bioline

BioUltra
INSTRUCTIONS FOR USE
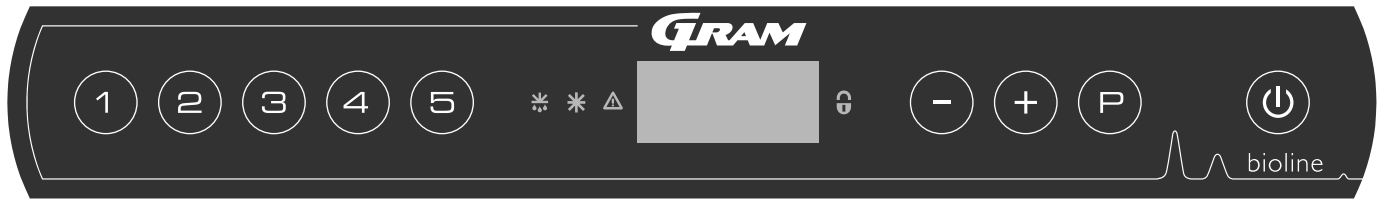**MODEL: UL570**

Original Instructions for use

GRAM

Biostorage you can depend on

Quick Guide – BioUltra

On/Off

Press the ⏻ button to turn the cabinet on. Press the ⏻ button for 6 seconds to turn the cabinet off.
The software version of the cabinet will be shown when turning the cabinet on, followed by the variant.
The cabinet is ready when the temperature is displayed.

Setting the temperature

Temperature adjustments are done by holding the Ⓟ button and pressing either ⊕ or ⊖
Confirm the settings by letting go of the buttons.

User menu

Menu Access Ⓟ + ① ⇥	⤵	⇥		
Local alarm settings	LAL	LHL	[° C]	Upper alarm limit. Code for activated alarm [A2]
		LLL	[° C]	Lower alarm limit. Code for activated alarm [A3]
		LHd	[Min.]	Delay of upper alarm limit
		LLd	[Min.]	Delay of lower alarm limit
		bU	On/off	Acoustic signal for alarm codes [A2] and [A3]. [1=on / 0=off]
External alarm settings	EAL	EHL	[° C]	Upper alarm limit. Code for activated alarm [A4]
		ELL	[° C]	Lower alarm limit. Code for activated alarm [A5]
		EHd	[Min.]	Delay of upper alarm limit
		ELd	[Min.]	Delay of lower alarm limit
		bU	On/off	Acoustic signal for external alarm codes [A4], [A5]. [1=on / 0=off]
Offset of sensors	CAL	CA	[K]	Offset of A-sensor. Reference sensor for the refrigeration system
		CE	[K]	Offset of E-sensor. Reference sensor for the display and alarms
	ALL			Activation of escorted alarm limits. [FAS] locked limits / [ESC] = follows setpoint
	dPS			Reference sensor for the display (A or E) (E is factory setting)

Example: Setting the upper limits for the alarms; LHL

↳ Press and hold Ⓟ + ① for more than 3 seconds until the display shows LAL

↳ Press Ⓟ to select LAL, LHL is now shown in the display

↳ Press Ⓟ to select LHL, 25 is shown in the display

↳ Press ⊖ or ⊕ to set the desired value for the upper temperature limit

↳ Press Ⓟ to confirm the set value

↳ Press ⏻ two times to return to LAL

↳ Press ⊕ to reach the next level, EAL, CAL, ALL and dPS are located on the same level

↳ Press ⏻ to leave the user menu

Alarms

| Alarm codes | A2 | The upper alarm limits, (LHL) alarm is or has been activated |
| | A3 | The lower alarm limits, (LLL) alarm is or has been activated |

Acknowledging an acoustic alarm

Temperature alarm codes A2 and/or A3: Flashes in the display. Press ⓟ to acknowledge. The display will continue to flash if the temperature is outside the alarm limits.

Latching alarms: A2, A3, A4, A5

Due to the potential implications of alarms, the red alarm triangle icon will turn on along with the corresponding alarm code will flash in the display. The alarm state will remain on until acknowledged by pressing ⓟ.

Reading Max/Min temperature

Read the higest recorded temperature inside the cabinet by holding down ⊕. Read the lowest recorded temperature inside the cabinet by holding down ⊖.

Reading the alarm history – Example [A2]

[A2] flashes in the display – This means that the temperature has exceeded the set value for the upper temperature limit, LHL. Press ⓟ to acknowledge the [A2]. The display continues to flash, indicating that there is information in the alarm history. Press ⊕, Htt (High temperature time) is shown, press ⓟ to see for how long the temperature was above the set alarm limit. Press ⏻ to return to Htt. Press ⊕ to reach Ht (Highest temperature). Press ⓟ to read the highest recorded temperature during Htt. Press ⏻ to return to Ht and press ⏻ again to leave the alarm history function. The procedure for reading an [A3] alarm is identical, apart from entering the alarm history with the ⊖ button. When reading out temperatures below set limits, the parameters are Ltt and Lt. A flashing display with no alarm codes indicates that the alarm codes have been acknowledged, but the alarm system contains information.

Resetting Max/Min and alarm history

Resetting of the Max/Min and alarm history is done by holding ⊖ and ⊕ for more than 3 seconds, an acoustic signal will be given when reset is complete.

Sensor read-out and error codes

Menu Access ⓟ + ⑤ ⇥	⮑	ⓟ ⇥ [° C]		Display code and its message	
Sensor for refrigeration system	P-A	Value on sensor for refrigeration system		F1	Error on sensor for refrigeration system
Sensor for evaporator	P-B	Value for evaporator sensor		F2	Error on evaporator sensor
Sensor for condensor	P-C	Value for condensor sensor		F3	Error on condensor sensor
Sensor for display and alarms	P-E	Value for display and alarm sensor		F5	Error on sensor for display and alarm
				F7	Overheated condensor
				F8	Over pressure safety switch has triggered by excessive pressure in the LT cooling system

Table of Content

Safety

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Make sure to read the instructions for use through thoroughly before using the cabinet for the first time.
*In the event of need for product support, do not hesitate to contact us at: **support@gram-bioline.com***

This instructions for use is intended for the following product series:

BioUltra

We recommend that you read this instructions for use through thoroughly before using the cabinet for the first time.

Gram Scientific does not guarantee safe operation if the cabinet is used for anything other than its intended use. Contents of the instructions for use can be subject to change without notice.

No part of this instructions for use may be reproduced in any form without expressed written consent of Gram Scientific. Gram Scientific guarantees the cabinet under certain warranty conditions. Gram Scientific is in no way responsible for any loss or damage of content.

This instructions for use should be considered an integral part of the cabinet, and should be stored close to the cabinet and be easy to access. If the instructions for use is lost, please refer to your local distributor or Gram Scientific for a replacement. For current versions of the manual, please go **www.gram-bioline.com**.

Intended Use

Gram BioLine BioUltra freezers are designed and manufactured to provide safe and precise storage conditions at ultra-low temperatures. Designed for an operating range between -60 °C and -86 °C, with a maximum ambient temperature of +30 °C and a maximum relative humidity of 70%.

The user must ensure that the cabinet is used in accordance with its intended use. Abnormal use or use

conflicting with the intended use or guidelines stipulated in the product documentation can lead to: danger to patient safety, damage to stored items, damage to cabinet, danger to user.

Gram BioLine equipment is designed to be used in a system with monitored additional independent alarms to ensure timely reaction to alarms and thereby maximum item safety.

Symbols used throughout the instructions for use

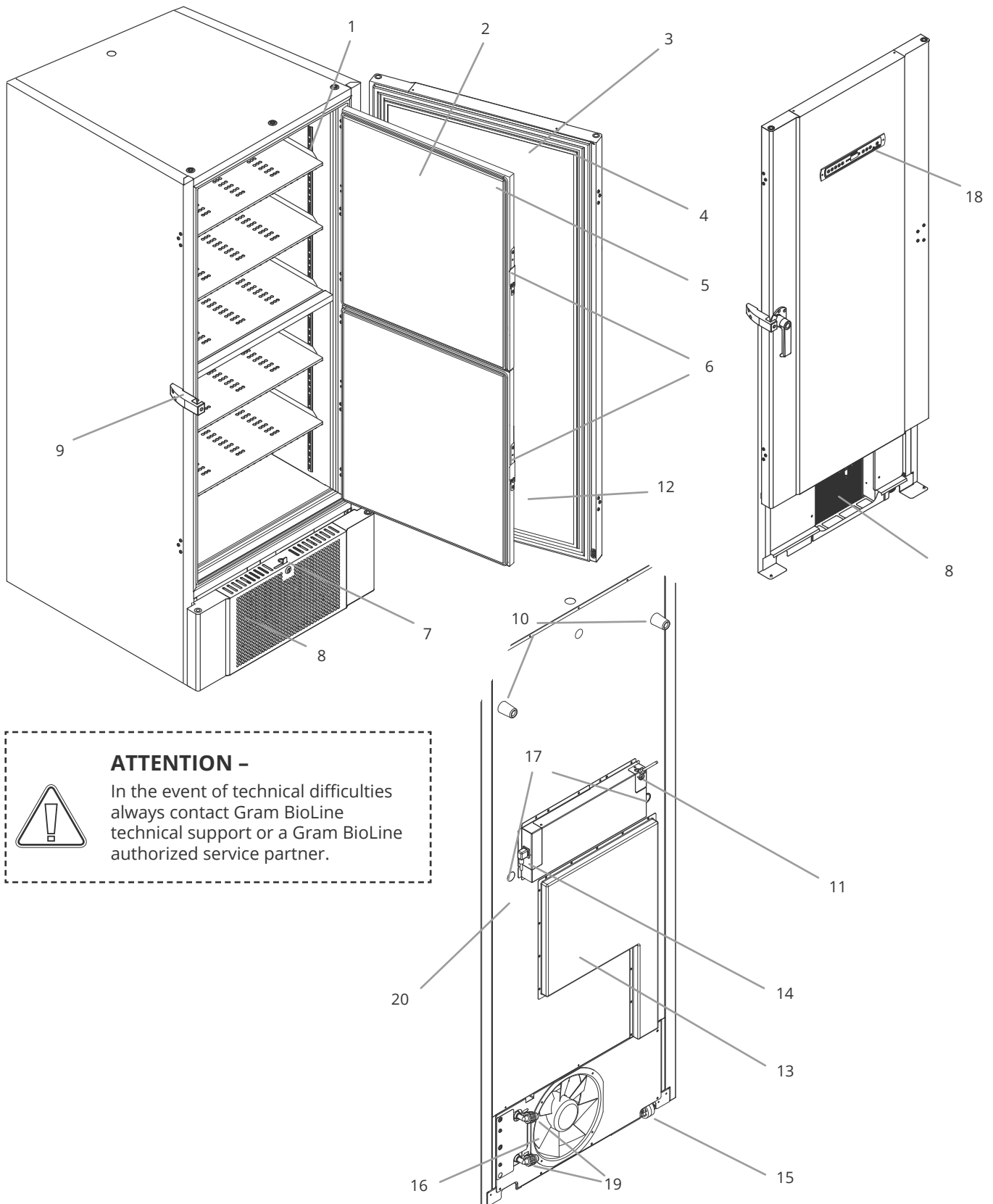|	
⚠ **Hazard**	⚡ **Risk of electric shock**
⚠ **Risk of material damage**	⚠ **Risk of personal injury**
⚠ **Risk of burning / freezing**	ⓘ **Info**
⚠ **Risk of fire /flammable materials**	Ⓔ **ATEX information**
⚠ **Risk of explosion / explosive materials**	

