

## **Integrated Sterilizer & Shredder (ISS AC 575)**



## **OPERATION AND USER MANUAL**

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## 1. General Information

### 1.1. Introduction

This device is a Steam Sterilizer with an Integrated Shredder, intended for the treatment of Medical Waste in hospitals and clinics.

The device shall not be used for disposal of Infectious chemical wastes that require special treatment, organic materials, blood and blood products, unrecognisable human body parts and parts of organs remaining after surgery and other kinds of medical treatment, laboratory and pathology examination materials, and particles of those (unless local country regulations allow it).

**This device's model is an electrically heated bio-hazard steriliser, which operates with saturated steam as a sterilising agent, and has a temperature range of up to 137°C (280.4°F) and a pressure of up to 2.5 bars (36 psi).**

The device is designed as a Large Steam Sterilizer in accordance with EN285, continuously operated, ordinary equipment without applied parts and without signal input-output parts. The device is not intended for use in the presence of flammable mixtures.

The device is constructed of stainless steel and is heated by saturated steam supplied by an external steam generator. All metal parts in the inner surfaces are made of stainless steel. The device's chamber is equipped with one door, provided with an automatic locking mechanism, activated by compressed air, preventing the opening of the door by a safety lock.

The ISS's operating cycles are user-specified. Only one general program is available: Sterilization and shredding 134°C/ 5 Minutes, bottom (fast) exhaust, 5 minutes drying. In addition, a Textile no cut cycle, Dynamic test program, a Cleaning, a Special Waste cycle and a Glass cycle are available (see 8.1.). The service cycles are protected by code and may be operated by technical staff only:

- Sterilization and shredding 134°C/ 5 minutes without bottom (fast) exhaust.
- Sterilization 134°C/ 5 minutes without shredding, and without bottom exhaust (fast).

The control system of the device is based on state-of-the-art microcomputer technology, ensuring a highly reliable and safe operation. The computerized control unit ensures a fully automatic operation through the entire cycle; hence, after setting the pre-selected data and starting the operation, no further intervention is necessary.

The selected program, the main phases of the cycle and the status of the machine are controlled and displayed on digital readouts. For process documentation, the important information concerning the operation can be printed in hard copy (optional).

For optimal control accuracy of the sterilization parameters, the system is equipped with temperature sensors PT100 and three pressure transducers having the following functions:

- A temperature sensor for chamber temperature (control and printout).
- A temperature sensor for the Filter's temperature (control and monitoring).
- A pressure transducer for chamber pressure (control and printout).
- A pressure transducer for generator pressure (control of the generator and monitoring).
- A pressure transducer in the over-pressurized sealing area for the knife shaft (safety and monitoring).

**ATTENTION!**



The machine is intended to be used by a person with knowledge and experience in the use of the machine, according to the user manual and training.



The machine is intended to be operated by the operator in an upright standing position. The operator starts the machine after putting the waste into the vessel.



The machine is intended to be maintained by a skilled/qualified technician following the instructions given in the technician manual and training.



Only technical personnel having proper qualifications and holding technical documentation (including a technician manual) and adequate information are authorized to service the device.

Only authorized personnel should have access to select the program and change the major parameters by using the key.

## 1.2. Bio-Hazard Sterilizer and Shredder Explanation

The ISS processes Regulated Medical Waste into ordinary Municipal Solid Waste. This means that the resultant sterile output can be safely disposed as regular waste.

The violent action of the shredding blades allows steam to penetrate the waste more efficiently and eliminates the possibility of cold spots.

The resultant waste is unusable and reduced by 50-80%.

Post processing, the treated waste is suitable for regular disposal.

A short explanation of the process (see piping diagram at annex 1): after loading the chamber, the door automatically closes and the chamber rotates to working position (fully vertical).

At this stage, 1 vacuum pulse of up to 60kPa (or PulsePress1 parameter) + 2 minutes (or PulseVacT1 parameter) is implemented through valve no. 9, through the Bio filter. After vacuum is created, steam is introduced through a lower steam filter (valve no. 3), until sterilization temperature is achieved. The shredder blades start rotating at the temperature of 120°C (or ShredTemp / ShredPress parameter).

During the inflation of the chamber with steam, the Vacuum valve (6) is opened, until the steam is replacing the air completely. This valve releases air through the Bio-filter to the drain box.

The drain box includes a float switch, to verify that no blockage has occurred. In case of blockage, the exhaust will be stopped.

During sterilization, the bio filter functions as an integral part of the chamber (being sterilized).

Compressed air is introduced through valve no. 4 (Clean filter) to clean the filter.

#### **The shredder's Blades:**

The vessel is equipped with a multipurpose shredder/crusher blade on the bottom, to ensure use of the full volume of the vessel. It is regulated by an electric motor which drives the knife shaft through a tooth belt. The shaft connects the knife to the motor through the bearing housing and the sealing area. The motor is sufficient to rotate the shaft with an RPM of 300-1400 for various operations. The blades are mounted on the shaft and are designed in a way that it shreds waste such as paper, small textile, plastic and glass. The blade is made of hardened corrosion resistant high quality blade material.

### **1.3. Directives and Standards**

#### Technical Standards

#### **General Applicable Directives:**

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- Machinery Directive – 2006/42/EC
- Pressure Equipment Directive – 2014/68/EU
- Electromagnetic Compatibility Directive – 2014/30/EU
- RoHS II Directive – 2011/65/EU

#### **General Applicable Standards:**

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- EN 60204-1 – Safety of machinery. Electrical equipment of machines. Part 1: General requirement
- EN 61326 – Electromagnetic compatibility (EMC).

#### Quality standards

The company's quality management system meets the following quality standards:

- ISO 9001– Quality Management System- Requirements.

### **1.4. Incoming Inspection**

Immediately upon receipt of your product, the packaging material shall be removed and must be preserved after careful examination. Any occurring shipment damage of the packaging material or of the content (such as: scratched panel surfaces, broken knobs, etc.) must be immediately reported at your dealer or at the point of purchase.

All Celitron products are tested and inspected before shipment.

### 1.5. Warranty

We certify that this instrument is guaranteed to be free from defects in material and workmanship for one year against faulty components and assembly except glassware, lamps, and heaters.

**The warranty does not include and does not replace routine treatment and preventive maintenance, to be performed according to the instructions (see para. 14 Maintenance)**

Our obligation is limited to replacing the instrument or parts, after our examination, if, within one year after the date of shipment, they prove to be defective. This warranty does not apply to any instrument that has been subject to misuse, neglect, accident, or improper installation or application, nor shall it extend to autoclaves that have been repaired or altered outside the factory without prior authorization from us.

**The warranty conditions in all cases are:**

#### **1. Professional installation of the equipment**

**(Available with the help of the manufacturer's specialists under a separate agreement. Please get in touch with your regional sales colleague if you need this service.)**

#### **2. Return of the installation documentation requirements to Celitron**

**(Filled out and signed by the person performing the installation.)**

#### **3. Full compliance with the cleaning and maintenance instructions prescribed and recommended by the manufacturer in the manual.**



**Note:**

**The autoclave should not be used in a manner not described in this manual!**

### **Warranty Statement**

The warranty registration must be completed and returned to our service department within fourteen (14) days of purchase, or the warranty will be void!

Under the warranty period, the packaging material must be retained or the warranty will be void!

Our Technical Service Department can be reached at:

**Celitron Medical Technologies Kft.**

2600 Vác, Nádas str.2, Hungary

Phone: +36 70 643 8995

Email: [info@celitron.com](mailto:info@celitron.com)

Web: [www.celitron.com](http://www.celitron.com)



**Note:**

If there is any difficulty with this instrument and the solution is not covered in the Technician Manual, contact our representative or us first. Do not attempt to service this instrument by yourself. Describe the difficulty as clearly as possible so we may be able to diagnose the problem and provide a prompt solution.

**In case you call for technical assistance, please have the following details available to help you as efficiently as possible:**

- **Shredder Model**
- **Shredder Serial Number**
- **Shredder Software version**
- **Printout of the faulty cycle if the machine is equipped with a printer or memory card.**

No autoclave will be accepted for repair without proper authorization from us. All transportation charges must be paid both ways by the owner. This warranty will be void if the autoclave is not purchased from an authorized full-service dealer.

## 1.6. Storage and Transportation Conditions

- The storage environment ambient temperature should be in the range of 0-50°C and a relative humidity of 90% respectively.
- The storage and transportation altitude shall not be over 2400 meters (ambient pressure shall not be lower than 76 kPa (11.02 psi)).
- The atmospheric pressure range should be of 700 – 1060 hPa diapason.
- Equipment may be moved only with empty Water Reservoirs.
- The device shall be transported packed in wooden boxes, upon wooden pallets. The boxes' dimensions are approximately 116x146x195 cm and 116x222x145 cm, in an upright position!

## 2. Safety Information

### 2.1. General Safety Instructions



Do not touch the mains plug or power cord with wet hands.



Warning! There is a danger of electric shock.



If the power cord or power outlet makes a noise, disconnect the power cord from the wall outlet and contact a service center.



Warning! There is a danger of electric shock.



Warning! There is a risk of fire hazard.



Do not use a damaged or loose mains plug or power cord or power outlet.



Warning! There is a danger of electric shock or fire hazard.



Plug the power cord firmly into the power outlet.



Warning! Failing to do so may cause fire hazard.



Do not unplug the power cord out by pulling the cable only.



Warning! If the cord is damaged, it may cause electric shock.



During loading and unloading of ISS, pay attention on the wet floor.



Warning! Avoid slips, trips and falls.



Do not bend the power cord excessively or do not place a heavy object over the power cord. It is especially important to keep the power cord out from wet surfaces.



Warning! If the cord is damaged, it may cause electric shock.



Warning! There is a risk of fire hazard.



Do not touch the chamber and the unloading equipment with bare hands. Read the requirements of PPE (see para. 2.2 Personal Protective Equipment).



Warning! There is a risk of biological hazard.



Warning! There is a risk of burning injury.



Do not stay in the loading area inside of the housing while the machine is under operation. Staying inside of the loading area may cause serious injuries or even death. If you have locked inside of the loading area, push safety shutdown button immediately.



Warning! There is a risk of crush hazard.



Warning! There is a risk of pinch injury.



Always dismount the handle of Waste Trolley before moving the chamber position, while the trolley is in the loading area.



Warning! There is a risk of crush hazard.



Warning! There is a risk of pinch injury.



Do not clean the chamber and the knife block with bare hands. Read the requirements of PPE (see para. 2.2 Personal Protective Equipment).



Warning! There is a risk of biological hazard.



Warning! There is a risk of burning injury.



Warning! There is a risk of sharp edges hazard.



Do not maintain the machine by yourself. Only qualified service technicians can service the instrument who are authorized by Celitron Medical Technologies Service Department.

## 2.2. Personal Protective Equipment (PPE)

Personal Protective Equipment (PPE) is a type of primary barrier worn by the operators and technicians, and should only be used if engineering and administrative controls do not provide sufficient protection. PPE includes gloves, lab coats, coveralls, gowns, shoe covers, boots, respirators, face shields, safety glasses, goggles, and hearing protection.

PPE must be carefully selected based on the specific hazards and conditions identified in the Job Hazard Analysis. Comfort should also be considered to ensure maximum compliance with PPE requirements. Below is a list of PPE categories with associated selection considerations which may be applicable to bio-hazardous waste disposal operations:

- Eye protection
- Hand protection
- Respiratory protection
- Foot protection
- Hearing protection
- Skin/clothing protection



### Eye protection

Appropriate eye protection (safety goggles, glasses, and face shield) must be worn if chemicals, pathogens, dust, particles, or flying objects may be present. The material and type of the eye protection must be carefully selected to ensure resistance to the specific hazards at the worksite.



### Hand protection

Gloves must be selected based on the expected hazard. Many safety equipment suppliers have charts showing recommended hand protection for various hazards; material should be selected to ensure the gloves will not be compromised by tears or otherwise damaged upon contact with the hazardous substance.



### Respiratory protection

The respirator must be selected based on the type and concentration of the breathing hazard, the fit-test results for the wearer, and suitability for the task. Employees wearing respirators must be enrolled in a Respiratory Protection Program in accordance with local requirements.



#### **Foot protection**

Foot protection must be selected based on the type of hazard. Steel-toed or similar shoes are required where heavy items may fall, and additional protection is required when metal drums are handled. Boot or shoe covers may be required to prevent tracking of contaminants from one area to another, and must be slip resistant and impervious to damage from chemical hazards. In laboratory environments, open toed-shoes (sandals, etc.) shall not be worn by operators, technicians or visitors.



#### **Hearing protection**

Hearing protection must be selected based on the noise level at the worksite and in accordance with local standards.



#### **Skin/clothing protection**

Protective clothing must be selected based on a risk assessment which considers the type of work to be performed, the nature of the hazards to be encountered, and resistance to break through/penetration of biological hazards or chemical hazards in the worksite. All protective clothing is either disposed of in the work area or decontaminated and laundered by the institution or decontaminated at the facility and laundered by a vendor/contractor who has been made aware of any potential risks. Home laundering of protective clothing is prohibited.



Fig. 1 – Caution Biohazard

### 2.3. Symbol Description



This sign indicates the need of caution. Reading accurately all these notes beside this sign is obligatory.



This sign indicates any terminal which is intended for connection to an external conductor for protection against electrical shock in case of a fault, or the terminal of a protective earth (ground) electrode.



This warning sign indicates a hazardous situation which may result in an electrical shock injury.



This warning sign indicates a hazardous situation which may result in a burn injury due to open fire.



This warning sign indicates a hazardous situation which may result in a harm to the health of the living organisms due to biological substances.



This warning sign indicates a hazardous situation which may result in a burn injury due to hot surfaces.



This warning sign indicates a hazardous situation which may result in a harm to the health of the living organisms due to trip, slip and fall.



This warning sign indicates a hazardous situation which may result in a crush injury due to moving elements of the machine.



This warning sign indicates a hazardous situation which may result in a pinch injury due to rotating and moving elements of the machine.



This warning sign indicates a hazardous situation which may result in a cut injury due to the sharp elements of the machine.

### 3. Product Information

#### 3.1. Specifications

| MODEL                                              |       | ISS AC - 575                               |
|----------------------------------------------------|-------|--------------------------------------------|
| Chamber size                                       | Dia.  | 500 mm                                     |
|                                                    | Depth | 800 mm                                     |
| Chamber volume                                     |       | 160 liters (150 net)                       |
| Weight with/without housing                        |       | 880/600 Kg                                 |
| External Dimensions with housing<br>(W x H x D)    |       | 1290 x 2150 x 2039 mm                      |
| External Dimensions without housing<br>(W x H x D) |       | 900 x 1200 x 1420 mm                       |
| Chamber Door                                       |       | 1 Automatic Door                           |
| Sterilization Temperature                          |       | 134°C - 137°C                              |
| Steam Source                                       |       | Saturated steam - 25.4 kg/h steam capacity |
| Steam pressure (relative)                          |       | 2.5 bar (36.3 psi)                         |
| Test Pressure                                      |       | 5.0 BAR                                    |
| Compressed Air                                     |       | 6.0 - 8.0 BAR                              |
| Water Source and Pressure                          |       | Filtered Tap Water 1.0 - 6.0 BAR           |
| Power Source                                       |       | 36 kW, 3 phase, 380-400V – 3 x 63A, 50 Hz  |

#### 3.2. Construction

The main parts of the device are made of materials as indicated below:

- Chamber is built of stainless steel AISI 304L thickness 4mm.
- Door is made of stainless steel AISI 304.



