



ISTRUZIONI D'USO
INSTRUCTION MANUAL
MODE D'EMPLOI
MANUAL DE USO
BETRIEBSANLEITUNG

LABCLAVE 23

(Vacuum Pump built-in)

VERTICAL - Rev.4.1 - 2009.12.19

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INTRODUCTION

Dear Client,

The autoclave is a device specifically studied for the steam sterilisation of tools and soils. It is broadly used in research laboratories, in facilities dedicated to personal hygiene and veterinary clinics. The very specific sterilisation loads encountered in these areas of application demand a diversification of requirements with respect of sterilisation performance characteristics.

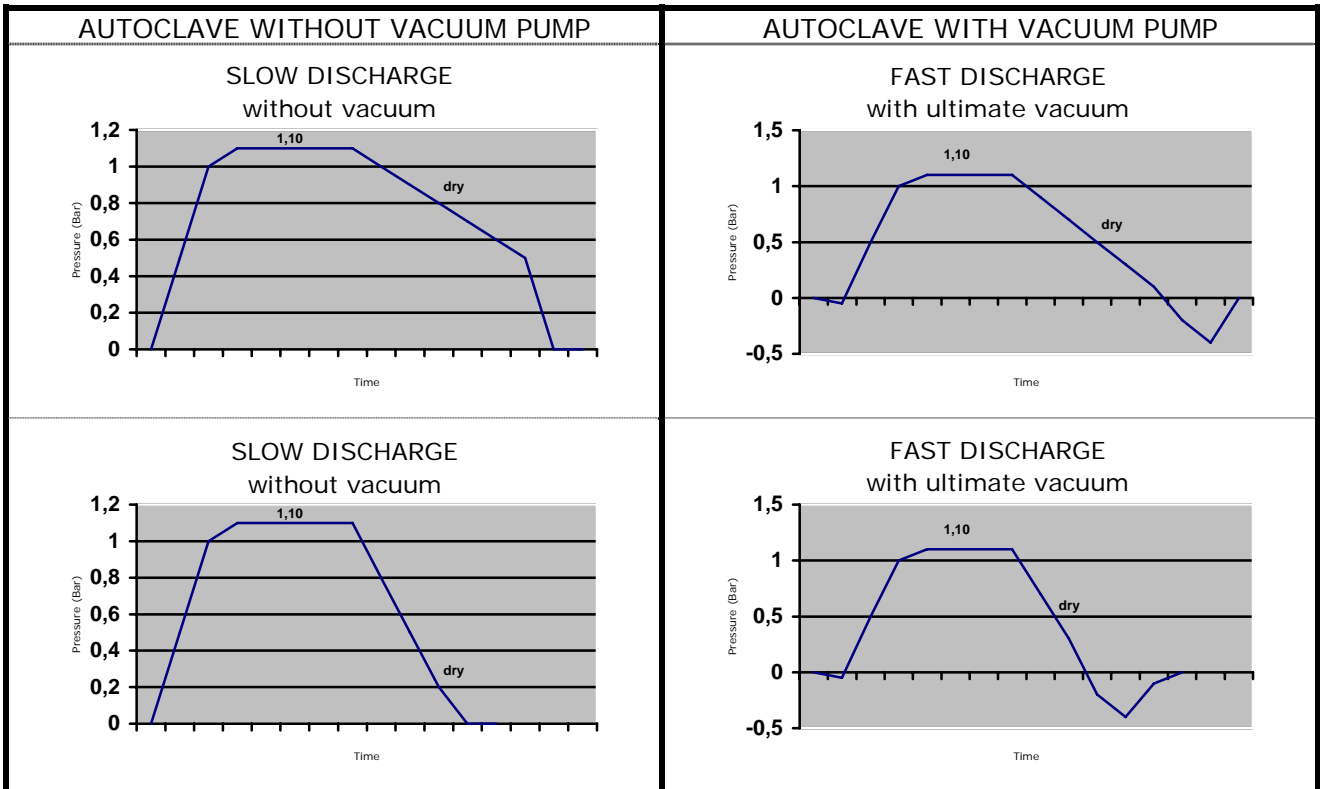
It is fundamental that the steriliser and its respective equipment are utilised exclusively for the sterilisation of the types of products for which they were designed.



ATTENTION

THIS AUTOCLAVE IS NOT CERTIFIED FOR THE STERILISATION OF MEDICAL DEVICES

GRAPHIC EXAMPLES OF THE DIFFERENT TYPES OF CYCLES





GENERAL WARNINGS

It is suggested that this manual be read thoroughly and with care before beginning to utilise the device in such a way as to carry out the required operations in an appropriate manner: **DO NOT** carry out, therefore, operations different from those found in this booklet. The manufacturing firm declines any and all responsibility for either direct or indirect damages to things, persons or animals stemming from the inappropriate use of this equipment.

- It is recommended that only responsible adult individuals use this equipment.
- Position the machine in a place inaccessible to children.
- Position the autoclave in such a manner that access to the main power switch is easy and practical.
- Install the device in a manner that an electric power outlet is easily accessible.
- Do not use the machine close to sources of inflammable or explosive materials.
- Utilise the machine in protected and dry environments.
- Periodically check the condition of the electric power cord: do not start the machine when the power cord is not perfectly integral.
- Do not carry out maintenance tasks when the machine is in operation or connected to the power outlet.
- Do not approach the machine while carrying inflammable material.
- Always wear personal safety devices and apparel, with respect of the current laws in force.
- Do not utilise this device for reasons other than those found in this instruction manual.
- Read the paragraph relative to the machine's technical characteristics before putting it into operation.
- For your personal safety we ask you to pay great attention to the instructions that follow herein.







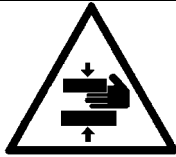
PRESSURISED VESSEL

The Pressurised vessel (sterilisation chamber) is an integral part of the autoclave, therefore it is necessary to adhere to, apart from the general warnings found above, specific cautions:

- Position the autoclave in such a manner that the safety valve (located in the back part of the machine) will not create any type of problem or disturbance in the event of a release of pressure.
- Do not interfere in any manner with the safety valve: any maintenance activity must be performed exclusively by personnel authorised by the manufacturing firm.
- Do not insert any tool that may damage the sterilisation chamber.
- Do not sterilize any corrosive liquid or substance.

SAFETY

SAFETY SYMBOLS

	ATTENTION CAREFULLY READ THE INSTRUCTIONS FOUND IN THE USER MANUAL
	TENSION
	BEWARE OF HIGH TEMPERATURE
	GROUND CONNECTION
	ATTENTION BEWARE OF HAND CRUSH HAZARD

SAFETY DEVICES

The safety devices foreseen are the following:

Three micro-switches in the hatchway and automatic locking system: they are independent each from the other and they verify that the hatchway system is closed and locked in the correct manner. In the event of problems, an alarm notifies the operator that the cycle cannot begin. If the cycle is already operational and a problem is detected, the microprocessor immediately interrupts the process and discharges the pressure from the machine.

Two mechanical temperature thermostats keep check that, for accidental reasons, the machine temperature does not exceed that which is required: one is for automatic reset, the other is for manual reset.

Two electronic temperature sensors continuously monitor all of the vital functions of the machine, preventing errors of overheating during the sterilisation process.

