

# SERVICE MANUAL

## **SterilClave<sup>®</sup> 18 / 24**

## **SterilClave<sup>®</sup> 6/18 S Dynamica**

-Steam Steriliser-



### FOREWORD

This manual IS NOT an integral part of the steriliser.

The manual is addressed to qualified, specialised technicians for routine maintenance and repairs.

Technicians or operators must be authorised in writing by **COMINOX**.

Technicians must read this manual and follow the instructions herein contained. **COMINOX** is not liable for any injury and/or damage to people or property or to the steriliser itself should the conditions herein illustrated be disregarded.

This manual contains industrial secrets which must not be disclosed. The manual and its annexes must not be edited, modified, copied or given to third parties unless authorised by **COMINOX**.





# CONTENTS

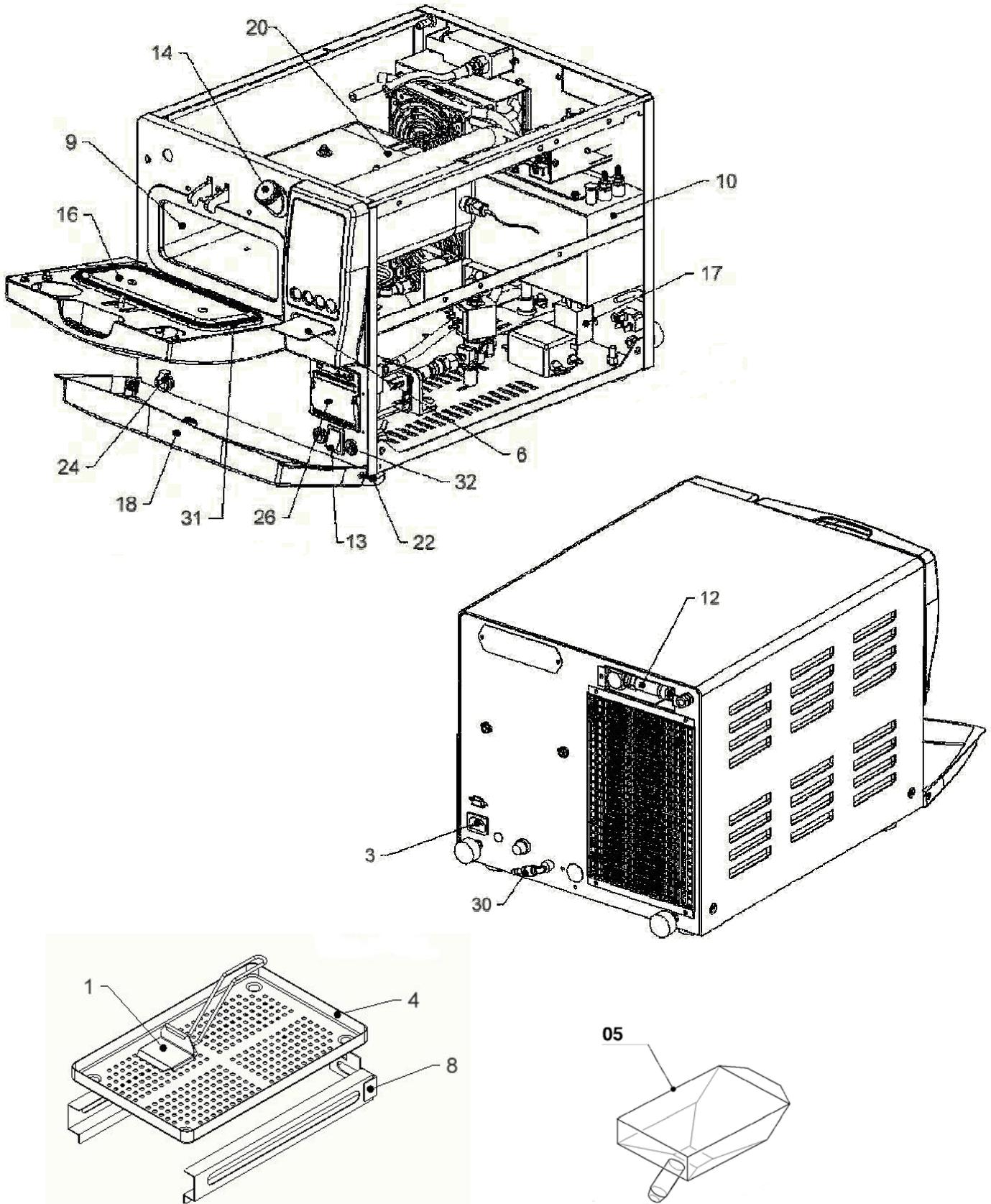
<b>CONTENTS</b> .....	<b>3</b>
Reference list.....	5
Graphical reference representation Model 6 S Dynamica.....	6
Graphical reference representation Model 18.....	7
Graphical reference representation Model 24.....	8
Graphical reference representation of common components.....	9
<b>TECHNICIAN MENU</b> .....	<b>11</b>
Inputs .....	13
Outputs.....	14
PT1 / PT2 / PT3 board calibration .....	15
TP board calibration.....	19
PT1 / PT2 / PT3 probe calibration .....	20
PT1 / PT2 / PT3 correction .....	20
Continuous cycle.....	21
Security code .....	22
Chamber load test.....	22
Accessories .....	23
Delete maintenance .....	24
<b>Simplified version of the Technician Menu (PUCK)</b> .....	<b>24</b>
<b>MAINTENANCE</b> .....	<b>25</b>
Items.....	25
Save maintenance .....	26
<b>Scheduled service table</b> .....	<b>27</b>
<b>MESSAGES</b> .....	<b>28</b>
Scheduled maintenance.....	28
Check water quality .....	28
Drain waste water .....	28
Cooling pause.....	30
<b>ALARMS</b> .....	<b>31</b>
Insufficient water quality alarm.....	31
Insufficient water level alarm.....	31
Chamber level alarm.....	32
Insufficient steam alarm .....	33
Pressurisation alarm .....	34
Overtemperature alarm.....	34
Insufficient vacuum alarm .....	34
Fractioned vacuum alarm.....	34
Sterilisation temperature band alarm: overtemperature / undertemperature .....	35
Level probe alarm .....	36
Coil alarm.....	36
Self-filling alarm .....	37

Door alarm.....	38
PT1 temperature probe alarm.....	39
Drain alarm .....	39
Misalignment alarm.....	39
Pressure transducer alarm.....	40
Manual stop alarm .....	40
Power missing alarm.....	40
Event alarm.....	40
<b>Alarm code list.....</b>	<b>41</b>
<b>ADDITIONAL CHECKS AND SETTINGS.....</b>	<b>42</b>
Display off or not clear.....	42
Level probe check .....	42
Safety valve check .....	43
Door adjustment .....	44
Pressure rises too slowly.....	45
Poor drying.....	45
Steam leakage from the safety valve .....	45
Vacuum pump servicing procedure .....	46
Water automatic inlet does not work correctly .....	48
The printer does not print .....	48
<b>AUTOMATIC WATER INLET AND DIRECT DRAIN SYSTEM INSTALLATION .....</b>	<b>49</b>
<b>INSTALLATION OF THE SPEEDY WATER DEMINERALIZATION SYSTEM .....</b>	<b>51</b>
<b>STERILCARD READER INSTALLATION .....</b>	<b>54</b>
<b>PRINTER INSTALLATION .....</b>	<b>56</b>
<b>FIRMWARE UPGRADE.....</b>	<b>59</b>
<b>DIAGRAMS AND WIRINGS .....</b>	<b>60</b>
Logic electronic board.....	60
Electronic power board .....	61
Wiring diagram - 18/24 S - B - BHD .....	64
Wiring diagram 6 S Dynamica.....	65
Wiring diagram - 18 S Dynamica .....	66
Hydraulic diagram 18/24 S - B - BHD .....	67
Hydraulic diagram 6/18 S Dynamica.....	68
STEAM PEAK diagram.....	69
p>1,2 bar VACUUM PULSE diagram .....	70
p<=1,2 bar VACUUM PULSE diagram.....	71
DRYING diagram .....	72
<b>APPENDIX 1: 18/24 CYCLE SET POINTS .....</b>	<b>73</b>
<b>APPENDIX 2: COLDEST AND WARMEST POINT DEFINITION .....</b>	<b>74</b>

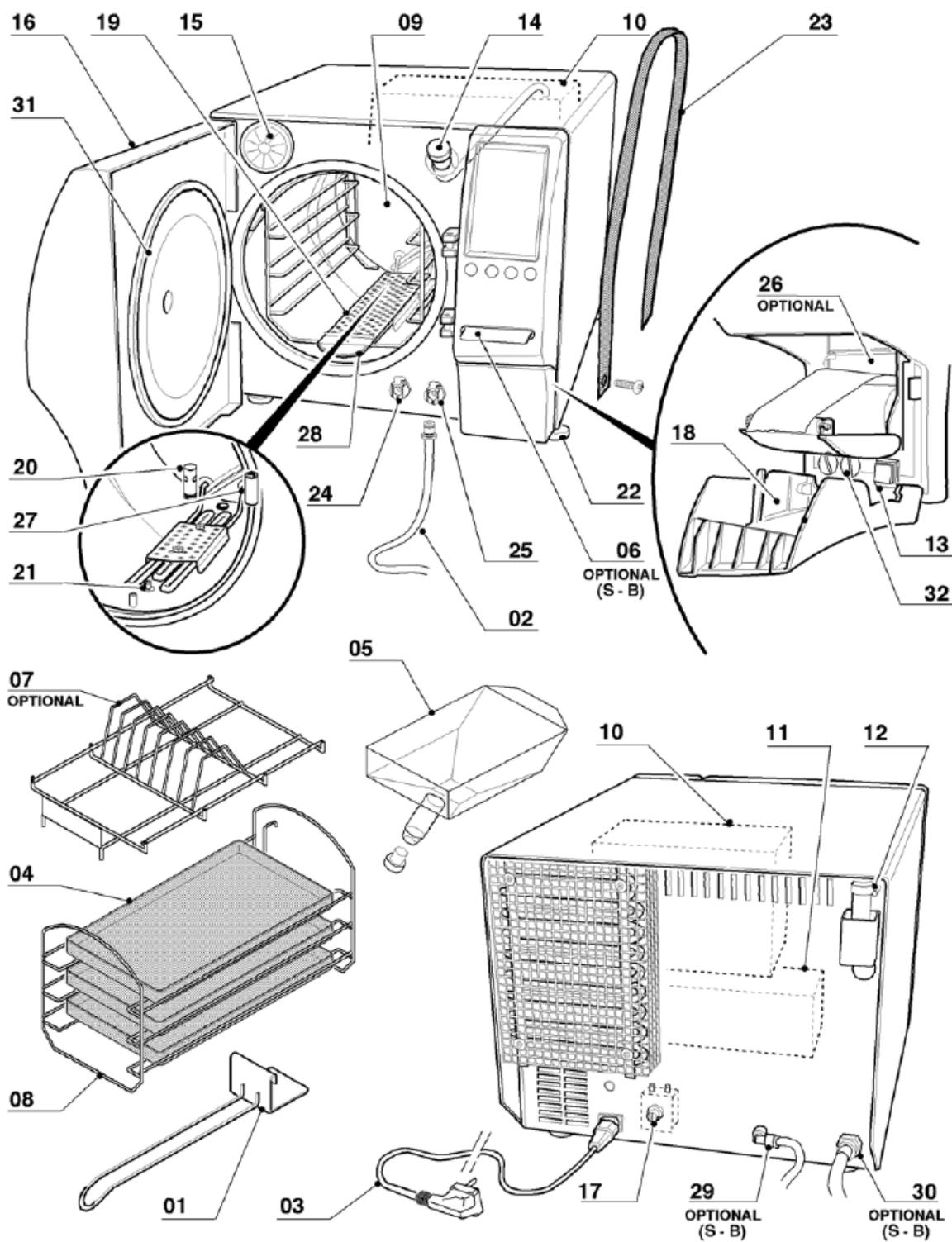
**Reference list**

*03, Power cable*  
*05, Measuring funnel*  
*06, SterilCard*  
*08, Tray support*  
*09, Chamber*  
*10, Clean water tank*  
*11, Waste water recovery tank*  
*12, Safety valve*  
*13, Main switch*  
*14, Filler*  
*15, Air sterilisation filter*  
*16, Door*  
*17, Safety thermostat*  
*18, Door*  
*19, Coil grid*  
*20, Drain filter*  
*21, Chamber probe*  
*24, Clean water drain tap*  
*25, Waste water drain tap*  
*26, Printer*  
*29, Automatic water inlet*  
*30, Direct drain*  
*31, Chamber seal*  
*32, Fuses*  
*33, Logic board*  
*34, Power board*  
*35, Water inlet pump*  
*36A, Micro-switch M1*  
*36B, Micro-switch M2*  
*37, Unlocking tool*  
*38, Transducer*  
*39, Chamber temperature probe*  
*40, Inspection plugs*  
*41, Vacuum pump*  
*42, Fans*  
*43, Level probes*  
*46, Automatic water inlet pump*

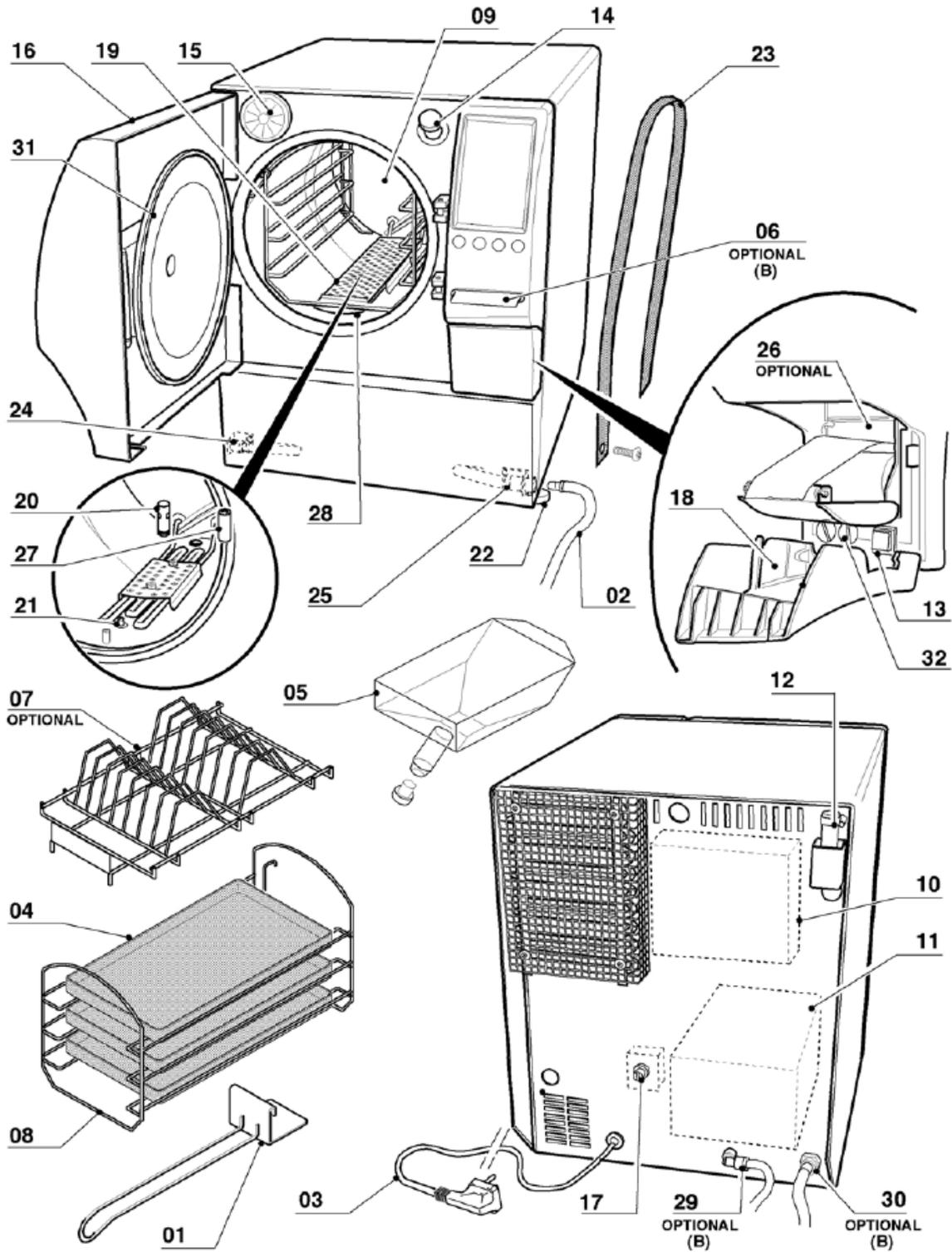
Graphical reference representation Model 6 S Dynamica