### 3.3. Product Dimensions

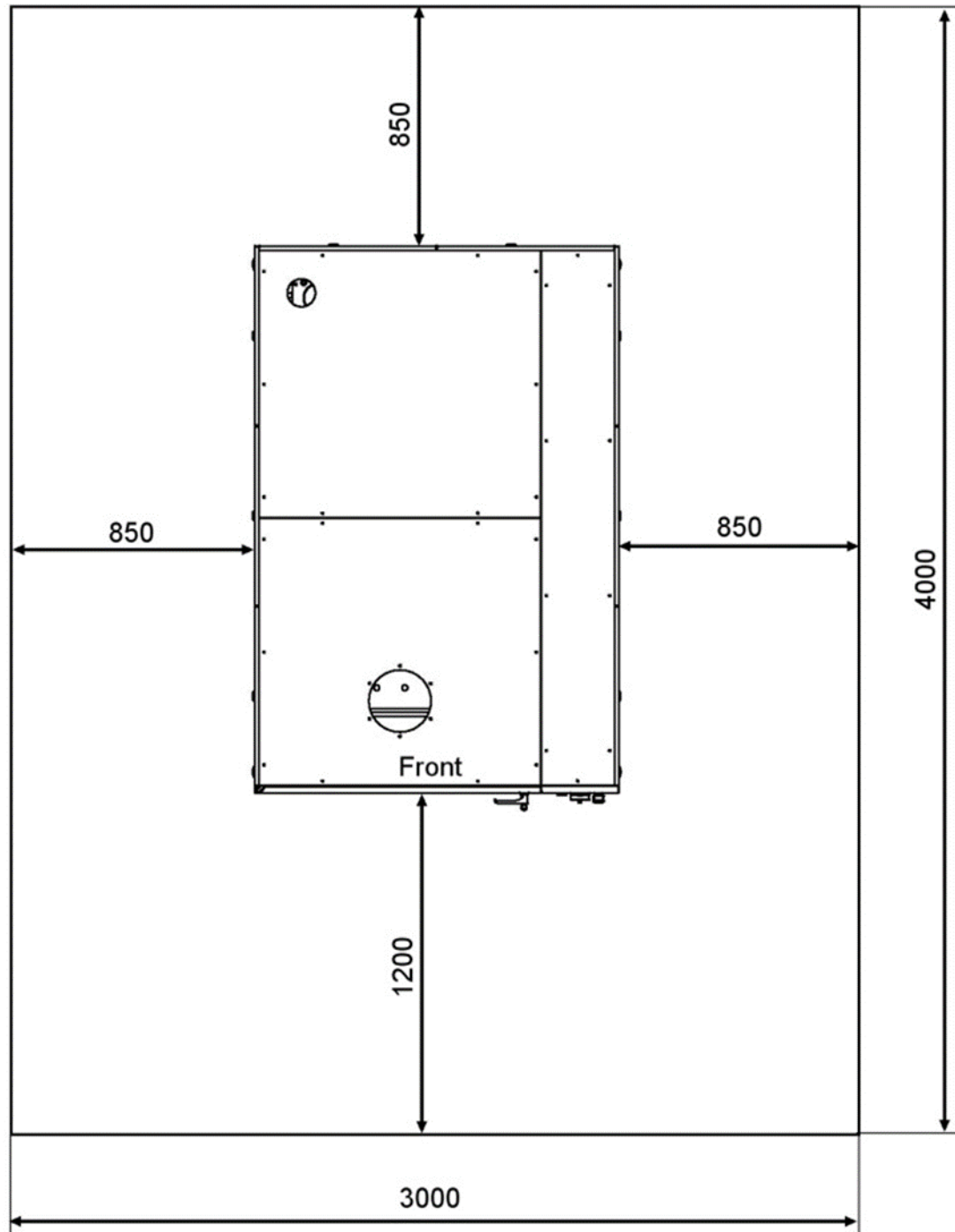


Fig. 2 – Recommended Room Dimensions

### 3.3.2. External Dimensions

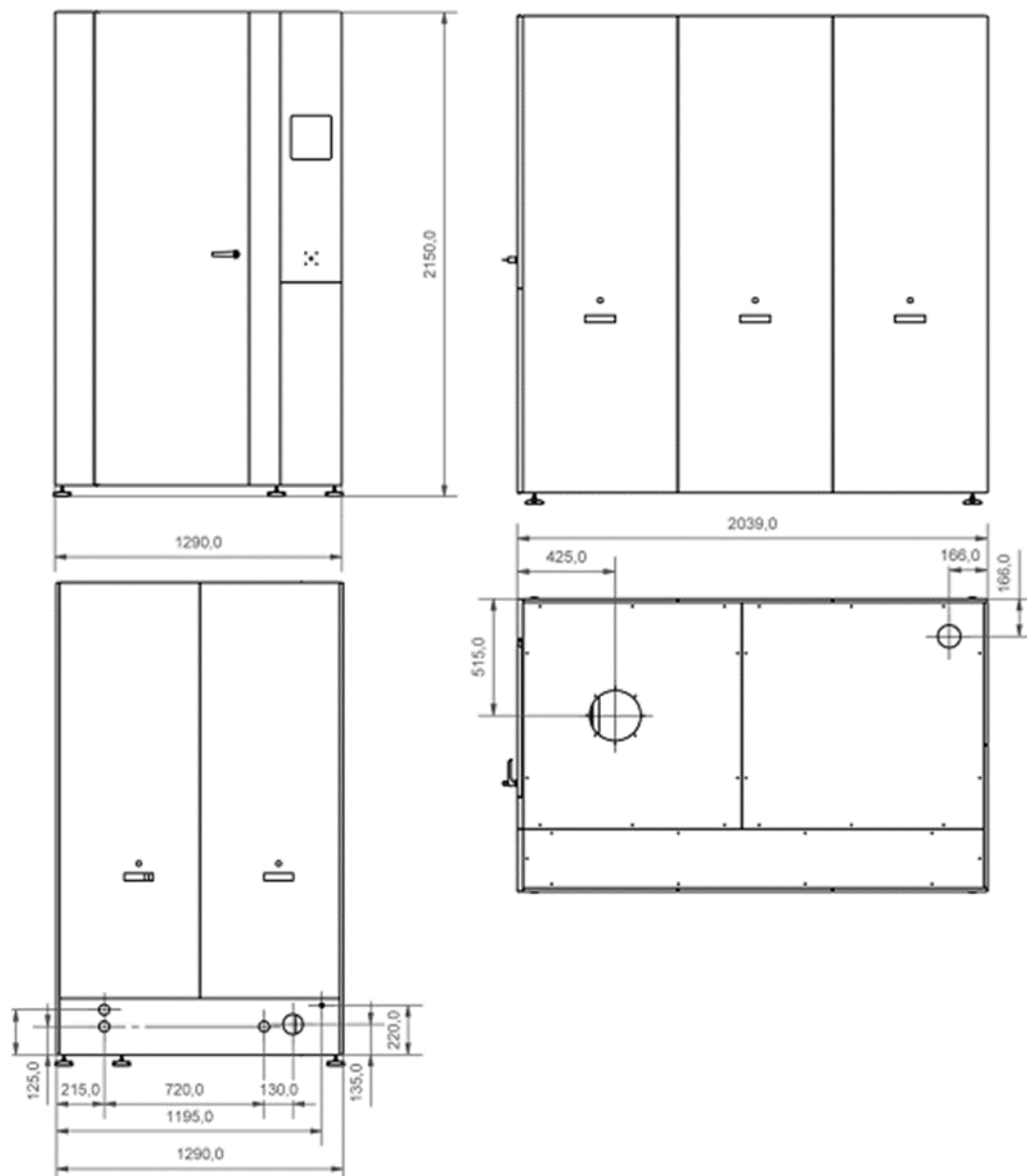


Fig. 3 – External Dimensions

### 3.4. Safety Equipment

#### ■ Approved Thermostat

These safety components interrupt the heating element in case of the temperature above 150°C for the chamber and 170°C for the steam generator. In order to precede the work, the user needs to push the reset button.

| SPECIFICATION                           | VALUE                        |
|-----------------------------------------|------------------------------|
| Max. ambient temperature                | T150                         |
| Rated voltage and current               | 16(3)A-250V                  |
| Work range                              | 50°C - 320°C                 |
| Tolerance on max temperature            | 3K - 12K                     |
| Resetting differential                  | 30%<br>intervention<br>temp. |
| Temperature change speed                | 1K/ min.                     |
| Features of automatic action            | 28 KN                        |
| Minimum current                         | 200 mA                       |
| Minimum bending radius of the capillary | 5 mm                         |
| Approved VDE (DIN EN 60730)             | 1                            |
| Situation of pollution                  | normal<br>situation          |
| Built in accordance with the rule       | EN 60730                     |
| Weight                                  | 65 gr. approx.               |

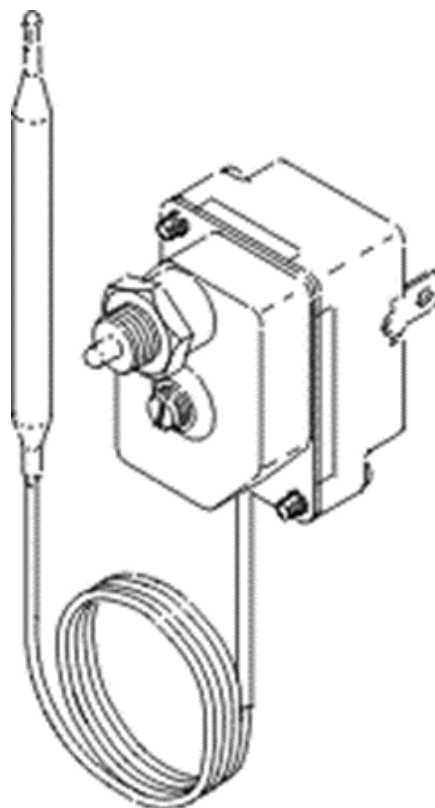


Fig. 4 – Thermostat parameters

### Certified Safety Valves

This safety component releases the pressures above 2.76 BAR (Chamber) and 3.5 BAR (Steam Generator).

| No. | MATERIAL       | DIN EN | ASTM             |
|-----|----------------|--------|------------------|
| 1   | Body           | CC491K | B 62 UNS C83600  |
| 2   | Valve Seal     | PTFE   |                  |
| 3   | Disc           | CW612N | B 283 UNS C37700 |
| 4   | Stem           | CW612N | B 283 UNS C37700 |
| 5   | Bonnet         | CW612N | B 283 UNS C37700 |
| 6   | Spring         | 1,12   | A 576 Grade 1045 |
| 7   | Lifting Device | CW612N | B 283 UNS C37700 |
| 8   | Closing Cap    | CW507L | B 30 UNS C26800  |

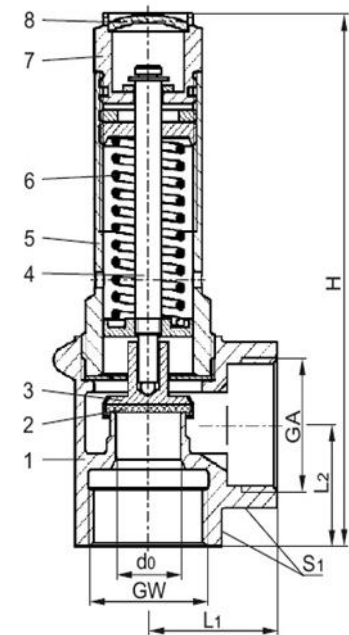


Fig. 5 - Safety valve parameters

### Pressure Switch

This safety component interrupts the heating element in the steam generator in case of the pressure is above 3.3 BAR.

| SPECIFICATION               |                                     |
|-----------------------------|-------------------------------------|
| Model                       | LF25                                |
| Medium                      | Non-hazardous gas, liquid or steam  |
| Operating Pressure          | 0.2-0.6 bar                         |
| Proof Pressure              | 3bar                                |
| Differential                | 0.2 +/- 0.1bar                      |
| Operating Temperature Range | +85°C / +125°C Maximum              |
| Contact Arrangement         | SPDT                                |
| Electric Rating             | SPDT / Normal Close: 16(4) A-250VAC |
| Terminal                    | 6.35mm                              |
| Connection                  | NPT 1/4 male                        |

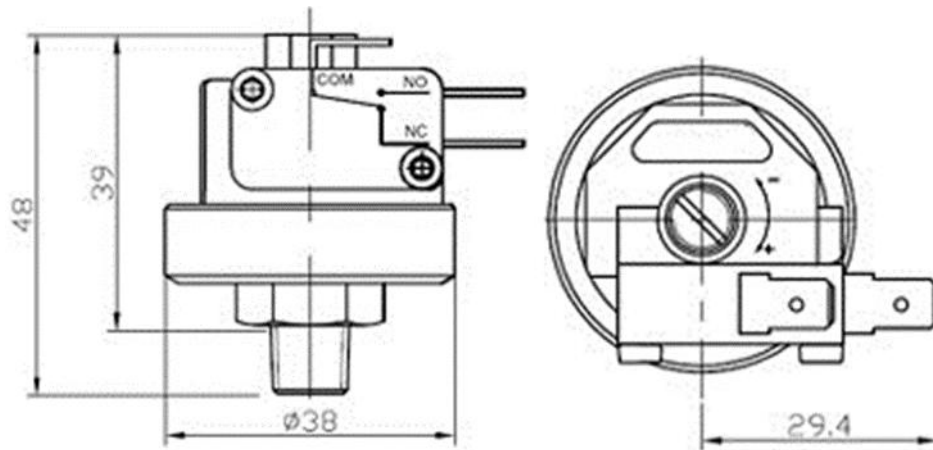
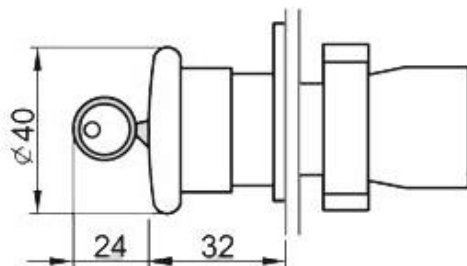


Fig. 6 - Safety pressure switch

#### ■ Safety switches:

With the help of these safety elements, the operators and technicians are able to shut down the unit in case of emergency:

#### ■ External Emergency Switch: (connected to a 3-ph contactor)



#### ■ Internal Emergency Switch: (connected to a 3-ph contactor)

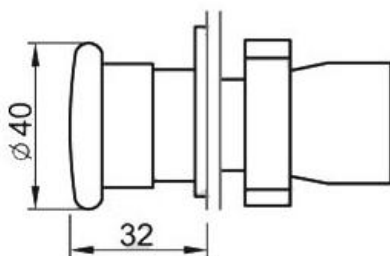


Fig. 7 – External emergency Switch

### ■ Housing Door Safety Switch:

This safety element shuts down the operation of the unit if the housing's door is opened.

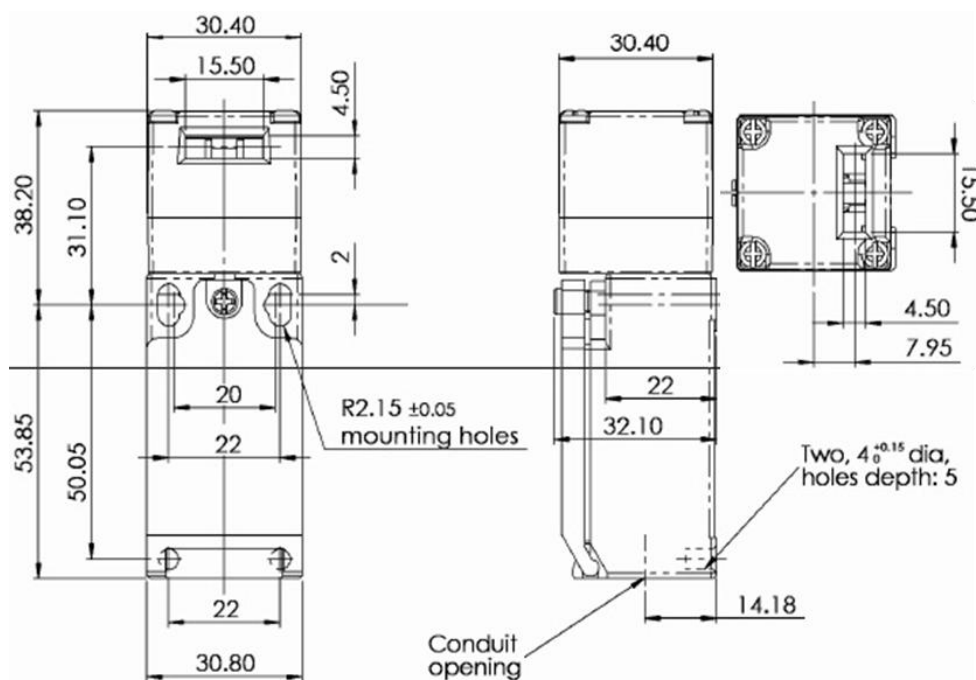
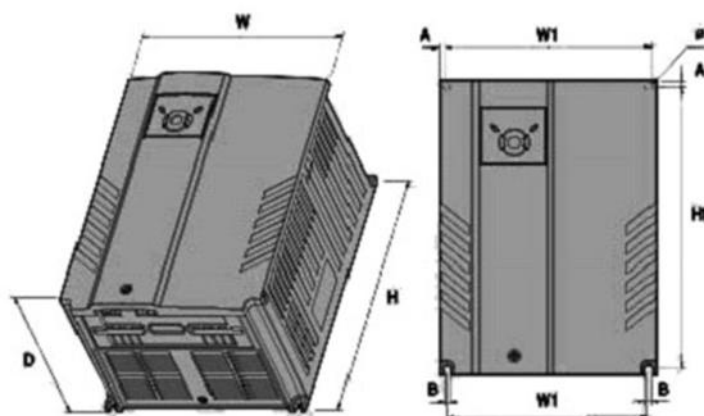


Fig. 8 – Housing Door Safety Switch

### ■ Motor Frequency Controllers

This controller includes an overload detector and dis-connector.



| MARK        | SIZE  |
|-------------|-------|
| W (mm)      | 235   |
| W1 (mm)     | 219   |
| H (mm)      | 320   |
| H1 (mm)     | 304   |
| D (mm)      | 189.5 |
| A (mm)      | 8.0   |
| B (mm)      | 7.0   |
| Weight (kg) | 9.0   |

## ■ Thermal-Magnetic Motor Protector

This contactor prevents the two motors from the same-time operation in case of the malfunction of the control system.

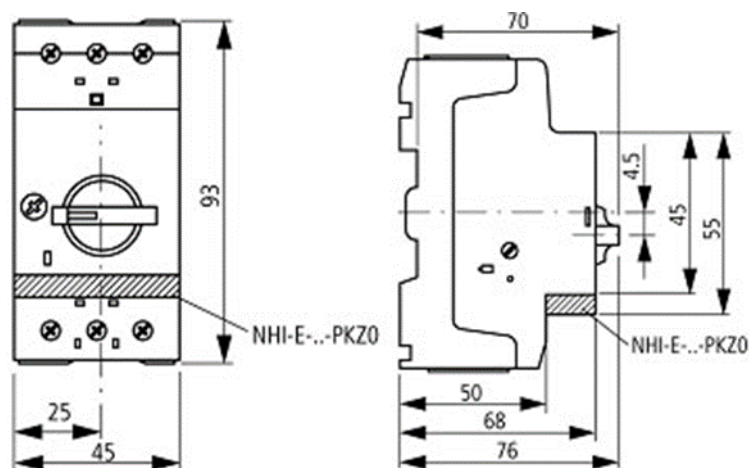


Fig. 10 – Thermal-Magnetic Motor Protector

## 4. Operation Conditions

### 4.1. General Conditions

- This device is for indoor use only!
- The device should be loaded only with autoclave-able material (see para. 11.1 Waste collection and Segregation)!
- The environmental temperature shall be in the range of 01°C and 35°C. The relative humidity shall not exceed 85%.
- The operation altitude shall not be over 3000 meters (ambient pressure shall not be lower than 70 kPa (10.2 psi)).
- The environmental heating, ventilation and air conditioning (HVAC) must be meet the requirements of sterilisation areas and laboratories (6-12 air exchange / hour).



**Waste water should be brought into the public network in accordance with the local rules or requirements. Only non-hazardous liquids shall be disposed in the public sewage!**

#### 4.2. Environment Emission Information

- The peak sound level generated by the device is less than 90 db A with background noise of 80 db A.
- The total heat per hour transmitted by the device is < 100 Wh.
- The device is not a source of electromagnetic emissions for medical purposes. The level of the EMC Emissions was tested by a certified laboratory according to the list of relevant standards (see para 1.3 Directives and Standards) and found to be in compliance with the requirements.



**Note:**

**The noise level of the machine has been measured and found in compliance with standards. However, the noise level also depends on environmental factors. After installation, it is recommended to check the noise level according to the local regulations.**

#### 4.3. Electromagnetic Compatibility (EMC)

The installation and the service of the device should consider special precautions regarding EMC according to the information stated in this chapter.



