



NÜVE SANAYİ MALZEMELERİ İMALAT VE TİCARET A.Ş.

**NC 100
VERTICAL STEAM
STERILIZER**

SERVICE MANUAL



Rev. No:00 Date: 01/2021

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SECTION 1

INTRODUCTION

1.1 PURPOSE OF THE SERVICE MANUAL

This manual includes servicing and maintenance information for NC 100 Vertical Laboratory Steam Sterilizers. It is prepared to be used by engineers and technicians who were formerly trained by only Nuve. This manual informs the engineers and technicians about the operating principles, diagnosing and repairing methods and spare part replacing.

If any problem is detected which is not identified in this manual, please contact to Nuve Service engineers.

1.2 GENERAL VIEW

The heating function on NC 100 unit is provided by means of jacket heater and generator heater. The sterilization cycle consists of the vacuum, heating, sterilization, steam discharge and drying.

Vacuum: When the device is started, the vacuum cycle starts. The chamber pressure is reduced under the ambient pressure and the air is discharged. The steam is taken in the chamber instead of the air. According to the chosen program, it repeats.

Heating: Before the sterilization cycle, the sterilization chamber is heated to reach enough steam temperature.

Sterilization: When the sterilization chamber temperature reaches the set temperature, sterilization starts. The sterilization chamber is kept at the required temperature and pressure for the set time.

Steam Discharging and Drying: During the steam discharge phase, the steam in the sterilization chamber is discharged and after the pressure has dropped to zero, the vacuum pump is operated for drying. During drying, the air intake is ensured by opening the air intake solenoid valve and taking in fresh air after it has been passed through microbiological filter.

SECTION 2

OPERATING PRINCIPLES

2.1 GENERAL VIEW

The NC 100 can be split into 5 main groups:

- Power supply
- Control unit
- Heating unit
- Water and Steam unit
- Vacuum unit

2.2 EXPLANATION OF THE FUNCTIONS

2.2.1 Power supply

The power supply values of NC 100 are listed below;

Model	Thermal switch	Power consumption	Power inlet	Chamber Heater	Generator heater
NC 100	3x16 A	7500 W	400 VAC ~ 50 Hz.	2 x 500 W	6000 W

Table 1

2.2.2 N-SmArt Programmable Control System

NC 100 N-Smart Control System consists of below units;

- N-SmArt Programmable Microprocessor PCB
- Steam Generator Water Level PCB
- Control and Display PCB

2.2.2.1 N-SmArt Programmable Microprocessor PCB

The N-Smart Programmable Microprocessor PCB operates based on “proportional” control system. This PCB, firstly, prepares the steam generator according to the chosen program. Vacuum process starts, after user gives the start command. The chamber pressure is dropped below the ambient pressure and the air in the chamber is discharged. After the vacuum process, sterilization, steam discharging and drying phases are completed by the main PCB as described in section 1.2.

The N-Smart Programmable Microprocessor PCB controls the sterilization process according to measurements of temperature and pressure sensors which are located in sterilization

chamber. It also prepares the steam generator based on the user preferences on the command and display unit.

2.2.2.2 Steam Generator Water Level PCB

Steam generator water level PCB works in conjunction with water level sensors. Steam generator water level PCB supplies water when the water level drops to the minimum level. Water supply is stopped if water level reaches to maximum level.

2.2.2.3 Control and Display PCB

The unit is controlled by N-Smart Advanced Control Panel that enables user to monitor the values which are measured by the temperature and pressure sensors in different points of the NC 100 vertical steam sterilizer. Also, Wi-Fi module is placed on this PCB.



Figure 1

F1, F2, F3 and F4 button names are starting with letter 'F' that is the first letter of function, since their functions are related to the commands on the screen.

When autoclave is switched on, white screen and Nuve logo appears for a while. Then main menu appears.



Figure 2



Figure 3

"Programs" menu is selected from the main menu by using left (F1) and right (F2) keys. Push enter (F4) key to access programs page on the left. Use left (F1) and right (F2) keys to select the program to operate. Working screen appears when enter (F4) key is pushed on the selected program.



Figure 4

The screen on the left is working screen. Sterilization chamber temperature and pressure values can be monitored on this screen. If F2 button (°C/Bar) is pressed, more detailed temperatures and pressures appear as shown on below picture.

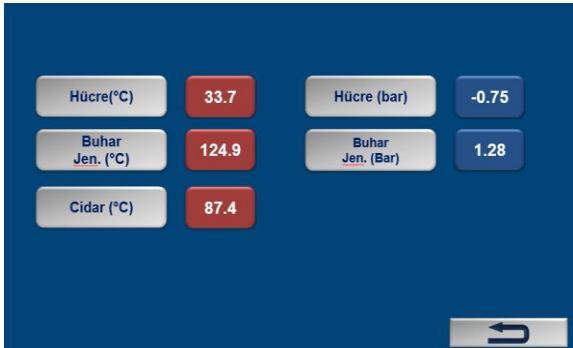


Figure 5

On this page, generator and jacket temperature could be seen as well as chamber temperature which is shown on above working page. Furthermore, generator pressure could be checked from this page. These values are important to find the source of any failure.

2.2.3 Heating unit

Heating on NC 100 is provided with generator heater and an isolated sheet heater which covers chamber. There is a surface thermostat on jacket heater and safety valve on generator for a safe running. Heating unit is controlled by N-Smart Control System and there is a soft protection as well as mechanical and electrical protections.

2.2.4 Water and Steam unit

The steam required for the sterilization is produced by boiling the distilled water which comes from the reserve tank.

The steam charge, steam discharge, air intake and vacuum line solenoid valves are controlled by the main PCB as mentioned in Section 1.2.

The sterilization chamber safety valve operates if the pressure inside the chamber exceeds 3 Bar as a result of any malfunction and it discharges the steam which causes over-pressure.

The distilled water level taken into steam generator is controlled by the two water level electrodes. Heating in the steam generator which is filled by required water level is provided by a group of heaters. Steam trap located on the steam generator takes out the condensate which is produced as a result of condensation. On the other hand, safety valve takes out the steam which causes over-pressure in the case of uncontrollable pressure.

In order to avoid the contact of sample and condensate that is caused by heat loss, a steam trap should be used and it should be situated on the upper basket.

Heater thermic guarantees the safety of the user and NC 100V by switching off the cycle in a case of malfunction in the mains phases or in heaters.

Water float in the reserve tank which contains the water required by steam generator is used to monitor the minimum and maximum water level. Reserve tank is the place to store the distilled water to be used in sterilization cycle.