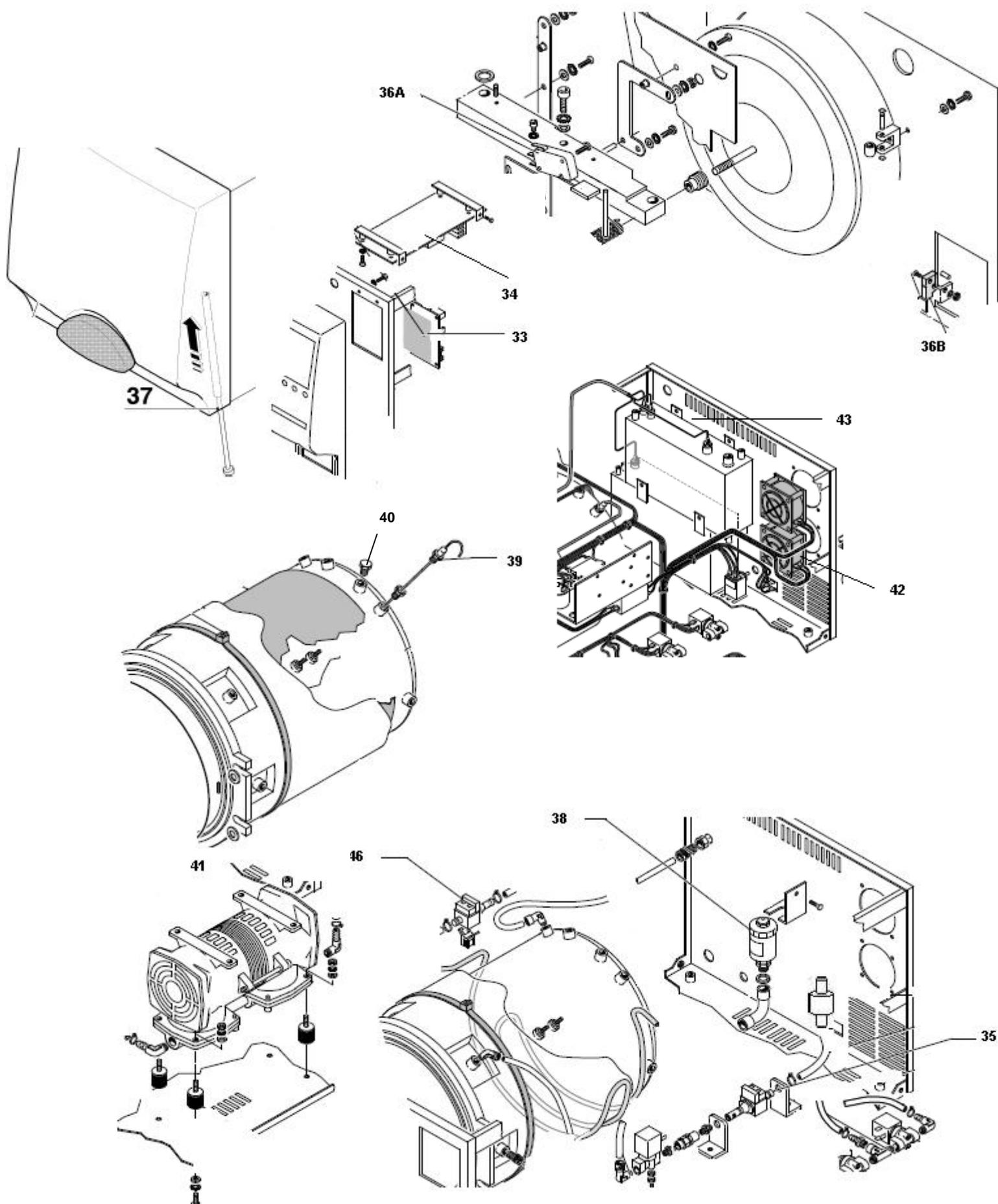
Graphical reference representation Model 18



Graphical reference representation Model 24



Graphical reference representation of common components





## TECHNICIAN MENU

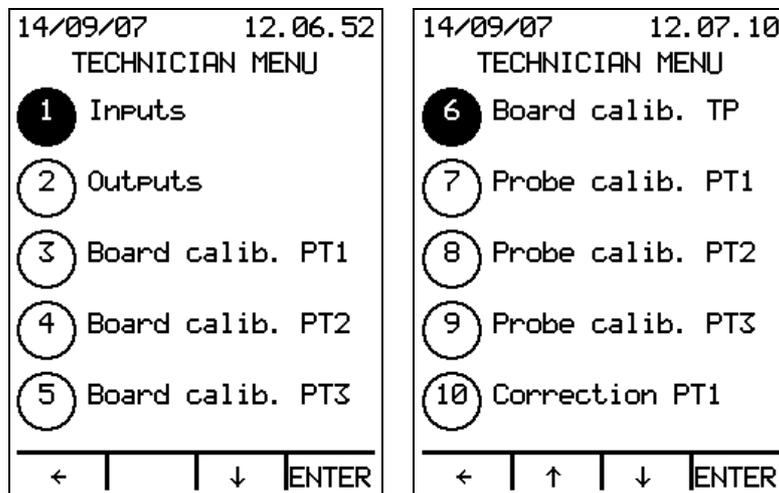
Insert the Technician's SterilCard to access the Technician Menu.

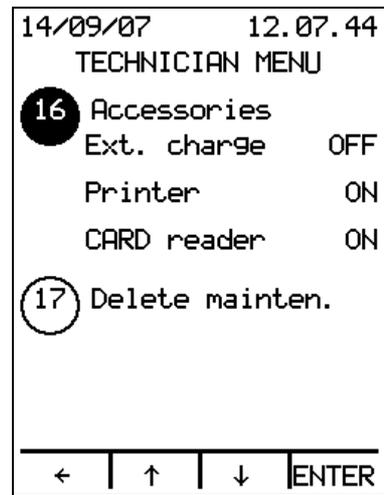
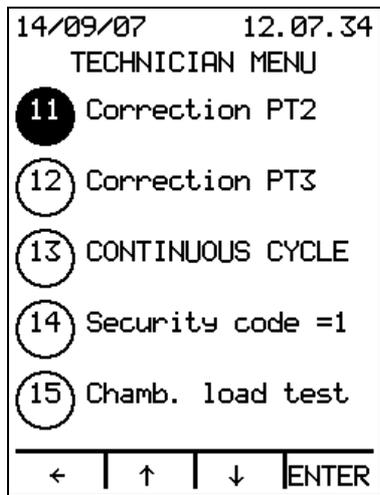
If the steriliser is not equipped with a SterilCard reader, a Technician's SterilCard kit may be employed. The kit includes a reader, a Technician's SterilCard and a cable for connecting the reader to *logic board 33* (connector J5).

In STAND BY mode, press MENU and use the  $\uparrow\downarrow$  arrows to select the Technician Menu (option 6):



Press ENTER to open the Technician Menu:





Use the ↑↓ arrows to scroll the list and highlight the required option. Press ENTER to access the selected option.

Press ← to go back to the MENU page.

1

Inputs

14/09/07	12.08.02	14/09/07	12.08.18
TECHNICIAN MENU		TECHNICIAN MENU	
Inputs		Inputs	
Level probe S1	CLOSE	Temperature probe PT1	47.1 °C
Level probe S2	CLOSE	Temperature probe PT2	0.0 °C
Level probe S3	OPEN	Temperature probe PT3	0.0 °C
Level probe S4	OPEN	Pressure transd.	0.982 bar
Level probe S5	OPEN	Conductivity meter	36 MS/cm
Level probe S6	OPEN	Micro-switch M1	OPEN
Level probe S7	OPEN	Micro-switch M2	CLOSE
←	↓	←	↑

The status of the steriliser inputs can be displayed:

- S1 is the *clean water tank 10 safety probe*
- S2 is the *clean water tank 10 minimum level probe*
- S3 is the *clean water tank 10 maximum level probe*
- S4 is the *waste water recovery tank 11 maximum level probe* (not used in 6/18 S Dynamica models)
- S5 is the *chamber 09 level probe* for models 18/24 S Dynamica - S - B – BHD (not used in 6 S Dynamica model)
- S6 is not used
- S7 is not used
- PT1 is the *temperature probe 39* in *chamber 09*
- PT2 is not used
- PT3 is not used
- *Pressure transducer 38*
- Conductivity meter (optional; standard on BHD models)
- *Micro-switch M1 36A*: door locked
- *Micro-switch M2 36B*: door pre-lock

Use the ↑↓ arrows to scroll the list and press ← to go back to the Technician Menu.

**2** Outputs

14/09/07	12.08.37
TECHNICIAN MENU	
Outputs	
<b>SU1 charge</b>	OFF
SU2 drain	OFF
SU3 3 way	OFF
SU4 steam	OFF
SU5 drying	OFF
SU6 by-pass	OFF
Water PUMP	OFF
←	↓ ENTER

14/09/07	12.08.54
TECHNICIAN MENU	
Outputs	
Vacuum PUMP	OFF
Door lock	ON
Fan/s	OFF
Aux 1	OFF
Aux 2	OFF
External coil	OFF
<b>Internal coil</b>	OFF
←	↑ ↓ ENTER

The status of the steriliser outputs can be displayed and modified:

- EV1 charge to which the *water inlet pump 35* is connected in parallel (included on all models)
- EV2 drain (included on all models)
- EV3 3-way (not included on 6/18 S Dynamica models)
- EV4 steam (not included)
- EV5 drying (not included on 6/18 S Dynamica models)
- EV6 by-pass (not included on 6/18 S Dynamica models)
- Water pump is the *automatic water inlet pump 46* (optional; standard on BHD models). If the steriliser is provided with connections to the SPEEDY WATER demineralisation system, the pump is replaced by solenoid valve EV7 (see page 51)
- Vacuum pump (not included on 6/18 S Dynamica models)
- Door lock (included on all models)
- The fan(s) are *fans 42*: single on 6/18 S Dynamica and 18 S; double on other models
- Aux 1 is not used
- Aux 2 is not used
- External coil for pre-heating and drying *chamber 09*
- Internal coil for steam generation

**NB.** The internal coil is:

- The external cylindrical band arranged around *chamber 09* in models 18 S Dynamica, 18/24 S - B - BHD
- The series of lower and upper coils external to *chamber 09* in 6 S Dynamica

The internal coil is:

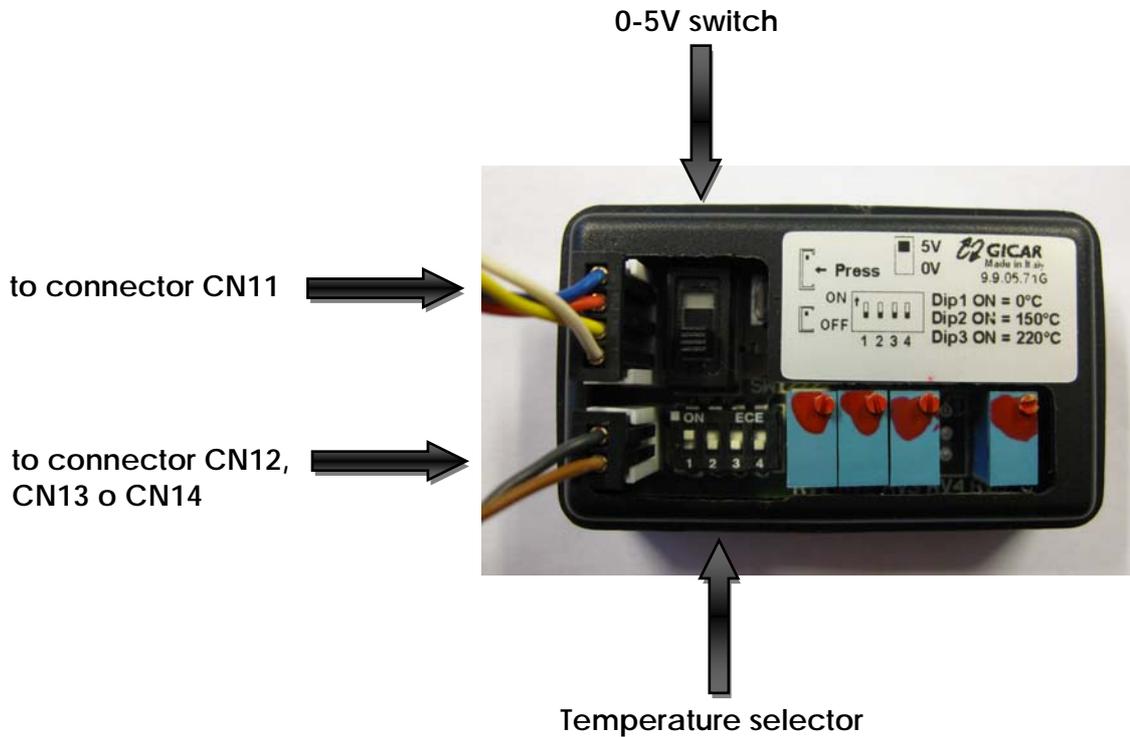
- The coil in *chamber 09* in models 18 S Dynamica, 18/24 S - B - BHD
- The lower coil external to *chamber 09* in 6 S Dynamica

Use the ↑↓ arrows to scroll the list and highlight the required option. Press ENTER to change the output state (ON/OFF).

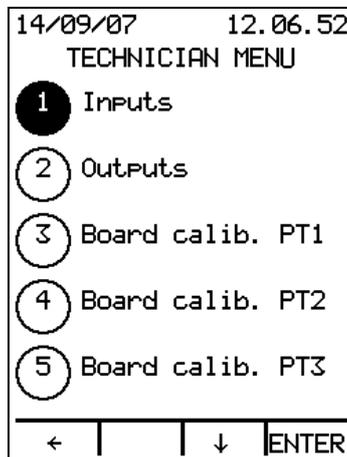
Press ← to go back to the Technician Menu.

**3** **4** **5** PT1 / PT2 / PT3 board calibration

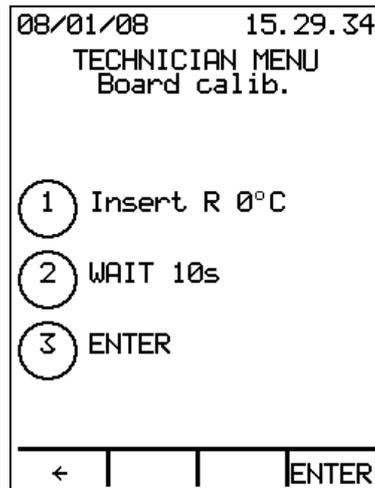
This procedure is used to calibrate temperature probe PT1, PT2 and PT3.  
A specific calibration kit is needed for calibration:



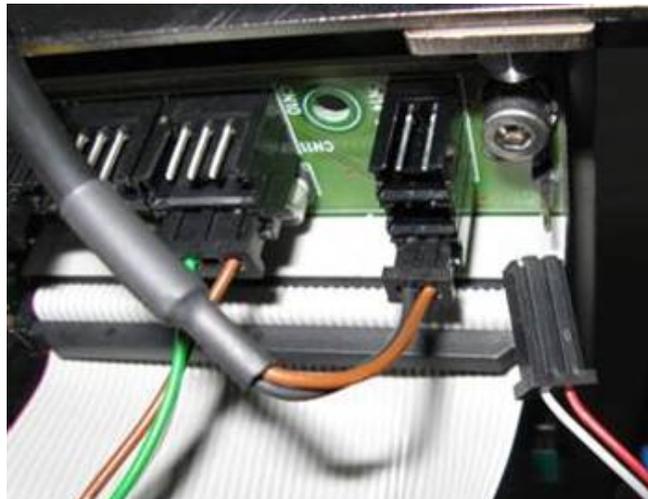
To calibrate PT1, PT2 or PT3 select option 3, 4 or 5 respectively in the Technician Menu:



Press ENTER:



Disconnect the connector from the electronic power board corresponding to the temperature probe you want to calibrate: disconnect connector CN12 for sensor PT1, connector CN13 for sensor PT2 or connector CN14 for sensor PT3.



Connect the 2 pin cable of the calibration tool to connector CN12, CN13 or CN14 of the power board. Put ON the switch number 1 of the temperature selector, which corresponds to a 1000 Ohm sample coil, corresponding to 0°C:



Wait for at least 10 seconds and press ENTER.

```

08/01/08      15.29.39
      TECHNICIAN MENU
      Board calib.

① Insert R 150°C
② WAIT 10s
③ ENTER

← | | | ENTER
    
```

To calibrate temperature sensor PT1, put OFF the switch number 1 of the temperature selector and put ON the switch number 2 of the temperature selector, which corresponds to a 1573 Ohm sample coil, corresponding to 150°C:



Wait for at least 10 seconds and press ENTER.

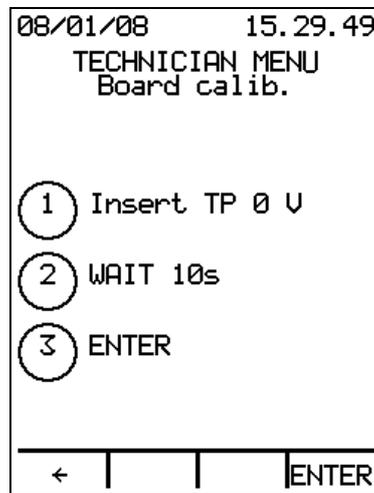
To calibrate temperature sensor PT2 or PT3, put OFF the switch number 1 of the temperature selector and put ON the switch number 3 of the temperature selector, which corresponds to a 1832 Ohm sample coil, corresponding to 220°C:



Wait for at least 10 seconds and press ENTER.  
Press ← to go back to the Technician Menu without changing the calibration.

## 6 TP board calibration

This procedure is used to calibrate the pressure transducer.  
Select option number option 6 in the Technician Menu and press ENTER:



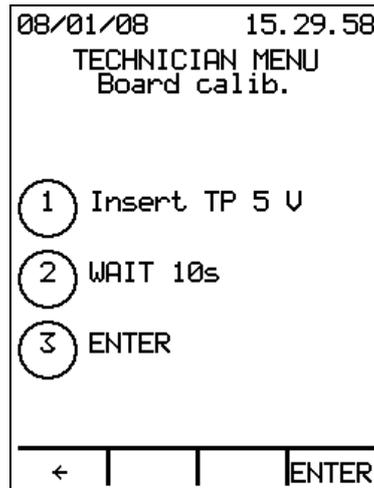
Disconnect the connector CN11 corresponding to the pressure transducer from the electronic power board:



Connect the 4 pin cable of the calibration tool to connector CN11 of the power board.  
Set the calibration tool switch to 0 V (position 2):



Wait for at least 10 seconds and press ENTER.

