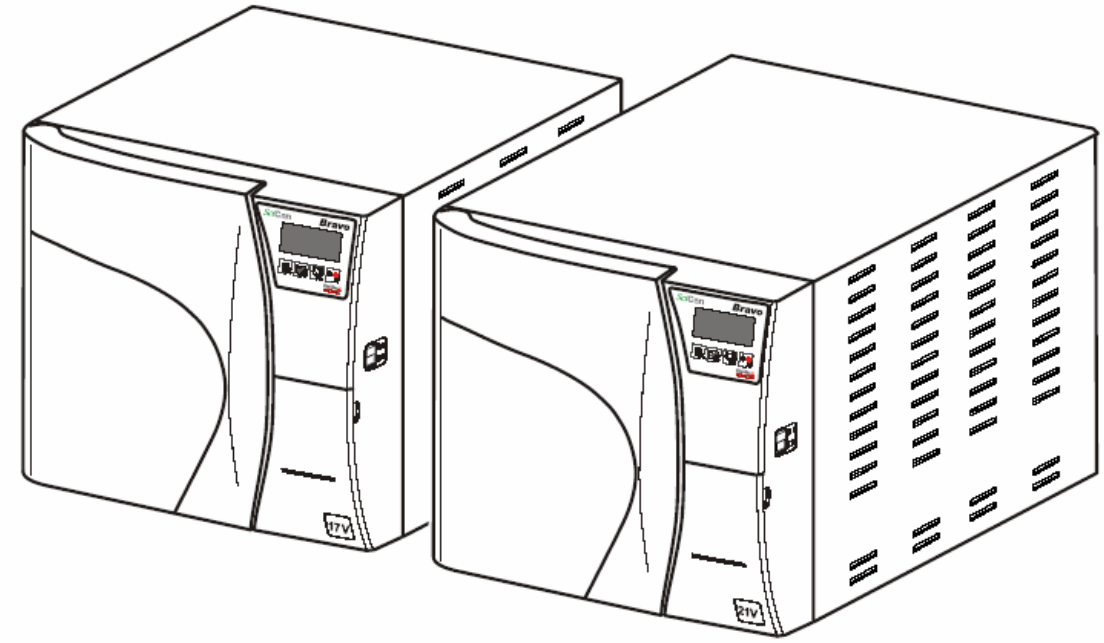
Bravo Autoclaves



Service Manual

SciCan
A HIGHER STANDARD

Bravo Service Manual SD-306/1 Rev 1

SciCan

1. UTILIZATION

GENERAL

SYMBOLS USED IN THE MANUAL

☞ THIS SYMBOL INDICATES IMPORTANT INFORMATION.

DANGER! THIS SYMBOL INDICATES THERE IS POTENTIAL FOR PROPERTY DAMAGE. FOLLOW THE INSTRUCTIONS IN THE MANUAL TO PREVENT POTENTIAL DAMAGE TO MATERIALS, EQUIPMENT OR OTHER PROPERTY.

WARNING! THIS SYMBOL INDICATES THERE IS POTENTIAL DANGER FOR INJURY. FOLLOW THE PROCEDURES DESCRIBED IN THE MANUAL TO AVOID INJURING THE USER AND/OR OTHERS.

DANGER! THIS SYMBOL INDICATES THERE IS POTENTIAL DANGER DUE TO HIGH TEMPERATURE.

DISCLAIMERS

The Bravo units described in this manual are to be used exclusively for the sterilization of solid and hollow re-usable instruments and porous materials (e.g., textiles).

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

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

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

Do not permit any person other than certified personnel to supply parts for, service or maintain your Bravo. SciCan shall not be liable for incidental, special or consequential damages caused by any maintenance or services performed on the Bravo by a third party, or for the use of equipment or parts manufactured by a third party, including lost profits, any commercial loss, economic loss, or loss arising from personal injury.

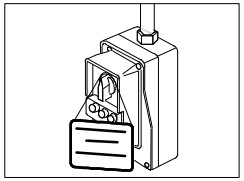
Never remove the cover of the unit and never insert objects through holes or openings in the cabinetry. Doing so may damage the unit and/or pose a hazard to the operator.

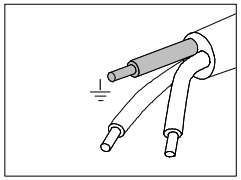
GENERAL WARNINGS

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

- Use ONLY distilled water of high quality.
- The use of water of inadequate quality can severely damage the equipment. See ***Characteristics of the water supply***.
- Do not pour water or other liquids on the equipment.
- Do not pour inflammable substances on the equipment.
- Do not use the equipment in presence of gas, explosive or flammable vapors.
- Before performing any maintenance or cleaning, ALWAYS DISCONNECT the power supply.

When it is not possible to disconnect the unit's power supply and the external power grid switch (main breaker) is far away or not visible from the unit, place a WORK IN PROGRESS sign on the external power grid switch (main breaker) after turning it OFF.





- Make sure the electrical system is grounded conforming to current laws and/or standards.
- **Do not remove any label or nameplate from the equipment; request new ones, if necessary**.
- Use only original replacement parts.

Failure to observe the warnings listed above releases the manufacturer from all liability.

CUSTOMER SERVICE

For all service and repair inquiries:

Canada	1-800-870-7777
United States:	1-800-572-1211
International:	(416) 446-4500
Email:	techservice.ca@scican.com (Canada) techservice.us@scican.com (USA) techservice.int@scican.com (International)

PRODUCT OVERVIEW

Bravo units are SciCan's revolutionary chamber autoclaves designed with safety, performance, flexibility and ease of use in mind.

They are a sophisticated yet easy-to-use sterilizer with a wide range of configuration options and patented operating devices designed to satisfy every need for sterilizing medical and dental tools, guaranteeing the maximum performance under all conditions.

They also feature a user-friendly interface. Rather than having to adapt to the machine and its characteristics, users can configure the unit to their own needs .

Easy-to-use, compact and aesthetically pleasing, Bravo units are the ideal partner for professionals seeking maximum sterilization safety.

Bravo units are completely microprocessor-controlled, and offer a large (17- or 21-liter) sterilization chamber made of stamped stainless steel.

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

Their exclusive steam generation system, effective plumbing circuit and electronic management (supplemented by high-precision sensors) guarantees high speed in the process execution and excellent stability of the thermodynamic parameter. Moreover, their Process Evaluation System constantly monitors all the machine's vital parameters in real-time, guaranteeing absolute safety and perfect results.

They offer users 10 sterilization programs (one customizable), each equipped with optimized drying for the fast, effective sterilization of the various types of loads (instruments and materials) used in a medical or dental environment. Four of these can be selected directly from the simplified control panel.

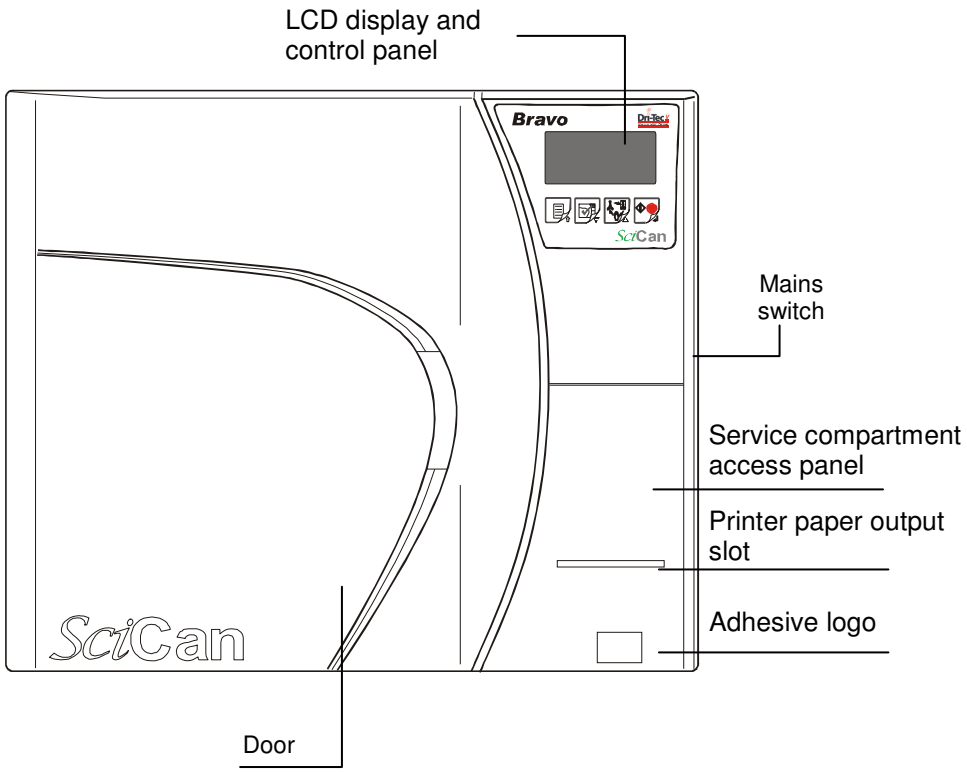
Bravo units also offer a number of interesting options for configuring the preheating mode (based on the sterilizer's frequency of use) and printing the cycle report.

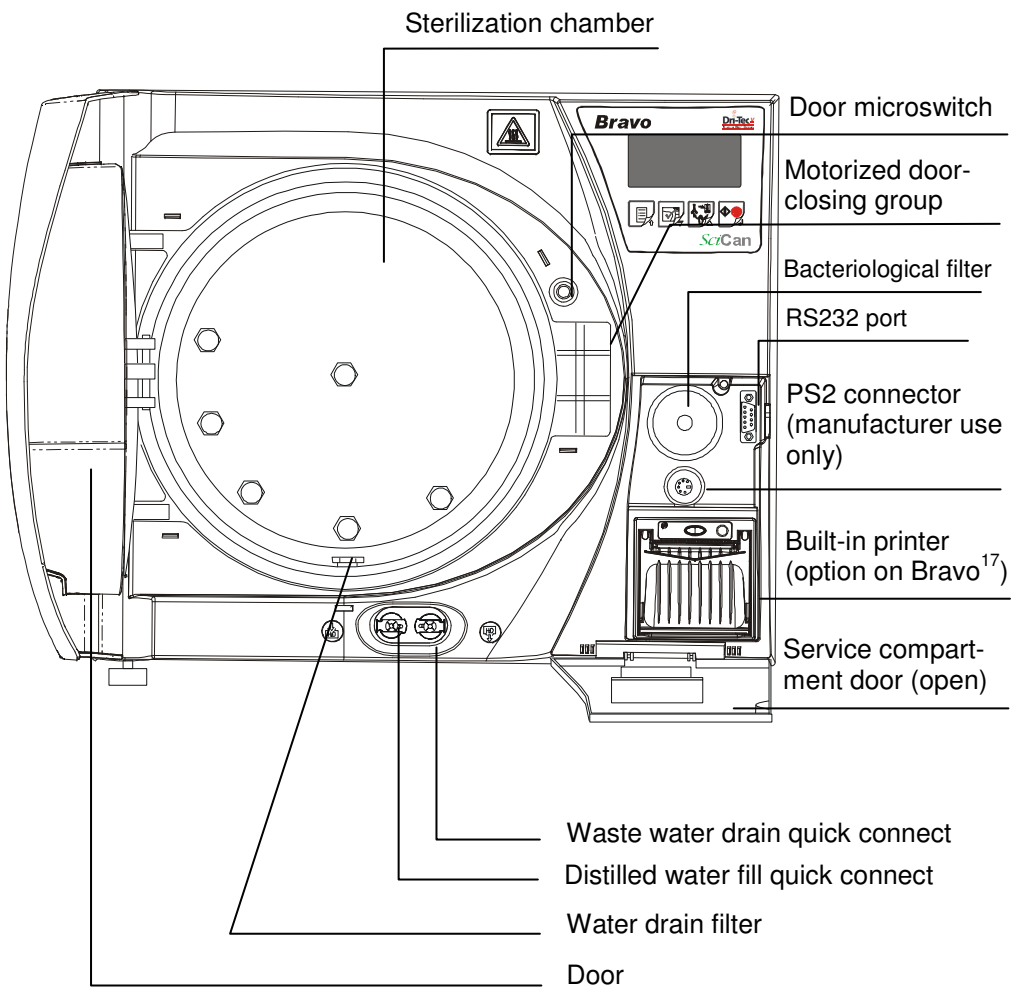
Refer to the chapter “Configuration” for more detail.

Bravo sterilizers also have one of the most complete, sophisticated and advanced safety systems available today to protect users in the case of electrical, mechanical, or thermal operating anomaly.

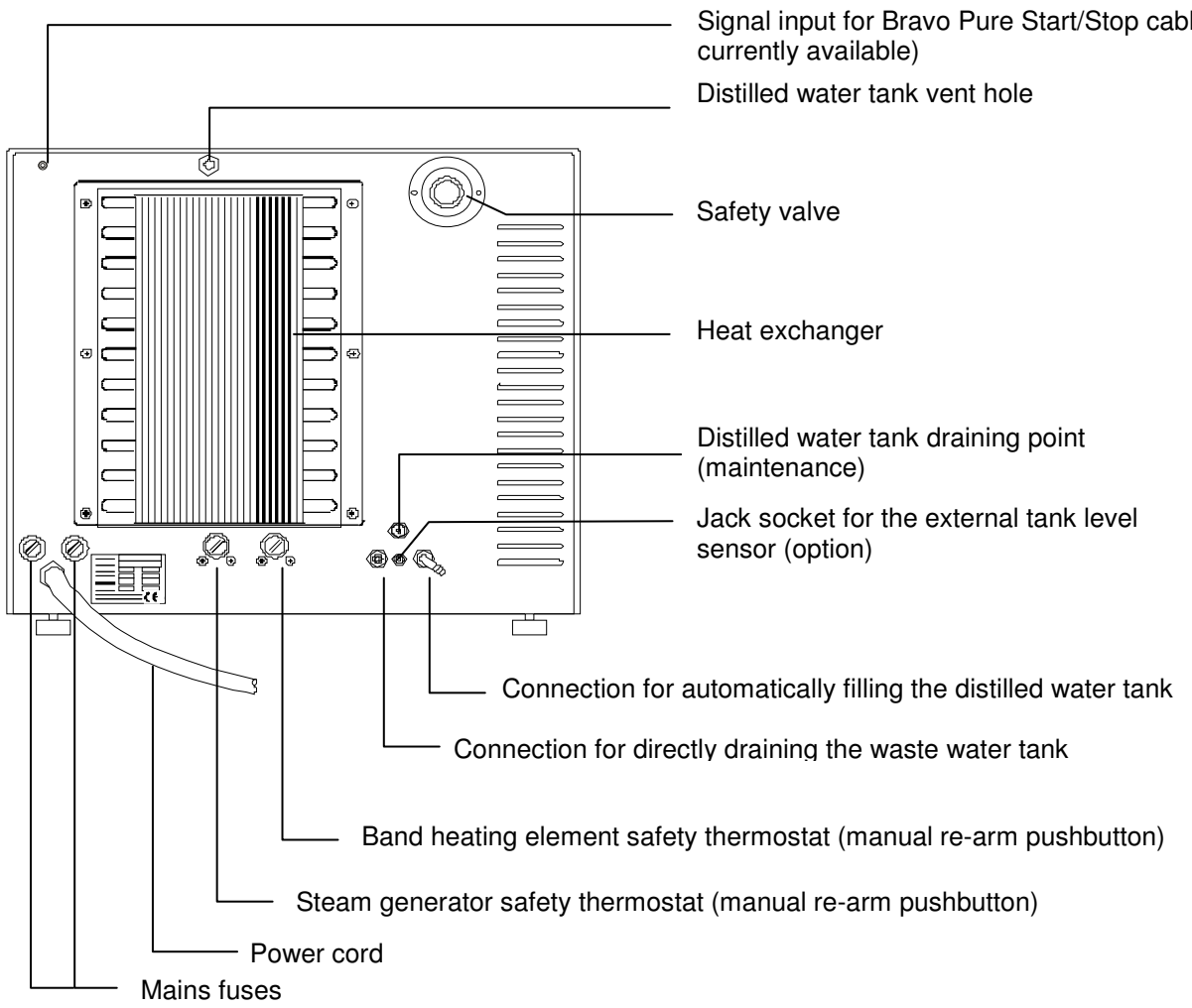
☞ Refer to chapter ***Technical characteristics*** for a description of the integrated safety devices.

FRONT VIEW

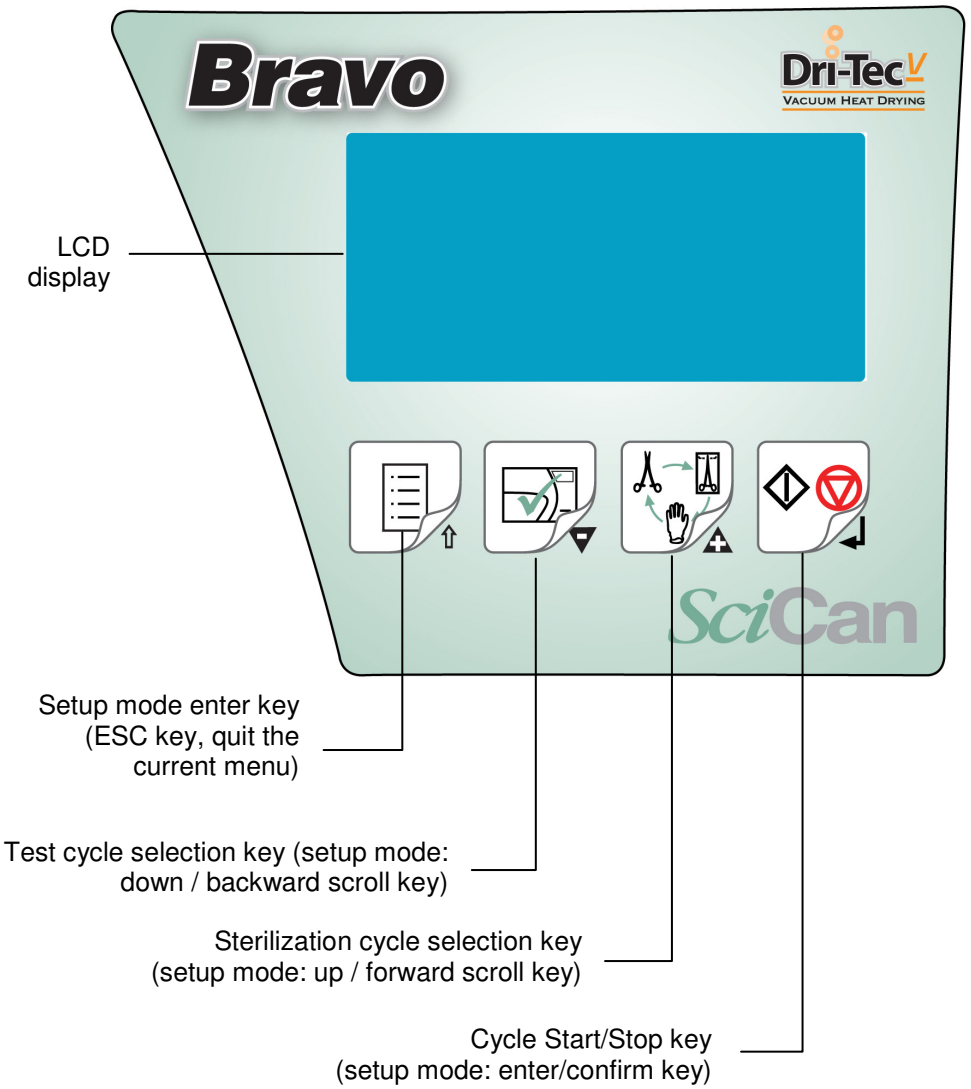

LCD display and control panel
Mains switch
Service compartment access panel
Printer paper output slot
Adhesive logo
Door
Bravo
SciCan


Sterilization chamber
Door microswitch
Motorized door-closing group
Bacteriological filter
RS232 port
PS2 connector (manufacturer use only)
Built-in printer (option on Bravo17)
Service compart-ment door (open)
Waste water drain quick connect
Distilled water fill quick connect
Water drain filter
Door
Bravo
SciCan

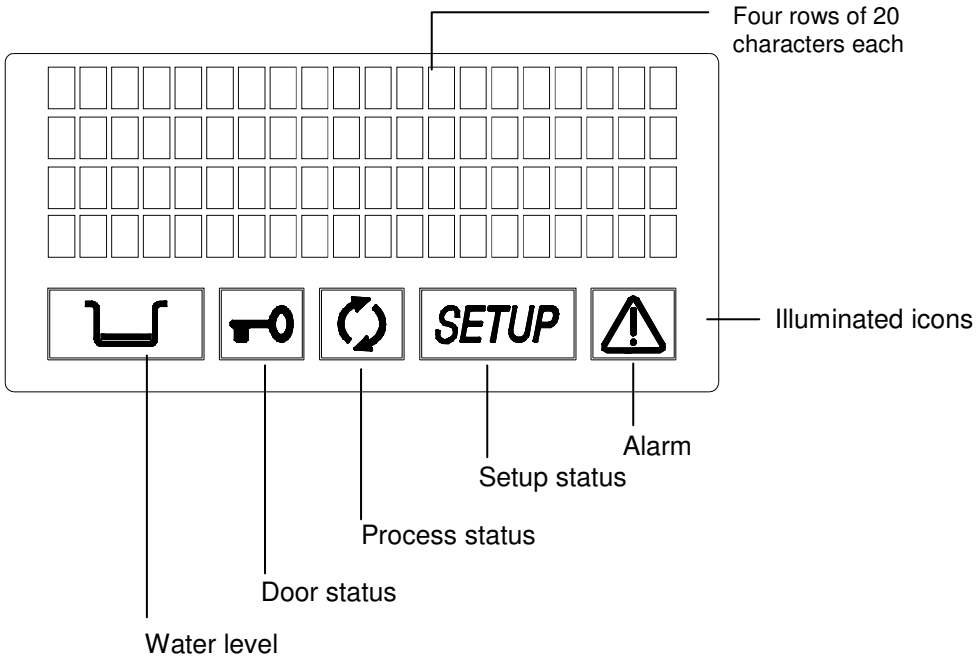
REAR VIEW


Signal input for Bravo Pure Start/Stop cable (not currently available)
Distilled water tank vent hole
Safety valve
Heat exchanger
Distilled water tank draining point (maintenance)
Jack socket for the external tank level sensor (option)
Connection for automatically filling the distilled water tank
Connection for directly draining the waste water tank
Band heating element safety thermostat (manual re-arm pushbutton)
Steam generator safety thermostat (manual re-arm pushbutton)
Power cord
Mains fuses

CONTROL PANEL



LCD DISPLAY



TECHNICAL CHARACTERISTICS

Equipment		Bravo^{17}, Bravo^{17V}, Bravo^{21V}		
Manufacturer		SciCan Ltd. 1440 Don Mills Road Toronto ON M3B 3P9 CANADA Phone: (416) 445-1600 Fax: (416) 445-2727 Toll free: 1-800-667-7733		
Power supply		120V, 60 Hz	220/230V, 60 Hz	220/240V, 50 Hz
Nominal power		1700 W (15A)	2300 W (10A)	2300 W (10A)
AC fuses *(6,3 x 32 mm)*		F 15A	F 15A	F 15A
On-board fuses (5 x 20 mm)				
pcb "GAM" version	F1 (secondary trafo)	T 5A 250V	T 5A 250V	T 5A 250V
	F2 (primary trafo)	T 4A 250V	T 2A 250V	T 2A 250V
	F3 (door-lock accidental activation)	F 200mA 250V	F 200mA 250V	F 200mA 250V
	F4 (door-lock overload)	F 1.25A 250V	F 1.25A 250V	F 1.25A 250V
pcb "TROLL" version	F1 (Secondary trafo):			T 6,3A 250V
	F2 (Primary trafo):			T 3,15A 250V
pcb Printer Power Supply	F1 PTR (printer protection):	T 5A 250V	T 5A 250V	T 5A 250V
External dimensions *(LxDxH)* *(excluding rear connections)*		Bravo$^{17/17V}$ 480x560x420mm / 18.9 x 22.04 x 16.5" Bravo^{21V} 480x660x420mm / 18.9 x 26 x 16.5"		
Insulation class		Class I		
Installation category		Cat. II		
Environment of use		Internal use		
Noise level		<60 db(A)		
Environmental operating conditions		Temperature: +15°C to +40°C Relative Humidity: max 80%, non condensing Altitude: max 3000 m *(a.s.l.)*		

Net weight:	Bravo^{17}	Bravo^{17V}	Bravo^{21V}
- empty)	~ 50kg/110 lbs	~ 53kg/117 lbs	~ 58kg/128 lbs
- empty with trays & support)	~ 55kg/121 lbs	~ 58kg/128 lbs	~ 63kg/139 lbs
- empty with trays, supports, max water)	~ 59kg/130 lbs	~ 62kg/137 lbs	~ 67kg/148 lbs
Sterilization chamber dimensions *(Diameter x Length)*	Bravo^{17}, Bravo^{17V} D250 x L350 mm / D10" x L14" Bravo^{21V} D250 x L450 mm / D10" x L18"		
Sterilization chamber total volume	Bravo^{17}, Bravo^{17V} ~ 17 L (0.017 m^3 / 0.60 ft^3) Bravo^{21V} ~ 21 L (0.021 m^3 / 0.74 ft^3)		
Distilled water tank capacity *(supply)*	~ 4.6 L / 1.22 USgal *(water at MAX level)* ~ 0.8 L / 0.02 USgal *(water at MIN level)*		
Sterilization programs	Available: 10 Pre-sets: 4 *(direct selection by user)*		
Test programs	Helix/Bowie & Dick Test Vacuum Test		
Preheating time *(from cold)*	~ 10 minutes		
Serial connection	DB-9 pin *(female) connector*		
Bacteriological filter *(PTFE filtering element)*	Porosity: 0.2 µm Connection: male 1/8" NPT connector		

SAFETY DEVICES

The sterilizer is equipped with the following safety devices:

– **AC mains fuses** (see technical characteristics)
Protects inside the device against a fault (e.g., heating elements short circuit).
Action: Cuts the electricity.

– **On-board fuses** (see technical characteristics)
Protects against a fault in the primary transformer circuit and low voltage uses.
Action: Cuts power to one or more low-voltage circuits.

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

– **Safety valve**
Protects against overpressure in the sterilization chamber.
Action: Releases the steam and restores to a safe pressure.

– **Steam generator manual re-arm safety thermostat**
Protects against steam generator overheating.
Action: Cuts-off the electricity to the steam generator.

– **Heating element manual re-arm safety thermostat**
Protects against overheating of the heating elements of the container under pressure.
Action: Cuts-off the electricity to the chamber heating element.

– **Door position safety microswitch**
Confirms the door is correctly closed when the container is under pressure.
Action: Signals incorrect door position.

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

– **Door lock mechanism safety microswitch**
Confirms the door lock is operating correctly.
Action: Signals the failure or incorrect operation of the door lock mechanism.

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

– **Integrated system for evaluating the sterilization process**
Provides continuous verification of the sterilization process parameters entirely managed by microprocessor.
Action: In case of anomaly, immediately interrupts the program and generates alarms.

– **Monitoring of the sterilizer's operation**
Provides real-time oversight of all significant parameters when the machine is on.
Action: In case of anomaly, generates alarm messages with possible interruption of the cycle.

WATER SUPPLY CHARACTERISTICS

DESCRIPTION	WATER SUPPLY VALUES	*VALUES IN CONDENSATE*
DRY RESIDUE	< 10 mg/l	*< 1 mg/l*
SILICON OXIDE SiO_2	< 1 mg/l	*< 0.1 mg/l*
IRON	< 0.2 mg/l	*< 0.1 mg/l*
CADMIUM	< 0.005 mg/l	*< 0.005 mg/l*
LEAD	< 0.05 mg/l	*< 0.05 mg/l*
HEAVY METAL RESIDUES (except iron, cadmium and lead)	< 0.1 mg/l	*< 0.1 mg/l*
CHORIDES	< 2 mg/l	*< 0.1 mg/l*
PHOSPHATES	< 0.5 mg/l	*< 0.1 mg/l*
CONDUCTIVITY AT 20°C	< 15 µs/cm	*< 3 µs/cm*
pH VALUE	5 - 7	*5 - 7*
APPEARANCE	colorless, transparent, without sediments	*colorless, transparent, without sediments*
HARDNESS	< 0.02 mmol/l	*< 0.02 mmol/l*

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

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

INSTALLATION

GENERAL

A correct and careful installation is the first and fundamental step to achieving an efficient sterilization and increasing the equipment life. Moreover, it will greatly reduce the risk of physical injury and property damage, as well as the risk of equipment malfunction and failure. Follow the instructions of this chapter scrupulously.

☞ The sterilizer has passed all inspections required before being shipped, and does not require any additional calibration before being put into service.

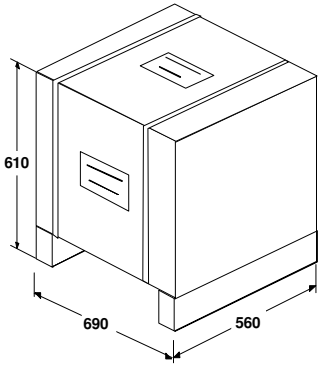
PACKAGE CONTENTS

Dimensions and weight

Height	610 mm
Width	690 mm
Depth	560 mm

Total weight

Bravo^{17}	approx. 126 lbs / 57kg
Bravo^{17V}	approx. 136 lbs / 62 kg
Bravo^{21V}	approx. 150 lbs / 68 kg

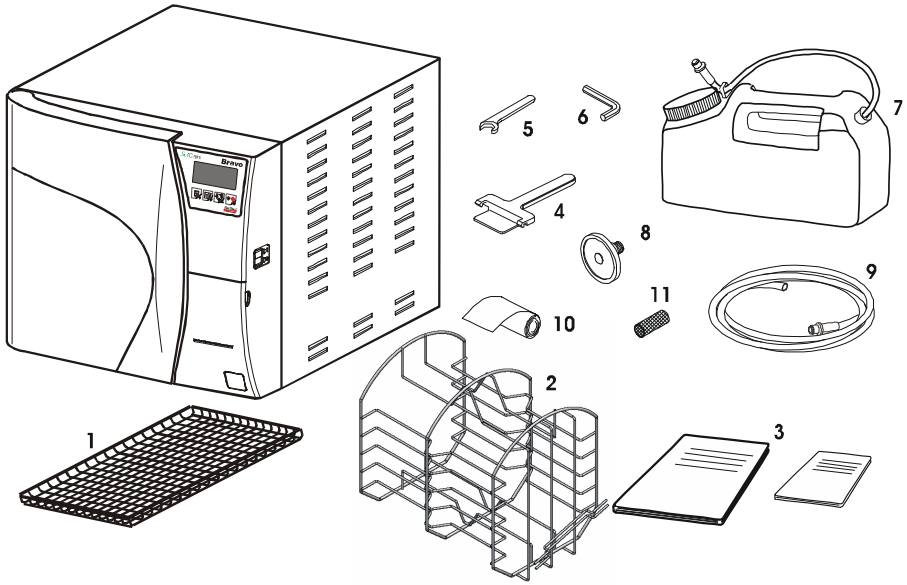


☞ Check the integrity of the package upon receipt.

Confirm that:
- the contents match the specifications of the order (see the accompanying document);
- there is no obvious damage to the contents.

☞ If you have received the wrong product, are missing parts, or if your unit has any type of damage, immediately provide a detailed description to the seller and shipper.

Contents



- Stainless steel wire instrument tray (Ref. 1)
  (5 with Bravo^{17V} and Bravo^{21V} models) (3 with Bravo^{17} model);
- Stainless steel rack (Ref. 2);
- Instruction/Operator's manual and other documents (Ref. 3);
- Tray extractor (Ref. 4);
- Hexagonal wrench 13mm (ref. 5)
- Allen screw (ref 6)
- Container with quick connect for adding distilled water (about 0.5 US gal / 2 L) (Ref. 7);
- Extra bacteriological filter (Ref. 8).
- Silicone tube (6.5 ft / 2 m) for draining water, with quick connector (Ref. 9).
- Spare printer paper roll (Ref. 10) – only for Bravo^{17V} and Bravo^{21V} models.
- Water drain filter (Ref. 11)

☞ The customer must keep the purchase receipt for any warranty service.

HANDLING THE UNIT

Where possible, the packaged equipment must be handled using suitable mechanical means (forklift truck, transpallet, etc.) and following the instructions printed on the package.

In case of manual handling, the product must be lifted by two people using the handles cut in the side of the box.

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

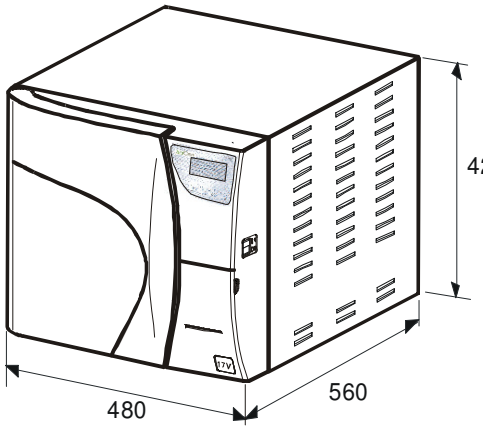
WE RECOMMEND THAT THE UNIT BE TRANSPORTED AND STORED AT A TEMPERATURE NO LOWER THAN 5 °C. PROLONGED EXPOSURE TO LOW TEMPERATURES COULD DAMAGE THE PRODUCT.

Keep the original packaging and use it when the device is being transported. Using different packaging could damage the product during shipping.

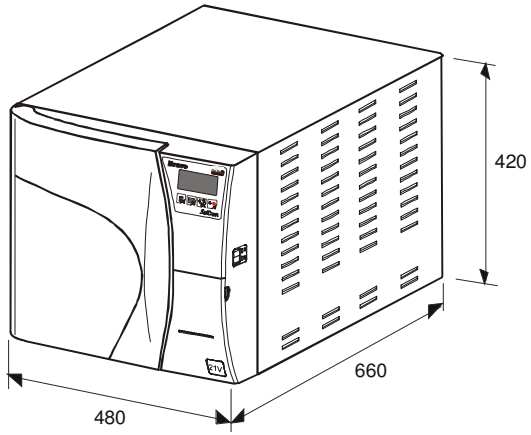
BEFORE SHIPPING, DRAIN THE DISTILLED WATER AND WASTE WATER TANKS, AND ENSURE THE DEVICE HAS BEEN OFF FOR 30 MINUTES FOLLOWING ITS LAST CYCLE SO THAT ALL THE HOT INTERNAL PARTS WILL HAVE TIME TO COOL.

Unit dimensions and weight

- Height (all models) 16.5” / 420 mm
- Width (all models) 19” / 480 mm
- Depths (excluding rear connections)
  - Bravo^{17} 22.0” / 560 mm
  - Bravo^{17V} 22.0” / 560 mm
  - Bravo^{21V} 25.0” / 635 mm
- Total weights (with rack and trays)
  - Bravo^{17} 121 lbs / 55 kg
  - Bravo^{17V} 128 lbs / 58 kg
  - Bravo^{21V} 139 lbs / 63 kg



Bravo^{17} . Bravo^{17V}



Bravo^{21V}

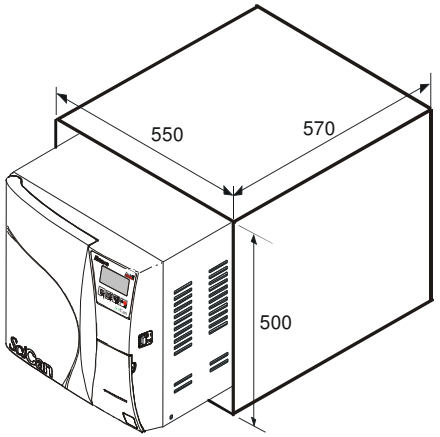
GENERAL INSTALLATION PRECAUTIONS

To ensure operator safety and the correct performance of the device:

- Install the sterilizer on a flat level surface strong enough to support the device's weight, and use the leveling feet to compensate for an irregular surface.
- Leave adequate space for ventilation, at least 2” (50 mm) on both side and top and 4” (100mm) at the back. Be sure to avoiding any obstructions to the air intake.
- Avoid contact with water or liquids. Do not install the sterilizer near tubs, sinks or similar places, as this could cause short circuits and/or potentially dangerous situations for the operator.
- Do not install the sterilizer in a place that is excessively humid or poorly ventilated.
- Do not install the machine were there is gas or flammable and/or explosive vapors.
- Install the device so that the power cord is not sharply bent or kinked. It must run freely to the electrical connection socket.
- Install the device so that any external fill/drain tubing is not sharply bent or kinked. These must run freely to the drain tank.

COMPARTMENT DIMENSIONS FOR BUILT-IN INSTALLATIONS

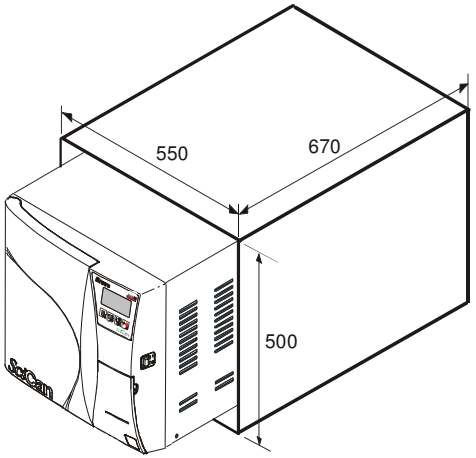
When installing the sterilizer in a cabinet, provide for adequate space around the device (>10cm, especially in the rear) for the aeration, and a large opening on the back side in order to allow the passage of the power cord as well as adequate air flow for the cooling of the heat exchanger.
A built-in compartment MUST have the minimum dimensions shown in the figure at right:



COMPARTMENT DIMENSIONS LESS THAN THOSE SHOWN MAY COMPROMISE THE CORRECT CIRCULATION OF AIR AROUND THE DEVICE AND MAY NOT PROVIDE ADEQUATE COOLING. THIS CAN RESULT IN THE DETERIORATION OF PERFORMANCE AND/OR POSSIBLE DAMAGE.

☞ If the power supply switch is not accessible, install an external breaker.

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



☞ Please refer to ***Technical Characteristics*** for additional data.

ELECTRICAL CONNECTIONS

The Bravo must be connected to an outlet that provides adequate capacity for the device's absorption and ground, and that conforms with current laws and/or standards. The outlet must also be protected by a suitable breaker.

☞ THE MANUFACTURER WILL NOT BE LIABLE FOR DAMAGES CAUSED BY INSTALLING THE STERILIZER ON AN INADEQUATE ELECTRICAL SYSTEM OR ONE NOT EQUIPPED WITH A GROUND.

If it is necessary to replace the plug on the power cord, use one with equal characteristics or, at any rate one, adequate to the device's electrical characteristics. The user is entirely responsible for the selection and replacement of the plug. This replacement should only be performed by a trained service professional.

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

CONNECTING A DATA RECORDER

The sterilizer can be connected to external data recorder to allow the recording of the cycle data onto a USB memory stick that can then be downloaded to a PC for archiving and data management.

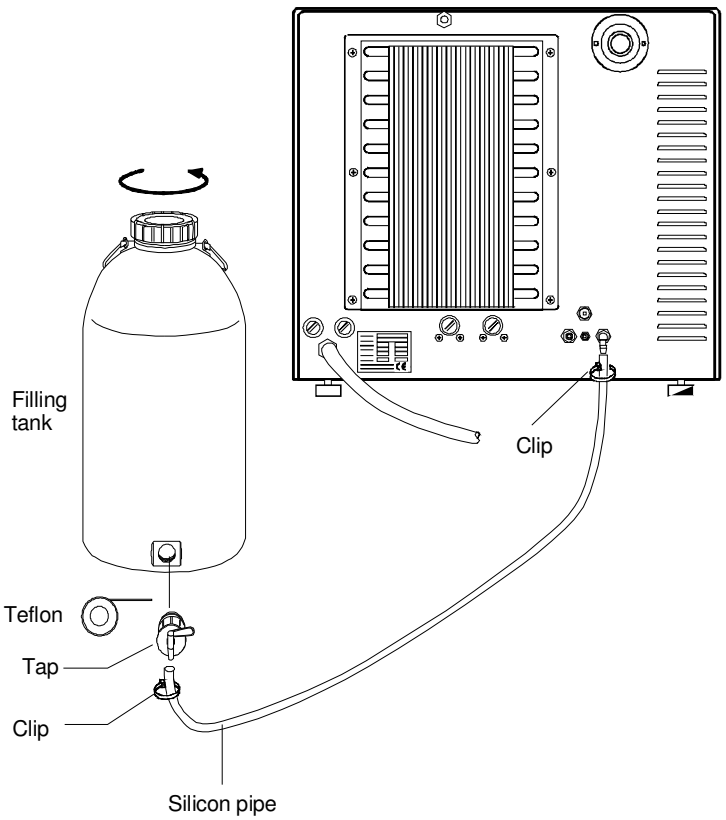
The connectors in the service compartment are used for interfacing; refer to Data Recorder Operator's Manual for the installation instructions.

1. Switch off the sterilizer and open the service compartment door.
2. Connect the serial ports of the data recorder and the Bravo unit using the 9-pin connector, and secure these with the screws. (The serial port of the autoclave can be found next to the biological filter).
3. Insert the power connector pin into the data recorder and then plug in the power supply.
4. Fully insert the USB stick in to data recorder.
5. Switch on the sterilizer.

CONNECTING AN EXTERNAL WATER SUPPLY TANK

(OPTIONAL, automatic filling function)

To avoid having to regularly fill the internal water tank (see ***First start-up***), it is possible to connect the sterilizer to an optional external tank that the user will fill less frequently, or to a commercially-available, water purification system with accumulation tank.



With this option, the autoclave automatically activates a pump that fills the internal tank when it reaches the MIN level. Be sure to monitor the external tank as the Bravo unit cannot monitor the water level in the external tank. To connect the external tank, follow the instructions below:

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

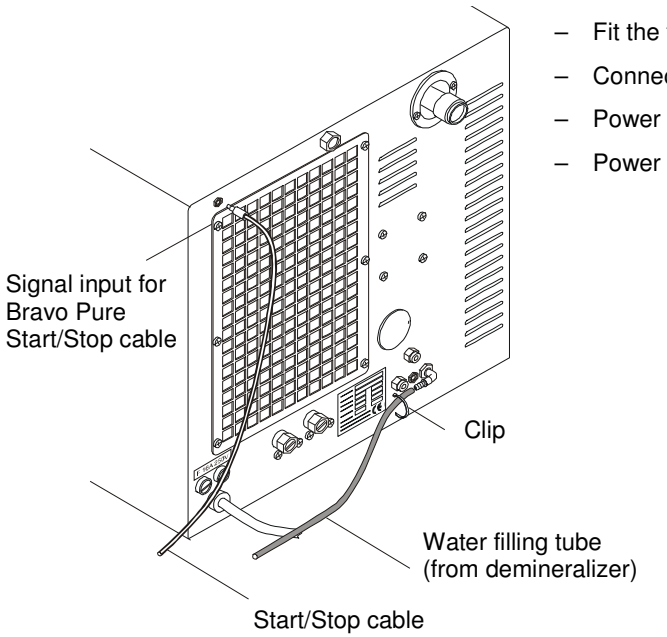
☞ For the setting of this option, refer to "***Setting the tank filling mode***".

CONNECTING DEMINERALIZER

(Optional - automatic filling option)

The sterilizer can be connected to an external clean water source (e.g., Bravo Pure or separate container of distilled water).

Refer to the demineralizer user manual for the installation instructions. To connect the demineralizer, follow these steps:



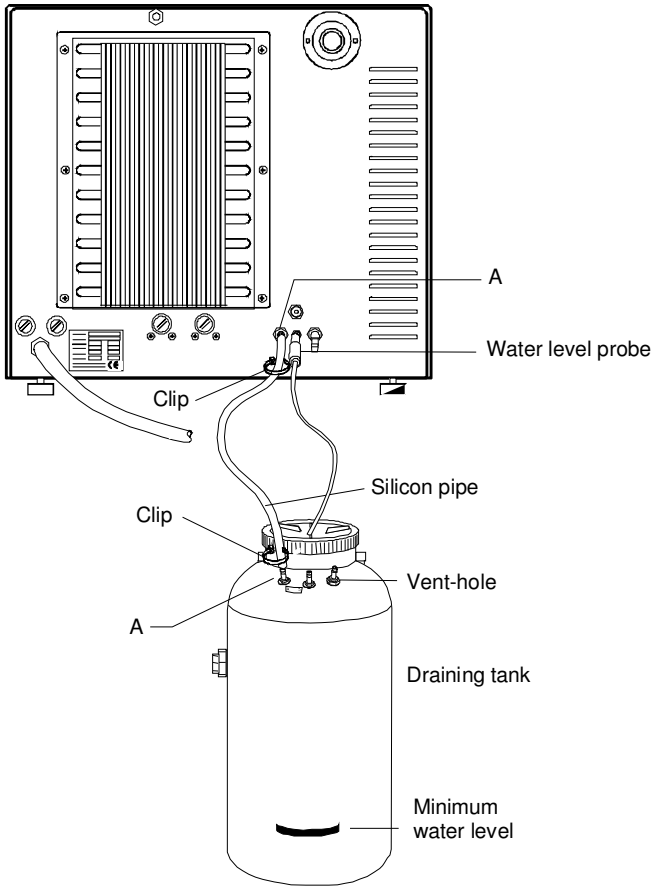
- Fit the filling tube on the rear connector. Fasten with a clip.
- Connect the START/STOP cable to the rear jack socket.
- Power on the demineralizer.
- Power on the sterilizer, enter in setup mode and configure the filling option (see "Setting the tank filling mode").

CONNECTING AN EXTERNAL WASTE BOTTLE

(OPTIONAL, external drain function)

An external optional waste bottle can be used to avoid having to manually empty the internal used water tank manually.

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



Instructions for the correct tank connection:

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

– Cut the silicone tube to measure, push the free end on connector A of the waste bottle and lock it with the plastic tie.

☞ Ensure the tube is not bent, kinked or obstructed in any way.

– Connect the plug of the level sensor to the jack water level probe jack on the back of the unit. This will advise the user when the external tank needs to be emptied.

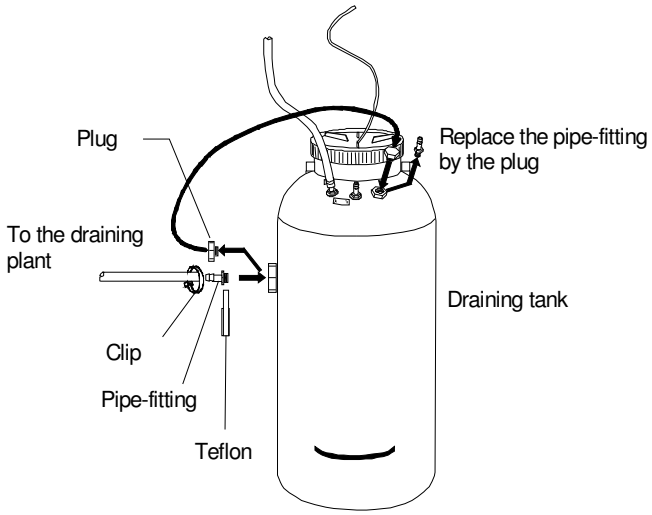
☞ Ensure the plug is correctly inserted. A poor connection will send a MAX level signal to the unit and an alarm will sound whenever you start a cycle.

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

☞ For the setting of the drain option, refer to “Setting the water drain mode.”

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

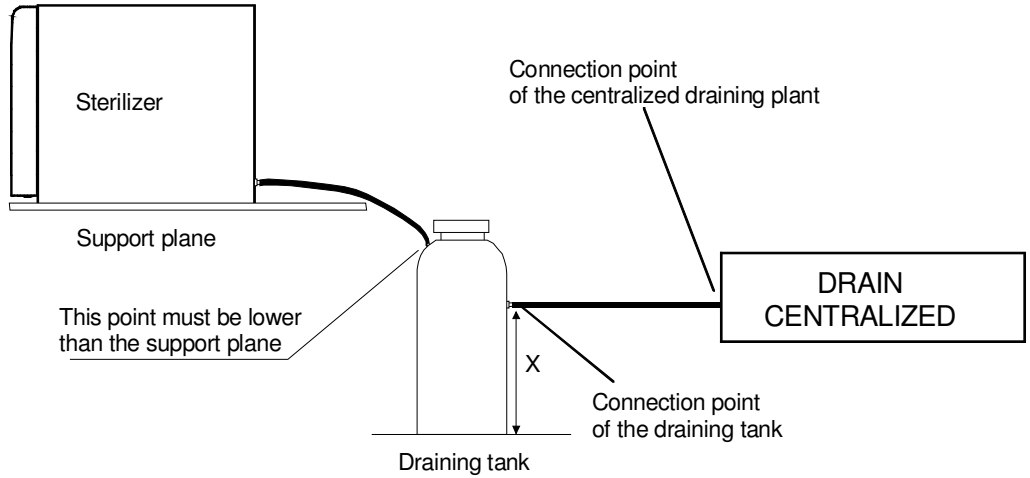
To avoid having to regularly empty the draining tank, it is possible to connect it directly to a central drain.



- Remove the metal plug from the side of the bottle and replace it with the fitting proved to allow it to connect to a hose
- Screw the 1/8" hose union, supplied, onto the side connector, and use a wrench to hold the connector to be tightened.
- Use Teflon tape or connector sealant for a perfect seal.
- On this tube union, insert a tube of suitable material and dimensions (NOT SUPPLIED). Push the tube all the way on and lock with the plastic tie provided.
- Connect the other end of the tube to the centralized draining point, and check the seal.

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

The following diagram depicts the ideal arrangement of components:



☞ Dimension **X** is the height of the side connector of the waste bottle above the floor. The connection between the waste bottle and the centralized draining point MUST no higher than x+30 mm (1.2”). ***Higher connections could compromise the proper emptying of the waste bottle***.

DIRECT CONNECTION TO A CENTRALIZED DRAINING POINT

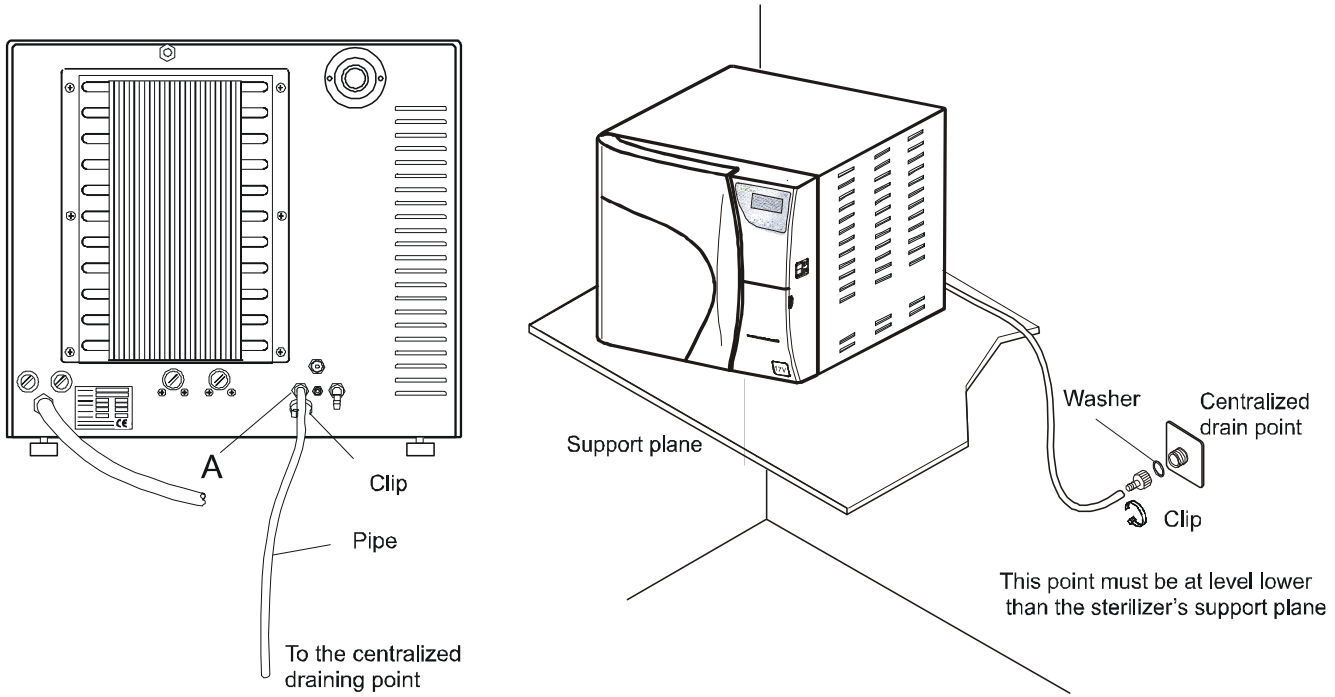
Instructions for a **correct direct connection** to a centralized draining point:

– Insert the silicone tube (supplied) or other suitable plastic tube onto hose connection A. Push the tube all the way on and lock with the plastic tie or other means;

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

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

The following diagram depicts the ideal arrangement of components:

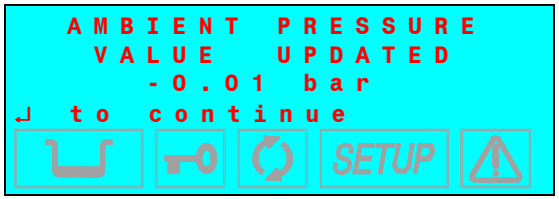


☞ The connection point to the central drain must be lower than the sterilizer's support surface otherwise the tank may not empty correctly.

ACQUIRING AND UPDATING THE AMBIENT PRESSURE VALUES

The sterilizer measures the ambient pressure for the correct operation of several auxiliary devices. Whenever the difference between the value read and the one previously stored is higher than a set value, the system automatically updates the stored value after a brief delay (see **Acquiring the ambient pressure**). Otherwise, the data remains unchanged without updating.

After updating, the device performs the initial automatic test procedure (see above). At the end, the display shows the following message (accompanied by a beep):



Push the key ↵ to put the equipment in ***STAND-BY mode***.

CONFIGURATION

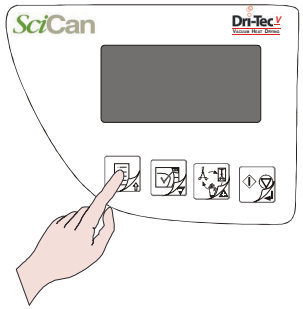
General

Bravo users can configure the device to meet their specific needs. For example, the device's performance may be adapted on the basis of the type of activity, the type of material to be sterilized or its frequency of use.

The SETUP program allows selecting from several options that users can activate through an easy-to-use menu.

☞ Use the SETUP program when necessary. A correctly personalized device provides the best performance.

Entering the Setup Mode



To enter the **SETUP** mode, hold down the ↑key on the control panel for several seconds, until the display shows:

☞ The SETUP icon on the display will light and stay on for the entire configuration phase.

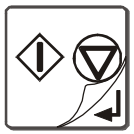
Press the key ↵ to enter the SETUP mode. The screen will show the first level menu (see ***SETUP Flowchart***).

Press the ESC key ↑ to quit the SETUP program and return to the normal operation (stand-by mode).

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

How the keys function in Setup mode

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



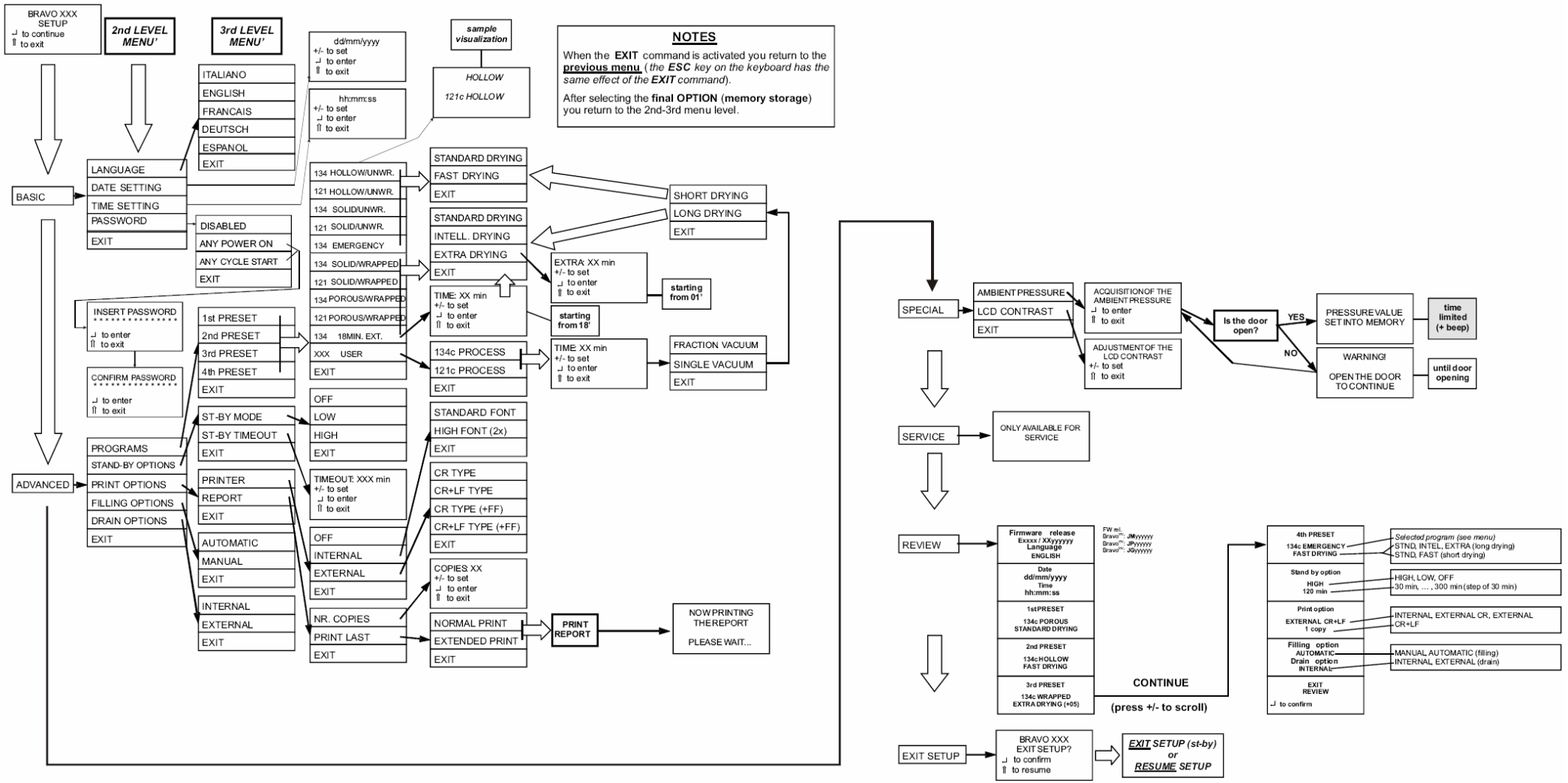
Symbol ↵ ENTER key: Confirms the selected option or value.

Symbol **+** Increases the value (or scroll down the cursor).
Also used to reset the unit during an error code (hold for 3 seconds)

Symbol **-** Decreases the value (or scroll up the cursor).

Symbol ↑ **ESC** key: Exits the selected menu option.

Setup flow diagram



Menu items

Meaning of the main level and second-level menu item descriptions.

MAIN menu - made up of six items:

BASIC
ADVANCED
SPECIAL
SERVICE
DATA REVIEW
EXIT SETUP

BASIC menu - (basic options) consisting of the following second-level menu items:

LANGUAGE
DATE SETTING
TIME SETTING
PASSWORD
EXIT (exit the BASIC menu and return to main menu)

ADVANCED menu - (advanced options) consisting of the following second-level menu items:

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

SPECIAL menu - (special options) - consisting of the following second-level menu items

AMBIENT PRESSURE (acquires the ambient pressure)
LCD CONTRAST (adjusting the contrast of the LCD display
EXIT (exit the SPECIAL menu and return to the main menu)

SERVICE - can be accessed only by a technician - it consists of the following second-level menu items

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

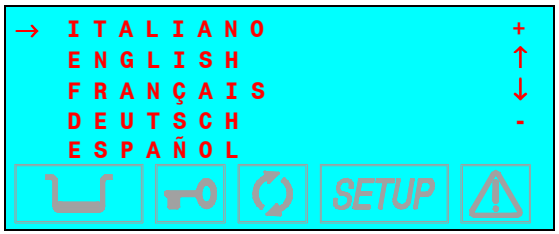
DATA REVIEW menu - displays the summary of the current settings, allowing users to verify their accuracy.

ACTIVATING CONFIGURATION OPTIONS – BASIC MENU

Setting the language

(LANGUAGE of the BASIC menu)

Selecting the LANGUAGE option with the ↵ key, the following screen will appear.



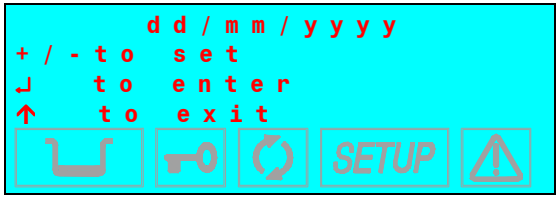
Select the desired language by moving the cursor using the + /– keys and confirming with the ↵ key. After the data is confirmed, return to the second-level menu.

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

Setting the Date

(DATE SETTING of the BASIC menu)

Selecting the DATE SETTING option with the ↵ key, the following screen will appear:



Proceed as follows:

– dd (day) is flashing: Set the current day with the + /- keys. Confirm with the ↵ key.

– mm (month) is flashing: Set the current month with the + /- keys. Confirm with the ↵ key.

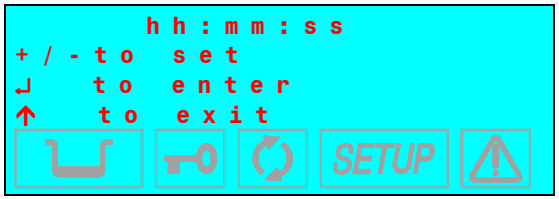
– yy (year) is flashing: Set the current year with the + /- keys. Confirm with the ↵ key.

The date is now stored, and the previous screen restored.

Setting the Time

(TIME SETTING of the BASIC menu)

Selecting the TIME SETTING option with the ↵ key, the following screen will appear



Proceed as follows:

– hh (hours) is flashing: Set the current hour value with the + /- keys. Confirm with the ↵ key.

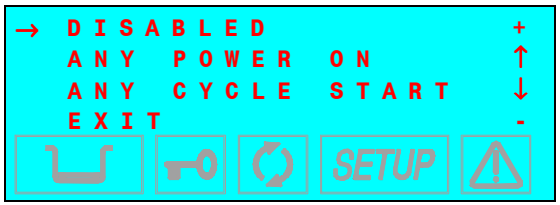
– mm (minutes) is flashing: Set the current minute value with the keys + /- . Confirm with the ↵ key.

The time is now stored, and the previous screen returned.

Setting the Password

(PASSWORD of the BASIC menu)

Selecting the PASSWORD option with the ↵ key, the following screen will appear:



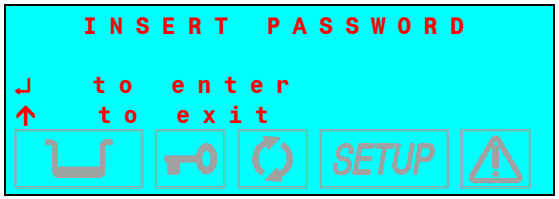
Select **DISABLED** to use the equipment freely, without limiting operator access.

Select **ANY POWER-ON** to password protect the main power switch. This allows only authorized personnel to turn the unit on. Once it is on, it can be used by any operator.

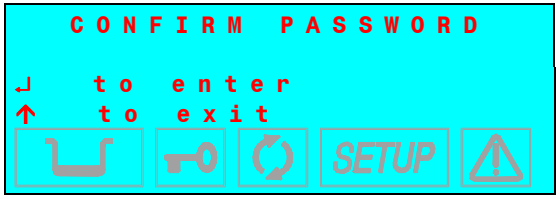
Select **ANY CYCLE START** to password protect the unit both at power-on and at the start of every sterilization program. In this mode, only authorized personnel will be able to use it.

☞ While the use of a password provides more controlled use of the equipment, it makes it more complex. It is suggested this option should only be enabled where there is a real need.

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



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



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

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

☞ To reset the BASIC USER PASSWORD, follow these step;

1. turn off power to the unit and remove the cover
2. remove jumper X21 from the main PCB
3. turn on the main power
4. press and hold the Setup button, to enter user menu
5. select BASIC
6. select PASSWORD
7. select DISABLED
8. then exit the menu
9. turn off power and replace jumper X21 and replace the cover

ACTIVATING CONFIGURATION OPTIONS – ADVANCED MENU

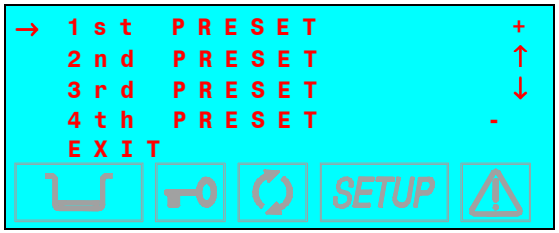
Setting the sterilization programs

(PROGRAMS of the ADVANCED menu)

The program setting and storing under four presets is accessed from the setting menu.
Each pre-set position can be associated to a standard or user configurable cycle (CUSTOM).

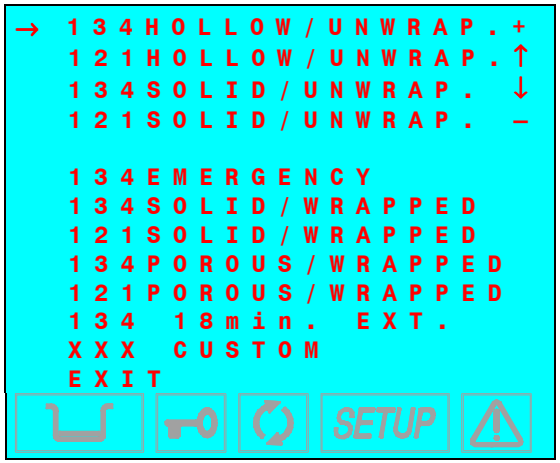
To associate a **standard program** and define several of its parameters, proceed as follows:

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



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

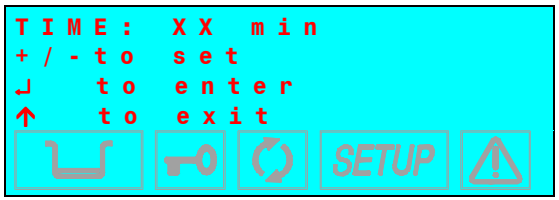
2. From here, enter the list of available cycles:



Use the + and - keys to scroll the list and select the sterilization program desired.

3. Confirm the selection with the ↵ key.

To select a **134 18 MIN: EXT**. cycle, for example, the display will start by showing a screen for the setting of the sterilization time.



Set the value, starting from 18 minutes.

As a function of the program selected, two alternative menus are prompted for the selection of the drying type.

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

Types of drying available: STANDARD DRYING (default setting), FAST DRYING (recommended for light loads).
Move the cursor with the + /- keys and confirm with the ↵ key.

☞ The EMERGENCY program allows only the FAST drying.

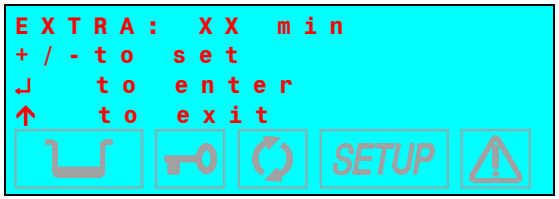
b) Programs with long drying (POROUS/WRAPPED, SOLID/WRAPPED and 18 MIN. EXT.)

Types of drying available: STANDARD DRYING (default setting), INTELLIGENT DRYING (automatic drying with duration depending on the load volume and/or load type), EXTRA DRYING (drying time extended by a value selectable, recommended for critical loads).
Move the cursor with the + /- keys and confirm with the ↵ key.

☞ With large loads or special materials, the STANDARD drying might not be sufficient. In this case, extend the drying time by selecting the EXTRA mode.

☞ With particularly complex types of loads (such as wrapped instruments in autoclave "container") "INTELLIGENT" drying might be less efficient then expected. In these cases, use the STANDARD or EXTRA options, depending on the need.

In case of EXTRA option selection, the following screen appears:



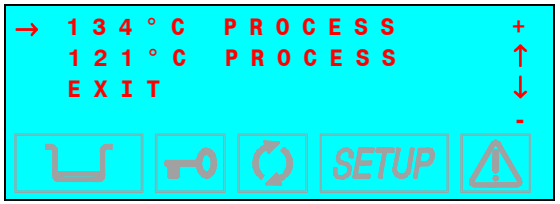
The user can set the duration from 1 to 15 minutes (in addition to the STANDARD DRYING duration). Set the value with the + /- keys and confirm with the ↵ key.

☞ The choice of the program to be preset can be changed at any time by following the procedure as described above.

☞ If the sterilization program selected is already preset, the procedure result will be not accepted, and the following warning appears on the display, along with a beep:

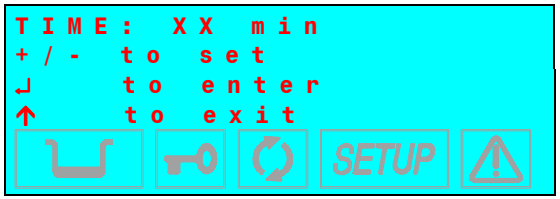
To preset the XXX CUSTOM program (and define the options), proceed as follows:

1. Select the item PROGRAMS and the number the program has to be preset to (see the previous description), then select the item XXX CUSTOM in the next screen. The following screen appears:



   Select the item 121°C or 134°C PROCESS to perform a custom program with sterilization process respectively at 121°C or 134°C. Confirm the choice with the ↵ key.

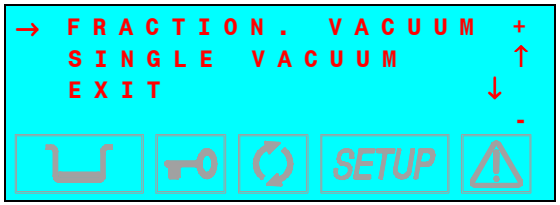
2. Next screen:



   Set the duration of the sterilization process by the + /- keys and confirm with the ↵ key.

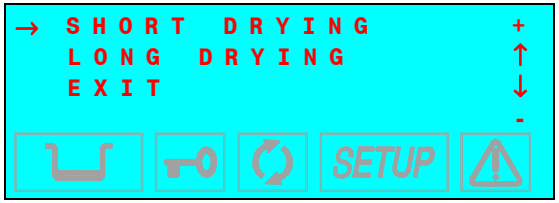
☞ The sterilization time range from 4 to 30 minutes for the 134°C program, and from 20 to 30 minutes for the 121°C program.

3. On the next screen, you will need to specify the type of the initial vacuum:



   Select FRACTION. VACUUM for a fractionated vacuum (for hollow and porous materials), or SINGLE VACUUM for a single vacuum pulse (solid instruments). Move the cursor with the + /- keys and confirm with the ↵ key.

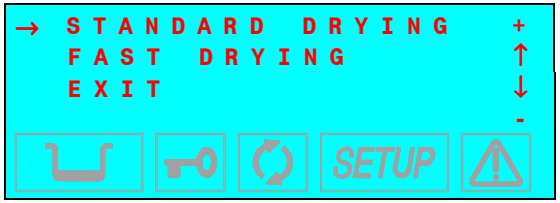
4. Next screen for the setting of the drying mode:



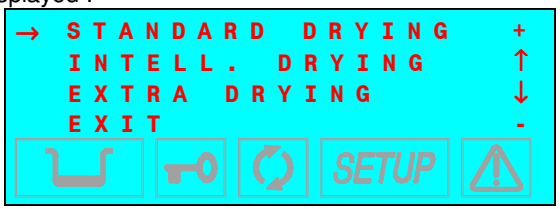
Select LONG DRYING for porous and/or wrapped loads, or SHORT DRYING for solid loose materials (and even hollow materials provided that not wrapped). Move the cursor with the + /- keys, confirm with the ↵ key.

5. Depending on the selection (SHORT or LONG DRYING), two different screens will appear (the same as the standard cycles):

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



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



For the choice criteria, refer to the STANDARD program section above.

1. If the program selected is already preset, the procedure result will be not accepted, and the following warning appears on the display, along with a beep:

☞ The choice of the program to be preset can be changed at any time by following the procedure as described above.

Please refer to the **Operation** section of this manual for a list of available programs, their screens and the characteristics of sterilizable materials (in relation to the programs).

The access to the XXX USER cycle does not require a password. None of the combinations available in the customization phase create any risks or dangers of injury to the operator or damage to the device.