The components of the water and steam unit are listed below:

- Reserve tank
- Water pump
- Water filling solenoid valve
- Steam generator
- Steam discharge solenoid valve
- Vacuum line solenoid valve
- Steam discharge / vacuum bridge solenoid valve
- Vacuum pump
- Safety valve (3 bars)
- Steam generator water level PCB

2.2.5 Vacuum Unit

Air is taken out from chamber by pre-vacuum. Vacuum line consists of vacuum pump, condenser and solenoid valves.

SECTION 3

SERVICE

Before servicing the instrument, please take the necessary precautions for your safety. Please respect to the warnings on the unit!



Please make sure that you have disconnected power of the unit before servicing.

3.1 GENERAL OVERVIEW

The failures of NC 100 can be diagnosed according to following tables. Most of the arising problems can be determined by the help of a multimeter.

The components on the main PCB must not be replaced even the failure is caused by one of the components on the main PCB. In this case, please contact with Nuve Service.

Before replacing the PCB or any control element, please make sure that the failure is not caused by weak wire and terminal connections.



Figure 6



Figure 7



Figure 8

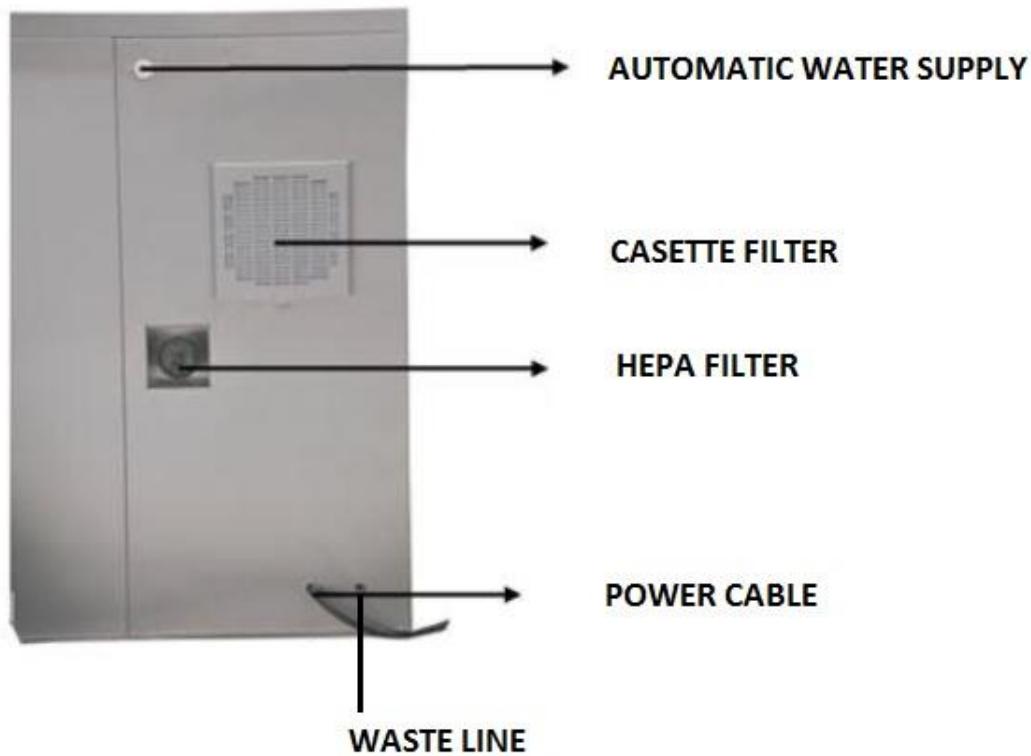


Figure 9

Automatic water supply water connection should be made as below figure.

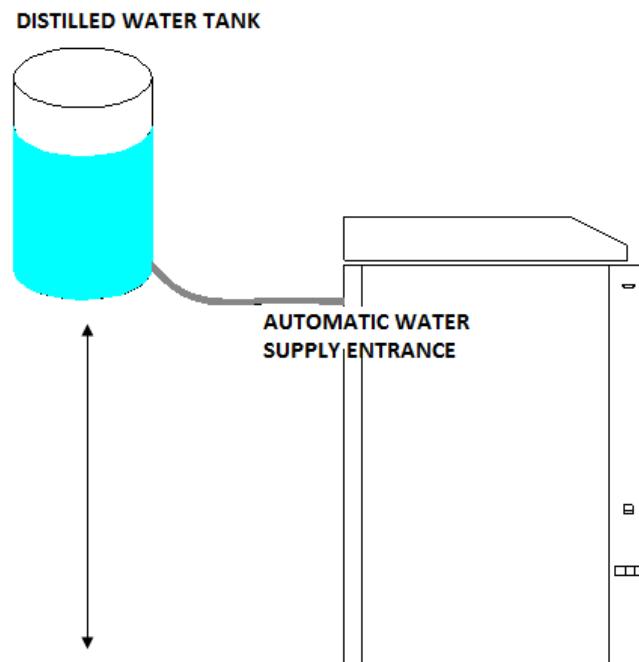


Figure 10

 Water tank should be placed as shown on above figure 10. Otherwise, water cannot be supplied by autoclave. The height of water tank from ground should be above the automatic water supply entrance.

 There should be only **distilled water** in water tank. Otherwise, it causes big problems on autoclave.

 In case of low water level on autoclave's water tank, distilled water tank supplies water to the autoclave. Water level on distilled water tank should be checked in regular intervals.

 Installation of automatic water supply unit should be made by authorized personals. The capacity of distilled water tank should be minimum 20 liter which is capacity of autoclave's water tank.

3.1.1 NÜVELIFT (OPTIONAL)

Basket loading and unloading process can be made by factory-made NuveLift.

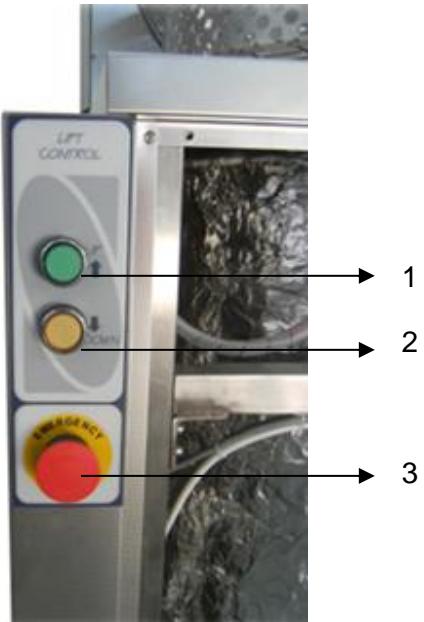


Figure 11

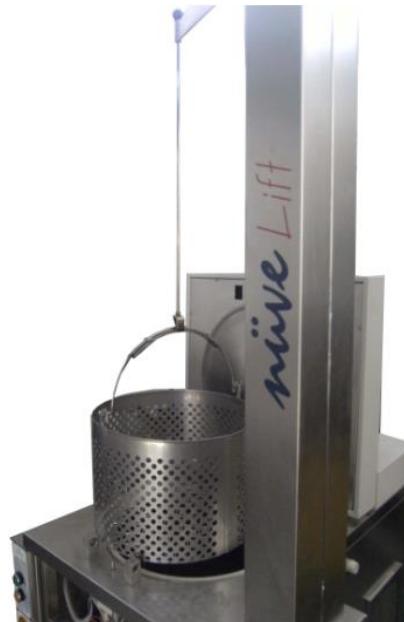


Figure 12

3.2 GENERAL FAILURES

1) The On/Off switch is ON, but it is not lightened and the display is blank.