Cabinet components

This part describes the main components pertinent to the user.

ATTENTION –

In the event of technical difficulties always contact Gram BioLine technical support or a Gram BioLine authorized service partner.

1. **Shelves and wall rails**
   Ensure that the shelves are fixed according to this instructions for use, before exerting load on them.
   All shelves must be supported by at least 6 shelf support clips each.

2. **Inner doors**
   Ensure that the doors are closed completely after use.
   To minimise ice build up and fluctuations in temperature, make the door openings as brief as possible. The inner doors are removable for easy cleaning.

3. **Door**
   Ensure that the door is closed completely after use. To minimise ice build up and fluctuations in temperature, make the door openings as brief as possible.

4. **Gasket for door**
   Ensure that the gasket is pliable and in good working order. Keep clean, find instructions in this instructions for use.

5. **Gaskets for inner doors**
   Ensure that the gaskets are pliable and in good working order. Keep clean, find instructions in this instructions for use.

6. **Latch for inner doors**
   Ensure that inner doors are closed completely after use.
   Find instructions for operation in this instructions for use.

7. **Door lock**
   Lock to secure the door.

8. **Front panel, air intake and condenser**
   Do no cover the holes in the front panel.
   Remove the front panel to access the condenser.

9. **Door handle and backstop**
   The door handle has to be in the closed position when the door is closed. Follow instructions in this instructions for use to use the handle correctly.

10. **Rubber spacers**
    Are intended to ensure appropriate space between the cabinet and the wall. Do not remove.

11. **Access plate for voltage free contact**
    Use to connect to an external alarm system.
    Instructions for connection is found in this instructions for use. Remember to set external alarms (EAL).

12. **Pressure equalisation valve**
    Do not use as access port. Keep it as free of ice as possible.

13. **Service hatch**
    Use to access the dry filter and heat exchanger.
    Gram BioLine authorized service partner.

14. **Mains connection**
    Ensure that the hanger is mounted on the connection plug prior to start up.

15. **Leveling castors**
    The castors allow for easy positioning, with the added stationary stability of legs once deployed. Find instructions and precautions in this instructions for use.

16. **Fan exhaust**
    Do not obstruct the fan exhaust, failing to do so will lead to reduced performance or malfunction.

17. **Access port**
    Use to lead sensors and similar into the cabinet. Ensure that the access port is sealed properly prior to start up.

18. **Digital display for controller**
    Use the display to show the cabinet temperature and, to set the parameters described in this instructions for use.

19. **Inlet and outlet for water cooling (if applicable)**
    Applicable for Water cooled, and Hybrid cooled (water and air cooled) cabinets. Ensure the that there are no signs of mold or dirt before water-connection is made. Be aware that there can be droplets of test-water in the water-system.

20. **Equipotential bonding**
    To ensure compliance with ATEX regulations EN 60079-14. See installation section for specifications.

> **ATTENTION –**
> If parts show signs of damage:
> do not use cabinet and contact Gram Bioline or supplier for further aid.

Installation

Initial setup

This part of the instructions for use describes how to set up the cabinet.

ℹ
I-1*: Due to safety and operating considerations, the cabinet must not be used outdoors.
I-2*: The cabinet should be installed in a dry and sufficiently ventilated area.
I-3*: To ensure efficient operation, the cabinet should not be installed in direct sunlight or close to heat sources.
I-4*: Minimum ambient temperature: +10 °C
Maximum ambient temperature: +30 °C
Setpoint temperature: -60 °C to -86 °C

⚠ **I-5*:** Avoid placement of the cabinet in a chloric/acidic environment due to risk of corrosion.

⚠ **I-6*:** The cabinet is shipped with a protective film that should be removed prior to use.
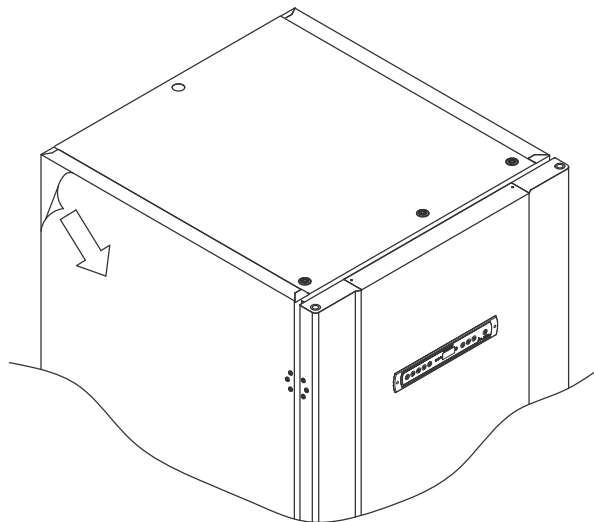
⚠ **I-7*:** Clean the cabinet with a mild soap solution prior to use.

⚠ **I-8*:** The cabinet is only allowed to lay down for very short durations (for instance handling through a doorway). If the cabinet has been laying down, the cabinet must stand up-right for at least 24 hours prior to use.
This enables oil in the compressors to run back into place.

⚠ **WARNING – POTENTIAL ELECTROSTATIC CHARGING HAZARD**
Removing protective packaging and film may cause electrostatic discharge. protective packaging and film shall not be removed in ATEX zones.

This part of the instructions for use describes how to adjust the levelling castors on the cabinet.

I-10*: All BioUltra cabinets are equipped with multifunctional levelling castors.
These allow for easy positioning, with the added stationary stability of legs once deployed.
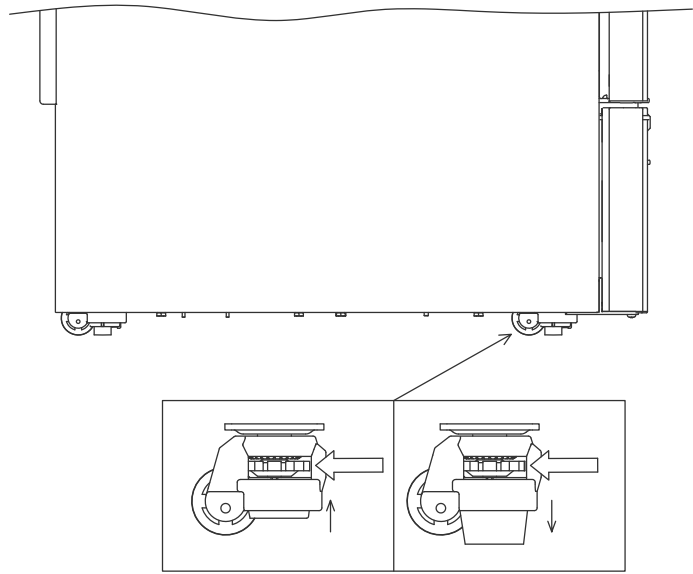
Turn the dial to either raise or lower the legs. Raising all four legs, makes it possible to move the cabinet unhindered.

Remember to disconnect cabinet from power supply before moving it.

I-9*: When the cabinet is positioned, ensure that at least two of the legs of the cabinet are deployed.

All lifting of the cabinet must be done by mechanical lifting equipment. Lifting by hand can result in injury.

ATTENTION –

I-11*: A visual inspection of the cabinet must be conducted prior to putting the cabinet into service. Check the cabinets structural integrity, that door frames and doors don't have deformities, that gaskets seal properly and that the doors sit flush up against the door frame.

): Paragraph designation (I-1, I-2 etc) refers to the IQ (Installation Qualification)

Surroundings

⚠️ **I-12-13*:** The cabinet must always be placed minimum 50 mm from the wall while in use. Allowing warm exhaust from the compressor room to dissipate. And at least a 30 mm between cabinet sides and or/ walls.