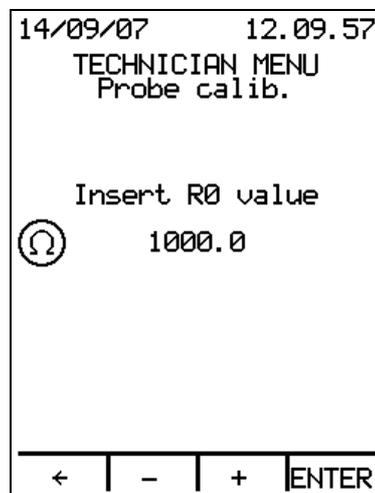


Now set the calibration tool switch to 5 V (position 1).  
Wait for at least 10 seconds and press ENTER.

Press ← to go back to the Technician Menu without changing the calibration.

### **7** **8** **9** PT1 / PT2 / PT3 probe calibration

This procedure is used to complete the calibration of the temperature probes PT1, PT2 and PT3. This operation must be performed whenever a temperature probe is replaced.



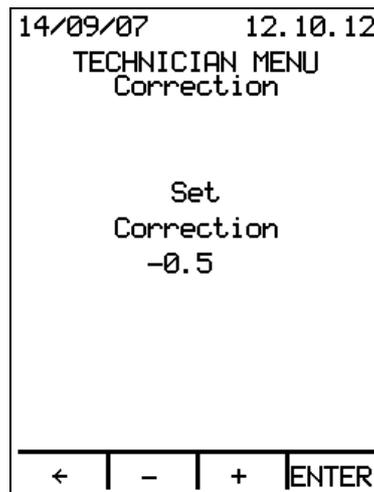
Press +/- to enter a 0°C value of the temperature probe shown on the label or on the wire sheath (e.g.: if a value of 1000.2 is shown on the PT1 sensor label, press + twice to display 1000.2). Press ENTER to confirm.

Press ← to go back to the Technician Menu without changing the calibration.

### **10** **11** **12** PT1 / PT2 / PT3 correction

This procedure is used to correct the temperature value displayed during the sterilising process. For example, if using an external sampling tool a temperature lower than the one

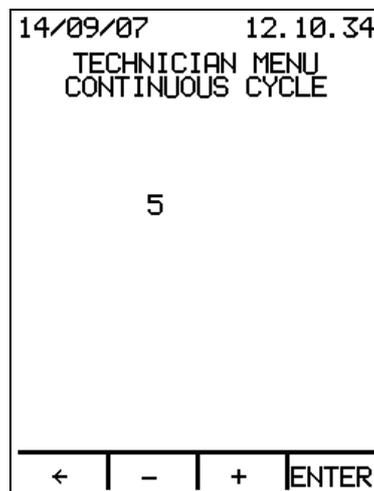
displayed is measured in the chamber during the sterilisation process, the temperature may be corrected as follows:



Press +/- to enter the correction which will change the temperature shown on the display. Press ENTER to confirm. Press ← to go back to the Technician Menu without changing the correction.

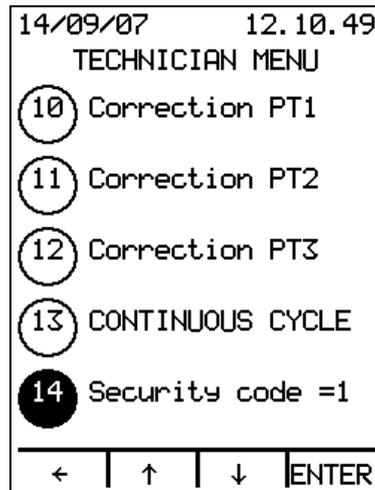
### 13 Continuous cycle

A CONTINUOUS CYCLE is a test cycle which includes pre-vacuum, 2 fractioned vacuum pulses, pressurisation, sterilisation (2 minutes) and drying (3 minutes). Minimum pressure values higher than standard cycles are reached during the vacuum phases. The purpose of the test cycle is to run the steriliser continuously, for instance at night, to test efficacy of the performed maintenance operations:



Press +/- to enter the number of cycles and press ENTER to confirm. Press ← to go back to the Technician Menu without making changes. CONTINUOUS CYCLE will be available in STAND BY mode if a number higher than zero is set; press ENTER to repeat the cycle for the set number of times.

## 14 Security code



Press ENTER to set the security code to 1.

## 15 Chamber load test

This test can only be run on 18 S Dynamica and 18/24 S - B - BHD models.

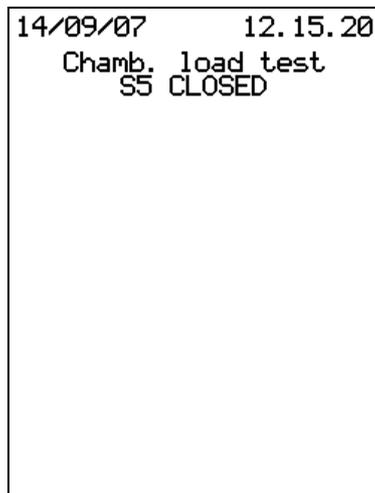
**Do not run this test on 6 S Dynamica.**

Press ENTER to operate the *water inlet pump 35*. The following screen will be displayed:



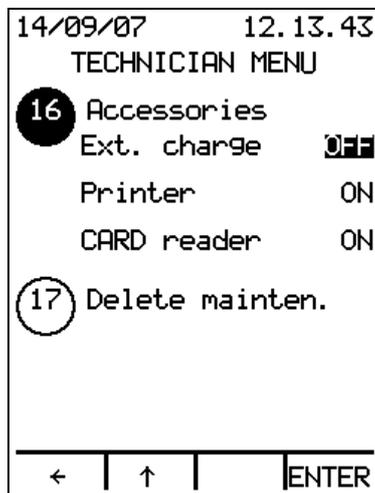
Press STOP to stop loading the chamber.

If chamber water level probe S5 is closed, the following message will be displayed for 5 seconds:



The Technician Menu will then appear.

## 16 Accessories



Select Accessories (option 16) and press ENTER. The external charge value (ON/OFF) will appear. Press  $\uparrow\downarrow$  to change the value, press ENTER to confirm and move to the next option.

Press  $\leftarrow$  to go back to the Technician Menu without changing accessory settings.

**17** Delete maintenance



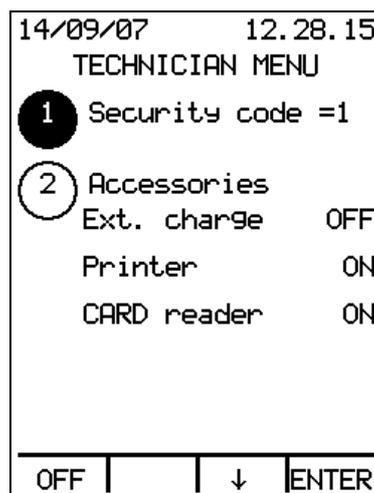
Press YES to delete all maintenance interventions performed on the steriliser from the machine memory and reset the remaining day and cycle counters for all components. Press NO to keep the maintenance log and go back to the Technician Menu.

**NB.** After installing the steriliser, delete the maintenance log to reset the remaining days and cycles for all components.

**Simplified version of the Technician Menu (PUCK)**

To access the simplified version of the Technician Menu when the Technician's SterilCard is not available, simultaneously press the second and fourth button on the left and switch the steriliser on using *main switch 13*.

The following screen will appear:



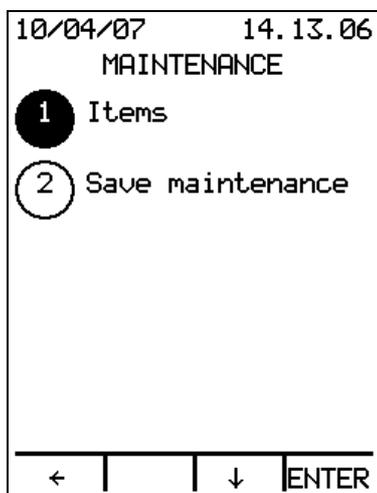
This Technician Menu contains only two options:

1. Security code =1
2. Accessories

These options correspond exactly to those contained in the Technician Menu and described above.

## MAINTENANCE

In STAND BY, press MENU and use ↓ to select the Maintenance Menu (option 5). Press ENTER to display the following screen:

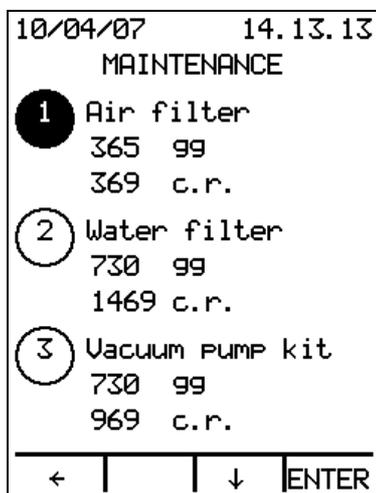


This menu contains only two options:

1. Items
2. Save maintenance

### 1 Items

Press ENTER to display the list of items subject to scheduled maintenance:



The remaining days and cycles and the last three replacements are shown for each item with the date of intervention and the total number of cycles when the replacement was performed.

Use the ↑↓ arrows to scroll the list of items.

Press ENTER to record replacement:

10/04/07	14.13.30
MAINTENANCE	
REPLACED ITEM Air filter?	
YES	NO

Press YES to store replacement information in the maintenance memory. Press NO to go back to the list of items.

## 2 Save maintenance

Press ENTER to display the following screen:

10/04/07	14.13.45
SAVE MAINTENANCE ON STERILCARD?	
YES	NO

Press NO to go back to the Maintenance Menu.  
Press YES to store the maintenance operation on the inserted *SterilCard 06*. The archive will be overwritten each time.

## Scheduled service table

Item	Number of cycles or max allowed time	Service date	Number of cycles performed at intervention operation	Technician signature
Air filter*	400 1 year			
Water filter	1500 2 years			
Vacuum pump kit	1000 2 years			
EV2 drain	1500 2 years			
EV6 by-pass	3000 3 years			
Empty tank probe	1500 2 years			
Water inlet pump	2000 2 years			
Internal coil	6000 6 years			
Door gasket*	3000 2 years			
Chamber level probe	3000 3 years			
Fan(s)	4000 3 years			
Temperature probe 1	6000 6 years			
Chamber safety thermostat	6000 6 years			
Pressure transducer	6000 6 years			
Chamber safety probe	3000 3 years			

\* this item can be replaced by the user.



*After each component fixing or replacing, please check the correct functioning of the component itself and the whole sterilizer by running a complete sterilization cycle.*

## MESSAGES

Messages contain information and warnings and usually require the user to perform a simple correction or check.

### Message / Cause / • Solution

---

#### Scheduled maintenance

This message indicates the need for a scheduled maintenance on one or more components.

*This message will appear when the steriliser is in STAND BY mode and the remaining cycles or days of life of one or more components are expiring.*

- The steriliser may however allow to run one or more cycles but the component subject to scheduled maintenance must be replaced (see chapter MAINTENANCE).
- 

#### Check water quality

This message appears only on models fitting an external water demineralisation system (optional) or if the water is automatically loaded from an external tank (optional; standard on BHD models); in this case, the steriliser monitors conductivity of loaded water.

*The steriliser will display this message in STAND BY mode and only when an automatic water inlet **29** is installed (see USE AND MAINTENANCE MANUAL, chapter CONNECTIONS) and Self-filling in the Main Settings Menu is ON. This indicates that the water conductivity has exceeded the optimal level (15  $\mu\text{S}/\text{cm}$ ) but is still acceptable.*

- The steriliser may allow to run one or more cycles but it is advisable to proceed as described in section INSUFFICIENT WATER QUALITY because this alarm could stop operation of the steriliser.

**Note: If the water conductivity increases, it means that mineral salts contents has increased and water is therefore NO LONGER suitable.**

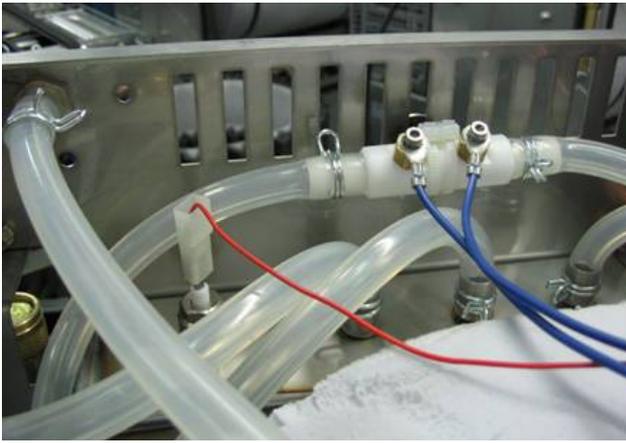
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#### Drain waste water

This message indicates that the *waste water recovery tank 11* is full and must be emptied.

*The steriliser shows this message in STAND BY mode.*

- Empty the tank (see USE AND MAINTENANCE MANUAL, chapter MANUALLY DRAIN TANKS).  
**ATTENTION:** The liquid may be very hot and infected and must be disposed according to local regulations.
- If the *direct drain 30* is installed, you should check that it is connected correctly and that the pipe is neither bent nor clogged.
- If the message is still displayed after emptying the tank, check:
  - the level probe which could be dirty or fouled by algae or lime scale caused by water stagnating in the tank; this could generate false readings (see LEVEL PROBE TEST);



*Waste water recovery tank 11  
on models 24*



*Waste water recovery tank 11  
on models 18*



- the probes and steriliser grounding, as correct steriliser operations depend on the correct grounding connection.

If the steriliser is not used for a long period, empty out the tanks and clean them carefully with a cleaning solution (70% water and 30% alcohol). **Do NOT use this solution for cycles.** Rinse out with plenty of water before any further operation. The *waste water recovery tank 11* can be filled without removing any parts. Simply connect a pipe to the *waste water drain tap 25* and hold the fluid container higher than the steriliser. The tank can be filled by removing the panelling and detaching one of the two pipes on top.

### Cooling pause

This message indicates that the temperature in *chamber 09* is too high to start or continue a cycle (see USE AND MAINTENANCE MANUAL, chapter OPERATION).

*The steriliser will display this message in STAND BY mode or after starting a cycle and will stop only during the pre-vacuum phase. This message normally appears when several cycles are run one after the other and no time is allowed for the chamber to cool down.*

- In such conditions, simply let the chamber cool down. To speed up cooling, open *door 16*, otherwise cooling will take considerably longer. To open the door, press STOP, cancel the MANUAL STOP ALARM and wait for a few seconds for the pressure inside the chamber to equalise ambient pressure to allow the door to be opened.
- **With the door closed** the operating cycle will resume automatically when the allowed temperature is reached.
- **If you opened the door**, start the cycle again after cooling down the steriliser.

## ALARMS

### Alarms indicate the presence of a possible fault and the need for repairs.

If a fault occurs during a cycle, the cycle will be immediately interrupted and a buzzer will sound for 15 seconds to indicate the alarm conditions. A description of the alarm will appear on the display along with the cycle and phase when the alarm occurred. To reset an alarm, press SILENCE ALARM and enter the security code or *SterilCard 06*.

An alarm will cause the steriliser to be switched off. Therefore, after cancelling the alarm and solving the cause, you will need to switch the steriliser back on before starting a new cycle.

The load in the steriliser during the cycle interrupted by the alarm is to be considered NON STERILE and must be dried and repacked, if required.

### Description / Cause / • Solution

---

#### Insufficient water quality alarm

This alarm is available only on models fitting an external water demineralisation system (optional) or if the water is automatically loaded from an external tank (optional; standard on BHD models); in this case, the steriliser monitors conductivity of loaded water.

In such conditions, the alarm indicates that the water conductivity value has exceeded an acceptable level and stops the automatic water inlet.

*The steriliser will display this message when a cycle is started (see USE AND MAINTENANCE MANUAL, chapter ALARMS), only when an automatic water inlet 29 is installed (see USE AND MAINTENANCE MANUAL, chapter CONNECTIONS) and Self-filling in the Main Settings Menu is ON.*

*It indicates that the conductivity of the water provided is no longer acceptable (>30 µS/cm); this alarm is always preceded by the CHECK WATER QUALITY message.*

- If the steriliser is connected to a demineralisation system, change the cartridge following the manufacturer's instructions. After replacing the cartridges, rinse the *clean water tank 10*.
  - If the steriliser takes water from an external tank, change the water because it is no longer suitable.
  - If you want to run the steriliser without replacing the cartridges in the water demineralisation unit, re-start the steriliser by setting Self-filling OFF and manually fill the tank through the *filler 14*. In this case, the water will not be monitored and you should make sure that the quality is suitable.
- 

#### Insufficient water level alarm

It indicates that there is no distilled or demineralised water in the *clean water tank 10*.

*The steriliser will show this alarm if probe S2 is uncovered when cycle is started or if probe S1 is uncovered during a cycle.*

- **If the alarm appears when a cycle is started**, fill the *clean water tank 10*. To fill the tank without the self-filling function, loosen and remove the plug from *filler 14* and insert the supplied *measuring funnel 05* (use suitable water only). If the steriliser is on and in STAND BY when filled, the "*Minimum water level*" and "*Maximum water level*" messages on the display may be used to check the level. A

buzzer will sound for 3 seconds when the *“Maximum water level”* is reached to indicate that the tank is full. If you do not hear the signal, excess water will flow out from the filler.

