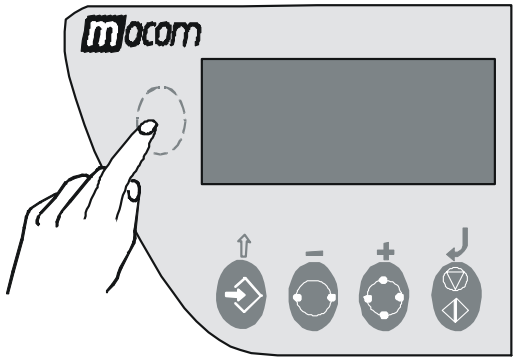


ATTACHMENT E -
RESET PRINT QUEUE

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Remove the covers (see card ***Gr7-1***);
2. Remove the jumper X21 on the CPU board;
3. Press the hidden key on the control panel, switch-on the unit and release the key only when the message "*LOCKING DEVICE*" appears on the LCD display;
4. Press the arrow-up key ⇧ to exit this status and start the Self test;
5. Turn off the unit at the end of the Self test, restore the jumper X21 and switch on the unit again;
6. Enter the SETUP mode, ADVANCED menu, PRINT OPTIONS, REPORT, PRINT LAST and select the option NORMAL PRINT;
7. Exit the SETUP mode and check that the printer resumes to operate correctly.





ATTACHMENT F -
CHECK PRINTER PAPER FEEDING

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

Fenix type

- Remove the covers (see card ***Gr7-1***);
- Switch on the sterilizer;
- Press the red key located rear the printer unit, and check that the paper moves forward the slot;

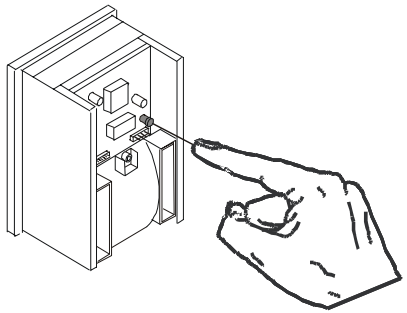
Custom type

- Open the service box;
- Switch on the sterilizer;
- Press the right key of the printer front panel, and check that the paper moves forward the slot;

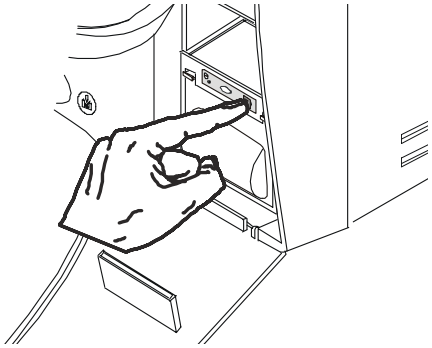
1. If so, perform a sterilization cycle and check the printout at the end of the cycle;
2. Otherwise, check:
   a. the fuse on the printer power supply board,
   b: the correct connection on pc boards and printer unit,

   or replace the printer unit.

Fenix type



Custom type



ATTACHMENT G -
START-UP STEAM GENERATOR

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

Perform this procedure when:

a. The sterilizer remains unused for more one month;
b. The sterilizer was stored at a temperature below 0°C;
c. Water pump is replaced;
d. Steam generator is replaced;
e. Alarm concerning water absence in the reservoir is occurring.

Procedure

1. Remove the covers (see card ***Gr7-1***);
2. Switch on the unit and enter the SETUP mode, SERVICE menu, type the access code “++--++--“, and select the option H2O CIRCUIT;
3. Press the Start/Stop key and check the operation of the water pump and that the water flows into the chamber;
4. Wipe the chamber and exit the SETUP mode;
5. Perform a sterilization cycle.

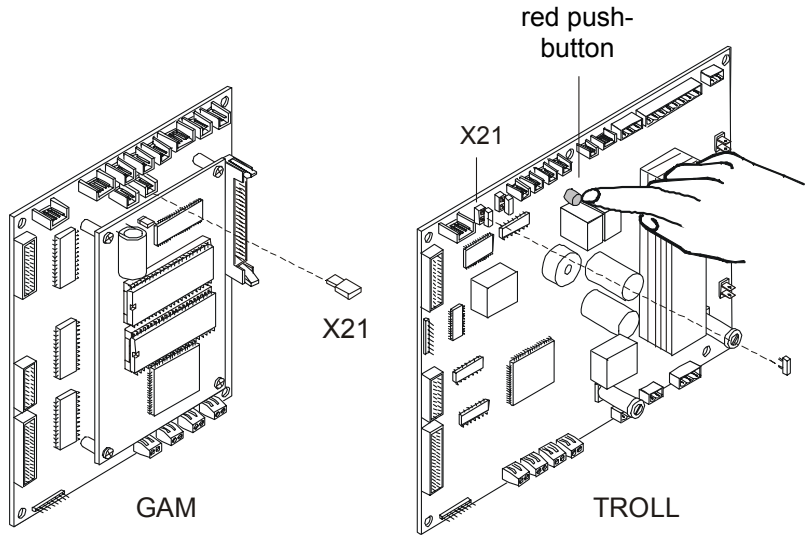
N.B. In case of problem, refer to the repairing card of the malfunctioning component.

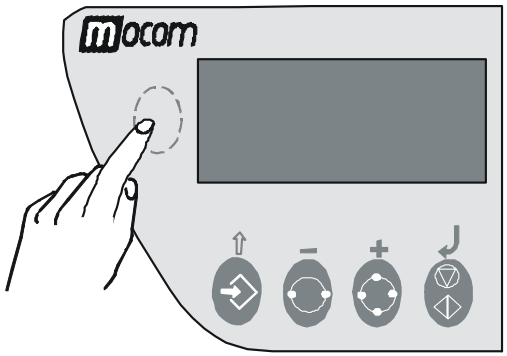
ATTACHMENT H -
RELEASE DOOR LOCKING MECHANISM VIA SOFTWARE-

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Remove the covers (see card ***Gr7-1***);
2. Remove the jumper X21 of the CPU board;
3. Press the hidden key on the control panel, switch-on the unit and release the key only when the message "*LOCKING DEVICE*" appears on the LCD display;
4. Press the Start/Stop key to release the door locking mechanism;
5. Open the door, press the arrow-up key to exit this status, and start the Self test;
6. **GAM type pc boards**
   Turn off the unit at the end of the Self test, restore the jumper X21 and switch on the unit again;

   TROLL type pc boards
   Press the red button at the end of the Self test, turn off the unit, restore the jumper X21 and switch on the unit again.
7. Perform a sterilization cycle.

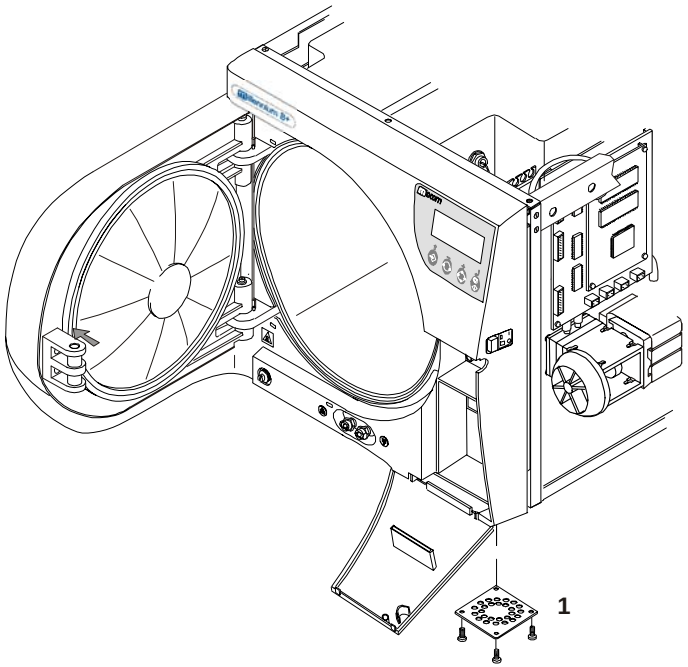


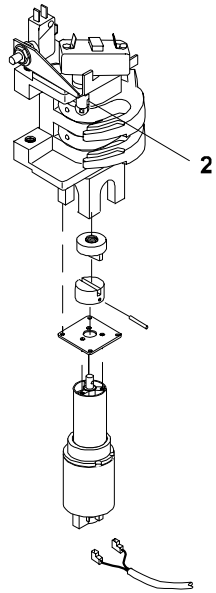


ATTACHMENT I -
RELEASE DOOR LOCKING MECHANISM MANUALLY

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Remove the covers (see card ***Gr7-1***);
2. Empty both reservoirs, and turn left side the unit
3. Remove the ratio-motor access plate (1) from the bottom frame;
4. Remove the motor wiring and the motor itself;
5. Now open the door causing the locking mechanism opening;
6. Arrange the motor on its seat, taking care to couple the bushes;
7. Connect the wiring (white = + / black = -) and mount the small plate (1) on the bottom frame, proceeding in reverse order as above ;
8. By means of a large screwdriver, push on the pin (2) of the door-unlocked switch (do not release it until explicitly indicated) and turn on the unit;
9. Wait for the end of the Self test, then enter the SETUP mode, option SERVICE, enter the code "++--++--", then select DEVICE TEST, MANUAL and the option LOCKING DEVICE;
10. As enabled the locking mechanism, **release the pin (2) of the door-unlocked switch**;
11. Push the Start key to release completely the locking mechanism;
12. Exit the Setup mode and switch off/on the unit;
13. Perform a sterilization cycle.





