User Manual

Froilabo
Precision for life

BIO GUARD 690

ULT Freezer



froilabo.com

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WARNING: GENERAL INFORMATION AND SAFETY INSTRUCTIONS

It is necessary to strictly follow the instructions for use of this manual to ensure the proper functioning of the device or to exercise a possible resort to warranty.

To use this manual:

- Read these instructions carefully before using the device for the first time.
- Follow the instructions in the operating instructions.
- This manual is an integral part of the product. Keep this manual in a convenient place.
- If you need to transfer this device, do not forget to attach the user manual.
- In case of loss, upon request, we will provide you with a new user manual. You can also download the manual from www.froilabo.com

In this manual:



This warning sign is intended to draw your attention to information or an observation of great importance or potential danger



This warning sign is intended to remind you to pay attention to the potential hazard due to the ultra-low temperature of the freezer & it's contents.

Symbols on serial number plate:



CE conformity marking



Date of manufacture



Refer to instruction manual

ENVIRONMENT:

Concerning products that does not use natural cooling, these devices may contain fluorinated greenhouse gases under the Kyoto protocol.

Waste treatment methods: Do not allow the product to disperse into the environment.

Destruction / Disposal: Consult the manufacturer or the supplier for information on recovery or recycling.

Companies installing, servicing, maintaining, repairing or commissioning equipment containing refrigerants must have a certificate referred to in Article R543-76 of the French Environment Code or an equivalent certificate issued in one of the member states of the European Union.

1 Certificate of conformity

FROILABO SAS certifies that the appliance mentioned below:

Bio Guard 690 ULT Freezer

Comply with the technical directives applying to them:

- RoHS Directive: 2011/65/EU
- Electromagnetic Compatibility Directive: 2014/30/EU
- Low Voltage Directive: 2014/35/EU

Note: *These appliances are not designed to operate in explosive environments (ATEX). Moreover they cannot be used to store flammable corrosive substances.*

2 Manufacturer

Froilabo
8 RUE DE LAMIRAULT
77090 COLLEGIEN FRANCE

3 Warranty

FROILABO SAS guarantees optimum operation of these appliances according to the installation and usage conditions indicated in this manual.

The duration of the warranty is: 24 months.

This warranty is extended to:

- 5 years on the following parts: fan, compressors & condenser*.
- 10 years on the VIP insulation.

* For parts, the warranty is limited to spare parts, other costs (transport, travel, labour) remain the responsibility of the customer.

During this period, in the event of a malfunction of your device, the warranty is limited to:

- free repair or exchange of equipment
- functioning improvement

It must be clear that the trouble or failure must be related to a defect in the material or manufacture. **Any other claim for compensation is excluded**.

Lifespan of the product is around 10 years minimum.

The right use includes following the instructions in the user manual and performing the inspection and maintenance work.

The photos used in this document are not contractual.

4 General Information



Ensure that all persons installing, using and repairing the equipment are aware of the potential hazards related to their work, of the safety measures to respect and have read and understood the instructions included in this user manual.

If hazardous or potentially hazardous products are used, only persons fully familiar with the equipment should handle these products. These persons must be capable to conduct an overall assessment of the potential risks. Please contact us if you have any questions regarding the use of the equipment or the instructions. **Under no circumstances Froilabo may be held liable for the quality of material stored in the freezers**.

Note: the equipment that you have purchased is designed for professional use. Nevertheless, impacts to the frame and vibrations should be avoided. Ensure that the equipment is inspected at regular intervals appropriate for its frequency of use. Also check (at least once every two years) that labels relating to safety and unauthorised use are properly in place.

5 Installation of the device

5.1 Delivery & unpacking

Use a pallet truck to move the freezer on its pallet. It is imperative to keep the freezer unpacked to avoid any risk of tipping over. The device can be placed on the ground and maneuvered thanks to the wheels. After positioning the device in the desired location, remove the various protective plastics and shims.

Do not forget to remove the foam padding from the shelves before starting the device.

Froilabo freezers are delivered on a pallet equipped with an unloading ramp. In fact, they do not require specific equipment to get off the pallet. Please refer to the handling and unpacking sheet attached to the device.

After the reception, please check the contents of the delivery.

690 Liters
1 detachable power cord L=2.5m with IEC19 connector
1 filter cassette
1 set of 2 keys
1 ice scraper
2 door bearings

Do not use sharp objects to avoid damaging the paint. Do not tip the device. Preserve the device as much as possible from all vibrations. Two people are needed to move the device.

Protective gloves should always be worn!

Only detachable mains cables with a rating of 16A/250V & a C19 IEC lock connector can be used with this product.

5.2 Setting up & Installation

The freezer is designed for use under the following environmental conditions (according to EN 61010-1):

- Indoor use only
- Maximum altitude: 2000 m
- Ambient temperature range between 18 ° C and 32 ° C
- Maximum relative humidity of 80% for temperatures up to 22 ° C
- Supply voltage ripple < ±10 % of rated voltage
- Supply network voltage surges: category II (Standard IEC 60364-4-44)
- Maximum level of room pollution: 2

Bio Guard freezers are Class A devices within the meaning of the EMC Directive.

In order to minimize energy consumption and reach announced performances, place the unit in a **well-ventilated room**, away from sources of heat (radiators, heating systems, etc.) and avoid direct exposure to the sun. Place it on an even & non-flammable surface, free from vibration. It is essential for its proper functioning that the device is level. If necessary, use rigid shims.

It is important to ensure that no obstacle (wall, switchgear) interferes with the ventilation of the appliance (air inlet and outlet) & that adequate space is provided to disconnect the mains supply cable. Allow **about 200mm** from each side of the freezer.

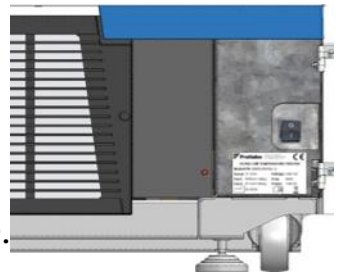
Lower the 2 front levelling feet, by performing an additional ¼ turn after contact with the ground.

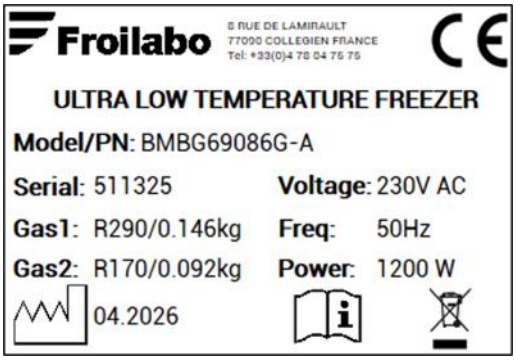
The temperature of the room must not exceed + 35 ° C. The moisture content in the air should ideally not exceed 50% RH. The use of air conditioning can significantly extend the life of the compressors.

5.3 Power supply

Refer to the manufacturer's serial number label at the front of the unit.

- Voltage 230VAC ~ +/-10%, 50 Hz, protected by a 16A RCBO.





The connectors of the device (USB & Ethernet Ports) must be connected to circuits rated S.E.L.V., according to standard IEC 61010-1: 2010.

5.4 Temperature range

The Bio Guard Freezer is factory set to optimise its power consumption.

The set point can be adjusted from -60°C to -86°C. The default setting is -80°C.

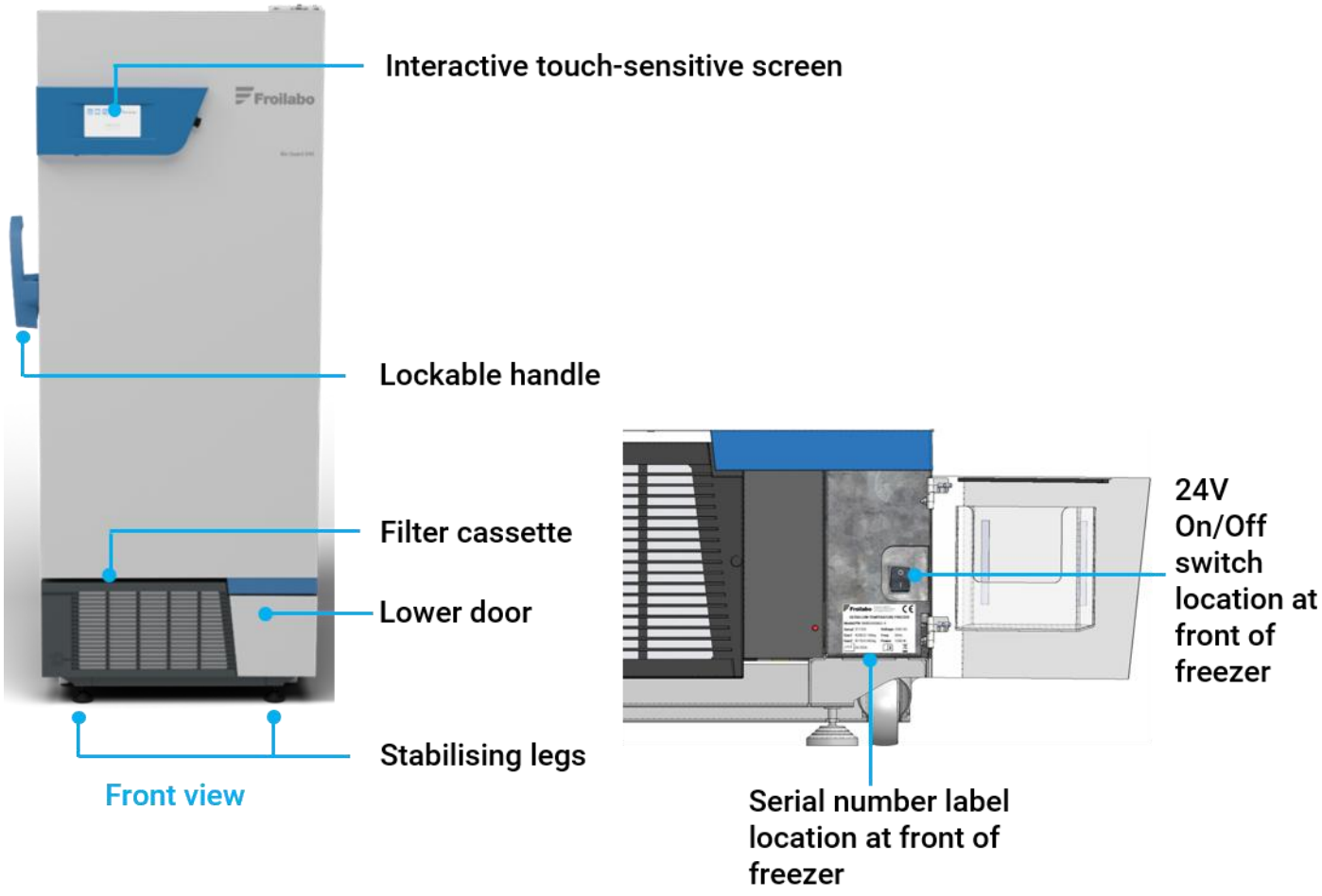
The ambient temperature (recommended between +18°C and +32°C, ideally between 20°C and 25°C) also has a significant impact on the power consumption of the equipment.