- **If the alarm is displayed during the cycle**, fill the tank and proceed as shown in the INSUFFICIENT STEAM ALARM procedure. Furthermore, check and replace the *clean water tank 10 level probe insulation*.

**Note:** In 18 S Dynamica and 18/24 S - B - BHD models, the steriliser introduces water into the chamber by means of the pump to generate steam until the water touches the *chamber probe 21*. If water is not sufficient during the water inlet phase, it means that there is leakage of steam from the valves, from the chamber or from the pipes.

- In extreme conditions, when a SPECIAL cycle is run with three fractioned vacuum pulses and with a very heavy porous load, the expected minimum level may not be sufficient. Reduce the load or use two vacuum pulses only.

**Note:** Steam is generated in 6 S Dynamica by introducing water in the chamber using the pump and measuring the required amount by means of the volumetric counter. If there are no leakages of water from underneath the steriliser, check correct operation of the volumetric counter and replace it, if required.

---

### Chamber level alarm

This alarm indicates that the time required to fill *chamber 09* with the required amount of water has elapsed.

*In 18 S Dynamica and 18/24 S - B - BHD models this alarm is displayed when chamber probe 21 does not detect water in the chamber. In 6 S Dynamica the alarm appears when the volumetric counter does not detect the required amount of water before the timeout.*

- When using 18 S Dynamica and 18/24 S - B - BHD, check inclination of the steriliser (see USE AND MAINTENANCE MANUAL, chapter INSTALLATION).
- If the problem persists, check:
  - that the *water inlet pump 35* and the solenoid valve **EV1** are pumping water into *chamber 09*;
  - if solenoid valve **EV1** winding has blown;
  - the *water inlet pump 35*;
  - the water filter;
  - fuse **F1** on the *power board 34*.

If none of these causes are found, check *chamber probe 21* which is probably not detecting the level and the probe electric connection.

To check correct operation probe:

- open *door 16* and remove the entire contents of *chamber 09*;
- remove *tray support 08*;
- remove *coil grid 19* by loosening the corresponding screw;
- reassemble back to front, i.e. by turning the grid and seal horizontally;
- switch the steriliser on in STAND-BY mode;
- run Chamber load test from the Technician Menu (option 15).

The probe could be dirty or the power cable could be interrupted. Furthermore, check level probe grounding.

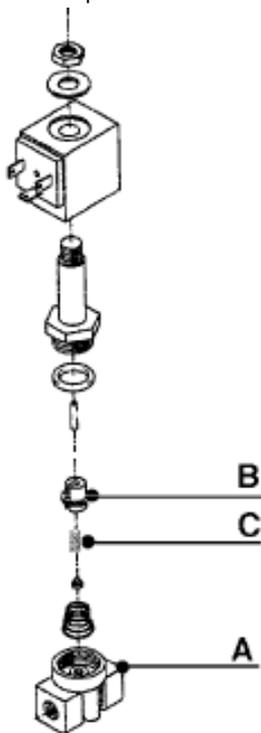
---

### Insufficient steam alarm

This alarm indicates leakage of steam from *chamber 09*.

*The alarm may appear during a cycle, when the suitable pressure needed to run a cycle is not reached at a temperature of 114°C. Pressure is detected by transducer 38 and temperature by chamber temperature probe 39.*

- Check the efficiency and cleanliness of *chamber seal 31* and of the flange of *chamber 09* on which it is fitted. Replace if damaged.  
If leakage of steam is found, adjust the door closing as shown in chapter DOOR ADJUSTMENT.
- Check inclination of the steriliser again (see USE AND MAINTENANCE MANUAL, chapter INSTALLATION).
- Check correct operation of *pressure transducer 38* and *temperature probe 39* using an appropriate measuring tool.
- Check internal coil.
- Check that the total weight of the load is not exceeded (see USE AND MAINTENANCE MANUAL, chapter OPERATING USE).
- If the alarm is not resolved after these checks, check drain solenoid valve **EV2** (see diagrams). This is connected to the chamber drain and is the first solenoid valve to intercept the steam. For this reason, it might need to be replaced.



Replace the solenoid valve when time or number of cycles shown in the Scheduled service table is exceeded (see USE AND MAINTENANCE MANUAL, chapter MAINTENANCE). Proceed as follows if cleaning is required:

- Remove the solenoid valve and keep track of the sequence of parts in order to refit them correctly.
- Carefully clean the hole in the valve body (**A**).
- Carefully clean the core (**B**). The seal pushed by the spring (**C**); should slide smoothly inside. Should the seal be deformed, the valve will need to be replaced.

If the steam keeps leaking, pressurise the steriliser and locate the leak by following the following practical procedure:

- Close the previously checked chamber door properly.
- Remove the cover from the steriliser.
- Energise the winding of solenoid valve **EV2** (see wiring diagrams) with an external power cable at 230V: it should be normally open **NO**.
- Remove one of the *inspection plugs 40* and connect a compressor (2÷3 bars).
- Introduce compressed air and hold the chamber pressurised for approximately 15 minutes: locate the leakage by observing the unit.
- Check the pressure/temperature alignment during a cycle (see STERILISATION TEMPERATURE BAND ALARMS).
- Run a VACUUM TEST to check for pressure losses.

### Pressurisation alarm

This alarm indicates that the temperature has not increased properly in *chamber 09* during the steam phase (steam or pressurisation peaks).

*The steriliser may display this alarm during a cycle, during steam phases, when the pressure does not correspond to the saturated steam curve.*

- Follow the instructions in the INSUFFICIENT STEAM ALARM solution.
  - If the alarm persists, there could be a fault in the heating circuit. Check that during pressurisation or steam peaks (fractioned vacuum), the chamber internal coil is correctly powered (see wiring diagrams).
  - Replace *chamber probe 21* (see technical newsletter).
- 

### Overtemperature alarm

The alarm indicates that temperature inside *chamber 09* has exceeded 150°C.

*The steriliser may display this alarm when the temperature reaches 150°C.*

- Check that the wires of the *chamber temperature probe 39* and the *transducer 38* are neither disconnected, nor worn or faulty.
  - Check the correct load positioning, which should be correctly arranged on the supports.
  - Replace *chamber probe 21* (see technical newsletter).
- 

### Insufficient vacuum alarm

This alarm indicates that during the pre-vacuum phase, the pressure did not drop to the correct set value.

*This alarm is displayed during the pre-vacuum phase of a cycle when the pressure does not drop to the correct value in the expected time.*

- Check the efficiency and cleanliness of *chamber seal 31* and of the flange of *chamber 09* on which it is fitted. Replace if damaged.
  - Check *vacuum pump 41* (see ADDITIONAL CHECKS AND SETTINGS – Vacuum Pump).
  - Check correct positioning of *drain filter 20* and its cleanliness.
  - Check correct positioning of *fans 42*.
  - Check that the steriliser is sufficiently ventilated.
- 

### Fractioned vacuum alarm

This alarm indicates that vacuum was not created inside *chamber 09*.

*This alarm is displayed during a cycle, during a vacuum pulse in the fractioned vacuum phase, when the pressure does not drop to the correct value in the expected time.*

- Check that the total maximum load weight was not exceeded and that the materials forming the load are compatible with the selected cycle (see USE AND MAINTENANCE MANUAL, chapter OPERATING USE), for example, NEVER mix fabrics with solid materials.
  - Check correct positioning of *fans 42*.
  - Check the steriliser is sufficiently ventilated (in particular if built-in).
  - Check that *vacuum pump 41* is properly powered and that it works correctly.
-

### Sterilisation temperature band alarm: overtemperature / undertemperature

Both alarms indicate that the temperature is out of the sterilising band (tolerance) defined by EN 13060. This standard defines the tolerance band (0°C - +4°C) from the setting value during sterilization. For example, if the setting is 134°C, the temperature should be in the band 134°C-138°C.

*The steriliser may display one of these alarms during sterilisation when the temperature in chamber 09 and/or the theoretic steam temperature are out of the tolerance band.*

This alarm could be generated by incorrect temperature and pressure values.

- If the UNDERTEMPERATURE alarm appears, check that the load weight does not exceed the maximum value allowed (see USE AND MAINTENANCE MANUAL, chapter OPERATING USE).
- Check steriliser temperature and pressure.

### Temperature adjustment

The temperature displayed must be 0.5°C lower than the actual temperature in *chamber 09*.

To adjust the temperature, firstly calibrate *chamber temperature probe 39* in the Technician Menu, options 3 (PT1 board calibration) and 7 (PT1 probe calibration).

If the temperature is still not correct, adjust the Correction parameter in the Technician Menu (see step 1 and 2) or replace the sensor (step 3).

#### 1. Using an external tool

- Remove the steriliser from the unit (if it is built-in) and remove the covering.
- Loosen and remove one of the *inspection plugs 40* on *chamber 09*.
- Insert the probe of the external tool checking its tightness and place it in contact with the end of *chamber temperature probe 39*. Alternatively, wireless probes may be used. These are introduced into the sterilising chamber and do not require assembly.
- Start an operating cycle and check the values. This operation should preferably be performed with Cycle 134 HOLLOW/POROUS, because the pressure in this cycle is best aligned to the saturated steam curve.
- Adjust the temperature using the Correction parameter in the Technical Menu (option 10).

#### 2. Using a sample coil

- Switch off the steriliser using *main switch 13* and disconnect *chamber temperature probe 39* (connector CN12 on *power board 34*).
- Connect a sample coil with an R value from 1000 to 1573 Ohm, corresponding to a temperature (°C) of

$$T = (-R0*A + (R0^2*A^2 - 4*R0^2*B + 4*R0*R*B)^{0,5}) / 2/R0/B$$

where

R0 = value of *chamber temperature probe 39* at 0°C (written on label and set in PT1 probe calibration in the Technician Menu)

A = 0,0039083

B = -0,0000005775

- Switch on the steriliser and check the temperature value which appears on the display.
- Adjust the temperature using the Correction parameter in the Technical Menu (option 10).

### 3. Replacing the PT1 temperature probe

- Replace *chamber temperature probe 39*.
- Select option 3 in the Technician Menu (Board calibration PT1 page 12) and proceed with calibration.
- Select option 3 in the Technician Menu (PT1 Probe calibration page 15) and enter the R0 value.

### Adjusting pressure setting

To adjust pressure setting select option 6 from the Technician Menu (TP Board calibration on page 4) and follow the instructions.

Replace the transducer if the error between the pressure shown on the display and the pressure indicated by an external calibration tool exceeds  $\pm 50$  mbar.

- If the alarm is not resolved, possible causes are:
    - sudden leakage from a valve or a disconnected pipe;
    - faulty chamber temperature probe **39**;
    - faulty *transducer 38*;
    - faulty electronic board.
- 

### Level probe alarm

This alarm indicates inconsistent operation of the level probes in the *clean water tank 10*. For example, if the maximum level probe detects presence of liquid, minimum level probe and tank safety probe should also detect it.

*The steriliser shows this message in STAND BY mode.*

- Empty, clean and fill *clean water tank 10*: the operation must be performed at environmental temperature.
  - Check the level probes.
  - Replace the level probe insulation (see page 29).
  - Check water quality: Excessively pure water is corrosive (it removes salts from metals) and cannot be detected by the probes. **In particular, DO NOT use bidistilled water or water with a conductivity of less than 1  $\mu\text{S}/\text{cm}$ .**
- 

### Coil alarm

This alarm indicates that the coil element circuit is either open or interrupted.

*The alarm is displayed on the steriliser in any condition coil circuit is NOT detected as closed.*

Perform the following checks in the order shown:

- Rearm *safety thermostat 17* by removing the plug and pressing the button underneath. The thermostat may be rearmed only if *chamber 09* has cooled down. To speed up cooling, open *door 16*, which will however be locked. *Door 16* can be opened by inserting *unlocking tool 37* (provided to service technicians) into the special hole on the right under the door.



Unlocking tool 37 must be fully inserted. Open the door without forcing it, remove unlocking tool 37 and open the handle completely.



- Check the coils with a tester for continuity without checking the value.
- Check TRIAC components on *power board 34* and replace the electronic board pair, if required.

---

### Self-filling alarm

This alarm is present on models with *automatic water inlet 29* (only (optional on BHD models)).

*The steriliser will display this message in STAND BY mode only when the automatic water inlet is fitted (see USE AND MAINTENANCE MANUAL, chapter CONNECTIONS).*

- **In configuration (A)**, fill or replace the distilled or demineralised water tank.
- Note: Constantly running the pump without water will effect durability and drastically reduce the component's life.**
- Check that the inlet pipe is neither bent nor twisted.
  - If the problem persists, check if the *automatic water inlet pump 46* is working.

- **In configuration (B)**, check that the water supply tap is open and that the mains water pressure is higher than the minimum pressure indicated for the installed demineralisation system.
- If the problem persists, check if solenoid valve **EV7** opens correctly.

**In both cases**, check:

- that all connections are properly connected;
- that all pipes are in their seats and neither cracked nor twisted.

---

### Door alarm

This indicates that *door 16* is not correctly closed.

*The steriliser may display this message when an attempt is made to start a cycle but the door is not completely locked. The steriliser will not start in this condition.*

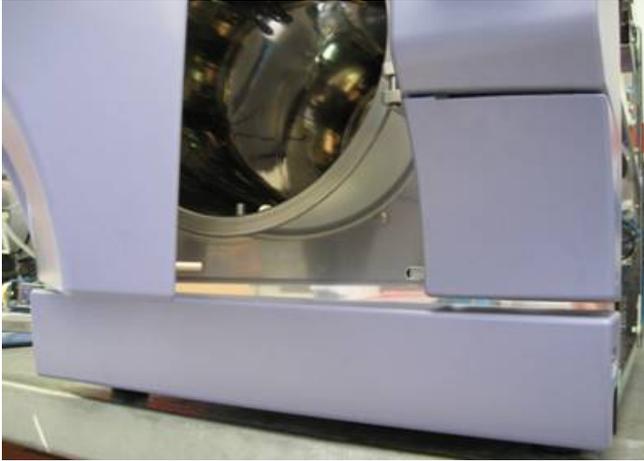
- Close the door well before starting a cycle.
- If the problem persists, despite the door being locked, *micro-switch M1 36A* and/or *micro-switch M2 36B* are not correctly pressed or faulty. Check that:
  - the lock nuts on the micro-switches are tight;
  - the pin is not bent, out of its seat, or loose;
  - there is continuity at micro-switch contacts (use a tester);
  - there are no obstructions or dirt near the micro-switch rod;
  - the connection cables between the door and the steriliser are operating and properly connected.

**Note:** To determine which of the two micro-switches is generating the signal, check:

- **if the alarm is triggered immediately** after starting the cycle, it means that the pre-closing micro-switch is not working (*micro-switch M2 36B*);
- **if the alarm is triggered 3 minutes after** starting the cycle, it means that the door lock micro-switch is not working (*micro-switch M1 36A*).

*Micro-switch M1 36A:*



*Micro-switch M2 36B:***PT1 temperature probe alarm**

This is triggered when *chamber temperature probe 39* in the steriliser is disconnected or faulty.

*The steriliser shows this alarm during operation when the probe detects a temperature of less than 3°C.*

- Check the connection of *chamber temperature probe 39* to connector CN12.
- Replace the probe if faulty.
- Check temperature setting following the instructions shown in the STERILISATION TEMPERATURE BAND ALARM section.

**Drain alarm**

This indicates that the pressure did not drop to the correct predetermined value during draining.

*This alarm is displayed during the draining phase of a cycle when the pressure did not drop to the correct value in the expected time.*

- Check solenoid valve EV6.
- Check solenoid valve EV3.
- Check operation of *vacuum pump 41*.
- Proceed as shown for the FRACTIONED VACUUM ALARM.

**Misalignment alarm**

This indicates that the temperature in *chamber 09* does not correspond to the theoretic steam temperature.

*The steriliser displays this alarm during the sterilisation phase when the temperature in chamber 09 and the theoretic steam temperature differ by more than 2°C.*

This alarm could be generated by incorrect temperature and pressure values.

- Check the temperature and pressure settings of the steriliser following the instructions shown in the STERILISATION TEMPERATURE BAND ALARM section.

### Pressure transducer alarm

This is triggered when *transducer 38* in the steriliser is disconnected or faulty.

*The steriliser shows this alarm during operation when the transducer detects a pressure of less than 30 mbars.*

- Check the connection of *transducer 38* to connector CN11.
  - Replace the transducer if faulty.
  - Check the pressure setting following the instructions shown in the STERILISATION TEMPERATURE BAND ALARM section.
- 

### Manual stop alarm

This indicates that that STOP was pressed during a cycle before the cycle was completed.

*The steriliser displays this alarm during operation and stops to inform the user that the load MAY NOT BE STERILE.*

- This is not a failure but a cycle stop override caused by the operator. For this reason, there are no operations to be performed but the load MAY NON BE STERILE. A new sterilisation cycle must be started.

**Note:** Manual cycle stops should always be avoided unless in case of extreme need. If the steriliser has already performed the fractioned vacuum or pressurisation phases, the material inside could be wet and the steriliser may not start properly. Dry the material well and change the bags.

---

### Power missing alarm

This indicates that a power blackout occurred during a cycle.

*The steriliser displays this alarm when power is restored. The cycle and the phase when the blackout occurred will appear on the display.*

*The last alarm will appear if the blackout occurred in presence of an alarm.*

- On the basis of the message on the display, you can infer if the steriliser managed to complete the sterilising cycle or not despite the power blackout.

A blackout may be caused by various reasons:

- the steriliser was accidentally switched off by means of *main switch 13*;
  - mains blackout;
  - *power cable 03* not plugged in correctly or damaged;
  - blown *fuses 32*.
- 

### Event alarm

This indicates that one of the timed phases (sterilisation, drying or vacuum test hold) was not completed correctly.