**Warning**

**The use of cables, pumps, transducers or any other electrical elements other than those specified by Celitron Medical Technologies as replacement parts may result in increased EMISSIONS or decreased IMMUNITY of the device.**



**Warning**

**The device should not be used adjacent to or stacked with other equipment.**



**Warning**

**The device should not be connected to the same power line with other equipment.**



**Warning**

**Portable and mobile RF communications equipment, such as cellular phones can affect the operation of the device.**



#### 4.4. Water Quality

The mineral-free water supplied to the autoclave should have the physical characteristics and maximum acceptable level of contaminants indicated in the table below:



**Note:**

**Maximum values of contaminants in Feed water and Condensate in accordance with Standard EN 285**

| CONTAMINANT                               | FEED WATER                        | CONDENSATE                        |
|-------------------------------------------|-----------------------------------|-----------------------------------|
| Evaporation residue                       | ≤ 10 mg /l                        | -                                 |
| Silicium oxide, SiO <sub>2</sub>          | ≤ 1 mg/l                          | ≤ 0.1 mg / kg                     |
| Iron                                      | ≤ 0.2 mg/l                        | ≤ 0.1 mg / kg                     |
| Cadmium                                   | ≤ 0.005 mg/l                      | ≤ 0.005 mg/kg                     |
| Lead                                      | ≤ 0.05 mg/l                       | ≤ 0.05 mg / kg                    |
| Rest of heavy metals except Iron,         | ≤ 0.1 mg/l                        | ≤ 0.1 mg / kg                     |
| Chloride (Cl)                             | ≤ 2 mg/l                          | ≤ 0.1 mg / kg                     |
| Phosphate(P <sub>2</sub> O <sub>5</sub> ) | ≤ 0.5 mg/l                        | ≤ 0.1 mg / kg                     |
| Conductivity (at 25°C)                    | ≤ 5 mS /cm                        | ≤ 4.3 mS /cm                      |
| pH value                                  | 5 to 7                            | 5 to 7                            |
| Hardness                                  | ≤ 0.02 mmol/l                     | ≤ 0.02 mmol/l                     |
| Appearance                                | Colorless, clean without sediment | Colorless, clean without sediment |

Compliance with the above data should be tested in accordance with acknowledged analytical methods, by an authorized laboratory.



**Attention:**

**The use of water for autoclaves that does not comply with the table above may have a severe impact on the working life of the steriliser and can invalidate the manufacturer's guarantee.**

The aforementioned requirements concerning the water supply are also valid for steam supplied from boilers installed at the customer's site, which enter the steriliser chamber and come in contact with the products or packaging.

#### **Water for the Vacuum System and the Drain Cooling**

The quality of the feed water supplied to the liquid ring ejector must meet the following requirements:

0.7 - 2 mmol/l, 72- 215 mg/l of CaCO<sub>3</sub>

4-12 ° (German) of CaCO<sub>3</sub>

7.2-21° (French) of CaCO<sub>3</sub>,



Note:

**The use of hard water is strictly forbidden!**

### Polyphosphate Filter

This model is an economic anti-scale system, based on polyphosphate salts. Recommended to install the filter between the tap water supply and the tap water income of the machine (see Fig. 13- Utilities Connection) to improve the quality of the incoming tap water.

Working pressure: 8 bar max

Burst pressure: 35 bar max

Working temperature: 0°C + 50°C min/max

Suggested Flow Rate: Max 8/10 lt/min

Life test: 200.000 cycles from 0-10 bar



**Fig. 11 – Polyphosphate Filter**



Note:

**The use of heavy-scale water for the vacuum pump cooling can cause blocking of the rotor and put the pump out of operation. This invalidates the guarantee for the vacuum pump.**

### Reverse Osmosis System

A Reverse Osmosis system must be used to improve the quality of the water used to generate steam into the autoclave chamber. The use of mineral-free water will contribute to better performance and longer life of the autoclave.

The system must be installed between the tap water source and the “Mineral Free Water Inlet” of the autoclave (see Fig. 13- Utilities Connection).



**Fig. 12 – R.O System**

## 5. Installation Instructions



Only qualified and authorised personnel are allowed to install, test, maintain and service the device.

### 5.1. Mounting

After unpacking the device, check that the Serial Number (S/N) on its nameplate corresponds with the package number.

-  The ambient temperature around the device must not exceed 40°C and 80% humidity.
-  Do not use the device in presence of dangerous gases and vapours.
-  The floor in the device area must be Waterproof and non-flammable, with working temperature 150°C or higher.
-  The floor construction should contain a drain hole in the lowest place of floor. All device area floor construction have to provide incline toward the drain hole, in order that the rest of the water will be able to flow out through the drain without obstacles.
-  The construction of the floor in the device area must be a minimum 15cm thick and C20 quality.
-  The ceiling above the device should be Waterproof and non-flammable with working temperature 150°C or higher. The space between ceiling and top level of the device is designated to prevent the steam concentration in the emergency cases, and the room shall be well ventilated outside.
-  It is recommended to use Fluorescent lighting. The stroboscopic effect of the lighting should be minimized in the plant room by the use of two tube fittings suitably adapted for this purpose or by the use of two phases for the lighting circuits. The fittings should be sited longitudinally between the devices.

-  Place the device on a level surface, leaving adequate space of minimum 4m x 3m, height 2.4m around it for operation and service requirements (see Fig. 2 – Recommended Room Dimensions).



**Note:**

**The access to technician service area should be only for qualified and authorized personnel, having proper instructions and which have been trained by the company.**

## 5.2. Connecting Utilities

- Electrical: 400V 3-ph, 36kW, 3x63A Industrial Power Plug with Neutral and Protective Grounding
- Mineral Free Water inlet: 6-7 bar, 6/4mm connection
- External Steam inlet: 30 KG/hr. at 6 bar, 1/2" connection (optional)
- Tap water inlet: 30 l/min. cold water, 3/4" connection
- Drain outlet: 110mm connection
- Compressed Air inlet: 6 bar, 8/6mm connection
- Ventilation: 100mm connection

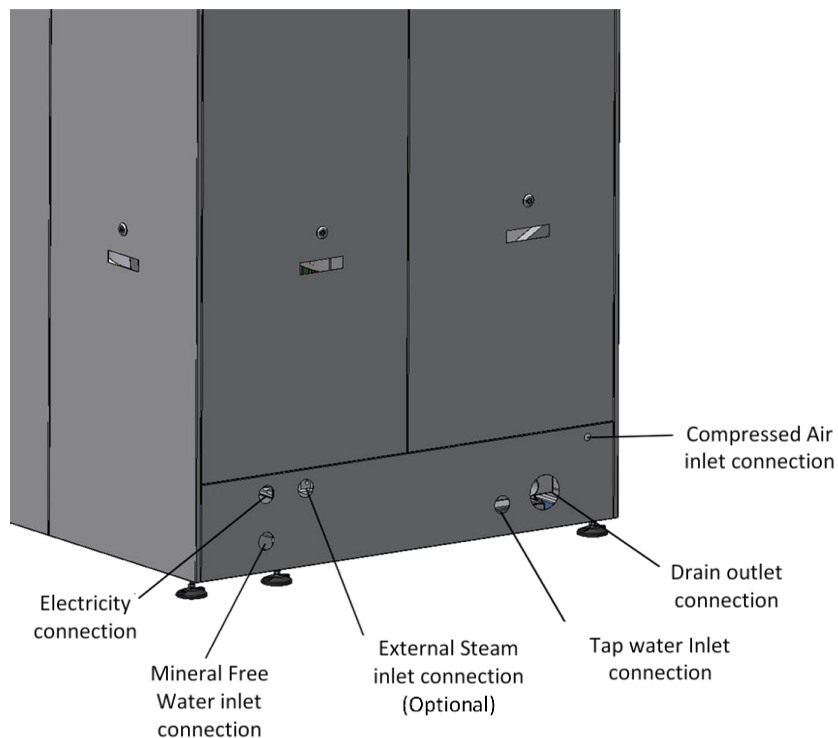


Fig. 13- Utilities Connection

### Water source connections

- Connect the 6/4mm plastic tube of the R.O System into the Steam Generator's Mineral Free Water connection.
- Connect the 3/4" flexible pipe and the filter sealing of the Tap water source into the Tap Water Inlet Valve.

### Compressed Air source connection

- Connect the 8/6mm pneumatic tube of the compressed air source into the Compressed Air Regulator Valve.

### External Steam source connection (optional)

- Connect the 1/2" flexible hose into the Regulator of the main steam line.

### Drain connection

- Connect the 110mm drain pipe into the drain connection of the Drain Box.

### Ventilation connection

- Connect the 100mm ventilation hose onto the ventilation opening ("chimney") of the Drain Box.



#### Notes:

- The Drain Box is a potential source of contamination. Therefore, the place of installation is obliged to use air filters (on the ventilation opening ("chimney") of the Drain Box).
- The connection to the drain water system shall be made in compliance with local rules and regulations; the user shall be acquainted with local laws before installation and apply the local rules.

### Power connection

- Connect the 63A Industrial Power Plug of the device to the power source's socket.

#### Notes:

- The device must be connected to the Power with a safety-approved Power cord in accordance with local and national regulations and/or rules, including all required connections: R, S, T, N, and GND! The minimum allowable current should be 38A, or 8AWG square section.
- The Maximum Length- 2.5m with the Square of cross section at least # 8AWG.



Fig. 14- Power Connection (illustration only)

### Protective Earthing

- Connect the earthing cable to the wall fuse box of the device's power supply.



#### Notes:

- The Wall fuse box of the device's power supply (400V/50Hz, 3x63A) must be equipped with a matching earthing clamp (or earthing screw) with at least 6AWG (5x16mm<sup>2</sup>) wire.
- Avoid direct contact with live parts or areas that are marked with a "High voltage" sign!

### 5.3. Preliminary check-up

After installation and prior to putting the machine into operation, the following preparing and check-out procedure is to be fulfilled:

- Check that the water and drain inlets are correctly connected to the utilities and the manual taps on the external lines and on the device's piping are open.

- Check all the manual bypass screws (on the base of the pilot solenoid valves), are set in neutral position, i.e. the slit on the head of the screw is set in horizontal position.
- Search for leaks and fix piping joints if necessary.
- Check at the electrical network switchboard, that the circuit of the device is switched on and fuses or circuit breakers are not interrupted, and that the correct voltages are present in the device's generator control box, according to the specifications.
- Check that circuit breakers in the control box are switched on.

If the results of the above checkouts are positive, the device is ready for operation.

#### 5.4. Setting Atmospheric Pressure Parameter



In case the autoclave shall be installed in a new geographic location, with different atmospheric pressure, the Atmospheric Pressure (ATM) parameter shall be adjusted (See para. 8.7 – Modifying Cycle Parameters).

Changing the 'ATMPressure' parameter shall be made as follows:

|                   |  |
|-------------------|--|
| MENU              |  |
| OPTIONS           |  |
| TECHNICIAN CODE   |  |
| CHANGE PARAMETERS |  |
| ATMPressue        |  |

In order to adjust the parameter, check what the Atmospheric pressure in the new location is, and program the value accordingly. (Default value is set to 100 in kPa units)

### Elevation and Atmospheric Pressure

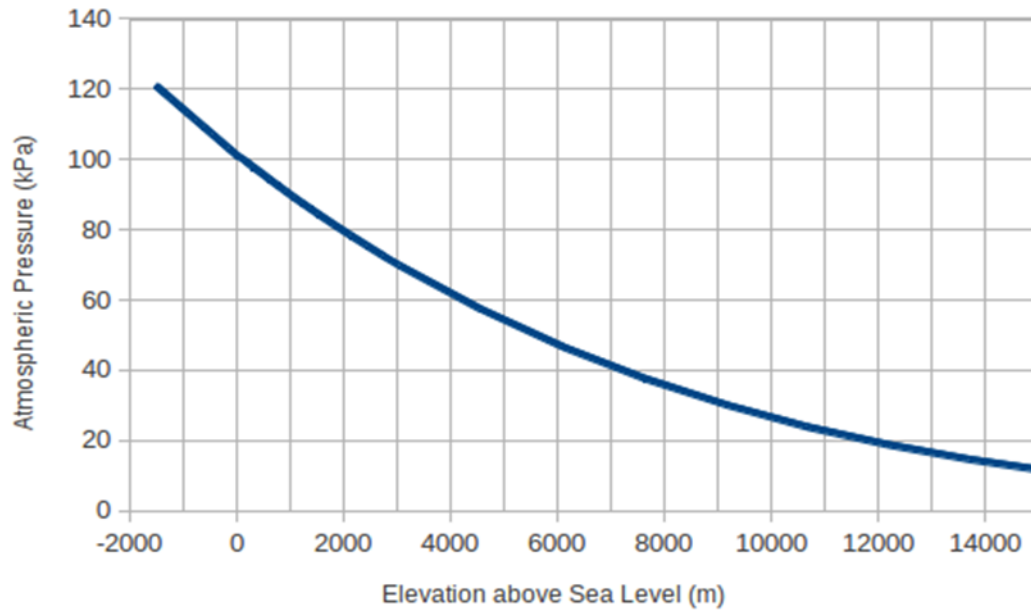


Fig. 15 - Elevation and atmospheric pressure chart



## 5.5. Control Panel Description

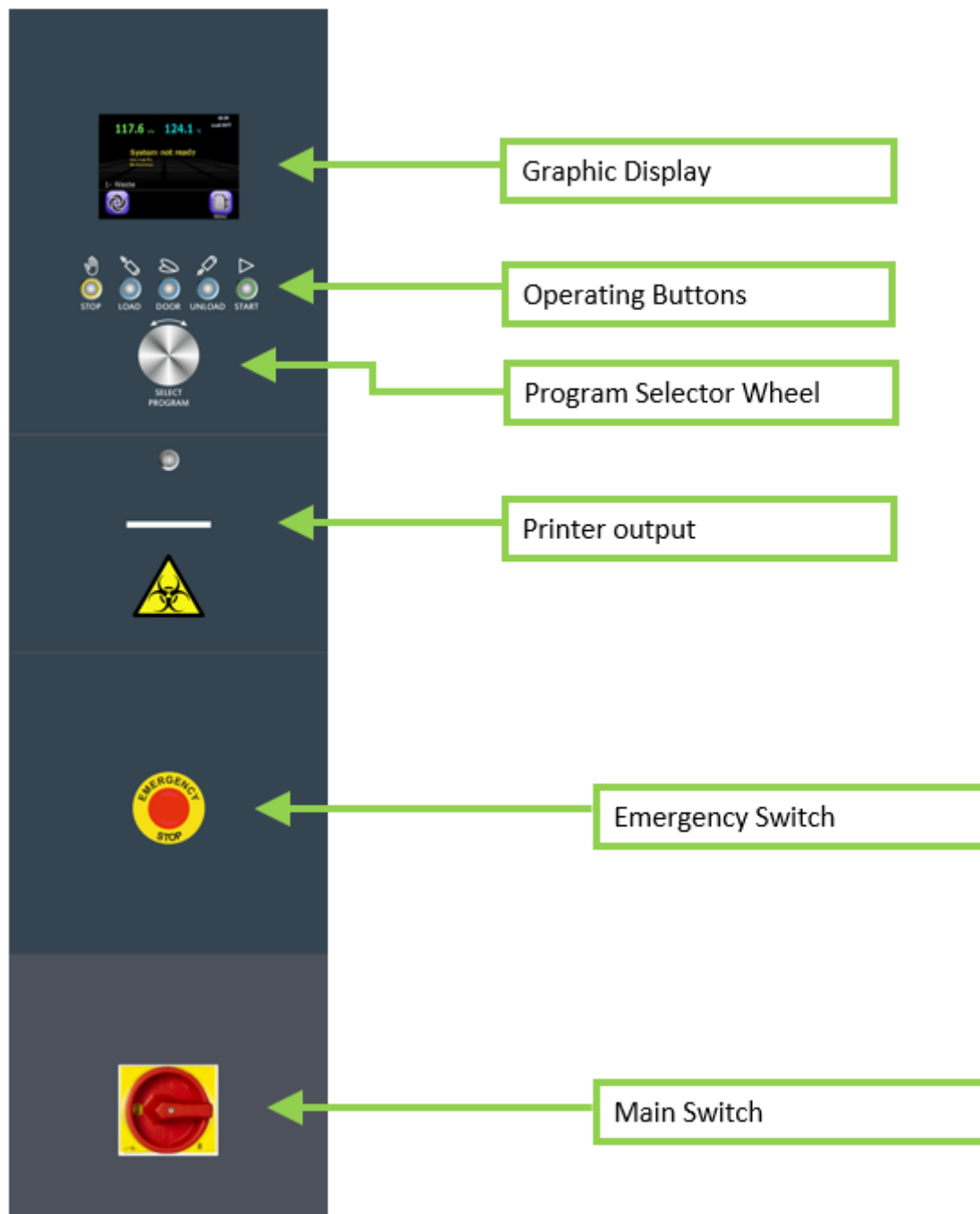


Fig. 16 – Control Panel Description

## 5.6. Operation of Control Buttons

### Red Rotary Switch: Main Switch

The Main Switch brings the unit into Power-ON or Power-OFF status.



### Lockable Red Button: Emergency Stop Button

Shuts down the unit in case of emergency. The lock keeps the unit out of operation against unauthorized personnel.



### START Button: Chamber Shredding Position Button

If the chamber is not in operational position, pressing the green button will bring chamber to operational position and close the door. It can also start a cycle by pressing it, if conditions are proper, and the machine is in Ready state.



### STOP Button: Chamber Movement Interruption Button

Stops any movement of the chamber and door. When the sterilizer is in a sterilization cycle, pressing the red button will abort the cycle and "Manual Stop" indication will be displayed.



### Load Button: Chamber Load Position Button

Pressing this button while the device is not during a sterilization process will bring the chamber to a LOADING position.



### Unload Button: Chamber Unload Position Button

Pressing this button while the device is not during a sterilization process will bring the chamber to an UNLOADING position. While the chamber is in UNLOADING position, holding the button will operate the shredder's motor for 4 seconds. This action is performed in order to help waste to fall out to the bin.



