Raypa

INSTRUCTION MANUAL
FOR USE AND MAINTENANCE

AUTOCLAVES FOR STERILIZATION

Model: AHS-50 DRY
AHS-75 DRY

This manual has been written for safety reasons, read the instructions carefully before installing and /or using this apparatus.
If this apparatus should be sold or transferred, ensure that this manual is given to the new owner, for the correct use and installation.
This manual should be kept by the apparatus for in case of doubt in its use and for maintenance reasons.

IMORTANT! READ CAREFULLY BEFORE USING THE AUTOCLAVE

1) Never use the autoclave to sterilize any of the following hazardous materials or substances with alkali content. Sterilization of such objects can cause explosion, corrosion of the working chamber or chamber piping, and deterioration of gaskets.

List of Hazardous Materials:
Explosive substances
- Nytroglycol, nitroglycerin, nitrocellulose, and other explosive nitric esters.
- Trinitrobenzene, trinitrotoluene, picric acid, and other explosive nitro compounds.
- Peracetic acid, methyl ethyl ketone peroxide, benzoyl peroxide and other organic peroxides.

Ignitable substances
- Metallic lithium, potassium, sodium, yellow phosphorous, phosphorous sulfide, and red phosphorous.
- Celluloids, calcium carbide (carbide), lime phosphide, and magnesium powder.
- Aluminum powder, magnesium powder, and metallic powders other than aluminum powder.
- Sodium dithionite (or sodium hydrosulfite).

Oxidizing agents
- Potassium chlorate, sodium chlorate, ammonium chlorate, and other chlorates.
- Potassium perchlorate, sodium perchlorate, ammonium perchlorate, and other perchlorates.
- Potassium peroxide, sodium peroxide, barium peroxide, and other inorganic peroxides.
- Potassium nitrate, sodium nitrate, ammonium nitrate, and other nitrates.
- Sodium chlorite and other chlorites.
- Calcium hypochlorite and other hypoclorites.

Flammable substances
- Ethyl ether, gasoline, acetaldehyde, propylene oxide, carbon disulfide, and other substances whose flash points range from -30 to 0ºC.
- Methanol, ethanol, xylene, benzyl acetate (or amyl acetate), and other substances whose flash points range from 0 to 30ºC.
- Kerosene, gas oil, turpenine oil, isopentyl alcohol (or isoamyl alcohol), acetic acid, and other substances whose flash points range from 30 to 65ºC.

Flammable gas
- Hydrogen, acetylene, ethylene, methane, ethane, propane, butane, and other substances that are gases at temperature of 15ºC under 1 atmospheric pressure.

2) When high salinity solutions are spilled in the chamber, discharge water in the chamber and wipe up any remaining drop of water around the lid gasket carefully. Not to do it can lead to corrosion of the chamber and the piping system.
3) Absolutely do not attempt to remodel or alter this product.
4) Do not forcibly bend, twist, tie or extend the power cord. Do not place heavy objects on the cord. A damaged cord or exposed wire can cause fire or electric shock.
5) Never connect the power cord to a power supply other than one of the rated voltage. Connection to such a power supply can cause fire or electric shock.
6) If grounded socket is unavailable, ground the equipment using a separate ground wire before connecting the power cord to the power source.
7) Never ground to a gas pipe or vinyl chloride water service pipe.
8) Do not pour anything except for water.
9) Do not use the autoclave for the purpose other than sterilization and agar preparation (dissolve).
10) Close the lid after confirming that no foreign matter is avoiding the contact between the tank and the lid gasket. Foreign matter in this section can cause vapour leakage.
11) When using a waste processing bag or any other kind of alternative bag, place the bag in the metal mesh holder and then insert it into the chamber. Using the bag “as is” can cause excessive temperatures, pressures, lack-of-water, etc.
12) Do not put your face or hands close to the chamber when lifting the lid after operations are complete; steam will gush out of the chamber.
13) The lid, chamber, gasket, and top casing are extremely hot immediately after the completion of operation. Don’t touch the equipment or you may get burned.
14) Put on heat insulating gloves before removing a substance from the chamber. Do not put hands into the chamber until the steam has been vented.
15) Some time is required for liquids to cool. Be sure to check that the temperature has dropped enough before unloading a liquid from the chamber or burns can result.
16) Never drain the chamber when it is under pressure. Boiling water or steam may gush out causing burns.
17) If any abnormality occurs (e.g. abnormal sounds, smells, smoke), immediately shut the power off. After checking that the abnormal condition does not continue, call out authorized distributor in your region.

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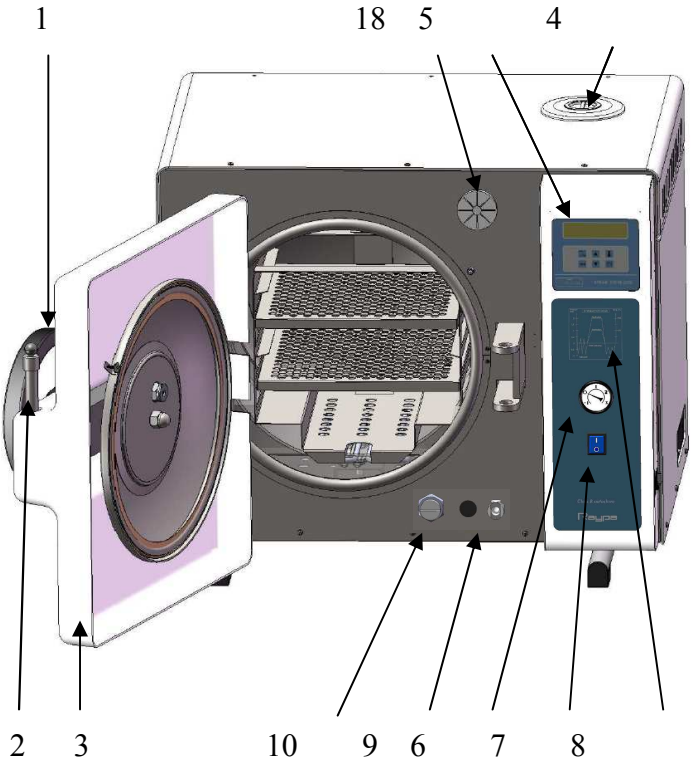
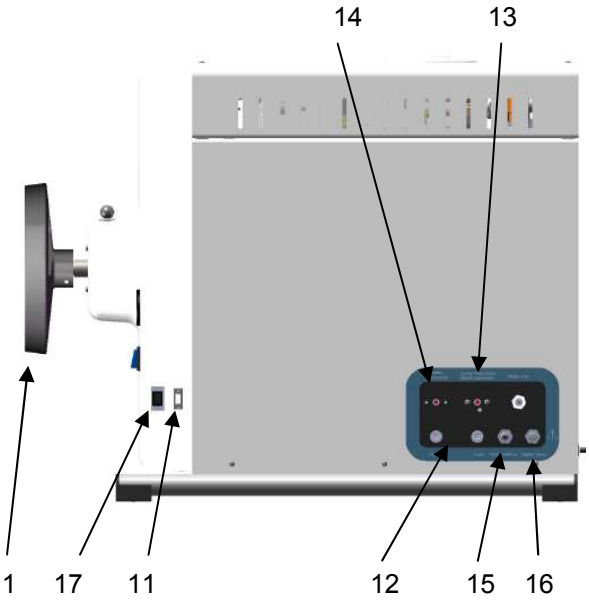
DESCRIPTION

FRONT VIEW



1. Flywheel handle
2. Door bolt
3. Lid thermal protection
4. Water tank inlet
5. Temperature and sterilization microprocessor with P.I.D action
6. Manometer indicating the pressure into the sterilization chamber
7. Main switch
8. Thermal printer of continuous sheet (accessory that must be installed at the factory).
9. Purging valve for water condensate tank
10. Unloading filter
18. Bacteriological filter

SIDE VIEW

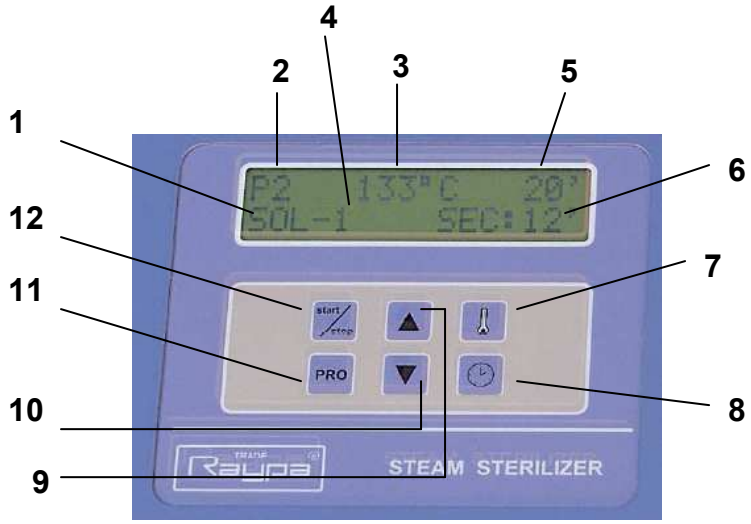


11. Connector RS-232
12. Fuses
13. Heating element safety valve with manual rearm.
14. Heating jacket safety thermostat.
15. Water condensate tank overflowing outlet
16. Autoclave chamber unloading safety valve
17. PC / Printer selector (only for autoclaves equipped with IT printer)

NOTE:
Two connections for the outlets 15 and 16 are supplied. They will enable you to connect a flexible tube to these outlets and to drainpipe.