- Contact COMINOX.

**Alarm code list**

<b>Code</b>	<b>Alarm type</b>
00	COIL
01	OVERTEMPERATURE PT1
02	
03	INSUFFICIENT STEAM
04	INSUFFICIENT WATER LEVEL
05	
06	MAX WATER LEVEL
07	DOOR
08	
09	MANUAL STOP
10	INSUFFICIENT VACUUM
11	FRACTIONED VACUUM
12	
13	LEVEL PROBE
14	PRESSURISATION
15	OVERTEMPERATURE BAND
16	UNDERTEMPERATURE BAND
17	
18	POWER MISSING
19	
20	
21	DRAIN
22	MISALIGNMENT
23	PRESSURE TRANSDUCER
24	PT1 TEMPERATURE PROBE
25	
26	
27	
28	
29	
30	EVENTS

## ADDITIONAL CHECKS AND SETTINGS

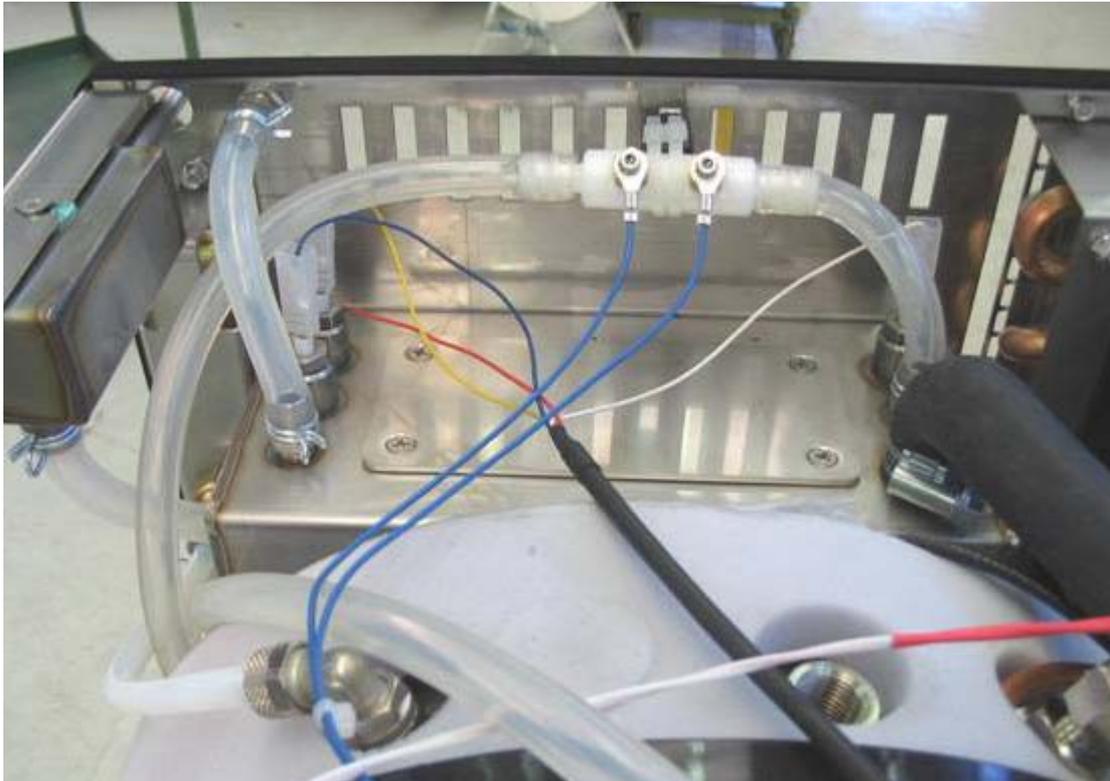
### Display off or not clear

Proceed as follows if no writing appears on the display and/or any if the display is not very clear:

- Check that power socket is powered, the *power cable 03* is correctly plugged in and connected to the steriliser.
- Check *fuses 32*. Check that the *main switch 13* is pressed to position "I".
- Check the fuses on *electronic power board 34*.
- If the display is not clear from where you are standing, change reading position or angle. If the display is clearer, adjust contrast by means of trimmer **PT1** starting from your preferred reading position (see chapter DIAGRAMS AND WIRING, Logic electronic board).

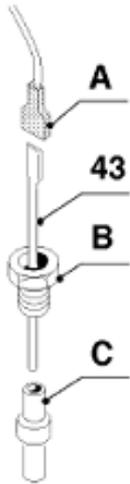
### Level probe check

*Level probes 43* of both tanks are simple metal rods fitted into the container to be monitored and insulated from it. The probe circuit is closed when liquid is present.



The presence of fouling or lime scales may create electric continuity between tank metal and level probe rod and consequently read the presence of liquid in the tank when the tank is empty.

If messages and alarm appear after emptying the tanks, remove the probes and clean the probes carefully as follows:

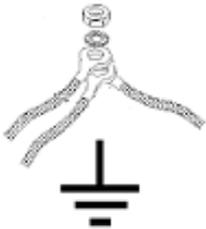


- Remove the cover and the faston **(A)** from the probe bulb.

- Use a wrench **ch 13** to loose the probe holder **(B)** and remove the probe rod.

- Remove the Teflon ogive seal **(C)** ; this is generally deformed to seal the probe holder and assumes the shape of the threaded hole. To remove the ogive seal, unscrew the ogive with a screwdriver and replace it, if required.

- Carefully clean inside the casing **(C)** and the rod and refit.



### Safety valve check

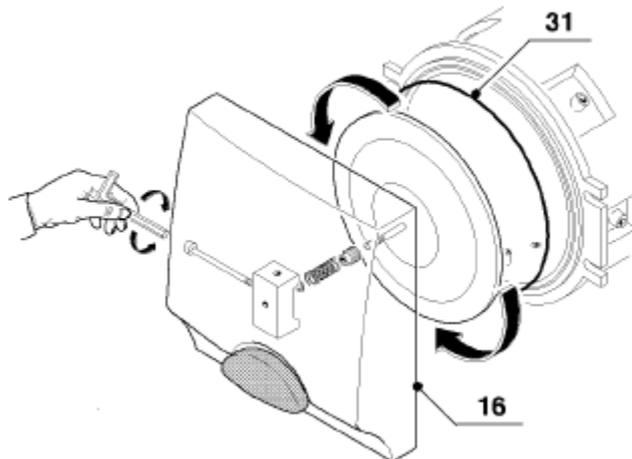
The safety valve should be checked every six months. For this check *chamber 09* should be cold and *door 16* open.

To ensure proper operations of *safety valve 12*, loosen the cover and unscrew the valve upper plug. Pull the plug upward to open the valve manually. Close the plug.

### Door adjustment

- Procedure for 18/24 litre models: if leakages still occur after checking and cleaning *chamber seal 31* and the flange of *chamber 09* on which it rests, you will need to:
  - Switch the steriliser off and wait for it to cool down, then open the door.
  - Use a wrench **ch5** to loosen the screw inside the hole on the left side of the door. When the screw is loose, the plate will be free to rotate.
  - Turn the plate anticlockwise for about ¼ of a turn or as required.
  - Tighten the Allen screw **ch5**.
  - When closing the door, a higher resistance should be felt.
  - Test tightness by starting a new cycle. Repeat the operation if required.
- For 6 S Dynamica, in case of leaks do the following:
  - Check and clean *chamber seal 31*.
  - Adjust the door closing by following these steps:
    - o Switch the steriliser off and wait for it to cool down, then open the door.
    - o Remove the cover from the steriliser.
    - o Rotate the screw on top of the chamber to adjust the hook and thus adjusting the door closing.
    - o Test tightness by starting a new cycle. Repeat the operation if required.

**Note:** Do not tighten the door excessively. Excessive pressure may deform the seal.



**Water in the chamber after the cycle**

Proceed as follows if there is still water inside *chamber 09*:

- Check that a cycle with drying phase has been selected. Otherwise, the presence of water or humidity in the chamber is a normal condition.
- Check the cleanliness and correct positioning of *drain filter 20* see USE AND MAINTENANCE MANUAL, chapter MAINTENANCE).
- Check inclination of the steriliser again (see USE AND MAINTENANCE MANUAL, chapter INSTALLATION).
- In 6/18 S Dynamica models with direct drain, check that the drain tube is clear (it must NEVER be immersed in water).

**Pressure rises too slowly**

Proceed as follows if the pressure, rises too slowly at the end of the cycle:

- Check *air sterilisation filter 15* and replace it, if required. Note that this filter, as many other components, has a specific duration (see USE AND MAINTENANCE MANUAL, chapter MAINTENANCE). NEVER run sterilisation cycles without this filter or if the filter is damaged or perforated. The load could be contaminated by ambient air.

**Poor drying**

Proceed as follows if drying is not satisfactory at the end of the cycle:

- Check that a cycle with drying phase has been selected and that the selected cycle is suitable for the material to be sterilised (see USE AND MAINTENANCE MANUAL, chapter OPERATING USE).
- Check that the total maximum load is not exceeded.
- Check that load is prepared correctly.
- Check cleanness and correct positioning of *drain filter 20*.
- Check *air sterilisation filter 15*.
- Check inclination of the steriliser again (see USE AND MAINTENANCE MANUAL, chapter INSTALLATION).
- Check that the valve **EV5** (see wiring diagrams) opens during the drying phase. This valve is normally closed but allows air peaks in during the drying phase.

**Steam leakage from the safety valve**

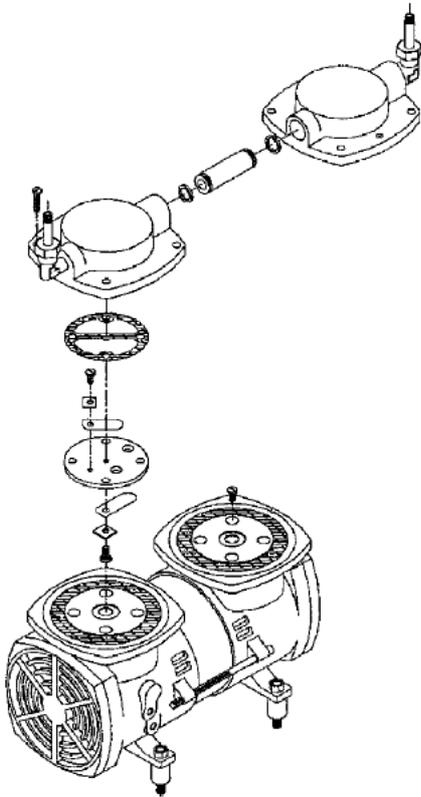
A steam leakage from *safety valve 12* may occur in various conditions:

- A suitable safety valve must be fitted if the steriliser is installed at more than 1500 meters above sea level (see USE AND MAINTENANCE MANUAL, chapter TECHNICAL SPECIFICATIONS).
- If the unit is installed at an altitude below 1500 meters above sea level and/or the problem repeatedly occurs, check the valve efficiency or replace it.

### Vacuum pump servicing procedure

The vacuum pump can be serviced by cleaning it and replacing the seals which are supplied in the specific kit.

Proceed as follows for vacuum pump 2119:



- Remove the pump and carefully check the position of components.
- Check that the membranes are not cracked. Clean or replace them.
- Check the rubber valves. Clean or replaced them. Make sure the position and orientation is correct when refitting.

Vacuum pump kit 2119:

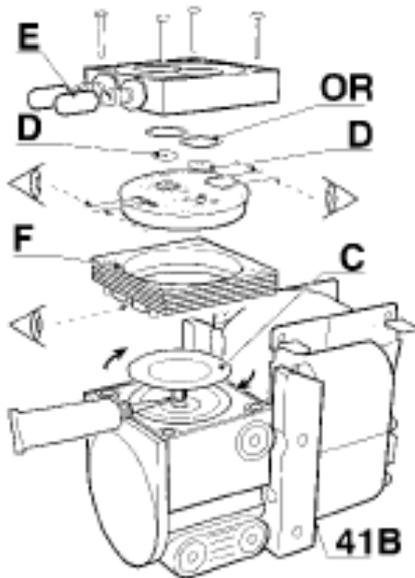


Vacuum pump 2119:



Proceed as follows for vacuum pump 41 B:

- Remove the pump and carefully check the position and orientation of components.



- Check that membrane **C**, valves **D** and **O-Rings** are not damaged. Clean them or replace them if required.
- Membrane **C** is fitted onto the pump piston by turning it clockwise. To prevent movements, use thread lock liquid or paste.
- When refitting, be careful to arrange the parts correctly. It may not be possible to refit the parts if they are not correctly oriented. Refit outlet **F** after fastening membrane **C**. Slide the lips of membrane **C** over the inner ring of the block using a screwdriver.

**Note:** If the pump is to be replaced, remove the rubber plugs **E**.

**Note:** Check correct fastening of the delivery and

suction fittings.

Vacuum pump kit 41 B:



Vacuum pump 41 B:



### Water automatic inlet does not work correctly

Proceed as follows if the *automatic water inlet 29* (optional) is not working correctly:

- Check that this device is actually available because not all models are supplied with the automatic water inlet.
- Check the External Charge setting (ON) in the Technician - Accessories Menu.
- Check the Self-filling setting (ON) in the Basic Setting Menu (see OPERATION INSTRUCTIONS, chapter OPERATION).
- For configuration **A** from external tank, check that there is water in the tank; if there is water and the AUTOMATIC WATER INLET ALARM is on, check that the inlet pipe is well positioned and touches the bottom of the tank; check that the tube is not bent or twisted; check operation of the *automatic inlet pump 46*.
- In some cases, if the *automatic water inlet pump 46* runs dry for a long period of time, performances may degrade and priming and filling the unit will not be possible in the expected times. Replace the pump in this case.
- For configuration **B** (supply from water mains), check that the mains water tap is open. If the tap is open and the AUTOMATIC WATER INLET ALARM is on, check for flow of water downstream of the installed demineralization system. Check inlet solenoid valve **EV7**.
- Check fuse **F1** on the *power board 34*. This fuse protects all loads; replace it if required.

### The printer does not print

Proceed as follows after having checked that the printer is present and settings Printer ON in the Technician - Accessory Menu:

- Check that Printer setting in the Basic Setting Menu allows use of the printer (see OPERATION INSTRUCTIONS, chapter OPERATION).
- Check that *door 18* and the internal flap containing the roll are closed.
- Check that the paper roll is present and correctly fitted.

**Note:** Never pull paper out as this may open the internal flap or tear it out of position. To eject the entire printout, press FEED (in STAND BY mode) on the printer control panel. The paper will be fed by a small amount each time the button is pressed.

- Check *fuses 32* and fuse **F1** on *power board 34*. Check the connection between board and printer (see chapter Printer Installation).

## Automatic water inlet and direct drain system installation

This accessory may be fitted after installing the steriliser and it includes both the *automatic water inlet 29* and *direct drain system 30*. These systems are the same for all models: only the tube length and arrangement changes.

- Pull out the steriliser (if built-in), place it in an appropriate position and remove the cover.
- Remove plugs (T) from the lower part of the steriliser (right-hand side).
- Fit the plastic fitting on the larger hole used for draining.
- Fit the fittings and the hose holders for the *automatic water inlet 29* on the smaller hole. Direct the hose holder towards the drain.



- Fit the *automatic water inlet pump 46* correctly blocking it on its support.



- Fit the branches (Y) and all connecting pipes.



- Fit the external filling and drain pipes; the end of the inlet pipe is cut in a particular manner to prevent a suction effect when it rests on the bottom of the tank. The drain pipe is provided with a quick coupling male attachment.
- Test tightness.
- In the Technician Menu, Accessories option (option 16), set External Charge ON; check operation of the steriliser. Close and restart the unit.

## Installation of the SPEEDY WATER demineralization system

The SPEEDY WATER demineralization system should be used to connect the SterilClave 6/18/24 sterilisers to the mains water in automatic water inlet configuration B (see USER AND MAINTENANCE MANUAL, chapter CONNECTIONS).

The SPEEDY WATER demineralization system consists of:

- *conductivity meter*, to be fitted on the steriliser;
- *purification block B* (ionic exchange resins), easy to substitute;
- *support bracket A* for the above mentioned block, to be attached to the wall.

### Control of water quality

The conductivity meter allows the steriliser to constantly check that the quality of water coming from the purification block is suitable for sterilization.

In particular, when the first threshold (15  $\mu\text{S}/\text{cm}$ , maximum conductivity recommended under EN 13060 for feedwater) is exceeded, when in STANBY mode the steriliser displays the message "Check water quality", so as to indicate that it is time to change the resins.

When the second threshold (30  $\mu\text{S}/\text{cm}$ ) is exceeded, the INSUFFICIENT WATER QUALITY ALARM stops water coming in automatically from the purification block and warns that it is necessary to change the resins.

### Purification block

By treating mains water with a flow of about 650  $\mu\text{S}/\text{cm}$  the *purification block B* is able to produce 250 liters of water below the first threshold (15  $\mu\text{S}/\text{cm}$ ) and another 50 before reaching the second (30  $\mu\text{S}/\text{cm}$ ) threshold, giving a total of 300 liters ( $\rightarrow$  600 cycles).

### Technical data

Flow rate	between 0,5 and 0,7 l/min
Dimensions H x W x D	520 x 160 x 90 mm
Operating weight	4.7 kg
Mains water requirements	pressure between 1 and 4.5 bar

### Support bracket

The *support bracket A* is equipped with rapid connections for connecting to the mains water (inlet) and to the steriliser (outlet). These fittings are suitable for 8 mm external diameter pipes. There are also four 7 mm holes for wall mounting.