≥ 30 mm

≥ 50 mm

*): Paragraph designation (I-1, I-2 etc) refers to the IQ (Installation Qualification)
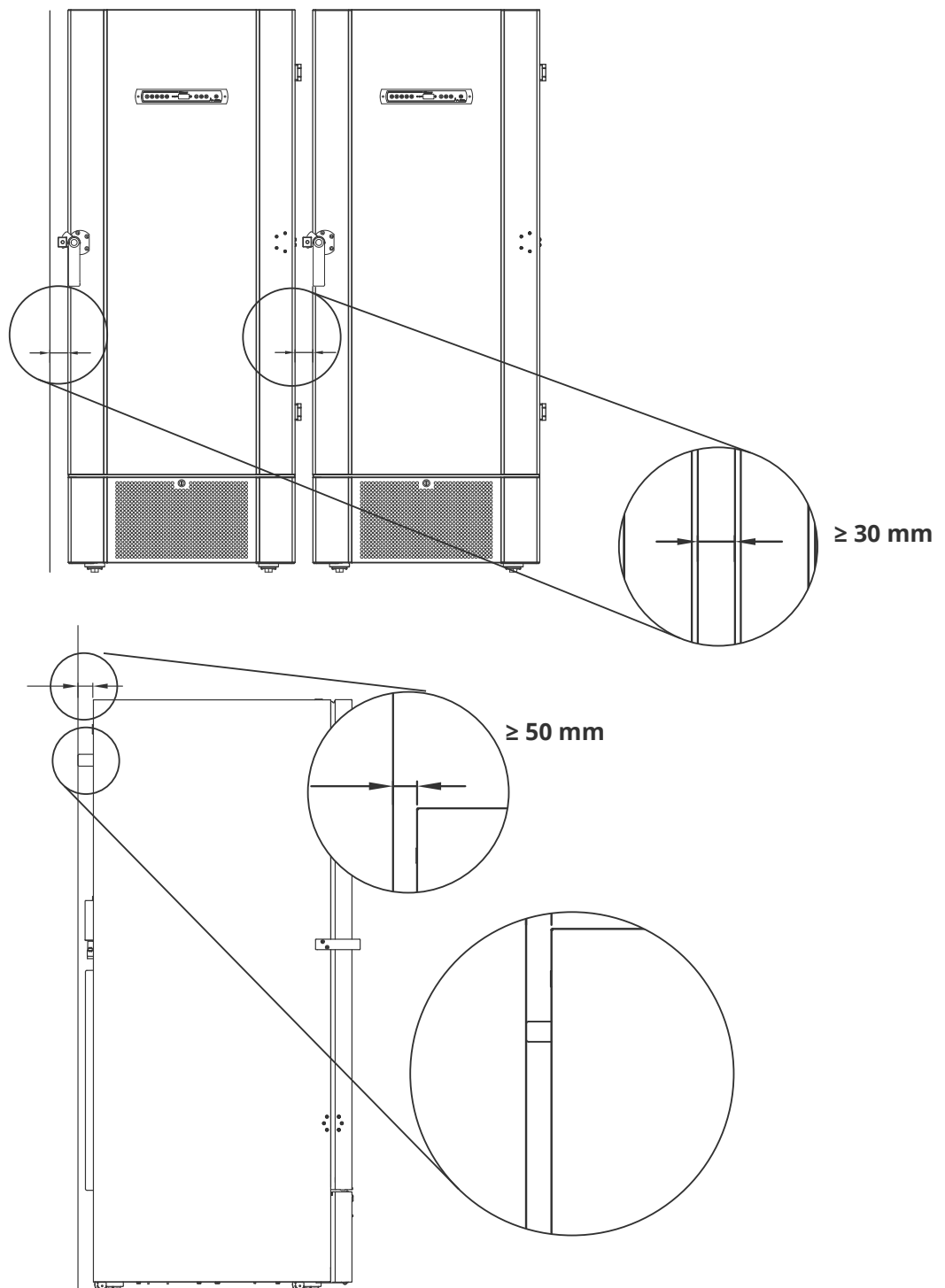
I-14*: Do not cover the holes in the front panel of the cabinet.

I-15*: Do not use electrical appliances inside the cabinet.

The cabinet is not suited for storing items that emit vapours, as they might corrode the cabinet and its components.

All items in the cabinet that are not encapsulated, or wrapped, should be covered to reduce the risk of corrosion of the cabinet and its components.

For Ex environments –
Open containers inside the storage chamber may impact the ATEX Zone classification

For Ex environments –
Special conditions for safe use may apply to this product when installing in an EN 60079-14 environment. Please see corresponding Ex certificate for specifications.

Do not remove the rubber spacers on the back of the cabinet, as they ensure the minimum required distance from the fan exhaust to the wall.

*): Paragraph designation (I-1, I-2 etc) refers to the IQ (Installation Qualification)

Mounting of shelves

This part of the instructions for use covers mounting and rearranging of the shelving in the cabinet.
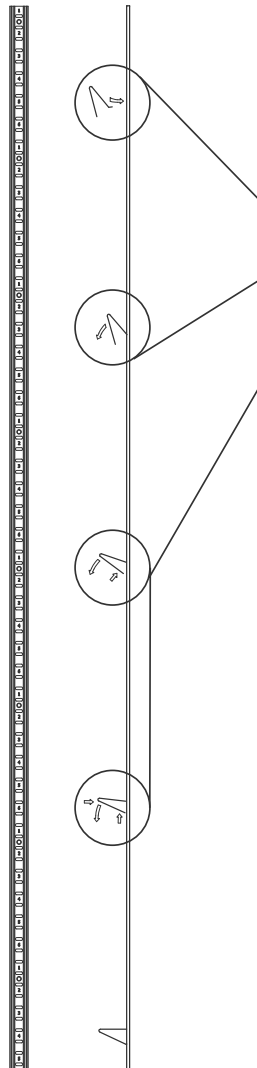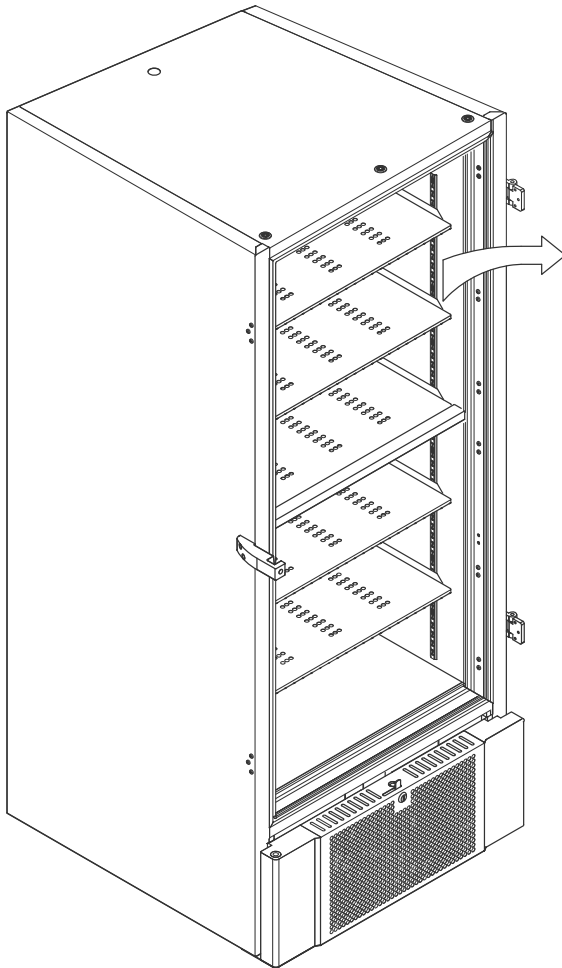
I-16*: Mount the shelf support clips to the wall rails, using the numbering on the wall rails to determine the right shelf height. Finally placing the shelf on the supports. Please note that the pronounced lip on the shelf must face outwards, as shown in the illustration.

Mount the clip by firstly slotting the protrusion on the horizontal part of the clip into the wall rail. While the protrusion is cradled in position, turn the clip down and inwards.

When turning the clip downwards, compress the diagonal strut of the clip, thereby allowing the protrusion on the diagonal strut to rest in the appropriate hole on the wall rail.

After mounting the shelf support clips, lay the shelf on top of the clips.

Ensure that the shelf is safely mounted before exerting load on them.

All shelves must be supported by at least 6 shelf support clips each.

Touching any part of a cold cabinet with wet hands can cause frost burns.

Changing the interior configuration must only be conducted when the cabinet is turned off, and when the cabinet is at room temperature

*): Paragraph designation (I-1, I-2 etc) refers to the IQ (Installation Qualification)

Correct use of outer door handle

This part covers the correct use of the outer door handle.
Read the following part thoroughly before using the cabinet.

ⓘ **I-17*:** It is important for safe operation and performance that the door is closed entirely when items in the cabinet are not being accessed.

⚠ Do not slam the door, as this can cause material damage.

⚠ A vacuum can be created in the storage space after closing the door, please allow the cabinet to equalise in pressure before attempting to open the door again. Attempting to open the door before adequate equalisation can result in material damage.

⚠ Ensure that there is a proper seal between gasket and door frame when the door is closed and the handle is in the closed position.