1

- Check the communication cable between mainboard and display. Replace the cable if it is faulty.

2

- Check if mains voltage is supplied to the unit.

3

- Check the fuse. Check if there is any short circuit on any component.

4

- Check the On/Off switch. Replace the switch if it is faulty.

5

- Replace the display.

6

- Replace the mainboard.

2) The On/Off switch is on and it is lightened, but display is blank.

1

- Check communication cable between mainboard and display

2

- Wait for 2 minutes after switching on autoclave. Check if it makes sound when any button is pressed. If it sounds function, contact Nuve Service to ask and make update.

3

- Replace display board.

4

- Replace mainboard.

3) The fuse blows frequently.



- Check if there is short circuit on generator heater, jacket heater and locking system with multimeter.
- Check if there is short circuit on other electrical terminals and cables as well as vacuum pump, water pump and solenoid valve coils.

4) The lid leaks steam.



- Check if gasket is placed well into the gasket house.
- Check if there is any material between the lid and the gasket.
- Replace the lid gasket.
- Tighten the lid adjustment screw by turning it to the clockwise direction.

5) The pressure in the sterilization chamber does not increase.

- 1 •The safety valve might be open. Close the valve by turning it to the counter clockwise direction.
- 2 •Check the lid gasket. Replace it if there is steam leak from lid.
- 3 •Remove steam charge solenoid valve and clean its core.
- 4 •Check generator heater SSR by multimeter.
- 5 •Check generator heater by multimeter.
- 6 •Check steam charge solenoid valve output on mainboard. If there is not any signal, replace mainboard.
- 7 •Check generator heater SSR output on mainboard. If there is not any signal, replace mainboard.
- 8 •Replace pressure sensor.

6) The lid is not locked when the steam sterilizer starts operating.

- 1 •Check locking coil operation mechanism.
- 2 •Check if locking coil pin contacts to locking position switch. If it contacts, make adjustment on locking position switch stick.
- 3 •Check locking coil board (AC-DC) and locking coil. Replace if one of them is defective.
- 4 •Check locking coil output of mainboard by multimeter. If there is no voltage (230 VAC), replace the mainboard.

7) The lid lock pin is not released even the pressure in the chamber decreases to zero.

- 1 •Check locking coil operation mechanism.
- 2 •Check locking coil board (AC-DC) and locking coil. Replace if one of them is defective.
- 3 •Check pressure automatic for door opening. Replace it if it is defective.
- 4 •Check locking coil output of mainboard by multimeter. If there is no voltage (230 VAC), replace the mainboard.

7) Autoclave does not discharge the steam in the chamber.



- Check steam discharge filter in the chamber. If it is clogged, clean or replace.



- Remove steam discharge solenoid valve and clean its core. If problem continues, replace solenoid valve.



- Check steam discharge solenoid valve output on mainboard. If there is no 230VAC voltage after sterilization, replace mainboard.



- Remove vacuum solenoid valve and clean its core. If problem continues, replace solenoid valve.



- Check vacuum solenoid valve output on mainboard. If there is no 230VAC voltage, replace mainboard.

8) Materials are wet at the end of sterilization cycle.

1

- Follow loading rules according to User Manual. Make loading by spacing between materials.

2

- Make sure that condensate trap is placed well.

3

- Check steam charge solenoid valve output on mainboard. If there is no 230VAC voltage, replace mainboard

4

- Check surface thermostat of jacket heater if there is short circuit. If there is not short circuit, replace surface thermostat.

5

- Check if jacket heater SSR is defective.

6

- Check jacket heater SSR output on mainboard. If there is not 12VDC, replace mainboard.

7

- Check jacket heater resistance by multimeter. If it is defective, replace it.

3.3 ERROR CODES AND SOLUTIONS

1) ERROR 1: Vacuum time exceeded.

- 1 • Follow loading rules according to User Manual. Make loading by spacing between materials.
- 2 • Check lid gasket. If there are points which don't contact to lid, remove gasket and place it back well. If there is any damage on gasket, replace it.
- 3 • Check all hoses if there is any damage.
- 4 • Check safety valve if it is open. Close the valve by turning it to the counter clockwise direction.
- 5 • Replace pressure sensor.
- 6 • Remove steam discharge solenoid valve and clean its core. If problem continues, replace solenoid valve.
- 7 • Remove vacuum solenoid valve and clean its core. If problem continues, replace solenoid valve.
- 8 • Check vacuum pump SSR. Replace it if it is defective.
- 9 • Replace vacuum pump.

- 10 • Remove steam charge solenoid valve and clean its core. If problem continues, replace solenoid valve.
- 11 • Replace condenser fan.
- 12 • Check condenser fan SSR. Replace it if it is defective.
- 13 • Check condenser. Replace it if there is any leakage.
- 14 • Check condenser fan SSR output on mainboard. If there is not 12VDC voltage, replace mainboard.
- 15 • Check vacuum solenoid valve output on mainboard. If there is not 230 VAC voltage, replace mainboard.
- 16 • Check vacuum pump SSR output on mainboard. If there is not 12 VDC voltage, replace mainboard.

2) ERROR 3: Steam Discharge

1

- Clean steam discharging line filter.

2

- Replace chamber pressure sensor

3

- Remove steam discharge solenoid valve and clean its core. If problem continues, replace solenoid valve.

4

- Check steam discharge solenoid valve output on mainboard. If there is no 230VAC voltage, replace mainboard

5

- Remove vacuum solenoid valve and clean its core. If problem continues, replace solenoid valve.

6

- Check vacuum solenoid valve output on mainboard. If there is not 230 VAC voltage, replace mainboard.