### Bracket technical data

Dimensions H x W x D	270 x 160 x 180 mm
Operating weight	0.9 kg

### Maintenance of the SPEEDY WATER demineralization system

When the *purification block B* needs to be changed:

- Switch OFF the steriliser, open the mains water tap and put a container to collect any water spillage under the *support bracket A*.
- Lift the front cover of the *support bracket A*.
- Remove the *metal blocking plate D*.
- Detach the *purification block B* from the support and install the new one as set out in the instructions below.

### Installation of the SPEEDY WATER demineralization system

To install the SPEEDY WATER demineralization system on a steriliser already fitted with *automatic water inlet 29* and *direct drain 30*, follow these steps:

- Install *support bracket A* to a wall suitable to hold the weight of the plate and of the *purification block B* during operations (5.6 kg). Take into account the vertical space needed to position the block.
- Turn off the mains water tap and remove the plugs from the connections behind the bracket.
- Connect the pipe from the water mains to the rear right section of the bracket (bearing the label "IN" at the front) and the pipe to the steriliser to the rear left section of the bracket (bearing the label "OUT" on the front). Use the supplied pipes (2 m each) and push them as far as possible into the connections.
- Remove the plugs positioned under the front cover of the bracket.
- Remove the protective plugs from the *purification block B* inlets and wet their seals with demineralized water to ensure maximum efficiency.
- Lift the cover of the bracket and place the *purification block B* onto the metal *guide pin C*, pushing it till the notch in the guide pin appears at the front.
- Fix the *purification block B* by fitting the *metal blocking plate D* into the groove in the *guide pin C*, and lower the cover of the *support bracket A*.
- Take the sterilizer out of the casing, if any. Place it in an appropriate place and remove the cover.
- Replace the hose holders of the *automatic water inlet 29* joint with the straight fittings supplied and connect the pipe from *support bracket A* to the external one.



- Replace the *automatic water inlet pump 46* and the connection pipes with the *solenoid valve EV7* (mounted on its support and with the outlet hose holders and the inlet L-joint) and the pipes supplied. Use the teflon pipe to connect the internal joint on the back of the steriliser with the *solenoid valve EV7* (inlet 1) and use the silicone pipe to connect the *solenoid valve EV7* (outlet 2) to the *clean water tank 10*.



- Insert the *probe support E* in the silicon pipe and fasten the ends with the pipe clamps provided. Connect to the pins using the appropriate screws and ready to use and clamped blue cables with eyelets to the *filler 14*. Clamp *probe support E* to the supplied support screwed into the *slit J*, making sure there is no contact between the pins and other parts of the steriliser.
- Open the water tap.
- Test the steriliser and the joints.
- Check operations, close the mains water tap and install the sterilizer again.

## SterilCard reader installation

The SterilCard kit includes:

- Administrator and User SterilCard
- SterilCard reader
- SterilCard reader support
- Cable
- 4 self-tapping screws
- 4 spacers
- 4 M3x6 screws
- 4 nuts
- 8 washers

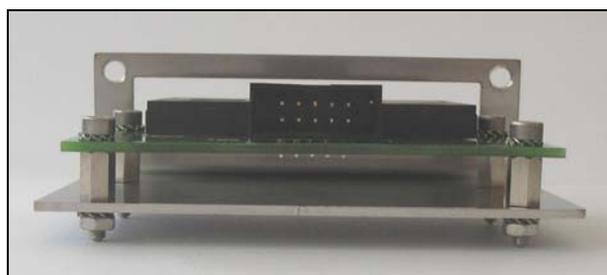
Follow these instructions to assemble the SterilCard kit:

1. Assemble the SterilCard reader on its support as shown in the picture:



- M3x6 screw
- Washer
- SterilCard reader
- Spacer
- SterilCard reader support
- Washer
- Nut

In order to obtain this assembly:



2. Mount the assembly in the control panel with the 4 self-tapping screws as shown in the picture.



**Note:** The assembly must be placed as high as possible, so that the opening of the control panel is aligned with the one of the SterilCard reader.

3. Connect end A of the cable to the SterilCard reader and connect end B to the J5 connector of the logic board. Reassemble the control panel on SterilClave.
4. Turn on the sterilizer and insert the Technician SterilCard. In the Technician Menu, scroll to Accessories (option 16) and set CARD Reader on ON. Check that the card reader works correctly.
5. Turn off the steriliser using the main switch and remove the Technician SterilCard. Turn on the steriliser and insert the Administrator SterilCard.

## Printer installation

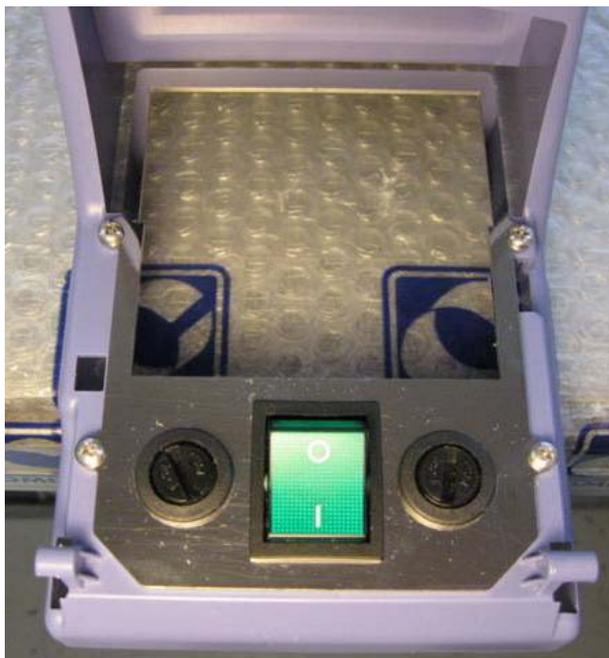
If the set up of the *printer 26* (optional) takes place following the purchase of the steriliser, a specific kit is provided. To install the components follow the procedure described below.

**Note:** This procedure is flexible. For this reason, keep track of the removal sequence for re-establishing the correct operating conditions.

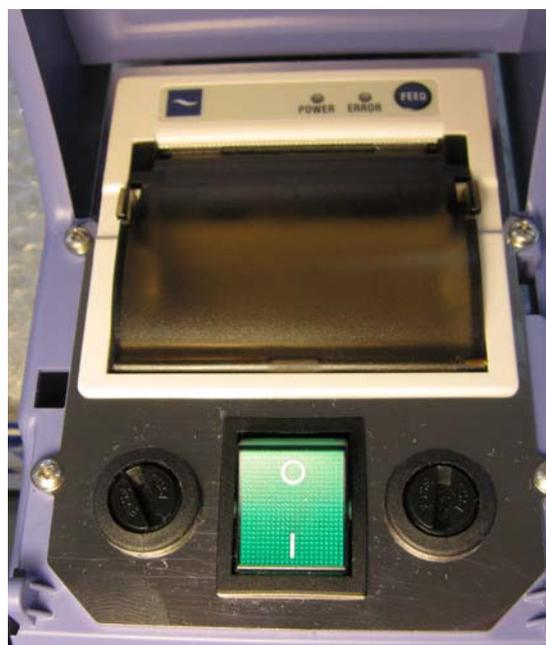
- Pull out the steriliser (if built-in), place it in an appropriate position and remove the cover.
- Remove the lid (**R**) and keep the four fastening screws as they will be needed to fit the printer support frame.



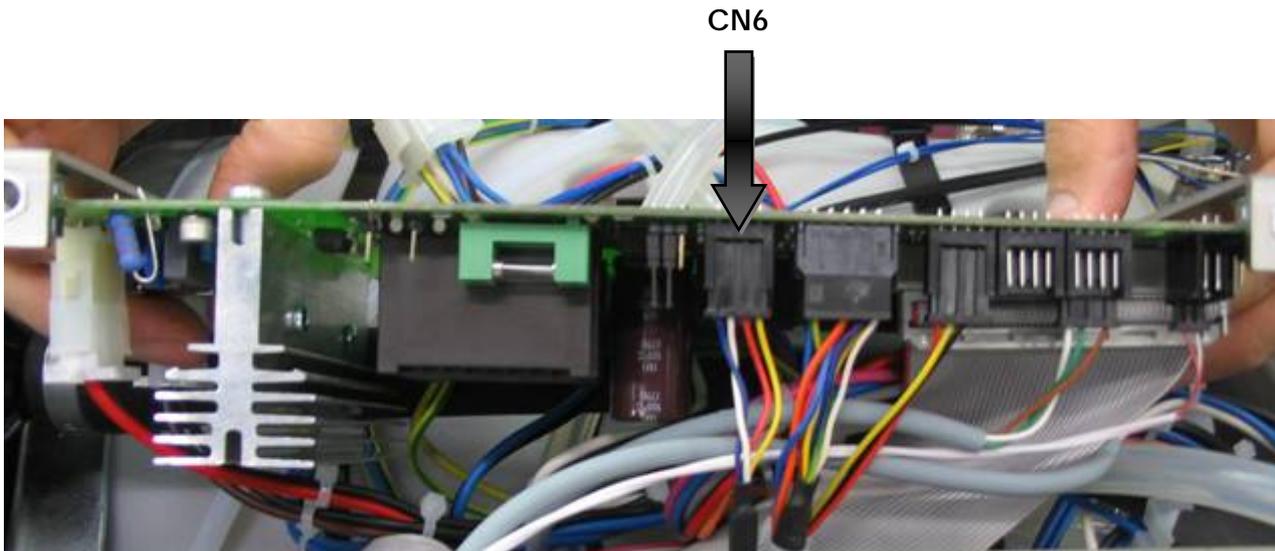
- Fit the frame (C) on the control panel (P) with the four screws previously removed from the lid (R).



- Connect the printer cable (L) to connector CN2 of the printer.
- Insert the printer into the frame (C) and make the fastening side tabs snap.



- Connect the printer cable (L) to connector **CN6** on *power board 34*:



- In the Technician Menu, scroll to Accessories (option 16), set Printer ON and check operation. Close and reinstall the steriliser.

## Firmware upgrade

To upgrade the firmware file, the configuration file and the parameters file, follow these steps:

1. Connect the steriliser to the computer using the USB serial cable.
2. Turn on the sterilizer from the *main switch 13*.
3. Turn on the computer and install the program SterilClaveVxx.exe following the instructions displayed on the screen.
4. Start the program SterilClaveVxx.exe.
5. Choose the data transfer rate: select 115200 bps.
6. Type the number of the COM port to which the steriliser is connected.
7. Click Open.
8. Click the Debug tab.
9. Click Identify. If the box below displays numbers different from zero the connection has been established correctly; otherwise, check the number of the COM port and the cable because there is something wrong with the connection.
10. Click the Download tab to download the firmware file, the configuration file and the parameter file, IN THIS ORDER.
11. Click Download Firmware File and select the firmware file (.s19) from a folder to start downloading. When the download is completed, the message OPERATION SUCCESSFUL will be displayed in the box.
12. Click Download Configuration File, select the configuration file (.cmxcnf) from a folder to start downloading.
13. Click Download Parameters File, select the parameters file (.cmxpars) from a folder to start downloading.

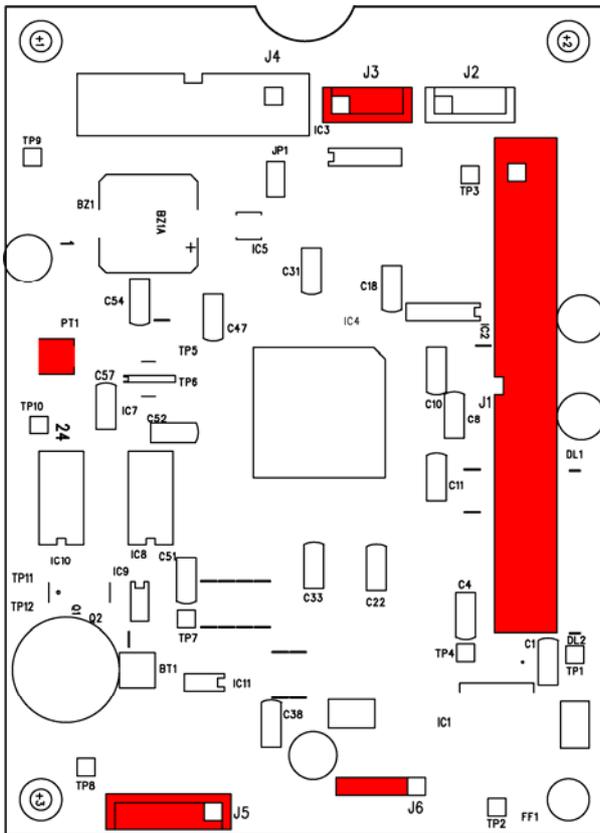
Click Close to close the connection and click Exit to exit the program.

## DIAGRAMS AND WIRINGS

### Logic electronic board

*Logic board 33* is a low voltage board common to all models.

- J1** Connection cable to *power board 34*
- J3** Connection cable to the serial port
- J5** Connection cable to the SterilCard reader
- J6** Connection cable to the keyboard
- PT1** Display adjustment trimmer (see chapter DISPLAY OFF OR NOT CLEAR)



## Electronic power board

The *power board 34* is common to all models.

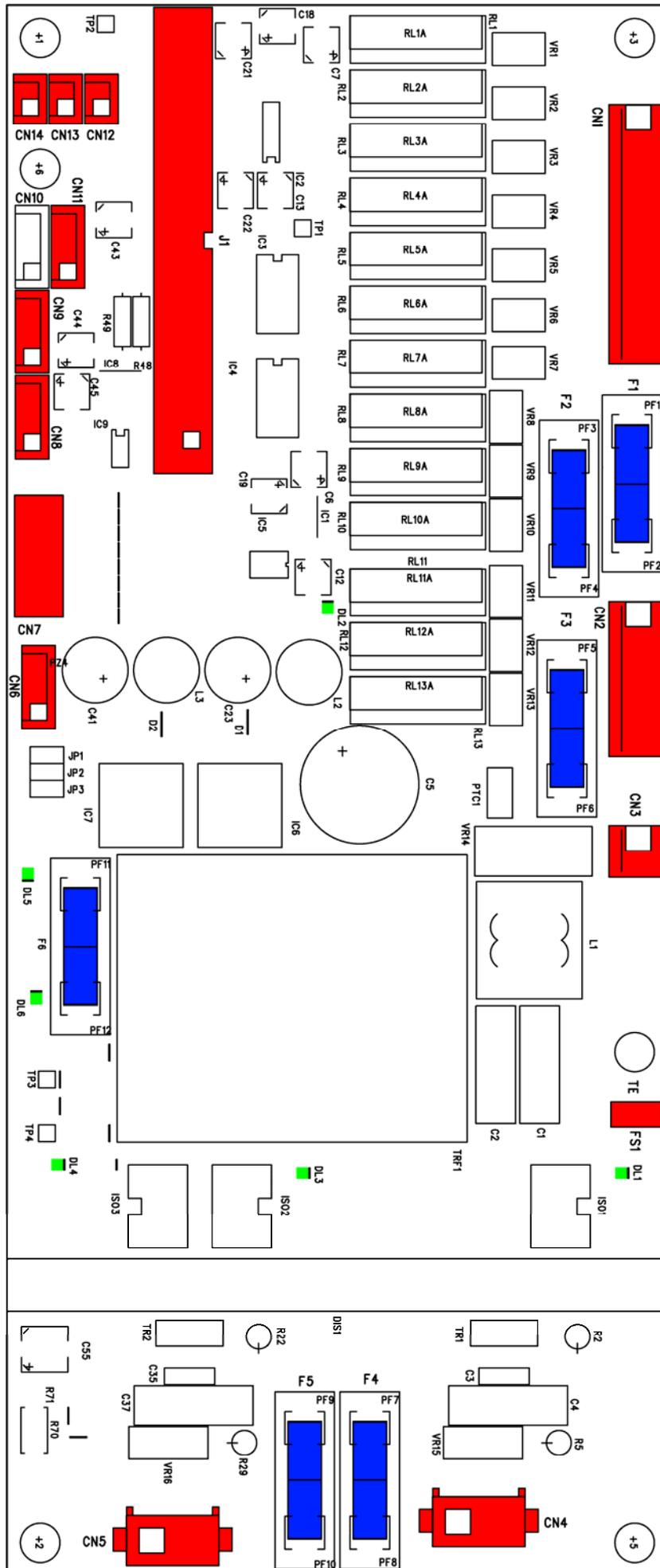
<b>J1</b>	Connection cable to <i>logic board 33</i>
<b>CN1</b>	Load connector: <ol style="list-style-type: none"> <li>1 - Solenoid valve <b>EV1</b> and <i>water inlet pump 35</i> [orange]</li> <li>2 - Water drain solenoid valve <b>EV2</b> [brown]</li> <li>3 - Three-way solenoid valve <b>EV3</b> [pink-black]</li> <li>4 - Steam solenoid valve <b>EV4</b> [green]</li> <li>5 - By-pass solenoid valve <b>EV5</b> [purple]</li> <li>6 - Drying solenoid valve <b>EV6</b> [white-black]</li> <li>7 - <i>Automatic water inlet pump 46</i> (configuration <b>A</b>) or solenoid valve <b>EV7</b> (configuration <b>B</b>) [blue]</li> <li>8 - <i>Vacuum pump 41</i> [pink]</li> <li>9 - Door lock [gray]</li> <li>10 - <i>Fans 42</i> [red]</li> </ol>
<b>CN2</b>	Contacteur connector
<b>CN3</b>	Power supply connector
<b>CN4</b>	Internal coil connector
<b>CN5</b>	External coil connector
<b>CN6</b>	Printer connector
<b>CN7</b>	Level probe connector: <ol style="list-style-type: none"> <li>1 - Ground [yellow-green]</li> <li>2 - Conductivity meter ground [blue]</li> <li>3 - Probe S7 (not used)</li> <li>4 - Probe S6 (not used)</li> <li>5 - Probe S5 (not used in 6 S Dynamica) for <i>chamber level 09</i> (18/24 S Dynamica - S - B - BHD models) [orange]</li> <li>6 - Conductivity meter signal [blue]</li> <li>7 - Maximum level probe S3 for <i>clean water tank 10</i> [blue]</li> <li>8 - Maximum level probe S4 for <i>waste water recovery tank 11</i> (not used in 6/18 S Dynamica models) [red]</li> <li>9 - Safety probe S1 for <i>clean water tank 10</i> [white]</li> <li>10 - Minimum level probe S2 for <i>clean water tank 10</i> [yellow]</li> </ol>
<b>CN8</b>	Micro-switch connector: <ol style="list-style-type: none"> <li>1 - M1 door locked [red]</li> <li>2 - M2 pre-lock [yellow]</li> <li>3 - Common [black]</li> </ol>
<b>CN9</b>	Volumetric counter connector
<b>CN11</b>	Pressure transducer connector
<b>CN12</b>	PT1 temperature probe connector
<b>CN 13</b>	PT2 temperature probe connector
<b>FS1</b>	Grounding connector