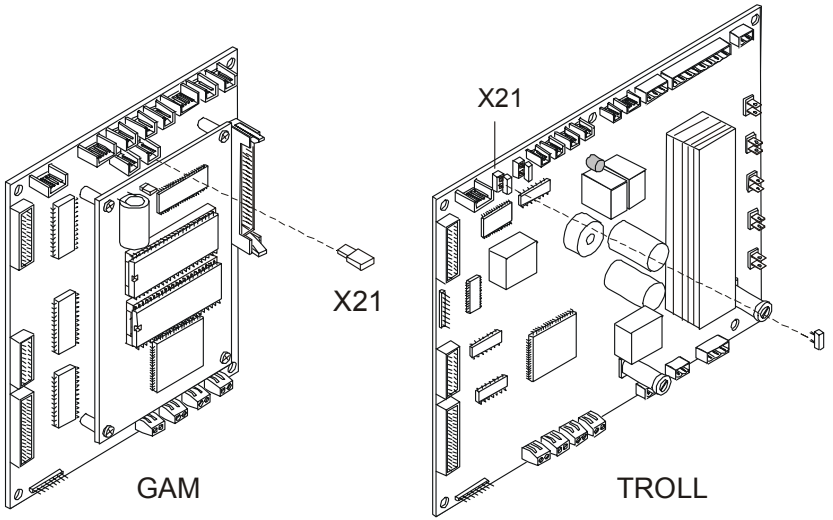
ATTACHMENT J -
RECOVER DEFAULT DATA

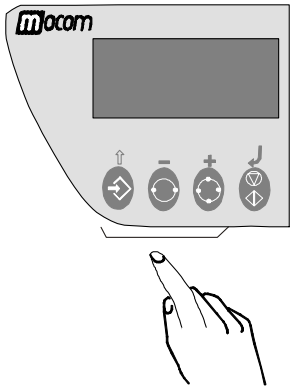
Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Remove the covers (see card ***Gr7-1***);
2. Remove jumper X21 of the CPU board;
3. Push on the three left keys and switch-on the unit;
4. LCD appears completely empty;
5. Switch-off and -on again the unit;
6. LCD will show now the message “DEFAULT DATA UPDATE”;
7. Wait for completing the update with the message “OK”;
8. Switch-off the unit;
9. Restore the jumper X21 and switch on again the unit;
10. Perform a sterilization cycle.

WARNING

As consequence of the data recovery operation, the sterilizer must be calibrated; this procedure should be performed starting from the software release **E0008 / BP00350**





ATTACHMENT K -
UPDATE SOFTWARE

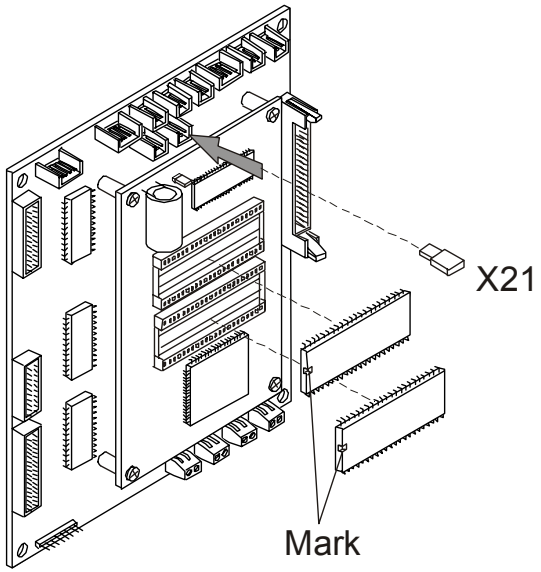
Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

GAM electronic boards

1. Remove the covers (see card ***Gr7-1***);
2. Unplug jumper X21 of the CPU board;
3. Replace the old EPROM's with the new ones ;
4. Switch-on the unit;
5. The display will show the message "RELEASE SOFTWARE UPDATE";
6. Wait for completing the update with the message "OK";
7. Switch-off the unit;
8. Restore the jumper X21 and switch on again the unit;
9. Perform a sterilization cycle.

WARNING

Should, at the first switching-on after the EPROM replacement, the message "RAM DATA LOSS" be shown, switch-off at once the unit and switch-on it again.

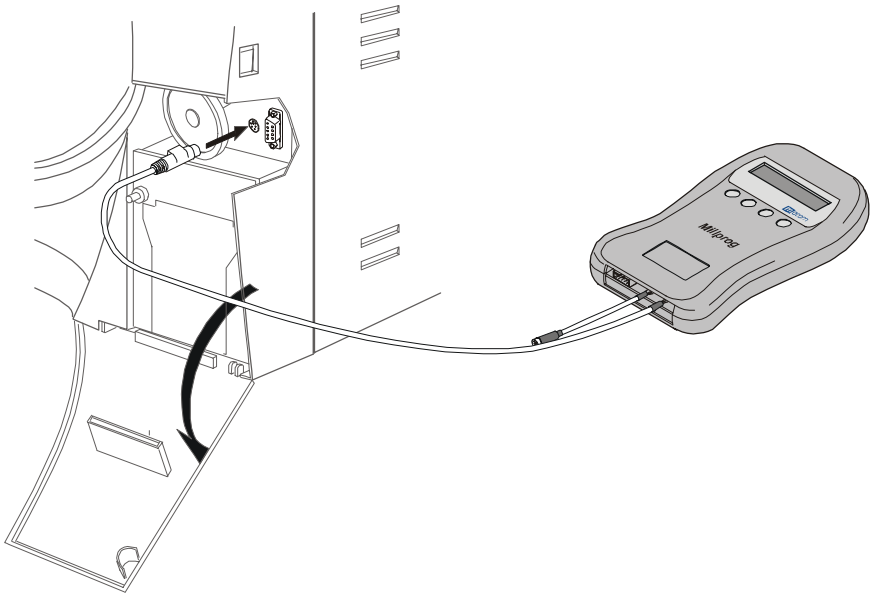


TROLL electronic boards (use of Millprog device)

Follow the instructions reported on the Millprog Operating Manual

1. Install the Millprog application on the PC;
2. Connect to PC the Millprog device and download the last release software;
3. Connect the Millprog device to the sterilizer;
4. Perform the sterilizer software upgrade;

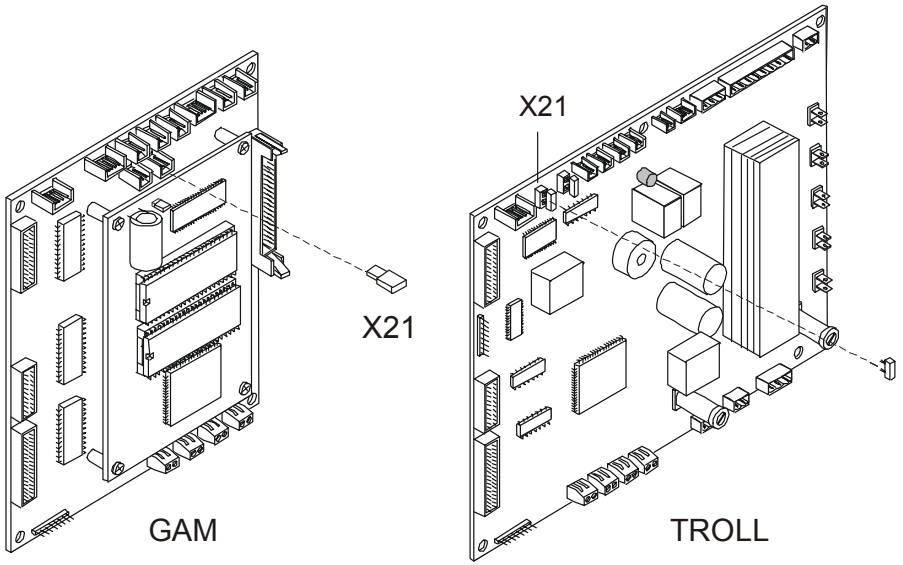
Connect the Millprog device to the sterilizer



ATTACHMENT L -
RELEASE ALARM A022 - DOOR LOCKED

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

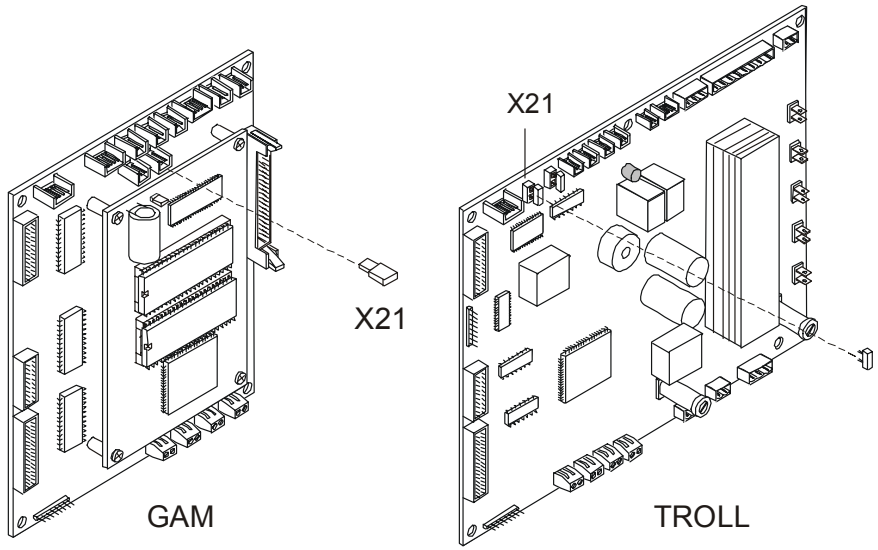
1. Remove the covers (see card ***Gr7-1***);
2. Unplug jumper X21 of the CPU board;
3. Push the key Start and switch-on the unit;
4. LCD will show the message “SETUP”;
5. Press the Start key up to the message “SETUP COMPLETE”;
6. Wait for the end of the Self test, then switch-off the unit;
7. Restore the jumper X21 and switch on again the unit;
8. Perform a sterilization cycle.