CUSTOM PROGRAMS HAVE NOT BEEN VALIDATED. THEY SHOULD ONLY BE USED BY EXPERIENCED USERS.

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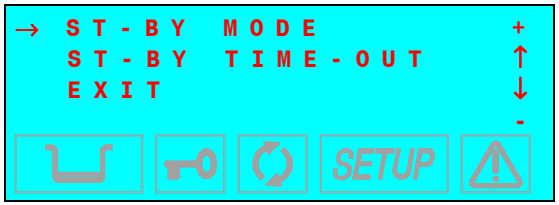
Setting the STAND-BY modes

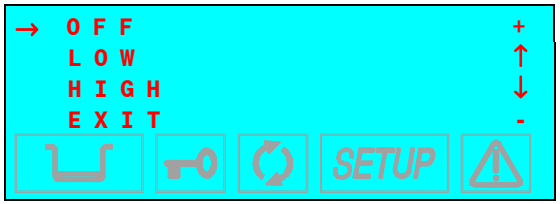
(STAND-BY OPTIONS of the ADVANCED menu)

Based on the equipment's frequency of use, or other considerations, users may want to select a high or low heating level during the STAND-BY (preheating) phase. They may also want to select a STAND-BY time-out mode that determines when the STAND-BY is deactivated.

Selecting the item STAND-BY OPTIONS, the following choice appears:



Selecting the option STAND-BY MODE, a submenu appears for the heating level setting:



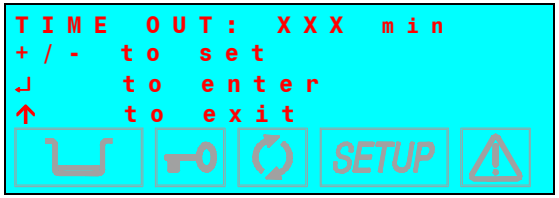
Select **HIGH** (high preheating level) to reduce the wait time between one cycle and the next.

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

Select **OFF** (deactivate preheating) for occasional use. In this case, the wait time will be longer (up to about 10 to 12 minutes for a "cold start").

Move the cursor with the ↵ key.

When the **STAND-BY TIME-OUT** option is selected, it is also possible to set the time for deactivating STAND-BY, i.e., how many minutes after the last cycle will the heating elements turn off.
The following screen appears:



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

Set the value with + /- keys; confirm with the ↵ key.

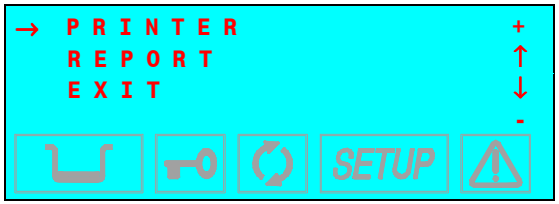
☞ This option is also active with STAND-BY OFF. However, in this condition the timer value has no effect since the heating elements are turned off anyway at the end of the sterilization program.
When any cycle selection key (sterilization or test) is pressed, or the machine is turned off and on with the main switch, the original STAND-BY mode (HIGH or LOW) is immediately reactivated.

Setting the Printing mode

(PRINT OPTIONS of the ADVANCED menu)

Bravo^{17V} and Bravo^{21V} sterilizer are equipped with a built-in printer – with Bravo^{17} the printer is an option - (and optionally can be connected to an external printer) to record on paper the sterilization cycle data. To set the parameters for the printout, proceed as follows:

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



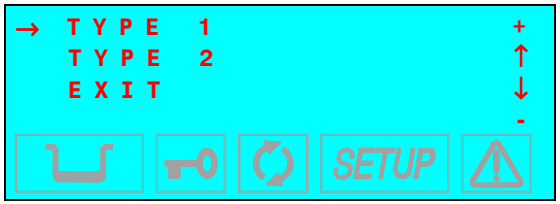
The item PRINTER allows the setting of the printer type, the item REPORT allows the setting of the printout mode, the number of copies, and the printing of the data of the last cycle performed.

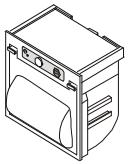
a) **Item PRINTER**

The following screen appears:

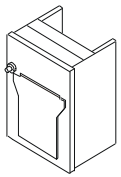
Select **OFF** to disable the print of the cycle data (or when the printer is not installed on the unit).

Select **INTERNAL** to enable the built-in thermal printer. In this case, another sub-menu opens:



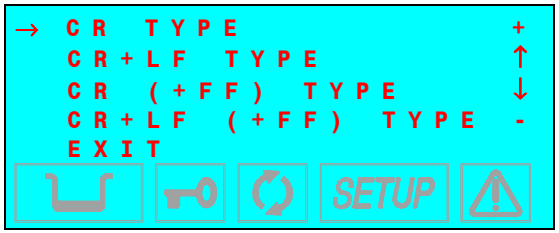


Select Type 1 for printer style 1 (“Custom”).



Select Type 2 for printer style 2 (“Fenix”).

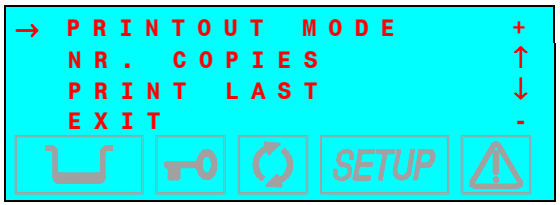
If, on the other hand, you choose **EXTERNAL**, the data will be printed on an external peripheral. Following this selection, another menu opens:



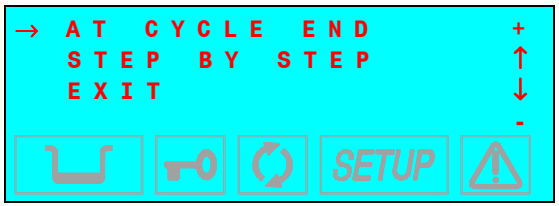
Activate **CR** to use printers that advance the paper only on the CR (*Carriage Return*) command, or **CR+LF** for those that require the CR+LF (*Carriage Return + Line Feed*) commands, or with **+FF** (Form-Feed) for printers that require the addition of this command.

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

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



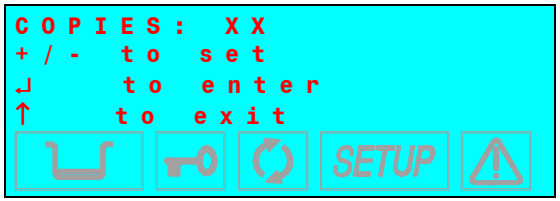
Select item PRINTOUT MODE to choose the mode in which the data is printed: The following options appear:



Select AT CYCLE END to print the report at the end of the cycle.
Select STEP BY STEP to print the data at each phase of the cycle (see Printed report examples).

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

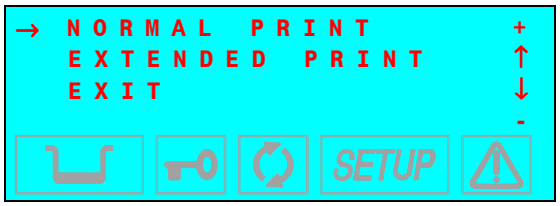
Activate **NR. COPIES** to set the number of cycle report copies to print at the end of the program. The following text appears:



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

☞ In STEP BY STEP mode only 1 copy is printed.

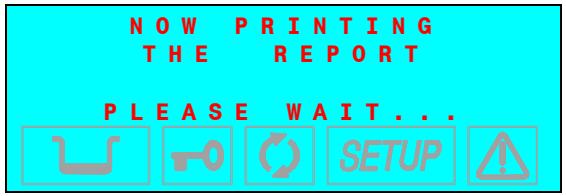
To print a report from the last cycle executed (whether it terminated correctly or was interrupted by an alarm), select **PRINT LAST**. The following screen will appear:



The **NORMAL PRINT** command activates normal printing (showing relevant cycle data and produced at the end of a correctly executed cycle), while **EXTENDED PRINT** activates a more complete print out (including all the data typical of a cycle interrupted by an alarm).

☞ If the last cycle ended correctly or was interrupted by MANUAL STOP, it is possible to reprint the report in either NORMAL or EXTENDED mode. If, however, the last cycle was interrupted by an error and corresponding alarm, only the EXTENDED report will be available. This will facilitate later troubleshooting.

When selecting the reprint command, this message will be displayed:



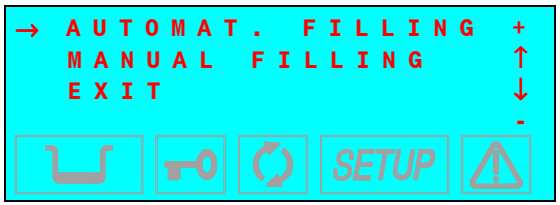
It will remain on the screen until the printing is complete.

Setting the tank filling mode

(FILLING OPTIONS of the ADVANCED menu)

The internal tank can be filled either manually or automatically. Automatic filling would occur from an external device (container or demineralizer) connected to the Bravo (see **Connecting an external water feeding tank** or **Connecting a demineralizer**).

Selecting the FILL OPTIONS, the following screen appears:



When **AUTOMATIC FILL** is selected, the unit will automatically fill the internal tank until the maximum level (MAX signal) is reached and the MAX icon is displayed.

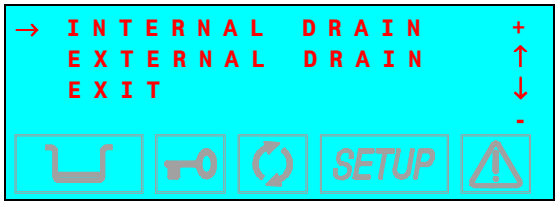
☞ Only activate the automatic filling mode AFTER the external tank has been filled with high quality distilled water or demineralizer. Also remember to open the tap on the external tank or demineralizer, if equipped.

When **MANUAL FILL** is selected, the internal tank must be filled manually; see Chapter "**First Start-Up**").
Move the cursor with the + /- keys; confirm with the ↵ key.

Setting the water draining mode
(DRAIN OPTIONS of the ADVANCED menu)

The water used for the sterilization cycle can be drained into either the **internal** tank (standard configuration) or the **external** SciCan tank of greater capacity (offered as an option, see *Installation - Connecting an external draining tank*) so as to reduce the frequency of emptying the used water .

Selecting the DRAIN OPTIONS, the following menu appears:



Selecting **INTERNAL DRAIN** enables the reading of the MAX level sensor in the internal tank.

Selecting **EXTERNAL DRAIN** enables the MAX level sensor located in the external tank and in the internal tank.

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

☞ IF THE INSTALLATION HAS CONNECTED DIRECTLY TO THE DRAIN, SELECT INTERNAL DRAIN.

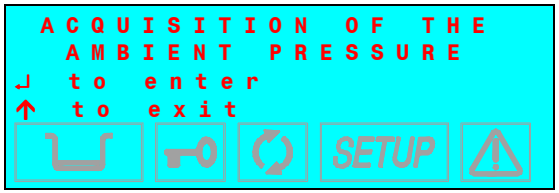
Move the cursor with the + /- keys; confirm with the ↵ key.

ACTIVATING CONFIGURATION OPTIONS – SPECIAL MENU

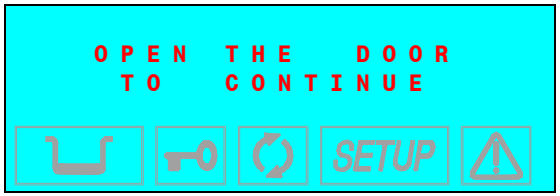
Acquiring the ambient pressure
(AMBIENT PRESSURE of the SPECIAL menu)

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

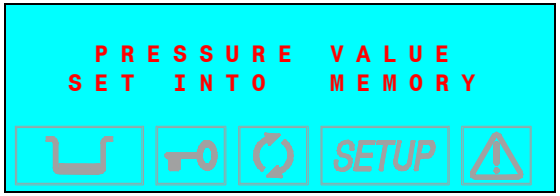
Activating the AMBIENT PRESSURE option, the following screen appears:



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



and will remain until the door is opened. Press the ↵ key to confirm acquisition of the data. The following message will appear,



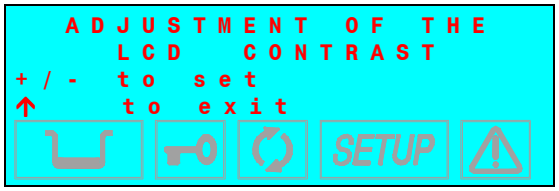
accompanied by a beep to say that the ambient data pressure has been acquired.

Press the ↑ key to cancel the operation.

Adjusting the contrast of the liquid crystal display

(LCD CONTRAST on the SPECIAL menu)

The LCD contrast function adjusts the screen's readability to compensate for the sterilizer location's lighting. Enabling this option, the following screen appears:



Push the + key to increase the contrast, the - key to decrease it.

Adjust the contrast until the display is as clear and readable as possible, based on the location's normal conditions.

ACTIVATING CONFIGURATION OPTIONS – SERVICE MENU

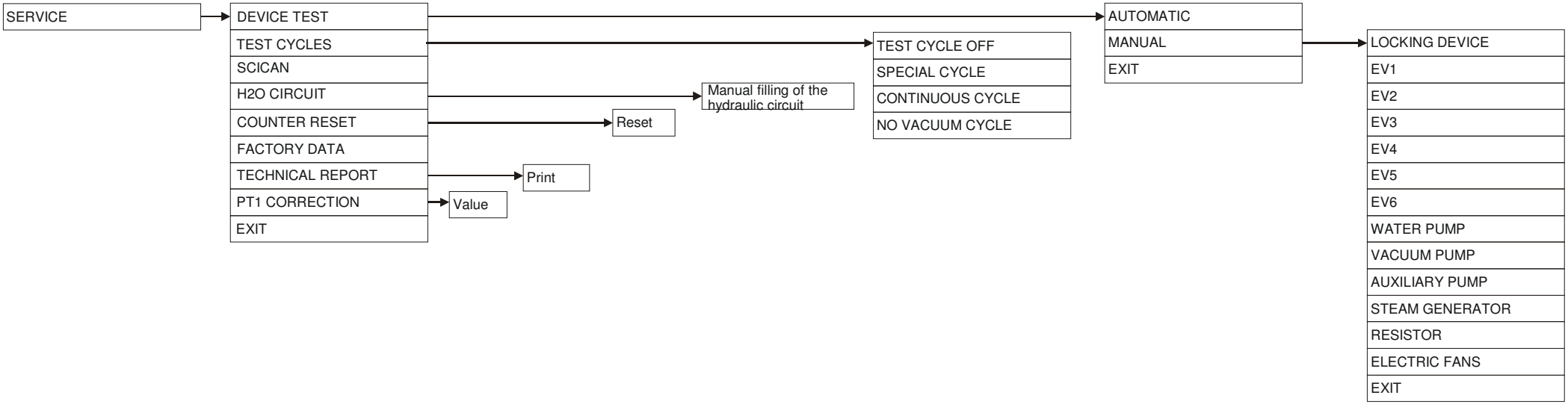
These menu options are only available to the authorized service technicians and by entering the service code.

The following display is shown:

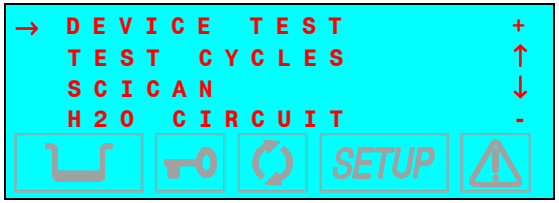
Enter the service code + + - - + + - - by using the symbol keys. The SERVICE menu consists of the following options:

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

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



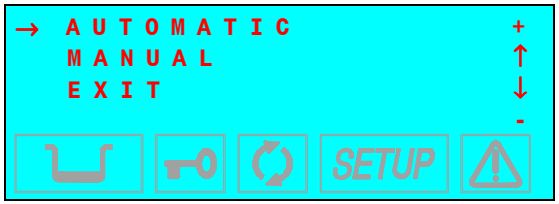
Use the + / - keys to move the cursor on the options; push the ↵ key to select an option or the ↑ key to exit.



Device Test

(DEVICE TEST item of the SERVICE menu)

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



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

In **AUTOMATIC**, a confirmation is required to start the automatic test of the devices according to the following sequence:

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

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

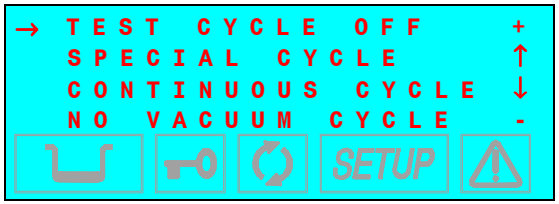
In **MANUAL** mode the display shows the list of the devices. Scroll through the list and select the item on which to carry out the test.

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

Test cycles

(TEST CYCLES item of the SERVICE menu)

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



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

TEST CYCLE OFF, this option disables the test mode previously set, or stops the current test cycle.

SPECIAL CYCLE, this option enables a full test of the sterilizer. After confirming the choice and quitting the Setup menu, select a cycle and enter the START command. The sterilizer will then launch an automatic sequence of any available cycle. At the end of each cycle, the report will be printed.

CONTINUOUS CYCLE, this option enables a test based on the continuous repetition of the cycle selected after exiting the Setup menu.

NO VACUUM CYCLE, this option enables a test based on the cycle selected after exiting the Setup menu, but without the pre-vacuum phases and the vacuum drying phase.

☞ See ***Attachment O*** for info about the use of these options.

SCICAN

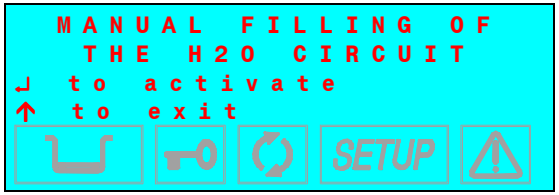
(SCICAN item of the SERVICE menu)

This item is only accessible and available to the manufacturer.

H2O circuit

(H2O CIRCUIT item of the SERVICE menu)

This option is for checking the operation of the plumbing circuit. The following display is shown:

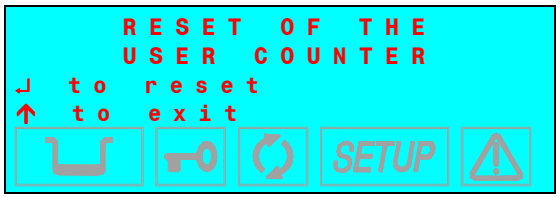


After confirming with the ↵ key, the water pump starts, and you can check the water flow into the plumbing circuit.

Counter reset

(COUNTER RESET item of the SERVICE menu)

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



To confirm the counter reset, push the ↵ key.

Use this option only in special case.

Factory Data

(FACTORY DATA item of the SERVICE menu)

This option allows the user to restore the default data in case of data memory reset or failure.

Technical report

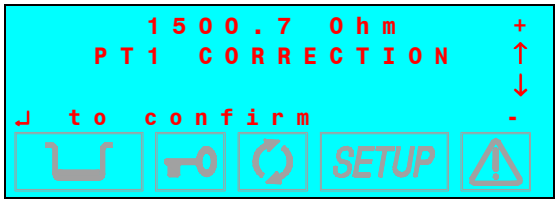
(TECHNICAL REPORT item of the SERVICE menu)

This option allows the user to print the data content of the history register stored in the sterilizer memory.

PT1 correction

(PT1 CORRECTION item of the SERVICE menu)

This option allows the user to set the value (Ohm) of the internal probe after a repair (PT1 replacement). The following display is shown:

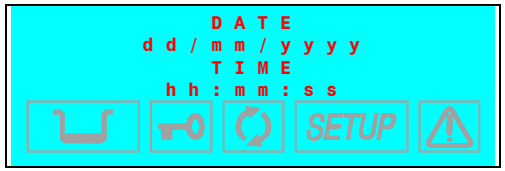


Use the **+** / **-** key to change the value displayed, push the ↵ key to confirm.

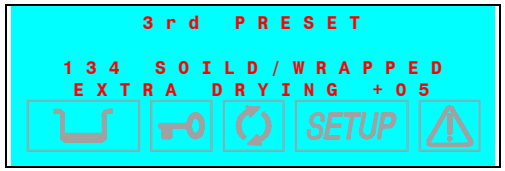
DATA REVIEW

The Data Review option displays an overview of the current settings, allowing the user to check their correctness.
The following screens are shown by way of example.

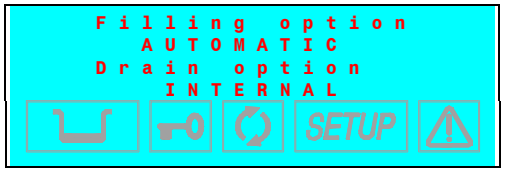
Firmware version



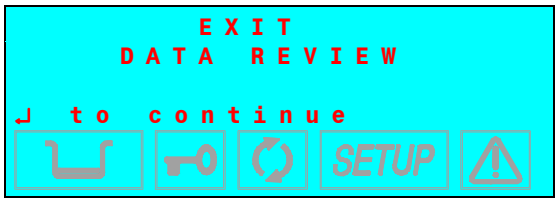
Use the + / - keys to scroll through the menu



Use the + / - keys to scroll through the menu



Use the + / - keys to scroll through the menu



Press ↵ to confirm

EXIT THE SETUP MODE

When you have completed the sterilizer configuration, return to the normal mode by selecting **EXIT** and confirming with the ↵ key.

☞ To return to the first level from any menu, just select EXIT and confirm with the ↵ key. You can also press ⇧ (ESC) key one or more times (see **Flowchart of the setup**).

The display shows:

Confirm with the key ↵ .

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

DEFAULT SETTING

The sterilizer leaves the factory with the following settings:

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

PROGRAMS:
Preset **1**: ***134 POROUS/WRAPPED*** (***standard*** drying)
Preset **2**: ***134 HOLLOW/UNWRAPPED*** (***standard*** drying)
Preset **3**: ***134 SOLID/WRAPPED*** (***standard*** drying)
Preset **4**: ***134 SOLID/UNWRAPPED*** (***standard*** drying)

☞ This set of programs should be considered as preferential. However, different combinations, based on the destination market, are possible.

ST-BY MODE: ***HIGH*** (pre-heating)
PRINT OPTIONS: ***INTERNAL (1 copy)*** with Bravo^{17V} and Bravo^{21V}
OFF (1 copy) with Bravo^{17}
FILLING OPTIONS: ***MANUAL***
DRAIN OPTIONS: ***INTERNAL***

PREPARING THE MATERIAL FOR STERILIZATION

General

Clean and rinse all instruments before loading them into the sterilizer. Disinfectant residues and solid debris may inhibit sterilization and damage the instruments and the Bravo.

Unwrapped instruments, once exposed to ambient or external conditions, cannot be maintained in a sterile state. If sterile storage is desired, wrap the instruments to be sterilized according to the instrument manufacturer's instructions, select the appropriate wrapped cycle and allow it to run to completion.

To promote drying and enable effective sterilization, wrapped or pouched instruments should not touch each other.

SciCan recommends the final user carefully choose the most appropriate sterilization cycle according to the recommendations of their leading infection control authorities and local regulatory guidelines / recommendations.

☞ Refer to PROGRAM for the list of compatible materials with the sterilizer.

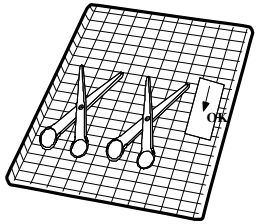
Treating textile material

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

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

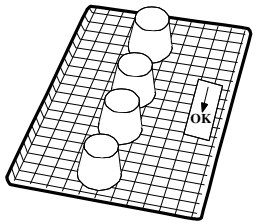
Arranging the load

To ensure proper sterilization and to reduce wear on instruments, follow the instructions below:



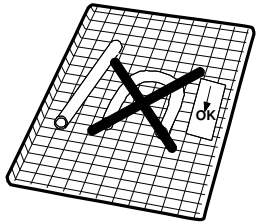
General notes for positioning on tray.

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



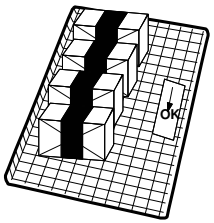
- Arrange receptacles (glasses, cups, test tubes, etc.) on their sides, or upside down to avoid pooling water.
- **Do not load trays beyond their maximum indicated limit** (see **Technical Characteristics**).
- Do not stack trays or put them in direct contact with the walls of the sterilization chamber.
- Always use the tray support provided.
- To insert and remove trays from the sterilization chamber, always use the extractor provided.

☞ Process the appropriate biological/chemical indicator with every tray to confirm sterilization has occurred. If processing **wrapped material**, place the **indicator inside** one of the wrappings.



Notes for rubber and plastic tubing

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



Notes for packets and packages

- Arrange packages side-by-side, evenly spaced and not piled, and do not allow them to come into contact with the walls of the chamber.
- When it is necessary to wrap an object, always use suitably porous material (sterilization paper, muslin napkins, etc.) and close the wrapping with autoclave adhesive tape.

Notes for wrapped material

- It is best to wrap instruments individually, but if more than one instrument is placed in the same envelope, make sure that they are made of the same metal.
- Seal the wrapping with adhesive tape designed for autoclaves or heat-sealing machines.
- Do not use staples, pins or other fasteners since they can compromise the maintenance of sterility.
- Arrange the envelopes to avoid forming air pockets that obstruct the correct penetration and removal of the steam.
- Orient the envelopes with the plastic side up and the paper side down.
- Always check that envelopes are correctly positioned and turn them over if necessary.
- If possible, place the envelopes on their sides using a suitable support.
- If pouched or wrapped loads are not dry when they are removed from the chamber, the instruments must be used immediately or resterilized.

IF YOU EXPECT TO STORE INSTRUMENTS, ALWAYS WRAP THEM. SEE "*Storing sterilized material.*"

FIRST START-UP

Turning on

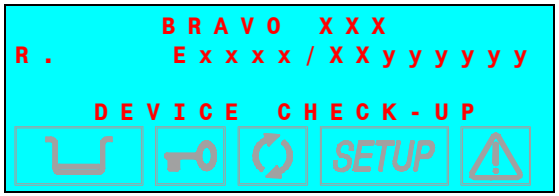
Once the sterilizer has been correctly installed, it may be turned on and prepared for use.

Turn on the Bravo using the main (luminous) switch located on the right side of the unit.

☞ Do this with the sterilizer's door open.

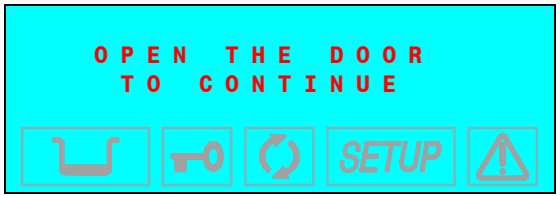
Initial autotest

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

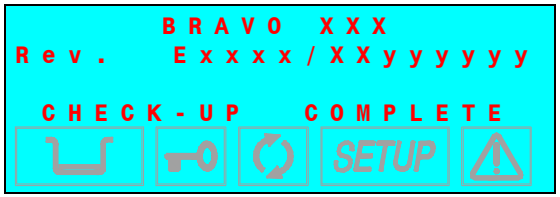


FW release:
- **JM**yyyyyy for Bravo^{17}
- **JP**yyyyyy for Bravo^{17V}
- **JG**yyyyyy for Bravo^{21V}

☞ If the door is closed, the initial auto-test is interrupted. A warning beep is generated and the following message displayed:

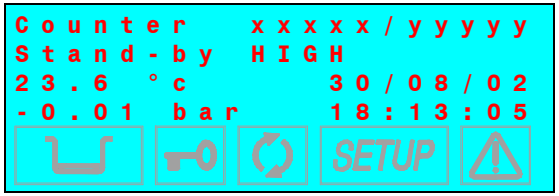


Open the door to allow the test to continue. At the end of the test you will see:



Stand-by mode

Over the initial auto-test, the sterilizer enters in STAND-BY mode and the display shows:



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

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

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

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

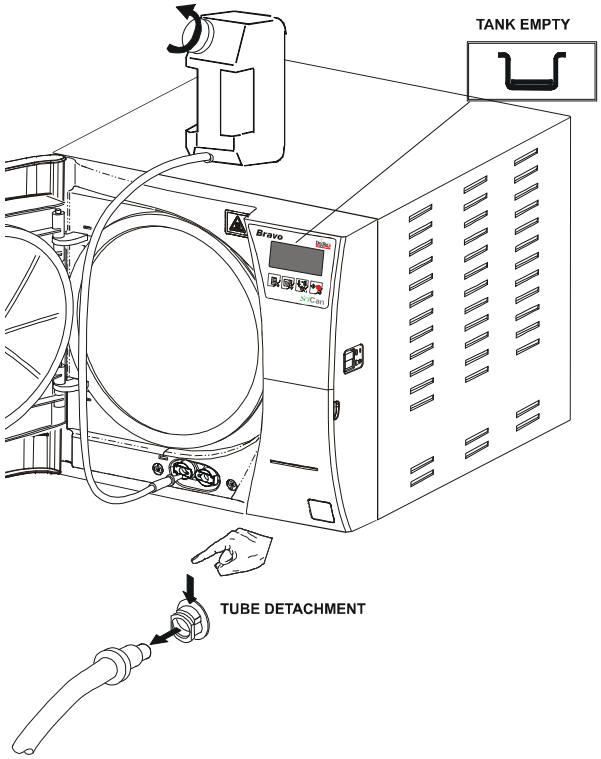
The icons in the lower part of the LCD screen remain off with the exception of the door status and/or water level indicators, which light-up if the door is closed and/or the level in the filling tank reaches its MIN or MAX values (or the MAX value in the drain tank).
During the first start-up, the MIN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

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

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

Filling distilled water

Manual filling



The first time the sterilizer is used or when the MIN water level indicator comes on, you will have to fill, or top-up, the internal distilled water tank.
To fill the distilled water tank, follow these steps:

1. Fill the manual container (2 litres/ 0.52 US gal) with distilled water, keeping it horizontal;
2. With the door open, connect the tube's quick connector to the corresponding female connector under the chamber entrance (marked H_2O), pushing until you hear a click.
3. Place the container in a vertical position and loosen the cap. Do not to spill water on the machine.
4. The water will begin to flow into the tank.
5. Continue filling until the MIN level indicator turns off or the MAX level indicator turns on.
6. At this point, lower the bottle below the connection point on the unit, keeping it horizontal.
7. While pinching the tube with your fingers press the metal lever on the side of the connector and detach the quick connector.
8. Refill the container (2 litres/ 0.52 US gal) and repeat steps 2, 3 and 4 a second time until the MAX level icon appears on the display.
9. When the MAX level icon comes on (accompanied by a beep), stop filling and detach the quick connector as described in steps 6 and 7.

☞ The MAX icon does not have to be on to start a sterilization program. There is sufficient water if the MIN indicator is off. Do not continue to fill once the MAX icon appears and you hear a beep. Doing so may cause water to drain from the unit's water tank draining point at the back of the machine.

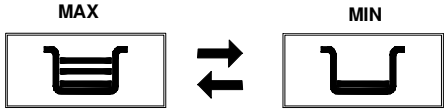
☞ Use ONLY high quality distilled water. For water specifications, see ***Technical Characteristics***.

Automatic filling

If a unit is set up for automatic filling from an external tank, the filling will occur automatically after this automatic filling option has been selected. To set the automatic filling option, please refer to the chapter "***Setting the tank filling mode***".

THE AUTOMATIC FILLING SYSTEM MUST NEVER RUN DRY. THIS WILL CAUSE PREMATURE WEAR TO THE AUXILIARY WATER-INJECTION PUMP. PERIODICALLY CHECK THE WATER LEVEL IN THE EXTERNAL TANK.

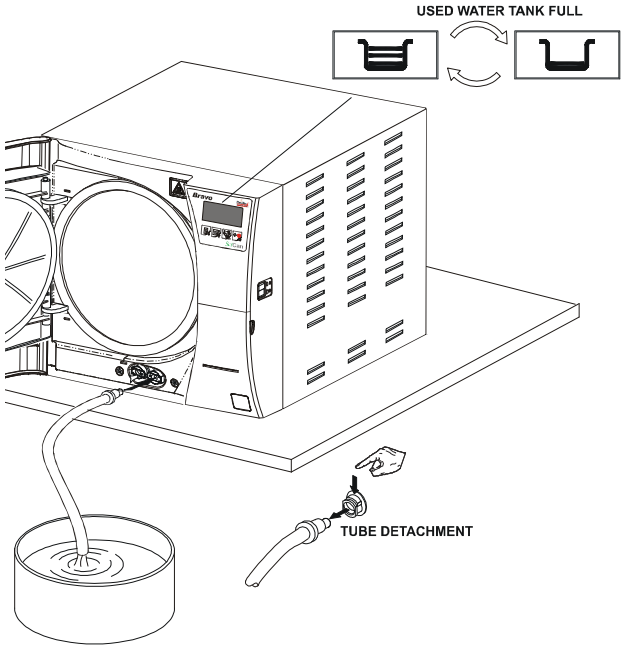
Draining the used water tank



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

☞ If, in this condition, you try to start a sterilization cycle, the equipment will generate an alarm.
Drain the used water tank before filling the main tank, as the reaching of the maximum level should not be signaled, and extra water spilled from the rear vent hole.

Internal tank



1. Arrange an empty container on the floor near the sterilizer and put the free end of the supplied tube into the container.
2. With the door open, connect the quick connector to the corresponding female connector under the chamber entrance (marked H2O), pushing until you hear a click.
3. Wait for the internal tank to drain completely, then while pinching the tube with your fingers, press the metal lever located on the side of the connector and detach the quick connector.
4. Press the push-button on top of the quick connector to dislodge the drain tube.

External tank

To drain the optional external tank, remove the top cap from the external tank and empty water into a sink until it reaches the minimum level.

Do not empty the tank completely, but keep a quantity of water up to the marked level. Otherwise the sound of water draining and the steam escaping from the vent-hole will increase considerably.
Refer to chapter "Connecting an external drain tank" for more details.

MAINTENANCE

GENERAL

Regular maintenance will guarantee safe, efficient operation of the Bravo over the device's entire life.
There are two levels of maintenance:
- Ordinary maintenance performed regularly by the user.
- Preventive maintenance carried out by an authorized service technician.

It is highly recommended users perform a periodic sterilizer calibration or 'check' of the thermodynamic parameters of the unit's processes by comparing them with the reference values provided with suitably calibrated instruments.

☞ Refer to the ***Periodic sterilizer calibration***.

The ordinary maintenance described here is easy to complete and involves simple instruments.

ALWAYS USE ORIGINAL REPLACEMENT PARTS.

MAINTENANCE SCHEDULE

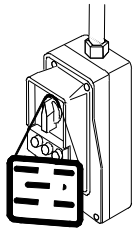
Follow this schedule to keep the sterilizer operating at peak efficiency. If units undergo **very intense use**, we recommend **shortening** maintenance intervals.

DAILY	Clean the gasket on the porthole Clean external surfaces
WEEKLY	Clean the sterilization chamber and relative accessories Disinfect external surfaces
MONTHLY	Clean the internal (and external - if installed) distilled water tank Safety valve maintenance Clean (or replace) the drain filter
EVERY 3-6 MONTHS (depending on frequency of use)	Replace bacteriological filter
ANNUAL or every 1000 cycles	Replace the door gasket
EVERY 3 YEARS or 3000 cycles (by approved personnel only)	Recommended complete maintenance and calibration of the sterilizer

General warnings

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

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



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

WHEN IT IS NOT POSSIBLE, TURN OFF THE EXTERNAL BREAKER OF THE EQUIPMENT POWER SUPPLY LINE.

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

Ordinary maintenance procedures

Clean gasket and porthole

To remove traces of lime, clean the gasket of the container and the porthole with a clean, cotton cloth soaked in a weak solution of water and vinegar (or similar product).

Dry the surfaces and remove any residue before using the device.

Clean external surfaces

Clean all the external parts using a clean cotton cloth dampened with water and, if needed, a neutral detergent.

Dry the surfaces and remove any residue before using the device.

Clean sterilization chamber and accessories

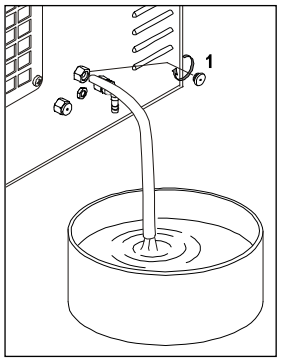
Clean the sterilization chamber, support and trays (and internal surfaces in general) with a clean cotton cloth soaked in water and, if needed, use a small amount of neutral detergent. Carefully rinse with distilled water, taking care not to leave any type of residue in the chamber or on accessories.

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

Disinfect external surfaces

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

Clean distilled water tank



1. Arrange an empty container on the floor near the sterilizer and place one end of a tube into the container
2. Unscrew the plug (1) from the rear draining point and plug in the other end of the tube. Note, water will be released as soon as the plug is unscrewed
3. Wait until the internal tank is completely drained and close the draining point with the plug (1).
4. Prepare 4 litres / 1.06 US gal of distilled water mixed with 10% of pure alcohol and fill the supplied standard container;
5. Fill the internal tank completely with this solution and allow the solution to sit for 30 minutes.

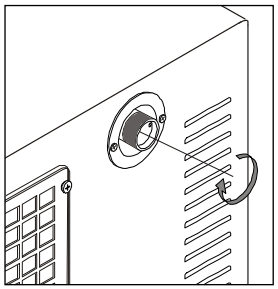
☞ Do not run any cycle during this period.

6. Now drain the internal tank and discard the solution. Close the draining point with the plug.
7. Run one empty cycle of your choice.

Clean external feeding water tank

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

Safety valve maintenance



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

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

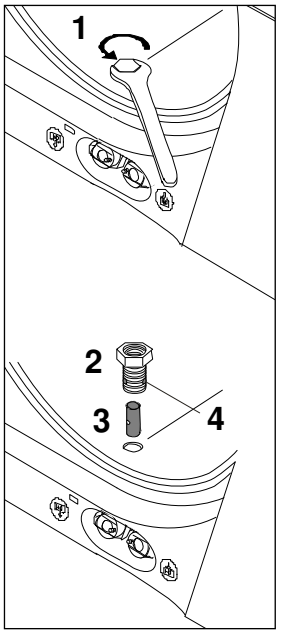
Retighten the locking ring making sure the threads are properly engaged.

Definitively tighten the locking ring all the way down.

THE USER SHOULD PERFORM THIS OPERATION MONTHLY TO GUARANTEE THE CORRECT FUNCTIONING OF THE VALVE OVER TIME.

AT THE END OF THE MAINTENANCE, MAKE SURE THAT THE LOCKING RING IS COMPLETELY SCREWED ON AND TIGHTENED.

Clean/ replace the water drain filter



Over time, various residues will accumulate inside the filter, obstructing the lower drain tube.

For cleaning (or to replace) the filter, open the door of the sterilizer and remove the nut (**1)** with a hexagonal no. 14 wrench.

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

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

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

Reassemble all the parts reversing the order in which you removed the parts. Pay attention on screwing down the fitting (**2**) so as to let the draining holes **(4)** at level of the chamber wall.

Replace bacteriological filter

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

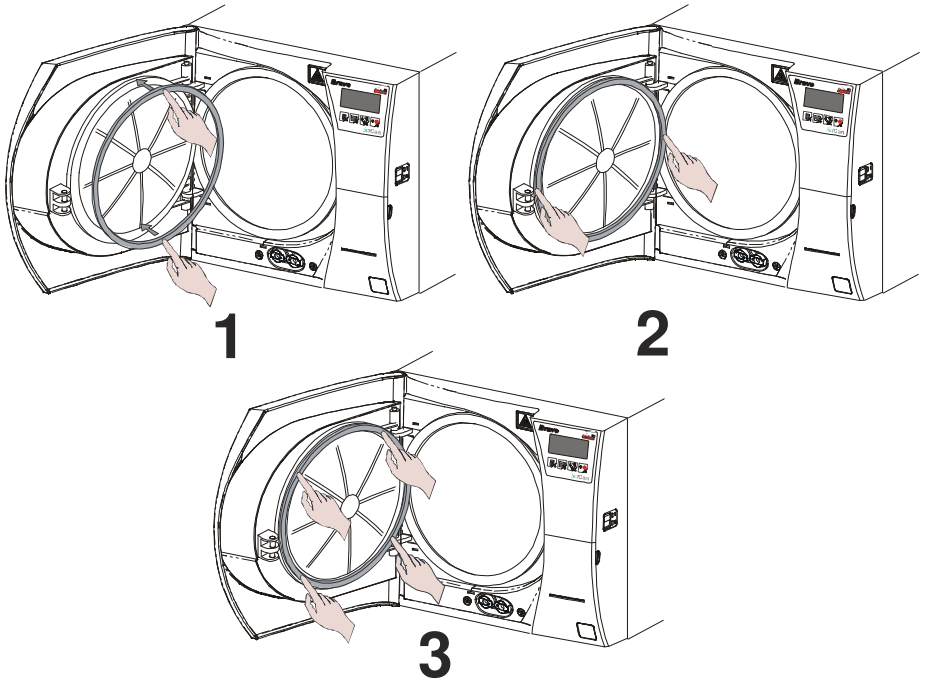
☞ A replacement bacteriological filter is supplied with the device.

Replace door gasket

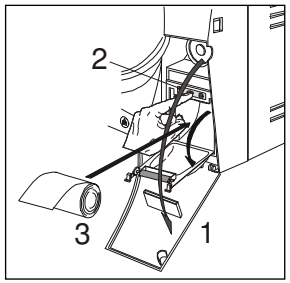
Check the inside of the door to ensure it is not hot and then remove the old gasket by hand.

Clean the door gasket seat to ensure it is debris free.

Install the new door gasket by pressing the gasket into its seat, first on top, then bottom, then both sides. Once seated on all four siides, continue to press the remaining gasket completely into its seat.



Replace printer paper roll



To replace the printer paper roll:

1. Open the door (1) of the service compartment to access the printer.
2. Push the central button (2) to open the printer door and access the paper compartment.
3. Remove the empty roll and place a new roll of **thermal paper** so that the paper unrolls from the top.

   Dimensions of the thermal paper roll:
   - width 57 mm (2.24”) / diameter max 45 mm (1.77”)

4. Unroll about 15 cm (6”) of paper and close the printer door.
5. Thread the paper in the service compartment door slot and close.

☞ The central button is lit steady when the paper is regularly present, and flashing when the paper roll is empty.

PERIODIC STERILIZER CALIBRATION

To ensure proper performance of the unit, **calibrate** the **sensors** (pressure and temperature) at least every three years.

Ensuring the sterilizer is properly calibrated over time is the **responsibility of the user**.

The calibration procedure requires the use of special equipment (high-precision reference instruments, calibration tools, dedicated software, etc.) suitably verified and calibrated in addition to specific experience and training. It is therefore necessary to contact Technical Service to perform this maintenance.

☞ *SciCan customer support department is available to provide any information relative to the periodic calibration of the sterilizer.*

SciCan

2. OPERATION

THE PROGRAMS AVAILABLE

GENERAL

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

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

☞ To prevent the instruments and/or materials from electrolythic corrosion during the sterilization process, please AVOID direct contact between the following metals.

Aluminum (al) - Nickel (Ni)
Carbon steel – Nickel (Ni)
Nickel (Ni) – Chrome (Cr)
Copper (Cu) – Aluminum (Al)
Carbon Steel – Copper (Cu)
Chrome (Cr) – Copper (Cu)
Stainless steel – Aluminum (Al)
Carbon steel – Stainless steel
Chrome (Cr) – Stainless steel

Always separate the instruments and/or materials by metal type and electrolythic compatibility.

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

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

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PROGRAM SUMMARY TABLE - BRAVO[17]

PROGRAM DESCRIPTION	NOMINAL VALUES			BASIC PROGRAM PARAMETERS					STERILIZABLE MATERIAL				NOTES
	Temperature (°C)	Pressure (bar)	Holding time (min)	Pre-vacuum (F=fractionated; S=single)	Standard drying (L=long; S=short)	Total cycle time (average load ÷ max load)	Average consumption H_2O (ml/cycle)	Average energy consumption (kWh/cycle)	TYPE	MAX TOTAL MASS (kg)	MAX MASS PER TRAY (kg)	MAX MASS PER ARTICLE (kg)	
134 POROUS/ WRAPPED	134	2.10	4	F	L	39÷44	525	0.8	Unpackaged porous material	**1.00**	0.30	0.30	For material and instruments in (single and double) packaging, we recommend using the 3-tray configuration
									Porous material in single package	**0.75**	0.25	0.25	
									Porous material in double package	**0.60**	0.20	0.20	
									Solid material / handpieces in single package	**3.00**	1.00	0.25	
									Solid material / handpieces in double package	**1.50**	0.50	0.25	
134 18min. EXT.	134	2.10	>18	F	L	51÷56	550	0.9	Unpackaged porous material	**1.00**	0.30	0.30	
									Porous material in single package	**0.75**	0.25	0.25	
									Porous material in double package	**0.60**	0.20	0.20	
									Hollow instruments in single package	**3.00**	1.00	0.25	
									Solid and hollow instruments in double package	**1.50**	0.50	0.25	
121 POROUS/ WRAPPED	121	1.10	20	F	L	54÷59	550	0.8	Unpackaged porous material	**1.00**	0.30	0.30	
									Porous material in single package	**0.75**	0.25	0.25	
									Porous material in double package	**0.60**	0.20	0.20	
									Solid material / handpieces in single package	**3.00**	1.00	0.25	
									Solid material / handpieces in double package	**1.50**	0.50	0.25	
134 HOLLOW/ UWRAPPED	134	2.10	4	F	S	30÷33	525	0.7	Unpackaged handpieces	**6.00**	1.20	0.50	

PROGRAM DESCRIPTION	NOMINAL VALUES			BASIC PARAMETERS OF THE PROGRAM					STERILIZABLE MATERIAL				NOTES
	Temperature (°C)	Pressure (bar)	Holding time (min)	Pre-vacuum (F=fractionated; S=single)	Standard drying (L=long; S=short)	Total cycle time (average load ÷ max load)	Average consumption H_2O (ml/cycle)	Average energy consumption (kWh/cycle)	TYPE	MAX TOTAL MASS (kg)	MAX MASS PER TRAY (kg)	MAX MASS PER ARTICLE (kg)	
121 HOLLOW/ UNWRAPPED	121	1.10	20	F	S	44÷47	550	0.7	Unpackaged handpieces	**6.00**	1.20	0.50	
134 SOLID/ WRAPPED	134	2.10	4	S	L	33÷36	300	0.6	Solid material in single package	**3.00**	1.00	0.25	We recommend using the 3-tray configuration
121 SOLID/ WRAPPED	121	1.10	20	S	L	47÷50	325	0.6	Solid material in single package	**3.00**	1.00	0.25	
134 SOLID/ UNWRAPPED	134	2.10	4	S	S	25÷28	300	0.5	Unpackaged solid material	**6.00**	1.20	0.50	
121 SOLID/ UNWRAPPED	121	1.10	20	S	S	39÷42	325	0.5	Unpackaged solid material	**6.00**	1.20	0.50	
134 EMERGENCY	134	2.10	3	S	Fast	16	300	0.45	Unpackaged solid material	**0.50**	0.50	0.50	
134/121 CUSTOM	134 or 121	2.10 or 1.10	> 4 or > 20	F/S	L/S	n.d.	n.d.	n.d.	Unpackaged solid material	**6.00 max**	1.20 max	0.50 max	
HELIX/BOWIE & DICK TEST	134	2.10	3.5	F	S	22	-	-	Test pack only *(without any other load)*	-	-	-	
VACUUM TEST	-	-0.80	-	-	-	23	-	-	Empty chamber*)*	-	-	-	

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PROGRAM SUMMARY TABLE - BRAVO^{17V}

PROGRAM DESCRIPTION	NOMINAL VALUES			BASIC PROGRAM PARAMETERS					STERILIZABLE MATERIAL				NOTES
	Temperature (°C)	Pressure (bar)	Holding time (min)	**Pre-vacuum (F=fractionated; S=single)**	**Standard drying (L=long; S=short)**	**Total cycle time (average load ÷ max load)**	**Average consumption H_2O (ml/cycle)**	**Average energy consumption (kWh/cycle)**	TYPE	**MAX TOTAL MASS (kg)**	**MAX MASS PER TRAY (kg)**	**MAX MASS PER ARTICLE (kg)**	
134 POROUS/ WRAPPED	134	2.10	4	F	L	30÷35	525	0.8	Unpackaged porous material	**1.00**	0.30	0.30	For material and instruments in (single and double) packaging, we recommend using the 3-tray configuration
									Porous material in single package	**0.75**	0.25	0.25	
									Porous material in double package	**0.60**	0.20	0.20	
									Solid material / handpieces in single package	**3.00**	1.00	0.25	
									Solid material / handpieces in double package	**1.50**	0.50	0.25	
134 18min. EXT.	134	2.10	>18	F	L	42÷47	550	0.9	Unpackaged porous material	**1.00**	0.30	0.30	
									Porous material in single package	**0.75**	0.25	0.25	
									Porous material in double package	**0.60**	0.20	0.20	
									Hollow instruments in single package	**3.00**	1.00	0.25	
									Solid and hollow instruments in double package	**1.50**	0.50	0.25	
121 POROUS/ WRAPPED	121	1.10	20	F	L	45÷50	550	0.8	Unpackaged porous material	**1.00**	0.30	0.30	
									Porous material in single package	**0.75**	0.25	0.25	
									Porous material in double package	**0.60**	0.20	0.20	
									Solid material / handpieces in single package	**3.00**	1.00	0.25	
									Solid material / handpieces in double package	**1.50**	0.50	0.25	
134 HOLLOW/ UWRAPPED	134	2.10	4	F	S	24÷27	525	0.7	Unpackaged handpieces	**6.00**	1.20	0.50	

PROGRAM DESCRIPTION	NOMINAL VALUES			BASIC PARAMETERS OF THE PROGRAM					STERILIZABLE MATERIAL				NOTES
	Temperature (°C)	Pressure (bar)	Holding time (min)	**Pre-vacuum (F=fractionated; S=single)**	**Standard drying (L=long; S=short)**	**Total cycle time (average load ÷ max load)**	**Average consumption H_2O (ml/cycle)**	**Average energy consumption (kWh/cycle)**	TYPE	**MAX TOTAL MASS (kg)**	**MAX MASS PER TRAY (kg)**	**MAX MASS PER ARTICLE (kg)**	
121 HOLLOW/ UNWRAPPED	121	1.10	20	F	S	38÷41	550	0.7	Unpackaged handpieces	**6.00**	1.20	0.50	
134 SOLID/ WRAPPED	134	2.10	4	S	L	23÷26	300	0.6	Solid material in single package	**3.00**	1.00	0.25	We recommend using the 3-tray configuration
121 SOLID/ WRAPPED	121	1.10	20	S	L	37÷40	325	0.6	Solid material in single package	**3.00**	1.00	0.25	
134 SOLID/ UNWRAPPED	134	2.10	4	S	S	17÷20	300	0.5	Unpackaged solid material	**6.00**	1.20	0.50	
121 SOLID/ UNWRAPPED	121	1.10	20	S	S	31÷34	325	0.5	Unpackaged solid material	**6.00**	1.20	0.50	
134 EMERGENCY	134	2.10	3	S	Fast	12	300	0.45	Unpackaged solid material	**0.50**	0.50	0.50	
134/121 CUSTOM	134 or 121	2.10 or 1.10	> 4 or > 20	F/S	L/S	n.d.	n.d.	n.d.	Unpackaged solid material	**6.00 max**	1.20 max	0.50 max	
HELIX/BOWIE & DICK TEST	134	2.10	3.5	F	S	20	-	-	Test pack only *(without any other load)*	-	-	-	
VACUUM TEST	-	-0.80	-	-	-	18	-	-	Empty chamber)	-	-	-	

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PROGRAM SUMMARY TABLE - BRAVO^{21V}

PROGRAM DESCRIPTION	NOMINAL VALUES			BASIC PROGRAM PARAMETERS					STERILIZABLE MATERIAL				NOTES
	Temperature (°C)	Pressure (bar)	Holding time (min)	Pre-vacuum (F=fractionated; S=single)	Standard drying (L=long; S=short)	Total cycle time (average load + max load)	Average consumption H_2O (ml/cycle)	Average energy consumption (kWh/cycle)	TYPE	MAX TOTAL MASS (kg)	MAX MASS PER TRAY (kg)	MAX MASS PER ARTICLE (kg)	
134 POROUS/ WRAPPED	134	2.10	4	F	L	40÷44	675	0.8	Unpackaged porous material	**1,25**	0,40	0.30	For material and instruments in (single and double) packaging, we recommend using the 3-tray configuration
									Porous material in single package	**1,00**	0,30	0.25	
									Porous material in double package	**0,75**	0,25	0.20	
									Solid material / handpieces in single package	**4,00**	1,25	0.25	
									Solid material / handpieces in double package	**2,00**	0,60	0.25	
134 18min. EXT.	134	2.10	>18	F	L	52÷56	700	0.9	Unpackaged porous material	**1,25**	0,40	0.30	
									Porous material in single package	**1,00**	0,30	0.25	
									Porous material in double package	**0,75**	0,25	0.20	
									Hollow instruments in single package	**4,00**	1,25	0.25	
									Solid and hollow instruments in double package	**2,00**	0,60	0.25	
121 POROUS/ WRAPPED	121	1.10	20	F	L	54÷58	700	0.8	Unpackaged porous material	**1,25**	0,40	0.30	
									Porous material in single package	**1,00**	0,30	0.25	
									Porous material in double package	**0,75**	0,25	0.20	
									Solid material / handpieces in single package	**4,00**	1,25	0.25	
									Solid material / handpieces in double package	**2,00**	0,60	0.25	
134 HOLLOW/ UWRAPPED	134	2.10	4	F	S	36÷42	625	0.7	Unpackaged handpieces	**7,50**	1,50	0.50	

PROGRAM DESCRIPTION	NOMINAL VALUES			BASIC PARAMETERS OF THE PROGRAM					STERILIZABLE MATERIAL				NOTES
	Temperature (°C)	Pressure (bar)	Holding time (min)	Pre-vacuum (F=fractionated; S=single)	Standard drying (L=long; S=short)	Total cycle time (average load + max load)	Average consumption H_2O (ml/cycle)	Average energy consumption (kWh/cycle)	TYPE	MAX TOTAL MASS (kg)	MAX MASS PER TRAY (kg)	MAX MASS PER ARTICLE (kg)	
121 HOLLOW/ UNWRAPPED	121	1.10	20	F	S	50÷56	700	0.7	Unpackaged handpieces	**7,50**	1,50	0.50	
134 SOLID/ WRAPPED	134	2.10	4	S	L	30÷32	375	0.6	Solid material in single package	**4,00**	1,25	0.25	We recommend using the 3-tray configuration
121 SOLID/ WRAPPED	121	1.10	20	S	L	44÷46	400	0.6	Solid material in single package	**4,00**	1,25	0.25	
134 SOLID/ UNWRAPPED	134	2.10	4	S	S	24÷26	375	0.5	Unpackaged solid material	**7,50**	1,50	0.50	
121 SOLID/ UNWRAPPED	121	1.10	20	S	S	38÷40	400	0.5	Unpackaged solid material	**7,50**	1,50	0.50	
134 EMERGENCY	134	2.10	3	S	Fast	14	375	0.45	Unpackaged solid material	**0,50**	0,50	0.50	
134/121 CUSTOM	134 or 121	2.10 or 1.10	> 4 or > 20	F/S	L/S	n.d.	n.d.	n.d.	Unpackaged solid material	**7,50 max**	1.50 max	0.50 max	
HELIX/BOWIE & DICK TEST	134	2.10	3.5	F	S	22	-	-	Test pack only *(without any other load)*	-	-	-	
VACUUM TEST	-	-0.80	-	-	-	18	-	-	Empty chamber)	-	-	-	

1) **FRACTIONATED** = Pre-vacuum stage completed with a sequence of three vacuum pulses and three pressure pulses. “Fractionated vacuum” programs are dedicated to the sterilization of porous materials or handpieces
Single = Pre-vacuum stage completed by one vacuum and one pressure pulse
“Single vacuum” programs are dedicated to the sterilization of solid materials

2) Long = Drying stage for porous material and/or handpieces and/or solid material in single/double package. The validated **LONG** drying time (**STANDARD** option) is **16.5 min**
The **EXTRA** and **INTELLIGENT** options have **not** been validated.

Short = Drying stage for unpackaged solid instruments and/or unpackaged handpieces.
The validated **SHORT** drying time (**STANDARD** option) is 7 **min.**

The **FAST** option, with a drying time of **2.5 min** (up to a load of **1.0 kg** max) has **not** been validated.

3) The **Total Cycle Time** indicates the approximate time required for the completion of the entire program. It does not include warm up phase initiated when the start button is pressed. Times are dependant on input voltage and load condition.

The program **121°C / 134°C CUSTOM** has holding times of 20 minutes (or more) and 4 minutes (or more) respectively at 121°C and 134°C.

Pre-vacuum type and **Drying type** can be set according to the indications given in the notes **(1)** and **(2)** above.

The **121°C / 134°C CUSTOM** programs have **not** been validated.

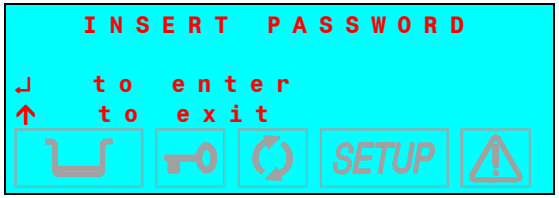
SELECTING THE STERILIZATION PROGRAM

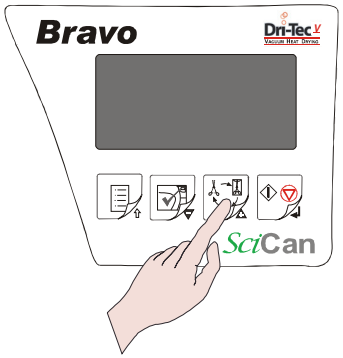
Program selection is key to a successful sterilization process.

Since objects for sterilization can vary in shape, consistency and properties, it is important to identify the most suitable program for it. This will not only preserve its physical characteristics (avoiding or, at any rate, limiting alterations) it will also ensure the most effective sterilization.

Power-on the device.

☞ If the password function has been enabled (see Chapter 6 - Configuration - Setting the password), you will be asked to enter it:





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

The display does not offer any active pre-selection, and waits for the user to select a program.

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

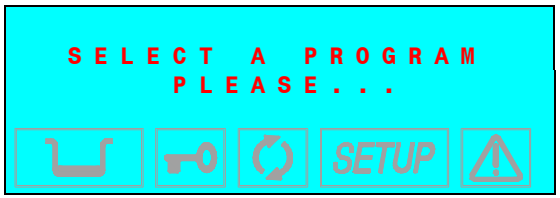
☞ The first sterilization program proposed is the last cycle performed.

The top two lines of the display show the description of the selected program and the type of drying set. Below are the set-point values for the temperature (**°C**), pressure (**bar**) and time (**mm:ss**) of the selected cycle. For example:

After a brief interval, the two lower lines of the display will change and show the present temperature and pressure values of the chamber, with the current date and time.

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

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



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

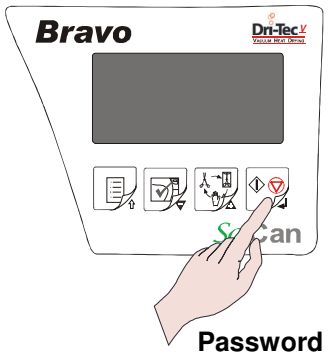
RUNNING THE CYCLE

General

A sterilization cycle consists of a predetermined number of phases. Based on the type of air extraction, sterilization process and drying method, the number and duration of these phases can differ with each program.

The electronic control system monitors the various phases, while checking that the various parameters are respected. If any type of anomaly is encountered during the cycle, the program is immediately interrupted, an alarm sounds and a code is displayed along with a message explaining the nature of the problem.

Starting the cycle

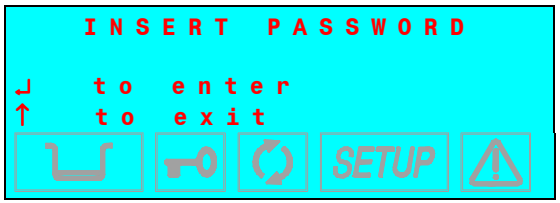


After placing the load in the sterilization chamber, select the desired program and close the door until you hear the click.

The door status icon will flash to indicate the door is closed. Press the **START** button.

☞ If the password function has been enabled (see the Chapter Configuration - Setting the password), you will be asked to enter it.

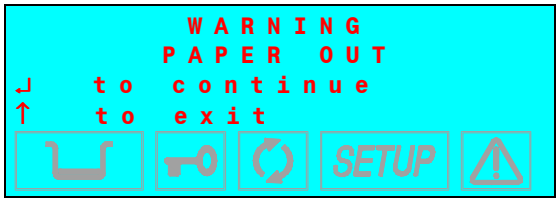
Password check



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

Printer paper-out check

The equipment will check for the presence of the paper in the on-board printer (if installed). If it is out of paper, the following message will be displayed:



Push ↵ key to bypass, but remember to replace the paper during or at the end of the cycle). Push the ↑ key to return to Stand-by mode.

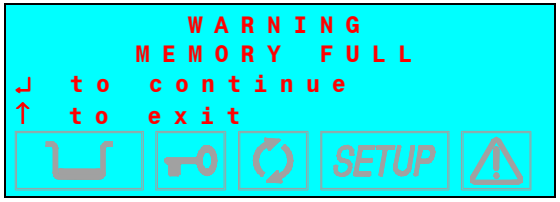
If data recorder is connected

The unit will check for the presence of a data recording device or depending on the type of the device, the presence of a memory card inserted. If not plugged in, the display may shows:

Ensure the data logger is properly connected and the proper memory card is installed then press the ↵ key on the command panel.
Push the ↑ key to interrupt the start command and return in Stand-by mode.

If there is insufficient memory to store the new cycle data, the following message will be displayed:

or

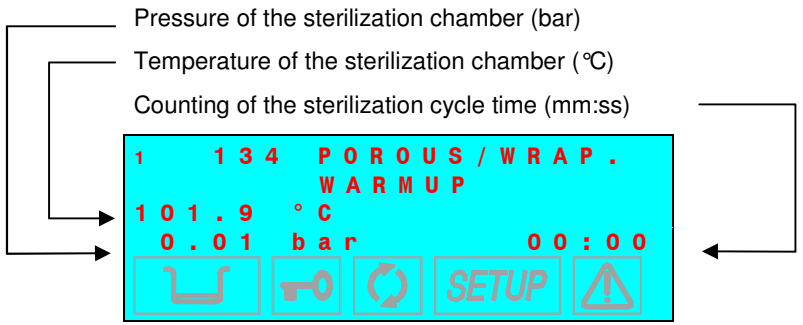


Push the ↵ key to continue without recording the cycle data.
Push the ↑ key to interrupt the start command then download the files onto a PC and delete the memory content according to the instructions of the data recorder operating manual.
Repeat the **Start** command.

Door locking

When the door status icon appears without blinking, the door is locked.

After the START command, and during the entire sterilization cycle, the lower lines of the display will show the following parameters:

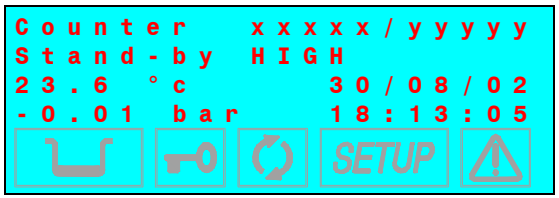


Cycle time is counted from the start of the sterilization cycle (at the first vacuum pulse), excluding the preheating phase.

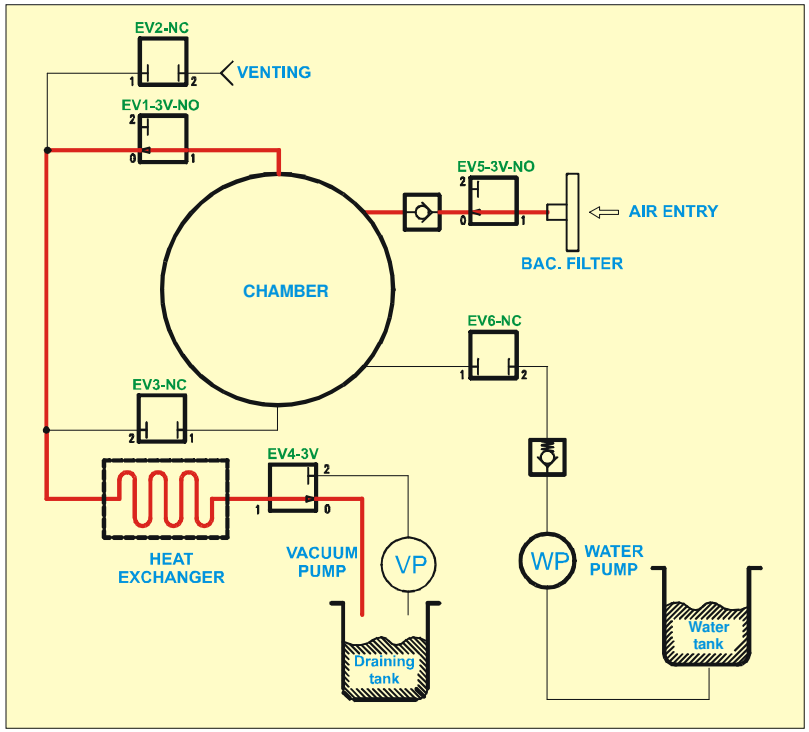
SEQUENCE OF THE PROCESS

Once the door is locked the following steps are performed during the sterilization of instruments. To illustrate the **134 POROUS/WRAPPED** (preset 1 on the control panel), as an example;

Standby status

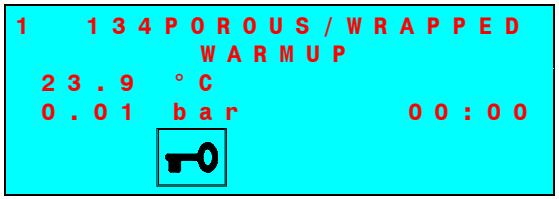


DESCRIPTION	STATUSES	PV	PA	EV1 (no)	EV2 (nc)	EV3 (nc)	EV4	EV5 (no)	EV6 (nc)	Fan
STAND-BY	Standby (door closed)	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	1' ON 6' OFF

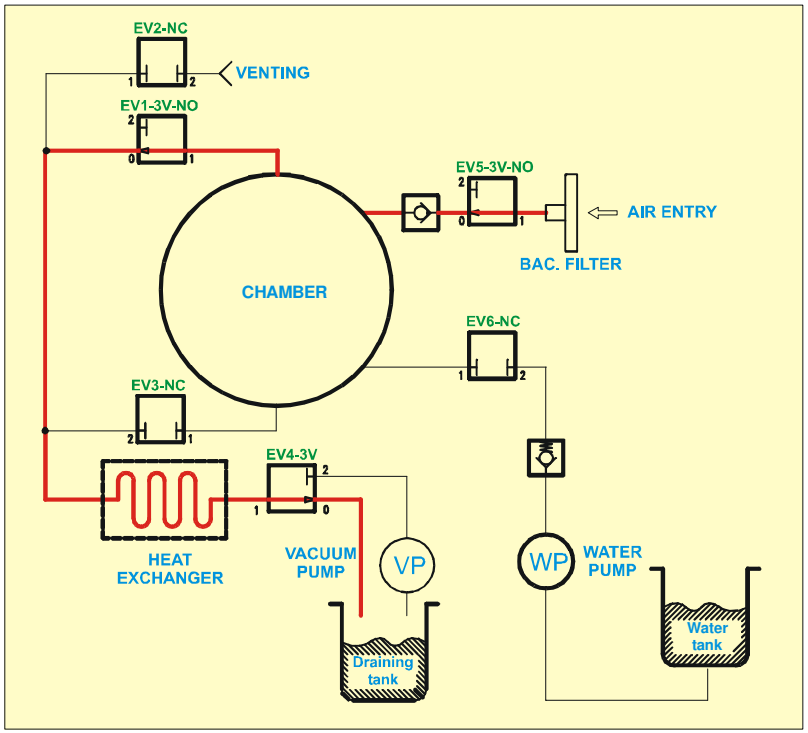


Warmup

After the START command, the first phase is WARMUP, which brings the chamber temperature to the preset value for the cycle starting. The display shows:

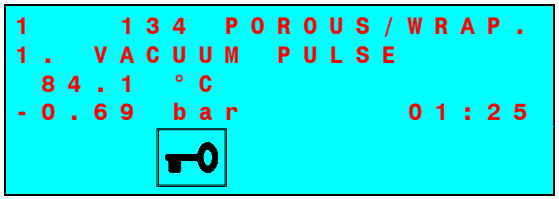


DESCRIPTION	STATUSES	PV	PA	EV1 (no)	EV2 (nc)	EV3 (nc)	EV4	EV5 (no)	EV6 (nc)	Fan
WARMUP	Standby (door closed)	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	1' ON 6' OFF

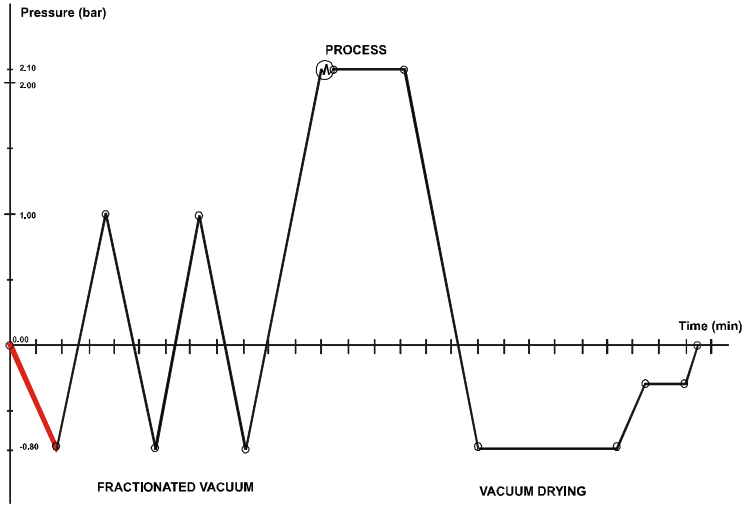


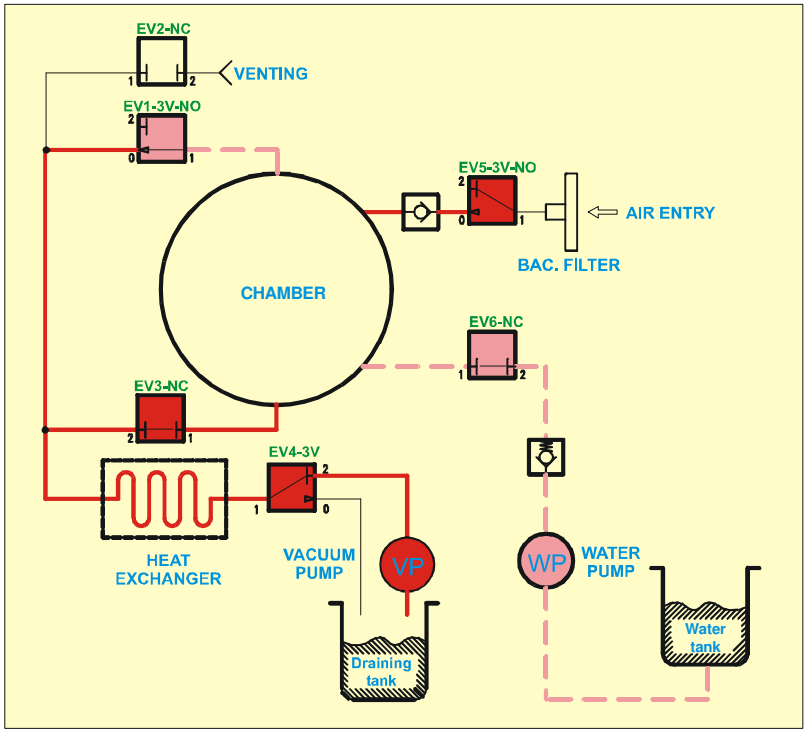
1st vacuum pulse – PV1

Reached the preset temperature, starts the first vacuum phase (1st VACUUM PULSE) with the fall of chamber pressure to the preset value. The display shows:



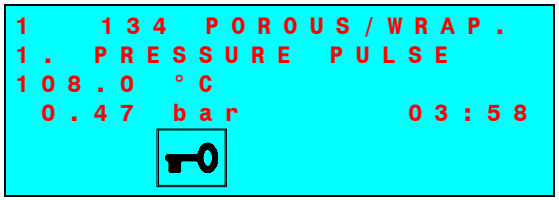
DESCRIPTION	STATUSES (P, t)	VP	WP	EV1 (no)	EV2 (nc)	EV3 (nc)	EV4	EV5 (no)	EV6 (nc)	Fan
1st vacuum pulse	from 0,00 to –0,70 bar	ON	OFF	OFF	OFF	ON	ON	ON	OFF	ON
	Water entry at –0,70 bar (0,5" x3)	ON	ON	ON	OFF	ON	ON	ON	ON	ON
	from -0,70 to –0,80 bar	ON	OFF	OFF	OFF	ON	ON	ON	OFF	ON
	Water enetry at –0,80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



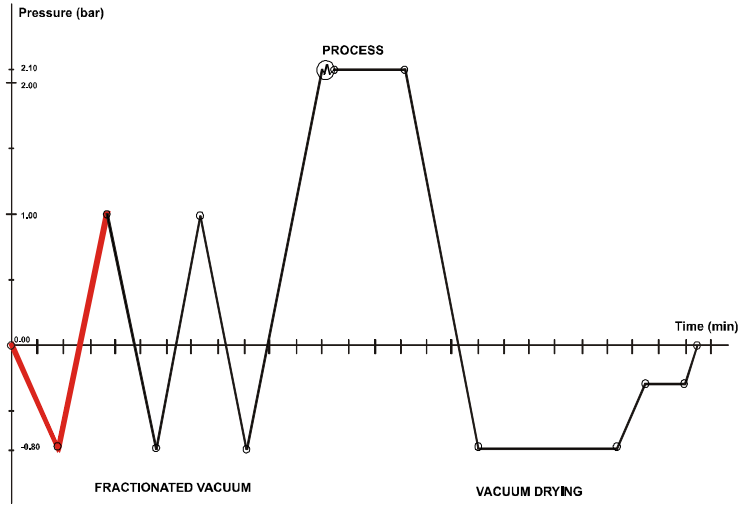


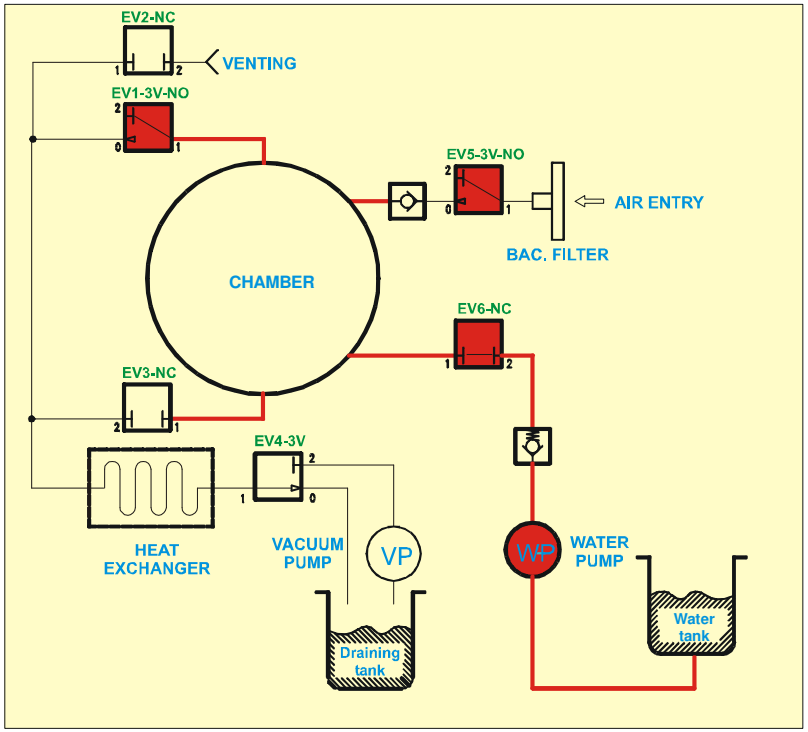
1st pressure pulse – PP1

Reached the pre-set vacuum value, the steam is injected in the chamber and the pressure rises (1st PRESSURE PULSE) until the preset value.