## FUSES

F1	4 A
F2	4 A
F3	4 A
F4	16 A
F5	10 A
F6	0.63 A

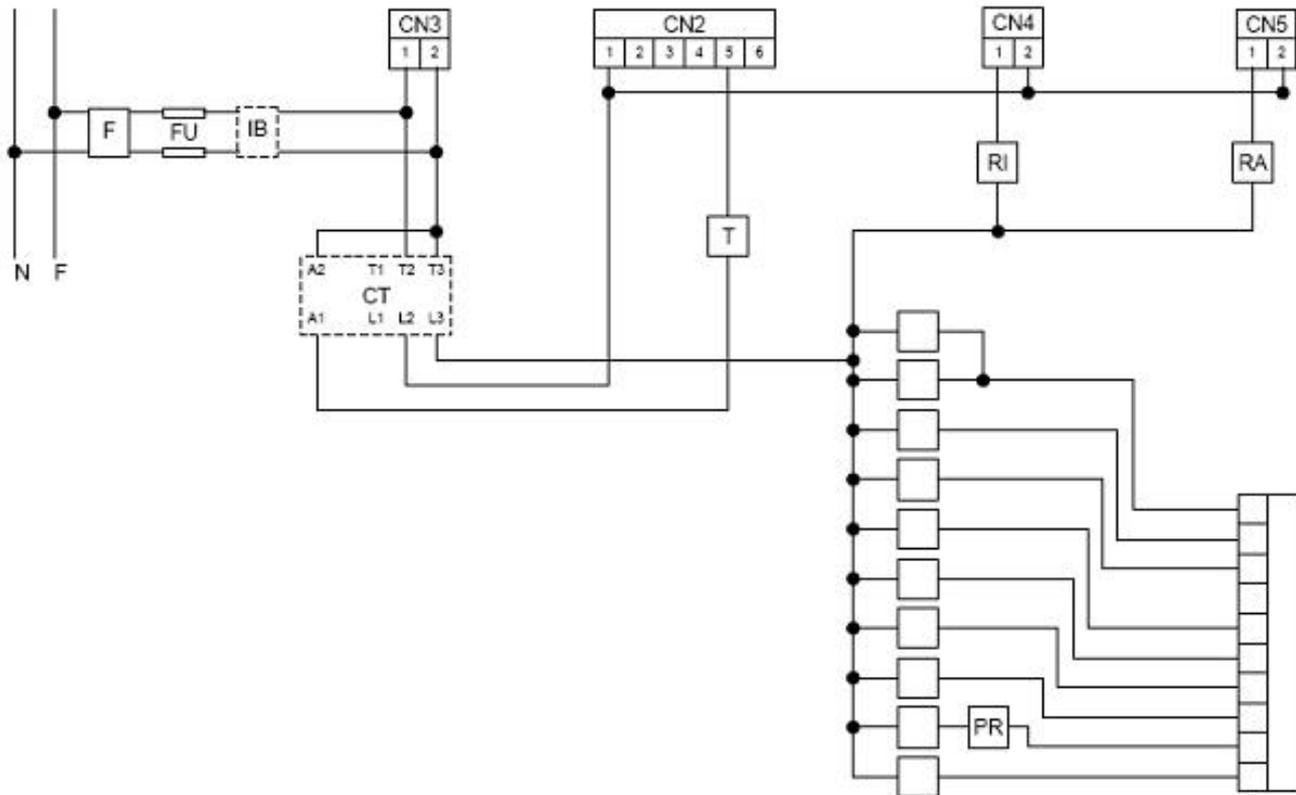
## LED

DL1	Internal coil on LED
DL2	+5V power LED
DL3	External coil on LED
DL4	Coil safety LED (on in normal conditions, off when a COIL ALARM occurs)
DL5	Printer power LED
DL6	+24V power LED



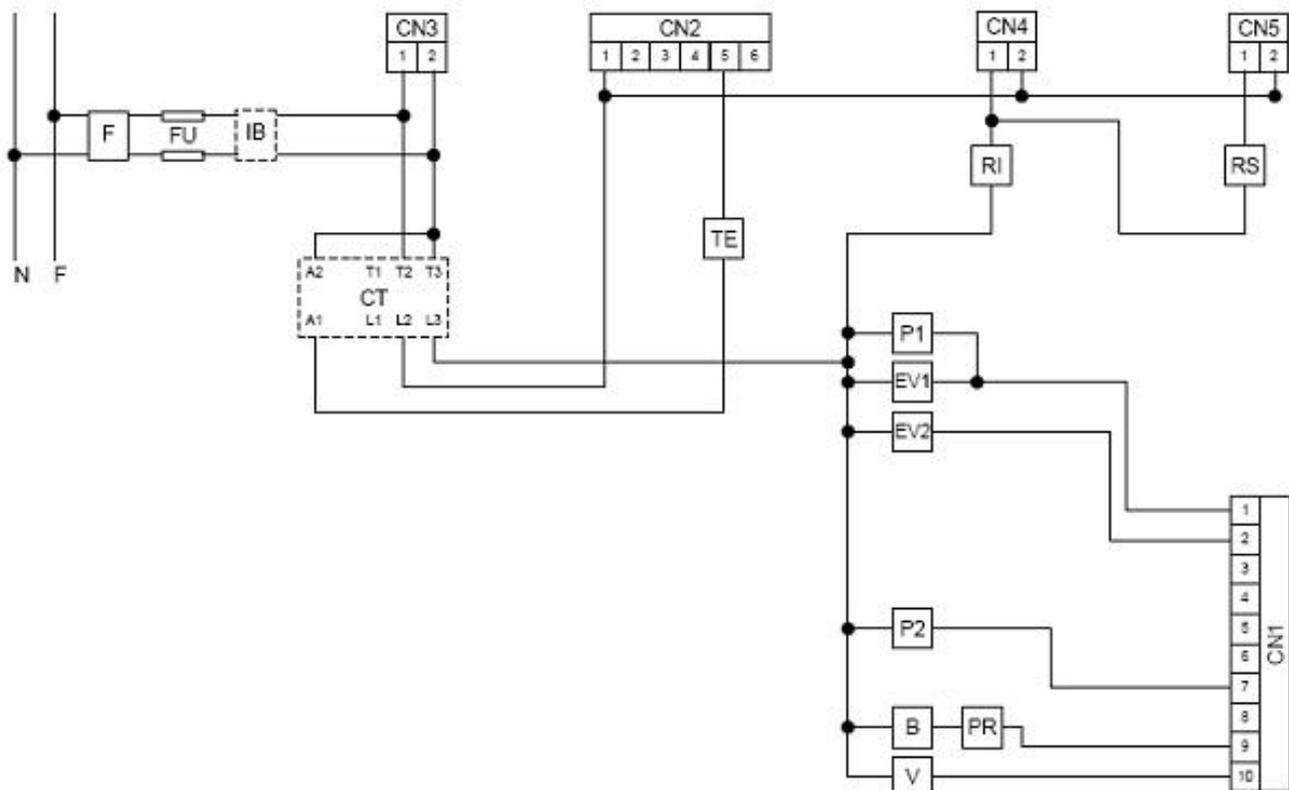
**Wiring diagram - 18/24 S - B - BHD**

- EV... Solenoid valves
- P1 *Water inlet pump 35*
- B Door lock winding
- P2 *Automatic water inlet pump 46 (config. A), solenoid valve EV7 (config. B)*
- CT Power contactor
- PR Safety pressure switch
- F Anti-jamming filter
- PV *Vacuum pump 41*
- FU *Fuses 32*
- RA Drying coil
- ET *Fans 42*
- RI Inlet coil
- IB Main switch 0-1
- T *Safety thermostat 17*



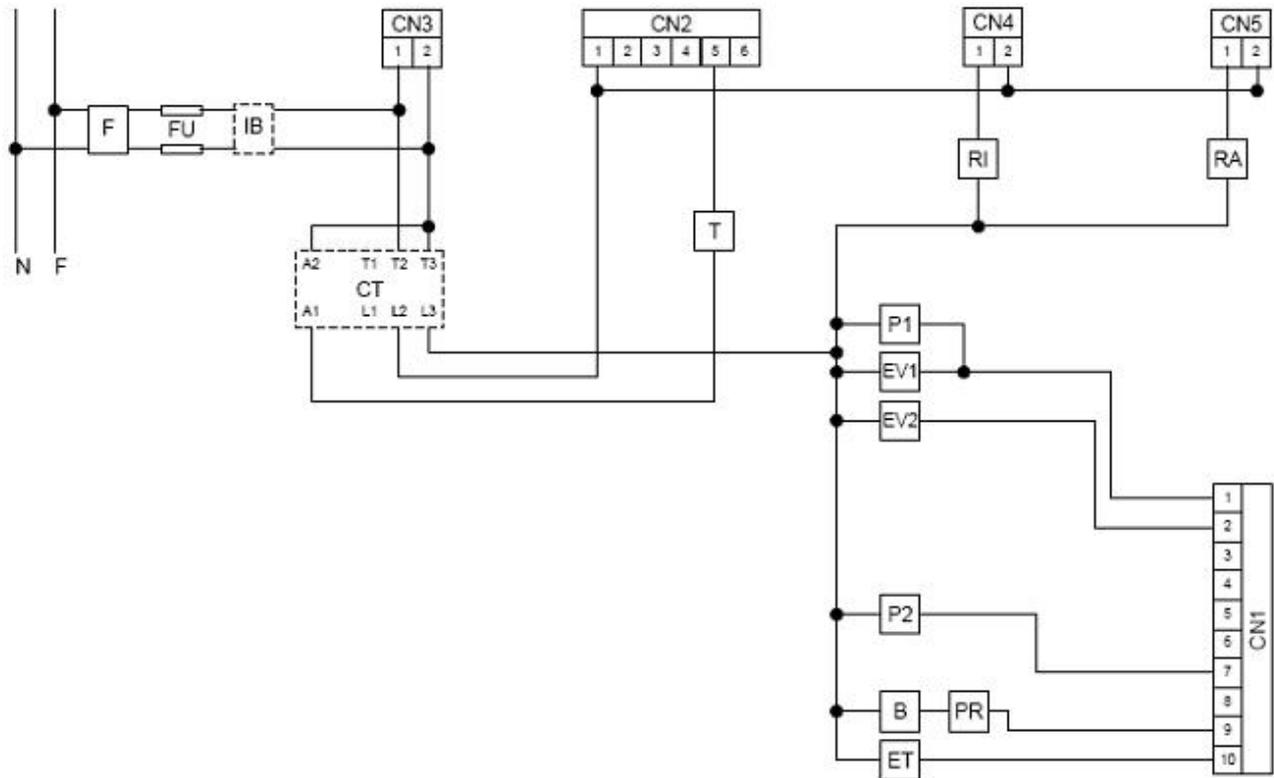
## Wiring diagram 6 S Dynamica

- EV... Solenoid valves
- P1 *Water inlet pump 35*
- B Door lock winding
- P2 *Automatic water inlet pump 46 (config. A), solenoid valve EV7 (config. B)*
- CT Power contactor
- PR Safety pressure switch
- F Anti-jamming filter
- PV *Vacuum pump 41*
- FU *Fuses 32*
- RS Upper coil
- ET *Fans 42*
- RI Lower coil
- IB Main switch 0-1
- T *Safety thermostat 17*



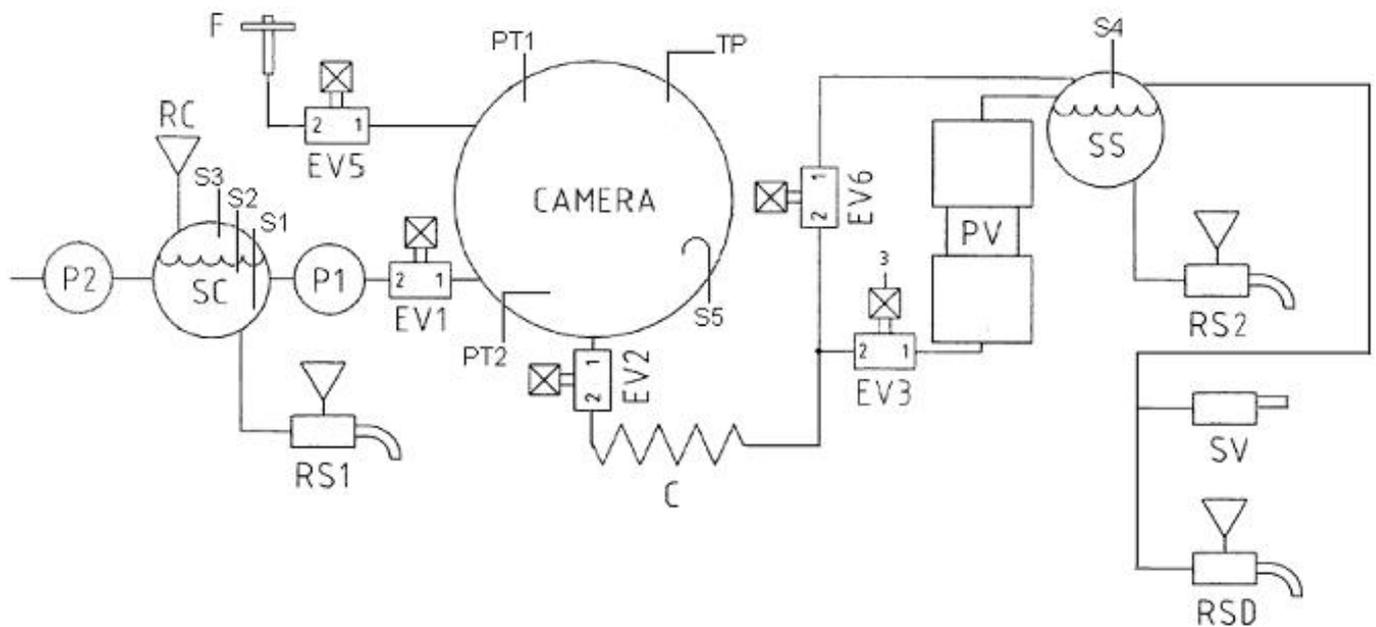
**Wiring diagram - 18 S Dynamica**

- EV... Solenoid valves
- P1 *Water inlet pump 35*
- B Door lock winding
- P2 *Automatic water inlet pump 46 (config. A), solenoid valve EV7 (config. B)*
- CT Power contactor
- PR Safety pressure switch
- F Anti-jamming filter
- PV *Vacuum pump 41*
- FU *Fuses 32*
- RA Drying coil
- ET *Fans 42*
- RI Inlet coil
- IB Main switch 0-1
- T Safety thermostat 17



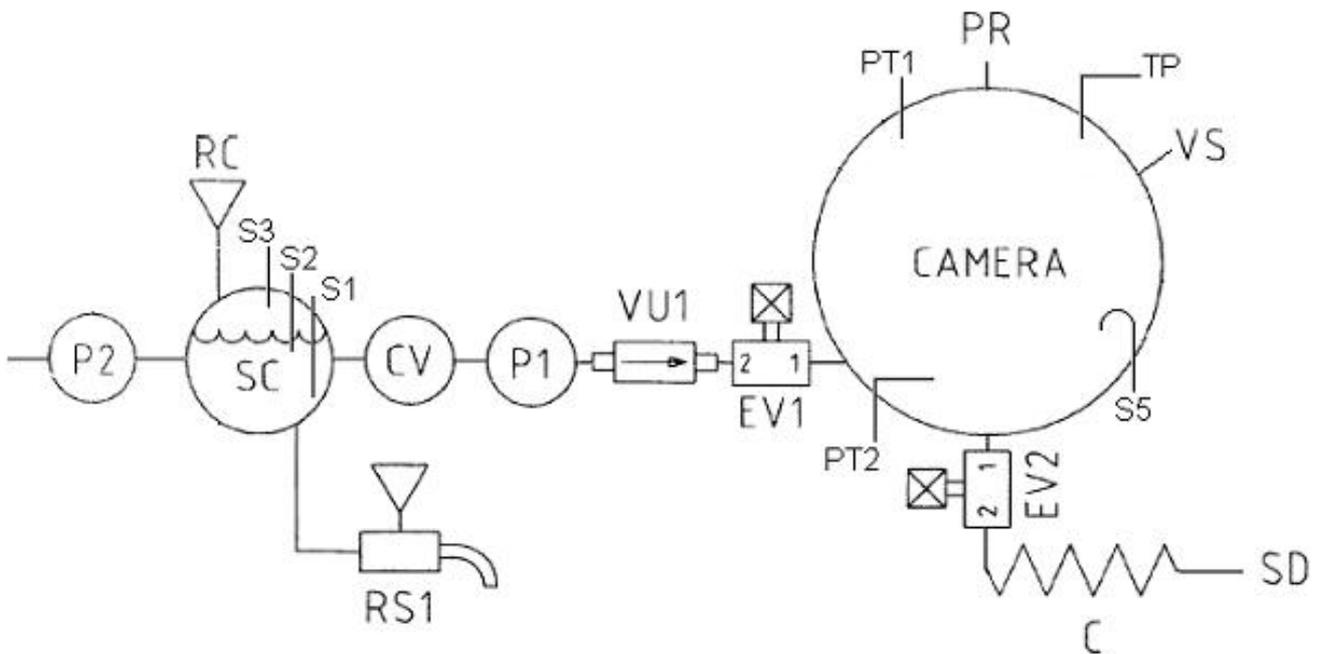
## Hydraulic diagram 18/24 S - B - BHD

- EV... Solenoid valves
- RS1 Clean water drain tap 24
- C Condenser
- RS2 Waste water drain tap 25
- F Air sterilisation filter 15
- RSD Direct drain (BHD model only)
- P1 Water inlet pump 35
- SC Clean water tank 10
- P2 Automatic water inlet pump 46 (config. A), solenoid valve EV7 (config. B)
- SS Waste water recovery tank 11
- TP Transducer 38 (pressure)
- PR Safety pressure switch
- SV Condensation tank
- PV Vacuum pump 41
- VS Safety valve 12
- RC Filler 14
- VU Check valves