⚠ The outer door handle must not be closed before securing that the inner doors are closed correctly.
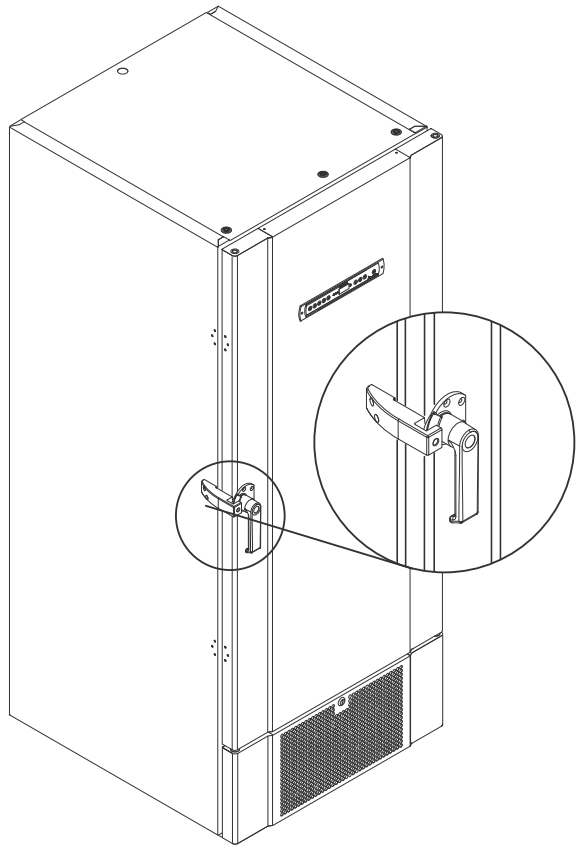
ⓘ Please note that the door is not fully closed until the handle is pointing down, as shown in the illustration below.
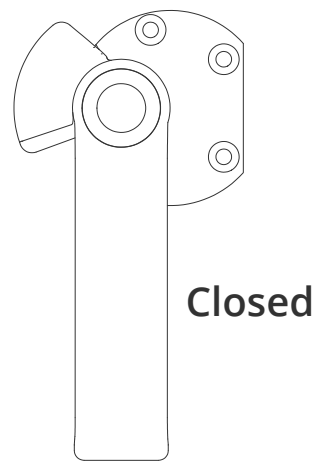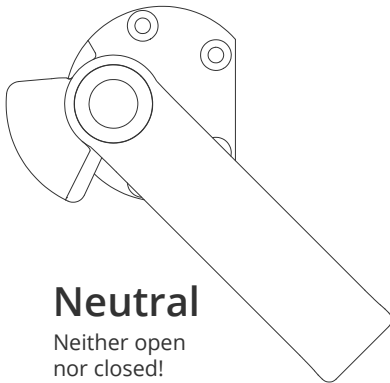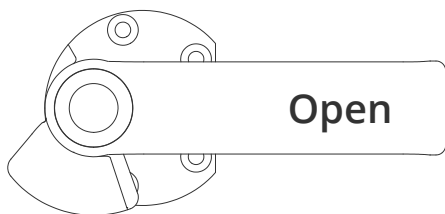
Open

Neutral
Neither open nor closed!

Closed

*): Paragraph designation (I-1, I-2 etc) refers to the IQ (Installation Qualification)

Correct use of inner door handles

This part covers the correct use of the inner door handles. Read the following part thoroughly before using the cabinet. The inner doors are designed to operate, close and mount/unmount independently.
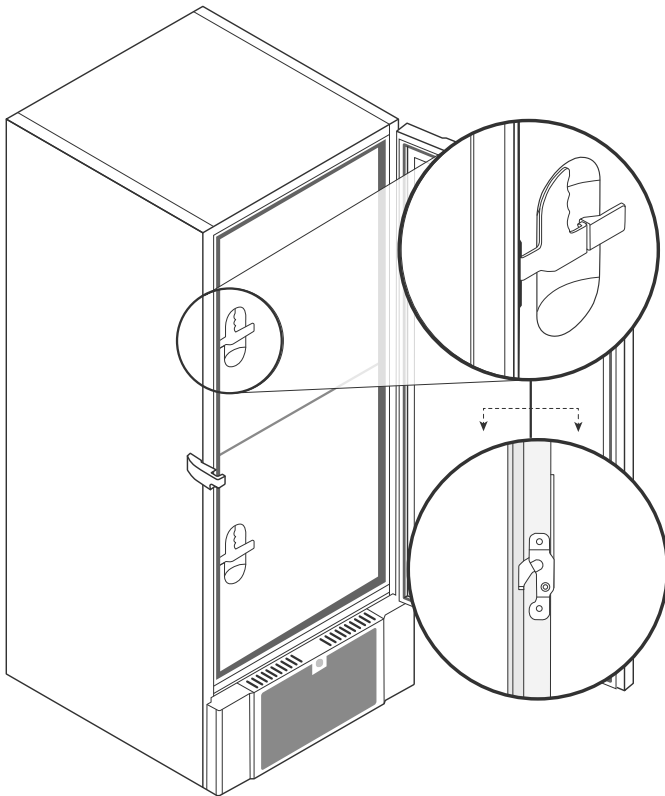
I-18*: The inner doors are locked when the door lever clicks in place and sits flush up against the inner door.

The illustration on the left shows the inner doors in the closed position.

The inner doors are opened by pulling the door lever straight downwards until the door latch disengages, then open the door normally.

The illustration below shows the process of opening an inner door.
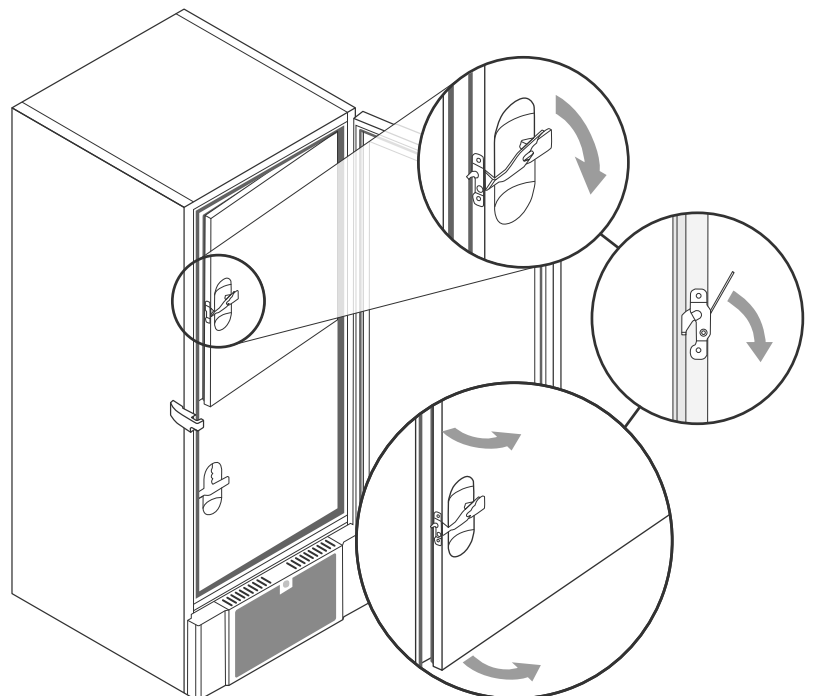
Always ensure that the door gaskets are in good condition. And that the different gaskets seal properly.

Voltage-free contact

This part of the instructions for use covers the voltage-free contact.

The illustration below shows the three connectors for the relay (used f.ex. in connecting to CTS or other external alarm systems). The three connections, are respectively. Common, NO and NC.

The moment when voltage is applied the controller draws the relay, this makes it possible for the controller to respond to both high and low temperature alarms and power failures. Temperature alarms must be configured in the external alarm settings (EAL) before they will activate the voltage-free contact. Find instructions on setting external alarms in the Parameter settings section.

The wires that are connected to the connection block for the voltage-free contact, are secured in place by a cable tension relief and a securing plate that is screwed in place. This secures that there is no tension on the connection block and prevents access to the electrical circuit.

Connection of the voltage-free contact should be done by a qualified installer.

Normally closed circuit (NC)
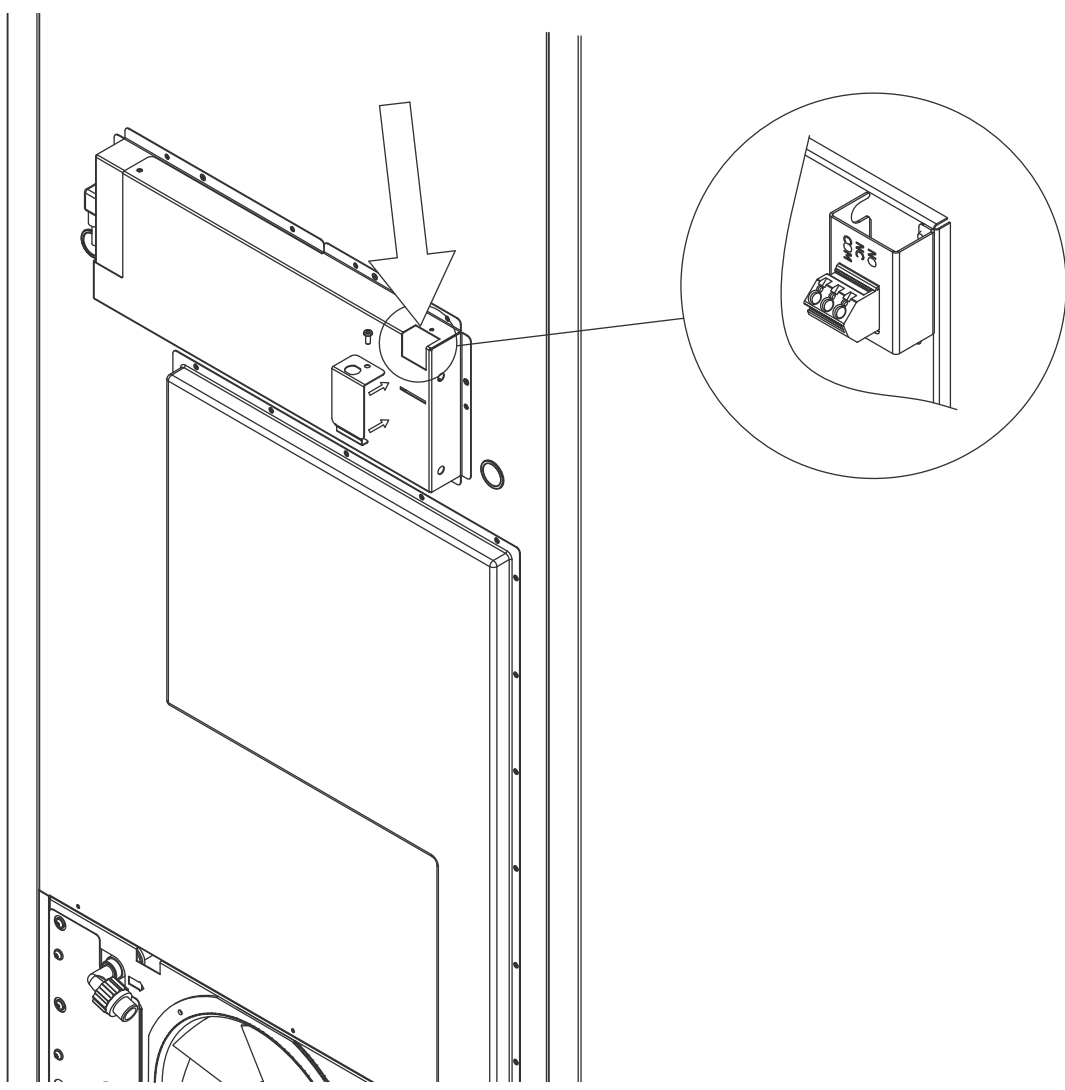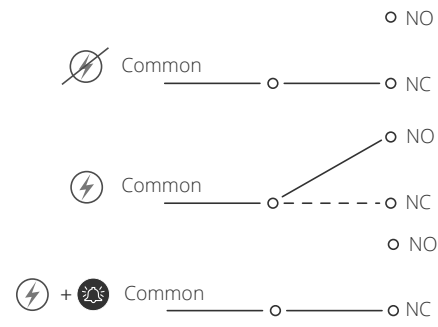
Connection to power