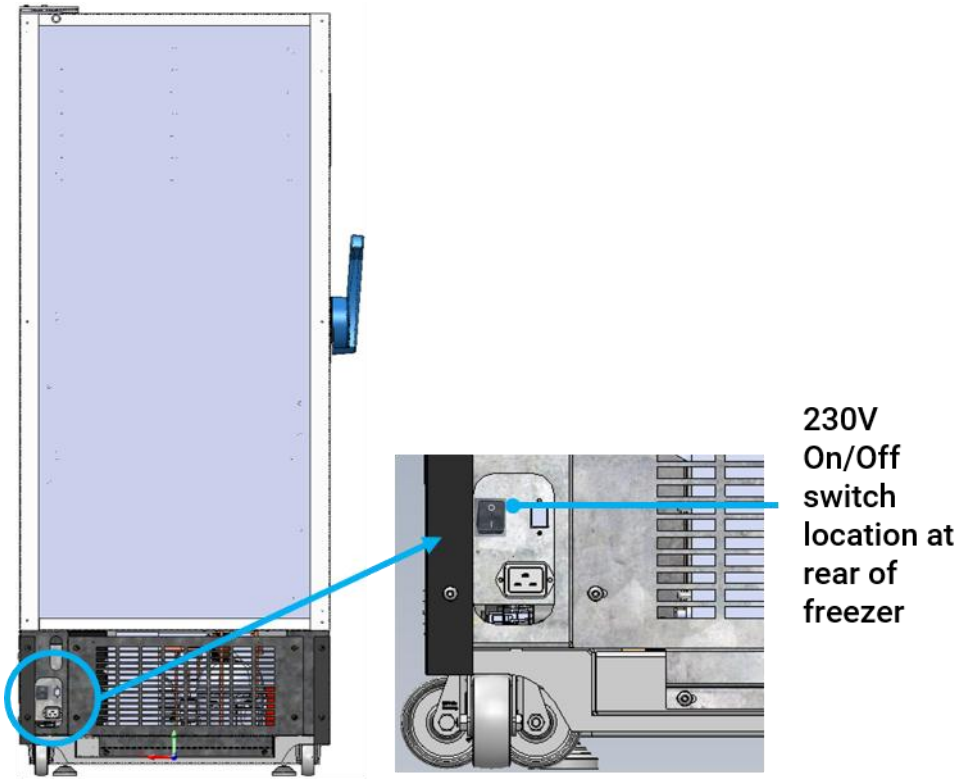
5.5 Construction & Insulation

The one-piece **electro-galvanized steel** exterior body is protected by an epoxy paint.

The inner tank is made of stainless steel. The thermal insulation is ensured by a set of insulating panels under vacuum / polyurethane foam. The insulated swing door is mounted on a pivot.

The closing and sealing of the door are ensured by a progressive tightening handle.





Rear view

Heated pressure relief valve:

The pressure relief valve allows a balance of pressures between the inside and the outside of the freezer which makes it easier to open the door.

Frequent opening of the doors allows moisture to enter the freezer and can lead to frost formation beyond the air intake tube to which the valve is attached. A specially sized foam insert is placed inside the air intake tube to minimize this effect.

Froilabo freezers are equipped with a **heated pressure relief valve** allowing a quick return to the ambient pressure inside the enclosure after a door opening and without ice formation in the valve well.

In normal operation, this valve does not require any maintenance.

The heating element of the valve starts to heat when the temperature inside the freezer reaches **-15°C.**

Nevertheless, regularly check (depending on usage) the proper functioning of the pressure relief valve (located on the side of the unit) and the foam insert. Reposition it correctly after cleaning.

After stopping the freezer completely, remove the valve foam to dry. Before restarting the freezer, replace the dry foam.

Heating door seal:

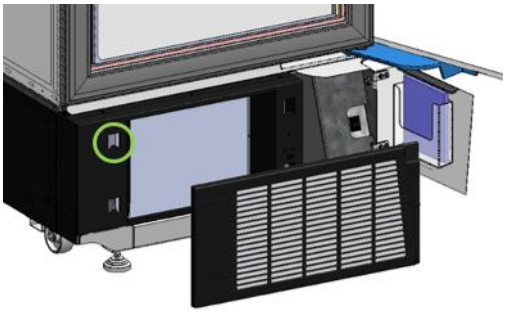
Froilabo freezers are equipped with a **heating door seal** to prevent the formation of ice and thus maintain an optimal seal of the freezer.

Refer to the "Maintenance, cleaning and decontamination" section for cleaning the door seal.

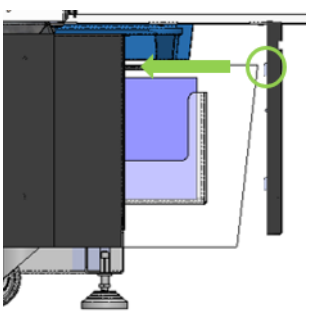
Air filter:

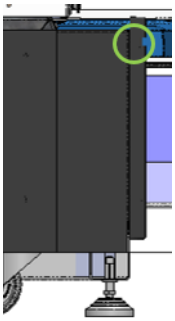
In order to maintain the cooling performance of the device and to preserve the compressors lifespan, an air filter is placed in front of the condenser.
It is necessary to dust or wash this filter as frequently as necessary.

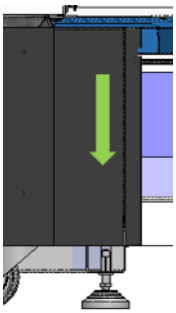
The product is shipped without the Air filter assembled. follow the steps shown below prior to starting up your freezer.



1. Open the freezer door & the lower door.
2. Position the filter assembly in front of the Freezer.
3. Move the filter assembly towards the front of the freezer ensuring that the hooks on the filter engage with the holes on the freezer.
4. Once engaged move the filter assembly down to lock it in position.







A device must never operate without a filter.

Clamping handle:

The device has a progressive tightening handle. Its double action makes it easier to open and close the door. The freezer door can be locked thanks to the key lock located on the side of the handle.

5.6 Technical characteristics & refrigeration system

Technical characteristics:

FREEZER MODEL	BMBG690
	-86°C
GENERALITIES	
Gross volume (litres)	690
Number of compartments	4
Freezer mass (kg)	320
Power consumption 230V (W) (BoSS System active)	1300
Max Power consumption @ -80°C, 230V, 50Hz (W)	1500
Steady State Power consumption @ -80°C, 230V, 50Hz (W)	1200
Energy consumption (kWh/day)	11.3*
Min power of cooling of the room containing the freezer in continuously (W)	1200
Noise level (BoSS System active) (dB)	76
Noise level (in regulation mode) (dB)	56
EXTERNAL DIMENSIONS	
Height (mm)	1900
Width (mm)	875
Depth(mm)	970
Clearance required at the rear of the unit (mm)	200
Max dimension with door open (mm)	1750
Max width with door open (mm)	1150
Max door opening angle	110°
GROSS INTERNAL DIMENSIONS EXCLUDING RACKS	
Height (mm)	1436
Width (mm)	630
Depth(mm)	752

*According to energy star calculation, with an ambient room temperature of 20°C (+/- 0.5°C), door closed & with empty cabinet.

Refrigeration system:

FREEZER MODEL	BMBG690	
	Standard cooling	Natural cooling
Two stage cascade system		
Stage 1 hermetic compressor power (W)	780	580
Stage 2 hermetic compressor power (W)	580	580
Stage 1 R290 refrigerant – load (g)	/	210
Stage 1 R170 refrigerant – load (g)	/	80
Capillary expansion	Yes	
Air condenser as standard	Yes	

5.7 Sample Storage

Technical characteristics:

In order to avoid any risk of deterioration of the elements of construction and to guarantee the announced technical performances, the following instructions must be respected:

- Do not place strong corrosive products inside the freezer.
- Do not place explosives or highly flammable products in the freezer.
- Leave a minimum space of 3 cm along the internal walls.
- Do not remove several shelves together.
- Take care not to prevent the internal doors from closing properly prior to closing the external door.

In order to avoid the risk of tipping over a heavily loaded device, it is forbidden to pull several drawers simultaneously.
The maximum permissible load for each shelf must never be exceeded (75 kg).



These devices are not explosion-proof.



The internal surfaces of the freezer and its contents can be extremely cold (-86 ° C).
Protect yourself accordingly (specially adapted gloves)

	BMBG690
Level 4	1 extractable shelf
Level 3	1 extractable shelf
Level 2	1 extractable shelf
Level 1	No fixture

5.8 Control Panel

The control panel is located on the upper part of the door. It consists of a main touchscreen & a USB port.



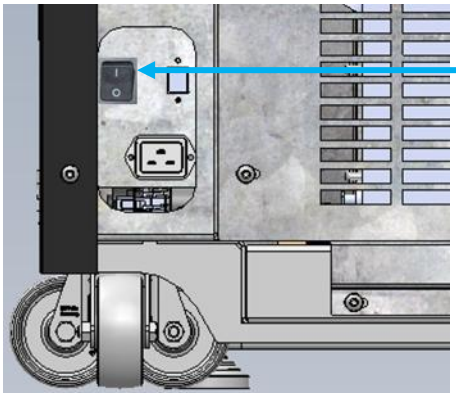
5.9 Commissioning

Follow the instructions in the correct sequence:

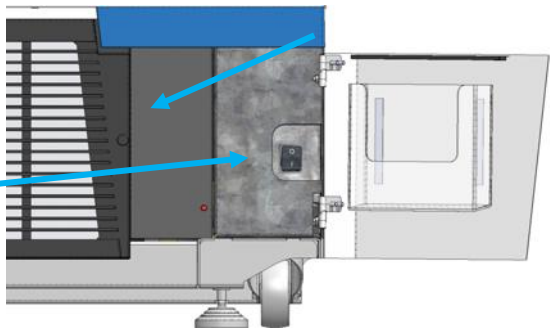
1. Remove any foam padding from the shelves at the back of the freezer.