3) ERROR 04: Air Intake

- 1 •Replace Hepa-Filter.
- 2 •Replace chamber pressure sensor.
- 3 •Remove air intake solenoid valve and clean its core. If problem continues, replace solenoid valve.
- 4 •Check air intake solenoid valve output on mainboard. If there is no 230VAC voltage, replace mainboard.

4) ERROR 6: Door Open

- 1 •Check door switch cable connections on both switch and mainboard side.
- 2 •Check if door contacts to the switch when door is closed. If there is no contact, make it contact.
- 3 •Replace door switch.

5) ERROR 7: Steam Generator Overheating

- 1 • Make calibration of generator temperature sensor.
- 2 • Check steam generator heater SSR.
- 3 • Check steam generator heater SSR output on mainboard with multimeter. If there is always 12VDC, replace mainboard.
- 4 • Check water level electrodes of generator. If sensor sees water even though there is not enough water, clean sensors or replace level electrodes.
- 5 • Although there is no water in generator and if there is 0 VDC on water level PCB terminals, replace water level PCB.

6) ERROR 8: Door Locking

- 1 • Check Page 17.
- 2 • Check locking mechanism.

7) ERROR 9: Insufficient Water

- 1 •Add water to water tank if water level is not enough.
- 2 •Check float in water tank. Replace it if it is defective.
- 3 •Check water pump SSR. Replace it if it is defective.
- 4 •Replace water pump
- 5 •Remove water pump solenoid valve and clean its core. Replace it if it is defective.
- 6 •Check water pump SSR output on mainboard with multimeter. If there is not 12VDC, replace mainboard.
- 7 •There is water in water tank, but display shows insufficient water or Input/Output page on Service Page shows water level is minimum. Check water level sensor sticks or water level electrodes.
- 8 •Check water level board of generator. If water level is on maximum and if there is not 0 VDC on minimum output of mainboard, replace water level board.

8) ERROR 10: Broken Sensor PT1, PT2, PT3, BT1

- 1 •Check if there is any damage on sensor cables or weak connection.
- 2 •Replace sensor.
- 3 •Replace mainboard.

9) ERROR 11: Pre-Heating

- 1 •Check jacket temperature sensor.
- 2 •Check jacket heater SSR.
- 3 •Check jacket heater SSR output on mainboard. If there is not 12VDC, replace mainboard.
- 4 •Check jacket heater resistance by multimeter.
- 5 •Check if there is short circuit on jacket heater surface thermostat. If there is short circuit, replace it.

10) ERROR 12: Pre-Heating High Temperature

- 
- 1 • Check jacket temperature sensor.
 - 2 • Check jacket heating SSR.
 - 3 • Check jacket heater SSR output on mainboard. If there is not 12VDC, replace mainboard.

11) ERROR 16: Power Failure

- 
- 1 • In case of power failure, pressure is taken out by air filter line if chamber is pressurized. In this case, it is recommended filter to be sterilized at next cycle.

12) ERROR 17: Heater Failure

- 1 • Check heater thermic if it is active.
- 2 • Check heater resistance by multimeter. Replace heater if there is short circuit between body and heater. Replace if heater has a strange resistance.
- 3 • If heater thermic is active, check thermic NC contact output by multimeter. If there is short circuit, replace thermic.
- 4 • Check heater failure input on mainboard. If there is short circuit, replace mainboard.

13) ERROR 18: Steam Generator High Pressure

- 1 • Check steam charge solenoid valve if it is always closed.
- 2 • Check heater SSR and mainboard-heater SSR output if there is always voltage.
- 3 • Check generator temperature sensor if it reads correct.
- 4 • Check water level sensors in generator if they work well.

14) ERROR 19: Low Temperature

- 1 •Check chamber temperature - pressure relation and inform Nuve Service.
- 2 •Check generator temperature - pressure relation and inform Nuve Service.
- 3 •Clean or replace steam trap.
- 4 •Check if there is any leak on chamber.
- 5 •Remove steam charge solenoid valve and clean its core. If problem continues, replace solenoid valve.
- 6 •Remove steam discharge solenoid valve and clean its core. If problem continues, replace solenoid valve.

15) ERROR 20: High Temperature

- 1 •Remove steam charge solenoid valve and clean its core. If problem continues, replace solenoid valve.
- 2 •Check sensor connection terminals. Check sensor according to temperature-pressure diagram. (Section 8.1). If there is any wrong, contact with Nuve Service.
- 3 •Check steam charge solenoid output on mainboard by multimeter. If there is always 12 VDC, replace mainboard.

16) ERROR 21: Low Pressure

- 1 • Check and make loading according to user manual.
- 2 • Check door gasket. If there is loose contact, fit the gasket very well. If it has deformation, replace it.
- 3 • Check stem generator temperature sensor according to temperature-pressure diagram (Section 8.1). If something is wrong, contact with nuve service for calibration.
- 4 • Check pressure sensor according to temperature-pressure diagram. If something is wrong, contact with nuve service for calibration.
- 5 • Replace the pressure sensor
- 6 • Remove steam charge solenoid valve and clean its core. If problem continues, replace solenoid valve.
- 7 • Check steam charge solenoid valve output on mainboard by multimeter. If there is not 12 VDC, replace mainboard.

8

- Check the safety valve. If valve is open, close it.

9

- Remove the steam discharge/vacuum bridge solenoid valve and clean its core. Replace it if it is defective.

10

- Check if steam generator SSR is defective. Replace it if it is defective.

11

- Check steam generator SSR output on mainboard by multimeter. If there is always 12 VDC, replace the mainboard.

12

- Check steam generator water level sensors. Replace if they are defective.

13

- In spite of there is water in steam generator, if there is 6 VDC on terminals of water level board, replace water level board.

17) ERROR 22: High Pressure

1

- Remove steam charge solenoid valve and clean its core. If problem continues, replace solenoid valve.

2

- If there is not relation between temperature and pressure according to temperature-pressure diagram, contact with Nuve Service for calibration.

3

- Check steam charge solenoid output on mainboard by multimeter. If there is always 12 VDC, replace mainboard.

18) For units with automatic water supply system; Insufficient Water

1

- Check distilled water line between autoclave and water tank.

2

- Check water supply solenoid valve. Replace if it is defective.

3

- Check automatic water supply output on mainboard by multimeter. If there is not voltage, replace mainboard.

3.4 GENERAL WARNINGS

In case of gasket and hepa filter replacement;

Go to Memory from Menu. Select “Cycle Info”. Go to “Gasket Cycle Left”. Press and hold F4 button for about 20 seconds. It will be reset. Go to “Hepa Filter Cycle Left”. Press and hold F4 button for about 20 seconds. It will be reset.