Read the following part thoroughly before connecting the cabinet. Contact a qualified electrician if in doubt.

I-19*: **When setting up in an ordinary scenario that is not subject to regulations for EN 60079-15 zone 2:**
The appliance may be connected in accordance with applicable local heavy current regulations.
Note that there are special regulations for products that are in accordance with EN 60079-15 zone 2 and EN 60079-14: Explosive atmospheres – Electrical installations design, selection and erection.

The appliance has been manufactured in accordance with EN 60079-15: Electrical apparatus for explosive gas atmospheres – Part 15: Type of protection II 3G Ex ec nC ic IIB Tx Gc. Zone 2 is the applicable zone. If the appliance is to be installed in a zone 2 environment, specialist personnel should perform the installation, or be consulted beforehand, in order to ensure that the appliance is installed in compliance with the guidelines currently contained in the standard.

The cabinet is intended for connection to alternating current. The connection values for voltage (V) and frequency (Hz) are given on the type/number-plate.

I-20*: The power cord from the mains is plugged in the terminal box on the back of the cabinet. The plug is then fixated in place by the hanger that is built into the terminal box. Please note that the hanger should be fitted tightly around the plug, as shown.
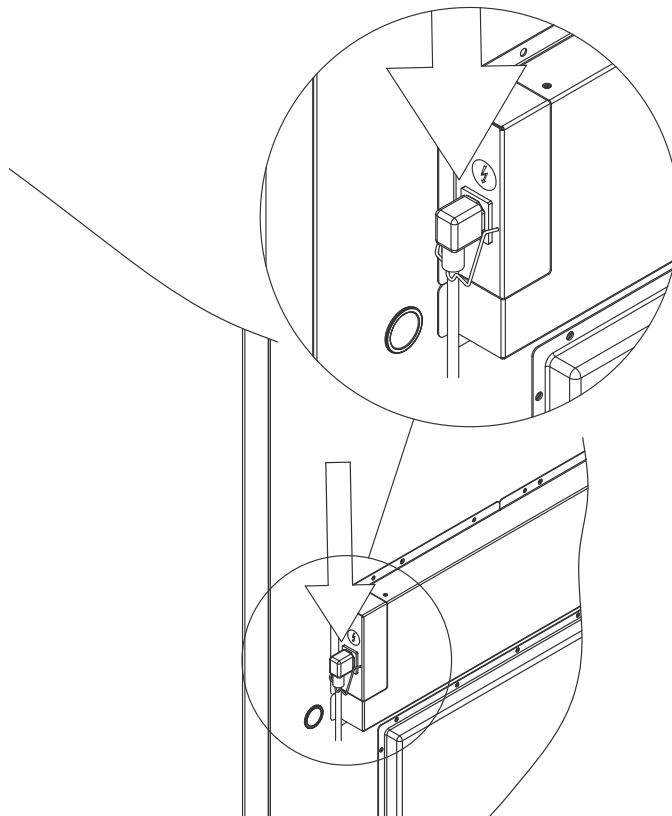
The appliance must be connected to the external power supply using a suitable device which mechanically prevents the plug and socket from being separated unintentionally.

I-21*: The connection must be labelled: **"DO NOT SEPARATE WHEN ENERGIZED"**

*): Paragraph designation (I-1, I-2 etc) refers to the IQ (Installation Qualification)

ATTENTION

Fuses and similar must never be removed or replaced while the appliance is connected to a power source.

The electrical terminal box must never be opened while the appliance is connected to a power source.

The compressor starting equipment must never be dismantled while the appliance is connected to a power source.

Whenever electrical components are dismantled or replaced, the appliance must be moved to an area in which there is no risk of ignition caused by the electrical components or gases contained in the appliance.

Never use the cabinet if the plug is damaged. The cabinet should be examined by a Gram BioLine service technician in such cases.

When setting up in an ordinary scenario that is not subject to regulations for Zone 2:

The appliance may be connected in accordance with applicable local heavy current regulations.

In both cases:
Use a three-wire plug, if the power outlet is intended for a three-wire plug, a the lead in green / yellow insulation should be connected to the ground terminal.

Power must be connected via a wall socket. The wall socket should be easily accessible.

All earthing requirements stipulated by the local electricity authorities must be observed. The cabinet plug and wall socket should then give correct earthing. If in doubt, contact your local supplier or authorized electrician.

Technical Support –
In the event of technical difficulties always contact Gram BioLine technical support or a Gram BioLine authorized service partner. Never dismantle the terminal box or any other electrical component.

For Ex environments –
Special conditions for safe use may apply to this product when installing in an EN 60079-14 environment.
Please, see corresponding Ex certificate for specifications.

Equipotential bonding

This part of the instructions equipotential bonding

For installation in ATEX Cat. 3 Zone 2 areas, it is mandatory to have a equipotential bonding, it is not sufficient to use protective earth through the mains connection.

To secure equipotential bonding of the unit – the mounted external bonding conductor must be used in accordance with national installation requirements e.g. EN 60079-14.

- Mounting of the bonding conductor should be done according to the following illustrations.

- Please find location for connection facilities on the back of the cabinet marked with:
  "Attention – Equipotential bonding".

- The bonding conductor should be at least 4 mm2 guage.

- Use a ring terminal to ensure adequate bonding.

- Use the supplied M5 machine screw and washer to attach the bonding conductor to the cabinet. Tighten the machine screw to 3.2 Nm.

Bonding of the cabinet is illustrated on this page.

3.2 Nm
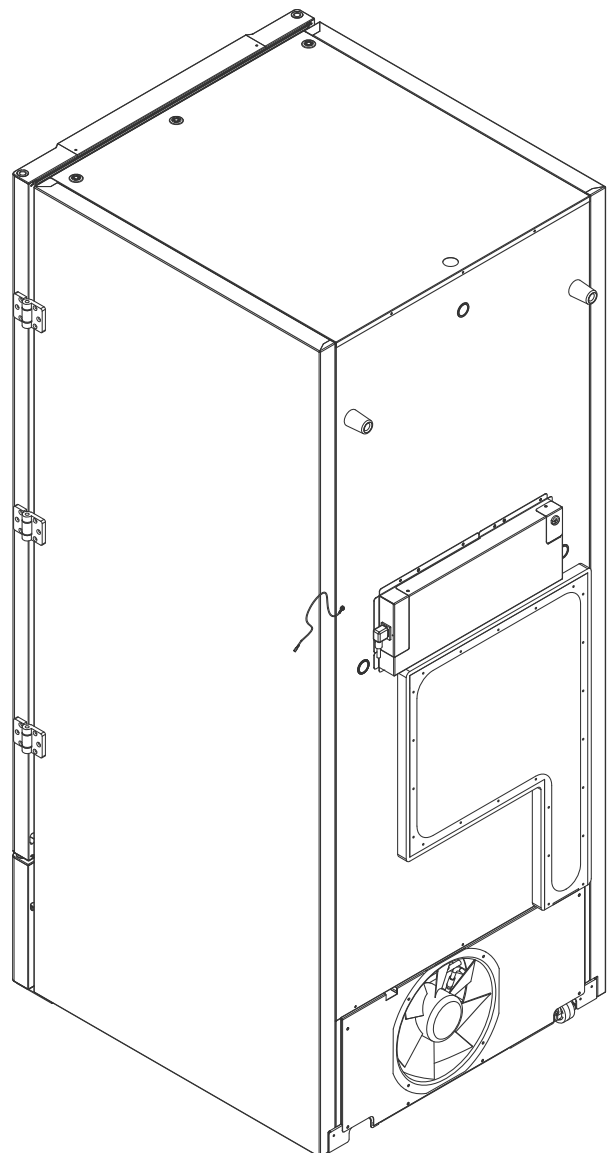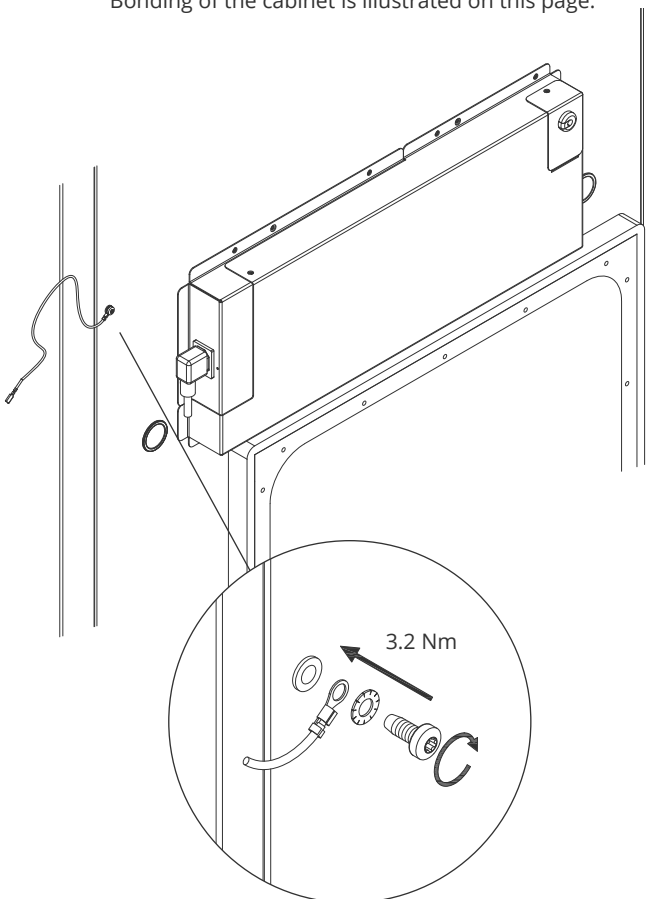
ATTENTION –
Please note, this location is the only manufacturerer-approved location for Equipotential bonding.