2. Connect the freezer to a single phase power supply with an earth connection protected by a 30mA residual current circuit breaker (RCCB) using the supplied power cord. Activate the switch to provide the 230V to the device.
3. The compressors & fan will start up. The freezer will make a sound.
4. Then open the lower door at the front of the freezer & activate the switch (it activates the 24V power supply).
5. The main page is displayed on the HMI screen detailing how the unit was configured prior to leaving the factory which is English & with a Set Temperature value of -80°C.
6. Wait until the freezer reaches the set temperature (4 hours to reach -80°C).
7. Load the freezer.



Open the lower door to provide access to assemble the Filter cassette to the Freezer



Note 1: Loading the appliance with "hot" products may cause the appliance's temperature to rise. The high temperature alarm may then activate.

Note 2: The On/Off switch at the front only cuts off the internal 24V power supply requested by the PLC and the HMI. The freezer remains powered as long as the switch at the rear remains in the on position.

All electrical work must be carried out by qualified personnel.

5.10The BoSS System

The BoSS system ensures the freezer continues to operate if there is a loss of the 230VAC mains power supply or the 24V power supply fails.

Loss of the 230VAC mains power supply.

The freezer reverts to the backup batteries which power the HMI & the PLC. The HMI will display the current status of the freezer. Due to the loss of mains power an alarm is triggered. The compressors have stopped working & the temperature inside the freezer will increase. In this condition the information on the HMI will be displayed for approximately 10 hours.

The samples inside the freezer will not be maintained at the desired temperature & will only remain frozen until the internal temperature of the freezer remains below 0°C.

Loss of the 24V power supply.

The mains voltage ensures that the compressors continue to run but without any control so the temperature in the freezer will drop below the set target value. The batteries again provide power for the HMI & the PLC but in addition to this they also ensure that the contactors for the 2 compressors & the fan are powered to enable them to run continuously. Due to this increased load on the batteries they will only provide power to the display & the compressors for 2 to 3 hours.

The display will once again display an alarm.

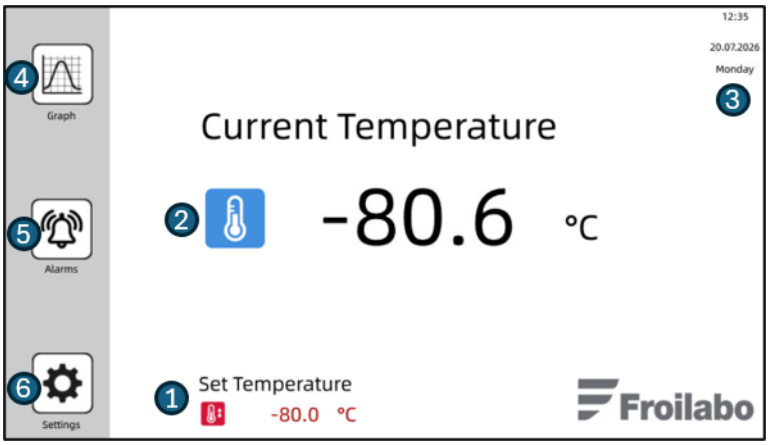
The samples inside the freezer will only be maintained at the desired temperature for 2 to 3 hours.



WARNING: THESE SPECIFICATIONS ARE OBTAINED WITH NEW BATTERIES CHARGED FOR AT LEAST 24 HOURS.

6 First contact with your Freezer

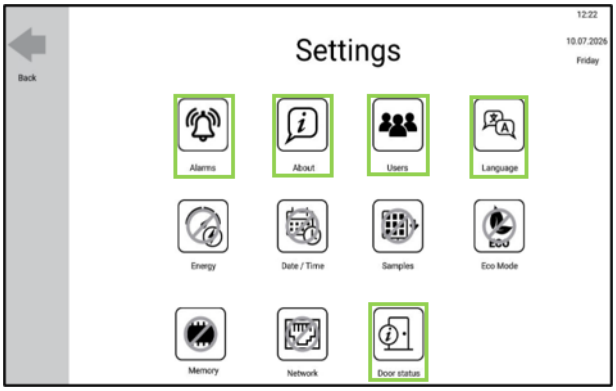
When you power up your freezer the main page appears detailing:



1. The **Set Temperature** value of the freezer (this value is **factory set to -80°C**).
2. The **Current Temperature** inside the freezer.
3. The current time, date & day (this value is **factory set**)
4. A Graph icon providing you access to the graph page.
5. An Alarm icon providing you access to the alarm page.
6. A Settings icon providing you access to the settings page.

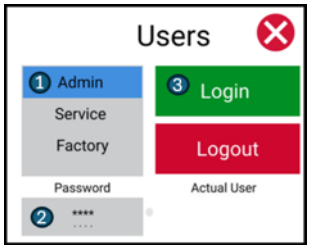
When first powered up no one is logged into the freezer & there is limited access available.

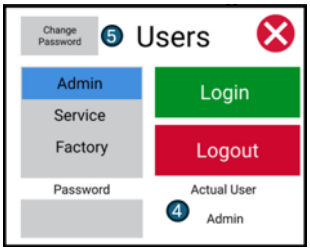
In order to make changes you must Login as Admin. To do this press the Settings icon which takes you to the Settings page. As you can see from the image on the right there is only access to the icons framed in green.



Press on the Users icon & a pop-up box appears.

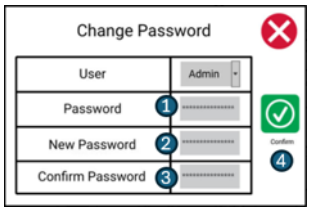
1. Press on Admin
2. Press on Password & use the virtual keypad to enter the default password 1234.
3. Press on Login & a message box briefly appears informing you that User login was successful
4. The User that is logged in is now shown on the bottom right hand corner of the box.
5. The Change Password box is now active.



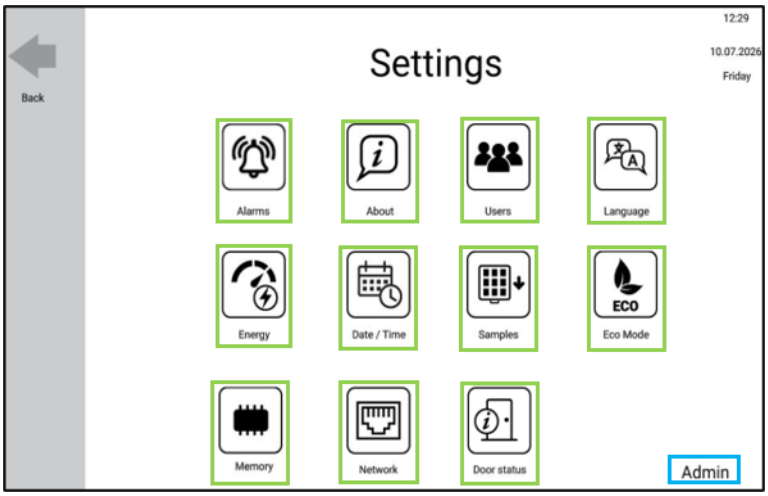


To change the Admin password press on the Change Password box.

1. Press on the Password box & enter the current password.
2. Press on the New Password box & enter the new password.
3. Press on the Confirm Password box & reenter the new password.
4. Press on the Confirm tick box to save the password.

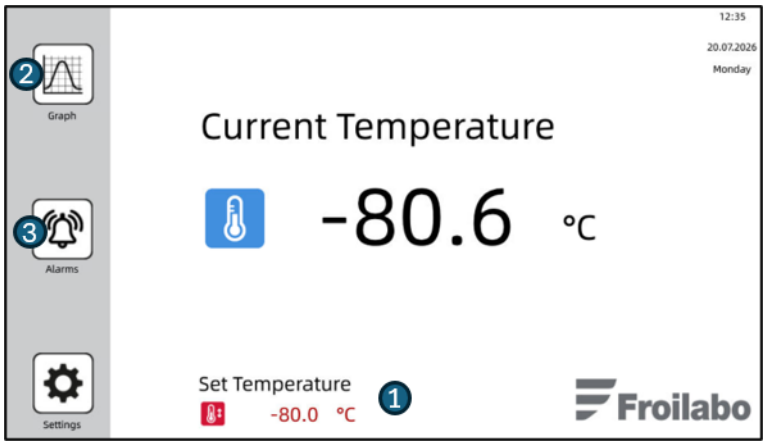


Logged in as Admin provides full Admin access to the pages on the Settings page & Admin is now displayed in the bottom right corner of the page.



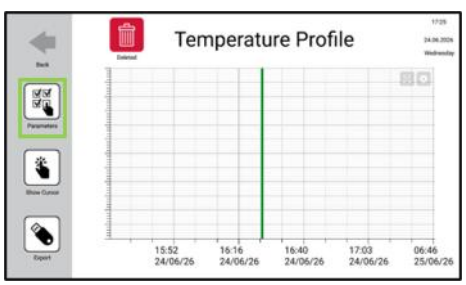
7 General use when logged in as Admin

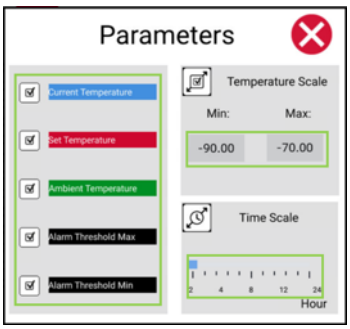
7.1 Configuring the Main page

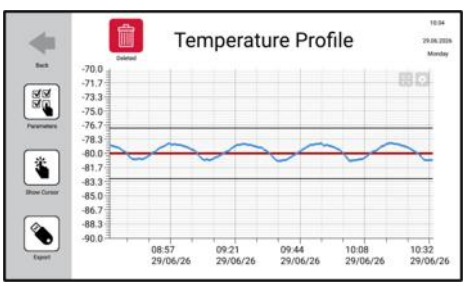


1. Press on the Set Temperature value & use the pop up virtual keypad to enter a value between -60°C & -86°C.
2. Press on the Graph icon.

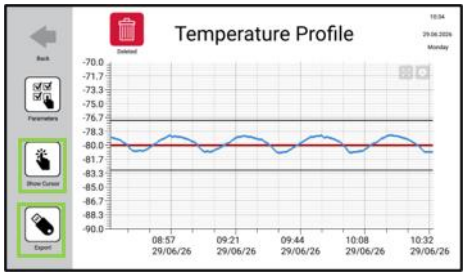
- This opens up the Temperature Profile page.
- To configure the graph press on the Parameters icon.
- This brings up the Parameters selection box where you can select which parameters you wish to view, define the Temperature scale by using the pop up virtual keypad & define the Time Scale by pressing on the sliding bar (the options are 2, 4, 8,12 & 24 hours) for the graph.

