Tuttnauer

Your Sterilization & Infection Control Partners

TECHNICIAN MANUAL

Prevacuum Table - top Autoclaves
models 2540 Nova-3

CE 0123

Cat. No. MAN205-0265001EN Rev. L

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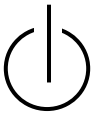
1 INTRODUCTION

This Technician's Manual, together with the Operator's Manual, forms the complete set of Operation and Maintenance instructions for the Nova-3 pre and post vacuum autoclave. This manual is intended for the use of the technician. It is strongly recommended that only qualified and Tuttnauer factory trained personnel service this autoclave and do so in accordance with the instructions in this manual. Any unauthorized service may result in the invalidation of the manufacturer's warranty.

2 SYMBOL DESCRIPTION



On-Off

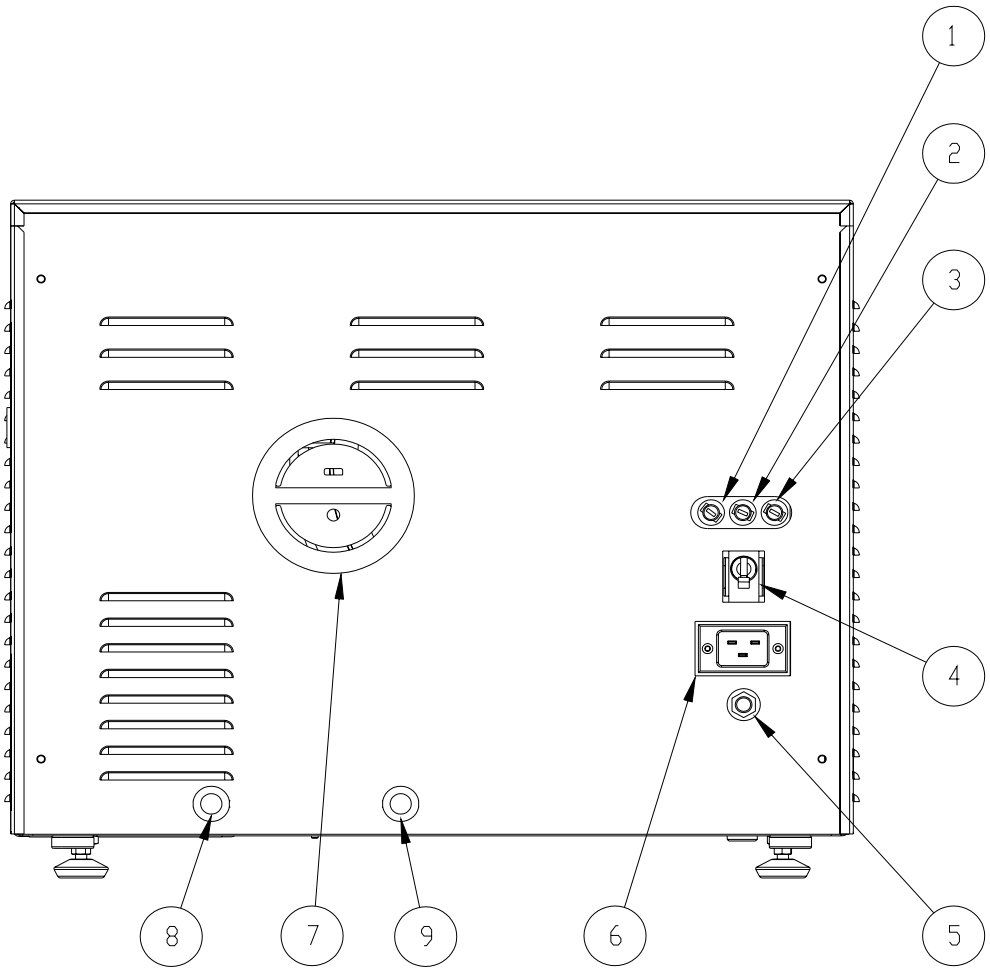
Caution! Consult accompanying documents

Caution! Hot surface.

Caution! Hot steam.

Protective earth (Ground)

REAR VIEW



No.	Description
1	Transformer fuse
2	Water pump fuse
3	Vacuum pump fuse
4	Circuit breaker
5	Cut-off thermostat
6	Main power electric cable socket
7	Air filter service cover
8	Drain outlet (option). Mandatory on autoclaves with automatic mineral free water filling).
9	mineral free water inlet (on autoclaves with automatic mineral free water filling)

3 INSTALLATION

3.1 Placing

CAUTION:

The sterilizer must be placed on a rigid and leveled surface. The stand must be able to withstand the load of the device and loaded material.

1. **Counter top** able to support a minimum of 70 kg.
2. **Counter space** minimum 51cmW x 60cmD (20.1"W x 20"D) * (see unit dimensions)

ATTENTION

It is essential to adjust parameter **ATMpressure** according to the altitude of the autoclave. See instruction for adjusting parameter **ATMpressure**.

3.1.1 Placing the Autoclave

The autoclave has an inclination of approx. 2° towards the rear. This ensures that water is completely drained out of the chamber through the opening at the bottom rear of the chamber.

NOTE: Keep the back and the sides of the autoclave approximately 2" (50 mm) away from the wall to allow ventilation.
If placed in a cabinet, verify that the rear of the cabinet is open to allow ventilation.
Insufficient space for ventilation may result in an increase of the autoclave's temperature that may damage the instrument.
It is recommended that enough space be left around the autoclave to give a technician access for servicing the machine.

3.1.2 Connections to Utility Supplies

Plug the power cord into the supply socket.

If the autoclave is equipped with an automatic mineral free water supply, continue as follows:

1. Connect the drain outlet to the drain. Verify that the drain water has a free path to the drain (i.e. not a closed connection).
2. Connect a pressure regulator with a pressure gauge to the mineral free water source. Set the regulated pressure to 1.2-1.5 Bar.

Attention

The pressure at the mineral-free water inlet must not exceed 1.5 Bar.

3. Connect the autoclave to the pressure regulator.
4. Open the mineral-free water valve.

important

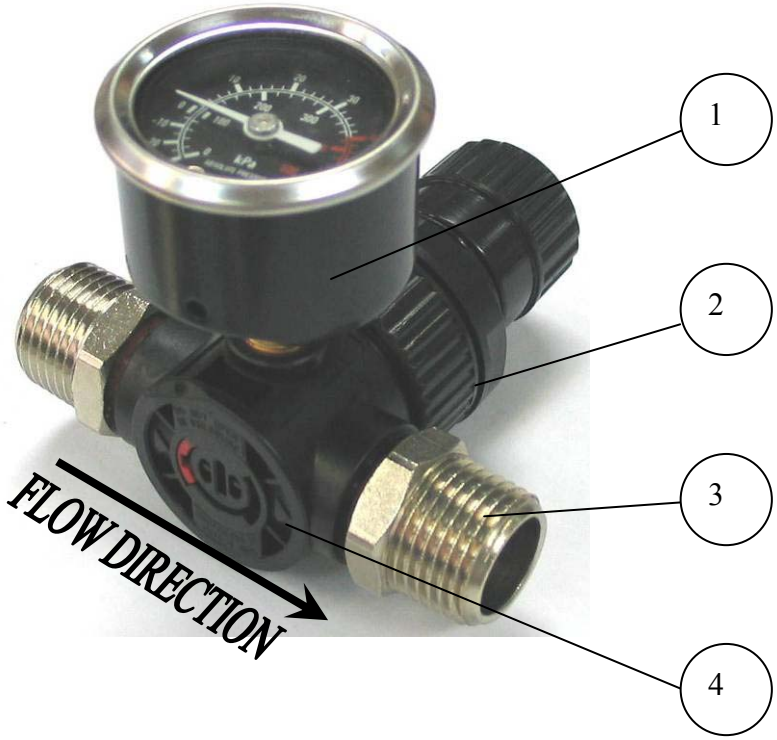
Verify that the pressure remains 1.2-1.5 Bar.

5. If the plant has no mineral-free water source, it is possible to fill the mineral free water manually. In this case, connect only the drain outlet to the drain.
6. If you want to operate the autoclave without automatic water filling and without connecting it to the drain (draining the waste water reservoir will be done through the drain valve located on the front) change parameter AutoAddWater to "0", disconnect solenoid valve (21) and plug the rear drain tube with the plug supplied with the autoclave (FIT100-0151).
7. **For customers in Australia only**. When operating the autoclave for the first time after installing it operate as follows:
   - Turn the autoclave on.
   - Wait until you hear that the water pump stops (approx. 90 seconds).
   - Turn the autoclave off.
   - Turn the autoclave on again.

   The autoclave is ready for use.

MINERAL-FREE WATER PRESSURE REGULATOR

(FOR AUTOCLAVES WITH AUTOMTIC WATER FILLING)



ATTENTION

Pay attention to the flow direction as indicated by the arrow (4)

No.	Cat. No	Description
1	GAU029-0012	Gauge, Pressure, Air, 1/4"
2	ARM029-0005	Pressure Reducer, Water, 1/4"
3	FIT100-0084	Parallel Nipple, male 1/2"-1/4"
4	N/A	Flow direction mark

3.2 Lifting and carrying

CAUTION:

Before moving the autoclave, Make sure that the electric cord is disconnected from the power, and there is no pressure in the chamber.

Attention! The pressure of the generator does not decrease immediately when the equipment is turned off. Wait approx. ½ an hour to verify that the pressure decreased to atmospheric pressure.

1. Disconnect the power supply cord.
2. Drain the water from both reservoirs.

To avoid injuries, lifting and carrying should be done with at least two persons or by using a fork-lift or any other mechanical aid.

Do not drop this device!

4 WATER QUALITY

The distilled or mineral – free water supplied to the steam generator shall be according to the table below:

A Reverse Osmosis system meeting the qualifications below may be used to provide water for the steam generator. The better the quality of the water, the better performance, the less maintenance and the longer the life of the autoclave.

Mineral Free Water qualifications

(In compliance with ISO 11134 and ISO 13683)

Evaporate residue	≤ 15 mg/l
Silica	≤ 2 mg/l
Iron	≤ 0.2mg/l
Cadmium	≤ 0.005 mg/l
Lead	≤ 0.05 mg/l
Rest of heavy metals	≤ 0.1 mg/l
Chloride	≤ 3 mg/l
Phosphate	≤ 0.5 mg/l
Conductivity	≤ 50 µs/cm
pH	6.5 to 8
Appearance	colorless, clean, without sediment
Hardness	≤ 0.1 mmol/l

Attention:

We recommend testing the water quality once a month. The use of water in the autoclave that does not comply with the table above may have severe impact on the working life of the sterilizer and can invalidate the manufacturer's warranty.

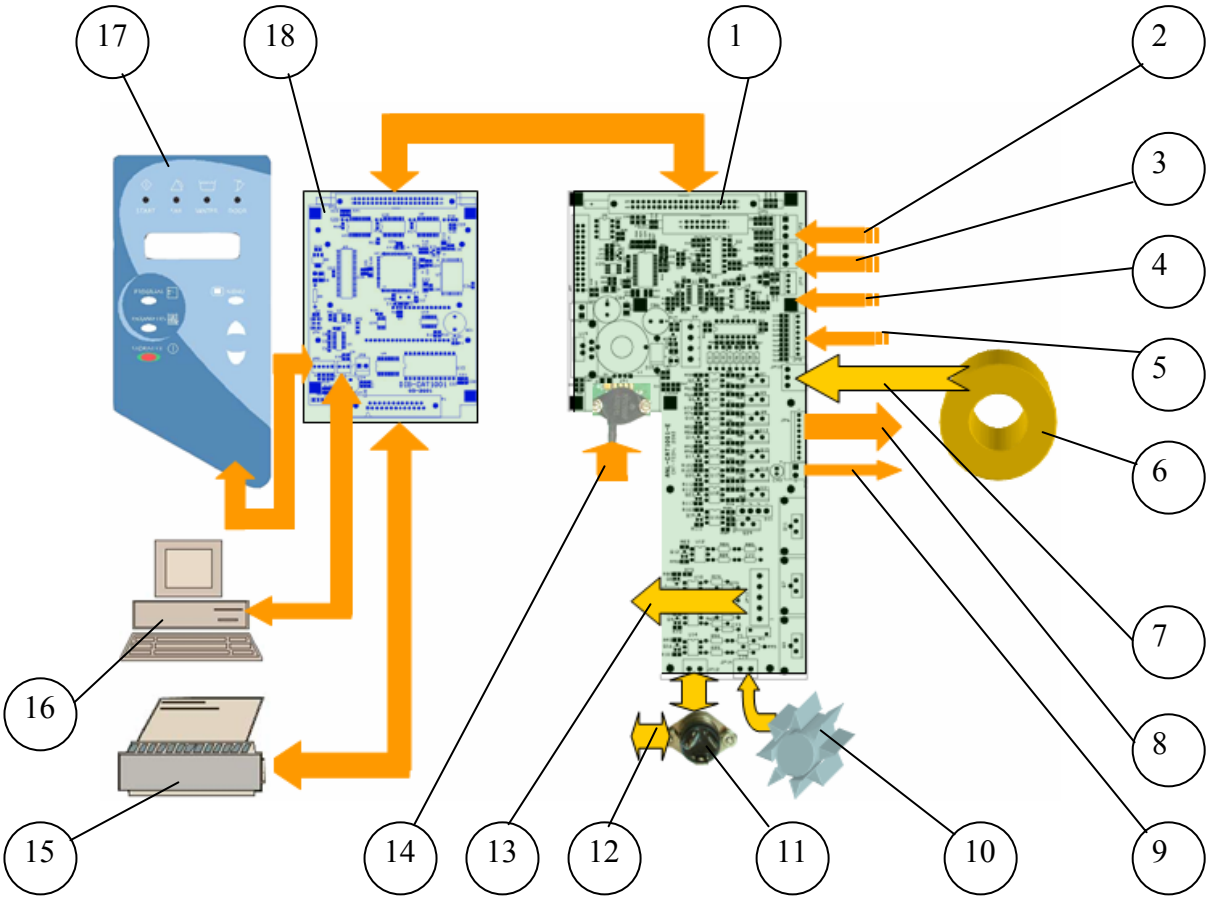
The suitability of the mineral free water to be used should be verified by testing in accordance with the above table, at an authorized laboratory using acknowledged analytical methods.

5 *DESCRIPTION OF THE CONTROL SYSTEM.*

(See Control diagram below).

The control system is based on 2 electronic boards designed according to the autoclave requirements, the digital board DIG-CAT1001 containing the micro-controller memories, buffers and digital ICs and the analog board ANL-1001 which performs the processing of signals coming from the sensors , the switches and AC drivers (24 VAC & 230 VAC) .

CONTROL SYSTEM BLOCK DIAGRAM



No.	description	No.	description
1	ANL-CAT1001 Board	10	Fan
2	Input from coil temperature sensor	11	Triac
3	Input from chamber temperature sensor	12	Connection to heaters
4	Input from generator pressure sensor	13	230VAC output to various devices
5	Digital inputs and inputs from electrodes	14	Input from chamber pressure sensor
6	230/24VAC transformer	15	Printer
7	24VAC - transformer to analogue board	16	Computer
8	24VAC output to valves	17	Keyboard
9	Door lock	18	DIG-CAT1001 board

The system is provided with communication interfaces RS 232 to PC and to parallel port for printer connection.

5.1 Digital Board DIG – CAT1001

— The digital board is connected to the keypad panel, to the parallel printer and to the analog board ANL-CAT1001.

— The board contains the micro-controller (U2) type MC68HC812A4 that runs the software program of the system.

— On the board, there are three types of memories:

1) FLASH memory (U7), part no. AM29F160DT storing the program codes with an electrical writing and erasing.

   This component serves as a non-volatile memory, enabling the system to store and change the different languages tables during running of the program codes, so that many parameters and flags that are storing and ensuring this data are not lost in case of power failure.

2) RAM memory (U4), part no. IDT7116 with a capacity of 128KB for the temporary data during the running of the program.

3) The board contains a Real Time Clock (U13) element, which serves as a clock to the system, including a back-up battery, which ensures that the clock will run continuously even when the autoclave is not powered. This component includes 113 Byte RAM memory under a back-up battery for the current state parameters storing.

— The micro controller contains the inner watchdog, which detects any faulty situation in the running program code. It performs an automatic reset of the micro-controller and stops all the commands to avoid an uncontrolled activation of any of the heating elements or the valves in case that during 2 sec the micro controller doesn't update the inner watchdog. This case may happen when the program is lost (infinitive loop, incorrect code etc.).

— The board functions as an MMI (Man-Machine Interface). It is connected to a LCD display of two rows with 16 characters on each row and to the following light indicators:

  — START (autoclave in process),

  — FAIL (the process failed),

  — WATER (no water in the reservoir),

  — DOOR (the door is not closed).

A keyboard connected to the digital board, serves as a control panel containing the commands and the programming keys.

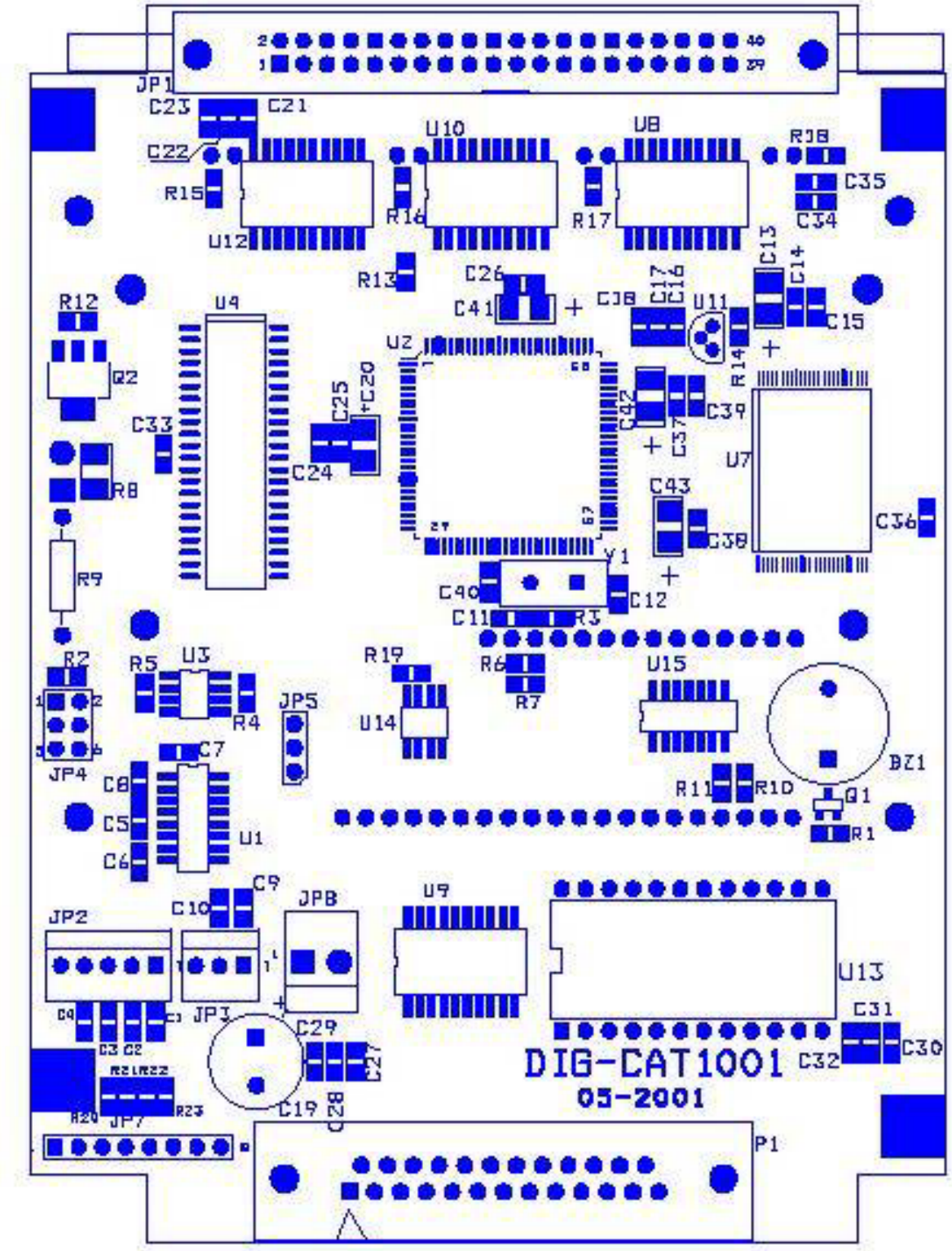
— The digital outputs and inputs are transferred to the system, as follows:

- Through the digital board to the analog board by means of buffers 74HC373 or 74HC244.
- RS232 or RS485 interface is performed on the board by the U1(RS232) or U3(RS485) components, the signal is transmitted to the communication connector JP2. JP5 in lower position gives RS232 signal, JP5 in (optional) upper position it gives RS485 signal.
- The printer is connected directly to this board, connector P1 enables to connect the standard Centronix connection.

The printer receives the data and the supply voltage directly from this connector.

The layout of the DIG-CAT1001 board components is provided below:

DIG-CAT1001 BOARD



5.2 Analog Board ANL – CAT1001E

The analog board includes three sections:

5.2.1 Power supply.

The boards contains the built-in power supply, which produces 5VDC from 24VAC, coming to JP13. U19 – LM2576T-5.0 - a switching regulator, providing 5VDC & 3Amps output.
JP9 is a special connector for printer power input.

5.2.2 Inputs/Outputs section.

The analog part of this section includes:

— The circuits that accept the analog signals from the sensors:

JP2 – Coil PT100 sensor.

JP3 – Chamber PT100 sensor.

JP4 – Generator MPX2200 sensor.

JP1 – Chamber MPX2200 sensor (installed & soldered on the board).

— The MUX-Selector for the needed analog channel selection. 12bit A/D.

— Digital inputs incoming to the system through JP8 are optoisolated from the micro controller. They have over voltage and minus voltage protection built on the diodes.

— The valves used in the autoclave are 24VAC. The board includes 7 Triacs built driver for them with an optoisolated Triac driver.

— JP6 - the valves connection.

5.2.3 High AC devices drivers.

The board provides four high AC devices outputs. Three of them through JP11 (up to 600 W) and one from external power Triacs that is connected to the board through JP12.
The Devices included in the system are:

— Generator Heaters element,

— Vacuum pump,

— Water Pump.

5.2.4 Door lock driver circuit.

The Analog board operates Door Lock 12VDC solenoid. The board contains all the required components to convert the 24VAC output to 12VDC. The components are as follows:

— U16 & Q24 the 12VAC drivers;

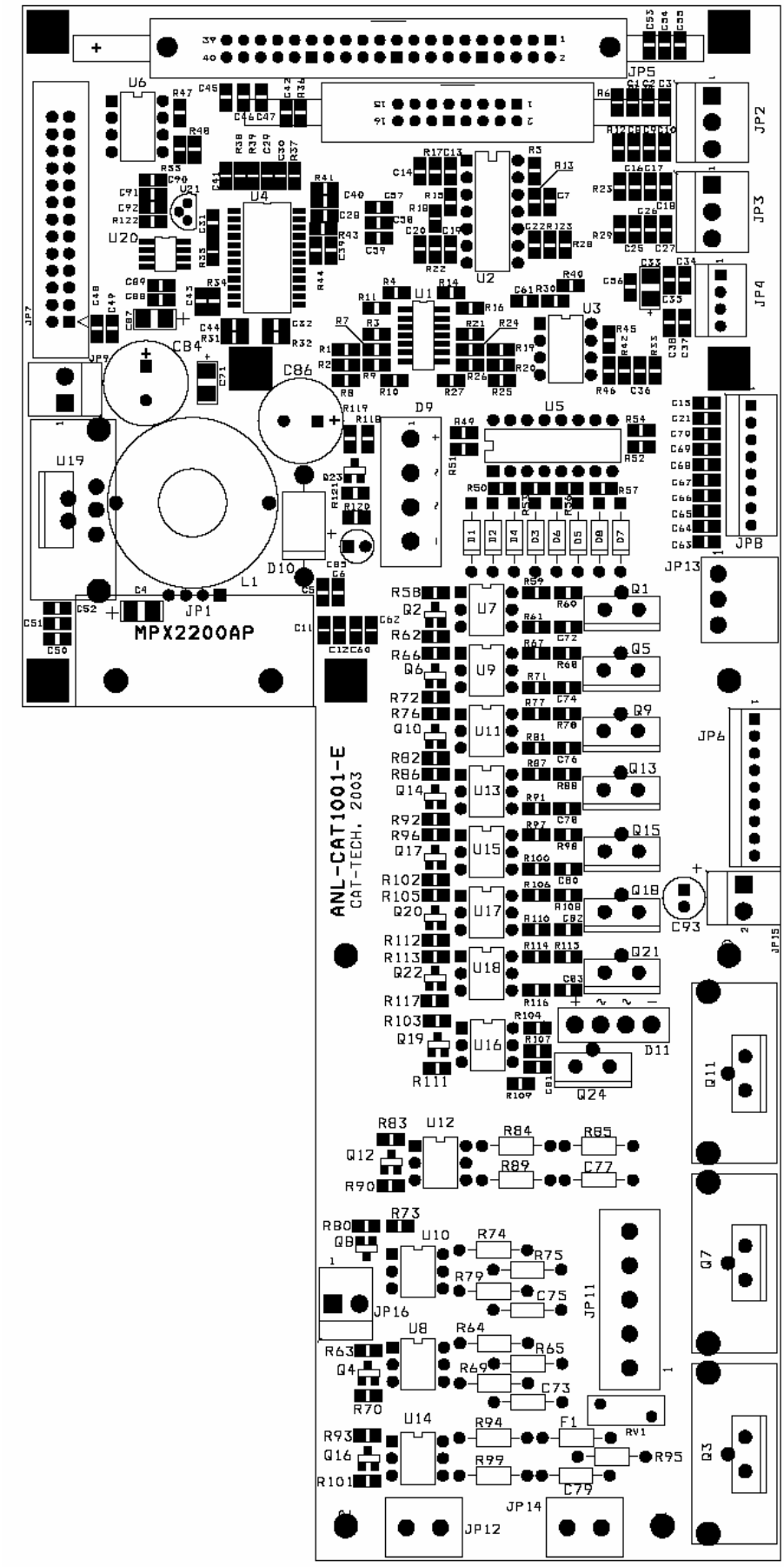
—12VAC supplying (JP13/3);

—Diodes bridge (D11);

—Capacitor - C93;

The solenoid is connected to the board through JP15.

The layout of the ANL-CAT1001E board components is provided below:



6 CHECKING AND CHANGING PARAMETERS AND OTHER DATA

In order to change parameters, to perform in-out-test and check various components, you can enter a few sub-directories and check or change the required data.

These operations include the following:

No.	*Operation*	*No.*	*Operation*
1.	Changing parameters	7.	Testing the printer
2.	Checking digital inputs	8.	Performing in out test
3.	Checking digital outputs	9.	Selecting display language
4.	Checking analog inputs	10	Printing 10 last cycles data
5.	Calibrating temp. and pressure	11.	More options
6.	Setting the clock (time and date)		

6.1 Entering the sub-directories

Entering the sub-directories and performing the operation shall be done as described ahead.

1. Press **MENU** pushbutton.
2. **ENTER CODE** will be displayed.

   2.1 If, at this point, **CYCLES** is pressed, **Set Clock** will be displayed. To continue with setting the clock, see para. 6.7.

   2.2 If you desire to browse through the menu, proceed as follows:
3. Enter the technician code (022) as follows:

   The cursor is under the right digit. To change the right digit press the **UP** pushbutton. Each press will increase the digit by 1 and each press on the **DOWN** pushbutton will decrease it by 1. Press **PARAMETERS** pushbutton to move the cursor to the second digit from the right. Change this digit as required and then repeat this to change the third digit.
4. To enter the **MENU** display press **CYCLES**.

   The **MENU** display enables you to browse through the various options by pressing **DOWN** or **UP**. In this display, the upper row displayed **MENU** and the lower row displays the required sub-directories as described below.
5. When entering the **MENU** display, **Parameters** is displayed. You can either enter the **Parameters** directory or move to **Digital Inputs** display.

   – To enter the **Parameters** directory press **CYCLES** and continue according to para. 6.2.

   – To move to the **Digital Inputs** display press **DOWN**
6. If you moved to the **Digital Inputs** display you can either enter the **Digital Inputs** directory or move to **Digital Outputs** display or return to the previous display**.**

   – To enter the **Digital Inputs** directory press **CYCLES** and continue according to para. 6.3**.**

   – To return to the previous display press **UP**.

   – To move to the **Digital Outputs** display press **DOWN**

7. If you moved to the **Digital Outputs** display you can either enter the **Digital Outputs** directory or move to **Analog Inputs** display or return to the previous displays**.**
   - To enter the **Digital Outputs** directory press **CYCLES** and continue according to para. 6.4**.**
   - To return to the previous display press **UP**.
   - To move to the **Analog Inputs** display press **DOWN**

8. If you moved to the **Analog Inputs** display you can either enter the **Analog Inputs** directory or move to **Calibration** display or return to the previous displays**.**
   - To enter the **Analog Inputs** directory press **CYCLES** and continue according to para. 6.5**.**
   - To return to the previous display press **UP**.
   - To move to the **Calibration** display press **DOWN**

9. If you moved to the **Calibration** display you can either enter the **Calibration** directory or move to **Set Clock** display or return to the previous displays**.**
   - To enter the **Calibration** directory press **CYCLES** and continue according to para. 6.6**.**
   - To return to the previous display press **UP**.
   - To move to the **Set Clock** display press **DOWN.**

10. If you moved to the **Set Clock** display you can either enter the **Set Clock** directory or move to **Printer Test** display or return to the previous displays**.**
    - To enter the **Set Clock** directory press **CYCLES** and continue according to para. 6.7**.**
    - To return to the previous display press **UP**.
    - To move to the **Printer Test** display press **DOWN.**

11. If you moved to the **Printer Test** display you can either perform the **Printer Test** or move to **In Out Test** display or return to the previous displays**.**
    - To return to the previous display press **UP**.
    - To move to the **Language** display press **DOWN.**
    - To perform the **Printer Test** Press **CYCLES** pushbutton and verify that the printer prints ”Printer Test”.

12. If you moved to the **In Out Test** display you can either enter the **In Out Test** directory or move to **Language** display or return to the previous displays**. (This menu is only available with a special service code)**
    - To enter the **In Out Test** directory press **CYCLES** and continue according to para. 6.8**.**
    - To return to the previous display press **UP**.
    - To move to the **Language** display press **DOWN.**

13. If you moved to the **Language** display you can either enter the **Language** directory or move to **More Options** display or return to the previous displays**.**
    - To enter the **Language** directory press **CYCLES** and continue according to para. 6.9**.**
    - To return to the previous display press **UP**.
    - To move to the **History** display press **DOWN.**

14. If you moved to the **History** display you can either enter the **History** directory or move to **More Options** display or return to the previous displays**.**
    - To enter the **History** directory press **CYCLES** and continue according to para. 6.10**.**
    - To return to the previous display press **UP**.
    - To move to the **More Options** display press **DOWN.**

15. If you moved to the **More Options** display you can either enter the **More Options** directory or return to the previous displays or return to the main display**.**
    - To enter the **More Options** directory press **CYCLES** and continue according to para. 6.11**.**
    - To return to the previous display press **UP**.
    - To return to the main display, displaying the temperature and pressure in the chamber, press **MENU.**

6.2 Parameters

1. To move from one item to another item use the UP or DOWN pushbuttons. DOWN will display the next item and UP will display the previous item.
2. To change the displayed value press the CYCLES pushbutton and then use the parameter pushbutton to change the cursor to the right digit and with the UP and DOWN pushbuttons you can change the value.
3. To exit to the menu and save the changed value press MENU.

The software contains a table of parameters of which some of them define the autoclave, and some of them define the processes in the autoclave. This section of the manual describes the parameters and how they control the software.

Listed below are all the available parameters for the 2540 Nova-3. Each section describes the parameter, shows the access code required to be able to make modifications, it shows the minimum and maximum allowed values and the increments (resolution) by which these values can be changed. Also included are the pre-set values of the parameters for each cycle.

The parameters of Program No. 8 (leakage test) are fixed and cannot be changed by a technician.

Notes:

1. If a parameter is modified the only way to return to the original value is to manually reenter it.
2. A global parameter is a parameter that by changing its value in one program, it is changed in all the other programs to receive the same value.

6.2.1 SterTemp – Temperature required for sterilization

This parameter will set the desired temperature for sterilization

Access Code – 022
Resolution – 0.1ºC
Minimum value – 100ºC
Maximum value – 136ºC

Default Values

Cycle	1	2	3	4	5	6	7	8	9
Value	134	134	134	121	121	121	134	Fixed value	0

6.2.2 Ster Time – Time required for sterilization

This parameter will set the time desired for sterilization

Access code – 022
Resolution – 0.1 minute
Minimum value – 3 minute
Maximum value – 99 minutes

Default Values

Cycle	1	2	3	4	5	6	7	8	9
Value	4	7	18	20	20	20	3.5	Fixed value	0

6.2.3 Dry Time – Time required for drying

This parameter will set the time desired for drying

Access Code – 022
Resolution – 0.1 minute
Minimum Value – 0 minutes
Maximum Value – 99 minutes

Default Values

Cycle	1	2	3	4	5	6	7	8	9
Value	1	15	15	0	20	0	1	Fixed value	5

6.2.4 Vac Pulses. – No. of pulses in the air removal stage

This parameter will set the number of vacuum pulses during the air removal stage

Access Code – available upon request
Resolution – 1
Minimum Value – 0
Maximum Value – 5

Default Values

Cycle	1	2	3	4	5	6	7	8	9
Value	2	4	4	2	4	2	4	Fixed value	—

6.2.5 SterPressAdd

This defines the required addition to the sterilization pressure in kpa.

For example, for a sterilization temperature of 121ºC the required pressure is 204kpa. Since the system controls the sterilization process according to pressure and temperature, if SterPressAdd equals “0”, the system will maintain the pressure at 204kpa. If the value is at 5kpa, the system will be maintained at 209kpa, and so on.

Entry Code – 022
Resolution – 0.1 kPa
Minimum Value – 0 kPa
Maximum Value – 20 kPa

Default Values

Cycle	1	2	3	4	5	6	7	8	9
Value	7	7	7	7	7	7	7	Fixed value	—

6.2.6 End Temp

This parameter will determine the temperature in the chamber at the end of the cycle.

Access Code – 022
Resolution – 0.1°C
Minimum Value – 50°C
Maximum Value – 130°C

Default Values

Cycle	1	2	3	4	5	6	7	8	9
Value	120	120	120	120	120	95	120	Fixed value	—

6.2.7 ATMpressure Atmospheric Pressure (global par. – note 2)

This parameter tells the unit the atmospheric pressure of the location in which it is installed. The pressure entered must be with in 5% of the actual atmospheric pressure for that location. Unlike the other parameters you only need to enter this parameter once in any one cycle and all cycles will be updated.

This value can easily be calculated by knowing the altitude of your location. The atmospheric pressure at Sea Level is 100 kPa. For every 100m above sea level, the atmospheric pressure drops 1 kPa, and for every 100m below sea level, the atmospheric pressure increases 1 kPa.

Changes in pressure do to weather will not affect the accuracy of this unit.

Access Code – 022
Resolution– 0.1 kPa
Minimum Value – 55 kPa (for +4500m above see level)
Maximum Value – 103 kPa (for –300m below see level)

Default Values

Cycle	1	2	3	4	5	6	7	8	9
Value	100	100	100	100	100	100	100	Fixed value	—

6.2.8 PulseVac1 – Vacuum value of the first vacuum pulse

This parameter sets the value of the vacuum that pulse no.1 needs to achieve in the prevacuum stage. This parameter is expressed in kPa.

Access Code – available upon request
Resolution – 0.1kPa
Minimum Value – 5 kPa
Maximum Value – 100 kPa

Default Values

Cycle	1	2	3	4	5	6	7	8	9
Value	30	20	20	30	20	30	20	Fixed value	—

6.2.9 Pulse Vac T1 – Vacuum Time in the First Pulse

This value defines the time the system will continue to maintain vacuum after reaching PulseVac1 for the first pulse.

Access Code – available upon request
Resolution – 1 seconds
Minimum Value – 1 seconds
Maximum Value – 360 seconds

Default Values

Cycle	1	2	3	4	5	6	7	8	9
Value	10	30	30	10	30	10	30	Fixed value	—

6.2.10 PulsPress1 – pulse pressure during the first vacuum pulse.

This parameter is used to set the maximum pressure in each pulse of the prevacuum stage and is expressed in kPa.

Access Code – available upon request
Resolution – 0.1 kPa
Minimum Value – 70 kPa
Maximum Value – 200 kPa

Default Values

Cycle	1	2	3	4	5	6	7	8	9
Value	140	140	140	140	140	140	140	Fixed value	—

6.2.11 PulseVac2 Vacuum value of all vacuum pulse except first and last

This parameter sets the value of the vacuum that all pulse, except the first and the last pulses, needs to achieve in the prevacuum stage and is expressed in kPa.

Access Code – available upon request
Resolution – 0.1 kPa
Minimum Value – 5 kPa
Maximum Value – 100 kPa

Default Values

Cycle	1	2	3	4	5	6	7	8	9
Value	30	30	30	30	30	30	30	Fixed value	—

6.2.12 Pulse Vac T2 – Vacuum Time in all vacuum pulse except first and last

This value defines the time the system will continue to maintain vacuum after reaching Pulse Vac T2 for all pulse, except the first and the last pulses.