## 5.7. Chamber movement explanation

### 5.7.1. Chamber moving sequence – Unloading Position

Pressing once the Chamber Unload Position Button after the cycle will activate the chamber movement sequence:



- Opening the door of the chamber

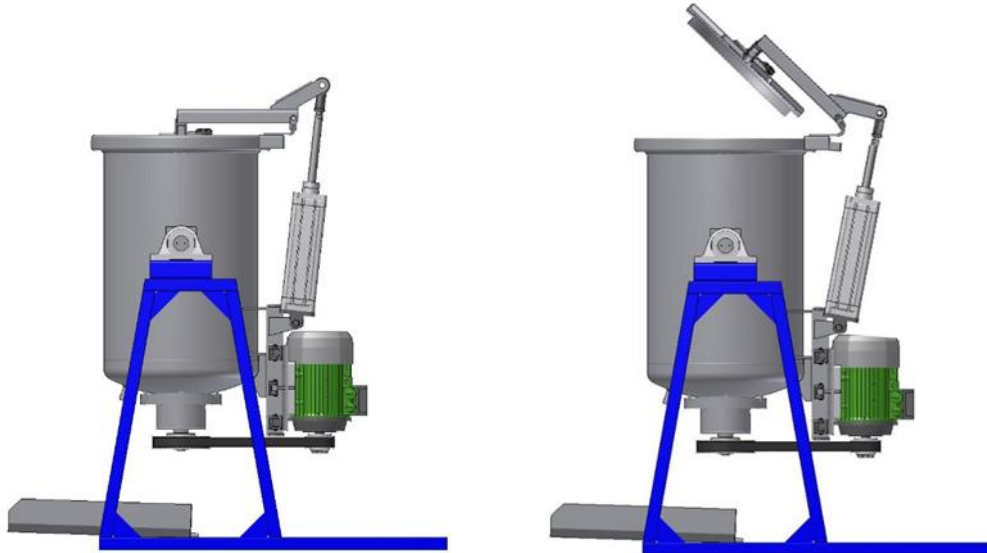


Fig. 17- Opening Chamber Door

- Moving chamber into unload position

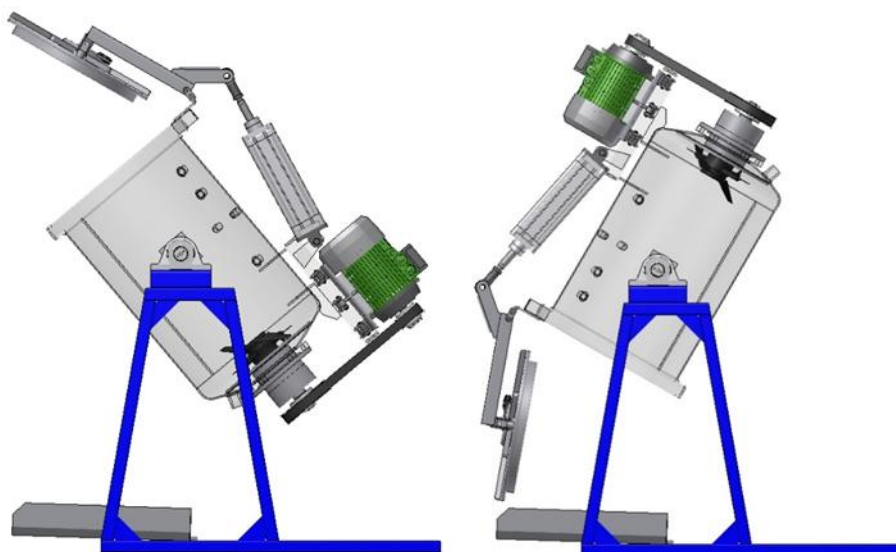


Fig. 18 – Chamber Unload Position

#### 5.7.2. Chamber moving sequence – Loading Position

Pressing once the Chamber Loading Position Button after the waste unloading will activate the chamber movement sequence:

- Moving chamber into loading position

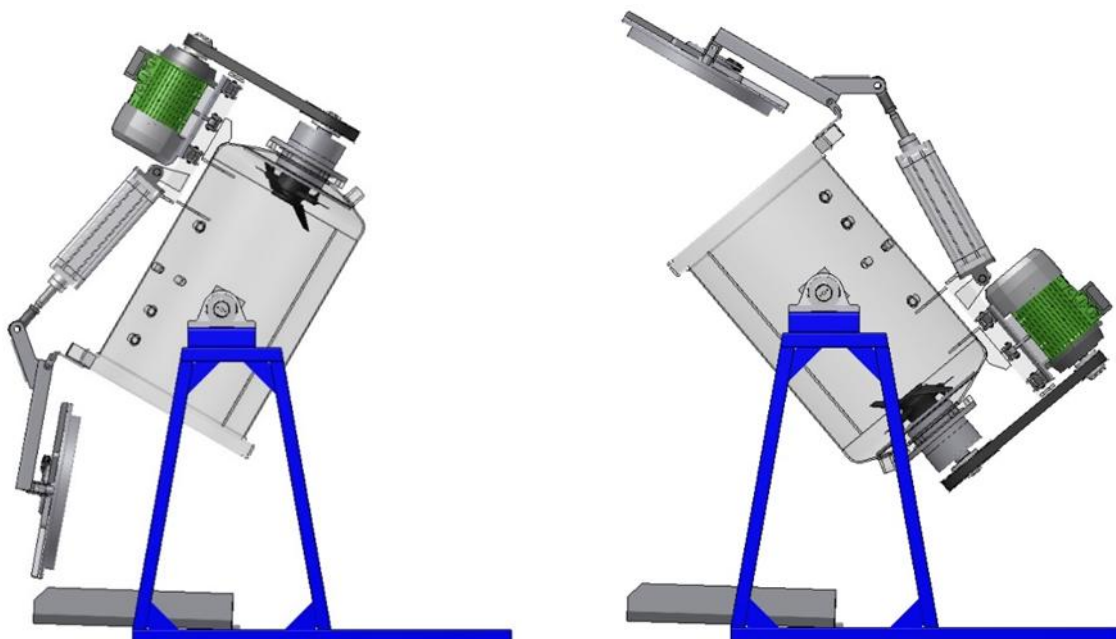


Fig. 19 - Chamber Load Position

### 5.7.3. Chamber moving sequence – Shredding Position

Pressing once the Chamber Shredding Position Button after the waste loading will activate the chamber movement sequence:

- Moving chamber into shredding position

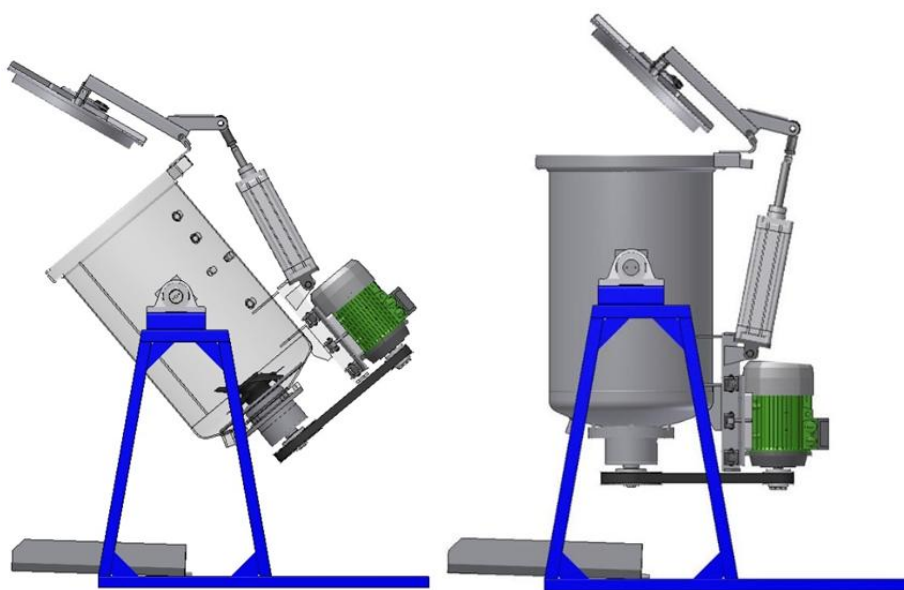


Fig. 20 - Shredding Position

- Closing the door of the chamber

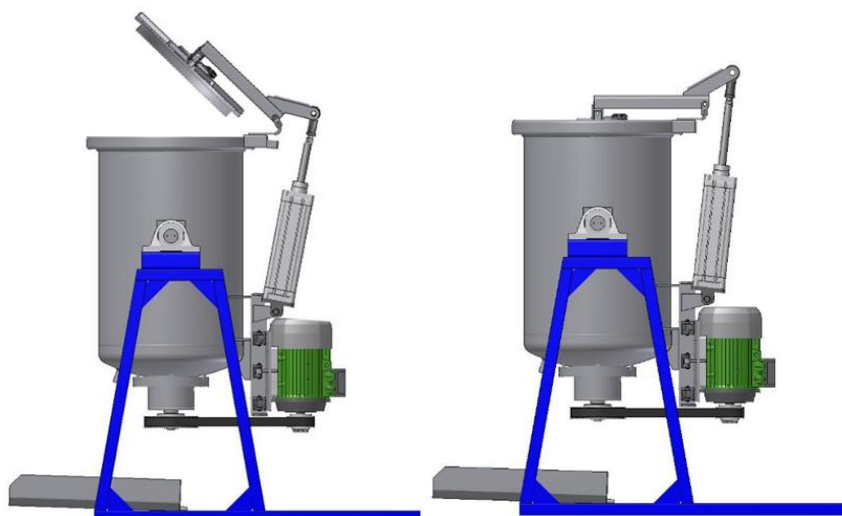


Fig. 21- Closing Chamber Door

#### 5.7.4. Chamber moving sequence – Moving Interruption

Pressing continuously the Chamber Position Interruption Button during chamber movement will pause the movement sequence:

- Interrupting chamber movement

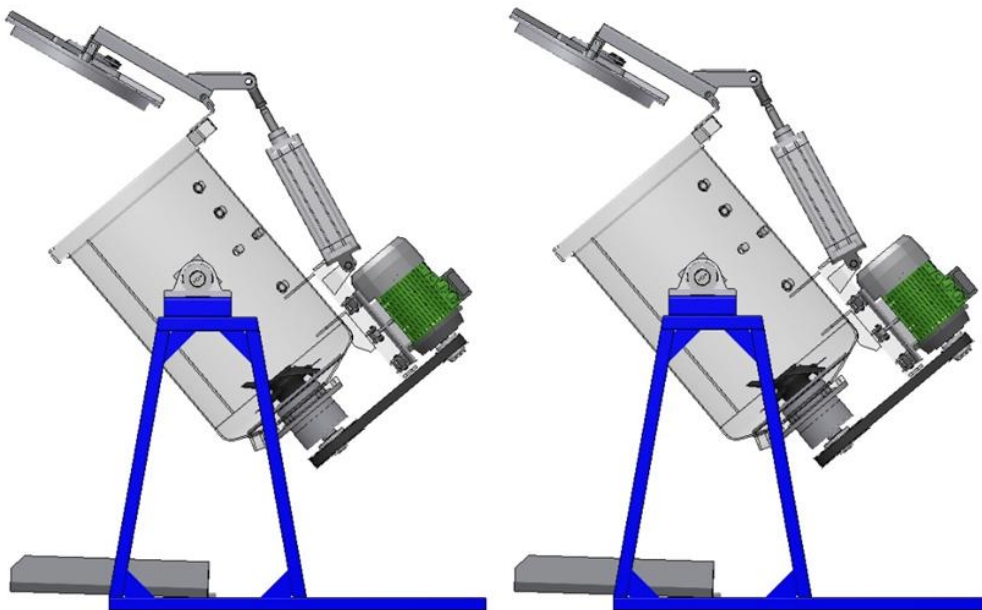
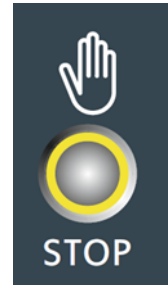


Fig. 22 – Chamber Movement Interruption

## 6. Graphic User Interface

### 6.2. GUI (Graphic User Interface) description

#### Foreword

The intent of this section is to provide information about the CPanel22 & SCS2-285 control system's Graphic User Interface. This paragraph will:

- Provide a general overview of the GUI.
- Explain how to operate the control system and how to perform all available actions using GUI.
- List all existing textual and graphic messages and indicators which the system provides.

### 6.2.1. GUI Overview

#### Keypad

The GUI has an integrated keyboard used for user input.

#### GUI structure

The GUI is based on screens. A Screen is what is displayed on the LCD in a given time. A Screen presents useful information such as temperature, textual messages, icons etc. A Screen also contains required keys, it also enables operator by touching selected keys as the basic interface. Based on the system process, the screens will be changed. In this case the GUI will display required information and will allow required input from the user.

### 6.3. Main Screen

The Main screen enables basic User-Machine interaction. The main screen displays the data when the device is on standby mode and displays different data when the system performs sterilization process.

#### 6.3.1. Keys on the Main Screen

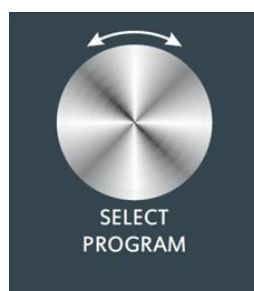


**Select Cycle**

Pressing this key will display 'Select Cycle' screen, which enables changing current cycle. This key is enabled only when the device is on standby mode.

#### NOTE:

Also there is a **Program Selector Wheel** under the push buttons. Turning it to both direction, different Program cycles can be selected not even touching the screen.



**Start New Cycle**

Pressing this key will start the selected cycle. This key is available when the device is ready to perform a new process.



**Reset Error**

This key is displayed when the device is on standby and an Error/Failure occurs. Pressing this key will reset the error and will return the device to normal mode. (In some cases, pressing this button will display 'ENTER CODE' screen, if the error reset is allowed to an authorized personnel only).



**Menu Key**

Pressing this key will show the 'MENU' screen. It enables setup of the system.

### 6.3.2. Displayed data on Main Screen



Fig. 23 - Main Screen

- **Selected Cycle** - the autoclave is designed to run several different cycles (see 8.1). This field represents the current selected cycle and includes the textual cycle name.
- **Message** – In this line, the user will get informative messages, fault results and instructions.
- **Clock** – Current time of the control system.



- **Chamber Pressure** – Current chamber pressure, stated in kPa.
- **Chamber Temp.** – Current chamber temperature, stated in °C.
- **Load Number** – the total cycle counter, in every run, this value will be increased by one. The counter is used to determine the maintenance status of the autoclave.

#### 6.4. Standby Screen

This screen is automatically displayed after the system is started. This screen is used to display useful information when the system is in Standby: Ready status of the machine, Errors, Failures and other messages are displayed.

The Main screen enables the setup of the system: selecting a program, parameters setup and many other operations that will be described later in this paragraph.

##### Status indication

If the machine is not ready to perform a sterilization process, the reason will be displayed on Stand-by screen. In this case, the 'START' key is unavailable. If the device is ready to perform a sterilization cycle, "Ready" message is displayed and 'START' key is visible.



Fig. 24 – Standby Screen

## 6.5. On-Process Screen

This screen is displayed when the device is performing the sterilisation process. All relevant data during the process is displayed on this screen.

Displayed data on Process screen:

- **Process Status**

A textual indicator which describes the cycle process.

- **Process Graph**

Cycle progress. The graph displays Chamber Pressure as a function of time.

- **Process Timer** – Time since the process started.

- **Chamber Temperature** - Current chamber temperature in °C.

- **Chamber Pressure** - Current chamber pressure in kPa.

- **Cycle Load Counter** - Current load number.



Fig. 25 - On-process Screen

## 7. Graphic User Interface Setup

### 7.1. Main Menu



Pressing the key on the main screen will show the 'MENU' screen:



Fig. 26 - Main Menu Screen

Select the required setup action by pressing the icons shown on the screen. Pressing the Exit key will go back to the main screen.



### 7.2. System Language Setup



a. On the main screen press the key. This will display the 'MENU' screen.



b. On the Menu screen press the key. This action will display the 'LANGUAGE' screen:



Fig. 27 – Language Selection Screen

c. Touch the required language.



d. Press the SET key to change the system language.



Pressing the key will cancel the 'LANGUAGE' screen.

### 7.3. LCD Contrast Setup



a. On the main screen press the menu key. This will display the 'MENU' screen.



b. On the 'MENU' screen press the  icon. The 'ENTER CODE' screen will be displayed (see para. 9.4 Typing the Code). After typing the code, the system will display the 'OPTIONS' screen.



c. Browse the menu list using the   keys and select 'Screen Contrast' option.



Pressing the  key will display 'SCREEN CONTRAST' screen:



Fig. 28 - Contrast Screen



d. Use the   keys to change the contrast.



Pressing the  key will save the changes.

## 7.5. System Clock Setup

The Time is represented in HH:MM:SS format.

The Date is represented in DD/MM/YYYY format.



a. On the main screen press the key. This will display the 'MENU' screen.



b. On the Menu screen press the key. This action will display the 'SET CLOCK' screen:



Fig. 29 - Set Clock Screen

c. Touch the required field (Date/ Time).



d. Use the keys to modify the field value.



e. Press the key to save new clock values.



Pressing the key will exit the 'SET CLOCK' screen without saving.



## 8. Graphic User Interface Operations

### 8.1. Selecting the Cycle

The cycle should be selected based on the composition of the material to be sterilized or disposed of. Please take the composition of the waste into account as maximum quantities of each material are specified. For details, see section 10.

The device offers 4 different sterilisation cycles (Waste, Textiles no cut, Special waste and Glass cycle), 1 Dynamic test and 1 Cleaning cycle.