A safety valve for over-pressurisation eliminates the danger of explosion.

An electronic pressure transducer controls all of the solenoid valves, opening them in case of over-pressurisation.

PACKAGING, STORAGE AND DISPOSAL

The cardboard packaging utilised for transport of the autoclave IS NOT STERILE.

The autoclave is a delicate piece of equipment, therefore it is to be transported without receiving excessive shocks, collisions or without being OVERTURNED.

The autoclave is packaged with its accessories enclosed in the boiler. It is positioned inside the carton surrounded by a protective polyethylene bag. In order to protect it from accidental shocks it is surrounded as well by polystyrene or cardboard forms.

Keep in a protected, dry environment at a temperature between 5° and 30° C.

The client is invited to keep the original packaging for the guarantee period: any eventual returns for repair without the original packaging will be charged for new packaging at the moment of restitution.

Extraction and positioning of the Autoclave.

The operation of extraction of the machine from the cardboard carton must be carried out by at least two people, following the cautions listed below:

- Cut the straps that bind the cardboard carton.
- Open the cardboard carton and remove the metallic sealing staples so as to not be scratched.
- Remove the machine, grasping it by its sides, without putting load on the plastic parts.
- Read the instructions for use.
- Connect the plug to a Schuko socket furnished with a safety ground connection.

Do not substitute the original plug with others.

Do not use additional or extension connections.

Do not connect to multiple outlets or other types.

Be sure that the electrical plant to which the autoclave is connected is up to standard based upon the norms in force and that it is able to withstand the electrical load required.

- Turn on the machine with the main switch located on the side of the control panel.
- Open the hatch pushing on the button marked DOOR.
- Remove the accessory kit and turn off the machine.
- CAREFULLY READ THE USER MANUAL BEFORE BEGINNING ROUTINE WORK.

DISPOSAL AND/OR DEMOLITION

For disposal and/or demolition of any component (packaging, water, any machinery...) scrupulously keep to the norms in force in the country in which this operation is carried out.



FIRST INSTALLATION

The correct installation of the autoclave is a fundamental operation for its proper functioning. Following are listed the installation procedures:

1. The machine is to be installed in a laboratory where only authorised personnel may enter.
2. The working environment must be adequately lighted (see UNI 10380 norm) and sufficiently ventilated.
3. The device is to be located on a perfectly flat surface. Leave a free space of at least 20 cm between the wall and the rear of the autoclave.
4. Position the autoclave in such a way as to allow the complete inspection of the sterilisation chamber in order to carry out its cleaning.
5. Do not install the autoclave beside sinks or faucets: The cover of the device is not waterproof.
6. Do not install the autoclave next to heat sources (other autoclaves, stoves or others).
7. In order to avoid harm to people, things or animals, it is necessary to position the device in such a way as to permit any eventual outflow coming from the safety valve, which is to be released in a safe area.

HYDRAULIC CONNECTIONS

The hydraulic connections of the machine are of fundamental importance for the proper operation of the same (for reference see the photograph) and to avoid unpleasant consequences due to burns. Proceed as described below:

1. The silicon hose connected to the small tank is attached to the hose nipple connection located in the back of the machine.
2. In some cases there are two hoses: these are attached to the two threaded nipples present.
3. Adhere to the information found in the photograph.
4. Leave at least 20 cm space between the machine and the wall behind it.
5. The small condensation trap tank must be checked and emptied often: Keep it, therefore, in an accessible and easily visible position.


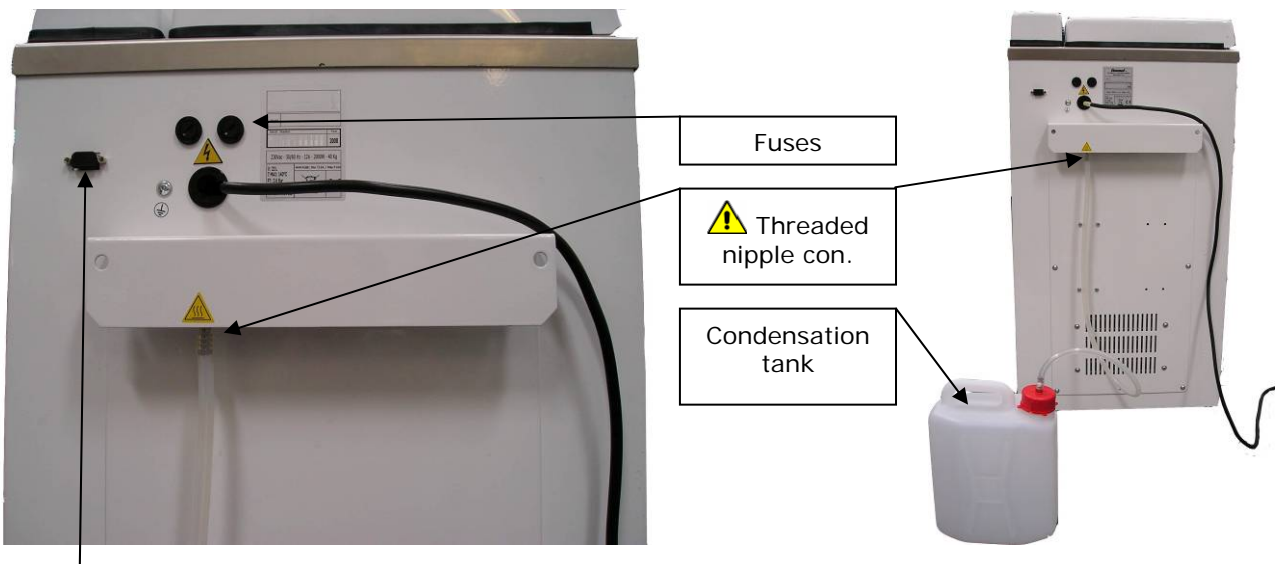
6.  The steam temperature at the outlet connection could be high (70° C).

PHOTO 1

PHOTO 2



RS232 data port for the connection of the "Datalogger" system: useful for the electronic recording of the machine cycles. The "Datalogger" system is optional.



IMPORTANT NOTES:

1. Empty the condensation tank often.
2. **DO NOT TOUCH THE THREADED NIPPLE CONNECTIONS DURING STEAM DISCHARGE.**
3. Allow at least 20 cm from the back panel to the wall to permit air circulation.