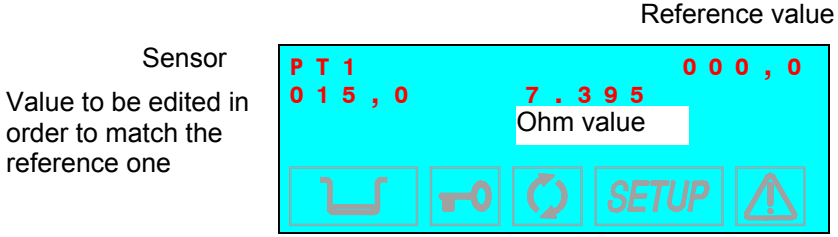
ATTACHMENT M -
CHECK CALIBRATION

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

1. Remove the covers (see card ***Gr7-1***);
2. Unplug jumper X21 of the CPU board;
3. Remove the wirings of any PT probes;
4. Plug-in the sample connector provided with the pin for checking value 000,0;
5. Press the Start key and switch-on the unit; LCD will show the message “SETUP” and then the PT1 value (see figure);
6. Check that PT1 value matches the calibration one, i.e. 000,0;
7. Press the Start key and repeat the check for PT2, PT3 and PT4 on the relating connector;
8. Should any value to be different from the calibration one, use key **+** and **–** to increase or decrease the value;
9. At the end of the last check, remove the sample connector, plug-in it again in reverse direction in order to check PTn value at 130.4° reference;
10. Repeat the check for any PTn as above, and adjust the value in case of mismatch from 000,0;
11. Ended the PTn checks, push again key Start to continue with the next check, i.e. pressure transducer at 0,00 , 2,10 and -.90 bar;
12. Press the Start key, the display will show “SETUP COMPLETE”;
13. Press again the Start key to exit the calibration function and launch the self-test;
14. At the end of the self-test, switch-off the unit and restore the jumper X21;
15. Switch-on the unit and perform a sterilization cycle;



Example of LCD display



ATTACHMENT N - CALIBRATION

Before servicing, switch off the equipment and unplug the power supply cable from the mains socket

WARNING

This procedure must be performed by skilled technicians and using the ref connector. Otherwise MOCOM Ltd won't be responsible for the wrong servicing.

Data memory locked

1. Remove the covers (see card ***Gr7-1***);
2. Unplug jumper X21 of the CPU board;
3. Maintaining pushed the three left-side keys, switch-on the unit;
4. LCD will clear any data; then switch-off the unit;
5. Remove the wirings of any PTn probe, and plug-in the ref connector provided with the pin for checking the value 000,0;
6. Switch-on the unit, enter the SETUP mode, SERVICE menu, type the access code "++--++--", move to the option PT1 CORRECTION, and check that the PT1 value matches 1500 Ω;
7. Exit SETUP mode, switch-off the unit, then switch-on again maintaining pressed the Start key; LCD will show the message "SETUP" and then the PT1 value;
8. Press the first left-side key; the value will decrease at 000,0;
9. Should the value to be different, use key **+** and **–** to change the value up to 000,0; wait a few seconds to check its stability;
10. Press the Start key and repeat the check for any PTn as above, adjusting the value in case of mismatch from 000,0;
11. Press again the Start key to continue the PT calibration with the tests at 130.4; remove the ref connector, and plug-in it again in reverse direction;
12. Push the first left-side key; the value will increase to the new reference value;
13. Press again the first left-side key to approach the reading value; should the value to be different, use key **+** and **–** to increase or decrease the value up to the reference one; wait a few seconds to check its stability;
14. Press the key Start and repeat the check for any PTn as above, adjusting the value in case of mismatch;
15. Continue with the **MPx calibration at ambient pressure**; use the left-side key to approach the value to the reference one, and the key **+** to set the value at 0,00; wait a few seconds to check its stability;
16. Press again the key Start for the **MPx calibration at 2,10 bar**; connect the pressure transducer to an external air compressor, set the pressure at 2,10 bar; pushing the first left-side key the read value will approach to the reference one; use key **+** and **–** to increase or decrease the value up to match the reference one; wait a few seconds to check its stability;
17. Press again the key Start for the **MPx calibration at -.90 bar**; remove the air compressor, and connect the pressure transducer to an external vacuum pump; set the value at -.90 bar; pushing the first left-side key the read value will approach to the reference one; use key **+** and **–** to increase or decrease the value up to match the reference one; wait a few seconds to check its stability;
18. Press again the key Start; the display will now show "SETUP COMPLETE"; press the key Start to confirm, and wait the end of the self-test;
19. Switch-off the unit; remove the sample connector; restore the PTn wirings and jumper X21;
20. Switch-on the unit, enter the SETUP mode, SERVICE menu, enter the code "++--++--", go to PT1 CORRECTION option;
21. Use key **+** and **–** to increase or decrease the value up to match the value written on the label attached on the right rail;
22. Press the key Start to confirm the operation; exit the SETUP mode and switch-off the unit;
23. Switch-on the unit and perform a sterilization cycle.

TROLL electronic boards

1. Remove the covers (see card ***Gr7-1***);
2. Unplug jumper X21 of the CPU board;
3. Remove the wirings of the probes PT1...PT4, and connect the ref connector provided with the pin for the check of value 000,0;
4. Switch-on the unit, enter the SETUP mode, SERVICE menu, enter the access code "++--++--", move to the option PT1 CORRECTION, and check that the PT1 value matches 1500 Ω;
5. Exit SETUP mode, switch-off the unit, then switch-on again maintaining pressed the Start key; LCD will show the message "SETUP" and then the PT1 value;
6. Press the first left-side key; the value will decrease at 000,0;
7. Should the value to be different, use key **+** and **–** to change the value up to 000,0; wait a few seconds to check its stability;
8. Press the Start key and repeat the check for any PTn as above, adjusting the value in case of mismatch from 000,0;
9. Push again the Start key to continue the PT calibration with the tests at 130.4; remove the ref connector, and plug-in it again in reverse direction;
10. Push the first left-side key; the value will increase to the new reference value;
11. Push again the first left-side key to approach the reading value; should the value to be different, use key **+** and **–** to increase or decrease the value up to the reference one; wait a few seconds to check its stability;
12. Push the key Start and repeat the check for any PTn as above, adjusting the value in case of mismatch;
13. Continue with the **MPx calibration at ambient pressure**; use the left-side key to approach the value to the reference one, and the key **+** to set the value at 0,00; wait a few seconds to check its stability;
14. Push again the key Start for the **MPx calibration at 2,10 bar**; connect the pressure transducer to an external air compressor, set the pressure at 2,10 bar; pushing the first left-side key the read value will approach to the reference one; use key **+** and **–** to increase or decrease the value up to match the reference one; wait a few seconds to check its stability;
15. Push again the key Start for the **MPx calibration at -.90 bar**; remove the air compressor, and connect the pressure transducer to an external vacuum pump; set the value at -.90 bar; pushing the first left-side key the read value will approach to the reference one; use key **+** and **–** to increase or decrease the value up to match the reference one; wait a few seconds to check its stability;
16. Push again the key Start; the display will now show "SETUP COMPLETE"; push the key Start to confirm, and wait the end of the self-test;
17. Switch-off the unit; remove the sample connector; restore the PTn wirings and jumper X21;
18. Switch-on the unit, enter the SETUP mode, SERVICE menu, enter the code "++--++--", go to PT1 CORRECTION option;
19. Use key **+** and **–** to increase or decrease the value up to match the value written on the label attached on the right rail;
20. Push the key Start to confirm the operation; exit the SETUP mode and switch-off the unit;
21. Switch-on the unit and perform a sterilization cycle.

ATTACHMENT O -
TEST THE UNIT THROUGH CONTINUOUS CYCLES

Use this procedure in case you need to test continuously the sterilizer for a lot of time and be sure that this test will be normally concluded.

WARNING

The sterilizer is not normally provided with a water filling device and the number of cycles is so limited.

1. Connect an external tank for the automatic water filling;
2. Connect an external tank for recovering the steam discharge at the end of the cycle;
3. Fill the external tank with distilled water;
4. Enter SETUP mode, ADVANCED menu and set the FILLING OPTIONS on the item AUTOMATIC;
5. Move to SERVICE menu and TEST CYCLES, select the option desired;
6. Exit the SETUP mode;
7. Select a cycle and enter the Start command.

