



NÜVE SANAYİ MALZEMELERİ İMALAT VE TİCARET A.Ş.

**NC 300 / NC 430 / NC 570
NC 710**

STEAM STERILIZERS

USER'S MANUAL



Z14 K25 285 Rev.No: 08 Rev.Date: 01/2018

Dear Nüve User,

We would like to take this opportunity to thank you for preferring this Nüve product. Please read the operating instructions carefully and keep them handy for future reference.

Please detain the packing material until you see that the unit is in good condition and it is operating properly. If an external or internal damage is observed, contact the transportation company immediately and report the damage. According to ICC regulations, this responsibility belongs to the customer.

While you are operating the instrument please;

1. obey all warning labels,
2. do not remove warning labels,
3. do not operate damaged instrument,
4. do not operate instrument with a damaged cable,
5. do not move instrument during operation.

In case of a problem contact your Nüve agent for an authorized service or maintenance.

The validity of the guarantee is subject to compliance with the instructions and precautions described in this manual.

Nüve reserves the right to improve or change the design of its products without any obligation to modify previously manufactured products.

Information contained in this document is the property of Nüve. It may not be duplicated or distributed without our permission.

NÜVE
SANAYİ MALZEMELERİ
İMALAT VE TİCARET A.Ş.

Saracalar Mah. Saracalar Kümeevleri No: 4/2

Akyurt 06750

ANKARA / TURKEY

Tel : (90.312) 399 28 30 (pbx)

Fax : (90.312) 399 21 97

Sales : sales@nuve.com.tr

Technical Service: nuveservice@nuve.com.tr

WARRANTY CERTIFICATE

1. Nüve warrants that the equipment delivered is free from defects in material and workmanship. This warranty is given for a period of two years. The warranty period begins from the delivery date.
2. Warranty does not apply to parts normally consumed during operation or general maintenance or any adjustments described in the operating instructions provided with the instrument.
3. Nüve does not accept any liability in case where the goods are not used in accordance with their proper intent.
4. The warranty may not be claimed for damages incurred during the shipment, for damages resulting from improper handling or use, abuse, fire, liquid spillage, tampering or unauthorized repairs by any persons, use of defective or incompatible accessories, exposure to abnormally corrosive conditions, use of the product in non-standard environmental conditions, including but not limited to failure to meet requirements of ambient temperature, lubrication, humidity or magnetic field influences, from the defects in maintenance, negligence, bad functioning of auxiliary equipment, in the case of force majeure or accident and incorrect power supply.
5. Any injury, loss or damage caused; due to a failure resulting from negligence of the instructions given in this manual; is beyond the scope of the warranty conditions.



BEFORE OPERATING THE INSTRUMENT THIS MANUAL SHOULD BE READ CAREFULLY.



THE VALIDITY OF THE GUARANTEE IS SUBJECT TO THE OBSERVATION OF THE INSTRUCTIONS AND PRECAUTIONS DESCRIBED IN THIS MANUAL.

INFORMATION CONTAINED IN THIS DOCUMENT IS THE PROPERTY OF NÜVE. IT MAY NOT BE DUPLICATED OR DISTRIBUTED WITHOUT PERMISSION.

PLEASE REGISTER ONLINE TO VALIDATE YOUR WARRANTY:

To register your warranty online, please visit our webpage www.nuve.com.tr and fill in the “Warranty Registration Form”.

CONTENT

	Page
1. INTRODUCTION	5
1.1. USE AND FUNCTION	5
2. TECHNICAL SPECIFICATIONS	6
2.1. TECHNICAL SPECIFICATIONS TABLE	6
3. PRECAUTIONS AND LIMITATIONS ON USE	6
4. SYMBOLS AND LABELS	7
5. INSTALLATION	8
5.1. ENVIRONMENTAL CONDITIONS	8
5.2. HANDLING AND TRANSPORTATION	8
5.3. UNPACKING	10
5.4. MAINS SUPPLY	11
5.5. POSITIONING	11
5.6. GENERAL PRESENTATION	12
5.7. CONNECTION TO THE MAINS, WATER AND AIR SUPPLY	15
5.7.1. CONNECTION TO THE MAINS	15
5.7.2. CONNECTION TO WATER SUPPLY	15
5.7.3. CONNECTION TO AIR SUPPLY	15
6. OPERATING PRINCIPLES	15
6.1. PRIOR TO OPERATION	15
6.2. OPERATION PHASES	23
6.3. SAMPLE REPORT	24
6.4. INSTRUCTIONS ON DRYING	25
6.4.1. DRYING IN STERILIZATION CONTAINERS	25
6.4.2. TEXTILES	26
6.4.3. INSTRUMENTS	26
6.4.4. LOADING THE AUTOCLAVE	26
6.4.5. LOADING CONTAINERS WITH SOFT STERILIZATION PACKAGES	27
6.4.6. STACKING STERILIZATION CONTAINERS	28
7. PERIODIC MAINTENANCE AND CLEANING	28
7.1. PERIODIC MAINTENANCE	28
7.2. PERIODIC CONTROL	28
7.3. CLEANING	28
8. DISPOSAL MANAGEMENT CONCEPT	30
9. TROUBLESHOOTING	30
9.1. WARNING MESSAGES AND EXPLANATIONS	30
9.2. ERROR CODES	30
10. ELECTRICAL CIRCUIT DIAGRAM	33

1. INTRODUCTION

1.1. USE AND FUNCTION

NC 300, NC 430, NC 570, NC 710 steam sterilizers are used at operating theatres of hospitals, laboratories, medical and dental departments of universities, at medical waste purification facilities and for pharmaceutical, biotechnological, veterinary sciences as well as for food sector.

NC 300, NC 430, NC 570, NC 710 steam sterilizers may be utilized for sterilization of packed or unpacked, porous or hollow loads of textile, metal, glass and rubber material that can be sterilized using pressurized and saturated steam. The units come with built-in operating programs for the above mentioned loads and a special program for liquid sterilization.

The jacket system situated outside the useful volume of the unit maintains a homogenous temperature distribution within the sterilization chamber. This jacket is also used to pre-heat system prior to sterilization thus decreasing the sterilization duration. All parts which are exposed to steam and water are made of stainless materials.

The system is fully automated, precluding any need for user involvement.

NC 300, NC 430, NC 570, NC 710 steam sterilizers are designed and manufactured in accordance with international directives and EN 285, EN 61010-1, EN 61010-2-040, EN 60601-1-6, EN 61326-1, EN 62304, EN 62366-1, EN ISO 14971, EN 50419, EN ISO 15223-1 and EN 13445 standards under the supervision of total quality management systems ISO 9001 and ISO 13485.

This device is in compliance with WEEE Regulation.

If the warnings mentioned in this manual are not considered, NUVE will not be responsible from their results.

2. TECHNICAL SPECIFICATIONS

2.1. TECHNICAL SPECIFICATIONS TABLE

Technical Specifications	NC 300	NC 430	NC 570	NC 710
Power Supply	400VAC, 3 phases + neutral + ground			
Power Supply Frequency	50/60 Hz.			
Power Consumption	29 kW	38 kW	50 kW	62 kW
Control System	Microprocessor			
Air Pressure	4 – 6 bar			
Chamber Material	Grade 316L stainless steel			
Generator Material	Grade 316L stainless steel			
Jacket Material	Grade 316L stainless steel			
No. of Sterilization Programs	7 standard, 1 liquid, 1 drying, 50 special			
Sterilization Temperatures (°C)	121 – 125 – 134 – 136			
Maximum Pressure	3,0 bars			
Maximum Temperature	144 °C			
Temperature Sensors	PT-100			
Test Programs	Vacuum, Bowie&Dick			
Max chamber pressure	3,0 bars			
Max Jacket Pressure	3,0 bars			
Max Generator Pressure	3,0 bars			
Volume (Liter)	300	430	570	710
STU capacity (1 STU 300x600x300 mm)	4	6	8	10
Chamber Dimensions (W x D x H), mm	635 x 722 x 655	635 x 1034 x 655	635 x 1371 x 655	635 x 1708 x 655
External Dimensions (W x D x H), mm	1140 x 1290 x 1910	1140 x 1330 x 1910	1140 x 1660 x 1910	1140 x 2000 x 1910
Weight (Kg)	860	980	1120	1260






3. PRECAUTIONS AND LIMITATIONS ON USE

The user shall pay attention to the following:

- Do not operate the instrument for purposes other than its main purpose.
- The set-up, installation, initial functioning, service, maintenance and transportation shall be handled by authorized personnel appointed by the manufacturer.