ACCESSORIES PROVIDED

The autoclave is furnished with the following accessories:

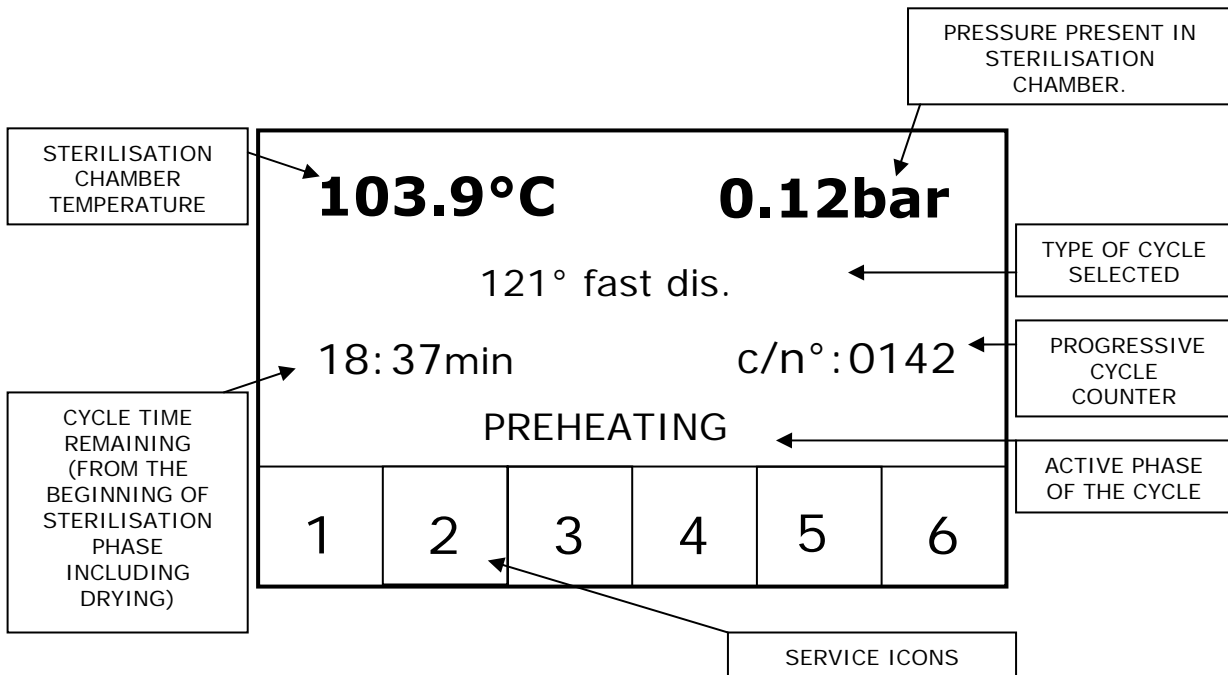
1. Perforated stainless steel basket.
2. Stainless steel support for the perforated basket.
3. Yellow/green sponge for cleaning the inside of the boiler.
4. Condensation container provided with threaded nipple connection.
5. Hatch adjustment wrench.

CONTROL PANEL

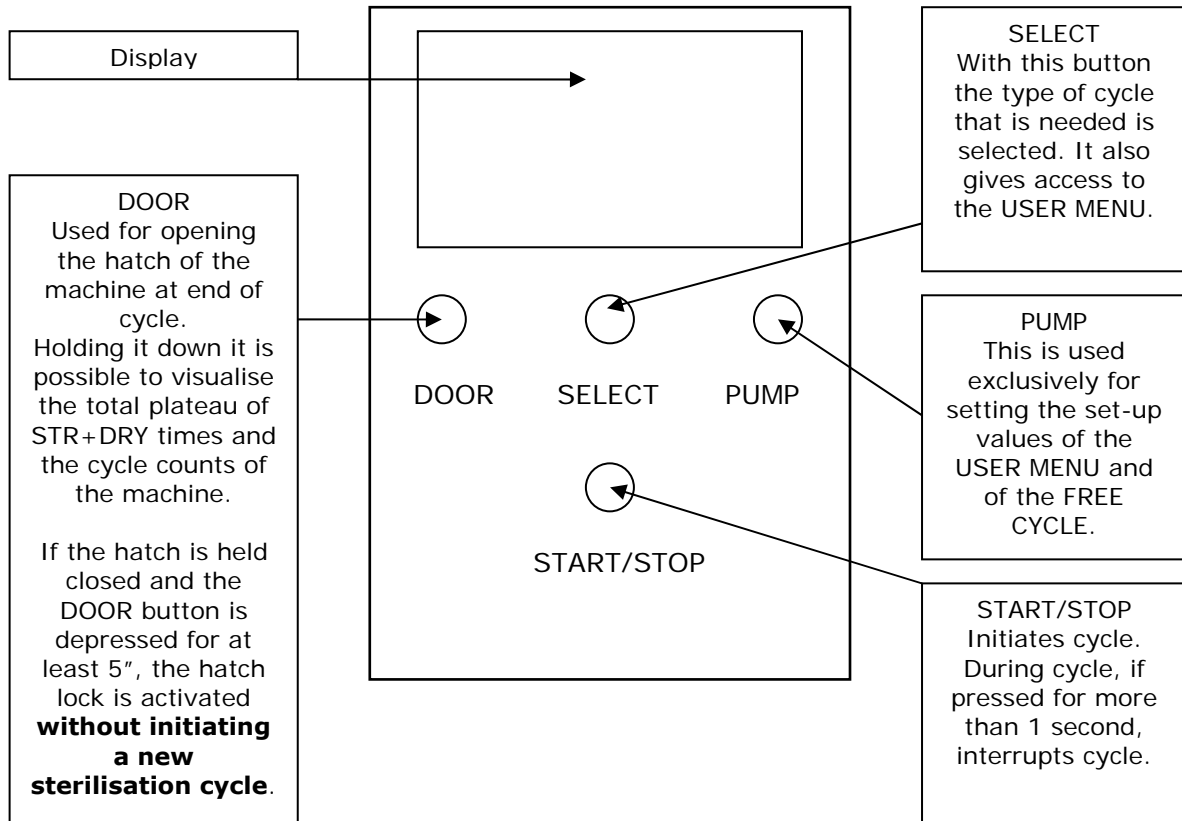


Do not use tools of any sort so as to not damage the display and its external protection.




DISPLAY



KEYBOARD



SERVICE ICONS

1		This icon appears immediately after the initiation of the cycle and indicates that the machine hatch is locked.
2		The presence of this icon indicates that the cycle is running: it is possible to also see the rotational movements of the arrows.
3		Icon No. 3 signals the lack of paper in the printer or, that the door to the same is not properly closed. The machine can in any case carry out cycles without any damage.
4	V	The letter "V" indicates that the selected cycle, after the final discharge, is carrying out a forced removal of the steam by way of the vacuum pump (see the cycle graphs). The cycles without this letter carry out thermodynamic drying.
5	<i>n.i.</i>	<i>Not used</i>
6	<i>n.i.</i>	<i>Not used</i>

PRINTER

At the beginning of any cycle, the autoclave initiates a printer strip on which are printed all of the values inherent in the type of cycle selected, the model and the serial number of the machine. At the end of the cycle the autoclave stops the printing strip as well: cut the printed data strip by pulling it toward the metallic blade (the incorporated cutter will be useful for this operation).

If the door is not correctly closed or if paper has not been loaded, the user will be notified by the service icon appearing in the display.

Refer to the indications of the Local Health Service for the filing of the printed strips.