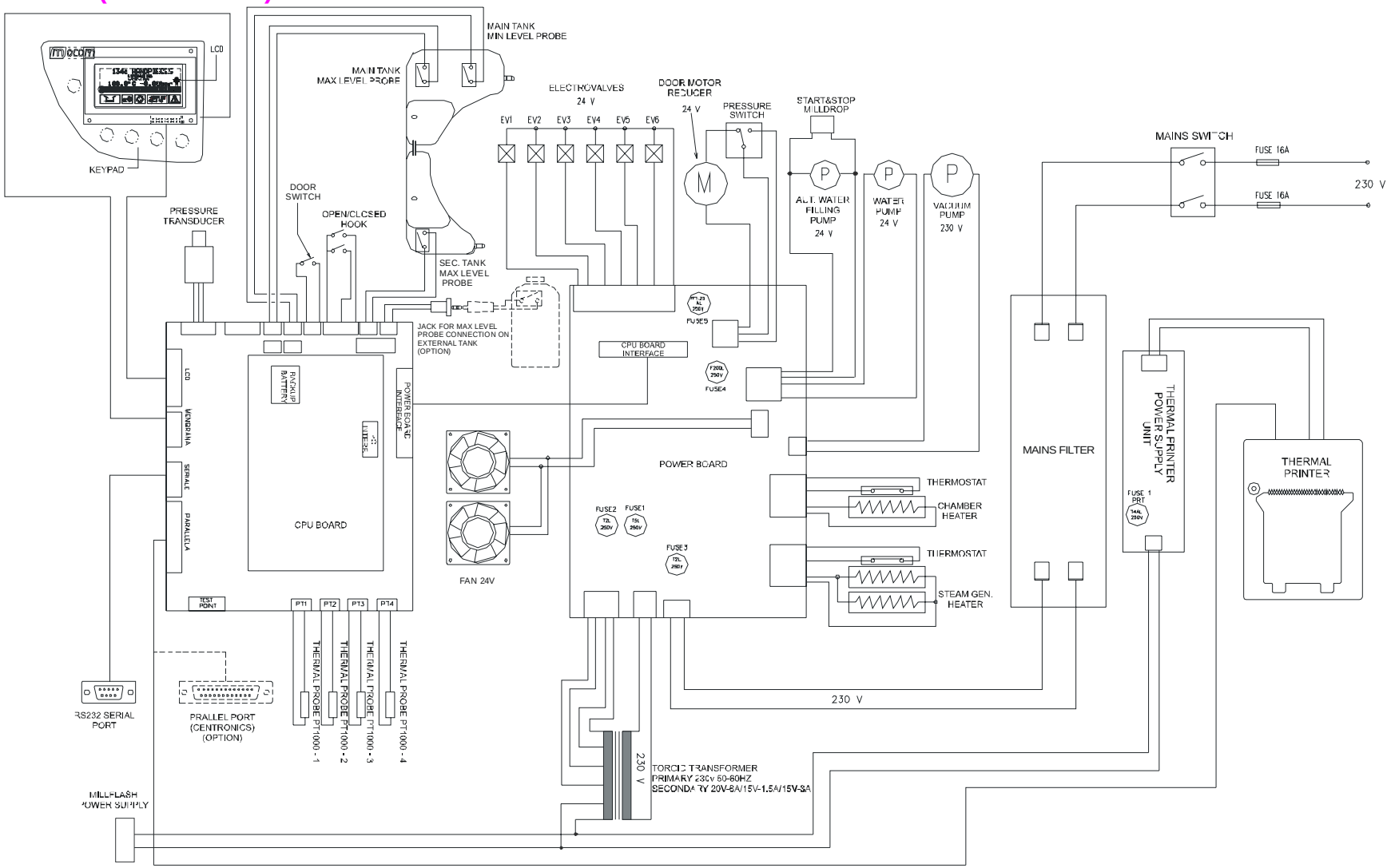
WARNING

At the end of the test, reenter the SETUP menu, SERVICE menu, TEST CYCLES and select the option “TEST CYCLES OFF” in order to set the sterilizer in standard mode.

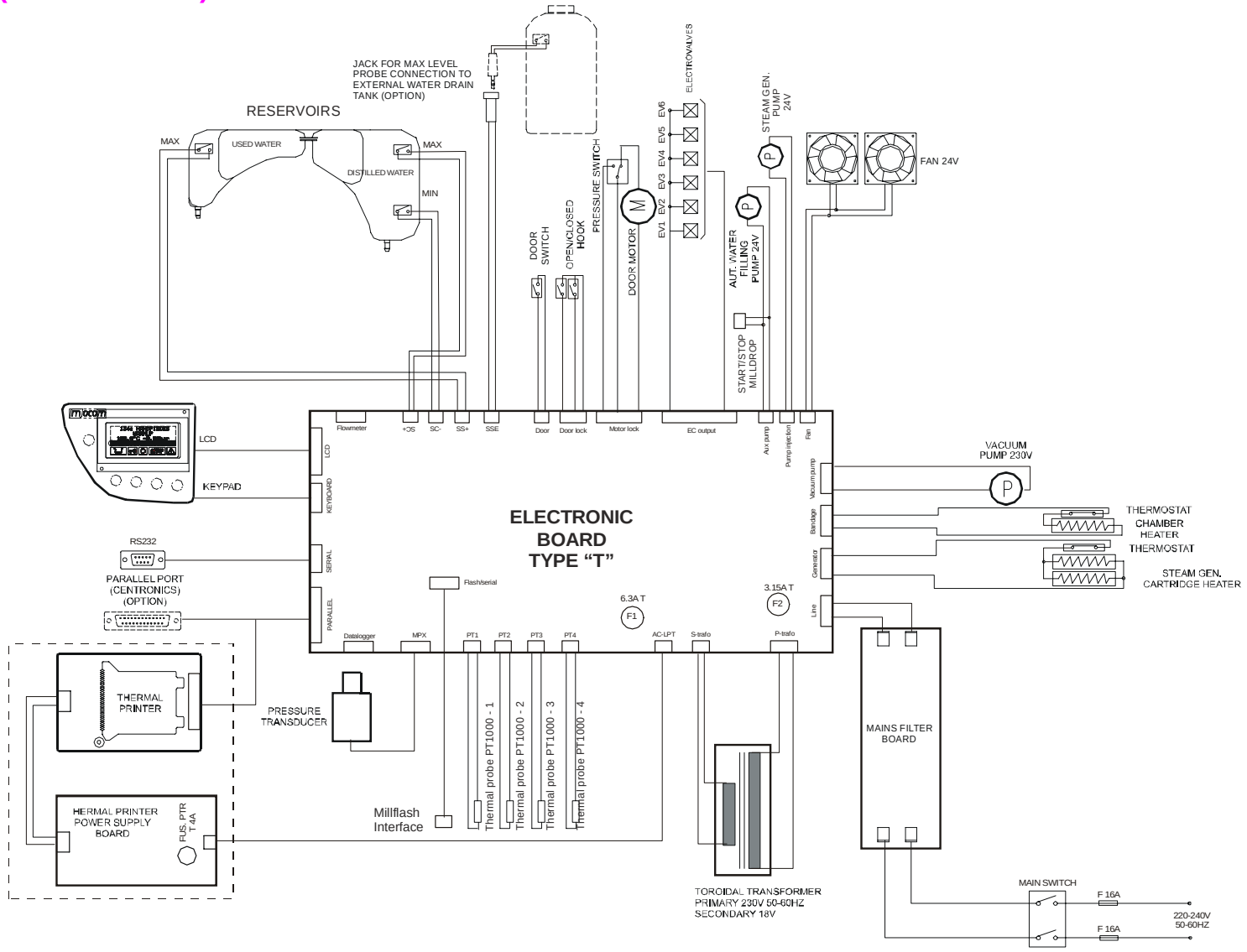
4. DIAGRAMS, ESPLODED VIEWS, SPARE PARTS

DIAGRAMS

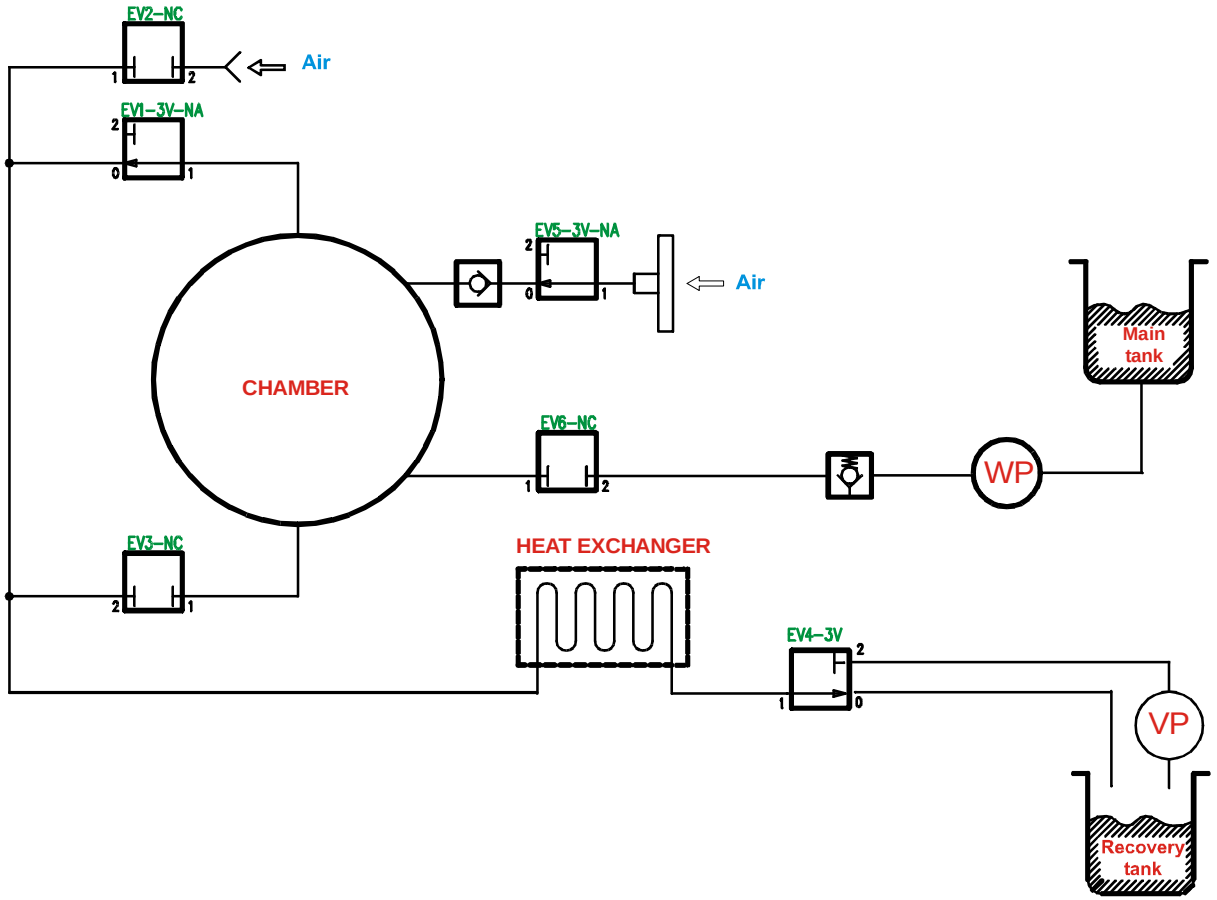
CIRCUIT DIAGRAM (GAM version)



CIRCUIT DIAGRAM (TROLL version)