Connection to water supply

Applicable for water cooled and hybrid cooled (air and water cooled) cabinets.
When performing the regular maintenance on the cabinet, please check all connections for the water-cooling system and make sure there are no leaks.

Water cooled or hybrid cooled means that a cabinet is connected to a water supply whereby the heat generated from the cabinet is carried away by the facility process water distribution system for utilisation in other parts of the facility. As added safety the hybrid cooled has an air-cooled condenser in the event of malfunction of the facility process water supply.

For connection to the water supply please use the inlets/outlet illustrated below. Please be aware of the direction of feed in/out according to illustration below.

Connection of the water supply must be done by a qualified installer and made in accordance with local legislation and guidelines.

Interfaces for water connection is ½" pipes with external metric coarse thread (male).

The recommended temperature of the water supply should be from +12 °C to +7 °C, and maximum 30 °C.

The recommended water flow pressure is 0.5 to 1 bar. Maximum operating water pressure must not exceed 10 bar.

Recommended particle size in water may not be greater than 1 mm (0.04 inch). A strainer with size of 16-20 mesh (number of openings per inch) shall be installed before the inlet to protect the cabinet and its functionality.

Outlet

Inlet
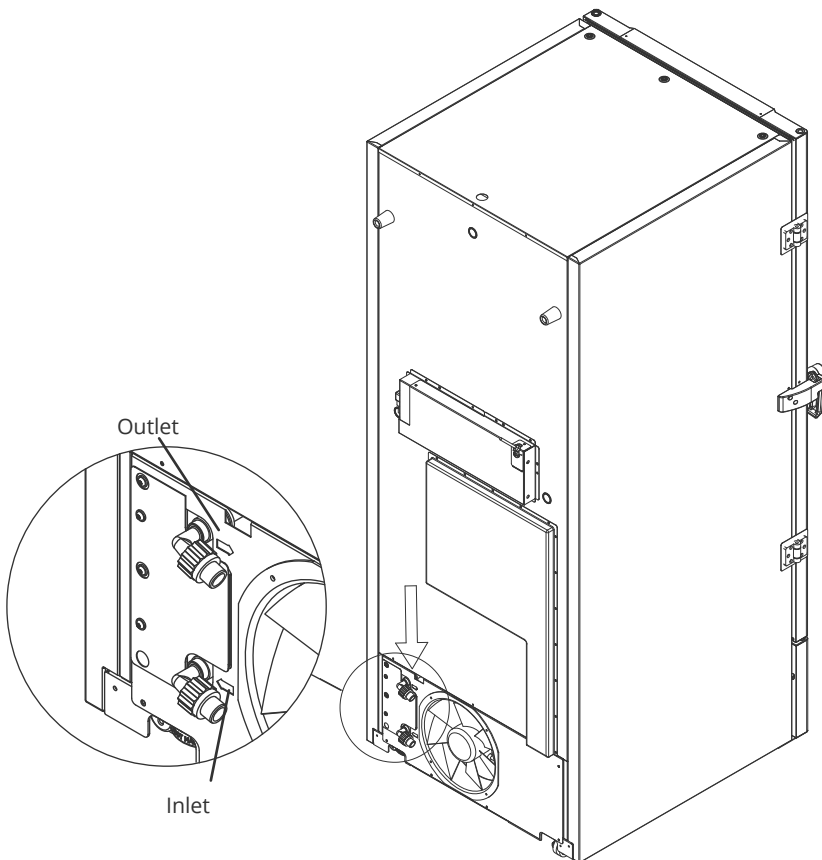
ATTENTION

When connected to the water supply the cabinet must not be moved.
Please be aware, water leaks must not occur.

Start-up

The digital display

The digital display depicted below, shows the cabinets temperature and indicates if the cabinet is connected to a power source.

Parameter setting

Defrost

N/A

N/A

Key pad lock

Temperature setting
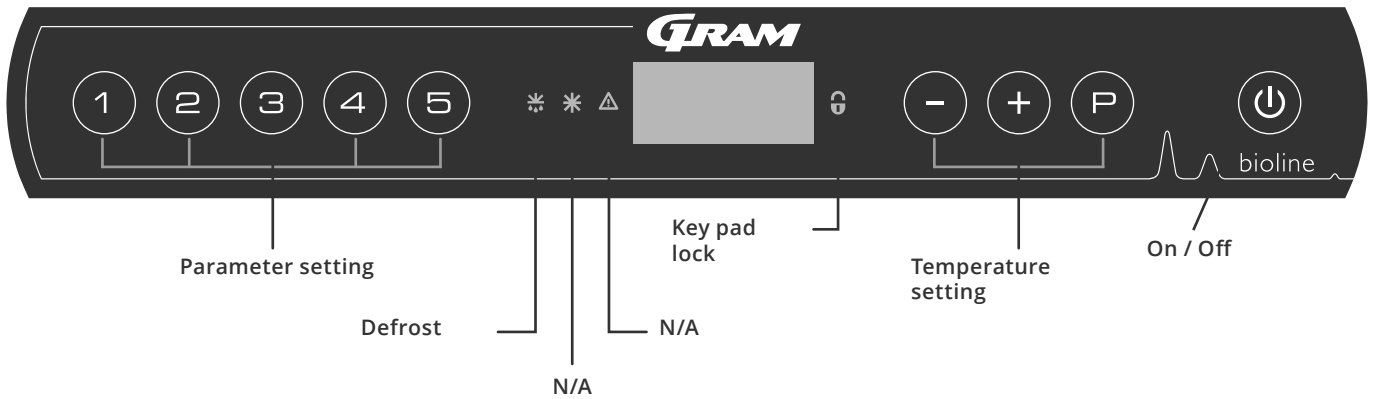
On / Off

O-1*: On / Off

Press ⏻ to turn the cabinet on. Press ⏻ for 6 seconds to turn the cabinet off. The software version of the cabinet will be shown when turning the cabinet on, followed by the software variant. The cabinet is ready when the temperature is displayed.

The cabinet will always commence operation when initially connected to a power supply. For instance after a power outage or when plugging the cabinet in for the first time.

> **ATTENTION –**
>
> Make sure the cabinet is switched off at the socket before service is performed on electrical parts.
>
> It is not sufficient to switch off the cabinet on the ⏻ key, as current will persist in some electrical parts of the cabinet. If fuses or similar are to be replaced, the cabinet must be moved to a no-risk area.

> **For Ex environments –**
>
> DO NOT OPEN, MAINTAIN OR SERVICE IN AN AREA WHEN AN EXPLOSIVE ATMOSPHERE IS PRESENT

> **ATTENTION –**
>
> High and low temperature alarms set up in the cabinets' controller (including EAL alarms) must be accompanied by additional redundant independent external alarms to ensure maximum item safety.

- **Parameter setting**
  Gives access to the cabinets configurable parameters, such as alarms, test program and sensor values.

- **Defrost**
  Defrost in progress on heat exchanger.

- **Key pad lock**
  Keypad is locked, no access to functions or menus.

- **Temperature setting**
  Setting of temperature setpoint and navigation in the menus.

- **On / Off**
  Turn the cabinet On or Off, and navigation in the menus.

O-2*: Temperature setting

Temperature adjustments are done by holding Ⓟ and pressing either ⊕ or ⊖. Confirm the settings by letting go of the buttons.

All-round introduction to navigating the menu

Beyond setting the temperature and on/off, Ⓟ, ⊕, ⊖ and ⏻ is used to navigate the menus and set the parameters for the cabinet.

The buttons have following functions in the menus:

Ⓟ   Open a menu step / confirm a set value in the parameter settings.

⊕   Scroll upwards in a given menu / raise a given value in parameter settings (alarm limit for instance).