- The user shall read the user’s manual prior to initial functioning of the unit. The manual shall accompany the user until he gains full competency over the equipment.
- The user shall immediately notify the technical service in case of improper functioning of the unit.
- Electricity line is suitable for the power of device and correctly grounded power supply should be used.
- Only original spare parts and original accessories supplied by Nüve should be used.
- NC 300, NC 430, NC 570, NC 710 steam sterilizers are suitable for the sterilization of textile, rubber, heat resistant glass, plastics and liquids. Material other than these and heat susceptible objects shall not be used.
- The liquid to be sterilized in the NC 300/430/570/710 sterilizer should have a boiling point of 100 ° C at sea level at 760 mmHg (1 atm) atmospheric pressure.
- Proper sterilization program shall be selected in accordance with the load type and the sterilization load shall be disinfected prior to being placed into the unit.
- The heat produced by the sterilizer should be evacuated by a suction type ventilation system.

4. SYMBOLS AND LABELS

	<p>Symbol in the operating instructions:</p> <p>Attention, general hazard area. This symbol refers to safety relevant warnings and indicates possibly dangerous situations. The non-adherence to these warnings can lead to material damage and injury to personal.</p>
	<p>Notified Body: KIWA Belgelendirme Hizmetleri A.Ş. (İTOSB) İstanbul Tuzla Organize Sanayi Bölgesi Tepeören Mevkii 34597 Tuzla- İstanbul / TURKEY</p>
	<p>Symbol in the operating instructions: This symbol refers to important circumstances.</p>
	<p>Type B protection.</p>
	<p>Before operating the instrument this manual should be read carefully.</p>

Labels on the product:



Earthed Wall Sockets



5. INSTALLATION

5.1. ENVIRONMENTAL CONDITIONS

The instrument is designed to operate safely under the following conditions:

- Indoor use only
- Ambient temperature: 5°C to 40°C
- Maximum relative humidity for temperature up to 31°C: 80%
- Maximum altitude: 2000 m
- Temperature for maximum performance: 15°C / 25°C

5.2. HANDLING AND TRANSPORTATION

All handling and transportation must be carried out by using proper equipment and experienced staff. The instrument must be supported underneath and never be turned upside down.



Prior to installation, do not remove styrofoams wrapped around sterilizer to protect the control panel and outer body of sterilizer.

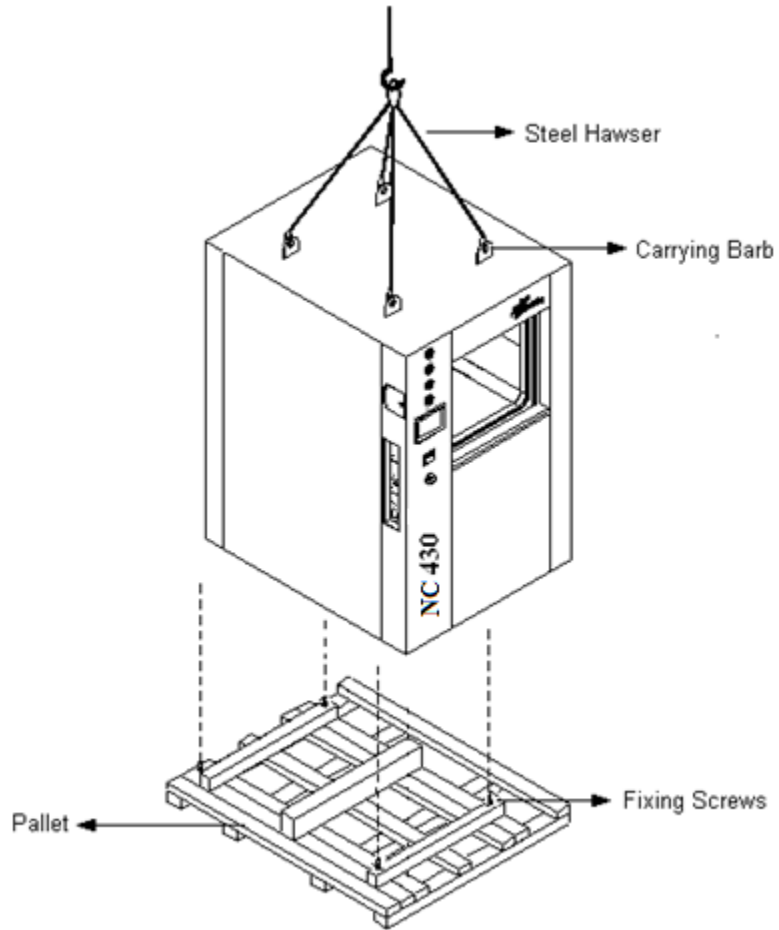


Figure 1

- Lift the device from carrying bars with a crane help.



The capacity of moving hawsers should be chosen according to weigh of the device.

- The weight of the device with pallet:
 - NC 300: 950 kg
 - NC 430: 1050 kg
 - NC 570: 1200 kg
 - NC 710: 1500 kg
- Unfix 4 fixing screws which are under the pallet.
- Remove the pallet carefully.
- After removing the pallet set down the device slowly and flatly.

- Move the device intended place with wheel help.
- After carry away the device to assembler unit, accommodate the fixing screws and together with sitting stillages place the device on the floor smoothly like below figure. Please connect to electric, air, water and drain connections.

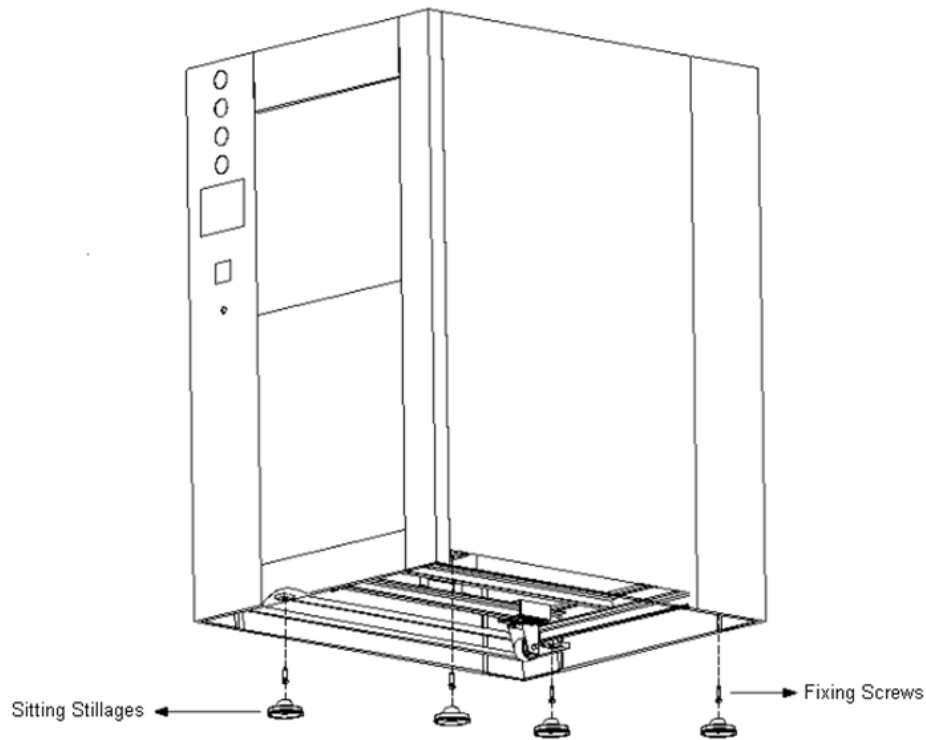


Figure 2

5.3. UNPACKING

Remove the cardboard box packing and the second nylon wrapping around the instrument. Ensure that no damage has occurred during transportation. The below mentioned are provided with the instrument, please check them;

- 1 ea. user's manual and warranty
- 1 ea. water tank
- 1 ea. tank stillage
- 1 ea. power cable
- 1 ea. water inlet hose
- 1 ea. water drain hose
- Teflon hose (5 m)
- Hepa filter
- Clamping ring

5.4. MAINS SUPPLY

The instrument requires 400V.