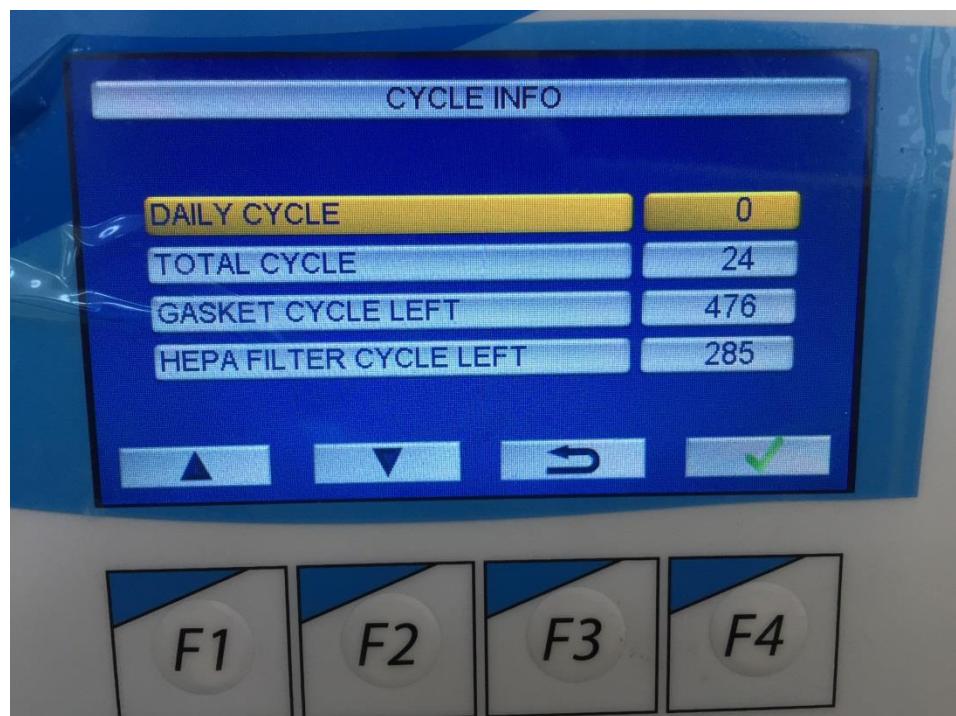


Figure 13

SECTION 4

SPARE PART REPLACEMENT



The unit should be plugged out before replacing any part.

4.1 MAINBOARD REPLACING



Figure 14

- Disconnect all the cables from mainboard terminals.
- Disconnect the display flat cable from mainboard side.
- Take out the mainboard.
- Place the new mainboard and make the connections carefully based on electrical circuit diagram.(see Section 5)
- Connect display cable back.

4.2 DISPLAY REPLACING



Figure 15

- Disconnect all the connections on the display.
- Unscrew the 2 screws on the display and take it out.
- Place the new display.
- Connect all the cables back.

4.3 THERMOCOUPLE REPLACING (PT-CHAMBER (PT-1), PT-JACKET (PT-2), PT- GEN (PT- 3))



Figure 16 – PT-Jacket



Figure 17 – PT-Generator

- Remove left panel.
- Disconnect the cables of thermocouple.
- Remove the old thermocouple and connect new thermocouple.
- Connect sensor of thermocouple to connection nut with liquid seal. Make sure that thermocouple cable is not broken after connection.
- Make terminal connection of thermocouple to mainboard carefully according to circuit diagram.

4.4 SOLENOID VALVE REPLACING

4.4.1 Solenoid Valves

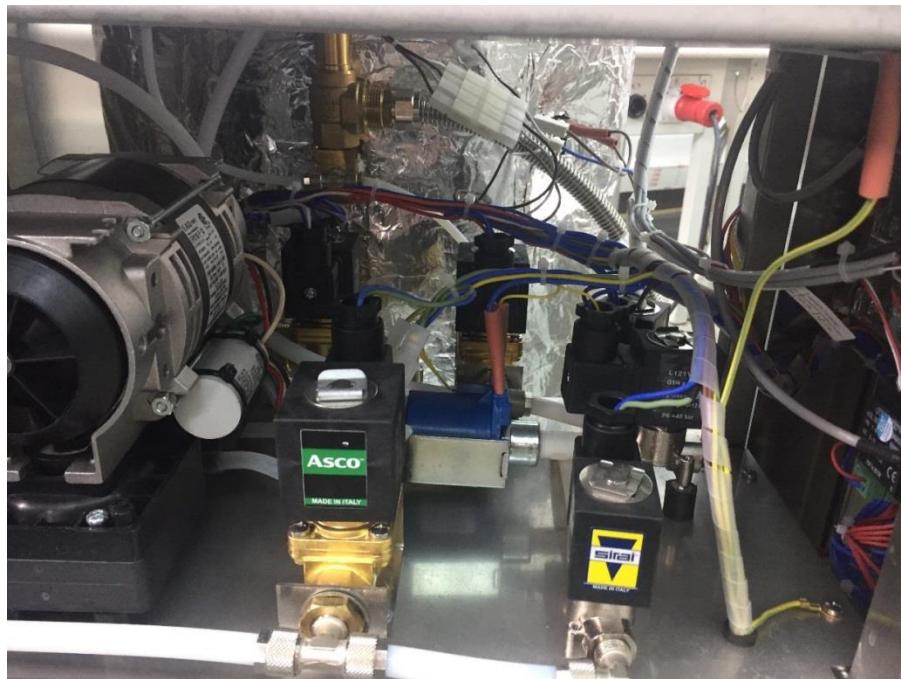


Figure 18

- 1-Vacuum pump solenoid valve
- 2-Steam discharge solenoid valve
- 3-Steam generator water supply solenoid valve
- 4-Air intake solenoid valve
- 5-Steam charge solenoid valve
- 6-Steam discharge / Vacuum bridge solenoid valve

4.4.1.1 Steam generator water supply solenoid valve replacing

- Remove the left panel.
- Make sure that generator pressure is zero before replacing.
- Unscrew solenoid valve coil socket.
- Unscrew the mounting screw of solenoid valve.
- Remove the solenoid valve by keeping water pump stable.
- Connect new solenoid valve by liquid seal on arrow way.
- Connect solenoid valve coil socket.

4.4.1.2 Steam discharge solenoid valve replacing

- Remove the left panel.
- Unscrew the solenoid valve coil socket.
- Unscrew the mounting screw of solenoid valve.
- Remove the solenoid valve.
- Connect new solenoid valve by liquid seal on arrow way.
- Connect solenoid valve coil socket.