**Hydraulic diagram 6/18 S Dynamica**

- EV... Solenoid valves
- RS1 *Clean water drain tap 24*
- C Condenser
- RS2 *Waste water drain tap 25*
- F *Air sterilisation filter 15*
- SD Direct drain
- P1 *Water inlet pump 35*
- SC *Clean water tank 10*
- P2 *Automatic water inlet pump 46* (config. A), solenoid valve **EV7** (config. B)
- SS *Waste water recovery tank 11*
- TP *Transducer 38* (pressure)
- PR Safety pressure switch
- SV Condensation tank
- PV *Vacuum pump 41*
- VS *Safety valve 12*
- RC *Filler 14*
- VU Check valves



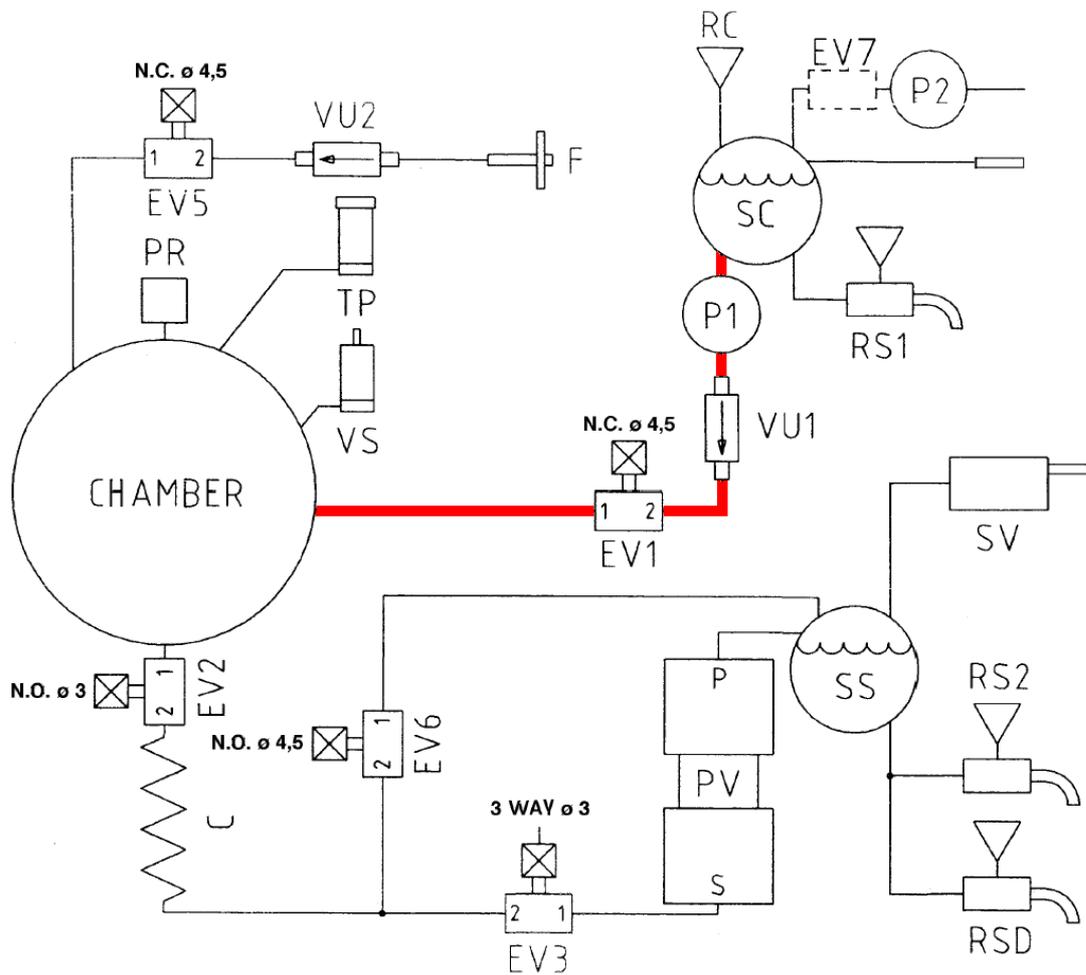
**STEAM PEAK diagram**

P1, EV1 **ON** until the water reaches the chamber level probe

EV2 **ON**

Internal coil **ON**

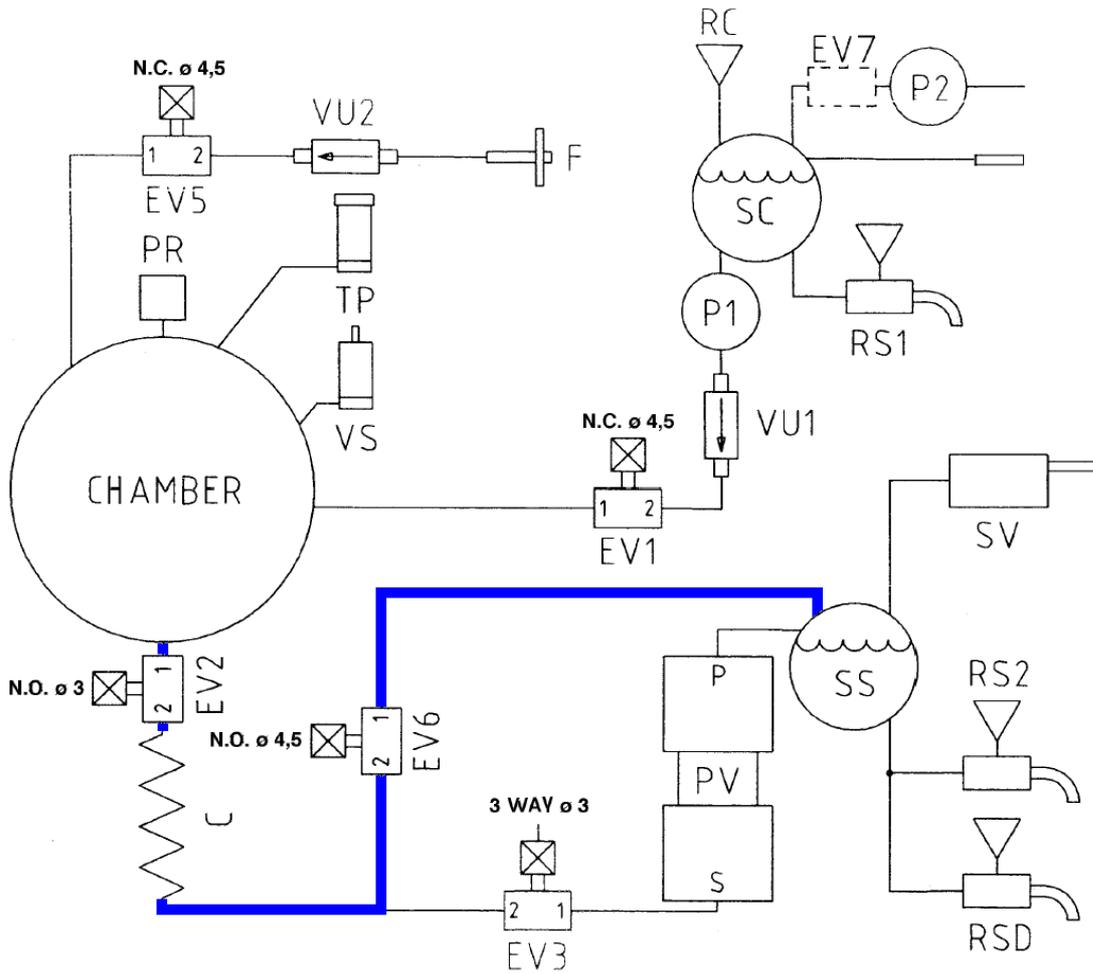
→ Water is vaporised inside the chamber



**p > 1,2 bar VACUUM PULSE diagram**

Pressure inside the chamber is higher than the atmospheric value

→ Steam flows naturally





**DRYING diagram**

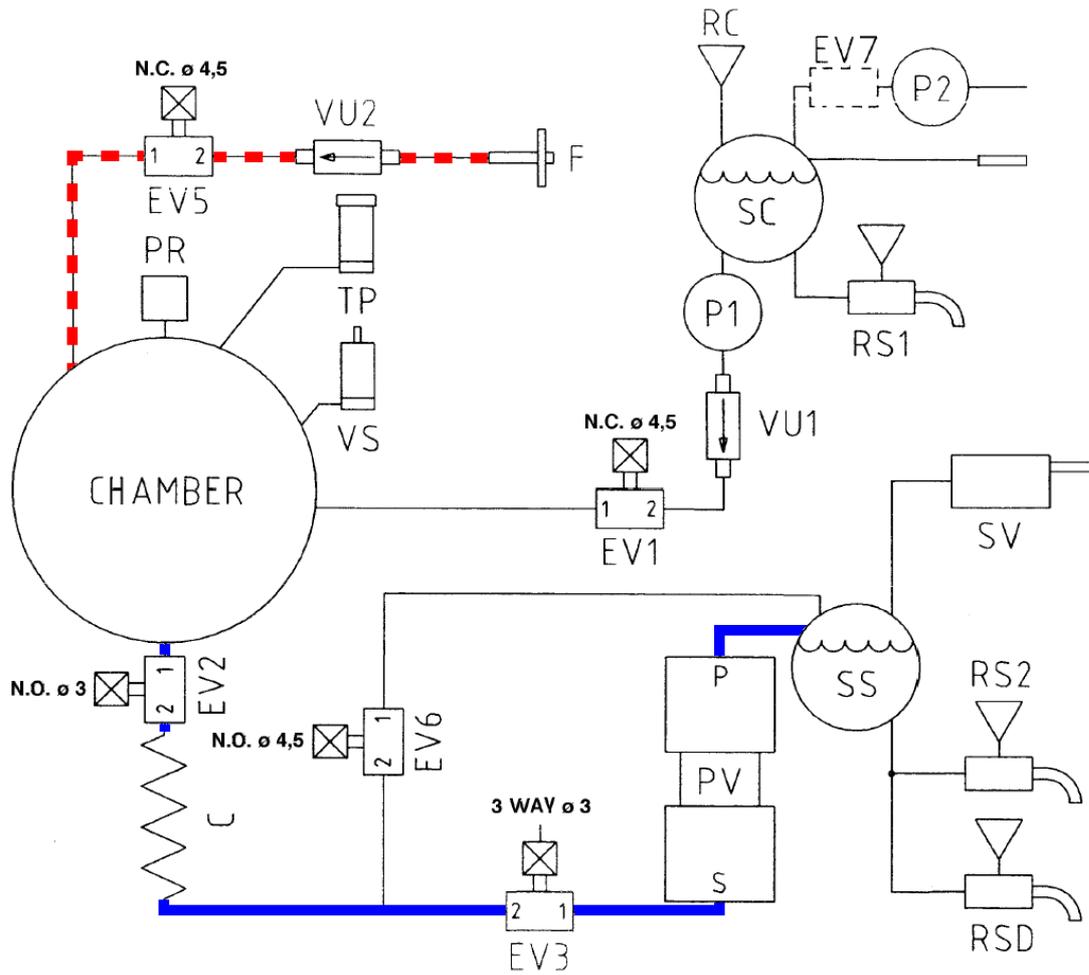
EV3 ON

EV6 ON

PV ON

Moreover EV5 is periodically ON

→ Steam removed from the chamber is replaced by filtered air



## APPENDIX 1: 18/24 CYCLE SET POINTS

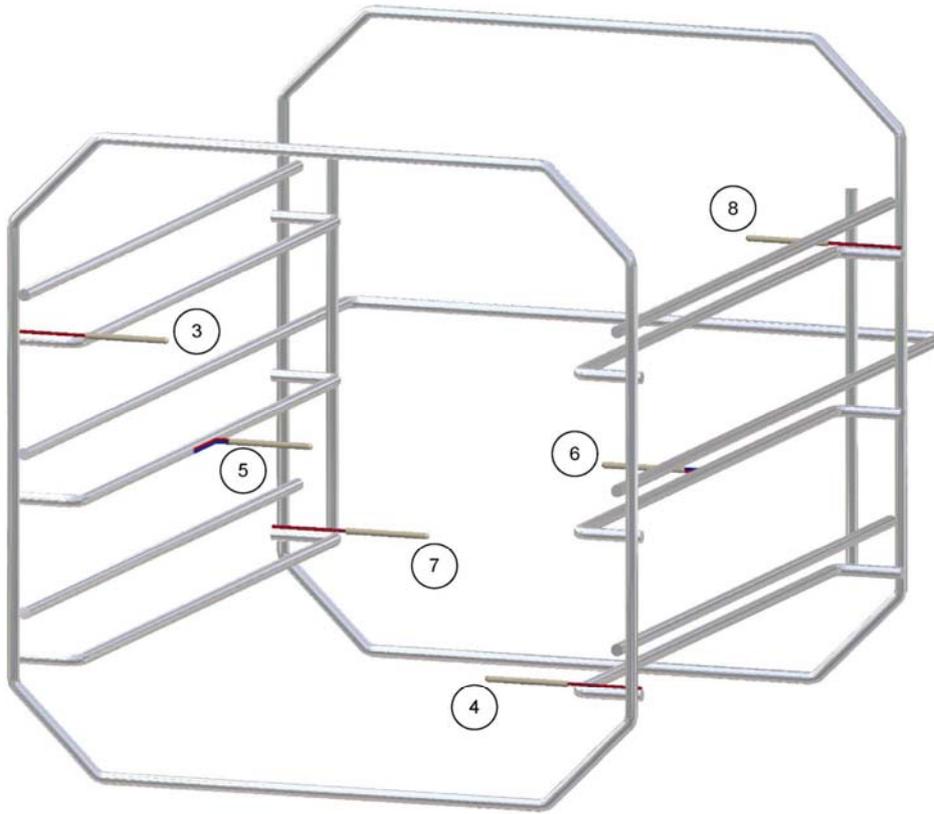
## 18/24 B - BHD CYCLE SET POINTS

	Pre-vacuum pressure (mbar)	Steam peak pressure (mbar)	Vacuum pulse pressure (mbar)	Sterilisation temperature (°C)	Sterilisation temperature (min)	Drying pressure (mbar)	Drying max pressure (mbar)	Drying length (min)
<b>121 UNWRAPPED</b>	200	2300	1240	121	15	-	-	-
<b>134 UNWRAPPED</b>	200	2300	1240	134	4	-	-	-
<b>134 WRAPPED</b>	200	1980	300	134	4	200	350	20
<b>121 HOLLOW/POROUS</b>	150	2100	190	121	15	200	350	20
<b>134 HOLLOW/POROUS</b>	150	3100	190	134	4	200	350	20
<b>134 PRION</b>	150	3100	190	134	18	200	350	20
<b>B&amp;D TEST</b>	150	3100	190	134	3,5	200	350	5
<b>VACUUM TEST</b>	130	-	-	-	-	-	-	-

## 18 S CYCLE SET POINTS

	Pre-vacuum pressure (mbar)	Steam peak pressure (mbar)	Vacuum pulse pressure (mbar)	Sterilisation temperature (°C)	Sterilisation temperature (min)	Drying pressure (mbar)	Drying max pressure (mbar)	Drying length (min)
<b>121 UNWRAPPED</b>	300	2300	1240	121	15	-	-	-
<b>134 UNWRAPPED</b>	300	2300	1240	134	4	-	-	-
<b>134 WRAPPED</b>	300	1980	300	134	4	350	500	25
<b>121 HOLLOW/POROUS</b>	300	2100	300	121	15	350	500	25
<b>134 HOLLOW/POROUS</b>	300	3100	300	134	4	350	500	25
<b>134 PRION</b>	300	3100	300	134	18	350	500	25
<b>B&amp;D TEST</b>	300	3100	300	134	3,5	350	350	5
<b>VACUUM TEST</b>	300	-	-	-	-	-	-	-

## APPENDIX 2: COLDEST AND WARMEST POINT DEFINITION



Coldest point SterilClave 18/24: n° 5

Warmest point SterilClave 18/24: n° 6





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