B SCIENCE

VDW
Crucial Temperature Solutions

BIOMEDICAL FREEZER

Premium Line

Dear User

To have efficient use of our product, which has been under quality control, please read the whole user manual carefully before taking the unit into use. Save and keep the manual until the abolition of the device.

Tabel of Content

Chapter 1: Introduction

Congratulations on the purchase of a B Science Freezer, Premium Line. We trust that this unit will serve you for many years to come. To gain optimal benefit from your Freezer, please read the following instructions thoroughly and act accordingly.

The Freezer Premium Line offers many unique features to enhance safety, performance and ergonomic. To take full advantage of the features, please read this manual firmly and keep it safe for future reference. If you are unfamiliar with how Freezers operate, please review Chapter 4: Performance Features and Safety Precautions before you start working with the Freezer. Even if you are an experienced user of Freezers, please review Chapter 5: Using the Freezer; it describes the Freezers features so that you can use it efficiently.

1.1 Intended use

Do not locate or store your Freezer outdoors. This model was designed for indoor use only and violation of this will void the terms of your warranty. The Freezers described in this manual are designed for professional use. These products are intended for use as cold storage of scientific materials for research purposes and as a general-purpose laboratory Freezer, storing samples or inventory at operating temperatures between -10°C and -30°C. It is not considered a medical device and has therefore not been registered with a medical device regulatory body: that is, it has not been evaluated for the storage of samples for diagnostic use or for samples to be re-introduced into the body. This unit is not intended for use in classified hazardous locations, nor to be used for the storage of flammable or corrosive inventory.

This Manual and other technical information is available in PDF format through email:

info@bscienceglobal.com

or

Service@bscienceglobal.com

NOTICE: Only use this product for its intended purpose.

Chapter 2: Precondition

Before you install the Freezer, you need to prepare the site for installation. Examine the location where you intend to install the Freezer. You must be certain that the area is level and of solid construction. In addition, a dedicated source of electrical power must be located near the installation site.

Carefully read this chapter to learn:

- Storage requirements.
- Location requirements.
- Electrical power requirements.
- Space requirements.
- Service utility requirements.
- Environment Requirement.

Storage.

If the Freezer is stored for a period without power, the lid should be kept open for free circulation of air inside the cabinet to avoid corrosion of the inner liner.

Environmental protection and disposal.

The packaging is designed to protect the appliance and its components during transportation, and it is made of recyclable materials.

- Please return the packaging to an official collection point for recycling.
- Old appliances contain reusable materials and should not be disposed off together with household refuse.
- Remove the spring-action hinges from the appliance, to prevent children from being entrapped in the appliance.
- Ensure that no part of the refrigeration tubing is damaged as the refrigerant in the appliance risks escaping to the environment.
- Information about refrigerant type and amount will be found on the Rating plate on the rear of the appliance (Fig. 1).

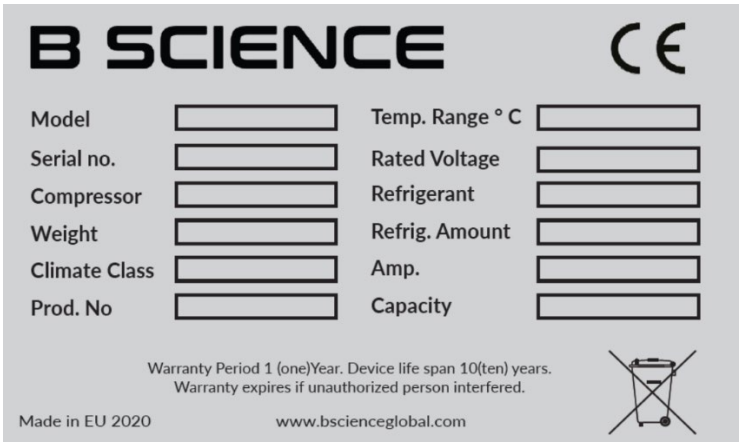


Figure: 1

Safety instructions.

- To prevent injuries and or damage to the appliance, it should be unpacked and set up by minimum two people.
- If upon unpacking the appliance is found damaged, do not connect to the mains, but contact the supplier.
- Interference with or repair to the appliance should only be carried out by authorized personnel, to avoid any injuries. (contact the supplier for further information)
- Never use open flames or other ignition sources inside the appliance.
- Never touch the Freezers interior or products in the Freezer when the Freezer is operating. Use gloves or alike to avoid injuries (frostbite).
- Keep the key to the doors away from the appliance, and out of the reach of children.

IMPORTANT NOTE! The type of refrigerant in the Freezers, R290 is flammable. These Freezers are designed and tested according to the EN 378 standard under clause A3 room and L3 refrigerants, this means that the volume of the room where the Freezers is placed must have a volume of minimum 40m3 corresponding to approx. 4m2 in a room with a normal floor height.

Chapter 3: Getting Started

Connection to the mains.

- For safety reasons, the appliance must be earthed. If you are in any doubt, please contact an authorized electrician.
- The appliance should be left for 1 hour before it is connected to the mains. If the appliance is connected before that, there is a risk of damaging the compressor.
- If for any reason the appliance is disconnected from the mains, please wait 10 minutes before re-connecting. The electronic starting device needs this time to cool down before a safe re-start can be made.

Before use.

- Before use, the interior of the appliance should be cleaned with a mild soap solution and wiped off with a dry clean cloth.

NOTE! Never use any kind of solvent or other chemicals.

Setting up the Freezer.

The Freezer should not be placed where it might be splashed with water, in extreme high humidity or in direct sunlight. Any of these factors may lead to a reduction in performance and shorten the life span of the components. The Freezer should be placed on a horizontal level and should not be placed close to a heating appliance or heating tubes. Allow a minimum of 50 mm (2”) clearance on the sides. The back of the Freezer should have a clearance of at least 100 mm (4”) to allow the heat from the compressor motor to dissipate. Underneath the appliance there should be a gap of 15 mm approx. (1⁄2”). On a soft surface, e.g. carpet, it may be necessary to ensure the correct distance by means of spacers.

Electrical supply.

The electrical supply should always be in accordance with the rating plate on the back of the Freezer.

The supply must always be in accordance with the law and regulations regarding electrical safety, if any doubts contact your supplier.

Chapter 4: Performance Features and Safety Precautions

Refrigerant

In the BMF Freezer there are used one type of refrigerants. Carefully read the below description of the refrigerants: R290.

***Demand for information*: Personnel working with these refrigerants mentioned above and below must be educated to know about these safety sheets.**

Field of application:

R290: The refrigerant is used as refrigerant for R290, is refrigerant grade propane, a natural, or "not in kind", refrigerant suitable for use in a range of refrigeration and air conditioning applications. The use of R290 is increasing due to its low environmental impact and excellent thermodynamic performance. It is non-toxic with zero ODP (Ozone Depletion Potential) and very low GWP (Global Warming Potential). It is a flammable refrigerant and therefore not suitable for retrofitting existing fluorocarbon refrigerant systems.

1. HAZARDS IDENTIFICATION:

EMERGENCY OVERVIEW: WARNING! Flammable gas. Contents under pressure. Causes damage to the following organs: Nervous System. Vapor may cause flash fire. Keep away from heat, sparks and flame. Do not puncture or incinerate container. Keep container closed. Use only with adequate ventilation. Contact with rapidly expanding gases can cause frostbite.

POTENTIAL ACUTE HEALTH EFFECTS:

SKIN: No known significant effects or critical hazards.

EYES: No known significant effects or critical hazards.

INHALATION: Acts as simple asphyxiant.

INGESTION: Ingestion is not a normal route of exposure for gases.

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE: Acute or chronic respiratory conditions may be aggravated by overexposure to this gas.

2. FIRST AID MEASURES

No action shall be taken involving any personal risk or without suitable training. If fume is still suspected to be present, the rescuer should wear appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

SKIN: In case of contact, immediately flush skin with plenty of water.
Remove contaminated clothing and shoes. Wash clothing before reuse.
Thoroughly clean shoes before reuse. Get medical attention.

EYES: Immediately flush eyes with plenty of warm water for at least 15 minutes.

Get medical attention.

INHALATION: Immediately remove to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, qualified personal may give oxygen. Get medical attention immediately.

INGESTION: Do NOT induce vomiting unless direct to do so by medical personnel.
Never give anything by mouth to an unconscious person.
Get medical attention if symptoms appear.

FROSTBITE: Try to warm up the frozen tissue and seek medical attention.

3. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS: Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment (section 5). Shut off gas supply if this can be done safely. Isolate area until gas has dispersed.

ENVIRONMENTAL PRECAUTIONS: Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

4. DISPOSAL CONSIDERATIONS:

Product removed from the cylinder must be disposed of in accordance with appropriate Federal, State and local regulations. Return cylinders with residual product to Airgas. *Do not dispose of locally.*

Chapter 5: Using the BMF Freezer

Starting Up.

In case the compressor does not start when the Freezer has been plugged in, the electrical supply may not be in order. Check if there is an electricity supply to the plug or if the fuse is blown.

Operating the Freezer

The empty Freezer should be switched on for at least 5-6 hours prior to loading of the Freezer. The Freezer should not be loaded above the inside walls which is also the load line limit.

Please note: After the door has been opened, there will be a vacuum created inside the Freezer due to the low temperatures. Wait a few moments before trying to reopen the door otherwise the handle could be damaged.

Temperature control Freezers.

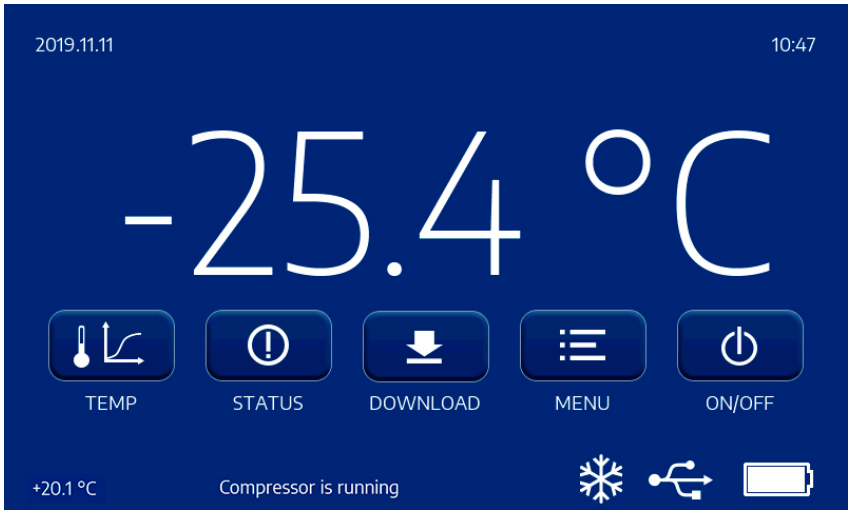
The temperature inside the Freezer is controlled by the electronic controller in the top panel. The controller has a digital readout of the temperature inside the cabinet and the option of changing the temperature inside the cabinet.