4.4.1.3 Steam discharge / Vacuum bridge solenoid valve replacing

- Remove the left panel.
- Unscrew the solenoid valve coil socket.
- Unscrew the mounting screw of solenoid valve.
- Remove the solenoid valve.
- Connect new solenoid valve by liquid seal on arrow way.
- Connect solenoid valve coil socket.

4.4.1.4 Vacuum pump solenoid valve replacing

- Remove the left panel.
- Unscrew the solenoid valve coil socket.
- Unscrew the mounting screw of solenoid valve.
- Remove the solenoid valve.
- Connect new solenoid valve by liquid seal on arrow way.
- Connect solenoid valve coil socket.

4.4.1.5 Air intake solenoid valve replacing

- Remove the left panel.
- Unscrew the solenoid valve coil socket.
- Unscrew the mounting screw of solenoid valve.
- Remove the solenoid valve.
- Connect new solenoid valve by liquid seal on arrow way.
- Connect solenoid valve coil socket.

4.4.1.6 Chamber steam supply solenoid valve replacing

- Remove the left panel.
- Make sure that generator pressure is zero before replacing.
- Unscrew solenoid valve coil socket.
- Unscrew the mounting screw of solenoid valve.
- Remove the solenoid valve by keeping water pump stable.
- Connect new solenoid valve by liquid seal on arrow way.
- Connect solenoid valve coil socket.

4.5 FILTER REPLACING

- Remove the left panel. Unscrew the filter.
- Disconnect the tubes.
- Connect the new filter on arrow way.



Figure 19

4.6 VACUUM PUMP REPLACING

- Remove the left panel.
- Disconnect the cables from mainboard terminals.
- Disconnect the tubes of vacuum pump.
- Unscrew the 4 screws of vacuum pump.
- Place the new vacuum pump. Make cable and tube connections.



Figure 20

4.7 WATER PUMP REPLACING

- Remove the left panel.
- Disconnect the water pump cable and solenoid valve socket.
- Disconnect the water pump inlet hose
- Unscrew the water pump and solenoid valve.
- Remove the water pump with solenoid valve.
- Connect the new water pump to solenoid valve and make tube and cable connections.

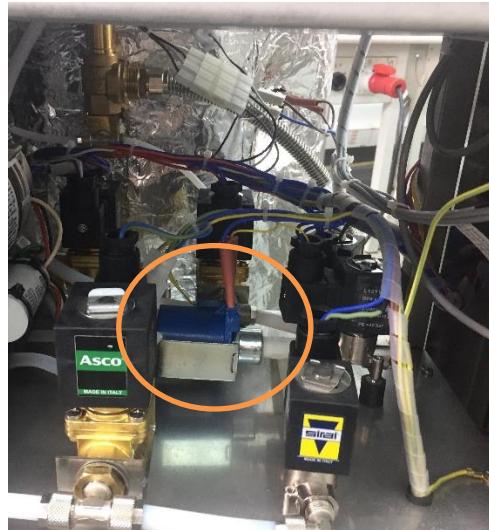


Figure 21

4.8 SSR REPLACING

- Remove the left panel.
- Disconnect the wires from SSR.
- Remove the SSR by unscrewing mounting screws.
- Place the new SSR and make wire connection according to circuit diagram.



Figure 22

4.9 SAFETY VALVE REPLACING

- Remove the left and back panel.
- Make sure that steam generator is not pressurized before removing safety valve.
- Remove connection nut of safety valve by keeping hose adapter stable.
- Remove the safety valve by rotating left with a wrench.
- Place the new safety valve carefully.



Figure 23

4.10 WATER LEVEL SENSOR OF WATER TANK REPLACING

- Remove the left panel.
- Disconnect the cables of sensor and remove the water tank.
- Remove the sensor from water tank by a wrench.
- Place the new sensor and make cable connection according to circuit diagram.



Figure 24

4.11 PRESSURE SENSOR REPLACING

- Make sure that generator is not pressurized and then remove the left panel.
- Remove the water tank.
- Disconnect the cables of pressure sensor from mainboard.
- Remove the pressure sensor from its place.
- Place the new sensor and make cable connection according to circuit diagram.

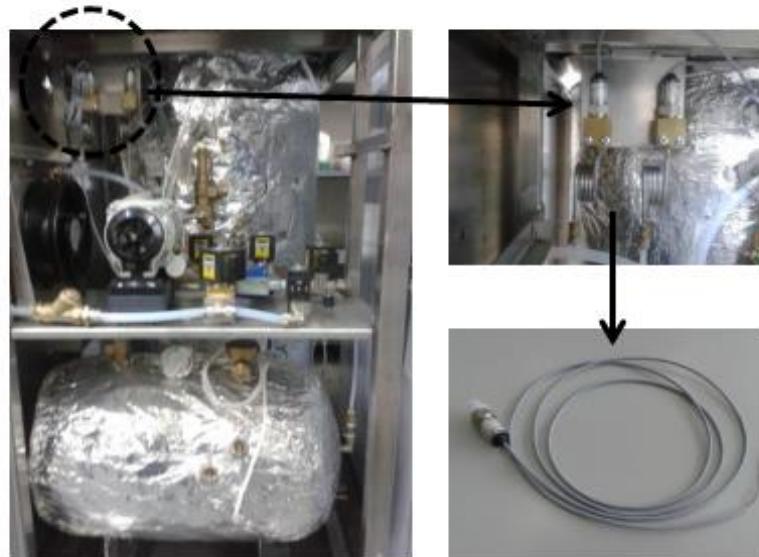


Figure 25

4.12 COOLING FAN REPLACING

- Remove the left panel firstly and then remove the back panel.
- Disconnect the cables of cooling fan.
- Remove the fan by unscrewing.
- Put the new fan and screw it.



Figure 26

4.13 THERMIC RELAY REPLACING

- Remove the left panel.
- Remove the board panel.
- Disconnect the cables of thermic relay.
- Move the thermic relay up by holding its body and remove it.
- Make cable connections of new thermic relay and put it to board panel.



Figure 27

4.14 CONDENSER REPLACING

- Remove the side panel.
- Remove the back panel.
- Disconnect the condenser carefully.
- Unscrew the condenser holder sheet and remove it.
- Put the new condenser.



Figure 28

4.15 SURFACE THERMOSTAT REPLACING

- Remove the front panel.
- Disconnect the terminal connections of surface thermostat.
- Remove the isolation around the thermostat and remove the thermostat.
- Put the new thermostat and make terminal connections.