MICROPROCESSOR FUNCTIONS AND CHARACTERISTICS

DESCRIPTION



1.- Operation mode: SOLIDS/LIQUIDS/AGAR.
2.- Number of the program.
3.- Sterilization temperature.
4.- Maintaining temperature (visible with AGAR mode).
5.- Sterilization time.
6.- Drying time.
7.- Key for sterilization temperature selection. (THERMOMETER)
This key is used during a sterilization program edition to select a given temperature
Also used in language configuration, type of degrees and to select PC/Printer .
8.- Sterilization time selection key. (CLOCK)
This key is also used during the edition of a sterilization program to select and edit different parameters:

- Time of sterilization.
- Type of sterilization.
- Drying time.
- Agar maintenance temperature.
- Date/Hour.

9.- Increasing key.
In program mode, it is used to increase the value of the parameter in edition.
Out of program it is also used to select a program.
10.- Decreasing key.
In program mode, it is used to decrease the value of the parameter in edition.
Out of program it is also used to select a program.
11.- Programming key (PRO)
When pressing this key during 2 seconds you can access to the edition of the program. During the process of sterilization will show the program while pressing.
12.- Start/Stop key.
This key is used to run or to stop the selected sterilization program.
To stop the sterilization cycle it must be pressed the START/STOP key during 2 seconds. If this operation is made, in the final inform will appear the message “STOP” instead of the message “STERILIZATION OK”.

TECHNICAL SPECIFICATION

Apparatus:	Steam sterilization autoclave
Sterilization temperature:	From 100ºC to 135ºC.
Max. pressure:	2,2 bar
Voltage:	230V
Frequency:	50 Hz
Consume:	2.8 kW (AHS-50 DRY), 3.2 kW (AHS-75 DRY)
Sterilization time:	from 3 to 180 minutes.
Final Drying:	Selectable: (DRY/NOT DRY)
Drying time:	Selectable from 3 to 60 minutes.
Data printing:	Manual / Automatic.
Printing cadence:	Selectable from 10 to 240 seconds.
Pc / Printer connection:	Interface RS-232

CHARACTERISTICS

- Tank and lid made of stainless steel AISI 304.
- Gasket of silicone.
- Electric heater for heating element shielded in the chamber itself.
- Automatic air purging evacuation by initial pre-vacuum.
- Drying system with dry heat and vacuum pump.
- Feeding water reservoir with min. and max. level detection
- Automatic water filling of the sterilization chamber.
- Over-temperature and over-pressure safety devices, safety thermostat and safety valve.
- Independent safety hydraulic system that avoids opening the lid while existing pressure inside the tank.
- Open lid detection avoids starting of any program in the case of not properly closed

ACCESSORIES

Accessories that must be installed at the factory:

Ref.	Description
PT-2	Heart probe PT-100, hermetic with flexible wire of silicone to introduce it into the liquids or bags to sterilize at a real time and temperature, not depending on the volume or capacity of the material to sterilize.
IT	Thermal printer. It that prints the number of the program, number of cycle, temperature, time and date of each sterilization.

Other accessories:

Ref.	Description
SOFT-RS232	Kit containing control software for a PC connection, allowing graphic and numeric visualization of the assays in a PC. An installation CD is included, together with instructions and a connection cord RS-232 and adapter RS-232-USB.
ITS	Table top printer of continuous sheet that prints the number of the program, number of cycle, temperature, time and date of every sterilization. RS-232 connection.

⚠ INSTALLATION

Install the apparatus on a stable and solid surface.
Don't install the autoclave in areas where there is danger of fire or explosion.
Don't block or cover the ventilation grid.
Connect a flexible tube to the outlet (15) for drainage.
It is VERY IMPORTANT that the autoclave has to be completely horizontal; to do so, use a level.
Before switching on the autoclave, open the door and remove the accessories and supports for trays and bags. Check that there are not left any remains of packing (plastic, paper etc.)

CONNECTION TO THE MAINS

There is a characteristics´ plate situated at the back of the autoclave, indicating the voltage and power. Check to make sure that your electrical installations have the same conditions.
The plug of the autoclaves is "SCHUKO" with central or lateral ground connection. For safety reasons this apparatus must be installed to ground.

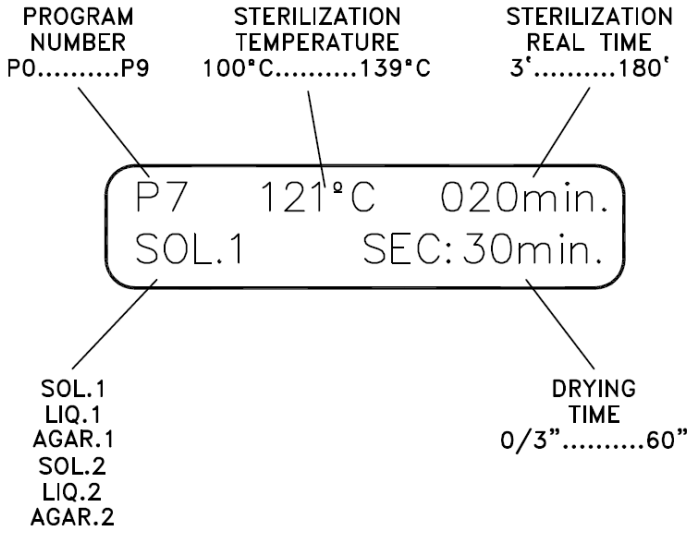
PROGRAMMING MODE

The microprocessor of this autoclave has 10 programs, numbers from P0 to P9. First 4, from P0 to P3, are protected programs and they come programmed from the factory with the usual parameters for sterilization.
These pre-set programs are:

Prog. Nº	Temp. sterilization (ºC)	Pressure (bar)	Sterilization time (minutes)	Sterilization mode (Solid/Liquid)	Drying time (minutes)
P0	115	0,6	60	Solids 1	12
P1	121	1,1	30	Solids 1	25
P2	133	2,1	20	Solids 1	30
P3	121	1,1	20	Liquids 1	-

These programs cannot be modified, in case of modification, protect or unprotect more programs, see PROTECTED PROGRAMS.
To edit different sterilization programs, use the programs between P4-P9 both included.

ALPHANUMERIC DISPLAY FUNCTIONS



The alphanumeric screen apart from showing the sterilization parameters also shows warning, failure and other messages. See WARNING MESSAGES and FAILURE MESSAGES.

PROGRAM EDITION

To edit data of a program is necessary to start from the main menu. Follow the next steps:

- Connect the autoclave to the mains, and press the main switch (7). It will become lighted on.
- The microprocessor screen will show the message: **"RAYPA Sterilmatic-Blue"** during 2 seconds.
  When the autoclave is running for the first time, the screen will show in the first line the nº of the program, the temperature of sterilization and the sterilization time, in the second line of the message: **"LACK OF WATER"**, because it is not filled yet the distilled water reservoir. See START UP.
  If you need to edit a program, the message **"LACK OF WATER"** will disappear and the parameters will be displayed.
- Using the keys (9) "INCREASE" and (10) "DECREASE", select the desired program.
- Press the key (11) "PRO" during 2 seconds to get into the program editor, the letter "P" to will start to blink indicating the edition situation.
- Press the key (7) "THERMOMETER" to edit the sterilization data.
- Pressing the key (8) "CLOCK" will be selected the time of sterilization of the parameter SOL/LIQ/AGAR, corresponding to the type of sterilization to carry out, or also to the parameter SEC, which corresponds to the drying time.
- Once the parameter to edit is set, use "Increase" and "Decrease" keys to modify the values of edition.
- To validate the modified data, press "PRO" key, finishing the program edition.
- If it is needed to exit from the program without validating the modifications done, press the "START" key that is used as an exit key of the program, the controller goes back to the main menu without validating any change in edition.
- Keys "INCREASE" and "DECREASE", make no effect over the edition data, if the selected program is protected.
- Keep in mind that:
  . If the program is for liquids, field SEC will not exist, and for this reason will not be modified.
  . If SEC is equal to "0", out of the program edition this parameter will not be displayed.

DELAYED START

Configuration of the delayed time:

- It will be programmed the hour - minute for the delayed start.
- To enter in programmed delay start, you should press simultaneously the keys CLOCK and START.
  It will be displayed:
  First row: " Start time "
  Second row: " 14h 00 ' "
- It will be modified first the minutes and then the hour, validating them with the key PRO or START.
- The difference in the use of the key START instead of the key PRO is that pressing on the key START when the parameter of hours is edited, provokes the activation of the delayed start.

Activation of the delayed start:

- Once closed the lid, press simultaneously the keys CLOCK and START.
  If you do not need to modify the programmed delayed time, press twice the key START.
  It will be displayed the delayed time in the second row:
  "Starts at 10h30 ' "
- If once activated a delayed start, you need to carry out immediately the sterilization, it will be enough to press the key START.
  The cycle will start when the hour-minute of the clock will match with the programmed time.
  For example it is 12:00, if we program a delayed start at 14:00 it will start when it be 14:00. If we program to start at 11:00 it will start the next day when it be 11:00.
  If the programmed time has passed when the autoclave has been switched on, it will wait to the next day.

Deactivation of the delayed start:

- If you need to abort a delayed start, it will be enough to touch simultaneously the keys CLOCK and START.
- Also the delayed start will be deactivated if there is some condition that does not allow the start of the cycle, as for example if the lid is opened.

 It Is important to check that the date and hour of the autoclave they are exact to assure that the programmed start works correctly.