External voltage and temperature alarm.

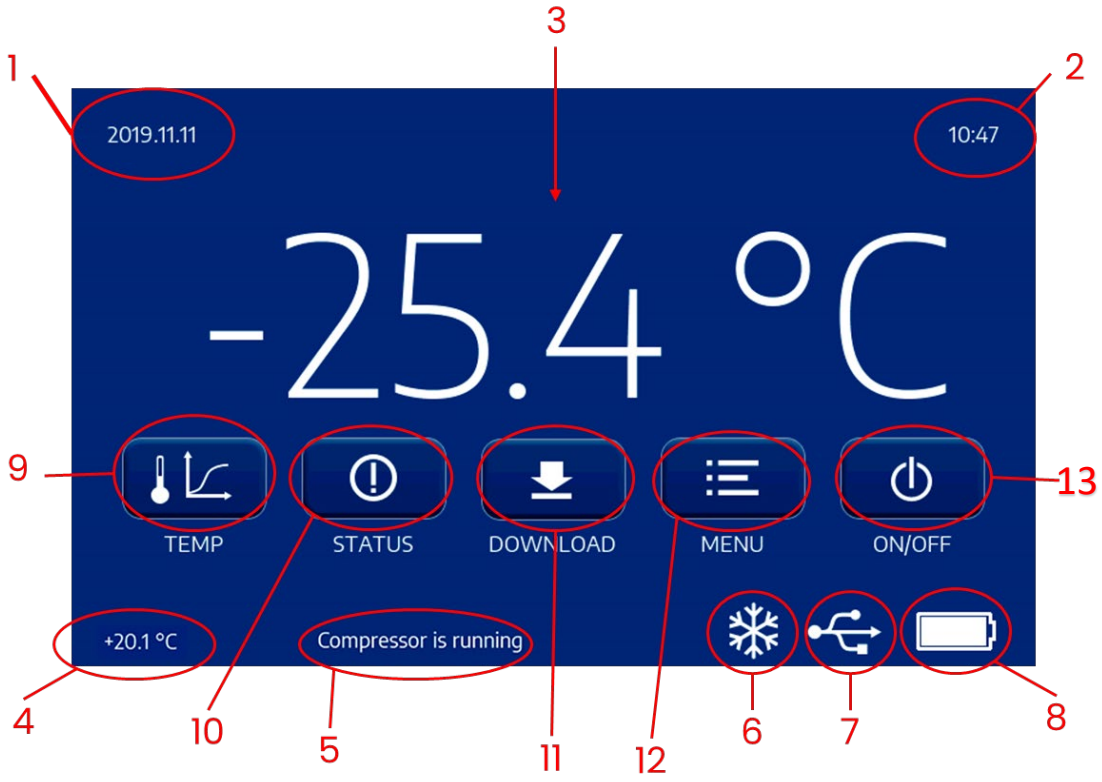
Optionally the Freezer can be equipped with a battery-operated alarm box with connections for external alarm for voltage failure and temperature alarm. The battery should be exchanged every two years.

Controller

1. Main Menu



Main Menu



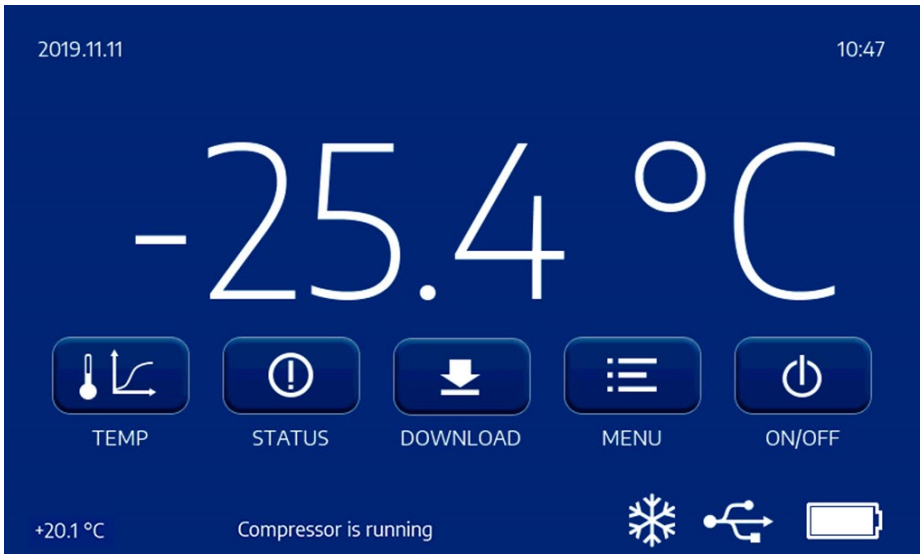
DISPLAY SHOWS

1. Date
2. Time
3. Temperature inside the cabinet
4. Room Temperature
5. Shows if compressor is running
6. Defrosting cycle activated
7. USB stick is connected
8. Battery status

DISPLAY GIVES ACCESS TO

9. Temperature graph
10. Status
11. Download
12. Menu
13. ON/OFF

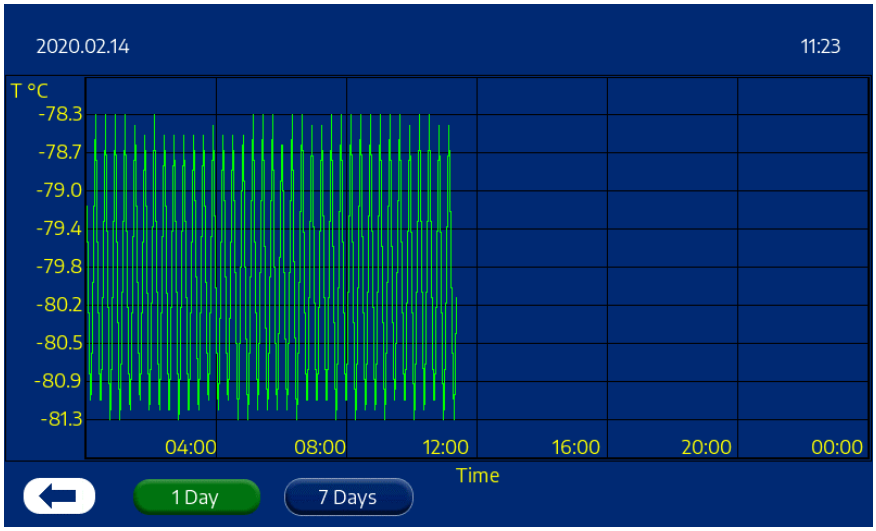
Main Menu



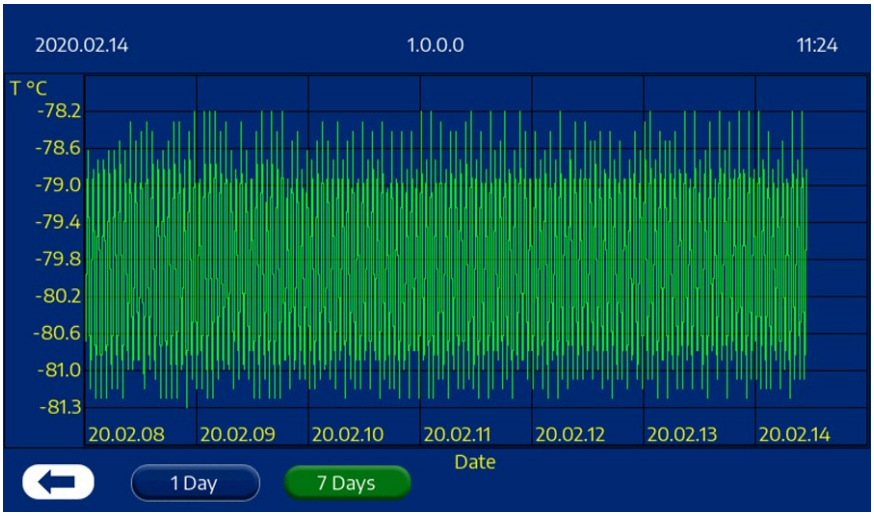
In the main menu you get access to

1. Temperature graph
2. Status
3. Download
4. Menu
5. ON/OFF

1. Temp. (Temperature graph)



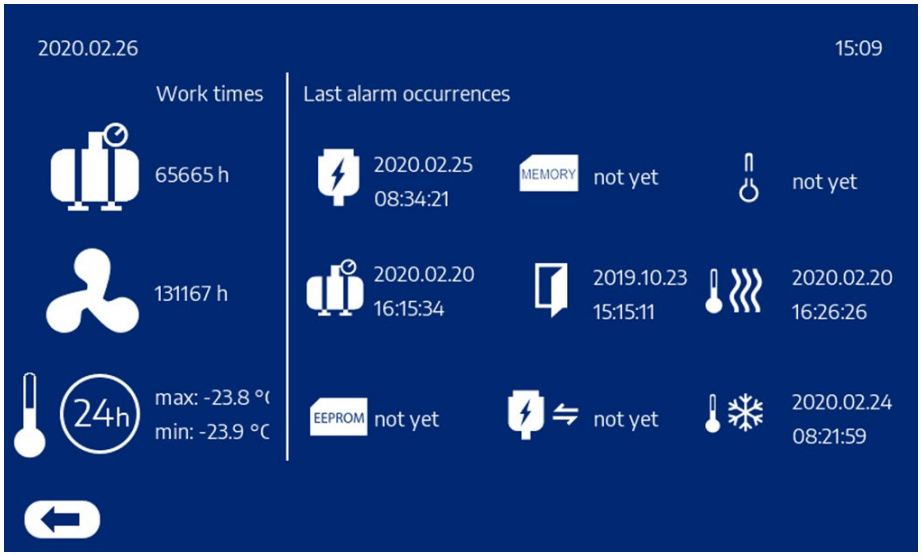
Temperature graph for 1 day



Temperature graph for 7 days

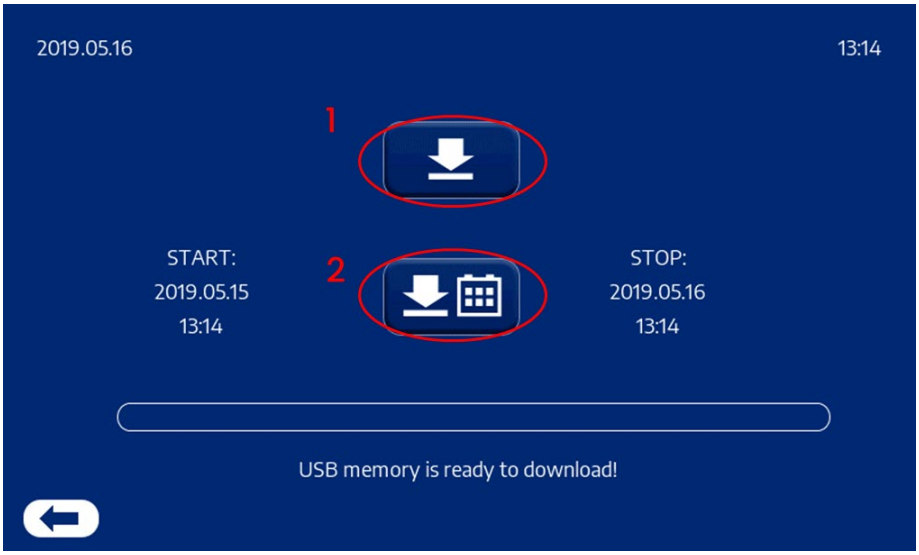
You can select a Temperature Map for either 1 or 7 days