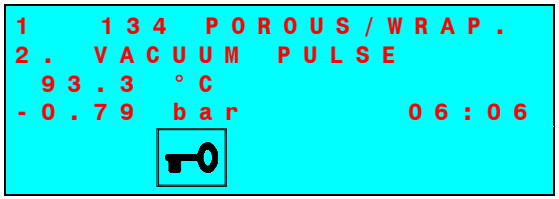
DESCRIPTION	STATUSES (P, t)	VP	WP	EV1 (no)	EV2 (nc)	EV3 (nc)	EV4	EV5 (no)	EV6 (nc)	Fan
1st pressure pulse from –0,88 to +0,50 bar	from –0,80 to 0,00 bar (water entry5" at –0,80 bar) from 0,00 to +0,50 bar	OFF	ON	ON	OFF	OFF	OFF	ON	ON	ON
1st pressure pulse from +0,50 to +1,00 bar	from +0,50 to +0,90 bar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



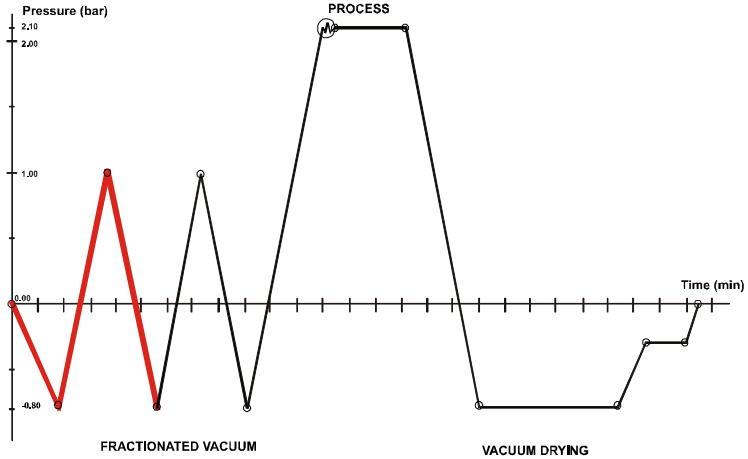


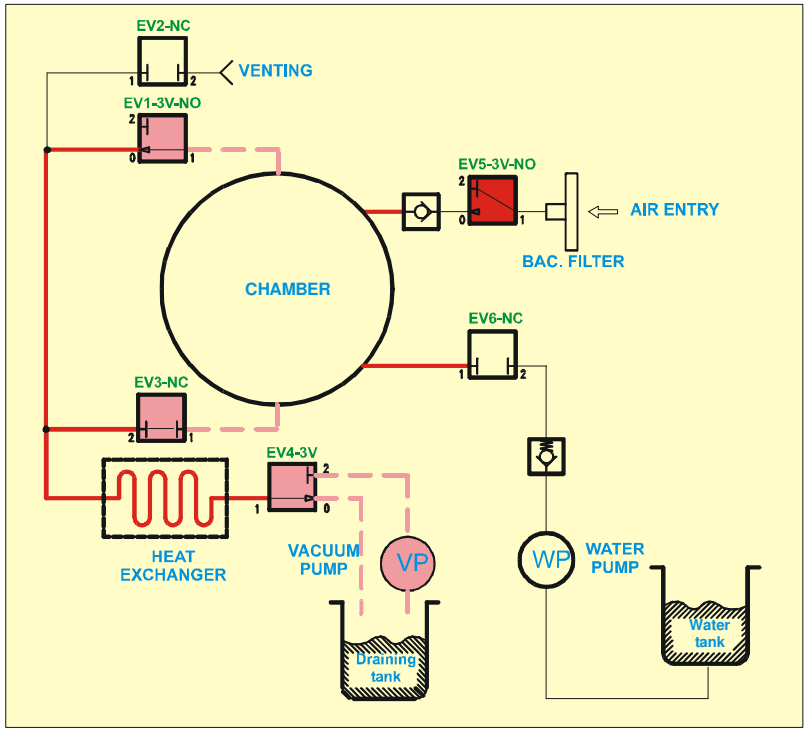
2nd vacuum pulse- PV2

At the end of the first pressure pulse, the steam, mixed with residual air, is discharged then a second vacuum pulse starts (2nd VACUUM PULSE).



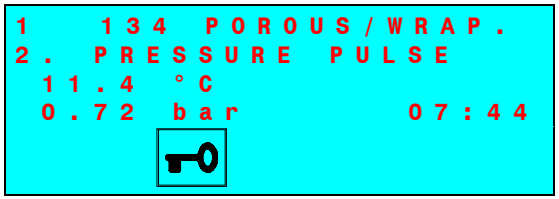
DESCRIPTION	STATUSES (P, t)	VP	WP	EV1 (no)	EV2 (nc)	EV3 (nc)	EV4	EV5 (no)	EV6 (nc)	Fan
2nd vacuum pulse	Steam discharge from +1,00 to +0,22 bar	OFF	OFF	ON	OFF	ON	OFF	ON	OFF	ON
	Transition phase of the charging circuit (1")	ON	OFF	ON	OFF	OFF	OFF	ON	OFF	ON
	Vacuum of the discharge circuit	ON	OFF	ON	OFF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



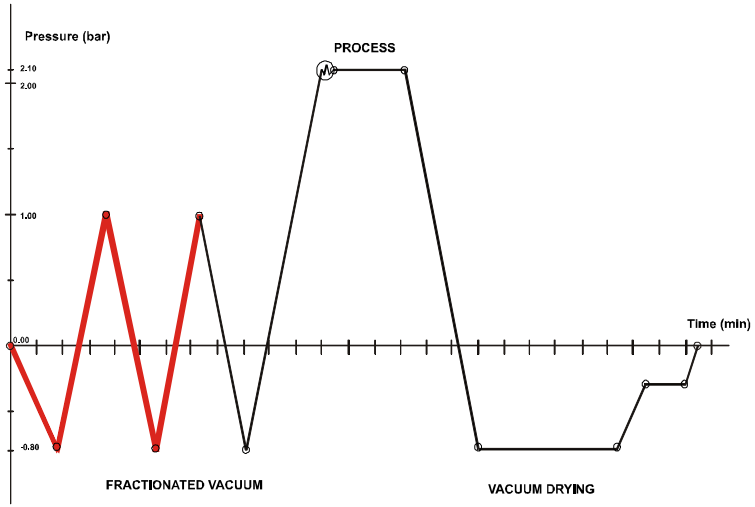


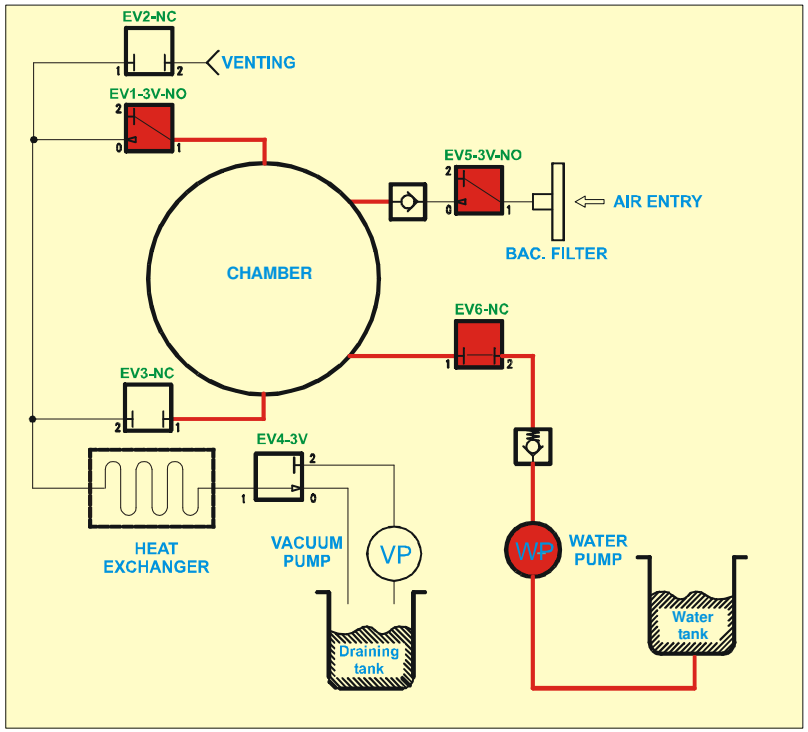
2nd pressure pulse – PP2

After the second vacuum pulse, the steam is again injected into the sterilization chamber, and the pressure rises a second time (2nd PRESSURE PULSE).



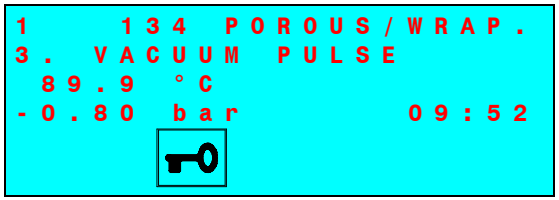
DESCRIPTION	STATUSES (P, t)	VP	WP	EV1 (no)	EV2 (nc)	EV3 (nc)	EV4	EV5 (no)	EV6 (nc)	Fan
2nd pressure pulse	from –0,80 to 0,00 bar (water entry 5" at –0,80 bar)	OFF	ON	ON	OFF	OFF	OFF	ON	ON	ON
	from +0,00 to +0,90 bar									
	from +0,90 to +1,00 bar									



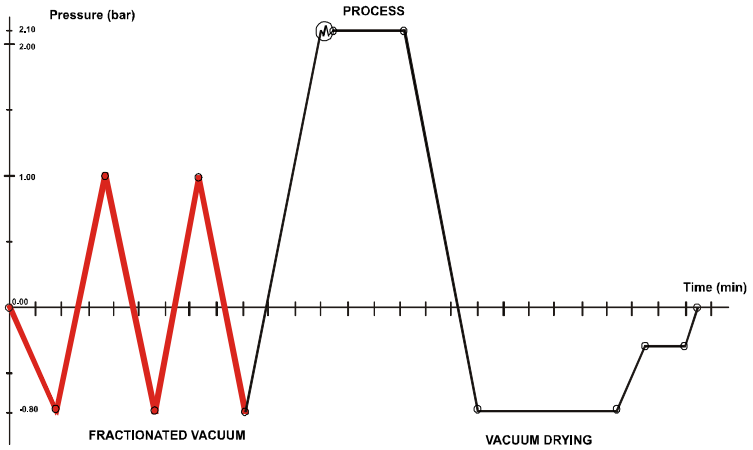


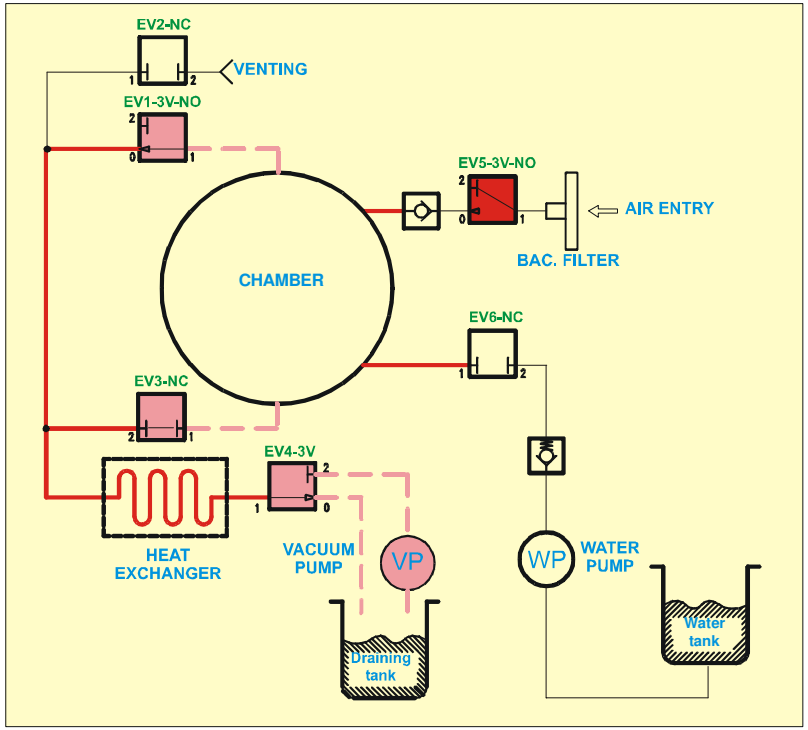
3rd vacuum pulse – PV3

At the end of the second pressure pulse, there is another steam discharge and a new (last) vacuum pulse (3rd VACUUM PULSE).



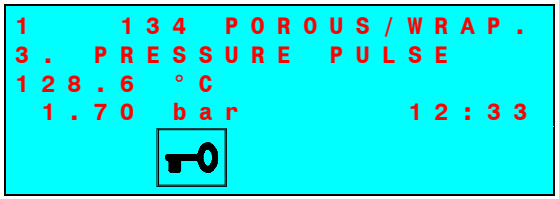
DESCRIPTION	STATUSES (P, t)	VP	WP	EV1 (no)	EV2 (nc)	EV3 (nc)	EV4	EV5 (no)	EV6 (nc)	Fan
3rd ° vacuum pulse	Steam discharge from +1,00 to +0,22 bar	OFF	OFF	ON	OFF	ON	OFF	ON	OFF	ON
	Transition phase of the charging circuit (1")	ON	OFF	ON	OFF	OFF	OFF	ON	OFF	ON
	Vacuum of the discharge circuit	ON	OFF	ON	OFF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



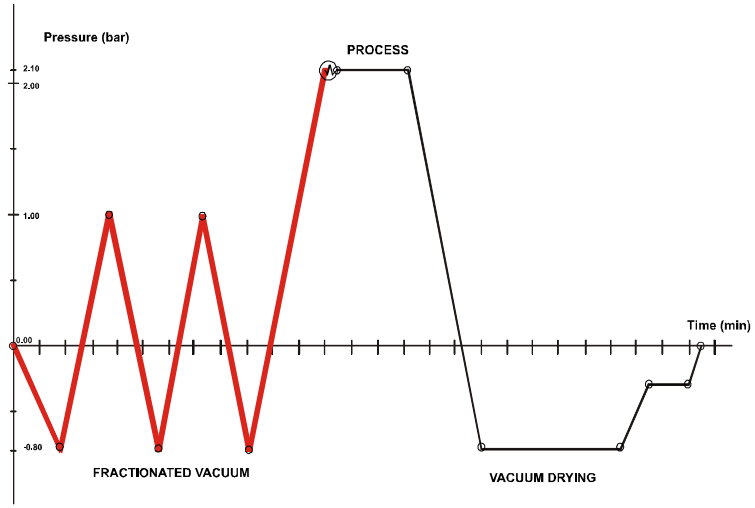


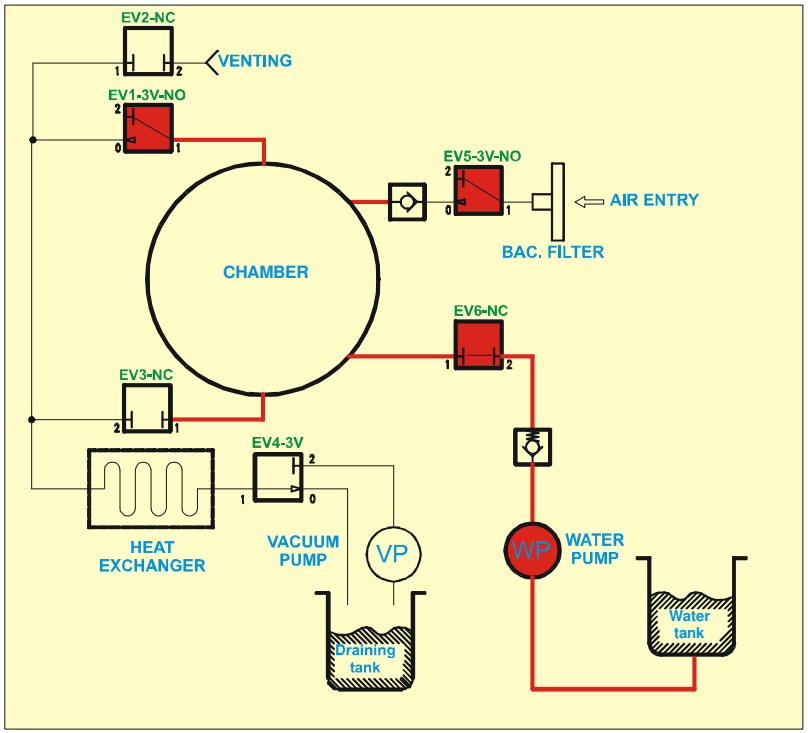
3rd pressure pulse – PP3

After the last vacuum pulse, a new steam injection occurs, and the pressure in the sterilization chamber rises again to the value preset for the sterilization process (3rd PRESSURE PULSE).



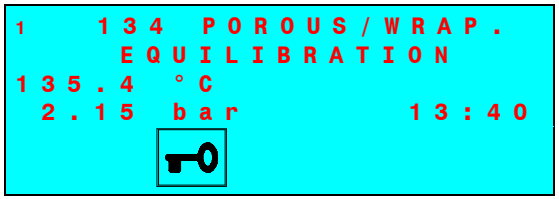
DESCRIPTION	STATUSES (P, t)	VP	WP	EV1 (no)	EV2 (nc)	EV3 (nc)	EV4	EV5 (no)	EV6 (nc)	Fan
3rd pressure pulse	from –0,80 to 0,00 bar (water entry5" at –0,80 bar)	OFF	ON	ON	OFF	OFF	OFF	ON	ON	ON
	from +0,00 to +0,90 bar									
	from +0,90 to +1,00 bar									



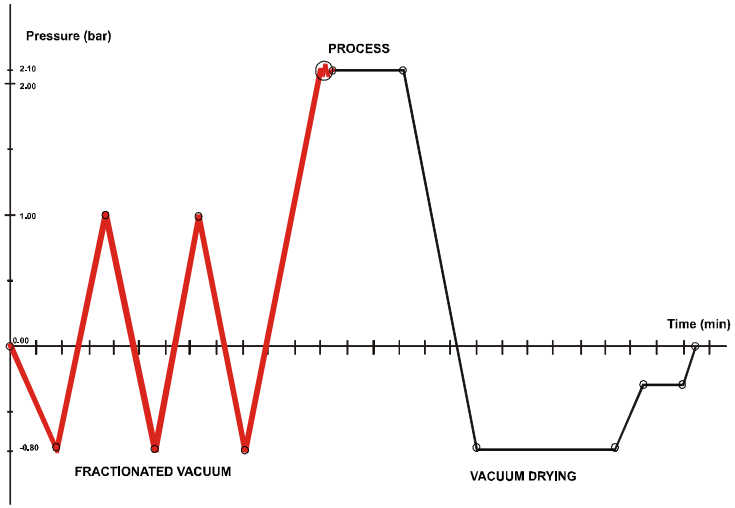


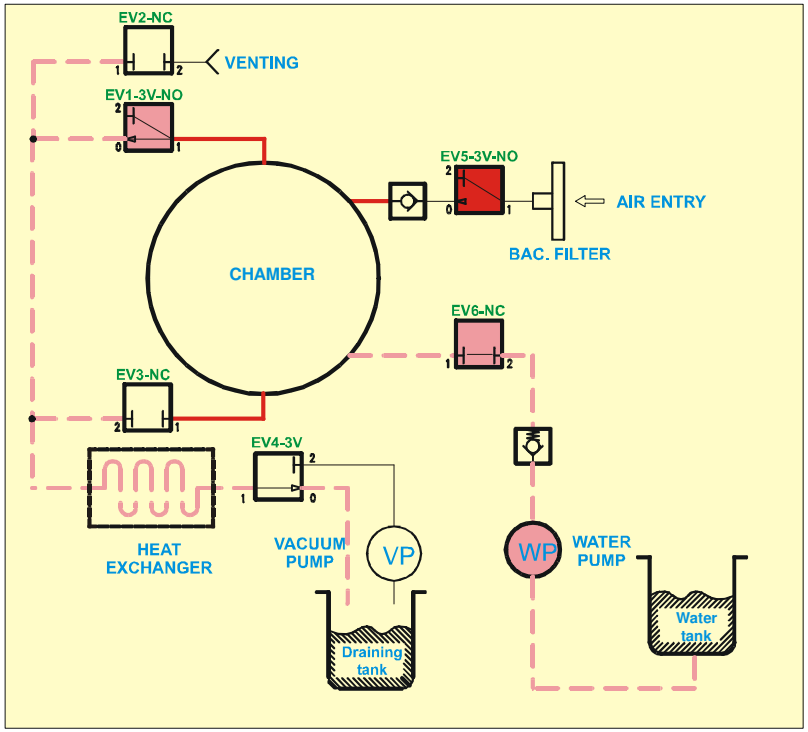
Thermodynamic equilibration

Once the pressure and temperature set-point values for the selected program are reached, the equipment waits a few seconds to allow the temperature in the chamber and in the load to stabilize (EQUILIBRATION). The display will show:



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

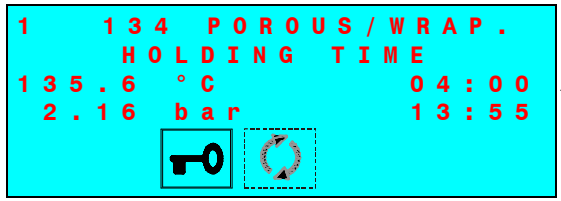




Process

When the thermodynamic parameters are balanced, the sterilization phase of the load (HOLDING TIME) begins.
The thermodynamic parameters are continuously monitored and the plumbing circuit controlled to keep the pressure and temperature values consistent within the limits preset by the program. The display shows.

Sterilization time countdown.

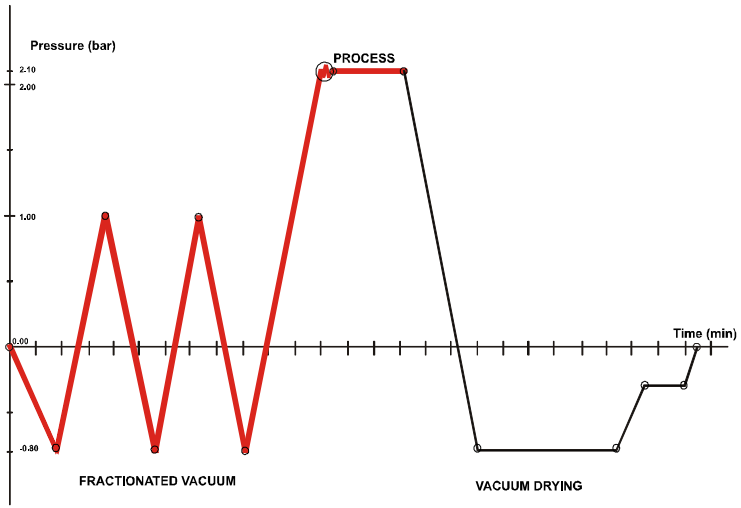


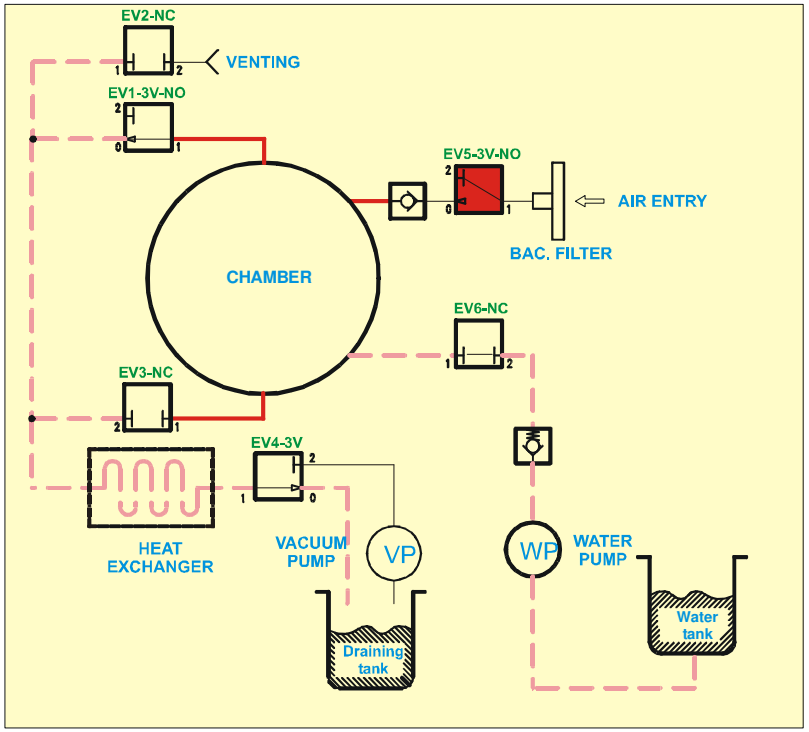
The icon ⟳ flashes to indicate the progress of the load sterilization process.

☞ At the end of the process phase, the icon ⟳ remains lit steady to indicate the sterilization status of the load in the chamber.

IF, FOR SOME REASON, THE STERILIZATION CYCLE IS INTERRUPTED BEFORE THE COMPLETION, THE ICON REMAINS FLASHING. IN THIS CASE, THE MATERIAL CANNOT BE CONSIDERED STERILE AND MUST NOT BE USED.

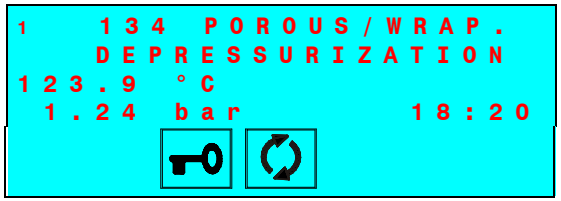
DESCRIPTION	STATUSES (P, t)	VP	WP	EV1 (no)	EV2 (nc)	EV3 (nc)	EV4	EV5 (no)	EV6 (nc)	Fan
Holding time	For the time set by the program	OFF	ON	ON	OFF	OFF	OFF	ON	ON	ON





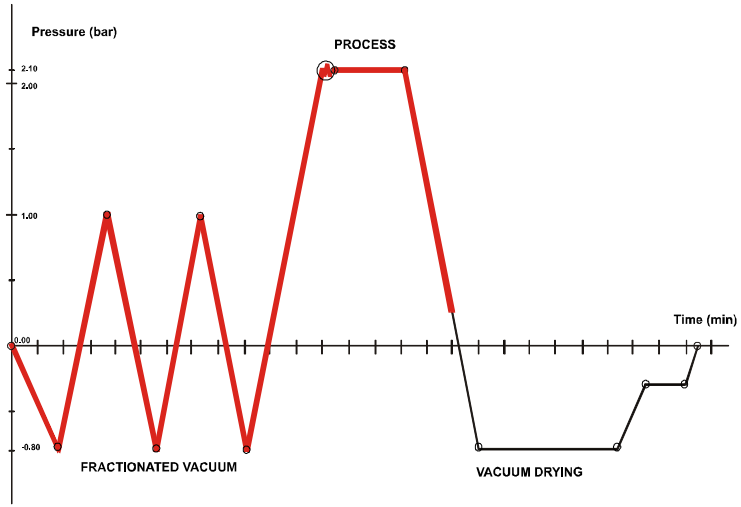
Steam discharge

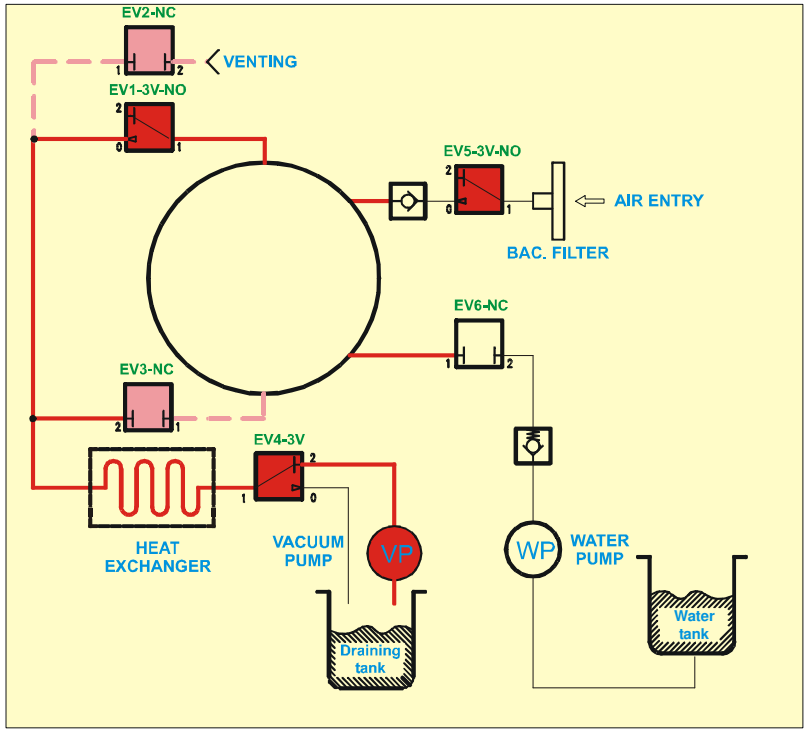
At the end of the sterilization phase, the steam is released from the sterilization chamber (DEPRESSURIZATION). The display shows:



The icon  is **lit and steady**.

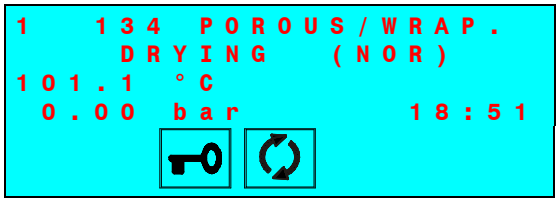
DESCRIPTION	STATUSES (P, t)	VP	WP	EV1 (no)	EV2 (nc)	EV3 (nc)	EV4	EV5 (no)	EV6 (nc)	Fan
Steam discharge	from +2,15/1,12 to +0,10 bar	OFF	OFF	ON	ON	OFF	OFF	ON	OFF	ON
	from +0,10 to +0,10 bar	ON	OFF	ON	OFF	OFF	ON	ON	OFF	ON
	from +0,20 to -0,00 bar	ON	OFF	OFF	OFF	ON	ON	ON	OFF	ON





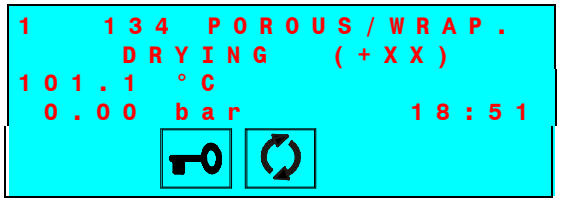
Drying

After the steam, under pressure, is released the vacuum pump turns on to begin the drying phase **(DRYING)**. This creates a low pressure in the sterilization chamber to facilitate the evaporation of the steam and consequently eliminate the moisture. As a function of the type of drying set, one of the following screens will appear:



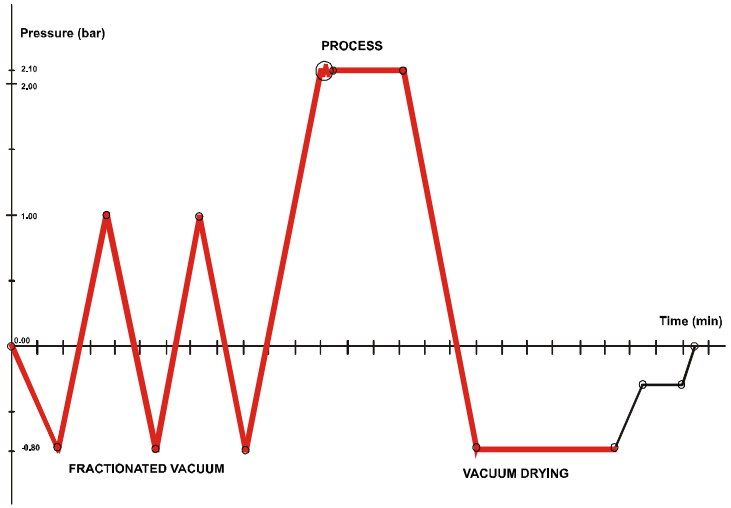
Standard drying

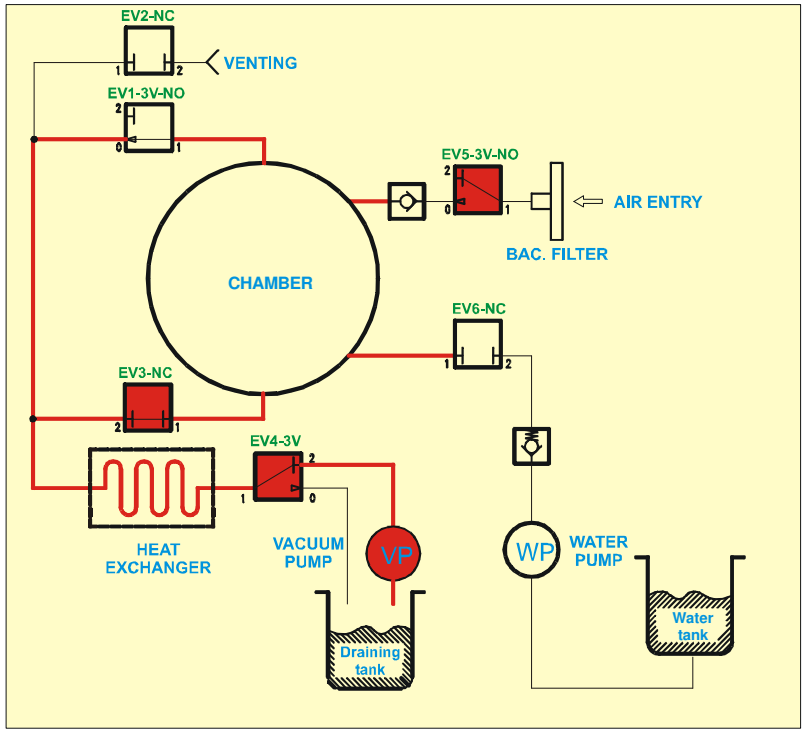
Intelligent drying



Extra drying
(+XX) = time set

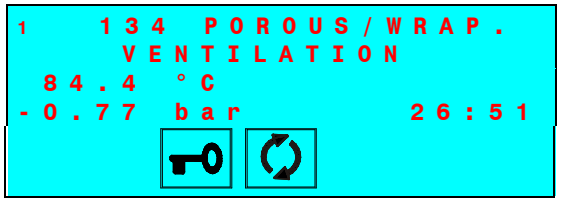
DESCRIPTION	STATUSES (P, t)	VP	WP	EV1 (no)	EV2 (nc)	EV3 (nc)	EV4	EV5 (no)	EV6 (nc)	Fan
Drying	From 0,00 to –0,80 bar	ON	OFF	OFF	OFF	ON	ON	ON	OFF	ON
	From -0,80 to –0,50 bar	ON	OFF	OFF	OFF	ON	ON	ON	OFF	ON
	From -0,50 to –0,80 bar	ON	OFF	OFF	OFF	ON	ON	ON	OFF	ON



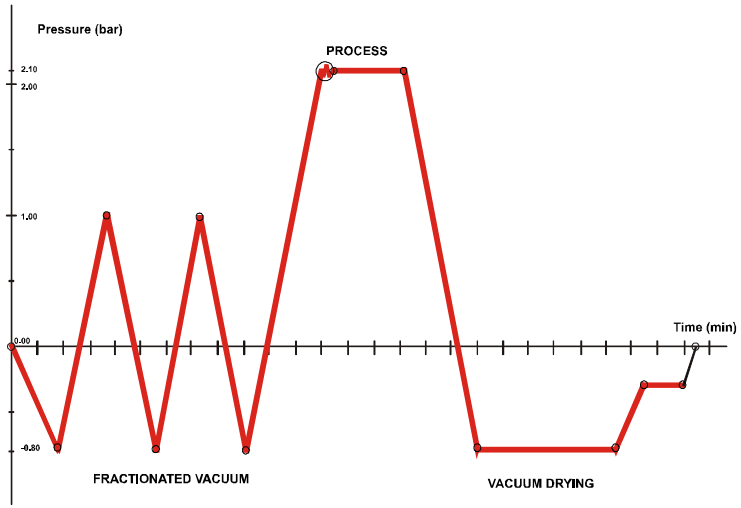


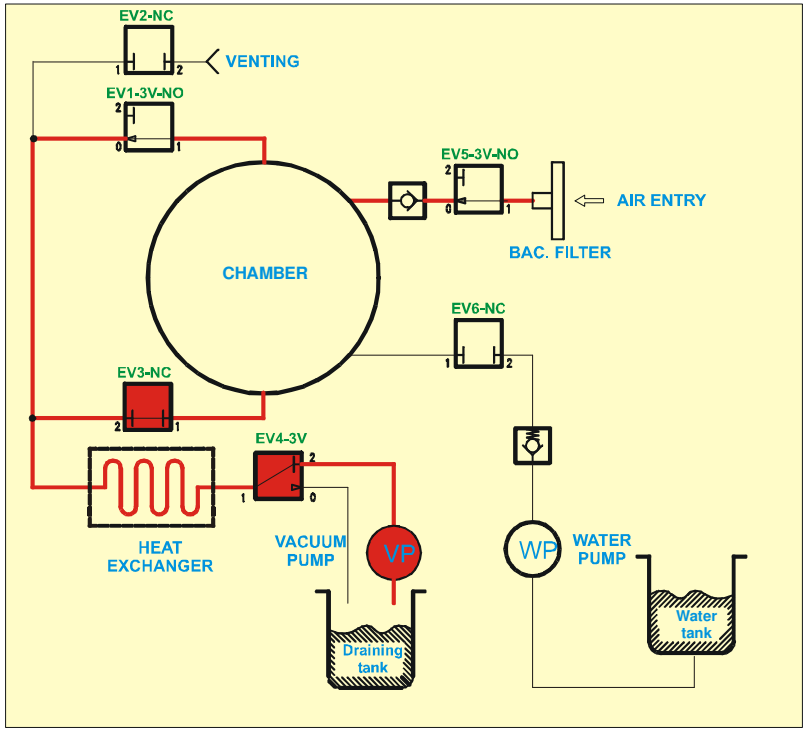
Ventilation

The drying phase is followed by a VENTILATION phase with fresh sterile air entry (vacuum in the chamber maintained) to eliminate the condensate and to cool the load:



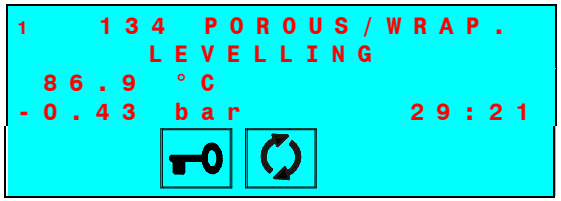
DESCRIPTION	STATUSES (P, t)	VP	WP	EV1 (no)	EV2 (nc)	EV3 (nc)	EV4	EV5 (no)	EV6 (nc)	Fan
Ventilation	from -0,50/0,80 to -0,45 bar	ON	OFF	OFF	OFF	ON	ON	OFF	OFF	ON



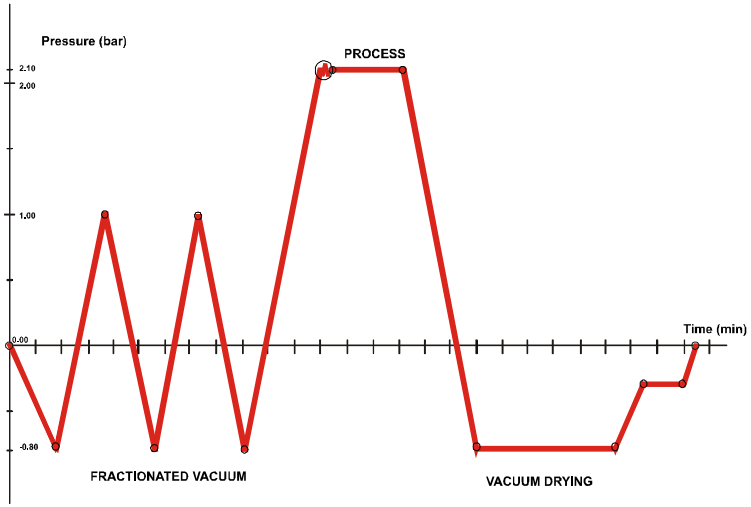


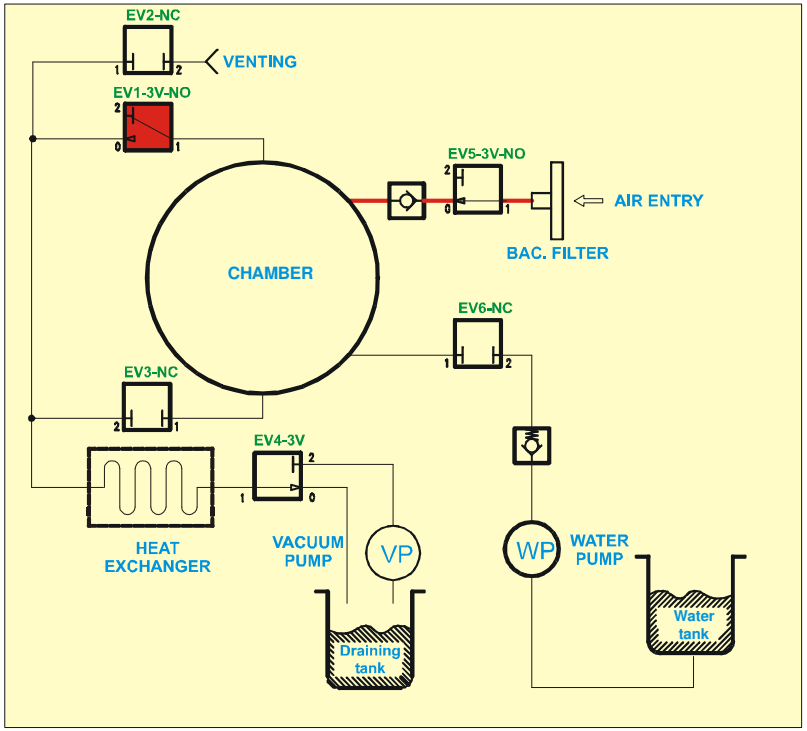
Levelling

At the end of the ventilation phase, the sterilization chamber is brought to the atmospheric pressure (LEVELLING) by drawing air through the micro-biological filter and then allows the user to open the door and access the sterilizer load:



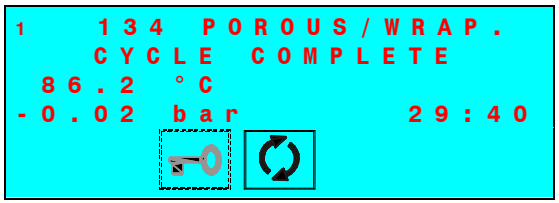
DESCRIPTION	STATUSES (P, t)	VP	WP	EV1 (no)	EV2 (nc)	EV3 (nc)	EV4	EV5 (no)	EV6 (nc)	Fan
Levelling (pressure)	from -0,45 to –0,10 bar (-0,10 bar to the value of 0 bar in the memory)	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF
Levelling (waiting time for the release of the locking door mechanism)	Waiting time =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





Completion of the cycle

As the pressure value in the sterilization chamber reaches the safety set-point limit, the door lock system is released.
As a consequence, the door status icon **flashes** and a series of beeps is generated.



The icon stays on.

Open the door and retrieve the sterilized material, using the extractor provided.

The icon **turns off**.

☞ When the door opens, a report of the sterilization cycle performed will be printed automatically (if the print mode AT CYCLE END selected). Check, sign and file the report. Refer to the ***Print report examples***.

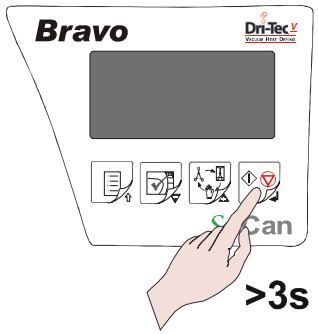
☞ At the end of the cycle, and until the opening of the door, the heating elements remain disabled. The equipment cools down slowly, regardless the mode STAND-BY set.

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

☞ As long as the sterilizer door is not opened, the vacuum pump is periodically enabled in order to remove any traces of condensate from the sterilization chamber. During these periods the display will show:

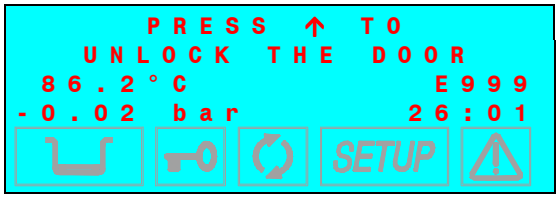
Push the ↑ key to interrupt the ventilation and open the door.

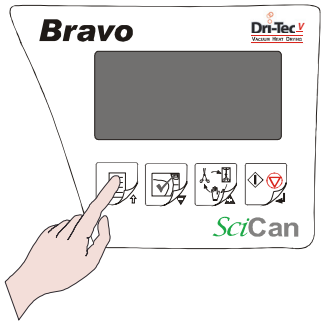
MANUAL INTERRUPTION OF THE CYCLE



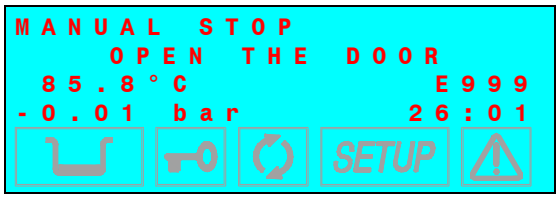
The operator can manually interrupt the cycle at any time by pushing the START/STOP key for three seconds.
This command generates the error E999 (cycle not ended correctly) and, until it is safe to open the door, the unit will beep and the display will show:

When safe conditions in the sterilization chamber are reached, the equipment activates a special procedure, first asking the user to manually unlock the door:

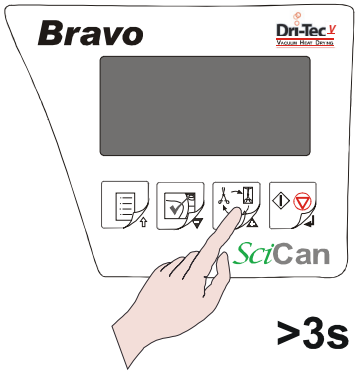




Press the ↑ key to unlock the door. The following message is then displayed:



When the door is opened, a prompt asks to reset the system:



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

With the door open, the data report of the sterilization cycle performed, including error code (E999), will be printed. Check the report, initial it in the proper space and file it in a suitable place.
Refer to the ***Print report examples***.

After the RESET, the equipment will enter STAND-BY mode, ready to execute a new cycle.

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

After an aborted cycle, due to a black-out or a power failure, the user CANNOT access the chamber until to the power returns. At that time, the user must reset the unit according to the procedure described in Section 3 – Alarm intervention. At the start of the next cycle, an automatic procedure is activated to clean the plumbing circuit.

After a manual interruption of the cycle (MANUAL STOP), always check the status of the icon before using the material processed.

If the icon is ON, the load can be considered STERILE and used. We recommend using it immediately.

If the icon is OFF, the load CANNOT BE CONSIDERED STERILE and MUST NOT BE USED.

RESULT OF THE CYCLE

After the end of the cycle, it is important to check the result of the sterilization process.

When a cycle ends (message CYCLE COMPLETE and icon lit) without being interrupted by an alarm, the load is completely aseptic.

The report of the sterilization cycle is an additional verification tool.

CHECKING THE CYCLE DATA REPORT

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

At the end of the cycle, the relevant data for the thermodynamic parameters of the sterilization, i.e., temperature and pressure (°C and bar), and time (in minutes) of the sterilization cycle, along with particular attention to the sterilization phase, will print automatically when the door is opened.

Check the values on the print report and any additional indications for further confirmation of sterilization.

The operator should sign in the space provided and file the document for possible future use.

If necessary, copies of the document can be used to identify the load (or parts of it) with the date/time of sterilization and details of the type of cycle performed.

To select the number of the copies to print, refer to ***Setting the printer options***.

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

PRINT REPORT EXAMPLES

Normal program report

Model	BRAVO 17V
S/N	03 JP 0001
Ver. SW	Exxxx/JPyyyyyy
Counter	0007/0015
Selection	134 SOLID/WRAPPED
Temperature	134 °C
Pressure	2.10 bar
Process time	4 min
Stand-by	LOW
Pre-vacuum	SINGLE
Drying	FAST
CYCLE START	19/11/08 12:14

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

Drying Pulses	01
CYCLE END	19/11/08 12:27

STERILIZATION: POSITIVE

OPERATOR

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Model	BRAVO 17V
S/N	03 JP 0001
Ver. SW	Exxxx/JPyyyyyy
Counter	0007/0015
Selection	134 POROUS/WRAPPED
Temperature	134 °C
Pressure	2.10 bar
Process time	4 min
Stand-by	HIGH
Pre-vacuum	FRACTIONATED
Drying	STANDARD
CYCLE START	19/11/08 09:52

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

Drying Pulses	05
CYCLE END	19/11/08 10:17

STERILIZATION: POSITIVE

OPERATOR

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Extended program report (required by operator)

Model	BRAVO 17V
S/N	03 JP 0001
Ver. SW	Exxxx/JPyyyyyy
Counter	0007/0015
Selection	134 POROUS/WRAPPED
Temperature	134 °C
Pressure	2.10 Bar
Process t ime	4 min
Stand-by	HIGH
Pre-vacuum	FRACTIONATED
Drying	STANDARD
CYCLE START	19/11/08 09:52

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

Drying pulses	05
CYCLE END	19/11/08 10:17

STERILIZATION: POSITIVE

OPERATOR

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EXTENDED REPORT
REQUESTED BY THE OPERATOR

SciCan

Report following a Manual Stop

Model	BRAVO 17V
S/N	03 JP 0001
Ver. SW	Exxxx/JPyyyyyy
Counter	0007/0015
Selection	134c POROUS
Temperature	134 °C
Pressure	2.10 bar
Process time	4 min
Stand-by	HIGH
Pre-vacuum	FRACTIONATED
Drying	STANDARD

CYCLE START 19/11/02 11:13

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

STERILIZATION: NEGATIVE

OPERATOR

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ALARM CODE: E999
DESCRIPTION MANUAL STOP

Report following a Black-out

Model	BRAVO 17V
S/N	03 JP 0001
Ver. SW	Exxxx/JPyyyyyy
Counter	0006/0012
Selection	XXX CUSTOM
Temperature	134 °C
Pressure	2.10 bar
Process time	07 min
Stand-by	HIGH
Pre-vacuum	FRACTIONATED
Drying	FAST

CYCLE START 19/11/08 15:31

BLACK OUT 19/11/02 15:45

STERILIZATION NEGATIVE

OPERATOR

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ALARM CODE: E000
DESCRIPTION BLACK-OUT

Report following an Alarm

Model	BRAVO 17V
S/N	03 JP 0001
Ver. SW	Exxxx/JPyyyyyy
Counter	0007~0015
Selection	134 POROUS/WRAPPED
Temperature	134 °C
Pressure	2.10 Bar
Process time	4 min
Stand-by	HIGH
Pre-vacuum	FRACTIONATED
Drying	STANDARD

CYCLE START 19/11/08 11:30

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

STERILISATION NEGATIVE

ALARM CODE: A112
DESCRIPTION PTC SHORTCIRCUIT

CAUTION !
PLEASE REFER TO USER MANUAL

HELIX/BD TEST program report

Model	BRAVO 17V
S/N	03 JP 0001
Ver. SW	Exxxx/JPyyyyyy
Counter	0011/0019
Selection	HELIX/BD TEST
Temperature	134 °C
Pressure	2.10 bar
Process time	3.5 min

CYCLE START 19/11/08 16:38

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

Drying pulses 01
CYCLE END 19/11/08 16:38

HELIX TEST COMPLETE
Please attach the indicator hereunder

OPERATOR

. . . . . .

VACUUM TEST program report

Model	BRAVO 17V
S/N	03 JP 0001
Ver. SW	Exxxx/JPyyyyyy
Counter	0011/0019
Selection	VACUUM TEST

CYCLE START 19/11/08 11:37

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

CYCLE END 19/11/08 11:41

VACUUM TEST: POSITIVE

OPERATOR

. . . . . .

TEST PROGRAMS

GENERAL

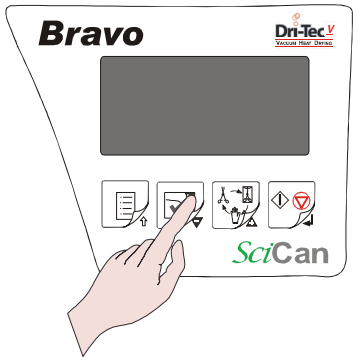
The Bravo product line offers two test programs to periodically check the unit's effectiveness. The two programs are:

- HELIX/BOWIE & DICK Test
- Vacuum Test

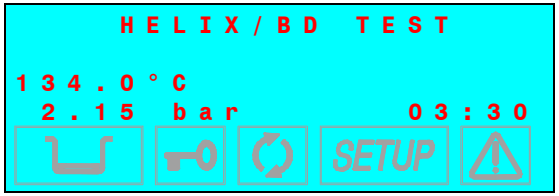
The **HELIX/BOWIE & DICK Test** program executes a cycle at 134 °C for 3.5 minutes. This cycle has a fractionated vacuum phase similar to that used in the POROUS and HOLLOW programs. Using a suitable test pack, it is possible to evaluate the correct penetration of the steam inside porous loads.

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

HELIX/BD TEST



To select the HELIX/BD Test, push the Test Selection key one or two times until the display shows:



The HELIX test device consists of a PTFE tube (1.5m long, internal diameter 2mm), with a small sealed screw capsule attached to one end and holding a suitable chemical indicator. The other end of the tube is left free to allow the penetration of the steam and evaluate its effectiveness.

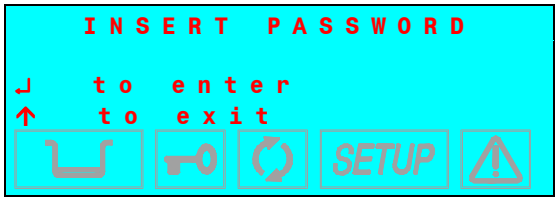
Insert the chemical indicator, consisting of a strip of paper with special reagent ink, into the capsule of the device (to be used perfectly dry). Tighten the capsule to avoid any blowing through the gasket seal.
Place the test device in the centre of the middle tray. Do not put any other material inside the chamber.

The **Bowie & Dick** test pack is manufactured according to the applicable standards. Place the test pack horizontally on the device's lowest tray, in the front part of the chamber, near the door. **Do not** put any other material inside the chamber.

☞ The test device and chemical indicators are not supplied with the equipment.

Close the door and start the program by pressing the **START** key.

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



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

☞ The phases of the cycle are the same as described for a standard cycle. See Chapter *"**Sequence of the process**"*.

At the end of the program, pull out the test device, open the capsule/test pack and remove the chemical indicator.

For steam correctly penetrated, the color of the chemical indicator will be completely changed on the entire length of the strip; otherwise (insufficient steam penetration) the color change will be only partial or not at all.

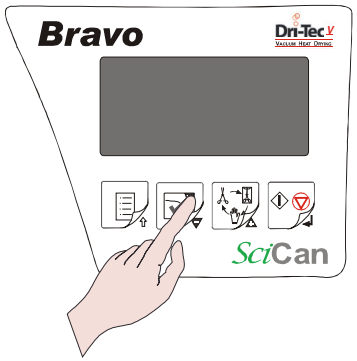
☞ Normally the color changes from light (beige, yellow, etc) to dark (blue, violet or black). In any case, follow closely the instructions provided by the manufacturer of the test device.

The duration of the test is approximately 23 minutes with **Bravo^{17}**, 20 minutes with **Bravo^{17V}** or 22 minutes with **Bravo^{21V}**.

As the door is opened at the end of the cycle, a report will be printed providing relevant data for the test cycle performed.
Attach the chemical indicator on the free space of the report, initial and file it in a suitable place.

For complete details about printing summaries, refer to ***Print report examples***.

VACUUM TEST



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

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

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

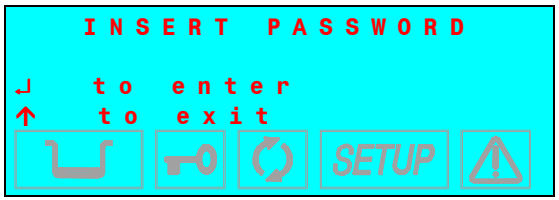
If you try to start the program with a higher temperature than indicated above, the display will read:

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

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

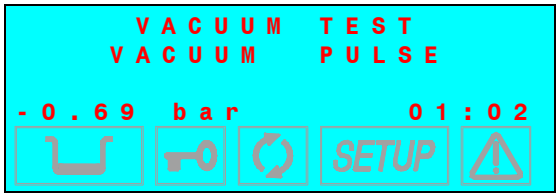
Close the door and push the **START** key.

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



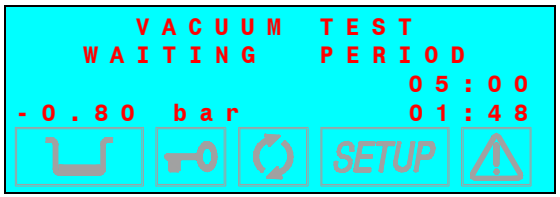
In addition, the equipment checks for the possible presence of the printer paper roll and if a data recorder is connected it will check for the presence of the Flash card and its memory capacity. The warning messages and the consequent actions to carry out are the same as described for a standard sterilization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

The vacuum phase will begin immediately and the display reads:



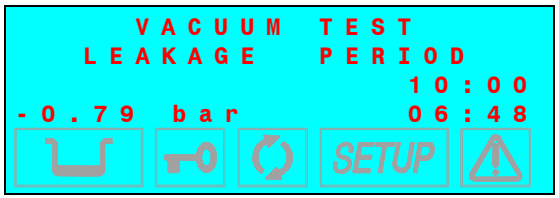
The display shows the pressure (bar), and the total time from the start of the program.

When the pre-set pressure is reached (**-0.80** bar) the pump stops and the pressure stabilization phase begins (**WAITING PERIOD**). This lasts 5 minutes and is shown on the display:



During this phase, a variation of not more than 10% of the maximum low pressure is allowed. Beyond this, the test will fail.

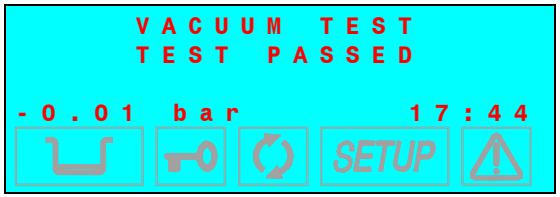
When the waiting phase is complete, the pressure verification phase begins (**LEAKAGE PERIOD**). This will last 10 minutes:



In this phase, a variation of **up to ±0.02 bar** is allowed, compared to the initial phase value. Higher variations, however, will cause the test to fail .

The time is counted down until the phase is completed, after which the pressure is brought back to atmospheric pressure.

When the program finishes, the display will read:



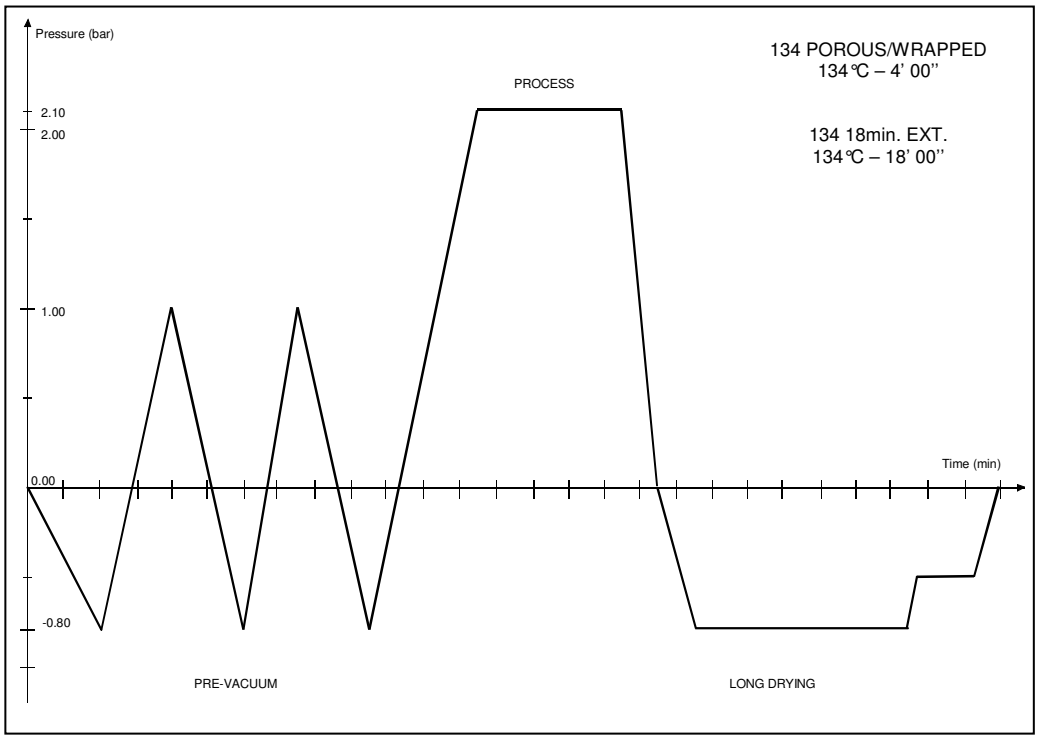
The end of the program is signaled with a beep.

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

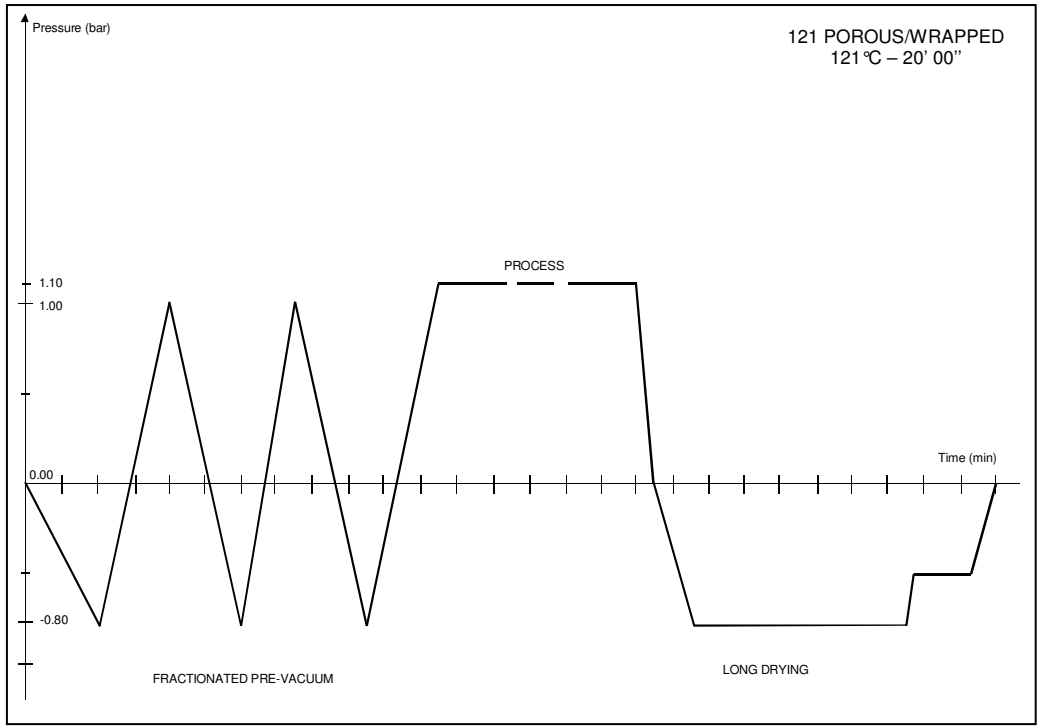
The duration of the test is approximately 18 minutes with **Bravo^{17V}** and **Bravo^{21V}**, and 23 minutes with **Bravo^{17}**.
When the door is opened at the end of the program, a report of the test cycle is printed with all the relevant data.
For complete details about printed reports, refer to ***Print report examples***.

CYCLE DIAGRAMS

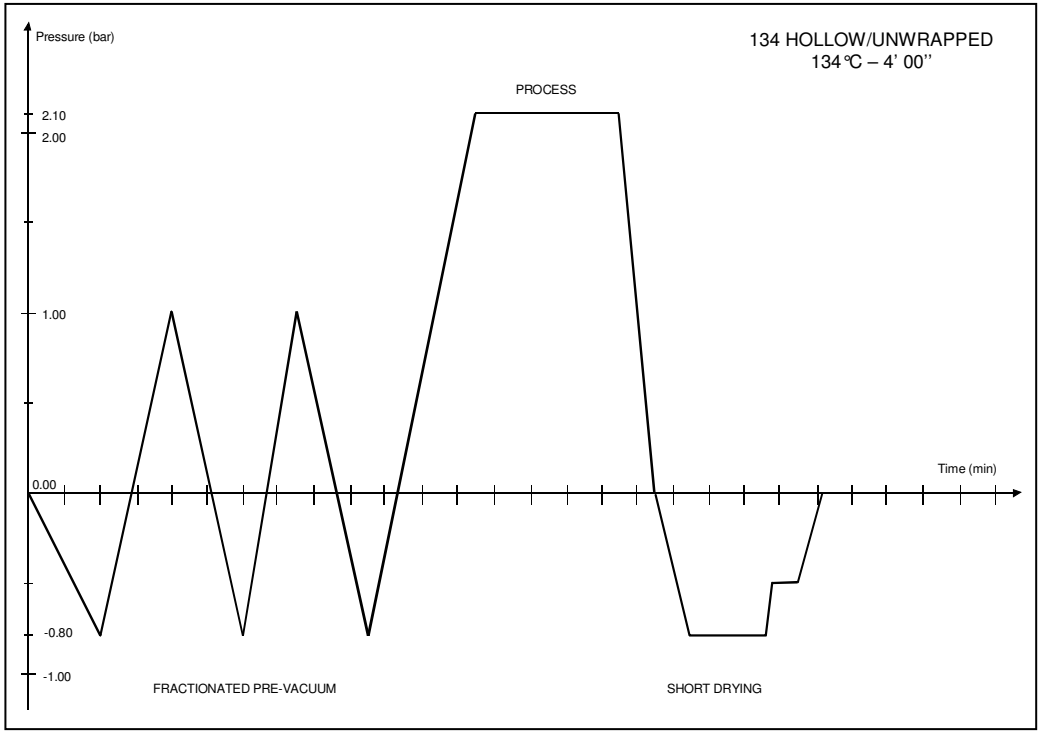
134 POROUS/WRAPPED & 134 18MIN. EXT.