ADJUSTMENT OF DATE AND HOUR

Starting from the initial menu, maintain pressed during 5 seconds the key "CLOCK", and the year will start to blink, pressing the key "PRO" again gives access to the other parameters (month, day, hour and minute).
To modify any edited parameter, press keys "increase/decrease". To return to the main menu, press "PRO".
To visualize date and hour, just press the key "CLOCK".

SELECTION OF LANGUAGE AND TYPE OF DEGREE

The control panel of the autoclave gives the possibility to display the steps of each cycle and messages in different languages, which are: SPANISH, CATALAN, ENGLISH and FRENCH.
The default language of the autoclave is SPANISH.
Similarly the apparatus offers the possibility the change the type of degree to be used, which are: DEGREE CELSIUS and DEGREE FAHRENHEIT.
The default type of degree of the autoclave is DEGREE CELSIUS
Starting from the main menu; maintain pressed during 7 seconds the key (7) “THERMOMETER” until the message “IDIOMA ESPAÑOL” (“Language Spanish”) is displayed. Using the key (9) “INCREASE” and (10) “DECREASE” select the language “INGLES” (English), “CATALAN” (Catalan), “FRANCES” (French). Press the key (11) “PRO” to display the message “TIPO DE GRADOS CENTIGRADOS” (“Type of degree Celsius”). With the key (9) “INCREASE” key to FAHRENHEIT, press again the key (11) “PRO” to return to the main menu.

NOTE: Messages in this menu are displayed in SPANISH.

CONNECTION RS-232

The autoclaves are provided with a female 9 pins connector, to enable connection with a printer or a PC.
You should select printer/PC from the microprocessor screen. To do this, proceed as follows:
Keep pressed key (7) “THERMOMETER” during 2 seconds till ***“connection”*** is displayed**.** With keys (9) “UP” y (10) “DOWN” make the suitable selection.

The printer to be connected, it should be 24 rows type as minimum, and it should have an interface RS-232 at 9.600 bps, 8 bits, no parity, 1 stop bit , and a minimum buffer of 150 characters.

The connection cord to the printer should be “Cable Null-modem” type with 9 pins connectors. For a PC connection a standard 9 pins cord has to be used.

The equipment has specific software to be connected to a PC (optional). In the case of not having a RS-232 connection, use a RS232-USB adapter.
The CD contains instructions to install it and to use it.
Requirements for the installation:

- Operative system Windows 98SE or subsequent.
- Screen resolution: 1024 x 768 pixels.

If connected to a printer, go to section PRINTER MODE.

IMPORTANT: In the case of having a printer already installed (ref. IT), you should put the selector in the corresponding option: “PC” for a computer connection and “PRINTER” for a printer connection.

To use the printer (ref. IT) after the PC, remember to change the selector and to disconnect the communications cord from the PC.

SOLID/LIQUID/AGAR MODE

If the autoclave is not equipped with an accessory reference: PT-2 (Heart probe), when a program is edited it will be set: SOL-1 to sterilize solids (glass, plastic, etc) and it will be set :LIQ-1 or AGAR-1 to sterilize a liquid (culture media).
If the autoclave has not the accessory (Heart probe) and it is set by mistake SOL-2 or LIQ-2/AGAR-2, when the sterilization cycle starts, the program will be aborted and it will be displayed the message: **"PROBE 2 FAILURE"**.
Moreover, if the autoclave has this accessory (Heart probe), SOL-1/SOL-2 and LIQ-1/AGAR-1/LIQ-2/AGAR-2 are usable depending on the application.
With the heart probe installed in the autoclave, we can place it inside a liquid or in waste bag. According to that the probe 1 controls and maintains the sterilisation temperature selected, the probe 2 (heart probe) controls the real temperature of the liquid to sterilize, while this liquid has not reached the selected temperature will not start counting the sterilization time. For this reason it can be possible to sterilize a product in real time and temperature without mass or volume dependence.

AGAR Mode

An AGAR cycle is carried out identically to a program of liquids, except in the final step where there is the maintenance of a given temperature: "AGAR Temperat.ON", after the phase "COOLING".
This phase of temperature maintenance will be supported in indefinite time, until STOP is touched during 2 sec, or until the lid is opened.

The temperature of maintenance of AGAR mode is adjustable:
Range: 40 – 80ºC
Default value: 50ºC

The "AGAR Temperat. ON" step lasting time does not accounts as time for the hours of review.
During this step the temperature is not printed, but the time of duration of this step whenever it is lower than 256 '.

PREPARATION OF THE MATERIAL TO STERILIZE

To consider a sterilization process as efficient, it is necessary to handle the material to sterilize in a suitable way and to place it in the chamber following some tips, stated below.

HANDLING THE MATERIAL BEFORE STERILIZING
To manipulate any contaminated material, one should take into account the following precautions:

- use rubber gloves of a suitable thickness
- always use a tray to move the material
- avoid manipulating the material directly by hands
- protect the hands against pointed and/or sharp objects
- clean carefully one's hands, even wearing gloves, after having touched the material for sterilization

Afterwards, proceed to clean carefully the material for sterilization, eliminating all type of waste.

In order to make efficient the cleaning process, follow these steps:

- rinse the objects under running water, immediately after they were used

- put aside the metallic objects and take into account the composition (carbon steel, stainless steel, aluminium, brass etc.) to avoid the phenomenon of oxidation-electrolytic reduction
- carry out the cleaning using an ultrasonic bath or manually with a mixture of water and germicidal solution. To get better results use a dedicated detergent for ultrasonic cleaning with neutral PH.

After the cleaning process, the objects should be rinsed. Check if the dirt was totally eliminated, if necessary repeat the cleaning.
To avoid the stains of lime it is recommended to use distilled or demineralised water. If you use tap water, you should always dry the objects.

⚠ LOAD DISPOSAL

To obtain a valid sterilisation, arrange the objects on the trays as follows:

- Objects made of different metals (stainless steel, carbon steel, brass, aluminium etc.) should be placed in different trays or at least they should be placed separately so as to avoid direct contact between them.
- If the objects are not made from stainless steel, a damp-proof paper as unwoven tissue should be placed between the tray and the object, to avoid direct contact between both materials.
- In any case, the objects should always be placed avoiding contact between them.
- Always place the objects to be sterilized in “open” position.
- Place glassware, test tubes, etc. leaning aside, or downwards, to avoid water inside.
- Do not overload the trays
- Do not stack the trays. Avoid direct contact with the sterilization chamber. Always use the supporting trays.

PLASTIC TUBING

- Rinse always before place them in the autoclave. They should be clean, rinsed and drained.
- Place the tubes on the tray avoiding flattening or obstructions.
- Leave them extended as much as possible, avoiding bending.

WRAPPED PRODUCTS

- Place the packages, keeping some space among them. Do not stack them. They should not touch the chamber walls.
- When wrapping particular objects, use a suitable sterilization paper, sealing the wrapped products with sterilization tape.

PRODUCTS IN ENVELOPES

- Use one envelope for every product. In the case of packing several products in one envelope, make sure they have same composition.
- Seal the envelopes with sterilization tape, or using a thermo sealer.
- Never use staples or pins.
- When placing this kind of bags in a tray, place the paper side upwards.
- Do not stack envelopes.

NOTE: In the case of not having damp-proof paper, it is possible to use Kraft paper or sterilization paper. The results are slightly worse but acceptable.

- When liquids or solutions as culture media or chemicals have to be sterilized, pay attention to the total amount of liquid per container. As a general rule, for an Erlenmeyer, you should fill to ¾ of the maximum capacity. When using a beaker, ½ of the maximum capacity is the

suggested volume to be filled. Too much liquid has the risk of overflow when increasing the temperature or during the cooling process.

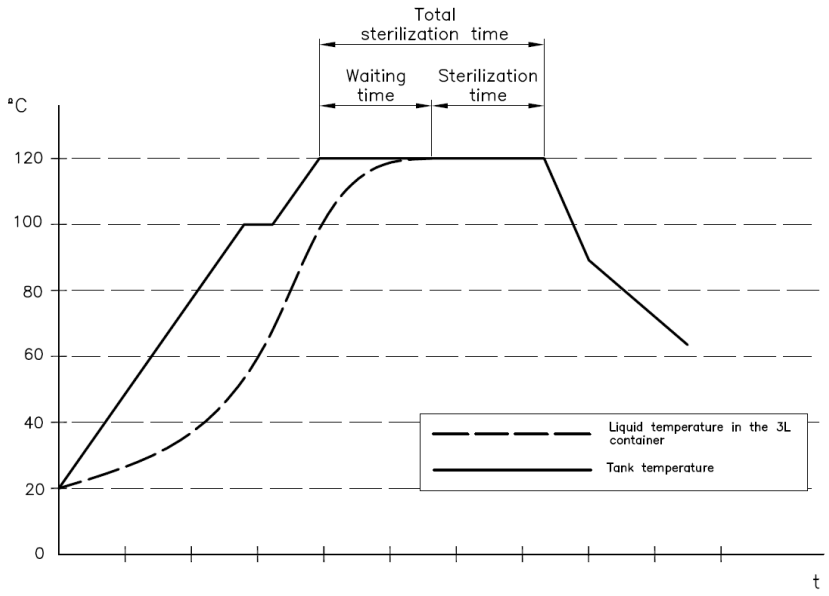
- When using containers with screw caps, leave them ¼ turn loosen to allow ventilation. If tightly closed, they can break during the process
- We recommend using Ø 6mm DURHAM tubes. To use a smaller diameter can lead to air trapped bubbles in the tube..
- When sterilizing liquids, keep in mind to enter enough time to guarantee a sterilizing period at the target temperature. Bigger volume needs a bigger period to reach the temperature.