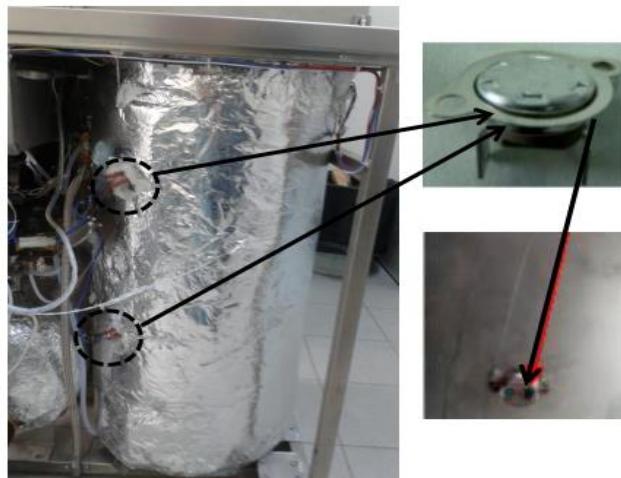


Figure 29

4.16 STEAM TRAP REPLACING

- Make sure that the pressure of steam generator is zero before replacing steam trap.
- Remove the left panel and disconnect the steam trap tube carefully.
- Disconnect the union on steam trap.
- Put the new steam trap.



Figure 30

4.17 DOOR SWITCH REPLACING

- Remove the right panel.
- Disconnect switch cables and unscrew the door switch.
- Screw the new door switch and make cable connections.



Figure 31

4.18 LOCKING COIL REPLACING

- Remove the right panel.
- Disconnect the cable on locking coil.
- Take out the locking coil by unscrewing.
- Separate the locking pin from coil by wrench.
- Mount locking pin to new locking coil.
- Mount locking coil to its place and make its cable connections.
- Check if locking pin presses locking position switch when door is unlocked. Make necessary adjustment.



Figure 32

4.19 JACKET HEATER REPLACING

- Remove the outer panels.
- Disconnect the jacket heater cables.
- Separate the isolation material carefully.
- Take out the jacket heater by pulling back jacket heater holder clamp.
- Place the new jacket heater by clamping.
- Make the cable connections carefully.
- Place the isolation material by sitting on thermostat.

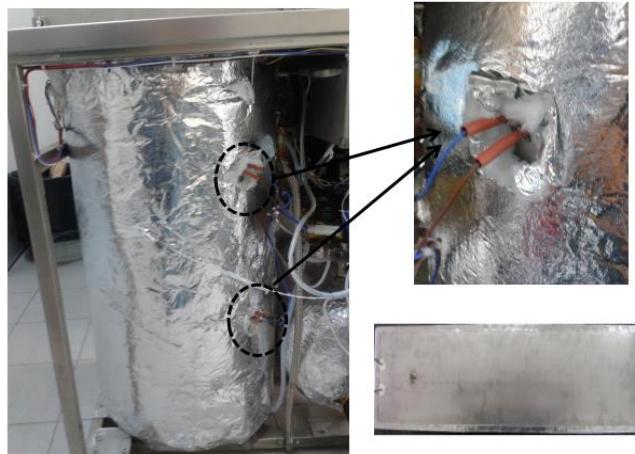


Figure 33

4.20 STEAM GENERATOR HEATER REPLACING

- Make sure that pressure is zero in generator. After you sure that pressure is zero, discharge the generator by opening valve under the generator.
- Remove the outer panels.
- Disconnect the heater cables.
- Clean if generator has calcification or lime.
- Put the new heater and make cable connections.

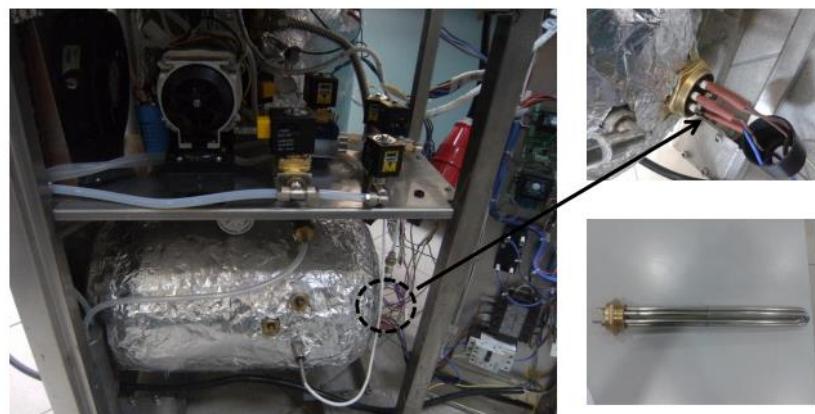


Figure 34

4.21 GENERATOR MANOMETER REPLACING

- Make sure that pressure is zero in generator. After you sure that pressure is zero, discharge the generator by opening valve under the generator.
- Remove the outer panels.
- Disconnect the input union of manometer.
- Remove the manometer nut by untightening.
- Remove the manometer from generator.
- Put the new manometer and make connections.

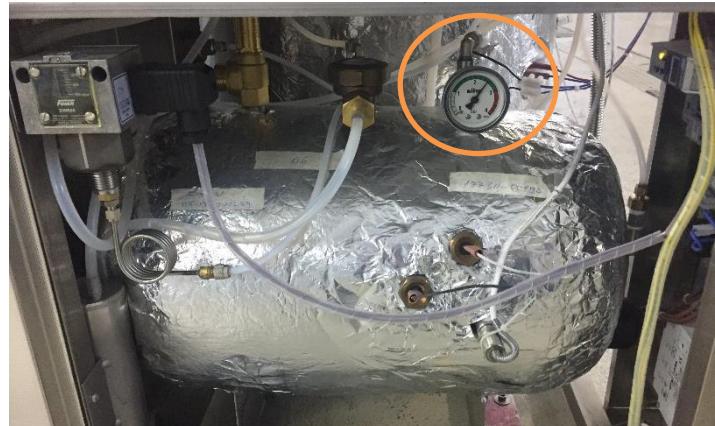


Figure 35

4.22 WATER LEVEL PCB REPLACING

- Remove the outer panels.
- Disconnect the cables on water level PCB.
- Take out the PCB by pulling back from corner pins.
- Put the new PCB and make connections.