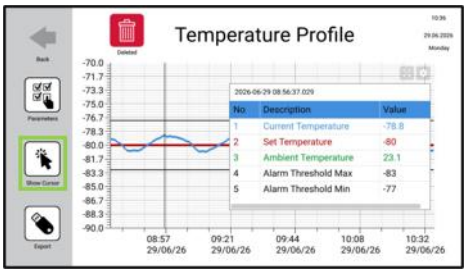




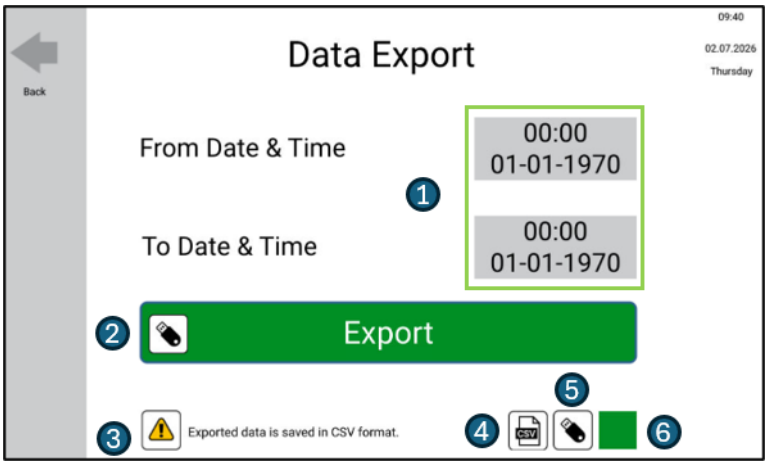


- You can also press on a location on the graph then press the Show cursor icon & the parameter values for that point are displayed. The icon also changes. To remove this press the icon again.



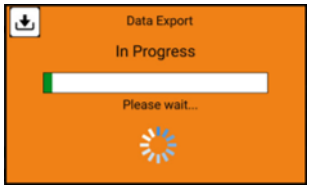


- The data from the graph is saved in the HMI in CSV format. To export this data to a USB stick press on the Export icon, ensure that the USB is formatted in FAT32 format. It can be either USB 2.0 or USB 3.0.
  When you press on the Export icon the Data Export page appears providing you with the capability to:



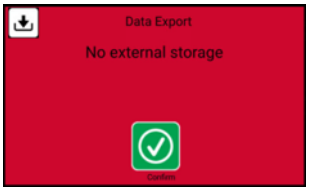
1 Select the range of data that you want to export.
2 The Export button that you press once you have selected the data range.
3 Information icon detailing the file format of the exported date file.
4 An information icon showing the CSV data file type.
5 Information icon showing the type of memory device that must be inserted into the HMI (in this case a USB stick).
6 An indication icon which is GREEN when a USB stick is present in the HMI & RED when one isn't.

If a USB stick is present then when you press the Export button then the pop up boxes shown below are displayed.

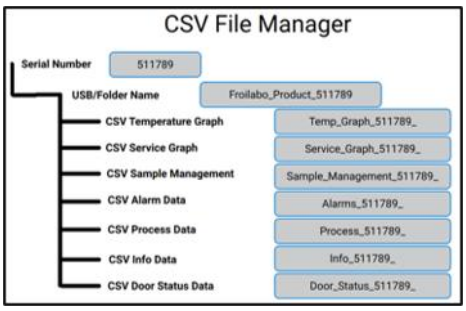




If a USB stick is not present then when you press the Export button then the pop up box shown below is displayed.



- Each freezer generates a data folder using the product serial number as the Main folder. From this a data tree is created as per the image below. Files are only added to this folder when they have been requested & each file is time stamped to avoid overwriting the same file if you export multiple times.

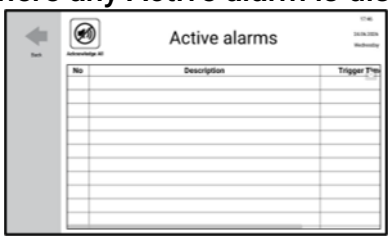


3. Press on the Alarms icon.

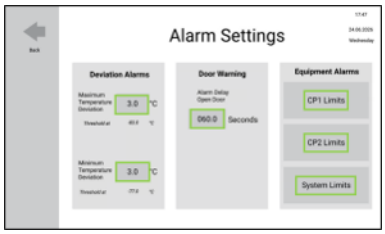


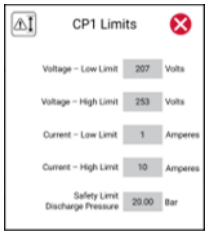
- This opens up the Alarms page. Providing access to:

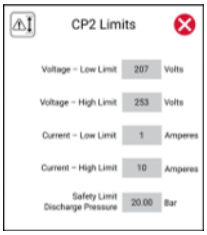
  - Active Alarms page where any Active alarm is displayed.



  - Alarm Settings page where you can select the Max & Min temperature limits using the pop up virtual keypad, set the delay for the door opening alarm to activate & view the Alarm limits for CP1, CP2 & the system Alarm limits

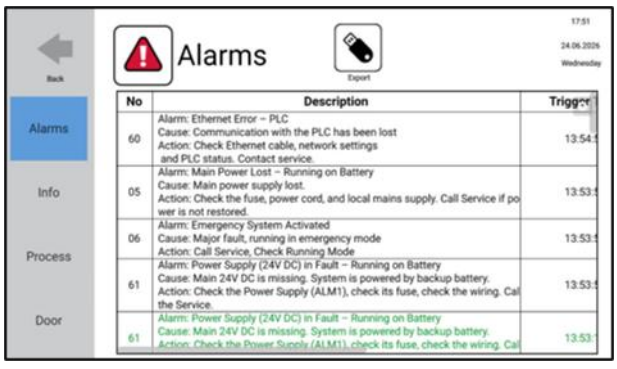


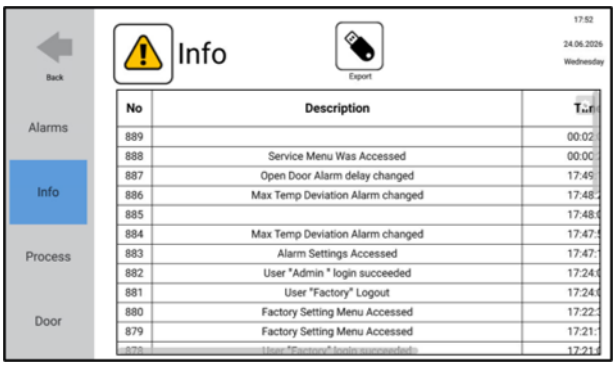


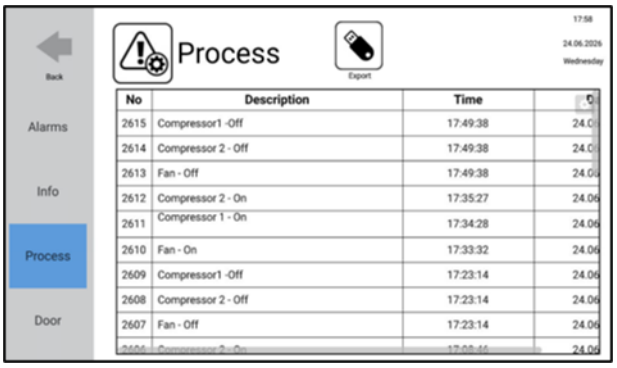




  - Alarm History page where you can view or export the historical data for the Critical Alarms, Info or warning messages, Process information messages & Door opening & closing messages. In each case the data can be exported via a USB stick as described on the previous page.

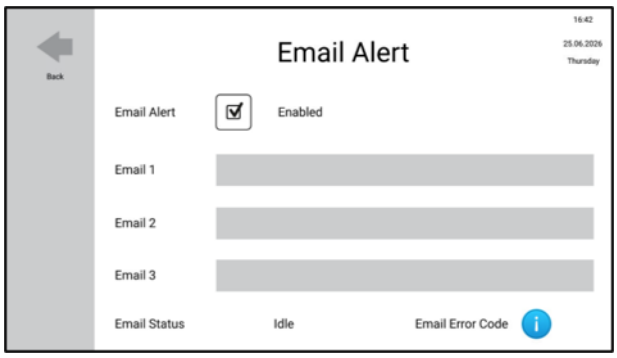


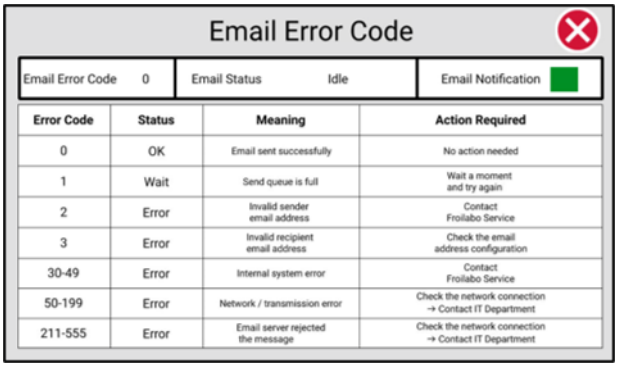






- The Email Alert page where you can identity 3 people who will receive an email should an alarm become active. There is also an information page detailing the possible error messages that might occur there meaning & the action required to rectify it.





7.2 Settings Page

7.2.1 About Page



Pressing this icon takes you to the About page. This details the Product Model, Serial Number, Fabrication date, a QR code which can be scanned to retrieve the product User manual from the Froilabo website, the HMI Software Version & the PLC software Version.

7.2.2 Language Page



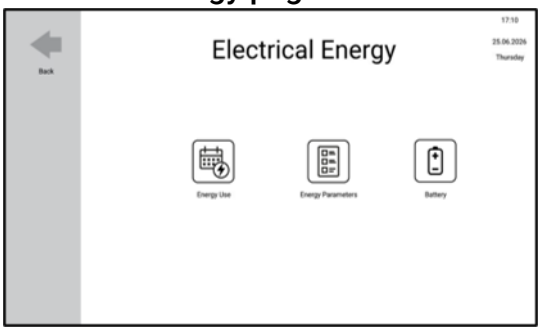
Pressing this icon opens the Language Management page.
On this page you can select the language that meets your requirement. When the product is started, the language is English.