2. Status

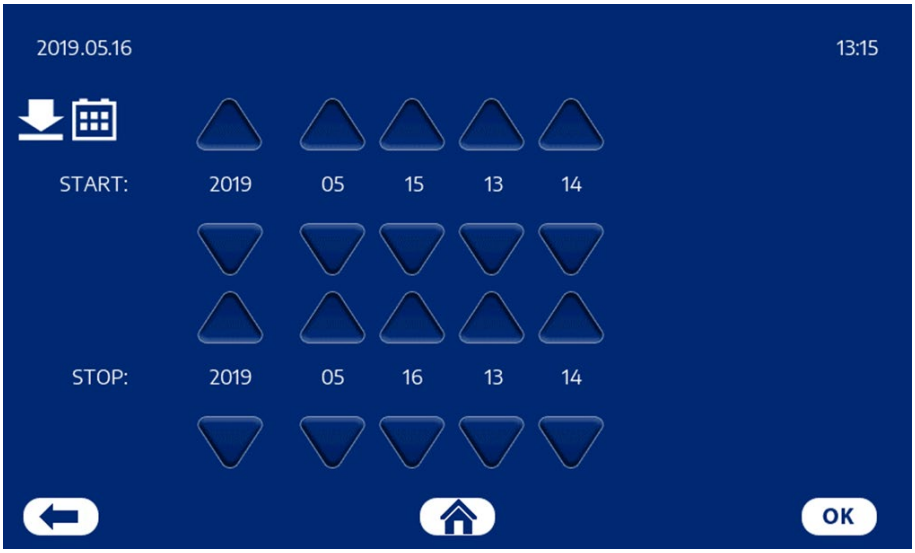


1. It shows the working hours of the compressor and the fan.
2. It shows the last alarms that have been activated.

3. Download data from controller



Click on select period button (No. 2)



Select a period that you want to download and press ok.

1. Use arrow up or down to change the value.
2. To save the changed data click on the OK button.

Then return to download menu and push the Download button (No. 1)

Every time you download data, you will receive 2 csv files,

a file with temperature data and a file with the parameter list.

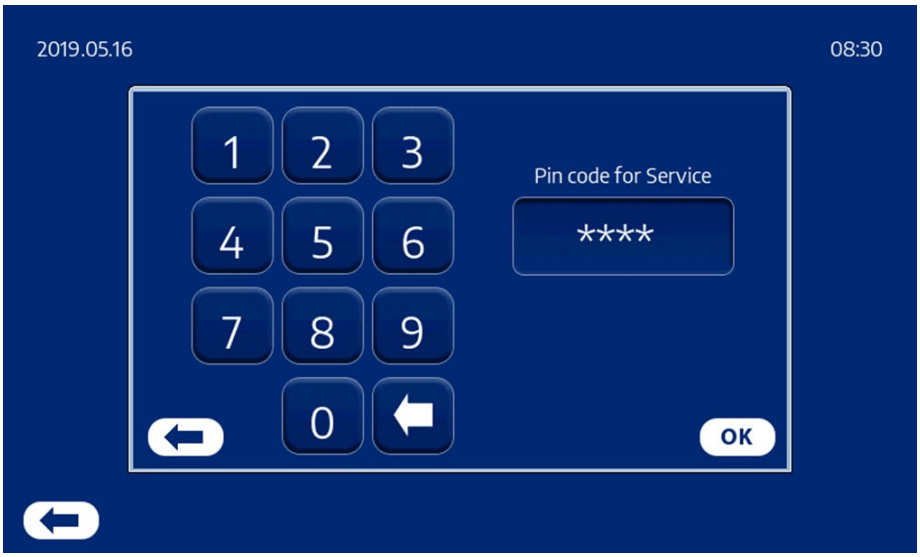
In the USB key, you will find the 2 files under folder “History”

4. Menu

From menu you can gain access to.

1. Admin menu (Only access to authorized personal approved by B Science)
2. Service menu
3. User menu
4. Temp unit
5. Display
6. Language (this option is under development)

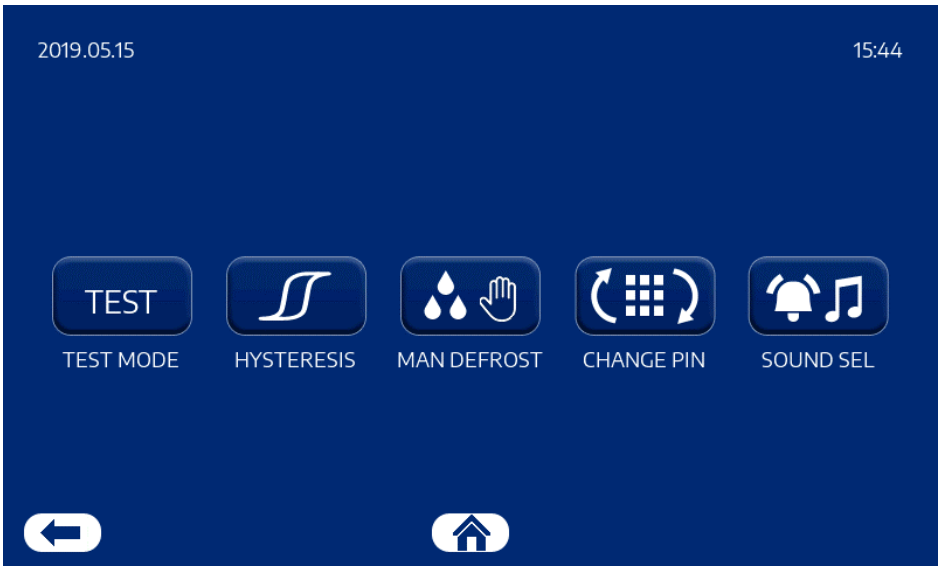
2. Service Menu



For access to service menu enter pin code.

1. Put in Pin code and click on the OK button.

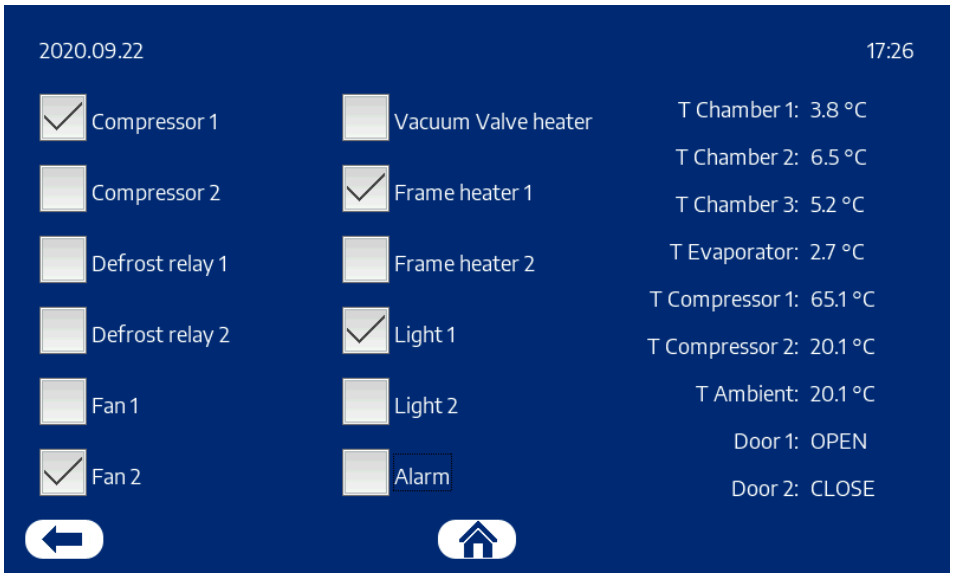
2. Service Menu



Service menu gives access to

1. Test Mode
2. Hysteresis
3. Manual defrosting
4. Change pin
5. Sound sel. (under development)

2. Test Mode in ON mode



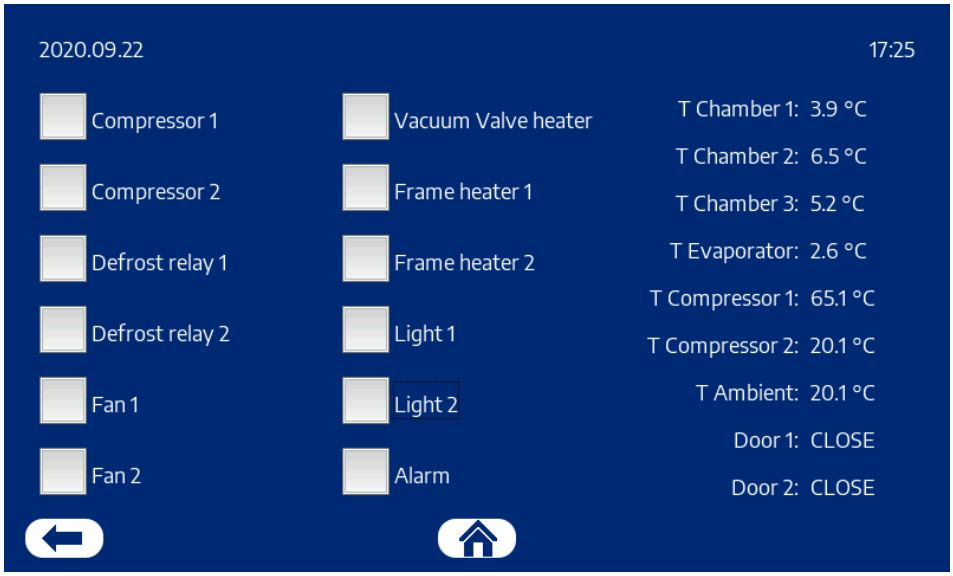
When the unit is Switched ON and running, you can see: Which relays are ON or OFF, the temperature of each sensor, and position of Door contact.