Figure 36

SECTION 5

CIRCUIT AND FLOW DIAGRAM

5.1 ELECTRICAL CIRCUIT DIAGRAM

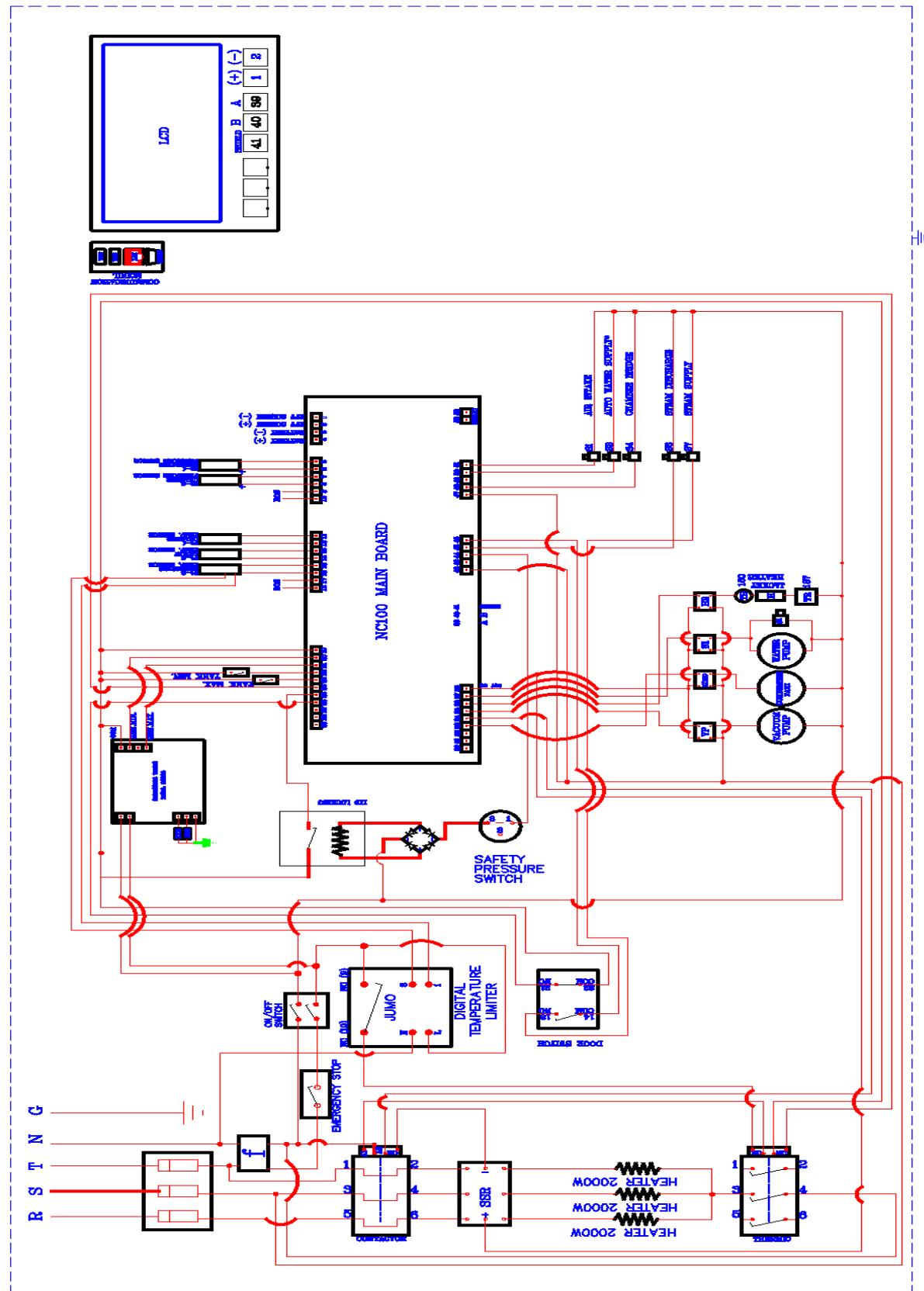


Figure 37

5.2 WATER AND STEAM FLUID SCHEME

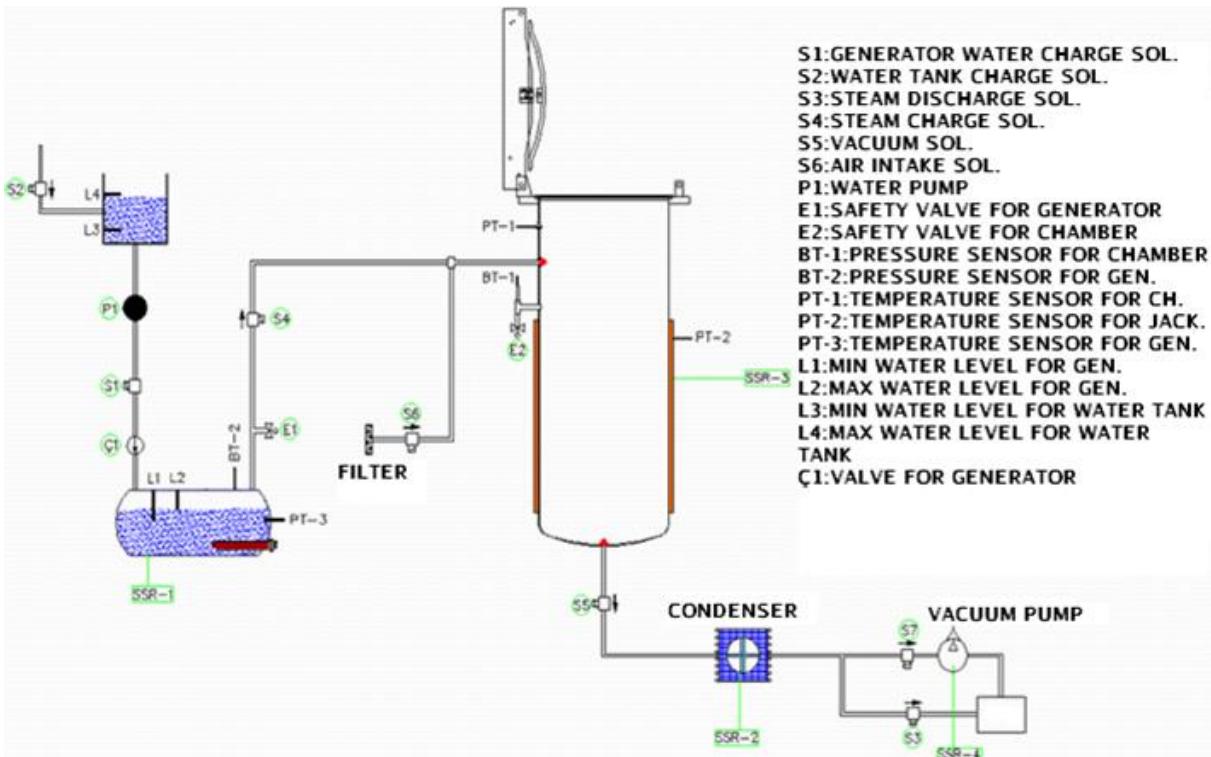


Figure 38