The product supports six languages, which are:

- English, French, Spanish, German, Chinese & Romanian

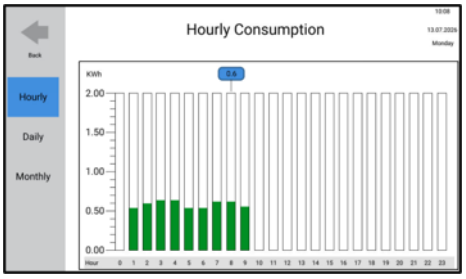
7.2.3 Energy Page

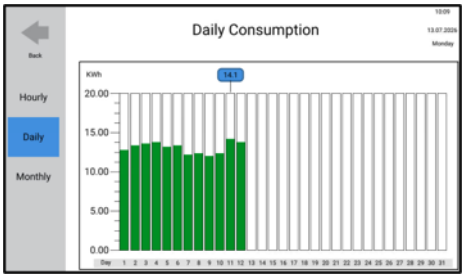
Pressing this icon opens up the Electrical Energy page.

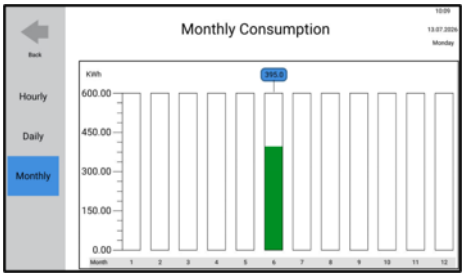


7.2.3.1 Energy Use page

This page allows you to view the Hourly, Daily & monthly energy consumption of the freezer. The Hourly graph resets each day, The Daily graph resets each month & Monthly graph resets each year. You can also press on the bar to display the actual energy consumption for the time period selected.

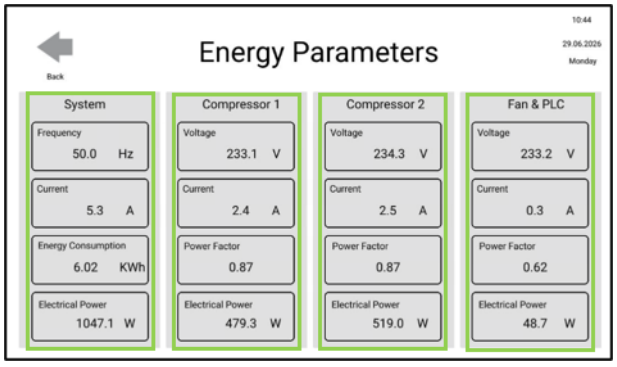






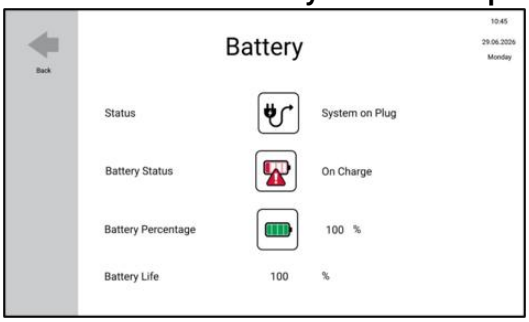
7.2.3.2 Energy Parameters page

This page displays the energy information for the System, Compressor 1, Compressor 2 & the Fan & PLC.



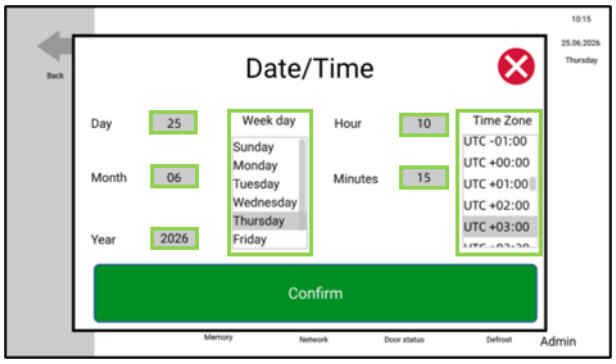
7.2.3.3 Battery page

This page displays the information for the Boss System backup batteries.



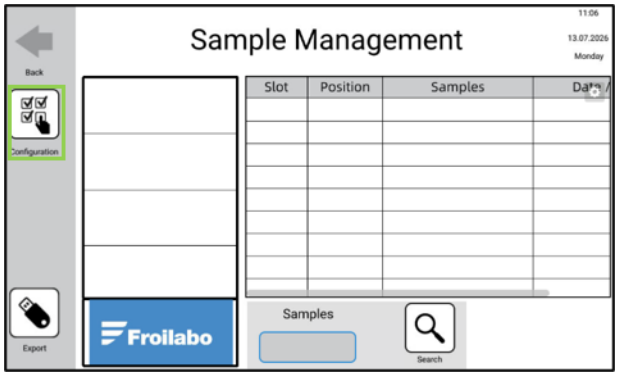
7.2.4 Date /Time Page

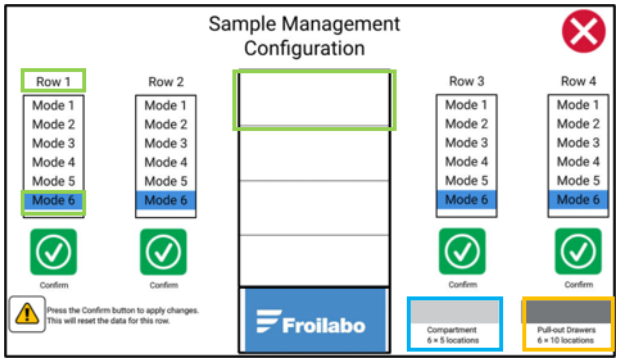
This page allows you to set the Day, Month, Year, day of the week, the hour, minutes & select the appropriate UTC (Coordinated Universal Time) Time Zone.
Please note that all our freezers are factory set to Romanian UTC Time Zone.



7.2.5 Samples Page

This page allows you to identify your samples & arrange the storage location within our freezer. When first opened the Sample Management page is blank. You must press the Configuration icon to open up the Sample Management Configuration page.





The default page shows that each row has been set to **Mode 6** which is an empty shelf.

Mode 1 is 4 of the 6 drawers 5 compartment storage devices.



Mode 2 is 2 of the 6 drawers 10 compartment storage devices.



Mode 3 is 2 of the 6 drawers 5 compartment storage devices & 1 of the 6 drawers 10 compartment storage devices.



Mode 4 is 1 of the 6 drawers 10 compartment storage devices & 2 of the 6 drawers 5 compartment storage devices.



Mode 5 is 1 of the 6 drawers 5 compartment storage devices, 1 of the 6 drawers 10 compartment storage devices & 1 of the 6 drawers 5 compartment storage devices.

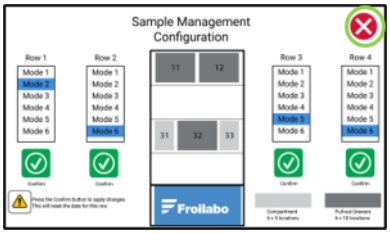


Note: Each sample is saved detailing the Row, Slot position, Position within the storage device, the Sample name & a unique date / time stamp.

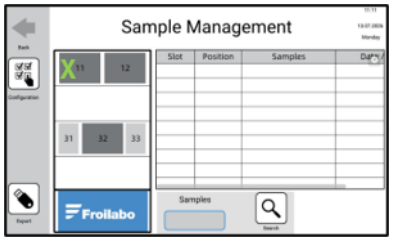
Slot	Position	Samples	Date / Time
33	12	samp13	25/06/2026 10:38:50
33	5	samp12	25/06/2026 10:38:40
32	37	samp11	25/06/2026 10:38:19
32	13	samp10	25/06/2026 10:38:09
31	28	samp9	25/06/2026 10:37:48
31	14	samp8	25/06/2026 10:37:35
31	2	samp7	25/06/2026 10:37:23
12	60	samp6	25/06/2026 10:36:25
12	5	samp5	25/06/2026 10:36:12

7.2.5.1 Example of Sample Management Configuration

- **Step 1**
  Decide upon the storage compartment configuration that you want to use & then press the "X" button to return to the Sample Management page.

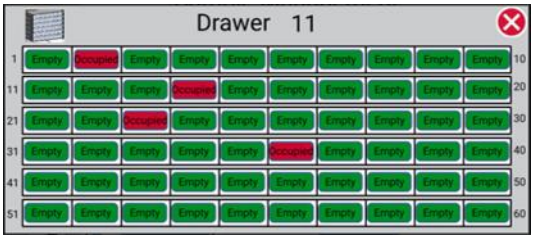


- **Step 2**
- On the Sample Management page press on the storage device that you want to store your sample in.
  This opens up the storage device.
  Press on the storage location for your sample & use the pop up keyboard to enter the sample name & press the tick button to confirm.





- **Step 3**
- Continue with this until you have assigned the storage locations to your samples in this storage device. Press the "X" button to confirm this



- **Step 4**
- Repeat steps 1 to 3 for the remaining storage devices.

7.2.5.2 Searching for the location of a sample

Providing you know the name that was allocated to your sample you can use the Search function to find it's location with the Freezer.

- **Step 1**
  Press on the Samples box & use the pop up keyboard to enter the name of the sample that you wish to locate.



- **Step 2**
  Press the Search button & a pop up box appears detailing the location of your sample.



- **Step 3**
- Press the Confirm button to exit.

7.2.5.3 Changing the location of your sample

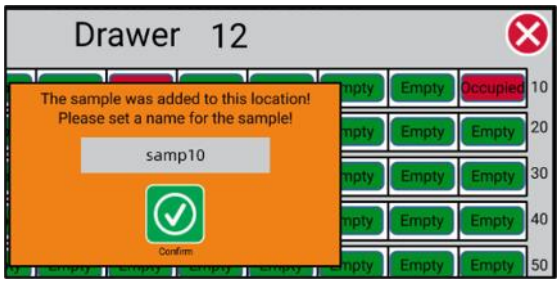
If you wish to change the location of your sample follow these steps.

- **Step 1**
- Find the location of the sample that you want to move. For this example we want to move samp10 which currently resides in Row 3, Slot 2 & position 13 within the storage device.

- **Step 2**
  Press on the Storage device & then on the location of the sample. This removes the sample from this location & a pop up box appears stating that the sample has been eliminated from this location.



- **Step 3**
  Press on the new Storage device for your sample, press on the location that you want to store your sample & enter the sample name & press the confirm button.



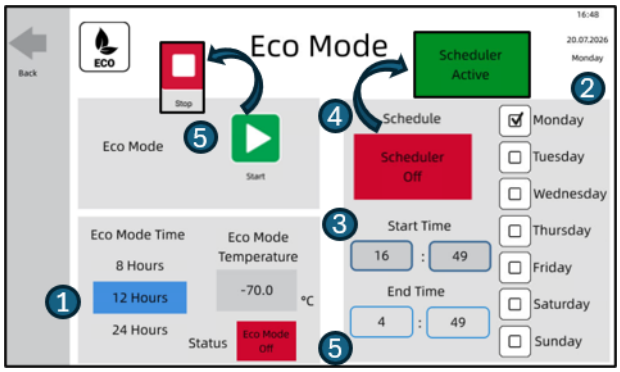
- **Step 4**
  Your sample has now been moved to its new location.