Access Code – available upon request
Resolution – 1 seconds
Minimum Value – 1 seconds
Maximum Value – 360 seconds

Default Values

Cycle	1	2	3	4	5	6	7	8	9
Value	10	30	30	10	30	10	30	Fixed value	—

6.2.13 PulsPress2 – pulse pressure during all vacuum pulse except first and last.

This parameter is used to set the maximum pressure in all pulse, except the first and the last pulses, of the prevacuum stage and is expressed in kPa.

Access Code – available upon request
Resolution – 0.1 kPa
Minimum Value – 70 kPa
Maximum Value – 200 kPa

Default Values

Cycle	1	2	3	4	5	6	7	8	9
Value	140	140	140	140	140	140	140	Fixed value	—

6.2.14 PulseVac3 – Vacuum value of the last vacuum pulse

This parameter sets the value of the vacuum that the last pulse needs to achieve in the prevacuum stage and is expressed in kPa.

Access Code – available upon request
Resolution – 0.1 kPa
Minimum Value – 5 kPa
Maximum Value – 200 kPa

Default Values

Cycle	1	2	3	4	5	6	7	8	9
Value	30	30	30	30	30	30	30	Fixed value	—

6.2.15 Pulse Vac T3 – Vacuum Time in the last Pulse

This value defines the time the system will continue to maintain vacuum after reaching Pulse Vac T for the last pulse.

Access Code – available upon request
Resolution – 1 seconds
Minimum Value – 1 seconds
Maximum Value – 360 seconds

Default Values

Cycle	1	2	3	4	5	6	7	8	9
Value	10	30	30	10	30	10	30	Fixed value	—

6.2.16 PulsPress3 – pulse pressure during the last vacuum pulse.

This parameter is used to set the maximum pressure in the last pulse of the prevacuum stage and is expressed in kPa.

Access Code – available upon request
Resolution – 0.1 kPa
Minimum Value – 70 kPa
Maximum Value – 200 kPa

Default Values

Cycle	1	2	3	4	5	6	7	8	9
Value	140	140	140	140	140	140	140	Fixed value	—

6.2.17 Heat Exh On – opening time of exhaust valve during the heating stage.

During the heating stage the exhaust valve (71) is opened and closed a few times to regulate the removal of the condense. This parameter is used to set the opening period each time the valve is opened. This parameter is expressed in 0.1 second.

Access Code – available upon request
Resolution – 1 second/10
Minimum Value – 0 second/10
Maximum Value – 50 second/10

Default Values

Cycle	1	2	3	4	5	6	7	8	9
Value	0	0	0	0	0	0	0	Fixed value	—

6.2.18 Heat Exh Off – closing time of the exhaust valve during the heating stage.

During the heating stage the exhaust valve (71) is opened and closed a few times to regulate the removal of the condense. This parameter is used to set the closing period each time the valve is closed. This parameter is expressed in 0.1 second.

Access Code – available upon request
Resolution – 1 second/10
Minimum Value – 0 second/10
Maximum Value – 1000 second/10

Default Values

Cycle	1	2	3	4	5	6	7	8	9
Value	0	0	0	0	0	0	0	Fixed value	—

6.2.19 Ster Exh On – opening time of exhaust valve during the sterilization stage.

During the sterilization stage the exhaust valve (71) is opened and closed a few times to regulate the removal of the condense. This parameter is used to set the opening period each time the valve is opened. This parameter is expressed in 0.1 second.

Access Code – available upon request
Resolution – 1 second/10
Minimum Value – 0 second/10
Maximum Value – 50 second/10

Default Values

Cycle	1	2	3	4	5	6	7	8	9
Value	0	0	0	0	0	0	0	Fixed value	—

6.2.20 Ster Exh Off – closing time of the exhaust valve during the sterilization stage.

During the sterilization stage the exhaust valve (71) is opened and closed a few times to regulate the removal of the condense. This parameter is used to set the closing period each time the valve is closed. This parameter is expressed in 0.1 second.

Access Code – available upon request
Resolution – 1 second/10
Minimum Value – 0 second/10
Maximum Value – 1000 second/10

Default Values

Cycle	1	2	3	4	5	6	7	8	9
Value	0	0	0	0	0	0	0	Fixed value	—

6.2.21 Exh Shoot On – opening time of exhaust valve during the exhaust stage.

During the exhaust stage the exhaust valve (71) is opened and closed a few times to regulate the exhaust rate. This parameter is used to set the opening period each time the valve is opened. This parameter is expressed in 0.1 second.

Access Code – available upon request
Resolution – 1 second/10
Minimum Value – 0 second/10
Maximum Value – 1000 second/10

Default Values

Cycle	1	2	3	4	5	6	7	8	9
Value	1	1	1	1	1	20	1	Fixed value	—

6.2.22 Exh ShootOff – closing time of the exhaust valve during the exhaust stage.

During the exhaust stage the exhaust valve (71) is opened and closed a few times to regulate the exhaust rate. This parameter is used to set the closing period each time the valve is closed. This parameter is expressed in 0.1 second.

Access Code – available upon request
Resolution – 1second/10
Minimum Value – 0 second/10
Maximum Value – 1000 second/10

Default Values

Cycle	1	2	3	4	5	6	7	8	9
Value	0	0	0	0	0	100	0	Fixed value	—

6.2.23 Dry Air On – opening time of air valve during the drying stage.

During the drying stage the air valve (43) is opened and closed a few times to improve the drying operation. This parameter is used to set the opening period each time the valve is opened. This parameter is expressed in 0.1 second.

Access Code – available upon request
Resolution – 1 second/10
Minimum Value – 0 second/10
Maximum Value – 1000 second/10

Default Values

Cycle	1	2	3	4	5	6	7	8	9
Value	20	20	20	20	20	20	20	Fixed value	—

6.2.24 Dry Air Off – closing time of air valve during the drying stage.

During the drying stage the air valve (43) is opened and closed a few times to improve the drying operation. This parameter is used to set the closing period each time the valve is closed. This parameter is expressed in 0.1 second.

Access Code – available upon request
Resolution – 1 second/10
Minimum Value – 0 second/10
Maximum Value – 1000 second/10

Default Values

Cycle	1	2	3	4	5	6	7	8	9
Value	200	200	200	200	200	200	200	Fixed value	—

6.2.25 SterGenPrsAd –pressure addition in the generator

This defines the required addition to the pressure in the generator above the pressure that correlates to the temperature (according to selected cycle). This parameter is expressed in kpa.

For example, for a steam temperature of 121ºC the required pressure is 204kpa. Since the system controls the process according to pressure and temperature, if SterGenPrsAd equals "0", the system will maintain the pressure in the generator at 204kpa. If the value is at 5kpa, the pressure in the generator will be maintained at 209kpa, and so on.

Entry Code – available upon request
Resolution – 0.1 kPa
Minimum Value – 0 kPa
Maximum Value – 50 kPa

Default Values

Cycle	1	2	3	4	5	6	7	8	9
Value	20	20	20	20	20	20	20	Fixed value	—

6.2.26 Ster PrintT –interval of Sterilization data printing

This parameter will set the interval between printings during the sterilization stage

Access Code – 022
Resolution – 1 seconds
Minimum Value – 10 seconds
Maximum Value – 360 seconds

Default Values

Cycle	1	2	3	4	5	6	7	8	9
Value	60	60	60	60	60	60	60	Fixed value	—

6.2.27 Print Rate –interval of heating and drying data printing

This parameter will set the interval between printings during the heating and drying stages

Access Code – 022
Resolution – 1 seconds
Minimum Value – 10 seconds
Maximum Value – 360 seconds

Default Values

Cycle	1	2	3	4	5	6	7	8	9
Value	180	180	180	180	180	180	180	Fixed value	—

6.2.28 HeatSterTime – heating stage duration time

This parameter defines how long the heating stage will take and is expressed in seconds.

If heating duration time will be shorter than system ability (for example "0") the system will try to get sterilization conditions as fast as possible.

Access Code – available upon request
Resolution – 1 seconds
Minimum Value – 0 seconds
Maximum Value – 1000 seconds

Default Values

Cycle	1	2	3	4	5	6	7	8	9
Value	0	0	0	0	0	0	0	Fixed value	—

6.2.29 WterGen Time – Timed extension for pumping mineral free water (global parameter – see note 2)

This parameter sets the length of time to continue pumping mineral free water into the steam generator after the water level electrode senses water.

This is necessary to prevent a situation where the water pump would cycle on and off as the water level rises and falls around the water level electrode.

Access Code – available upon request
Resolution – 1 second
Minimum Value – 1 seconds
Maximum Value – 10 seconds

Default Values

Cycle		1	2	3	4	5	6	7	8	9
Value	For other than Australia	10	10	10	10	10	10	10	Fixed value	—
	For Australia	15	15	15	15	15	15	15		

6.2.30 Coil LimTemp – low temperature in the coil (global parameter – see note 2)

The steam flow through the coil is controlled by the steam valve (97). This valve is opened when the temperature in the coil (as measured by the PT100 installed at the outlet of the coil) decreases below the pre-set low temperature. The CoilimTemp parameter defines the low limit of the coil temperature and is expressed in °C.

Access Code – available upon request
Resolution – 0.1 °C
Minimum Value – 60 °C
Maximum Value – 95 °C

Default Values

Cycle	1	2	3	4	5	6	7	8	9
Value	80	80	80	80	80	80	80	Fixed value	—

6.2.31 SterPresLimAd

This defines the required addition to the pressure in the generator, during the sterilization stage, in kpa.

For example, for a sterilization temperature of 121ºC the required pressure is 204kpa. To this add the value of SterPresAdd. If SterPresAdd is 5, the basic pressure for calculating SterPresLimAd will be 209 kPa. Since the system controls the sterilization process according to pressure and temperature, if SterPresLimAd equals "0", the system will maintain the pressure in the generator at 209 kPa. If the value is at 10 kPa, the system will be maintained in the generator at 219 kPa, and so on.

Entry Code – available upon request
Resolution – 0.1 kPa
Minimum Value – 0 kPa
Maximum Value – 20 kPa

Default Values

Cycle	1	2	3	4	5	6	7	8	9
Value	14	14	14	14	14	14	14	Fixed value	—

6.2.32 HeatTimeErr – Heating Stage Error Time

This parameter defines permitted time for heating stage and is expressed in seconds. If the heating stage time will pass heating stage error time, the cycle will fail before reaching the sterilization temperature and "Low Heat" message will be displayed.

Access Code – available upon request
Resolution – 1 second
Minimum Value – 1000 seconds
Maximum Value – 3600 seconds

Default Values

Cycle	1	2	3	4	5	6	7	8	9
Value	1200	1200	1200	1200	1200	1200	1200	Fixed value	—

6.2.33 Vac TimeErr – waiting time until reaching required vacuum during air removal stage

If, during the air removal stage, the system does not reach the required vacuum within the pre-defined time, "Low Vacuum" message will be displayed. The Vac TimeErr parameter defines the waiting time until reaching the required vacuum and is expressed in seconds.

Access Code – available upon request
Resolution – 1 seconds
Minimum Value – 500 seconds
Maximum Value – 3000 seconds

Default Values

Cycle	1	2	3	4	5	6	7	8	9
Value	1000	1000	1000	1000	1000	1000	1000	Fixed value	—

6.2.34 WaterTimeErr – waiting time until water reaches water level electrode (global parameter – see note 2)

If the water level decreases below the water level electrode the water pump begins to pump water into the generator. If the water level electrode does not sense water within a pre-set time since the pump is ordered to operate, "NoGenWtr" will be displayed. The WaterTimeErr parameter defines the waiting time until water reaches water level electrode and is expressed in seconds.

Changing this parameter in one of the cycles will change this parameter in all the other cycles to the value.

Access Code – available upon request
Resolution – 1 seconds
Minimum Value – 10 seconds
Maximum Value – 200 seconds

Default Values

Cycle		1	2	3	4	5	6	7	8	9
Value	For other than Australia	60	60	60	60	60	60	60	Fixed value	—
	For Australia	90	90	90	90	90	90	90		

6.2.35 SleepPower – waiting time until entering power saving state (global parameter – see note 2)

If the autoclave is idle and the key panel is not touched for a pre-set time, the system enters the "power-save" state. In this state all the autoclave's systems, including the heating elements, are not active. Pressing any key will return the autoclave to active state. The SleepPower parameter defines the waiting time until entering power saving state and is expressed in hours.

Changing this parameter in one of the cycles will change this parameter in all the other cycles to the value.

Access Code – available upon request
Resolution – 1 hours
Minimum Value – 1 hours
Maximum Value – 99 hours

Default Values

Cycle	1	2	3	4	5	6	7	8	9
Value	4	4	4	4	4	4	4	Fixed value	—

6.2.36 TemInf – displayed temperature (global parameter – see note 2)

This parameter enables the technician to set the displayed temperature in ºC or in ºF.

Changing this parameter in one of the cycles will change this parameter in all the other cycles to the value.

Access Code – available upon request
Resolution – 1
Value – 0 or 1
If TemInf = 1 the temperature is expressed in ºF.
If TemInf = 0 the temperature is expressed in ºC.

Default Values

Cycle	1	2	3	4	5	6	7	8	9
Value	0	0	0	0	0	0	0	Fixed value	—

6.2.37 PresInPSI – displayed pressure (global parameter – see note 2)

This parameter enables the technician to set the displayed pressure in kPa or in psig.

Changing this parameter in one of the cycles will change this parameter in all the other cycles to the value.

Access Code – available upon request
Resolution – 1
Value – 0, 1 or 2
If PresInPSI = 0 the temperature is expressed in kPa.
If PresInPSI = 1 the temperature is expressed in psia.
If PresInPSI = 2 the temperature is expressed in psig.

Default Values

Cycle	1	2	3	4	5	6	7	8	9
Value	0	0	0	0	0	0	0	Fixed value	—

6.2.38 AutoAddWater – Automatic addition of water (global parameter – see note 2)

This parameter defines if the mineral free water filling is automatic or manual.

Automatic filling option is not available yet.

Access Code – available upon request
Resolution – 1
Value – 0 or 1
If AutoAddWater= 1 the water filling is automatic.
If AutoAddWater = 0 the water filling is manual.

Default Values

Cycle	1	2	3	4	5	6	7	8	9
Value	0	0	0	0	0	0	0	Fixed value	—

6.3 Digital Inputs

This directory enables you to check the digital inputs. It is possible to enter this directory while the autoclave is performing a cycle in order to check the devices sending these inputs.

1. To move from one item to another item use the UP or DOWN pushbuttons. **DOWN** will display the next item and UP will display the previous item.
2. To exit to the menu display press **MENU**.

Displayed item	Displayed value	Operation	Remarks
Float Low	0	Does not sense water	Lower float in the mineral free water reservoir. Move the float up and down and verify that the displayed value changes from "1" to "0" and vice versa.
	1	Senses water	
Door Switch	0	Door open	Door switch. Press and release the door switch pin and verify that the displayed value changes from "1" to "0" and vice versa.
	1	Door closed	
Float Res	0	Does not sense water	Upper float in the mineral free water reservoir. Move the float up and down and verify that the displayed value changes from "1" to "0" and vice versa.
	1	Senses water	

6.4 Digital Outputs

This directory enables you to check the digital outputs. It is possible to enter this directory while the autoclave is performing a cycle in order to check the devices sending these inputs.

1. To move from one item to another item use the **UP** or **DOWN** pushbuttons. **DOWN** will display the next item and **UP** will display the previous item.
2. To exit to the menu display press **MENU**.

Displayed item	Displayed value	Operation	Remarks
Vac Pump	0	Not operating	Vacuum pump
	1	Operating	
Water Pump	0	Not operating	Water Pump
	1	Operating	
Heater 1	0	Not operating	Heating element
	1	Operating	
Wtr to Res	1	Not operating	Mineral free water to reservoir valve (21)
	0	Operating	
Air Valve	0	Not operating	Air valve (43).
	1	Operating	
Vac Valve	0	Not operating	Vacuum valve (52).
	1	Operating	
Release Coil	0	Not operating	Condensate release valve from the coil to the mineral free water reservoir (11)
	1	Operating	
Door Lock	1	Locked position	Door locking pin
	0	Unlocked position	
Chamb Steam	0	Not operating	Steam inlet valve to the chamber (93) and slow exhaust valve (74)
	1	Operating	
Air VacPump	0	Not operating	Air inlet valve to the vacuum pump (44)
	1	Operating	
Fast Exh	0	Not operating	Fast exhaust valve (71)
	1	Operating	
Door Led	0	On	Locked door LED (on the control panel)
	1	Off	
Water Led	0	On	Water LED (on the control panel)
	1	Off	
Fail Led	0	On	Fail LED (on the control panel)
	1	Off	
Start Led	0	On	Start LED (on the control panel)
	1	Off	
Buzzer	0	Off	
	1	Buzzing	

6.5 Analog Inputs

This directory enables you to check the analog inputs. It is possible to enter this directory while the autoclave is performing a cycle in order to check the devices sending these inputs.

1. To move from one item to another item use the **UP** or **DOWN** pushbuttons. **DOWN** will display the next item and **UP** will display the previous item.
2. To exit to the menu display press **MENU**.

Displayed item	Displayed value	Operation	Remarks
ChamPress			Pressure in the chamber in kPa
Chamb Temp			Temperature in the chamber in °C
Coil Temp			Temperature in the coil in °C
Gen Press			Pressure in the generator in kPa
Electr_Gen	Under 200	Enough water	Water level electrode in the steam generator
	Over 200	Not enough water	
Electr_1	Under 200	Water in the reservoir	Water level electrode in the waste water reservoir
	Over 200	No water in the reservoir	

6.6 Calibration

6.6.1 Calibration Components:

The calibration of temperature and pressure is performed digitally. This system does not have adjustment pots. All calibrations are preformed through the keypad.

The electronic temperature and pressure measuring circuits built into the autoclave's are designed with components having 1% accuracy.

The temperature circuit produces a linear output and has an electrical output range of 100mv – 2400mv that corresponds to a temperature range of 20°C (68°F) – 150°C (302°F).

The pressure circuit also produces a linear output and has an electrical output range of 100mv – 2400mv, which corresponds to a pressure range of 0 – 400 kPa (0 – 58 psia).

The temperature and pressure circuits provide analog input voltages that are converted to digital signal by the A/D converter. The performance of the Analog to Digital converter (A/D) is limited for values greater than 2400mv or less than 100mv.

The system has a non-volatile memory in which the offset and gain data of the sensors are stored, as well as any error compensation factors that are calculated. Storage in the no-volatile memory means that even if the main power is turned off the information is saved for use the next time the machine is run.

Calibration is performed by entering data into the keypad or a stand-alone computer when the PC communication port is used.

6.6.2 Calibration Theory:

6.6.2.1 Definition of Gain and Offset:

Any device that produces a linear output (which is a straight line) can be described by the mathematical equation $y=ax+b$. Where "b" is the offset of the device, "a" is the gain, x is the input and y is the output. The offset is the minimum output value of the device when the input is zero and need not itself be zero. The gain is the factor that any input is multiplied by to determine what output value should be generated for that input.

The A/D converter receives an input voltage from the sensor and converts that signal to a digital output. The software then takes that output and using the equation $y=ax+b$ together with error compensation factors converts the information to a digital signal for use by the autoclave.

The system's error compensation is based on a calculation involving two points as shown in the following example. Each point has two values, one value is the actual (measured) reading, of either temperature or pressure (from and independent thermometer, PT simulator or pressure gauge), and the other value is the reading from the autoclave's digital display of either temperature or pressure.

By entering these values into the unit through the keypad, the system is able to calculate a compensation factor that will correct the digital display and allow it to accurately return the actual temperature or pressure.

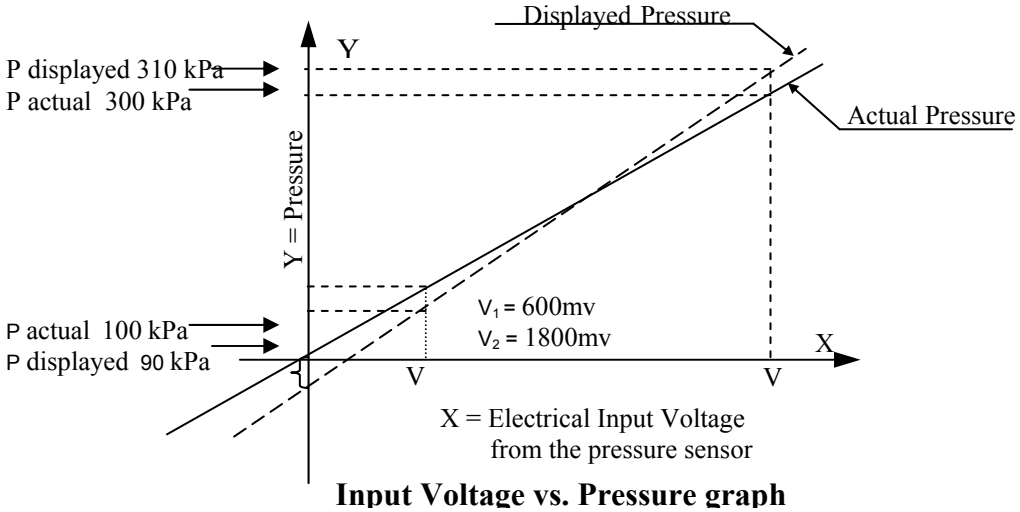
Example:

If the actual measured pressures, using an independent pressure gage, are 100 kPa (14.5 psia) with the unit at rest and 300 kPa (43.5 psia) when the unit is in sterilization. The displayed pressures are 90 kPa (13 psia) and 310 kPa (45 psia) respectively. Based on the operating range of the pressure sensor in the system, the input voltage that corresponds to 100 kPa (14.5 psia) is 600mv. The input voltage that corresponds to 300 kPa (43.5 psia) is 1800mv. The graph and input voltages are given for information purposes only and are not needed for the calibrations.

The example shows the four values needed to calculate the compensation factor for the pressure displayed by the unit, but would work exactly the same for a temperature correction. In this example the first point can be thought of as the starting pressure or the pressure when the unit is at not running. The second point would be the ending pressure or the pressure when the unit will be in the sterilizing mode. Keep in mind that the two points do not have to be the beginning and ending of the range, they can be any two points in the range.

Note: The two points that are selected will define the range of the error compensation. Values above or below this range will not be compensated.

Using the pressure values in the example the "Input Voltage vs. Pressure" graph would look like this:



Input Voltage vs. Pressure graph

The calibration steps that follow will allow you to automatically correct the displayed pressure and temperature so it accurately reflects the actual pressure and temperature. All you need do is input the appropriate data (actual and displayed values) into the system through the keypad and the on board computer will do the rest.
Note: It is necessary to know the actual and displayed values prior to entering the calibration mode.

6.6.3 Required equipment for calibration

— PT Simulator (for temperature calibration). The PT simulator comes marked off in °C, with a range of 70°C to 130°C. This corresponds to and is interchangeable with a °F range of 158°F to 266°F.

— Reference temperature sensor with an accuracy of 0.5°C.

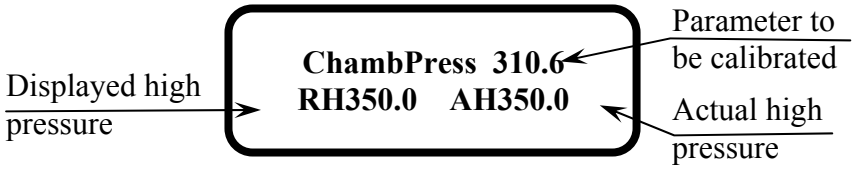
— Pressure gauge capable of reading <u>absolute</u> pressure with an accuracy of 1% .

6.6.4 Calibrating the pressure in the chamber

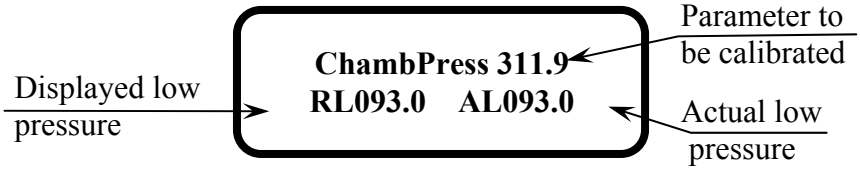
When entering the calibration sub-directory the following is displayed:

To calibrate the autoclave install a precise pressure gauge to the chamber to measure the actual pressure. This pressure gauge will be the reference gauge.

Press **CYCLES**. The following will be displayed.



A ─ actual pressure in the chamber. R ─ displayed pressure.
H ─ high value. L ─ low value.
Therefore:
RH is the high displayed (read) value and AH is the high actual value.
RL is the low displayed (read) value and AL is the low actual value.
Change the actual pressure value, using the **UP** and **DOWN** pushbutton, to be identical to the value displayed on the gauge displaying the actual pressure (AH313.0). Only two rows can be displayed on the autoclave's display. To display the third row (the row that displays the low value) use the **PARAMETERS** pushbutton. Every press on the **PARAMETERS** pushbutton will move the cursor from one digit to another until it moves to and displays the low value row. The display will show as follows:



To return to the high values row continue to press the **PARAMETERS** pushbutton until the high value row is displayed.

To carry out the calibration operation follow the example described below:

Example:

The pressure gauge displaying the actual pressure shows a pressure of 313 kPa and the display displaying the read pressure shows a pressure of 320 kPa. The purpose of the calibration is to modify the "read" value so it will display the actual pressure as displayed on the pressure gauge connected to the chamber.

To calibrate the high pressure perform any cycle. When the autoclave reaches the sterilization stage, enter the calibration sub-directory. At the beginning, the cursor is on the actual high value (AH). Change the pressure value to be identical to the value displayed on the gauge displaying the actual pressure (AH313.0). Use the **UP** and **DOWN** pushbutton to increase or decrease each digit and the **PARAMETERS** pushbutton to move the cursor from one digit to another. By pressing the **PARAMETERS** pushbutton move the cursor to the "read" high value. Change the pressure value to be identical to the value displayed on the gauge displaying the actual pressure (AH313.0). This can be done either by using the **UP** and **DOWN** pushbutton or by pressing the **STOP/START** pushbutton when the cursor is on the right digit of the RH (a short operation that copies the AH value to the RH).

Press **CYCLES** and the system will complete the calibration operation.

After completing the calibration of the high value the low value will be displayed as follows:

ChambPress 310.9
RL093.0 AL093.0

To perform the calibration of the low pressure, stop the cycle and decrease the pressure in the chamber to atmospheric pressure. Open the autoclave's door. At this stage the reference pressure gauge will display the atmospheric pressure. At the beginning, the cursor is on the actual low value (AL). Change the pressure value, using the **UP** and **DOWN** pushbutton, to be identical to the value displayed on the reference gauge displaying the actual pressure. By pressing the **PARAMETERS** pushbutton move the cursor from one digit to another until the cursor is on the "read" low value. Change the pressure value to be identical to the value displayed on the gauge displaying the actual pressure (AH093.0). Use the **UP** and **DOWN** pushbutton to increase or decrease each digit and the **PARAMETERS** pushbutton to move the cursor from one digit to another. An alternative way is by pressing the **STOP/START** pushbutton when the cursor is on the right digit of the RL (a short operation that copies the AL value to the RL).

Press **CYCLES**. The system will complete the calibration operation and the following will be displayed:

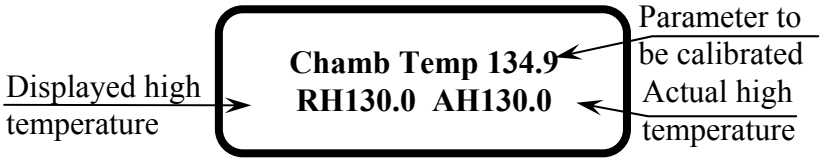
At this point, you can either stop the calibration operation and save the data or continue to calibrate the temperature in the chamber.
If you want to calibrate only the pressure, press **MENU**. This will save the calibration data while the following will be displayed:

After completing the saving, the system will return to the following display:

6.6.5 Calibrating the temperature in the chamber

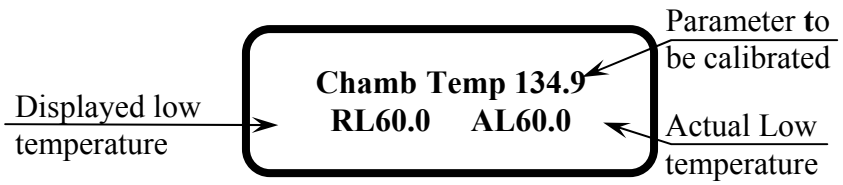
If you want to continue and calibrate the temperature in the chamber, press **DOWN** and the following will be displayed:

To perform the temperature calibration, insert a calibrated thermometer into the chamber with a display outside the chamber.
Press **CYCLES**. The following will be displayed.



A ─ actual temp. in the chamber. R ─ displayed (read) temp.
H ─ high value. L ─ low value.
Therefore:
RH is the high displayed (read) value and AH is the high actual value.
RL is the low displayed (read) value and AL is the low actual value.

Change the actual temperature value, using the **UP** and **DOWN** pushbutton, to be identical to the value displayed on the thermometer displaying the actual temperature (AH130.0). Since only two rows can be displayed on the autoclave's display, use the **PARAMETERS** pushbutton to display the third row (the row that displays the low value). Every press on the **PARAMETERS** pushbutton will move the cursor from one digit to another until it moves to and



displays the low value row. The display will show as follows:

To return to the high values row continue to press the **PARAMETERS** pushbutton until the high value row is displayed.

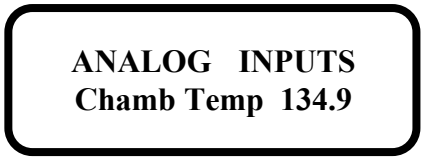
To carry out the calibration operation follow the example described below:

Example:

The thermometer displaying the actual temperature shows a temperature of 60°C and the display displaying the read temperature shows a temperature of 61°C. The purpose of the calibration is to modify the "read" value to 60°C.

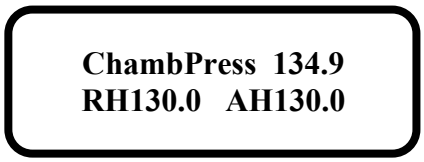
To perform the calibration of the low temperature, replace the chamber's PT100 (the lower PT100 plug on the electronic box) with a temperature simulator. Set the simulator to 60°C. At the beginning, the high value is displayed. Press the **PARAMETERS** pushbutton a few times until the low value is displayed. The cursor is on the actual low value (AL). Change the temperature value to 60°C (AH60). Use the **UP** and **DOWN** pushbutton to increase or decrease each digit and the **PARAMETERS** pushbutton to move the cursor from one digit to another. By pressing the **PARAMETERS** pushbutton move the cursor to the "read" low value. Change the temperature value to 60°C (AH60). This can be done either by using the **UP** or **DOWN** and the **PARAMETERS** pushbuttons or by pressing the **STOP/START** pushbutton when the cursor is on the right digit of the RL (a short operation that copies the AL value to the RL).

Press **CYCLES**. The system will complete the calibration operation and the following will be displayed:



To calibrate the high temperature perform any cycle. When the autoclave reaches the sterilization stage, enter the calibration sub-directory. At the beginning, the cursor is on the actual high value (AH). Change the temperature value to

the value displayed on the thermometer displaying the actual temperature (AH134). Use the **UP** and **DOWN** pushbutton to increase or decrease each digit and the **PARAMETERS** pushbutton move the cursor from one digit to another. Press the **PARAMETERS** until the cursor is on the "read" high value. Change the temperature value to be identical to the value displayed on the thermometer displaying the actual temperature (RH130). This can be done either by using the **UP** or **DOWN** and the **PARAMETERS** pushbuttons or by pressing the **STOP/START** pushbutton when the cursor is on the right digit of the RH (a short operation that copies the AH value to the RH).
Press **CYCLES** and the system will complete the calibration operation.
After completing the calibration of the high value will be displayed as follows:

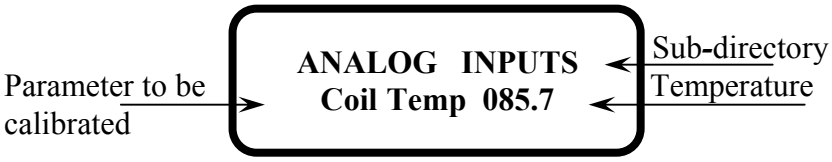


At this point, you can either stop the calibration operation and save the data or continue to calibrate the temperature in the coil.
If you want to stop the calibration, press **MENU**. This will save the calibration data while the following will be displayed:

After completing the saving, the system will return to the following display:

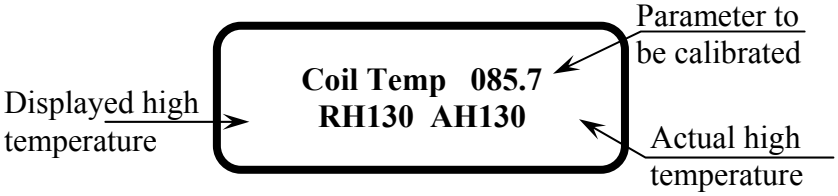
6.6.6 Calibrating the temperature in the coil

If you want to continue and calibrate the temperature in the coil, press **DOWN** and the following will be displayed:



To perform the calibration of the temperature, replace the coil's PT100 (the higher PT100 plug on the electronic box) with a temperature simulator. Set the simulator to 130°C.

Press **CYCLES**. The following will be displayed.



A ─ actual temp. in the chamber. R ─ displayed (read) temp.
H ─ high value. L ─ low value.

Therefore:

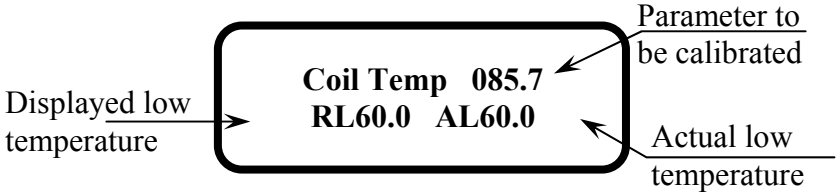
RH is the high displayed (read) value and AH is the high actual value.

RL is the low displayed (read) value and AL is the low actual value.

To carry out the calibration operation follow the example described below:

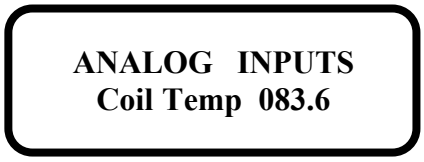
Example:

The thermometer displaying the actual temperature shows a temperature of 130°C and the display displaying the read pressure shows a pressure of 132°C. The purpose of the calibration is to modify the "read" value so it will display the actual temperature according to the pre-set simulator.



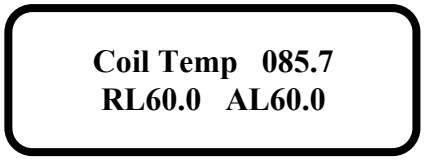
At the beginning, the high value is displayed. The cursor is on the actual high value (AH). Change the temperature value to 130°C (AH130). Use the **UP** or **DOWN** pushbuttons to increase or decrease the digit's value and the **PARAMETERS** pushbutton to move the cursor from one digit to another. Continue by pressing the **PARAMETERS** pushbutton until the cursor is on the "read" high value. Change the temperature value to 130°C (RH130). This can be done either by using the **UP** or **DOWN** and the **PARAMETERS** pushbutton or by pressing the **STOP/START** pushbutton when the cursor is on the right digit of the RH (a short operation that copies the AH value to the RH).

Press **CYCLES**. The system will complete the calibration operation and the following will be displayed:



To calibrate the low temperature set the simulator to 60°C. Enter the calibration sub-directory. At the beginning, the cursor is on the actual low value (AL). Change the temperature value, using the **UP** and **DOWN** pushbutton, to 60°C (AL60). Use the **UP** or **DOWN** pushbuttons to increase or decrease the digit's value and the **PARAMETERS**

pushbutton to move the cursor from one digit to another. Continue by pressing the **PARAMETERS** pushbutton until the cursor is on the "read" low value. Change the temperature value to 60°C (RL60). This can be done either by using the **UP** or **DOWN** and the **PARAMETERS** pushbutton or by pressing the **STOP/START** pushbutton when the cursor is on the right digit of the RL (a short operation that copies the AL value to the RL).
Press **CYCLES** and the system will complete the calibration operation.
After completing the calibration of the low value the low value will be displayed as follows:



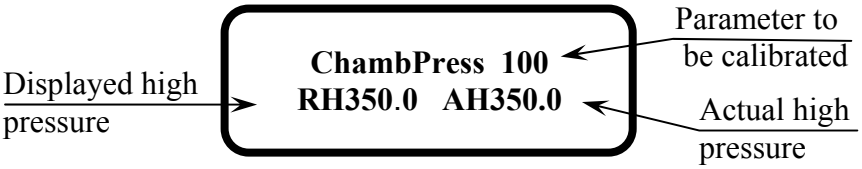
At this point, you can either stop the calibration operation and save the data or continue to calibrate the pressure in the generator.
If you want to stop the calibration, press **MENU**. This will save the calibration data while the following will be displayed:

After completing the saving, the system will return to the following display:

6.6.7 Calibrating the pressure in the generator

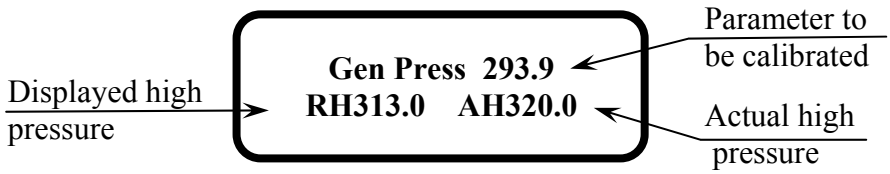
If you want to continue and calibrate the pressure in the generator, press **DOWN** and the following will be displayed:

Press **CYCLES**. The following will be displayed.