In this example:

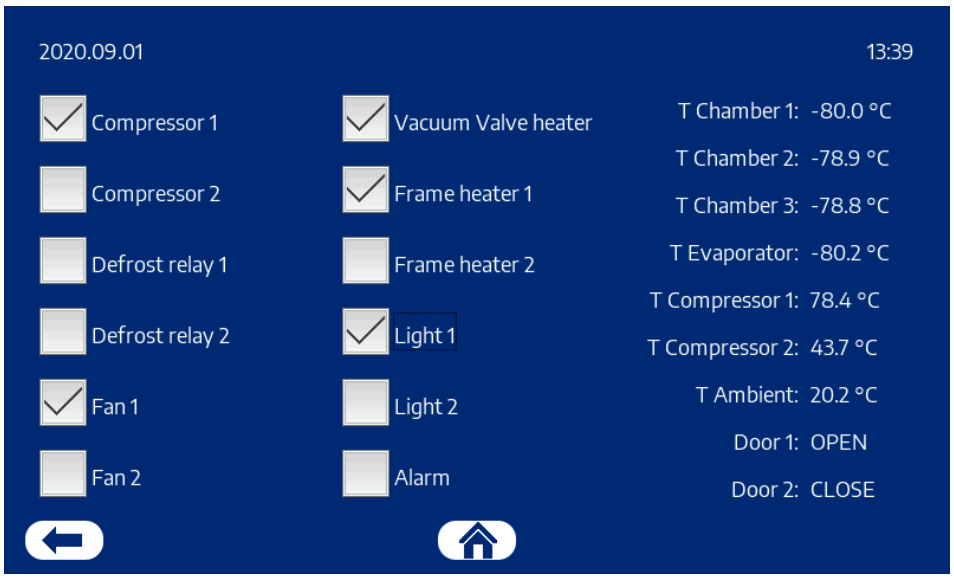
The Compressor 1 and Fan 2 is running.

The Frame heater 1, Light 1 are ON, and Door 1 is open.

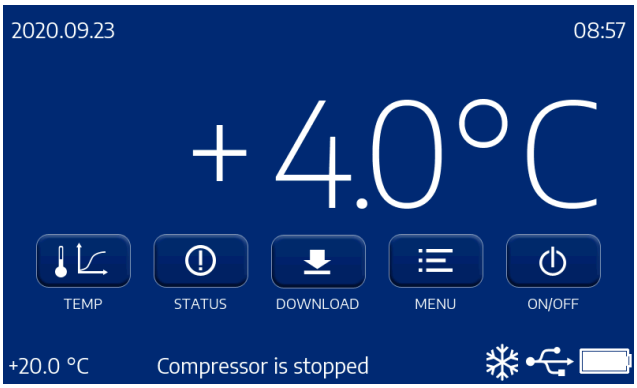
1. Test Mode for troubleshooting in OFF mode



When the unit is OFF, you can simulate each relay by pushing the square field, for testing each kind of device. (Compressor, Light, Fan motor etc.) Very good feature for service and maintenance use.

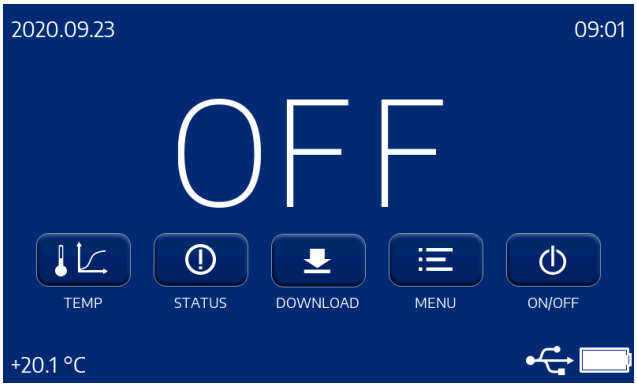


This feature is for service and maintenance use. By this Test mode, you can check all relays and door contacts and check the temperature sensors.



Switch OFF the unit by the display ON/OFF button.

Type in the pin code for one of the pin codes levels, and push the OK button.

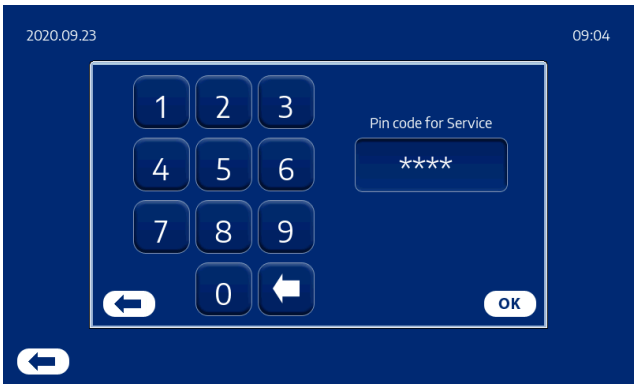


The display will now be in OFF mode.

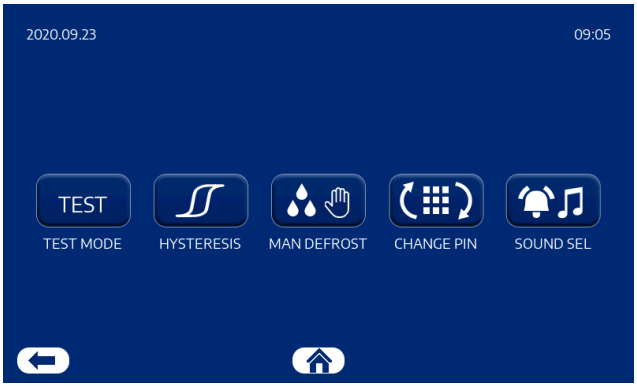
Click on the MENU button.

Click on the SERVICE button

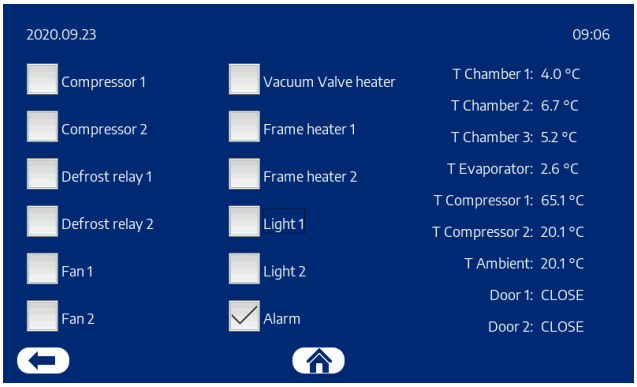
Type in the pin code for Service level, and push the OK button.



Click on the TEST MODE button.



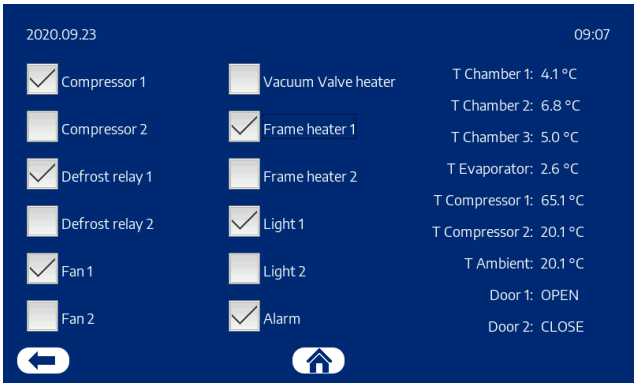
By clicking on each white square angle, the relay for the specific component will be activated.



In this example, the relay for Compressor 1, Defrost relay 1, Fan 1, Frame heater 1 and Light 1 are ON. Alarm output has change from NC to NO or opposite. The door no. 1 is open.

When finished testing relays, click the HOME button, for returning to Main screen.

If you do not touch the display, the Test Mode will automatic stop after 5 minutes for safety reason.

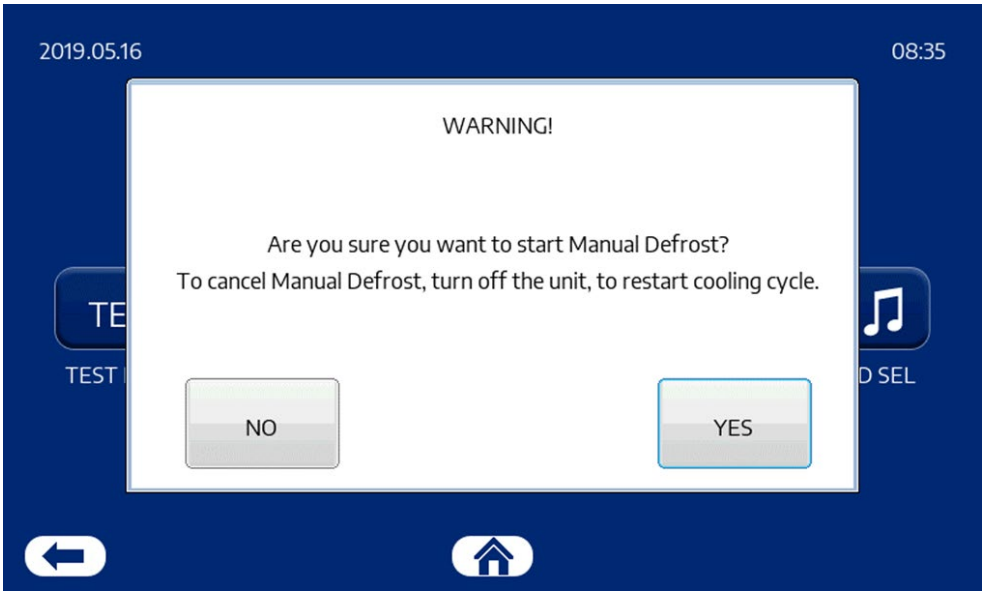


2. Hysteresis

Hysteresis settings: The temperature between start and stop of the Compressor.

1. Use arrow up or down to change the value.
2. To save the changed data click on the OK button.

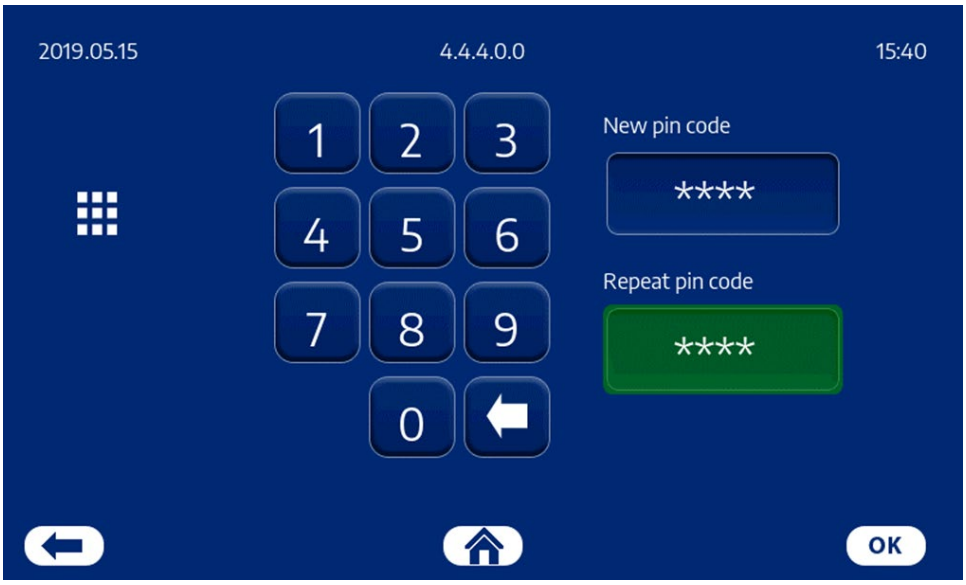
3. Manual Defrost



Manual defrost:

- You can start the defrost cycles in this menu manually by clicking on the YES button. Now the defrost cycles will run automatically.
- If you want to cancel the defrost cycle, you must switch the unit OFF and switch ON again. Then the unit will cancel the defrost cycle and run normally.