Pressing the Program Icon on the lower left corner of the main screen will show the 'SELECT CYCLE' screen:

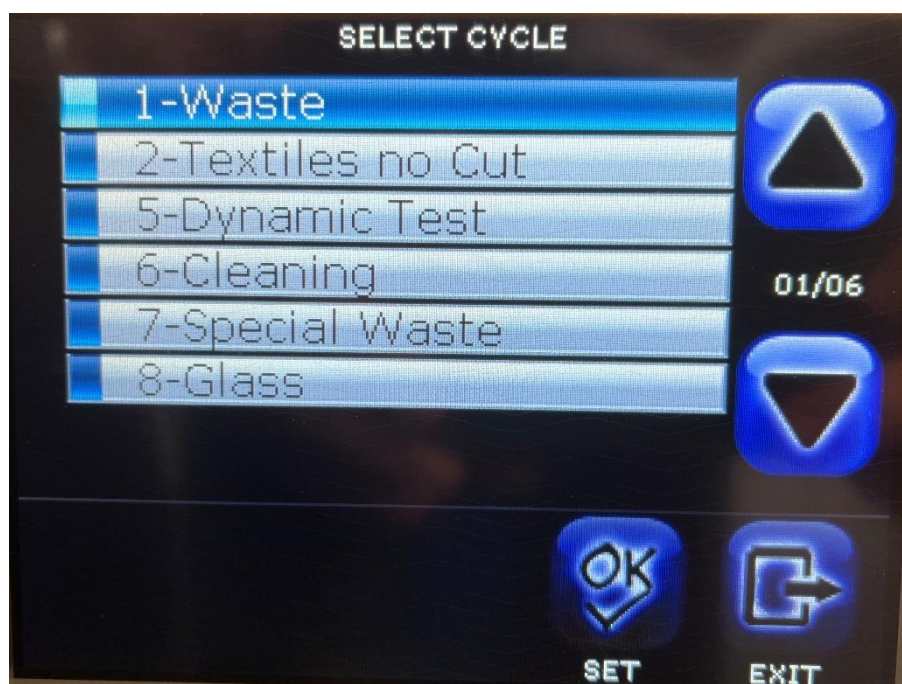


Fig. 30 - Select Cycle Screen

This screen displays a list of all available cycles of the machine.



a. Select the required cycle using the keys.



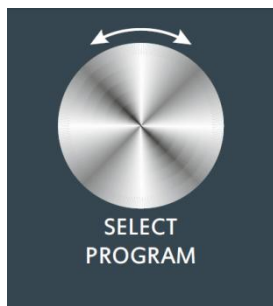
b. Press key to select the required cycle.



Pressing the key will cancel the 'SELECT CYCLE' screen.

**NOTE:**

You can also use the **Program Selector Wheel**, choosing a cycle, turning it in any direction, while in the Main screen at standby.



**Note: Some of the cycles are protected by code.**

### 8.2.1. Waste Sterilization Cycle

- Sterilization temperature: 134°C -137°C (273.2°F – 280.4°F)
- Sterilization time: 5 minutes.
- Dry Time: 5 minutes.
- Vacuum pulses: 1.
- Average cycle time: 25-35 minutes.

#### Cycle Sequence

**Loading:** Waste is loaded into the chamber. The door closes and the chamber rotates to the process position (fully vertical).

**Vacuum stage:** The cycle starts with one vacuum pulse to 60kPa + 2 minutes (or PulseVac1 + PulseVacT1 parameter value), to remove the air from the chamber.

**Heating Stage:** Steam is introduced into the chamber until the sterilization temperature is reached (134°C and pressure of 312kPa).

**Shredding:** The shredder starts working at 120°C (or 'ShredTemp'/'ShredPress' parameter value) in different speeds, as required. The shredder continues working till the end of the cycle. (Shredding time may be limited by 'ShredTime' parameter.)

**Sterilization Stage:** Temperature and pressure are controlled at the required sterilization level for the sterilization time. The Vacuum valve is working in shoot mode of 3 seconds opened and 30 seconds closed throughout the sterilization stage.



**Exhaust stage:** The shredder starts working in low speed. The Top exhaust and the Vacuum valve opens to reduce pressure down to 150kPa (or Exhaust Press parameter value). When pressure is lower than 150kPa, the Fast Exhaust valve opens.

**Drain:** Liquids and steam are rapidly exhausted from the chamber to the drain box, until pressure equalizes atmospheric pressure. The shredder's blades are working.

**Drying stage:** Compressed air introduced into the chamber for about 5 seconds (till around 120kPa) and released through the Fast Exhaust valve. This continues for 5 minutes (or 'DryTime' parameter value).

**Unloading:** The chamber rotates to the unloading position and the waste is evacuated to the bin.

### 8.2.2. Textile Cycle (No cut)

- Sterilization temperature: 134°C -137°C (273.2°F – 280.45°F)
- Sterilization time: 5 minutes.
- Dry Time: 5 minutes.
- Vacuum pulses: 1.
- Average cycle time: 25-35 minutes.

#### Cycle Sequence

**Loading:** Waste is loaded into the chamber. The door closes and the chamber rotates to the process position (fully vertical).

**Vacuum stage:** The cycle starts with one vacuum pulse to 70kPa + 2 minutes, to remove the air from the chamber.

**Heating Stage:** Steam is introduced into the chamber until the sterilization temperature is reached (134°C and pressure of 312kPa).

**Sterilization Stage:** Temperature and pressure are controlled at the required sterilization level for the sterilization time. The Vacuum valve is working in shoot mode of 3 seconds opened and 30 seconds closed throughout the sterilization stage.

**Exhaust stage:** The Top exhaust and the Vacuum valve opens to reduce pressure down to 150kPa ('ExhaustPress' parameter). When pressure is lower than 150kPa, the Fast Exhaust valve opens.

**Drain:** Liquids and steam are rapidly exhausted from the chamber to the drain box, until pressure equalizes atmospheric pressure

**Drying stage:** Drying is done by vacuum.

**Unloading:** The chamber rotates to the unloading position and the waste is evacuated to the bin.

### 8.2.3. Dynamic Test

The purpose of this cycle is to test the chamber under pressure and detect any possible leakages.

#### Operations Sequence

- The shredder is operated to create a vortex.
- Vacuum created up to 35kPa
- Sterilization time: 3.5 minutes
- No drying stage
- During periodic Maintenance, or if a leak has been detected during this test, a technician may use leak detection foam to detect the source of leakages during this test.



**Note:**

**It is recommended to implement the Dynamic test at least once every working week, to detect leaks which may cause infection to the operator and the environment!**

#### 8.2.4. Cleaning Cycle

This cycle is designed to keep the chamber in clean condition.

##### Operations Sequence

- Water and steam are introduced into the EMPTY chamber; steam is introduced to the filter to clean any remaining residues.
- The system holds a temperature of 60°C in the chamber for 5 minutes, while the shredder is working in high speed.
- Drainage of the water and residue into the drain box via the Fast Exhaust valve.
- Adding Water for 2 minutes. The shredder's motor is stopped.
- Pressurizing the chamber to 110kPa with steam and compressed air.
- Drainage of the water into the drain box via the Fast Exhaust valve.

#### 8.3. Starting the Cycle



The cycle start is performed from the 'MAIN' screen. Press the 'START' key to start the selected cycle. Or press start button.



Fig. 31 - Ready Screen



**Note:**

The 'START' key will be displayed only if the device is ready and the 'READY' message is displayed. In some cases, starting a new cycle operation is protected by a code. In this case, pressing the 'START' key will open the 'CODE' screen and enable inserting the code. After code verification, the cycle will start.

#### 8.4. Resetting Failed Cycle

When an error occurs in the system while the device is under process, the error will fail the current cycle and the reason will be displayed on the screen.



To clear the error message, press the 'CLEAR' key.



Fig. 32 - Error Screen



Note:

The 'CLEAR' key will be displayed only if the device has finished the current process. In some cases, resetting the failed cycle is protected by a code. In this case, pressing the 'CLEAR' key will open the 'CODE' screen and will enable inserting the code. After code verification, the error message will disappear.

## 8.5. Typing the Code

In order to perform protected operations, the system will display the code screen:

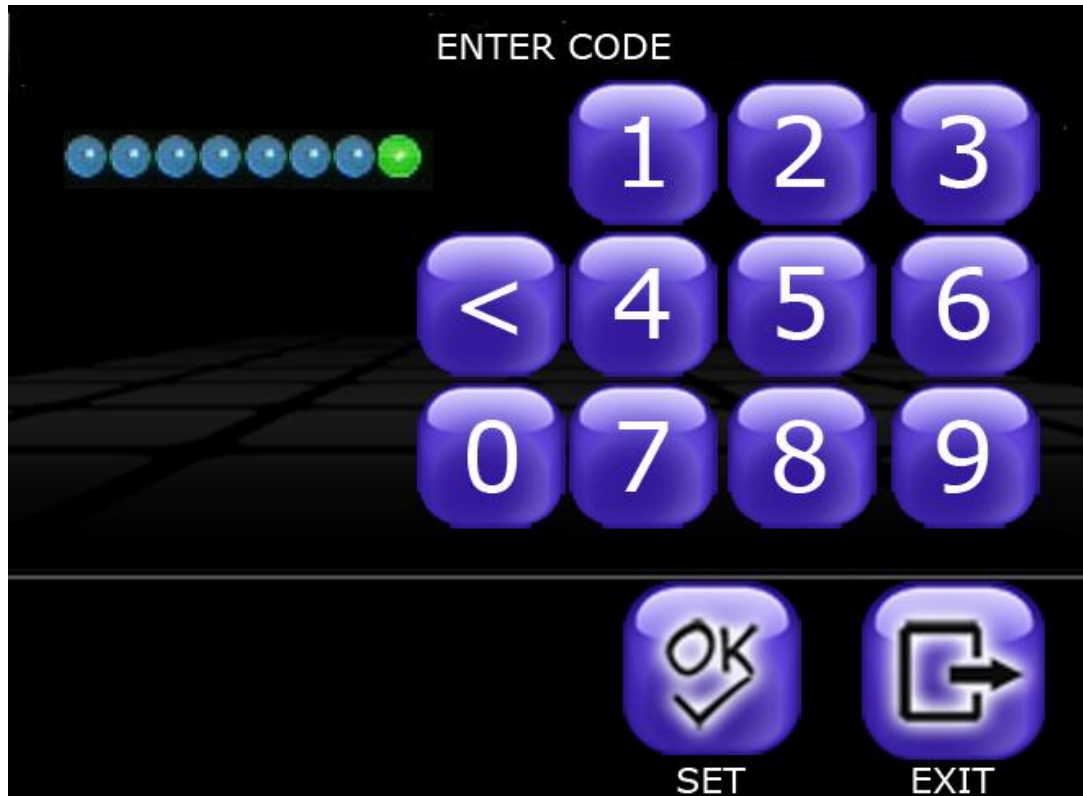


Fig. 33 - Code Screen

To enter the code:

- a. Use the NUMBER keys to enter the Operator's code ("1").

- b. Press  key to submit.

In order to clear the code use  key.

Pressing the  key will cancel the 'ENTER CODE' screen.

## 8.6. Cycle Recording



The system can keep only 60 cycle's log. It means when the system reaches the 60 log, it will overwrite the the last with the newest one.

The system saves last cycle's printouts and enables printing of the saved cycles (optional- for device with a printer).

In order to print a cycle from the history:



a. On the main screen press the menu key. This will display the 'MENU' screen.



b. On the 'MENU' screen press the 'OPTIONS' icon. The 'ENTER CODE' screen will be displayed. After typing the code and submitting, the system will display the 'OPTIONS' screen.



c. Browse the menu list using the UP and DOWN keys and select 'Cycle History' option. Pressing the 'SET' key will display 'HISTORY' screen:

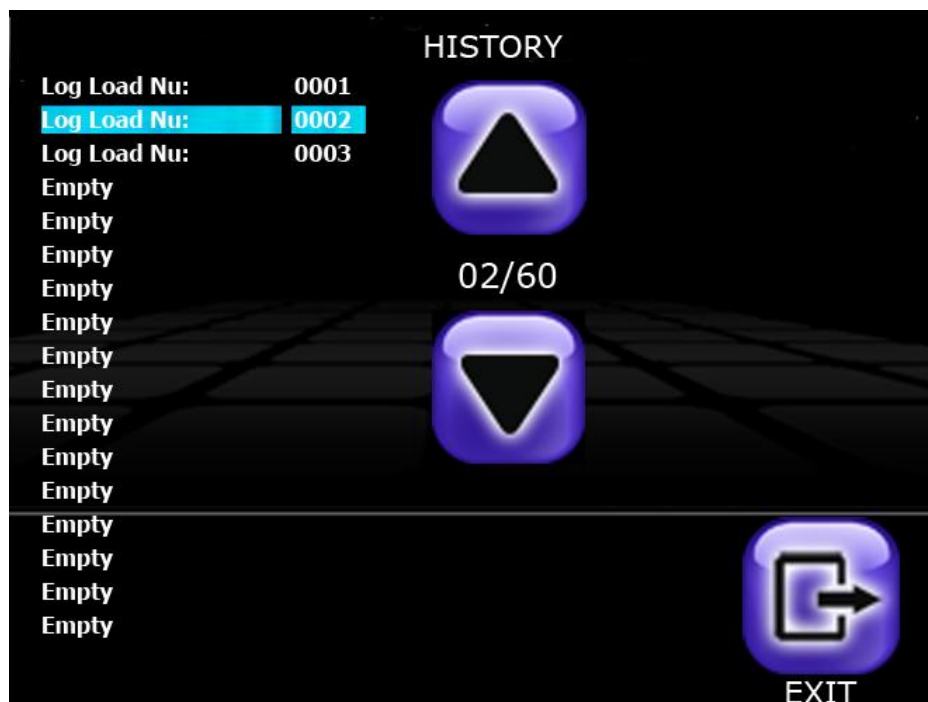


Fig. 34 - Process History Screen

On the 'HISTORY' screen, the list of saved logs is displayed.



d. Browse the history list using the UP and DOWN keys and select the required log.

#### 8.6.1. Printer

The autoclave is equipped with a character printer, which prints a detailed history of each cycle performed by the device (for the record or for subsequent consideration).

The printing is made on impact/thermal paper with 24 characters per line and contains the following information:

- Software version (is printed only on Power Off)
- Real time
- Selected program
- Sterilization pressure
- Sterilization temperature
- Sterilization time
- Summary of performed cycle and identification hints.

When the cycle begins the printer starts printing the above data. After the preliminary printing, the machine starts performing the sequence of operations of the cycle. The measured values of temperature and pressure are printed at fixed time intervals, according to the phase of the process. The data is printed from the bottom up, beginning with the date and ending with "CYCLE ENDED." for a complete cycle or "FAIL" for an aborted cycle.

#### Legend:

- V - Vacuum stage
- S - Sterilization stage
- E - Exhaust stage
- H - Heating stage
- F – Fail
- D - Drying

### 8.6.2. Printer Output

## Printout Layout Printout Legend

## Printout Layout

## Printout Legend

[illegible]

|                                                |                                                 |                        |                  |
|------------------------------------------------|-------------------------------------------------|------------------------|------------------|
| Operator: _____                                | Operator's Signature                            |                        |                  |
| Time: 17:29:22                                 | Time Index                                      |                        |                  |
| Date: 06.01.2016                               | Date Index                                      |                        |                  |
| Min Temp: 134.1°C                              | Minimum temperature reached during cycle        |                        |                  |
| Max Temp: 135.6°C                              | Maximum temperature reached during cycle        |                        |                  |
| CYCLE ENDED!                                   | Cycle final status index                        |                        |                  |
| Current cycle phase: D=<br>Drying Stage        | Current<br>Elapsed<br>Time                      | Current<br>Temperature | Current Pressure |
| D                                              | 00:18:44                                        | 112.8                  | 099.6            |
| D                                              | 00:15:44                                        | 113.4                  | 106.2            |
| Current cycle phase: E=<br>Exhaust Stage       |                                                 |                        |                  |
| E                                              | 00:14:45                                        | 135.1                  | 318.1            |
|                                                | 00:14:45                                        | 135.1                  | 318.1            |
| Current cycle phase: S=<br>Sterilization Stage | 00:13:45                                        | 135.1                  | 318.3            |
| S                                              | 00:12:45                                        | 135.2                  | 318.5            |
| S                                              | 00:11:45                                        | 135.1                  | 318.3            |
| S                                              | 00:10:45                                        | 135.1                  | 319.0            |
| S                                              | 00:09:44                                        | 134.1                  | 314.6            |
| Current cycle phase: H=<br>Heating Stage       | 00:09:20                                        | 132.5                  | 300.8            |
| H H H                                          | 00:06:20                                        | 118.9                  | 215.9            |
| Current cycle phase: V=<br>Vacuum Stage        | 00:03:19                                        | 102.4                  | 090.9            |
|                                                |                                                 |                        |                  |
| V                                              | 00:03:19                                        | 102.5                  | 090.3            |
| V                                              | 00:03:09                                        | 102.5                  | 022.5            |
|                                                |                                                 |                        |                  |
|                                                | Time                                            | °C                     | kPa              |
| Dry Time: 005.0min                             | Drying time of the selected cycle               |                        |                  |
| Ster Time: 005.0min                            | Sterilization time of the selected cycle        |                        |                  |
| Ster Temp: 134.0°C                             | Sterilization temperature of the selected cycle |                        |                  |



|                    |
|--------------------|
| Cycle: 1-Waste     |
| Load Number: 00002 |
| Ver: ISS-1D 3.44   |
| Ser.Num: 43140046  |
| Time: 17:04:35     |
| Date: 06.01.2016   |

|                    |                                               |
|--------------------|-----------------------------------------------|
| Cycle: 1-Waste     | Name of the selected cycle                    |
| Load Number: 00002 | Number of the executed cycles                 |
| Ver: ISS-1D 3.44   | Name and software version of the touch screen |
| Ser.Num: 43140046  | The serial number of the Autoclave            |
| Time: 17:04:35     | Time Index                                    |
| Date: 06.01.2016   | Date Index                                    |

### 8.6.3. Printer Specification and Handling

|                                    |                                                  |
|------------------------------------|--------------------------------------------------|
| <b>MODEL</b>                       | <b>DCN-191 Series; Data Module</b>               |
| <b>Printing method.</b>            | <b>Impact dot system</b>                         |
| <b>Printing mechanism.</b>         | <b>EPSON M-160</b>                               |
| <b>Data input interfaces.</b>      | <b>8 bit parallel Centronics / serial RS232C</b> |
| <b>Dot composition/line.</b>       | <b>144</b>                                       |
| <b>Printing speed (lines/sec).</b> | <b>1.7</b>                                       |
| <b>Paper width (mm).</b>           | <b>57.5</b>                                      |
| <b>Printing width (mm).</b>        | <b>46</b>                                        |
| <b>Character dot matrix.</b>       | <b>5 x 7</b>                                     |
| <b>Characters/line.</b>            | <b>24</b>                                        |
| <b>Operating voltage range.</b>    | <b>5VDC +/- 5% 3A peak max.</b>                  |
| <b>Dimensions W x D x H (mm).</b>  | <b>110 x 43 x 117</b>                            |
| <b>Weight (gr).</b>                | <b>Approx. 300</b>                               |

To ensure a reliable operation of the printer perform the following:

- Turn the main switch to the "OFF" position.
- Turn the main switch to the "ON" position; press the feed switch at the same time.
- Verify that the printer performs an operation test by printing all the built-in characters



The following precautions have to be taken ensuring the proper operation of the printer:

- Do not pull out the paper roll from the paper insertion opening.
- Use only the 57,5mm wide paper rolls, supplied by your dealer.