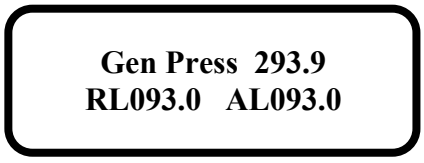


A ─ actual pressure in the chamber. R ─ displayed (read) pressure.
H ─ high value. L ─ low value.

Therefore:
RH is the high displayed (read) value and AH is the high actual value.
RL is the low displayed (read) value and AL is the low actual value.
To carry out the calibration operation follow the example described below:
Example:
The pressure gauge displaying the actual pressure shows a pressure of 313 kPa and the display displaying the read pressure shows a pressure of 320 kPa as follows:



The purpose of the calibration is to modify the "read" value so it will display the actual pressure as displayed on the pressure gauge connected to the chamber.
To calibrate the high pressure perform any cycle. During the sterilization stage, the pressure in the chamber equals the pressure in the generator. When the autoclave reaches the sterilization stage, enter the calibration sub-directory. At the beginning, the cursor is on the actual high value (AH). Change the pressure value to the value displayed on the gauge displaying the actual pressure (AH313.0). Use the **UP** or **DOWN** pushbuttons to increase or decrease the digit's value and the **PARAMETERS** pushbutton to move the cursor from one digit to another. Continue by pressing the **PARAMETERS** pushbutton until the cursor is on the "read" high value. Change the pressure value to be identical to the value displayed on the gauge displaying the actual pressure (AH313.0). This can be done either by using the **UP** or **DOWN** and the **PARAMETERS** pushbuttons or by pressing the **STOP/START** pushbutton when the cursor is on the right digit of the RH (a short operation that copies the AH value to the RH).
Press **CYCLES** and the system will complete the calibration operation.
After completing the calibration of the high value the low value will be displayed as follows:



To perform the calibration of the low pressure, stop the cycle and decrease the pressure in the chamber to atmospheric pressure. Press **MENU** to return to the following display:

Press three times **DOWN** to enter the in-out-test display.
To enter the In Out Test directory press **CYCLES**. Press a few times **DOWN** until Release Coil is displayed. If the value displayed is "0" press **CYCLES** to change it to "1". This will open the valve from the coil to the mineral free water reservoir and the pressure in the generator will

decrease to the atmospheric pressure.
Open the autoclave's door. At this stage the reference pressure gauge will display the atmospheric pressure. By pressing the **PARAMETERS** pushbutton move the cursor to the low-pressure row. At the beginning, the cursor is on the actual low value (AL). Change the pressure value to the value displayed on the reference gauge displaying the actual pressure (AH093.0). Use the **UP** or **DOWN** pushbuttons to increase or decrease the digit's value and the **PARAMETERS** pushbutton to move the cursor from one digit to another. Continue by pressing the **PARAMETERS** pushbutton until the cursor is on the "read" low value. Change the pressure value to the value displayed on the reference gauge (RH093.0). This can be done either by using the **UP** or **DOWN** and the **PARAMETERS** pushbuttons or by pressing the STOP/START pushbutton when the cursor is on the right digit of the RL (a short operation that copies the AL value to the RL).
Press **CYCLES**. The system will complete the calibration operation and the following will be displayed:

To complete the calibration pressure, press **MENU**. This will save the calibration data while the following will be displayed:

After completing the saving, the system will return to the following display:

6.7 Set Clock

This directory enables you to set the time and date.

When entering the set clock display the time and date are displayed. The cursor is on the hour that is blinking.
The time is displayed in the upper row in the form “hh:mm:ss”. The hour range is 24 hour (i.e. from “0” to “24”)
The date is displayed in the lower row in the form “DD:MM:YY”

1. To increase or decrease the time or the date use the **UP** and **DOWN** pushbuttons.
2. To move the cursor from one digit to another press the **PARAMETERS** pushbutton
3. After completing setting the time and the date press **CYCLES** to enter the new time and date and to exit and return to the **MENU** display

6.8 In Out Test

The In-Out-Test is provided to assist in trouble shooting the autoclave.

1. To move from one item to another item use the **UP** or **DOWN** pushbuttons. **DOWN** will display the next item and **UP** will display the previous item.
2. When a solenoid valve will be displayed, a "click" sound will be heard and the solenoid will be magnetized. The magnetization can be verified by touching the solenoid with a screwdriver or any other iron, steel, etc. object.
3. To change the Displayed value from "0" to "1" and vice versa press the **CYCLES** pushbutton
4. To exit to the menu display press **MENU**.

Displayed item	Displayed value	Operation	Remarks
Vac Pump	0	Not operating	Vacuum pump
	1	Operating	
Water Pump	0	Not operating	Water Pump
	1	Operating	
Heater 1	0	Not operating	Operation of the heating element can be verified by connecting the autoclave to an Ampermeter
	1	Operating	
Wtr to Res	1	Not operating	Mineral free water to reservoir valve (21)
	0	Operating	
Air Valve	0	Not operating	Air valve (43).
	1	Operating	
Vac Valve	0	Not operating	Vacuum valve (52).
	1	Operating	
Release Coil	0	Not operating	Condensate release valve from the coil to the mineral free water reservoir (11)
	1	Operating	
Door Lock	1	Locked position	Door locking pin
	0	Unlocked position	
Chamb Steam	0	Not operating	Steam inlet valve to the chamber (93) and slow exhaust valve (74)
	1	Operating	
Air VacPump	0	Not operating	Air inlet valve to the vacuum pump (44)
	1	Operating	
Fast Exh	0	Not operating	Fast exhaust valve (71)
	1	Operating	
Door Led	0	On	Locked door LED (on the control panel)
	1	Off	
Water Led	0	On	Water LED (on the control panel)
	1	Off	
Fail Led	0	On	Fail LED (on the control panel)
	1	Off	
Start Led	0	On	Start LED (on the control panel)
	1	Off	
Buzzer	0	Off	
	1	Buzzing	

6.9 Language

THIS OPTION IS NOT AVAILABLE YET

6.10 History

This directory enables the operator to print printouts of the last 10 cycles.

When entering the directory, the description of the last cycle (including the load number) is displayed.

1. Use **UP** and **DOWN** pushbuttons to brows through the last 10 cycles.
2. Select the required cycle and press **CYCLE**. The required printout will be printed
3. To exit to the menu display press MENU.

6.11 More Options

The following option may be used only according to the restriction written in each paragraph:

No.	*Operation*	*No.*	*Operation*
1.	Calib Default	4.	Reset Load Nu.
2.	Set Calib Last	5.	Enable Programs
3.	Set Serial Nu.	6.	Set as default

1. To move from one item to another item use the **UP** or **DOWN** pushbuttons. **DOWN** will display the next item and **UP** will display the previous item.

6.11.1 Calib Default

Purpose: This option shall be used if a faulty calibration operation has been performed and the parameters values are far out of range. This option enables the technician to retrieve the default values of the calibration values (pressure and temperature), as set at the manufacturing plant. These calibration values are as follows: **ChamPress, Chamb Temp, Coil Temp, Gen Press, Electr_Gen, Electr_1.**

1. To enter this directory press **CYCLES**.

   When entering the **Calib Default** display, **ChambPress** and the current value are displayed.

2. To select the required parameter, use the **UP** or **DOWN** pushbuttons. **DOWN** will display the next parameter and **UP** will display the previous parameter.

3. To retrieve the default value press **CYCLES**.

4. To exit to the menu display press **MENU**.

6.11.2 Set Calib Last

Purpose: This option shall be used if a faulty calibration operation has been performed and the parameters values in the previous calibration (the condition before the faulty calibration) are close to the required values. This option enables the technician to retrieve the last values of the calibration values (pressure and temperature), as they were before the last change. This possibility enables the technician to return to last values if he entered wrong values. The inputs are as follows: **ChamPress, Chamb Temp, Coil Temp, Gen Press, Electr_Gen, Electr_1**.

1. To enter this directory press **CYCLES**.

   When entering the **Set Calib Last** display, **ChambPress** and the current value are displayed.

2. To select the required calibration values, use the **UP** or **DOWN** pushbuttons. **DOWN** will display the next parameter and **UP** will display the previous parameter.

3. To retrieve the default value press **CYCLES**.

4. To exit to the menu display press **MENU**.

6.11.3 Set Serial Nu.

Purpose: This option shall be used if the digital board has been replaced. This option enables the technician to enter or change the serial number of the autoclave, so it will be printed in the autoclave's print-out.

1. To enter this directory press **CYCLES**.

   When entering the **Set Serial Nu.** display, **SERIAL NUMBER** is displayed on the upper row, a 7 digit number is displayed on the lower row and the cursor is under the right digit.

2. Begin with entering the last (right) digit. To enter the required number, use the **UP** or **DOWN** pushbuttons.

3. After entering the last (right) digit press **PARAMETERS** pushbutton and the cursor will move to the next digit.

4. To exit to the menu display press **MENU**.

6.11.4 Reset Load Nu.

Purpose: This option shall be used after the autoclave has been installed at the customer's facility. This option enables the technician to nullify the load number.

1. To enter this directory press **CYCLES**.

2. When entering the **Reset Load Nu.** display, press **CYCLES** to nullify the load number.

3. To exit to the menu display press **MENU**.

6.11.5 Enable Programs

Purpose: This option shall be used if the customer wants to hide programs that he does not want to use. This option enables the technician to hide or reveal any programmed cycle.

1. To enter this directory press **CYCLES**.

   When entering the **Enable Programs** display **History** is displayed on the upper row and a cycle name and status are displayed on the lower row. If the status number is 1 the cycle is enabled. If the status number is 0 the cycle is hidden and will not be active.

2. To select the required program, use the **UP** or **DOWN** pushbuttons. **DOWN** will display the next program and **UP** will display the previous program.

3. To change the displayed status value from “0” to “1” and vice versa press the **CYCLES** pushbutton

4. After completing the required change press **MENU**. **Saving wait** will be displayed. After saving is completed the system will return to options display.

6.11.6 Set as default

Purpose: This option shall be used only at Tuttnauer facility or by an authorized service agency, in case a temperature sensor has been replaced and the previous calibration is known as accurate. This option enables the technician to set the calibration values as "default values". If this option has been selected, performing **Calib Default** will retrieve the values as set by **Set as default**. The calibration values are as follows: **ChamPress, Chamb Temp, Coil Temp, Gen Press, Electr_Gen, Electr_1**.

1. To enter this directory press **CYCLES**.

   When entering the **Set Calib Last** display, **ChambPress** and the current value are displayed.

2. To select the required parameter, use the **UP** or **DOWN** pushbuttons. **DOWN** will display the next parameter and **UP** will display the previous parameter.

3. To retrieve the default value press **CYCLES**.

4. To exit to the menu display press **MENU**.

7 TESTING AND RESETTING

7.1 Test Points

These test points are provided to assist in trouble shooting the autoclave. A test point board is needed to be able to read these test points.

NU TP	FUNCTION		VALVE
TP1	GND		
TP2	+5V DC		
TP3	——		——
TP4	OUTPUT	WATER PUMP	0V-Off; 5V-On
TP5	OUTPUT	VACUUM PUMP	0V-Off; 5V-On
TP6	OUTPUT	HEATER	0V-Off; 5V-On
TP7	OUTPUT	WATER TO RESERVOIR	0V-Off; 5V-On
TP8	OUTPUT	AIR VALVE (43)	0V-Off; 5V-On
TP9	OUTPUT	VACUUM VALVE (52)	0V-Off; 5V-On
TP10	OUTPUT	RELEASE COIL VALVE (11)	0V-Off; 5V-On
TP11	OUTPUT	DOOR LOCK	0V-Off; 5V-On
TP12	OUTPUT	STEAM VALVE (93)	0V-Off; 5V-On
TP13	OUTPUT	AIR TO VACUUM PUMP VALVE (44)	0V-Off; 5V-On
TP14	OUTPUT	FAST EXHAUST VALVE (71)	0V-Off; 5V-On
TP15	——		——
TP16	INPUT	FLOAT LOW	0V-Off; 5V-On
TP17	INPUT	DOOR SWITCH	0V-Off; 5V-On
TP 18	INPUT	FLOAT HIGH	0V-Off; 5V-On
TP19	——		——
TP20	——		——
TP21	INPUT	ELECTRODE RESERVOIR	"0V" – YES; "2.5V" – NO
TP22	INPUT	ELECTRODE GENERATOR	"0V" – YES; "2.5V" – NO
TP23	INPUT	GENERATOR PRESSURE	2.0B – 2.031V
TP24	INPUT	PT100 – COIL TEMPERATURE	134ºC = 1.97V
TP25	INPUT	PT100 – CHAMBER TEMPERATURE	134ºC = 1.97V
TP26	INPUT	CHAMBER PRESSURE	2.0B – 2.031V

7.2 Resetting the Autoclave:

Whenever it becomes necessary to restore the system to normal operation, the system must be reset. This will remove corrupted data from memory and restore a healthy program. On occasion other situations require that a reset be preformed, they are as follows:

— When the machine is operated for the first time

— If the machine has been sitting unused for a long period of time.

To reset the system; proceed as follows:

— Turn the main power switch OFF.

— Turn the main power switch ON, while pressing and holding the ***START/STOP*** key, until the **Program Wait** message is displayed.

After resetting, the autoclave will be in the stand-by mode

8 REPLACEMENT PROCEDURES

8.1 Safety Tests after Repair

ATTENTION!

After every repair or dismantling the enclosure, the autoclave should pass two safety electrical test by the Service Engineer. The following shall be performed:

1. Enclosure Leakage Current Test.

Every autoclave should pass this test as follows:

1. Connect the electrical cord to the autoclave.
2. Turn on the main switch and the circuit breaker.
3. Short-circuit the L and N pins on the cord's plug.
4. Connect the Short-circuit pins to the L pole on the Megger.
5. Connect the earth pins to the earth pole on the Megger.
6. Impose an electrical potential of 500-1000V on the tested autoclave. The insulation resistance should be at least 2 MΩ.

The test is successful if there was no leakage.

2. Protective Earth Impedance Test

1. Connect the grounding pin of the power cord plug to one pole of an Ohmmeter.
2. Connect any other metallic part (preferable – the metallic part of the locking screw) to the second pole of the Ohmmeter.
3. The resistance should not exceed 0.3 Ω.

After performing these tests, the Service Engineer should complete and sign the Work Order.

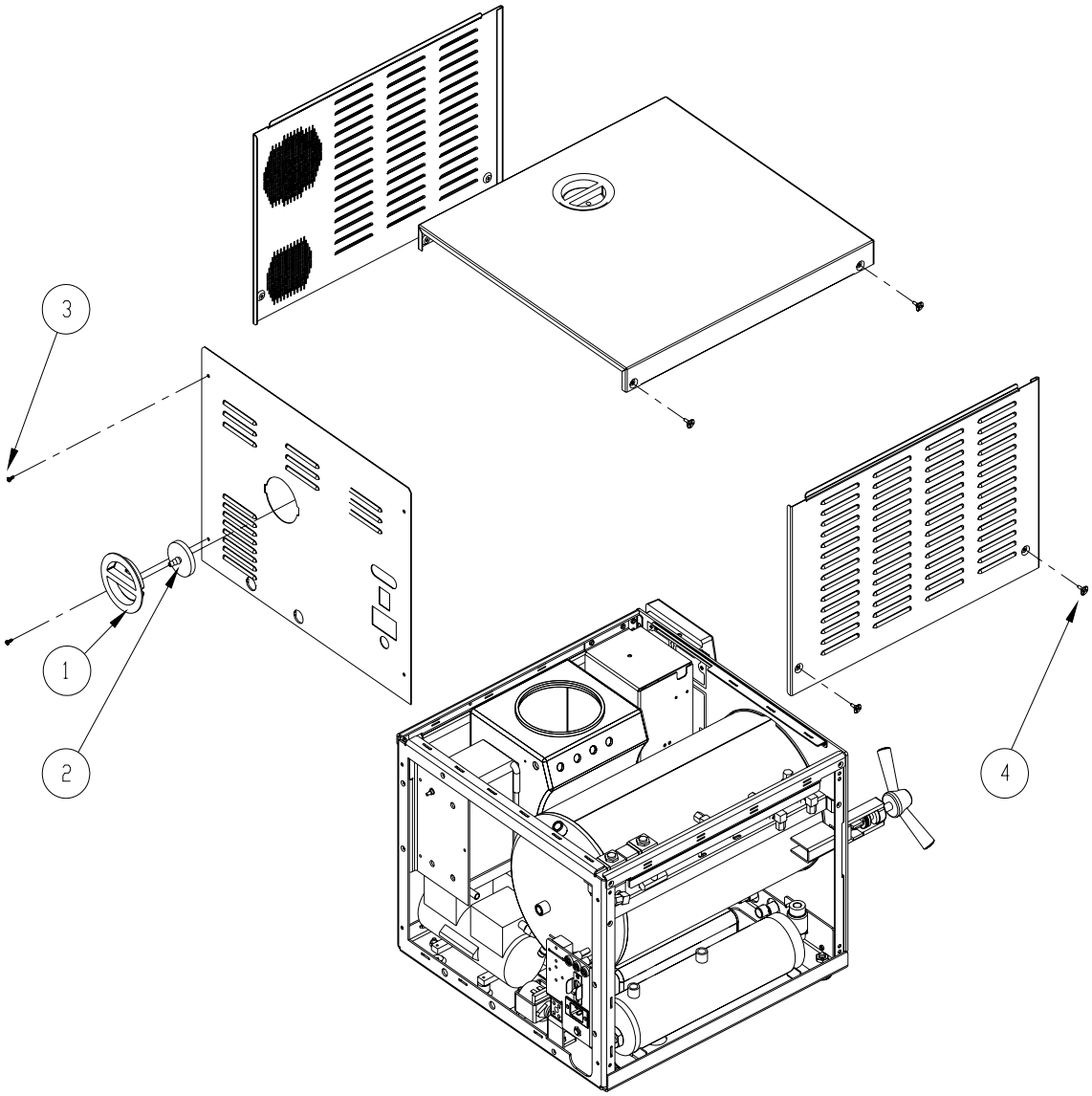
8.2 Removing the Autoclave's Outer Covers

Caution!

Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the chamber, coil or generator.

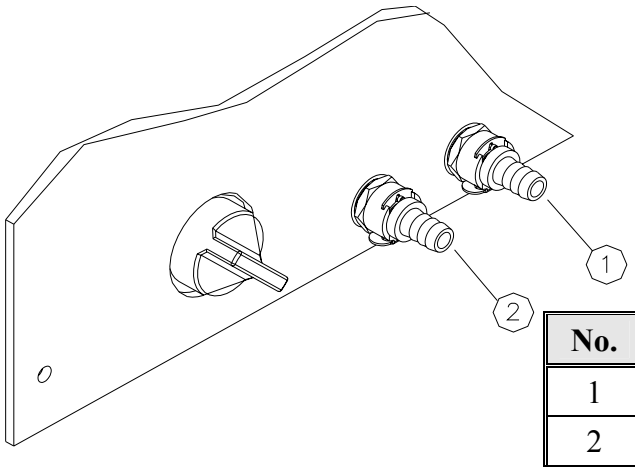
Allow the autoclave to cool before removing outer covers.

1. Opens the air filter cover (1) by turning it ¼ turn counterclockwise and disconnect the filter (2).
2. Remove the screws holding the rear cover (3).
3. Remove the screws holding the side covers to the base (4).
4. Remove the grounding wires from the covers.



8.3 Replacing the water pump

The water pump supplies mineral - free water to the generator from the mineral - free water reservoir. This water is used by the steam generator to produce steam for sterilization.
The pump is protected from running dry and burning out, by the float switch mounted in the lower part of the mineral free water reservoir.

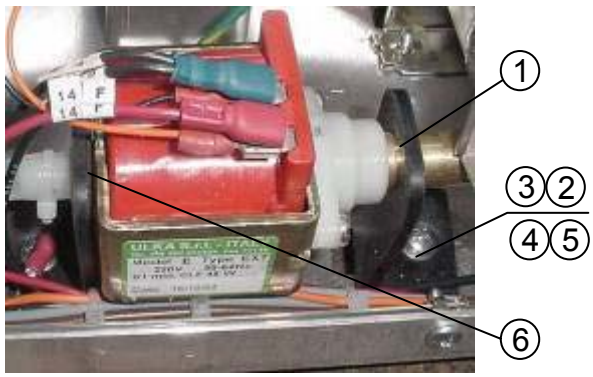


No.	description
1	Clean water drain
2	Waste water drain

Caution!
Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the chamber, coil or generator.
Allow the autoclave to cool before removing outer covers.

1. Take off the autoclave cover (see para. 8.2 **"**Removing the Autoclave's Outer Covers**"**).
2. Disconnect the wires from the pump
3. Empty the water reservoir, by using the drain valve on the front of the autoclave.
4. Disconnect the piping from the pump.
5. Remove the pump from the rubber shock absorbers. (If the rubber shock absorbers are damaged, replace them too).
6. Replace the damaged pump with a new pump.
7. Reconnect wiring and piping.
8. Turn on the autoclave and verify if it operates correctly and none of the connections are leaking
9. Reassemble the cover.

No.	Description	Cat. No.
1	Rubber shock absorber	SKR203-0006
2	Screw ¼ x 15 mm	BOL191-0039
3	Washer	NUT193-0276
4	Spring washer	NUT193-0317
5	Nut	NUT192-0185
6	ULKA water pump	PUM055-0006
	ULKA water pump for Australia only	PUM055-0026



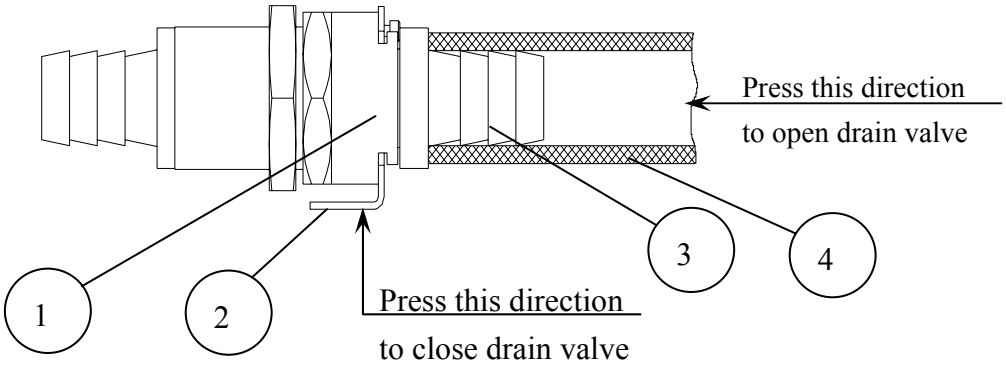
8.4 Replacing the drain valve assembly

There are two drain valves on the front of the autoclave. One drains the mineral free water from the clean water reservoir and the other drains the water from the waste water reservoir.

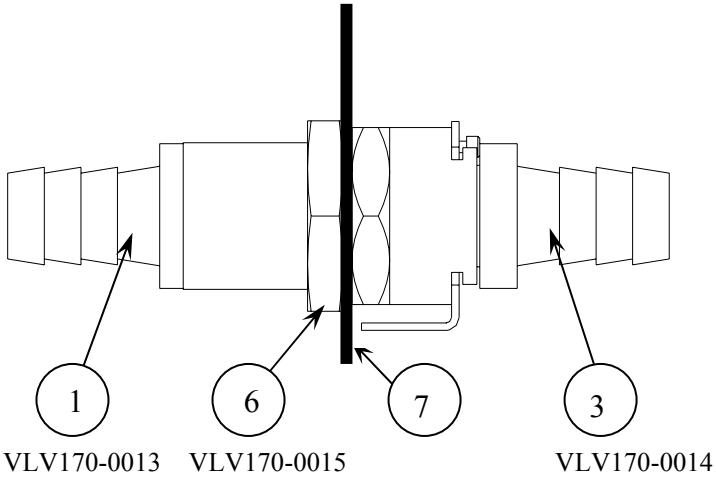
Caution!

Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the chamber or coil or generator. Allow the autoclave to cool before removing outer covers.

1. Drain the reservoir, using item (3) with the plastic tube (4) attached to it (supplied with the autoclave).
2. Insert part (3) into valve (1) and press it until you hear a "click". The drain valve is open.
3. When the water reservoir is empty, press part (2). Item (3) will pop out approx. 3mm and the drain valve will be closed. Remove item (3) with the plastic tube (4).



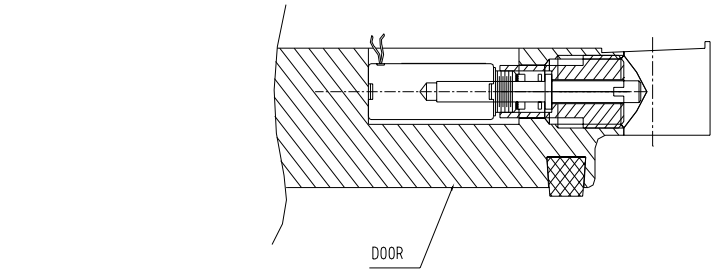
4. Take off the autoclave cover (see para. 8.2 "Removing the Autoclave's Outer Covers").
5. Disconnect the drain tube from the valve (1).
6. Unscrew nut (6) using a 21mm socket wrench.
7. Remove the drain valve (1) from the panel (7).
8. Install a new valve and reassemble the drain tube to the drain valve.
9. Verify that there is no leakage.

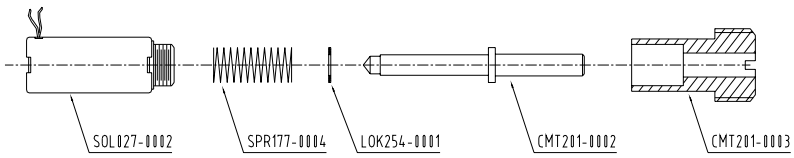


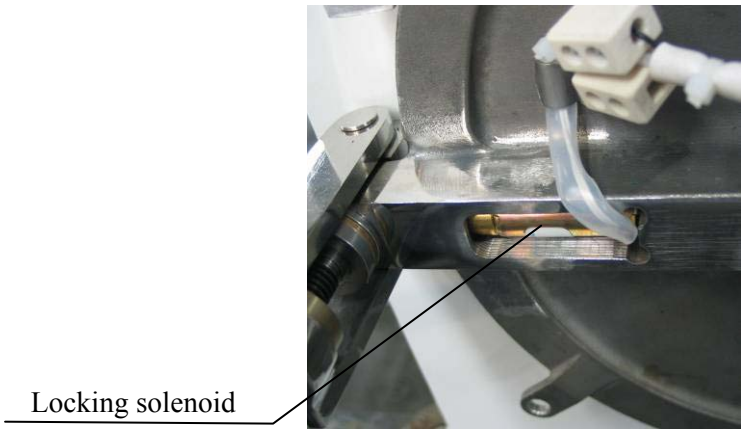
8.5 Replacing the Locking Device

Caution!
Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the chamber, coil or generator.
Allow the autoclave to cool before removing outer covers.

1. Remove the door cover.
2. Disconnect the wires from the connector.
3. Unscrew the tightening nut (cat. No. CMT201-0003).
4. Remove the pin, the spring and the solenoid.
5. Replace the damaged items and reinstall according to drawing below.
6. Verify that the wires from the solenoid are in a plastic isolation tube and that no bare wire is touching the metal door (see picture below), since this may lead to a short circuit.
7. Operate the autoclave and verify that the pin is retracted.







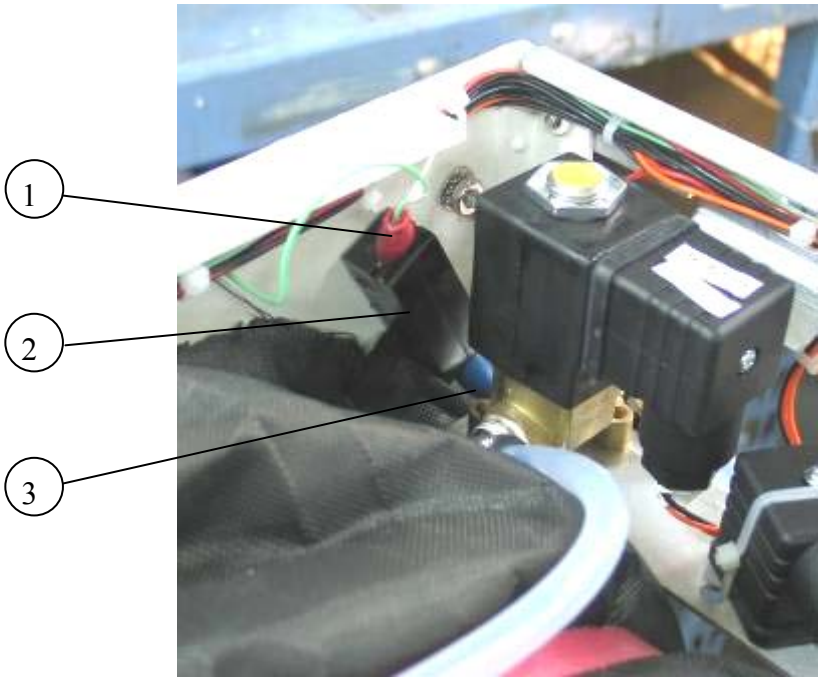
Locking solenoid – assembly -- LOK254-0030

8.6 Replacing the Door Switch

The door switch is designed to ensure that the door is properly closed before and during a cycle.

Caution!
Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the chamber, coil or generator.
Allow the autoclave to cool before removing outer covers.

1. Take off the autoclave cover (see para. 8.2 **"**Removing the Autoclave's Outer Covers**"**).
2. Disconnect the wires (1), (3) from the door microswitch (2).
3. Remove the microswitch and replace it with a new one.
4. Reconnect the black ground wire (3) to the microswitch.
5. Test the connection with an ohmmeter. Connect the ohmmeter to the common terminal of the microswitch and chassis ground. In the "door open" position the ohmmeter should show no continuity and in "door close" position the ohmmeter should show a complete circuit.
   - 5.1 If it fails the test then check that the ground wire is connected to the correct terminal. If it is then replace the microswitch.
   - 5.2 If it passes the test then connect the green wire from the electronic box to the common terminal (1) of the switch
6. Reassemble the autoclave cover.

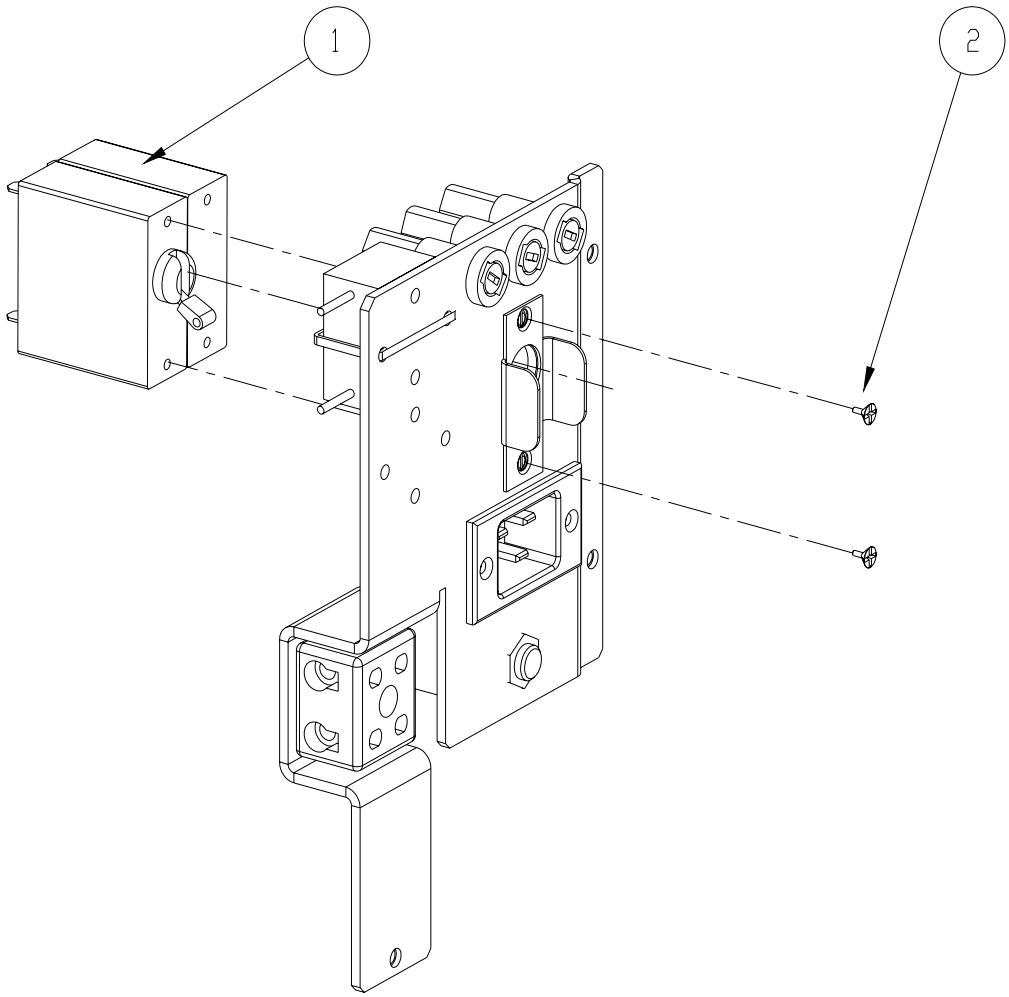


8.7 Replacing the circuit breaker

Caution!
Before starting, disconnect the instrument from the power source.

1. Take off the autoclave cover (see para. 8.2 **"**Removing the Autoclave's Outer Covers**"**).
2. Disconnect the wires from the circuit breaker.
3. Remove the screws (2) connecting the circuit breaker (1) to the panel.
4. Replace the circuit breaker with a new one.
5. Reconnect the electrical wires.
6. Reassemble the cover.
7. Turn on the autoclave and verify it operates correctly.
8. Move the circuit breaker's lever to the "tripped" position and verify that the autoclave turns off.

Make sure that a 15A/1ph circuit breaker is installed:



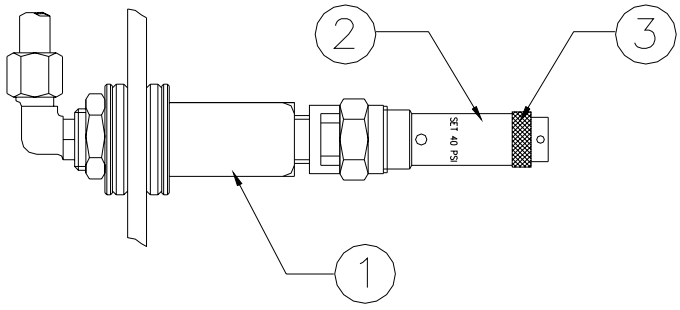
No.	Description	Cat. No.
1	Circuit Breaker, Rail, 1PH, 15A, Carlingswitch	ELE035-0021
2	Screw, flat cross recessed head, #6-32 x 3/8	BOL190-0006

8.8 Replacing the Safety Valve

The safety valve is installed to protect the system from over pressurizing should all the electrical controls fail.

Caution!
Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the chamber, coil or generator.
Allow the autoclave to cool before removing outer covers.

1. Take off the autoclave cover (see para. 8.2 **"**Removing the Autoclave's Outer Covers**"**).
2. Remove the water reservoir gasket.
3. Unscrew the safety valve (2) and remove it from the safety valve base (1).
4. Replace the valve with a new safety valve (install only an original equipment replacement!). Use Teflon on the thread to sea**l** it. Tighten the safety valve to prevent leaking.
5. To check the new safety valve, perform the following:
6. Turn the pressure relief nut (3) two turns counter clockwise.
7. Turn on the autoclave and perform one cycle and verify that the valve operates correctly.
8. Turn off the autoclave, wait until the generator cools down and the pressure decreases to atmospheric pressure.
9. Turn the pressure relief nut two turns clockwise to re-adjust the relief pressure.



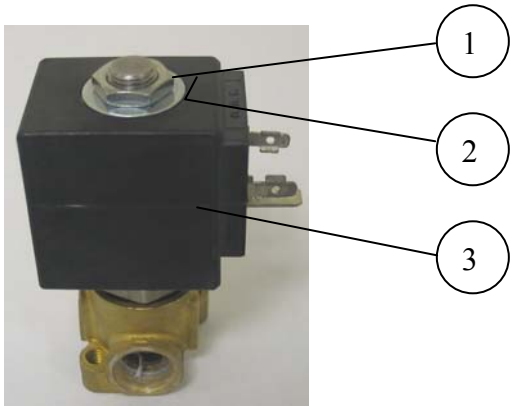
No.	Description
1	Safety valve base
2	Safety valve
3	Pressure relief nut

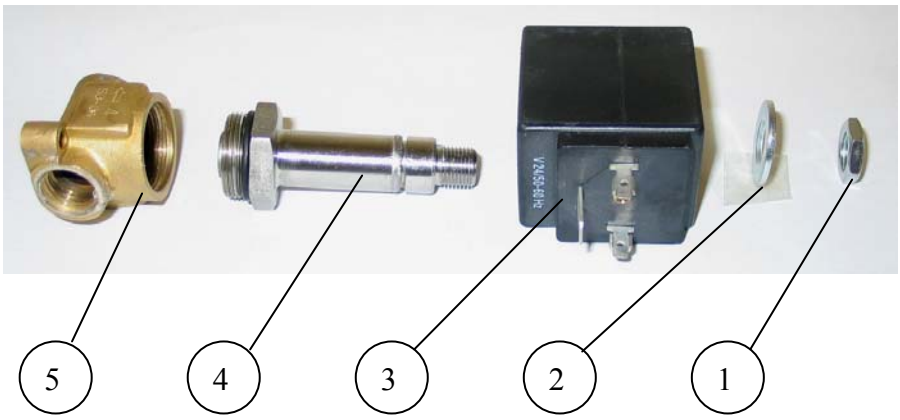
8.9 Replacing the Valve's Plunger or Housing

The solenoid valves may be out of order due to faulty plunger or solenoid. To repair the solenoid valve – replace the faulty plunger or solenoid.