Please make sure that the supplied mains matches the required power ratings which are written on the name of plate of the instrument located at the back of the instrument.



Always plug-in the instrument to correctly grounded sockets.



A supply fitted with a circuit breaker should be used for protection against indirect contact in case of isolation fault.

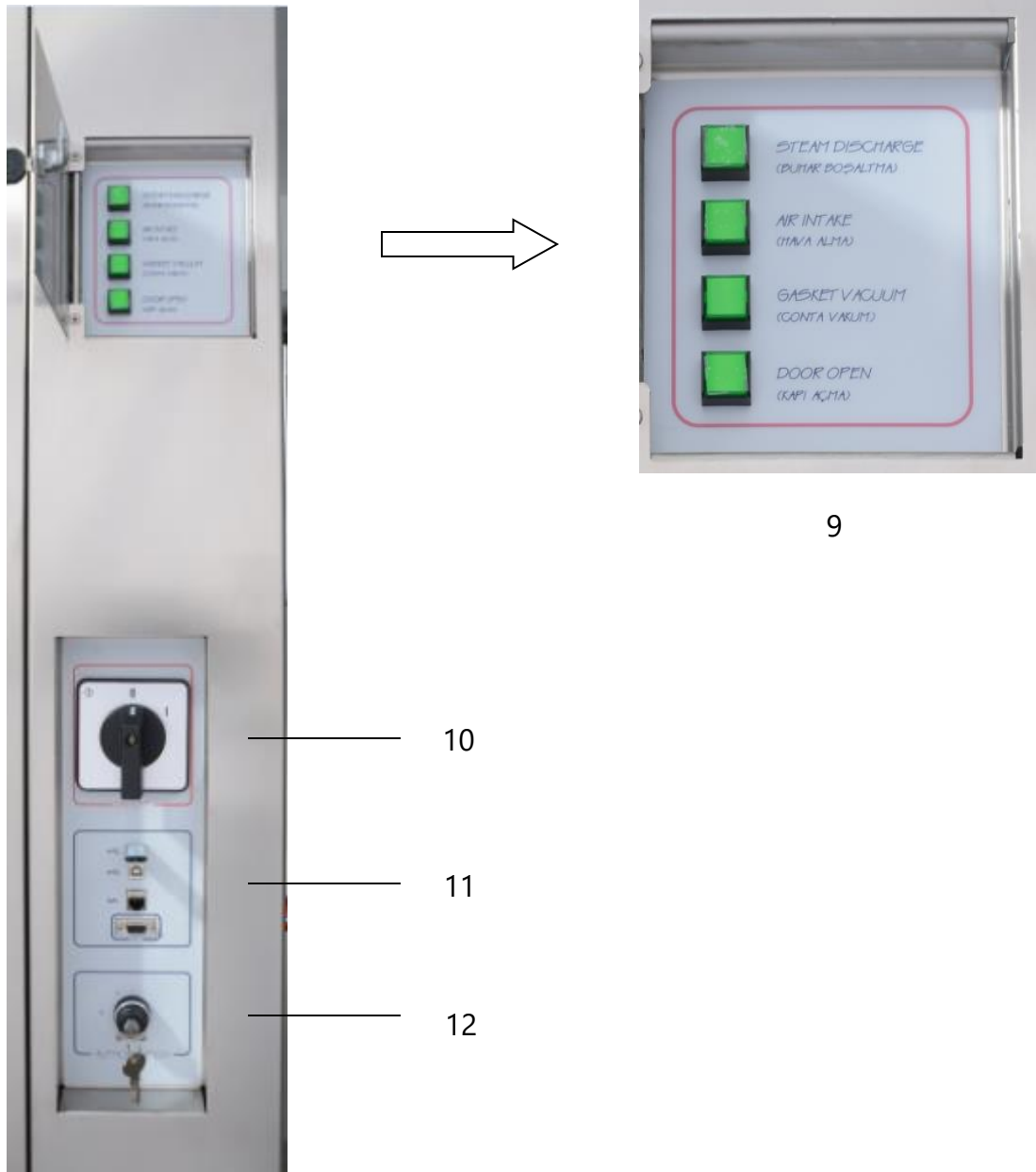
5.5. POSITIONING

- Check that the positioning is suitable for the users.
- Check that the instrument is stable on its four pedestals. If necessary, provide stable standing by adjusting the pedestal heights.
- Check that the user will be able to follow up the operation even when he deals with something else.
- Check that the positioning of the device prevents interference with other equipment in the near surrounding.

5.6. GENERAL PRESENTATION



Figure 3



9

- 1- **Chamber Manometer:** Shows the pressure in the chamber.
- 2- **Generator Manometer:** Shows the pressure in the generator that produces the steam.
- 3- **Jacket Manometer:** Shows the pressure within the jacket surrounding the chamber.
- 4- **Gasket Manometer:** Shows the pressure in the gasket channel.
- 5- **Touchscreen:** Screens having imaginary buttons on top are called touchscreens. These buttons are activated by patting the requested commands shown on the screen. It is the interface utilized by the user to communicate with the control unit that bears the information for operation.
- 6- **Panel Type Printer:** A thermal printer that is used to print the completed program or any program recorded in the memory. The output involves parameters such as the sterilization phases, pressure-temperature data during sterilization phases time and installation settings.

- 7- Emergency Stop Button:** Stops all the control functions of the unit. Pressing this button during a sterilization cycle will prevent immediate opening of the door. To open the door, the user has to discharge the pressure if the chamber is under pressure or break the vacuum inside in case the chamber is under vacuum. Then, the pressure within the gasket channel shall be released. Please see the “Manual Control Panel” section for further explanation.
- 8- Sterilization Basket:** The basket in which the materials to be sterilized are placed.
- 9- Manual Control Panel:** Activated when the “Emergency Stop Button” is pressed. The Manual Control Panel is designed to safely open the door when the Emergency Stop Button is pressed or in case of any failure of the control unit. The Manual Control Panel shall only be used by the authorized personnel or the Nüve Technical Service.
- **Steam Discharge Button:** When the chamber is under pressure, a positive value is displayed by the chamber manometer. To dissipate this pressure, the user shall press the Steam Discharge Button until the chamber pressure drops to zero. When the manometer reading becomes zero, the process is finalized by pressing the button once more.
 - **Air Intake Button:** When the chamber is under vacuum, a negative value is displayed by the chamber manometer. The chamber vacuum is broken by taking air into the chamber. To achieve this, the user shall press the Air Intake Button until the chamber pressure rises to zero. When the manometer reading becomes zero, the process is finalized by pressing the button once more.
 - **Gasket Vacuum Button:** Following the “Steam Discharge” or “Air Intake” operations which are realized in accordance with the pressure status of the chamber; the “Gasket Vacuum” step shall be commenced by pressing the “Gasket Vacuum Button” to be able to open the door. This step shall be stopped after two minutes by pressing the button again.
 - **Door Open Button:** Following the above listed steps, the “Door Open Button” shall be pressed to open the door. When the door is completely open, the function shall be terminated by pressing the button once more. The “Door Open Button” shall only be used in case the door is closed.
- 10- On-Off Switch:** Puts the unit on and off power.
- 11- Communication Unit:** Following 4 ports are available in the unit:
- USB Port-1
 - USB Port-2
 - Ethernet
 - RS 485
- 12- Authorization Key:** This key shall be in position “1” in order to be able to function the unit when it is in stand-by or to stop it while it is functioning.