Example: For a volume of 3 litres, more than 30 minutes ser needed to have the whole volume at the sterilization temperature, alter reaching the sterilization temperature inside the tank. So, in this case you should program 30 additional minutes. In the case of a sterilization of 20 minutes, you should enter 50 minutes to add the additional 30 minutes.

Waiting time (30') + Sterilization time (20') = 50'

Chart of standard waiting times:

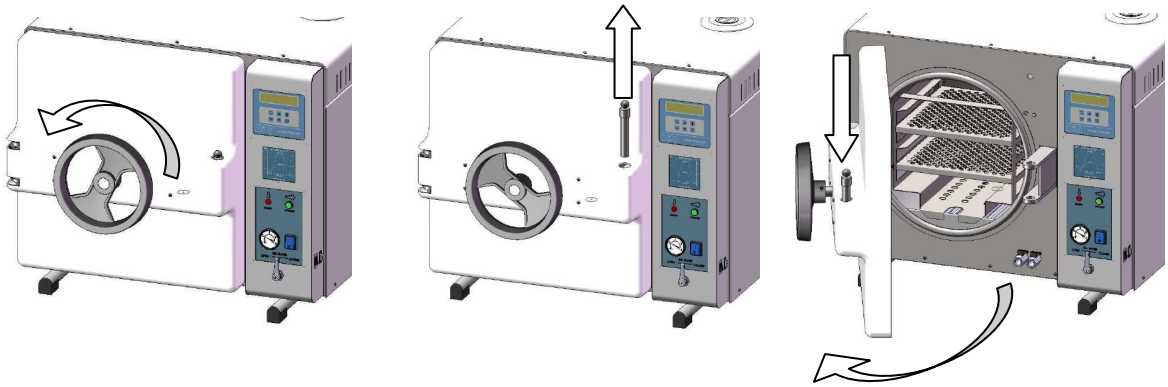
Volume	***Waiting time***
3 litres	30 minutes
2 litres	25 minutes
1 litre	20 minutes
500 ml	15 minutes



NOTE: For autoclaves equipped with the accessory reference: PT-2 (Heart probe), the required sterilization time (20 min.) begins just after the liquid reaches the required sterilization temperature.

OPENING AND CLOSING OF THE DOOR

Firstly, to open the autoclave, turn the flywheel handle (1) counter-clockwise until you could not turn it any more. Then, slide back the door bolt (2) upwards and open the door. To close the autoclave, do the opposite operations by pressing strongly to assure avoid leakage or pressure loss.



START UP INSTRUCTIONS

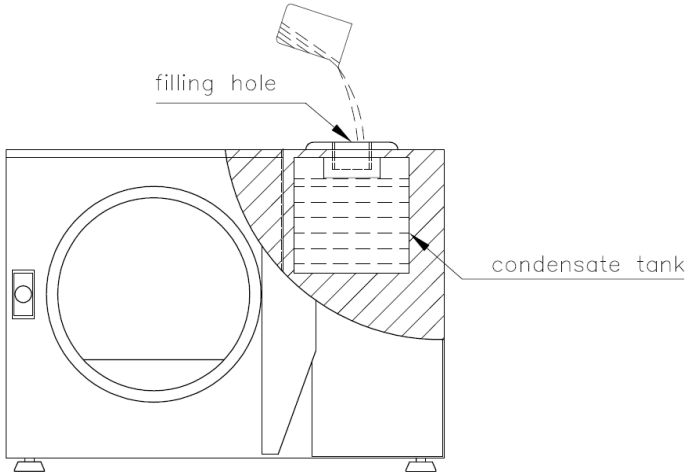
Connect the autoclave to the mains.
Press the main switch (7)
At the microprocessor screen will be displayed the message: "**RAYPA SteriImatic-Blue**" and a few seconds later will appear a number of a program (it will always be the last program used), and the message**: "LACK OF WATER".**
Before filling the sterilization chamber, check that the valves (9) and (10) are closed.

⚠ If you use water containing contaminating elements that exceed the ones indicated on the table below, you can considerably diminish the shelf life of the autoclave.
Moreover, you can generate an increase in the oxidation of the most sensitive materials and the increase of the lime waste in the sterilization chamber, internal supports, trays and instruments.

MAXIMUM LIMITS SUGGESTED OF CONTAMINATING ELEMENTS IN THE WATER AND CHARACTERISTICS OF THE WATER ASSIGNED FOR THE STERILIZATION BY STEAM

	VOLUME IN THE DISTILLED WATER	*VOLUME IN THE CONDENSATE WATER*
Evaporation residue	= 10 mg/l	= 1.0 mg/kg
Silica, Si O2	= 1 mg/l	= 0.1 mg/kg
Iron	= 0.m2/l	= 0.1 mg/kg
Cadmium	= 0.005 mg/l	= 0.005 mg/kg
Lead	= 0.05mg/l	= 0.05 mg/kg
Appearance of heavy metals except iron, cadmium and lead	= 0.1 mg/l	= 0.1 mg/kg
Chloride	= 0.2 mg/l	= 0.1 mg/kg
Phosphate	= 0.5 mg/l	= 0.1 mg/kg
Conductivity	= 15 µs/l	= 3 µs/cm
pH value	From 5 to 7	= From 5 to 7
Aspect	Colourless, clean, without deposit	Colourless, clean, without deposit
Hardness	= 0.02 mmol/l	= 0.02 mmol/l

After purchasing distilled water, always check its quality and that its characteristics are compatible with the ones indicated in the table.



FILLING OF THE CONDENSATION TANK

Unscrew the cap of the water inlet (4).
Fill in the condensation tank with distilled water to the maximum level, until the message of the screen disappears and you hear the acoustic signal. Put the cap again without tighten it.

Open the lid. The microprocessor screen will display the message: “DOOR OPEN”.

Place the material. (See LOADING THE AUTOCLAVE).

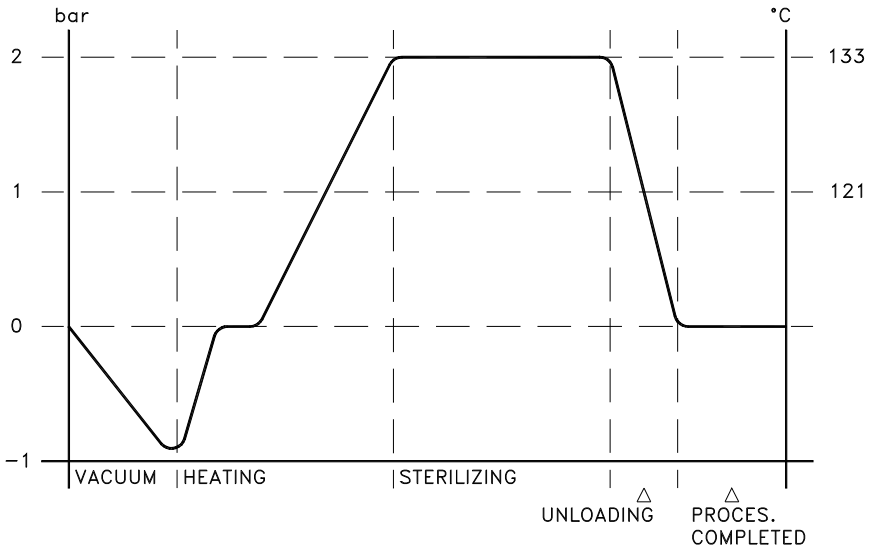
Close the lid of the autoclave by turning the closure (1) until the message “DOOR OPEN” disappears and you hear an acoustic signal.

Select the appropriate program with “UP”/”DOWN” keys

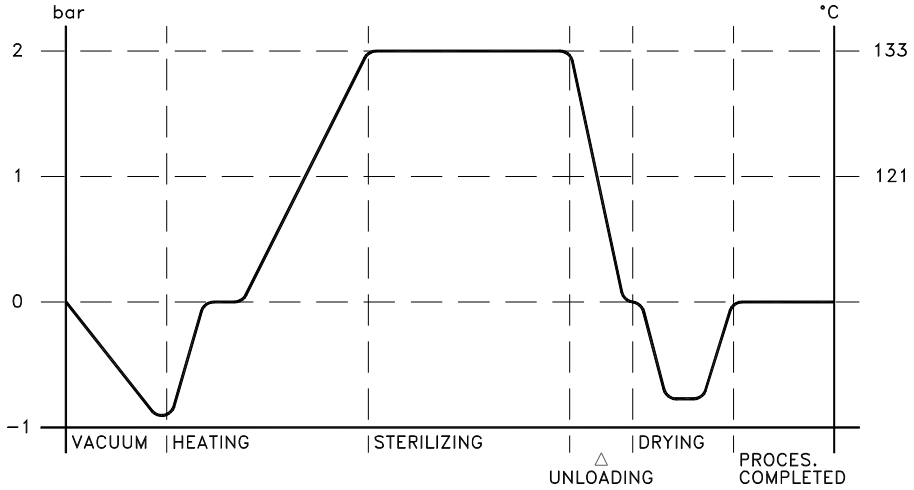
Press “START/STOP” key, starting the process of sterilization.

The microprocessor screen will keep you informed of every step of the process.