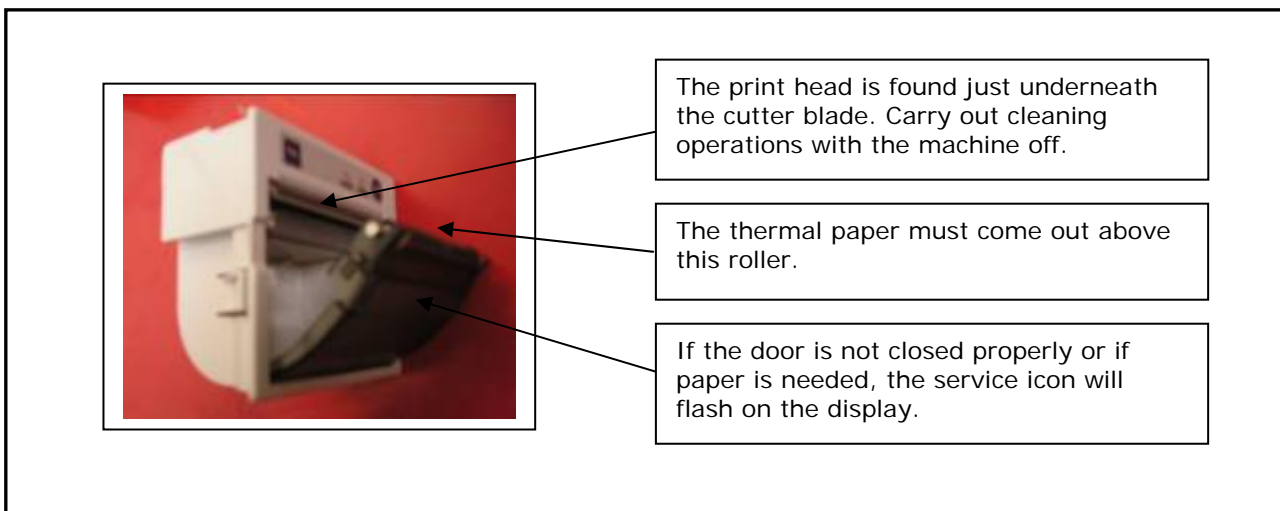
In order to maintain the printed strips for an ample duration of time, they must be filed in a place free from excessive heat and light.

SUBSTITUTION OF THE PRINTER PAPER ROLL

In order to substitute the printer paper roll: open the small door, insert a roll of thermal paper (the maximum size of which must be 56 mm) in the proper slot, having the free end of the paper come out above the door while closing the same. Utilize only thermal paper. Position the thermal paper in its proper direction of orientation: overturning the paper, the printed strip will come out blank.

PRINT HEAD CLEANING

If the print on the strip is difficult to read the print head needs to be cleaned, using a cloth dampened with alcohol: open the small door to the printer, extract the roll of paper and clean the print head (see the highlighted points in the photo). Blow away the dust deposited inside the printer with air.



PRINTED STRIP

Correct reading and interpretation of the information on the printed strip:

The printed strip contains the following information:

```

.....
                JUNO
RELEASE: 1.02
S/N: JUN0050001
DATA: 06:10:05
C/N : 0009
CICLO : LIBERO
110°C 0.46bar 20.00min
START
hh:mm:ss °C bar
11:51:50 026.4 0.833
11:51:52 026.4 0.833
11:51:53 026.4 0.830
STERILIZZAZIONE
12:17:34 110.8 0.485
12:18:34 110.6 0.484
12:19:34 110.5 0.479
12:20:34 110.6 0.486
12:21:34 110.7 0.490
12:22:34 110.7 0.491
12:23:34 110.7 0.490
12:24:34 110.7 0.492
12:25:34 110.7 0.492
12:26:34 110.7 0.492
12:27:34 110.7 0.492
12:28:34 110.7 0.491
12:29:34 110.7 0.490
12:30:34 110.7 0.490
12:31:34 110.7 0.491
12:32:34 110.7 0.492
12:33:34 110.7 0.492
12:34:34 110.7 0.492
12:35:34 110.8 0.493
12:36:34 110.8 0.495
                Min.    Max.
                °C    110.4    110.8
                bar    0.476    0.495
SCARICO
12:37:40 110.7 0.494
12:38:40 106.9 0.318
12:39:40 104.4 0.209
12:40:40 102.4 0.127
12:41:40 101.0 0.111
12:42:40 100.1 0.039
12:43:40 099.8 0.029
12:44:40 099.4 0.014
12:45:40 099.1 0.001
12:46:40 098.7 -0.013
12:47:40 098.2 0.042
12:48:40 096.9 0.033
12:49:40 096.3 0.042
12:50:40 095.7 0.045
12:51:40 095.0 0.041
12:52:40 094.6 0.045
12:53:40 094.0 0.044
12:53:41 093.9 0.044
FINE CICLO: OK
OPERATORE :
.....
    
```

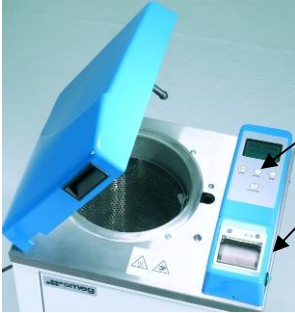
Callout boxes identify the following fields:

- Model name.
- Serial number.
- Cycle type selected.
- Time column: hour, minutes and seconds.
- Active phases of cycle.
- Temperature column expressed in degrees centigrade (°C).
- Space for operator's signature.
- Software version.
- Date of cycle initiation.
- Progressive number of cycles initiated.
- Characteristics of cycle initiated. Temperature and minimum pressure are marked.
- Pressure column expressed in bar (relative pressure).
- Cycle results.

USER MENU

ACCESS TO THE USER MENU

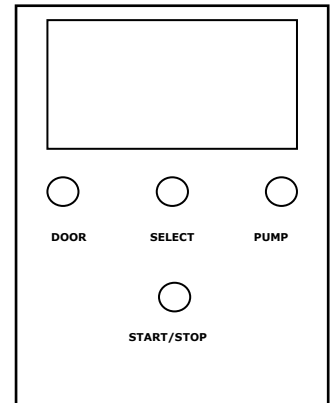
To access the user menu proceed as described below:



1. Open the door and turn off the machine.
2. Press the **SELECT** button and hold it down
3. Turn on the machine by way of the main **ON/OFF** switch.
4. Release the **SELECT** button only after "language set" appears on the display.

Inside of the user menu the buttons are to be used in this manner:

- **START/STOP** = moves up to the next page.
- **DOOR e PUMP** = allow the modifications of settings inside the page.
- **SELECT** = pushing it until the confirmation tone is heard, it will memorize the pre-selected value (not all of the pages require the memorisation of pre-selected values).



MENU SEQUENCE

1 LANGUAGE

ITALIAN/ENGLISH/.....

it is possible to select the language utilising the DOOR and PUMP buttons.

2 TIME

FORMAT hh mm ss

In this page the time is set. With the DOOR button the value is increased, with PUMP it is decreased and with the SELECT button the cursor is moved under the value to be modified. With the START/STOP button the screen moves up to ...

3 DATE

FORMAT dd mm yr

In this page the date is set. With the DOOR button the value is increased, with PUMP it is decreased and with the SELECT button the cursor is moved under the value to be modified. With the START/STOP button the screen moves up to ...

4 SET-UP PRESSURE

PRESSURE atm _ . _ _ _ bar

The machine automatically carries out the set up of atmospheric pressure. It is not possible to interfere in any manner. With the START/STOP button the screen moves up to ...

5 REPRINT CYCLES

REPRINT CYCLES

This function allows the archival in one action of the last cycles performed by the machine.
These cycles are printed by the internal or external printer by holding the SELECT button down for 5".
With the START/STOP button the screen moves up to ...