⊖   Scroll downwards in a given menu / lower a given value in parameter settings (alarm limit for instance).

⏻   Go a menu step back.

Walkthrough of menu

The menu below gives a quick overview of the parameter settings for the cabinet.

User menu

Menu Access (P) + (1) ⇥	⤵	⇥		
Local alarm settings	LAL	LHL	[° C]	Upper alarm limit. Code for activated alarm [A2]
		LLL	[° C]	Lower alarm limit. Code for activated alarm [A3]
		LHd	[Min.]	Delay of upper alarm limit
		LLd	[Min.]	Delay of lower alarm limit
		bU	On/off	Acoustic signal for alarm codes [A2] and [A3]. [1=on / 0=off]
External alarm settings	EAL	EHL	[° C]	Upper alarm limit. Code for activated alarm [A4]
		ELL	[° C]	Lower alarm limit. Code for activated alarm [A5]
		EHd	[Min.]	Delay of upper alarm limit
		ELd	[Min.]	Delay of lower alarm limit
		bU	On/off	Acoustic signal for external alarm codes [A4], [A5]. [1=on / 0=off]
Offset of sensors	CAL	CA	[° K]	Offset of A-sensor. Reference sensor for the refrigeration system
		CE	[° K]	Offset of E-sensor. Reference sensor for the display and alarms
	ALL		Activation of escorted alarm limits. [FAS]= locked limits / [ESC] = follows setpoint	
	dPS		Reference sensor for the display (A or E) (E is factory setting)	

Other Shortcuts

Buttons:	Duration:	Function:
(P) + (⏻)	> 3 seconds	Start or stop a defrost of heat exchanger
(⏻) + (1)	> 6 seconds	Activating / deactivating the key pad lock
(P)	-	Shows temperature setpoint value
(+)	-	Shows the highest registered temperature spike (since the last reset alarm history)
(−)	-	Shows the lowest registered temperature spike (since the last reset alarm history)
(+) + (−)	> 3 seconds	Reset alarm history
(P) + (1) + (3)	> 6 seconds	Reset of set parameters. Restores factory settings
(P) + (1)	> 3 seconds	Access to user menu and alarm settings

Error codes

The following table covers the different error codes that might occur

Display code	Explanation:
A2	Local upper alarm LHL is or has been activated
A3	Local lower alarm LLL is or has been activated
A4	External upper alarm EHL is or has been activated
A5	External lower alarm ELL is or has been activated
F1	Error on the main cabinet sensor. The refrigeration system will use an emergency program to make the cabinet run. Temperature stability will be affected. Service is required
F2	Error on the evaporator sensor. Service is required. NOTE: F2 fault can occur at start-up. Please ignore for 10-15 minutes.
F3	Error on the 1. condenser sensor. Service is required
F5	Error on the extra sensor. Service is required
F7	F7 indicates that the temperature of the condenser is too high. Turn off the cabinet and check that the condenser is not covered by undesirable items, and insure that the condenser (and possibly filter) is clean. Service is required if the problem is not alleviated
F8	Over pressure safety switch has triggered by excessive pressure in the LT cooling system

Examples of alarms

Acknowledge an acoustic alarm

Temperature alarm codes A2 and/or A3: Flashes in the display. Press (P) to acknowledge.
The display will continue to flash if the temperature is outside the alarm limits.

Latching alarms: A2, A3, A4, A5

Due to the potential implications of alarms, the red alarm triangle icon will turn on along with the corresponding alarm code will flash in the display. The alarm state will remain on until acknowledged by pressing (P).

Reading the alarm history – Example [A2]

[A2] flashes in the display – The temperature has exceeded the set value for the upper temperature limit, LHL.

Press (P) to acknowledge the [A2]. The display continues to flash, indicating that there is information in the alarm history. Press (+), Htt (High temperature time) is shown, press (P) to see for how long the temperature was above the set alarm limit. Press (⏻) to return to Htt. Press (+) to reach Ht (Highest temperature). Press (P) to read the highest recorded temperature during Htt. Press (⏻) to return to Ht and press (⏻) again to leave the alarm history.

The procedure for reading an [A3] alarm is identical, apart from entering the alarm history with (−). When reading out temperatures below set limits, the parameters are Ltt and Lt.

A flashing display with no alarm codes indicates that the alarm codes have been acknowledged, but the alarm history contains information.

Resetting Max/Min and alarm history

Resetting of the Max/Min and alarm history is done by holding (−) and (+) for more than 3 seconds, an acoustic signal will be given when reset is complete.

Local alarms

Local high alarm
Local low alarm

The following part covers the setting of upper and lower temperature alarm limits.

O-3*:   LHL – Setting the upper alarm limit [° C]

↳   Press and hold ⓟ + ① for more than 3 seconds. "LAL" is shown in display

↳   Press ⓟ to select "LAL". "LHL" is now shown in the display

↳   Press ⓟ to select "LHL". The upper alarm limit is now shown in the display

↳   Press ⊕ or ⊖ to set the desired value for the upper alarm limit

↳   Press ⓟ to confirm the set value

– The upper alarm limit is now set, proceed to other parameters by pressing ⏻, and then navigate by using ⊕ or ⊖.

↳   Leave the user menu by pressing ⏻ several times until the cabinet temperature is shown in the display

O-4*:   LLL – Setting the lower alarm limit [° C]

↳   Press and hold ⓟ + ① for more than 3 seconds. "LAL" is shown in display

↳   Press ⓟ to select "LAL". "LHL" is now shown in the display

↳   Press ⊕ to proceed to "LLL"

↳   Press ⓟ to select "LLL". The lower alarm limit is now shown in the display

↳   Press ⊕ or ⊖ to set the desired value for the lower alarm limit

↳   Press ⓟ to confirm the set value

– The lower alarm limit is now set, proceed to other parameters by pressing ⏻, and then navigate by using ⊕ or ⊖.

↳   Leave the user menu by pressing ⏻ several times until the cabinet temperature is shown in the display

⚠ **ATTENTION –**
High and low temperature alarms set up in the cabinets' controller (including EAL alarms) must be accompanied by additional redundant independent external alarms to ensure maximum item safety.

*): Paragraph designation (O-1, O-2 etc) refers to the OQ (Operation Qualification)

Local high alarm delay
Local low alarm delay

The following part covers the setting of the delay for the local upper and lower temperature alarm limits.

O-5*: LHd – Setting the delay of the local upper alarm limit [min.]

↳ Press and hold ⓟ + ① for more than 3 seconds. "LAL" is shown in display

↳ Press ⓟ to select "LAL". "LHL" is now shown in the display

↳ Press ⊕ several times until "LHd" is shown in the display

↳ Press ⓟ to select "LHd". The delay of the upper alarm limit is now shown in the display

↳ Press ⊕ or ⊖ to set the desired value for the delay of the upper alarm limit

↳ Press ⓟ to confirm the set value

– The delay of the upper alarm limit is now set, proceed to other parameters by pressing ⏻, and then navigate by using ⊕ or ⊖.

↳ Leave the user menu by pressing ⏻ several times until the cabinet temperature is shown in the display

O-6*: LLd – Setting the delay of the local lower alarm limit [min.]

↳ Press and hold ⓟ + ① for more than 3 seconds. "LAL" is shown in display

↳ Press ⓟ to select "LAL". "LHL" is now shown in the display

↳ Press ⊕ several times until "LLd" is shown in the display

↳ Press ⓟ to select "LLd". The delay of the lower alarm limit is now shown in the display

↳ Press ⊕ or ⊖ to set the desired value for the delay of the lower alarm limit

↳ Press ⓟ to confirm the set value

– The delay of the lower alarm limit is now set, proceed to other parameters by pressing ⏻, and then navigate by using ⊕ or ⊖.

↳ Leave the user menu by pressing ⏻ several times until the cabinet temperature is shown in the display

⚠ **ATTENTION –**
High and low temperature alarms set up in the cabinets' controller (including EAL alarms) must be accompanied by additional redundant independent external alarms to ensure maximum item safety.

*): Paragraph designation (O-1, O-2 etc) refers to the OQ (Operation Qualification)

Local acoustic settings

The following part covers the setting of the acoustic local alarms.

O-7*: bU – Activation / deactivation of the acoustic local alarms

↳ Press and hold (P) + (1) for more than 3 seconds. "LAL" is shown in display

↳ Press (P) to select "LAL". "LHL" is now shown in the display

↳ Press (+) several times until "bU" is shown in the display

↳ Press (P) to select "bU".

↳ Press (+) or (−) to activate / deactivate the local acoustic alarms [1 = activated / 0 = deactivated]

↳ Press (P) to confirm the set value

– The local acoustic alarms is configured, proceed to other parameters by pressing (⏻), and then navigate by using (+) or (−).

↳ Leave the user menu by pressing (⏻) several times until the cabinet temperature is shown in the display

ATTENTION –

High and low temperature alarms set up in the cabinets' controller (including EAL alarms) must be accompanied by additional redundant independent external alarms to ensure maximum item safety.

*): Paragraph designation (O-1, O-2 etc) refers to the OQ (Operation Qualification)

External alarms

External high alarm
External low alarm

The following part covers the setting of upper and lower external temperature alarm limits.

O-8*:   EHL – Setting the external upper alarm limit [° C]

↳   Press and hold (P) + (1) for more than 3 seconds. "LAL" is shown in display

↳   Press (+) several times until "EAL" is shown in the display

↳   Press (P) to select "EAL". "EHL" is now shown in the display

↳   Press (P) to select "EHL". The external upper alarm limit is now shown in the display

↳   Press (+) or (–) to set the desired value for the external upper alarm limit

↳   Press (P) to confirm the set value

– The external upper alarm limit is now set, proceed to other parameters by pressing (⏻), and then navigate by using (+) or (–).