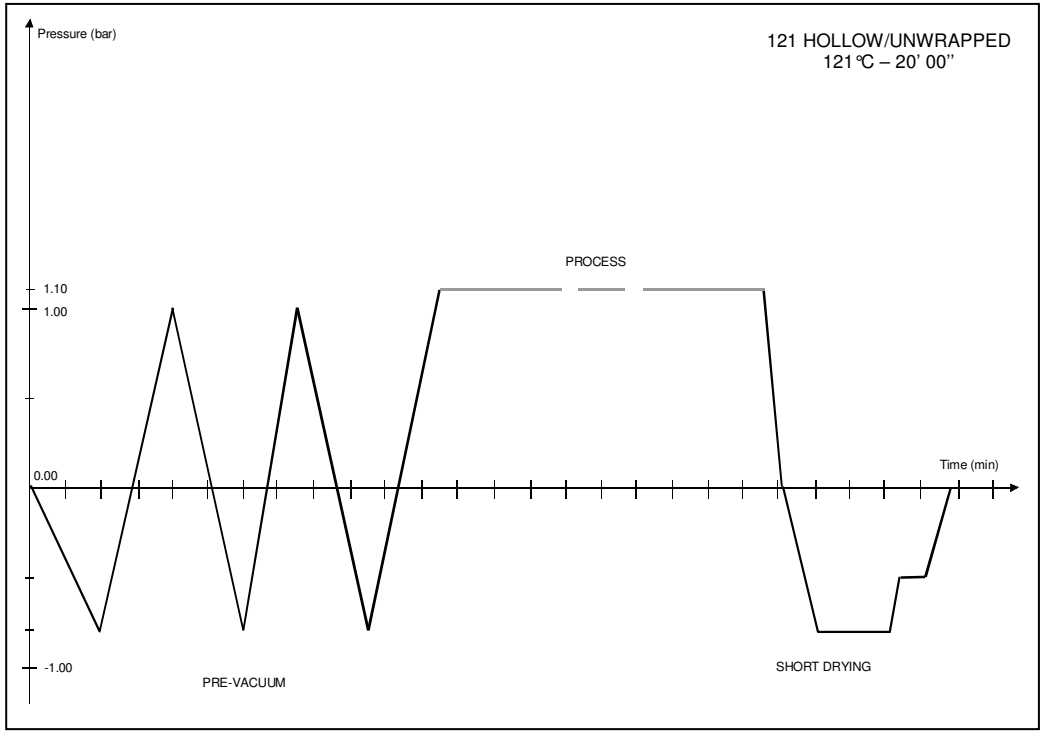
121 POROUS/WRAPPED



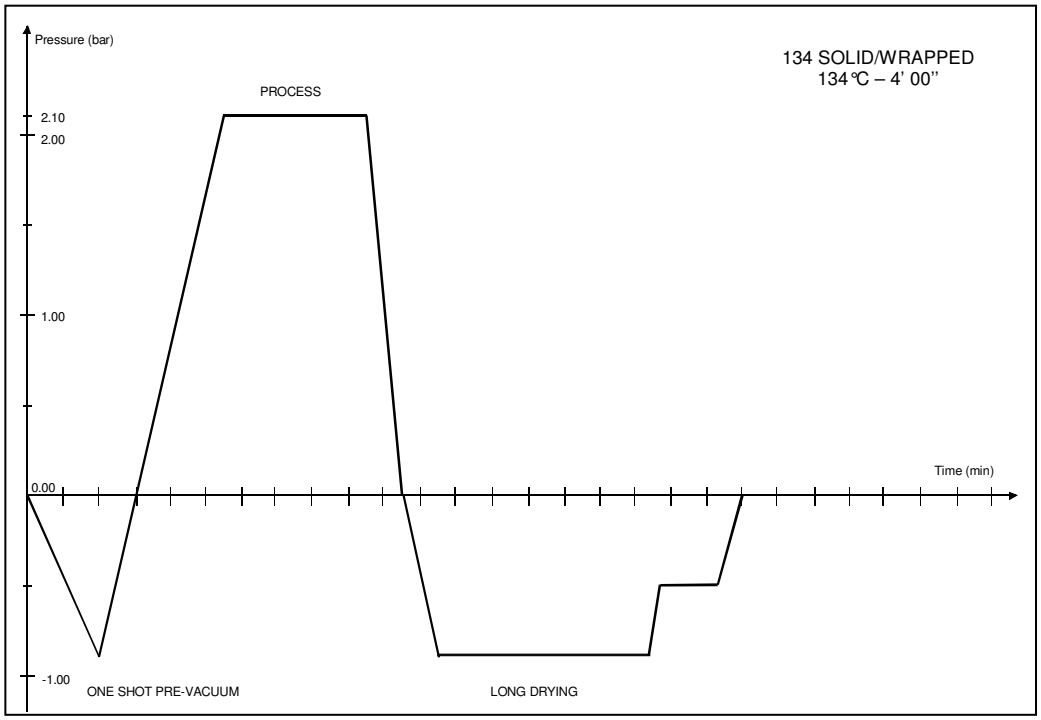
134 HOLLOW/UNWRAPPED



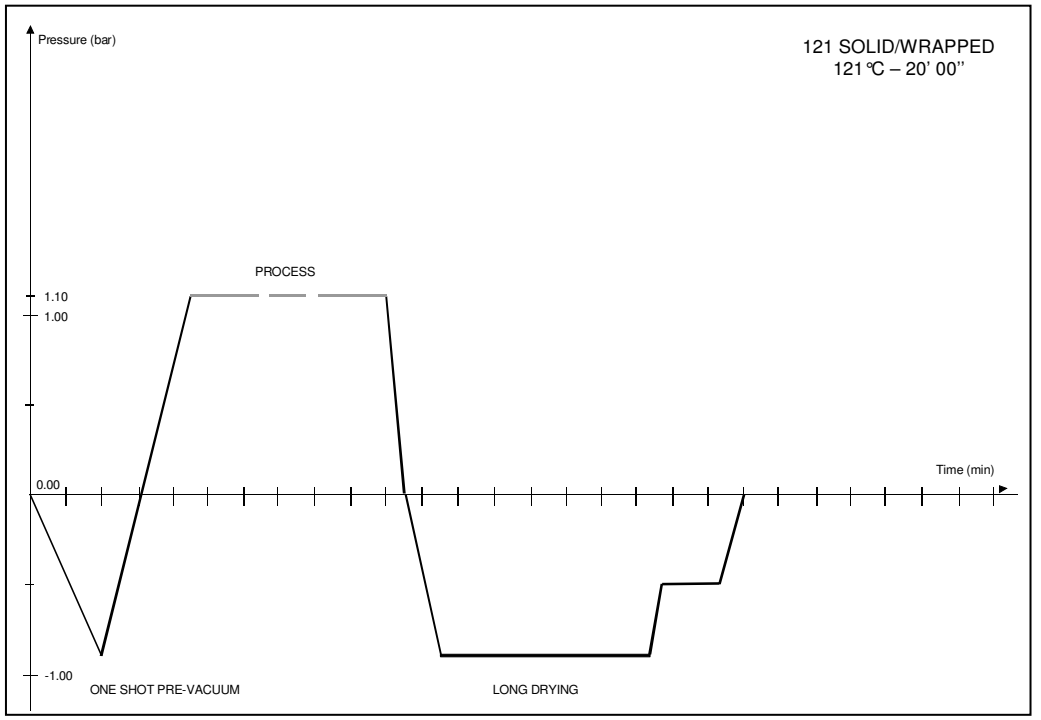
121 HOLLOW/UNWRAPPED



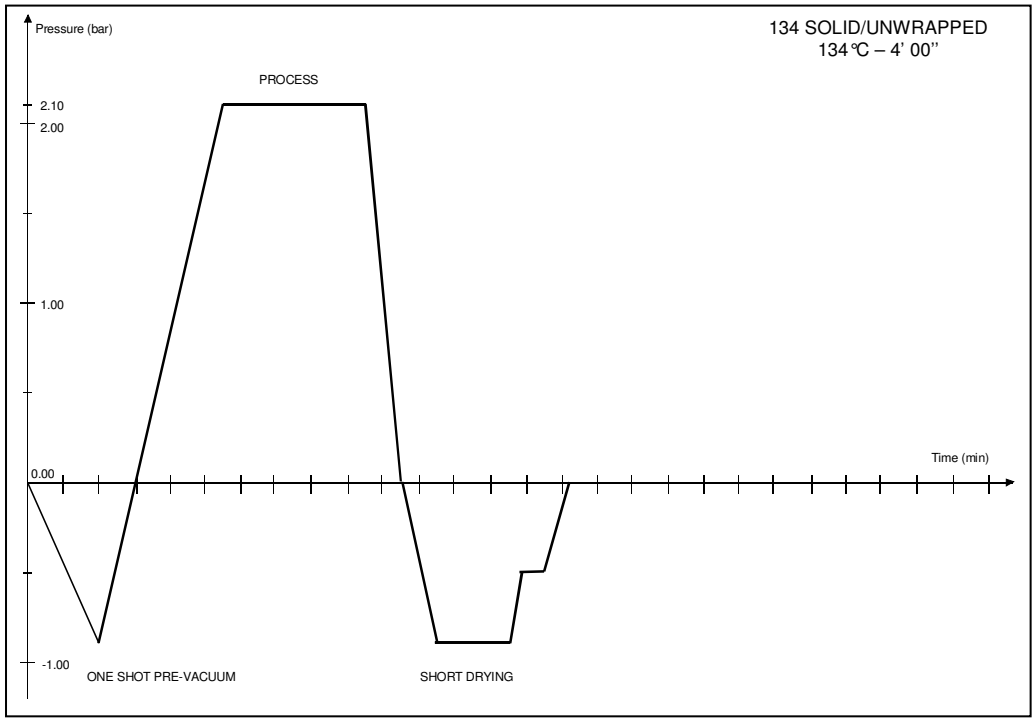
134 SOLID/WRAPPED



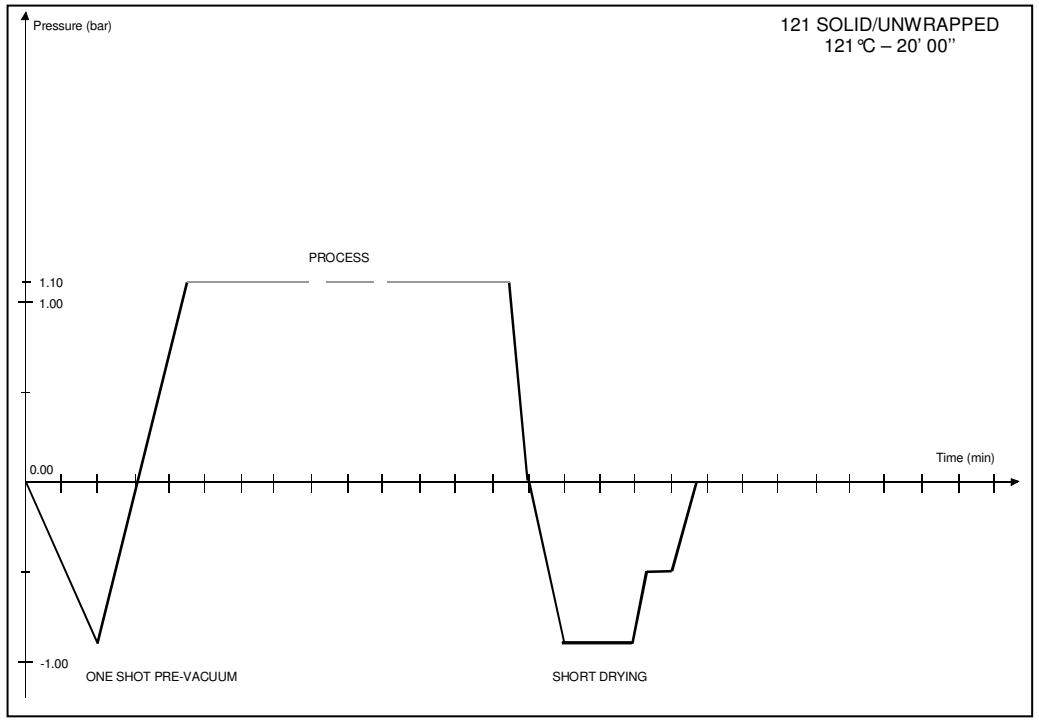
121 SOLID/WRAPPED



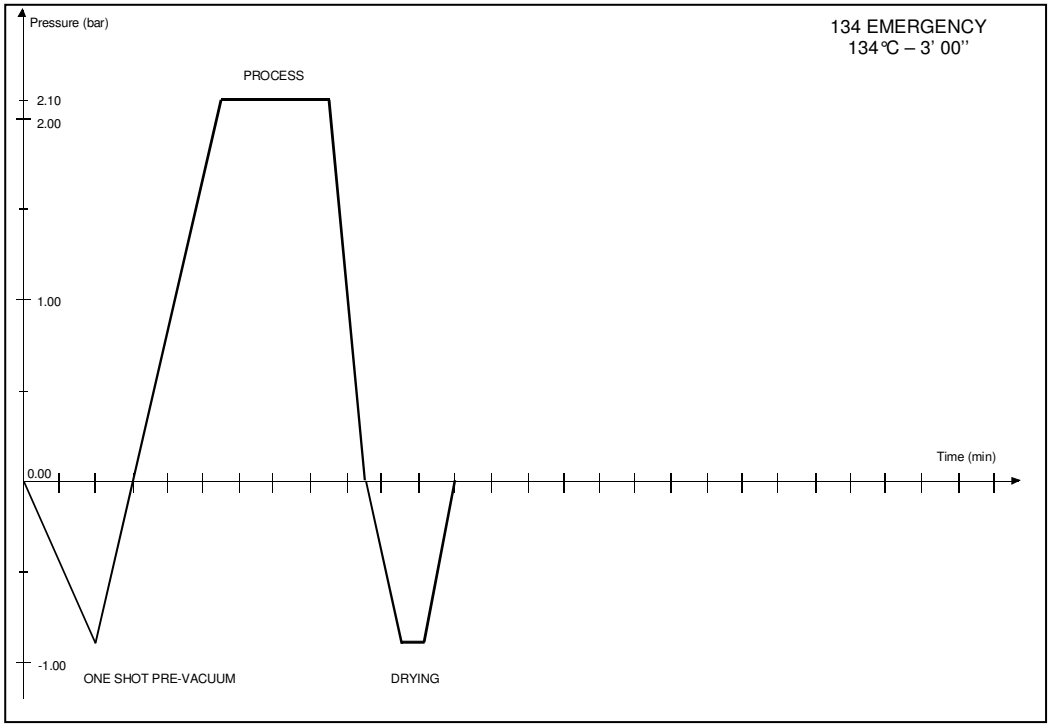
134 SOLID/UNWRAPPED



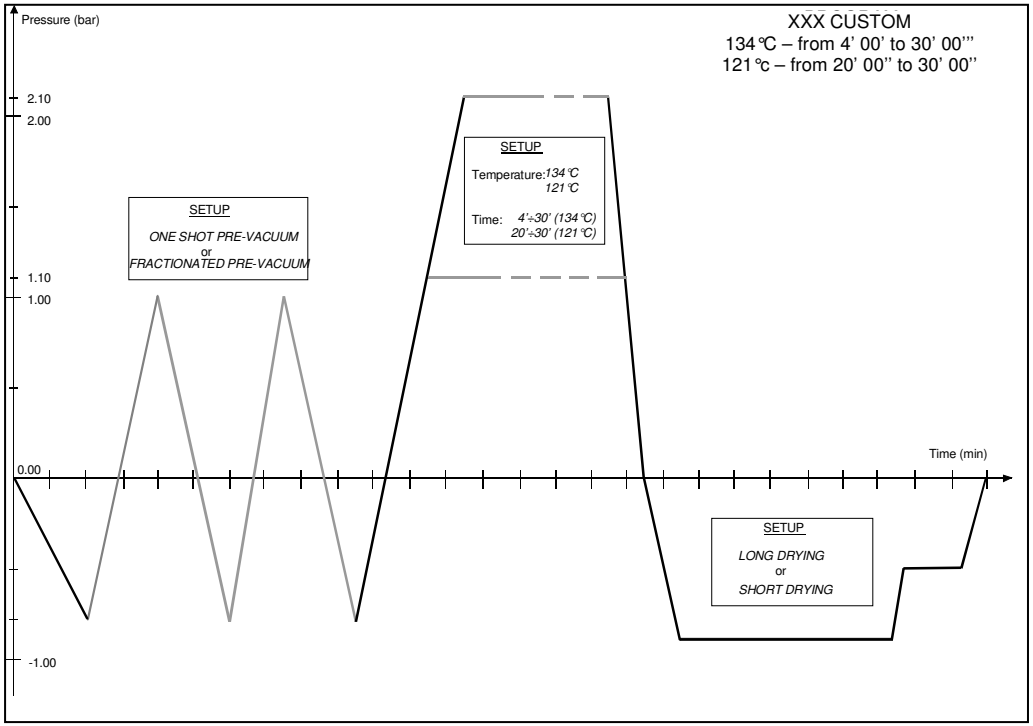
121 SOLID/UNWRAPPED



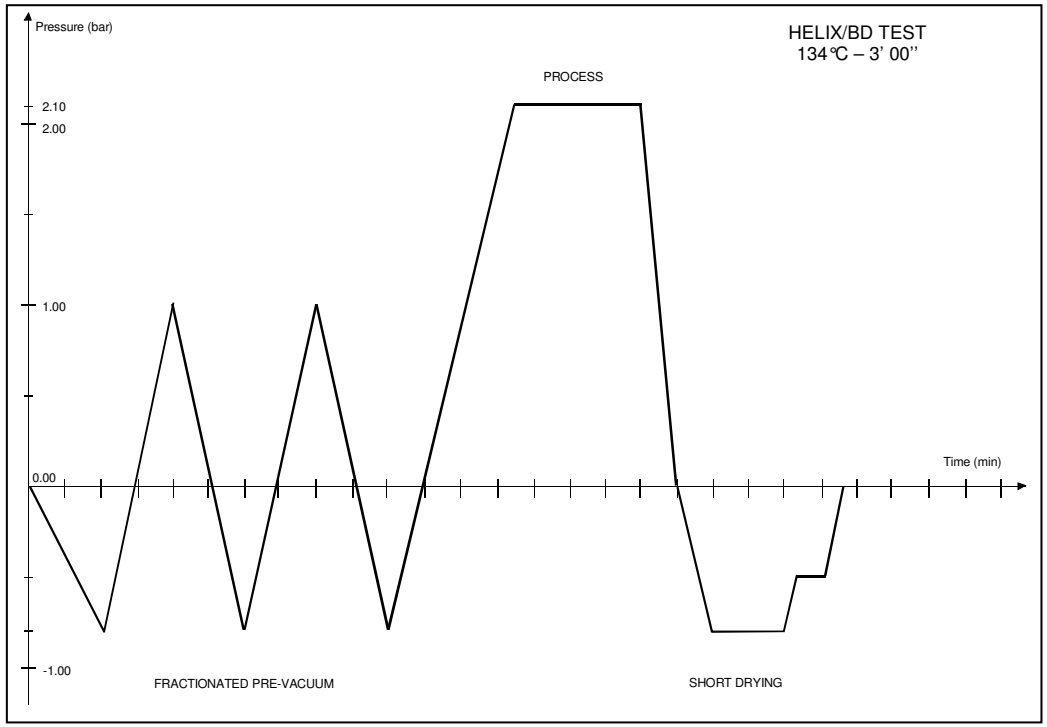
134 EMERGENCY



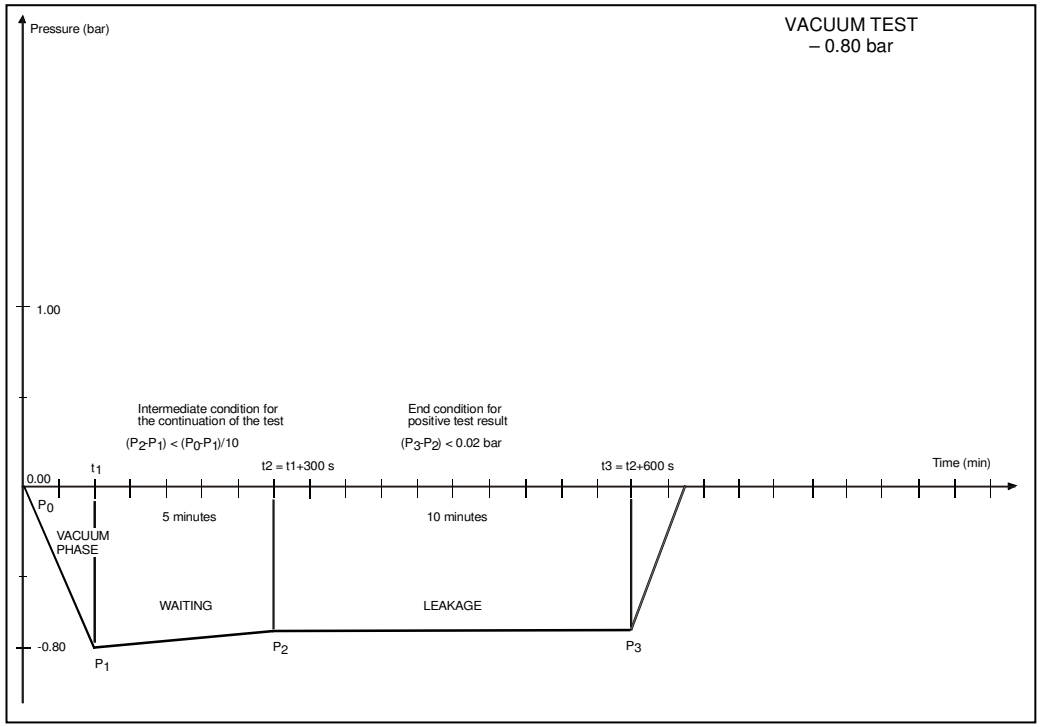
XXX CUSTOM



HELIX/ BD TEST



VACUUM TEST



SciCan

3. TROUBLESHOOTING AND REPAIR

TROUBLESHOOTING

GENERAL

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

The alarm codes are divided into **three categories**:

- **E** = **ERROR**
  Operator error or a cause external to the device.
  Problem normally fixed by the user.
  Code format: **Exxx** **(xxx = identifying number 000 ÷ 999)**

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

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

ALARM INTERVENTION

☞ In the case of an alarm, do not power off the unit before you have executed a reset *(see "**System reset**").*

An alarm causes the interruption of the cycle with the relative **alarm code** displayed on the display, accompanied by a **beep** and a flashing **alarm icon.**

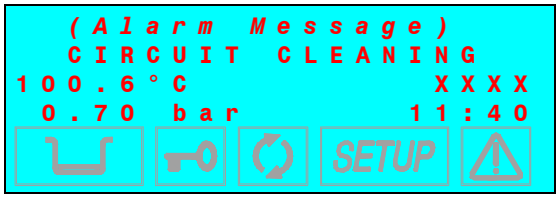
☞ During the alarm procedure, the display always shows the current temperature and pressure in the sterilization chamber..

This procedure is designed to keep the user from mistaking an anomalous cycle for a correctly completed cycle and, as a consequence, involuntarily using non-sterile material.
The alarm procedure is **differentiated** depending on whether it occurs **during** the execution of the program or **outside**, and is structured to guide the user to the necessary **RESET** of the sterilizer .

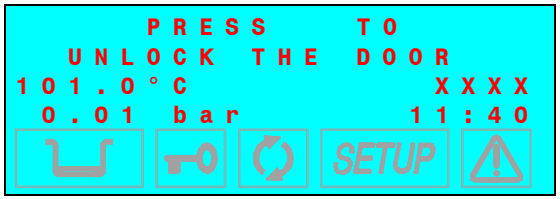
Alarm occurring during a cycle

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

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

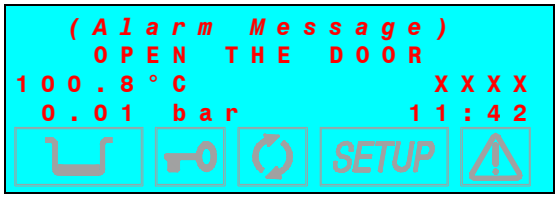


At the end of what has been described and having reached safe conditions, the machine activates a special procedure, that asks the user to manually unlock the door:

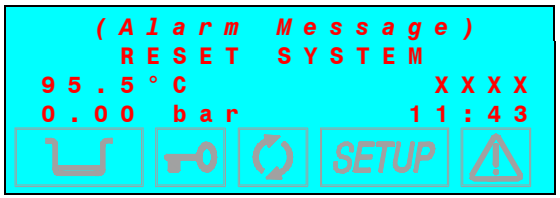


☞ The above indicated message is shown ONLY when the pressure in the chamber is within a safety limit. The release of the locking device is NOT possible when the pressure value is outside this limit.

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



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



Perform a **RESET** , then turn-off the equipment, find the problem or make the repair.

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

Alarm outside the cycle

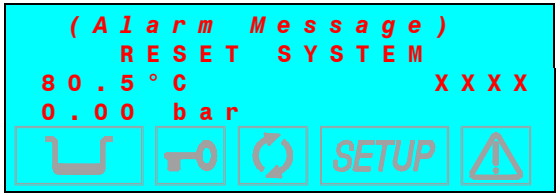
If the alarm intervenes **outside the sterilization or test program**, the display will show:

Depending on the alarm

Alarm code

Turn-off the equipment and check the alarm. Or, depending on the type of alarm:

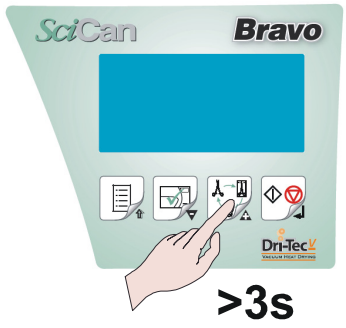
which is automatically transformed to the message:



Perform a **RESET**, then turn-off the equipment and check the problem.

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

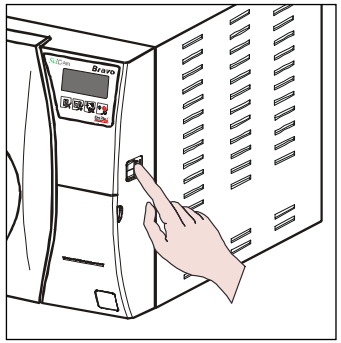
SYSTEM RESET



Depending on the alarm, the system must be reset in one of two ways (see the **Alarm Code List**):

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

Never turn the device off before trying to execute a reset as described above.

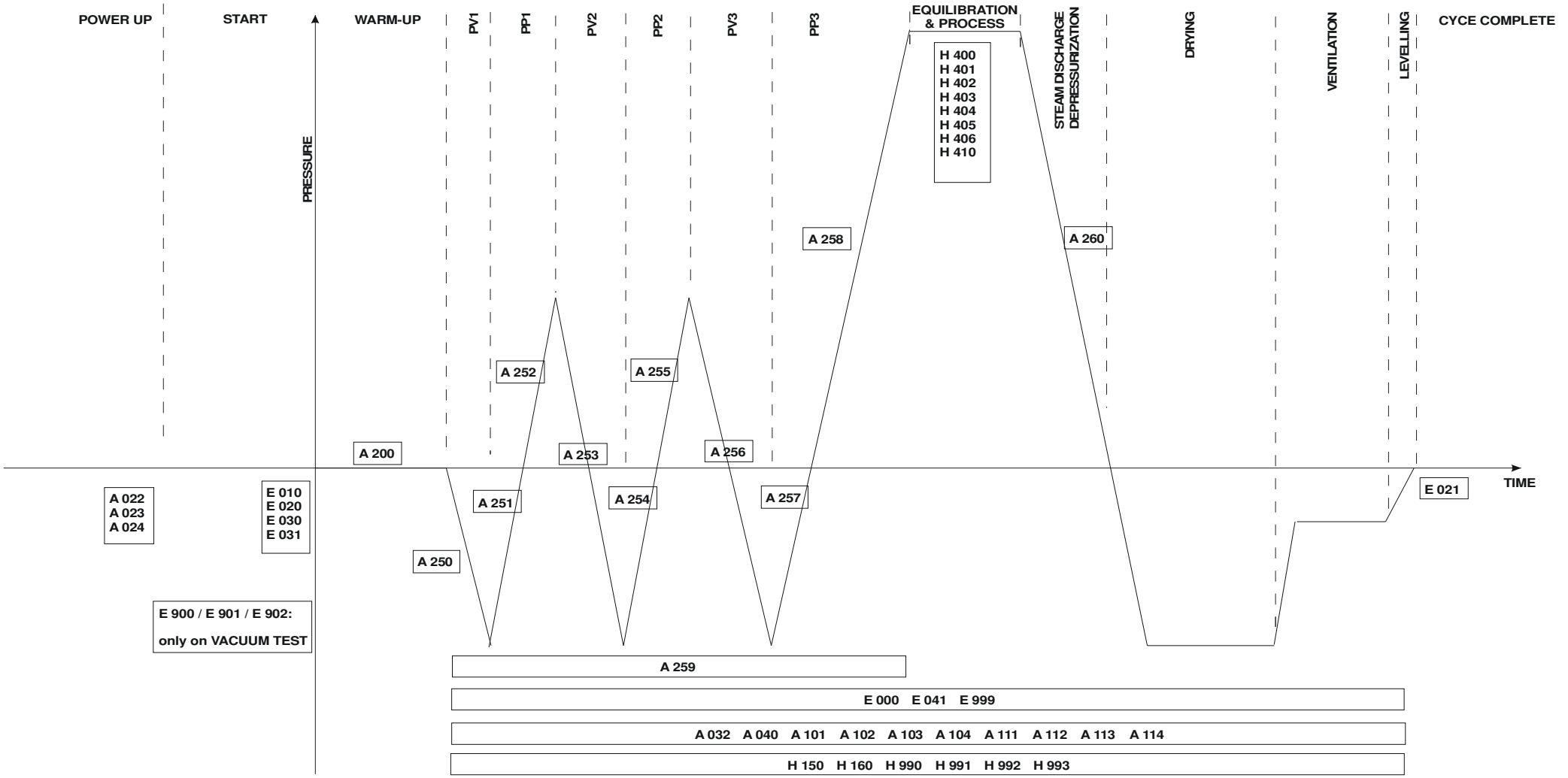


2. Turn-off the equipment, then power-on using the main switch.
   Upon power-up, the sterilizer will perform its normal initial test.

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

ALARM CODES VERSUS CYCLE DIAGRAM

The alarm code detected by the Process Evaluation and Monitor System depends on the cycle phase the sterilizer is being processing.
This relation is shown on the following diagram.


POWER UP
START
WARM-UP
PV1
PP1
PV2
PP2
PV3
PP3
EQUILIBRATION & PROCESS
STEAM DISCHARGE DEPRESSURIZATION
DRYING
VENTILATION
LEVELLING
CYCE COMPLETE
PRESSURE
TIME
H 400
H 401
H 402
H 403
H 404
H 405
H 406
H 410
A 258
A 260
A 252
A 255
A 200
A 253
A 256
A 022
A 023
A 024
E 010
E 020
E 030
E 031
A 251
A 254
A 257
E 021
A 250
E 900 / E 901 / E 902:
only on VACUUM TEST
A 259
E 000 E 041 E 999
A 032 A 040 A 101 A 102 A 103 A 104 A 111 A 112 A 113 A 114
H 150 H 160 H 990 H 991 H 992 H 993

ERROR LIST - “E” CODES

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

ALARM LIST - "A" CODES

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

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

HAZARD ALARM LIST - "H" CODES

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

E 000

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

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

E 010

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

E 020

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

Continue

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
				- Check for possible loosening of the motor mounting screws. - Fasten the motor. - Replace the motor **- see card Gr6-6**. - Do not use any sealant on these screws. - Check for the correct power supply during the motor operation. - Replace the motor **- see card Gr6-6**. - Replace the motor wiring **- see card Gr5-3**. - Replace the power supply pcb **- see card Gr1-1**. The mechanism does not work and remains in open position: - Check for the correct motor power supply. - Replace F4 fuse 1,25A - **see card Gr1-16**. - Replace the motor **- see card Gr6-6**. - Replace the motor wiring **- see card Gr5-3**. - Check the pcb connector. - Replace the tip of the motor wiring. - Check the pressure switch. - Disconnect and connect again the pressure switch wiring. - Replace the pressure switch **- see card Gr1-5** - Replace the CPU pcb. **- see card Gr1-1**
			Close the door, start the cycle and check the operation of the door locking mechanism.	Check as above.
			Check for the correct connection of the wiring on the release micro-switch .	Restore the wiring and try a new cycle. - Replace the wiring - Replace the release micro-switch **- see card Gr6-5** .
			Check for the correct connection of the wiring on the locking micro-switch .	Restore the wiring and try a new cycle. - Replace the wiring - Replace the locking micro-switch **- see card Gr6-5** .
Continue			Check for possible block of the release micro-switch pin.	- Replace the release micro-switch **- see card Gr6-5**.

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
			Check manually the operation of the locking micro-switch pin.	- Adjust the micro-switch. - Replace the micro-switch- see card Gr6-5.
			Check the F4 fuse 1,25 A	- Replace the fuse (same value). - Replace the electronic pcb - see card Gr1-1.
			Check for the correct fastening of the motor mounting screws.	- Restore the correct mounting. - Replace the motor - see card Gr6-6. - Replace the motor pin- see card Gr6-6.
			Check for the free turning of the fork bushes.	- Replace the blocked bush- see card Gr6-3.
			Check that the motor runs normally.	- Replace the pin- see card Gr6-6. - Replace the motor- see card Gr6-6.
			The locking mechanism is step-working.	
			Check the 2 A fuse on the power pcb	- Replace the fuse - see card Gr1-16.
			Operating of the 2nd safety logic on the pcb TROLL	Reset the safety logic by pushing the pcb's red button
			Enter the setup, go to SERVICE, DEVICE TEST and then select the option LOCKING DEVICE in order to check the door locking mechanism.	- Replace the burned fuse- see card Gr1-16. - Replace the power pcb- see card Gr1-1.
			Door gasket replaced by the user.	- Remove and mount properly the gasket. - Replace the door gasket - see card Gr6-1 - Check the door adjustment. - see Attachment B - Replace the door dish- see card Gr6-2

E 021

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
DOOR LOCKED	Exceeded the timeout for the operation of door locking mechanism (opening)	At the end of the cycle the door locking mechanism exceeds the timeout of 2.5 seconds.	Use the procedure to open the door.	The door opens: - Check for the free turning of the fork bushes. - replace the blocked bush - see card Gr6-3. - Check for the regular mechanism operation. - Replace the motor pin - see card Gr6-6. - Replace the motor - see card Gr6-6. The door does not open: - Check the F4 1,25 A fuse - Replace the fuse - see card Gr1-16. - Check the pressure switch. - Disconnect and connect again the pressure switch wiring. - Replace the pressure switch- see card Gr1-5. - Disassemble the motor and unlock the mechanism. - Check the locking micro-switch. - Replace micro-switch - see card Gr6-5
			Wiring loosen during the operation.	Reconnect the wiring.
			Failure of the locking black micro-switch.	Replace locking micro-switch - see card Gr6-5.
			Fuse F4 1,25 A blown during the cycle.	Replace the fuse - see card Gr1-16.
			Fork bush blocked.	Replace the bush - see card Gr6-3.
			The pressure switch reads a wrong pressure and impedes the door opening.	Disconnect and connect again the pressure switch wiring. - Replace the pressure switch - see card Gr1-5.

E 030

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

E 031

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

E 041

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

E 900

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
TEST FAILED	Vacuum test failed	Pressure change over the limit of 0,02 bar.	Check that the Vacuum test was not launched with chamber too hot.	Advise to carry out the Vacuum test at the beginning of the working day, with chamber empty and temperature lower than 50°C; never just after an alarm occurring .
			Leakage from the door gasket.	Clean carefully gasket and parabola; try a new Vacuum test. **Replace the gasket - see card Gr6-1**
			Leakage from a valve.	Find the valve and clean it. **Replace the valve causing the leakage - see cards Gr2**
			Pipe loosening on the pressure transducer .	Disconnect and connect again the pipe.
			Pipe loosening on the sterilization chamber.	Disconnect and connect again the pipe.
			Check that the teflon pipes are not loosen on pressure transducer, pressure switch and sterilization chamber pipe fittings.	Disconnect and connect again the loosen pipe.
			Check the O-ring on the steam generator	**Replace the steam generator O-ring – see card Gr4-6**
			Leakage from the heat exchanger	**Replace the heat exchanger - see card Gr4-3**
			Sterilizer not used for a long time.	**Startup the hydraulic circuit of the steam generator – see Attachment G.** **Perform cycles without load.** **Replace the water pump – see card Gr3-1**

E 901

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

E 902

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

Continue

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

E 999

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

A 022

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
LOCKING PROBLEM	Micro-switches failure (OFF-OFF)	During the initial self test the two micro-switches are ON	Switching ON at door open with micro-switch failure.	Replace the micro-switch - see card Gr6-5
			Switching ON at door open with micro-switch wiring broken.	Replace micro-switch wiring
			Switching ON at door open with micro-switch blocked.	Release the micro-switch Replace the micro-switch - see card Gr6-5
			Switching ON at door closed with the wheel-pin micro-switch broken.	Replace the micro-switch - see card Gr6-5 Go to Attachment H or Attachment I
			Switching ON at door closed with the micro-switch blocked.	Release the micro-switch Replace the micro-switch - see card Gr6-5 Go to Attachment H or Attachment I
			Fuse blown during the previous cycle	Replace the fuse - - see card Gr1-16 Go to Attachment H or Attachment I
			Micro-switch wiring disconnected from the pcb	Connect the micro-switch (see electrical drawing)
			Alarm occurred during the previous cycle; sterilizer turned off before completing the safety procedure	Go to Attachment H or Attachment I Advice the user for the correct operation in case of alarm
			The alarm is occurring continuously	replace the CPU pcb – see card Gr1-1.

A 023

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
LOCKING PROBLEM	Micro-switches failure (ON-ON).	During the initial self test the two micro-switches are OFF	Blackout during the startup check procedure	**Go to Attachment H or Attachment I**
			Power supply problem during the startup check procedure.	
			Anomalous reading of the pressure switch	**Replace the pressure switch – see card Gr1-6**
			Micro-switch wiring disconnected from the pcb	**Connect the micro-switch (see electrical drawing)**
			Same alarm occurred during the previous cycle without a reset on the pcb TROLL	Reset the safety logic by pushing the pcb's red button
			Gear motor not powered by the electronic pcb	Reset the safety logic by pushing the pcb's red button
				Replace the CPU pcb - **see card Gr1-1.**

A 024

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
LOCKING PROBLEM	Failure on the micro-switches (ON-OFF).	During the initial self test the closing micro-switch is ON and the opening micro-switch is OFF	Locking mechanism fuse burned during a cycle	Replace the fuse - see card Gr1-16
				Go to Attachment H or Attachment I.
			Alarm occurred during the previous cycle; sterilizer turned off before completing the safety procedure	Go to Attachment H or Attachment I
				Advice the user for the correct operation in case of alarm
			Locking mechanism broken	Replace the motor - see card Gr6-6
				Replace the motor coupling pin - see card Gr6-6
			Burned fuse.	Replace the fuse – see card Gr1-16.
			Anomalous reading of the pressure switch	Replace the pressure switch – see card Gr1-6
			Micro-switch wiring disconnected from the pcb	Connect the micro-switch (see electrical drawing)
			Same alarm occurred during the previous cycle without a reset on the pcb TROLL	Reset the safety logic by pushing the pcb's red button
			Gear motor not powered by the electronic pcb	Reset the safety logic by pushing the pcb's red button
				Replace the CPU pcb - see card Gr1-1.

A 032

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

A 040

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
FILLING PROBLEM	Fail of the automatic filling from the external tank.	MIN level signaling not turned off within 2' from the start command of the automatic filling.	Check for water into the external filling tank.	Fill the external tank, reset the alarm and let the sterilizer's main tank to be filled.
			Check that the tap in the external filling tank is in open position.	Open the tap in the external filling tank.
			Check for possible obstruction in the external filling tank pipe.	Free the external filling tank pipe and shorten it if too long.
			Check for possible dirty in the Saeco filter.	**Replace the filter in the filling pipe path**
			Check for possible excessive pipe length	**Reduce the pipe length, or make easier the water flow by rising more the external tank**
			Verify that the water pump works properly.	**Replace the fuse - see card Gr1-16** **Replace the water pump wiring** **Replace the water pump - see card Gr3-1** **Replace the power pcb - see card Gr1-1**
			Verify that the water pump is not blocked	Water pump piston may be dry. A few taps on the pump body may loosen the dry piston and start the pump. **Replace the water pump - see card Gr3-1**
			Water pump failure	**Replace the water pump - see card Gr3-1**

Continue

A 040 (continue)

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

A 101

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
PT1 BROKEN	PT1 failure	Temperature detected by PT1 over 250°C	PT1 broken	**Replace the PT1 - see card Gr1-8**
			PT1 uncalibrated.	**Perform the calibration – see Attachment N**
			Check the temperature reading on the display.	If = the room temperature: **- Turn off / on the sterilizer a few times;** **- Replace PT1 – see card Gr1-8.** If differing of many °C: **- turn off / on the sterilizer a few times;** **- Replace PT1 – see card Gr1-8;** **- Reset and calibrate the CPU pcb – see Attachment N.**
			Check the calibration.	**Perform the PT1 calibration– see Attachment M.** **Complete sterilizer calibration – see Attachment N** **Replace the CPU pcb – see card Gr1-1**
			Data memory reset or failure ..	**Reset and calibrate CPU pcb – see Attachment N** **Replace the CPU pcb – see card Gr1-1**

A 102

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
PT2 BROKEN	PT2 failure	Temperature detected by PT2 over 250°C	PT2 broken	Replace PT2 - see card Gr1-9
			PT2 uncalibrated.	Perform the calibration – see Attachment N
			Steam generator clogged.	Replace lower section of the steam generator - see card Gr4-6 Advice the user to change the type of distilled water
			No water is feeding the steam generator.	Fill the main tank Replace the water pump - see card Gr3-1 Replace valve EV6 - see card Gr3-1
			Check the temperature reading on the display.	If = the room temperature: - turn off / on the sterilizer a few times; - Replace PT2 – see card Gr1-9. If differing of many °C: - turn off / on the sterilizer a few times; - Replace PT2 – see card Gr1-9; - Reset and calibrate CPU pcb – see Attachment N.
			Check the calibration.	Perform the PT2 calibration– see Attachment M. Complete sterilizer calibration – see Attachment N Replace the CPU pcb – see card Gr1-1
			Data memory reset or failure .	Reset and calibrate CPU pcb – see Attachment N Replace the CPU pcb – see card Gr1-1

A 103

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
PT3 BROKEN	PT3 failure	Temperature detected by PT3 over 250°C	PT3 broken	Replace the PT3 - see card Gr1-10
			PT3 uncalibrated.	Perform the calibration – see Attachment N
			Check the temperature reading on the display.	If = the room temperature: - Turn off/on the sterilizer a few times; - Replace PT3 – see card Gr1-10. If differing of many °C: - Turn off/on the sterilizer a few times; - Replace PT3 – see card Gr1-10; - Reset and calibrate the CPU pcb – see Attachment N.
			Check the calibration.	Perform the PT3 calibration– see Attachment M. Complete sterilizer calibration – see Attachment N Replace the CPU pcb – see card Gr1-1
			Data memory reset or failure.	Reset and calibrate CPU pcb – see Attachment N Replace the CPU pcb – see card Gr1-1

A 104

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
PT4 BROKEN	PT4 failure	Temperature detected by PT4 over 250°C.	PT4 broken	Replace the PT4 - see card Gr1-11
			PT4 uncalibrated.	Perform the calibration – see Attachment N
			Check the temperature value on the display.	If = the room temperature: - Turn off/on the sterilizer a few times; - Replace PT4 – see card Gr1-11. If differing of many °C: - Turn off/on the sterilizer a few times; - Replace PT4 – see card Gr1-11; - Reset and calibrate the CPU pcb – see Attachment N.
			Check the calibration.	Perform the PT4 calibration– see Attachment M. Complete sterilizer calibration – see Attachment N Replace the CPU pcb – see card Gr1-1
			data memory reset or failure.	Reset and calibrate CPU Pcb – see Attachment N Replace the CPU Pcb – see card Gr1-1

A 111

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

A 112

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

A 113

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

A 114

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

A 200

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

A 250

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

Continue

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

A 251

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
ATM1 TIMEOUT	1st pressure pulse (from -.88 to 0.00) not performed within the preset time	1st pressure pulse not performed within 3' timeout	The water pump of the steam generator does not work properly	**Replace the water pump - see card Gr3-1** **Replace the power pcb - see card Gr1-1**
			Incorrect operation of the EV6 valve	Clean the valve **Replace EV6 valve - see card Gr3-1**
			Fault in the pipe connecting the steam generator	**Replace the pipe**
			Sterilization chamber overloaded	Advice the operator to properly load the sterilization chamber.
			Intervention of the steam generator safety thermostat	Restore the safety thermostat and repeat the sterilization cycle **Replace the safety thermostat - see card Gr1-12**
			Steam generator clogged	**Replace the lower section of the steam generator - see card Gr4-6** Different distilled water must be used
			Fault in the CPU pcb	**Replace the CPU pcb - see card Gr1-1**
			CPU pcb uncalibrated	**Send the sterilizer to the Service department**
			Check the continuity of the steam generator cartridge	**Replace the failed cartridge**
			Power supply voltage lower than 210Vac	**Install a voltage stabilizer in order to maintain the power supply voltage at the nominal value**

A 252

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
PP1 TIMEOUT	1st pressure pulse (from 0.00 to +1.00 bar) not performed within the preset time	First pressure pulse not performed within 3' timeout	Sterilization chamber overloaded	Advice the operator for properly loading of the sterilization chamber.
			Intervention of the steam generator safety thermostat	Restore the safety thermostat and repeat the sterilization cycle **Replace the safety thermostat - see card Gr1-12**
			Steam leakage from the door gasket	Clean properly the door gasket and dish **Replace the door gasket - see card Gr6-1**
			Steam leakage from a valve	Identify the valve and clean it **Replace the valve causing the problem - see cards Gr2**
			Steam leakage from a pipe	**Replace the pipe causing the problem**
			Steam generator clogged	**Replace the lower section of the steam generator - see card Gr4-6** Different distilled water must be used
			Fault in the CPU pcb	**Replace the CPU pcb - see card Gr1-1**
			CPU pcb uncalibrated	**Send the sterilizer to the Service department**
			Check the continuity of the steam generator cartridge	**Replace the failed cartridge - see card Gr1-19**
			Check the maintenance status	**Advice the operator on the proper maintenance**
			Power supply voltage lower than 210Vac	**Install a voltage stabilizer in order to maintain the power supply voltage at the nominal value**

A 253

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

Continue

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
			Air leakage from a valve	Identify the valve and clean it **Replace the valve - see cards Gr2**
			Air leakage from the heat exchanger	**Replace the heat exchanger - see card Gr4-3**
			Air leakage from the pipe of the pressure transducer.	Unplug and plug again the pipe correctly on the pressure transducer, reset the alarm and restart the cycle
			Pressure transducer uncalibrated	**Send the sterilizer to the Service department**
			Check type and mass of the load arranged in the chamber	**Advice the user to load and arrange the material in the chamber as indicated on the Operating Manual**
			Check the quality of the distilled water	**Advice the user about the correct water to use.** **Clean the hydraulic circuit** **Replace the damaged components**
			Check the current arrangement of the equipment	**Change as necessary**
			Check the electric system of the room	**Eliminate any possible power strip** **The equipment must be powered through one's own supply line**
			Check the fan of the heat exchanger	**Clean the fans – see card Gr4-4** **Replace the damaged fan – see card Gr4-4**
			Sterilizer close to the wall	**Keep away 20 cm at least**

A 254

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
ATM2 TIMEOUT	2nd pressure pulse (from -.80 to 0.00 bar) not performed within the preset time	2nd pressure pulse not performed within 3' timeout	The water pump of the steam generator does not work properly	**Replace the water pump - see card Gr3-1** **Replace the power pcb - see card Gr1-1**
			Incorrect operation of the EV6 valve	Clean the valve **Replace the EV6 valve - see card Gr3-1**
			Fault in the pipe connecting the steam generator	**Replace the pipe**
			Sterilization chamber overloaded	Advice the operator to load properly the sterilization chamber.
			Intervention of the steam generator safety thermostat	Restore the safety thermostat and repeat the sterilization cycle. **Replace the safety thermostat - see card Gr4-6**
			Steam generator clogged	**Replace the lower section of the steam generator - see card Gr4-6** Different distilled water must be used
			CPU pcb failure	**Replace the CPU pcb - see card Gr1-1**
			CPU pcb uncalibrated	**Send the sterilizer to the Service department**
			Check the continuity of the steam generator cartridge	**Replace the failed cartridge - see card Gr1-19**
			Power supply voltage lower than 210Vac	**Install a voltage stabilizer in order to maintain the power supply voltage at the nominal value**

A 255

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
PP2 TIMEOUT	2nd pressure pulse (from 0.00 to +1.00 bar) not performed within the preset time	2nd pressure pulse not performed within 3' timeout	Sterilization chamber overloaded	Advice the operator for properly loading of the sterilization chamber
			Intervention of the steam generator safety thermostat	Restore the safety thermostat and repeat the sterilization cycle. **Replace the safety thermostat - see card Gr1-12**
			Steam leakage from the door gasket	Clean carefully door gasket and dish, reset the alarm and restart the cycle **Replace the door gasket - see card Gr6-1**
			Steam leakage from a valve	Identify the valve and clean it **Replace the valve - see cards Gr2**
			Steam leakage from a pipe	**Replace the pipe causing the problem**
			Steam generator clogged	**Replace the lower section of the steam generator - see card Gr4-6** Different distilled water must be used
			Fault in the CPU pcb	**Replace the CPU pcb - see card Gr1-1**
			CPU pcb uncalibrated	**Send the sterilizer to the Service department**
			Check the continuity of the steam generator cartridge	**Replace the failed cartridge - see card Gr1-19**
			Check the maintenance status	**Advice the operator about the proper maintenance**
			Power supply voltage lower than 210Vac	**Install a voltage stabilizer in order to maintain the power supply voltage at the nominal value**

A 256

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

Continue

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
			Air leakage from a valve	Identify the valve and clean it **Replace the valve - see cards Gr2**
			Air leakage from the heat exchanger	**Replace the heat exchanger - see card Gr4-3**
			Air leakage from the pipe of the pressure transducer	Unplug and plug again the pipe correctly on the pressure transducer, reset the alarm and restart the cycle
			Pressure transducer uncalibrated	**Send the sterilizer to the Service department**
			Check the type and the mass of the load arranged in the chamber	**Advice the user on loading and arranging the material in the chamber as indicated on the Operating Manual**
			Check the quality of the distilled water	**Advice the user** **Clean the hydraulic circuit** **Replace the damaged components**
			Check the current arrangement of the equipment	**Change as necessary**
			Check the electric system of the room	**Eliminate any possible power strip** **The equipment must be powered through one's own supply line**
			Check the fan of the heat exchanger	**Clean the fans – see card Gr4-4** **Replace the damaged fan – see card Gr4-4**
			Sterilizer close to the wall	**Keep it away at least 20 cm**

A 257

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

A 258

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

A 259

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

A 260

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
PROCESS TIMEOUT	Depressurization not performed within the preset time	Problem on switching the valves during the steam discharge	EV3 interrupted	Replace the EV3 shaft - see card Gr2-3
			EV3 Shaft blocked	Clean or replace the shaft - see card Gr2-3
			EV3 dirty	
			EV3 not powered	Replace the wiring Replace the fuse - see card Gr1-16 Replace the CPU pcb - see card Gr1-1
			Check the arrangement of the sterilizer (slope)	Change as necessary (adjust the feet for the proper slope)
			Check the water drain filter LP1	Clean/replace the filter (see Section 1 – Maintenance)
			Chamber filter partially or completely dirty	Clean or replace the filter – see card Gr4-9
			Chamber filter wrong mounted	Remount the filter – see card Gr4-9

H 150

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

H 160

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

H 400

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

H 401

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

H 402

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

H 403

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
T UNDER LIMIT	Temperature under the MIN threshold during the process phase	Temperature detected by PT1 probe lower than Tnom value (PT1 temperature lower than 121/134°C)	Intervention of the steam generator safety thermostat	Restore the safety thermostat and repeat the sterilization cycle. **Replace the safety thermostat - see card Gr1-12**
			Problem in the steam generator	Dismount and replace the O-ring in the steam generator **Replace the lower section of the steam generator - see card Gr4-6**
			Steam leakage from the hydraulic circuit	Identify the component and replace it
			Fault in the CPU pcb	**Replace the CPU pcb - see card Gr1-1**
			Steam leakage from the door gasket	Clean properly door gasket and the door dish. **Replace the door gasket - see card Gr6-1**
			Steam leakage from a pipe	**Replace the pipe causing the problem**
			Stored calibration values changed	**Send the sterilizer to the Service department**
			Check the type and the mass of the load arranged in the chamber	**Advice the user to load and arrange the material in the chamber as per the Operator's Manual.**
			Verify the cycle type used by the user	**Suggest the suited cycle according the material to be sterilized**
			In case of smell something is burning	**Replace the electronic pcb – see card Gr1-1**

H 404

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

H 405

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

H 406

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
P UNDER LIMIT	Pressure value under the MIN threshold during the process phase	Pressure lower than 1.03 or 2.02 bar (depending on the cycle type: 121 or 134°C)	Intervention of the steam generator safety thermostat	Restore the safety thermostat and repeat the sterilization cycle **Replace the safety thermostat - see card Gr1-12**
			Problem in the steam generator	Dismount and replace the O-ring in the steam generator **Replace the lower section of the steam generator - see card Gr4-6**
			Steam generator clogged	**Replace the lower section of the steam generator - see card Gr4-6** Different distilled water must be used
			Fault in the CPU pcb	**Replace the CPU pcb- see card Gr1-1**
			Steam leakage from the door gasket	Clean door gasket and the door dish **Replace the door gasket - see card Gr6-1**
			Steam leakage from the hydraulic circuit	**Replace the component causing the problem**
			Stored calibration values changed	**Send the sterilizer to the Service department**
			Special trays in the chamber	Advice the user to use one special tray per cycle and arrange it on the middle area.
			The steam generator cartridges don't heat	**Replace the broken cartridge – see card Gr1-19** **Replace the CPU pcb – see card Gr1-1** **Replace the power supply pcb – see card Gr1-1**
			Steam leakage from the pipes	**Replace the pipe**
			Check the wiring connecting the external used water tank	**Restore the wiring**
			Power supply voltage lower than 210Vac	**Install a voltage stabilizer in order to maintain the power supply voltage at the nominal value**

H 410

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

H 990

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

H 991

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
OVERHEATING PT1	PT1 overheating	PT1 detects a temperature value over 138°C	Failure (optocoupler) in the CPU pcb	Replace the CPU pcb - see card Gr1-1
			Fault in the pressure transducer	Replace the pressure transducer - see card Gr1-4
			Stored calibration values changed	Send the sterilizer to the Service department
			Fault in the PT1	Replace PT1 - see card Gr1-8
			Check the wiring connecting the external used water tank	Restore the wiring
			Water feeding pump locked	Enter the setup mode and unlock the pump Replace the pump- see card Gr3-2
			Power supply voltage lower than 210Vac	Install a voltage stabilizer in order to maintain the power supply voltage at the nominal value
			Check type and mass of the load arranged in the chamber	Advice the user to load and arrange the material in the chamber as per Operating Manual

H 992

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

H 993

LCD INDICATION	Alarm description	Effect/Signaling	Possible cause / Check	Proposed solution
OVERHEATING PT3	PT3 overheating	PT3 detects a temperature value over 160°C	Failure (optocoupler) in the CPU pcb	Replace the CPU pcb - see card Gr1-1
			Fault in the pressure transducer	Replace the pressure transducer - see card Gr1-4
			Stored calibration values changed	Send the sterilizer to the Service department
			In case of smell something is burning	Replace the electronic pcb – see card Gr1-1

REPAIR PROCEDURES

The repair procedures consist of cards grouped as follows:

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

SciCan

GROUP 1

ELECTRONIC DEVICES AND ASSEMBLIES

ELECTRONIC BOARD GROUP (GAM VERSION)
A0BP5730000 (Printer PS board not included)

BASIC BOARD (GAM VERSION)
C5BP5630000

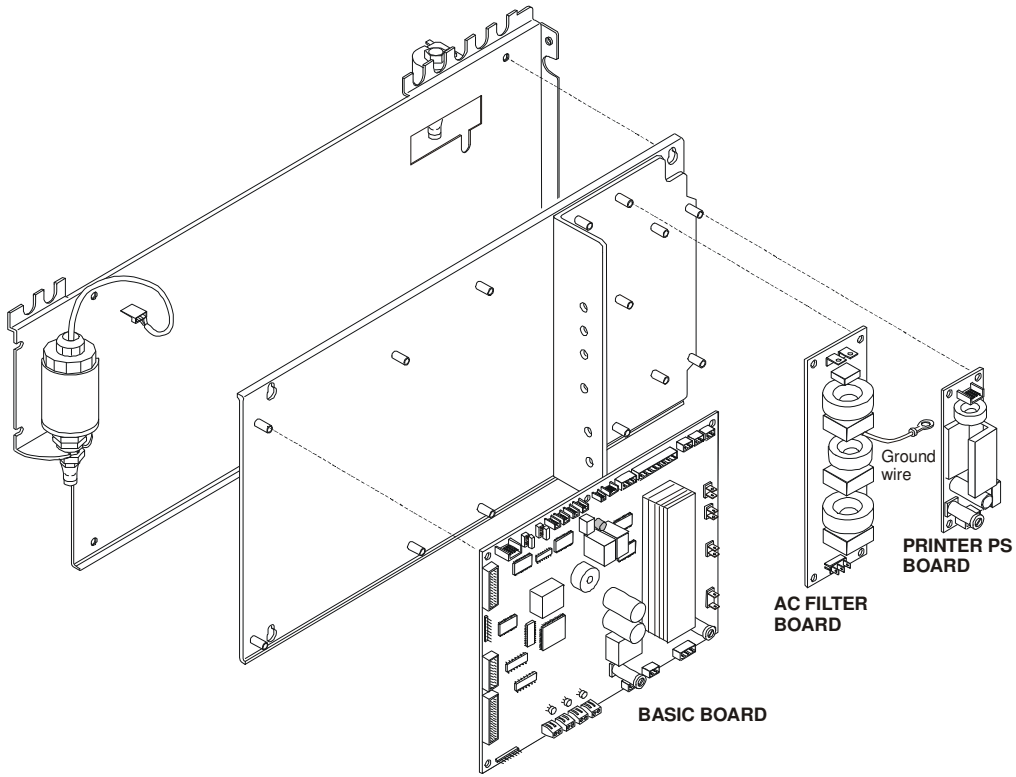
AC FILTER BOARD
C5BP4350000 - 120VAC, 60Hz
C5BP9820000 - 220/230VAC, 60H
C5BP1420000 - 220/240VAC, 50Hz

PRINTER POWER SUPPLY BOARD
C5BP1430000

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

1. Remove the frame cover (see card ***Gr7-1***).
2. Unplug connectors and wirings from the pcb.
3. Remove the screws and remove the pcb.
4. Mount the new pcb, restore connections proceeding in reverse order.
5. Check the calibration, see Attachment M
6. Run a sterilization cycle.

Note: When replacing printer pcb board, perform a check of the print report by selecting the items Print options/Report/Print last/Normal print of the Setup menu (see **Setting printing mode**).



ELECTRONIC BOARD GROUP (TROLL VERSION)

(Printer PS board not included)
A5BM4760000 – step 1
A0BM5400200 – step 2

BASIC BOARD (TROLL VERSION)

C5BM1400100 - step 1
C5BM1400200 – step 2

AC FILTER BOARD

C5BM1420000

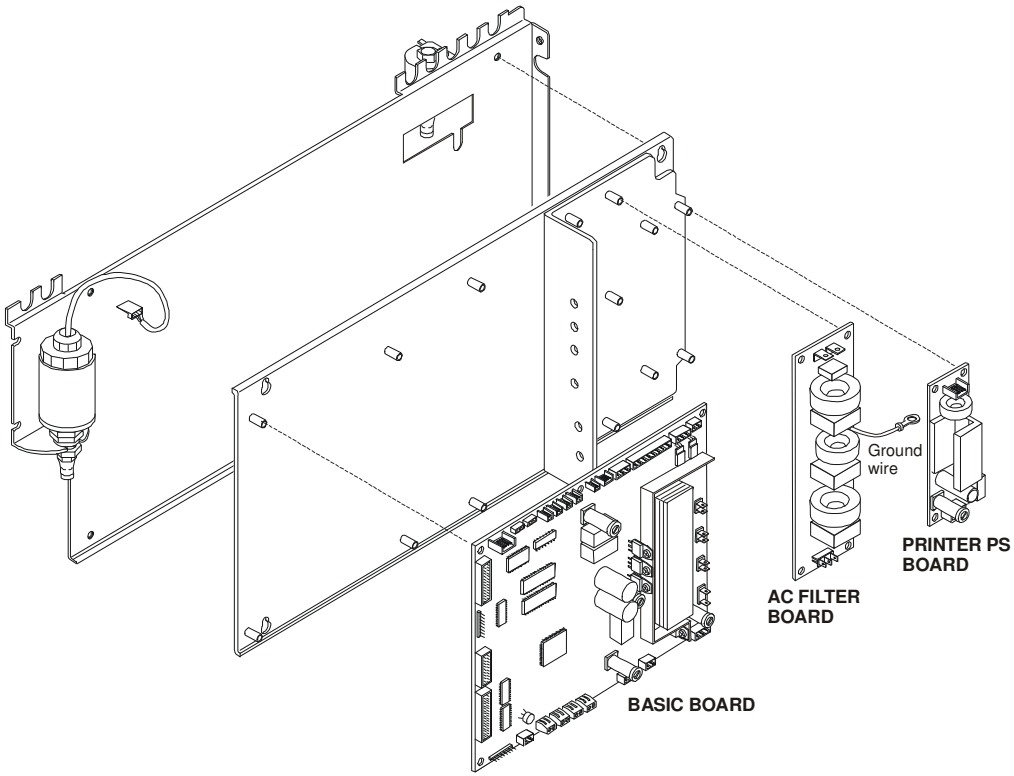
PRINTER POWER SUPPLY BOARD

C5BM1430000

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

1. Remove the covers (see card ***Gr7-1***).
2. Unplug connectors and wirings from the pcb.
3. Remove the screws and remove the pcb.
4. Mount the new pcb, restore connections proceeding in reverse order.
5. Check the calibration, see Attachment M.
6. Run a sterilization cycle.

Note: When replacing printer pcb, perform a check of the print report by selecting the items Print options/Report/Print last/Normal print of the Setup menu (see **Setting printing mode)**.

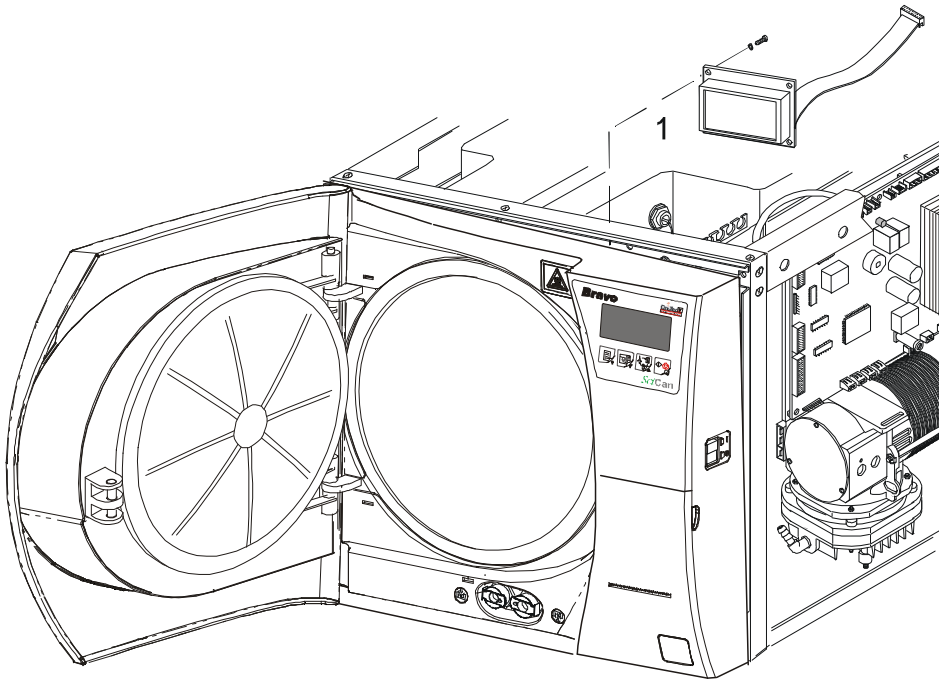


LCD DISPLAY

C5BP1230000

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

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



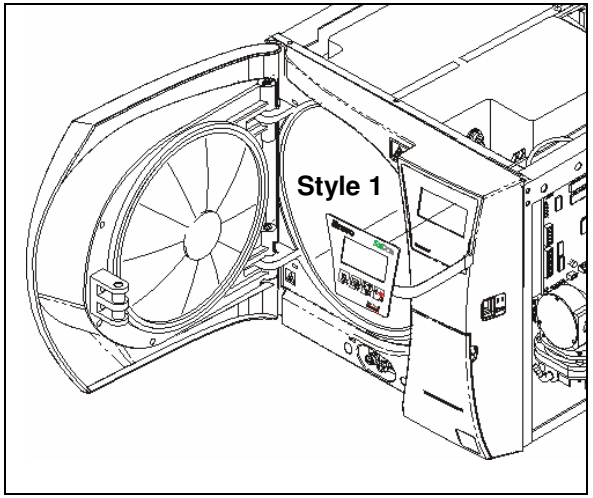
ADHESIVE MEMBRANE KEYPAD

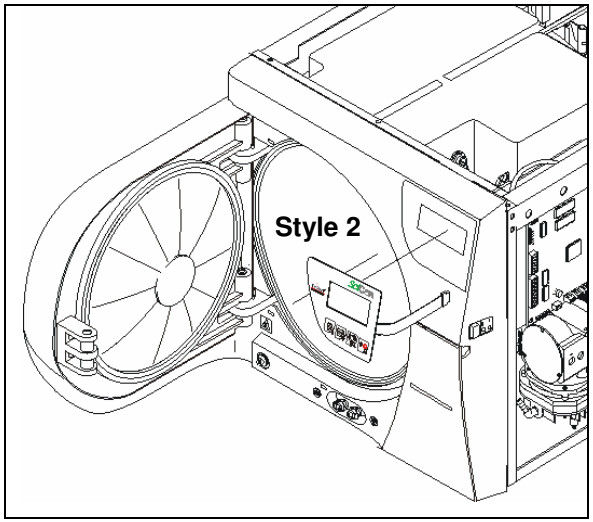
C6JP0190000 - Style 1

C6JP0010000 - Style 2

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

1. Remove the frame cover (see card ***Gr7-1***).
2. Remove the keypad's flat cable from the pcb.
3. Detach carefully the keypad (1).
4. Remove the protective film from the new keypad.
5. Attach the new keypad.
6. Restore connections and reassemble proceeding in reverse order.
7. Run a sterilization cycle.



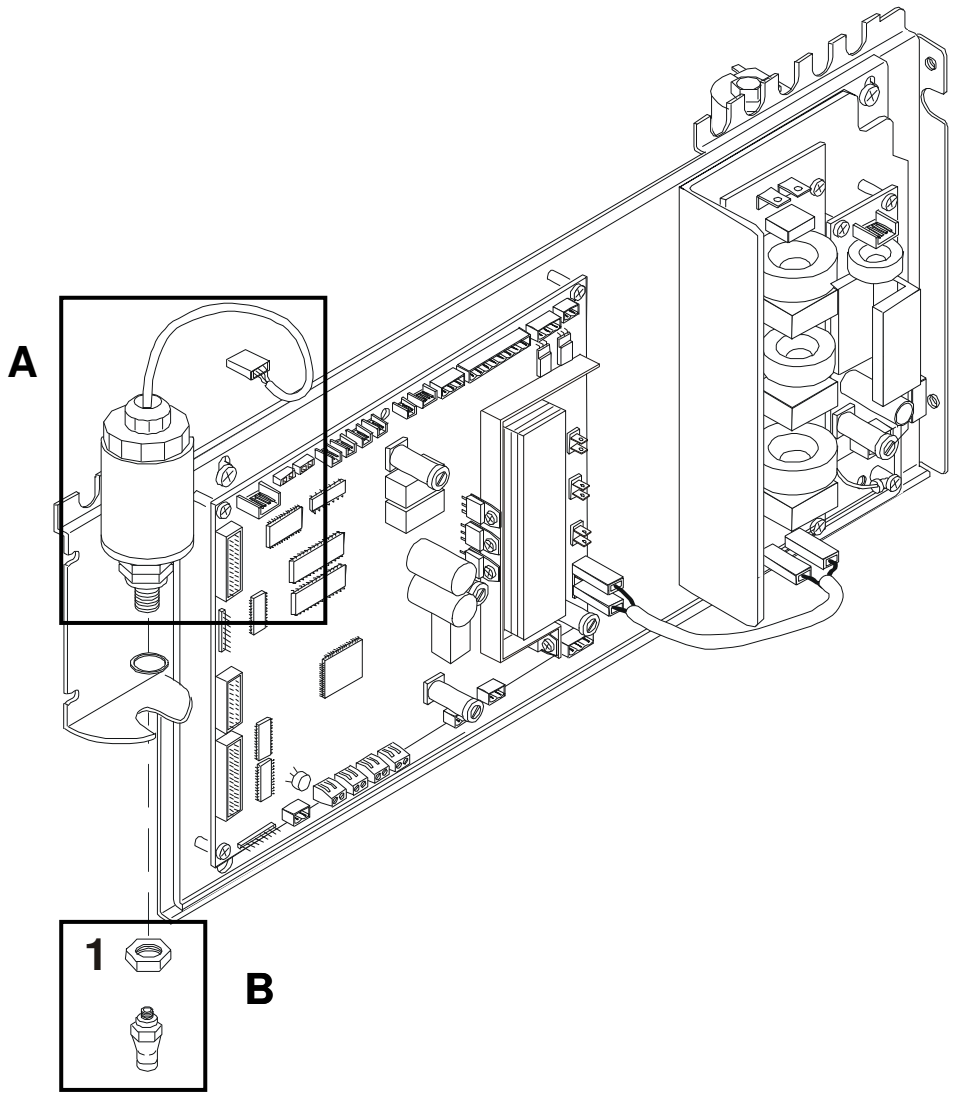


PRESSURE TRANSDUCER

A8BPR320000 (Pressure transducer replacement kit – see A+B)
43100090000 (Transducer – see A)

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

1. Remove the frame cover (see card ***Gr7-1***).
2. Remove the pressure transducer wiring from the pcb.
3. Withdraw the tubing from the pressure transducer.
4. Remove the nut (1) fixing the pressure transducer to the bracket.
5. Remove the pressure transducer.
6. Mount the new pressure transducer, restore connections and reassemble proceeding in reverse order.
7. Calibrate the pressure transducer –***see Attachment N.***
8. Run a sterilization cycle.

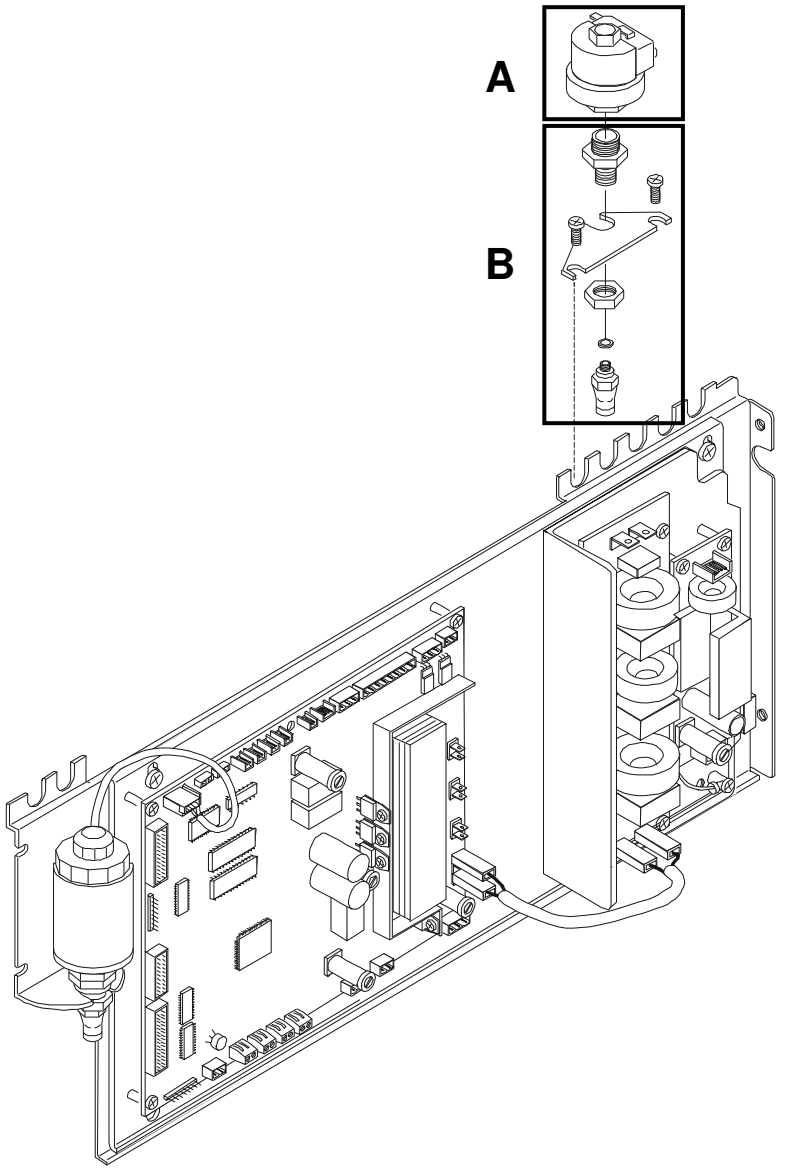


PRESSURE SWITCH

A0BP6260000 (Pressure switch group – see A+B)
43100060000 (Pressure switch – see A)

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

1. Remove the frame cover (see card ***Gr7-1***).
2. Remove the wiring from the pressure switch.
3. Remove the two screws fixing the pressure switch to the plate.
4. Mount the new pressure switch, restore connections and reassemble proceeding in reverse order.
5. Run a sterilization cycle.