Caution!
Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the chamber, coil or generator.
Allow the autoclave to cool before removing outer covers.

1. Take off the autoclave top cover (see para. 7.2 "Removing the Autoclave's Outer Covers").
2. Unscrew nut (1) and remove the nut and the washer (2).
3. Remove the coil (3).
4. Unscrew the plunger with the plunger housing (4) from the valve (5) and replace it with a new one. Do not replace plunger without the housing since the plunger and the plunger housing have to be replaced as a kit.
5. Reassemble the coil (3) and the washer (2) and tighten the nut (1).
6. Re-install the autoclave's cover.





8.10 Replacing the Pressure Gauge

Caution!
Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the chamber, coil or generator.
Allow the autoclave to cool before removing outer covers.

1. Open the door.
2. Remove the pressure gauge from the front panel by unscrewing it from the front panel
3. Install the new pressure gauge using Teflon tape to seal the threads. Verify that the gauge's tube does not protrude from the doors inner surface.
4. Operate the autoclave and verify that there are no leaks.

8.11 The Generator's Water Sensing Electrode

The electrode that controls the water level of the generator is located in the rear of the generator.

The Electrode performs the following:

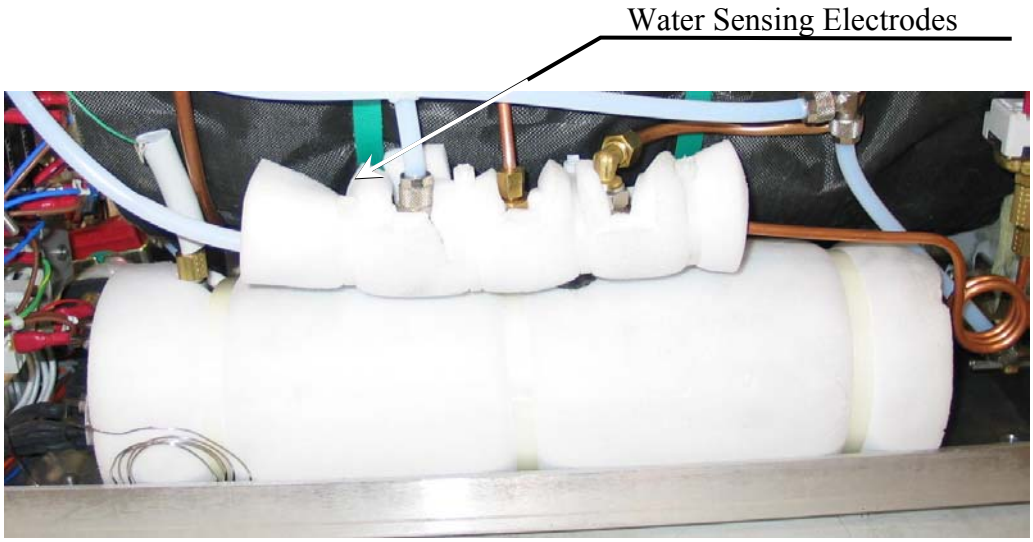
a. It protects the heating element by switching it off when there is too little water in the generator.

b. It maintains the water level in the generator by switching the water pump on and off as required.

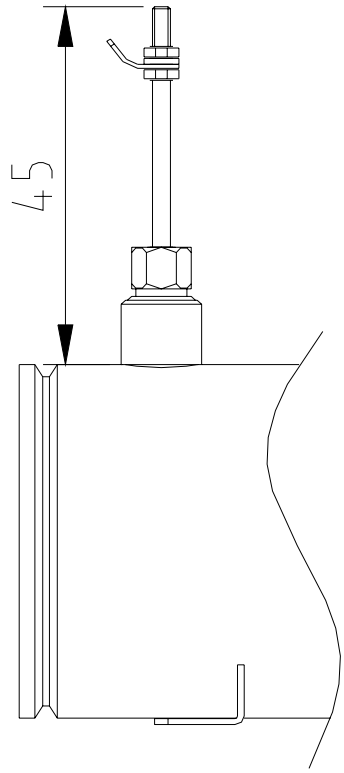
To clean or replace the electrode proceed as follows (refer to drawings on the next page):

Caution!
Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the chamber, coil or generator.
Allow the autoclave to cool before removing outer covers.

1. Take off the autoclave cover (see para. 8.2 **"**Removing the Autoclave's Outer Covers**"**).
2. Remove the electrical connection from the terminal of the electrode.
3. Unscrew the locking nut and remove the electrode from the top of the housing.
4. Replace the electrode with a new one or reinstall the same electrode after cleaning.
   4.1 To clean the electrode use a damp cloth or sponge. A mild soapy solution may be used, rinse thoroughly. **DO NOT** use any harsh chemicals
   4.2 When installing a new electrode, **make sure** that the nut and ferrell are positioned exactly the same as on the electrode being replaced. This will ensure that the electrode is positioned at the correct height in the housing.
5. Tighten the locking nut to prevent any steam or water leakage.
6. Reconnect the electrical wire to the electrode terminal.
7. Turn the autoclave on. The generator will automatically fill with water. Observe that the unit is heating. Wait for the unit to reach 308 kPa, and then check for leaks around the locking nuts.
8. Reassemble the cover.



WATER ELECTRODE HOUSING



8.12 The Waste Water Reservoir Sensing Electrode

The electrode that senses the water level of the waste water reservoir is located on the side of the reservoir.

The electrode notifies the operator to empty the waste water reservoir.

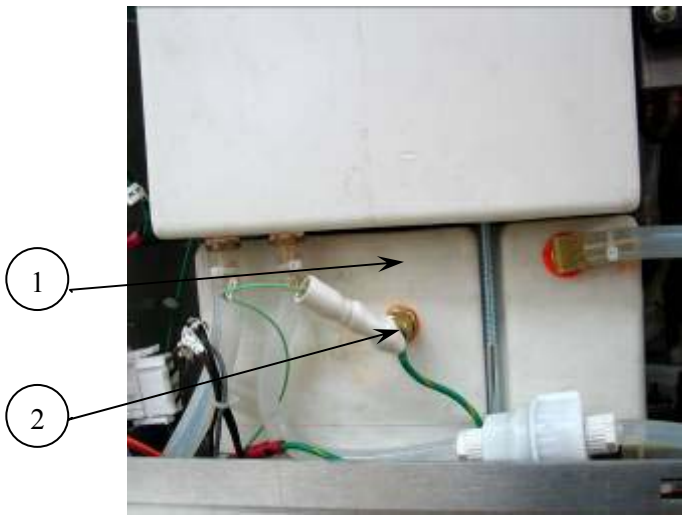
To clean or replace the electrodes proceed as follows (refer to drawings below:

Caution!

Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the chamber, coil or generator.

Allow the autoclave to cool before removing outer covers.

1. Remove the autoclave cover (see para. 8.2 **"**Removing the Autoclave's Outer Covers**"**).
2. Attach a transparent tube to the waste water drain valve.
3. Drain the water from the reservoir.
4. Remove the electrical connection from the terminal of the electrode.
5. Unscrew the locking nut and remove the electrode from the housing.
6. Replace the electrode with a new one or reinstall the same electrode after cleaning.
   6.1 To clean the electrode use a damp cloth or sponge. A mild soapy solutio n may be used, rinse thoroughly. **DO NOT** use any harsh chemicals
7. Tighten the locking nut to prevent water from leaking out.
8. Reconnect the electrical wire to the electrode terminal.
9. Hold the transparent isolation tube pointed upwards (its free end shall be above the reservoir's water level electrode).
10. Pour mineral free water into the mineral free water reservoir and let it flow through the overflow pipe into the waste water reservoir.
11. Watch the water level in the transparent tube. Verify that when the water level reaches the electrode's level **Empty Res L** will be displayed.
12. Reassemble the cover.



No.	description
1	Waste Water Reservoir
2	Water Sensing Electrodes

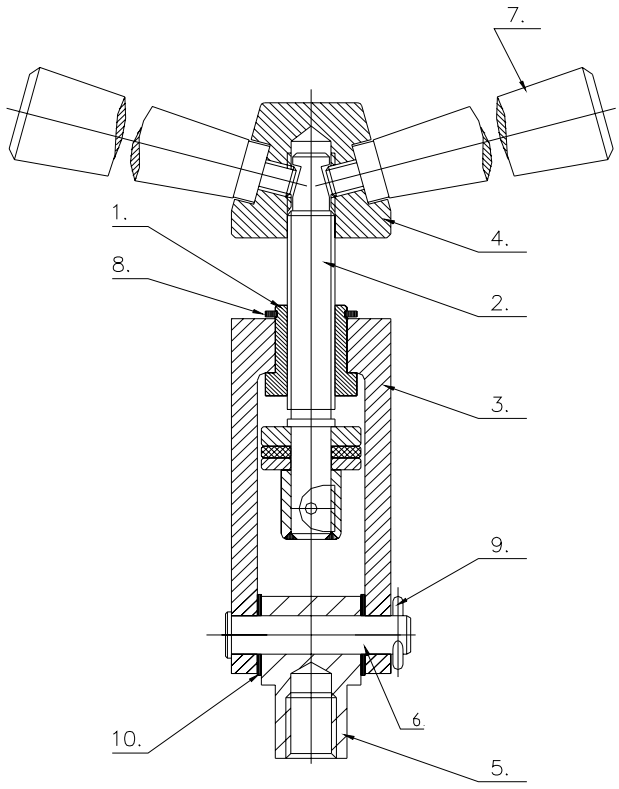
8.13 Replacing the Closing Device

Caution!

Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the chamber, coil or generator.

Allow the autoclave to cool before removing outer covers.

1. Remove the cotter pin (9) from the door locking device pin (6).
2. Remove the locking pin (6) by pulling it up out of its position.
3. Remove the closing device assembly. Be careful not to lose the two Teflon disks (10) resting on the top and bottom of the lock housing axe (5).
4. Position the new closing device on the lock housing axe (5), making sure that the Teflon disks (10) are in between the lock housing axe (5) and the screw housing (3).
5. Insert the pin (6).
6. Insert a new cotter pin (9).



No.	Description	No.	Description
1	Bushing	6	Door locking device pin
2	Door tightening bolt assembly	7	Bakelite handle
3	Locking screw housing	8	Closing bridge “c” clip
4	Locking base	9	Cotter pin
5	Locking housing axis	10	Teflon disk

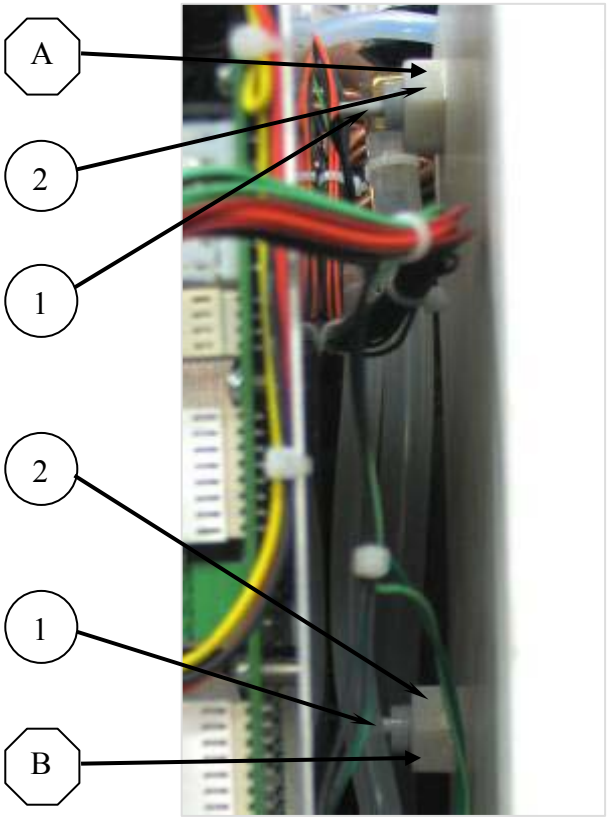
8.14 Replacing the water level float switch

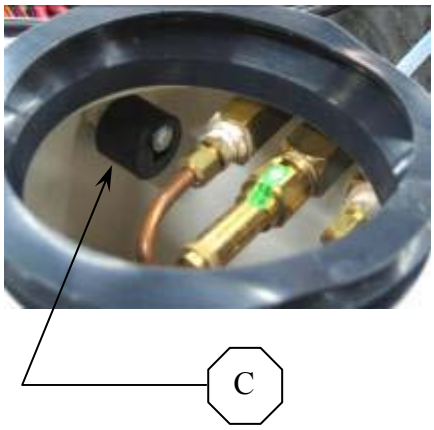
Caution!

Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the chamber, coil or generator.

Allow the autoclave to cool before removing outer covers.

1. Take off the autoclave cover (see para. 8.2 **"**Removing the Autoclave's Outer Covers**"**).
2. Disconnect the electrical wires (1) from the water level float switch (A or B).
3. Unscrew the plastic nut (2).
4. Remove the water level float (inside the water reservoir) and replace it with a new one. Verify that the new float is assembled in the right direction (see picture C below).
5. Reassemble the plastic nut and connect the electrical wires.
6. Reassemble the autoclave's cover.





No.	description
A	Upper level float switch
B	Lower level float switch
C	Upper level float switch

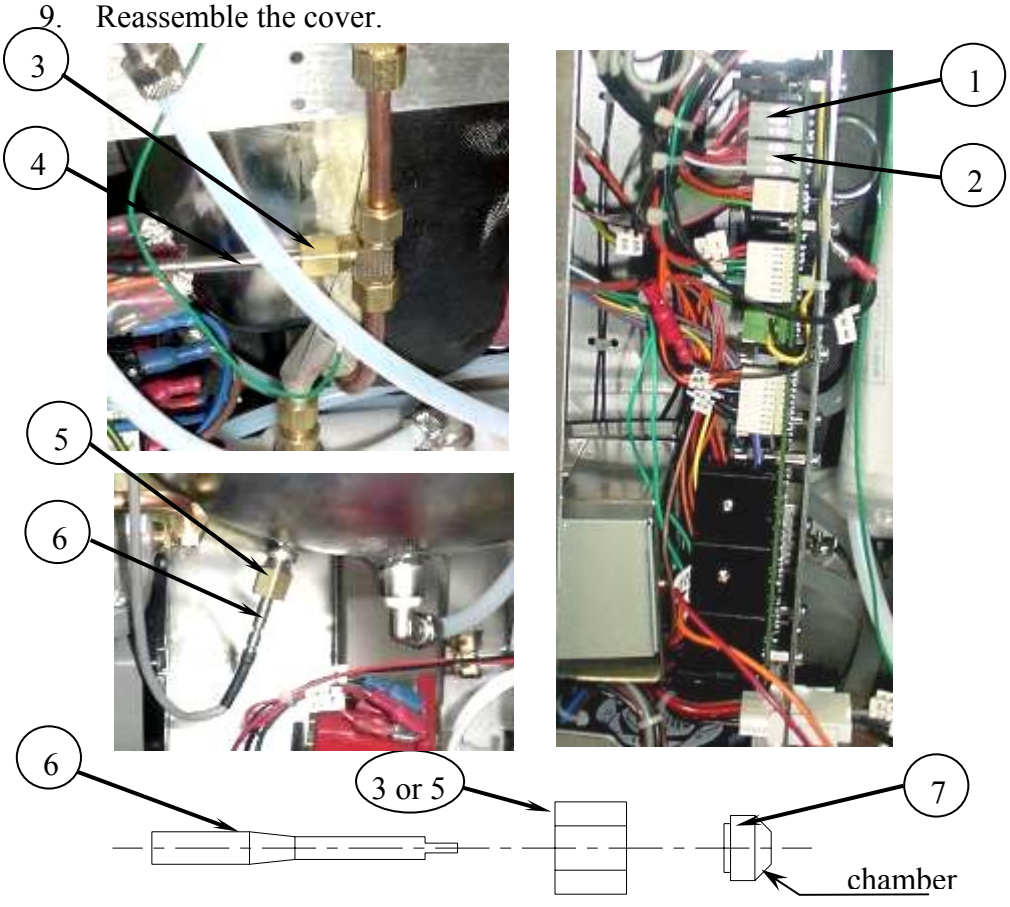
8.15 Replacing the temperature sensor PT-100

Caution!

Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the chamber, coil or generator.

Allow the autoclave to cool before removing outer covers.

1. Take off the autoclave cover (see para. 8.2 **"**Removing the Autoclave's Outer Covers**"**).
2. Disconnect the electric wire from the board .
   2.1 To replace the chamber's PT100 (6), disconnect the lower plug JP3 (2).
   2.2 To replace the coil's PT100 (4), disconnect the upper plug JP2 (1).
3. Cut the plastic cable ties.
4. Unscrew the PT100's fastening nut.
   4.1 To replace the chamber's PT100, unscrew nut (5).
   4.2 To replace the coil's PT100, unscrew nut (3).
5. Replace the PT100 with a new sensor.
6. Install a new ¢6 mm (7) Teflon sleeve on the sensor in the fastening nut and then insert the sensor into the sleeve. The sleeve has to be inserted into the nut with the chamfer outward.
7. Reconnect the wire to the electronic board.
8. Attach the wires to the autoclave's frame with cable ties.
9. Reassemble the cover.



8.16 Replacing the Heat Exchanger's Fan

Caution!

Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the chamber, coil or generator.

Allow the autoclave to cool before removing outer covers.

1. Take off the autoclave cover (see para. 8.2 **"**Removing the Autoclave's Outer Covers**"**).
2. Disconnect the electric wire (1) from the fan (4).
3. Unscrew the four screws (3) fastening the grid (5) and the fan to the heat exchanger (2).
4. Remove the grid from the faulty fan and attach it to the new fan.
5. Assemble the new fan with the grid with the fastening screws and reconnect the electrical wire.
6. Reassemble the autoclave's covers.

8.17 Replacing the Digital Unit

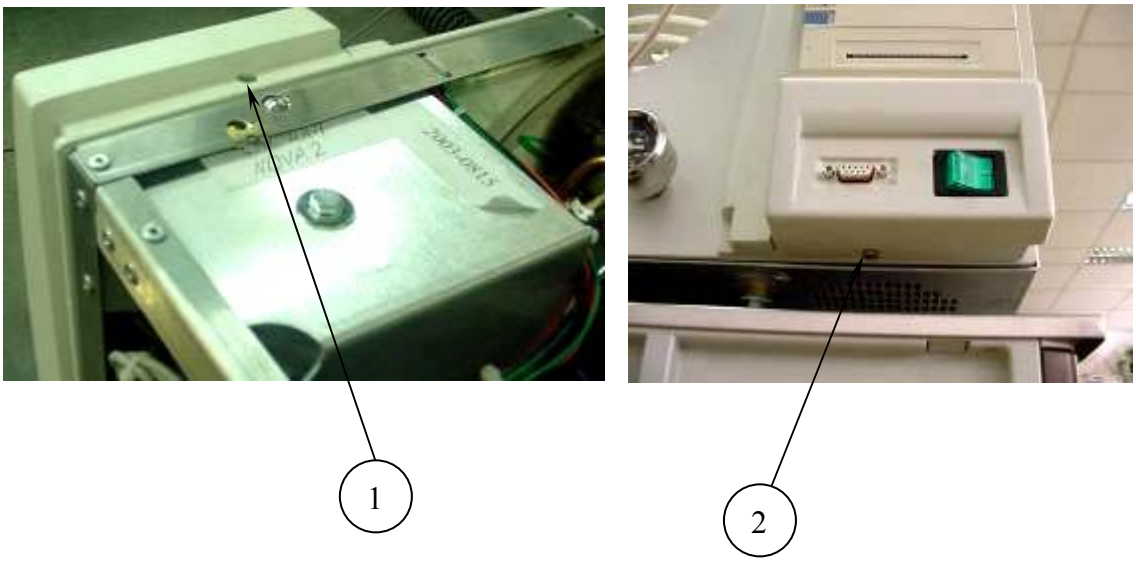
Caution!

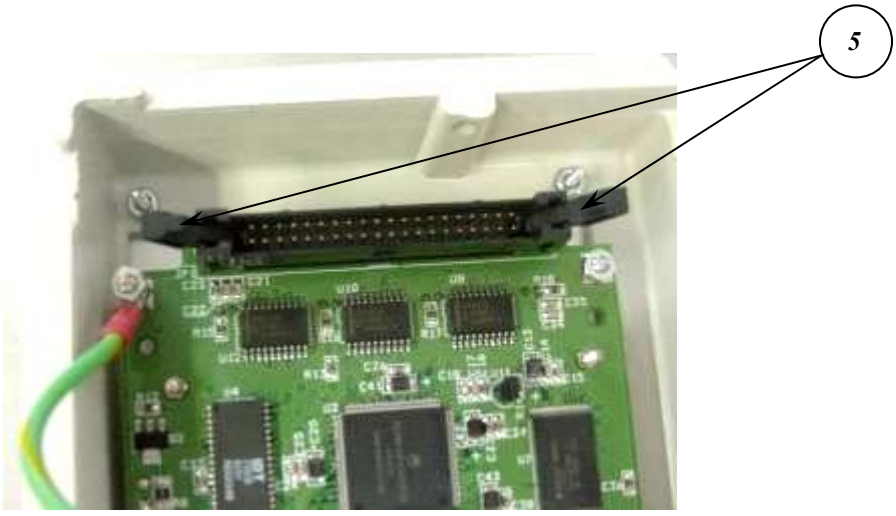
Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the chamber, coil or generator.

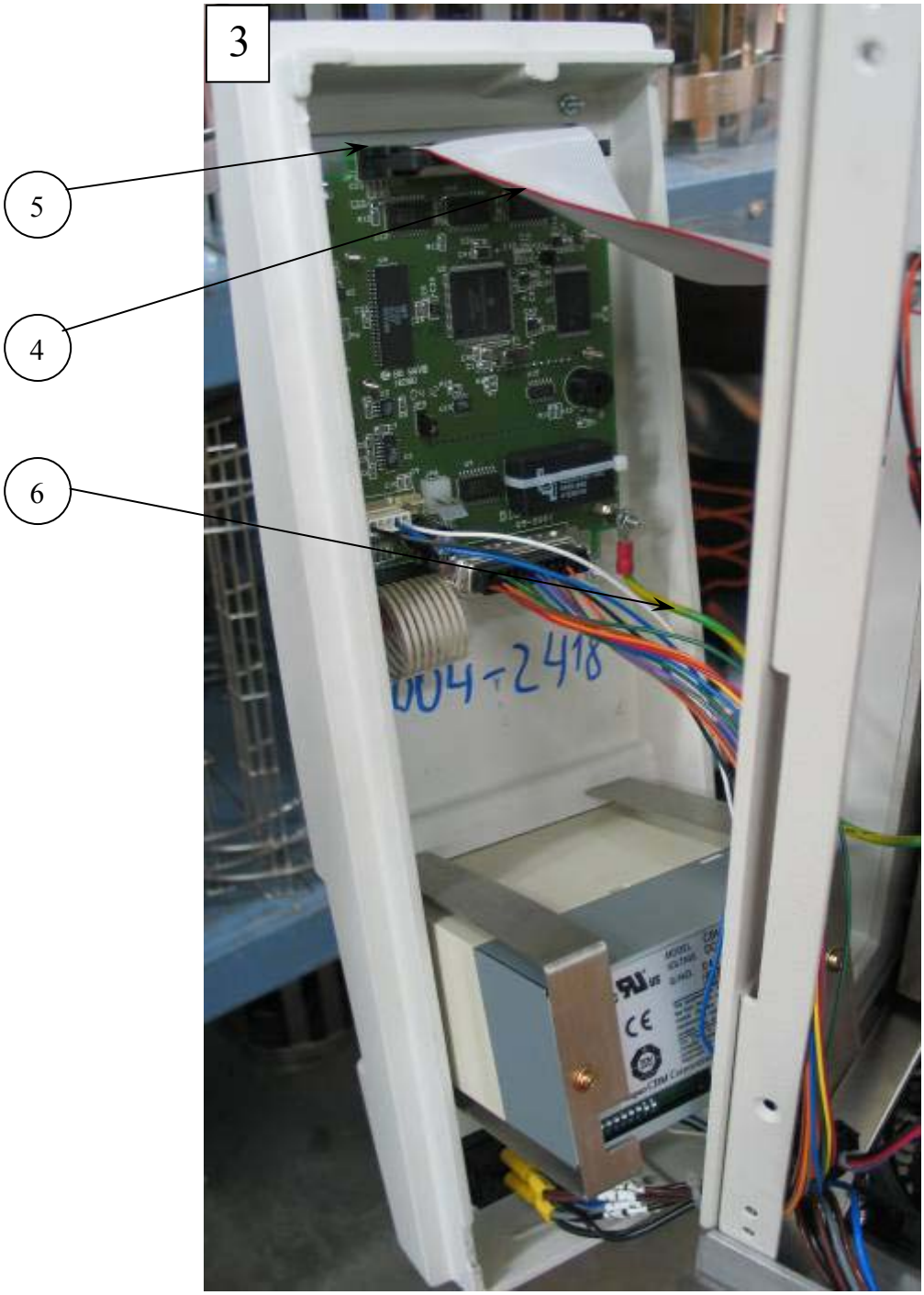
Allow the autoclave to cool before removing outer covers.

1. Unscrew screws (1), (2).
2. Pull slightly and disconnect the keyboard panel (3)
3. Disconnect the flatcable (analog-digital cable) (4) by opening the two clips (5) placed on both sides of the socket mounted on the board.
4. Disconnect the grounding wire (6) connections.
5. Disconnect the main switch connections (7). Verify that the wires are marked so you will be able to reassemble the wires in the right way.
6. Disconnect the printer's power wire from point JP9 on the analog board (see analog board drawing in the description of the system).

At this point the keyboard panel is disconnected.



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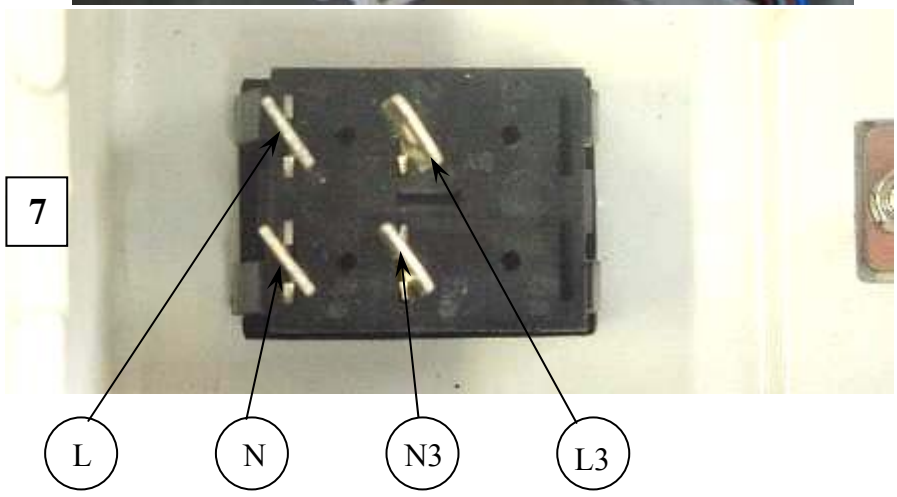
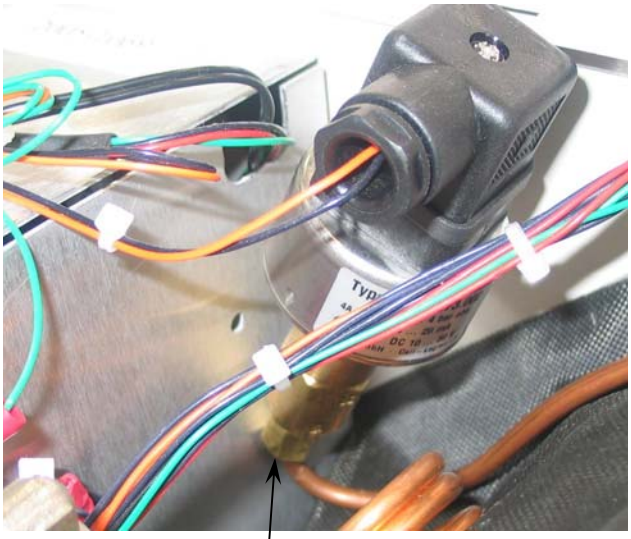
5
4
6


7
L
N
N3
L3

8.18 Replacing the electronic box

Caution!
Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the chamber, coil or generator.
Allow the autoclave to cool before removing outer covers.

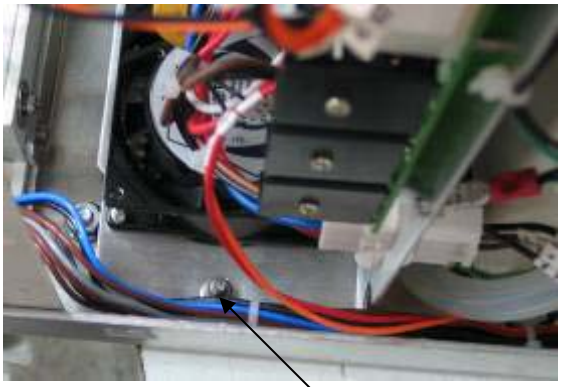
1. Remove the autoclave cover (see para. 8.2 **"**Removing the Autoclave's Outer Covers**"**).
2. Remove the key-board panel (see para. 8.17 "Replacing the Digital Unit").
3. Disconnect the electrical connection of the generator's pressure transducer JP4 (8).
4. Unscrew transducer's nut (1) and unplug the connecrors of the power supply (2) and (3).
5. Cut the plastic cable tie fastening the inlet of the chamber's transducer to the plastic tube (10).
6. Unscrew top electronic box screw (4).
7. Unscrew two bottom electronic box screws (5).
8. Disconnect the connectors of the temperature sensors JP2 (6) and JP3 (7).
9. Disconnect the grounding connector (9).
10. Disconnect the connector of the output to the valves JP6 (12).
11. Disconnect the connector JP15 (13) connecting the control to the door lock solenoid.
12. Disconnect connector JP11 of the AC command of the pumps (15).
13. Disconnect connector JP8 (11).
14. Disconnect power connector (14).
15. Disconnect the chamber's pressure transducer from the plastic tube (10).
16. Take out the electronic box.
17. Replace the faulty box with a new one.
18. Connect all the connections that have been disconnected.
19. Reassemble the keyboard panel.
20. Re-assemble the covers.



1

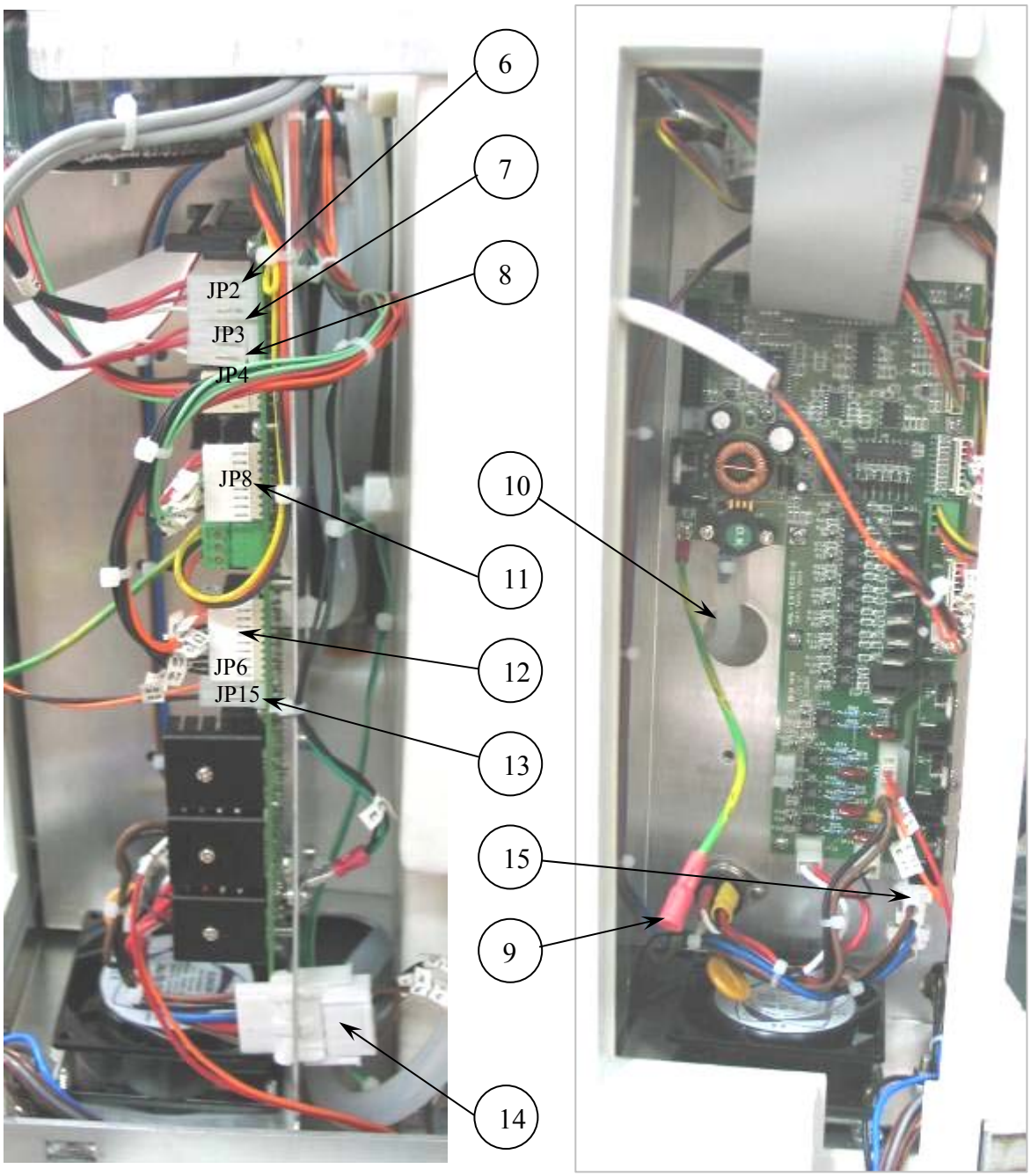
2

3



4

5


6
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JP2
JP3
JP4
JP8
10
11
JP6
JP15
12
13
15
9
14

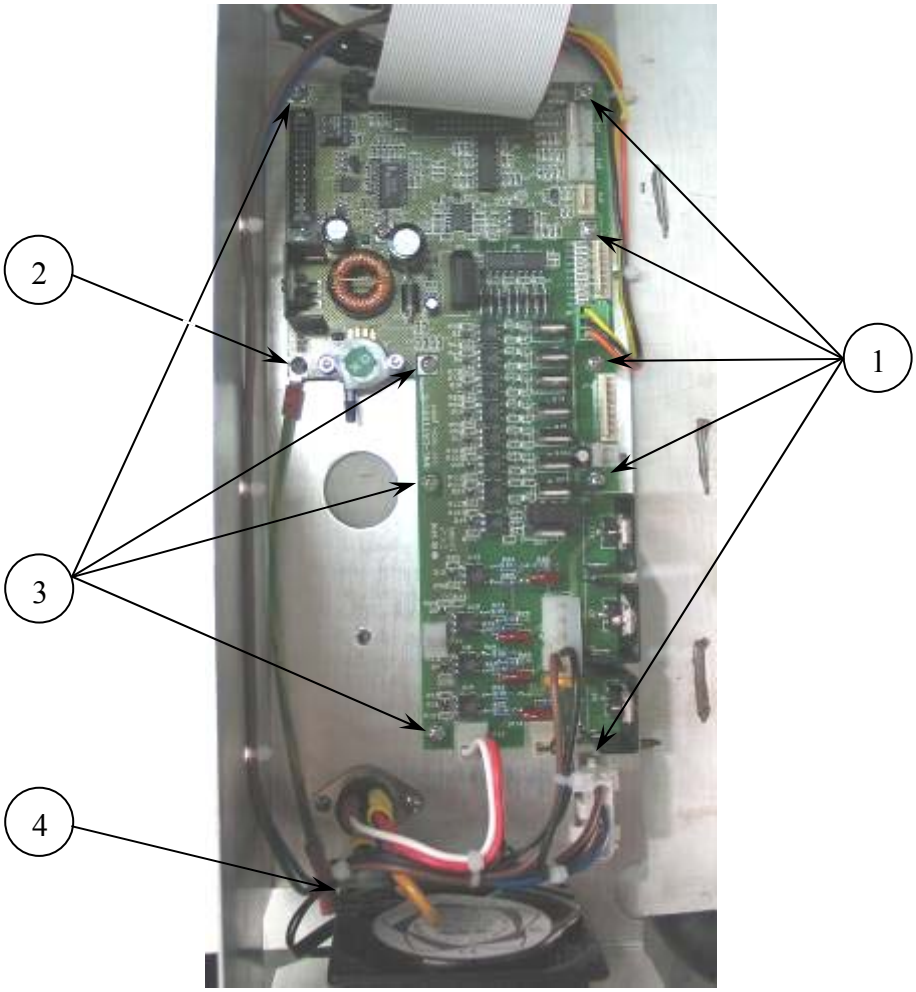
8.19 Replacing the analog board

Caution!

Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the chamber, coil or generator.

Allow the autoclave to cool before removing outer covers.

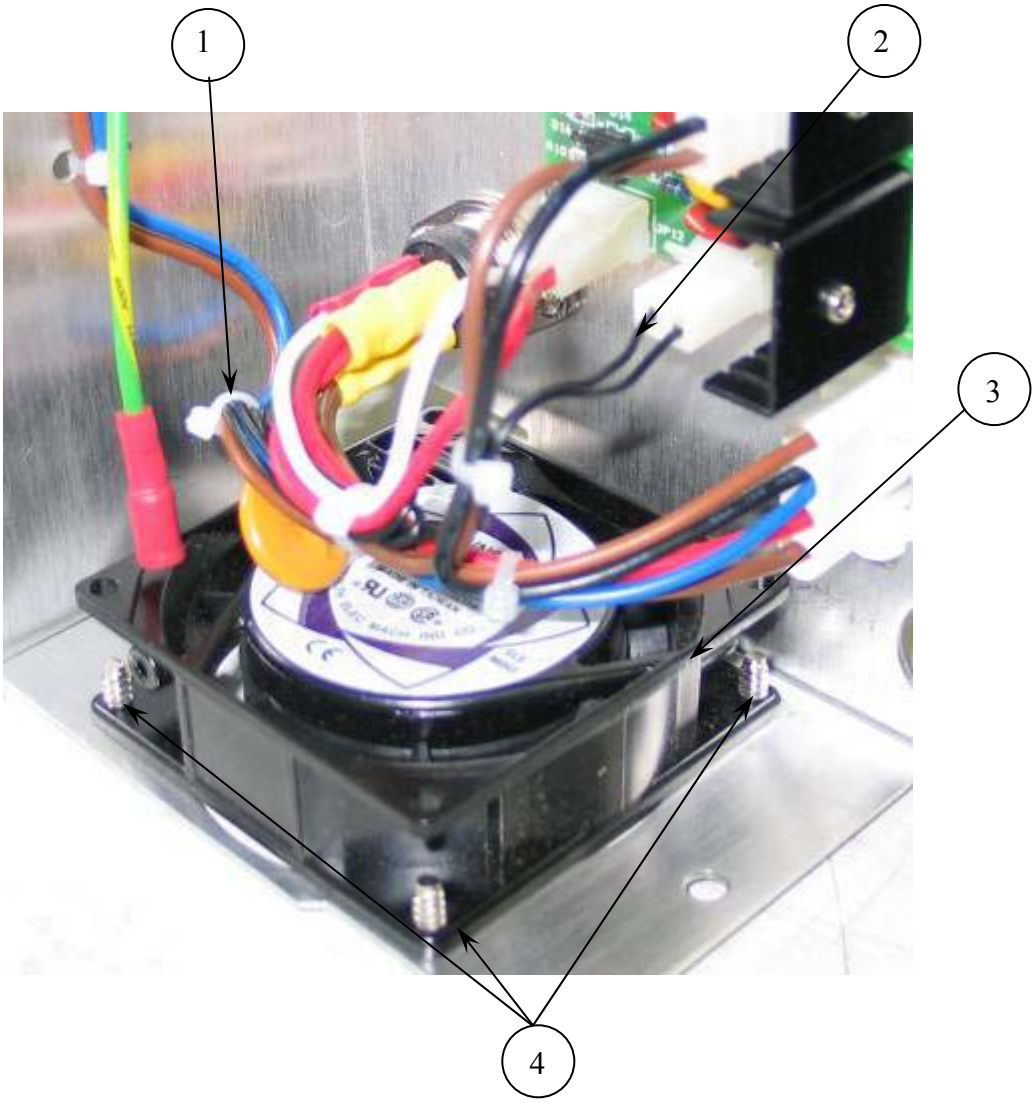
1. Take out the electronic box (see para. 8.18 “Replacing the electronic box”)
2. Unscrew the nuts attaching the analog board to the electronic box (1), (2) and (3).
3. Replace the analog board with a new board.
4. Reassemble the nuts (1), (2) and (3). Verify that the ground wire is connected to the ground wire of the digital board (4).
5. Re-connect the electrical wires.
6. Return the electronic box into the autoclave and fasten it with 3 screws (see para. 8.18 “Replacing the electronic box”).
7. Reassemble the keyboard panel.
8. Re-assemble the covers.



8.20 Replacing the electronic box's fan

Caution!
Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the chamber, coil or generator.
Allow the autoclave to cool before removing outer covers.

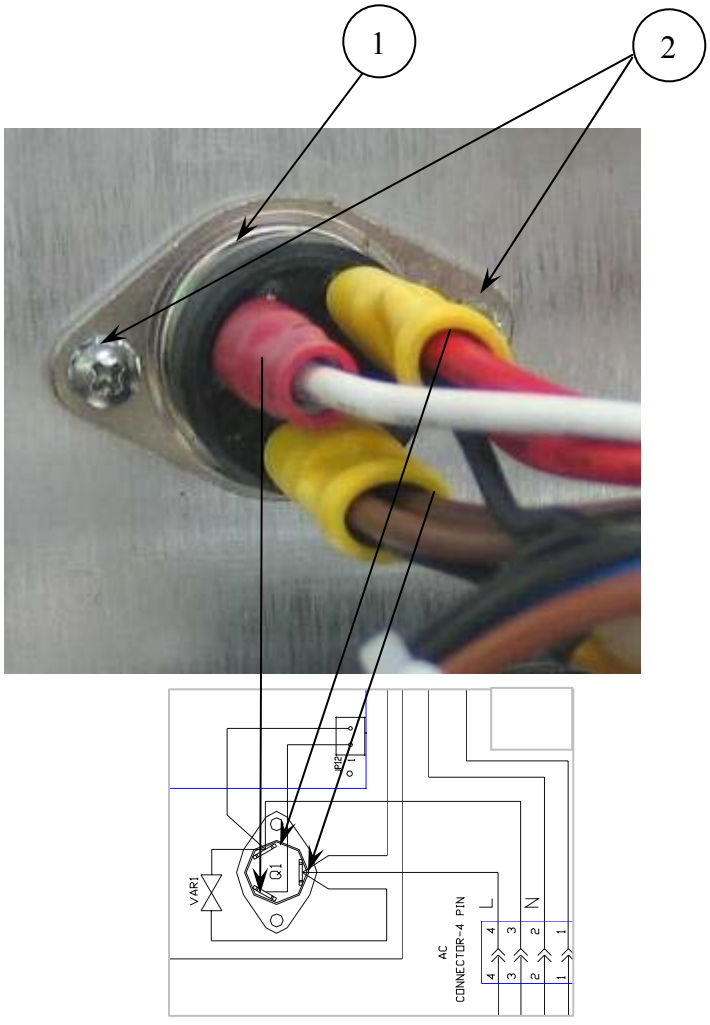
1. Take out the electronic box (see para. 8.18 "Replacing the electronic box")
2. Unscrew the screws attaching the fan (3) to the electronic box (4).
3. Cut the cable tie (1) and disconnect the electrical wires (2).
4. Replace the fan with a new fan.
5. Fasten the four screws fastening the fan to the electronic box..
6. Re-connect the electrical wire.
7. Return the electronic box into the autoclave and fasten it with 3 screws (see para. 8.18 "Replacing the electronic box").
8. Reassemble the keyboard panel.
9. Re-assemble the covers.



8.21 Replacing the triac

Caution!
Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the chamber, coil or generator.
Allow the autoclave to cool before removing outer covers.

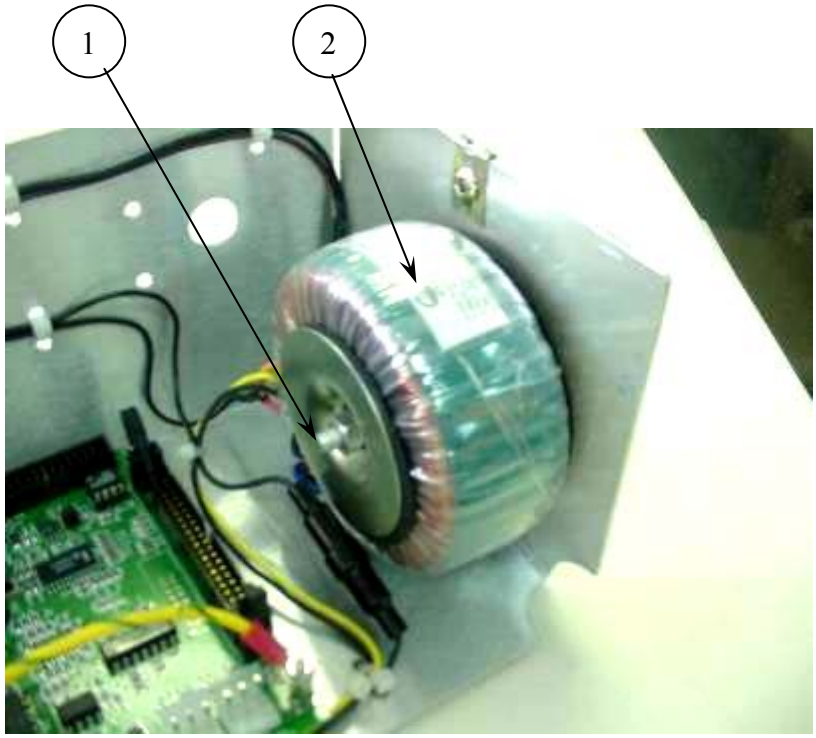
1. Take out the electronic box (see para. 8.18 “Replacing the electronic box”)
2. Disconnect the electrical wires from the triac (1).
2. Unscrew the screws (2) attaching the triac (1) to the electronic box.
3. Replace the triac with a new triac.
4. Reassemble the nuts fastening the triac to the electronic box.
5. Re-connect the electrical wires. Verify that they are connected in the right way as defined by the drawing.
6. Return the electronic box into the autoclave and fasten it with 3 screws (see para. 8.18 “Replacing the electronic box”).
7. Reassemble the keyboard panel.
8. Re-assemble the covers.



8.22 Replacing the transformer

Caution!
Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the chamber, coil or generator.
Allow the autoclave to cool before removing outer covers.

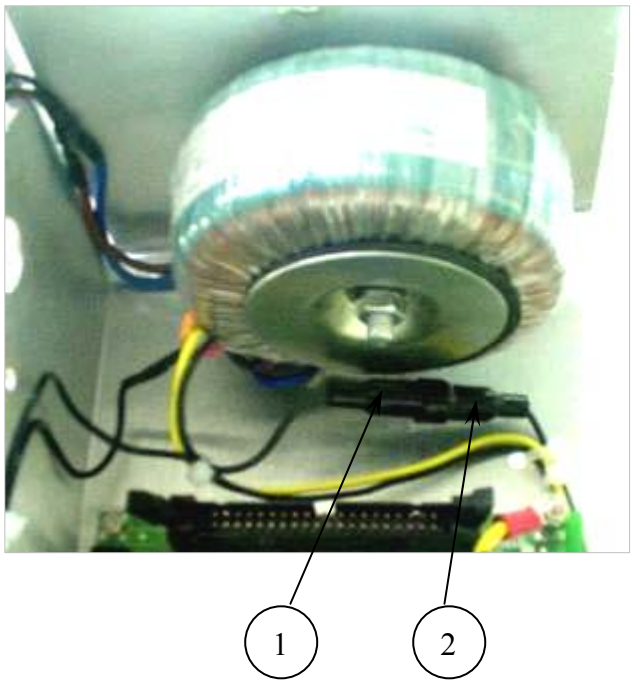
1. Take out the electronic box (see para. 8.18 “Replacing the electronic box”)
2. Disconnect the electrical wires from the transformer.
2. Unscrew the screw (1) attaching the transformer (2) to the electronic box.
3. Replace the transformer with a new transformer.
4. Fasten the screw fastening the transformer to the electronic box.
5. Re-connect the electrical wires. Verify that they are connected in the right way.
6. Return the electronic box into the autoclave and fasten it with 3 screws (see para. 8.18 “Replacing the electronic box”).
7. Reassemble the keyboard panel.
8. Re-assemble the covers.



8.23 Replacing the internal fuse of the transformer

Caution!
Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the chamber, coil or generator.
Allow the autoclave to cool before removing outer covers.

1. Take out the electronic box (see para. 8.18 “Replacing the electronic box”)
2. Unscrew the two halves of the fuse holder apart (1) and (2).
3. Take out the burnt fuse and replace it with a new 5A fuse
4. Reassemble the fuse holder.
5. Re-assemble the covers.



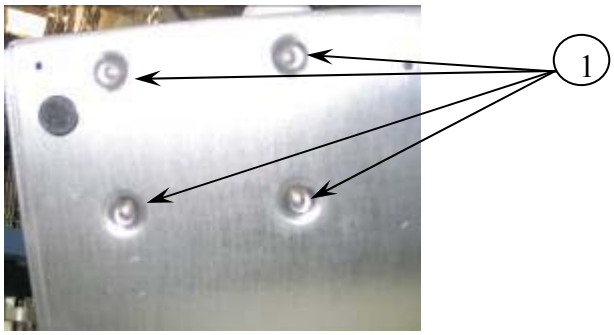
8.24 Replacing the Vacuum Pump

Caution!

Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the chamber, coil or generator.

Allow the autoclave to cool before removing outer covers.

1. Take off the autoclave cover (see para. 8.2 **"**Removing the Autoclave's Outer Covers**"**).
2. Place the autoclave so that the bottom of the base, under the vacuum pump, will be revealed.



3. Disconnect the inlet tube (2) and outlet tube (3).
4. Unscrew the 4 pump-legs nuts (1).

5. Disconnect the electrical wires (blue and brown wires) (4).
6. Remove the vacuum pump.
7. Install a new pump and assemble the leg nuts (1).
8. Install tubes (2) & (3). Use Teflon tape to prevent leakage.
9. Connect the electrical wires. Verify that the wires are connected in the right way.
10. Reassemble the covers.
11. Connect the autoclave to the power supply and turn on the autoclave. Perform a leakage test and verify that the vacuum pump operates O.K.

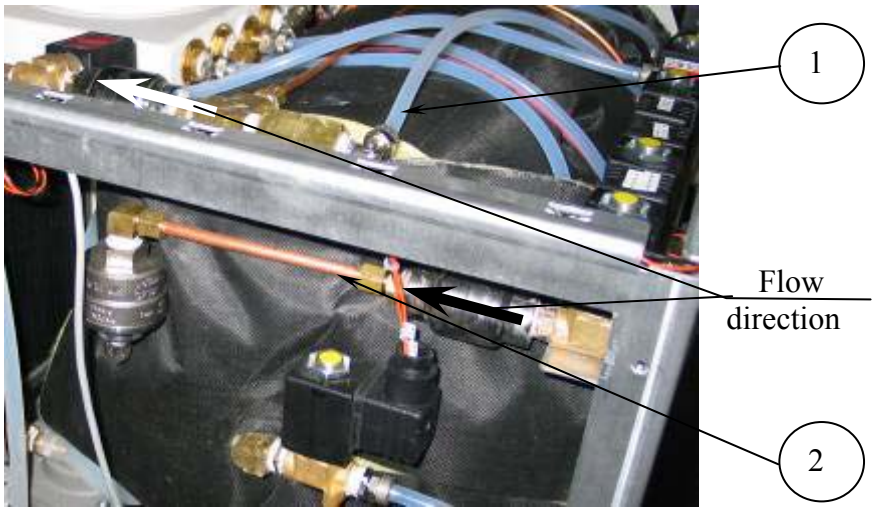
8.25 Replacing the non-return valves

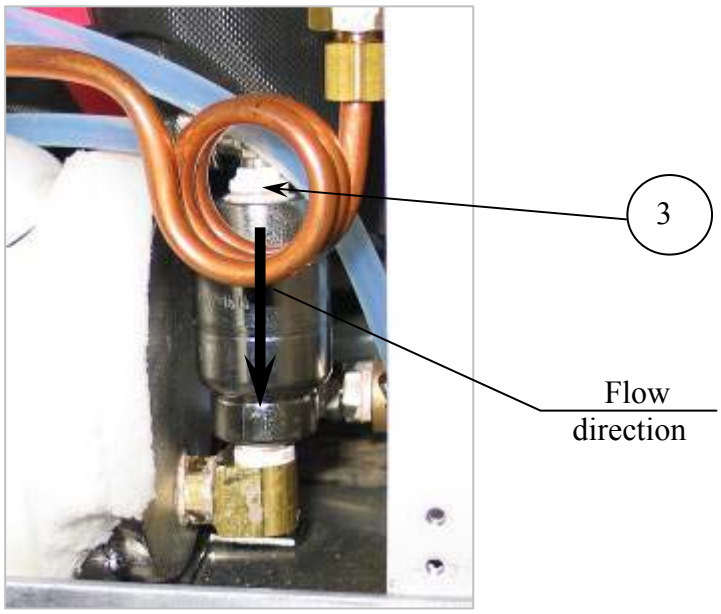
Caution!

Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the chamber, coil or generator.

Allow the autoclave to cool before removing outer covers.

1. Take off the autoclave cover (see para. 8.2 **"**Removing the Autoclave's Outer Covers**"**).





2. Disconnect the tube assembled to the non-return valve (1), (2) or (3).
3. Unscrew the valve, using a small pipe wrench.
4. Install a new non-return valve. Use Teflon tape to prevent leakage. An arrow is marked on the valve, indicating the flow direction. Make sure that the valve is installed in the right direction so that the flow direction is as marked above.
5. Connect the tube.
6. Connect the autoclave to the power source and turn it on.

7. Perform a cycle and verify that the new valve operated as required. If the new valve is faulty, the following messages will be displayed:
   - If the generator's non-return valve is faulty – **Gen Eror** will be displayed.
   - If one of the two upper non-return valves is faulty – **Low Vacuum**, **Low Pres**, **Low Temp** or **Low Heat** will be displayed.

8.26 Replacing the Door Cover

Caution!

Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the chamber, coil or generator.
Allow the autoclave to cool before removing outer covers.

1. Unscrew the four screws attaching the door cover (1) and remove the door cover (2). Note that the screw that activates the door microswitch includes two washers and a spring, be careful not to lose them.
2. Position the new cover and screw in four screws (1).
3. Assemble and install the door microswitch activator (3). Insert screw (4) through washers (5) and spring (6) and screw into the door until dimension A is approximately 15 mm.
4. Before proceeding, make certain that the door gasket is in good condition. Perform final adjustment of the door microswitch activator as follows:

   4.1 Press the microswitch and listen to hear it click. The clicking sound indicates that the microswitch has been activated.

   4.2 Close the door until the closing device feels tight, also verifying that the microswitch click was heard.

   4.3 If the microswitch does not click then unscrew the screw (4) one turn counter-clockwise and check again. Repeat until the microswitch click is heard.

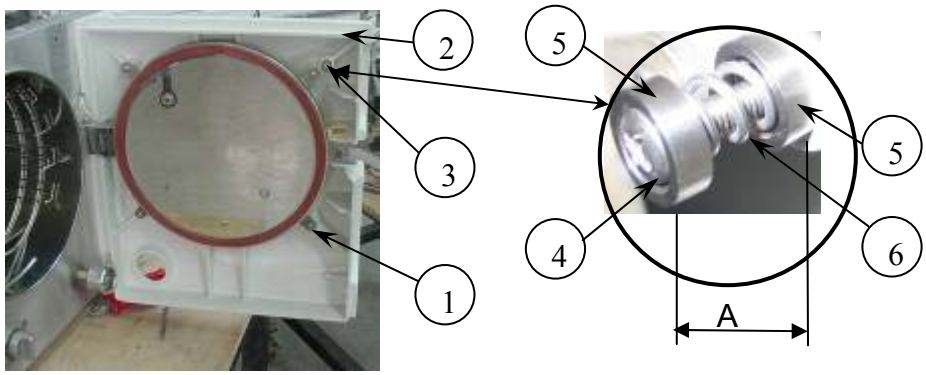
   4.4 Turn the main power back on.

   4.5 Close the door until the closing device feels tight, but do not over tighten. Make sure a click is heard.

   4.6 Select a cycle and run the autoclave. Check that there is no steam or pressure leak around the door.

      4.6.1 If there is a leak then tighten the door slightly.

      4.6.2 If the door-open indicator sounds and the door LED lights then repeat step 4.3



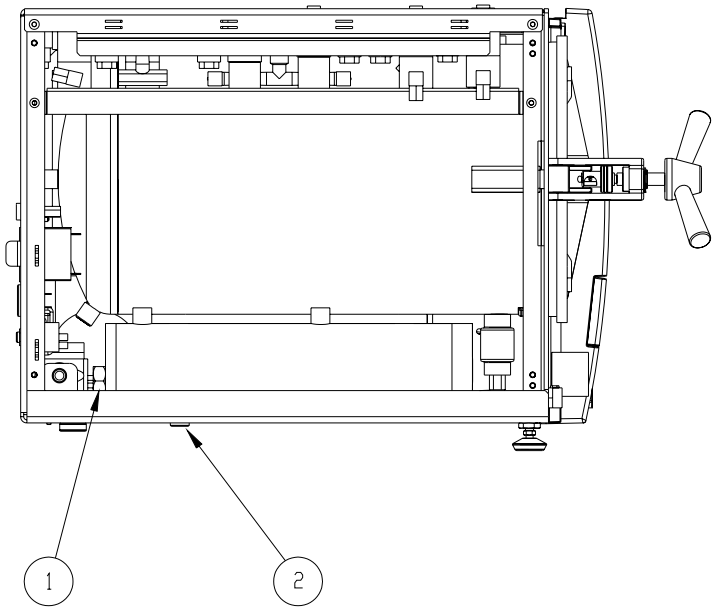
No.	Description	Cat. No.	No.	Description	Cat. No.
1	Screw	BOL191-0033	5	Washer	ELE036-0009
2	Door cover	POL062-0012	6	Spring	SPR177-0012
4	Screw	BOL191-0032			

8.27 Replacing the cut-off thermostat and the heating element

Caution!

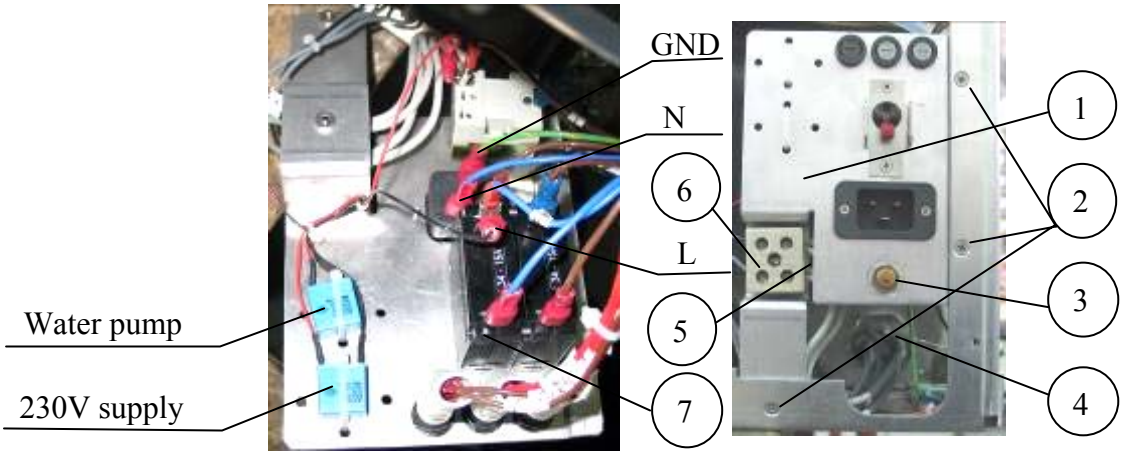
Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the chamber, coil or generator.

Allow the autoclave and the generator to cool before removing outer covers.



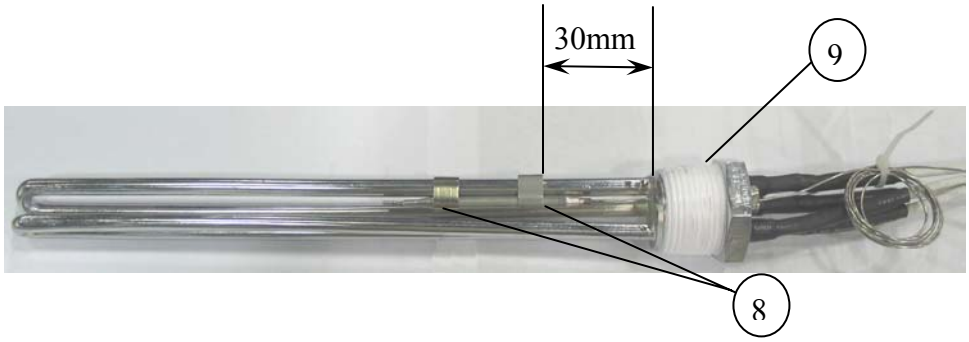
No.	description
1	Heating element
2	Drain plug

1. Take off the autoclave cover (see para. 8.2 **"**Removing the Autoclave's Outer Covers**"**).
2. Drain the water from the generator by gradually opening the drain plug using a ½" open wrench. Wait until all the water has drained from the generator.
3. Disconnect the heating element wires (5) from the porcelain connector (6).

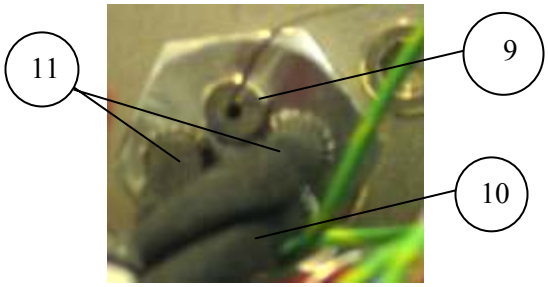


4. Unscrew three screws (2) fastening the electric bracket (1) to the autoclave's frame.
5. Take out the electric panel and disconnect the electrical wires of the cut-off (7).

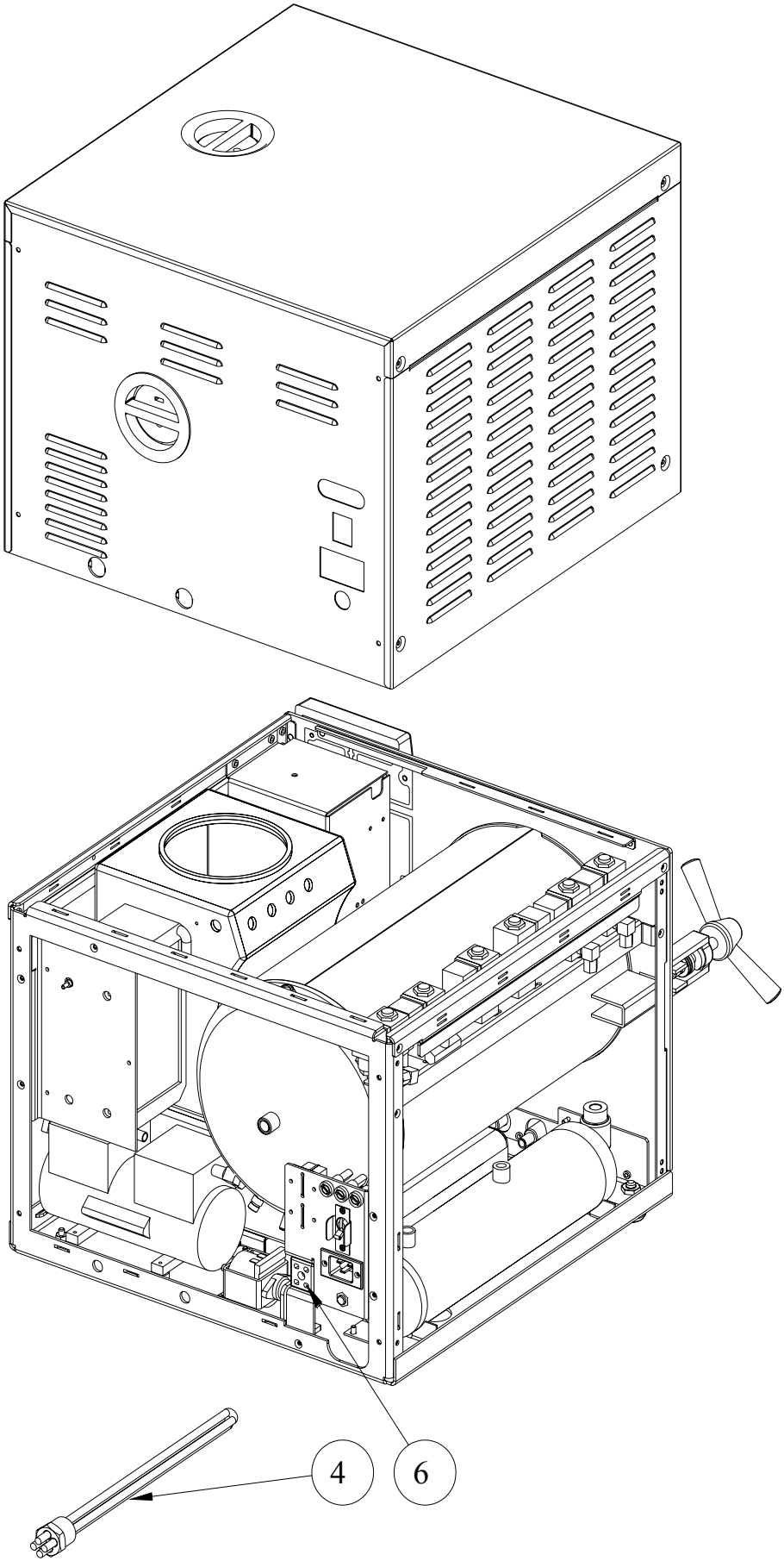
6. Unscrew nut (3) fastening the cut-off unit to the electrical bracket.
7. Remove the heating element (4) from the generator.
8. If you intend to replace the heating element, you have to replace also the cut-off thermostat. In this case skip steps 9 & 11.
9. Remove the clips (8) that are fastening the sensor to the heating element.



10. Unscrew the nut fastening the sensor to the heating element's nut (9).
11. Replace the thermostat. Verify that the distance between the first clip and the heating element's nut (9) is approx. 30mm.
12. Fasten the thermostat's sensor to the upper "branch" of the heating element (you may use the right or the left element but verify that the thermostat is fastened to the upper branch).
13. Insert and fasten the thermostat fastening nut (9).
14. Reassemble the heating element. Verify that the sensor is located upward (see picture below).



15. Connect the electrical wires to the cut-off unit.
16. Assemble the cut-off unit on the electrical bracket and tighten the nut (3).
17. Reassemble the wires of the heating element to the porcelain connector.
18. Re-assemble the electrical bracket to the autoclave's frame.
19. Re-assemble the covers.
20. **For customers in Australia only**. When operating the autoclave for the first time after replacing the heaters operate as follows:
    - Turn the autoclave on.
    - Wait until you hear that the water pump stops (approx. 90 seconds).
    - Turn the autoclave off.
    - Turn the autoclave on again.
    - The autoclave is ready for use.


4
6

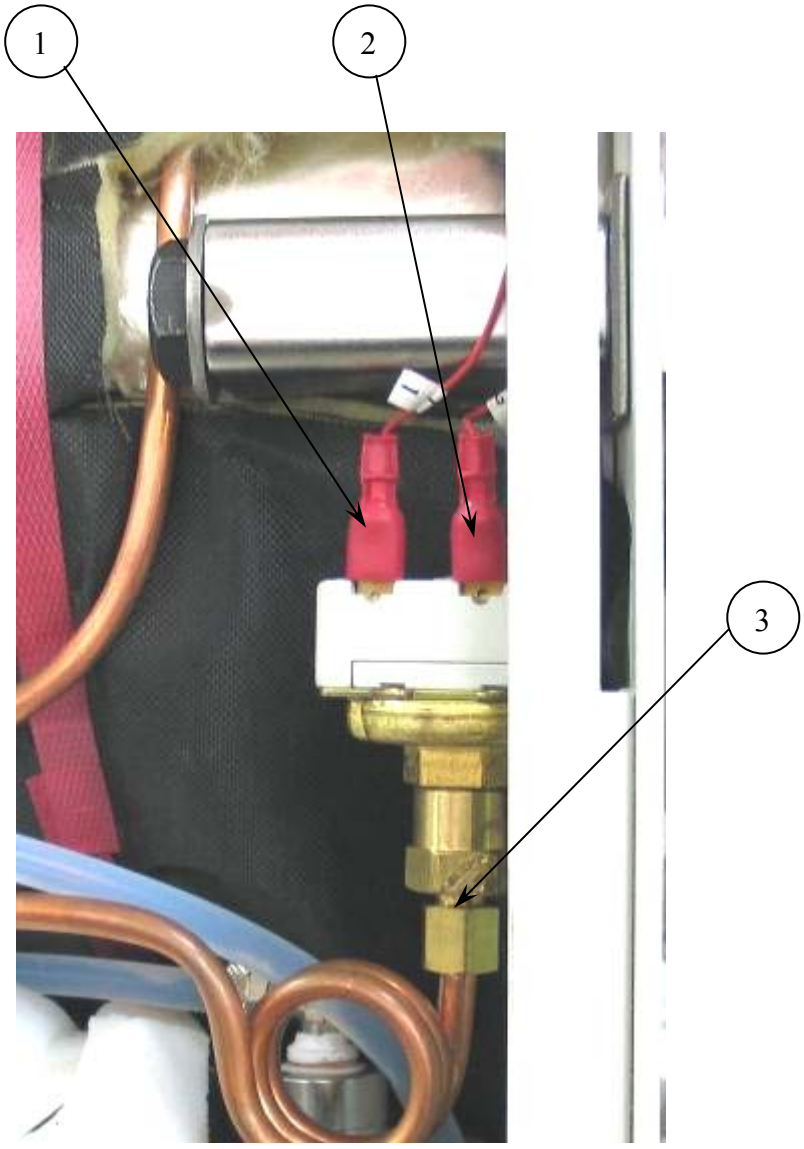
8.28 Replacing the pressure switch

Caution!

Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the chamber, coil or generator.

Allow the autoclave to cool before removing outer covers.

1. Take off the autoclave cover (see para. 8.2 **"**Removing the Autoclave's Outer Covers**"**).
2. Disconnect the electrical wires (1), (2).
3. Unscrew nut (3) and remove the pressure switch.
4. Replace the faulty pressure switch with a new one.
5. Tighten the fastening nut (3).Use Teflon tape to seal the threads.
6. Connect the electrical wires.
7. Re-assemble the covers.



8.29 Replacing the heat exchanger

Caution!

Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the chamber, coil or generator.

Allow the autoclave to cool before removing outer covers.

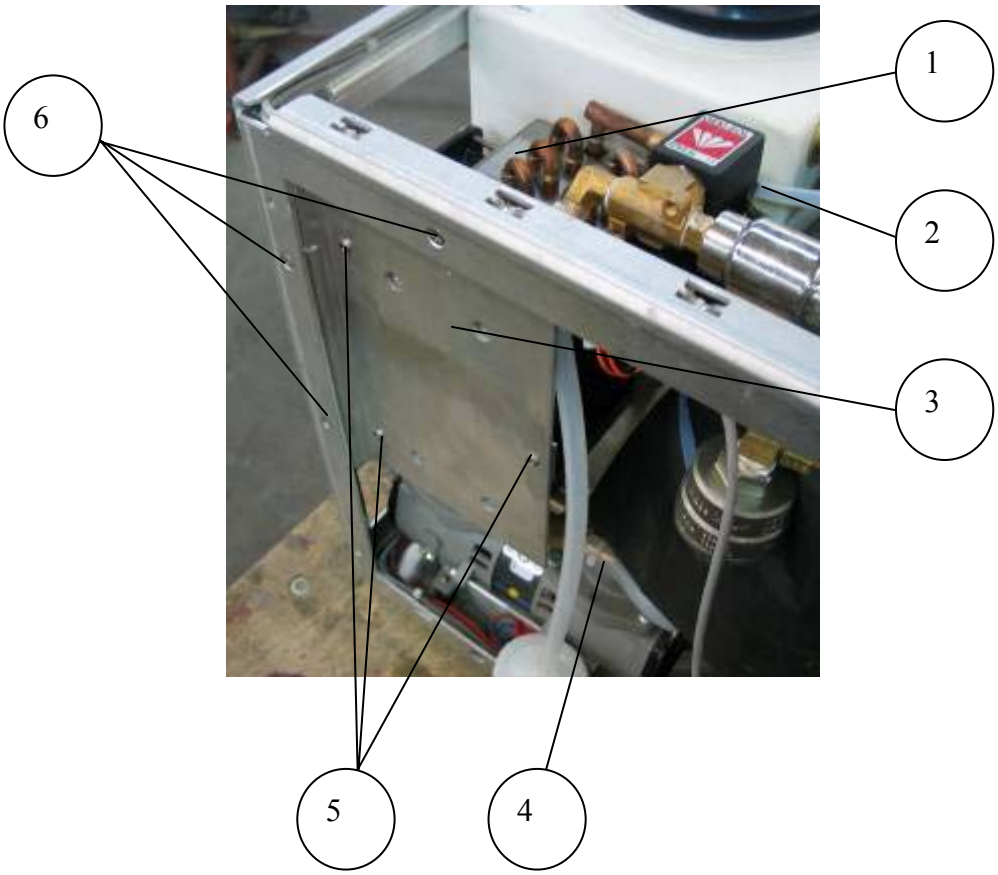
1. Remove the autoclave cover (see para. 8.2 **"**Removing the Autoclave's Outer Covers**"**).
2. Remove the fan (see para. 8.16 "Replacing the Heat Exchanger's Fan").
3. Disconnect the inlet tube (1) and the outlet tube (4).
4. Unscrew the three screws connecting the heat exchanger bracket to the frame (6).
5. Remove the heat exchanger and the bracket from the autoclave.