HYDRAULIC DIAGRAM



EXPLODED VIEWS

TABLE 1

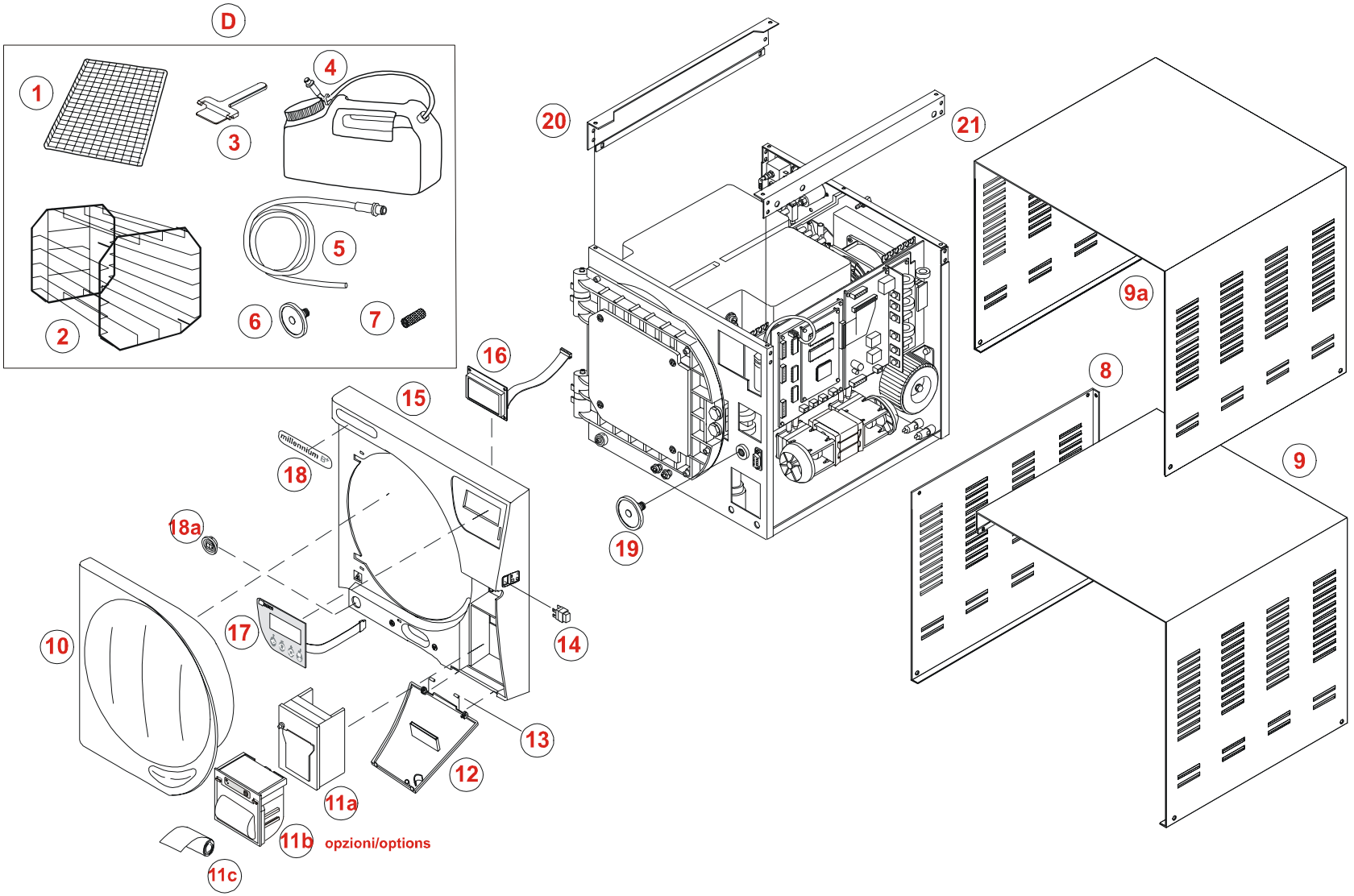


TABLE 2

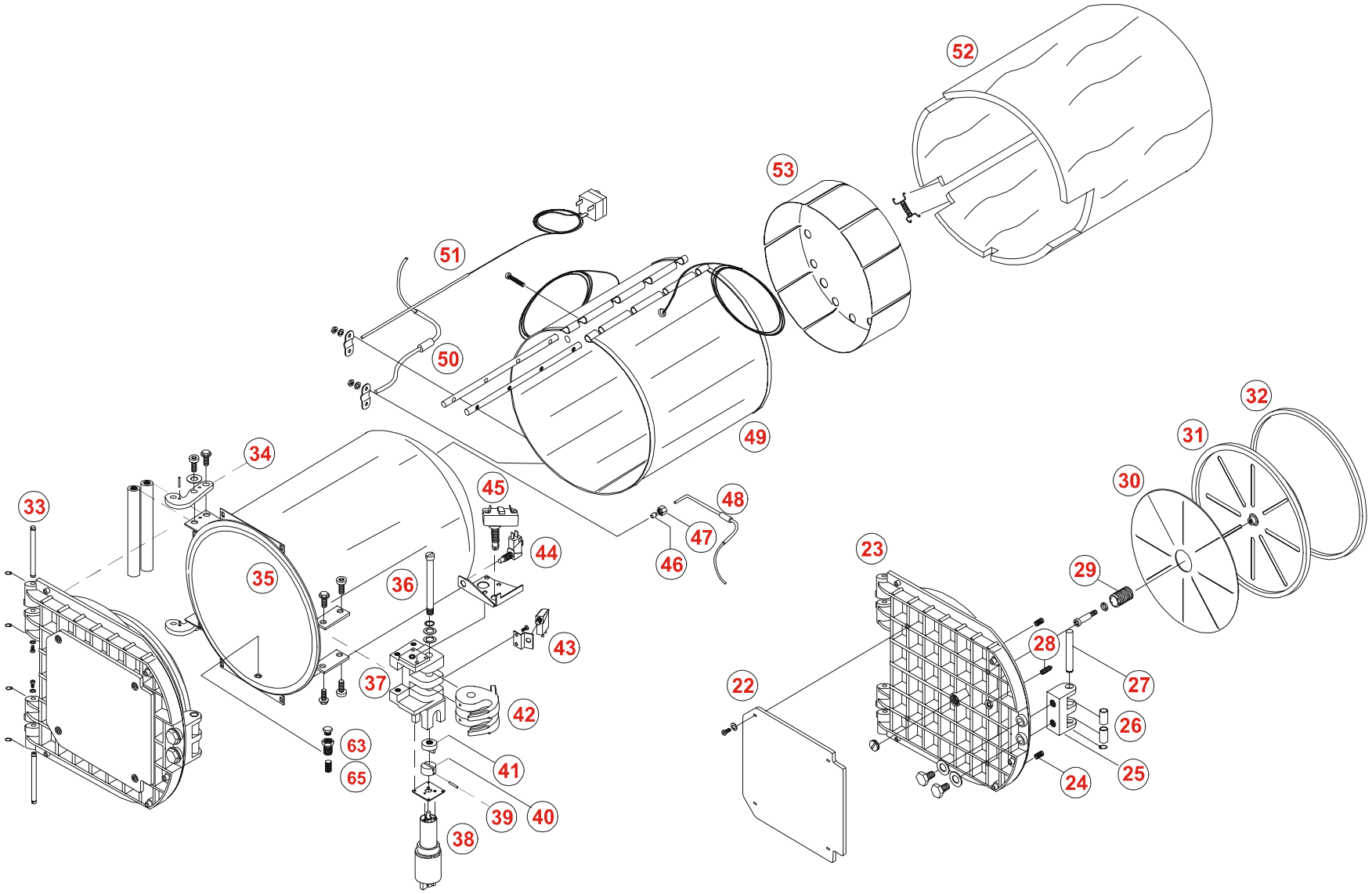

52
53
51
50
49
34
33
45
48
47
46
44
35
36
43
37
42
63
65
41
39
40
38
32
31
30
23
29
28
27
22
26
25
24