#### 8.6.4. Loading Printer Paper

- Pull out the front cover and place the paper roll in its receptacle
- Insert the end of the paper roll in the slit of the printer
- Press the FEED button until a few centimeters come out of the printer.
- Make sure that the paper roll remains in its receptacle in the right position
- Put the frontal cover back to its place.

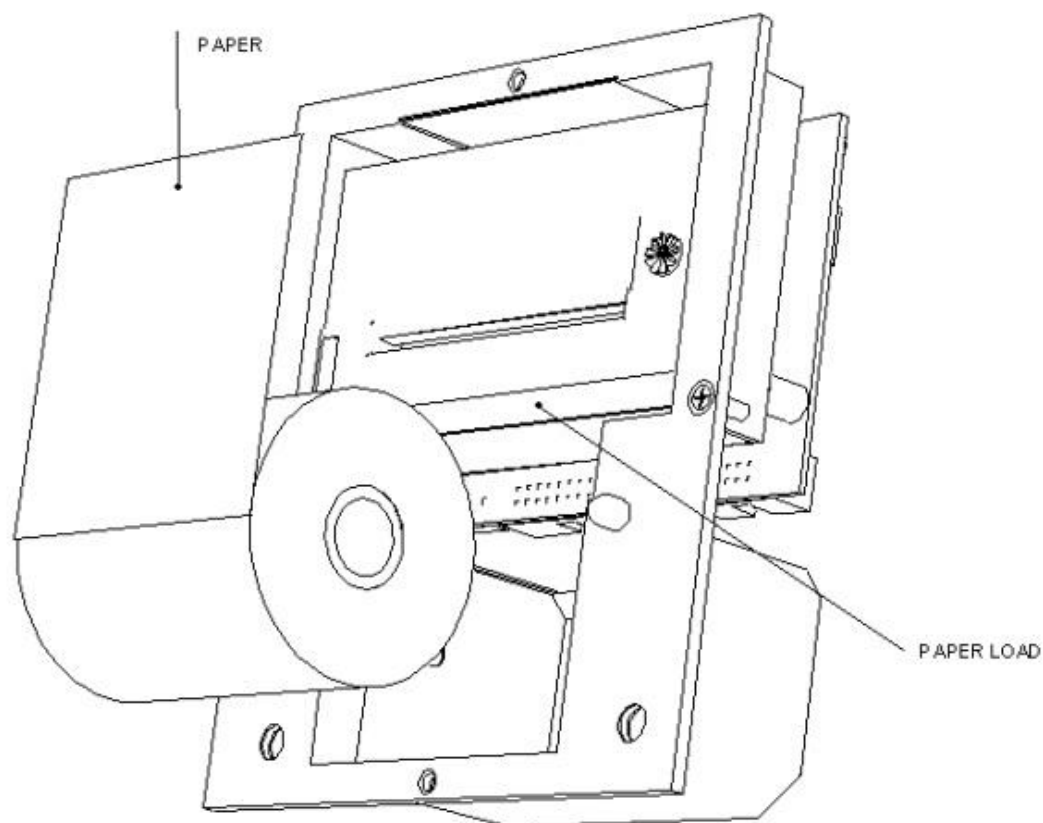


Fig. 35 - Paper loading

#### 8.7. Modifying Cycle Parameters



Always be careful with the parameter modifications! A bad adjustment(s) can damage the machine!

The system allows changing the parameters of the selected program.



a. On the main screen, press the key. This will display the 'MENU' screen.



b. On 'MENU' screen press the key. The 'ENTER CODE' screen will be displayed. After typing the code and submitting, the system will display the 'OPTIONS' screen:

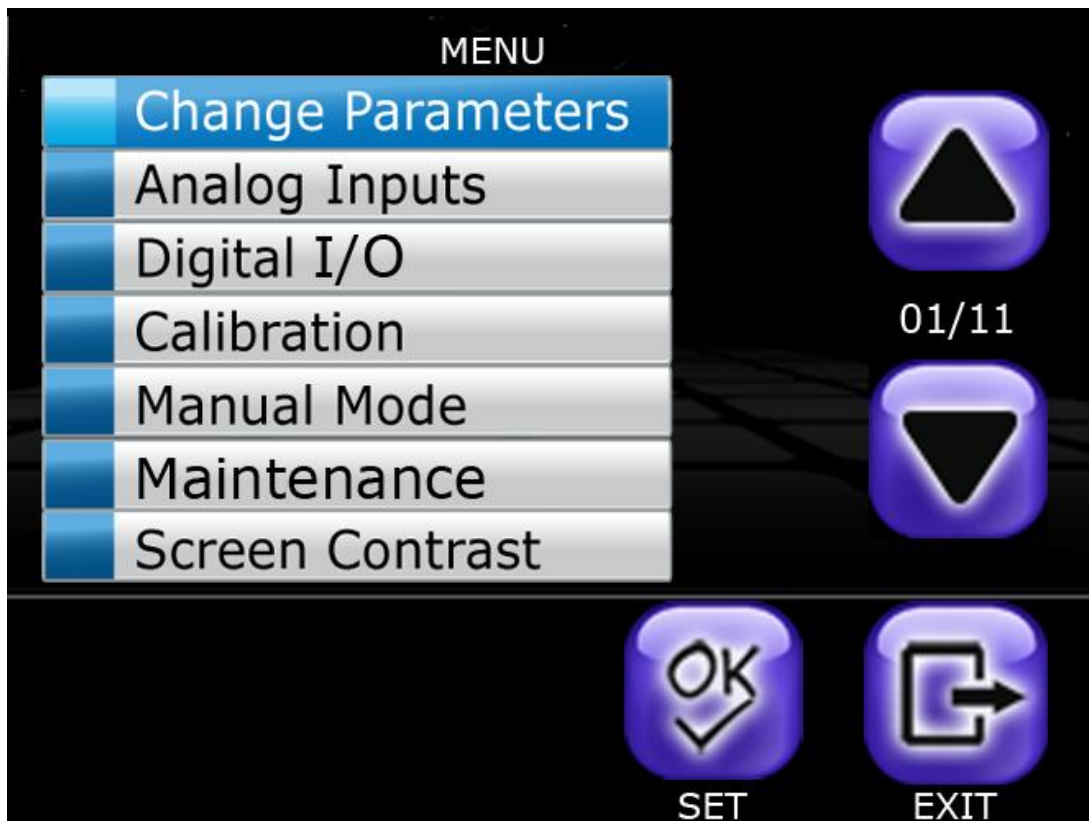


Fig. 36 - Menu Screen



c. Browse the menu list using the keys and select 'Change Parameters' option.



d. When the 'Change Parameters' option is selected, pressing the key will display the 'PARAMETERS' screen. Only submitted by user-level, parameters will be displayed.

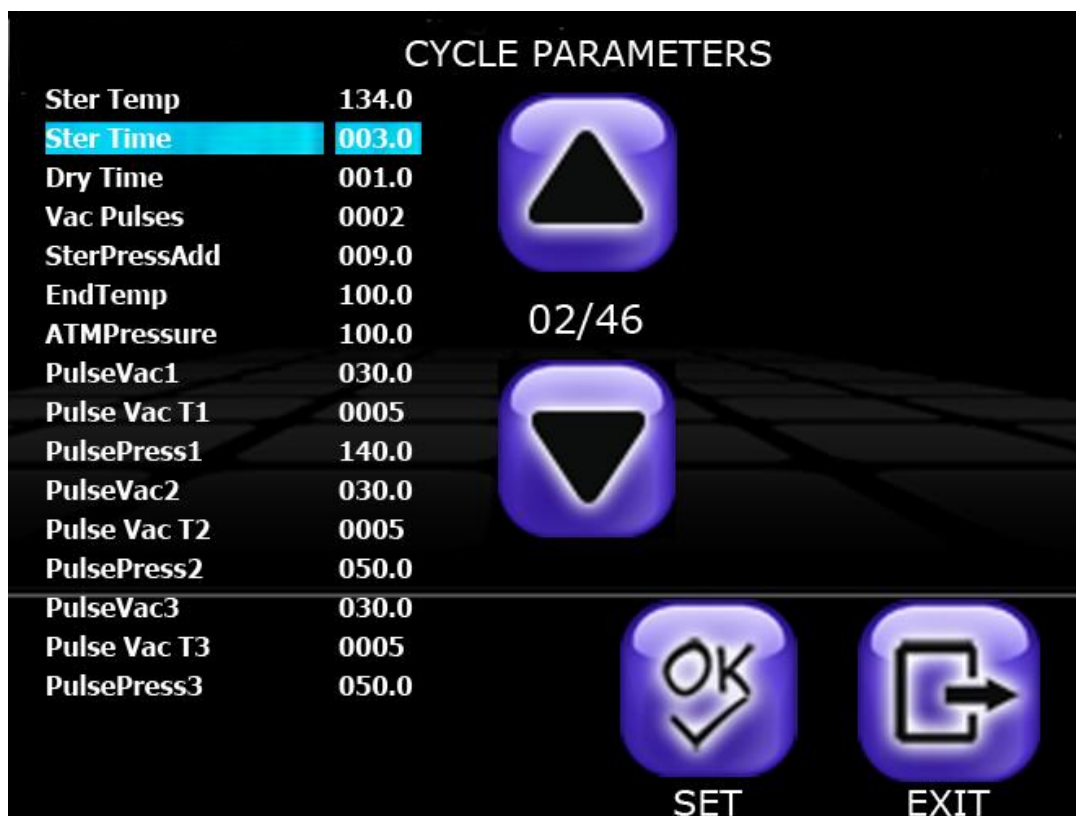


Fig. 37 - Parameters Screen

e. Browse the list using the   keys to select the required parameter.

f. Press the  key to submit the selection. 'SET PARAMETER' screen will be displayed:



Fig. 38 - Set Parameters Screen

g. Use  key to clear the parameter value field. Use numeric buttons to type a new value.

h. Press  key to submit.

Pressing the  key will cancel the 'CHANGE PARAMETER' screen.

**Note: Parameters are protected by Min/Max values and only allowed values will be accepted.**

## 8.8. Monitoring System's I/O

The GUI enables to view system's I/O. The system has analog inputs, digital inputs and digital outputs.

### 8.8.1. Digital Inputs/Outputs

- a. Browse the menu list using the   keys and select 'Digital I/O' option. Pressing the  key will display 'DIGITAL INPUTS & OUTPUTS' screen:

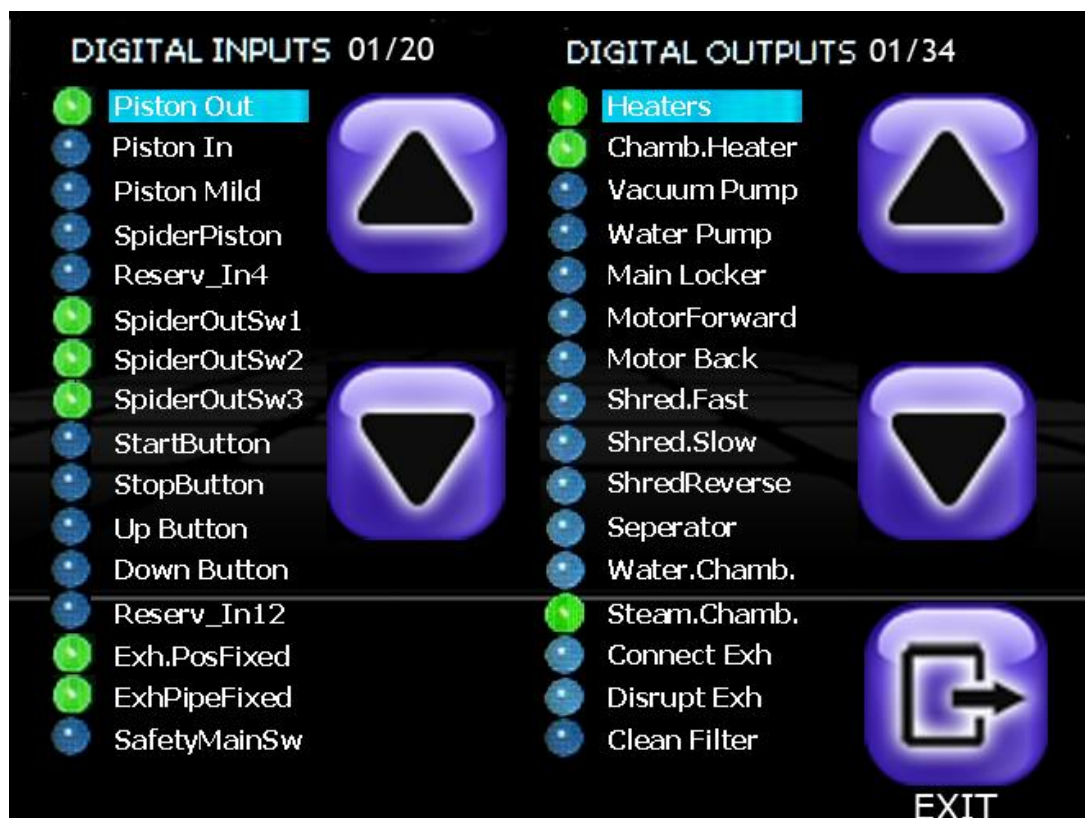


Fig. 39 - Digital Inputs/Outputs Screen

### 8.8.2 Analog Inputs

- a. On the main screen press the  key. This will display the 'MENU' screen.
- b. On the 'MENU' screen press the  icon. The 'ENTER CODE' screen will be displayed. After typing the code and submitting, the system will display the 'OPTIONS' screen.



c. Browse the menu list using the   keys and select 'Analog Inputs' option. Pressing the  key will display 'ANALOG INPUTS' screen:

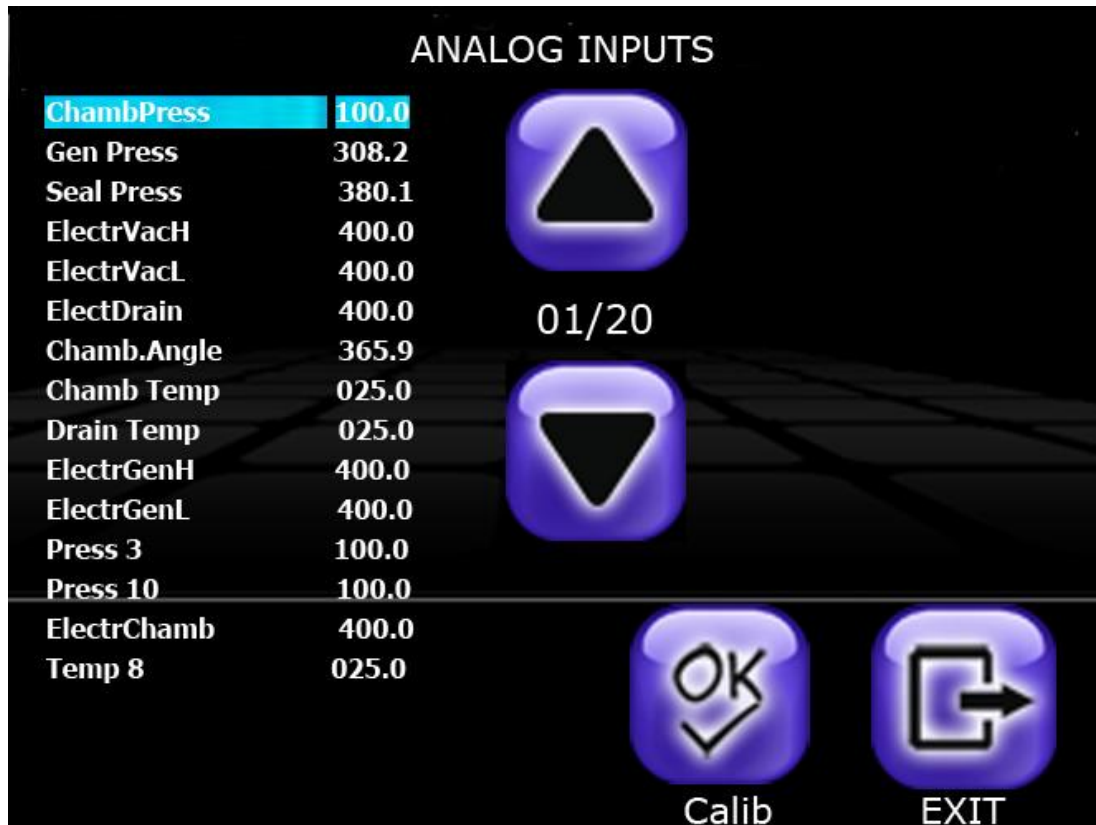


Fig. 40 - Analog Inputs Screen

## 9. System Messages

Message types:

-  Standby Mode
-  Standby Mode - Chamber Movement
-  Cycle Status
-  Cycle Status - Exhaust Operations
-  Error

## 9.1. Standby Messages

Standby messages are displayed on the screen in YELLOW color if the unit is 'NOT READY' to perform a cycle. Standby messages are displayed in WHITE color if the unit is 'READY' to perform a cycle. Standby messages are displayed in RED color if an error occurred during standby mode or the unit failed to complete the previous cycle. The error message will remain on the screen until the operator clears it (see para. 9.3 Resetting Failed Cycle).

### List of Standby Messages

#### Ready

This message is displayed on the standby stage when the device is ready to start a new cycle.

#### FAIL

This message is displayed on the standby stage when the sterilisation cycle fails.

#### No Gen Water

This message is displayed if there is no water in the generator.

#### Door Open

The message is displayed when the Door is not closed.

#### No Steam

This message is displayed if the generator pressure is too low. The message disappears when the pressure is above the required pressure.

#### No Compressed air

This message is displayed if the compressed air supply has been interrupted.

#### No Seal Press

This message is displayed if the pressure in the sealing is too low.

#### Door Open

This message is displayed on the standby stage when the door is open.

#### Opening Door

This message is displayed on the standby stage when the door is on the unlocking process.