5.7. CONNECTION TO THE MAINS, WATER AND AIR SUPPLY

5.7.1. CONNECTION TO THE MAINS

- The unit is fed by 3-phased network supply. Please make sure that the supplied mains match the required power ratings. If not, please provide an extra line to support.
- The neutral and grounding cables connecting the socket to the general panelboard shall be separate lines.
- Please make sure that the connection cables between the socket and the panelboard are equal or greater in cross-section than the power cables of the unit.
- The panelboard where the socket is connected shall be fuse protected.

5.7.2. CONNECTION TO WATER SUPPLY

- There exist a supply water inlet line and a waste water discharge line on the unit.
- The water from the mains shall be connected to the water inlet of the unit after being treated by a suitable water softening unit. It shall be always kept in mind that the supply water quality has a direct effect on the lifetime of the equipment.
- The waste water discharge line shall be connected to the general drain system. The piping of the drain system shall be resistant to a continuous water flow at 65°C and a temporary (2-3 minutes) water flow at 100°C.



A regulator should be used on the lines where the water supply pressure is over 4 bars.

5.7.3. CONNECTION TO AIR SUPPLY

- There is air inlet on the top of the sterilizer.
- Dry air line should be connected and it should have 5 to 6 bars of pressure.

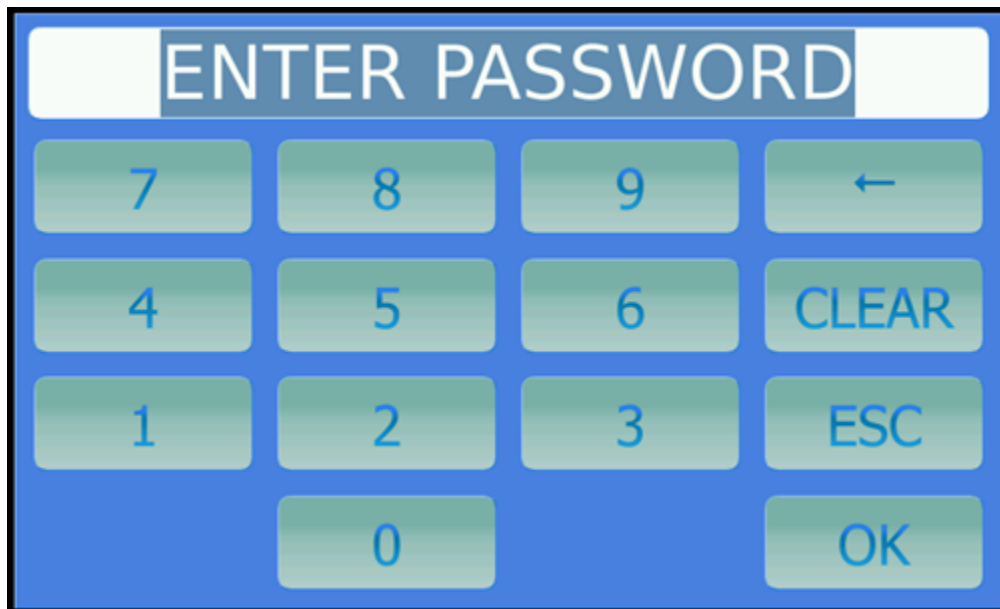
6. OPERATING PRINCIPLES

6.1. PRIOR TO OPERATION


- Turn on the unit by using the On-Off switch on the left side
- See that the microprocessor control system is activated.
- NUVE logo appears on the screen.
- After NUVE logo disappears, Menu page appears.



- Password screen is accessed when 'Start' is pushed.



- When the password is entered correctly, program screen appears.

 The password for first usage is '1111'.



- When 'TEST PROGRAMS' is pushed, the page where two test programs are listed is shown.



- When 'PRESET PROGRAMS' is pushed, the page where preset programs are listed is shown.



This control panel features a light blue background with a pattern of water droplets. At the top left is a double-left arrow button (<<). At the bottom center is a double-right arrow button (>>). Five horizontal buttons are stacked vertically, each with a number in a circle on the left and text on the right:

- 1 WRAPPED, POROUS MATERIAL 134°C - 2.1Bar
- 2 SENSITIVE MATERIAL, GLASS, PLASTIC 121°C - 1.1Bar
- 3 RESISTANT RUBBER MATERIAL 125°C - 1.4Bar
- 4 HEAVY WRAPPED MATERIAL 134°C - 2.1Bar
- 5 PRION 134°C - 2.1Bar



This control panel features a light blue background with a pattern of water droplets. At the top left is a double-left arrow button (<<). At the bottom center is a double-left arrow button (<<). Three horizontal buttons are stacked vertically, each with a number in a circle on the left and text on the right:

- 6 QUICK, UNWRAPPED MATERIAL 134°C - 2.1Bar
- 7 DRYING PROGRAM
- 8 GRAVITY 121°C - 1.1Bar

Program Name	Temperature (°C)	Pressure (Bar)	Sterilization Duration (min)	Drying Duration (min)
Wrapped, porous Material	134	2.10-2.15	7	15
Sensitive material Glass, plastics	121	1.10-1.15	20	15
Resistant rubber material	125	1.35-1.40	20	15
Heavy wrapped material	134	2.10-2.15	7	15
Prion	134	2.10-2.15	20	15
Fast, unwrapped material	134	2.10-2.15	4	3
Gravity	121	1.10-1.15	25	-
Drying	-	-	-	10
Bowie&Dick test	134	2.10-2.15	3.5	3
Vacuum test	-	-	-	-

- The corresponding program screen is displayed when a program is selected.



- On this page, the program line displays the selected program and the total time dissipated after program is started. There also exists the step line that displays the current sterilization phase (pre-vacuum, sterilization, steam discharge, air intake...) and the time dissipated since the corresponding sterilization phase has commenced.
- The user may follow the pressure and temperature from the graphics at the middle of the screen. The indicators at the right hand side of the graph shows the current temperature and

pressure values. Temperature is denoted by red, whereas the blue indicator shows the pressure.

- Sterilization is commenced by pressing the START button after choosing the requested program.
- STOP button has to be pressed to terminate a running program. If the STOP button is pressed during sterilization, the unit realizes the necessary steps in accordance with the state of pressure within the chamber and then, lets the user open the door.
- The authorization key shall be in position “1” in order to be able to function the unit when it is in stand-by or to stop it while it is functioning.
- The “**Settings**” item which is the third choice on the Menu page, takes the user to the “Settings” screen.




- The user can adjust time and date from this screen. The password to access program menu can be changed from this screen.
- The configuration for e-mail and SMS sending in case of failure is accessed on this screen.
- ‘SETUP’ button is used to access the page where the information of sterilizer is entered.
- The page below appears when ‘STANDBY’ is pushed. On stand-by mode, electricity and water is saved while the power is on. In order to activate the stand-by, enter a time between 20 and 999 minutes. Push HOLD to deactivate stand-by.