AC TRANSFORMER GROUP

(see A)

A9BP5860000 - 120VAC 60Hz (GAM board)
A9BP5970000 - 220/230VAC 60Hz (GAM board)
A0BM5630000 - 120VAC 60Hz (TROLL board)
A9BM5430000 - 220VAC 60Hz (TROLL board)
A9BM5380000 - 220/240VAC 50Hz (TROLL board)

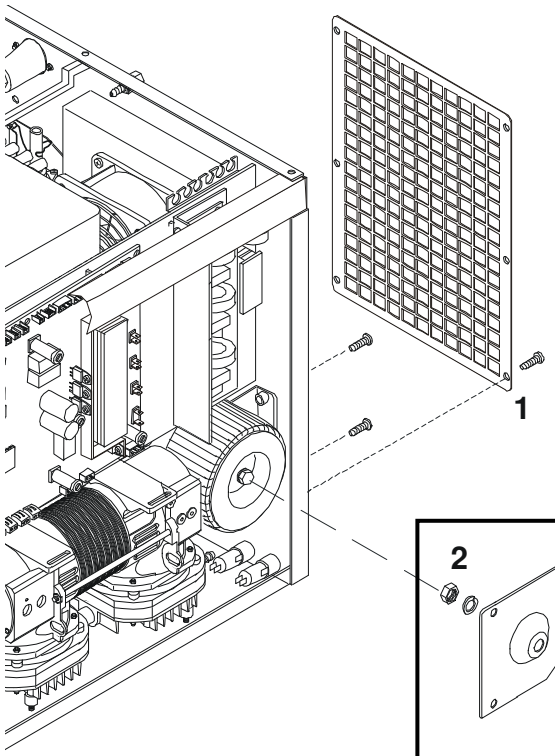
AC TRANSFORMER

(see B)

41200140000 - 120VAC 60Hz (GAM board)
41200150000 - 220/230VAC 60Hz (GAM board)
41200170000 - 120VAC 60Hz (TROLL board)
41200110000 - 220/230VAC 60Hz (TROLL board)
41200100000 - 220/240VAC 50Hz (TROLL board)

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

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

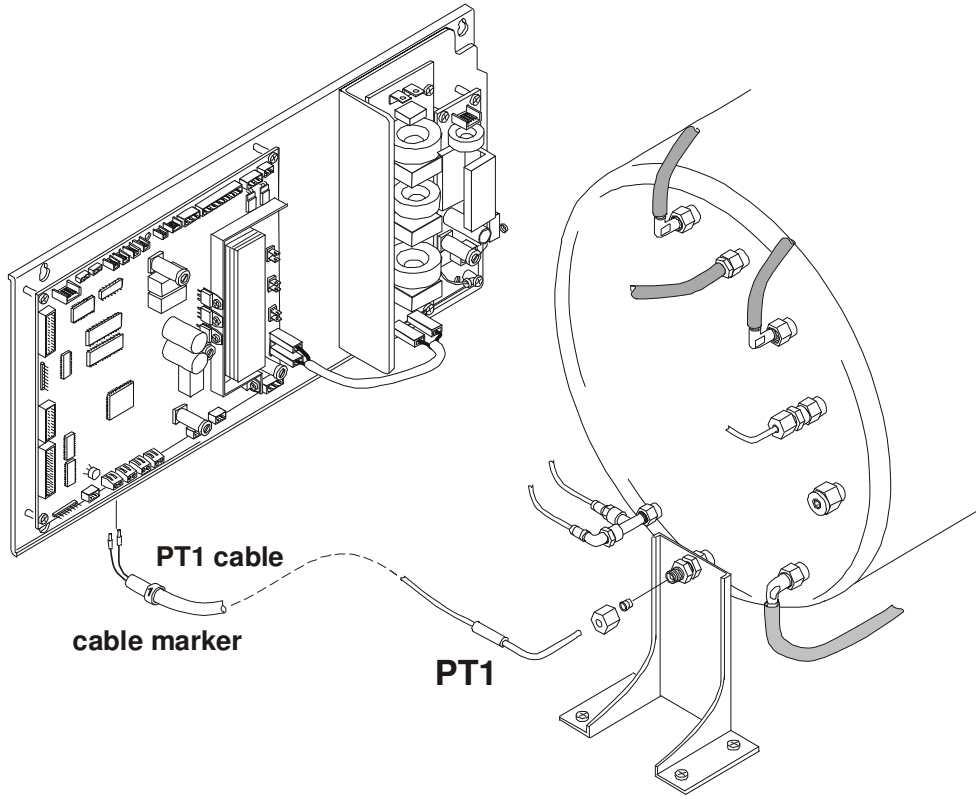


PT1 THERMAL PROBE

43000190000

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

1. Remove the frame cover (see card ***Gr7-1***).
2. Remove the PT1 wiring from the pcb board.
3. Remove the cable marker number 1 (to be reused with the new probe).
4. Withdraw the wiring up to the thermal probe,
5. Access to the rear side of the chamber.
6. Remove the nut and PT1 from its seat.
7. Measure the Ohm value of the new PT1 and write the value on the next row of the label attached on the right rail.
8. Mount the new PT1 device, restore connections and reassemble proceeding in reverse order.
9. Switch on the unit and enter the SETUP mode.
10. Move to SERVICE menu, enter the code “++--++--“and select the option “PT1 CORRECTION”.
11. Enter the new value (Ohm).
12. Exit the SETUP mode.
13. Run a sterilization cycle.

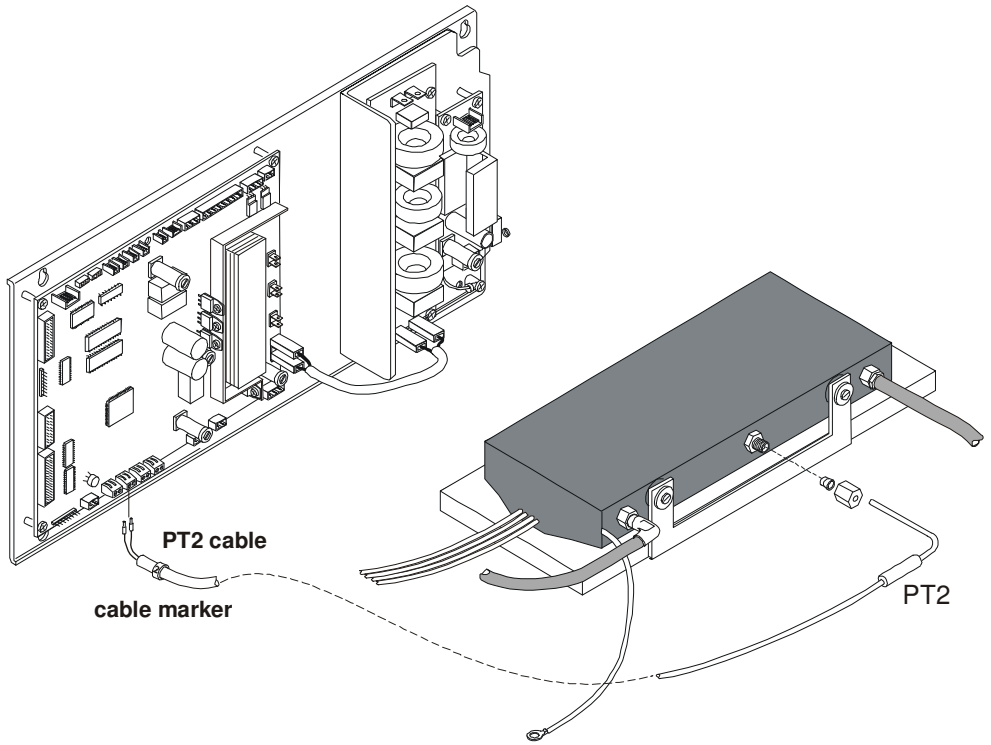


PT2 THERMAL PROBE

43000180000

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

1. Remove the frame cover (see card ***Gr7-1***).
2. Remove the PT2 wiring from the pcb board.
3. Remove the cable marker number 2 (to be reused with the new probe).
4. Access to the left side of the machine and withdraw the wiring up to the thermal probe.
5. Remove the nut and PT2 from its seat.
6. Measure the Ohm value of the new PT2 and write the value on the next row of the label attached on the right rail.
7. Mount the new PT2 device, restore connections and reassemble proceeding in reverse order.
8. Run a sterilization cycle.

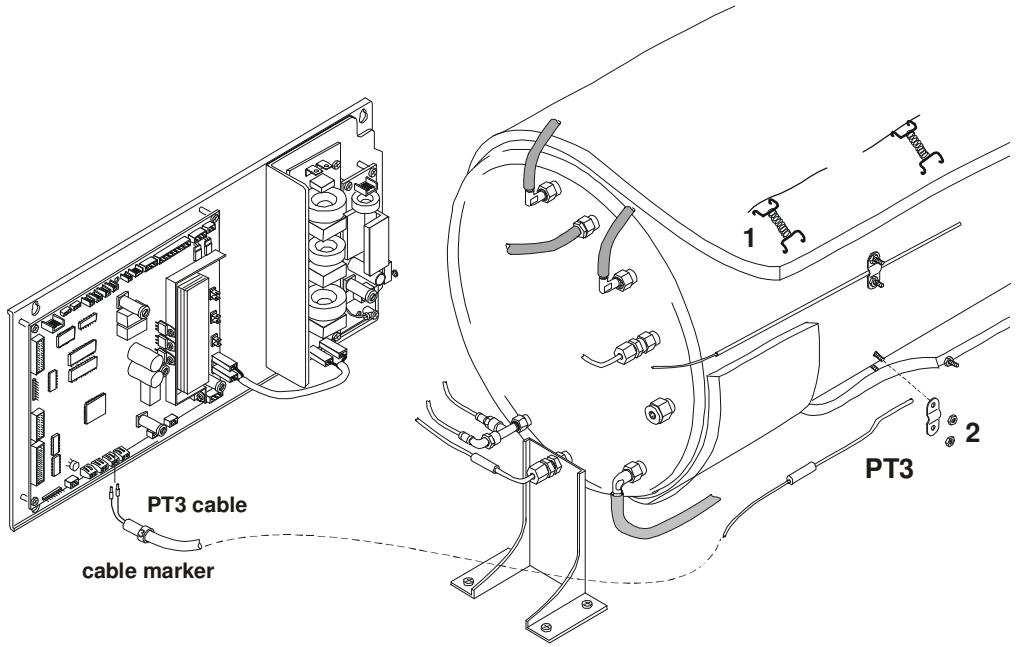


PT3 THERMAL PROBE

43000180000

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

1. Remove the frame cover (see card ***Gr7-1***)
2. Remove the PT3 wiring from the pcb board.
3. Remove the cable marker number 3 (to be reused with the new probe).
4. Access to the left side of the machine and withdraw the wiring up to the thermal probe.
5. Unlock the spring (1) of the chamber's insulation layer to access the PT3 fixing.
6. Loosen the nuts (2) and withdraw the probe.
7. Shape the new probe as shown in figure (at right) and mount it. Restore connections and reassemble proceeding in reverse order.
8. Switch on the unit.
9. Run a sterilization cycle.

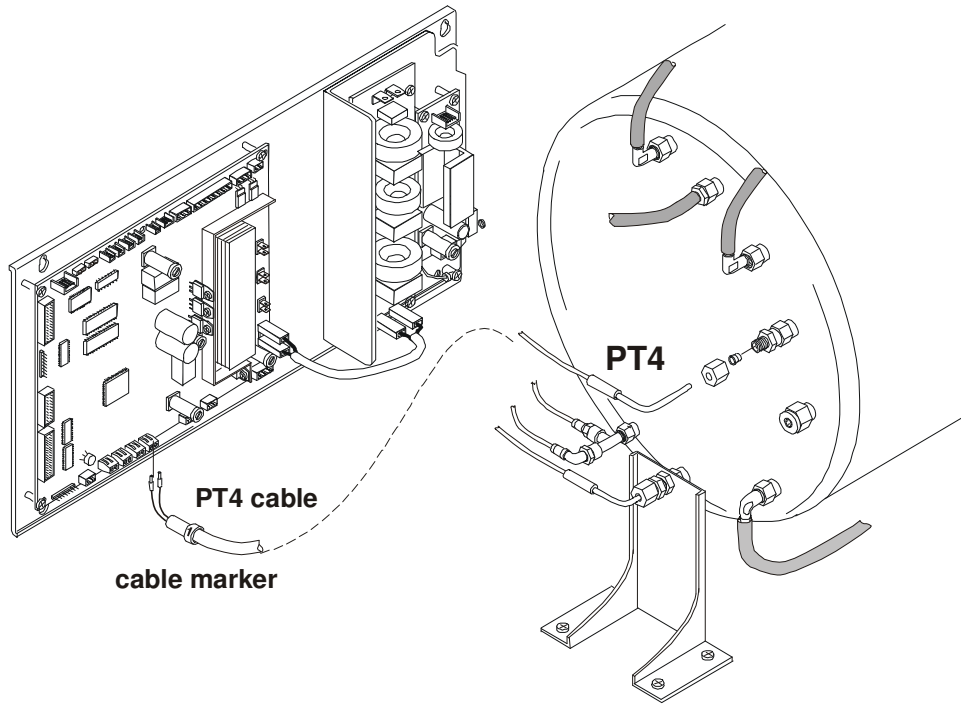


PT4 THERMAL PROBE

43000180000

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

1. Remove the frame cover (see card ***Gr7-1***).
2. Remove the PT4 wiring from the pcb board.
3. Remove the cable marker number 4 (to be reused with the new probe).
4. Access to the rear side of the chamber.
5. Remove the nut and the PT4 and withdraw the probe from the chamber.
6. Shape the new probe as shown in figure (at right) and mount it, restore connections and reassemble proceeding in reverse order.
7. Switch on the unit.
8. Run a sterilization cycle.

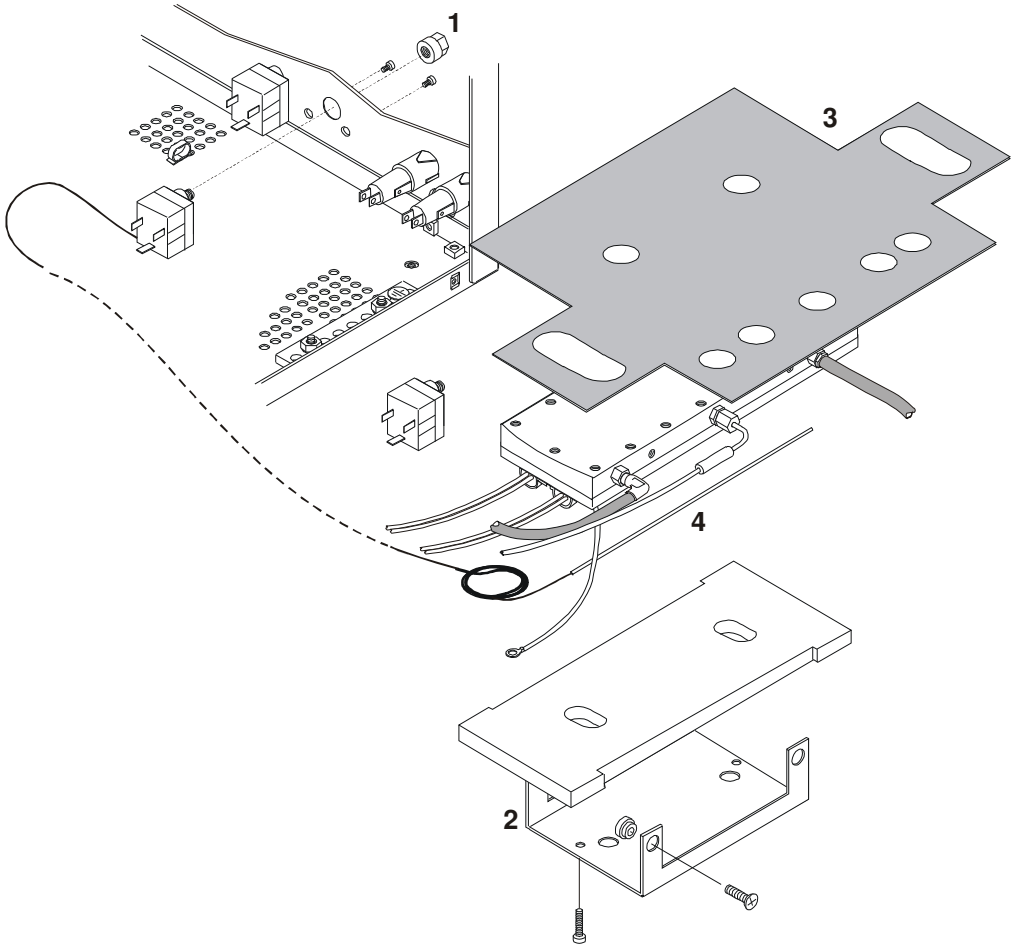


STEAM GENERATOR THERMOSTAT

43000150000

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

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

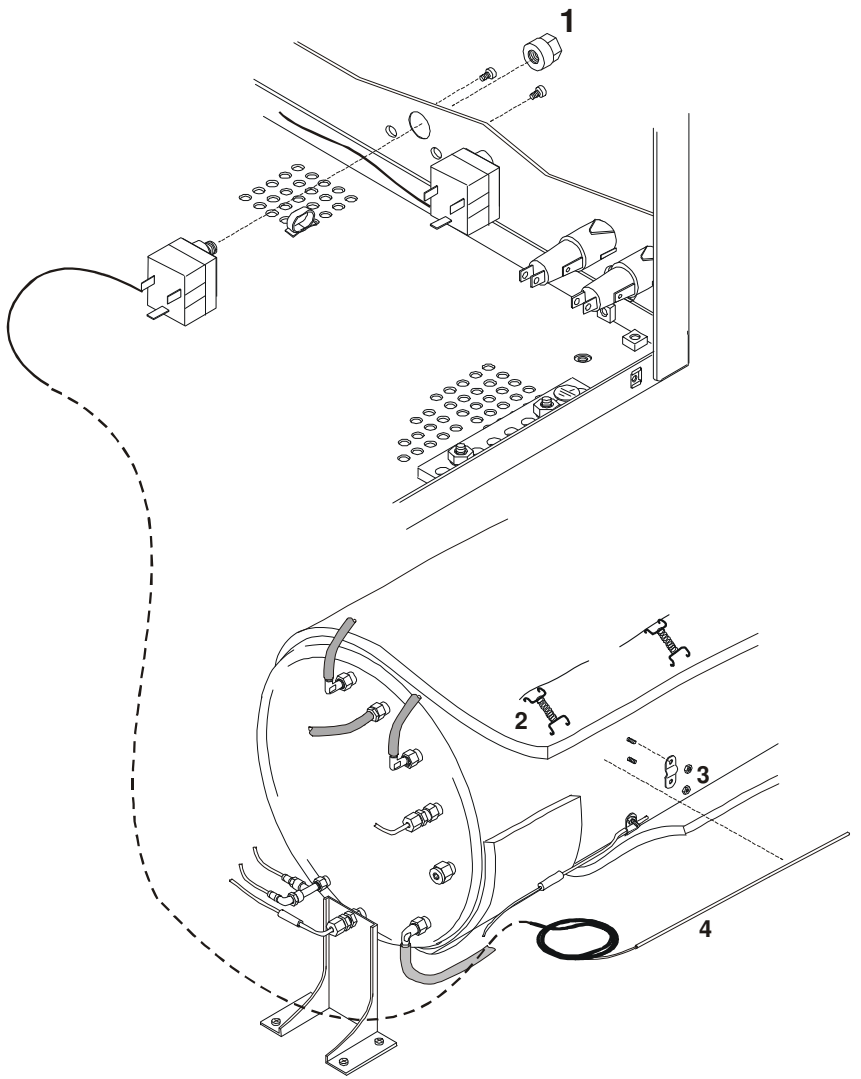


CHAMBER HEATER THERMOSTAT

43000140000

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

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

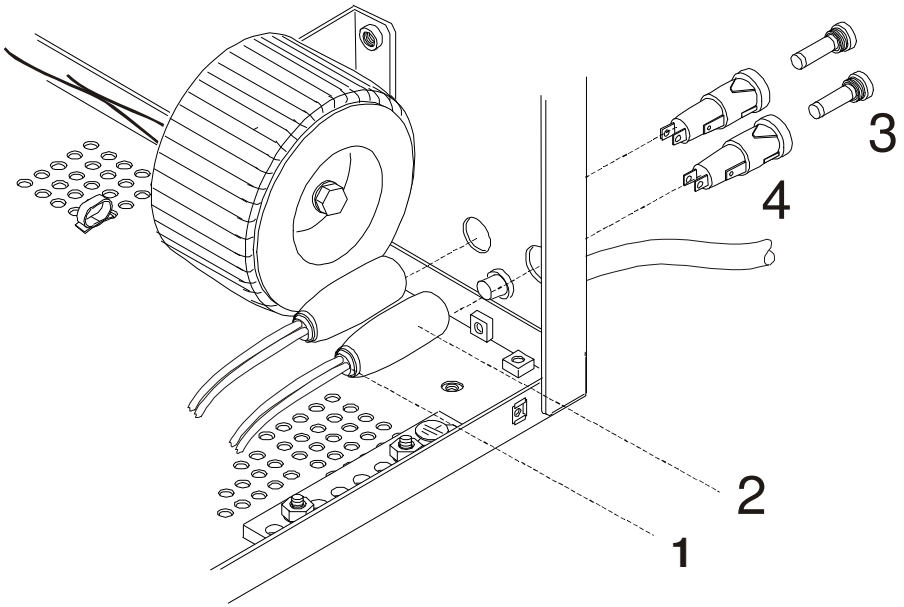


AC FUSE HOLDER

41700260000

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

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

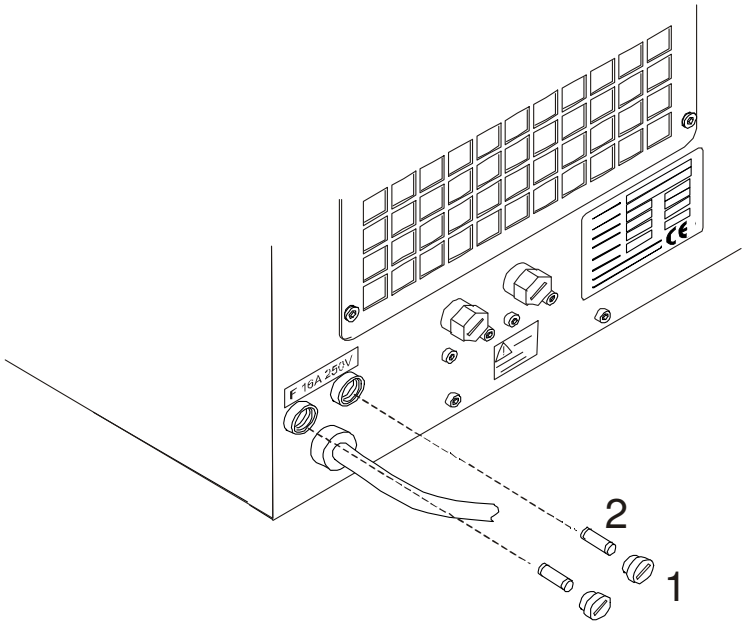


AC FUSE

41700240000

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

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



PCB FUSES

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

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

Basic board: GAM version

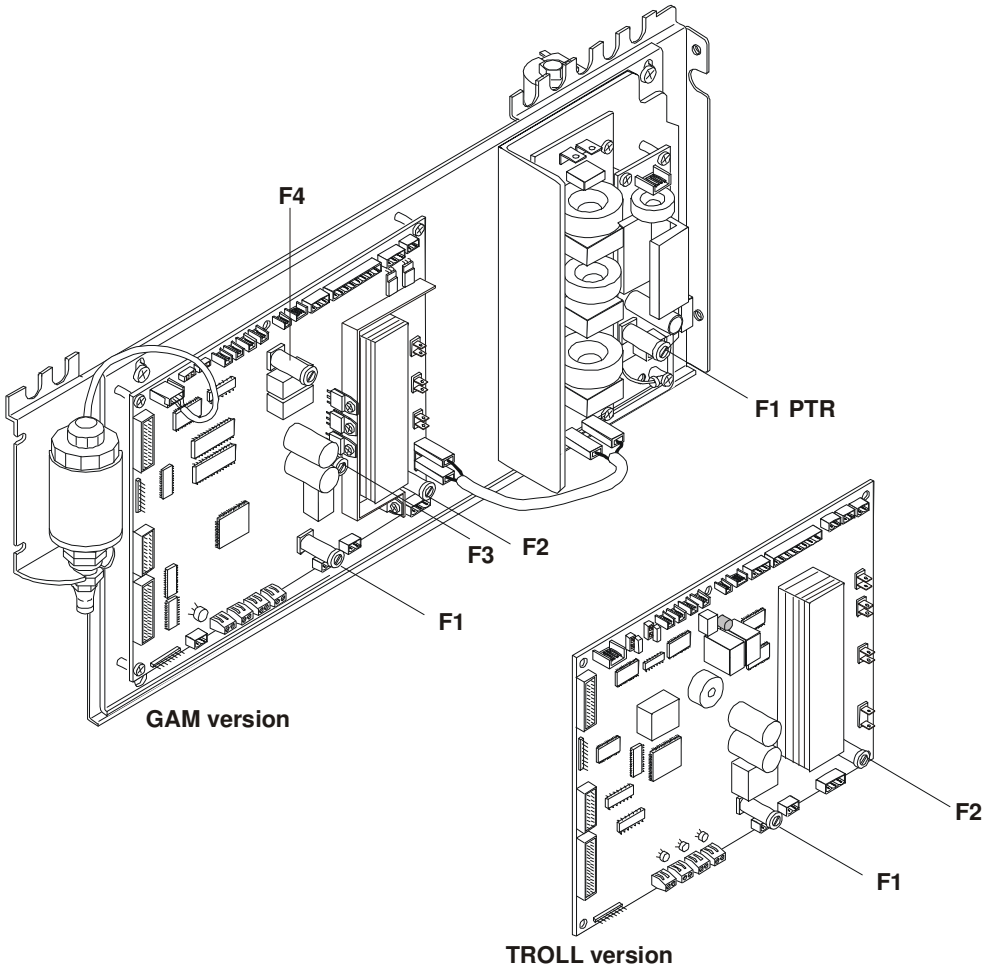
F1: **T 5A 250VAC** *(secondary trafo winding)*
F2: **T 4A 250V** (mains 120VAC) *(primary trafo winding)*
F2: **T 2A 250V** (mains 220/230VAC)
F3: **T 200mA 250VAC** *(door-lock accidental activation)*
F4: **F 1.25A 250VAC** *(door-lock overload)*

Basic board: TROLL version (mains 120/220VAC and 230VAC)

F1: **T 6,3A 250VAC** *(secondary trafo winding)*
F2: **T 3,15A 250VAC** *(primary trafo winding)*

Printer PS board

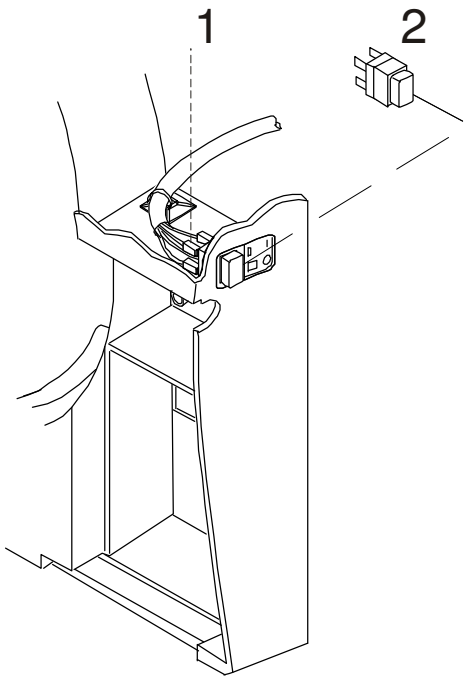
F1 PTR: **T 5A 250VAC** *(printer protection)*



AC SWITCH
42000070000

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

1. Remove the frame cover (see card ***Gr7-1***)
2. Remove the wiring (1) from the switch.
3. Remove the main switch (2).
4. Mount the new switch, restore connections and reassemble proceeding in reverse order.
5. Run a sterilization cycle.

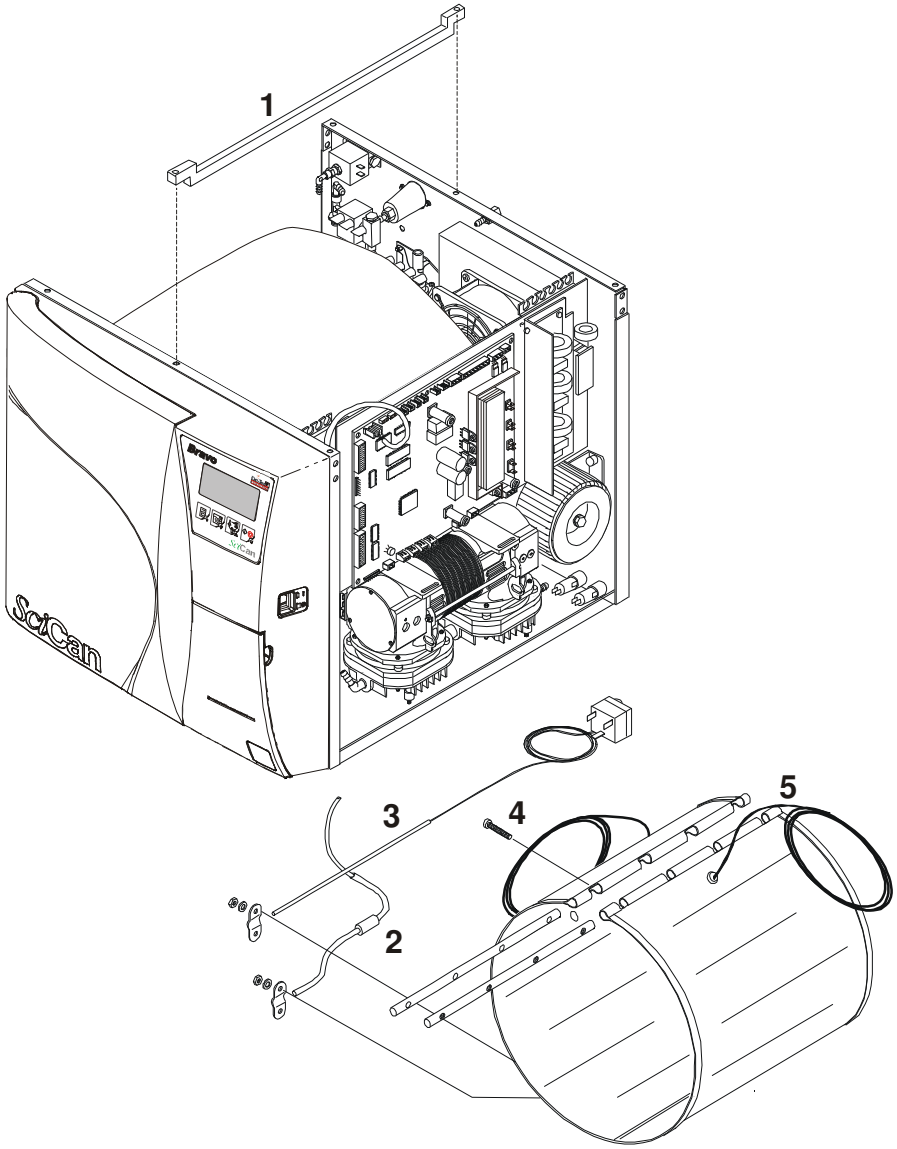


CHAMBER HEATER

Bravo[17] & Bravo[17V]	**41000180000 -** 1500W 120VAC **41000140000 -** 1700W 230VAC (style 2) **41000280000 -** 1700W 220VAC (style 1)
Bravo[21V]	41000190000 - 1500W 120VAC 41000290000 -2000W 230VAC (style 2) 41000150000 -2000W 230VAC (style 1)

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

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

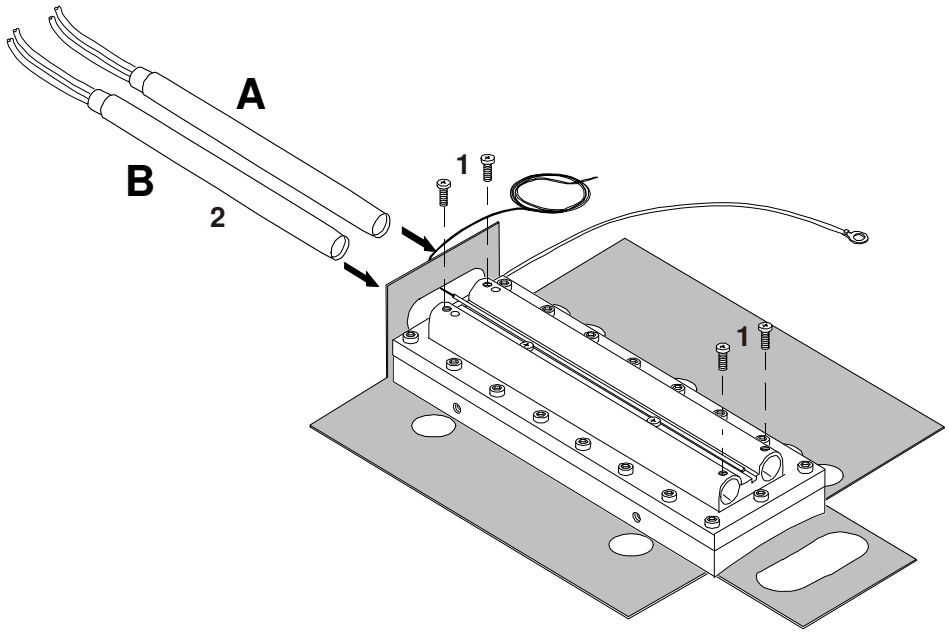


HEATER CARTRIDGE

A8JPR010000 (Heater cartridge replacement kit 120VAC 850W – see A))
A8BPR330000 (Heater cartridge replacement kit 230VAC 1000W – see B)
41000170000 (Heater cartridge 120VAC 850W)
41000260000 (Heater cartridge 230VAC 1000W)

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

1. Remove the frame cover (see card ***Gr7-1***).
2. Remove the water pump from the base frame (see card ***Gr3-1***).
3. Remove the cartridge wiring from the PCB board.
4. Remove the steam generator (see card ***Gr4-6***).
5. Remove the support and the thermal insulation from the steam generator.
6. Loosen the screws (1) locking the cartridges (2) and remove.
7. Apply the dissipation paste on the new cartridges and mount.
8. Restore connections and reassemble proceeding in reverse order.
9. Run a sterilization cycle.



THERMAL PRINTER “FENIX”

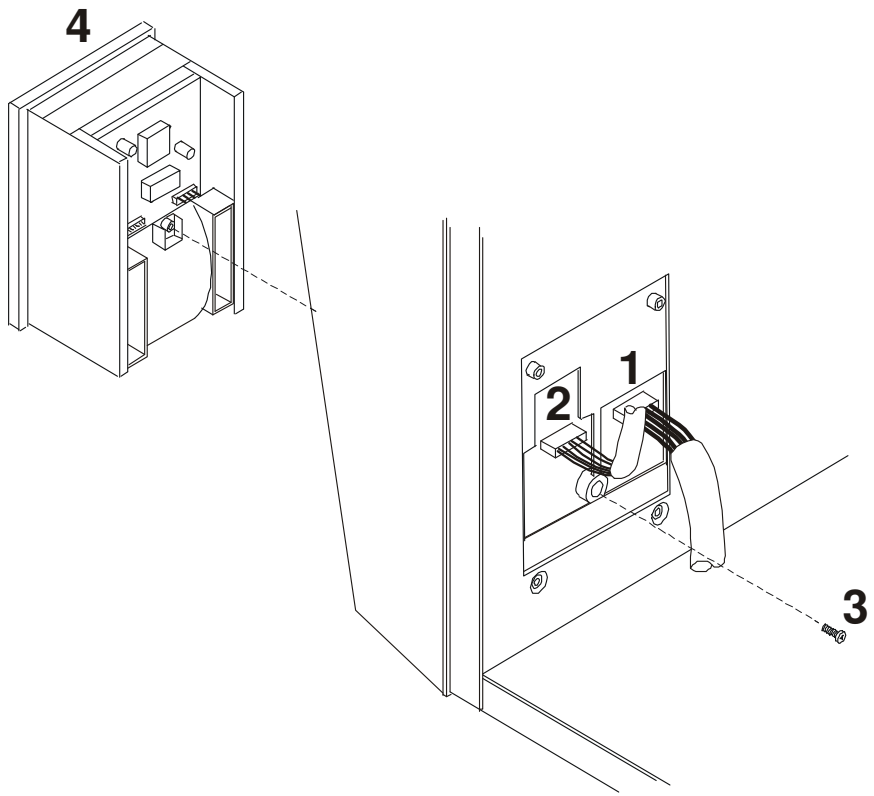
C5BP2550000

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

1. Remove the frame cover (see card ***Gr7-1***).
2. Remove power supply (1) and interface (2) wiring from the printer unit.
3. Unscrew the rear screw (3) and remove the printer (4).
4. Mount the new printer unit, restore connections and reassemble proceeding in reverse order.
5. Perform a printout of the last cycle.
6. Run a sterilization cycle.

IMPORTANT NOTE:

In the case of printer replacement, refer to “Attachment D” to mount the printer kit.

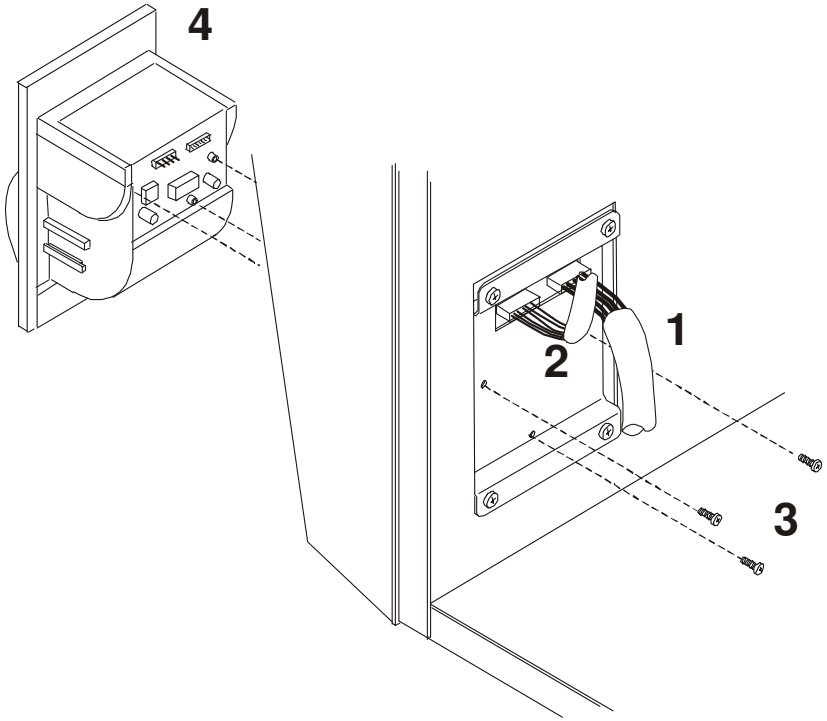


THERMAL PRINTER “CUSTOM”

C5BP5500000

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

1. Remove the frame cover (see card ***Gr7-1***).
2. Remove power supply (1) and interface (2) wiring from the printer unit.
3. Unscrew three screws (3) and remove the printer (4).
4. Mount the new printer unit, restore connections and reassemble proceeding in reverse order.
5. Perform a printout of the last cycle.
6. Run a sterilization cycle.



IMPORTANT NOTE:

In the case of printer replacement, refer to “Attachment D” and mount the relating printer kit.

SciCan

GROUP 2

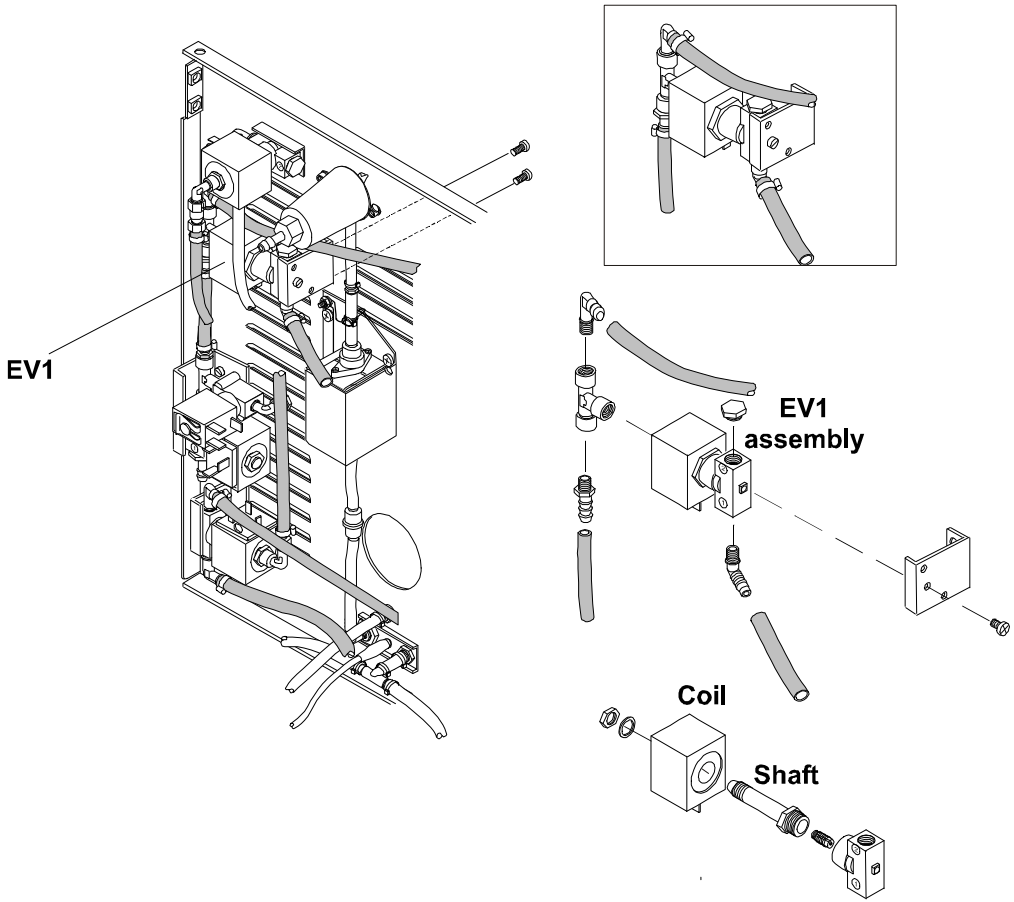
ELECTROVALVES

EV1 GROUP
A0BP2820000

EV PARKER 3-WAY 24V
40100240000

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

1. Remove the frame cover (see card *Gr7-1*);
2. Remove the wiring from the solenoid spool and the sheathed pipe;
3. Remove the mounting screws on the rear panel, shift the group to access the second sheathed pipe and remove it;
4. Remove EV1 group, disassemble as necessary (see figure) and replace the part;
5. Reassemble, and restore the connections proceeding in reverse order;
6. Run a sterilization cycle.

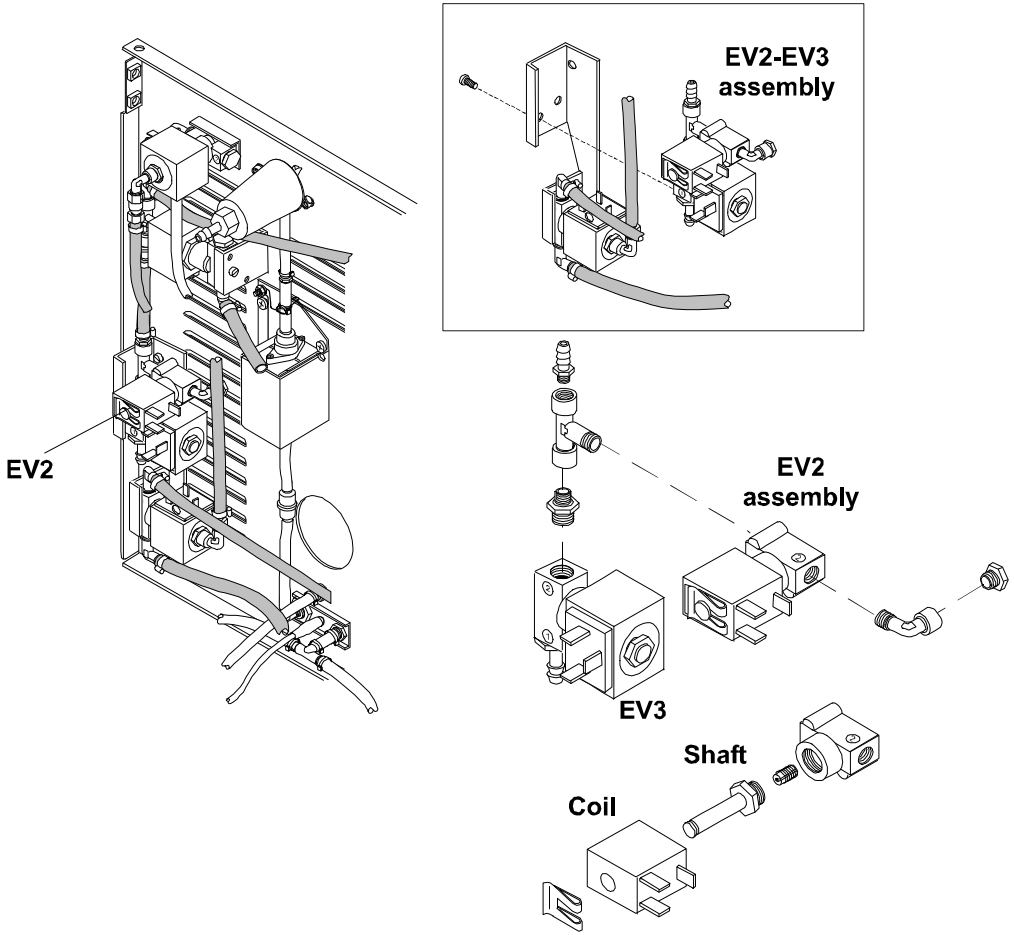


EV2 – EV3 GROUP
A0BP2830000

EV PARKER 2-WAY 24V (EV2)
40100030000

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

1. Remove the frame cover (see card *Gr7-1*);
2. Remove the wiring from the solenoid spool and the sheathed pipe;
3. Remove the EV2/EV3 group from the support;
4. Disassemble the EV2 group as necessary (see figure) and replace the part;
5. Reassemble and restore the connections proceeding in reverse order;
6. Run a sterilization cycle.

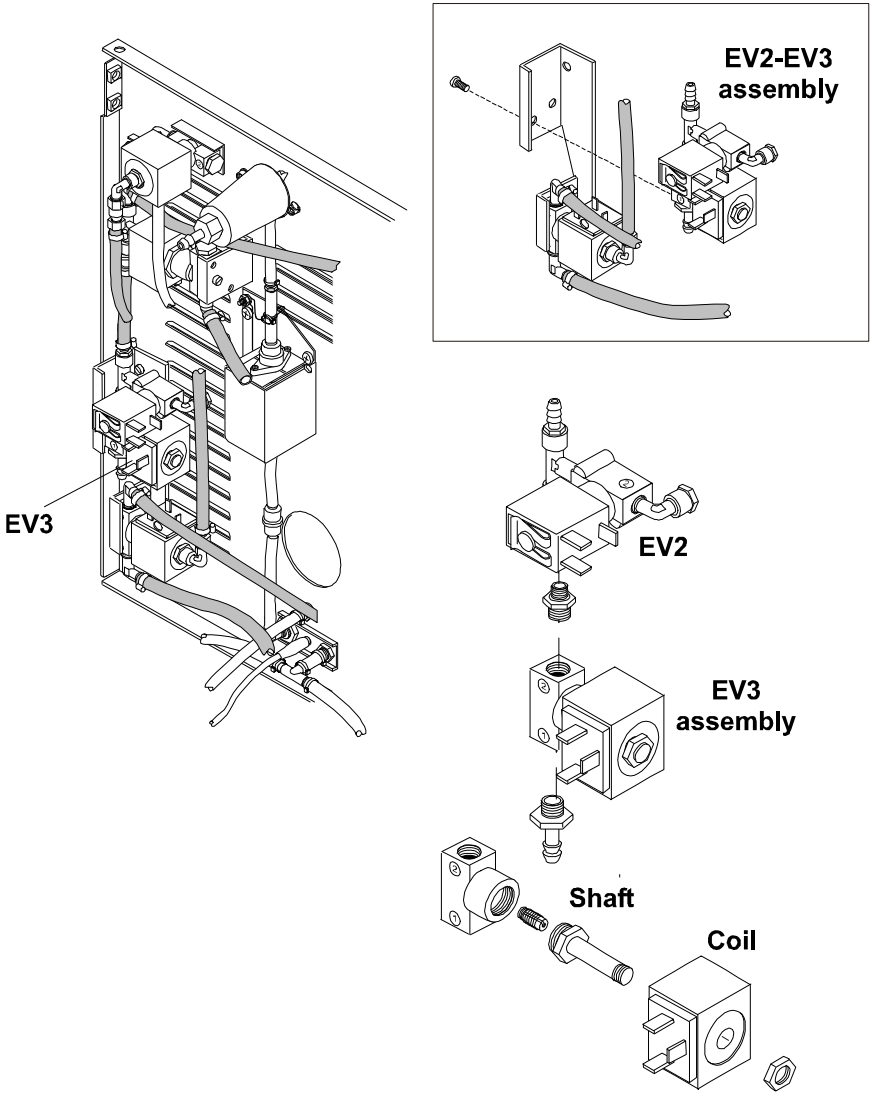


EV2 – EV3 GROUP
A0BP2830000

EV PARKER 2-WAY 24V (EV3)
40100230000

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

1. Remove the frame cover (see card *Gr7-1*);
2. Remove the wiring from the solenoid spool and the sheathed pipe;
3. Remove the EV2/EV3 group from the support;
4. Disassemble the EV3 group as necessary (see figure) and replace the involved part;
5. Reassemble and restore the connections proceeding in reverse order;
6. Run a sterilization cycle.

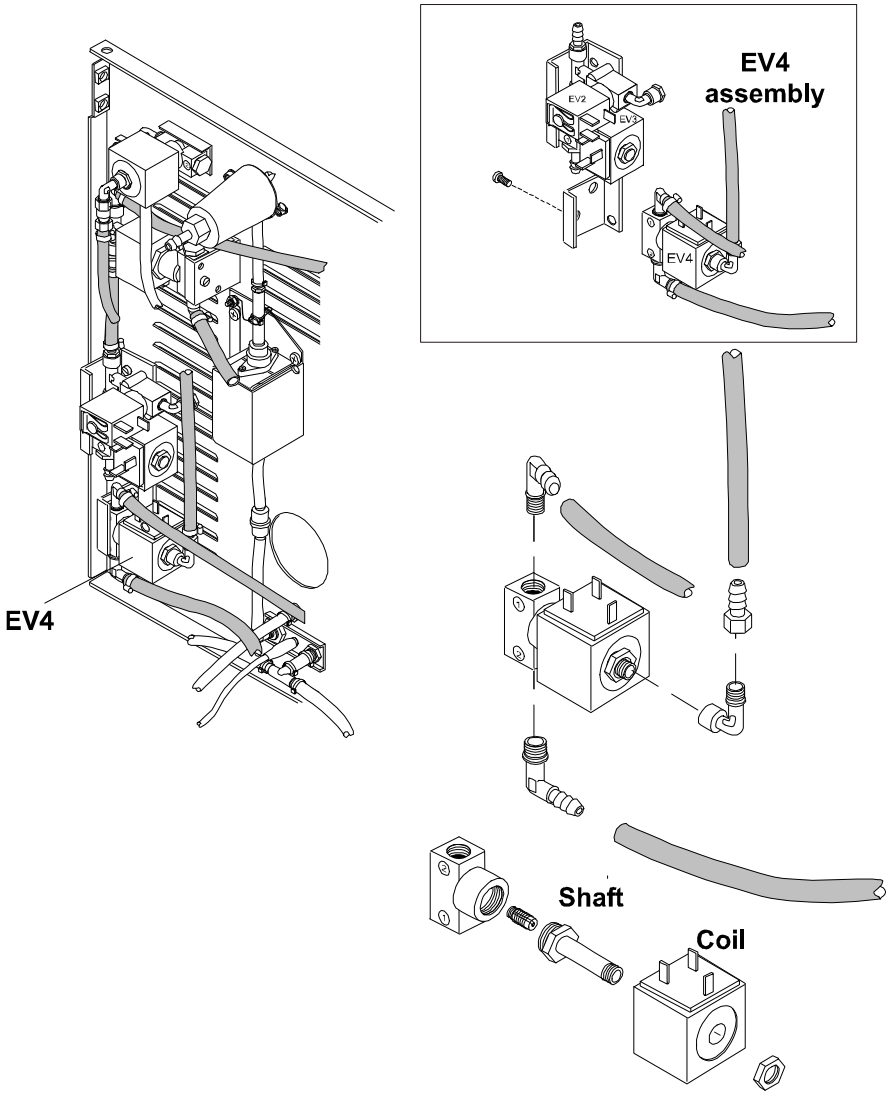


EV4 GROUP
A0BP2840000

EV PARKER 3-WAY 24V
40100260000

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

1. Remove the frame cover (see card *Gr7-1*);
2. Remove the wiring and the sheathed pipes from the valve;
3. Remove the EV4 group from the support;
4. Disassemble the EV4 group as necessary (see figure) and replace the involved part;
5. Reassemble and restore the connections proceeding in reverse order;
6. Run a sterilization cycle.

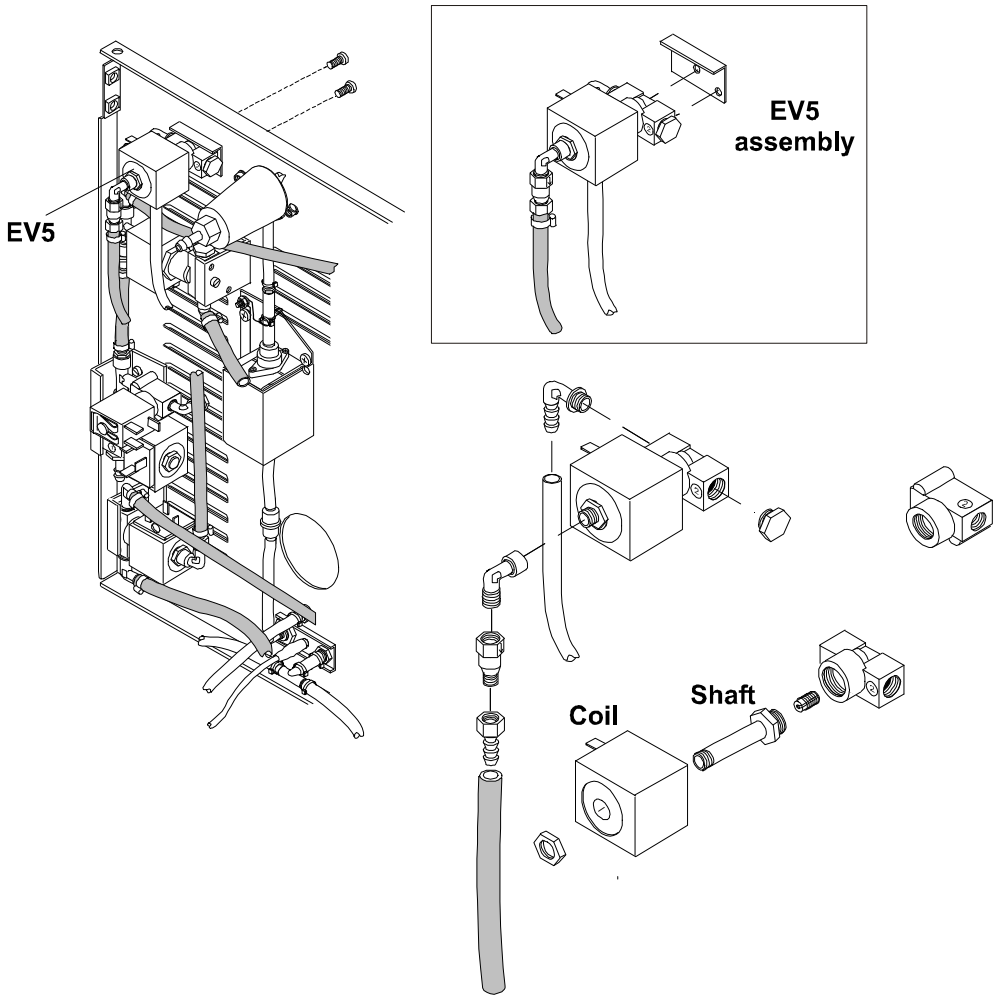


EV5 GROUP
A0BP2850000

EV PARKER 3-WAY 24V
40100240000

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

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



SciCan

GROUP 3

PUMPS

STEAM GENERATOR WATER PUMP GROUP
A0BP2860000 – (see A)

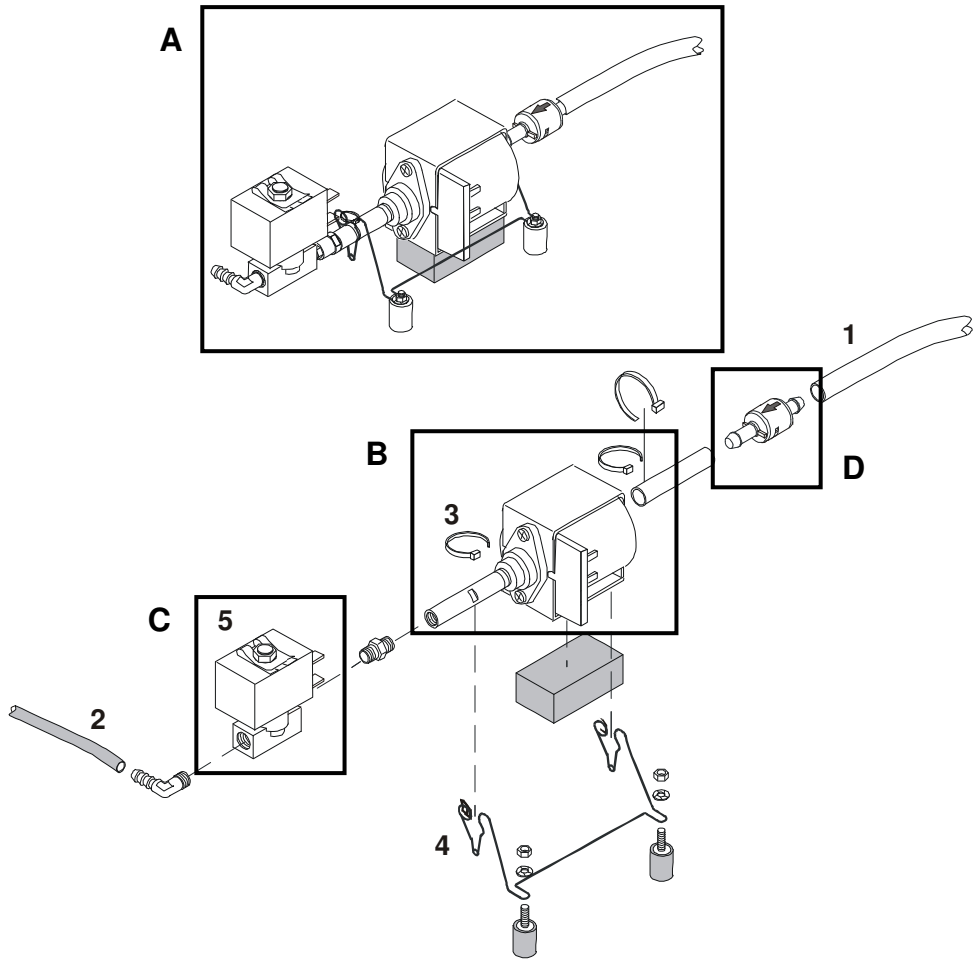
WATER PUMP 24VDC
40000220000 - (see B)

EV PARKER 2-WAYS 24VDC (EV6)
40100370000 - (see C)

ONE-WAY WATER FILTER
4720005000 - (see D)

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

1. Remove the frame cover (see card *Gr7-1*).
2. Empty the main tank by removing the bottom plug.
3. Remove the transparent and sheathed tubing (1 and 2).
4. Remove the wiring from the pump.
5. Remove the clips (3) fixing the pump to the wire-bracket (4) and remove the pump.
6. Steady the pump shaft, and unscrew the solenoid valve (5).
7. Mount the new part, restore the connections and reassemble proceeding in reverse order.
8. Run a sterilization cycle.



AUTOMATIC WATER FEEDING PUMP GROUP

A0BP2870000 – see A

WATER PUMP 24VDC

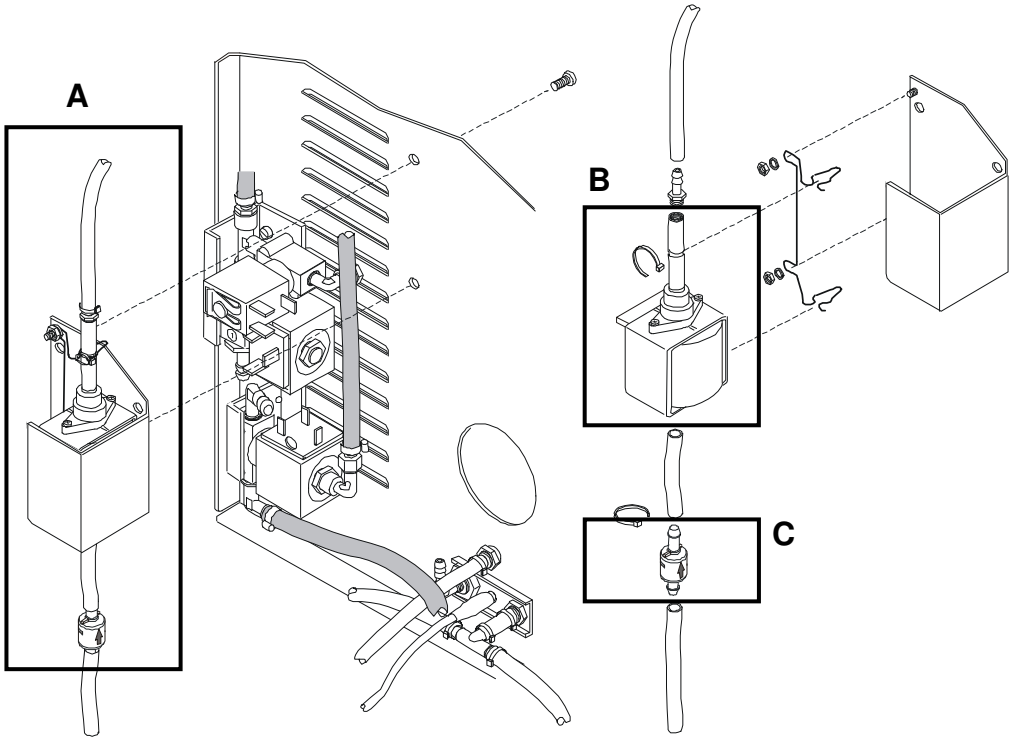
40000220000 – see B

ONE-WAY WATER FILTER

4720005000 - see C

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

1. Remove the frame cover (see card ***Gr7-1***).
2. Remove the tubing and the wiring from the automatic water feeding pump.
3. Remove the screws from the rear frame.
4. Disassemble the water pump as necessary (see figure at right).
5. Mount the new part, restore connections and reassemble proceeding in reverse order.
6. Test the auxiliary water pump from the device test menu.
7. Run a sterilization cycle.

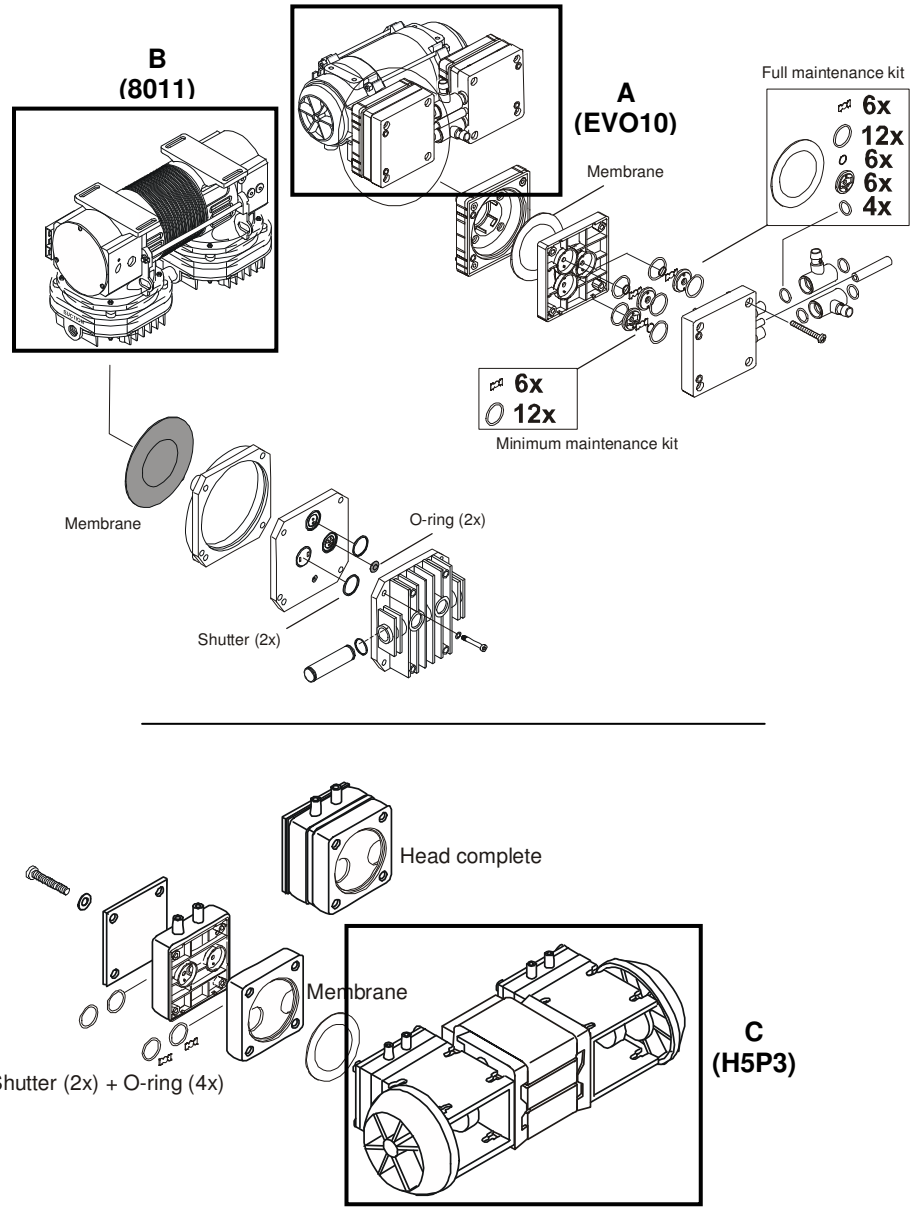


VACUUM PUMP

Vacuum pump EVO10 group (see A) (Bravo^{17V} & Bravo^{21V})	A8JPR010000 -	120VAC 60Hz
	A8BPR010000 -	220/230VAC 50/60Hz
Vacuum pump EVO10 spare parts	40000470000 -	Membrane
	40000480000 -	Minimum maintenance kit
	40000490000 -	Full maintenance kit
Vacuum pump 8011 group (see B) (Bravo^{17V} & Bravo^{21V})	A9BP5870000 -	120VAC 60Hz
	A9BP5270000 -	220/230VAC 60Hz
Vacuum pump 8011 spare parts	40000260000 -	Membrane
	40000250000 -	Shutter (2x)
	48100150000 –	O-ring (2x)
Vacuum pump H5P3 group (see C) (Bravo^{17})	A9BM5520000-	120VAC 60Hz
	A9BM5270000 -	220/230VAC 60Hz
	A0BM3100000 -	220/240VAC 50Hz
Vacuum pump H5P3 spare parts	40000500000 -	Membrane
	40000450000 -	Shutter (2x) + O-ring (4x)
	40000460000 -	Head complete

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

1. Remove the frame cover (see card ***Gr7-1***).
2. Remove the screws, from the bottom frame.
3. Remove the sheathed tubing and the wiring from the pump.
4. Remove the pump and disassemble as necessary (see figure at right).
5. Replace the part, restore connections and reassemble proceeding in reverse order.
6. Perform a vacuum test.
7. Run a sterilization cycle.



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GROUP 4

PLUMBING CIRCUIT

CLEAR AND USED WATER TANK GROUP

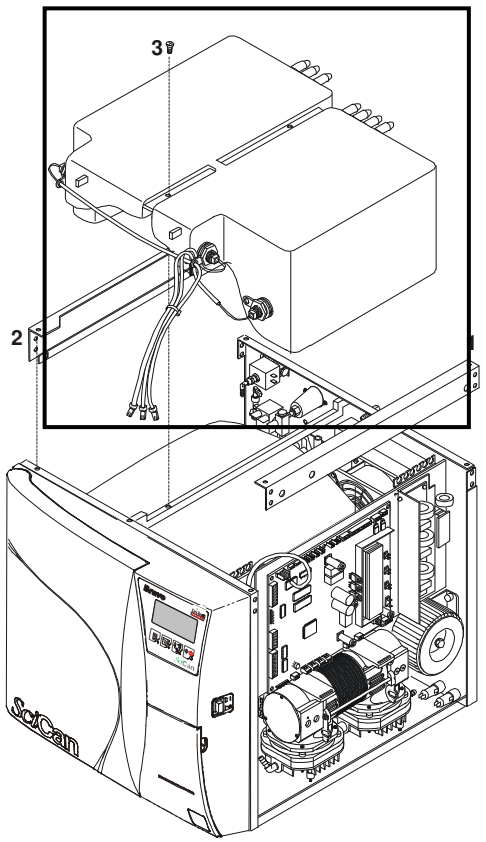
A0BP2900000 – see A

CLEAR AND USED WATER TANK

C3BP1700000 – see B

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

1. Remove the frame cover (see card ***Gr7-1***).
2. Empty both reservoirs.
3. Remove the wiring from the water level probes and the rear tubing.
4. Remove the right (1) and left (2) rails.
5. Remove the screws (3).
6. Lift the reservoir (4) and remove the bottom tubing.
7. Remove the water level probes (if necessary).
8. Mount the new part, reassemble and restore the connections proceeding in reverse order.
9. Run a sterilization cycle.

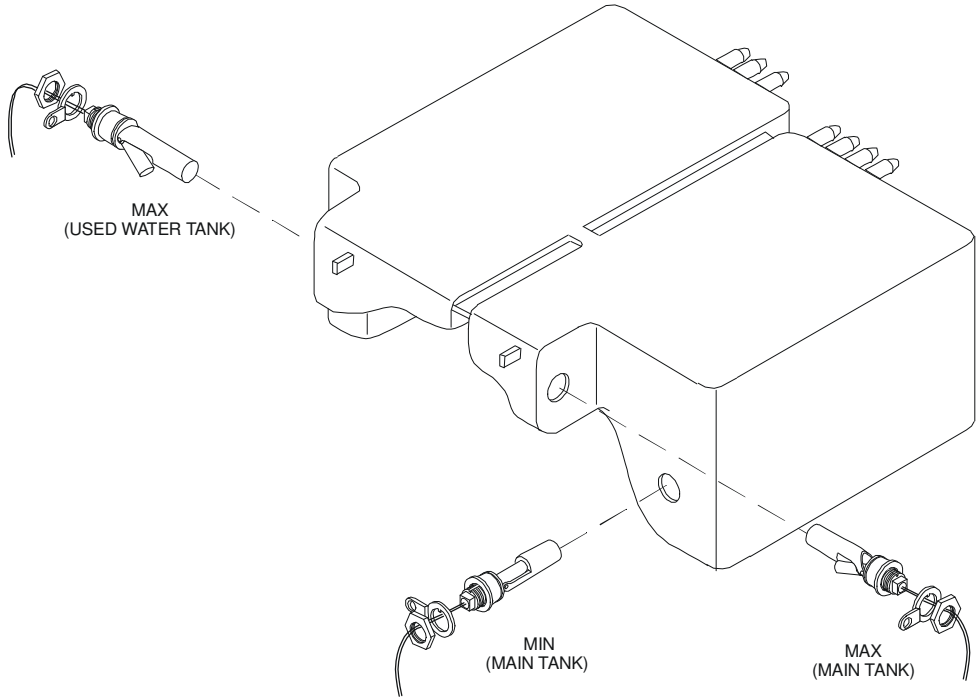


MIN/MAX WATER LEVEL SENSORS (CLEAR WATER TANK)
43200050000

MAX WATER LEVEL SENSOR (USED WATER TANK)
43200060000

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

1. Remove the frame cover (see card ***Gr7-1***);
2. Remove the wiring of the water level sensor from the PCB;
3. Steady the sensor's body and loosen the ring nut to remove the sensor.
4. Mount the new sensor, reassemble and restore the connections proceeding in reverse order.
5. Run a sterilization cycle.