TABLE 3

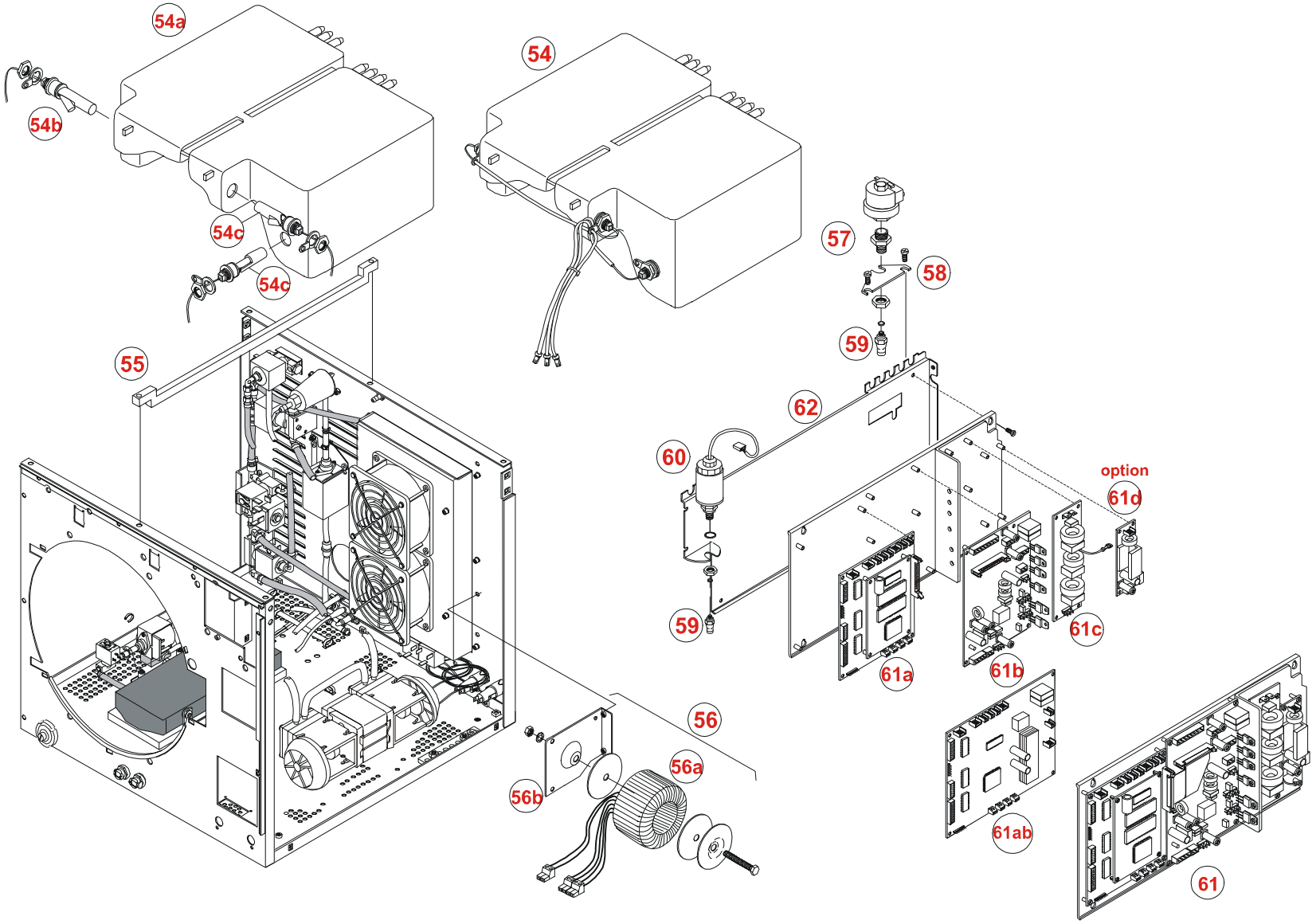

54a
54b
54c
54c
54
55
57
58
59
62
60
option
61d
59
61c
61a
61b
56
56a
56b
61ab
61

TABLE 4

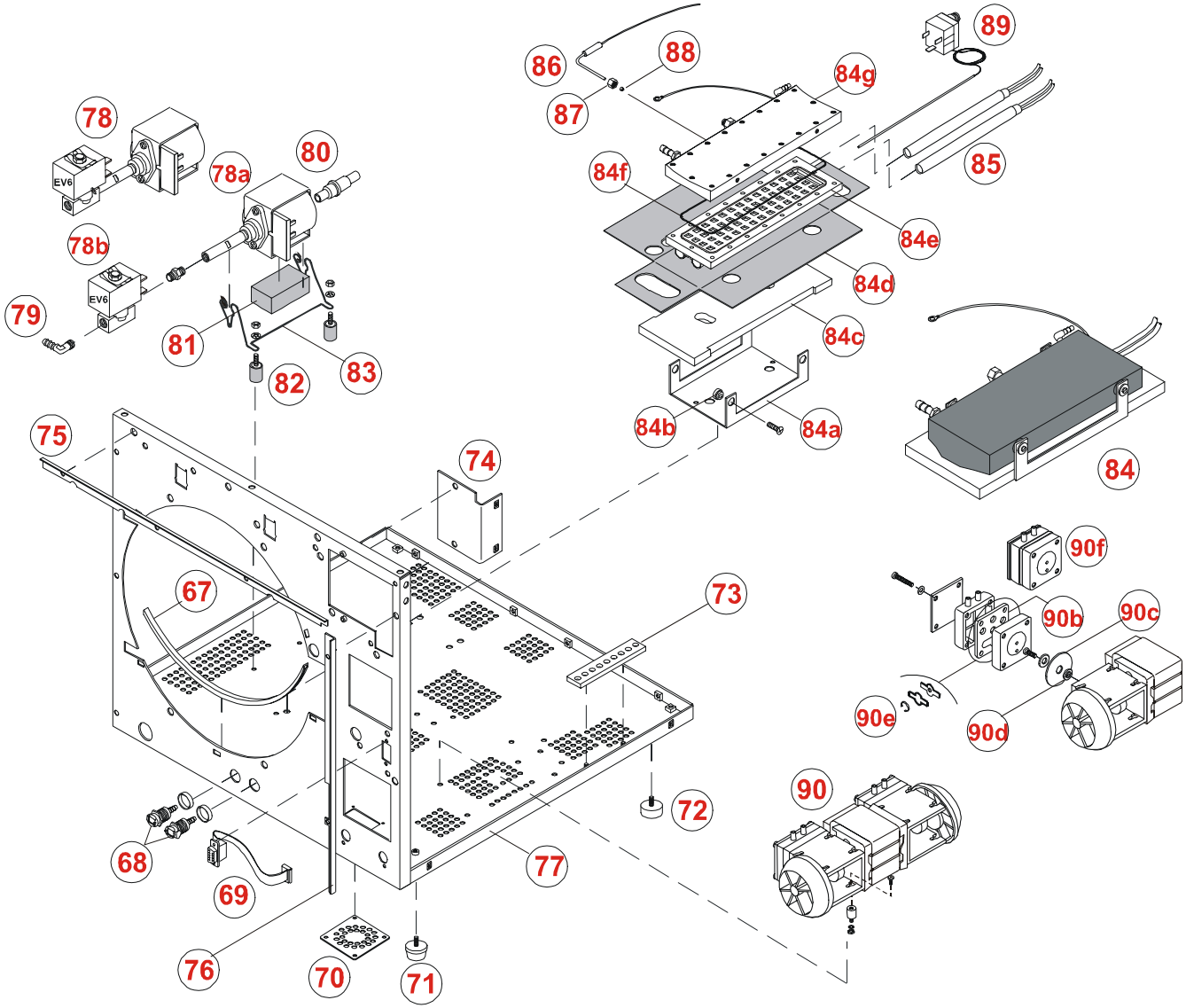

78
78a
80
78b
79
81
82
83
86
88
89
84g
87
84f
85
84e
84d
84c
84b
84a
84
75
74
67
73
90f
90b
90c
90e
90d
90
72
68
69
77
76
70
71

TABLE 5

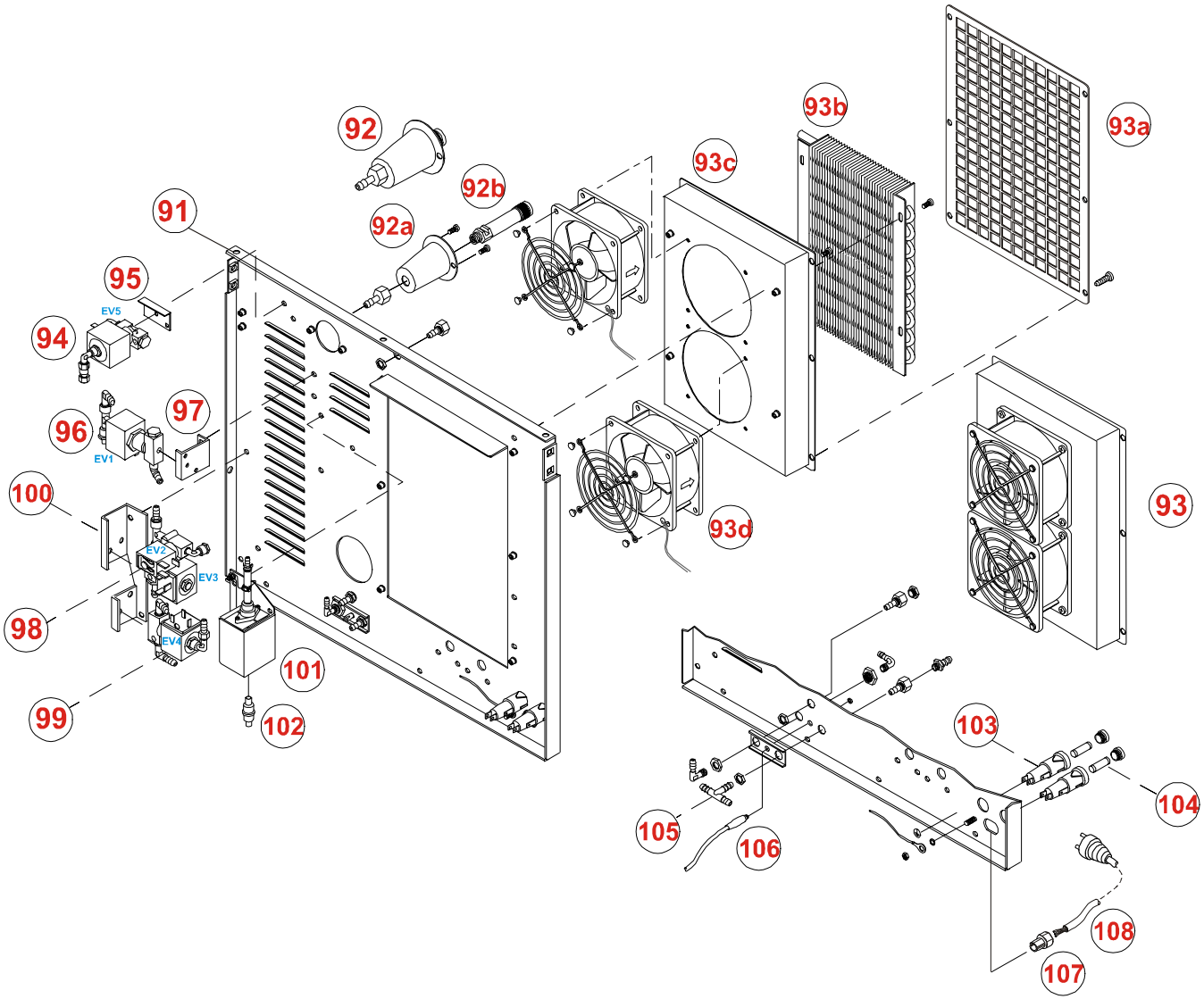
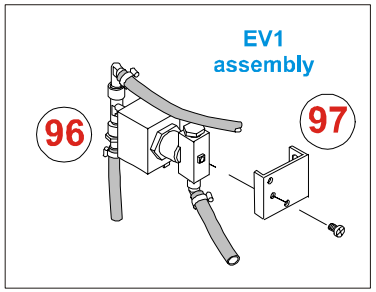
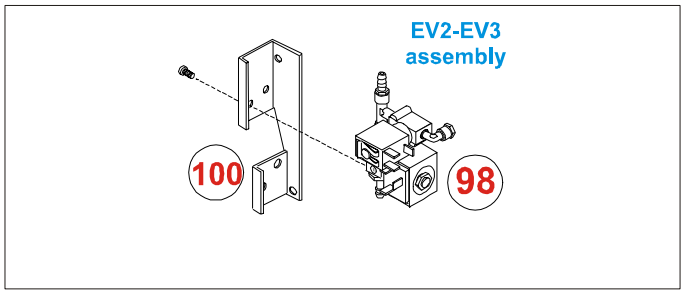
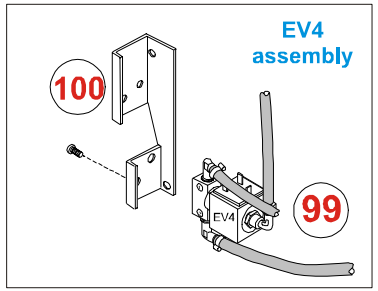
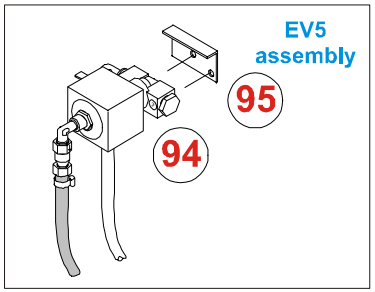