Slot	Position	Samples	Date / Time
12	10	samp10	30/06/2026 11:22:17
33	12	samp13	25/06/2026 10:38:50
33	5	samp12	25/06/2026 10:38:40
32	37	samp11	25/06/2026 10:38:19
31	28	samp9	25/06/2026 10:37:48
31	14	samp8	25/06/2026 10:37:35
31	2	samp7	25/06/2026 10:37:23
12	60	samp6	25/06/2026 10:36:25
12	5	samp5	25/06/2026 10:36:12

7.2.6 Eco Mode Page

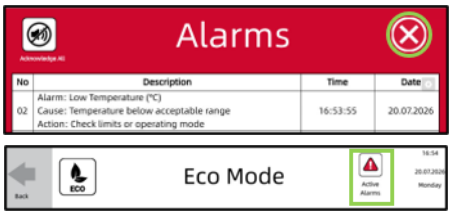
This page enables you to minimise the power consumption of the freezer outside of working periods (no door opening). Please note that the Eco Mode Temperature is factory set to the value of **-70°C** & cannot be changed.

- **Step 1**
  Select the Eco Mode Time value.
- **Step 2**
  Select the day of the week that you wish the Eco Mode to operate.
- **Step 3**
  Enter the start time using the pop up keyboard.
- **Step 4**
  Activate the Scheduler by pressing the Scheduler Off button.



- **Step 5**
  Press the Eco Mode Start button (which changes to the Stop button & updates the End Time based on the ECO Mode Time that has been selected).

When the Eco Mode is activated an Alarm may be triggered depending on the previous Set Temperature value that the Freezer was set to. Press on the "X" button to return to the Eco Mode page. the Active Alarm icon is still visible & will appear be present on every page until it is no longer active.

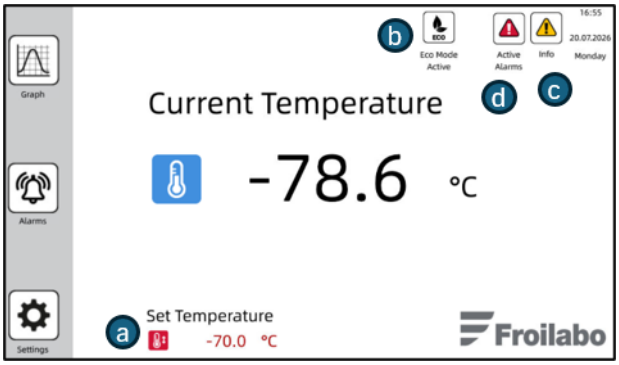


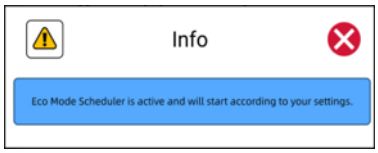
When you navigate back to the Main page you will see that:

a) The Set Temperature Value has been changed to the Eco Mode Temperature value.

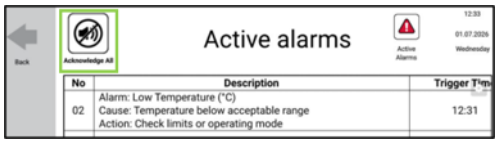
b) The Eco Mode Active icon is present.

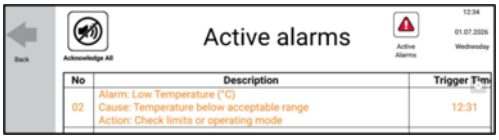
c) An Information icon is present & when pressed an information box appears.



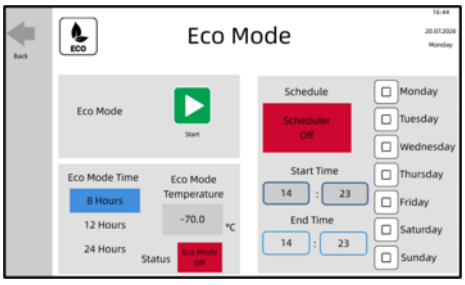


d) The Active Alarms icon is present & when pressed it takes you to the Active alarms page where the description of the alarm is shown in **Black** text. Press the Acknowledge All button changes the text colour to **Orange**, signifying that the alarm has been acknowledged. The Active Alarms icon remains present until the cause of the alarm has been rectified either automatically or by an intervention by an Engineer.

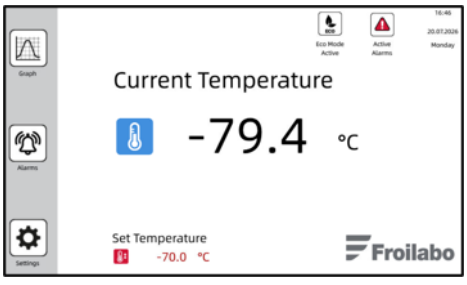




You can also start the Eco Mode manually by pressing the start button & the Status changes to Eco Mode Active. When you navigate back to the Main page the Eco Mode Active icon is present as is the Active Alarms icon.

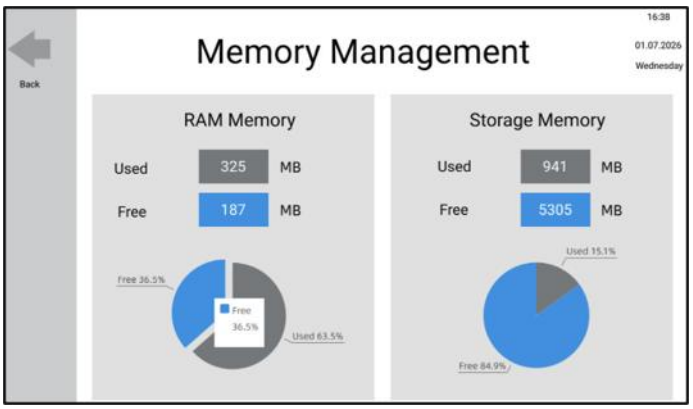






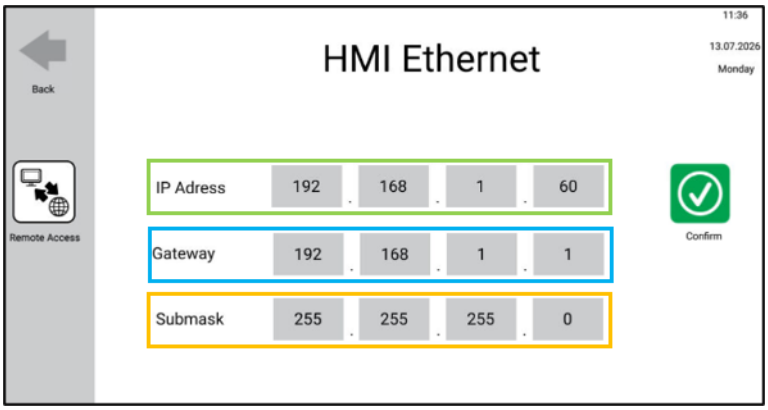
7.2.7 Memory Page

This page allows you to view the available RAM & Storage memory of the Freezer. It also allows you to click on one of the graph segments which then separates this segment from the graph until the screen is pressed again.

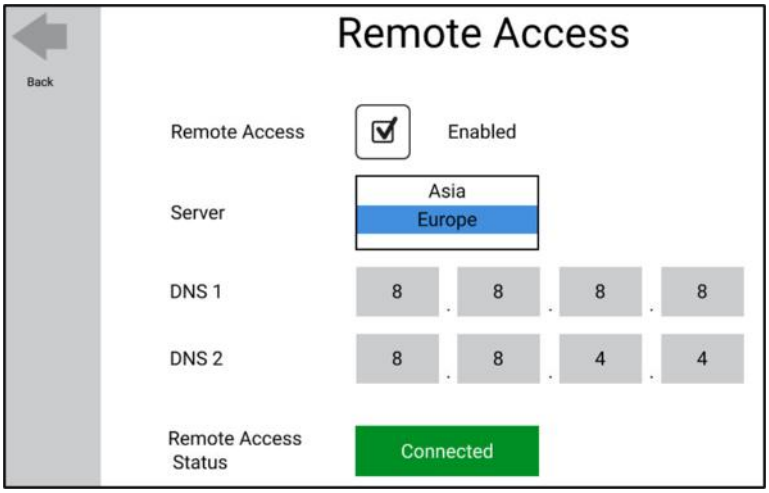


7.2.8 Network Page

Pressing the Network icon opens up the HMI Ethernet page. This page allows you to set up the IP, Gateway & Submask address values using the pop up keyboard.

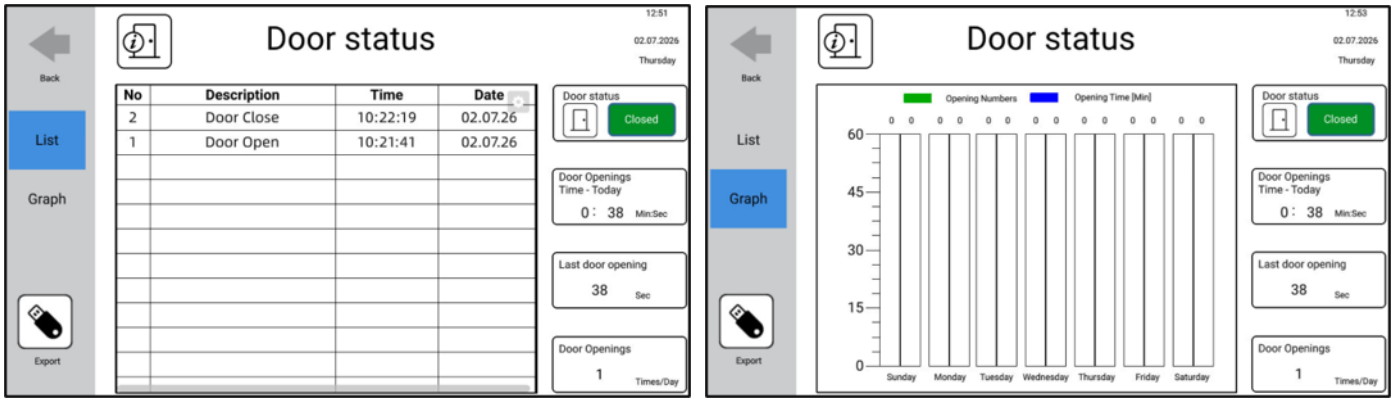


This page also gives you the capability to connect to an external Server if Enabled.