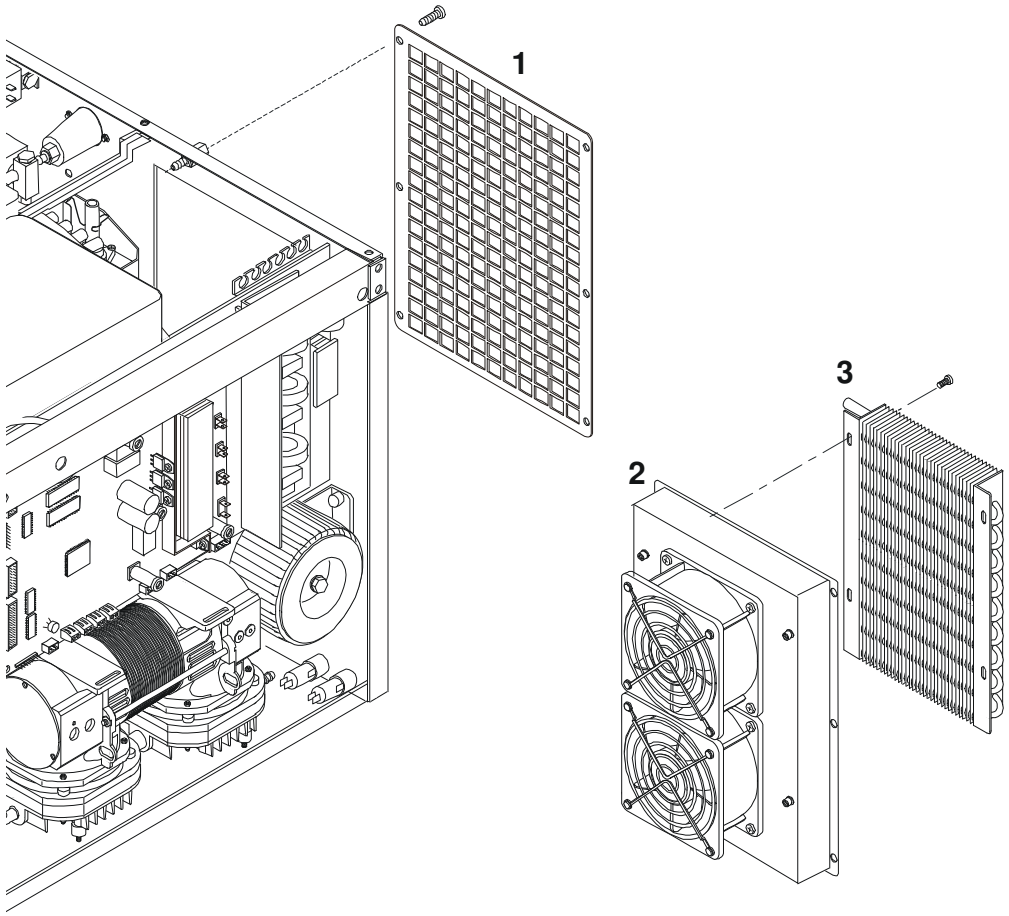


HEAT EXCHANGER

C1BP1600000

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

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

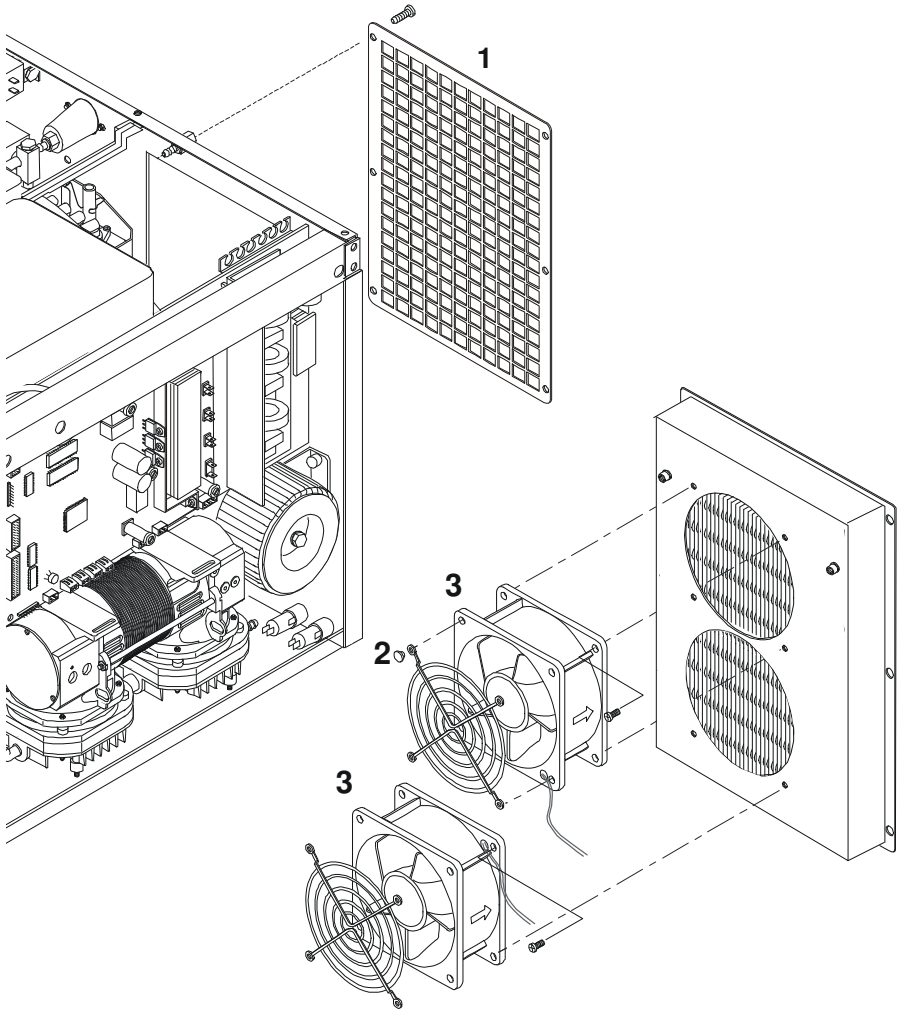


ELECTRIC FAN

40400030000

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

1. Remove the frame cover (see card ***Gr7-1***).
2. Remove the rear grid (1).
3. Move as possible the group (2) out the frame, remove the sheathed tubing and remove the fan wiring from the electronic boards.
4. Remove cap and grid (2), then remove fan (3).
5. Mount the new fan, reassemble and restore connections proceeding in reverse order.
6. Run a sterilization cycle.

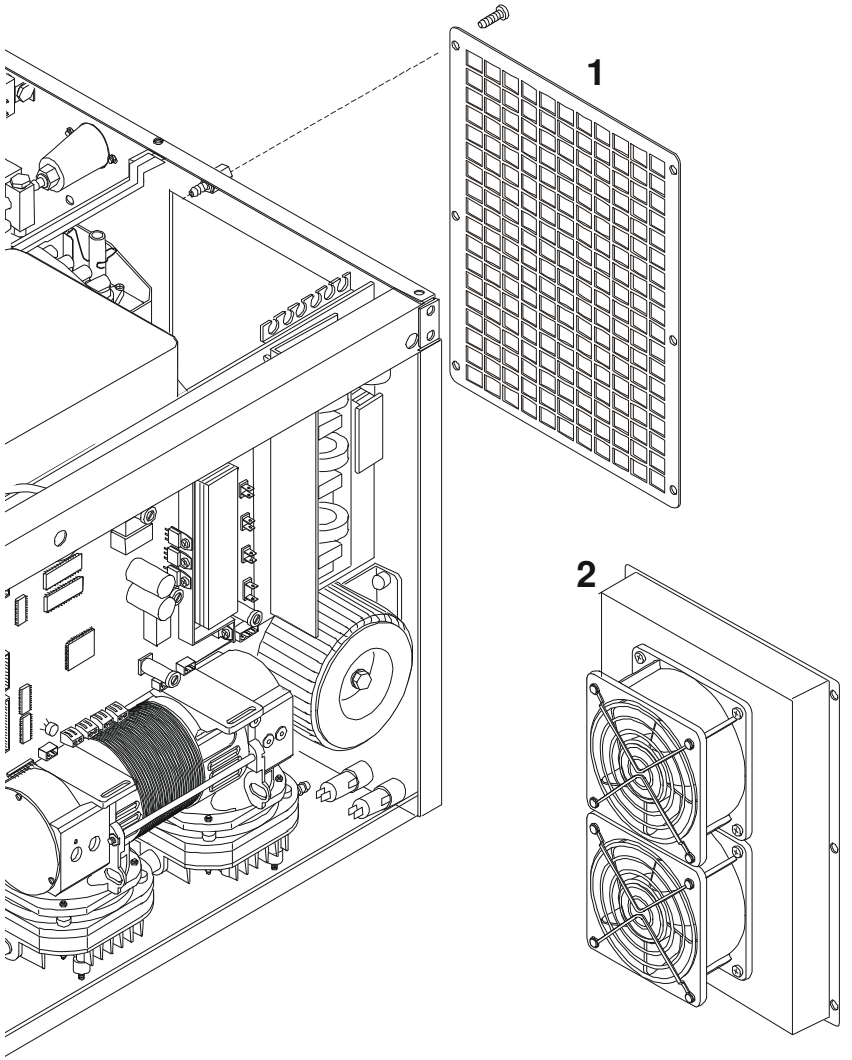


HEAT EXCHANGER GROUP

A1BP1640000

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

1. Remove the frame cover (see card ***Gr7-1***).
2. Remove rear grid (1).
3. Move the group (2) as much as possible out the frame and remove the sheathed tubing and the fan wiring.
4. Mount the new group, reassemble and restore the connections proceeding in reverse order.
5. Run a sterilization cycle.



STEAM GENERATOR GROUP

A9BM5510000 -120VAC 60Hz-
A9BM5250000 - 220/230VAC 60Hz
A0BP2810000 - 220/240VAC 50Hz

UPPER PART

C0BP547000P

LOWER PART

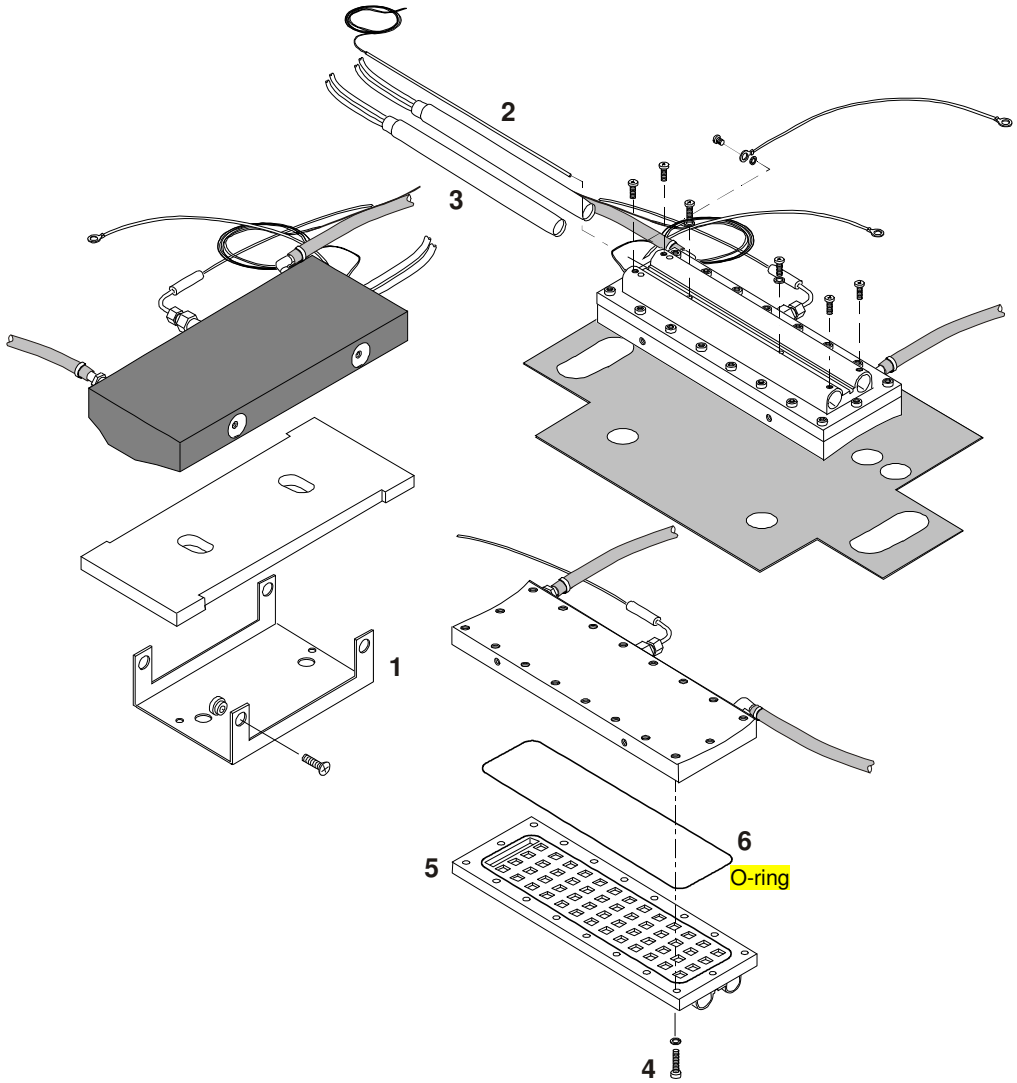
C0BP548000P

O-RING

48100080000

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

1. Remove the frame cover (see card *Gr7-1*).
2. Empty both reservoirs.
3. Remove the water pump group (see card *Gr3-1*).
4. Remove the screws from the bottom frame, and move the steam generator as much as possible out the frame.
5. Remove the steam generator from the support (1), and remove the thermo-insulating panel.
6. Remove the bulb of the safety thermostat (2).
7. Loosen the screws and remove the heater cartridges (3).
8. Remove the screws (4) and separate the lower parts (5) from the upper part.
9. Clean the upper part of the steam generator.
10. Replace the lower part, mount a new O-ring (6), reassemble and restore the connections proceeding in reverse order.
11. Run a sterilization cycle.

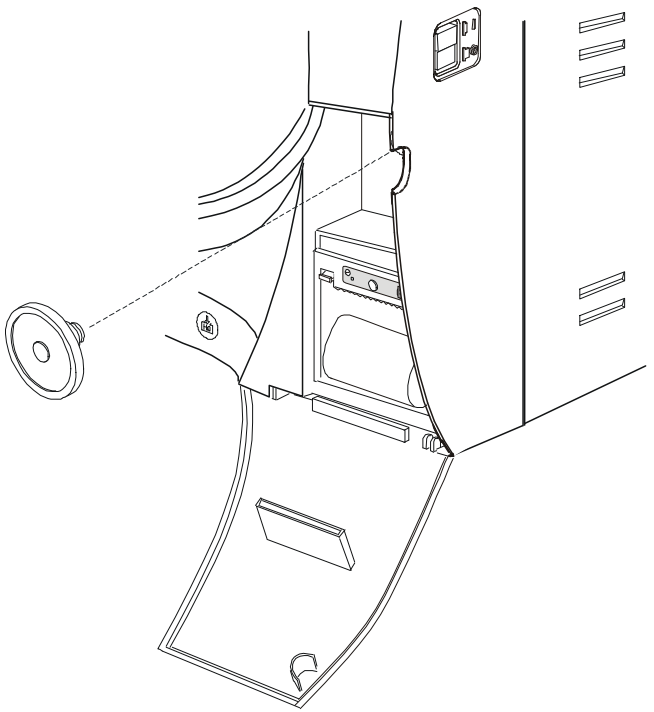


BACTERIOLOGICAL FILTER

47200010000

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

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

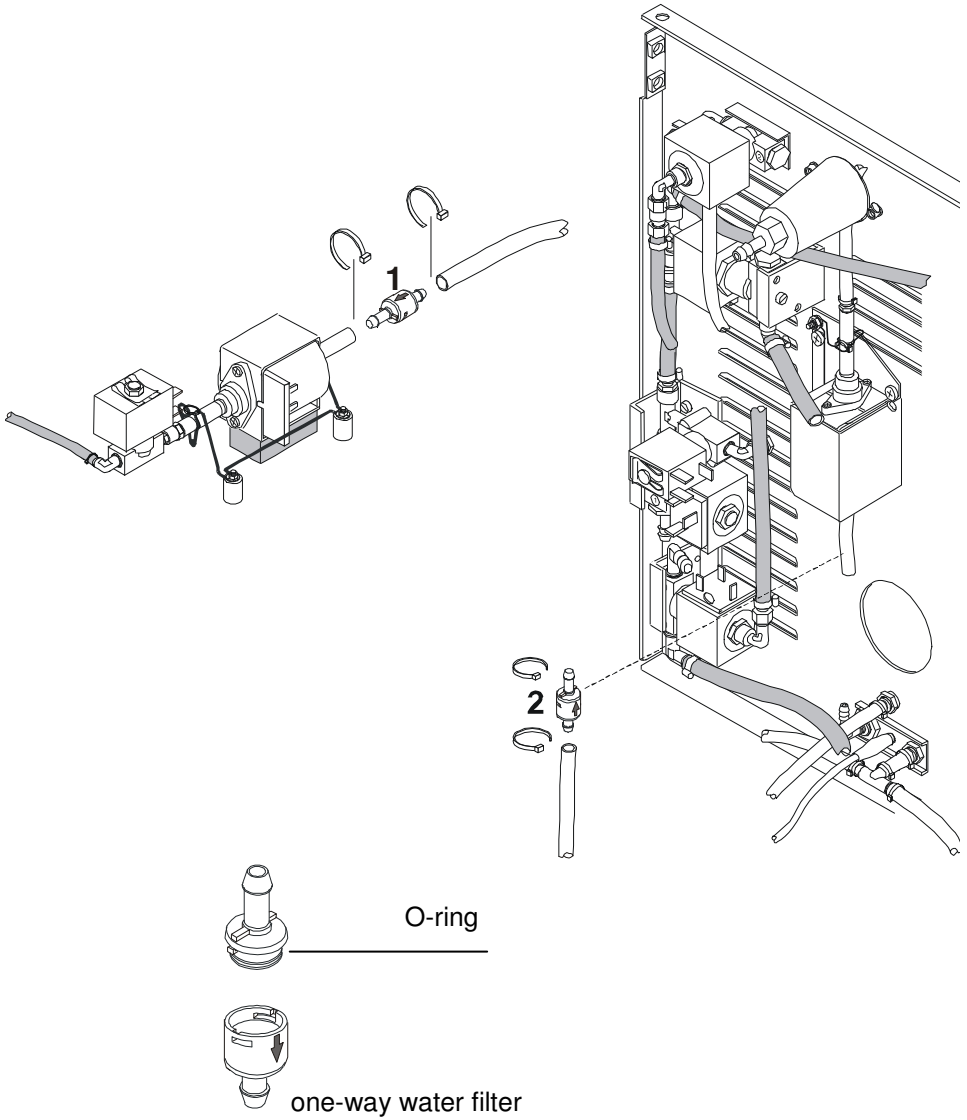


ONEWAY WATER FILTER

47200050000

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

1. Remove the frame cover (see card *Gr7-1*).
2. Empty the distilled water reservoir.
3. Cut the plastic cable ties holding the steam generator water pump's one-way filter (1), or the cable ties holding the one-way filter (2) of the automatic water feeding pump and remove it.
4. Mount the new filter, reassemble and restore the connections proceeding in reverse order.
5. Run a sterilization cycle.

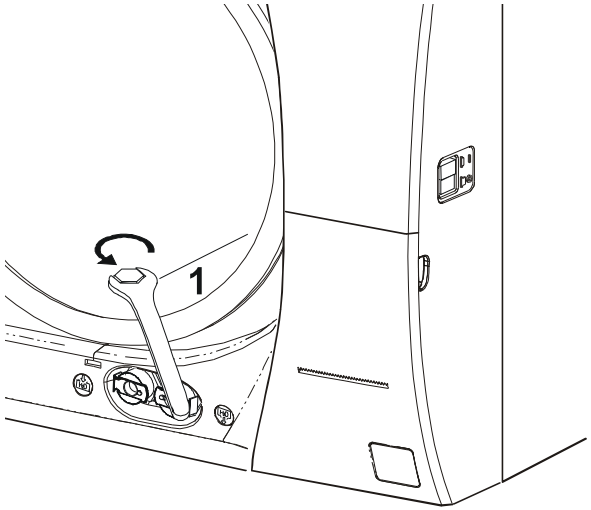


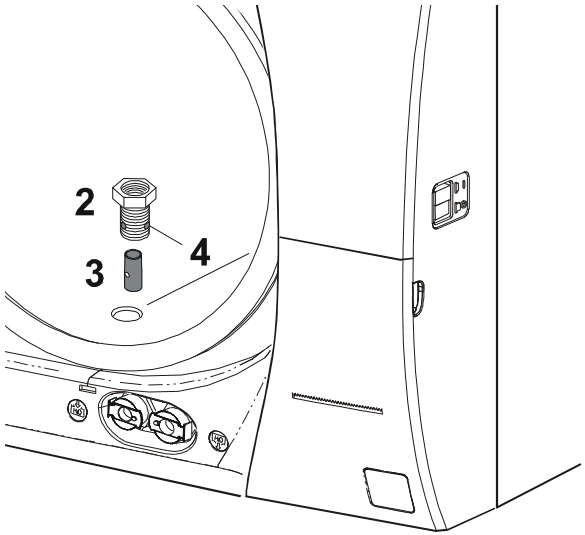
CHAMBER FILTER
47200030000

FITTING
28600290000

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

1. For cleaning (or replacing) the filter, open the door of the sterilizer and remove the nut (1) with a hexagonal wrench (no. 14).
2. Then remove the fitting (2) and the filter (3).
3. Carefully clean the filter with tap water, use a pointed tool, if necessary, to remove larger, more persistent materials.
4. If the filter cannot be reused, replace with a new one.
5. Plug the filter in the fitting, block it with a drop of sealant (if available), taking care to not obstruct the holes.
6. Reassemble proceeding in reverse order. When screwing down the fitting (2),
7. Run a sterilization cycle.





TUBING AND FITTINGS

110000005W0 – silicon tubing ∅6x12 black

110000003W0 – silicon tubing ∅6x10 transparent

110000011W0 – silicon tubing ∅4X7 transparent

110000014W0 – armed tubing ∅6x10

110000002W0 – Teflon tubing ∅4X2.5

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

TRANSPARENT SILICON /TEFLON TUBING

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

INSULATION/BLACK TUBING

When replacing any tubing, be careful to ensure the positions and routing of the replacement tube is the same as the tubing removed.
Fasten the 6x12 tubing with metal clips or hose clamps.

FITTING/CONNECTOR

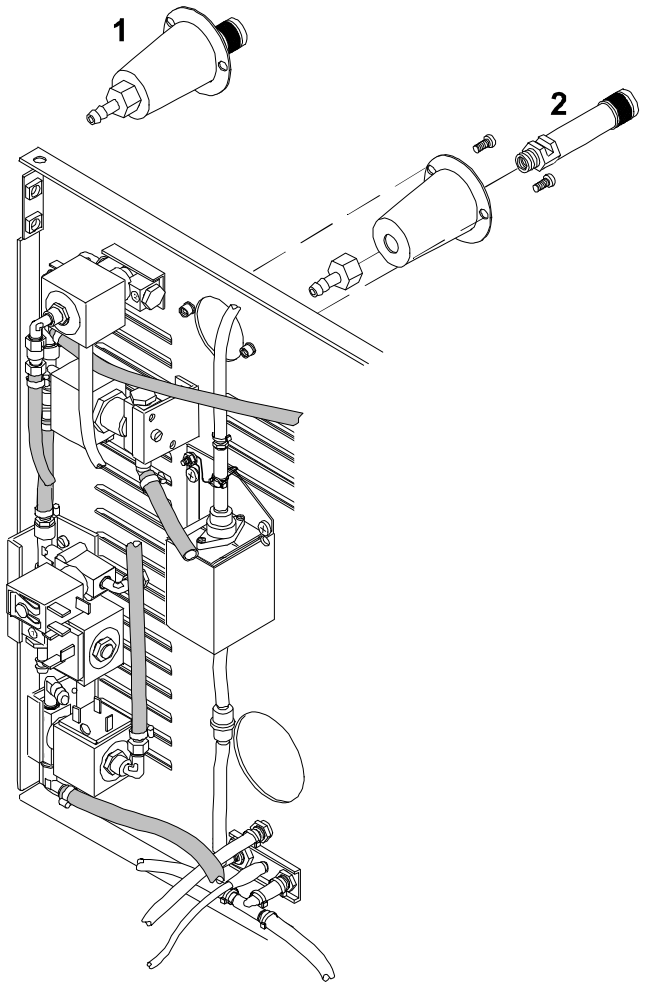
Unplug the tubing from the connector before removing it then clean the connector body.
Use a sealing product on the connector body before fitting the tubing.

SAFETY VALVE TUV GROUP
A0BS0520000

SAFETY VALVE TUV
47000020000

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

1. Remove the covers (see card ***Gr7-1***).
2. Remove the black insulated tubing from the safety valve connector.
3. Remove the safety valve group (1).
4. Unscrew the safety valve (2).
5. Mount the new valve, reassemble and restore the connections proceeding in reverse order.
6. Run a sterilization cycle.



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GROUP 5

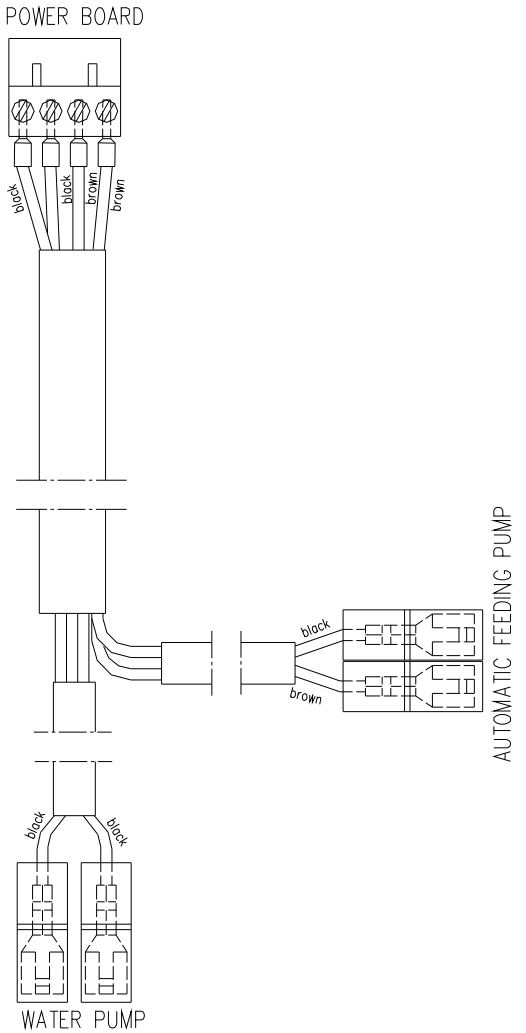
WIRING

WATER PUMPS

A2BP2270000

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

1. Remove the frame cover (see card ***Gr7-1***).
2. Disconnect the wiring from the water pumps and pcb board.
3. Replace the wiring, reassemble proceeding in reverse order.
4. Run a sterilization cycle.

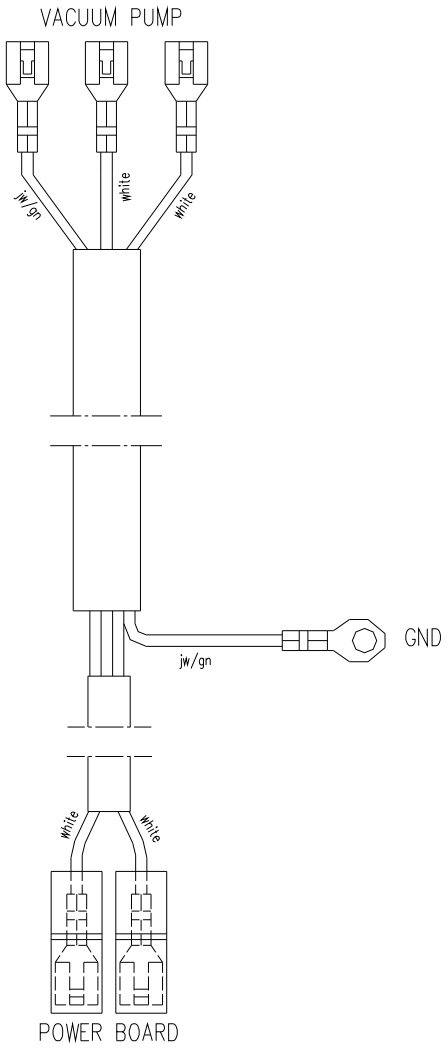


VACUUM PUMP

A2BP4030000 - Bravo^{17V} & Bravo^{21V}
A2BM3390000 - Bravo^{17}

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

1. Remove the frame cover (see card ***Gr7-1***).
2. Disconnect the wiring from the vacuum pump and pcb board.
3. Replace the wiring, reassemble proceeding in reverse order.
4. Run a sterilization cycle.

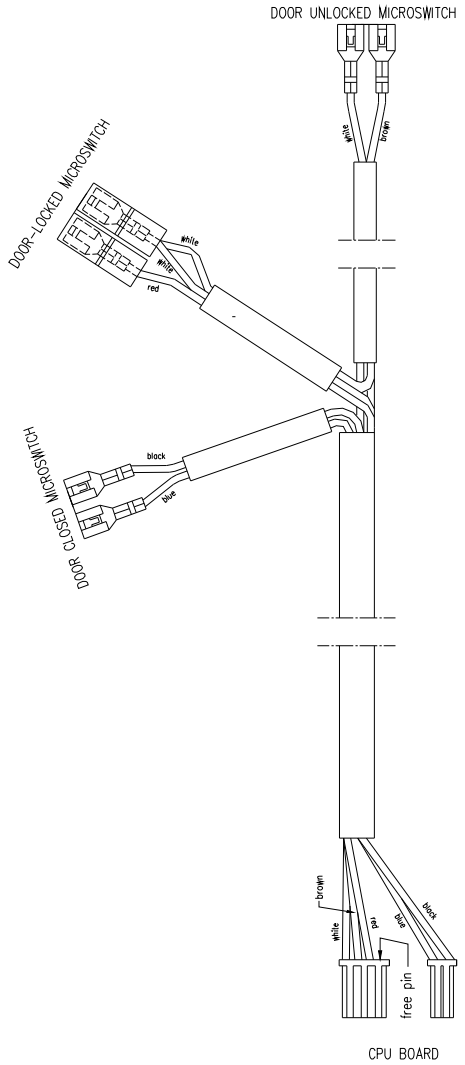


DOOR MICROSWITCH

A2BP2220000

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

1. Remove the frame cover (see card ***Gr7-1***).
2. Disconnect the wiring from the microswitches and pcb board.
3. Replace the wiring, reassemble proceeding in reverse order.
4. Run a sterilization cycle.

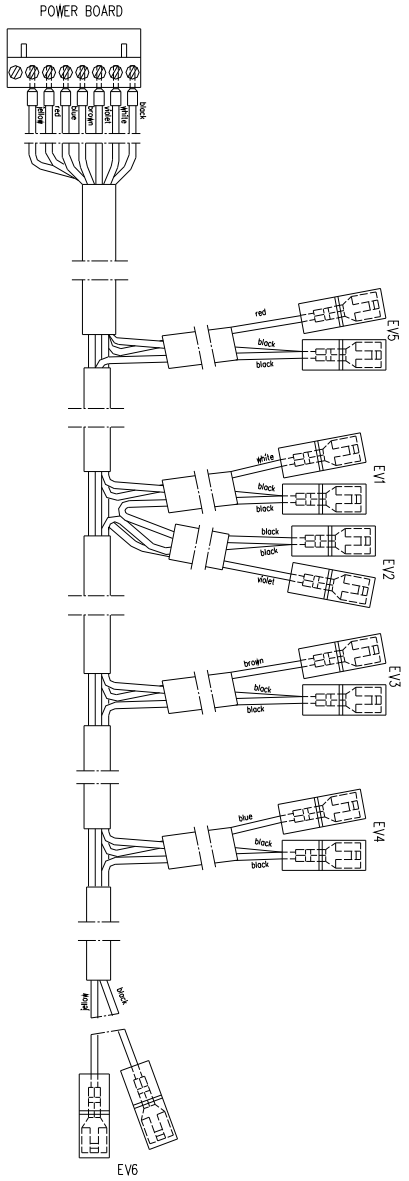


ELECTROVALVES

A2BP2280000

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

1. Remove the frame cover (see card ***Gr7-1***).
2. Disconnect the wiring from the electro-valves and pcb board.
3. Replace the wiring, reassemble proceeding in reverse order.
4. Run a sterilization cycle.

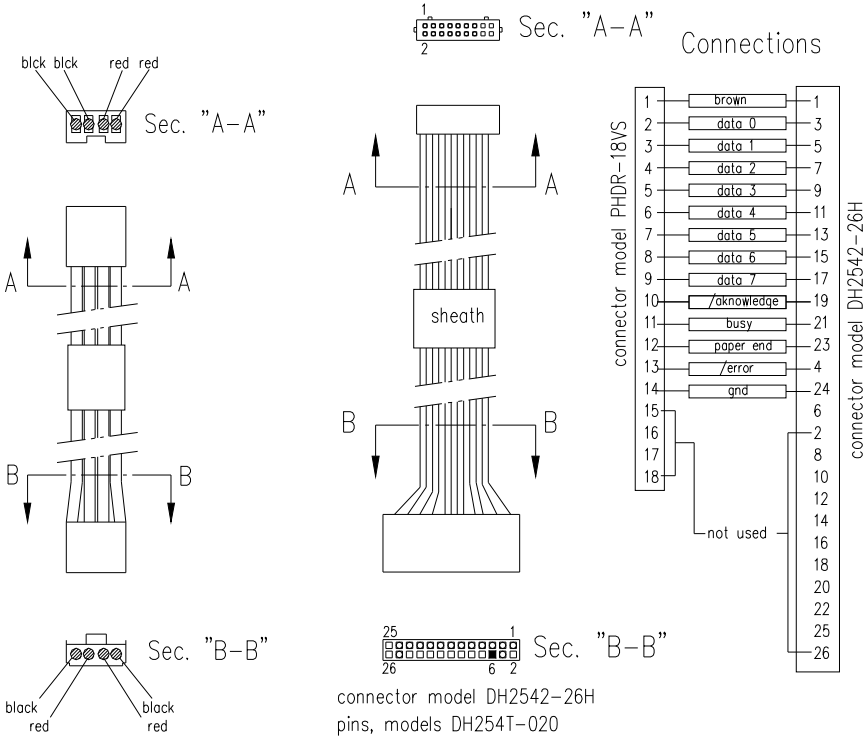


PRINTER SIGNAL CABLE
A2BP4690000

PRINTER POWER SUPPLY CABLE
A2BP4700000

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

1. Remove the frame cover (see card ***Gr7-1***).
2. Disconnect the signal and power supply wirings from the printer and pcb board.
3. Replace the wiring, reassemble proceeding in reverse order.
4. Run a sterilization cycle.

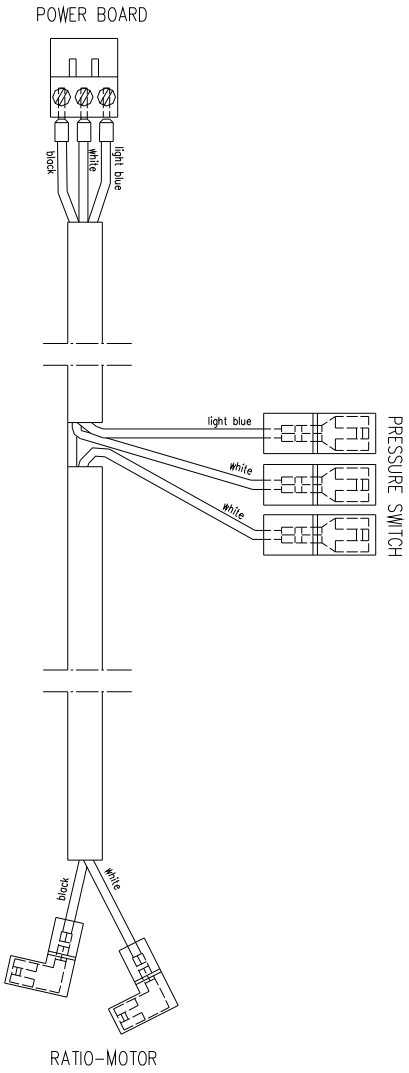


MOTOR AND PRESSURE SWITCH

A2BG3520000

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

1. Remove the frame cover (see card ***Gr7-1***).
2. Disconnect the wiring from the ratio-motor and pressure switch.
3. Disconnect the wiring from the pcb board.
4. Replace the wiring, reassemble proceeding in reverse order.
5. Run a sterilization cycle.

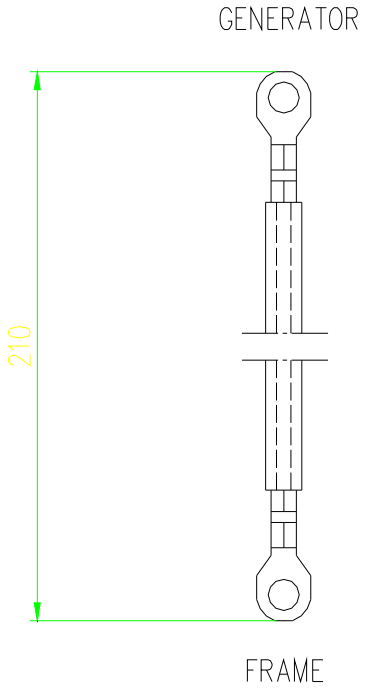


STEAM GENERATOR GROUND CABLE

A2BP4830000

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

1. Remove the frame cover (see card ***Gr7-1***).
2. Remove the steam generator (see card ***Gr4-6***).
3. Disconnect the ground wire from the steam generator and frame.
4. Replace the cable, reassemble proceeding in reverse order.
5. Run a sterilization cycle.

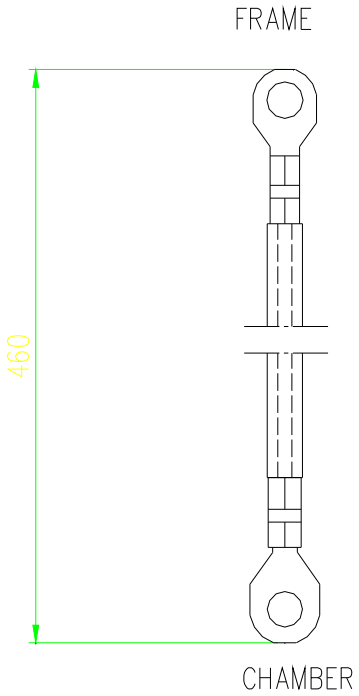


CHAMBER GROUND CABLE

A2BP4820000

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

1. Remove the frame cover (see card ***Gr7-1***).
2. Access to the chamber (see card ***Gr1-18***).
3. Disconnect the ground wire from the chamber and frame.
4. Replace the cable, reassemble proceeding in reverse order.
5. Run a sterilization cycle.

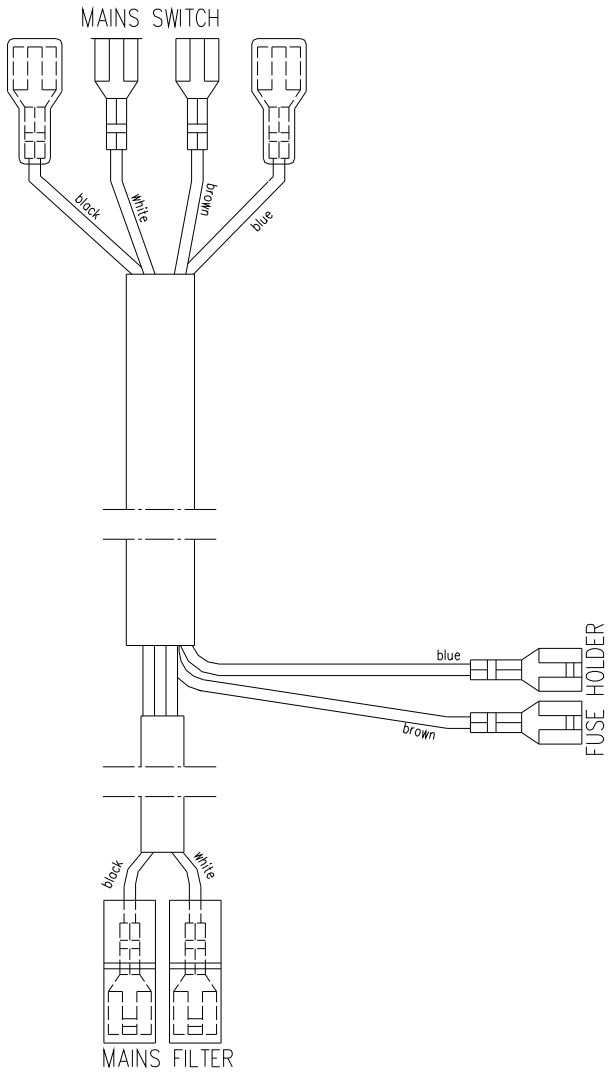


MAIN SWITCH

A2BP40200000

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

1. Remove the frame cover (see card ***Gr7-1***).
2. Disconnect the wire from the main switch, and fuse holders.
3. Replace the wiring, reassemble proceeding in reverse order.
4. Run a sterilization cycle.

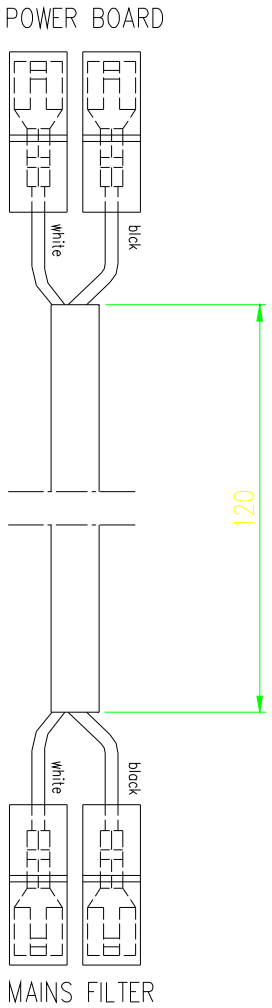


AC FILTER

A2BP40700000

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

1. Remove the frame cover (see card ***Gr7-1***).
2. Disconnect the wire from the pcb board.
3. Replace the wiring, reassemble proceeding in reverse order.
4. Run a sterilization cycle.

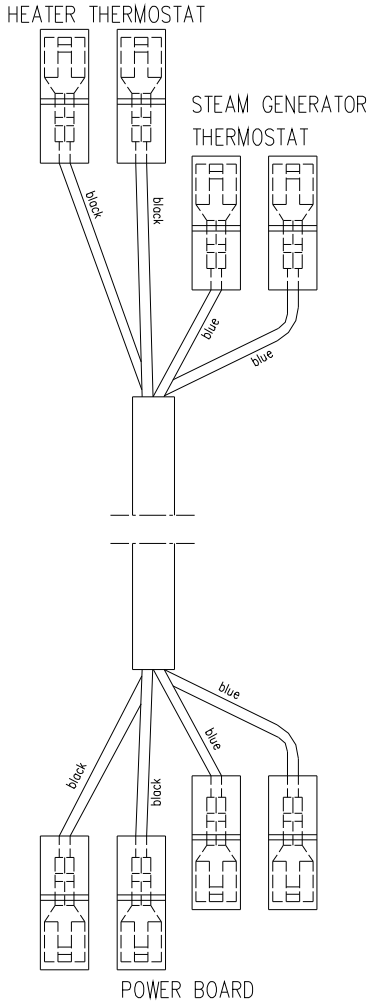


SAFETY THERMOSTAT

A2BP40100000

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

1. Remove the frame cover (see card ***Gr7-1***).
2. Disconnect the wire from the safety thermostats and pcb board.
3. Replace the wiring, reassemble proceeding in reverse order.
4. Run a sterilization cycle.



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GROUP 6

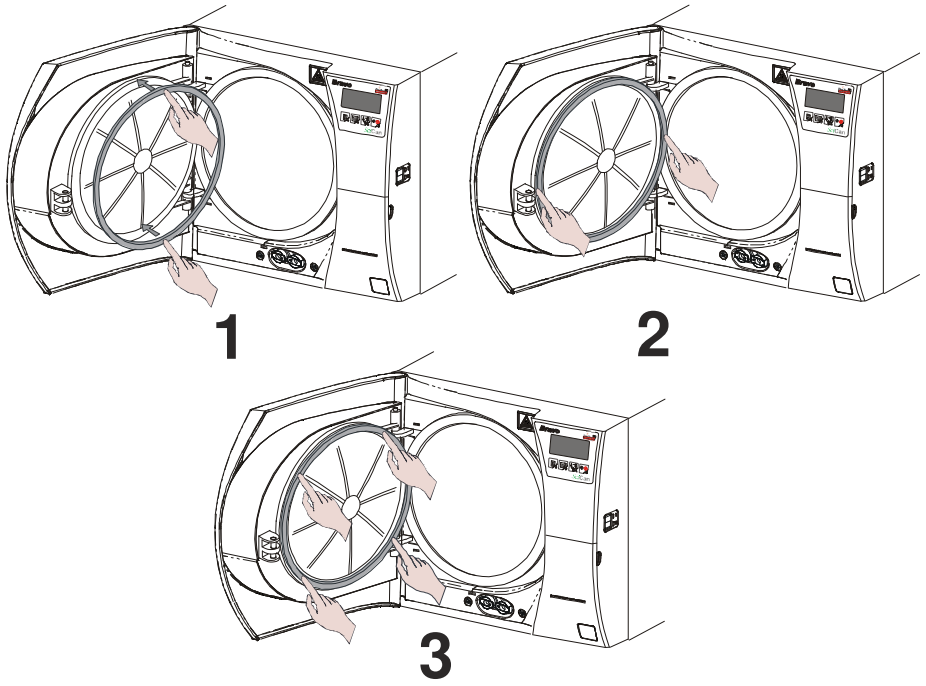
DOOR-LOCKING MECHANISM

DOOR GASKET

48000050000

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

1. Open the door.
2. Remove the old gasket by hand.
3. Clean the door gasket seat to ensure it is debris-free.
4. Install the new door gasket by pressing it into its seat, starting from the top/bottom and on the sides. Then press the remaining gasket completely into its seat.
5. seat..
6. Perform a sterilization cycle.

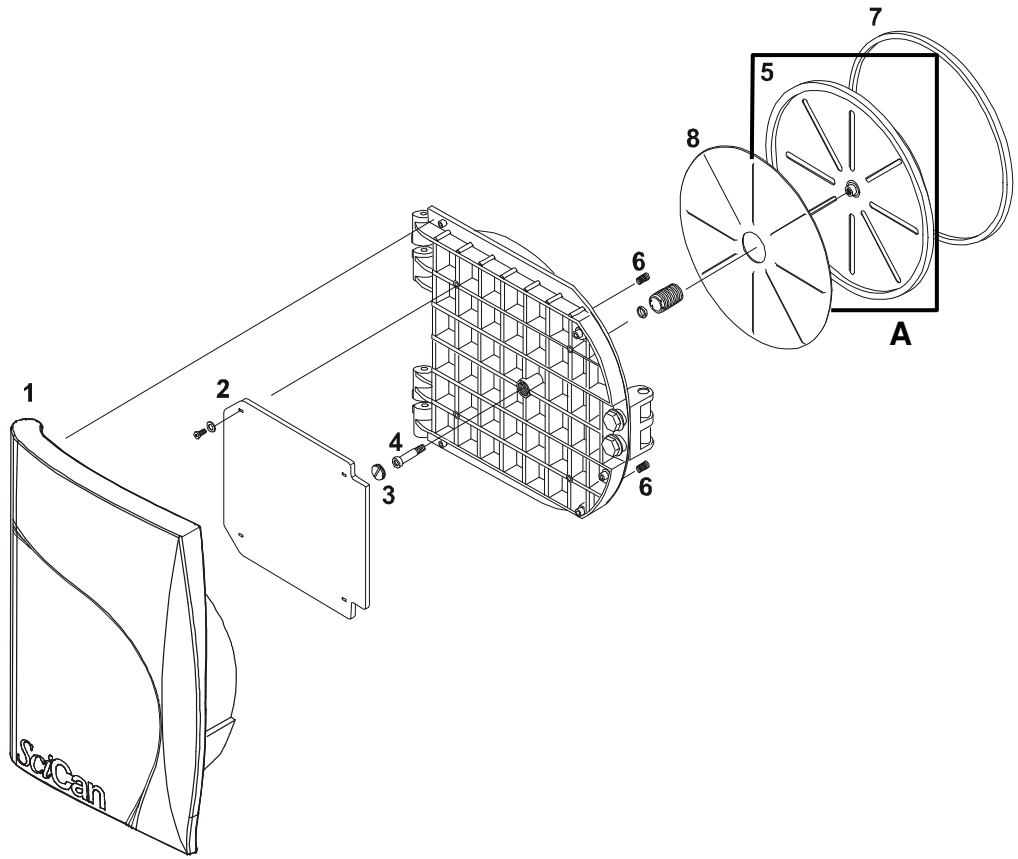


DOOR DISH

A1BP027000Y – see A

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

1. Open the door and remove the plastic door cover (1) (see card *Gr7-2*).
2. Remove the thermo-insulating panel (2) from the cast aluminium door.
3. Remove the plug (3) and the central screw (4).
4. Remove dish (5), gasket (7), thermo-insulating disk (8) – be careful to the springs (6).
5. Mount the new gasket and thermo-insulating disk on the dish.
6. Reassemble any part proceeding in reverse order.
7. Perform a sterilization cycle.



DOOR BUSH
49000050000

DOOR FORK PIN
C0BP0500000

DOOR NITRIDED FORK
C0BP060000Z

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

1. Open the door.

Door catch bushes / Fork pin

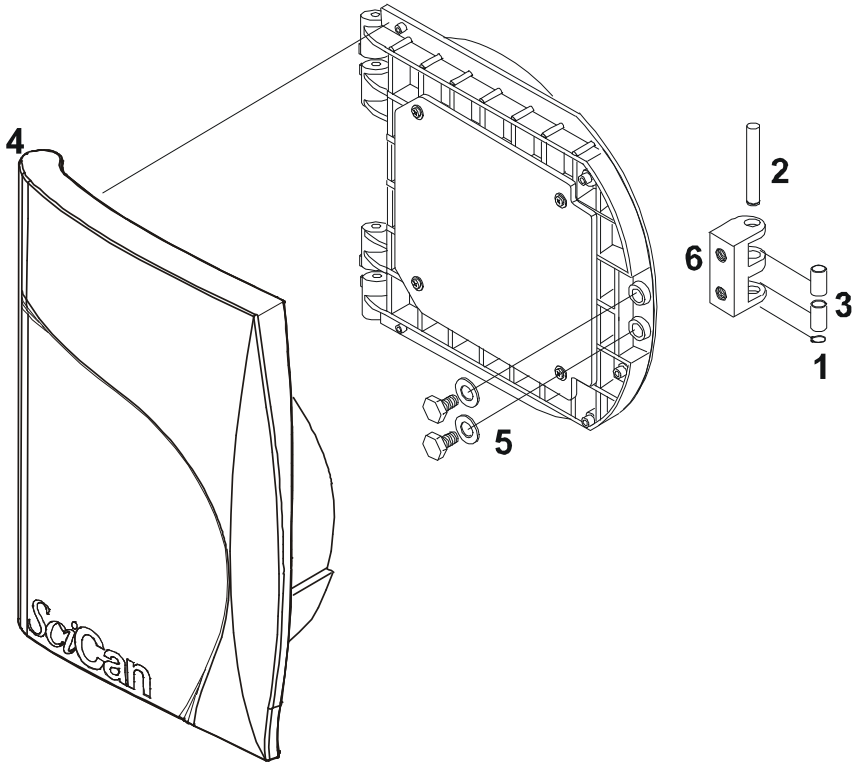
2. Remove the Seiger (1) from the bottom of the fork pin.
3. Withdraw the fork pin (2).
4. Remove the bushes (3).

Nitrided fork

5. Remove the plastic door cover (4) (see card ***Gr7-2***).
6. Remove screws and washers (5) and the nitrided fork (6).
7. Mount the new part, reassemble proceeding in reverse order.
8. Perform a sterilization cycle.

WARNING

The fork pin must be inserted such that the dimple on the pin is on the top and the pin retention clip on the bottom.

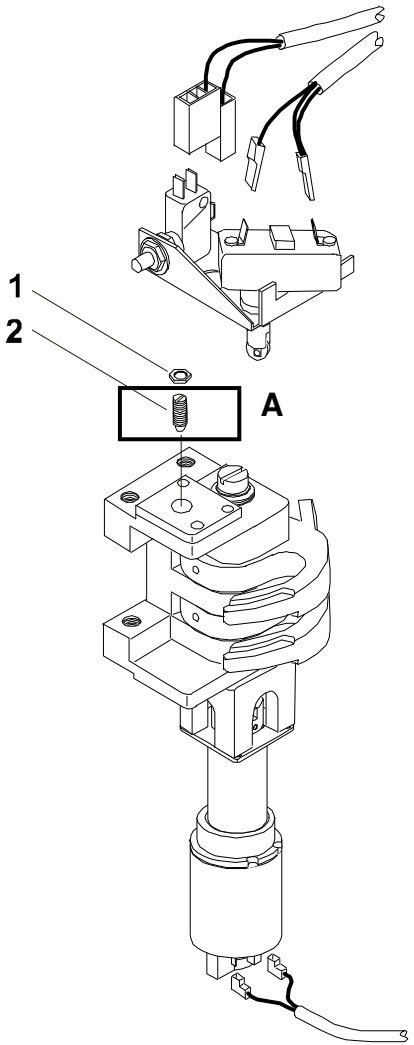


DOOR POSITIONER

251000003K0 – see A

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

1. Remove the frame cover (see card ***Gr7-1***).
2. Access from the top and unscrew the nut (1), remove the positioner (2).
3. Mount the new positioner, reassemble proceeding in reverse order.
4. Adjust the positioner, see ***Attachment A***.
5. Perform a sterilization cycle.



OPEN-HOOK MICROSWITCH
43300010000

CLOSED-DOOR MICROSWITCH
43300010000

CLOSED-HOOK MICROSWITCH
43300040000

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

1. Remove the frame cover (see card ***Gr7-1***).
2. Remove the wiring of the switch involved:

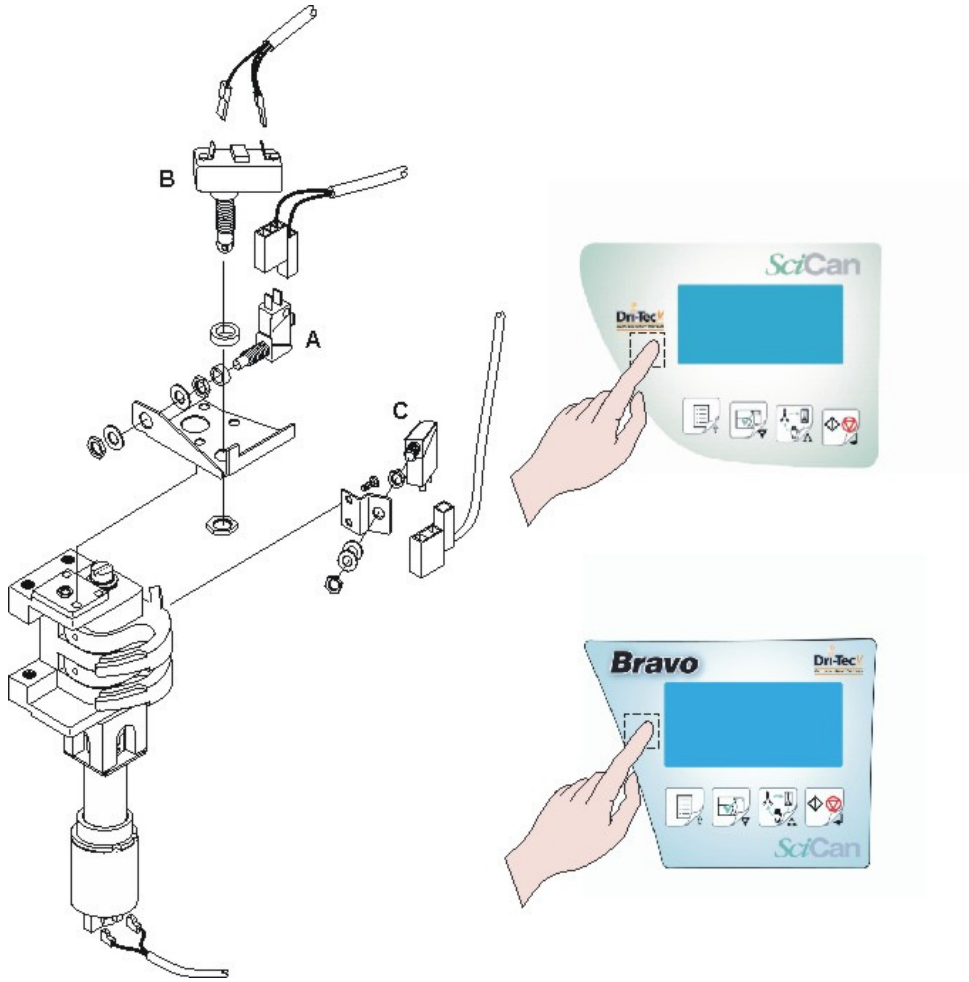
   A: Door microswitch

   B: Hook microswitch (close)

   C: Hook microswitch (open)
3. Remove the bracket screws and the switch involved.
4. Replace the switch, reassemble proceeding in reverse order.
5. Perform a sterilization cycle.

Note: To release the open hook microswitch, proceed as follows:

1. From the Start menu, go to **Setup**, then **Service**, and enter the code "++--++--", go to **Device Test**, **Manual** and **Locking Device**, push START key to enable/disable.
2. After a switch replacement, check its correct operation. Remove the jumper X21 from the pcb board, press and hold the **hidden key** on the keypad and switch on the sterilizer. As the message "LOCKING DEVICE" appears on the display, release the hidden key and push the Start key to enable the unlocking of the mechanism. Exit the Setup mode, turn-off the sterilizer and restore the jumper X21.



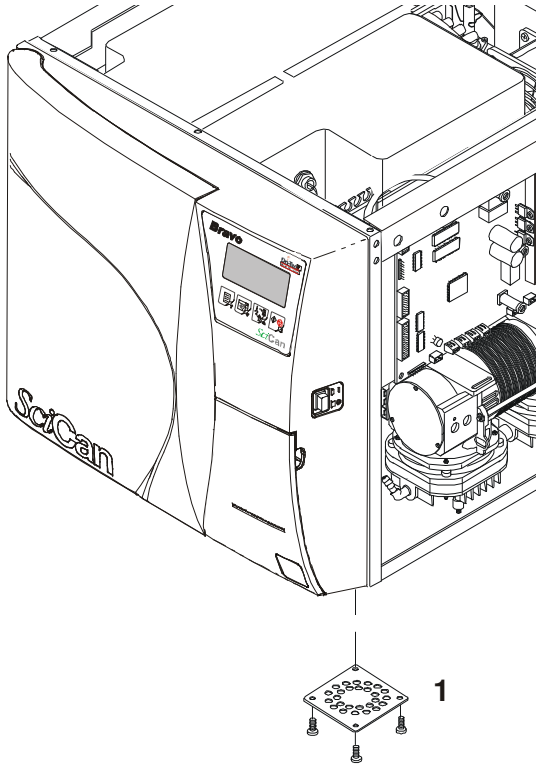
GEAR-MOTOR GROUP
A0BP6250000 – see A

GEAR-MOTOR
40300020000 / **24VDC** – see B

PIN 3X25
232A03L25K0 – see C

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

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

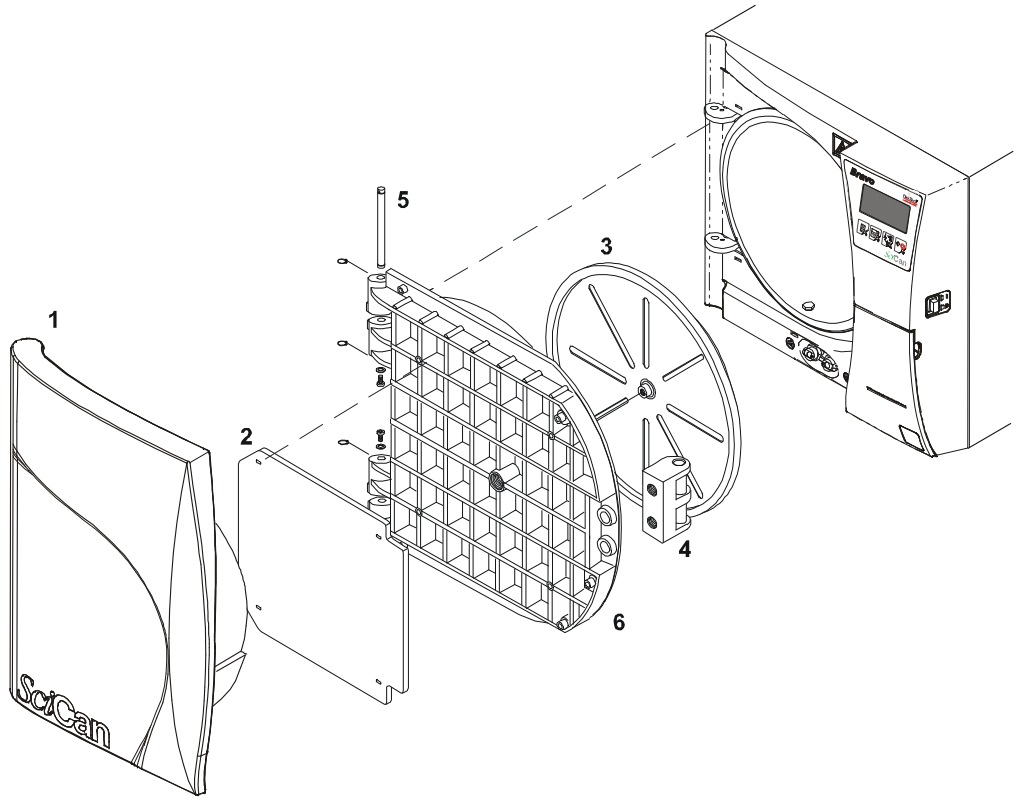


CAST ALUMINUM DOOR

C0BP260000P

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

1. Open the door and remove the plastic door cover (1) (see card *Gr7-2*).
2. Remove the thermal insulating panel (2).
3. Remove the dish (3) (see card *Gr6-2*).
4. Remove the nitrided fork (4) (see card *Gr6-3*).
5. Remove the hinge pin (5) in order to free the cast door (6).
6. Mount the new metallic door and reassemble components proceeding in reverse order.
7. Perform a sterilization cycle.



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GROUP 7

COVERS

METALLIC FRAME COVER

Bravo^{17} & Bravo^{17V}

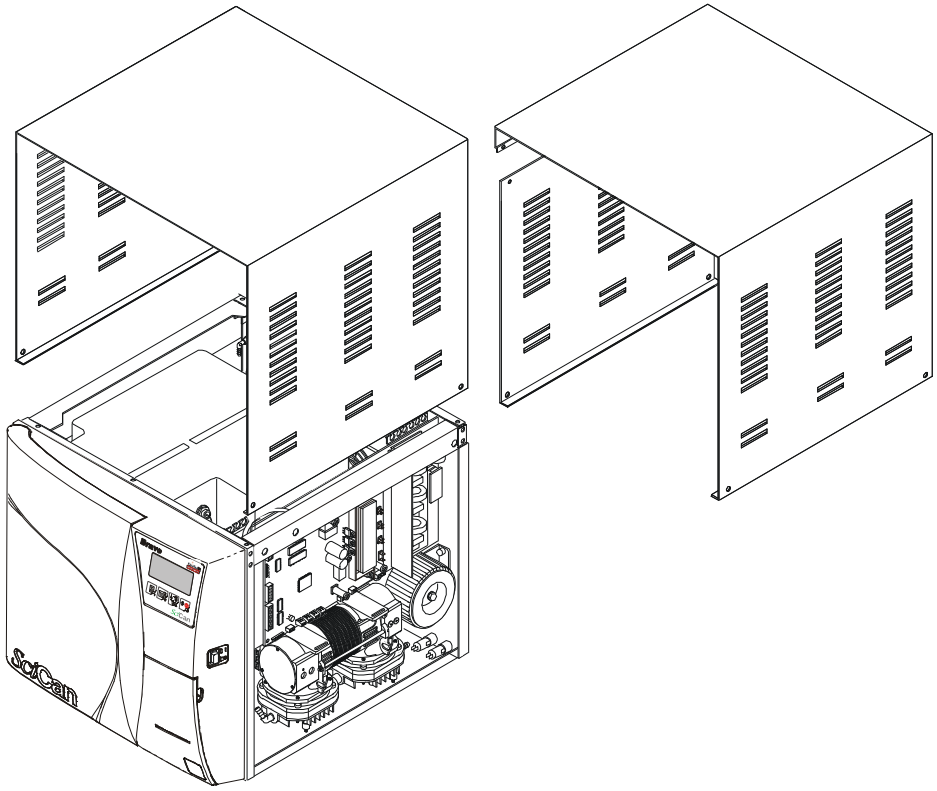
C1BH0060001 (1pc-frame cover) -
C1BP6230002 - top/right frame cover (2pc-frame cover)
C1BP6240002 - left frame cover (2pc-frame cover)

Bravo^{21V}

C1BG4680001 (1pc-frame cover)
C1BG5760002 - top/right frame cover (2pc-frame cover)
C1BG5770002 - - left frame cover (2pc-frame cover)

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

1. Remove the screws from the base of the metallic cover.
2. Remove the cover.
3. Mount the new cover.
4. Perform a sterilization cycle.



PLASTIC DOOR COVER

AJMR030000 (style 1)

C3BP1850000 (style 2)

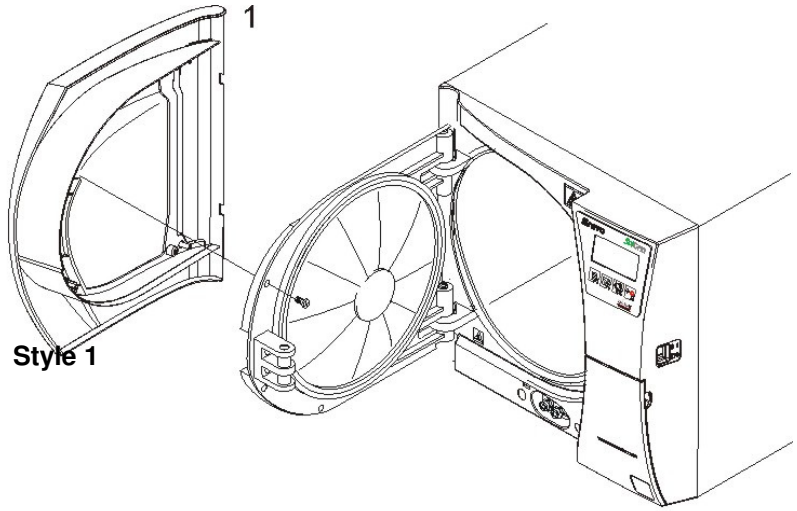
Before servicing, switch off the equipment and unplug the power supply cable from the mains socket.

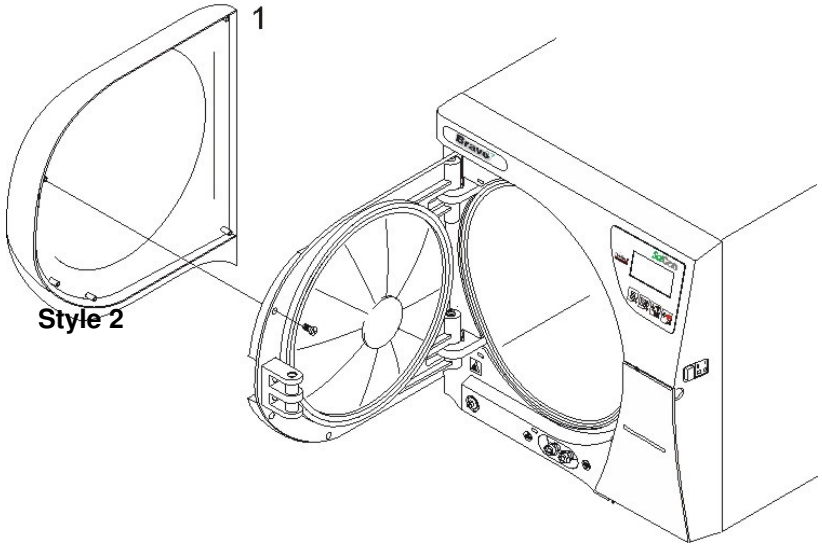
Style 1

1. Open the door.
2. Disassemble the plastic door cover .
3. Mount the new plastic door cover.
4. Perform a sterilization cycle.

Style 2

1. Open the door.
2. Disassemble the plastic door cover (1).
3. Mount the new plastic door cover.
4. Perform a sterilization cycle.





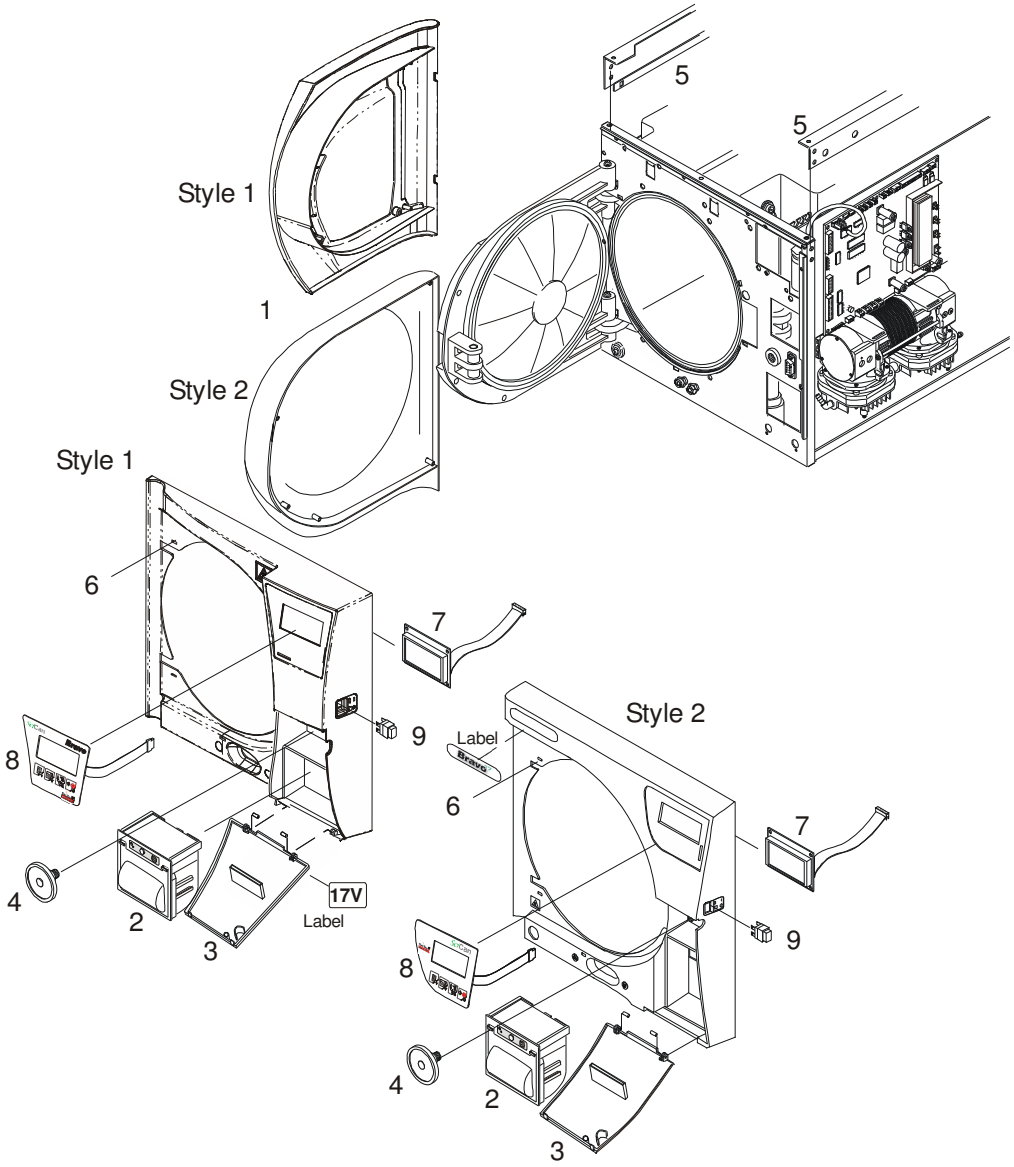
PLASTIC FRONT FRAME

C3JP0110000 (**Style 1)**

C3BP1830000 (Style 2)

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

1. Remove the metallic frame cover (see card ***Gr7-1***).
2. Remove plastic door cover (1) (see card ***Gr7-2***).
3. Remove the thermal printer unit (2) (see card ***Gr1-20*** ***or*** ***Gr21***).
4. Remove the service compartment door (3) (see card ***Gr7-4***);
5. Cut the clips and disconnect the wiring from the main switch.
6. Remove the LCD display and keypad connections from the pcb.
7. Remove the bacteriological filter (4).
8. Remove left and right rails (5).
9. Remove from the rear of front frame and printer compartment the screws holding the plastic front cover.
10. Using a screwdriver, unlock from the front frame slots around chamber circumference the four tabs (6) of the plastic front cover.
11. Carefully move the front cover to the left and remove it by pulling it away from the door.
12. Remove labels, LCD (7), keypad (8) and main switch (9) and remount on the new plastic front frame.
13. Remove the adhesive label.
14. Reassemble and restore the connections proceeding in reverse order.
15. Perform a sterilization cycle.