#### Safety Sw Off

The main door is open.

#### Check Safety Sw

The Safety Switch is faulty.



## 9.2. Standby Messages - Chamber Movement

(YELLOW color)

Chamber Movement messages are displayed during Standby Mode, when the chamber is moving (see para. 6.3 Chamber Movement Explanation).

### List of Chamber Movement Messages

#### **6-OperPos D.Open**

The machine is waiting for the door to reach its safety position before chamber movement.

#### **7-OperPos Go Back**

The chamber is moving back

#### **8-Load DoorClosed**

The machine is waiting for the door to be completely open when in the load position.

#### **9-Load DoorMiddle**

The machine is waiting for the door to be completely open when in the load position.

#### **10-Load Go Back**

The chamber is moving back to the Load position.

#### **11-Load Go Forward**

The chamber is moving forward to the Load position.

#### **12-Serv.DoorOpen**

The machine is waiting for the door to reach its safety position before the chamber is moving to service position.

#### **13-Serv.Go Back**

The chamber is moving back to service position.

#### **14-Serv.Go Forward**

The chamber is moving forward to the service position.

#### **15-Unload D.Close**

The machine is waiting for the door to reach its safety position before the chamber is moving to the unload position.

#### **16-Unload D.Open**

The machine is waiting for the door to reach its safety position before the chamber is moving to the unload position.

#### **17-Unload Go Back**

The chamber is moving back from unload position.

#### **18-Unload GoFrwr**

The chamber is moving forward to load position.

#### **19-Limit ATM.Prs**

The machine is waiting for the pressure in the chamber to reach its safety value before the chamber is moving.

### **9.2. Cycle Status Messages**

(WHITE color)

Cycle Status messages are displayed during the cycles to indicate the current cycle's exact status (see Fig. 23 - Main Screen).

#### **List of Cycle Status Messages**

##### **Steam On**

This message is displayed on Heating Stage when the system creates pressure by steam in the chamber.

##### **Heating to Ster.**

This message is displayed on the Heating Stage when the system creates sterilization conditions.

##### **Sterilizing**

This message is displayed on the Sterilization stage.

##### **Exhaust**

This message is displayed on the Exhaust stage.

##### **Dry**

This message is displayed on the Dry stage.

##### **CYCLE END**

This message is displayed on the standby stage when the sterilization cycle successfully ends.

##### **TEST ENDED**

The message is displayed when the Dynamic Test is finished.

### 9.3. Cycle Status Messages - Exhaust Operations

(WHITE color)

Exhaust Operation messages are displayed during cycles, when the unit is operating the exhaust system.

#### **List of Exhaust Messages**

##### **Exh Water Cooling**

Cooling of the chamber through the water sprinkler.

##### **Exh Pressurizing**

Pressurizing the chamber with compressed air before water removal.

##### **Exh Water Remove**

Removing water from the chamber.

##### **Exh Finalizing**

The machine is waiting for the safe pressure and temperature in the chamber.

### 9.4. Error Messages

System errors are displayed in RED color on the main screen.

When the device is on process, the error will interrupt the progress, and the cycle will fail. An error reset operation is required in order to bring the system to the normal mode (see para. 9.3 Resetting Failed Cycle).

When an error occurs in the system, the 'Caution' icon  will be displayed on the main screen (see Fig. 32 - Error Screen).

#### **List of Error Messages**



##### **01-Temp1 Cut.**

This message is displayed when one of the Temperature sensors fails.



##### **02-Low Temp.**

The temperature drops for more than 5 seconds below the sterilization temperature during 'Sterilize' stage.



### 03-High Temp.

This error occurs in one of the following cases:

- **Heating Stage:** If the chamber temperature is higher than 'Limit Temperature' for more than 10 seconds.
- **Sterilization Stage:** If temperature rises to 3°C (+37.4°F) above sterilization temperature for 10 seconds.



### 04-Exh Valv.Err.

This error may occur on Standby or Exhaust stages when removing pressure from the chamber takes a long time.



### 05-High GenPress.

This error may occur if the steam generator's pressure is too high for any reason.



### 06- Pistons error.

This message is displayed when the door operation pistons are found in unreasonable positions.



### 07-High Pressure

This message is displayed if the Chamber Pressure raises 40 kPa above sterilization pressure during the sterilization stage.



### 08-Low Pressure

This message is displayed if the Chamber Pressure drops 10 kPa below sterilization pressure during the sterilization stage.



### 9-Door SW. Err.

This message is displayed if the Door Closing Mechanism switches are in wrong position.

**10-Door Open**

This message is displayed if during the sterilization process the system detects that the door is not closed.

**11-Manual Stop**

This message is displayed if the sterilization cycle is aborted after the 'STOP' key is pressed.

**12- Air Error**

This message is displayed on process when the system fails to pressurize the chamber with compressed air.

**13- Low Vacuum**

This message is displayed if the system can't create required vacuum conditions in the chamber after 20 minutes.

**14-Low Heat**

This message is displayed if the system can't reach the required heating conditions in the chamber after 20 minutes during the Heating stages.

**15-Press1 Cut**

This message is displayed when one of the Pressure sensors fails.

**16-Chamb Move Err**

This message is displayed if the chamber's position is incorrect.

**17-Doors Sw Err**

This message is displayed when the door switches are in wrong position.



#### **18-Err Water Pump**

This message is displayed when the Water Pump which supplies water to steam generator fails.



#### **19-Test Fail**

This message is displayed when the Dynamic Test cycle fails.



#### **20-No I2C Com.**

This message is displayed when the communication between the main electrical board and I/O board fails.



#### **21-Chamb Angle Err**

This message is displayed if the chamber's position is incorrect.



#### **22-No Gen.Source**

This message is displayed if there is no mineral-free water in the reservoir.

## **10. Preparation before waste disposal**

### **10.1. Waste Collection and Segregation**

Many countries have national legislation that prescribes the waste sorting categories to be used and a colour-coding system for waste containers. Where there is no national legislation, the World Health Organization (WHO) system is available (see table below. Source: WHO, Safe management of wastes from health-care activities, 2nd edition). Colour-coding makes it easier for medical and hospital staff to place waste in the correct container and to maintain waste segregation during transport, storage, handling, and disposal. Colour-coding also provides a visual indication of the potential risk posed by the waste in a given container.

| Type of waste                                             | Colour of container and markings <sup>a</sup>             | Type of container                                                        |
|-----------------------------------------------------------|-----------------------------------------------------------|--------------------------------------------------------------------------|
| Highly infectious waste                                   | Yellow, marked "HIGHLY INFECTIOUS", with biohazard symbol | Strong, leak-proof plastic bag, or container capable of being autoclaved |
| Other infectious waste, pathological and anatomical waste | Yellow with biohazard symbol                              | Leak-proof plastic bag or container                                      |
| Sharps                                                    | Yellow, marked "SHARPS", with biohazard symbol            | Puncture-proof container                                                 |
| Chemical and pharmaceutical waste                         | Brown, labelled with appropriate hazard symbol            | Plastic bag or rigid container                                           |
| Radioactive waste <sup>b</sup>                            | Labelled with radiation symbol                            | Lead box                                                                 |
| General health-care waste                                 | Black                                                     | Plastic bag                                                              |

The treatment in the ISS requires that different kinds of waste be worked upon separately. This requires the responsibility of all involved employees at the hospital, so that the segregation of waste is done at the stage of waste generation.

Follow the recommendations below for waste segregation:

- Non-Infectious Waste
- Infectious Waste

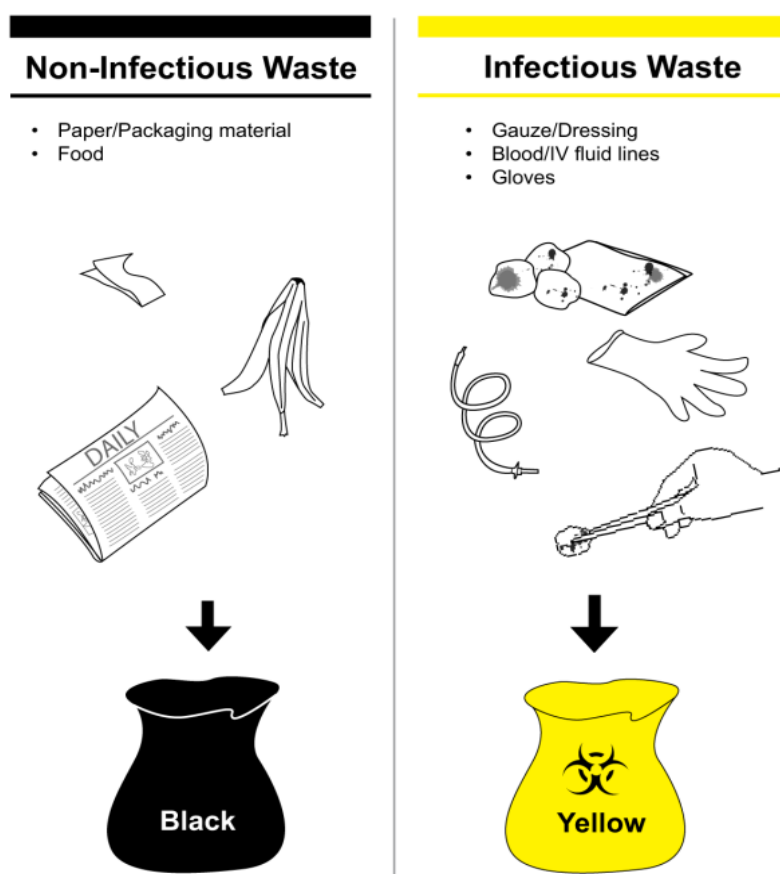


Fig. 41- Waste Segregation (1/2)

- Highly Infectious Waste
- Sharps Waste

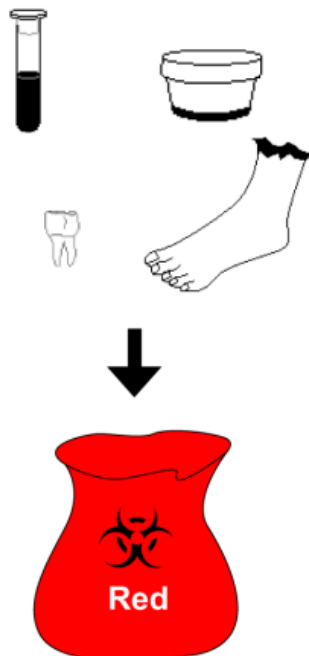
### Highly Infectious Waste

#### Anatomical waste

- Teeth
- Placenta

#### Pathological waste

- Sputum container
- Test tubes containing specimens



### Sharps Waste

- Infusion sets
- Retractable
- Broken slides
- Scalpels
- Broken vial
- Blades
- Broken ampules
- Needles
- Lancet

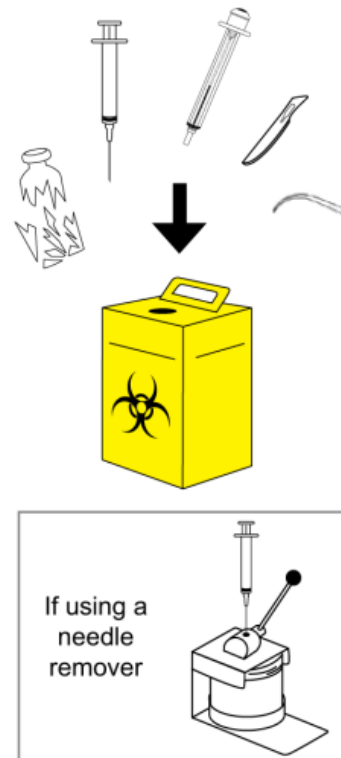


Fig. 42- Waste Segregation (2/2)



Fig. 43 – Highly Infectious Waste (Red Bag)





**Notes:**

- **Highly infectious waste (red bags) shall be treated in this machine according to local rules and regulations.**
- **Any segregation method to be implemented shall comply with local rules and regulations!**
- **The Manufacturer's recommendations concerning the sterilization of each type of material/item shall be taken into consideration!**

## 10.2. Processable Waste in ISS

Before starting sterilization, the composition of the material to be sterilized must be considered. Please take into account the composition of the waste, as maximum quantities of each material are specified.

The following types of waste can be processed in the ISS:

- **Sharps Wastes including glass waste (max. 5-10% / load)**
- **Dressing, textiles, gloves (including diapers, max. 15-20 % / load)**
- **Plastic (up to 90% per load)**
- **Paper, packaging material (max. 15-20 % per load)**
- **Food Waste from healthcare facilities**



**Notes:**

**It is forbidden to put into the loads any metal wires and big metal parts, because they can cause malfunctions or damage to the machine.**



**Notes:**

**In the case of other – not listed - Bio-Medical Hazardous or Non-Hazardous Waste, or composition of the load, please get in touch with Celitron for further information.**



**Notes:**

**In the case of placing “closed boxes” into the machine for processing, do not use “no-cut” program settings, because the inside of the box will not be sterilized!**



**Note:**

The food waste to be sterilized and shredded by ISS shall be consisted of already cooked food, that is leftovers from the patient's meals (cooked or boiled vegetables, small pieces of chicken meat or chicken bones, liquids, such as water or soup, small pieces of cooked or boiled beef, small pieces of boiled cow bones, etc.), NOT of remaining debris from the kitchen before cooking food (large cow bones, beef, uncooked vegetables, etc.).



**Note:**

In order to verify if sterilization is performed, it is recommended to use the Biological Spore Test Indicator (connected to the door) once a week in any load.

## 11. Operation Instructions



**Warning!**

**Only trained and authorized operators are allowed to use the machine!**

**Read safety instructions first before operating the machine (see para. 2. Safety Information).**

- **Power up the ISS with the 'MAIN SWITCH'.**

(See para. 6.1 Control Panel Description)

- **Select the desired cycle on the main screen.**

(See para. 9.1 Selecting the Cycle)

- **Open the housing.**

(See Fig. 44 – Opening the Housing)

- **Check the position of the chamber.**

(See para. 6.3 Chamber movement explanation)

- **Close the housing.**

(See Fig. 50 – Closing the Housing)

- **Move the chamber into loading position.**

(See para. 5.7.2 Chamber moving sequence – Loading Position)

- **Open the housing.**

(See Fig. 44 – Opening the Housing)

- **Place the load into the chamber.**

(See para. 12.1.1 Placing waste into the chamber)

- **Close the housing.**

(See Fig. 50 – Closing the Housing)

- **Move the chamber into operating position.**

(See para. 6.3.3 Chamber moving sequence – Shredding Position)

- **Wait until “READY” message is appears on the screen.**

(See para. 6.3.2 Displayed Data on Main Screen)

- **Press the “START” icon to begin the process.**

(See para. 8.3 Starting the Cycle)

- **Type the User’s code if it is necessary.**

(See para. 8.5 Typing the Code)

- **Wait until “CYCLE END’ message is appears on the screen.**

(See para. 9.3 Cycle Status Messages)

- **Discharge the waste from the chamber.**

(See para. 12.2 Unloading)

- **Prepare the chamber and the unloading equipment for a new cycle**

(See para. 13.4 Waste Bag Trolley Preparation)

(See para. 13.5 Waste Bag Ring Preparation)



**Warning!**

**Loading or unloading of material from the chamber can be done only when the door is open and in the lowest position. It is forbidden to put a hand or any other body part inside the chamber while the door is closing. In order to avoid any possible accidents during the cycle, the machine must be closed. If the door is open, the machine suspends its operation. In case of a cycle fails, there is a risk of contaminant and biohazard. In this case opening the door is not allowed. (see para. 13.3 Load discharge when process fails).**

## 12. Operation Process

### 12.1. Loading

When loading the waste to be sterilized into the chamber, observe the rules described in this chapter.



**WARNING**

**Read Safety Instructions before operating the machine (see para. 2. Safety Instructions).**



**WARNING**

**The Operator is instructed to wear protective measures (gloves, long cloths, bio- mask and glasses) in accordance with local safety regulations and good practice, in order to avoid contact with Bio-hazardous waste, hot surfaces, sharp edges or moving parts (see para. 2.2 Personal Protective Equipment (PPE) ).**



**CAUTION**

**Before each cycle, verify that the door gasket and the surface that the gasket is pressed on are clean and intact.**



**CAUTION**

**Do not overload the chamber as this can have adverse effects on the results of the sterilization and drying programs!**



**CAUTION**

**Make sure that the load meets the segregation requirements (see para. 10.1 Waste Collection and Segregation).**



**Chose always the best suitable cycle for the current type of waste (see para. 8.1 Selecting the Cycle).**

### 12.1.1. Placing waste into the chamber

- Prepare the trolley for the waste discharge.

(See para. 13.4 Waste Bag Trolley Preparation)

- Press the Chamber Load Position button to move the chamber into load position.
- Open the housing and place the waste bag into the chamber.



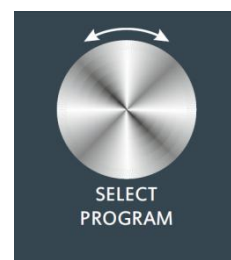
Fig. 44 – Opening the Housing    Fig. 45 – Loading the Chamber

- Close the housing.
- Press once the Chamber Shredding Position Button in order to move the chamber into shredding position.



### 12.1.2. Start running the cycle

- If Chamber is at Shredding Position, and the Chamber Shredding Position Button - START – is pressed once again, and the unit is in Ready state, it will start to run the chosen, selected program cycle.
- Note: the Program selector wheel, rotate this wheel allows to select the right program cycle to be chosen. See para. 9.1 Selecting the cycle.



### 12.2. Unloading

On completion of the cycle, the load shall be immediately removed from the device and a visual inspection shall be made to assure that the load is dry, or that sterilizing indicators have made the required color change.



**CAUTION-** during loading and unloading, be careful not to slip on wet floor (see para. 2.1 General Safety Instructions)!



**The Operator is instructed to wear protective measurements (gloves, long cloths, bio-mask and glasses) in accordance with local safety regulations and good practice, in order to avoid contact with Bio-hazardous waste, hot surface, sharp edges or moving (see para. 2.2 Personal Protective Equipment (PPE)).**

#### 12.2.1. Load discharge using Waste Trolley

- Prepare the trolley for the waste discharge.

(See para. 13.4 Waste Bag Trolley Preparation)

- Place the handle into the trolley's socket.