4. Change Pin for SERVICE MENU



If needed the service pin code can be changes under Change Pin.

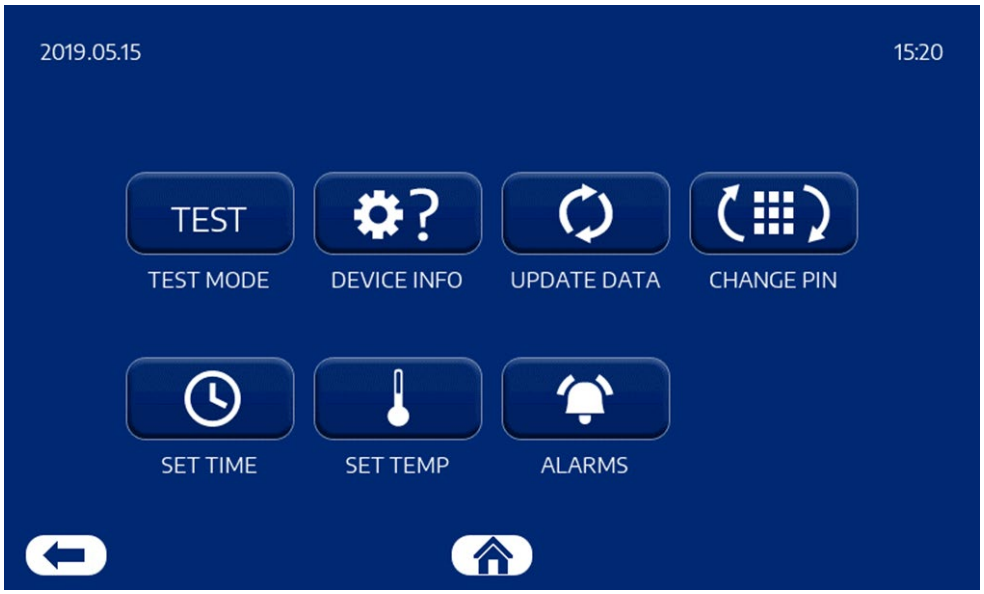
1. Put in New 4 numbered code.
2. Repeat new pin code.
3. Click the OK button to save change.

3. User Menu

Enter pin code to access User menu

1. Put in Pin code and click on the OK button.

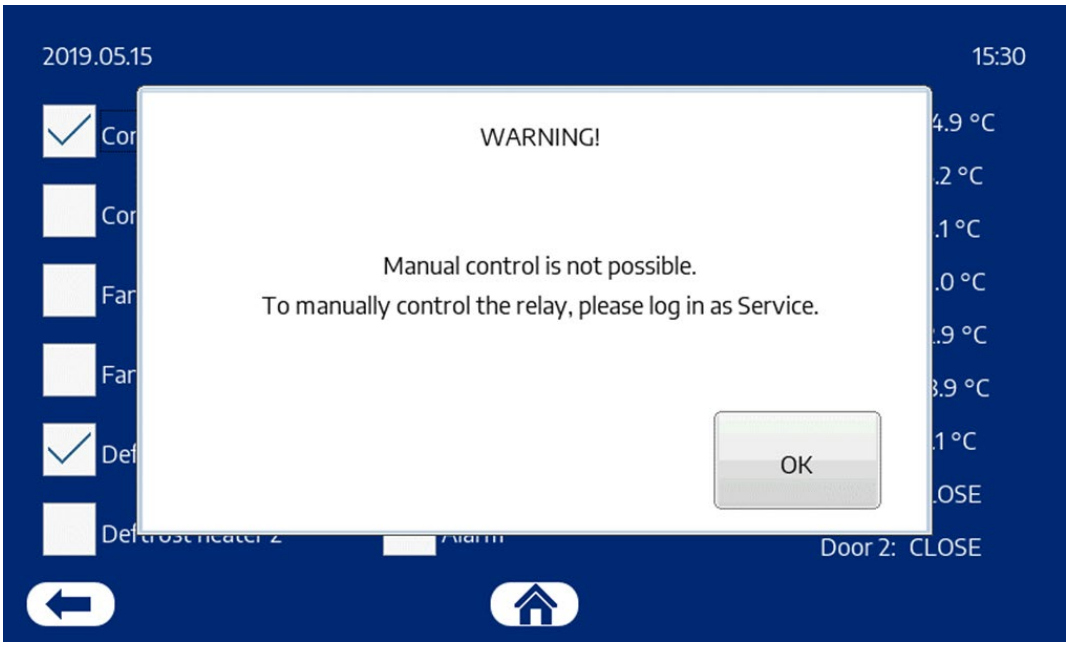
3. User Menu



In user menu you can get access to.

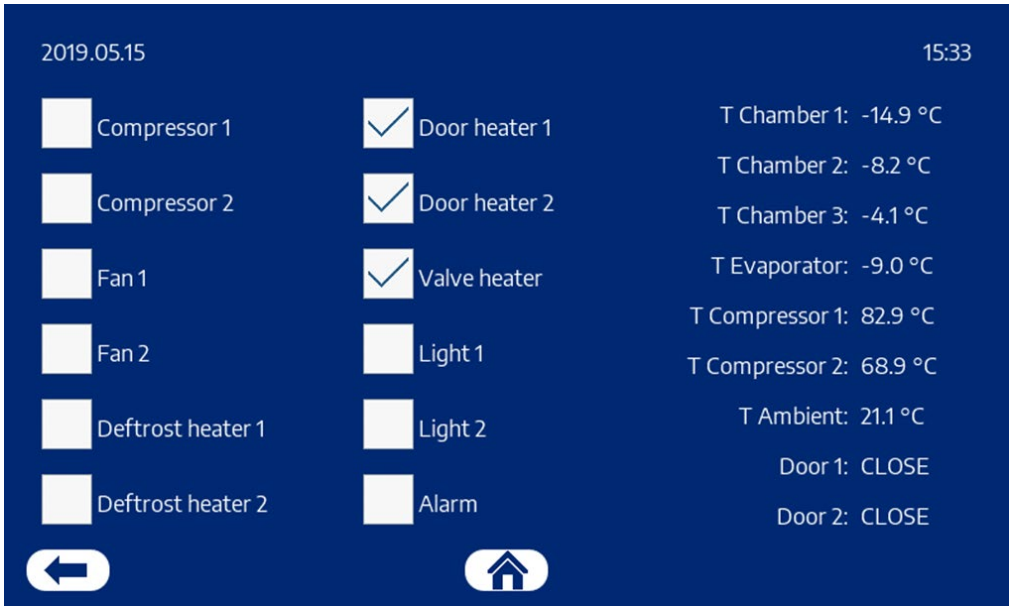
1. Test Mode
2. Device Info
3. Update Data
4. Change Pin
5. Set Time
6. Set Temperature
7. Alarms

1. Test Mode in ON mode



Test mode when the unit is switched ON.

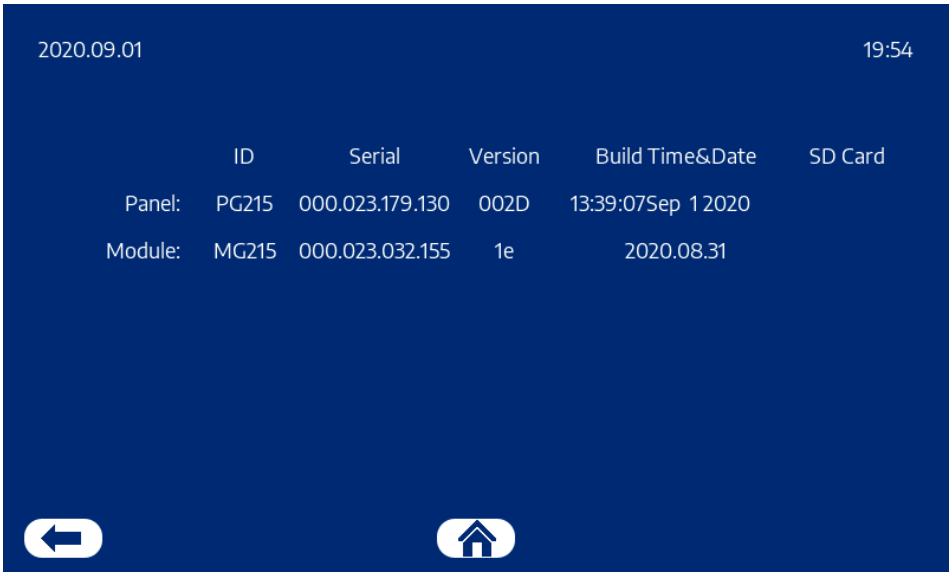
1. Test Mode



Test Mode for when the unit is switched ON.

You can see which relay are ON or OFF, and the sensors temperature.

2. Device Info



In Device info you get all the information of the controller's software versions.

3. Update software / firmware and parameter

Insert the USB stick in the USB port for the Controller port.

Here ◯ you should be able to see

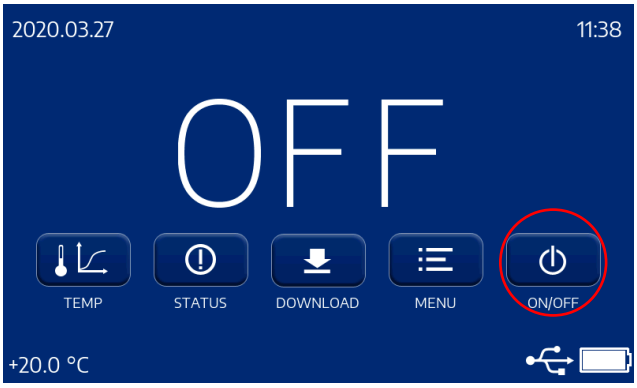
if there is a USB stick connected.

If the USB stick are not detected, try to remove main power plug, wait 10 seconds and connect main power plug again.
If there is still no USB stick detected or
the update is not working, try with another type of USB stick.

Step 1.

The Controller must be switch OFF,
since you are only able to update in OFF mode.