SERVICE COMPARTMENT DOOR

C3JP0140000 (Style 1) – see A

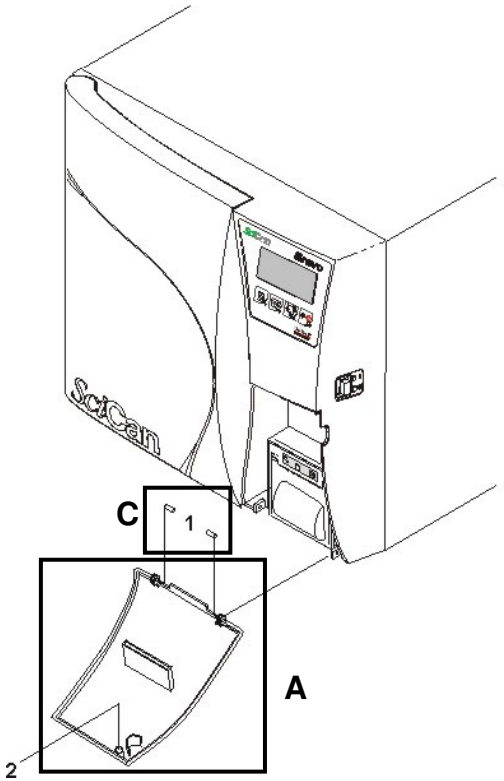
C3BP1840000 (Style 2) – see B

SERVICE DOOR PIN

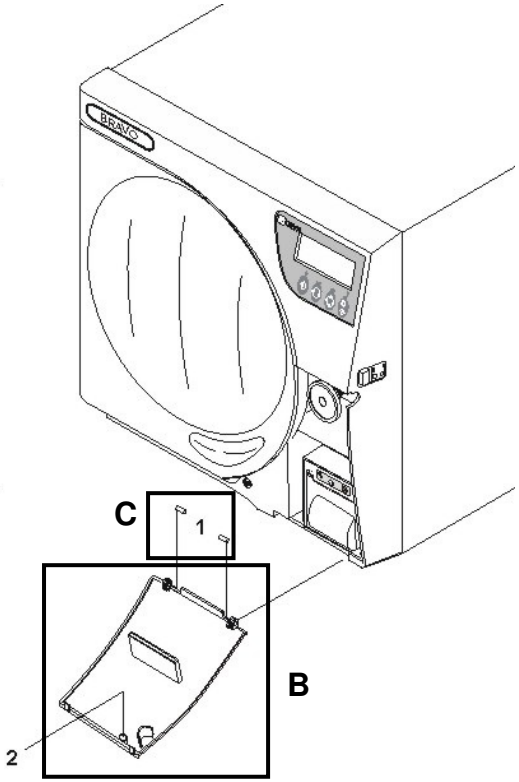
230B04L14K0 – see C

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

1. Open the service cover and remove the two pins (1).
2. Replace the cover, mount the pins.
3. Check the correct operation (close/open) of the door - fix the adhesive magnet button (2).



Style 1



Style 2

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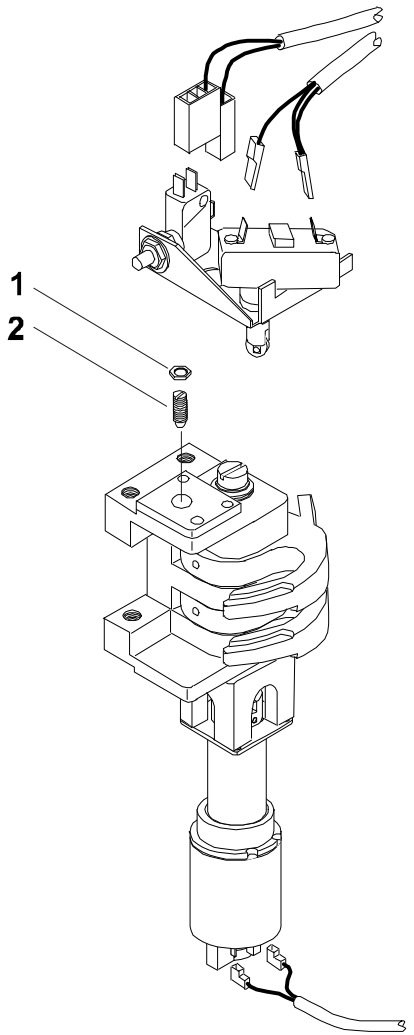
ATTACHMENTS

ATTACHMENT A -
DOOR POSITIONER ADJUSTMENT

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

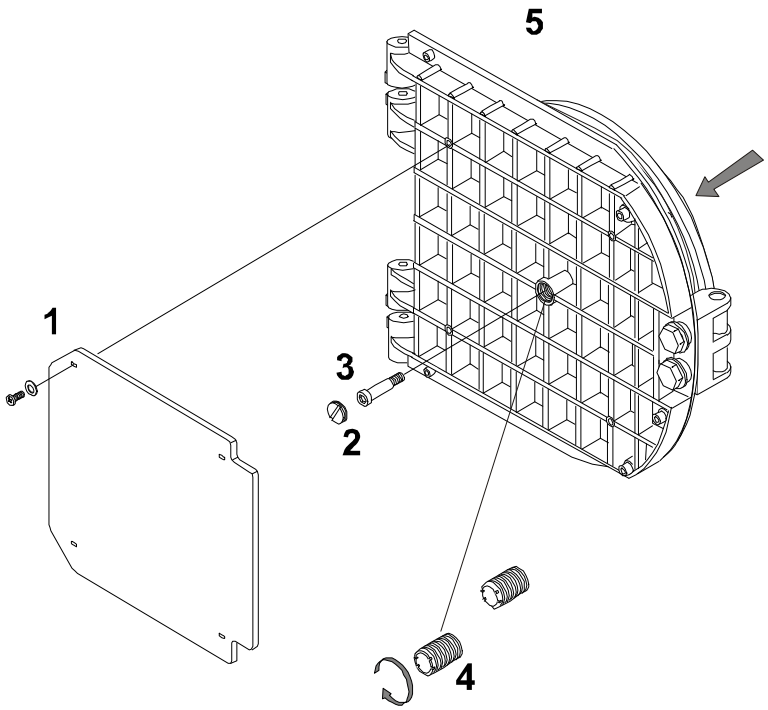
1. Remove the frame cover (see card ***Gr7-1***).
2. Open and close the door to check its operation.
3. In case the door does not remain close (no click sound at the stroke end), loosen the nut (1) and turn clockwise the positioner (2).
4. In case you encounter resistance on closing/opening the door,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



ATTACHMENT B -
DOOR ADJUSTMENT

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

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



ATTACHMENT C -
PRINTER PAPER ROLL REPLACEMENT

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

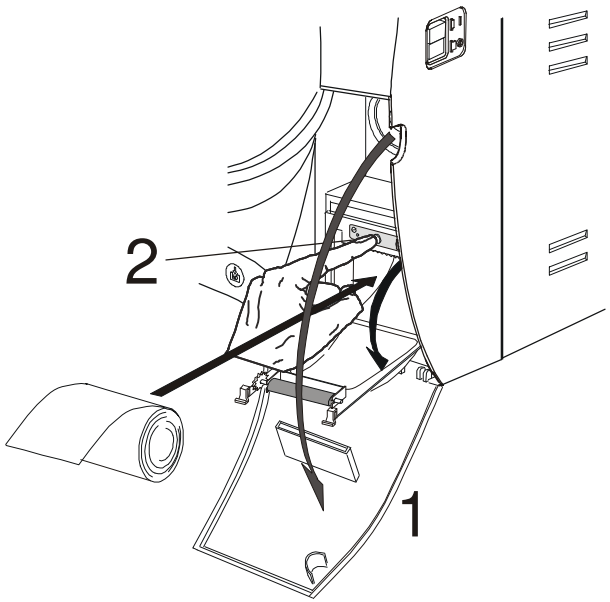
Custom type

1. Open the door (1) of the service compartment to access the printer.
2. Push the central button (2) to open the printer door and access the paper compartment.
3. Remove the empty roll and place a new roll of thermal paper so that the paper unrolls from the top;
   Dimensions of the thermal paper roll:
   - width 57 mm (2.24”) / diameter max 45 mm (1.77)
4. Unroll about 15 cm (6”) of paper and close the printer door.
5. Thread the paper in the service compartment door slot and close.
6. Switch on the sterilizer;
7. Perform a sterilization cycle.

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

WARNING

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



ATTACHMENT D -
PRINTER KIT INSTALLATION

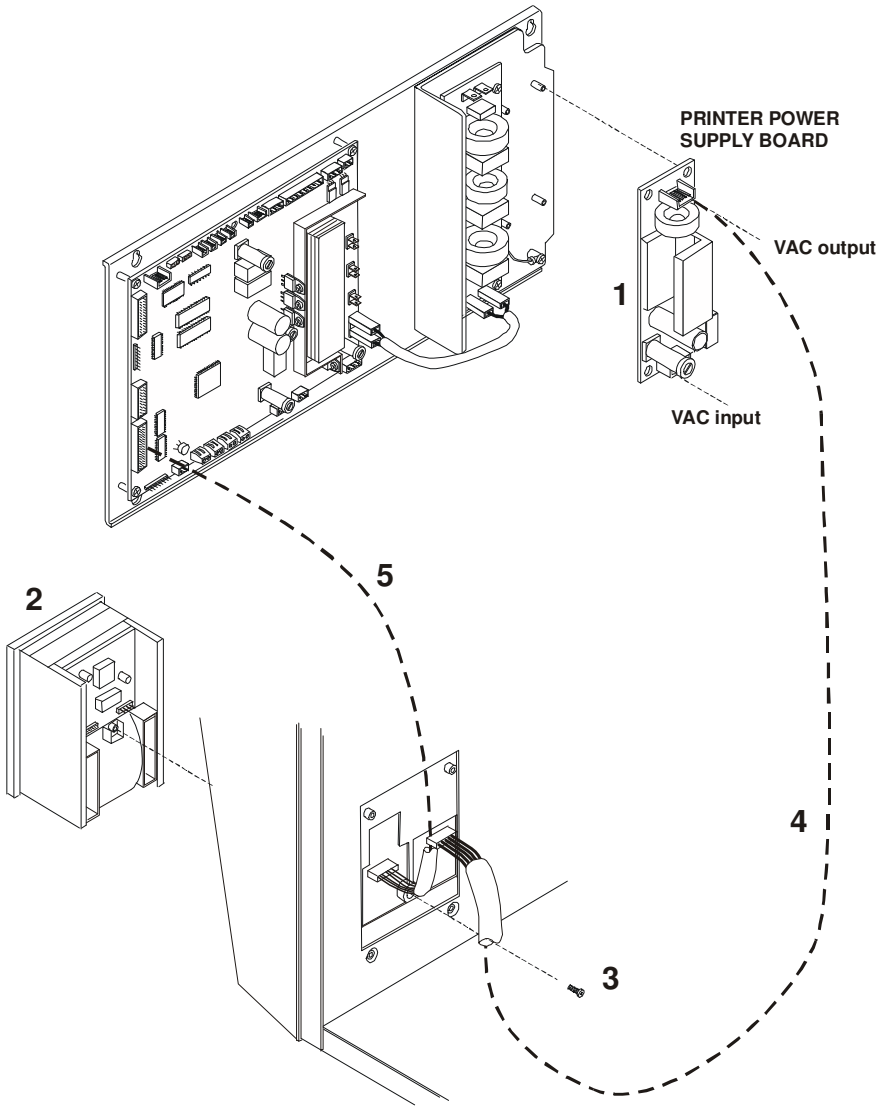
A0JP0230000 (style 1)

A9BP5430000 (style 2 , pcb GAM) - **A9BM5250000 (style 2 , pcb TROLL)**

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

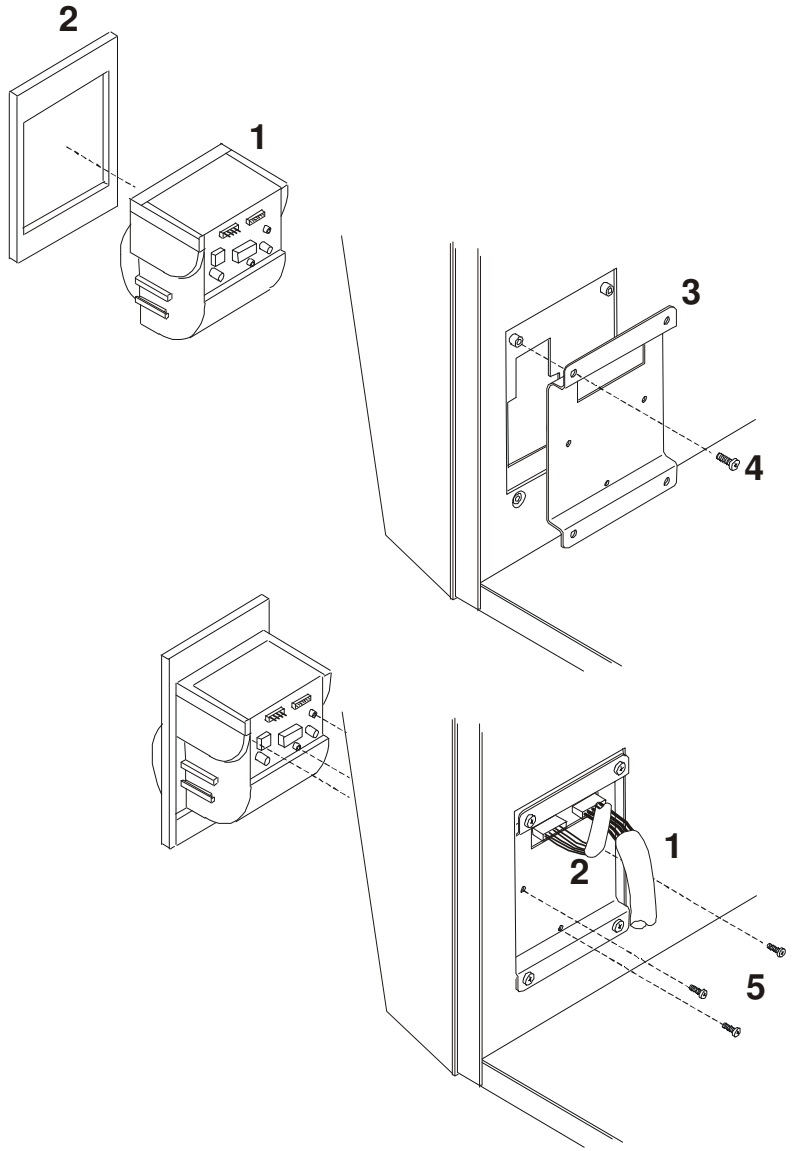
Style 1

1. Remove the frame cover (see card ***Gr7-1***).
2. Mount on the electronic board support the printer's power supply board (1) provided with kit
3. Cut the clamp on the transformer wiring and connect the free wiring to the AC input connector.
4. Place the printer unit (2) in the the service compartment and fix it back by means of the screw (3)
5. Connect the printer cable (4) between the output connector of the power supply board and the power supply input connector of the printer unit; arrange the cable path on the top of the electronic board support and fasten it by nylon clamps.
6. Connect the signal cable (5) between the CPU board and printer unit connectors.
7. Enter the SETUP mode, select ADVANCED menu, PRINT OPTIONS, PRINTER, and the INTERNAL option.
8. Exit the SETUP mode.
9. Run a sterilization cycle; at the end of the cycle check the correct print report.



Style 2

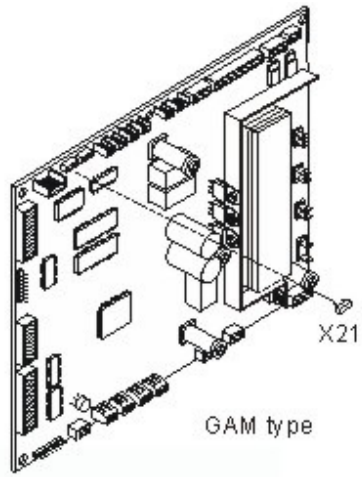
1. Remove the frame cover (see card ***Gr7-1***).
2. Replace the old printer power supply board with the one of the printer kit
3. Fit the printer unit (1) in the kit's printer frame (2).
4. Fix the printer support plate (3) on the service compartment by means of four screws (4).
5. Now fix the framed printer unit on the support plate by means of three screws (5).
6. Restore the the printer cable connections.
7. Enter the SETUP mode, select ADVANCED menu, PRINT OPTIONS, PRINTER, and the INTERNAL option.
8. Exit the SETUP mode.
9. Run a sterilization cycle; at the end of the cycle check the correct print report.



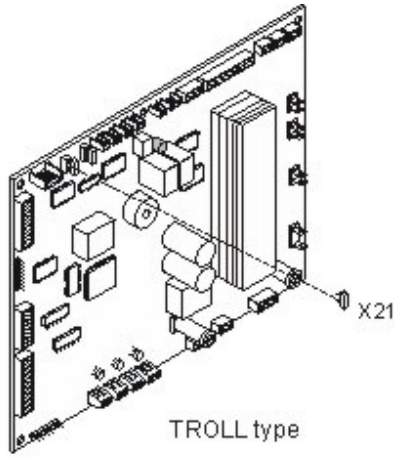
ATTACHMENT E -
RESETTING THE PRINT QUEUE

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

1. Remove the frame cover (see card ***Gr7-1***).
2. Remove the jumper X21 of the CPU board.
3. Push the key (hidden) of the control panel, switch-on the sterilizer. Release the key when the message "*LOCKING DEVICE*" appears on the LCD display.
4. Push the key  to exit this status. The auto-test will start.
5. When completed the auto-test, switch off the sterilizer, restore the jumper X21 and switch on again the unit.
6. Enter the SETUP mode. Select ADVANCED menu, PRINT OPTIONS, REPORT, PRINT LAST and the NORMAL PRINT option.
7. Exit the SETUP mode, and check that the printer resumes to operate correctly.

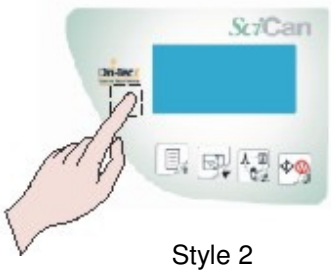


GAM type



TROLL type

Style 1

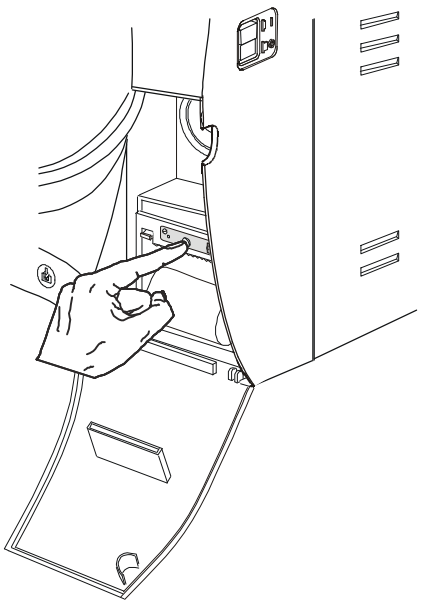

Style 2

ATTACHMENT F -
CHECKING THE PRINTER PAPER FEEDING

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

- Open the service compartment.
- Switch on the sterilizer.
- Push the key on the right of the printer's front panel, and check that the paper advances from the slot.

1. If so, run a sterilization cycle and check the print report at the end of the cycle.
2. Otherwise, check:
   a. the fuse on the printer power supply board,
   b: the correct connection on the electronic boards,
   c: replace the printer unit, if necessary



ATTACHMENT G -
START-UP OF THE STEAM GENERATOR

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

Perform this procedure in case of:
a. sterilizer unused for one month or more;
b. sterilizer stored at a temperature lower than 0°C;
c. water pump have replaced;
d. steam generator have replaced;
e. alarm of lack of water in the tank.

Procedure
1. Remove the frame cover (see card ***Gr7-1***).
2. Switch on the unit and enter the SETUP mode. Select SERVICE menu, type the access code "++--++--", and select H2O CIRCUIT option;
3. Push the Start/Stop key and check that the water pump runs correctly and the water flows in the chamber.
4. Wipe the chamber and exit the SETUP mode.
5. Run a sterilization cycle.

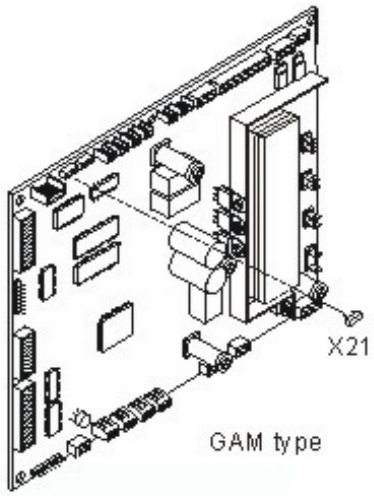
N.B. In case of problem, refer to the repair card of the malfunctioning component.

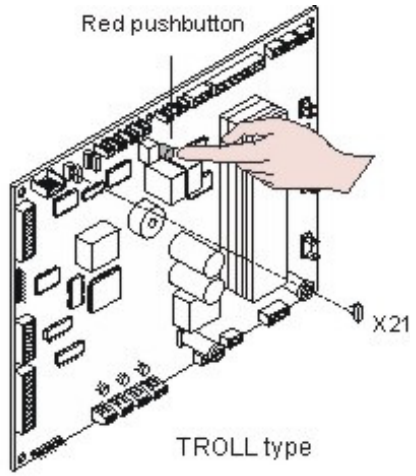
ATTACHMENT H -
UNLOCKING THE DOOR MECHANISM THROUGH A SW PROCEDURE

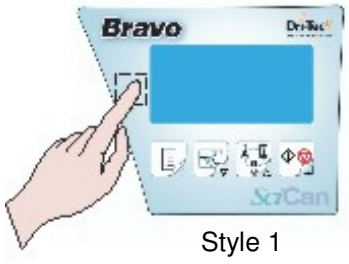
Before servicing, switch off the equipment and unplug the power supply cable from the mains socket.

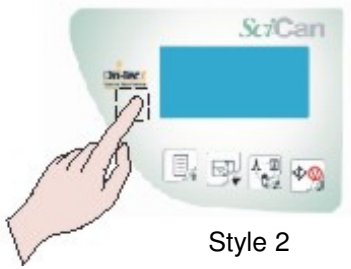
1. Remove the frame cover (see card ***Gr7-1***).
2. Remove the jumper X21 of the CPU board.
3. Push the key (hidden) of the control panel, switch-on the unit. Release the key when the message "*LOCKING DEVICE*" appears on the LCD display.
4. Push the Start/Stop key to release the door locking mechanism.
5. Open the door, push the key to exit this status. The auto-test will start.
6. **pcb type GAM**
   When completed the auto-test, turn off the unit, restore the jumper X21 and switch on the unit again;

   pcb type TROLL
   When completed the auto-test, push the red button of the CPU board, turn off the unit, restore the jumper X21 and switch on the unit again.
7. Run a sterilization cycle.





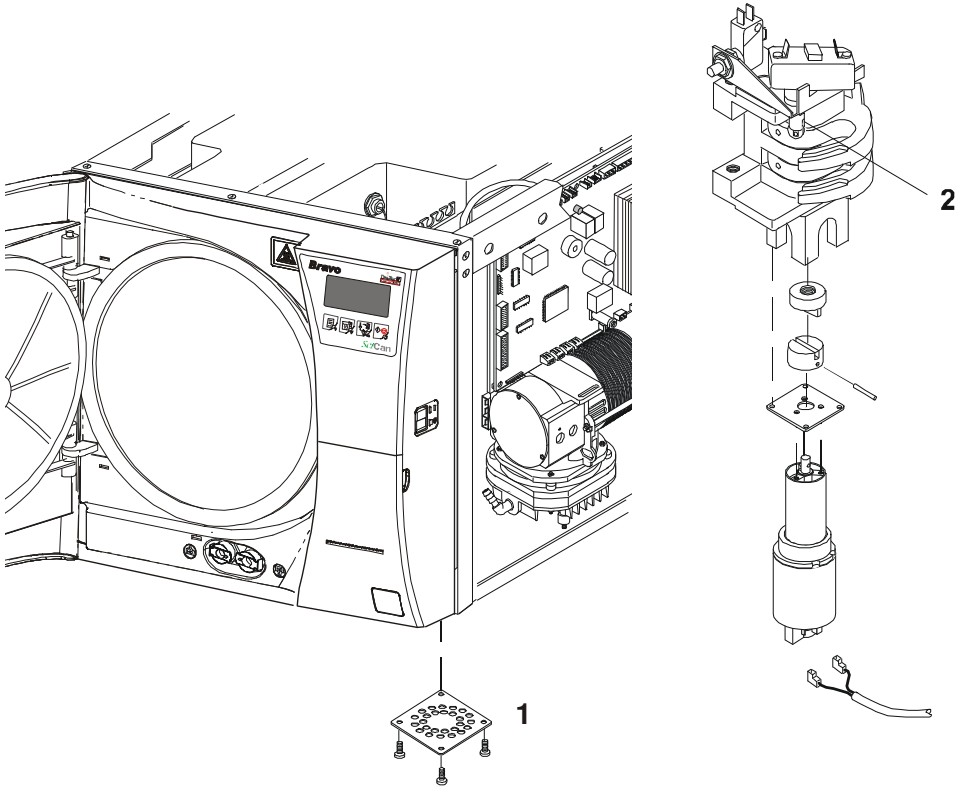




ATTACHMENT I -
MANUAL UNLOCK OF THE DOOR MECHANISM

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

1. Remove the frame cover (see card *Gr7-1*).
2. Empty both reservoirs, and turn left side the unit.
3. Remove the motor access plate (1) from the bottom.
4. Remove the motor wiring and the motor assembly.
5. Open the door; the door mechanism will unlocks.
6. Remount the motor, taking care to couple the bushings;
7. Connect the wiring (white = + / black = -) and mount the plate (1) on the bottom frame.
8. Use a screwdriver and keep pushed the pin (2) of the switch (door-unlocked).
9. Switch on the unit and wait for the end of the auto-test. Enter the SETUP mode, select the SERVICE option, enter the code "++--++--", then select DEVICE TEST – MANUAL - LOCKING DEVICE.
10. When the locking mechanism engages, **release the pin (2) of the switch**.
11. Push the Start/Stop key to release completely the locking mechanism.
12. Exit the Setup mode, and switch off/on the unit,
13. Run a sterilization cycle.



ATTACHMENT J -
RECOVERING THE DEFAULT DATA

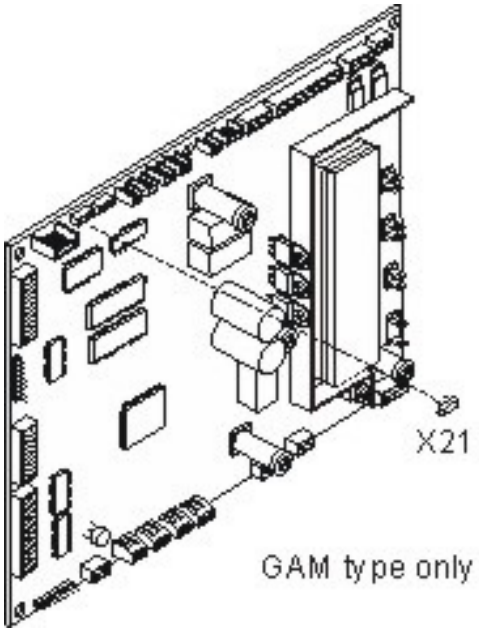
Before servicing, switch off the equipment and unplug the power supply cable from the mains socket.

1. Remove the frame cover (see card ***Gr7-1***).
2. Unplug the jumper X21 of the CPU board.
3. Push in the same time the three left keys, and switch-on the unit,
4. LCD display is completely empty.
5. Turn-off and-on the unit.
6. LCD display will show the message “DEFAULT DATA UPDATE”.
7. Wait for the completion of the update procedure (message “OK”).
8. Turn-off the unit.
9. Restore the jumper X21. and turn on the unit.
10. Run a sterilization cycle.

WARNING

When completed the data recovery, the sterilizer needs to be calibrated.

This procedure should apply starting from the software release **E0008 / BP00350.**



Style 2

NOTE: Not applicable with TROLL board.

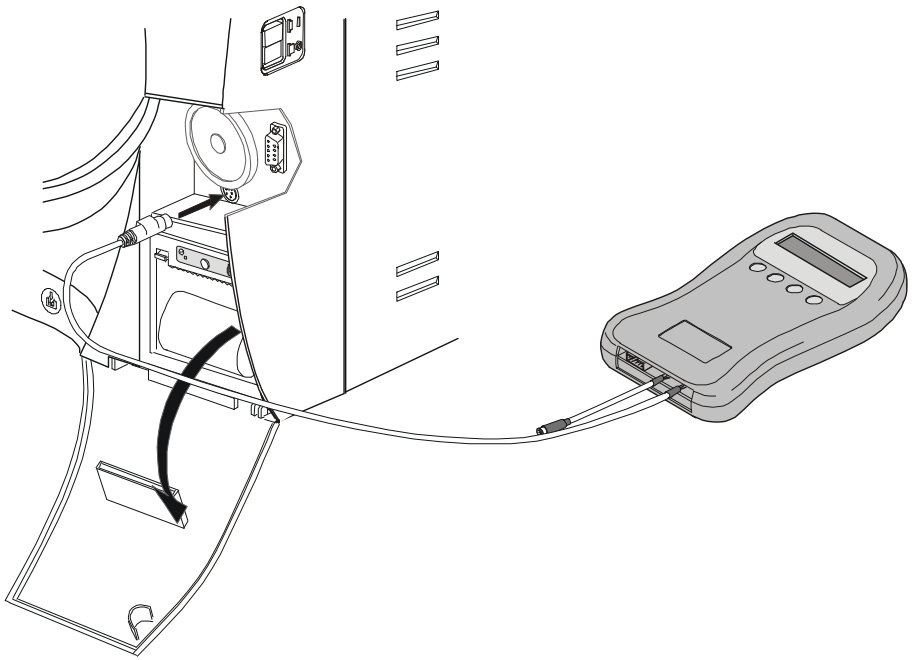
ATTACHMENT K -
SOFTWARE UPDATE

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

Follow the instructions reported on the Operating Manual of the Programmer.

1. Install the BravoProg application on the PC.
2. Connect the BravoProg device to the PC and download the last release of the software.
3. Connect the BravoProg device to the sterilizer.
4. Perform the sterilizer software upgrade.

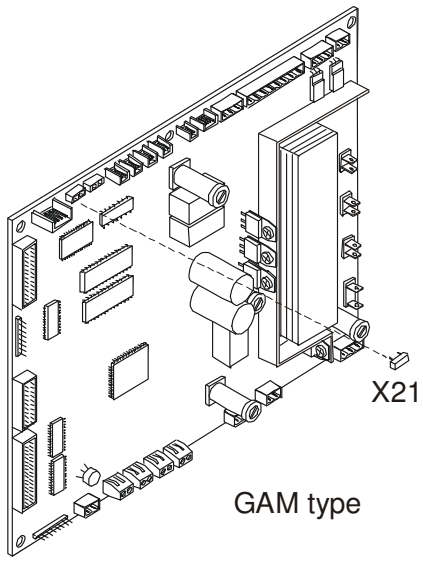
BravoProg - Sterilizer connection



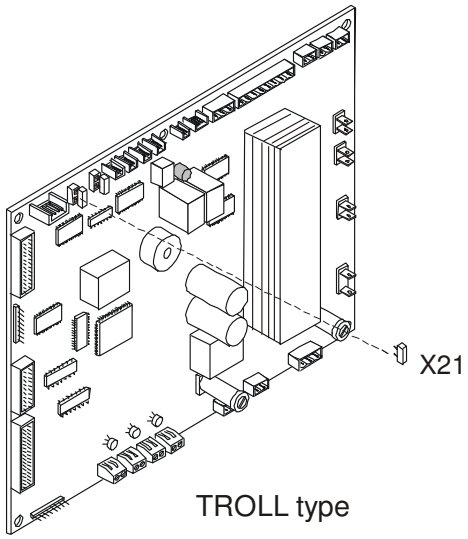
ATTACHMENT L -
RESETTING THE ALARM A022 - DOOR LOCKED

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

1. Remove the frame cover (see card ***Gr7-1***).
2. Unplug the jumper X21 of the CPU board.
3. Push the key Start ,and switch-on the unit.
4. LCD will show the message “SETUP”.
5. Keep pushed the Start key up to the display of the message “SETUP COMPLETE”.
6. Wait for the end of the autotest, then switch off the unit.
7. Restore the jumper X21. and switch on the unit.
8. Run a sterilization cycle.



GAM type

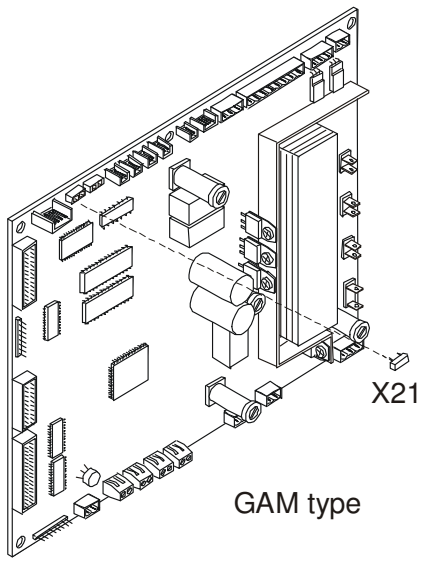


TROLL type

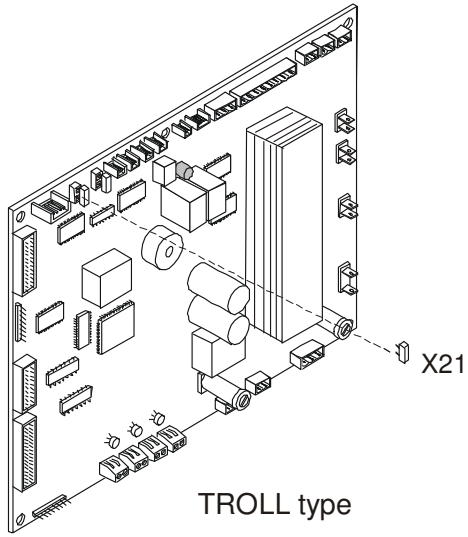
ATTACHMENT M -
CHECKING THE CALIBRATION

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

1. Remove the frame cover (see card ***Gr7-1***).
2. Unplug the jumper X21 OF the CPU board.
3. Remove the wiring of the probes PT1...4.
4. Plug-in the ref. connector to check the value 000.0.
5. Keep pushed the Start key and switch-on the unit; LCD will show the message “SETUP”, then the PT1 value (see figure).
6. Check that PT1 value agrees the calibration one, i.e. 000.0.
7. Push the key Start and repeat the check for PT2, PT3 and PT4 on the related connector.
8. Should any value be different from the calibration one, use the **+** / **–** key to increase or decrease the value.
9. When completed the last check, remove the ref. connector, and plug-in it again in reverse direction to check the PTn value at the set-point of 130.4°C;
10. Repeat the check as above for any PTn, and adjust the value in case it disagrees the value 000.0.
11. When completed the PTn checks, push again the Start key to continue the check procedure for the pressure transducer at the set-points of 0.00 , 2.10 and -.90 bar.
12. Push the Start key. The display will show “SETUP COMPLETE”.
13. Push again the Start key to exit the calibration mode and launch the auto-test.
14. When completed the auto-test, switch-off the unit and restore the jumper X21.
15. Switch-on the unit, and run a sterilization cycle.

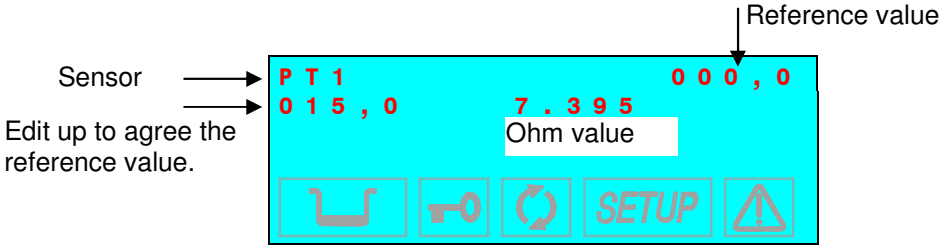


GAM type



TROLL type

Example of LCD display



ATTACHMENT N -
CALIBRATION PROCEDURE

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

WARNING

This procedure must be performed by skilled technicians and using the ref connector. Otherwise the manufacturer won't be responsible for wrong servicing.

1. Remove the frame cover (see card ***Gr7-1***).
2. Unplug jumper X21 of the CPU board.
3. Remove the wiring of the probes PT1...4.
4. Plug-in the ref. connector to check the value 000,0.
5. Switch-on the unit, enter the SETUP mode, select SERVICE menu, enter the access code "++--++--", move to the PT1 CORRECTION option, and check that the PT1 value agrees 1500 Ω.
6. Keep pushed the Start key and switch-on the unit; LCD will show the message "SETUP", then the PT1 value.
7. Push the first key at the left-side of the keypad; the value will drop to 000.0.
8. Should the value be different, use the **+** / **–** key to increase/decrease the value up to agree 000.0; wait a few seconds and check the stability of the value.
9. Push the Start key and repeat the check as above for any PTn. Adjust the value in case of disagree from 000.0.
10. Push again the key Start to continue the PTn calibration at the set-point of 130.4°C. Remove the ref. connector, and plug-in it again in reverse direction.
11. Push the first key at the left-side of the keypad; the value will increase to the new reference value.
12. Push again the key to approach the value to the reference one; should the value be different, use **+** / **–** key to increase/decrease the value up to agree the reference one; wait a few seconds and check the stability of the value.
13. Push the Start key and repeat the check as above for any PTn, and adjust the value in case it disagrees.
14. Continue the procedure with the **MPx calibration at ambient pressure**; use the key at the left-side of the keypad to approach the value to the reference one, and the key **+** to set the value at 0,00; wait a few seconds and check the stability of the value.
15. Push the Start key to continue with the **MPx calibration at 2,10 bar**; connect the pressure transducer to an external air compressor, set the pressure at 2.10 bar; push the key at the left-side of the keypad to read the value; use the **+** / **–** key to increase/decrease the value up to agree the reference one; wait a few seconds and check the stability of the value.
16. Push the Start key to continue with the **MPx calibration at -.90 bar**; remove the air compressor, connect the pressure transducer to an external vacuum pump; set the value at -.90 bar; push the key at the left-side of the keypad to read the value; use the **+** / **–** key to increase/decrease the value up to agree the reference one; wait a few seconds and check the stability of the value.
17. Push the key Start; now the display will show "SETUP COMPLETE"; press the Start key to confirm the calibration. Wait for the end of the auto-test.
18. Switch-off the unit; remove the ref. connector; restore the PTn wiring and the jumper X21.
19. Switch-on the unit, enter the SETUP mode, select SERVICE menu, enter the code "++--++--", go to the PT1 CORRECTION option;
20. Use the **+** / **–** key to increase/decrease the value up to agree the written value of the label attached on the right rail.
21. Push the Start key to confirm; exit the SETUP mode and switch-off the unit.
22. Switch-on the unit and run a sterilization cycle.

ATTACHMENT O -
TESTING THE UNIT THROUGH CONTINUOUS CYCLES

Use this procedure with test repeated for a lot of times.

The unit must be properly set to carry out a continuous test cycle.

1. Connect an external tank for the automatic water supply (or an external demineralizer).
2. Connect an external tank for the used water drain.
3. Fill of distilled water the external tank.
4. Enter SETUP mode, select the menu ADVANCED, FILLING OPTIONS and AUTOMATIC.
5. Move to the menu SERVICE, TEST CYCLES, and select the option desired.
6. Exit the SETUP mode.
7. Select the cycle and push the key Start.

WARNING

When ended the test, enter the SETUP menu, select the menu SERVICE, TEST CYCLES and the option “TEST CYCLES OFF” in order to reset the sterilizer in standard mode.

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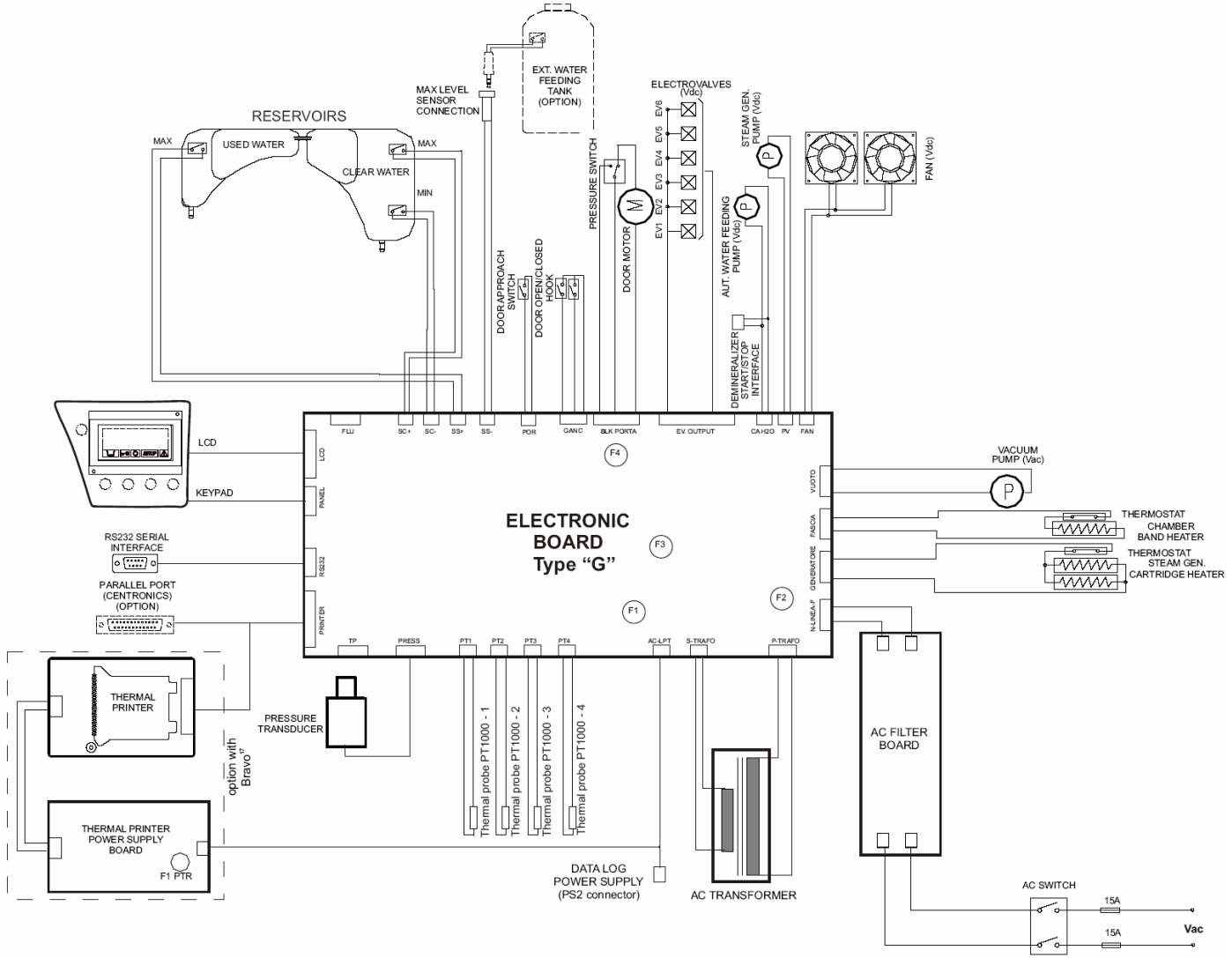
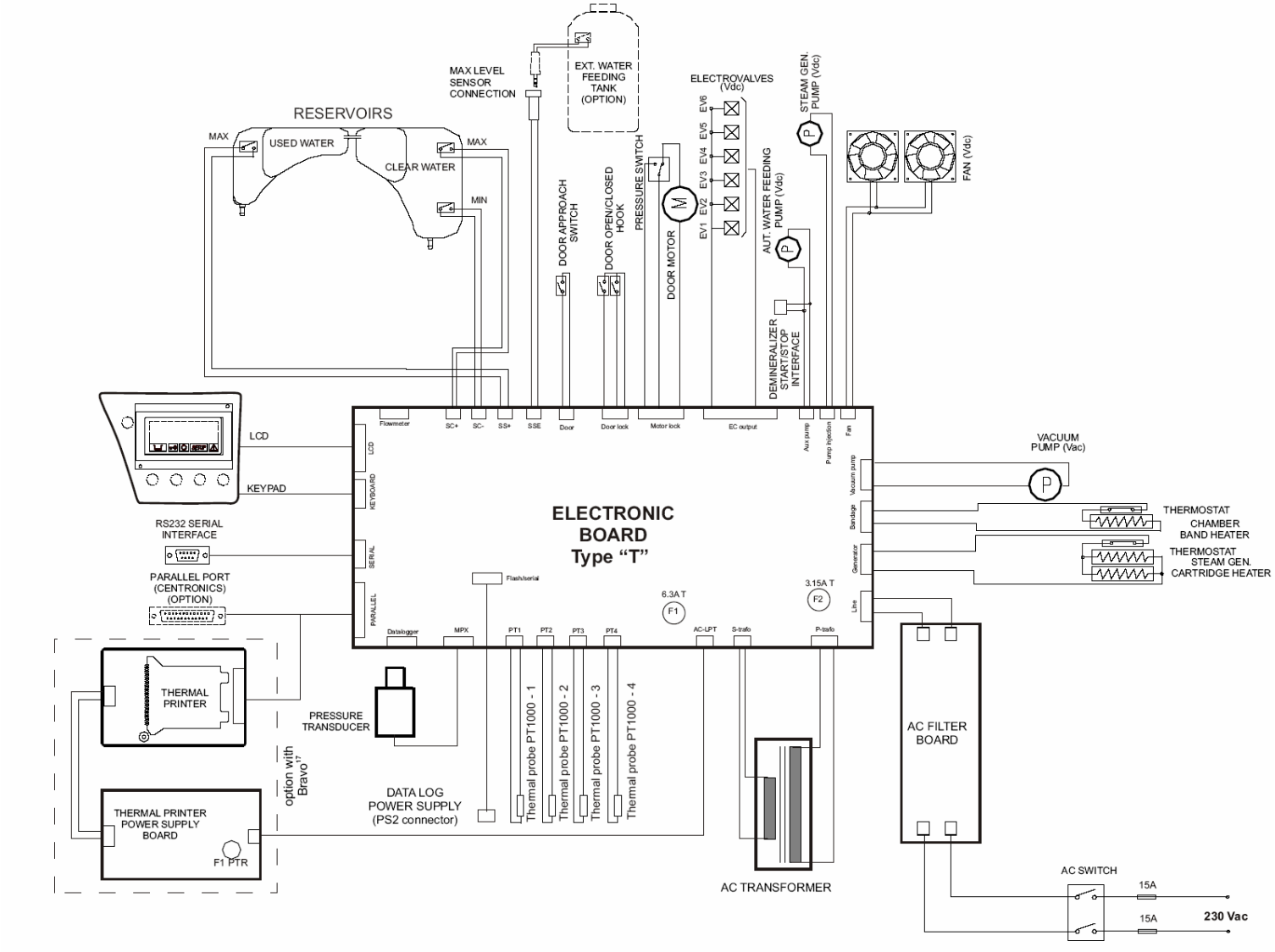
4. DIAGRAMS, EXPLODED VIEWS AND SPARE PARTS

DIAGRAMS

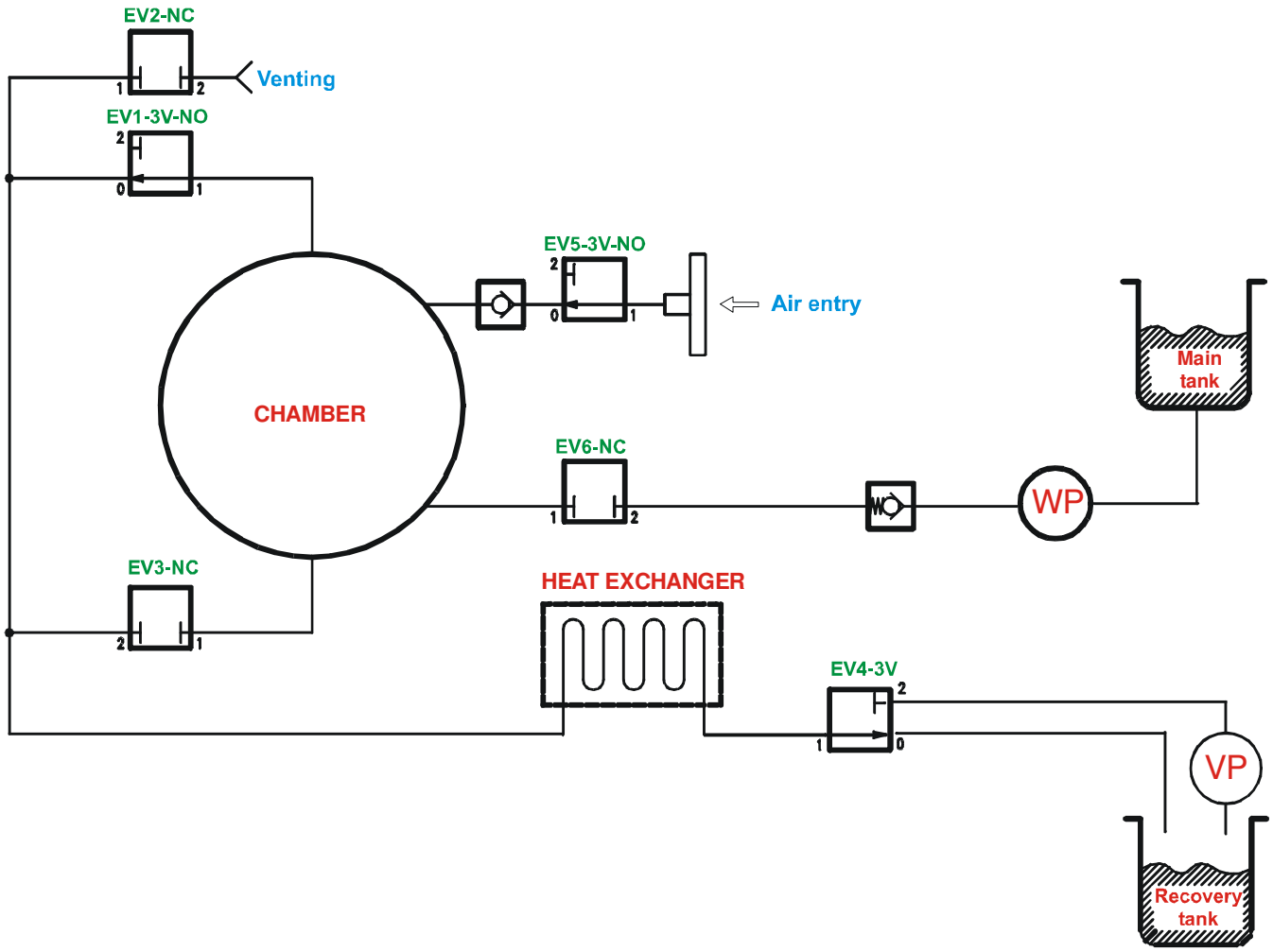
CIRCUIT DIAGRAM (GAM version)



CIRCUIT DIAGRAM (TROLL version)

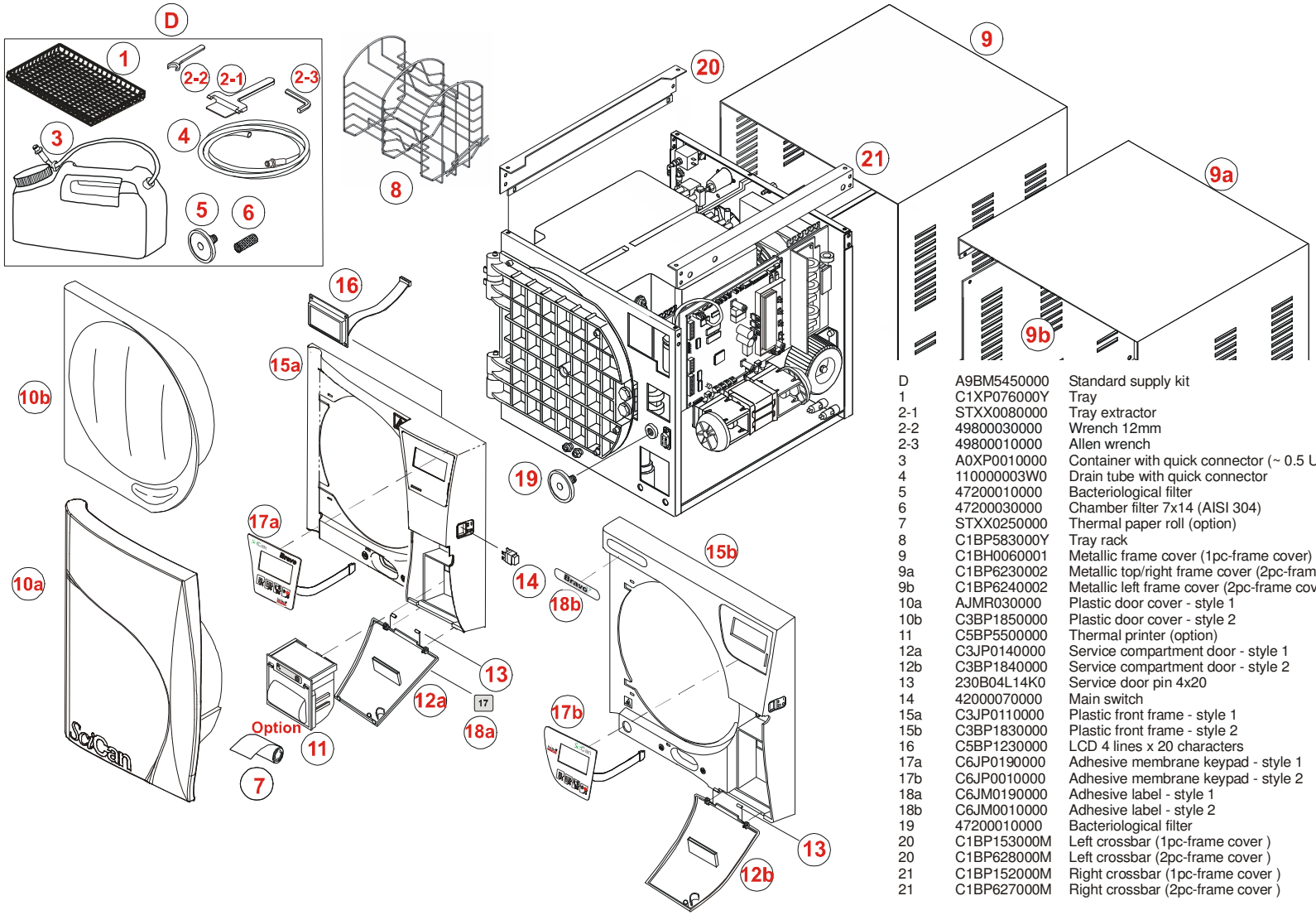


HYDRAULIC DIAGRAM



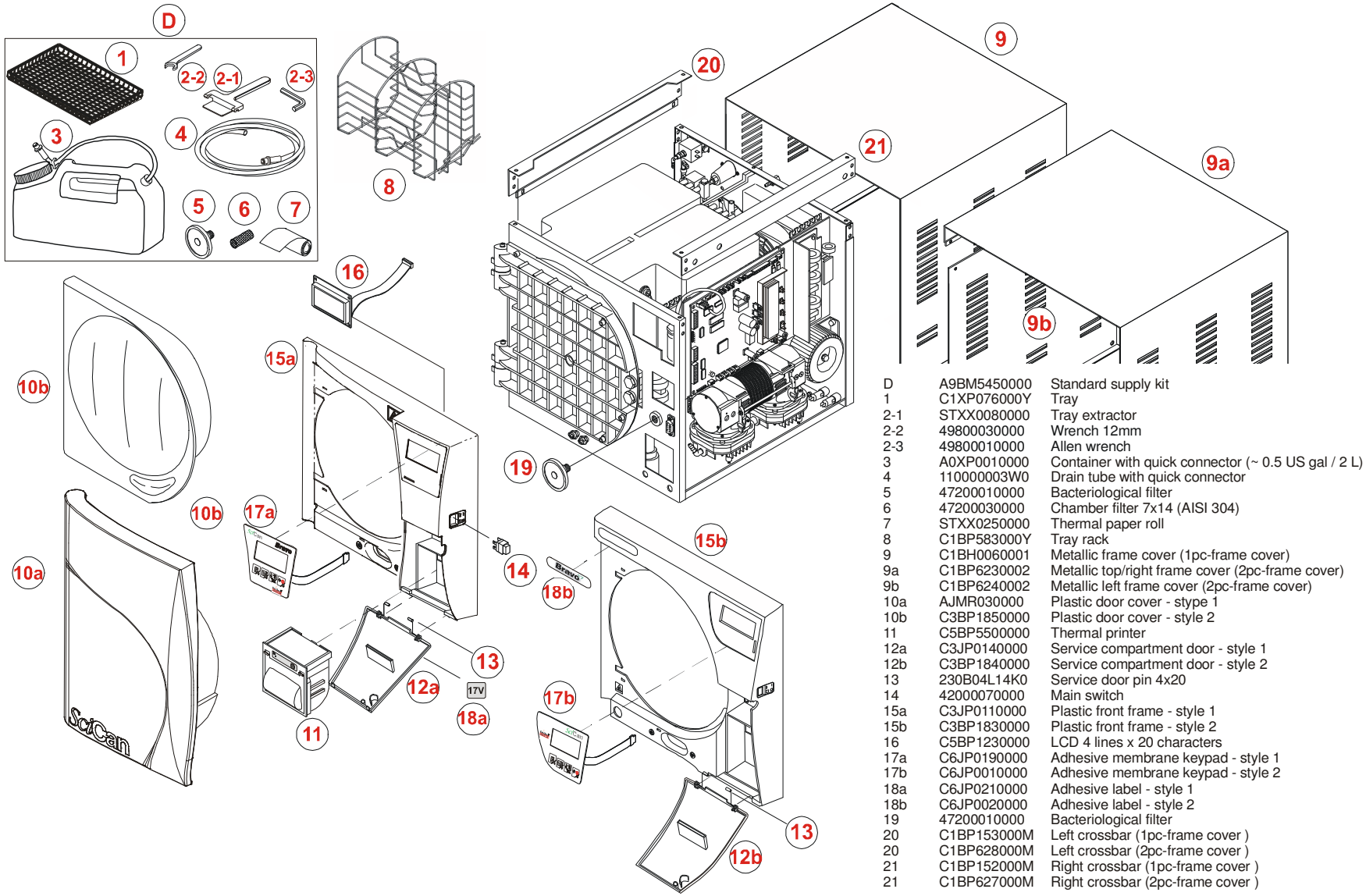
EXPLODED VIEWS

TABLE 1 - BRAVO[17]



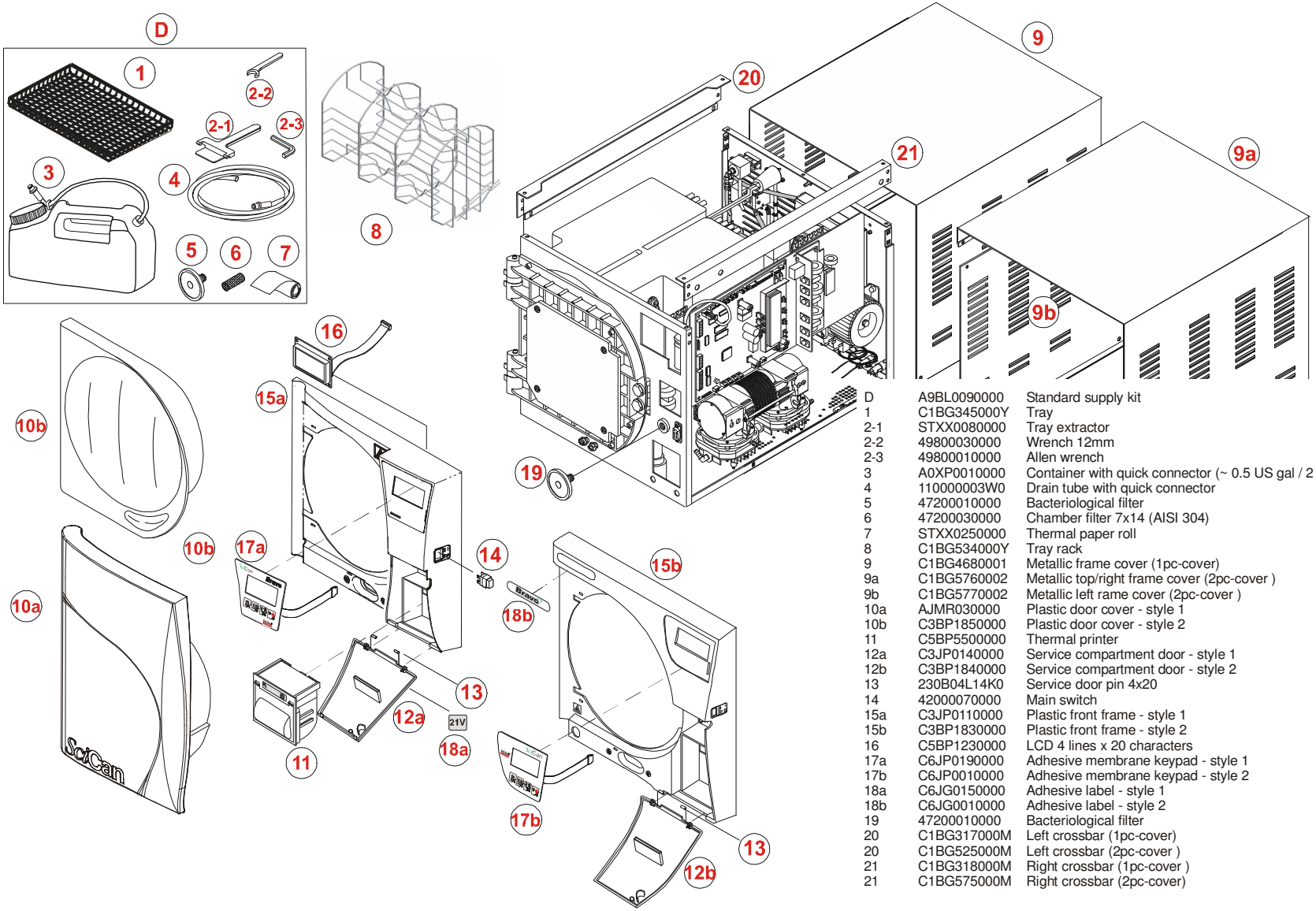
D	A9BM5450000	Standard supply kit
1	C1XP076000Y	Tray
2-1	STXX0080000	Tray extractor
2-2	49800030000	Wrench 12mm
2-3	49800010000	Allen wrench
3	A0XP0010000	Container with quick connector (~ 0.5 US gal / 2 L)
4	110000003W0	Drain tube with quick connector
5	47200010000	Bacteriological filter
6	47200030000	Chamber filter 7x14 (AISI 304)
7	STXX0250000	Thermal paper roll (option)
8	C1BP583000Y	Tray rack
9	C1BH0060001	Metallic frame cover (1pc-frame cover)
9a	C1BP6230002	Metallic top/right frame cover (2pc-frame cover)
9b	C1BP6240002	Metallic left frame cover (2pc-frame cover)
10a	AJMR030000	Plastic door cover - style 1
10b	C3BP1850000	Plastic door cover - style 2
11	C5BP5500000	Thermal printer (option)
12a	C3JP0140000	Service compartment door - style 1
12b	C3BP1840000	Service compartment door - style 2
13	230B04L14K0	Service door pin 4x20
14	42000070000	Main switch
15a	C3JP0110000	Plastic front frame - style 1
15b	C3BP1830000	Plastic front frame - style 2
16	C5BP1230000	LCD 4 lines x 20 characters
17a	C6JP0190000	Adhesive membrane keypad - style 1
17b	C6JP0010000	Adhesive membrane keypad - style 2
18a	C6JM0190000	Adhesive label - style 1
18b	C6JM0010000	Adhesive label - style 2
19	47200010000	Bacteriological filter
20	C1BP153000M	Left crossbar (1pc-frame cover)
20	C1BP628000M	Left crossbar (2pc-frame cover)
21	C1BP152000M	Right crossbar (1pc-frame cover)
21	C1BP627000M	Right crossbar (2pc-frame cover)

TABLE 1 - BRAVO[17V]



D	A9BM5450000	Standard supply kit
1	C1XP076000Y	Tray
2-1	STXX0080000	Tray extractor
2-2	49800030000	Wrench 12mm
2-3	49800010000	Allen wrench
3	A0XP0010000	Container with quick connector (~ 0.5 US gal / 2 L)
4	110000003W0	Drain tube with quick connector
5	47200010000	Bacteriological filter
6	47200030000	Chamber filter 7x14 (AISI 304)
7	STXX0250000	Thermal paper roll
8	C1BP583000Y	Tray rack
9	C1BH0060001	Metallic frame cover (1pc-frame cover)
9a	C1BP6230002	Metallic top/right frame cover (2pc-frame cover)
9b	C1BP6240002	Metallic left frame cover (2pc-frame cover)
10a	AJMR030000	Plastic door cover - stype 1
10b	C3BP1850000	Plastic door cover - style 2
11	C5BP5500000	Thermal printer
12a	C3JP0140000	Service compartment door - style 1
12b	C3BP1840000	Service compartment door - style 2
13	230B04L14K0	Service door pin 4x20
14	42000070000	Main switch
15a	C3JP0110000	Plastic front frame - style 1
15b	C3BP1830000	Plastic front frame - style 2
16	C5BP1230000	LCD 4 lines x 20 characters
17a	C6JP0190000	Adhesive membrane keypad - style 1
17b	C6JP0010000	Adhesive membrane keypad - style 2
18a	C6JP0210000	Adhesive label - style 1
18b	C6JP0020000	Adhesive label - style 2
19	47200010000	Bacteriological filter
20	C1BP153000M	Left crossbar (1pc-frame cover)
20	C1BP628000M	Left crossbar (2pc-frame cover)
21	C1BP152000M	Right crossbar (1pc-frame cover)
21	C1BP627000M	Right crossbar (2pc-frame cover)

TABLE 1 - BRAVO^{21V}



D	A9BL0090000	Standard supply kit
1	C1BG345000Y	Tray
2-1	STXX0080000	Tray extractor
2-2	49800030000	Wrench 12mm
2-3	49800010000	Allen wrench
3	A0XP0010000	Container with quick connector (~ 0.5 US gal / 2 L)
4	110000003W0	Drain tube with quick connector
5	47200010000	Bacteriological filter
6	47200030000	Chamber filter 7x14 (AISI 304)
7	STXX0250000	Thermal paper roll
8	C1BG534000Y	Tray rack
9	C1BG4680001	Metallic frame cover (1pc-cover)
9a	C1BG5760002	Metallic top/right frame cover (2pc-cover)
9b	C1BG5770002	Metallic left rame cover (2pc-cover)
10a	AJMR030000	Plastic door cover - style 1
10b	C3BP1850000	Plastic door cover - style 2
11	C5BP5500000	Thermal printer
12a	C3JP0140000	Service compartment door - style 1
12b	C3BP1840000	Service compartment door - style 2
13	230B04L14K0	Service door pin 4x20
14	42000070000	Main switch
15a	C3JP0110000	Plastic front frame - style 1
15b	C3BP1830000	Plastic front frame - style 2
16	C5BP1230000	LCD 4 lines x 20 characters
17a	C6JP0190000	Adhesive membrane keypad - style 1
17b	C6JP0010000	Adhesive membrane keypad - style 2
18a	C6JG0150000	Adhesive label - style 1
18b	C6JG0010000	Adhesive label - style 2
19	47200010000	Bacteriological filter
20	C1BG317000M	Left crossbar (1pc-cover)
20	C1BG525000M	Left crossbar (2pc-cover)
21	C1BG318000M	Right crossbar (1pc-cover)
21	C1BG575000M	Right crossbar (2pc-cover)

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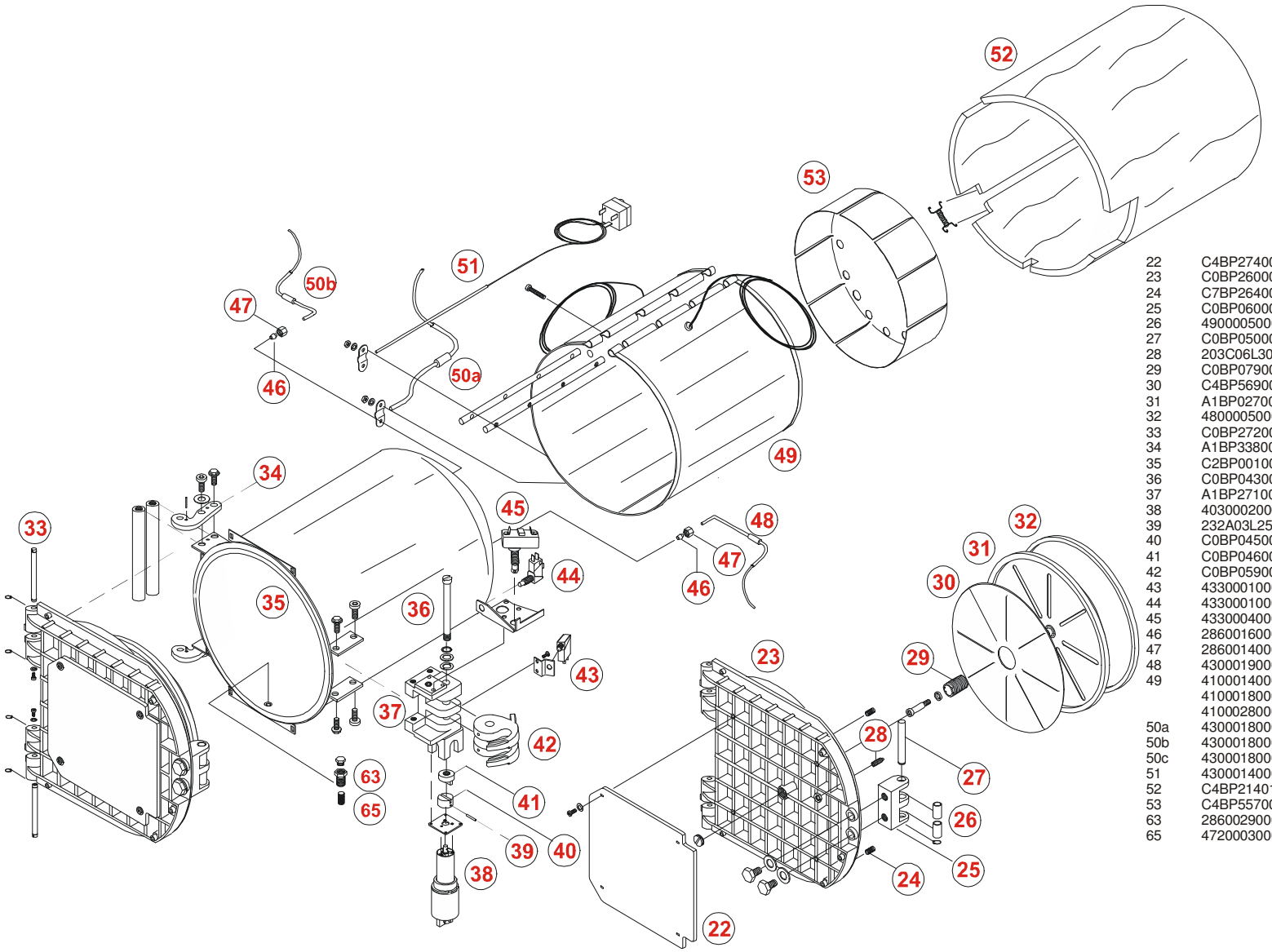
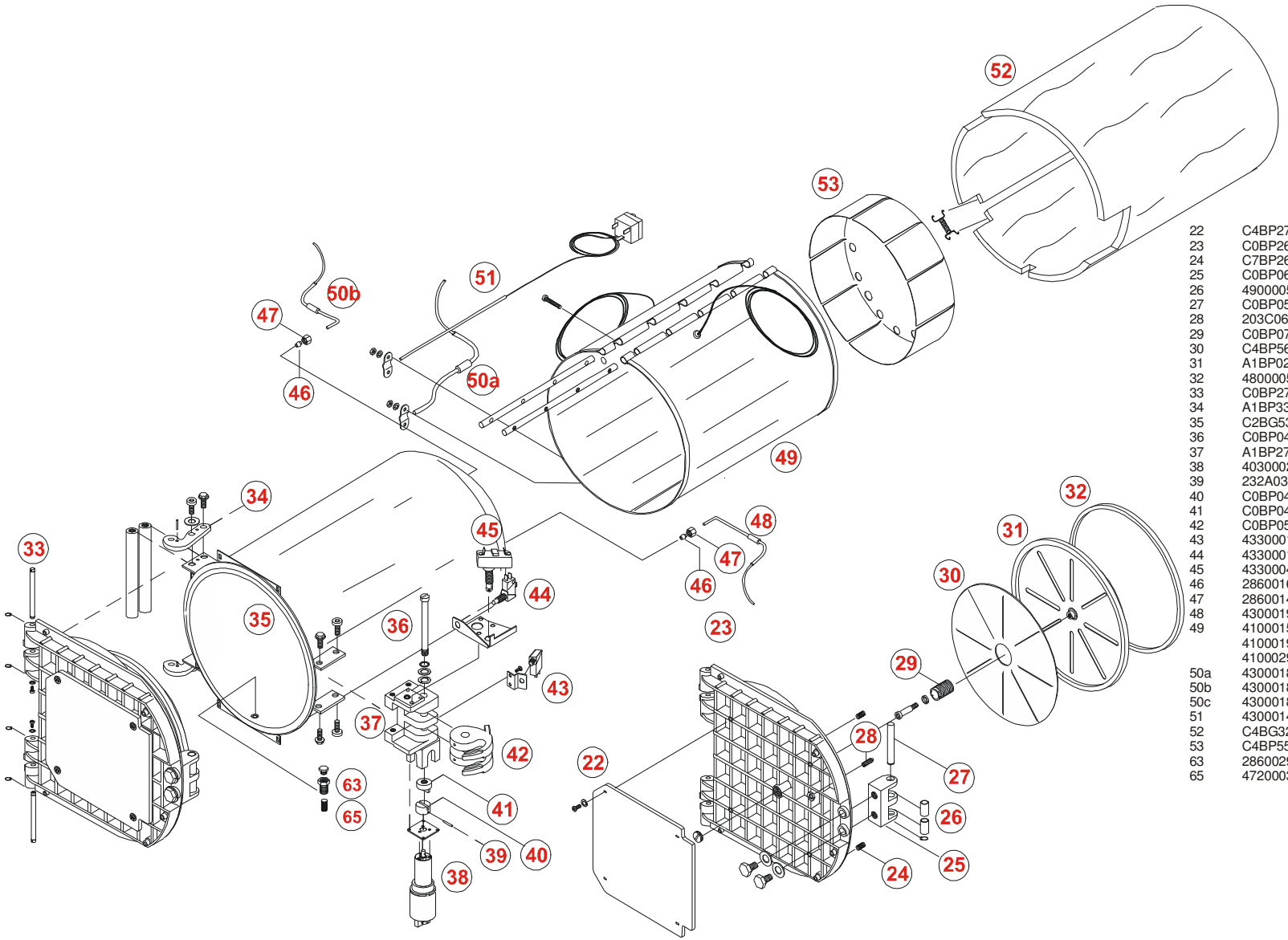
TABLE 2 – BRAVO[17] & BRAVO[17V]