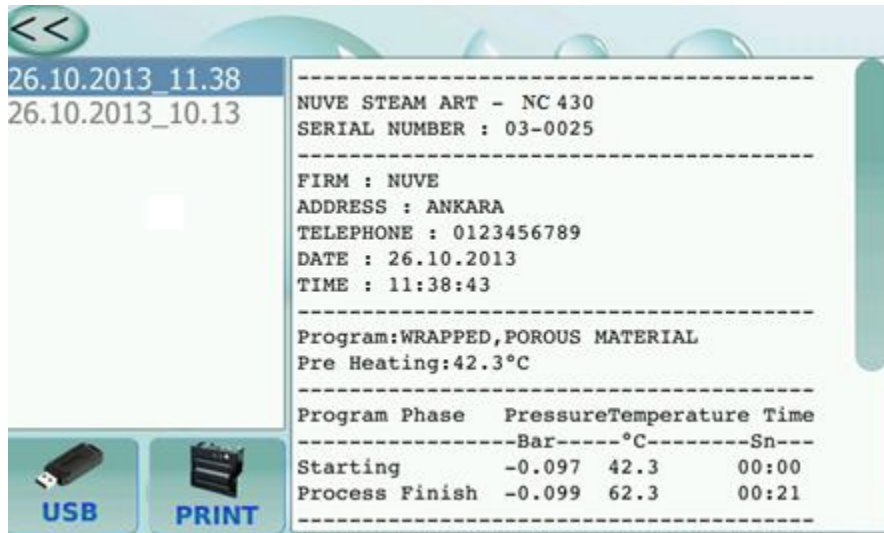
- The page below appears when 'PRIVATE PROGRAMS' is pushed on the menu page. The properties of private programs are set on this page. In order to run a private program, select 'PRIVATE PROGRAMS' in programs menu page.

A screenshot of a control panel interface showing a table of private programs. At the top left is a double-left arrow button. The table has five columns: 'PRIVATE PROGRAM NAME', 'STERILIZATION TEMP - °C', 'STERILIZATION TIME - MIN', 'PRE VACUUM PCS', and 'DRY TIME - MIN'. The rows are: 'LIQUID PROGRAM' (121, 1, 0, 0), 'KISA PROGRAM' (121, 20, 1, 25), '2' (121, 60, 0, 0), '3' (121, 60, 0, 0), and '4' (121, 60, 0, 0). At the bottom are two buttons: '<< BACK' and 'FORWARD >>'.

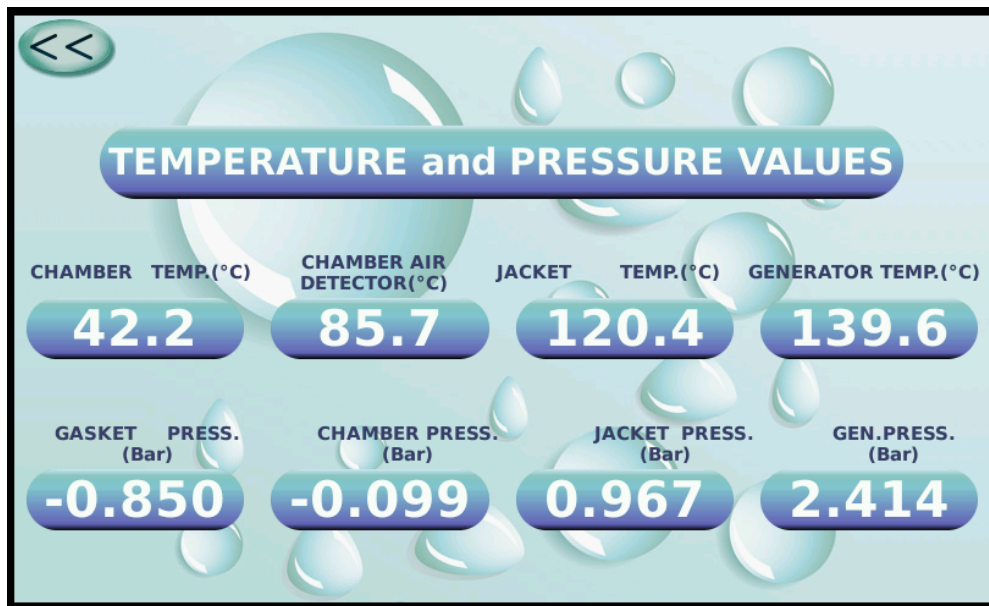
PRIVATE PROGRAM NAME	STERILIZATION TEMP - °C	STERILIZATION TIME - MIN	PRE VACUUM PCS	DRY TIME - MIN
LIQUID PROGRAM	121	1	0	0
KISA PROGRAM	121	20	1	25
2	121	60	0	0
3	121	60	0	0
4	121	60	0	0

 Liquid program is a private program therefore success of sterilization and damages that occurs on the materials which depends on parameters to be entered are user's responsibility.

- When 'MEMORY' is pushed on menu page, the records of programs are accessed.

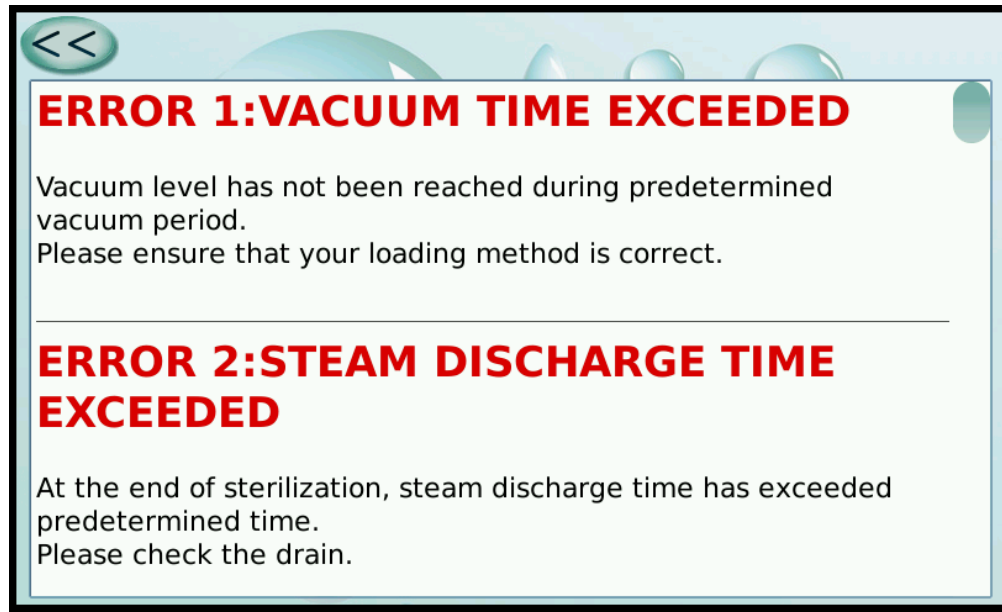


- When ‘°C / Bar’ is pushed on menu page, the page where the temperature and pressure values are listed appears.



- When ‘CALIBRATION’ is pushed on menu page, the page to do calibration for pressure and temperature values is accessed.

- When 'HELP' is pushed on menu page, the page where the possible errors with detailed explanations are listed appears.



- 'SERVIS' on menu page is password protected and it is only for authorized technical staff.

6.2. OPERATION PHASES

PREPARATION: Heating starts after the generator is filled with sufficient water. Once the temperature is high enough, the unit starts to prepare the jacket. The preparation phase may be summarized as preliminary heating of the generator and the jacket prior to sterilization.

PRE-VACUUM: As soon as the program is started, the pre-sterilization vacuum phase commences for the built-in programs with a pre-vacuum phase. The pressure in the chamber is lowered below ambient pressure by removing the air out of the chamber and steam is injected in to replace the volume of removed air.

STEAM CHARGE: Steam is injected into the chamber, to reach the steam temperature sufficient enough for sterilization.


STERILIZATION: The chamber temperature is kept at the required sterilization degree all through the sterilization phase.