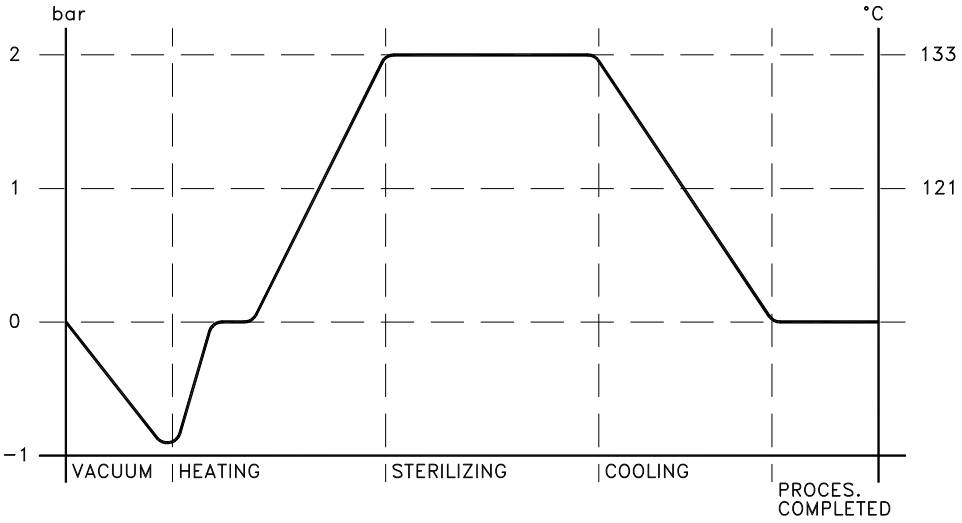
The sterilization cycle of a solid without dry is composed by the following phases:



The sterilization cycle of a solid with dry is composed by the following phases:



The sterilization cycle of a liquid is composed by the following phases:



(AGAR Temperat.ON)

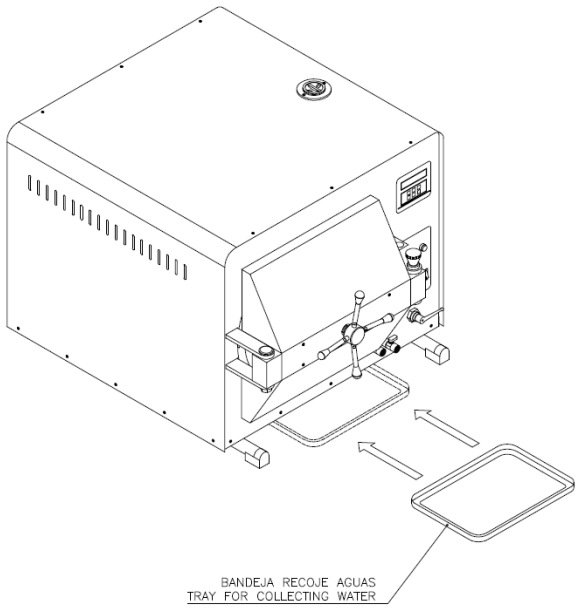
VACUUM:	**Initial vacuum, air expulsion of the sterilization chamber.**
FILLING:	**Automatic filled of distilled water in the sterilization chamber.**
HEATING:	**Increase of pressure, heating.**
UNLOADING:	**Automatic unload of the water and steam of the chamber to the condensed water tank. (only in solid program).**
DRYING:	**Baric balance and drying vacuum. (only in solid program).**
COOLING:	**Natural cooling process, after the sterilization period and up to 90ºC. (only liquid program).**
AGAR TEMPERAT.ON:	**Maintenance temperature at the end of the cycle (only AGAR mode)**
PROCESS COMPLETED:	**End of cycle signal.**

At the end of the sterilization cycle (END OF PROCESS) sounds an acoustic signal. To go back to the main menu screen just press key “START/STOP”.
After the acoustic signal of “END OF PROCESS”, and if the cycle done is with drying, the sterilization chamber has vacuum yet that is shown on the manovacuometre (6). Depending on the autoclave's model, it still needs some time to re-establish the atmospheric temperature, it could be 10 minutes.
Do not try to open the lid while the manovacuometre (6) is not showing ±0.
Once the manovacuometre shows ±0, open the lid and keep it opened for a couple of minutes before taking out the material.

DO NOT INITIALIZE ANOTHER CYCLE OF STERILIZATION BEFORE HAS PASSED 15 MINUTES, FROM THE LAST CYCLE, LET THE LID OPEN DURING THIS TIME.

If the cycle done before was of liquids, in the screen will be possible to read:
"WATER IN CHAMBER" alternatively with **"START TO CONTINUE"** (See "ADVISE MESSAGES").
Notice: *to start a new sterilization cycle, the lid has to be correctly closed. If not, the message "WATER IN CHAMBER" will be displayed and the autoclave will remain blocked. To solve it, simply close the lid tightly till the message "START TO CONTINUE" is displayed alternatively with "WATER IN CHAMBER".*

⚠ DO NOT OPEN THE AUTOCLAVE UNTIL THE END OF THE PROCESS AND THE MANOMETRE WILL SHOW "0".



¡CAUTION!
Place the tray for collecting water below the entrante of the vessel in order to collect water that may drop while opening the door.

AUTOCLAVE SHUTDOWN

To switch off the autoclave press the general switch (7) position 0. When you start up the autoclave again will be shown the last used program.

WATER TANK

The Autoclave is equipped with a distilled water tank used for the sterilization. Filling of this tank is done through the upper inlet (4).
While running sterilization the water level of this tank decreases. When it reaches the minimum level, the screen will display, once again, the "LACK OF WATER" message; if this is the case, fill

again the tank through the upper inlet (4) until an acoustic signal is heard and the message disappears.

To empty the water tank condensate, insert the quick connector into the valve (9) with flexible tube and remove the liquid to a drainpipe.
You have to repeat this operation every time the autoclave is moved, but also according to its use in order to renew the water in the condensate water tank.

To empty the sterilization chamber, unscrew the unloading tap (10) and remove the liquid placing a flat container.

PRINTER MODE

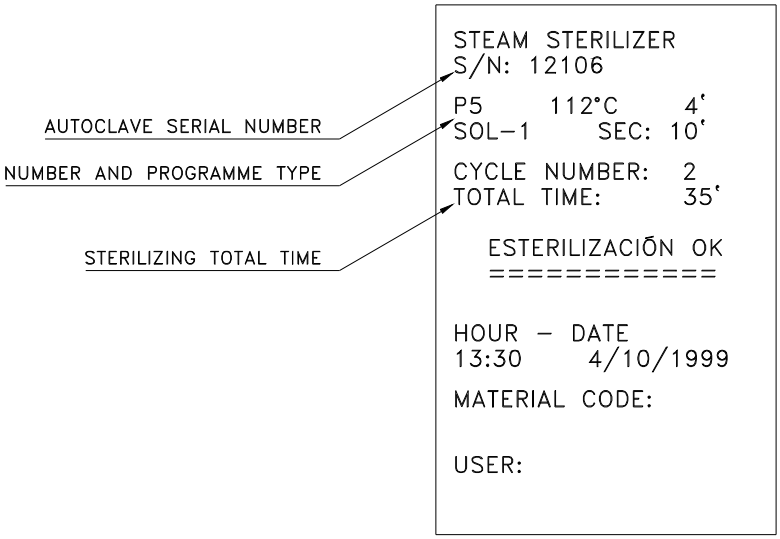
The microprocessor comes out from the factory with the configuration of “connection: PC”.

To make possible printing a sterilization report, if the printer has a switch called “PRINT”, just press it (only for table top printers “ITS” model).

To print a report manually from the microprocessor:

1.- Keep pressed key “TEMPERATURE” (7), during some seconds, in the screen will appear the message **: ”CONNECTION: PC”.** Use the keys “INCREASE / DECREASE” to select **“CONNECTION: PRINTER”.**
2.- Press the key (11) “PRO”, the screen will display: **“AUTOMATIC PRINTING”.** Press keys “INCREASE / DECREASE” to select **“MANUAL PRINTING”.**
3.- Press the key (11) “PRO”, the screen will display: **“PRINT NOW? NO”.**
4.- Press the key (9) “INCREASE”, the screen will display: **“PRINT NOW? YES”**
5.- Press the key (11) “PRO”, the screen will display: **“PRINTING”**, and it will print out a report about the last sterilization without data, as the following example:

DATA PRINTING RESULTS



To set automatic printing:

1.- Keep pressed key “TEMPERATURE” (7), during some seconds, the screen will display the message **:”CONNECTION: PC”.** Use the keys “INCREASE / DECREASE” to select **“CONNECTION: PRINTER”.**