⚠ Update can only be executed when unit is switched OFF



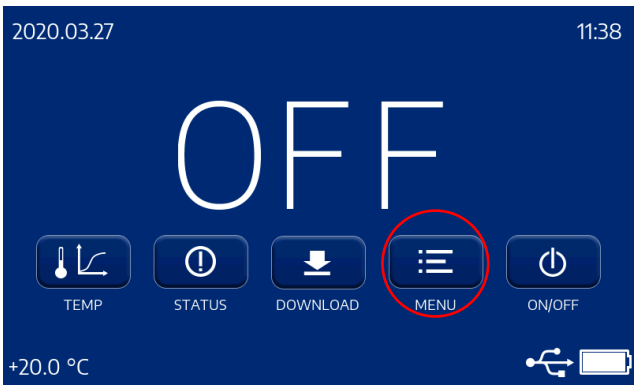
Step 2

If the controller is pass code protected, you can use the same code as for USER, SERVICE or ADMIN.

Press 4 numbers in, and press OK

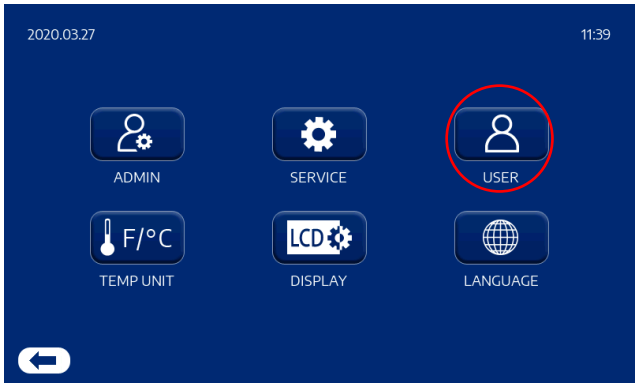
Step 3

Press the MENU button to enter the next menu.



Step 4

Press the USER button to enter the next code menu.

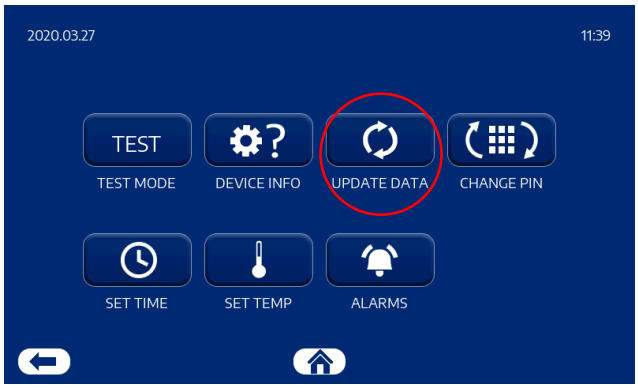


Step 5

Use pin code 0000 to enter the USER menu and press OK.

Step 6

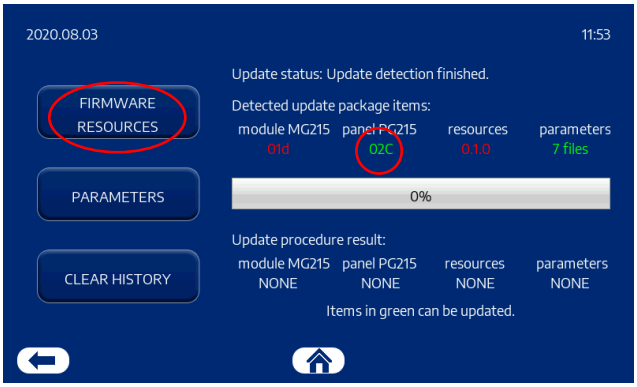
Press on the UPDATE DATA button to enter the next menu.



Step 7

In this UPDATE MENU, you can see new detected firmware which are in green color.
Press the FIRMWARE RESOURCES button to update firmware.

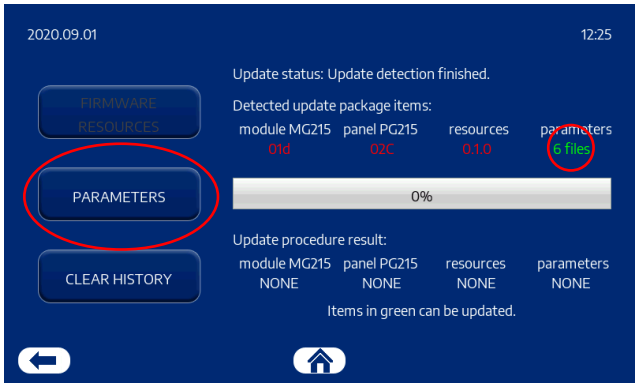
When the controller is finished updating firmware,
the controller will perform a rebooting.



Step 8

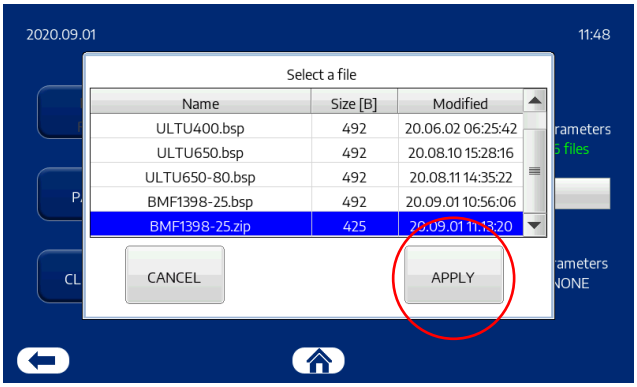
For uploading new parameter file,
you need to go from Step 3 to step 6 again
In this UPDATE MENU, you can see new detected parameters which are in green color.
Press the PARAMETERS button to upload the new parameter.

PS. If the Controller does not detect any new files,
please check that you have copied the files into the correct folder in the USB stick.



Select the parameter file which fits to the unit.

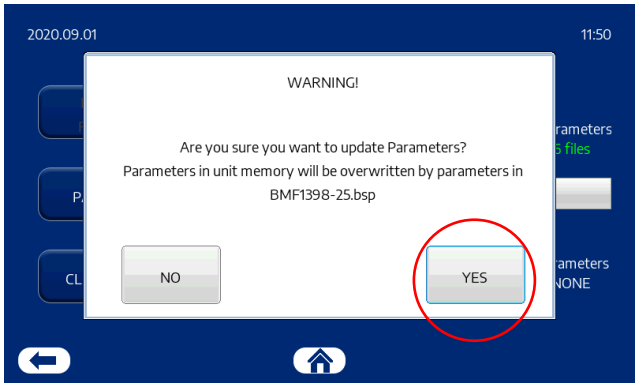
Press the APPLY button.



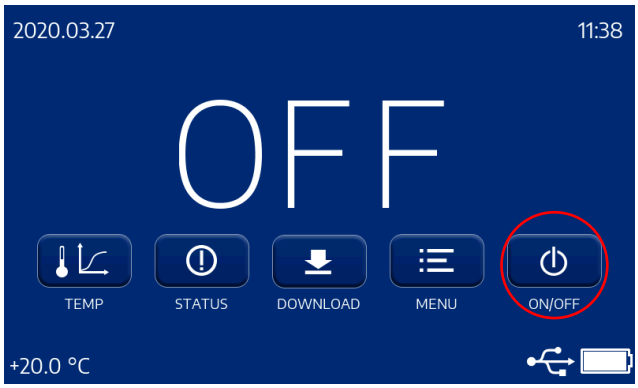
You will now get a Warning.

If you are sure to update the Parameter file,

press the YES button.



When the controller is finished uploading parameter,
the controller will perform a rebooting.



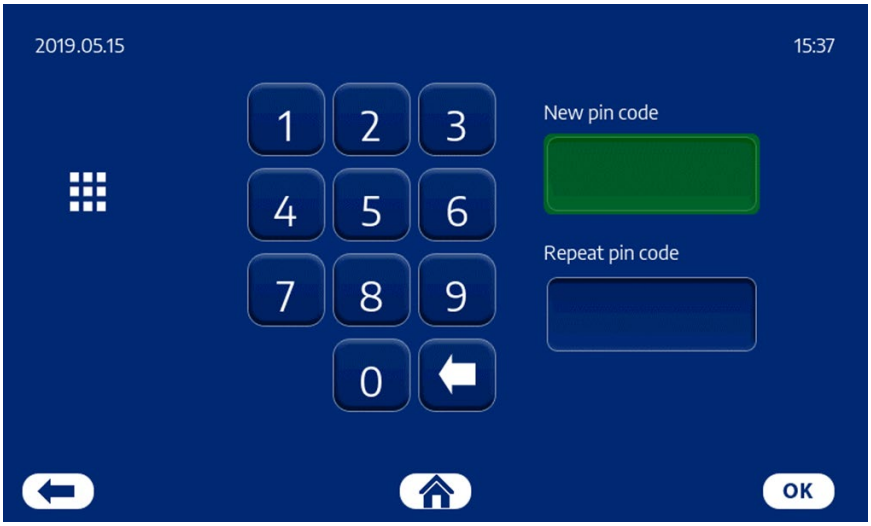
Important!

When you have updated all firmware and parameter,
remove the USB stick and switch ON the unit,
and always check the main parameters such as
the **Set point** and **Alarm settings**.

Important!

When you have updated the parameter file,
remove the USB stick and switch ON the unit,
and always check the main parameters such as
the **Set point** and **Alarm settings**.

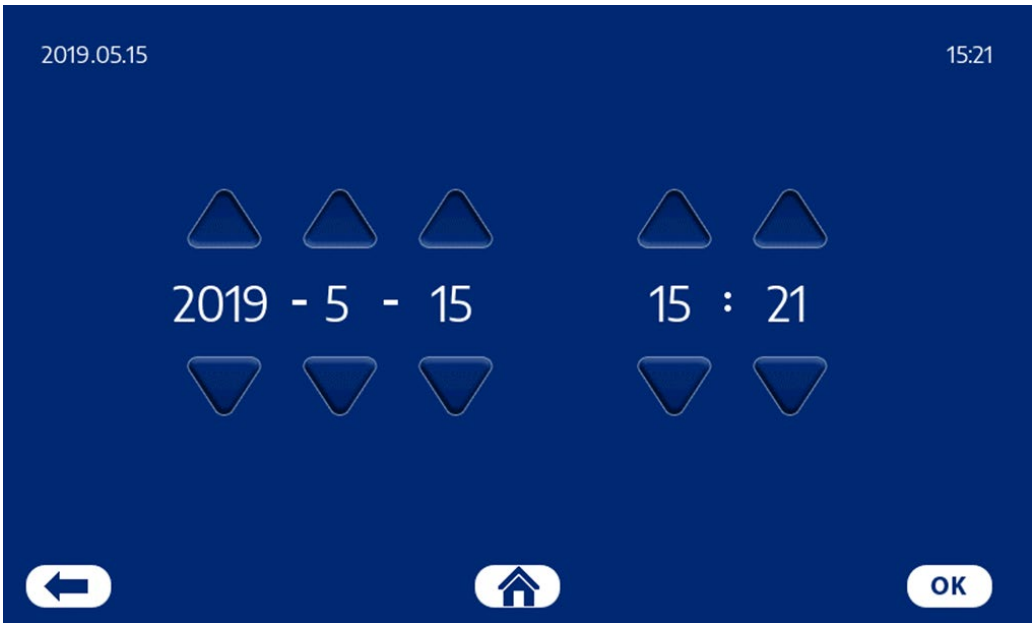
4. Change Pin USER MENU



If needed the User Menu´s pin code can be changed under Change Pin

1. Put in New 4 numbered code.
2. Repeat new pin code.
3. Click the OK button to save change.

5. Set Time & Date



Setting the Date and Time.