6 SETTING UP THE FREE CYCLE

STERILISATION TEMPERATURE:

CYCLE No. 08
TEMPERATURE
___._ °C

With the DOOR and PUMP buttons the value of the temperature of the free cycle may be increased or diminished respectively.
With the START/STOP button the screen moves up to ...

STERILISATION TIME:

CYCLE No. 08
STERILISATION DURATION
__mm.__ss.

With the DOOR and PUMP buttons the value of the minutes and seconds of the free cycle may be increased or diminished respectively.

With the SELECT button the cursor is moved under the parameter that is to be changed (minutes or seconds).

With the START/STOP button the screen moves up to ...

7 TYPE OF END CYCLE PRESSURE DISCHARGE

FAST DISCHARGE / SLOW DISCHARGE

This function allows the choice of the method of the final discharge in the FREE CYCLE.

- > SET SLOW DISCHARGE FOR THE STRERILISATION OF LIQUID MATERIALS.
- > SET FAST DISCHARGE FOR THE STRERILISATION OF SOLID MATERIALS.

Pushing the **START/STOP** returns the screen to point 1 of this chapter.

Holding down the **START/STOP** button for an extended period exits the user menu.


At any moment it is possible to exit from the USER MENU mode holding down the START/STOP button for an extended period.

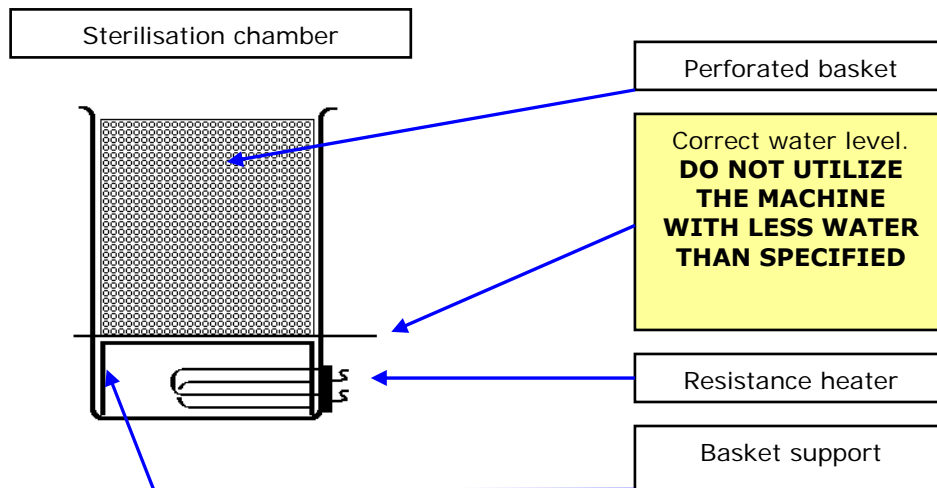
FIRST COMMISSIONING

FIRST UTILIZATION

After having installed the autoclave, the correct function of the device must be verified. Proceed however utilizing certain cautions found below:

1. Turn on the machine by way of the main switch.

2.  **Fill the sterilisation chamber with demineralised water (DO NOT USE DISTILLED WATER). The chamber must be filled with water up to where the resistance heater is completely covered by the water.**



3. Choose the cycle utilising the SELECT button.

4. Remove the basket and fill the sterilisation chamber with demineralised water:

5. Close the hatch.

6. Holding the hatch pushed downward, start the pre-selected cycle by way of the START button (release the hatch only after the closed door icon appears on the display).

7. The autoclave will continue automatically up to the end of the cycle, signalled by a triple tone and by the message END CYCLE on the display.

TEST CYCLE

The test cycle is needed to verify that the autoclave is integral, that it hasn't suffered any damage during delivery or that, for technical reasons it doesn't present any operational problems. As a verification test, it is suggested that a rapid discharge cycle be set. Below the functioning of a sample free cycle (fast discharge) is described, in such a way that simplifies the utilisation and the comprehension of the carrying out of the operational cycles of the machine:

- FREE CYCLE

During the entire period of the cycle, on the display there will be visible the values of:

- temperature
- pressure
- time remaining
- No. of the cycle initiated
- type of cycle initiated
- active phase of the cycle
- eventual warning icons

Insert the perforated basket into the machine, close the hatch and push the START button. The printer will begin the first part of the printed strip after which the preheating phase will be initiated.

In machines with vacuum pump, this preheating phase may be preceded by a brief pre-emptying phase (VACUUM).

During the operation of the cycle a light humming of the water condensation cooling fan is heard.

When the temperature of the sterilisation chamber has reached the pre-established value (normally 105° C), the solenoid valve will close and the actual rise in pressure and temperature of the machine will begin.

Having reached the pre-established parameters of the cycle, the STERILISATION phase will begin. During this phase, the electronic system of the machine continuously monitors the pressure and temperature values, intervening, where necessary, to re-establish the correct procedure of the cycle.

In an extreme case, the software intervenes to block the cycle signalling an ALARM.

At the end of the sterilisation phase the solenoid valve will open so as to permit the outflow of steam toward the cooling system and, afterward, toward the condensation tank (DISCHARGE).

This phase may be SLOW or FAST: it is suggested that "SLOW DISCHARGE" be set if liquids in their own appropriate containers must be sterilised; set "FAST DISCHARGE" if exclusively solid materials are to be sterilised.

The end of the cycle will be signalled by an acoustic tone and by the respective writing on the display.

In the event of a residual negative pressure or temperature above 94° C, the machine will not permit the opening of the hatch.

If in the chamber there is negative pressure, push the DOOR button and wait for equalisation then open the hatch.

If the temperature is above 94° C, wait for the machine to cool then open the hatch with the DOOR button.

Extract the perforated basket, lifting it with its handle:



ATTENTION: utilize protective gloves to avoid serious burns.

FREE CYCLE

THE FREE CYCLE is utilised for particular laboratory applications. All of the parameters that may be set in the "FREE CYCLE" must be modified exclusively by specialised personnel.

FREE CYCLE PARAMETERS

To access the FREE CYCLE parameters see the chapter USER MENU.

TEMPERATURE ADJUSTMENT

It is possible to set the temperature from 105 ° C to 135° C. When the display shows

**CYCLE No. 08
TEMPERATURE
000.0°C**

it is necessary to use the DOOR button to increase the value and the PUMP button to decrease it. Having found the desired value, hold down the START button for an extended period in order to exit the program or else push the START button one time to go into...

STERILISATION TIME ADJUSTMENT

It is possible to set the sterilisation time from 1 to 90 minutes (89 minutes and 59 seconds). When the display shows

**CYCLE No. 08
DURATION OF STERILISATION
00.00 (mm.ss)**

it is necessary to use the DOOR button to increase the value and the PUMP button to decrease it. The SELECT button allows the cursor to be moved to the parameter to be modified (minutes or seconds).

In the special "Long Time" version the duration of the RUNNING phase may vary from 1 minute to 59.999 minutes.

Having found the desired value, hold down the START button for an extended period in order to exit the program or else push the START button one time to go into the choice between...

FAST DISCHARGE / SLOW DISCHARGE

It is necessary to push the DOOR button to change the type of final steam discharge: utilise the "SLOW DISCHARGE" if the intention is to sterilise liquids. Having set the desired value, hold the START button down for an extended period to exit the program.