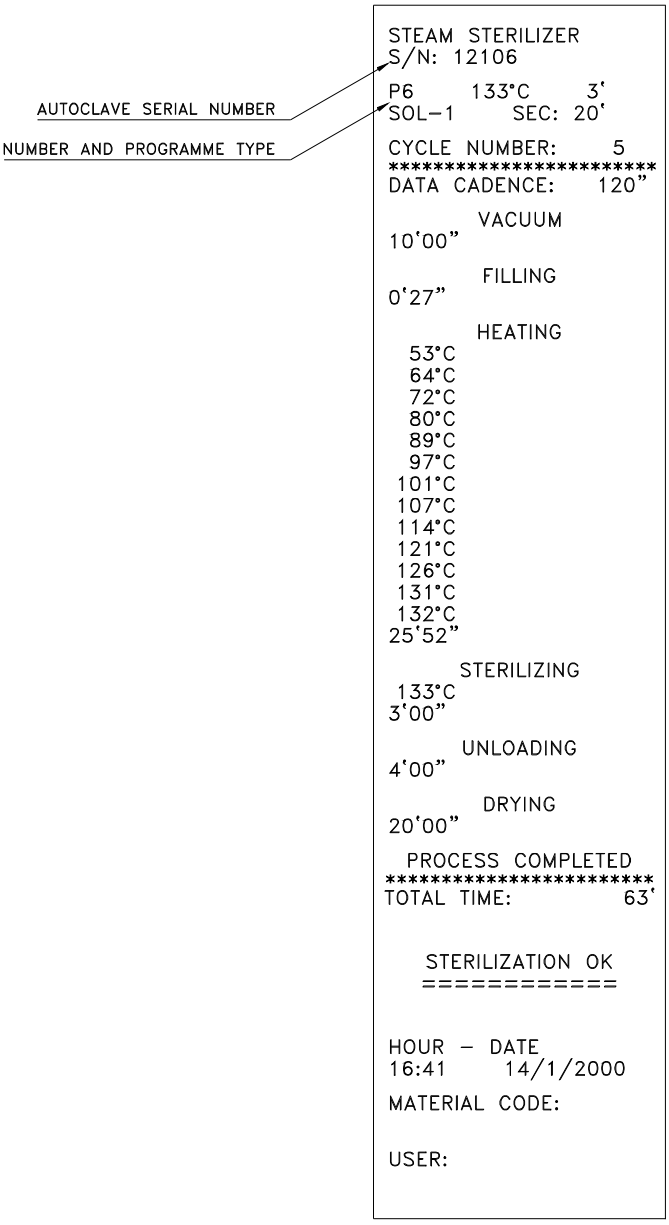
2.- Press the key (11) “PRO”, in the screen will appear: **“AUTOMATIC PRINTING”.**

3.- Press key nº (11) “PRO”, and in the screen will appear **“DATA CADENCE”**, this means that this will print data every 120 seconds. To modify the printing times press keys “INCREASE/DECREASE”.

4.- Press key nº (11) “PRO”, the screen will show: **“PRINT NOW?”**. Press again key nº (11) “PRO” to come back to the main menu.

With this mode of printer, every time the sterilization cycle is initialized, the printer automatically will print data with a cadence of printing previously set by doing the following:

DATA PRINTING RESULTS



PROTECTED PROGRAMS (Info.)

The autoclave comes from the factory with 4 standard programs of sterilization, memorized in programs P0 to P3, and they are protected, that means impossibility to change them.
Otherwise, to have access to block and unblock the programs of our choice, we have to follow the next steps:

1.- Keep pressed the key (7) "TEMPERATURE" during some seconds, the screen will show the message: "MANUAL PRINTING" and then and during the next 4 seconds will be shown in the screen the message: "N.PROG.PROTEC. 4". That shows us that the 4 programs are protected.

2.- Use keys "INCREASE/DECREASE" to modify the nº of program needed to be blocked or unblocked.

0		=	No program protected.
1	**To 10**	=	Program to protect from P0 to P9.

3.- To exit the screen and validate the nº of programs protected press key "PRO".

⚠ NOTE: THIS INFORMATION IS CONVENIENT TO BE KNOWN BY AUTHORIZED PERSONNEL ONLY.

WARNING MESSAGES

These messages will appear in the second row of the microprocessor screen. They only are shown if there is a sterilization process running.

LACK OF WATER
It is detected that the water of the condensed tank has reached its minimum level.
This message will not disappear until the maximum level would be replaced. Fill in with water just up to the point the message disappears. This will coincide with an acoustic signal.
It can also be a failure if the message does not disappear; see FAILURE MESSAGES.

PRINTING
This message will remain until the printing process is finished.

REPLACE FILTER
Remind you to change the bacteriologic filter. An acoustic signal will sound intermittently.
To delete this message it must be stopped and started with the main switch (7).

WATER IN CHAMBER
The control detects the water inside the sterilization chamber, out of cycle. This message will be alternative with another: **"START TO CONTINUE"**, that shows the possibility to re-start the cycle again. This situation will take place after the execution of a program of liquids or when the cycle has been aborted in a step where the pressure was not enough to take out the water in a solid program.
It can also be a failure. (See FAILURE MESSAGES)

OPEN DOOR
It detects the door open
Also, it can be a failure, see FAILURE MESSAGES
When closing the door you must hear an acoustic beep indicating the closure

FAILURE MESSAGES

The failures detected during the sterilization process, apart from giving you the printing warning, are accompanied with the sound of an acoustic signal and the light of LCD. Pressing the key “START/STOP”, the sound stops. To delete an alarm message; maintain pressed the button “START/STOP” during 2 seconds; **until the message is deleted**, in case you don’t have to do a discharge phase (program LIQUIDS), if the cycle was in a determined phase, the control still consider to be pressure inside the autoclave, or the temperature is still high, in the case of liquid programs when the cooling process is finished or the discharge, the acoustic signal will sound.

FAULT PROBE 1
The control detects that the temperature probe 1 (main) is broken. It is impossible to proceed with the sterilization. If during the sterilization the probe is broken the process stops.

FAULT PROBE 2
The control detects that the probe 2 (heart probe) is broken during a sterilization process with two probes. If this happens during a cycle, the sterilization is aborted.
In this case it can be continued the sterilization while the probe 2 is changed, by editing the programs as SOL-1 and LIQ-1/AGAR-1.

FAULT FILLING
When the filling phase is initialized, the control makes the autoclave fill in with water up to its level, by acting over the filling valve. The control takes the time to fill in the chamber.
If the autoclave is not filled within a determined time, or if it is observed a failure during this process, or also a failure at the level detector, the cycle is aborted.

FAULT HEATING
When a cycle of sterilization starts, the evolution of the temperature increase is being controlled up to the temperature selected. If the temperature does not evolute correctly, that means there must be a problem and the cycle is aborted.

FAULT TEMPERATURE
During the sterilization process the temperature must be maintained between specific values to guarantee a suitable sterilization. If this value moves out the range, the sterilization will be not acceptable and the process is aborted.

ELECTRO CUTTING
This means not a failure but an interruption of the sterilization cycle, because of a power cut. This will mean an abortion of the cycle.

WATER IN CHAMBER
If at the end of the sterilization process, the control detects water inside the autoclave, after running a solids program.

LACK OF WATER
This message will not disappear until the autoclave has been filled up to its maximum level.

OPEN DOOR
It has been detected attempt of opening the door while a cycle was running. It means abortion of the cycle.

⚠ CLEANING AND MAINTENANCE

Check regularly the steal of the lid, if you find any cuts or lacerations it must be replaced.
To clean the inside of the autoclave use soap and water.
To clean the autoclave tank, use neutral detergent mixed with water.
Do not use acid cleaning agents, chlorine solvents, and saline solutions.
Always switch the autoclave off when repairing it.

UNLOADING FILTER CLEANING/REPLACEMENENT

It is possible that, with the use, different types of residues are accumulated in the filter, thus obstructing the unloading pipe.

To clean (or replace) the filter, we must open the lid of the autoclave and unscrew the filter with a screwdriver.
We must clean the filter carefully under a current water flow, using a sharp tool if necessary to remove bigger residues. If it is obstructed with agar, we must use hot water.
If we can not recover the filter, we must replace it for a new one.
To re-insert the filter, we must use a screwdriver. Screw it tightly, with the supplied gaskets.

⚠ SAFETY NOTICES

The autoclave is an apparatus which operates with electricity, temperature and pressure. Some safety regulations must be followed and a suitable manipulation should be carried out to avoid dangerous accidents.

Keep in mind that:

- Do not try to open the autoclave's chamber during a cycle, you can open it only when the manometer shows ±0 bar.
- Do not process with sterilization/disinfecting without any trained people aware of that.
- Empty out carefully the instruments from the chamber once the cycle is finished. Do not touch hot areas (door, chamber). Remember that if the material sterilized is metallic, it keeps high temperatures during a long time.
- Do not manipulate the wiring or piping (electrical, water and steam) of the autoclave.
- The fuse replacement must be done with the autoclave disconnected from the mains.
- Before connecting the autoclave to the mains, check that the plug has been properly introduced is in good conditions of use. Do not use extension leads.

- Check that the instruments to sterilize do not have disinfecting liquids, detergent or residues that could produce damages to the autoclave's piping and to its filtration systems as well as oxidation and instruments damages.
- Do not obstruct the Autoclave ventilation. Keep always a distance to the wall or to neighboring furniture.

SAFETY THERMOSTAT

If there is not enough water in the autoclave or the temperature is too high the safety thermostat will block the heating system of the autoclave.
To rearm the safety thermostat and to restore the service of the autoclave, press the red button (13) until you hear a “click”. If the thermostat is activated again when you have began a new sterilization cycle (in normal conditions) switch off the autoclave and call the technical assistance service.

NOTE: The rearming operation of the safety thermostat has to be done in a cold autoclave at room temperature.