STEAM DISCHARGE: The pressure in the chamber is reduced to the ambient pressure by releasing the steam in the chamber at the end of sterilization duration.

DRYING: Following the steam release, the pressure in the chamber is lowered below ambient pressure. Thus, the humidity within the chamber is eliminated throughout the drying phase.

AIR INTAKE: Following the drying phase; ambient air passing through the filter is given into the chamber to break the vacuum and raise the chamber pressure to ambient pressure.

FINALIZING: The steam in the gasket is discharged and the gasket channel is vacuumed.

 The door has to be opened upon completion of a cycle before repeating a sterilization program. Otherwise, the program will not restart.

 After sterilization, some condensate may be observed on sterile materials. It does not show that the materials are not sterile and the sterilization cycle is unsuccessful. DIN 58953 Part 7 Section 7 states that "...Small amounts of water on the surface of packages do not represent a cause for concern if they dry completely within thirty minutes after removal from a steam sterilization system..."

6.3. SAMPLE REPORT

NUVE STEAM ART - NC 430
SERIAL NUMBER : 03-0025

FIRM : NUVE A.S.
ADDRESS : ANKARA
TELEPHONE : 312-3992830
DATE : 30. 10. 2013
TIME : 12:54:51

Program : WRAPPED,POROUS MATERIAL
Pre Heating : 58.4°C

Program Phase	Pressure Bar	Temperature °C	Time Sn
Starting	-0.101	58.4	00:00
1.Pre Vacuum	-0.974	86.9	04:10
Steam Charge	0.508	104.0	04:38
2.Pre Vacuum	-0.983	89.2	08:30
Steam Charge	0.541	109.5	09:01
3. Pre Vacuum	-0.983	90.1	12:54
Steam Charge	0.513	108.1	13:23
4. Pre Vacuum	-0.979	90.1	17:13
Steam Charge	0.526	107.6	17:42
Heating	2.100	134.3	19:10
Steriliz. Start	2.100	134.3	19:10
Steriliz. End	1.986	135.4	26:09
Steam Discharge	0.093	104.8	27:10
Vacuum Drying			
Drying start	-0.707	89.1	27:55
Drying Cont	-0.714	89.2	27:56
Drying Cont	-0.984	71.6	35:24
DryingEnd	-0.985	62.5	38:16
Process Finish	-0.147	62.2	38:50

13	3	5
Year	Daily Run	Total Run

LOAD STRILE

Sterilization Time : 39:07 Min

Finish Time : 13 : 34 : 03

13 3 5

OPERATOR NAME :
SIGNATURE :

6.4. INSTRUCTIONS ON DRYING

The NC series steam sterilizers provide very good drying standards for sterilized items. Particularly difficult drying tasks (e.g. double wrapping) can also be dried to very good standards with the help of the supplementary drying function and the automatic pre-heating.



Load the sterilization bags vertically in order to have better drying results.

6.4.1. DRYING IN STERILIZATION CONTAINERS

Steam is obtained by heating the water in the sterilizer. The steam transfers heat to the instruments and sterilization container and warms these. This leads to steam condensing on the instruments and containers (Figure 4). Some of the condensation drops to the bottom of the sterilization container (Figure 5).

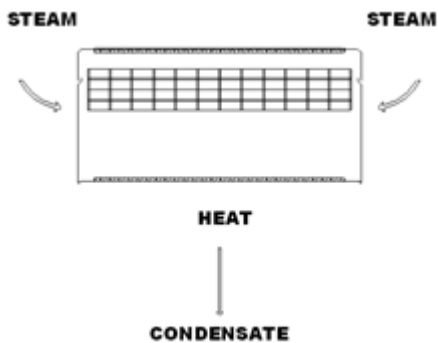


Figure 4 - Formation of condensation on the sterilization container

CONDENSATE+HEAT=STEAM

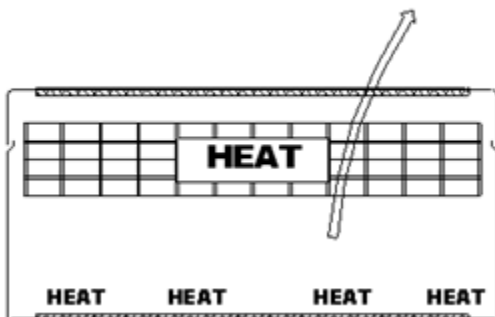


Figure 6 - Drying

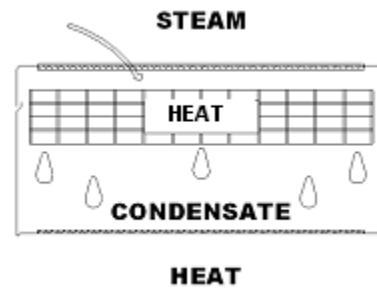


Figure 5 - Formation of condensation on sterilized objects

After sterilization, during the drying phase, all condensation must evaporate from the sterilization container and from the sterilized items. This is achieved by the transfer to the condensate of heat stored in the walls of the sterilization container and in the sterilized items themselves. It is preferable that the sterilization container be made of aluminum, as this metal stores and conducts heat well, ensuring faster drying than other materials.

6.4.2. TEXTILES

While preparing textiles for treatment in the sterilizer, care must be taken that the folds in the textiles are arranged in parallel, and that the items are packed side by side. This vertical configuration ensures that channels can form between the textile folds for the air to flow out and steam to flow in. Do not stack textiles on the top each other as this hinders the penetration of steam into the packages of textiles.

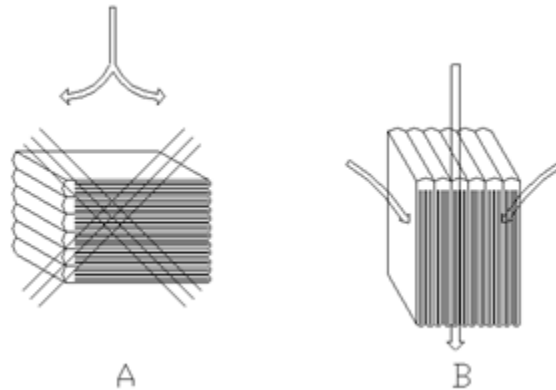


Figure 7 - Loading textiles properly

When loading sterilization containers with textile items, care should be taken ensure that they retain their vertical orientation, but that the items are not squashed together. This would prevent the formation of flow channels for air and steam. If the packages of textiles cannot be kept upright, then it might be advisable to wrap them in sterilization paper.

The textiles must not touch the sides or the base of the sterilization container, since they might become saturated with condensate.

For good drying results, the textiles should also be as dry as possible when they are placed in the autoclave. The heat stored in the chamber and sterilization container may not otherwise be sufficient to evaporate both the moisture and the condensation.

6.4.3. INSTRUMENTS

Where appropriate, instruments should be disassembled before placing them in the autoclave, as this will improve the drying results.

The use of lubricants (such as instrument oil) should be avoided unless absolutely necessary. Prior confirmation should be obtained from the manufacturer of such agents that they are in fact suitable for steam sterilization. Substances which are hydrophobic or impenetrable for steam can not only lead to poor drying results, but may also mean that the steam sterilization is unsuccessful , since not only the instruments are protected but also micro-organisms.