1. Use arrow up or down to change the value.
2. To save the changed data click on the OK button.

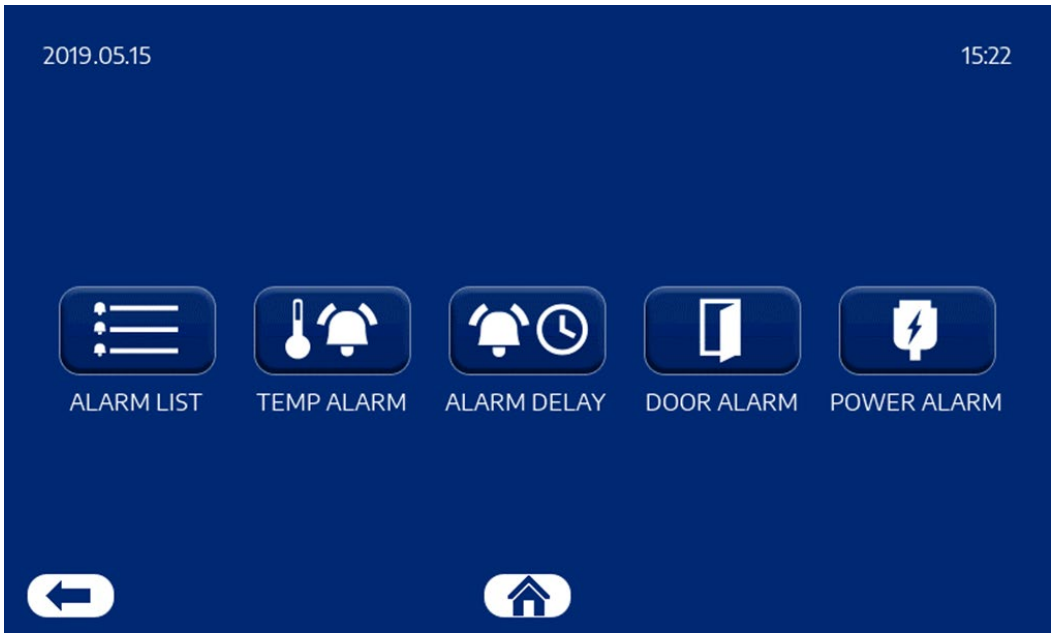
6. Set Temperature

To set the setpoint for the temperature in the cabinet.

1. Use arrow up or down to change the value.
2. To save the changed data click on the OK button.

In this example the setpoint are
-20,0°C and the Hysteresis are 1,0°C.
That means the controller will start the Compressor at -19,5°C
and stop the Compressor at -20,5°C.

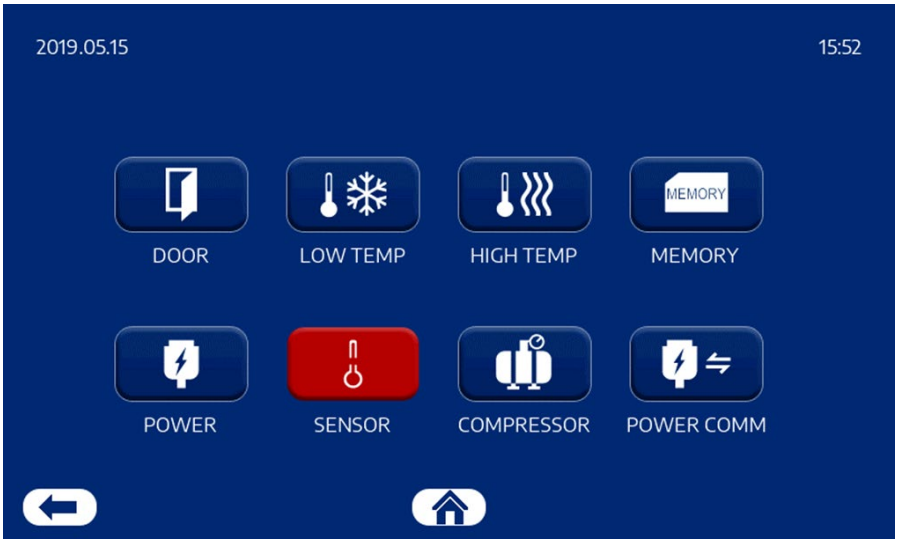
7. Alarms



Under Alarms get access to

1. Alarm List
2. Temp Alarm
3. Alarm Delay
4. Door Alarm
5. Power Alarm

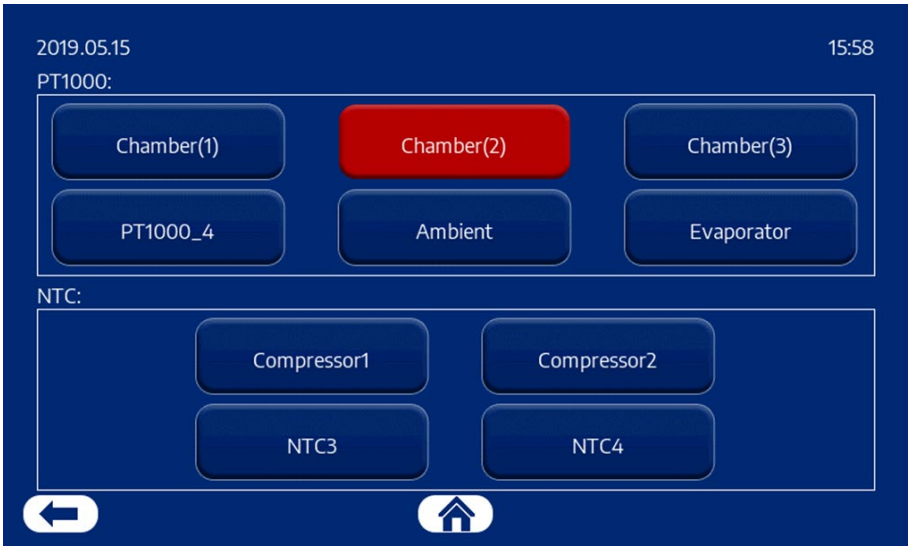
1. Alarm List



Under alarm list it is showed which type of alarm that are occurring. The Button will be red when the failure is activated, and the remote alarm relay will be active until you click on the red button to deactivate the alarm.

Under the Sensor menu.

Sensor Menu



When a Sensor alarm occur, you can see which one are having a failure.

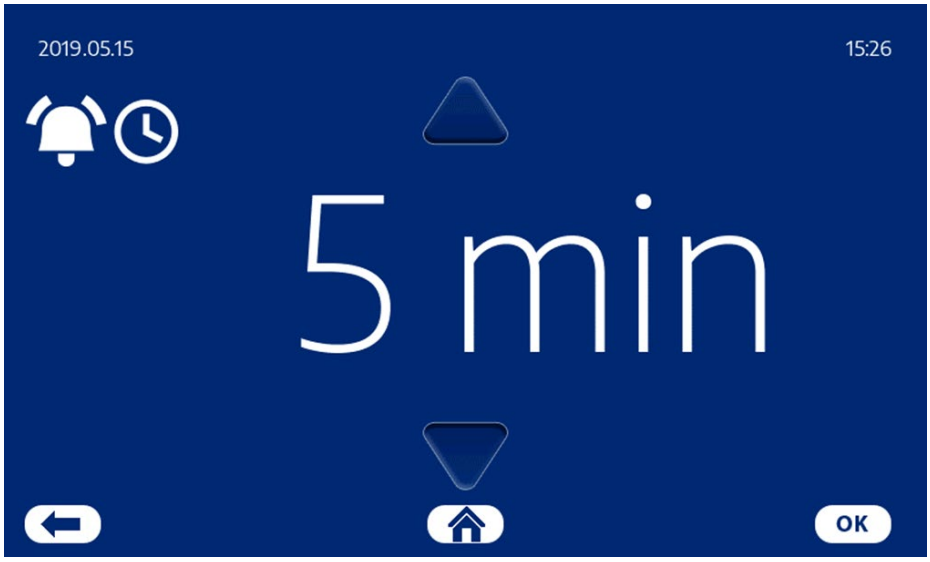
Click on the red button to deactivate the alarm.

2. Temperature Alarm

To set up the High and Low temperature alarm.

1. Use arrow up or down to change the value.
2. To save the changed data click on the OK button.

3. Temperature Alarm Delay

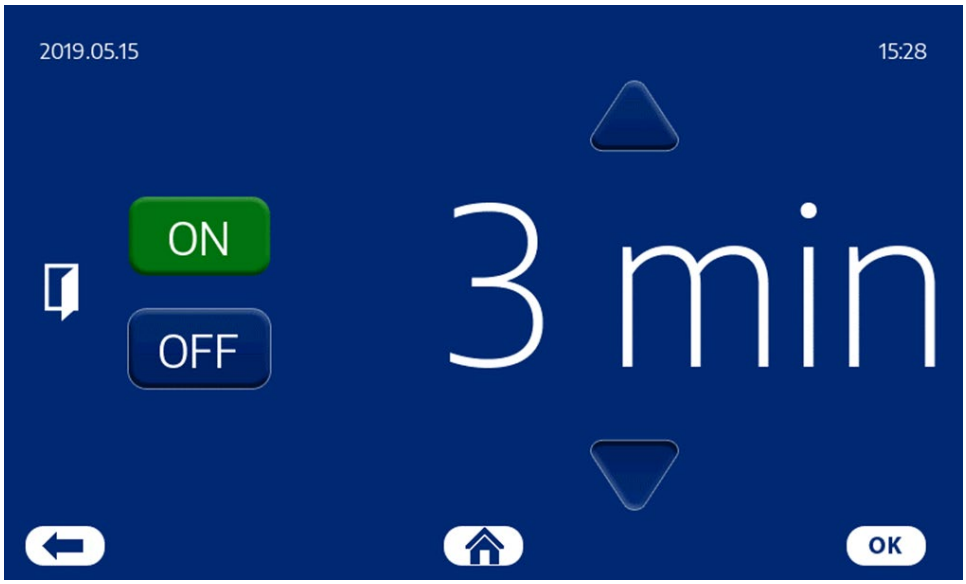


To set up the time for alarm delay.

1. Use arrow up or down to change the value.
2. To save the changed data click on the OK button.
3. When the high or low temperature level are reached, this alarm delay timer will start counting.

In this example, where the high temperature alarm level is reached, and the temperature inside the chamber are not starting to fall under the high temperature alarm level within the 5 minutes, the High temperature alarm will be activated. You will both see and hear an alarm.