ATTENTION

Utilise the "SLOW DISCHARGE" if the intention is to sterilise liquids.

Once the desired value has been set, turn off the machine to exit the user menu.

STERILISATION TABLES

STERILISABLE MATERIALS

Normally this type of autoclave is utilised for the sterilisation of:

- Glassware (glasses, jars, etc.);
- Products for Microbiology (soils, broths, etc.);
- Metalware (spoons, flatware in general, etc.)
- Plastic containers

TABLE OF CYCLES FOR AUTOCLAVES WITHOUT VACUUM PUMPS

1. Turn on the machine by way of the main switch.
2. Open the hatch and wait for the double beep (without this "permission" the machine will not carry out any operations).
3. Choose the cycle utilising the SELECT button.
4. Close the hatch and initiate the cycle directly from the START button.



ATTENTION

Before sterilising any tool, liquid, solid or fabric, verify its technical characteristics, normally specified by its manufacturer. The choice of the type of sterilisation cycle must also be based on information furnished by the manufacturer of the objects that are intended for sterilisation.

Type of Cycle	Minutes of Sterilisation	Temperature	Pressure	Type of Discharge	Load Maximum
121°C Fast Discharge	15.00	121.0°C	1.10	Fast	6 kg If solid materials <i>or else</i> 5 kg if liquid products
121°C Slow Discharge	15.00	121.0°C	1.10	Slow	
121°C Fast Discharge	20.00	121.0°C	1.10	Fast	
121°C Slow Discharge	20.00	121.0°C	1.10	Slow	
134°C Fast Discharge	4.00	134.0°C	2.10	Fast	
134°C Slow Discharge	4.00	134.0°C	2.10	Slow	
134° PRION	18.00	134.0°	2.10	Fast	
FREE CYCLE	Min: 1' Max: 90' Default: 20'	Min: 105°C Max: 135°C Default: 110°C	Automatic	Options Default: Fast	



The autoclave is enabled for the sterilisation of liquids exclusively in the cycles headed by "SLOW DISCHARGE"



When opening the hatch, give maximum attention to the surfaces, to the materials and to the liquids which may cause severe burns

TABLE OF CYCLES FOR AUTOCLAVES WITH VACUUM PUMPS

1. Turn on the machine by way of the main switch.
2. Open the hatch and wait for the double *beep* (without this "permission" the machine will not carry out any operations).
3. Choose the cycle utilising the SELECT button.
4. Close the hatch and initiate the cycle directly from the START button.



ATTENTION

Before sterilising any tool, liquid, solid or fabric, verify its technical characteristics, normally specified by its manufacturer. The choice of the type of sterilisation cycle must also be based on information furnished by the manufacturer of the objects that are intended for sterilisation.

Type of Cycle	Minutes of Sterilisation	Temperature	Pressure	Type of Discharge	Empty of Dry	Load Maximum
121°C Fast Discharge	15.00	121.0°C	1.10	Fast	X	6 kg If solid materials <i>or else</i> 5 kg if liquid products
121°C Slow Discharge	15.00	121.0°C	1.10	Slow	X	
121°C Fast Discharge	15.00	121.0°C	1.10	Fast	✓	
121°C Slow Discharge	15.00	121.0°C	1.10	Slow	✓	
121°C Fast Discharge	20.00	121.0°C	1.10	Fast	X	
121°C Slow Discharge	20.00	121.0°C	1.10	Slow	X	
121°C Fast Discharge	20.00	121.0°C	1.10	Fast	✓	
121°C Slow Discharge	20.00	121.0°C	1.10	Slow	✓	
FREE CYCLE	Min: 1' Max: 90' Default: 20'	Min: 105°C Max: 135°C Default: 110°C	Automatic	Options Default: Fast	✓	

LEGEND:

✓ = Present (letter **v** present on display) X = Absent (no letter on display)



The autoclave is enabled for the sterilisation of liquids exclusively in the cycles headed by "SLOW DISCHARGE"



When opening the hatch, give maximum attention to the surfaces, to the materials and the liquids which may cause severe burns

SPECIAL VERSION "LONG TIME"

Special autoclaves called "Long Time" have a FREE CYCLE with the possibility of expanding the exposition time (RUNNING) up to 59.999 minutes.

Type of Cycle	Minutes of Sterilisation	Temperature	Pressure	Type of Discharge	Load Maximum
FREE CYCLE	Min: 1' Max: 59.900' Default: 20'	Min: 105°C Max: 135°C Default: 110°C	Automatic	Options Default: Fast	6 kg If solid materials <i>or else</i> 5 kg if liquid products

NIGHT CYCLE

If there are no operations to be carried out on the autoclave, this cycle reduces the consumption of energy keeping lit only the display backlight. Pushing any button (except START/STOP) the display will show the results of the last operation carried out (for ex. END CYCLE). Any cycle may become a "night cycle".

WATER QUALITY TABLE (DIN EN 285)

CEN STANDARD DIN EN 285	Maximum value
Evaporation residue	10 mg/l
Silicon oxide (SiO ₂)	1 mg/l
Iron	0,2 mg/l
Cadmium	0,005 mg/l
Lead	0,05 mg/l
The rest of the heavy metals (except iron, cadmium and lead)	0,1 mg/l
Chloride	2 mg/l
Phosphate	0,5 mg/l
Conductivity (at 20° C)	15 µS/cm
pH value	from 5 to 7
Aspect	Colourless, clean and with no sediment
Hardness	0,02 mmol/l

NOTE: The use of feed water containing concentrations superior to those indicated in the table above may notably reduce the life of the device causing serious damage to its components and leading to the forfeiture of the guarantee.

BIOLOGICAL TEST

Together with other chemical tests a biological test may also be requested. This test consists in the sterilisation of one or more vials containing biological spores, together with a normal sterilisation load. At the end of the initiated cycle, remove the vials and allow them to cool for some minutes (keep to the manufacturers instructions for the control procedures). Normally the sterilised vials are broken, using the instruments provided by the manufacturer, and inserted in a specific incubator: together with these another, as control, that has not undergone the process of sterilisation. After the incubation period, the difference in colour of the sterilised vials determines the result of the cycle.

ALARMS AND ERRORS

Alarms remain visualised on the display and block any further operations: they are also recorded on the printed strip: **after an alarm it is necessary to carry out the reset by contemporaneously pushing the START and SELECT buttons** for at least 5 seconds.