6.4.4. LOADING THE AUTOCLAVE

Textiles and instruments should not be sterilized together in one sterilization container. Textiles and instruments in separate sterilization containers should as far as possible not be sterilized in

the same load. However, where this is unavoidable for economic or other reasons, the following rules should be observed:

- Instruments and sterilization containers should be placed at the bottom
- Textiles should always be placed at the top
- Transparent sterilization packages and paper sterilization packages should be placed at the top (except when in combination with textiles, in which case they must be at the bottom)

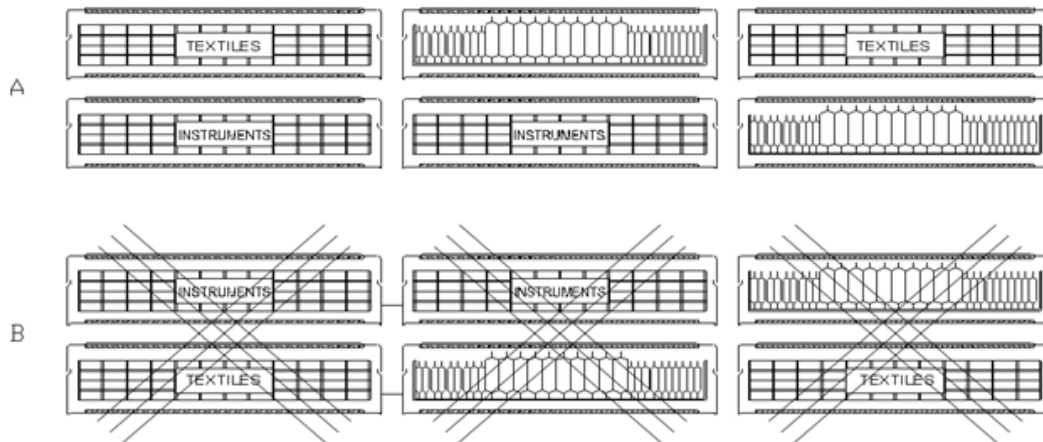


Figure 8 - Loading the autoclave

6.4.5. LOADING CONTAINERS WITH SOFT STERILIZATION PACKAGES

“Soft” sterilization packages such as paper bags or transparent sterilization packages can be sterilized either in sterilization containers or sterilization baskets. To enable better drying, arrange such soft sterilization packages side-by-side and close to each other. This allows condensation to run off the packages, while at the same time preventing time from expanded excessively, and possibly bursting at the seams.

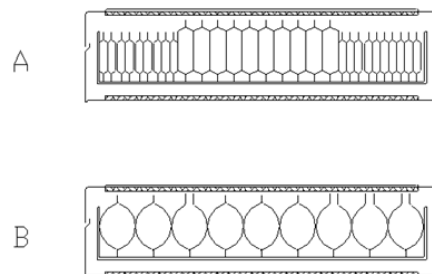


Figure 9 - Packing “soft” sterilization packages in sterilization containers

6.4.6. STACKING STERILIZATION CONTAINERS

When arranging sterilization containers, care should be taken that drops of condensate do not wet items being sterilized beneath, but can flow away to the base of the chamber. The best arrangement is a stack of sterilization containers of the same size, so that condensate can flow down the sides.

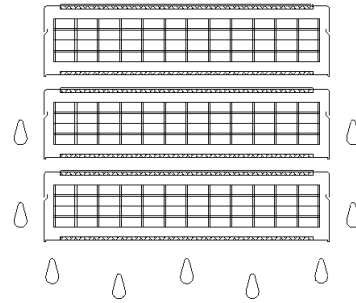



Figure 10 - Stacked sterilization containers

7. PERIODIC MAINTENANCE AND CLEANING

7.1. PERIODIC MAINTENANCE



Cleaning and periodical maintenance operations should be performed the manometer pressure is 0 bar, the lid is open position and the chamber is cold. During cleaning and maintenance operation, remove the plug from the outlet.

- All the safety valves subjected to direct vapor pressure shall be changed once in five years by the authorized personnel.
- After each 2000 runs the instrument should be controlled by authorized technical service personnel.
- The door gasket shall be replaced by the authorized personnel after each 500 runs or once per six months.
- The air filter shall be replaced after each 300 runs.
- It is recommended that the Bowie&Dick Test shall be performed weekly, while the Vacuum Test shall be executed at the beginning of every working day while the chamber is not yet heated; to assure efficient functioning of the unit.

NO	TEST PARAMETERS	CONTROL RANGE
1.	Check the safety valve by operating it.	2 months
2.	Remove the cover of the autoclave, check and tighten the ports and valves.	6 months
3.	Check the lid gasket.	6 months
4.	Check that the autoclave is leveled.	Annual
5.	Check the continuity of the grounding connections.	Annual
6.	Check the safety elements (safety valve, safety and cut-off thermostats and lid locking mechanism).	Annual

7.	Check the water reservoir, piping and plastic parts of autoclave.	Annual
8.	Run the sterilization programs of autoclave and check the operational/ sterilization parameters.	Annual
9.	Check the precise operation of the earth leakage relay and electrical control systems.	Annual
10.	Check and tighten all screw connections in the control box, valves and instrument.	Annual
11.	Check the temperature sensor calibration.	Annual
12.	Validate autoclave effectiveness (loading/ unloading).	6 months/ Annual
13.	Observe the closing device for excessive wear.	5 years
14.	All safety valves exposed to direct steam pressure must be checked.	5 years



Safety tests (pressure vessel, efficiency, electrical) shall be performed in accordance with local rules or regulations, by an authorized inspector.



According to calculations, number of allowable cycles for the operation conditions are 10.000 at pressure fluctuation between 0 bar to 2,05 bar and 20.000 at pressure fluctuation between 0 bar to 1,05 bar.

CLEANING

- Clean the device when the chamber is at room temperature after disconnecting the power cable.
- If the unit is used every day, the sterilization chamber shall be cleaned weekly. Liquid dish detergent may be used for stubborn stains. The probable impact of other cleansing chemicals shall be sought after prior to application and shall be handled with care.
- A soft washcloth shall be used not to cause any detriment in the chamber.
- The chamber shall be checked before each and every sterilization loading against any contamination; and shall be immediately cleaned if needed.
- The sterilization load should have been disinfected prior to placement into the sterilization chamber.

8. DISPOSAL MANAGEMENT CONCEPT

The currently valid local regulations governing disposal must be observed. It is in the responsibility of the user to arrange proper disposal of the individual components.

All parts which may comprise potentially infectious materials have to be disinfected by suitable validated procedures (autoclaving, chemical treatment) prior to disposal. Applicable local regulations for disposal have to be carefully observed.

The instruments and electronic accessories (without batteries, power packs etc.) must be disposed off according to the regulations for the disposal of electronic components.

Batteries, power packs and similar power source have to be dismantled from electric/electronic parts and disposed off in accordance with applicable local regulations.

9. TROUBLESHOOTING

If the device fails to operate, please check the followings:

- The power switch is on;
- the automatic fuse on the unit board is on and not defective;
- The plug is plugged-in properly;
- The plug is not defective;
- The mains supply is present.



Keep in mind that the steam in the sterilization chamber is not discharged upon power failure. If steam is to be discharged, open the safety valve on top of the unit to release the steam inside.

9.1. WARNING MESSAGES AND EXPLANATIONS

Door Open: This warning is displayed if the user presses “START” before closing the door. If the message is displayed when the door is closed, then there is a failure in the system.

Insufficient Water, Water Filling Failure: This warning is displayed when there is a shortage in the water mains or the water in the storage tank is insufficient. If the message is displayed despite there is no such problem; then there is a failure in the system.

Change Filter: A long air intake duration beyond acceptable limits at the end of the drying period means that the filter is blocked or the expiry date is exceeded. Change the filter. If this message is displayed with a new filter installed; then there is a failure in the system.

9.2. ERROR CODES

- The Error Codes may appear before a program start, after the sterilizer is powered on.
- The Error Codes may appear immediately after a program started or during a run.
- These messages are accompanied by an alarm tone.

In case the error has occurred during program execution; the unit stops the program and either releases steam or vents the chamber according to the pressure conditions in the chamber.

The unit then goes to the “Finalizing” step to let the door open.

In such a condition, the message “Please Wait” will be displayed on the screen. The user can open the door as soon as this message disappears.



An error code means that sterilization is not complete and the load is not sterile. The sterilization shall be repeated.