Fig. 46 – Mounting Trolley's Handle

- Verify if “CYCLE END” message appeared on the screen.
- Open the housing and move the trolley into the loading area.



Fig. 47 – Opening the Housing



Fig. 48 – Moving Trolley

- Remove the handle of the trolley and close the housing.



Fig. 49 – Dismounting Trolley's Handle



Fig. 50 – Closing the Housing

- Press once the Chamber Unload Position Button to unload the waste into the trolley.
- Press the Chamber Unload Position Button continuously to discharge the remaining waste from the chamber.



- Press the Chamber Load Position button to move the chamber into load position.
- Open the housing and place the handle into the trolley's socket.
- Remove the trolley from the loading area.







Fig. 51 - Removing Trolley from Loading Area

- Shut the opening of the plastic waste bag to prevent waste scattering.
- Prepare the chamber for the new cycle.

#### 12.2.2. Load discharge using Waste Trolley and Waste Bag Ring

- Prepare the waste bag ring for the waste discharge.

(See para. 13.4 Waste Bag Ring Preparation)

- Verify if “CYCLE END” message appeared on the screen.
- Press the Chamber Load Position button to move the chamber into load position.
- Open the housing and place the waste bag ring on the chamber’s flange.



Fig. 52 – Placing Waste Bag Ring on the Chamber

- Check the position of waste bag ring, verify if the ring is fixed properly.



Fig. 53 – Checking Waste Bag Ring's Position

- Prepare the trolley for the waste discharge.

(See para. 13.4 Waste Bag Trolley Preparation)

- Place the handle into the trolley's socket.



Fig. 54 - Mounting Trolley's Handle

- Move the trolley to the front of the chamber.



Fig. 55 - Moving Trolley into Loading Area

- Remove the handle of the trolley and close the housing.



Fig. 56 – Dismounting Trolley's Handle



Fig. 57 – Closing the Housing

- Press once the Chamber Unload Position Button to unload the waste into the trolley.
- Press and hold the Chamber Unload Position Button continuously to discharge the remaining waste from the chamber.





- Press the Chamber Load Position Button to move the chamber into load position.



- Open the housing and remove the waste bag ring from the chamber's flange



Fig. 58 - Removing Waste Bag Ring from Chamber's Flange



Fig. 59 – Placing Waste Bag Ring into the Trolley

- Shut the opening of the plastic waste bag to prevent waste scattering.
- Place the handle into the trolley's socket and remove the trolley from the loading area.



Fig. 60 – Mounting Handle

Fig. 61 – Removing Trolley

- Prepare the chamber for the new cycle.

### 12.3. Load discharge when process fails

In case of failure, the chamber will be sealed and the door remains closed until a Technician with a special code fixes the problem and continues the cycle. In any case that the Fail enables completion of the sterilization process, the cycle will be forced to continue until sterilization is reached and the User will get an indication at the end of the cycle on the type of the failure. The machine cannot be restarted without fixing the error first.

In case of process fail, follow the steps below to exit from the process:

- Touch the "CLEAR" icon. (See para. 9.3 Resetting Failed Cycle)
- Type the code in order to complete the RESET process by alphanumeric table (see para. 9.4 Typing the Code).
- Move the chamber into Load Position. (See para. 6.3.2 Chamber moving sequence – Loading Position)

### 12.4. Waste Trolley Preparation

- Clean Waste Bag Trolley from the remaining waste.
- Place a new plastic waste bag into the trolley.



Fig. 62 – Preparing Waste Bag Trolley

### 12.5. Waste Bag Ring Preparation

- Place the Waste Bag Ring on the stand



Fig. 63 – Pacing Waste Bag Ring on the Stand

- Clean Waste Bag Ring from the remaining waste.



Fig. 64 – Cleaning Waste Bag Ring

- Place a new plastic waste bag onto the Waste Bag Ring.



Fig. 65 – Pacing waste bag onto Waste Bag Ring



- Close the opening of the bag with the rim-lock of Waste Bag Ring and shut the latch.



Fig. 66 – Placing and Closing Waste Bag Ring's Rim Lock

- Take out the Waste Bag Ring from the stand and pull the bag through the opening to make room for the waste.



Fig. 67 – Preparing Waste Bag Ring for waste discharge



## 12.6. Moving chamber into Shredding Position

- Prepare the chamber for the new cycle:
- Clean the chamber's flange from the remaining waste.
- Clean the door gasket from the remaining waste.
- Press once the Chamber Shredding Position Button in order to move the chamber into shredding position

## 12.7. Chamber movement interruption

- Hold the Chamber Movement Interruption Button during chamber movement in order to pause the movement of the chamber



## 13. Maintenance



**Warning!**

Maintenance tasks are to be performed only providing the machine is unplugged from electricity. Before implementing service, maintenance or regular cleaning, shut the machine off and unplug it from the electrical source. It is recommended to verify that the machine is not powered with a volt meter.



**Note:** Cleaning of the machine shall be done according to the instructions below. Do not apply any chemicals, steam or large quantities of water, to avoid chemical reactions, damage to the machine or electrical shock hazard.

### 13.1. Preventive and Periodical Maintenance

|                          |                                                                                                                                                                                                                                                   |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Before each cycle</b> | <p>Verify that the door gasket and the surface that the gasket is pressed on are clean and intact.</p> <p>Use a soft brush to clean if necessary.</p> <p><b>Caution! Do not use steel wool or steel brush as this can damage the chamber!</b></p> |
| <b>Daily</b>             | <ol style="list-style-type: none"> <li>1. Clean the gasket with a soft cloth.</li> <li>2. Clean the chamber's door area with a soft cloth.</li> <li>3. Run the Cleaning program.</li> </ol>                                                       |

|                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                     | 4. Replace the internal door cover not woven textile at least once per day and if necessary.                                                                                                                                                                                                                                                                                                                                                       |
| <b>Monthly</b>                      | <ol style="list-style-type: none"> <li>1. Allow the safety valves to blow- Turn the pressure relief nut counterclockwise for 2 seconds.</li> <li>2. Check that valves which are connected directly to the chamber do not leak.</li> <li>3. Check and tighten all fasteners and parts of the door locking device where necessary.</li> </ol>                                                                                                        |
| <b>Every second months</b>          | <ol style="list-style-type: none"> <li>1. Replace the Bio-filter.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Quarterly</b>                    | <ol style="list-style-type: none"> <li>1. <b>Clean water strainers on drain pipes while the device is not operated (idle).</b></li> <li>2. Clean the non-return valves.</li> <li>3. Clean the exhaust pipes: verify sewage pipe from the device to the main sewage pipe is clean. It is important to prevent the overflow of the sewage liquids.</li> <li>4. Check and tighten the piping connections where necessary to avoid leakage.</li> </ol> |
| <b>In every 3 or 6 months</b>       | <ol style="list-style-type: none"> <li>1. Replace RO system filters (3 pieces excluding the membrane filter)</li> <li>2. Put a few drops of lubricant on the doors' hinges.</li> <li>3. Replace the sealing between the knives.</li> </ol>                                                                                                                                                                                                         |
| <b>After 500 cycles or 6 months</b> | <ol style="list-style-type: none"> <li>1. Replace Tap water filter. (if it was necessary to install)</li> </ol>                                                                                                                                                                                                                                                                                                                                    |
| <b>In every 6 months</b>            | <ol style="list-style-type: none"> <li>1. <b>Clean water strainers on steam and feed water inlet pipes while the device does not operate (idle).</b></li> <li>2. Replace Door Gaskets (or after every 1000 cycles)</li> <li>3. Replace sealing on the exhaust pipe (or after every 1000 cycles)</li> <li>4. Sharpen the Shredder's blades (or after every 1000 cycles)</li> </ol>                                                                  |



**Note:**

**Keeping the inside of the chamber clean will lengthen its life and its proper operation.**

## Periodical Tests

Check all safety devices from time to time and re-regulate if necessary. Once a year, calibrate and validate the device. Periodical safety tests derived from local rules, regulations or law shall be applied in compliance with the law.

### 13.1. Regular Maintenance Tasks

- Always carry out the cycles in accordance with the operating manual.
- Test the condition of the supply lines of the device at regular intervals for cracks or possible mechanical damage. After the end of the cycle, close all the valves and taps of the supply cables, such as those for cooling water and compressed air.
- The unit is equipped with two safety valves, located at the chamber and the steam generator. As long as the device is regularly inspected (at least twice a year) by an authorized customer service agent, the preventive relieving of the valves is not necessary. To check the operation of the safety valves, turn the pressure relief nut counterclockwise for 2 seconds. Verify steam escapes from the valve. Attention: Use protective gloves in order not to burn your hands with the hot steam. Press the STOP key to interrupt the operation, and exhaust steam from the chamber.

### 13.2. Emergency actions for pressurized chamber



**Warning!**

In case of an emergency situation push the "STOP" emergency button and disconnect the main 3 phase switch (left side of the electrical box).

Call a technician to solve the problem.

## 14. Troubleshooting

| Symptoms                                                                     | Possible causes check-ups and tests                                                          | Corrections                                                                                      |
|------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| 1. Control unit is not energized. No displays and lights on the front panel. | 1.1 The control circuit breaker is switched off.                                             | 1.1 Check the circuit breaker and turn the switch on.                                            |
| 2. Low pressure or no steam pressure from the external source.               | 2.1 Low pressure on the steam supply line.<br>2.2 Pressure reducer is faulty or set too low. | 2.1 Fix pressure on the steam supply line.<br>2.2 Set correctly or replace the pressure reducer. |

|                                                                                                          |                                                                                                                                                                      |                                                                                                                                                                             |
|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3. Steam pressure goes up beyond the control point.                                                      | 3.1 The electronic pressure transducers or measuring circuits are faulty or out of calibration.<br>3.2 Leakage through the steam to chamber valve.                   | 3.1 Check and calibrate pressure measuring circuits or replace transducers.<br>3.2 Check, fix or replace the steam to chamber valve.                                        |
| 4. No steam inlet or low steam pressure.                                                                 | 4.1 Steam inlet valve is blocked or damaged.<br>4.2 Low pressure at the steam supply line.                                                                           | 4.1 Fix or replace the steam valve.<br>4.2 Check the steam supply pressure as described in clause 2 above.                                                                  |
| 5. Temperature rises above the pre-set sterilization value.                                              | 5.1 Steam pressure is too high.<br>5.2 Steam valve leaks.<br>5.3 Control system problem.                                                                             | 5.1 Check and set the steam pressure from the building source and the pressure reducer correctly.<br>5.2 Fix or replace the steam valve.<br>5.3 Replace the control boards. |
| 6. Fast or slow exhaust phases do not function; chamber pressure remains high or exhaust takes too long. | 6.1 The fast or slow exhaust valves is stuck or damaged.<br>6.2 Steam valve leaks.<br>6.3 Control system problem.                                                    | 6.1 Repair or replace the damaged valve.<br>6.2 Repair or replace the steam valve.<br>6.3 Replace the control boards.                                                       |
| 7. Drying stage does not work.                                                                           | 7.1 Steam valve leaks.<br>7.2 Control system problem.                                                                                                                | 7.1 Repair or replace the steam valve.<br>7.2 Replace the control boards.                                                                                                   |
| 8. The air inlet does not work.                                                                          | 8.1 Air inlet valve is clogged or damaged.<br>8.2 Air filter is jammed.                                                                                              | 8.1 Repair or replace the air valve.<br>8.2 Replace the air filter.                                                                                                         |
| 9. Unsatisfactory results of sterilization process.                                                      | 9.1 Sterilization conditions of improper temperature or pressure too low, ster. time too short.<br>9.2 Incorrect loading of the Sterilizer, air trapped in the load. | 9.1 Set the temp. and time correctly according to the sort and quantity of material.<br>9.2 See para. 5 "Preparation before Sterilization".                                 |

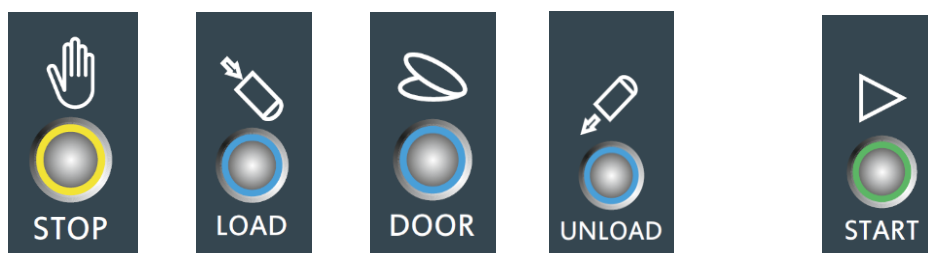
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>10. Drying incomplete- waste remains wet.</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <p><b>10.1 Insufficient steam pressure.</b></p> <p><b>10.2 Incorrect loading of the chamber.</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <p><b>10.1 Set or fix the pressure switch.</b></p> <p><b>10.2 Reload the chamber correctly. (see para. 5.2)</b></p>                                                                                                                                                                                                                                                                                                                                                                                                         |
| <p><b>11. Problems related to the control system.</b></p> <p>The keypad or display is out of order.</p> <p>No response when pressing any key on the keyboard. Disordered response to manual controls.</p> <p>Pressing one key gives the effect of pressing a different key. Cycle does not start when pressing the START key.</p> <p>Printer does not work or printing is incoherent. While pressing the STOP key, the system does not react.</p> <p>While switching the device on, initialization is not correct.</p> | <p><b>11.1 Check if the flat cable or MOLEX connectors between the control boards and keyboard are well plugged in.</b></p> <p><b>11.2 Power supply out of order.</b></p> <p><b>11.3 Control boards or keyboard faulty.</b></p> <p><b>11.4 Printer Paper is missing or quality is unsuitable.</b></p> <p><b>11.5 Flat cable connection between control board and printer is not plugged in correctly.</b></p> <p><b>There are interruptions or loose contacts.</b></p> <p><b>11.6 Printer damaged.</b></p> <p><b>11.7 Temperature sensor is disconnected or loosely connected. Sensor damaged.</b></p> <p><b>11.8 Pressure transducer is bad. Mechanical or electrical connections or transducer damaged.</b></p> | <p><b>11.1 Firmly plug in the MOLEX connectors.</b></p> <p><b>11.2 Fix the power supply.</b></p> <p><b>11.3 Replace the defective board of the microcomputer unit.</b></p> <p><b>11.4 Insert a paper roll inside the printer. Make sure you use the correct type of paper.</b></p> <p><b>11.5 Plug in the connection or replace it.</b></p> <p><b>11.6 Fix connection or replace the printer.</b></p> <p><b>11.7 Fix connection or replace the sensor.</b></p> <p><b>11.8 Fix connection or replace the transducer.</b></p> |
| <p><b>12. Chamber does not rotate to its required position</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <p><b>12.1 Angle sensor is damaged</b></p> <p><b>12.2 Drive malfunction</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <p><b>12. Call a Technician</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

|                                                                                             |                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                             | <b>12.3 Control system failure</b>                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                    |
| <b>13. Exhaust is too slow</b>                                                              | <b>13.1 Filter is clogged</b>                                                                                                                                                                | <b>13. Clean the drain filter and run the Cleaning program. If the problem persists, call a technician to clean the chamber filter.</b>                                                                                                                                                                                                            |
| <b>14. The waste has not been shredded well in the chamber during sterilization process</b> | <b>14.1 Incorrect loading of material in the chamber (see para. 5.2)</b><br><b>14.2 Shredder's blades are damaged</b><br><b>14.3 Motor malfunction</b><br><b>14.4 Control system failure</b> | <b>14. Call a Technician</b>                                                                                                                                                                                                                                                                                                                       |
| <b>15. The load is moist at the end of sterilization cycle</b>                              | <b>15.1 Incorrect loading of material in the Sterilizer</b><br><b>15.2 The air to chamber piping is blocked</b><br><b>15.3 Compressed air system malfunction</b>                             | <b>15. Call a Technician</b>                                                                                                                                                                                                                                                                                                                       |
| <b>16. Door does not close</b>                                                              | <b>16.1 Door is not clean</b><br><b>16.2 Overload/ Interruption</b>                                                                                                                          | <b>16.1 Clean the door and the flange</b><br><b>16.2 Verify that the chamber is not overloaded or that there is no object blocking the door and/or the flange.</b>                                                                                                                                                                                 |
| <b>17. Leakage from the machine</b>                                                         | <b>One of the valves is faulty- continuously open</b>                                                                                                                                        | <b>In case of detection of a leakage on the floor or surrounding area, immediately: Evacuate all personnel and seal the room, contact a technician to provide instructions and contact a third party to handle the hazardous substances removal.</b><br><br><b>Do not come in direct contact with the machine without protective measurements!</b> |



## Appendix I.

### Operation buttons & functions



|                           | Stop                                         | Load                             | Door        | Unload                                                           | Start                                                                            |
|---------------------------|----------------------------------------------|----------------------------------|-------------|------------------------------------------------------------------|----------------------------------------------------------------------------------|
| <b>Not ready</b>          | No function, light is blinking               | Chamber goes to loading position | No function | Chamber goes to unloading position                               | No function, light is off                                                        |
| <b>Ready</b>              | No function, light is off                    | Chamber goes to loading position | No function | Chamber goes to unloading position                               | Starting the cycle, light is blinking / or Chamber goes to shredding position    |
| <b>Running</b>            | Stopping cycle, light is off                 | No function                      | No function | No function                                                      | No function, light is on                                                         |
| <b>Manual Stop</b>        | Stopping cycle, light is on                  | No function                      | No function | No function                                                      | No function, light is off                                                        |
| <b>Cycle End</b>          | No function, light is off                    | Chamber goes to loading position | No function | Chamber goes to unloading position                               | No function, light is blinking                                                   |
| <b>Fail</b>               | No function, light is on                     | No function                      | No function | No function                                                      | No function, light is off                                                        |
| <b>Loading Position</b>   | No function, light is blinking               | No function                      | No function | Chamber goes to unloading position                               | Chamber goes to shredding position, light is off                                 |
| <b>Unloading Position</b> | No function, light is blinking               | Chamber goes to loading position | No function | Pushing it for seconds, it starts shredder motor to clean debris | Chamber goes to shredding position, light is off                                 |
| <b>Shredding Position</b> | No function, in not ready, light is blinking | Chamber goes to loading position | No function | Chamber goes to unloading position                               | No function, if light is off not ready, if light is blinking, ready starts cycle |