IT IS NOT POSSIBLE TO RESET AN ALARM IF THE INTERNAL TEMPERATURE IS > 94.0° C

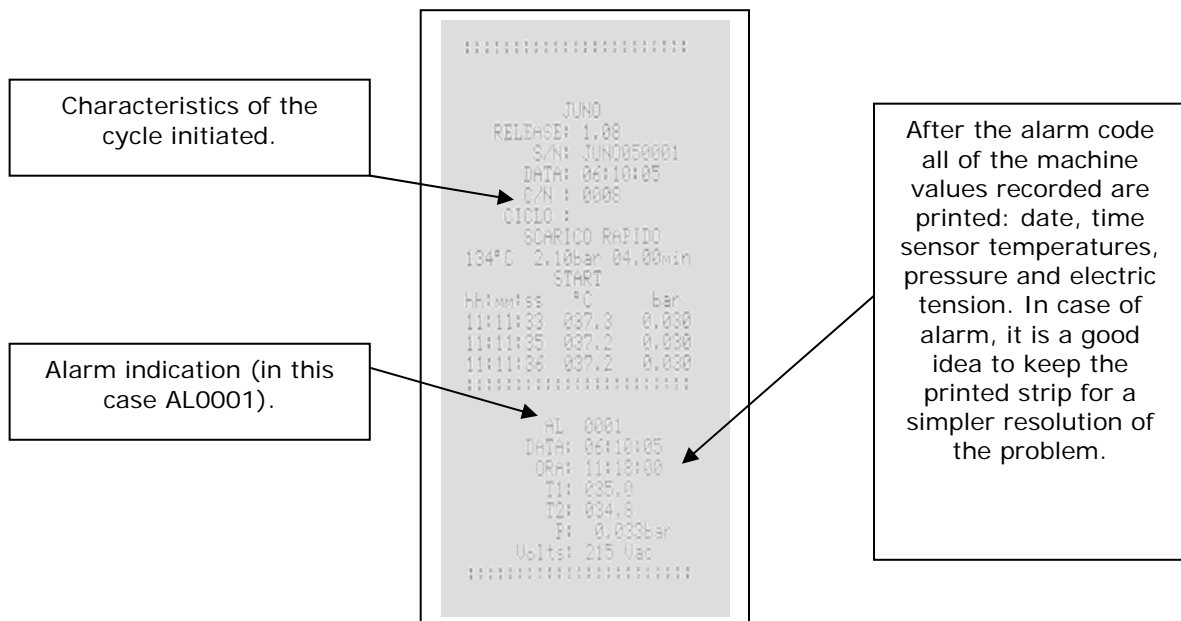
Errors, on the other hand, do not permit the initiation of the cycle but give the warning that it is necessary to carry out an operation before initiating the sterilisation procedure (for ex. "DOOR OPEN").



Any cycle not completed is to be considered ineffective: on the display there will appear an alarm code.

In the event of an alarm, the cycle being carried out is to be considered invalid (unsterile material).

Interpretation of an ALARM code:




ALARMS



IT IS NOT POSSIBLE TO RESET AN ALARM IF THE INTERNAL TEMPERATURE IS > 94.0° C

To carry out the reset it is necessary to push and hold down simultaneously the START and SELECT buttons until the display shuts off momentarily.

Code and meaning	Cause	Resolution of the problem: Reset alarm = START/STOP + SELECT for 5"
AL0001 Cycle interrupted voluntarily	This occurs if the START/STOP button is pushed for more than 1 second.	Reset the alarm then repeat the cycle.
AL0002 Power failure	Caused by the lack of electric power	
AL0003 Door open during cycle	This occurs if one of the door control micro-switches detects "door open during cycle".	Reset the alarm then repeat the cycle: If the problem persists call the service centre
AL0004 Timer stopped	May occur if the battery in the electronic data card is drained.	Reset the hour and date Before utilisation leave the autoclave turned on for at least an hour.
AL0005 High tension	Caused by an overload of the electric power line.	Reset the alarm then repeat the cycle.
AL0011 1 st vacuum failure	This alarm appears if the 1 st vacuum is not achieved.	Reset the alarm, adjust the hatch, clean the gaskets and insure that inside of the chamber there are no sacks that obstruct the ducts, then repeat the cycle.
AL0024 Failure of final rise	The machine does not reach working pressure.	 ATTENTION: SEVERE BURN HAZARD Check the water fill then repeat the cycle. During operation, verify that there are no losses of steam from the hatch.
AL0034 Final discharge failure	During the drying phase the machine does not discharge pressure.	Reset the alarm, remove the basket and make sure that on the inside of the chamber there are no sacks that obstruct the ducts, clean the inside of the sterilisation chamber, then repeat the cycle.
AL0100 Codification sensor T1 error	The alarm is the result of electronic data-card self diagnosis	Reset alarm. Turn off machine and turn on again: If the problem persists call the service centre.
AL0101 OPEN T1	T1 sensor reads open.	
AL0102 Short circuit T1	The T1 sensor is detected in short circuit.	
AL0110 T1 high temperature sensor	The T1 sensor has detected temperature above that set for the cycle.	Reset the alarm then wait 10 minutes with hatch open. Repeat the cycle: If the problem persists call the service centre.
AL0111 T1 sensor Low temperature in sterilisation	During the sterilisation phase the T1 sensor has detected temperature lower than the minimum limit permitted.	

AL0200 Codification sensor T2 error	The alarm is the result of electronic data-card self diagnosis	Reset alarm. Turn off machine and turn on again: If the problem persists call the service centre.
AL0201 OPEN T2	T2 sensor reads open.	
AL0202 SHORT CIRCUIT T2	The T2 sensor is detected in short circuit.	
AL0210 T2 high temperature sensor	The T2 sensor has detected temperature above that set for the cycle.	Reset the alarm then wait 10 minutes with hatch open. Repeat the cycle: If the problem persists call the service centre.
AL0211 T2 sensor Low temperature in sterilisation	During the sterilisation phase the T2 sensor has detected temperature lower than the minimum limit permitted.	
AL0300 Codification sensor P error	The alarm is the result of electronic data-card self diagnosis	Reset alarm. Turn off machine and turn on again: If the problem persists call the service centre.
AL0301 OPEN P	P sensor reads open.	
AL0302 SHORT CIRCUIT P	The P sensor is detected in short circuit.	
AL0310 High pressure in sterilisation	During the sterilisation phase the P sensor has detected pressure higher than the maximum limit permitted.	Reset the alarm, remove the basket and make sure that on the inside of the chamber there are no sacks that obstruct the ducts, clean the inside of the sterilisation chamber, then repeat the cycle.
AL0311 Low pressure in sterilisation	During the sterilisation phase the P sensor has detected pressure lower than the minimum limit permitted.	Reset alarm. Clean the gaskets and repeat the cycle: If the problem persists, it is necessary to call the service centre.
AL0700 Comparison T1 / T2	During sterilisation the two internal sensors have detected discordant temperature readings	Reset the alarm then repeat the cycle: If the problem persists call the service centre.

ERRORS

The messages that may appear on the display in the event of error are the following:

MESSAGE	CAUSE	RESOLUTION
OPEN DOOR	At start up it is requested that the hatch be opened to permit the machine to carry out its pressure check-up.	Open the hatch to permit automatic barometric alignment (double beep).
DOOR OPEN	A cycle has been initiated with the hatch open.	Close the hatch and initiate the cycle.
LOCK FAILURE	<p>The hatch has been released too quickly, after having started initiation of the cycle.</p> <p>Regardless of the perfect closure of the hatch, it is read as being "not locked" for mechanical reasons (the repetition of this error code requires the intervention of an expert technician.).</p>	Push the DOOR button, open and re-close the hatch, initiate the cycle with the START button.
UNLOCK FAILURE	At the end of a cycle the hatch locking system does not open completely.	<p>Re-close the hatch initiating a new cycle: after a few seconds, interrupt it with START/STOP, reset the alarm and open the hatch with DOOR for verification.</p> <p>The repetition of this error requires the intervention of an expert technician.</p>
SERVICE	The machine has carried out an elevated number of cycles and requires a service call for a periodic overhaul.	As soon as possible contact your reseller and request a service call by a technician.