92
92b
92a
91
95
94
EV5
96
97
EV1
100
EV2
EV3
EV4
98
99
101
102
93b
93a
93c
93d
93
103
104
105
106
107
108

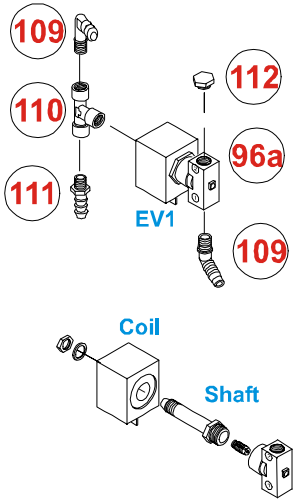
TABLE 6

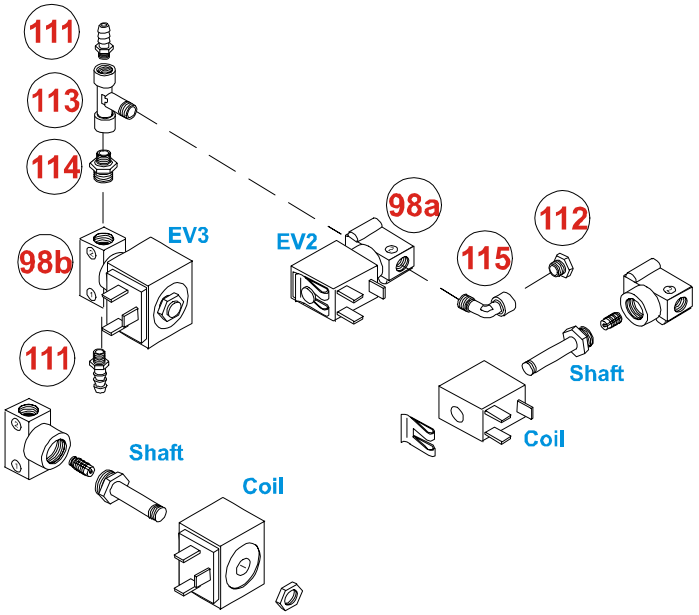

EV1
assembly
96
97

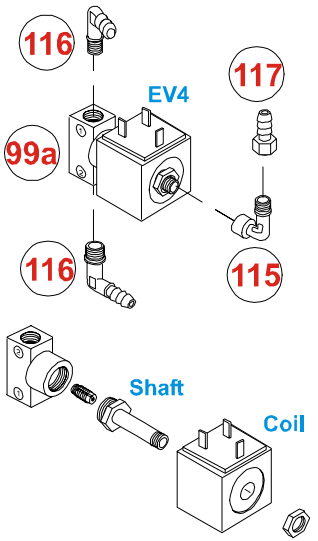

EV2-EV3
assembly
100
98


EV4
assembly
100
99
EV4


EV5
assembly
95
94


109
110
111
112
96a
109
EV1
Coil
Shaft


111
113
114
98b
111
EV3
98a
EV2
112
115
Shaft
Coil
Shaft
Coil


116
117
EV4
99a
116
115
Shaft
Coil

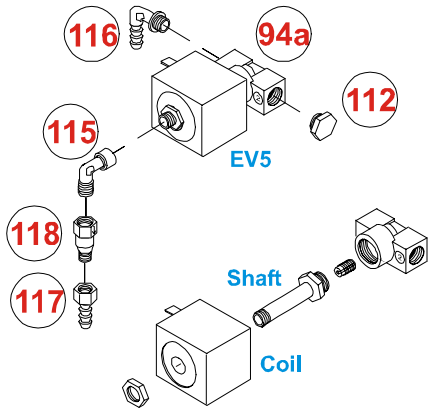
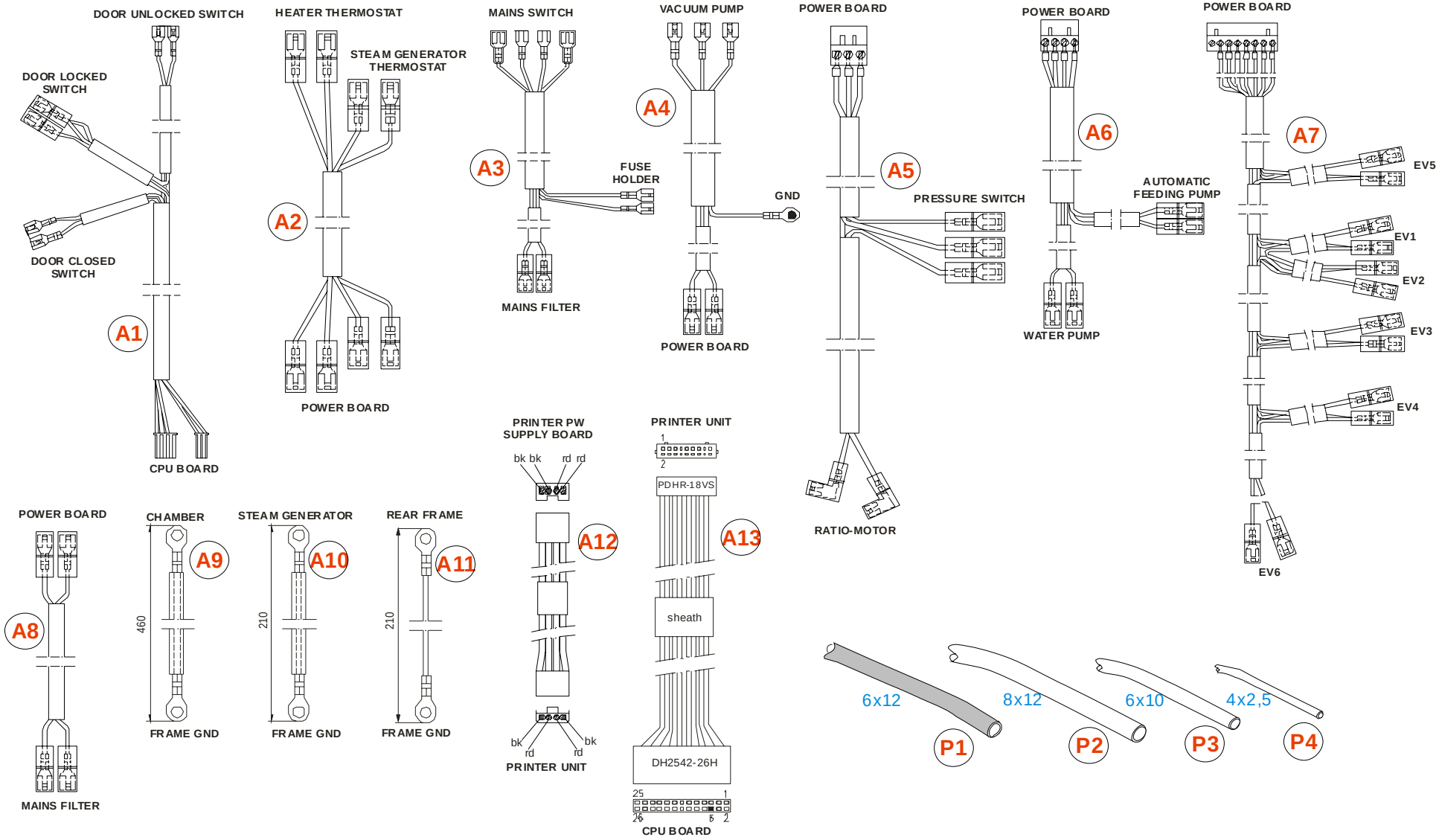

116
94a
112
115
EV5
118
117
Shaft
Coil

TABLE 7


DOOR UNLOCKED SWITCH
DOOR LOCKED SWITCH
DOOR CLOSED SWITCH
A1
CPU BOARD
HEATER THERMOSTAT
STEAM GENERATOR THERMOSTAT
A2
POWER BOARD
MAINS SWITCH
A3
FUSE HOLDER
MAINS FILTER
VACUUM PUMP
A4
GND
POWER BOARD
POWER BOARD
A5
PRESSURE SWITCH
RATIO-MOTOR
POWER BOARD
A6
AUTOMATIC FEEDING PUMP
WATER PUMP
POWER BOARD
A7
EV5
EV1
EV2
EV3
EV4
EV6
POWER BOARD
A8
MAINS FILTER
CHAMBER
A9
460
FRAME GND
STEAM GENERATOR
A10
210
FRAME GND
REAR FRAME
A11
210
FRAME GND
PRINTER PW SUPPLY BOARD
bk bk rd rd
A12
bk rd
bk rd
PRINTER UNIT
PRINTER UNIT
PDHR-18VS
A13
sheath
DH2542-26H
25
1
26
5
2
CPU BOARD
6x12
P1
8x12
P2
6x10
P3
4x2,5
P4