⚠ REPARATION AND SPARE PARTS

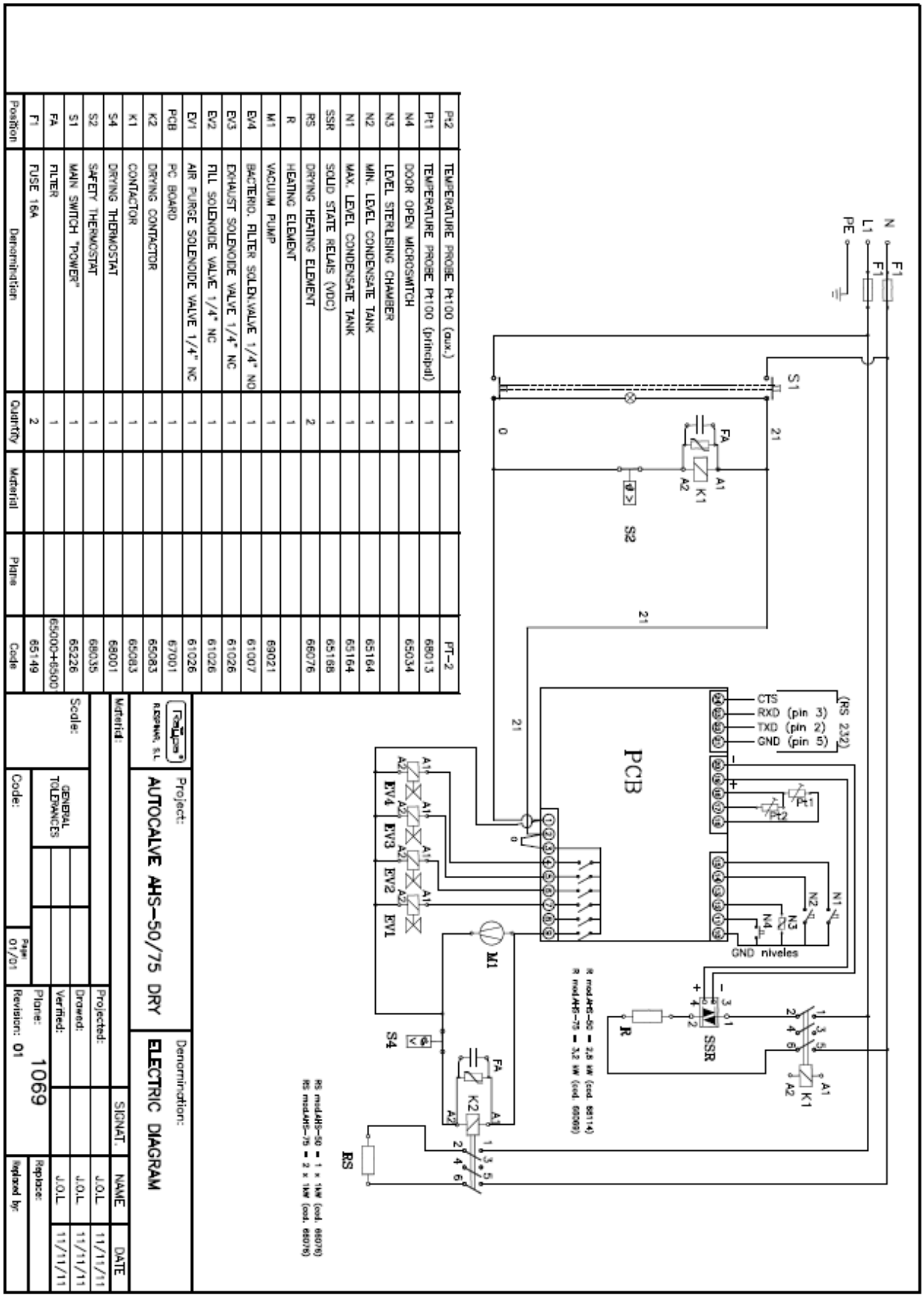
Before any reparation disconnect the apparatus from the mains.
Please get in touch with your distributor in case of doubt.
For safety reasons and a good function of the apparatus use original spare parts only.
If spare parts are needed state the serial number and the model of the apparatus, indicated on the characteristic plate at the rear of the apparatus.

BEWARE !
R. Espinar, S.L. will not accept non-cleaned and non-disinfected apparatus, as well as apparatus with non-emptied tanks (sterilization chamber, dirty water tank according to the model) for repairing.

⚠ GUARANTEE

This apparatus is guaranteed for a one year period, against any fabrication failure or defective part. The guarantee does not cover any casualty produced by improper use of the apparatus or alien casualties to R.ESPINAR, S.L.
If the apparatus is manipulated by non-authorized personnel by R.ESPINAR, S.L., this guarantee will be automatically cancelled.

ELECTRIC DIAGRAM



Position	Denomination	Quantity	Material	Plane	Code
Pt2	TEMPERATURE PROBE Pt100 (aux.)	1			PT-2
Pt1	TEMPERATURE PROBE Pt100 (principal)	1			68013
N4	DOOR OPEN MICROSWITCH	1			65034
N3	LEVEL STERILISING CHAMBER	1			
N2	MIN. LEVEL CONDENSATE TANK	1			65164
N1	MAX. LEVEL CONDENSATE TANK	1			65164
SSR	SOLID STATE RELAIS (VDC)	1			65168
RS	DRYING HEATING ELEMENT	2			66076
R	HEATING ELEMENT	1			
M1	VACUUM PUMP	1			69021
EV4	BACTERIO. FILTER SOLEN.VALVE 1/4" NO	1			61007
EV3	EXHAUST SOLENOIDE VALVE 1/4" NC	1			61026
EV2	FILL SOLENOIDE VALVE 1/4" NC	1			61026
EV1	AIR PURGE SOLENOIDE VALVE 1/4" NC	1			61026
PCB	PC BOARD	1			67001
K2	DRYING CONTACTOR	1			65083
K1	CONTACTOR	1			65083
S4	DRYING THERMOSTAT	1			68001
S2	SAFETY THERMOSTAT	1			68035
S1	MAIN SWITCH "POWER"	1			65226
FA	FILTER	1			65000+65001
F1	FUSE 16A	2			65149

Project: AUTOCALVE AHS-50/75 DRY

Denomination: ELECTRIC DIAGRAM

Material:

Scale:

GENERAL TOLERANCES

Code:

Page 01/01

Projected:

Drawed:

Verified:

Plane: 1069

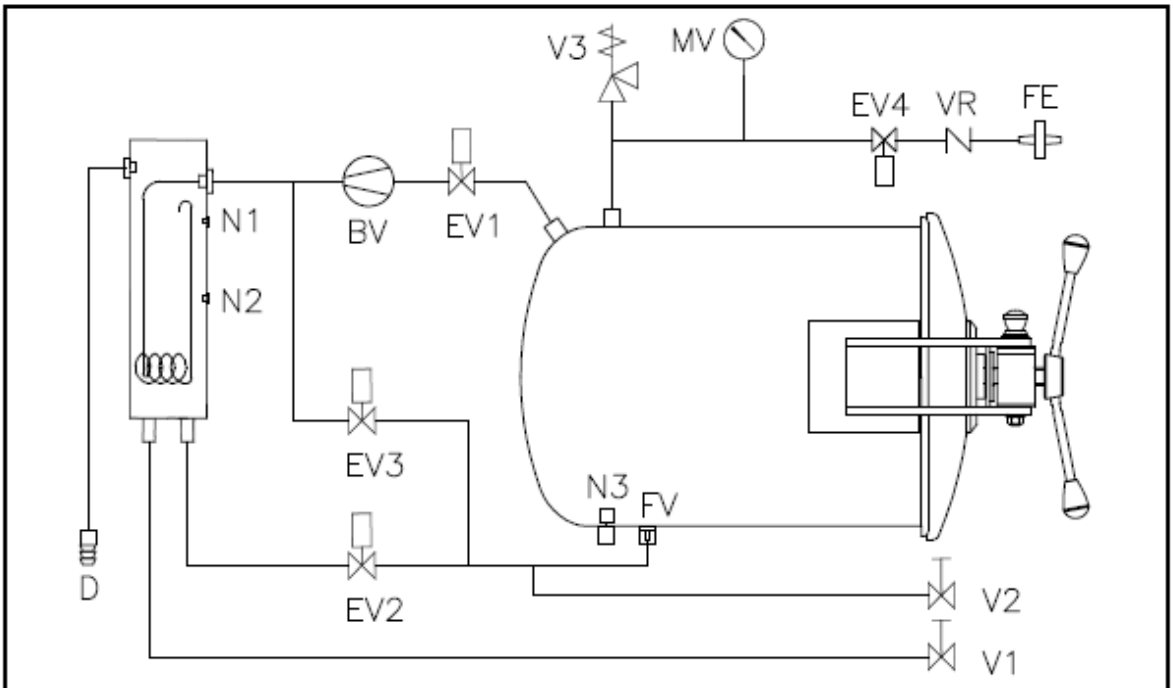
Revision: 01

	SIGNAT.	NAME	DATE
		J.O.L	11/11/11
		J.O.L	11/11/11
		J.O.L	11/11/11

Replace:

Replaced by:

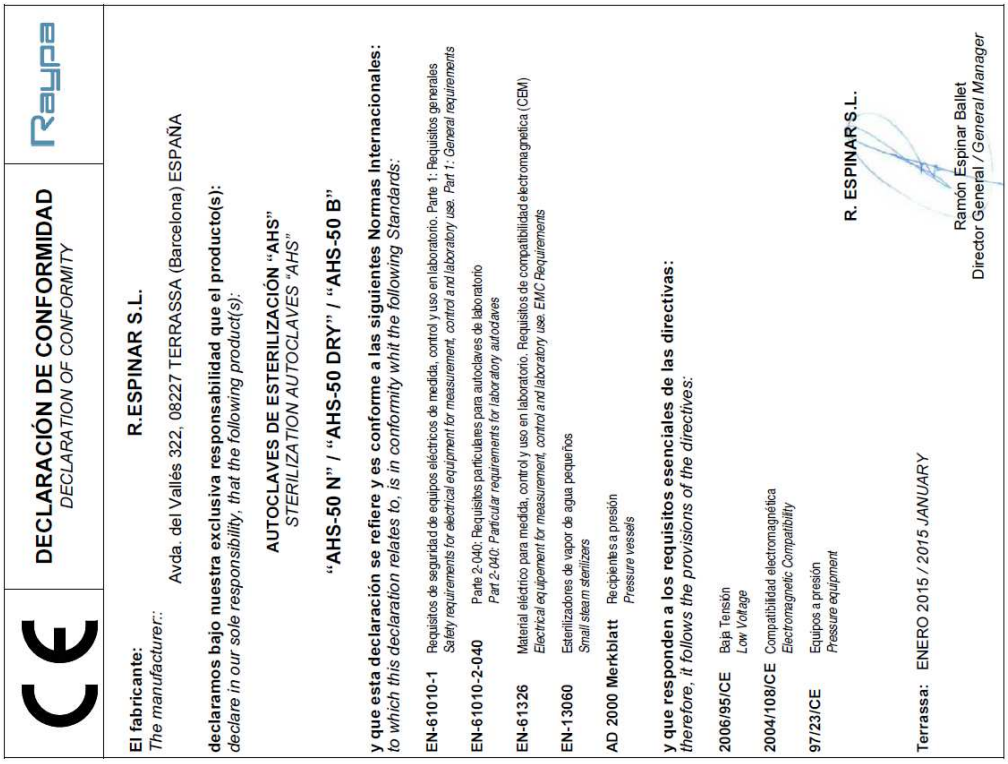
PIPING DIAGRAM



Position	Denomination	Quantity	Material	Plan n.	Code
N3	LEVEL STERILISING CHAMBER	1			65140
N2	MIN. LEVEL CONDENSATE TANK	1			65164
N1	MAX. LEVEL CONDENSATE TANK	1			65164
MV	PRESSURE GAUGE	1			68051
D	OVERFLOW	1			
V1	DRAIN MANUAL VALVE	1			61022
V2	DRAIN MANUAL VALVE	1			61022
V3	SAFETY VALVE	1			61031
EV4	BACTERIO. FILTER SOLEN.VALVE 1/4" NO	1			61007
EV3	EXHAUST SOLENOIDE VALVE 1/4" NC	1			61026
EV2	FILL SOLENOIDE VALVE 1/4" NC	1			61026
EV1	AIR PURGE SOLENOIDE VALVE	1			61026
VR	CHECK VALVE	1			61002
FE	BACTERIOLOGICAL FILTER	1			79013
BV	VACUUM PUMP	1			69021
FV	DRAIN FILTER	1			79152

Raypa R.ESPINAR, S.L.	Project: AUTOCLAVE AHS-50/75	Denomination: PIPING DIAGRAM		
Material:		SIGNAT.	NAME	DATE
Finish:		Projected:	J.O.L.	27/12/11
Scale: */*	GENERAL RESISTANCES	Drawings:	J.O.L.	27/12/11
		Checking:	J.O.L.	27/12/11
	Code:	Sheet: 01/01	Plan number: 2037 Revision: 01	Substitutes to: Replaced by:

DECLARATION OF CONFORMITY"CE"



DECLARACIÓN DE CONFORMIDAD
DECLARATION OF CONFORMITY

Raypa

El fabricante: **R.ESPINAR S.L.**
The manufacturer::
Avda. del Vallés 322, 08227 TERRASSA (Barcelona) ESPAÑA

declaramos bajo nuestra exclusiva responsabilidad que el producto(s):
declare in our sole responsibility, that the following product(s):

AUTOCLAVES DE ESTERILIZACIÓN "AHS"
STERILIZATION AUTOCLAVES "AHS"

"AHS-75 N" / "AHS-75 DRY" / "AHS-75 B"

y que esta declaración se refiere y es conforme a las siguientes Normas Internacionales:
to which this declaration relates to, is in conformity whit the following Standards:

EN-61010-1 Requisitos de seguridad de equipos eléctricos de medida, control y uso en laboratorio. Parte 1: Requisitos generales
Safety requirements for electrical equipment for measurement, control and laboratory use. Part 1: General requirements

EN-61010-2-040 Parte 2-040: Requisitos particulares para autoclaves de laboratorio
Part 2-040: Particular requirements for laboratory autoclaves

EN-61326 Material eléctrico para medida, control y uso en laboratorio. Requisitos de compatibilidad electromagnetica (CEM)
Electrical equipement for measurement, control and laboratory use. EMC Requirements

AD 2000 Merkblatt Recipientes a presión
Pressure vessels

y que responden a los requisitos esenciales de las directivas:
therefore, it follows the provisions of the directives:

2006/95/CE Baja Tensión
Low Voltage

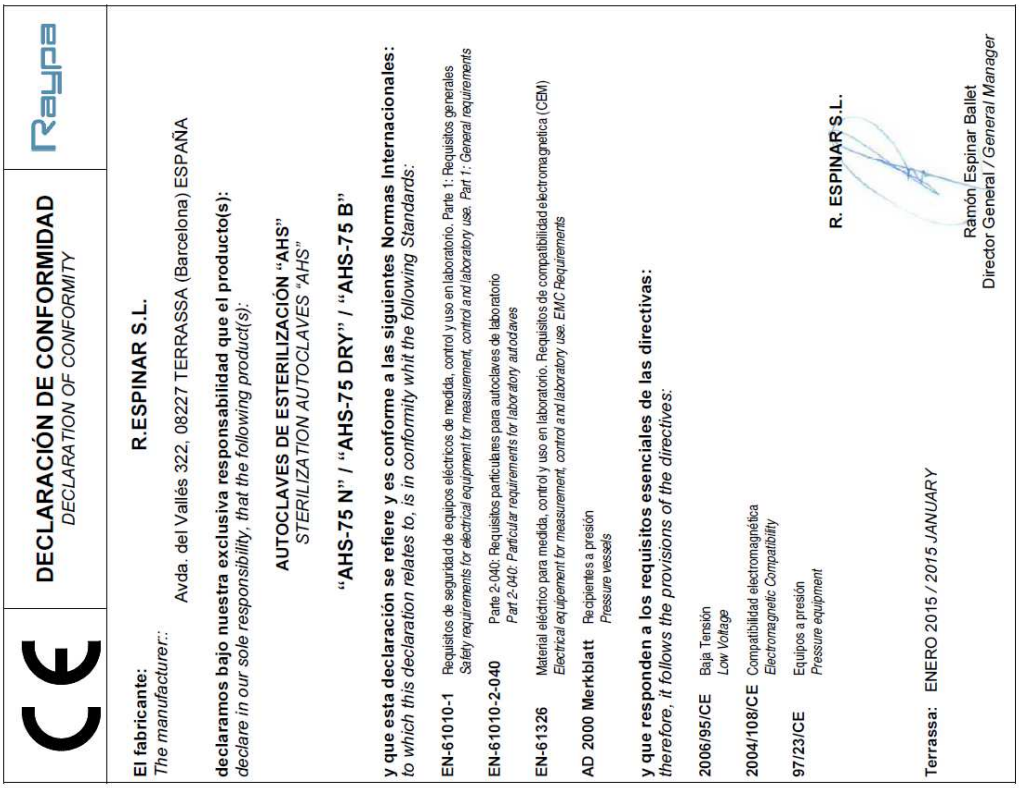
2004/108/CE Compatibilidad electromagnética
Electromagnetic Compatibility

97/23/CE Equipos a presión
Pressure equipment

Terrassa: ENERO 2015 / *2015 JANUARY*

R. ESPINAR S.L.

Ramón Espinar Ballet
Director General / *General Manager*



DECLARACIÓN DE CONFORMIDAD
DECLARATION OF CONFORMITY

Raypa

El fabricante: **R.ESPINAR S.L.**
The manufacturer::
Avda. del Vallés 322, 08227 TERRASSA (Barcelona) ESPAÑA

declaramos bajo nuestra exclusiva responsabilidad que el producto(s):
declare in our sole responsibility, that the following product(s):

AUTOCLAVES DE ESTERILIZACIÓN "AHS"
STERILIZATION AUTOCLAVES "AHS"

"AHS-50 N" / "AHS-50 DRY" / "AHS-50 B"

y que esta declaración se refiere y es conforme a las siguientes Normas Internacionales:
to which this declaration relates to, is in conformity whit the following Standards:

EN-61010-1 Requisitos de seguridad de equipos eléctricos de medida, control y uso en laboratorio. Parte 1: Requisitos generales
Safety requirements for electrical equipment for measurement, control and laboratory use. Part 1: General requirements

EN-61010-2-040 Parte 2-040: Requisitos particulares para autoclaves de laboratorio
Part 2-040: Particular requirements for laboratory autoclaves

EN-61326 Material eléctrico para medida, control y uso en laboratorio. Requisitos de compatibilidad electromagnetica (CEM)
Electrical equipement for measurement, control and laboratory use. EMC Requirements

EN-13060 Esterilizadores de vapor de agua pequeños
Small steam sterilizers

AD 2000 Merkblatt Recipientes a presión
Pressure vessels

y que responden a los requisitos esenciales de las directivas:
therefore, it follows the provisions of the directives:

2006/95/CE Baja Tensión
Low Voltage

2004/108/CE Compatibilidad electromagnética
Electromagnetic Compatibility

97/23/CE Equipos a presión
Pressure equipment

Terrassa: ENERO 2015 / *2015 JANUARY*

R. ESPINAR S.L.

Ramón Espinar Ballet
Director General / *General Manager*

R. ESPINAR, S.L.
Avda. del Vallès, 322. Políg. Ind. “Els Bellots”
08227 TERRASSA (Barcelona) Spain
Tel. +34 93 783 07 20 / +34 93 783 03 44
Fax +34 93 731 37 17
raypa@raypa.com
www.raypa.com