4. Door Alarm

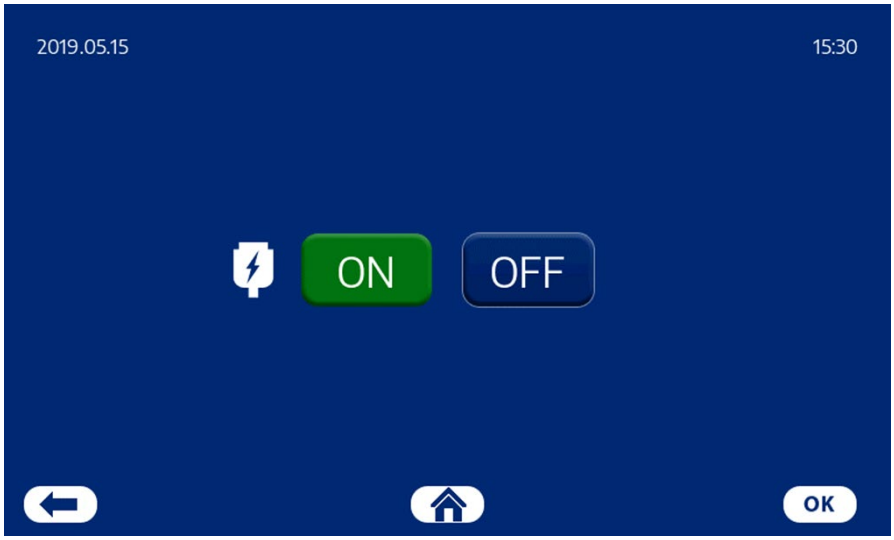


To set alarm for Door alarm delay.

1. Use arrow up or down to change the value.
2. To save the changed data click on the OK button.

If the Door are left open for more than 3 minutes, the Door open alarm will be activated.

5. Power Alarm

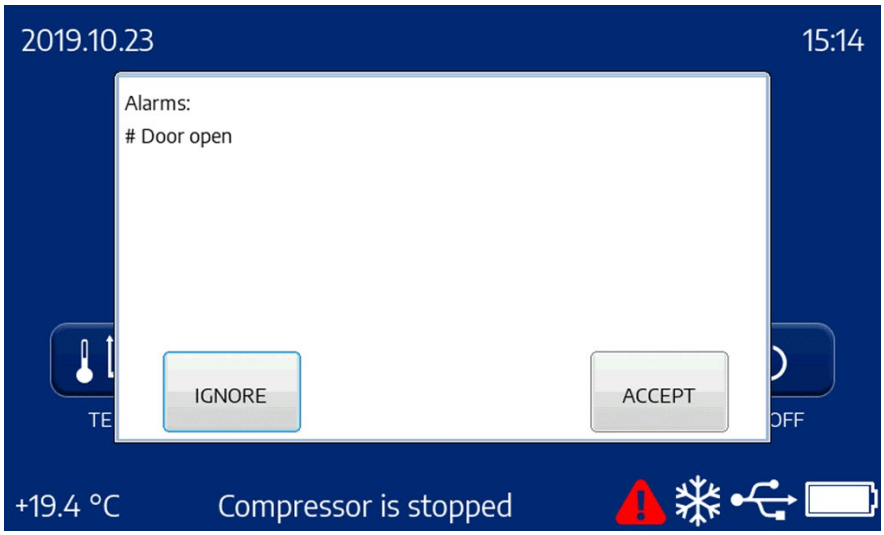


Setting for Power Alarm.

1. You can enable or disable the Power failure alarm. Push ON or OFF.
2. To save the changed data click on the OK button.

In case of Power cut, the Power failure alarm will be activated.

Main Menu Alarm Screen



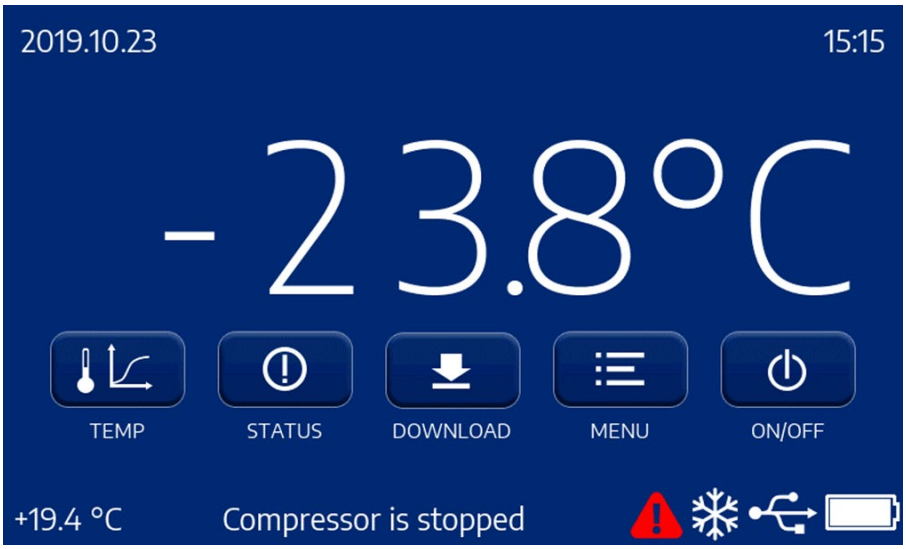
When an alarm occurs, you can choose to IGNORE or ACCEPT the alarm.

When you accept the alarm, you are automatically taken to the Alarm List Menu.

Click on the Activated alarm (red button) to accept and deactivate the Alarm.

If you choose to IGNORE the alarm, you are temporally ignoring the alarm and a red triangle will be visual on the main menu.

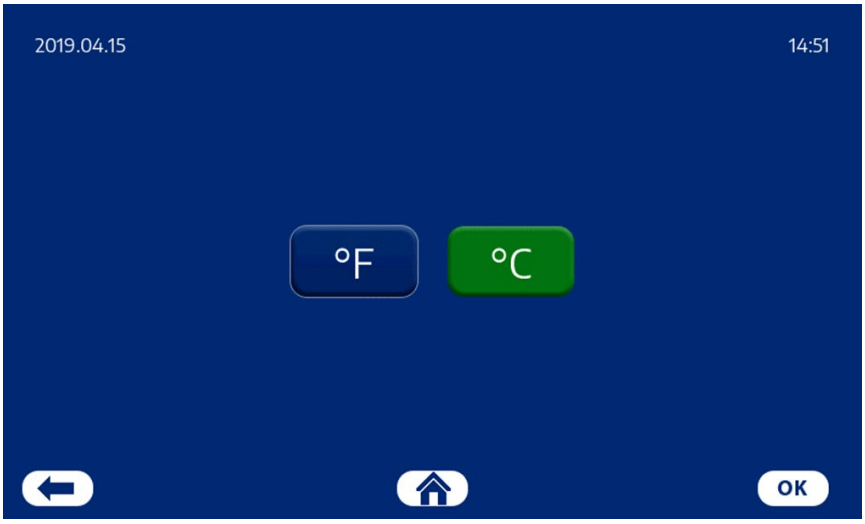
Main Menu Alarm Screen



If you choose to IGNORE the alarm, you are temporally ignoring the alarm and a red triangle will be visual on the main menu.

The Red triangle (Alarm indicator) will not disappear until it has been accepted in the Alarm List Menu

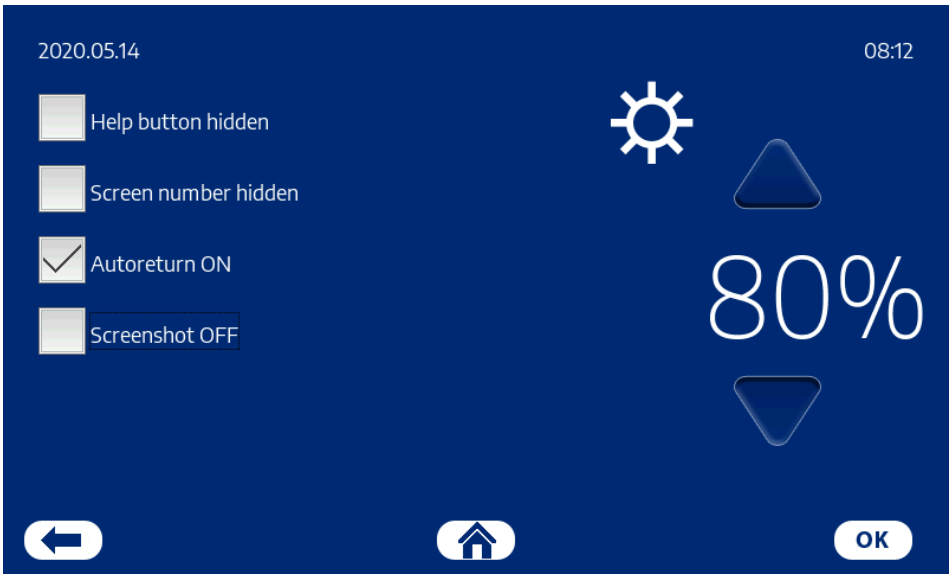
4. Temp. Unit



Under Temp. Unit, you can select if you want the temperature range to be in Fahrenheit or in Celsius degrees.

1. Push °F or °C, the selected will turn green.
2. To save the changed data click on the OK button.

5. Display



Display Settings:

To the Right you can change Light brightness.

1. Use arrow up or down to change the value.
2. To save the changed data click on the OK button.

The squares to the left.

1. Help button (future option)
2. Screen number (used for screen identification)
3. Auto return (Auto return to main menu within 30 sec. if switched ON)
4. Screenshot (if switched ON, you can take a screenshot)

Chapter 6: Maintaining the Freezer

Note: This manual cover operations and maintenance operations for the owners/users of the BMF Premium Line. Complete certification procedures and specifications are published in a separate publication Technical Manual: BMF Freezer Line Procedure Stations. This manual is available for trained and service person authorized by B Science. A complete certifier service kit is available to qualified certifiers from B Science.

Cleaning

Cleaning should be done when needed. When used in a dirty environment it might be necessary to remove the compressor compartment top cover and clean the compressor compartment eventually with a vacuum cleaner.

If the cleaning process is neglected there is a risk that the performance of the Freezer will be affected, and even damage to the compressor could occur due to overheating.

Automatic Defrosting.

This BMF Freezer has Automatic Defrosting cycles every 6 hours, so the evaporator will have the best performance. The evaporator will be heated up to +1°C, so there is no ice left, but the chamber will still maintain the normally temperature as the setpoint, since the evaporator is in a closed metal box, with a fan to circulate the air around in the chamber. During the defrost cycle, the fan will also be stopped.

NOTE! Never use a sharp metal object which might will cause damage to the inner liner.

In case of loading the chamber with warm samples, or having any or long door openings, the ice will build up faster, and may need a manually defrost cycle.
The manual defrosting frequency is determined mainly by two factors the usage pattern (number of door openings) and the relative humidity.

Time between each automatic defrost cycles.

Starting the manual defrost cycles.

Wire diagram.