6 Unscrew screws (5) attaching the heat exchanger to the bracket and replace the heat exchanger with a new one.

6 reassemble screws (5).

6 Assemble the bracket with the new heat exchanger to the frame with the three screws (6).

7. Connect the inlet and outlet tubes to the inlet and outlet of the heat exchanger (1), (4).
8. Assemble the fan to the heat exchanger (see para. 8.16 "Replacing the Heat Exchanger's Fan").
9. Re-assemble the autoclave's covers.



8.30 Replacing the steam trap

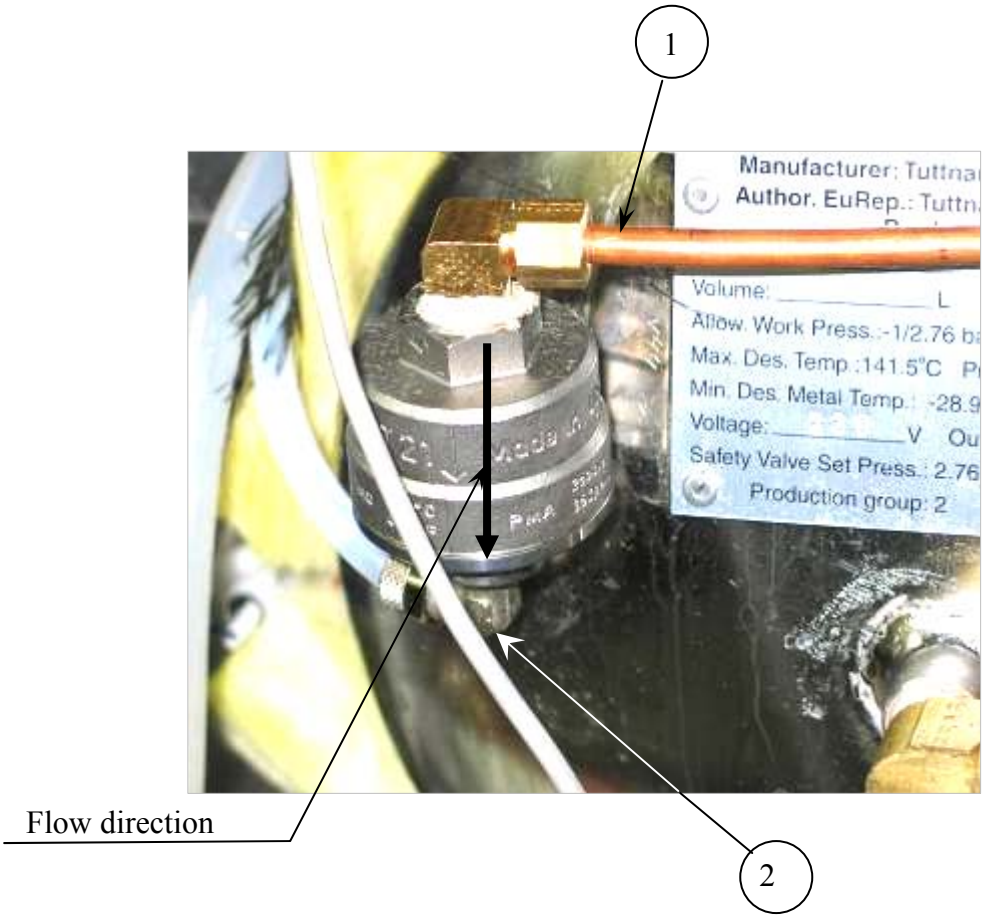
Caution!

Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the chamber, coil or generator.

Allow the autoclave to cool before removing outer covers.

1. Remove the autoclave rear cover (see para. 8.2 **"**Removing the Autoclave's Outer Covers**"**).
2. Disconnect the inlet tube (1) and the outlet tube (2).
3. Replace the steam trap with a new one. Use Teflon tape to seal the threads.

   The steam trap is marked with an arrow indicating the flow direction. Verify that that the flow direction is as indicated in the picture below.
4. Re-assemble the rear cover.



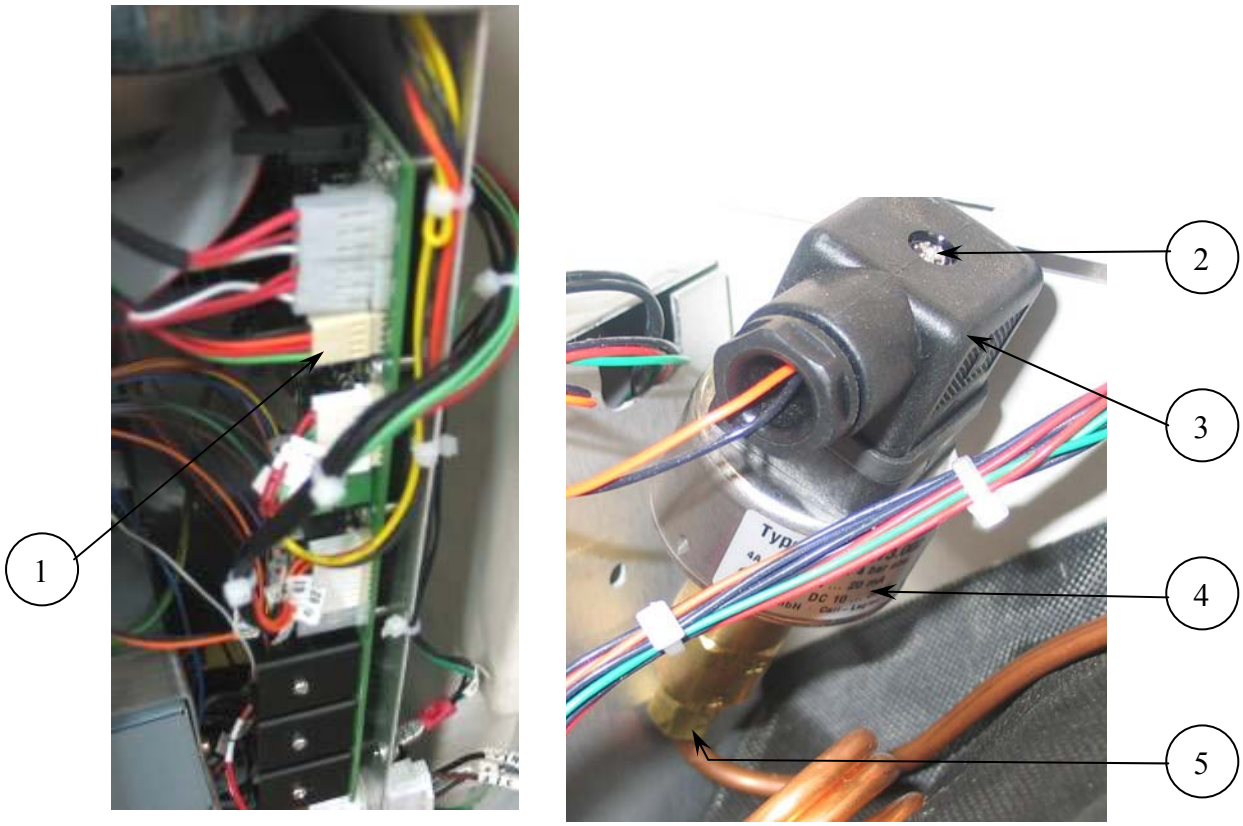
8.31 Replacing the generator's pressure transducer

Caution!

Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the chamber, coil or generator.

Allow the autoclave to cool before removing outer covers.

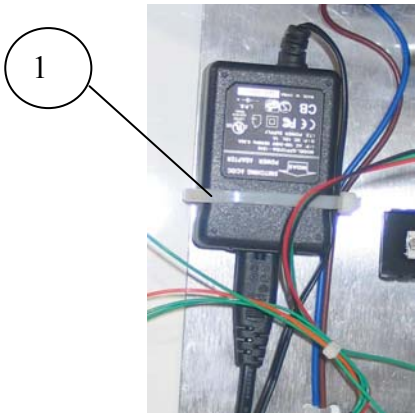
1. Remove the autoclave rear cover (see para. 8.2 **"**Removing the Autoclave's Outer Covers**"**).
2. Unscrew screw (2) and disconnect connector (3).
3. Disconnect tube (5) from the pressure transducer.
4. Assemble a new pressure transducer (4).
5. Reconnect the connector (3).
9. Re-assemble the rear cover.
10. To check that the installed pressure transducer operates as required, turn on the autoclave. Verify that the generator's displayed pressure is the atmospheric pressure.

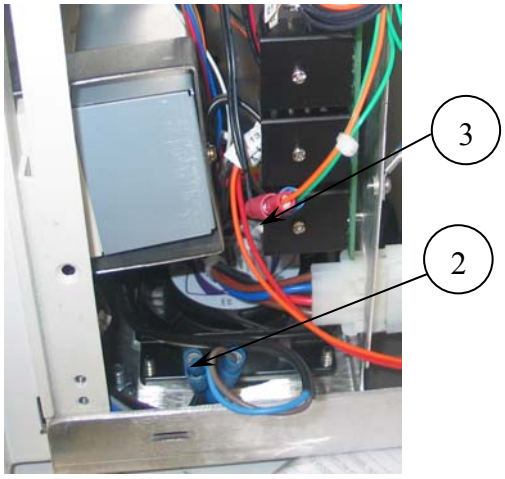


8.32 Replacing the power supply of the pressure transducer

Caution!
Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the chamber, coil or generator.
Allow the autoclave to cool before removing outer covers.

1. Remove the autoclave rear cover (see para. 8.2 **"**Removing the Autoclave's Outer Covers**"**).
2. Cut and remove the plastic cable tie (1) attaching the power supply to the electronic box.
3. Disconnect the bullet connectors (2) (3).





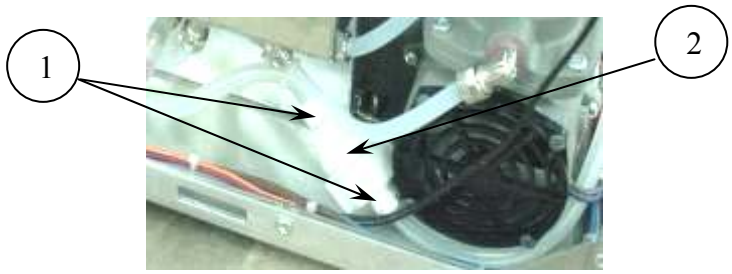
4. Replace the power supply.
5. Reassemble the cover.
6. Connect the autoclave to electrical power.
7. Verify that the autoclave operates as required.

8.33 Water Inlet Strainer

8.33.1 Replacing the water inlet strainer

Caution!
Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the chamber, coil or generator.
Allow the autoclave to cool before removing outer covers.

1. Remove the autoclave right side cover (see para. 8.2 **"**Removing the Autoclave's Outer Covers**"**).
2. Drain the water from the water reservoir.
3. Unscrew the two nuts (1) on both sides of the strainer (2).
4. Pull the tube apart from the strainer.
5. Replace the strainer wit a new strainer and insert the strainer's ends into the tubes.
6. Fasten the tubes to the strainer by closing both nuts (2)
7. Fill the water reservoir.



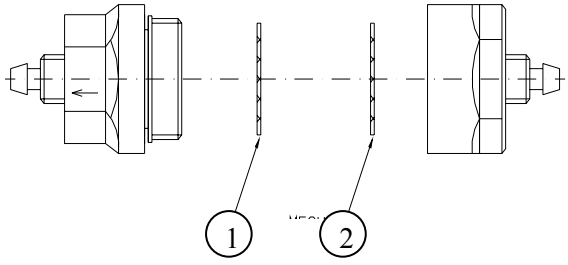
8.33.2 Cleaning the water inlet strainer

Caution!
Before proceeding, make sure that the electric cord is disconnected and there is no pressure in the autoclave.

1. Remove Remove the autoclave right side cover (see para. 8.2 **"**Removing the Autoclave's Outer Covers**"**).
2. Drain the water from the water reservoir.
3. Remove the water filter from the silicon tube.
4. Open the filter by unscrewing the two filter parts.
5. Clean the filter by flushing it under running water for a few minutes.
6. Replace the filter parts and reconnect it to the silicon tube.
7. Fill the water reservoir.

Water Reservoir Filter

No.	Description
1	Mesh screen
2	Mesh screen



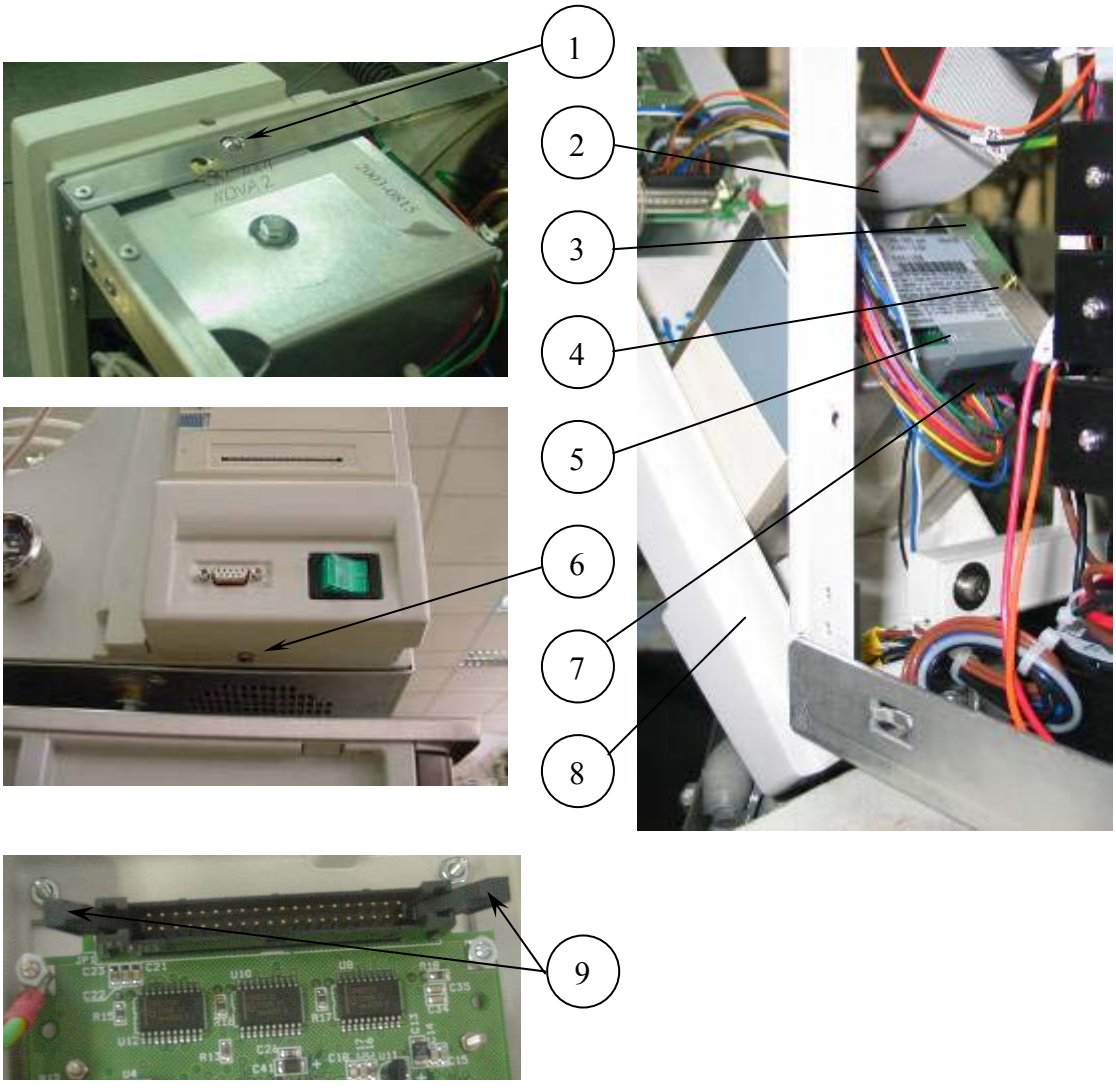
8.34 Replacing the printer

Caution!

Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the chamber, coil or generator.

Allow the autoclave to cool before removing outer covers.

1. Unscrew screws (1), (6).
2. Pull slightly and disconnect the keyboard panel (8)
3. Disconnect the printer's cable (7) from the printer.
4. Disconnect the flat cable (analog-digital cable) (2) by opening the two clips (9) placed on both sides of the socket mounted on the board.
5. Unscrew the two screws (4) fastening the printer (5) to the bracket (3).
6. Pull out the printer from the panel and replace it with a new one.
7. Fasten the screws (4); reassemble the harness (7) and cable (2).
8. Resemble the keyboard panel.
9. Connect the autoclave to the electrical power and turn on the autoclave. Verify that the printer prints a test print.



9 TROUBLESHOOTING

The status of each input and output can be inspected, during any cycle, by viewing the Digital Inputs, Analog Inputs and the Digital Outputs (see para. 5.3, 5.4 and 5.5).
The status of a few of the inputs and outputs can be inspected, while the autoclave is idle, by using the IN-OUT-TEST
We recommend to begin the trouble-shooting by performing the In-Out-test.
If the malfunction is possibly a fault in the electronic system, the following should be performed prior to any corrective action:
Clean the grid under the fan with compressed air. This should be done from inside so debris will be blown outwards.
Clean the entire electronic box with compressed air. (dirt can be conductive and possibly causing a short in the circuit)

Symptom	Possible cause check-up and tests	Corrections
1. "Low Heat" is displayed	1. Generator's water level electrode is faulty. 2. Heating element is burnt. 3. Generator's pressure switch is faulty. 4. Cut-off thermostat is faulty. 5. Triac is faulty 6. Analog board is faulty.	1. Replace the water sensing electrode. (see para. 8.11 "The generator's water sensing electrodes"). 2. Replace the cut-off and the heating element. (see para. 8.27 "Replacing the cut-off thermostat and the Heating Element"). 3. Replace the pressure switch(see para. 8.28 "Replacing the pressure switch") 4. Replace the Cut-off thermostat (see para. 8.27 "Replacing the cut-off thermostat"). 5. Replace the Triac (see para. 8.21 "Replacing the Triac"). 6. Replace the analog board (see para. 8.19 "Replacing the analog board").
2. "Low Vacuum" is displayed	1. Door seal is faulty. 2. Air valve (43) is leaking. 3. Exhaust valve (71) is leaking. 4. Vacuum valve (52) is leaking. 5. Steam valve (93) is leaking. 6. Steam exhaust valve (74) is leaking. 7. Validation port is leaking. 8. Piping is leaking. 7. Vacuum pump's fuse is burnt. 10. Vacuum pump is faulty.	1. Replace door seal (see operator's manual). 2. Fix or replace the valve. 3. Fix or replace the valve. 4. Fix or replace the valve. 5. Fix or replace the valve. 6. Fix or replace the valve. 7. Fasten or replace plug. 8. Fix the leaking point. 9. Replace the fuse (see operator's manual). 10. Replace faulty vacuum pump (see para. 8.24 "Replacing the Vacuum Pump").

Symptom	Possible cause check-up and tests	Corrections
3. "Air Error" is displayed	1. Air filter is clogged. 2. Air inlet tube is clogged. 3. Air valve (43) is clogged. 3. Non-return valve in air inlet tube is stuck.	1. Replace the air filter (see operator's manual). 2. Clean the air inlet tube. 3. Fix or replace the valve. 4. Fix or replace the valve.
4. FAIL "Door Open" is displayed	1. Door switch is faulty	1. Fix or replace the switch (see para. 8.6 "Replacing the Door Switch").
5. "Fill Water" is displayed during the stand-by period.	1. Mineral free water reservoir is empty 2. Lower water level float switch is faulty. If equipped with automatic water fill: 3. Faulty water pressure regulator. 4. Mineral free water inlet valve (21) is stuck. 5. No mineral free water supply.	1 Fill the reservoir. 2. Replace float switch (see para. 8.14 "Replacing the water level float switch"). 3. Replace pressure regulator 4. Replace faulty valve. 5. Fix mineral free water supply.
6. "STOP FILL" is displayed	1. Mineral free water reservoir is full. 2. Upper water level float switch is faulty.	1. Empty water until water level is below safety valve . 2. Replace float switch(see para. 8.14 "Replacing the water level float switch").
7. "Empty Res.L" is displayed simultaneously with an alarm sound	1. Waste water reservoir is full. 2. Waste water level electrode is faulty.	1. Empty reservoir. 2. Replace electrode (see para. 8.12 "The Waste Water Sensing Electrode").
8. "CoilTemp Low" is displayed	1. Temperature measuring system not calibrated. 2. Coil's temperature sensor is faulty. 3. Coil's valve (11) is faulty. 4. Digital board is faulty. 5. Analog board is faulty.	1. Calibrate temperature. 2. Replace PT100 (see para. 8.15 "Replacing the temperature sensor PT-100"). 3. Fix or replace valve. 4. Replace digital board (see para. 8.17 "Replacing the Digital Unit"). 5. Replace analog board (see para. 8.19 "Replacing the analog board").

Symptom	Possible cause check-up and tests	Corrections
9. "Low Temp" is displayed	1. Leakage from the chamber. 2. Temperature sensor (PT100) is out of calibration. 3. Temperature sensor (PT100) is faulty. 4. Triac is faulty. 5 Digital board is faulty. 6. Analog board is faulty.	1. 1.1 Replace door seal (see operator's manual). 1.2 Fix piping leakage. 2. Calibrate temperature (see para. 6.6.5 "Calibrating the temperature in the chamber"). 3. Replace PT100 (see para. 8.15 "Replacing the temperature sensor PT-100"). 4. Replace the Triac (see para. 8.21 "Replacing the Triac"). 5. Replace digital board (see para. 8.17 "Replacing the Digital Unit". 6. Replace analog board (see para. 8.19 "Replacing the analog board").
10. "PT1 – Out" is displayed	1. Chamber's temperature sensor is faulty.	1. Replace Chamber's PT100 (see para. 8.15 "Replacing the temperature sensor PT-100").
11. "PT2 – Out" is displayed	1. Coil's temperature sensor is faulty.	1. Replace Coil's PT100 (see para. 8.15 "Replacing the temperature sensor PT-100").
12. "Press1-Cut" is displayed	1. Chamber's pressure transducer is faulty.	1. Replace analog board (see para. 8.19 "Replacing the analog board").
13. "Press2-Cut" is displayed	1. Generator's pressure transducer is faulty. 2. Power supply of the pressure transducer is faulty. 3. Electrical connections to and from the power supply are faulty.	1. Replace Generator's Tecsis 3296 pressure transducer (see para. 8.31 "Replacing the generator's pressure transducer"). 2. Replace the power supply (see para. 8.32 " Replacing the power supply of the pressure transducer"). 3. Fix faulty electrical connections.
14. Memory error is displayed	1. Digital board is faulty.	1. Replace board (see para. 8.17 "Replacing the Digital Unit").

Symptom	Possible cause check-up and tests	orrections
15. "Sensor Err" is displayed	1. Chamber's PT100 is out of calibration.	1. Replace sensor with a simulator and test. If reading is not accurate – calibrate the system (see para. 6.6.5 "Calibrating the temperature in the chamber").
	2. Chamber's PT100 is faulty.	2. If reading is accurate – PT100 is faulty. Replace PT100 (see para. 8.15 "Replacing the temperature sensor PT-100").
	3. Chamber's PT100 is disconnected.	3. Fix connections.
	4. Analog board is faulty.	4. Replace analog board (see para. 8.19 "Replacing the analog board").
	5. Digital board is faulty.	5. Replace digital board (see para. 8.17 "Replacing the Digital Unit").
16. "High Temp" is displayed	1. Chamber's PT100 is out of calibration.	1. Replace sensor with a simulator and test. If reading is not accurate – calibrate the system (see para. 6.6.5 "Calibrating the temperature in the chamber").
	2. Chamber's PT100 is faulty.	2. If reading is accurate – PT100 is faulty. Replace PT100 (see para. 8.15 "Replacing the temperature sensor PT-100").
	3. Chamber's PT100 is disconnected.	3. Fix connections.
	4. Chamber's pressure transducer is out of calibration.	4. Open autoclave's door and read pressure on the display. If reading is not accurate (atmospheric pressure) – calibrate the system (see para. 6.6.4 "Calibrating the pressure in the chamber").
	5. Chamber's pressure transducer is faulty.	5. If reading is accurate – the pressure transducer is faulty. Replace analog board (see para. 8.19 "Replacing the analog board").
	6. Triac board is faulty.	6. Replace the Triac (see para. 8.21 "Replacing the Triac").
	7. Analog board is faulty.	7. Replace analog board (see para. 8.19 "Replacing the analog board").
	8. Digital board is faulty.	8. Replace digital board (see para. 8.17 "Replacing the Digital Unit").

Symptom	Possible cause check-up and tests	Corrections
17. "High Press" is displayed	1. Chamber's pressure transducer is out of calibration.	1. Open autoclave's door and read pressure on the display. If reading is not accurate (atmospheric pressure) – calibrate the system (see para. 6.6.4 "Calibrating the pressure in the chamber").
	2. Chamber's pressure transducer is faulty.	2. If calibration did not solve the problem – the pressure transducer is faulty. Replace analog board (see para. 8.19 "Replacing the analog board").
	3. Generator's pressure transducer is out of calibration.	3. Calibrate the pressure in the generator (see para. 6.6.7 "Calibrating the pressure in the generator").
	4. Generator's pressure transducer is faulty.	4. If calibration did not solve the problem– the pressure transducer is faulty. Replace the pressure transducer (see para. 8.31 "Replacing the generator's pressure transducer").
	5. Generator's Tecsis pressure transducer is disconnected.	5. Fix connections.
	6. Power supply of the Tecsis pressure transducer is faulty.	6. Replace the power supply (see para. 8.32 "Replacing the power supply of the pressure transducer").
	7. Electrical connections of the power supply are faulty.	7. Fix the faulty electrical connections of the power supply.
	8. Analog board is faulty.	8. Replace analog board (see para. 8.19 "Replacing the analog board").
	9. Digital board is faulty.	9. Replace digital board (see para. 8.17 "Replacing the Digital Unit").

Symptom	Possible cause check-up and tests	Corrections
18. "Low Press" is displayed	1. Door seal is faulty. 2 Piping is leaking. 3. Air valve (43) is leaking. 4. Exhaust valve (71) is leaking. 5. Vacuum valve (52) is leaking. 6. Steam valve (93) is leaking. 7. Steam exhaust valve (74) is leaking. 8. Validation port is leaking. 9. Chamber's pressure transducer is out of calibration. 10. Chamber's pressure transducer is faulty. 11. Generator's pressure transducer is out of calibration. 12. Generator's pressure transducer is faulty. 13. Electrical connections to and from the power supply are faulty. 14. Electrical connections of the power supply are faulty. 15. Generator's pressure transducer is disconnected. 16. Analog board is faulty. 17. Digital board is faulty.	1. Replace door seal (see operator's manual). 2. Fix the leaking point. 3. Fix or replace the valve. 4. Fix or replace the valve. 5. Fix or replace the valve. 6. Fix or replace the valve. 7. Fix or replace the valve. 8. Fasten or replace plug. 9. Open autoclave's door and read pressure on the display. If reading is not accurate (atmospheric pressure) – calibrate the system (see para. 6.6.4 "Calibrating the pressure in the chamber"). 10. If calibration did not solve the problem– the pressure transducer is faulty. Replace analog board (see para. 8.19 "Replacing the analog board"). 11. Calibrate the generator's pressure (see para. 5.6.7"Calibrating the pressure in the generator"). 12. If calibration did not solve te problem – the pressure transducer is faulty. Replace the pressure transducer (see para. 8.31"Replacing the generator's pressure transducer"). 13. Replace the power supply (see para. 8.32 "Replacing the power supply of the pressure transducer"). 14. Fix the faulty electrical connections of the power supply. 15. Fix connections. 16. Replace analog board (see para. 8.19 "Replacing the analog board"). 17. Replace digital board (see para. 8.17 "Replacing the Digital Unit").

Symptom	Possible cause check-up and tests	Corrections
19. "Low Vacuum" is displayed	1. Door seal is faulty. 2 Piping is leaking. 3. Vacuum valve (52) is leaking. 4. Pump condense removal valve (44) is leaking. 5. Vacuum pump fuse is burnt. 6. Vacuum pump is faulty. 7. Heat exchanger's fan is disconnected. 8. Heat exchanger's fan is faulty. 9. Poor ventilation to the heat exchanger	1. Replace door seal (see operator's manual). 2. Fix the leaking point. 3. Fix or replace the valve. 4. Fix or replace the valve. 5. Replace the burnt fuse (see operator's manual). 6. Replace faulty vacuum pump (see para. 8.24 "Replacing the Vacuum Pump"). 7. Reconnect the heat exchanger's fan. 8. Replace the heat exchanger's fan (see para. 8.16 "Replacing the heat exchanger's fan"). 9. Relocate the autoclave. Make sure that the back and the sides of the autoclave are approximately 2" (50 mm) away from the wall to allow ventilation.
20. Door does not open.	1. Locking solenoid is faulty 2. Locking solenoid is disconnected. 3. Rectifier of the locking solenoid is faulty. 4. Transformer is faulty. 5. Transformer's fuse is burnt. 6 Analog board is faulty. 7. Digital board is faulty.	1. Replace the faulty solenoid (see para. 8.5 "Replacing the Locking Device"). 2. Fix electrical wiring. 3. Replace analog board (see para. 8.19 "Replacing the analog board"). 4. Replace faulty transformer (see para. 8.22 "Replacing the transformer"). 5. Replace burnt fuse (see operator's manual). 6. Replace analog board (see para. 8.19 "Replacing the analog board"). 7. Replace digital board (see para. 8.17 "Replacing the Digital Unit").

Symptom	Possible cause check-up and tests	Corrections
21. "Gen. Low Prs" is displayed	1. Generator's piping leaks. 2. Generator's non-return valve leaks. 3. Generator's non-return valve is stuck. 4. Generator's pressure switch is faulty. 5. Heating element is burnt. 6. Steam to coil valve (11) is leaking. 7. Steam valve (93) is leaking. 8. Cut-off thermostat is faulty. 9. Generator's water level electrode is faulty. 10. Water inlet strainer (to pump) is clogged. 11. Triac is faulty 12 Pressure transducer is faulty 13. Electrical connections to and from the power supply are faulty. 14. Electrical connections of the power supply are faulty. 15 Water pump fuse is burnt. 16. Water pump is faulty. 17. Analog board is faulty. 18. Digital board is faulty	1. Locate and fix the leaking point. 2. Fix or replace the valve. 3. Replace faulty non-return valve (see para 8.25 "Replacing the non-return valves"). 4. Replace the pressure switch (see para. "8.28 Replacing the pressure switch") 5. Replace the heating element (see para. 8.27 "Replacing the cut-off and the Heating Element"). 6. Fix or replace the valve 7. Fix or replace the valve 8. Replace the Cut-off thermostat (see para. 8.27 "Replacing the cut-off thermostat and the heating element"). 9. Replace water level electrode (see para. 8.11 "The Generator's Water Sensing Electrodes"). 10. Clean or replace the strainer (see para. 8.32 "Water Inlet Strainer"). 11. Replace the Triac (see para. 8.21 "Replacing the Triac"). 12. Replace the pressure transducer (see para. 8.31 "Replacing the generator's pressure transducer"). 13. Replace the power supply (see para. 8.32 "Replacing the power supply of the pressure transducer"). 14. Fix the faulty electrical connections of the power supply. 15. Replace burnt fuse (see operator's manual). 16. Replace water pump (see para. 8.3 "Replacing the water pump"). 17. Replace analog board (see para.. 8.19 "Replacing the analog board"). 18. Replace digital board. (see para.. 8.17 "Replacing the Digital Unit").

Symptom	Possible cause check-up and tests	Corrections
22. "High G.Prs"	1. Pressure transducer faulty.	1. Replace the faulty pressure transducer (see para. 8.31 “Replacing the generator’s pressure transducer”).
	2. Triac faulty.	2. Replace the faulty Ttriac (see para. ***8***.21 "Replacing the triac”).
	3. Analog board faulty.	3. Replace faulty board (see para. ***8***.19 ***"***Replacing the analog board”).
	4. Digital board faulty.	4. Replace faulty Digital board (see para. 8.17 “Replacing the digital unit”).
23. No light in the display.	1. No power in the power source.	1. Check and restore power.
	2. Main switch is faulty.	2. Replace main switch.
	3. Circuit breaker is faulty.	3. 3.1 Replace circuit breaker (see para. 8.7 “Replacing the circuit breaker”). 3.2 If the circuit breaker continues to trip, check whether wiring and heating element are short-circuited. Fix wiring or replace the heating element (see para. 8.27 “replacing the cut-off thermostat and the Heating Element”).
	4. Cut-off thermostat is faulty.	4. Replace the Cut-off thermostat (see para. 8.27 “Replacing the cut-off thermostat and the heating element”).
	5. External transformer’s fuse is burnt.	5. Replace burnt fuse (see operator’s manual).
	6. Internal transformer’s fuse is burnt.	6. Replace burnt fuse (see para. 8.23 “Replacing the internal fuse of the transformer”).
	7. Electrical wiring short-circuit.	7 Fix short-circuit
	8. A solenoid is short-circuited.	8. Replace faulty solenoid.
	9. Transformer is faulty.	9. Replace transformer (see para. 8.22 “Replacing the transformer”).
	10. Analog board is faulty.	10. Replace analog board (see para. 8.19 “Replacing the analog board”).
	11. Digital board is faulty.	11. Replace digital board (see para. 8.17 “Replacing the Digital Unit”).

Symptom	Possible cause check-up and tests	Corrections
24. Continuous water leakage to drain.	1. Water level float in the mineral-free water reservoir stuck. 2. Mineral-free water inlet valve is leaking.	1. Replace water level float. 2. Replace leaking valve.