7.2.9 Door status Page

This page allows you to view the list of door openings for each day or to view this data in a graphical format.



7.2.10 Alarm Notification

When the freezer is running normally a blue screensaver page is displayed showing the current temperature of the freezer & the current time, date & day. However should an alarm be triggered the screen turns red & the Alarm Active text is displayed.



7.2.10.1 Product Error Alarms

Each triggered alarm displays the description of the alarm, the cause of the alarm & the required action to rectify the alarm as per the table below.

Alarm ID	Alarm details
1	Alarm: Door Open Cause: Door open too long Action: Check Door, Check Door Sensor
2	Alarm: Low Temperature (°C) Cause: Temperature below acceptable range Action: Check limits or operating mode
3	Alarm: High Temperature (°C) Cause: Temperature above set value Action: Check Door, Check Running Mode, Wait for Stabilization, Call Service

Alarm ID	Alarm details
4	Alarm: Low Voltage – Backup Battery Cause: Backup battery voltage too low Action: Check Battery, Check Running Mode, Call Service
5	Alarm: Main Power Lost – Running on Battery Cause: Main power supply lost. Action: Check the fuse, power cord, and local mains supply. Call Service if power is not restored.
6	Alarm: Main Power Lost – Running on Battery Cause: Main power supply lost. Action: Check the fuse, power cord, and local mains supply. Call Service if power is not restored.
7	Alarm: Compressor 1 Pressure Too High Cause: Compressor 1 pressure above limit Action: Check Running Mode, Check Gas, Check Limits, Call Service
8	Alarm: Compressor 2 Pressure Too High Cause: Compressor 2 pressure above limit Action: Check Running Mode, Check Gas, Check Limits, Call Service
9	Alarm: Top Temperature Sensor Fault Cause: Top temperature sensor or connection fault Action: Check Sensor, Check Connector, Check Analog Input, Call Service
10	Alarm: Bottom Temperature Sensor Fault Cause: Bottom temperature sensor or connection fault Action: Check Sensor, Check Connector, Check Analog Input, Call Service
11	Alarm: Ambient Temperature Sensor Fault Cause: Ambient temperature sensor or connection fault Action: Check Sensor, Check Connector, Check Analog Input, Call Service
12	Alarm: Heat Exchanger Temperature Sensor Fault Cause: Heat exchanger temperature sensor or connection fault Action: Check Sensor, Check Connector, Check Analog Input, Call Service
13	Alarm: Compressor 1 Contactor Fault Cause: Contactor and auxiliary contact mismatch Action: Check Contactor, Check Digital Input/Output, Call Service
14	Alarm: Compressor 2 Contactor Fault Cause: Contactor and auxiliary contact mismatch Action: Check Contactor, Check Digital Input/Output, Call Service
15	Alarm: Fan Contactor Fault Cause: Contactor and auxiliary contact mismatch Action: Check Contactor, Check Digital Input/Output, Call Service
16	Alarm: Compressor 1 High Pressure Sensor Fault, system is running in BOSS mode for xx hours. Cause: Pressure sensor or connection fault Action: Check Sensor, Check Connection, Check Analog Module, Call Service
17	Alarm: Compressor 1 Low Pressure Sensor Fault, system is running in BOSS mode for xx hours. Cause: Pressure sensor or connection fault Action: Check Sensor, Check Connection, Check Analog Module, Call Service

Alarm ID	Alarm details
18	Alarm: Compressor 2 High Pressure Sensor Fault, system is running in BOSS mode for xx hours. Cause: Pressure sensor or connection fault Action: Check Sensor, Check Connection, Check Analog Module, Call Service
19	Alarm: Compressor 2 Low Pressure Sensor Fault, system is running in BOSS mode for xx hours. Cause: Pressure sensor or connection fault Action: Check Sensor, Check Connection, Check Analog Module, Call Service
20	Alarm: Compressor 1 Run Too Much Cause: Compressor running too long without stop, including pull-down cycle Action: Check Compressor, Check Gas Pressure, Check Heat Exchanger, Check Running Mode, Call Service
21	Alarm: Large Difference Top vs Bottom Temp [°C] Cause: Too many degrees between top and bottom temperatures of the product Action: Check Temperature Probes, Check Analog Module, Check Running Mode, Call Service
22	Alarm: Gas Low Pressure – CP1 Cause: Pressure too low on the circuit of Compressor 1 Action: Check Gas Leakage, Check Gas Pressure, Check Compressor, Call Service
23	Alarm: Gas Low Pressure – CP2 Cause: Pressure too low on the circuit of Compressor 2 Action: Check Gas Leakage, Check Gas Pressure, Check Compressor, Call Service
41	Alarm: PLC Battery Low Voltage Cause: PLC battery voltage too low Action: Replace Battery, Call Service
42	Alarm: Overvoltage Detected – Compressor 1 [V] Cause: Voltage exceeded the allowed limit Action: Check Compressor, Check Network Voltage, Check Energy Module, Call Service
43	Alarm: Undervoltage Detected – Compressor 1 [V] Cause: Voltage under the allowed limit Action: Check Compressor, Check Network Voltage, Check Energy Module, Call Service
44	Alarm: Overvoltage Detected – Compressor 2 [V] Cause: Voltage exceeded the allowed limit Action: Check Compressor, Check Network Voltage, Check Energy Module, Call Service
45	Alarm: Undervoltage Detected – Compressor 2 [V] Cause: Voltage under the allowed limit Action: Check Compressor, Check Network Voltage, Check Energy Module, Call Service
46	Alarm: System Overvoltage Detected [V] Cause: System voltage above the safe limit Action: Check Network Voltage, Check Energy Module, Call Service
47	Alarm: System Undervoltage Detected [V] Cause: System voltage under the safe limit Action: Check Network Voltage, Check Energy Module, Call Service

Alarm ID	Alarm details
48	Alarm: Undercurrent on Compressor 1 [A] Cause: Compressor may be in thermal protection or disconnected Action: Check Compressor, Check Energy Module, Call Service
49	Alarm: Undercurrent on Compressor 2 [A] Cause: Compressor may be in thermal protection or disconnected Action: Check Compressor, Check Energy Module, Call Service
50	Alarm: High Current on Compressor 1 [A] Cause: Compressor may be blocked or possible short circuit Action: Check Compressor, Check Energy Module, Call Service
51	Alarm: High Current on Compressor 2 [A] Cause: Compressor may be blocked or possible short circuit Action: Check Compressor, Check Energy Module, Call Service
52	Alarm: High Network Frequency (Hz) Cause: Frequency above limit Action: Check power supply or network
53	Alarm: Low Network Frequency (Hz) Cause: Frequency below limit Action: Check power supply or network
54	Alarm: Battery Life Critical Cause: Battery lifetime below 25% Action: Replace Battery Immediately, Call Service
54	Alarm: Battery Life Low Cause: Battery lifetime below 50% Action: Plan battery replacement, Plan preventive maintenance
55	Alarm: Compressor 2 Run Too Much Cause: Compressor runs too long without stopping, including pull-down cycle Action: Check the compressor, gas pressure, heat exchanger and running mode. Call service.
56	Alarm: Modbus Error – Energy Device Cause: Communication with the energy meter has been lost Action: Check the power supply, communication settings and wiring. Call Service.
58	Alarm: Email notification cannot be sent Cause: Incorrect settings or no network communication Action: Check settings. Check communication. Contact IT department. Contact Froilabo Service.
60	Alarm: Ethernet Error – PLC Cause: Communication with the PLC has been lost Action: Check Ethernet cable, network settings
61	Alarm: Power Supply (24V DC) in Fault – Running on Battery Cause: Main 24V DC is missing. System is powered by backup battery. Action: Check the Power Supply (ALM1), check its fuse, check the wiring. Call the Service.

8 Options

8.1 Slowing down temperature rise (Cryo Accumulator)

Principle: the cryo-accumulator plates are incorporated into the useful volume of the freezer and do not reduce the storage capacity.

It provides additional autonomy, slowing down temperature rise in case of any freezing issue.

For the 690 litres freezer, the rising temperature time from -80°C to -40°C is:

- 6½ hours without cryo-accumulator.
- 13 hours with cryo-accumulator.

Note: these tests were conducted with a freezer half full, at an ambient temperature of 25°C, without opening the door.

8.2 Remote Alarm

The connection located at the rear (bottom left) of the unit can be used to connect a remote alarm.

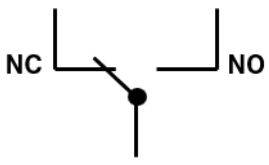
We highly recommend using the NC contact, which also enables an alarm to be transmitted if one of the wires is disconnected.

Maximum allowable current: 5 A at 30 V DC, 5 A at 250 V AC.

Note: After connecting the wires, screw the connector to its base to avoid any risk of the wires being pulled loose.

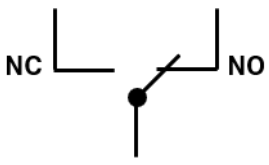
FREEZER at -80°C, ALARM THRESHOLD SET TO -60°C

Contact position
above alarm threshold

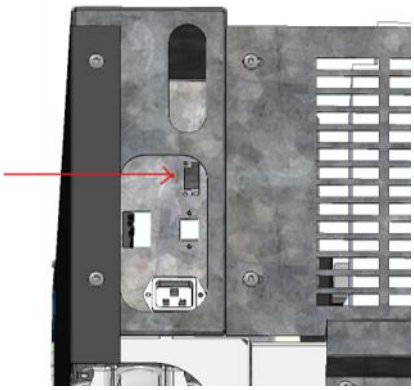


Temperature above alarm threshold (e.g.,-59°C): contact switches to NC.

Contact position
below alarm threshold



Temperature below alarm threshold (e.g.,-80°C): contact is NO.

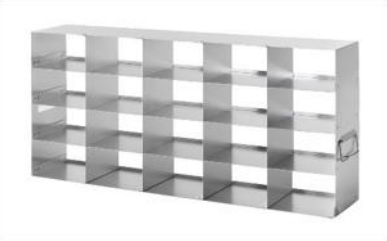


9 Storage Elements

To make organizing your freezer easier, we offer a complete range of storage solutions.
For further information, please contact our sales department.