MAINTENANCE



Before any maintenance operation it is obligatory that the electric power source to the device be disconnected.

DAILY MAINTENANCE

Daily maintenance foresees the topping up of the water level, cleaning of the edge of the boiler and the maintenance in good condition of the hatch gasket.

- **TOPPING UP OF THE WATER LEVEL:** the water level inside the chamber must always be even with the bottom of the perforated basket.
- **BOILER EDGE:** is the external edge of the sterilisation chamber on which the gasket makes a seal. Utilise the rough part of the sponge furnished in the kit.
- **HATCH GASKET:** clean the hatch gasket using the soft part of the sponge furnished in the kit. Cleaning must be carried out to remove any eventual debris that could impede the full operational completion of cycles.
- **GENERAL CLEANING OF THE SURFACES:** utilize a cloth for removal of dust and deposits from the different upper parts of the machine.

WEEKLY MAINTENANCE

Weekly maintenance foresees the total substitution of the sterilisation chamber water, visual inspection of the inside of the chamber and the check of a proper seal on the hatch gasket.

- **TOTAL WATER SUBSTITUTION** Utilising the condensation container, empty the sterilisation chamber by opening the spigot below (see photo). Remove the perforated basket to ascertain the total emptying of the chamber. Then proceed to the...

DO NOT CARRY OUT THIS OPERATION WITH LIVE MACHINE, DURING A CYCLE OR WITH PRESSURE IN THE CHAMBER!

Discharge tap: use the condensate container to empty the chamber from water.



ATTENZION: SCALD DANGER



- **CLEANING OF THE INSIDE OF THE CHAMBER:** clean the inside of the sterilisation chamber utilising the rough part of the sponge, provided in the kit, to remove small impurities in the bottom of the chamber. Any limescale deposits require a verification of the water that is being used.

- **PROPER SEAL OF THE GASKET** if during the cycle there is a release of steam from the hatch gasket, it is necessary to adjust the hatch hinges in a uniform manner. Utilising the wrench provided in the kit, adjust the hinges in the following manner:

! ATTENTION: ALWAYS ADJUST BOTH HINGES IN A UNIFORM MANNER.

- to tighten the hatch screw down in a clockwise direction
- to loosen the hatch unscrew in a counter-clockwise direction



QUARTERLY MAINTENANCE

Quarterly maintenance foresees the lubrication of the hatch hinges.

- **HINGE LUBRICATION:** utilize silicone oil, spraying it, in small quantities, on the two hatch hinges.

ANNUAL MAINTENANCE

The autoclave is a fundamental tool for the safeguarding of one's work: even though the electronic controls of these machines are always more reliable, it is well advised to perform an operational check of the device at least once a year. This check must be performed only by authorised and specialised service centres, with calibrated and certified instruments, so as to guarantee the machine long life and reliability (validation). To determine the control methods for the machine, it is, in any case, incumbent to refer to the indications of the local public health service.

- **ANNUAL VALIDATION:** Validation foresees the utilisation of instruments calibrated by centres specialised in the check of the parameters of autoclave cycles. Indeed, the pressure and temperature sensors are verified and the timer of the machine is checked. The manufacturer, upon request, provides an annual certificate of inspection for those machines brought in to its shop for maintenance and inspection.

TECHNICAL CHARACTERISTICS

MECHANICAL SPECIFICATIONS

Operational temperature	+5° +30° C
Maximum operational altitude	2000 m
Maximum relative humidity at 30° C	80%
Maximum relative humidity at 40° C	50%
Maximum dimensions (H x W x D)	930 x 460 x 395 mm
Open hatch clearance	350 mm
Weight	55 Kg
Colour	RAL9002
Material	Stainless Steel AISI 304 /FeP01
Noise level at 1 m distance	53,6 dbA
Noise level in front of display	62,2 dbA

ELECTRIC SPECIFICATIONS

Electric power tension	230 Vac (+/-10%)
Power rating	2500 W
Frequency	50-60 Hz
Power cord (L 1.5 m)	2+1 x 1,5mm
Fuses	6,3x32mm – T12A
Maximum heat transmission	5,76 MJ/h (1370 Kcal/h)
Insulation class	1

CHAMBER SPECIFICATIONS

Maximum operational pressure	2.3 bar relative
Maximum operational vacuum	-0.80 bar relative
Maximum operational temperature	140°C
Material	Stainless Steel AISI 304
Dimensions (diam. x depth)	236,5 x 530 mm

STEAM / DISCHARGE WATER SPECIFICATIONS

Steam temperature near the threaded nipple connection	56°C
Steam temperature near the condensation tank	50°C

POLLUTION LEVEL	2
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GUARANTEE

For all defects in conformity existent at the moment of delivery of the device and imputable to actions or omissions of the manufacturer

THE MANUFACTURER guarantees this product for a period of:

12 months on the entire product

The guarantee period begins on the date of delivery of the machine to the client: said date must be written on the guarantee certificate, fully filled out, stamped and signed by both the reseller and the client and mailed to the manufacturer's offices. In the event of contestation, the delivery date attested to by a fiscally valid document (shipping invoice, sales invoice, fiscal sales receipt, etc.) that has on it the name of the seller, the date of delivery, the identifying particulars of the product (model and serial number), and the sales price is considered valid.

So that this guarantee may have full validity it is necessary that:

1. all of the operations of installation and hydraulic and electric connections were carried out scrupulously following the instructions in this manual of INSTRUCTIONS FOR USE;
2. all of the operations of utilisation and maintenance are carried out according to the INSTRUCTIONS FOR USE;
3. any repair procedure is carried out by authorised personnel and that only original spare parts are used.

Not covered by the guarantee are all the components that may show defects in conformity derived from:

1. improper maintenance, negligence, careless use on the part of the user caused by disrespect for that which is written and recommended in the booklet of INSTRUCTIONS FOR USE.
2. alterations or of all other causes not imputable to the manufacturer.
3. the components subject to normal wear (for ex., keyboard in polycarbonate, hoses provided, trays, etc.) and accessories if not when it is demonstrated that there has been a manufacturing fault.

THE MANUFACTURER declines any and all responsibility for:

1. damages derived from transport, if not specified in the purchase order.
2. inappropriate installation of the machine.
3. any damages, either direct or indirect, to persons, things or animals for the lack of observation of all of the recommendations indicated in the INSTRUCTIONS FOR USE booklet and concerning, especially, the conditions of installation, use and maintenance of the product.

Limitations of the guarantee

1. The right to total substitution of the machine is not recognised if the defect is not reported within two months of the date of purchase.
2. it is at the discretion of the MANUFACTURER to carry out or the repair or the substitution of a part in guarantee. This operation does not include, in any case, the transfer of personnel.
3. no claim for compensation for machine down time will be recognised.
4. the guarantee is automatically voided if the machine is altered, repaired or modified by the purchaser or by a third party not authorised by the MANUFACTURER. For all service calls, the purchaser must rely upon only the reseller or else service personnel indicated by the manufacturer.
5. components substituted in guarantee must be rendered to the manufacturer (under penalty of being charged for the same), with exception of agreements previously stipulated between the parties.

All the products that require repair must be authorised upon re-entry by the MANUFACTURER.



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