10 SPARE PARTS LIST

No.	Cat. No.	DESCRIPTION
1.	ACS215-0008	Pouch Rack 2340, 2540
2.	ARM029-0005	Pressure Reducer, Water, 1/4"
3.	ARM100-0057	Steam Trap, 1/4, Spirax-Sarco
4.	ARM100-0131	Heat Exchanger, With Shield, Nova, 815 TU40, Lordan
5.	ARM172-0007	Check Valve, Spring Disk, 1/4", St.St., Mondeo
6.	CMV196-0001	Teflon bushing ¢6 mm for electrode
7.	CMT196-0005	Electrode, Water Level, Assembly, For TTA
8.	CMT240-0001	Handle, Tray, TTA 1730, 2340, 2540
9.	CMT253-0002	Cover, Top
10.	CMT253-0003	Cover, Side, Left
11.	CMT253-0003	Cover, Side, Right
12.	CMT253-0005	Cover, Rear
13.	CMT254-0058	Cover, Air Filter
14.	CTP200-0005	Control Unit, Electronic, 2540 NOVA-3, Complete
15.	CTP201-0004	Fan, 230VAC, 38*20*120, DP200A, Sunion
16.	CTP201-0000	Fan, Axial, 12VDC, 80mm
17.	CTP201-0016	Capacitor, 470nF
18.	CTP201-0054	Board, Electronic, DIG-CAT1001
19.	CTP201-0132	Board, Electronic, ANL-CAT1001E
20.	ELC254-0082	Harness, Electrical, printer, Nova3
21.	ELC258-0003	Sensor, Temperature, PT-100, 3 Wires, 5X80
22.	ELE035-0001	Fuse Holder, Mini, 5*20
23.	ELE035-0012	Switch, Rocker, 16A
24.	ELE035-0021	Circuit Breaker, Rail, 1PH, 15A, Carlingswitch
25.	ELE035-0055	Fuse, Slow Blow, 1.25A, 1/4"*32 (water & vacuum pumps)
26.	ELE035-0072	Transformer, 24/220V, A25
27.	ELE035-0075	5A F.F. fuse
28.	ELE035-0090	Fuse, Slow Blow, Glass Tube, 0.5A, 250V, 5*20, 0034.5614, Schurter (transformer)
29.	ELE035-0094	Power supply, 12V, AD1612A, Deer Computer
30.	ELE036-0001	Microswitch, E13-00M, CHEERY 15A, 125/250VAC, 3/4HP
31.	FIL175-0020	Filter, Water, PVC
32.	FIL175-0027	Cap, strainer, ¼”

No.	Cat. No.	DESCRIPTION
33.	FIL175-0042	Filter, Air, 0.2 Micron, Model 50mm D
34.	FIL175-0044	Lid, Silicon, for Filter 1/4
35.	FIL175-0046	Screen, 400 Micron
36.	FIL175-0051	Strainer Housing + Cap
37.	FIT100-0151	Cap 1/2
38.	GAS080-0003	Gasket, Door
39.	GAS080-0007	Gasket, Silicone, Water Reservoir
40.	GAS080-0039	Gasket, between top and bottom water reservoirs
41.	GAS082-0008	Gasket, 4mm, Silicon, for 1/4" Strainer
42.	GAS083-0002	Tube, Silicone, 5*10mm
43.	GAS083-0004	Tube, Silicone, 7*13mm
44.	GAS083-0006	Tube, Silicone, 7*5mm
45.	GAS086-0016	Tube, Teflon, 4*6mm
46.	GAS086-0017	Tube, Teflon, 6*8mm
47.	GAU029-0009	Gauge, Pressure, Steam, -30+60 psi, 1.5"
48.	GAU029-0012	Gauge, Pressure, Air, 1/4"
49.	HAN071-0003	Handle, Door, Bakelite for TTA (522)
50.	HEA016-0025	Heating Element, 230V, 1"*300, 2*1500W, Nova 3, Generator
51.	LOK240-0001	Tightening Bolt, Door, Assembly, 23/2540
52.	LOK240-0014	Locking Housing, Axis
53.	LOK240-0017	Washer, Ocolon, Door Tightening Bolt, 1730-2540
54.	LOK240-0019	Pin, Tightening Bolt Hinge, 1730-2540
55.	LOK240-0020	Housing, Door Hinge
56.	LOK254-0030	Solenoid, Door Locking, Assembly, 2540
57.	LOK692-0039	Pin, Cotter, 2.0*16
58.	NUT193-0339	Closing bridge “c” clip
59.	POL062-0012	Cover, Door, Nova-3, Ratio.
60.	PUM055-0006	Pump, Water, EX7, 230V 50/60HZ, Ulka
61.	**For Australian customers only** PUM055-0026	Pump, Water, EX4, 240V/50Hz, Ulka
62.	PUM057-0027	Pump, Vacuum, 230v, M-2107, ASF
63.	RES075-0012	Reservoir, water, upper, Nova 3
64.	RES075-0013	Reservoir, water, lower, nova 3
65.	SKR203-0006	Shock Absorber, ULKA Pump

No.	Cat. No.	DESCRIPTION
66.	SOL026-0034	Plunger, Solenoid Valve ¼, R450898/E, ODE
67.	SOL026-0036	Coil, Solenoid, 24VAC, 8W, BDF08024DS, ODE
68.	SOL026-0059	Replacement Kit – coil + plunger, 2/2 Way N. L., 24VAC, 8W, KT130KE55-F, ODE.
69.	SRV000-0187	O-Ring (drain valve)
70.	SRV000-0302	Cover, fuse
71.	SVL029-0028	Valve, Safety, Steam, CE1/4x2.76 Bar, TUV
72.	THE002-0009	Printer, CBN-920, CITIZEN
73.	THE002-0010	Paper, Roll, Printer CBN-920
74.	THE002-0020	Ribbon, Ink, Printer CBN-920
75.	THE005-0006	Switch, Pressure, TY85, Campini
76.	THE005-0016	Thermostat, Cut-Off, 155C, Campini
77.	THE006-0006	Transducer, Pressure, -1+3 Bar abs (Tecsis 3296)
78.	THE007-0001	Switch, Float, Mini, Rico
79.	THE039-0036	Connector, Ceramic, No. 3, Onka
80.	TRH254-0001	Holder, Tray, 2540
81.	TRH254-0009	Holder, Tray, Wire, 2540
82.	TRY240-0001	Tray, perforated, St.St, 23/2540
83.	VLV170-0013	Housing, Cock, Drain
84.	VLV170-0014	Cock, Drain
85.	VLV170-0015	Nut, Cock, Drain
86.	WHE070-0016	Leg, Rubber, Plug Type, 25x1/4
87.	WHE070-0024	Leg, Rear, rubber, Nova
88.	WIR040-0060	Cord, electrical, 220V, 16A, Angled

11 PRESSURE VS TEMPERATURE FOR SATURATED STEAM

psia	InHg	°F	Bar	kPa	°C
1.5	2.95	114.5	0.10	10	45.8
2.2	4.44	129.3	0.15	15	54.1
2.9	5.90	140.2	0.20	20	60.1
3.6	7.39	149.1	0.25	25	65.0
4.4	8.86	156.4	0.30	30	68.9
5.1	10.34	162.9	0.35	35	72.7
5.8	11.81	168.6	0.40	40	75.9
6.5	13.30	173.8	0.45	45	78.8
7.3	14.76	178.4	0.50	50	81.3

psia	psig	°F	Bar	kPa	°C
14.7	0.0	212.0	1.01	101.3	100.0
14.8	0.1	212.2	1.02	101.7	100.1
14.8	0.1	212.4	1.02	102.1	100.2
14.9	0.2	212.5	1.02	102.4	100.3
14.9	0.2	212.7	1.03	102.8	100.4
15.0	0.3	212.9	1.03	103.2	100.5
15.0	0.3	213.1	1.04	103.6	100.6
15.1	0.4	213.3	1.04	104.0	100.7
15.1	0.4	213.4	1.04	104.3	100.8
15.2	0.5	213.6	1.05	104.7	100.9
15.2	0.5	213.8	1.05	105.1	101.0
15.3	0.6	214.0	1.05	105.4	101.1
15.4	0.7	214.2	1.06	105.8	101.2
15.4	0.7	214.3	1.06	106.2	101.3
15.5	0.8	214.5	1.07	106.6	101.4
15.5	0.8	214.7	1.07	106.9	101.5
15.6	0.9	214.9	1.07	107.3	101.6
15.6	0.9	215.1	1.08	107.7	101.7
15.7	1.0	215.2	1.08	108.1	101.8
15.7	1.0	215.4	1.08	108.4	101.9
15.8	1.1	215.6	1.09	108.8	102.0
15.8	1.1	215.8	1.09	109.2	102.1
15.9	1.2	216.0	1.10	109.6	102.2
16.0	1.3	216.3	1.10	110.0	102.4
16.1	1.4	216.5	1.11	110.7	102.5
16.1	1.4	216.7	1.11	111.1	102.6
16.2	1.5	216.9	1.12	111.5	102.7
16.2	1.5	217.0	1.12	111.9	102.8
16.3	1.6	217.2	1.12	112.3	102.9
16.4	1.7	217.4	1.13	112.7	103.0
16.4	1.7	217.6	1.13	113.1	103.1
16.5	1.8	217.8	1.14	113.5	103.2
16.5	1.8	217.9	1.14	114.0	103.3
16.6	1.9	218.1	1.14	114.3	103.4
16.6	1.9	218.3	1.15	114.7	103.5
16.7	2.0	218.5	1.15	115.1	103.6
16.8	2.1	218.7	1.16	115.6	103.7
16.8	2.1	218.8	1.16	116.0	103.8
16.9	2.2	219.0	1.16	116.3	103.9
16.9	2.2	219.2	1.17	116.7	104.0
17.0	2.3	219.4	1.17	117.1	104.1
17.1	2.4	219.6	1.18	117.5	104.2

psia	psig	°F	Bar	kPa	°C
17.1	2.4	219.7	1.18	117.9	104.3
17.2	2.5	219.9	1.18	118.6	104.4
17.2	2.5	220.1	1.19	118.6	104.5
17.3	2.6	220.3	1.19	119.3	104.6
17.4	2.7	220.5	1.20	120.0	104.7
17.4	2.7	220.6	1.20	120.0	104.8
17.5	2.8	220.8	1.20	120.4	104.9
17.5	2.8	221.0	1.21	120.7	105.0
17.6	2.9	221.2	1.21	121.3	105.1
17.7	3.0	221.4	1.22	122.0	105.2
17.7	3.0	221.5	1.22	122.0	105.3
17.8	3.1	221.7	1.23	122.7	105.4
17.8	3.1	221.9	1.23	122.7	105.5
17.9	3.2	222.1	1.23	123.4	105.6
18.0	3.3	222.3	1.24	124.1	105.7
18.0	3.3	222.4	1.24	124.1	105.8
18.1	3.4	222.6	1.24	124.7	105.9
18.2	3.5	222.8	1.25	125.1	106.0
18.2	3.5	223.0	1.26	125.5	106.1
18.3	3.6	223.2	1.26	126.0	106.2
18.3	3.6	223.3	1.26	126.2	106.3
18.4	3.7	223.5	1.27	126.8	106.4
18.5	3.8	223.7	1.27	127.2	106.5
18.5	3.8	223.9	1.28	127.7	106.6
18.6	3.9	224.1	1.28	128.1	106.7
18.6	3.9	224.2	1.29	128.5	106.8
18.7	4.0	224.4	1.29	129.0	106.9
18.8	4.1	224.6	1.29	129.6	107.0
18.9	4.2	224.8	1.30	129.9	107.1
18.9	4.2	225.0	1.30	130.4	107.2
19.0	4.3	225.1	1.31	130.8	107.3
19.0	4.3	225.3	1.31	131.3	107.4
19.1	4.4	225.5	1.32	131.7	107.5
19.2	4.5	225.7	1.32	132.2	107.6
19.3	4.6	225.9	1.33	132.6	107.7
19.3	4.6	226.0	1.33	133.1	107.8
19.4	4.7	226.2	1.34	133.5	107.9
19.4	4.7	226.4	1.34	134.0	108.0
19.5	4.8	226.6	1.34	134.4	108.1
19.6	4.9	226.8	1.35	134.9	108.2
19.6	4.9	226.9	1.35	135.3	108.3
19.7	5.0	227.1	1.36	135.8	108.4
19.8	5.1	227.3	1.36	136.2	108.5
19.8	5.1	227.5	1.37	136.7	108.6
19.9	5.2	227.7	1.37	137.1	108.7
19.9	5.2	227.8	1.38	137.6	108.8
20.0	5.3	228.0	1.38	138.1	108.9
20.1	5.4	228.2	1.39	138.5	109.0
20.2	5.5	228.4	1.39	139.0	109.1
20.3	5.6	228.6	1.39	139.5	109.2
20.3	5.6	228.7	1.40	140.0	109.3
20.4	5.7	228.9	1.40	140.5	109.4
20.4	5.7	229.1	1.41	140.9	109.5

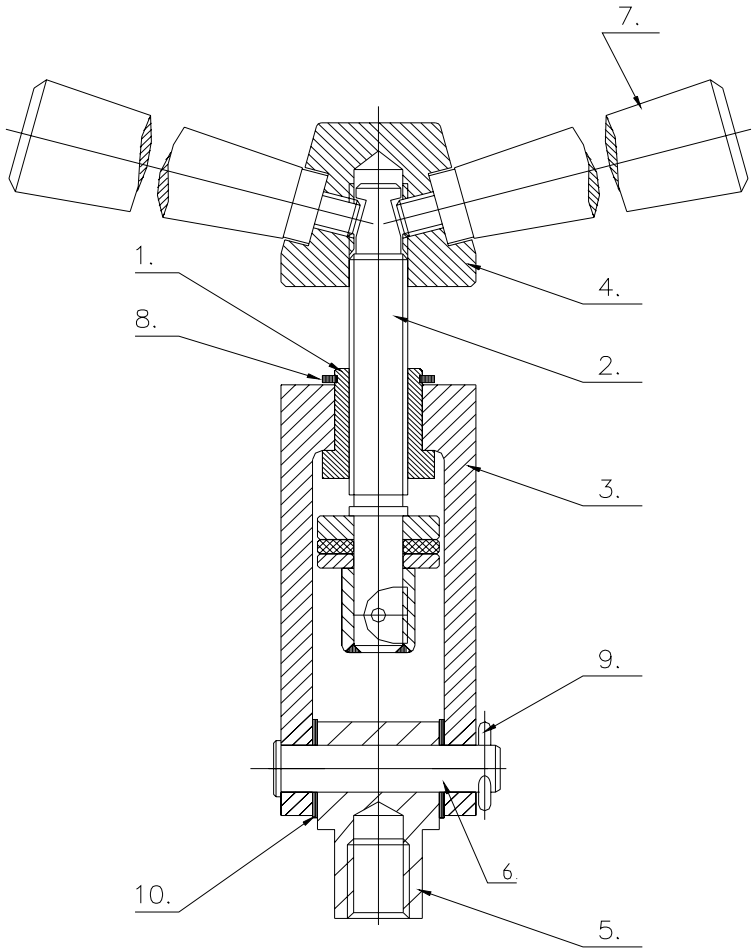
psia	psig	°F	Bar	kPa	°C	psia	psig	°F	Bar	kPa	°C
20.5	5.8	229.3	1.41	141.4	109.6	24.6	9.9	239.2	1.70	169.7	115.1
20.6	5.9	229.5	1.42	142.0	109.7	24.7	10.0	239.4	1.70	170.2	115.2
20.6	5.9	229.6	1.42	142.4	109.8	24.7	10.0	239.5	1.71	170.8	115.3
20.7	6.0	229.8	1.43	142.9	109.9	24.8	10.1	239.7	1.71	171.3	115.4
20.8	6.1	230.0	1.43	143.3	110.0	24.9	10.2	239.9	1.72	171.8	115.5
20.9	6.2	230.2	1.44	143.9	110.1	25.0	10.3	240.1	1.72	172.4	115.6
21.0	6.3	230.4	1.44	144.3	110.2	25.1	10.4	240.3	1.73	173.1	115.7
21.0	6.3	230.5	1.45	144.8	110.3	25.2	10.5	240.4	1.74	173.6	115.8
21.1	6.4	230.7	1.45	145.3	110.4	25.3	10.6	240.6	1.74	174.1	115.9
21.1	6.4	230.9	1.46	145.8	110.5	25.3	10.6	240.8	1.75	174.7	116.0
21.2	6.5	231.1	1.46	146.2	110.6	25.4	10.7	241.0	1.75	175.3	116.1
21.3	6.6	231.3	1.47	146.7	110.7	25.5	10.8	241.2	1.76	175.9	116.2
21.3	6.6	231.4	1.47	147.2	110.8	25.6	10.9	241.3	1.76	176.4	116.3
21.4	6.7	231.6	1.48	147.7	110.9	25.7	11.0	241.5	1.77	177.0	116.4
21.5	6.8	231.8	1.48	148.2	111.0	25.8	11.1	241.7	1.78	177.6	116.5
21.6	6.9	232.0	1.49	148.6	111.1	25.9	11.2	241.9	1.78	178.2	116.6
21.7	7.0	232.2	1.49	149.6	111.2	25.9	11.2	242.1	1.79	178.7	116.7
21.7	7.0	232.3	1.50	149.6	111.3	26.0	11.3	242.2	1.79	179.3	116.8
21.8	7.1	232.5	1.50	150.3	111.4	26.1	11.4	242.4	1.80	180.0	116.9
21.9	7.2	232.7	1.51	151.0	111.5	26.2	11.5	242.6	1.80	180.5	117.0
21.9	7.2	232.9	1.51	151.0	111.6	26.3	11.6	242.8	1.81	181.1	117.1
22.0	7.3	233.1	1.52	151.7	111.7	26.4	11.7	243.0	1.82	181.6	117.2
22.1	7.4	233.2	1.52	152.2	111.8	26.4	11.7	243.1	1.82	182.2	117.3
22.1	7.4	233.4	1.53	152.7	111.9	26.5	11.8	243.3	1.83	182.8	117.4
22.2	7.5	233.6	1.53	153.2	112.0	26.6	11.9	243.5	1.83	183.4	117.5
22.3	7.6	233.8	1.54	153.8	112.1	26.7	12.0	243.7	1.84	184.0	117.6
22.4	7.7	234.0	1.54	154.3	112.2	26.8	12.1	243.9	1.85	184.5	117.7
22.4	7.7	234.1	1.55	154.8	112.3	26.8	12.1	244.0	1.85	185.1	117.8
22.5	7.8	234.3	1.55	155.3	112.4	26.9	12.2	244.2	1.86	185.7	117.9
22.6	7.9	234.5	1.56	155.8	112.5	27.0	12.3	244.4	1.86	186.3	118.0
22.7	8.0	234.7	1.56	156.3	112.6	27.1	12.4	244.6	1.87	186.9	118.1
22.8	8.1	234.9	1.57	156.8	112.7	27.2	12.5	244.8	1.88	187.5	118.2
22.8	8.1	235.0	1.57	157.3	112.8	27.3	12.6	244.9	1.88	188.2	118.3
22.9	8.2	235.2	1.58	157.9	112.9	27.4	12.7	245.1	1.89	188.8	118.4
23.0	8.3	235.4	1.58	158.4	113.0	27.5	12.8	245.3	1.89	189.4	118.5
23.1	8.4	235.6	1.59	158.9	113.1	27.6	12.9	245.5	1.90	190.0	118.6
23.1	8.4	235.8	1.59	159.4	113.2	27.7	13.0	245.7	1.91	190.6	118.7
23.2	8.5	235.9	1.60	159.9	113.3	27.7	13.0	245.8	1.91	191.2	118.8
23.3	8.6	236.1	1.60	160.4	113.4	27.8	13.1	246.0	1.92	191.8	118.9
23.4	8.7	236.3	1.61	160.0	113.5	27.9	13.2	246.2	1.92	192.4	119.0
23.4	8.7	236.5	1.62	161.5	113.6	28.0	13.3	246.4	1.93	193.0	119.1
23.5	8.8	236.7	1.62	162.1	113.7	28.1	13.4	246.6	1.94	193.7	119.2
23.6	8.9	236.8	1.63	162.6	113.8	28.2	13.5	246.7	1.94	194.3	119.3
23.7	9.0	237.0	1.63	163.1	113.9	28.3	13.6	246.9	1.95	194.9	119.4
23.7	9.0	237.2	1.64	163.7	114.0	28.4	13.7	247.1	1.95	195.5	119.5
23.8	9.1	237.4	1.64	164.2	114.1	28.5	13.8	247.3	1.96	196.1	119.6
23.9	9.2	237.6	1.65	164.8	114.2	28.6	13.9	247.5	1.97	196.7	119.7
24.0	9.3	237.7	1.65	165.3	114.3	28.6	13.9	247.6	1.97	197.3	119.8
24.1	9.4	237.9	1.66	165.9	114.4	28.7	14.0	247.8	1.98	197.9	119.9
24.1	9.4	238.1	1.66	166.4	114.5	28.8	14.1	248.0	1.99	198.5	120.0
24.2	9.5	238.3	1.67	167.0	114.6	28.9	14.2	248.2	1.99	199.2	120.1
24.3	9.6	238.5	1.67	167.5	114.7	29.0	14.3	248.4	2.00	199.8	120.2
24.4	9.7	238.6	1.68	168.0	114.8	29.1	14.4	248.5	2.00	200.5	120.3
24.4	9.7	238.8	1.69	168.6	114.9	29.2	14.5	248.7	2.01	201.1	120.4
24.5	9.8	239.0	1.69	169.1	115.0	29.3	14.6	248.9	2.02	201.8	120.5

psia	psig	°F	Bar	kPa	°C	psia	psig	°F	Bar	kPa	°C
29.4	14.7	249.1	2.02	202.4	120.6	34.6	19.9	258.6	2.39	238.7	125.9
29.5	14.8	249.3	2.03	203.1	120.7	34.7	20.0	258.8	2.39	239.4	126.0
29.5	14.8	249.4	2.04	203.7	120.8	34.8	20.1	259.0	2.40	240.2	126.1
29.6	14.9	249.6	2.04	204.4	120.9	34.9	20.2	259.2	2.41	240.9	126.2
29.7	15.0	249.8	2.05	205.0	121.0	35.0	20.3	259.3	2.42	241.6	126.3
29.8	15.3	250.0	2.06	205.7	121.1	35.1	20.4	259.5	2.42	242.3	126.4
29.9	15.4	250.2	2.06	206.3	121.2	35.3	20.6	259.7	2.43	243.1	126.5
30.0	15.5	250.3	2.07	207.0	121.3	35.4	20.7	259.9	2.44	243.8	126.6
30.1	15.6	250.5	2.08	207.6	121.4	35.5	20.8	260.1	2.45	244.5	126.7
30.3	15.6	250.7	2.08	208.3	121.5	35.6	20.9	260.2	2.45	245.3	126.8
30.5	15.8	250.9	2.09	208.9	121.6	35.7	21.0	260.4	2.46	246.0	126.9
30.5	15.8	251.1	2.10	209.6	121.7	35.8	21.1	260.6	2.47	246.8	127.0
30.6	15.9	251.2	2.10	210.2	121.8	35.9	21.2	260.8	2.48	247.6	127.1
30.7	16.0	251.4	2.11	210.8	121.9	36.0	21.3	261.0	2.48	248.3	127.2
30.8	16.1	251.6	2.11	211.5	122.0	36.1	21.4	261.1	2.49	249.1	127.3
31.0	16.3	251.8	2.12	212.1	122.1	36.2	21.5	261.3	2.50	249.9	127.4
31.0	16.3	252.0	2.13	212.8	122.2	36.5	21.8	261.5	2.51	250.6	127.5
31.1	16.4	252.1	2.13	213.5	122.3	36.5	21.8	261.7	2.51	251.4	127.6
31.2	16.5	252.3	2.14	214.2	122.4	36.6	21.9	261.9	2.52	252.2	127.7
31.3	16.6	252.5	2.15	214.8	122.5	36.7	22.0	262.0	2.53	252.9	127.8
31.4	16.7	252.7	2.16	215.2	122.6	36.8	22.1	262.2	2.54	253.7	127.9
31.5	16.8	252.9	2.16	216.2	122.7	36.9	22.2	262.4	2.54	254.5	128.0
31.6	16.9	253.0	2.17	216.9	122.8	37.0	22.3	262.6	2.55	255.2	128.1
31.7	17.0	253.2	2.18	217.6	122.9	37.1	22.4	262.8	2.56	256.0	128.2
31.8	17.1	253.4	2.18	218.3	123.0	37.2	22.5	262.9	2.57	256.8	128.3
31.8	17.1	253.6	2.19	218.9	123.1	37.4	22.7	263.1	2.58	257.5	128.4
31.9	17.2	253.8	2.20	219.6	123.2	37.5	22.8	263.3	2.58	258.3	128.5
32.0	17.3	253.9	2.20	220.3	123.3	37.6	22.9	263.5	2.59	259.1	128.6
32.1	17.4	254.1	2.21	221.0	123.4	37.7	23.0	263.7	2.60	259.8	128.7
32.2	17.5	254.3	2.22	221.7	123.5	37.8	23.1	263.8	2.61	260.6	128.8
32.3	17.6	254.5	2.22	222.4	123.6	37.9	23.2	264.0	2.61	261.4	128.9
32.4	17.7	254.7	2.23	223.1	123.7	38.0	23.3	264.2	2.62	262.2	129.0
32.5	17.8	254.8	2.24	223.7	123.8	38.1	23.4	264.4	2.63	263.0	129.1
32.6	17.9	255.0	2.24	224.4	123.9	38.3	23.6	264.6	2.64	263.8	129.2
32.6	17.9	255.2	2.25	225.1	124.0	38.4	23.7	264.7	2.65	264.6	129.3
32.7	18.0	255.4	2.26	225.8	124.1	38.5	23.8	264.9	2.65	265.4	129.4
32.8	18.1	255.6	2.26	226.5	124.2	38.6	23.9	265.1	2.66	266.2	129.5
32.9	18.2	255.7	2.27	227.2	124.3	38.7	24.0	265.3	2.67	267.0	129.6
33.0	18.3	255.9	2.28	227.9	124.4	38.8	24.1	265.5	2.68	267.8	129.7
33.1	18.4	256.1	2.29	228.6	124.5	39.0	24.3	265.6	2.69	268.6	129.8
33.3	18.6	256.3	2.29	229.3	124.6	39.1	24.4	265.8	2.69	269.4	129.9
33.4	18.7	256.5	2.30	230.0	124.7	39.2	24.5	266.0	2.70	270.3	130.0
33.5	18.8	256.6	2.31	230.7	124.8	39.3	24.6	266.2	2.71	271.1	130.1
33.6	18.9	256.8	2.31	231.5	124.9	39.4	24.7	266.4	2.72	271.9	130.2
33.7	19.0	257.0	2.32	232.2	125.0	39.5	24.8	266.5	2.73	272.7	130.3
33.8	19.1	257.2	2.33	232.9	125.1	39.7	25.0	266.7	2.73	273.5	130.4
33.9	19.2	257.4	2.34	233.6	125.2	39.8	25.1	266.9	2.74	274.3	130.5
34.0	19.3	257.5	2.34	234.4	125.3	39.9	25.2	267.1	2.75	275.1	130.6
34.1	19.4	257.7	2.35	235.1	125.4	40.0	25.3	267.3	2.76	275.9	130.7
34.2	19.5	257.9	2.36	235.8	125.5	40.1	25.4	267.4	2.77	276.7	130.8
34.3	19.6	258.1	2.37	236.5	125.6	40.3	25.6	267.6	2.78	277.5	130.9
34.4	19.7	258.3	2.37	237.3	125.7	40.4	25.7	267.8	2.78	278.3	131.0
34.5	19.8	258.4	2.38	238.0	125.8	40.5	25.8	268.0	2.79	279.1	131.1

psia	psig	°F	Bar	kPa	°C	psia	psig	°F	Bar	kPa	°C
40.6	25.9	268.2	2.80	280.0	131.2	45.7	31.2	275.4	3.15	315.0	135.2
40.7	26.0	268.3	2.81	280.9	131.3	45.8	31.3	275.5	3.16	315.9	135.3
40.9	26.2	268.5	2.82	281.7	131.4	45.9	31.5	275.7	3.17	316.8	135.4
41.0	26.3	268.7	2.83	282.6	131.5	46.1	31.6	275.9	3.18	317.7	135.5
41.1	26.4	268.9	2.83	283.4	131.6	46.2	31.7	276.1	3.19	318.6	135.6
41.2	26.5	269.1	2.84	284.3	131.7	46.3	31.9	276.2	3.20	319.5	135.7
41.4	26.7	269.2	2.85	285.1	131.8	46.5	32.0	276.4	3.20	320.5	135.8
41.5	26.8	269.4	2.86	286.0	131.9	46.6	32.1	276.6	3.21	321.4	135.9
41.6	26.9	269.6	2.87	286.8	132.0	46.8	32.3	276.8	3.22	322.4	136.0
41.7	27.0	269.8	2.88	287.7	132.1	46.9	32.4	277.0	3.23	323.3	136.1
41.8	27.1	270.0	2.89	288.5	132.2	47.0	32.6	277.2	3.24	324.3	136.2
42.0	27.3	270.1	2.89	289.4	132.3	47.2	32.7	277.3	3.25	325.2	136.3
42.1	27.4	270.3	2.90	290.2	132.4	47.3	32.8	277.5	3.26	326.2	136.4
42.2	27.5	270.5	2.91	291.1	132.5	47.4	33.0	277.7	3.27	327.1	136.5
42.3	27.6	270.7	2.92	291.9	132.6	47.6	33.1	277.9	3.28	328.1	136.6
42.5	27.8	270.9	2.93	292.8	132.7	47.7	33.2	278.1	3.29	329.0	136.7
42.6	27.9	271.0	2.94	293.6	132.8	47.9	33.3	278.2	3.30	330.0	136.8
42.7	28.0	271.2	2.94	294.5	132.9	48.0	33.3	278.4	3.31	330.9	136.9
42.8	28.1	271.4	2.95	295.4	133.0	48.1	33.4	278.6	3.32	331.9	137.0
43.0	28.3	271.6	2.96	296.2	133.1	48.3	33.6	278.8	3.33	332.8	137.1
43.1	28.4	271.8	2.97	297.1	133.2	48.4	33.7	279.0	3.34	333.8	137.2
43.2	28.5	271.9	2.98	297.9	133.3	48.5	33.8	279.1	3.35	334.7	137.3
43.3	28.6	272.1	2.99	298.8	133.4	48.7	34.0	279.3	3.36	335.6	137.4
43.5	28.8	272.3	3.00	299.7	133.5	48.8	34.1	279.5	3.37	336.6	137.5
43.6	28.9	272.5	3.01	300.6	133.6	49.0	34.3	279.7	3.38	337.5	137.6
43.7	29.0	272.7	3.01	301.5	133.7	49.1	34.4	279.9	3.38	338.5	137.7
43.9	29.2	272.8	3.02	302.4	133.8	49.2	34.5	280.0	3.39	339.4	137.8
44.0	29.3	273.0	3.03	303.3	133.9	49.4	34.7	280.2	3.40	340.4	137.9
44.1	29.4	273.2	3.04	304.2	134.0	49.5	34.8	280.4	3.41	341.4	138.0
44.2	29.5	273.4	3.05	305.1	134.1	49.7	35.0	280.6	3.42	342.4	138.1
44.4	29.7	273.6	3.06	306.0	134.2	49.8	35.1	280.8	3.43	343.4	138.2
44.5	29.8	273.7	3.07	306.9	134.3	49.9	35.2	280.9	3.44	344.4	138.3
44.6	29.9	273.9	3.08	307.8	134.4	50.1	35.4	281.1	3.45	345.4	138.4
44.8	30.1	274.1	3.09	308.7	134.5	50.2	35.5	281.3	3.46	346.4	138.5
44.9	30.2	274.3	310	309.6	134.6	50.4	35.7	281.5	3.47	347.4	138.6
45.0	30.3	274.5	3.10	310.5	134.7	50.6	35.9	281.7	3.48	348.4	138.7
45.2	30.5	274.6	3.11	311.4	134.8	50.7	36.0	281.8	3.49	349.4	138.8
45.3	30.6	274.8	3.12	312.3	134.9	50.8	36.1	282.0	3.50	350.4	138.9
45.4	30.7	275.0	3.13	313.2	135.0	51.0	36.3	282.2	3.51	351.4	139.0
45.6	31.1	275.2	3.14	314.1	135.1	51.1	36.4	282.4	3.52	352.4	139.1

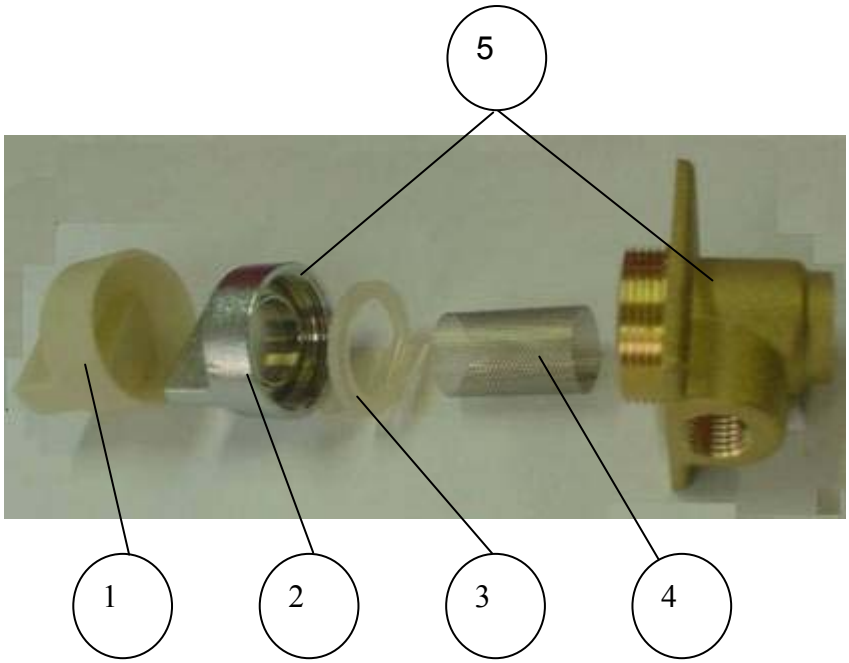
Legend:
psia ─ absolute pressure in psi
Psig ─ gauge pressure in psi
kPa ─ absolute pressure in kilo-Pascal
InHg ─ pressure (vacuum) in inch-Mercury

DOOR TIGHTENING BOLT – ASSEMBLY



No.	Description	Cat. No.
1	Bushing	LOK240-0003
2	Door tightening bolt assembly	LOK240-0007
3	Locking screw housing	LOK240-0005
4	Locking base	LOK240-0012
5	Locking housing axe	LOK240-0014
6	Door locking device pin	LOK240-0019
7	Bakelite handle	HAN071-0003
8	Closing bridge “c” clip	NUT193-0339
9	Cotter pin	LOK692-0039
10	Okolon disc	LOK240-0017
	Bushing (1) + Locking screw housing (3) + Closing bridge “c” clip (8)	LOK240-0020
	Door tightening bolt – assembly	LOK240-0001

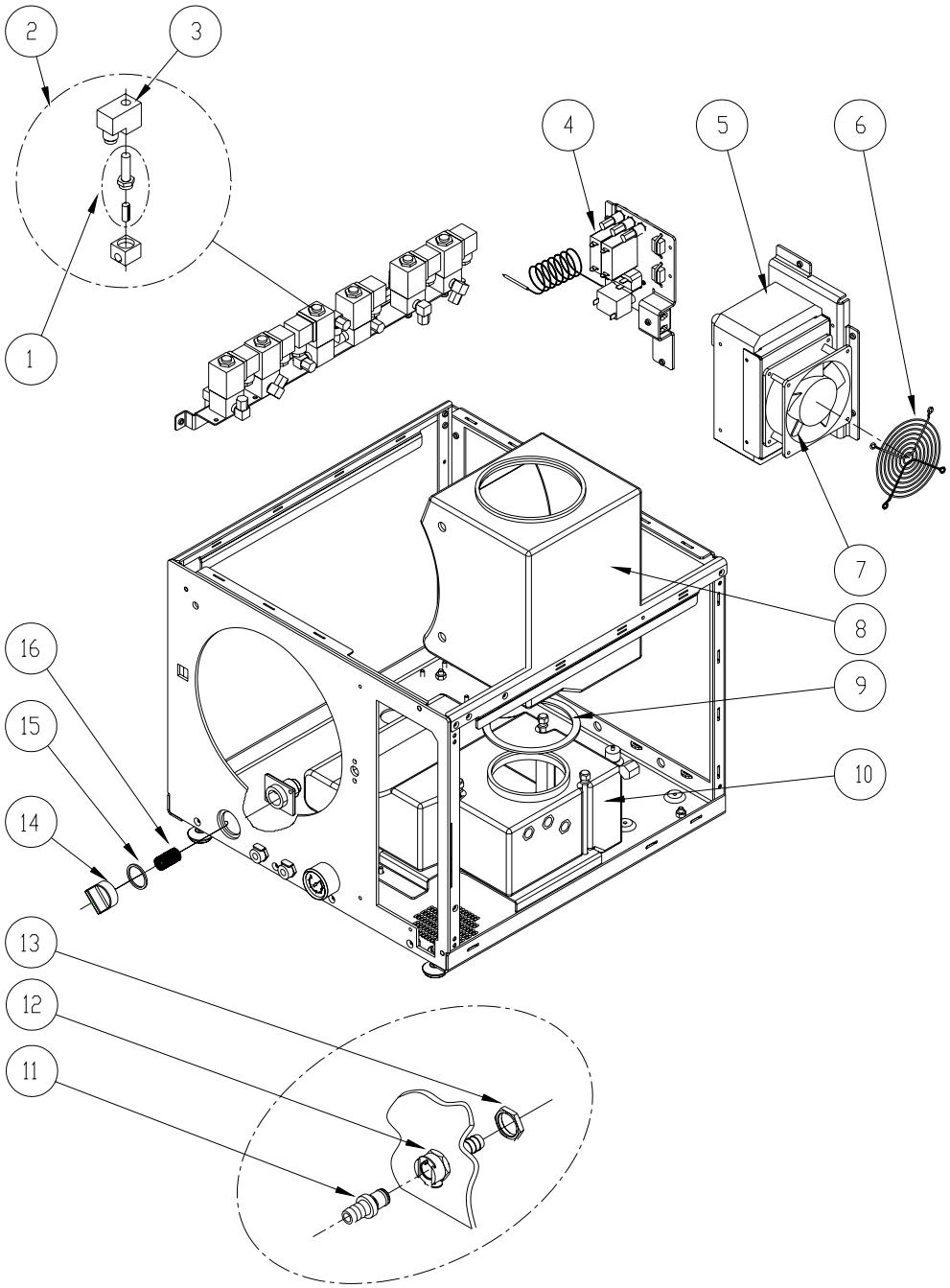
WATER OUTLET STRAINER



No.	description	Cat No.
1	Lid, Silicon, for Filter 1/4	FIL175-0044
2	Cap for ¼” strainer	FIL175-0027
3	Gasket, 4mm, Silicon, for 1/4" Strainer	GAS082-0008
4	Screen, 400 Micron	FIL175-0046
5	Strainer Housing + Cap	FIL175-0051