SPARE PARTS

P/N	Description	Ref.	Exploded view
A#6BM4380000	Standard supply kit	D	1
C#1XP076000Y	Tray	1	1
C#1BP459000Y	Tray holder	2	1
S#TXX0080000	Tray extractor	3	1
A#0XP0010000	Bottle (2 liters)	4	1
110#000003W0	Drain pipe with quick coupling	5	1
472#00010000	Bacteriological filter	6	1
472#00040000	Filter LP1	7	1
C#1BP1660001	Side cover	8	1
C#1BP1650001	Top cover	9	1
C#1BH0060001	Single cover	9a	1
C#3BP1850000	Door cover	10	1
C#5BP2550000	Thermal printer “Fenix type”	11a	1
C#5BP4630000	Thermal printer “Custom type”	11b	1
S#CBP0010000	Thermal paper roll	11c	1
C#3BP1840000	Printer box cover	12	1
230#B04L14K0	Pin 4x20	13	1
420#00070000	Main switch	14	1
C#3BP1830000	Plastic front frame	15	1
C#5BP1230000	LCD Display	16	1
C#6BM1630000	Keyboard	17	1
C#6BM1890100	Millennium B adhesive label	18	1

P/N	Description	Ref.	Exploded view
C#3BP2790000	Plastic plug	18a	1
472#00010000	Bacteriological filter	19	1
C#1BP153000M	Left bar	20	1
C#1BP152000M	Right bar	21	1
C#4BP2740000	Thermal insulating panel	22	2
C#0BP260000P	Aluminum die-casting door	23	2
C#7BP2640000	Spring	24	2
C#0BP060000Z	Nitrided fork	25	2
490#00050000	Bush	26	2
C#0BP0500000	Fork pin	27	2
203#C06L30K0	Screw 6x30	28	2
C#0BP079000N	Door adjustment screw-sleeve	29	2
C#4BP2160000	Thermal insulating disk	30	2
A#1BP027000Y	Inner dish	31	2
480#00050000	Dish gasket	32	2
C#0BP2720000	Hinge pin	33	2
A#1BP3380000	Hinge	34	2
A#1BP002000Y	Chamber	35	2
C#0BP0430000	Closing pin	36	2
A#1BP2710000	Closing block	37	2
403#00010000	Gear-motor	38	2
232#A03L25K0	Pin 3x25	39	2
C#0BP0450000	Gear-motor coupling	40	2
C#0BP0460000	Intermediate coupling	41	2

P/N	Description	Ref.	Exploded view
C#0BP0590000	Hook	42	2
433#00010000	Micro-switch	43	2
433#00010000	Micro-switch	44	2
433#00040000	Micro-switch (wheel pin)	45	2
286#00160000	Thermal probe bush	46	2
286#0014000N	Thermal probe nut	47	2
430#00190000	Thermal probe PT1000	48	2
410#00140000	Band heating resistor 1700W	49	2
430#00180000	Thermal probe PT1000	50	2
430#00140000	Thermostat	51	2
C#4BP2140100	Chamber thermal insulating panel	52	2
C#4BP2150000	Rear thermal insulating panel	53	2
A#0BP2900000	Reservoir assembly	54	3
C#3BP1700000	Main/recovery reservoirs	54a	3
432#00060000	Float (MAX – recovery reservoir)	54b	3
432#00050000	Float (MAX/MIN – main reservoir)	54c	3
C#1BP146000M	Reservoir middle bar	55	3
A#0BP3060000	Transformer assembly	56	3
412#00040000	Mains transformer	56a	3
C#1BP161000M	Transformer bracket	56b	3
431#00060000	Pressure switch	57	3
C#1BP125000M	Pressure switch bracket	58	3
260#000009MN	Fast pipe coupling connector	59	3
431#00080000	Pressure transducer	60	3

P/N	Description	Ref.	Exploded view
A#5BP5410000	Board assembly (GAM version)	61	3
C#5BP1410000	CPU board (GAM version)	61a	3
C#5BP1400000	Power board (GAM version)	61b	3
C#5BP1420000	Filter board (GAM version)	61c	3
C#5BP1430000	Printer power supply board (GAM version)	61d	3
A#5BM4760000	Board assembly (TROLL version)	61	3
C#5BM1400000	Basic board (TROLL version)	61ab	3
C#5BM1420000	Filter board (TROLL version)	61c	3
C#5BM1430000	Printer power supply board (TROLL version)	61d	3
C#1BP145000M	Board assembly bracket	62	3
286#00290000	LP1 filter holder	63	2
472#00030000	LP1 filter	65	2
111#000009W0	Rubber protection	67	4
260#000006V0	Charge/discharge fast coupling connector	68	4
A#2BP2380000	Flat cable 9 poles	69	4
C#1BP195000M	Closing door access window cover	70	4
256#00000400	PVC foot	71	4
256#00001000	Rubber foot	72	4
55V702016000	Ground bar	73	4
C#1BP147000M	Board assembly fixing plate	74	4
C#1BP269000M	Top angle bar	75	4
C#1BP270000M	Side angle bar	76	4

P/N	Description	Ref.	Exploded view
C#1BP150000M	Chassis	77	4
A#0BP2860000	Water pump assembly	78	4
400#00220000	Water pump	78a	4
401#00030000	Electrovalve 2-way (EV6)	78b	4
261#000009MN	Angle pipe fitting	79	4
472#00020000	Filter “Saeco”	80	4
111#000006W0	Adhesive mousse	81	4
256#00000800	Shock absorber	82	4
400#00050000	Water pump wire bracket	83	4
A#0BP2810000	Steam generator assembly	84	4
C#1BP136000M	Steam generator bracket	84a	4
C#0BP1310000	Thermal insulating spacer	84b	4
C#4BP2360000	Lower thermal insulating panel	84c	4
C#4BP2390000	Thermal insulating sheet	84d	4
C#0XP007000P	Steam generator bottom section	84e	4
481#00080000	Steam generator O-Ring	84f	4
C#0BP137000P	Steam generator top section	84g	4
410#00130000	Cartridge resistor	85	4
430#00180000	Thermal probe PT1000	86	4
286#0014000N	Thermal probe fixing nut	87	4
286#00160000	Thermal probe bush	88	4
430#00150000	Thermostat	89	4
A#0BM3100000	Vacuum pump assembly	90	4

P/N	Description	Ref.	Exploded view
400#00150000	Vacuum pump head central gasket	90b	4
400#00170000	Vacuum pump hole membrane	90c	4
400#00240000	Vacuum pump recessed-screw membrane	90d	4
400#00180000	Vacuum pump head shutters	90e	4
400#00120000	Vacuum pump head	90f	4
C#1BP151000M	Rear chassis	91	5
A#0BS0520000	Safety valve assembly (TUV)	92	5
C#1BS020000P	Safety valve bracket	92a	5
470#00020000	Safety valve	92b	5
A#1BP1640000	Heat exchanger assembly	93	5
404#00040000	Heat exchanger protection grid	93a	5
C#1BP160000	Heat exchanger	93b	5
C#1BP159000M	Heat exchanger holder	93c	5
404#00030000	Electric fan	93d	5
A#0BP2850000	EV5 assembly	94	5 / 6
401#00240000	EV5 3-way electrovalve	94a	6
55V432011000	EV5 bracket	95	5 / 6
A#0BP2820000	EV1 assembly	96	5 / 6
401#00240000	EV1 3-way electrovalve	96a	6
C#1BP241000M	EV1 bracket	97	5 / 6
A#0BP2830000	EV2/EV3 assembly	98	5 / 6
401#00030000	EV2 2-way electrovalve	98a	6
401#00230000	EV3 2-way electrovalve	98b	6
A#0BP2840000	EV4 assembly	99	5 / 6

P/N	Description	Ref.	Exploded view
401#00260000	EV4 3-way electrovalve	99a	6
C#1BP173000M	EV2/EV3/EV4 bracket	100	5 / 6
A#0BP2870000	Automatic water filling pump assembly	101	5
400#00220000	Automatic water filling pump	101	5
472#00020000	Filter “Saeco”	102	5
417#00060000	Fuse holder	103	5
417#00040000	Fuse F16A 6,3x32	104	5
261#000014V0	Plastic T-type fitting	105	5
A#2BP2630000	External tank level probe cable	106	5
277#00001400	Cable tight	107	5
A#2XP0160000	Mains cable	108	5
261#000009MN	Angle pipe fitting	109	6
263#000002MN	T-type fitting - FFF	110	6
261#000001MN	Straight pipe fitting	111	6
266#000003MN	Fitting plug 1/8	112	6
263#000003MN	T-type fitting - FMF	113	6
265#000009MN	Coupling	114	6
262#000003MN	Angle fitting FM	115	6
261#000010MN	Angle pipe fitting	116	6
261#000004MN	Straight pipe fitting	117	6
470#00010000	One-way valve	118	6
A#2BP2220000	Door microswitch cable	A1	7
A#2BP2230000	Thermostat cable	A2	7
A#2BP2240000	Mains switch cable	A3	7

P/N	Description	Ref.	Exploded view
A#2BP4030000	Vacuum pump cable	A4	7
A#2BG3520000	Gear-motor / pressure switch cable	A5	7
A#2BP2270000	Water pump cable	A6	7
A#2BP2280000	EV1÷EV6 electrovalves cable	A7	7
A#2BP2290000	Power board cable	A8	7
A#2BP2300000	Chamber ground wire	A9	7
A#2BP2310000	Steam generator ground wire	A10	7
A#2BP3070000	Rear chassis ground wire	A11	7
A#2BP2580000	Printer power supply cable	A12	7
A#2BP2570000	Printer signal cable	A13	7
110#000005W0	Reinforced silicone tube Ø 6 x 12 mm	P1	7
110#000014W0	Braided silicone tube Ø 6 x 12 mm	P2	7
110#000003W0	Transparent silicone tube Ø 6 x 10 mm	P3	7
110#000002V0	Tube PTFE Ø 4 x 2,5 mm	P4	7