Drawers



Shelving racks



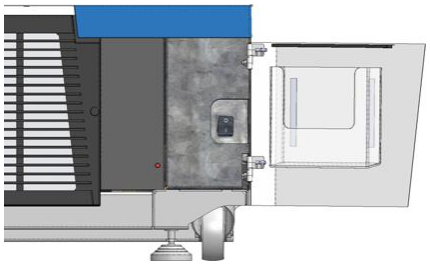
Drawer units

10 Maintenance

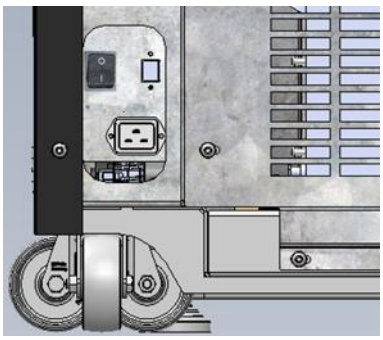
10.1 Safety Rules

Before performing any maintenance work on the freezer, follow the steps detailed below:

1. Turn off the 24 V power Off at the front of the device.



2. Turn off the 230 V power Off at the rear of the device.



3. Unplug the power cord from the rear of the unit.

10.2 User Maintenance

1) General Information

Due to the intense cold, microorganisms introduced through packaging, handling and contact can survive and remain fully virulent. All necessary precautions must be taken when accessing freezers:

- Outer surfaces must be cleaned regularly.
- Gloves must be worn.
- The door must be briefly opened.
- Tissue samples and packaging must be handled under a laminar flow hood.

The freezer must be switched off before cleaning. A water jet must not be used for cleaning, to avoid splashing the freezer.

2) Outer Surfaces

Prior actions

Turn off the device before cleaning as detailed in section 11.1.

Cleaning

Froilabo strongly recommend that users of our -86°C freezers perform a complete defrost twice a year to ensure optimal performance.

For a thorough cleaning of the appliance, we recommend a commercial product without acid or halides. A diluted alcohol-based solution can be used when specified.

- **Outer surfaces**:

  For a simple cleaning, wipe the surfaces with a damp cloth.

- **Inner cabinet**:

  Strictly avoid bleach, even very diluted. Never scrub the stainless steel with metal scouring pads or any other abrasive material.

- **Door seal**:

  The door gasket is heated by conduction through a resistive wire located in the gasket itself and reduces frost formation. Nevertheless, frost can build up, especially during frequent door openings. Clean the silicone seal using compressed dry air or the plastic scraper provided by Froilabo.

- **Compartment doors**

➢ Commercial cleaning products without halides or acid.
➢ Maximum 10% alcohol solutions.

To protect surfaces, do not scrub with abrasive sponges; use microfiber cloths instead.

After cleaning, completely remove all cleaning products from surfaces with a damp cloth.

Do NOT use soap-based detergents for cleaning as they main contain chlorides.

Do NOT use acetone and other organic solvents for cleaning.

Decontamination

Following a contamination of the device by hazardous substances, the operator must ensure that proper decontamination is carried out.

Don't use decontamination products that may cause a danger due to the reaction with the components of the unit or the potential materials inside. If you are unsure about the cleaning product, please contact FROILABO Customer Service.

In the event of contamination of the interior chamber with hazardous biological or chemical materials, we recommend decontaminating the interior with commercial-grade products.

Alternatively, you can use the following disinfectants for:

- Interior (stainless steel):

  - Surface disinfectants of commercial type without acid or halides (no drips).
  - Alcohol solutions.

- Inside door seal (silicone):

  - Alcohol solutions

- Compartment doors:

  - Surface disinfectants of commercial type without acid or halides (no drips).

  - Maximum 10% alcohol solutions

After cleaning, rinse with a sterile damp cloth.

Before putting the appliance into operation, thoroughly dry and ventilate the device, as explosive gases may form during disinfection.

During each decontamination, ensure appropriate personal protective equipment is in place.

CAUTION related to the risk of corrosion and damage to the appliance:

DO NOT use cleaners containing acid or chlorine.

In the event of any damage or corrosion resulting from the use of non-recommended cleaners, FROILABO declines all responsibility.

3) Heated pressure relief valve

Froilabo freezers are equipped with a heated pressure relief valve that allows for a rapid return to ambient pressure inside the unit after a door opening.

Frequent door opening increase humidity in the freezer. It may result in frost forming in the air intake tube in which the pressure relief valve is located. A set of foam blocks are located in the air intake tube to minimise this issue.

If the air intake tube is blocked by ice, opening the door becomes difficult.

If this occurs, remove the safety valve and the foam blocks and then insert a long thin object in the air intake tube and push the ice into the freezer chamber. When possible, apply a spray of warm water also allows to remove the ice.

Clean the pressure relief valve (on the side of the unit) and the foam blocks on a regular basis (every one to three months, as needed). Ensure that the valve and blocks are repositioned correctly. The foam set consists of 2 foams, a thin on valve side and a thicker on tank side.

After a freezer shut down, remove the foam from the pressurization valve. Allow the foam to dry completely, or use the spare set, before replacing the foam in the valve, and restarting freezer.

4) Air filter

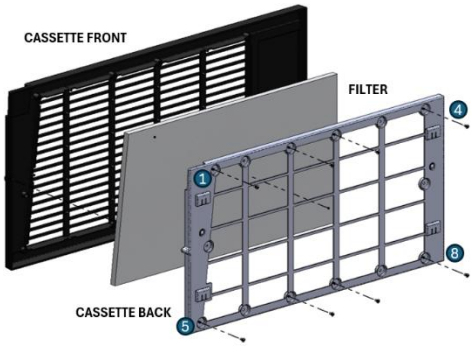
In order to keep the refrigeration performance of the freezer optimum and prolong the life of the compressors, an air filter is located on the front panel, in front of the condenser.

This filter must be cleaned of dust as often as necessary. To do this, simply remove the filter and use a hoover or cloth to remove the dust. After cleaning put it back in place.

Freezers must not be operated without filters.
Froilabo strongly recommend disposing of the filter and replacing it with a clean one. It will protect users from potential contamination and reduce the risk of exposure.

To replace the filter follow these steps.

1. Turn off the freezer.
2. Remove the filter cassette assembly from the front of the freezer.
3. Disassembly the filter assembly by removing the 8 retaining screws from the cassette back.
4. Replace the filter.
5. Reassemble the filter assembly



10.3 Long stop period

If the unit is to remain unused for a long period of time, the following operations should be performed:

1. Turn off the freezers 24V & 230V switches.
2. Unplug the mains lead.
3. Defrost, clean and thoroughly dry the chamber.
4. Leave the door ajar to avoid any unpleasant odours.
5. Remove any foam from the valve and allow it to completely dry.

10.4 Annual Maintenance

An annual maintenance is recommended, to check various aspects (performance, safety, alarms), to pre-empt certain failures and to carry out preventive actions to minimise the risks of unexpected shutdowns. The customer's maintenance department could perform this service as long as a Froilabo technician or a local representative has properly trained them, and the appropriate equipment is available. Notwithstanding the above, any serious issues will require a visit from our maintenance department, or assistance and diagnosis by phone.

Inspection points:

- Fully clean the condenser and replace the filter.
- Check the refrigerant charge.
- Check the compressor current level.
- Check the safety mechanisms, alarms and thermostats.
- Check all mechanical parts (latches, chamber fixtures)
- Check the internal freezer temperature.
- Check the refrigerating circuit is leak-proof.
- Check the compressor dampers (vibration reduction).
- Check the fan bearings.

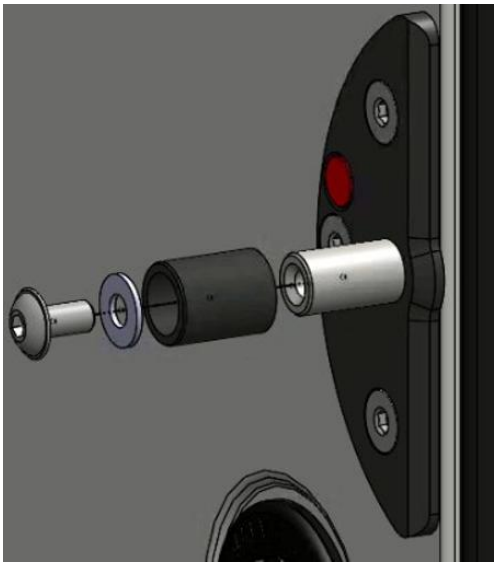
Depending on the type of service contract, Froilabo undertakes to respond within set lead times in the event of a failure.

10.5 Door bearings

Your Froilabo freezer is delivered with 2 extra door bearings. In case of intensive use of the freezer, this part may have to be replaced.

When the bearing is damaged, it should be replaced with the ones supplied (x2) with the freezer, as described in the procedure below:

- Open the door.
- Remove the screw with a suitable tool.
- Remove the washer and the damaged bearing.



- Replace the new bearing, then the washer and put in the screw, tightening by hand
- Close the door

11 Transportation and waste disposal

11.1Transportation

Do not tip the device. Preserve the device as much as possible from all vibrations. At least two people are needed to move the device. Protective gloves should always be worn!

11.2 Waste Disposal

Before disposing of the device, whatever the means, decontaminate the appliance. Please observe the corresponding legal provisions in case of product disposal. Information on the disposal of electrical and electronic equipment in the European Community: in the European Union, electrical appliances are governed by national regulations, based on the Directive 2002/96 / EC on Waste Electrical and Electronic Equipment (WEEE). According to this directive, it is now

forbidden to discard industrial devices (of which this product is a part) delivered after 13.08.2005 with municipal or domestic waste. To facilitate their identification, these devices will be provided with the following symbol:



Since waste disposal regulations within the EU may vary from country to country, we invite you to contact your suppliers if necessary.

12 Manufacturers contact information

Sales Department

Phone: +33 (0)4 78 04 75 75
Email: commercial@froilabo.com

After-sales service

Phone: +33 (0)4 78 04 75 75
Email: service@froilabo.com

13 Maintenance Contract

To obtain a maintenance contract please print off the contract detailed in Appendix 1, fill it in, scan it & then email it to our Service Department at service@froilabo.com.

Appendix 1 – Maintenance Contract

MAINTENANCE CONTRACT

YOUR DETAILS:

Ms. ☐ Miss ☐ M ☐ Name:.....

Company or institution: .....

Function: .....

Service: .....

Phone: .....

Email: .....

Address: .....

Post code: ..... City: .....

YOUR REQUEST:

Maintenance contract ☐ Renewal ☐ Number: .....

Type of device: .....

Temperature: .....

Brand: .....

For freezers:
Emergency LN_2 Yes ☐ No ☐ CO_2 Yes ☐ No ☐
Number of devices: .....

Desired number of visits per year:

You already have a maintenance contract FROILABO Yes ☐ No ☐

If so, contract number: .....

Froilabo
Precision for life