FRAME - EXPLODED VIEW

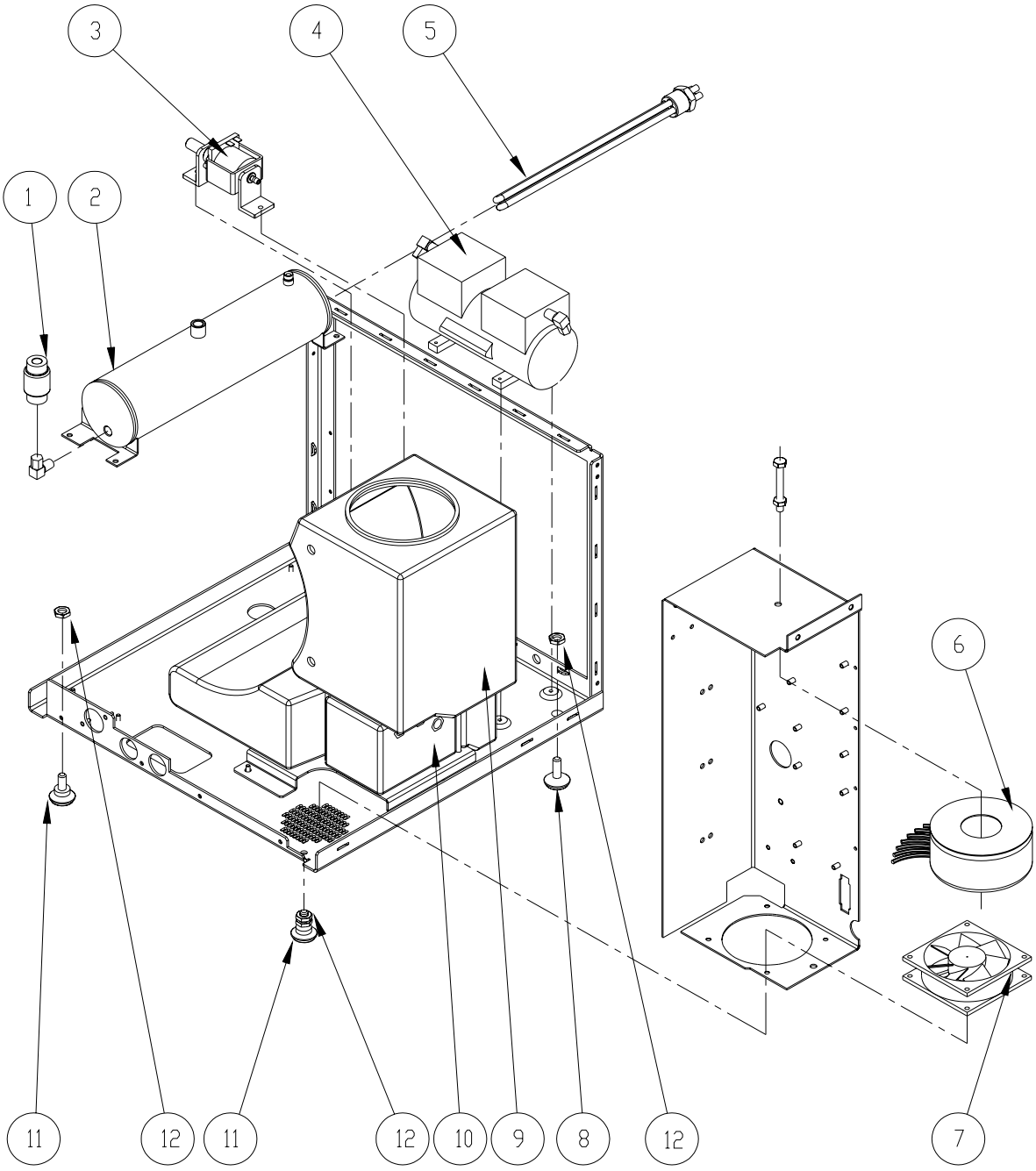
(For description – refer to the table on the next page)



No.	Cat. No.	description
1	SOL026-0029	Plunger 4 mm VAC
2	SOL026-0011	Valve, Solenoid 1/4"x4
3	SOL026-0018	Coil, solenoid 24v, 10w
4		Electrical bracket
5	ARM100-0051	Heat Exchanger, for Table Top
6	FIL175-0052	Grid, metal, fan, 12*12cm
7	CTP201-0004	Fan, 230VAC, 38*20*120, DP200A, Sunon
8	RES075-0012	Reservoir, water, upper, nova 3
9	GAS080-0038	Gasket, between top and bottom water reservoirs
10	RES075-0013	Reservoir, water, lower, nova 3
11	VLV170-0014	Cock, Drain
12	VLV170-0013	Housing, Cock, Drain
13	VLV170-0015	Nut, Cock, Drain
14	FIL175-0027	Cap for ¼” strainer
15	GAS082-0008	Gasket, 4mm, Silicon, for 1/4" Strainer
16	SRV000-0235	Screen, 400 Micron, for Strainer 1/4"

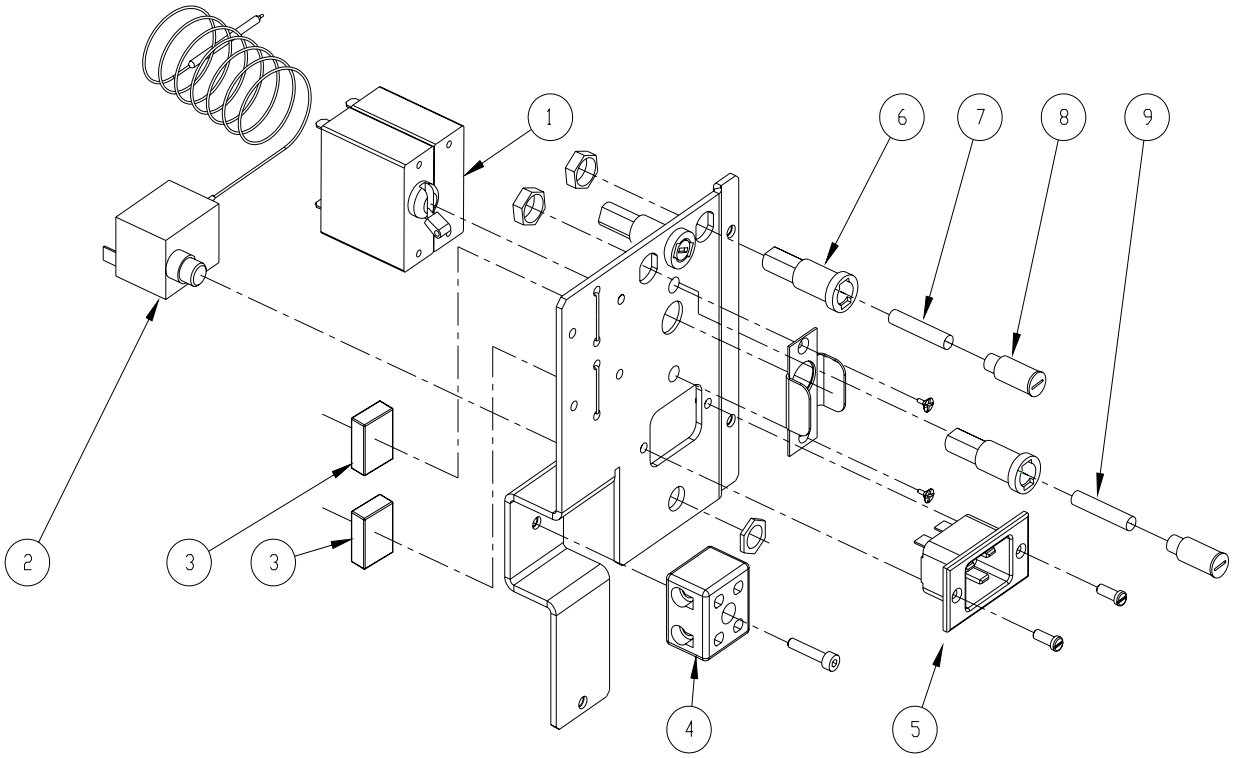
BASE - EXPLODED VIEW

(For description – refer to the table on the next page)



No.	Cat. No.	description
1	ARM172-0007	Check Valve, Spring Disk, 1/4", St.St., MONDEO
2	GEN078-3Kw	Generator
3	PUM055-0006	Pump, Water, EX7, 230V 50/60HZ, Ulka
4	PUM057-0027	Pump, Vacuum, 230v, M-2107, ASF
5	HEA016-0025	Heating Element, 230v, 1"*300, 2*1500W, Nova 3, Generator
6	ELE035-0072	Transformer, 24/220V, A25
7	CTP201-0000	Fan, Axial, 12VDC, 80mm
8	WHE070-0016	Leg, Rubber, Plug Type, 25x1/4
9	RES075-0012	Reservoir, water, upper, nova 3
10	RES075-0013	Reservoir, water, lower, nova 3
11	WHE070-0024	Leg, Rear, rubber, Nova
12	NUT192-0155	Nut, 1/4, self locking

ELECTRICAL BRACKET - EXPLODED VIEW



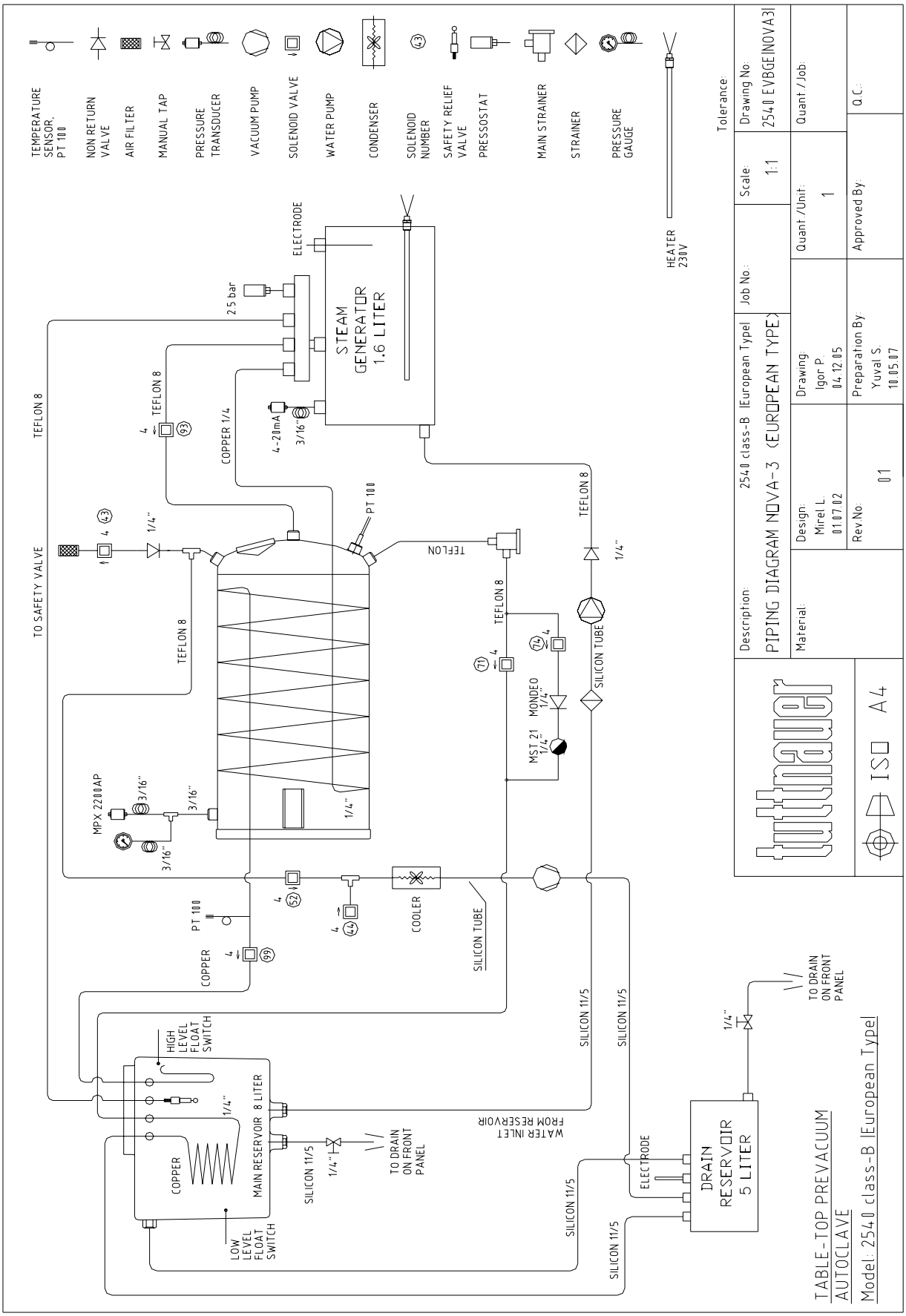
No.	Cat. No.	description
1	ELE035-0021	Circuit Breaker, Rail, 1PH, 15A, Carlingswitch
2	THE005-0014	Thermostat, CUT-OFF, TY95-H, Campini
3	CTP201-0016	Capacitor, 470nF
4	THE039-0036	Connector, Ceramic, No. 3, Onka
5	WIR040-0034	Electric Plug 5*16A 208V
6	ELE035-0001	Fuse Holder, Mini, 5*32
7	ELE035-0005	Fuse, mini, Slow Blow, 1.25A, 5*20
8	SRV000-0302	Fuse cover
9	ELE035-0074	Fuse, Slow Blow, 0.5A, 5*20

12 VALVES NUMBERING

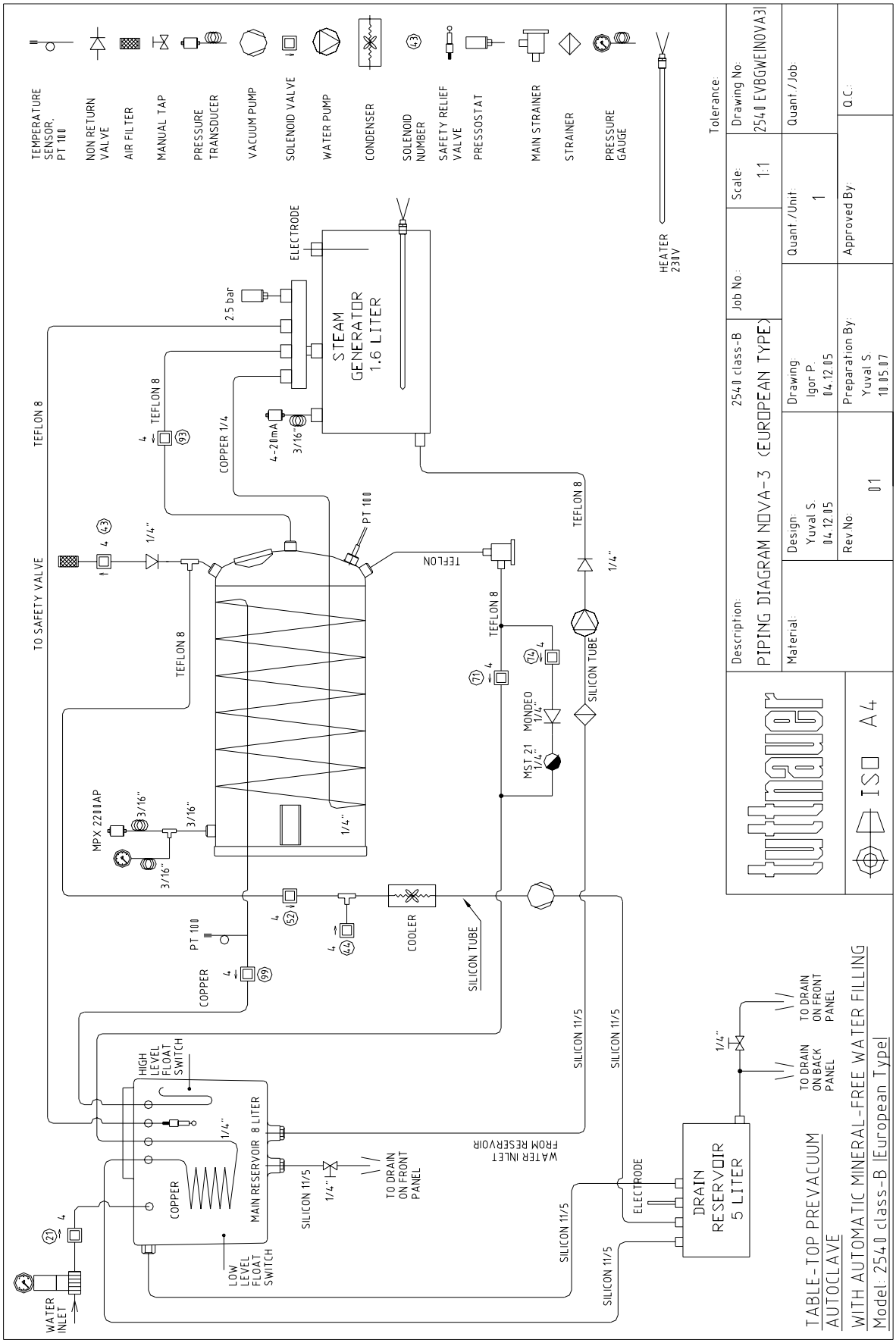
The valves in the drawing and the manual are numbered according to their function. The following list includes the valve numbers that are in use in the Nova-3 piping drawing.

2.	**MINERAL FREE WATER**	21. Mineral free water - inlet
4.	**AIR**	43. Filtered air - inlet 44. Air Inlet to Vacuum pump
5.	**VACUUM**	52. Vacuum - to pump
7.	**EXHAUST**	71. Exhaust – to reservoir 73. Fast exhaust 74. Slow exhaust
9.	**STEAM**	93. Steam – to chamber 94 – 1. Steam – to door 1 seal 99. Steam – from jacket

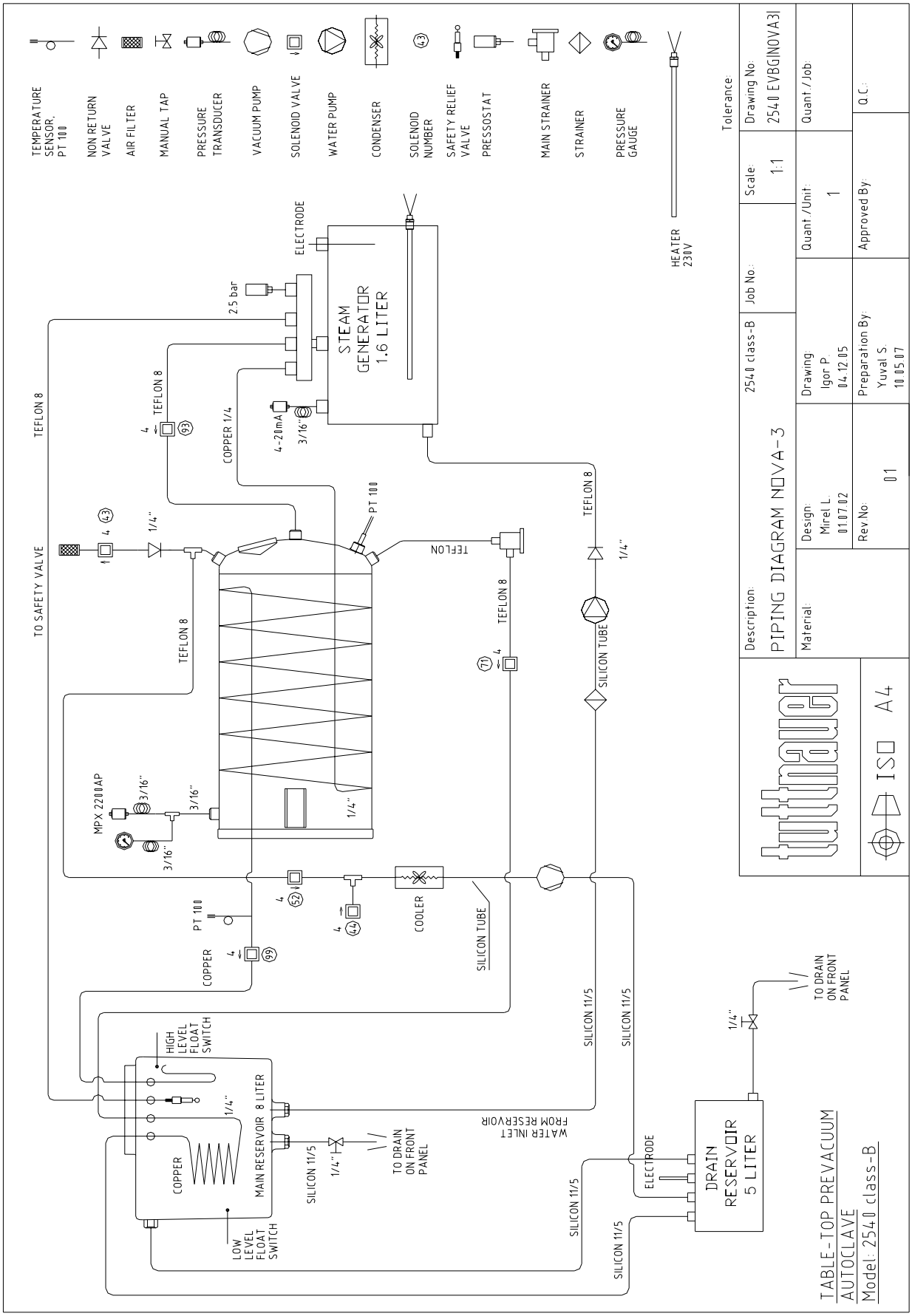
PIPING DRAWING
AUTOCLAVE WITH WASTE WATER COLLECTING RESERVOIR
FOR EUROPEAN CUSTOMERS



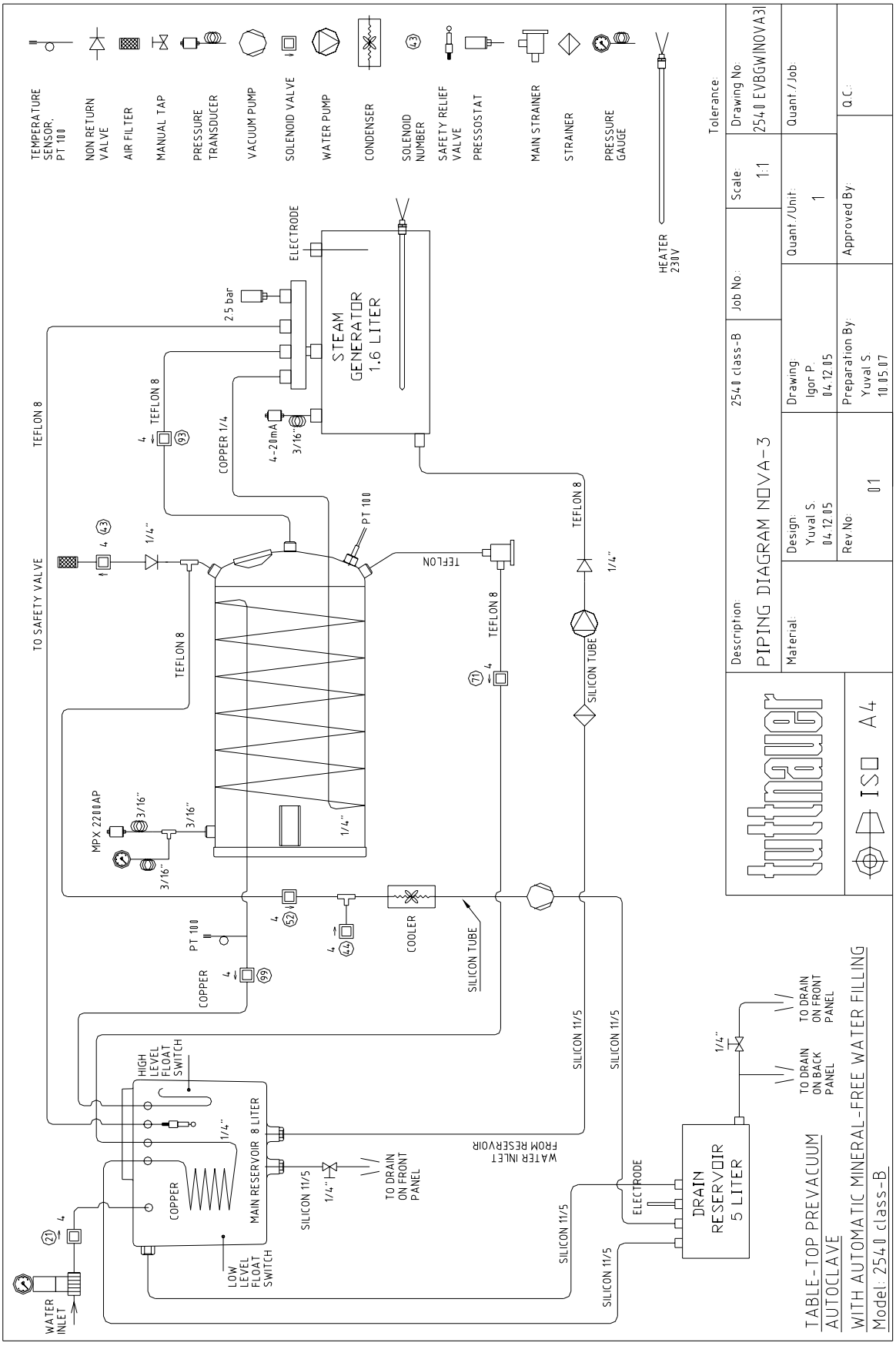
PIPING DRAWING
AUTOCLAVE WITH WASTE WATER COLLECTING RESERVOIR AND AUTOMATIC MINERAL FREE WATER FILLING - FOR EUROPEAN CUSTOMERS



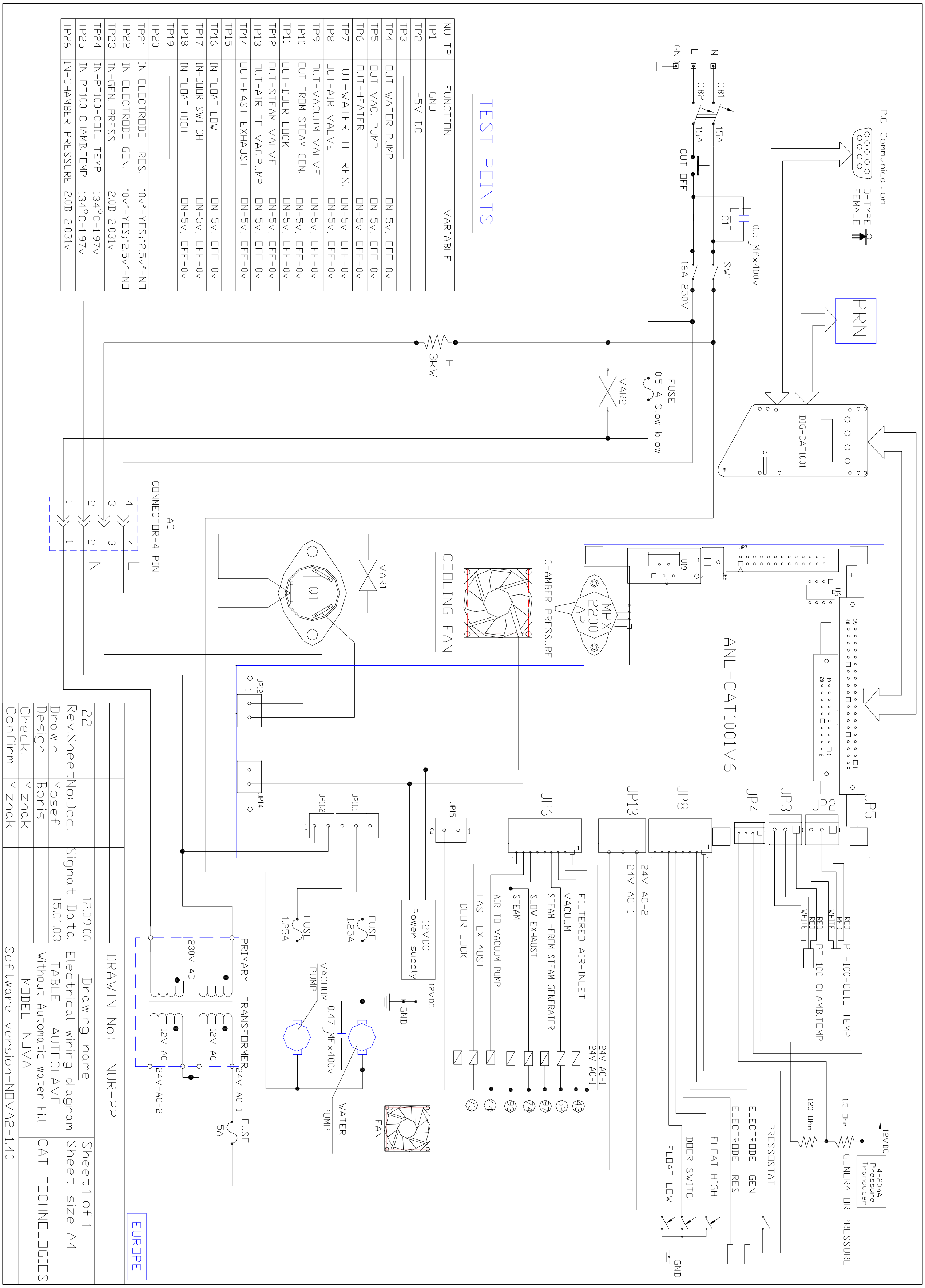
PIPING DRAWING
AUTOCLAVE WITHOUT MINERAL FREE WATER AUTOMATIC FILLING
NOT AVAILABLE IN EUROPE!!!



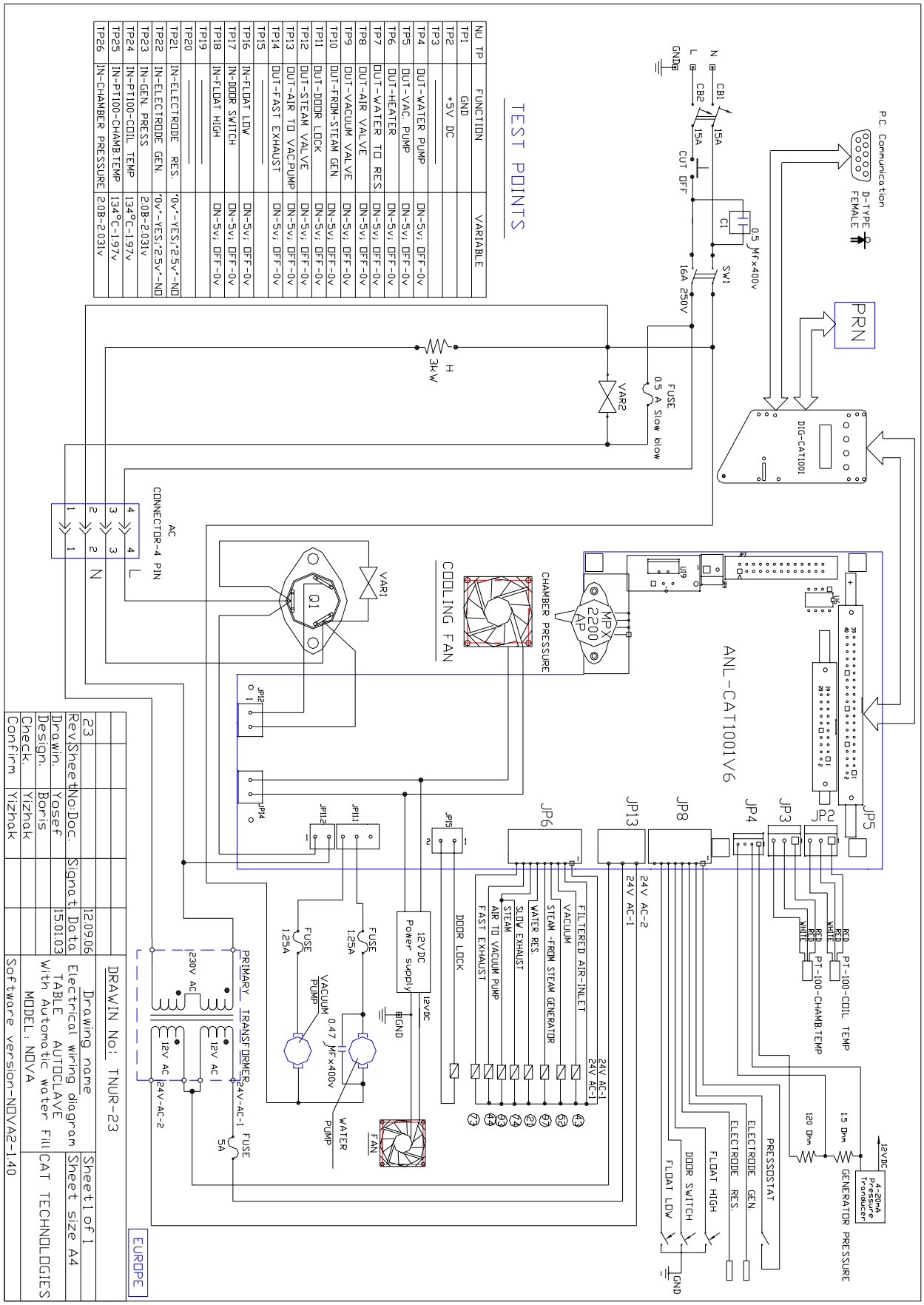
PIPING DRAWING
AUTOCLAVE WITH MINERAL FREE WATER AUTOMATIC FILLING
NOT AVAILABLE IN EUROPE!!!

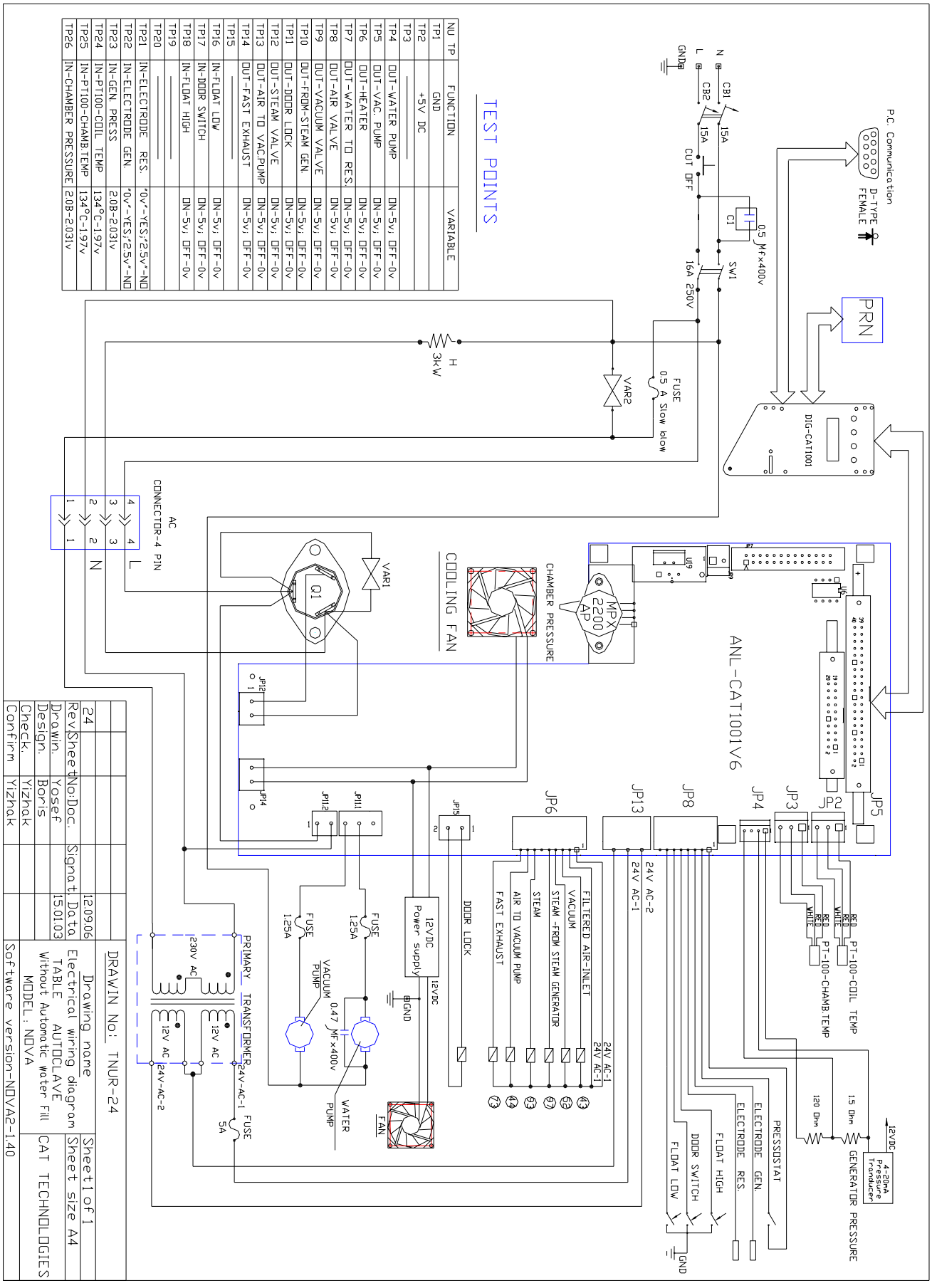


ELECTRICAL DRAWING
AUTOCLAVE WITH WASTE WATER COLLECTING RESERVOIR
FOR EUROPEAN CUSTOMERS



ELECTRICAL DRAWING
AUTOCLAVE WITH WASTE WATER COLLECTING RESERVOIR AND AUTOMATIC MINERAL FREE WATER FILLING - FOR EUROPEAN CUSTOMERS





			DRAWIN No: TNUR-24
24			
Rev	Sheet No:	Doc.	Signat.	Data	Drawing name	Sheet 1 of 1
Drawin.	Yosef			15.01.03	Electrical wiring diagram TABLE AUTOCLAVE without Automatic Water Fill MODEL: NOVA	Sheet size A4
Design.	Boris					
Check.	Yizhak					CAT TECHNOLOGIES
Confirm	Yizhak					
					Software version-NOVA2-1.40	

ELECTRICAL DRAWING
AUTOCLAVE WITH MINERAL FREE WATER AUTOMATIC FILLING
NOT AVAILABLE IN EUROPE!!!