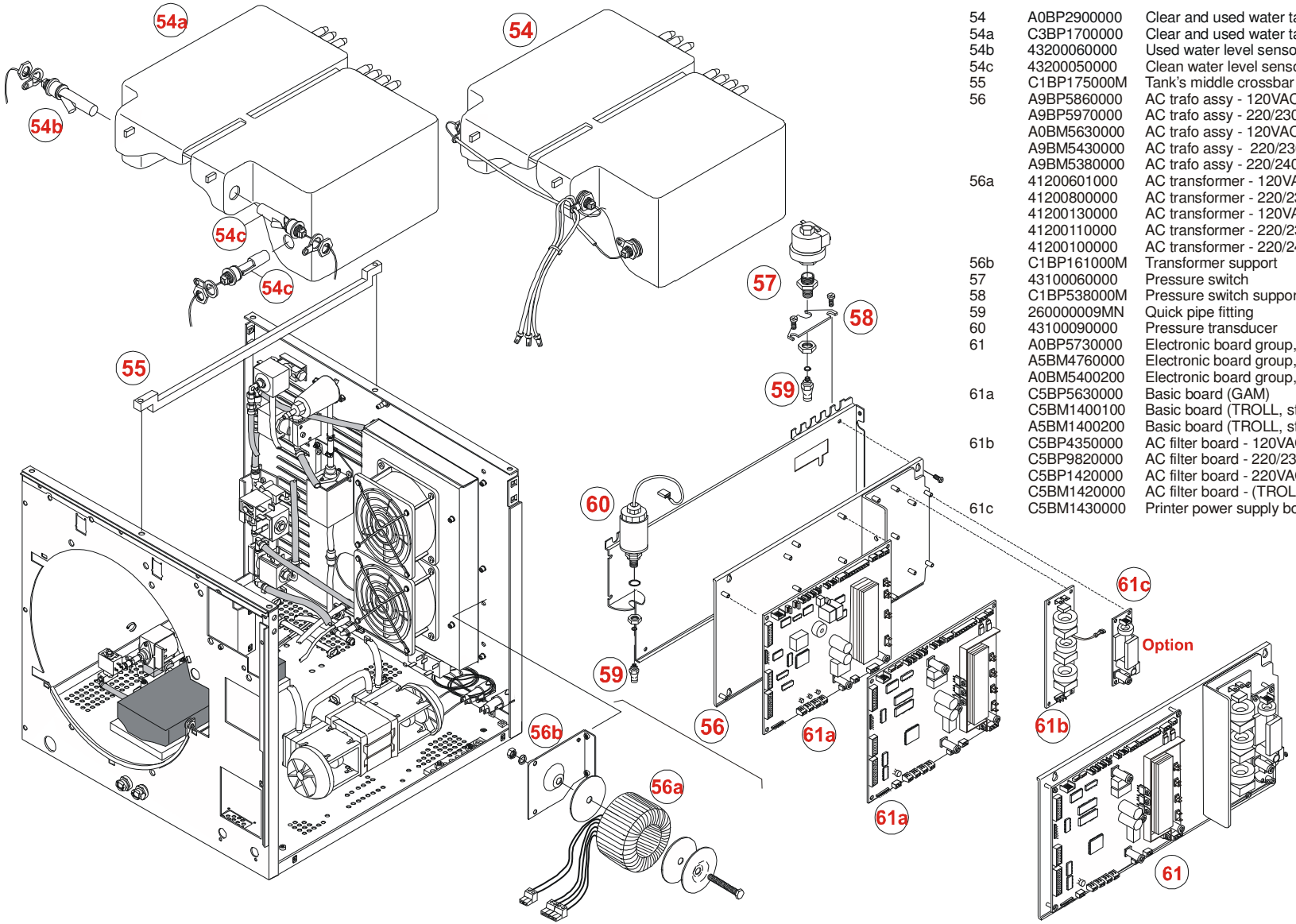
22	C4BP2740000	Thermo-insulating panel (door)
23	C0BP260000P	Cast aluminum door
24	C7BP2640000	Door spring
25	C0BP060000Z	Door nitrided fork
26	49000050000	Door bush
27	C0BP0500000	Door fork pin
28	203C06L30K0	Screw 6x30
29	C0BP079000N	Door adjustment screw
30	C4BP5690000	Door thermo-insulating disk
31	A1BP027000Y	Parabola board
32	48000050000	Door gasket
33	C0BP2720000	Door hinge pin
34	A1BP3380000	Door hinge
35	C2BP0010000	Stainless steel chamber
36	C0BP0430000	Pin of the door closing system
37	A1BP2710000	Door closing system group
38	40300020000	Gear-motor 24VDC
39	232A03L25K0	Pin 3x25
40	C0BP0450000	Gear-motor coupling
41	C0BP0460000	Intermediate join
42	C0BP0590000	Closing hook
43	43300010000	Hook micro-switch (open)
44	43300010000	Door micro-switch
45	43300040000	Hook micro-switch (close)
46	28600160000	Olive for temperature sensor connection
47	2860014000N	Nut for temperature sensor connection
48	43000190000	Thermal sensor PT1000 - PT1
49	41000140000	Chamber heater 1700W 220VAC 50Hz - style 1
	41000180000	Chamber heater 1500W 120VAC 60Hz - style 2
	41000280000	Chamber heater 1700W 220VAC 60Hz - style 2
50a	43000180000	Thermal sensor PT1000 - PT3
50b	43000180000	Thermal sensor PT1000 - PT4
50c	43000180000	Thermal sensor PT1000 - PT2
51	43000140000	Safety thermostat TG400
52	C4BP2140100	Thermo-insulating panel (chamber)
53	C4BP5570000	Rear thermo-insulating panel (chamber)
63	28600290000	Fitting for chamber filterr
65	47200030000	Chamber filter 7 x14 (AISI 304)

TABLE 2 –BRAVO^{21V}



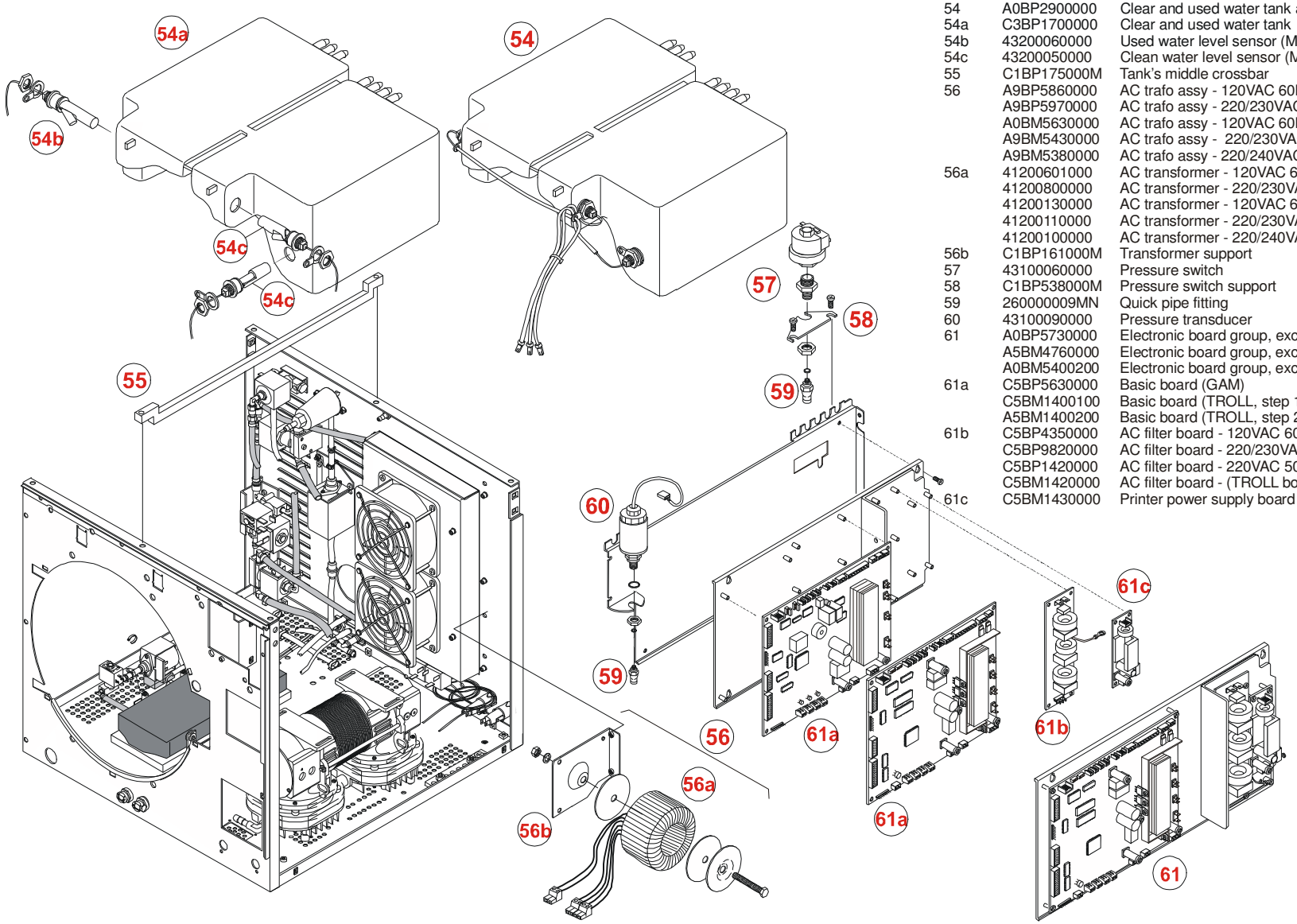
22	C4BP2740000	Thermo-insulating panel (door)
23	C0BP260000P	Cast aluminum door
24	C7BP2640000	Door spring
25	C0BP060000Z	Door nitrided fork
26	49000050000	Door bush
27	C0BP0500000	Door fork pin
28	203C06L30K0	Screw 6x30
29	C0BP079000N	Door adjustment screw-
30	C4BP5690000	Door thermo-insulating disk
31	A1BP027000Y	Parabola board
32	48000050000	Door gasket
33	C0BP2720000	Door hinge pin
34	A1BP3380000	Door hinge
35	C2BG5300000	Stainless steel chamber
36	C0BP0430000	Pin of the door closing system
37	A1BP2710000	Door closing system group
38	40300020000	Gear-motor 24VDC
39	232A03L25K0	Pin 3x25
40	C0BP0450000	Gear-motor coupling
41	C0BP0460000	Intermediate join
42	C0BP0590000	Closing hook
43	43300010000	Hook micro-switch (open)
44	43300010000	Door micro-switch
45	43300040000	Hook micro-switch (close)
46	28600160000	Olive for temperature sensor connection
47	2860014000N	Nut for temperature sensor connection
48	43000190000	Thermal sensor PT1000 - PT1
49	41000150000	Chamber heater 2000W 220VAC 50Hz - style 1
	41000190000	Chamber heater 1500W 120VAC 60Hz -style 2
	41000290000	Chamber heater 2000W 220VAC 60Hz - style 2
50a	43000180000	Thermal sensor PT1000 - PT3
50b	43000180000	Thermal sensor PT1000 - PT4
50c	43000180000	Thermal sensor PT1000 - PT2
51	43000140000	Safety thermostat TG400
52	C4BG3280000	Thermo-insulating panel (chamber)
53	C4BP5570000	Rear thermo-insulating panel (chamber)
63	28600290000	Fitting for chamber filter
65	47200030000	Chamber filter 7 x 14 (AISI 304)

TABLE 3- BRAVO[17]



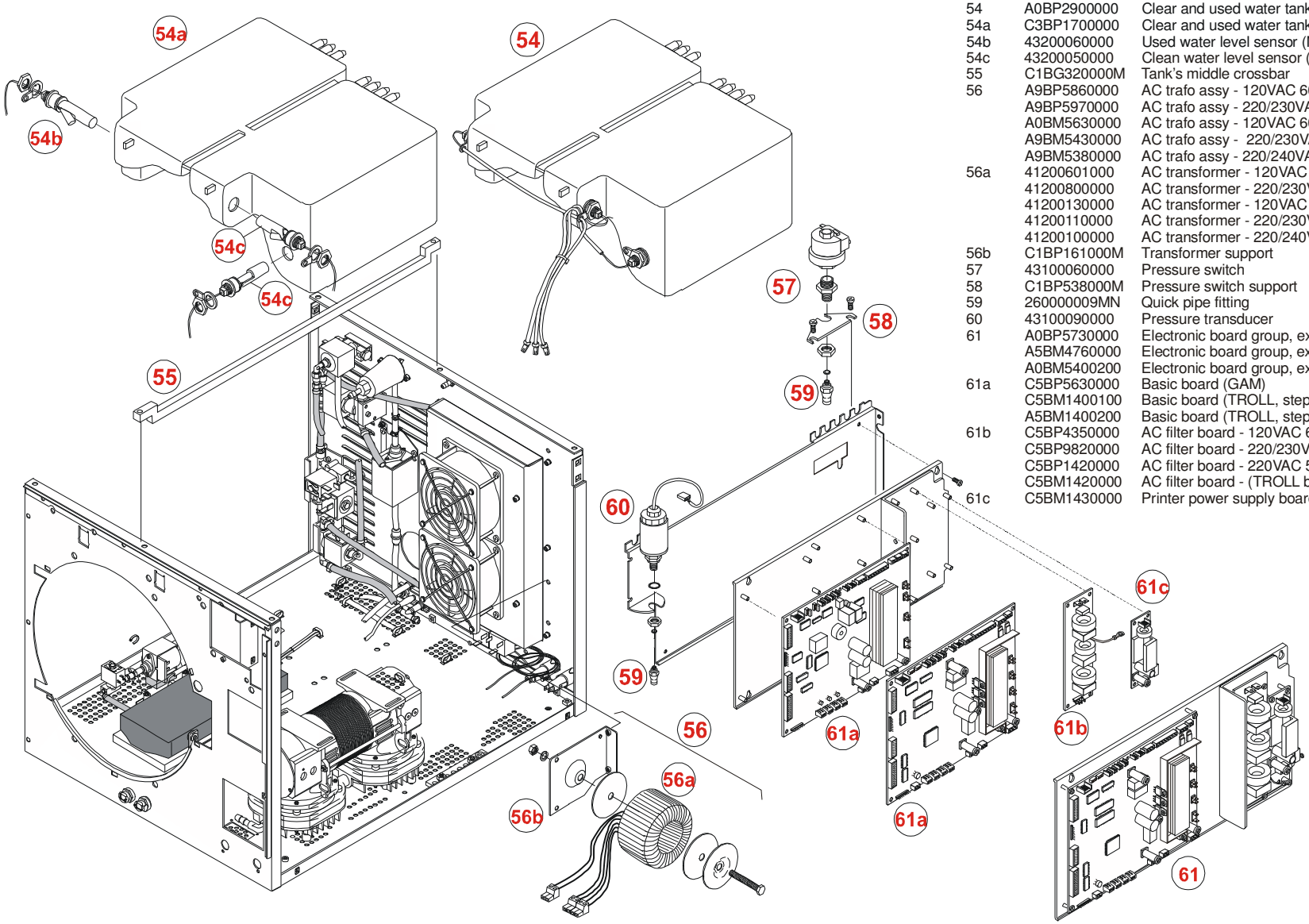
54	A0BP2900000	Clear and used water tank assy
54a	C3BP1700000	Clear and used water tank
54b	43200060000	Used water level sensor (MAX)
54c	43200050000	Clean water level sensor (MIN/MAX)
55	C1BP175000M	Tank's middle crossbar
56	A9BP5860000	AC trafo assy - 120VAC 60Hz (GAM board)
	A9BP5970000	AC trafo assy - 220/230VAC 60Hz (GAM board)
	A0BM5630000	AC trafo assy - 120VAC 60Hz (TROLL board)
	A9BM5430000	AC trafo assy - 220/230VAC 60Hz (TROLL board)
	A9BM5380000	AC trafo assy - 220/240VAC 50Hz (TROLL board)
56a	41200601000	AC transformer - 120VAC 60Hz (GAM board)
	41200800000	AC transformer - 220/230VAC 60Hz (GAM board)
	41200130000	AC transformer - 120VAC 60Hz (TROLL board)
	41200110000	AC transformer - 220/230VAC 60Hz (TROLL board)
	41200100000	AC transformer - 220/240VAC 50Hz (TROLL board)
56b	C1BP161000M	Transformer support
57	43100060000	Pressure switch
58	C1BP538000M	Pressure switch support
59	260000009MN	Quick pipe fitting
60	43100090000	Pressure transducer
61	A0BP5730000	Electronic board group, except Printer Board (GAM)
	A5BM4760000	Electronic board group, except Printer Board (TROLL, step 1)
	A0BM5400200	Electronic board group, except Printer Board (TROLL, step 2)
61a	C5BP5630000	Basic board (GAM)
	C5BM1400100	Basic board (TROLL, step 1)
	A5BM1400200	Basic board (TROLL, step 2)
61b	C5BP4350000	AC filter board - 120VAC 60Hz (GAM board)
	C5BP9820000	AC filter board - 220/230VAC 60Hz (GAM board)
	C5BP1420000	AC filter board - 220VAC 50Hz (GAM board)
	C5BM1420000	AC filter board - (TROLL board)
61c	C5BM1430000	Printer power supply board (option)

TABLE 3- BRAVO[17V]



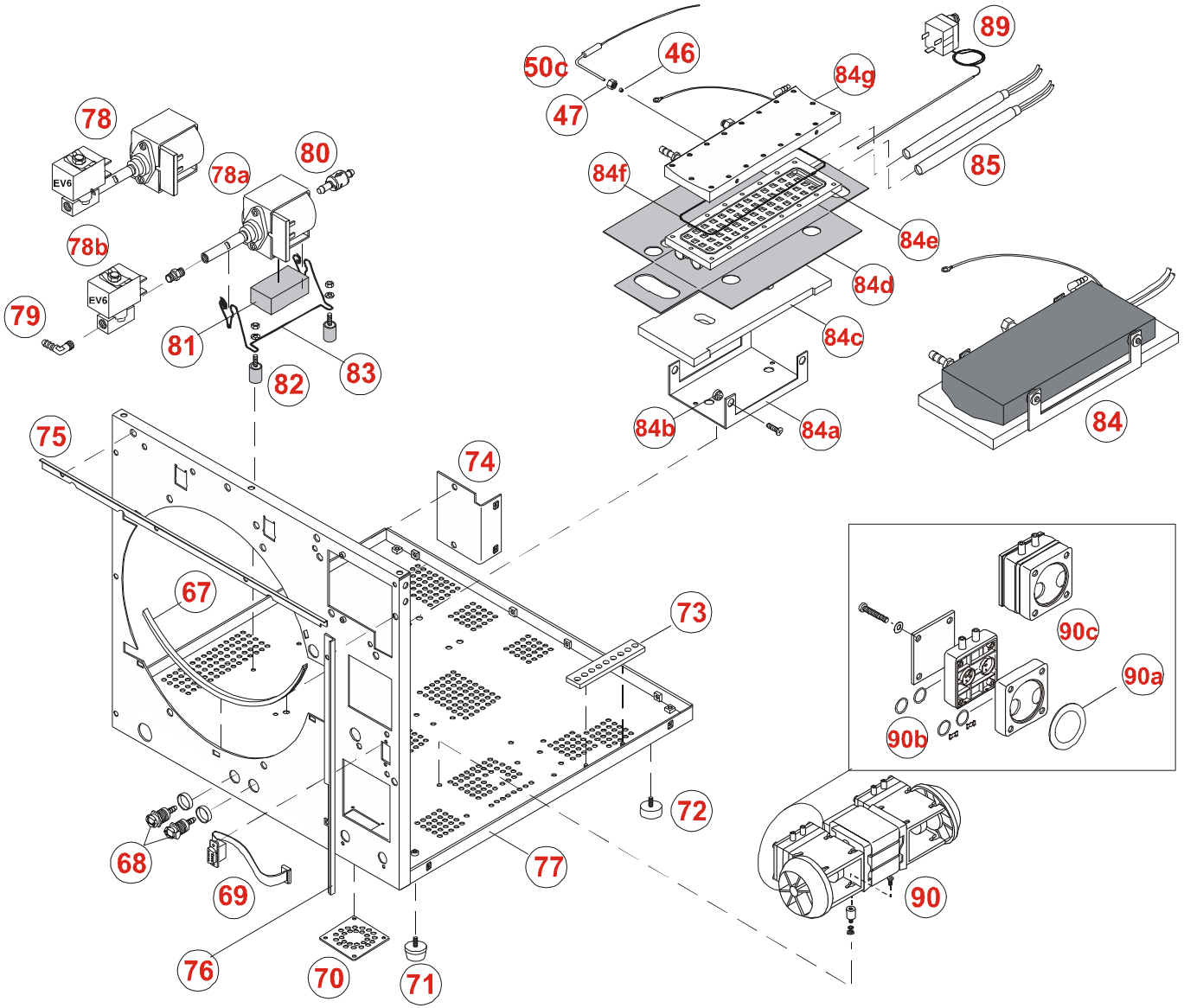
54	A0BP2900000	Clear and used water tank assy
54a	C3BP1700000	Clear and used water tank
54b	43200060000	Used water level sensor (MAX)
54c	43200050000	Clean water level sensor (MIN/MAX)
55	C1BP175000M	Tank's middle crossbar
56	A9BP5860000	AC trafo assy - 120VAC 60Hz (GAM board)
	A9BP5970000	AC trafo assy - 220/230VAC 60Hz (GAM board)
	A0BM5630000	AC trafo assy - 120VAC 60Hz (TROLL board)
	A9BM5430000	AC trafo assy - 220/230VAC 60Hz (TROLL board)
	A9BM5380000	AC trafo assy - 220/240VAC 50Hz (TROLL board)
56a	41200601000	AC transformer - 120VAC 60Hz (GAM board)
	41200800000	AC transformer - 220/230VAC 60Hz (GAM board)
	41200130000	AC transformer - 120VAC 60Hz (TROLL board)
	41200110000	AC transformer - 220/230VAC 60Hz (TROLL board)
	41200100000	AC transformer - 220/240VAC 50Hz (TROLL board)
56b	C1BP161000M	Transformer support
57	43100060000	Pressure switch
58	C1BP538000M	Pressure switch support
59	260000009MN	Quick pipe fitting
60	43100090000	Pressure transducer
61	A0BP5730000	Electronic board group, except Printer Board (GAM)
	A5BM4760000	Electronic board group, except Printer Board (TROLL, step 1)
	A0BM5400200	Electronic board group, except Printer Board (TROLL, step 2)
61a	C5BP5630000	Basic board (GAM)
	C5BM1400100	Basic board (TROLL, step 1)
	A5BM1400200	Basic board (TROLL, step 2)
61b	C5BP4350000	AC filter board - 120VAC 60Hz (GAM board)
	C5BP9820000	AC filter board - 220/230VAC 60Hz (GAM board)
	C5BP1420000	AC filter board - 220VAC 50Hz (GAM board)
	C5BM1420000	AC filter board - (TROLL board)
61c	C5BM1430000	Printer power supply board (option)

TABLE 3- BRAVO^{21V}



54	A0BP2900000	Clear and used water tank assy
54a	C3BP1700000	Clear and used water tank
54b	43200060000	Used water level sensor (MAX)
54c	43200050000	Clean water level sensor (MIN/MAX)
55	C1BG320000M	Tank's middle crossbar
56	A9BP5860000	AC trafo assy - 120VAC 60Hz (GAM board)
	A9BP5970000	AC trafo assy - 220/230VAC 60Hz (GAM board)
	A0BM5630000	AC trafo assy - 120VAC 60Hz (TROLL board)
	A9BM5430000	AC trafo assy - 220/230VAC 60Hz (TROLL board)
	A9BM5380000	AC trafo assy - 220/240VAC 50Hz (TROLL board)
56a	41200601000	AC transformer - 120VAC 60Hz (GAM board)
	41200800000	AC transformer - 220/230VAC 60Hz (GAM board)
	41200130000	AC transformer - 120VAC 60Hz (TROLL board)
	41200110000	AC transformer - 220/230VAC 60Hz (TROLL board)
	41200100000	AC transformer - 220/240VAC 50Hz (TROLL board)
56b	C1BP161000M	Transformer support
57	43100060000	Pressure switch
58	C1BP538000M	Pressure switch support
59	260000009MN	Quick pipe fitting
60	43100090000	Pressure transducer
61	A0BP5730000	Electronic board group, except Printer Board (GAM)
	A5BM4760000	Electronic board group, except Printer Board (TROLL, step 1)
	A0BM5400200	Electronic board group, except Printer Board (TROLL, step 2)
61a	C5BP5630000	Basic board (GAM)
	C5BM1400100	Basic board (TROLL, step 1)
	A5BM1400200	Basic board (TROLL, step 2)
61b	C5BP4350000	AC filter board - 120VAC 60Hz (GAM board)
	C5BP9820000	AC filter board - 220/230VAC 60Hz (GAM board)
	C5BP1420000	AC filter board - 220VAC 50Hz (GAM board)
	C5BM1420000	AC filter board - (TROLL board)
61c	C5BM1430000	Printer power supply board (option)

TABLE 4 – BRAVO[17]

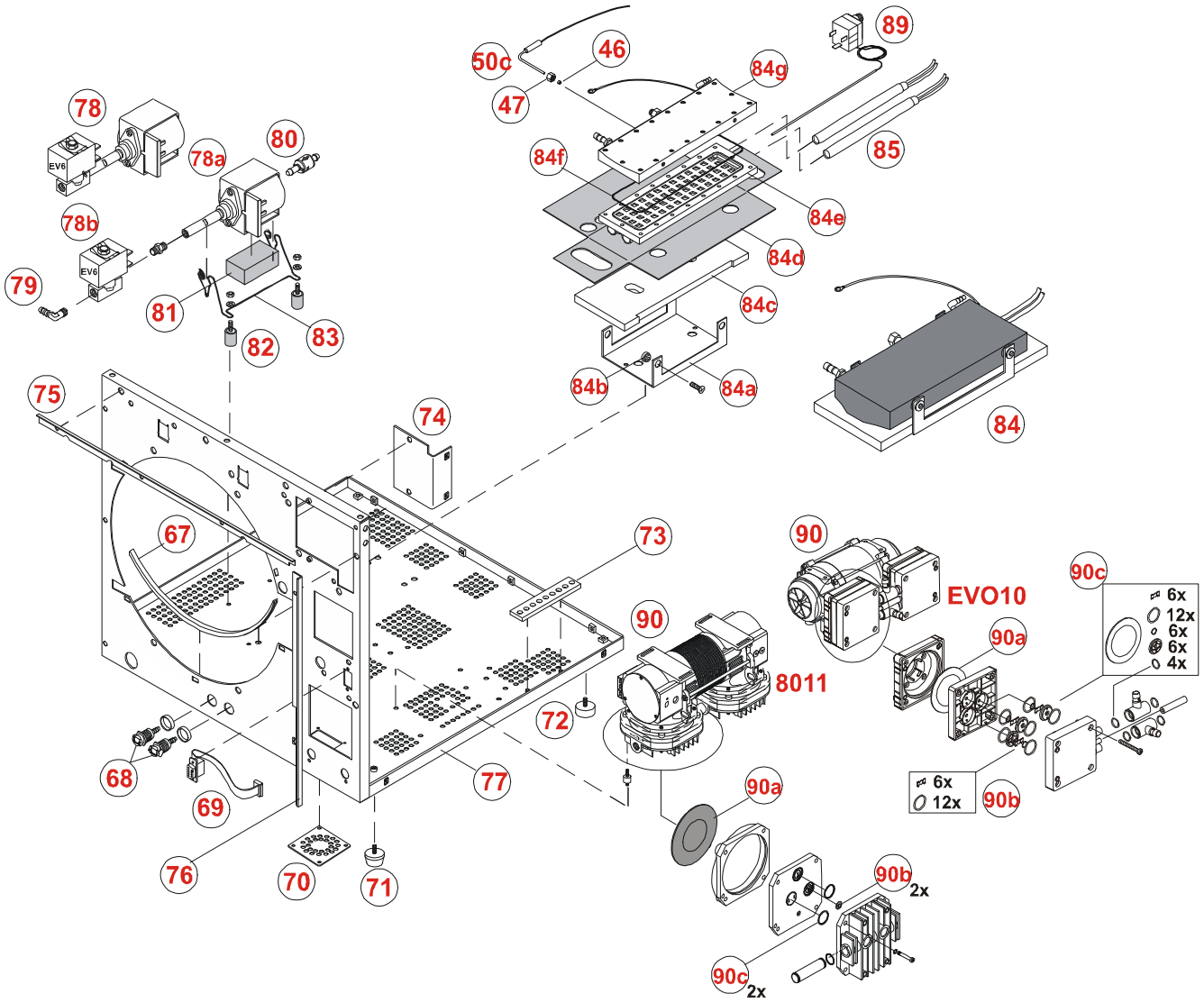


46	28600160000	Olive for temperature sensor connection
47	2860014000N	Nut for temperature sensor connection
50c	43000180000	Thermal sensor PT1000 - PT2
67	111000003W0	Rubber profile
68	260000006V0	Drain connection
69	A2BP2380000	Serial port flat cable
70	C3BP5610000	ABS plate
71	25600000400	PVC foot
72	25600001000	Rear plastic foot
73	55V702016000	Ground plate
74	C1BP147000M	Electronic board angle support
75	C1BP269000M	Top angle bar
76	C1BP270000M	Side angle bar
77	C1BP150000M	Chassis
78	A0BP2860000	Steam generator water pump group
78a	40000220000	Water pump 24V
78b	40100370000	EV parker 2way 24V (EV6)
79	261000009MN	Angle pipe fitting
80	47200050000	One-way water filter
81	111000006W0	Adhesive mousse
82	25600000800	Vibration absorber
83	40000050000	Water pump wire-support
84	A9BM5510000	Steam generator assy - 120VAC 60Hz
	A9BP5250000	Steam generator assy - 220/230VAC 60Hz
	A0BP2810000	Steam generator assy - 220/240VAC 50Hz
84a	C1BP136000M	Steam generator support
84b	C0BP1310000	Thermo-insulating spacer
84c	C4BP2360000	Thermo-insulating panel (bottom)
84d	C4BP2390000	Thermo-insulating sheet
84e	C0BP548000P	Steam generator lower section
84f	48100080000	Steam generator O-Ring
84g	C0BP547000P	Steam generator upper section
85	A8JPR010000	Heater cartridge replacement kit 120VAC 850W
	41000170000	Heater cartridge 120VAC 850W
	A8BPR330000	Heater cartridge replacement kit 230VAC 1000W
	41000260000	Heater cartridge 230VAC 1000W
89	43000150000	Safety thermostat TG400
90	A9BM5520000	Vacuum pump H5P3 assy 120VAC 60Hz
	A9BM5270000	Vacuum pump H5P3 assy 220/230VAC 60Hz
	A0BM3100000	Vacuum pump H5P3 assy 220/240VAC 50Hz

Vacuum pump H5P3 spare parts

90a	40000500000	Membrane
90b	40000450000	Shutters (2x) + O-ring (4x)
90c	40000460000	Head complete

TABLE 4 – BRAVO^{17V}



46	28600160000	Olive for temperature sensor connection
47	2860014000N	Nut for temperature sensor connection
50c	43000180000	Thermal sensor PT1000 - PT2
67	111000003W0	Rubber profile
68	260000006V0	Drain connection
69	A2BP2380000	Serial port flat cable
70	C3BP5610000	ABS plate
71	25600000400	PVC foot
72	25600001000	Rear plastic foot
73	55V702016000	Ground plate
74	C1BP147000M	Electronic board angle support
75	C1BP269000M	Top angle bar
76	C1BP270000M	Side angle bar
77	C1BP150000M	Chassis
78	A0BP2860000	Steam generator water pump assy
78a	40000220000	Water pump 24V
78b	40100370000	EV parker 2way 24V (EV6)
79	261000009MN	Angle pipe fitting
80	47200050000	One-way water filter
81	111000006W0	Adhesive mousse
82	25600000800	Vibration absorber
83	40000050000	Water pump wire-support
84	A9BM5510000	Steam generator group - 120VAC 60Hz
	A9BP5250000	Steam generator group - 220VAC 60Hz
	A0BP2810000	Steam generator group - 220VAC 50Hz
84a	C1BP136000M	Steam generator support
84b	C0BP1310000	Thermo-insulating spacer
84c	C4BP2360000	Thermo-insulating panel (bottom)
84d	C4BP2390000	Thermo-insulating sheet
84e	C0BP548000P	Steam generator lower section
84f	48100080000	Steam generator O-Ring
84g	C0BP547000P	Steam generator upper section
85	A8JPR010000	Heater cartridge replacement kit, 120VAC 850W
	41000170000	Heater cartridge 115V 850W
	A8BPR330000	Heater cartridge replacement kit, 230VAC 1000W
	41000260000	Heater cartridge 230V 1000W
89	43000150000	Safety thermostat TG400
90 (8011)	A9BP5870000	Vacuum pump assy 120VAC 60Hz
	A9BP5270000	Vacuum pump assy 220/230VAC 60Hz

8011 spare parts

90a	40000260000	Membrane
90b	40000250000	Shutter (2x)
90c	48100150000	O-ring (2x)

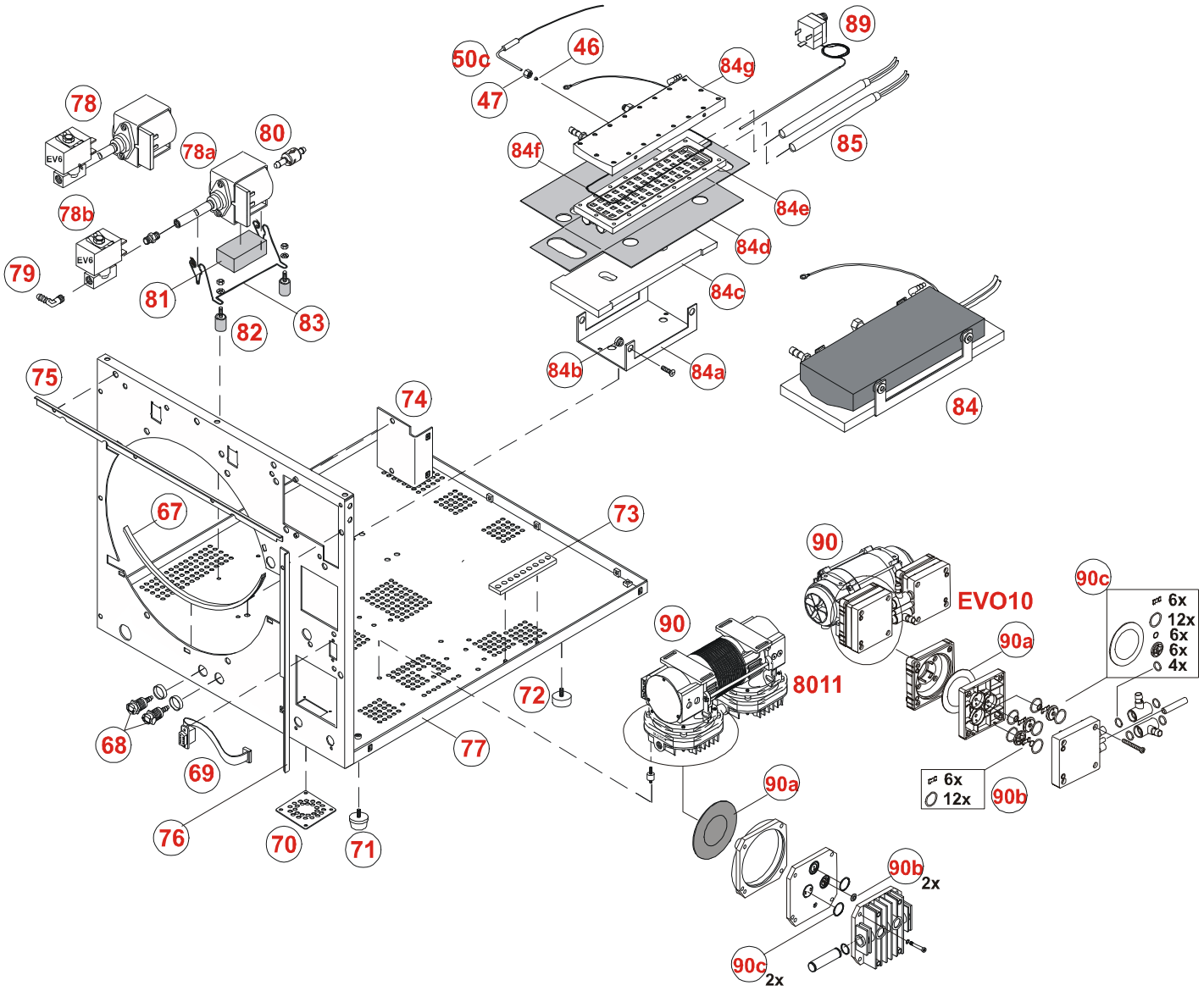
90 (EVO10)	A8JPR010000	Vacuum pump assy 120VAC 60Hz
	A8BPR010000	Vacuum pump assy 220/230VAC 50/ 60Hz

EVO10 spare parts

90a	40000470000	Membrane
90b	40000480000	Minimum maintenance kit
90c	40000490000	Full maintenance kit

SciCan

TABLE 4 - BRAVO^{21V}



46	28600160000	Olive for temperature sensor connection
47	2860014000N	Nut for temperature sensor connection
50c	43000180000	Thermal sensor PT1000 - PT2
67	111000003W0	Rubber profile
68	260000006V0	Drain connection
69	A2BP2380000	Serial port flat cable
70	C3BP5610000	ABS plate
71	25600000400	PVC foot
72	25600001000	Rear plastic foot
73	55V702016000	Ground plate
74	C1BP147000M	Electronic board angle support
75	C1BP269000M	Top angle bar
76	C1BP270000M	Side angle bar
77	A1BG350000M	Chassis
78	A0BP2860000	Steam generator water pump group
78a	40000220000	Water pump 24V
78b	40100370000	EV parker 2way 24V (EV6)
79	261000009MN	Angle pipe fitting
80	47200050000	One-way water filter
81	111000006W0	Adhesive mousse
82	25600000800	Vibration absorber
83	40000050000	Water pump wire-support
84	A9BM5510000	Steam generator group - 120VAC 60Hz
	A9BP5250000	Steam generator group - 220VAC 60Hz
	A0BP2810000	Steam generator group - 220VAC50Hz
84a	C1BP136000M	Steam generator support
84b	C0BP1310000	Thermo-insulating spacer
84c	C4BP2360000	Thermo-insulating panel (bottom)
84d	C4BP2390000	Thermo-insulating sheet
84e	C0BP548000P	Steam generator lower section
84f	48100080000	Steam generator O-Ring
84g	C0BP547000P	Steam generator upper section
85	A8JPR010000	Heater cartridge replacement kit 120VAC 850W
	41000170000	Heater cartridge 115V 850W
	A8BPR330000	Heater cartridge replacement kit 230VAC 1000W
	41000260000	Heater cartridge 230V 1000W
89	43000150000	Safety thermostat TG400
90 (8011)	A9BP5870000	Vacuum pump assy 120VAC 60Hz
	A9BP5270000	Vacuum pump assy 220/230VAC 60Hz

8011 spare parts

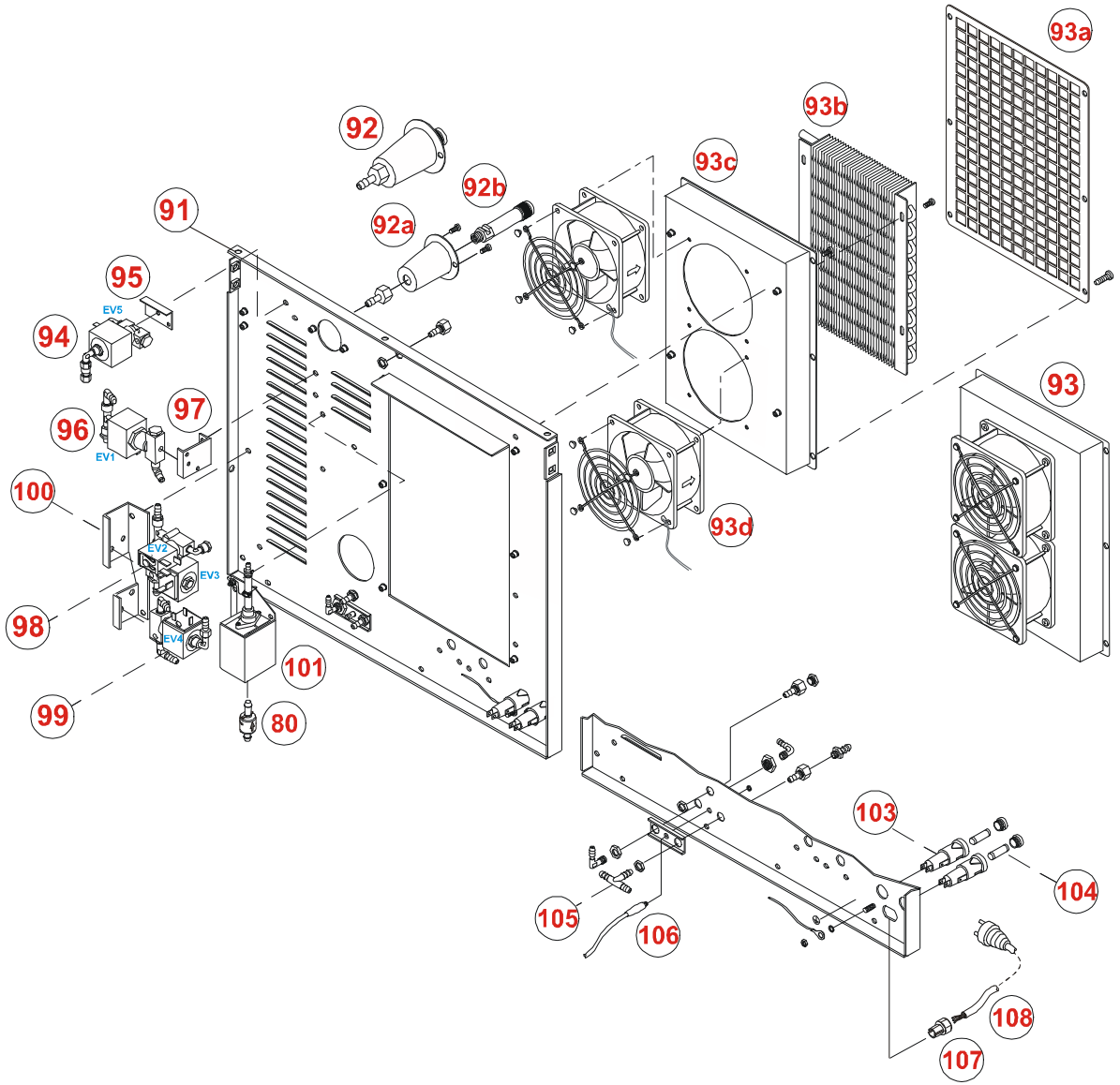
90a	40000260000	Membrane
90b	40000250000	Shutter (2x)
90c	48100150000	O-ring (2x)

90 (EVO10)	40000420000	Vacuum pump assy 120VAC 60Hz
	40000360000	Vacuum pump assy 220/230VAC 50/60Hz

EVO10 spare parts

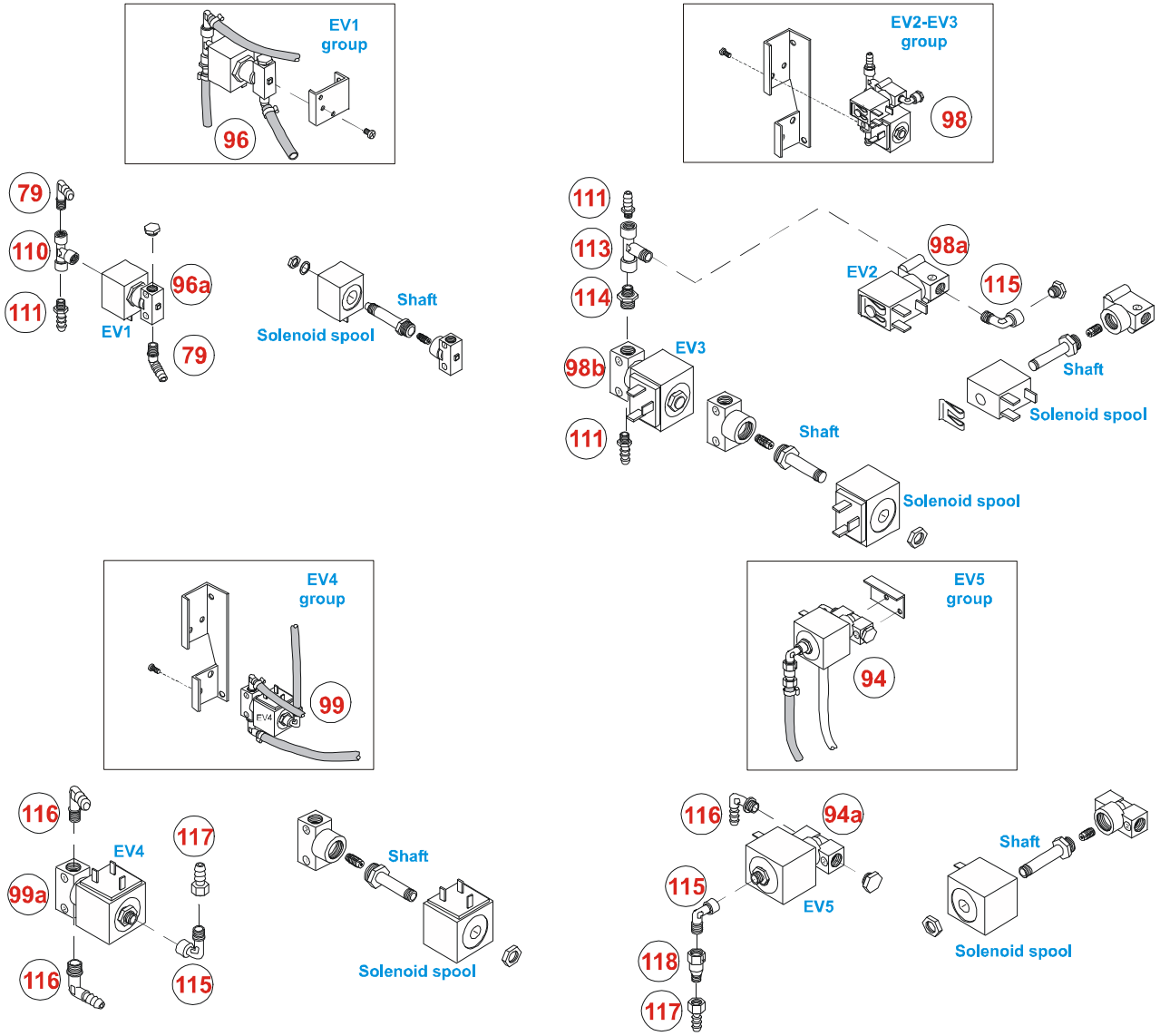
90a	40000470000	Membrane
90b	40000480000	Minimum maintenance kit
90c	40000490000	Full maintenance kit

TABLE 5 - ALL MODELS



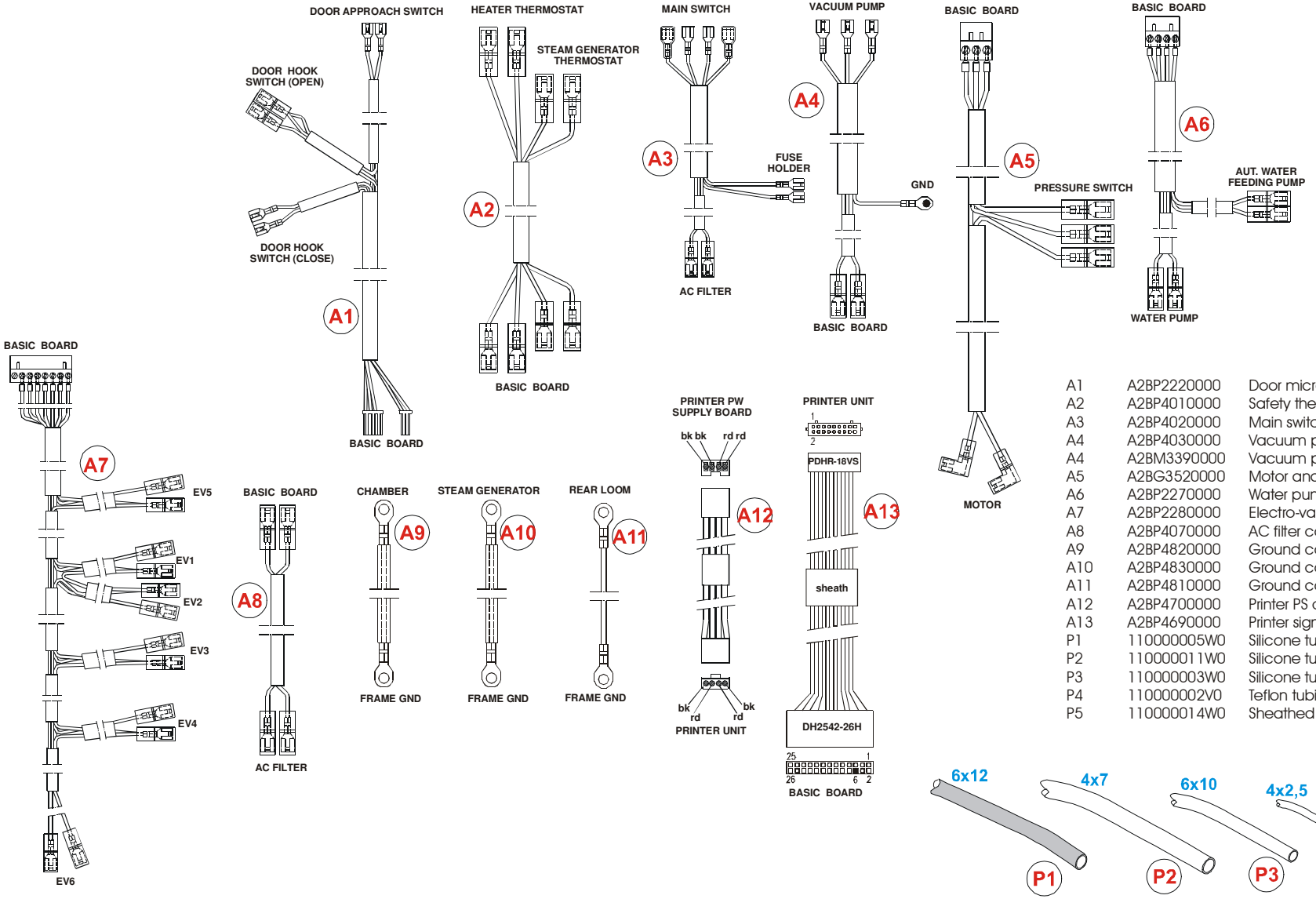
80	47200050000	One-way water filter
91	C1BP151000M	Rear chassis
92	A0BS0520000	Safety valve TUV group
92a	C1BS020000P	Safety valve support
92b	47000020000	Safety valve
93	A1BP1640000	Heat exchanger group
93a	40400040000	Protection grid
93b	C1BP1600000	Heat exchanger
93c	C1BP159000M	Heat exchanger support
93d	40400030000	Electric fan 120 x 120 x 38 mm
94	A0BP2850000	EV5 group
95	55V432011000	EV5 support
96	A0BP2820000	EV1 group
97	C1BP241000M	EV1 support
98	A0BP2830000	EV2/EV3 group
99	A0BP2840000	EV4 group
100	C1BP173000M	EV2/EV3/EV4 support
101	A0BP2870000	Automatic water feeding pump group
101	40000220000	Water pump 24V
103	41700260000	Fuse holder
104	41700330000	Fuse F15A 6,3x32
105	261000014V0	Tubing fitting T
106	A2BP2630000	Cable for external tank level sensor connection
107	27700001400	Cable tight
108	A2BP5890000	Power cable - 120/220-230V 60Hz
	A2XP0160000	Power cable - 220/240V 50Hz

TABLE 6 - ALL MODELS



79	261000009MN	Angle tubing fitting
94	A0BP2850000	EV5 group
94a	40100240000	EV parker 3-way 24V
96	A0BP2820000	EV1 group
96a	40100240000	EV parker 3-way 24V
98	A0BP2830000	EV2/EV3 group
98a	40100030000	EV parker 2-way 24V (EV2)
98b	40100230000	EV parker 2-way 24V (EV3)
99	A0BP2840000	EV4 group
99a	40100260000	EV parker 3-way 24V
110	263000002MN	Tubing fitting T - FFF
111	261000001MN	Tubing fitting
113	263000003MN	Tubing fitting T - FMF
114	265000009MN	Coupling
115	262000003MN	Angle tubing fitting - FM
116	261000010MN	Angle tubing fitting
117	261000004MN	Tubing fitting

TABLE 7 – ALL MODELS



A1	A2BP2220000	Door micro-switch cable
A2	A2BP4010000	Safety thermostat cable
A3	A2BP4020000	Main switch cable
A4	A2BP4030000	Vacuum pump cable with Bravo17V & Bravo21V
A4	A2BM3390000	Vacuum pump cable with Bravo17
A5	A2BG3520000	Motor and pressure switch cable
A6	A2BP2270000	Water pump cable
A7	A2BP2280000	Electro-valves cable
A8	A2BP4070000	AC filter cable
A9	A2BP4820000	Ground cable (chamber)
A10	A2BP4830000	Ground cable (steam generator)
A11	A2BP4810000	Ground cable (rear loom)
A12	A2BP4700000	Printer PS cable (option with Bravo17)
A13	A2BP4690000	Printer signal cable (option with Bravo17)
P1	110000005W0	Silicone tubing Ø6 x 12mm black
P2	110000011W0	Silicone tubing Ø4 x 7mm transparent
P3	110000003W0	Silicone tubing Ø6 x 10mm transparent
P4	110000002V0	Teflon tubing Ø4 x 2,5mm
P5	110000014W0	Sheathed tubing Ø6 x 10mm

SPARE PARTS

P/N	Description	Ref.	Exploded view
A9BM5450000	Standard supply kit - Bravo^{17}	D	1
A9BP5450000	Standard supply kit - Bravo^{17V}	D	1
A9BL0090000	Standard supply kit - Bravo^{21V}	D	1
C1XP076000Y	Tray - Bravo^{17} & Bravo^{17V}	1	1
C1BG345000Y	Tray - Bravo^{21V}	1	1
STXX0080000	Tray extractor	2-1	1
49800030000	Wrench 12mm	2-2	
49800010000	Allen wrench	2-3	
A0XP0010000	Container provided with quick connector -distilled water (~ 0.5 US gal / 2 L)	3	1
110000003W0	Drain tube with quick coupling	4	1
47200010000	Bacteriological filter	5	1
47200030000	Chamber water filter 7x14 (AISI 304)	6	1
STXX0250000	Thermal paper roll (option in Bravo^{17})	7	1
C1BP583000Y	Tray rack - Bravo^{17} & Bravo^{17V}	8	1
C1BG534000Y	Tray rack - Bravo^{21V}		
C1BH0060001	Metallic frame cover (1pc-frame cover) - Bravo^{17} & Bravo^{17V}	9	1
C1BG4680001	Metallic frame cover (1pc-frame cover) - Bravo^{21V}	9	1
C1BP6230002	Metallic top/right frame cover (2pc-frame cover) - Bravo^{17} & Bravo^{17V}	9a	1
C1BG5760002	Metallic top/right frame cover (2pc-frame cover) - Bravo^{21V}	9a	1
C1BP6240002	Metallic left frame cover (2pc-frame cover) - Bravo^{17} & Bravo^{17V}	9b	1
C1BG5770002	Metallic left frame cover (2pc-frame cover) - Bravo^{21V}	9b	1

P/N	Description	Ref.	Exploded view
AJMR030000	Plastic door cover – Style 1	10a	1
C3BP1850000	Plastic door cover - Style 2	10b	1
C5BP5500000	Thermal printer (option in Bravo^{17})	11	1
C3JP0140000	Service compartment door – Style 1	12a	1
C3BP1840000	Service compartment door – Style 2	12b	1
230B04L14K0	Service door pin 4x20	13	1
42000070000	Main switch	14	1
C3JP0110000	Plastic front frame – Style 1	15a	1
C3BP1830000	Plastic front frame –Style 2	15b	1
C5BP1230000	LCD 4 lines x 20 characters	16	1
C6JP0190000	Adhesive membrane keypad – Style 1	17a	1
C6JP0010000	Adhesive membrane keypad – Style 2	17b	1
C6JM0190000	Adhesive label Bravo^{17} – Style 1	18a	1
C6JP0210000	Adhesive label Bravo^{17V} – Style 1		
C6JG0150000	Adhesive label Bravo^{21V} – Style 1		
C6JM0010000	Adhesive label Bravo^{17} – Style 2	18b	1
C6JP0020000	Adhesive label Bravo^{17V} – Style 2		
C6JG0010000	Adhesive label Bravo^{21V} – Style 2		
47200010000	Bacteriological filter	19	1
C1BP153000M	Left crossbar (1pc-frame cover) - Bravo^{17} & Bravo^{17V}	20	1
C1BP628000M	Left crossbar (2pc-frame cover) - Bravo^{17} & Bravo^{17V}	20	1
C1BG317000M	Left crossbar (1pc-frame cover) - Bravo^{21V}	20	1
C1BG525000M	Left crossbar (2pc-frame cover) - Bravo^{21V}	20	1

P/N	Description	Ref.	Exploded view
C1BP152000M	Right crossbar (1pc-frame cover) - Bravo^{17} & Bravo^{17V}	21	1
C1BP627000M	Right crossbar (2pc-frame cover) - Bravo^{17} & Bravo^{17V}	21	1
C1BG318000M	Right crossbar (1pc-frame cover) - Bravo^{21V}	21	1
C1BG575000M	Right crossbar (2pc-frame cover) - Bravo^{21V}	21	1
C4BP2740000	Thermo-insulating panel	22	2
C0BP260000P	Cast aluminum door	23	2
C7BP2640000	Door spring	24	2
C0BP060000Z	Door nitrided fork	25	2
49000050000	Door bushing	26	2
C0BP0500000	Door fork pin	27	2
203C06L30K0	Screw 6x30	28	2
C0BP079000N	Door adjustment screw-	29	2
C4BP5690000	Door thermo-insulating disk	30	2
A1BP027000Y	Parabola board	31	2
48000050000	Door gasket	32	2
C0BP2720000	Door hinge pin	33	2
A1BP3380000	Door hinge	34	2
C2BP0010000	Stainless steel chamber - Bravo^{17} & Bravo^{17V}	35	2
C2BG5300000	Stainless steel chamber - Bravo^{21V}	35	2
C0BP0430000	Pin of the door closing system	36	2
A1BP2710000	Door closing system group	37	2
A0BP6250000	Gear-motor assembly	38	2
40300020000	Gear-motor / 24VDC	38	2

P/N	Description	Ref.	Exploded view
232A03L25K0	Pin 3x25	39	2
C0BP0450000	Gear-motor coupling	40	2
C0BP0460000	Intermediate join	41	2
C0BP0590000	Closing hook	42	2
43300010000	Hook micro-switch (open)	43	2
43300010000	Door micro-switch	44	2
43300040000	Hook micro-switch (close)	45	2
28600160000	Olive for temperature sensor connection	46	2/4
2860014000N	Nut for temperature sensor connection	47	2/4
43000190000	Thermal sensor PT1000 – PT1	48	2
41000140000	Chamber heater 1700W 220VAC 50Hz - Bravo^{17} & Bravo^{17V} – Style 1	49	2
41000280000	Chamber heater 1700W 220VAC 60Hz - Bravo^{17} & Bravo^{17V-} Style 2		
41000180000	Chamber heater 1500W 120VAC 60Hz - Bravo^{17} & Bravo^{17V} - Style 2		
41000150000	Chamber heater 2000W 220VAC 50Hz - Bravo^{21V} - Style 1	49	2
41000290000	Chamber heater 2000W 220VAC 60Hz - Bravo^{21V} – Style 2		
41000190000	Chamber heater 1500W 120VAC 60Hz - Bravo^{21V} – Style 2		
43000180000	Thermal sensor PT1000 – PT3	50a	2
43000180000	Thermal sensor PT1000 – PT4	50b	2
43000180000	Thermal sensor PT1000 – PT2	50c	4
43000140000	Safety thermostat TG400	51	2
C4BP2140100	Thermo-insulating panel (chamber) - Bravo^{17} & Bravo^{17V}	52	2
C4BG3280000	Thermo-insulating panel (chamber) - Bravo^{21V}	52	2
C4BP5570000	Rear thermo-insulating panel (chamber)	53	2

P/N	Description	Ref.	Exploded view
A0BP2900000	Clear and used water tank group	54	3
C3BP1700000	Clear and used water tank	54a	3
43200060000	Used water level sensor (MAX)	54b	3
43200050000	Clear water level sensor (MIN/MAX)	54c	3
C1BP175000M	Tank's middle crossbar - Bravo^{17} & Bravo^{17V}	55	3
C1BG320000M	Tank's middle crossbar - Bravo^{21V}	55	3
A9BP5860000	AC transformer assembly - 120VAC 60Hz (GAM board)	56	3
A9BP5970000	AC transformer assembly– 220/230VAC 60Hz (GAM board)		
A0BM5630000	AC transformer assembly - 120VAC 60Hz (TROLL board)		
A9BM5430000	AC transformer assembly– 220/230VAC 60Hz (TROLL board)		
A9BM5380000	AC transformer assembly– 220/240VAC 50Hz (TROLL board)		
41200140000	AC transformer - 120VAC 60Hz (GAM board)	56a	3
41200150000	AC transformer - 220/230VAC 60Hz (GAM board)		
41200170000	AC transformer – 120VAC 60Hz (TROLL board)		
41200110000	AC transformer – 220/230VAC 60Hz (TROLL board)		
41200100000	AC transformer – 220/240VAC 50Hz (TROLL board)		
C1BP161000M	Transformer support	56b	3
A0BP6260000	Pressure switch group	57	3
43100060000	Pressure switch		
C1BP538000M	Pressure switch support	58	3
260000009MN	Quick tubing fitting	59	3
43100090000	Pressure transducer	60	3
A8BPR320000	Pressure transducer replacement kit	59+60	3

P/N	Description	Ref.	Exploded view
A0BP5730000	Electronic board group–Printer power supply board excluded (GAM)	61	3
A5BM4760000	Electronic board group – Printer power supply board excluded (TROLL, step 1)		
A0BM5400200	Electronic board group – Printer power supply board excluded (TROLL, step 2)		
C5BP5630000	Basic board (GAM)	61a	3
C5BM1400100	Basic board (TROLL, step 1)		
C5BM1400200	Basic board (TROLL, step 2)		
C5BP4350000	AC filter board - 120VAC 60Hz (GAM board)	61b	3
C5BP9820000	AC filter board - 220/230VAC 60Hz (GAM board)		
C5BP1420000	AC filter board – 220/240VAC 50Hz (GAM board)		
C5BM1420000	AC filter board - (TROLL board)		
C5BM1430000	Printer power supply board	61c	3
28600290000	Fitting for chamber filter	63	2
47200030000	Chamber filter 7 x 14 (AISI 304)	65	2
111000003W0	Rubber profile	67	4
260000006V0	Drain connection	68	4
A2BP2380000	Serial port flat cable	69	4
C3BP5610000	ABS plate	70	4
25600000400	PVC foot	71	4
25600001000	Rear plastic foot	72	4
55V702016000	Ground plate	73	4

P/N	Description	Ref.	Exploded view
C1BP147000M	Electronic board angle support	74	4
C1BP269000M	Top angle bar	75	4
C1BP270000M	Side angle bar	76	4
C1BP150000M	Chassis - Bravo^{17} & Bravo^{17V}	77	4
A1BG350000M	Chassis - Bravo^{21V}	77	4
A0BP2860000	Steam generator water pump assembly	78	4
40000220000	Water pump 24V	78a	4
40100370000	EV parker 2way 24V (EV6)	78b	4
261000009MN	Angle tubing fitting	79	4/6
47200050000	One-way water filter	80	4/5
111000006W0	Adhesive mousse	81	4
25600000800	Vibration absorber	82	4
40000050000	Water pump wire-support	83	4
A9BM5510000	Steam generator assembly - 120VAC 60Hz	84	4
A9BP5250000	Steam generator assembly – 220/230VAC 60Hz		
A0BP2810000	Steam generator assembly– 220/240VAC 50Hz		
C1BP136000M	Steam generator support	84a	4
C0BP1310000	Thermo-insulating spacer	84b	4
C4BP2360000	Thermo-insulating panel (bottom)	84c	4
C4BP2390000	Thermo-insulating sheet	84d	4
C0BP548000P	Steam generator lower section	84e	4
48100080000	Steam generator O-Ring	84f	4
C0BP547000P	Steam generator upper section	84g	4

P/N	Description		Ref.	Exploded view
A8JPR010000	Heater cartridge replacement kit 120VAC 850W		85	4
41000170000	Heater cartridge 120VAC 850W			
A8BPR330000	Heater cartridge replacement kit 230VAC 1000W			
41000260000	Heater cartridge 230VAC 1000W			
43000150000	Safety thermostat TG400		89	4
A9BM5520000	Vacuum pump H5P3 assembly - Bravo^{17}	120VAC 60Hz	90	4
A9BM5270000		220/230VAC 60Hz		
A0BM3100000		220/240VAC 50Hz		
40000500000	Vacuum pump H5P3 spare parts	Membrane	90a	4
40000450000		Shutter (2x) + O-ring (4x)	90b	
40000460000		Head complete	90c	
A8JPR010000	Vacuum pump EVO10 assembly Bravo^{17V} & Bravo^{21V}	120VAC 60Hz	90	4
A8BPR010000		220/230VAC 50/ 60Hz		
40000470000	Vacuum pump EVO10 spare parts	Membrane	90a	4
40000480000		Minimum maintenance kit	90b	
40000490000		Full maintenance kit	90c	
A9BP5870000	Vacuum pump 8011 assembly - Bravo^{17V} & Bravo^{21V}	120VAC 60Hz	90	4
A9BP5270000		220/230VAC 50/60Hz		

P/N	Description		Ref.	Exploded view
40000260000	Vacuum pump 8011 spare parts	Membrane	90a	4
40000250000		Shutter (2x)	90b	
48100150000		O-ring (2x)	90c	
C1BP151000M	Rear chassis		91	5
A0BS0520000	Safety valve TUV assembly		92	5
C1BS020000P	Safety valve support		92a	5
47000020000	Safety valve		92b	5
A1BP1640000	Heat exchanger assembly		93	5
40400040000	Protection grid		93a	5
C1BP1600000	Heat exchanger		93b	5
C1BP159000M	Heat exchanger support		93c	5
40400030000	Electric fan 120 x 120 x 38 mm		93d	5
A0BP2850000	EV5 group		94	5
40100240000	EV parker 3-way 24V		94a	6
55V432011000	EV5 support		95	5
A0BP2820000	EV1 group		96	5
40100240000	EV parker 3-way 24V		96a	6
C1BP241000M	EV1 support		97	5
A0BP2830000	EV2/EV3 group		98	5
40100030000	EV parker 2-way 24V (EV2)		98a	6
40100230000	EV parker 2-way 24V (EV3)		98b	6
A0BP2840000	EV4 group		99	5
40100260000	EV parker 3-way 24V		99a	6

P/N	Description	Ref.	Exploded view
C1BP173000M	EV2/EV3/EV4 support	100	5
A0BP2870000	Automatic water feeding pump assembly	101	5
40000220000	Water pump 24V	101	5
41700260000	Fuse holder	103	5
41700330000	Fuse F15A 6,3x32	104	5
261000014V0	Tubing fitting T	105	5
A2BP2630000	Cable for external tank level sensor connection	106	5
27700001400	Cable tight	107	5
A2BP5890000	Power cable - 120/220V 60Hz	108	5
A2XP0160000	Power cable – 220V 50Hz		
263000002MN	Tubing fitting T - FFF	110	6
261000001MN	Tubing fitting	111	6
263000003MN	Tubing fitting T - FMF	113	6
265000009MN	Coupling	114	6
262000003MN	Angle tubing fitting - FM	115	6
261000010MN	Angle tubing fitting	116	6
261000004MN	Tubing fitting	117	6
47000010000	One-way valve connector	118	6
A2BP2220000	Door micro-switch cable	A1	7
A2BP4010000	Safety thermostat cable	A2	7

P/N	Description	Ref.	Exploded view
A2BP4020000	Main switch cable	A3	7
A2BM3390000	Vacuum pump cable - Bravo^{17}	A4	7
A2BP4030000	Vacuum pump cable - Bravo^{17V} & Bravo^{21V}	A4	7
A2BG3520000	Motor and pressure switch cable	A5	7
A2BP2270000	Water pump cable	A6	7
A2BP2280000	Electro-valves cable	A7	7
A2BP4070000	AC filter cable	A8	7
A2BP4820000	Ground cable (chamber)	A9	7
A2BP4830000	Ground cable (steam generator)	A10	7
A2BP4810000	Ground cable (rear loom)	A11	7
A2BP4700000	Printer PS cable (option in Bravo^{17})	A12	7
A2BP4690000	Printer signal cable (option in Bravo^{17})	A13	7
110000005W0	Silicone tubing Ø6 x 12mm black	P1	7
110000011W0	Silicone tubing Ø4 x 7mm transparent	P2	7
110000003W0	Silicone tubing Ø6 x 10mm transparent	P3	7
110000002V0	Teflon tubing Ø4 x 2,5mm	P4	7
110000014W0	Sheathed tubing Ø6 x 10mm	P5	7