In case of below written failures, related error codes are shown on the display.

Error 01: Vacuum Time Exceeded

The system pressure has not dropped to the required value within the prescribed duration.

Error02: Steam Release Time Exceeded

The steam within the chamber has not been released within the prescribed duration following the sterilization phase.

Error 03: Door Lock Open

Door lock has been released during operation.

Error 05: Sensor Failure 1, 2

One or more of the temperature and pressure sensors which perform the test functions of the equipment are defected.

Error 06: Heater Failure

The error code is displayed when the thermic relays of the heaters give a signal of heater failure.

If only one group of heaters are defective; the unit continues to function while displaying a message on the screen e.g. “Failure in 1st. group of heaters. Call Service.”

In case more than one group of heaters are defective; the unit stops functioning and displays a message on the screen e.g. “Failure in 1st. and 4th. group of heaters’ operation terminated. Call Service”.

Error 07: Air Detector Failure

This message displays when the volume of air in the chamber is above an acceptable limit.

Error 08: Leakage in System, Vacuum Test Failed!

This message is displayed in case the leakage measured during the vacuum test exceeds the acceptable limit. This error indicates that there is a leakage in the system that leads ambient air into the chamber.

Error 09: Power Failure

Displayed when the mains supply has gone off and on during a cycle. As all the air and steam lines will be closed during the power failure, the steam-if any-in the chamber shall be released

manually by using the safety valve on the right hand side. Check that the chamber manometer drops to zero and then close the valve. The valve is opened by slightly turning it clockwise. A “click” sound is heard when it gets in to the closed position.

Error 10: Low Pressure

The pressure in the chamber remains below the prescribed program pressure after the sterilization phase has started.

Error 11: Low Temperature

The temperature in the chamber remains below the prescribed program temperature after the sterilization phase has started.

Error 12: High Pressure

The sterilization pressure exceeds the maximum permitted pressure.

Error 13: High Temperature

The sterilization temperature exceeds the maximum permitted temperature.

Error 14: Air-in Time Exceeded the Limit

The pressure has not reached the predetermined value in the predetermined time during air in phase.

Error 15: Steam Supply to Gasket Time Exceeded

Gasket pressure has not reached the predetermined value in the predetermined time when the cycle starts.

Error 16: Insufficient Water in Vacuum Pump Reserve Tank

The water in vacuum pump reserve tank is insufficient.

Error 17: Insufficient Water in Steam Generator

The water in steam generator is insufficient.

Error 18: Drying Phase Vacuum Time Exceeded

Vacuum level has not been reached in the predetermined time during drying phase.

Error 19: Water Level Failure in Vacuum Pump Reserve Tank

Water level sensor in vacuum pump reserve tank has failed to read the water level during a cycle.

Error 20: Water Level Failure in Steam Generator

Water level sensor in steam generator has failed to read the water level during a cycle.



If an error occurs, please contact with an authorized Nüve agent to seek technical help.

10. OPTIONS

10.1. CENTRAL STEAM UNIT (FABRIC FITTED)

For NC 430D / NC 570D / NC 710D double door steam sterilizer, If central steam unit is selected, steam feed should be provided by installing a steam line from an external steam supply at the area where the autoclave is installed in and internal steam generator which is on the device should be deactivated

10.2. CENTRAL STEAM UNIT OPTION

For NC 430D / NC 570D / NC 710D double door steam sterilizer, when steam supply is requested from an external steam generator, make the followings changes:

- Connect the device and the steam line which is came from the external steam generator.
- Choose “Steam Generator-Central” option by following Settings>>Maintenance pages.

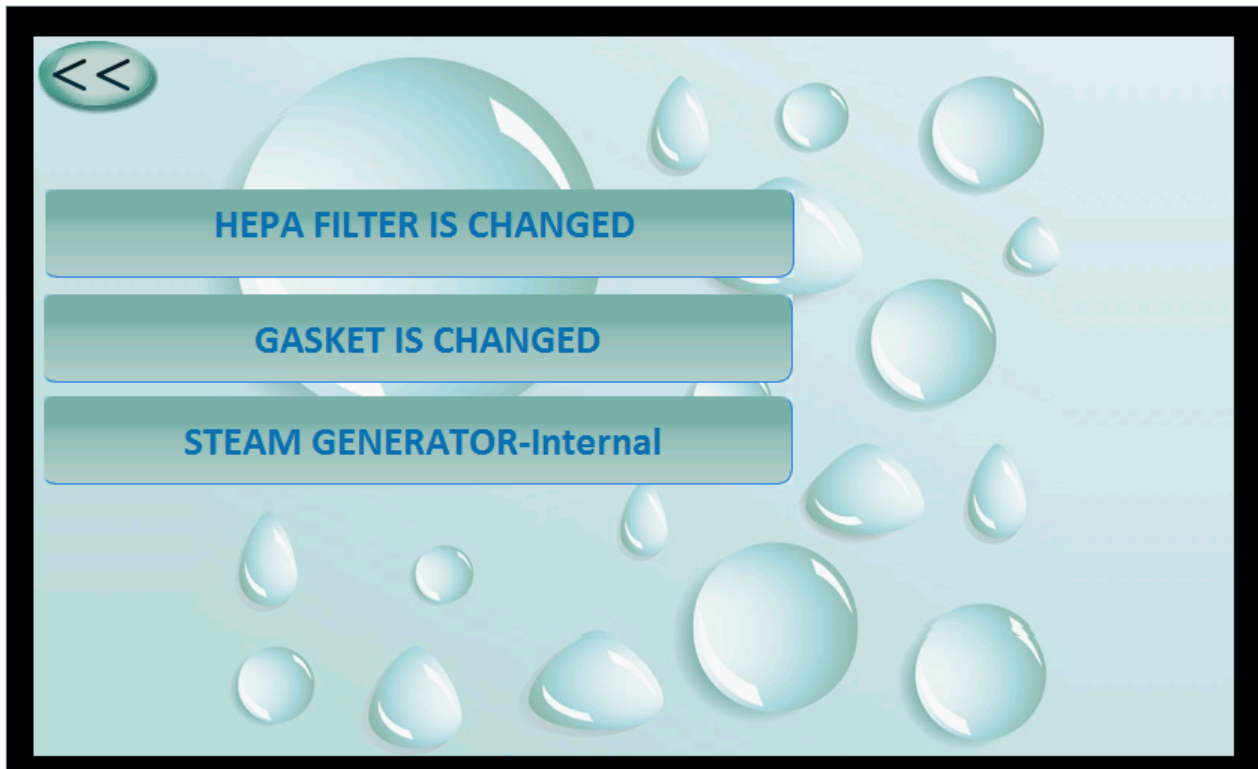


Figure 13 – Maintenance Page

- Valve position should be changed according to the steam supply which is selected from the screen.
 - If the internal steam generator which is placed on the device is used, select the “STEAM GENERATOR-Internal” option from the screen and turn “Internal-Device” valve to **ON** position, turn “Central-Customer” valve to **OFF** position.
 - If the external steam generator is used, select the “STEAM GENERATOR-Central” option from the screen and turn “Internal-Device” valve to **OFF** position, “Central-Customer” valve to **ON** position.



After the generator option is selected, the device power should be turned off-on.



**BEFORE GENERATOR OR CENTRAL
UNIT OPTIONS ARE SELECTED,
TURN THE VALVE POSITION.**

TAMAM

Figure 14 – Central Unit Option Warning Screen



Ensure that there is no waste steam which is came from the external steam generator.



Steam supply minimum temperature and pressure values should be 139°C and 2.6 Bar; maximum temperature and pressure values should be 143°C and 3.0 Bar.



In case steam value is below the determinated minimum temperature and pressure values or above the determinated maximum temperature and pressure values, undesired failures can be occurred on the device.

11. ELECTRICAL CIRCUIT DIAGRAM