↳   Leave the user menu by pressing (⏻) several times until the cabinet temperature is shown in the display

O-9*:   ELL – Setting the external lower alarm limit [° C]

↳   Press and hold (P) + (1) for more than 3 seconds. "LAL" is shown in display

↳   Press (+) several times until "EAL" is shown in the display

↳   Press (P) to select "EAL". "EHL" is now shown in the display

↳   Press (+) to proceed to "ELL"

↳   Press (P) to select "ELL". The external lower alarm limit is now shown in the display

↳   Press (+) or (–) to set the desired value for the external lower alarm limit

↳   Press (P) to confirm the set value

– The external lower alarm limit is now set, proceed to other parameters by pressing (⏻), and then navigate by using (+) or (–).

↳   Leave the user menu by pressing (⏻) several times until the cabinet temperature is shown in the display

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ATTENTION –
High and low temperature alarms set up in the cabinets' controller (including EAL alarms) must be accompanied by additional redundant independent external alarms to ensure maximum item safety.

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*): Paragraph designation (O-1, O-2 etc) refers to the OQ (Operation Qualification)

External high alarm delay
External low alarm delay

The following parts covers the setting of the delay of the external upper and lower alarms.

O-10*: EHd – Setting the delay of the external upper alarm limit [min.]

↳   Press and hold (P) + (1) for more than 3 seconds. "LAL" is shown in display

↳   Press (+) to proceed to "EAL"

↳   Press (P) to select "EAL". "EHL" is now shown in the display

↳   Press (+) several times until "EHd" is shown in the display

↳   Press (P) to select "EHd". The external delay of the upper alarm limit is now shown in the display

↳   Press (+) or (–) to set the desired value for the external delay of the upper alarm limit

↳   Press (P) to confirm the set value

– The delay of the external upper alarm limit is now set, proceed to other parameters by pressing (⏻), and then navigate by using (+) or (–)

↳   Leave the user menu by pressing (⏻) several times until the cabinet temperature is shown in the display

O-11*: ELd – Setting the delay of the external lower alarm limit [min.]

↳   Press and hold (P) + (1) for more than 3 seconds. "LAL" is shown in display

↳   Press (+) to proceed to "EAL"

↳   Press (P) to select "EAL". "EHL" is now shown in the display

↳   Press (+) several times until "ELd" is shown in the display

↳   Press (P) to select "ELd". The delay of the external lower alarm limit is now shown in the display

↳   Press (+) or (–) to set the desired value for the delay of the lower alarm limit

↳   Press (P) to confirm the set value

– The delay of the external lower alarm limit is now set, proceed to other parameters by pressing (⏻), and then navigate by using (+) or (–)

↳   Leave the user menu by pressing (⏻) several times until the cabinet temperature is shown in the display

> ⚠ **ATTENTION –**
> High and low temperature alarms set up in the cabinets' controller (including EAL alarms) must be accompanied by additional redundant independent external alarms to ensure maximum item safety.

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External acoustic settings

The following part covers the setting of the acoustic external alarms.

O-12*: bU – Activation / deactivation of the acoustic external alarms

↳   Press and hold ⓅＰ + ①１ for more than 3 seconds. "LAL" is shown in display

↳   Press ⊕ to proceed to "EAL"

↳   Press Ⓟ to select "EAL". "EHL" is now shown in the display

↳   Press ⊕ several times until "bU" is shown in the display

↳   Press Ⓟ to select "bU"

↳   Press ⊕ or ⊖ to activate / deactivate the external acoustic alarms [1 = activated / 0 = deactivated]

↳   Press Ⓟ to confirm the set value

– The external acoustic alarms is configured, proceed to other parameters by pressing ⓤ, and then navigate by using ⊕ or ⊖.

↳   Leave the user menu by pressing ⓤ several times until the cabinet temperature is shown in the display

⚠ **ATTENTION –**
High and low temperature alarms set up in the cabinets' controller (including EAL alarms) must be accompanied by additional redundant independent external alarms to ensure maximum item safety.

): Paragraph designation (O-1, O-2 etc) refers to the OQ (Operation Qualification)

Parameter settings

Sensor offset

The following part covers the offsetof the A- and E-sensor.

O-13*: The temperature sensors connected to MPC controller can be off-set independently of each other in the parameter cAL. Offset is used in cases where there are deviations in the cabinets actual temperature compared to the temperature shown in the display and / or control measurements by independent temperature monitoring.

The cabinet is equipped with a sensor (A-sensor) and an extra sensor (E-sensor).

The A-sensor is used to manage the cabinets refrigeration system
and is fixated in a given position in the cabinet. The location of the A sensor must not be altered.

The E-sensor is placed in the cabinet storage space. The E-sensor is the default display sensor and reference for the alarms. The E-sensor has no effect on operation of the refrigeration system.

The A-sensor is offset if the actual temperature in the cabinet does not match the setpoint, despite taking the hysteresis into consideration. Offset of A sensor is named "cA".

The E-sensor is offset if the actual temperature in the cabinets display, provided that the display sensor for reference is the E-sensor, does not match the independent temperature monitoring used for control. Offset of E-sensor is named "cE"

ⓘ **Practical example of offset:**

Example 1
The temperature in the cabinet is operating warmer than the actual setpoint.

With a setpoint of -80 °C, the actual temperature inside the cabinet is between -78 °C and -80 °C. The desired temperature range is between -79 °C and -81 °C. This means that "cA", in this case, should be +1.0K, so that the refrigeration system stops 1.0K later and starts 1.0K earlier than the setpoint normally otherwise would dictate.

Example 2
The temperature in the cabinet is operating colder than the actual setpoint.

With a setpoint of -80 °C, the actual temperature inside the cabinet is between -80 °C and -82 °C. The desired temperature range is between -79 °C and -81 °C. This means that "cA", in this case, should be -1.0K, so that the refrigeration system stops 1.0K earlier and starts 1.0K later than the setpoint normally otherwise would dictate.

Offset of the A-sensor

↳ Press and hold Ⓟ + ① for more than 3 seconds

↳ Press ⊕ several times until "cAL" is shown in the display

↳ Press Ⓟ to select "cAL". "cA" is shown in the display

↳ Press Ⓟ to select "cA"

↳ Press ⊕ or ⊖ to offset the A-sensor

↳ Press Ⓟ to confirm the set value

– The A-sensor is now offset, proceed to other parameters by pressing ⏻, and then navigate by using ⊕ or ⊖

↳ Leave the user menu by pressing ⏻ several times until the cabinet temperature is shown in the display

Offset of the E-sensor

↳ Press and hold Ⓟ + ① for more than 3 seconds

↳ Press ⊕ several times until "cAL" is shown in the display

↳ Press Ⓟ to select "cAL". "cA" is shown in the display

↳ Press ⊕ until "cE" is shown in the display

↳ Press Ⓟ to select "cE"

↳ Press ⊕ or ⊖ to offset the E-sensor

↳ Press Ⓟ to confirm the set value

– The E-sensor is now offset, proceed to other parameters by pressing ⏻, and then navigate by using ⊕ or ⊖

↳ Leave the user menu by pressing ⏻ several times until the cabinet temperature is shown in the display

Escorted / set alarm limits

The following part covers the setting of escorted or set alarm limits.

ALL – Setting of escorted / set alarm limits

↳ Press and hold Ⓟ + ① for more than 3 seconds

↳ Press ⊕ several times until "ALL" is shown in the display

↳ Press Ⓟ to select "ALL"

↳ Press ⊕ or ⊖ to select set (FAS) or escorted (ESC) alarm limits

↳ Press Ⓟ to confirm the set value

↳ Leave the user menu by pressing ⏻ several times until the cabinet temperature is shown in the display

ⓘ "Set alarm" is fixed limits working independently from the setpoint.
The alarm limits will remain the selected values regardless of the setpoint being altered.

"Escorted alarm" is fixed limits locked to the setpoint. The alarm limits will change according to the altered setpoint.

⚠ **ATTENTION –**
High and low temperature alarms set up in the cabinets' controller (including EAL alarms) must be accompanied by additional redundant independent external alarms to ensure maximum item safety.

Display sensor

The following part covers the setting of which sensor to be shown in the display.

dPS – Selection of reference sensor for the display

↳ Press and hold (P) + (1) for more than 3 seconds

↳ Press (+) several times until "dPS" is shown in the display

↳ Press (P) to select "dPS"

↳ Press (+) or (−) to select either the A- or E-sensor

↳ Press (P) to confirm the set value

↳ Leave the user menu by pressing (⏻) several times until the cabinet temperature is shown in the display

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ⓘ Please note that dPS only changes the reference sensor for the display, and not the reference sensor for the alarms.

Furthermore, please note that the reference sensor for the refrigeration system is the A-sensor, this can not be altered.

⚠ **ATTENTION –**

High and low temperature alarms set up in the cabinets' controller (including EAL alarms) must be accompanied by additional redundant independent external alarms to ensure maximum item safety.

Regular maintenance

Cleaning

Inadequate cleaning can lead to the cabinet not functioning properly or at all.

The cabinet must be completely thawed prior to cleaning.

The cabinet should be cleaned internally with a mild soap solution (max. 85 °C) at suitable intervals and checked thoroughly before it is put into operation again.

The compressor compartment and in particular the condenser must be kept free from dust and dirt. This is best done with a vacuum cleaner and a brush.

It is recommended that the re-evaporation tray is checked regularly for foreign objects and cleaned at least once a year. Do not flush compressor compartment with water as this may cause short-circuits in the electrical system.

Cleaning agents containing chlorine (or chlorine compounds), abrasive or solvent compounds as well as other corrosive agents, may not be used, as they might damage the cabinet and its components.

The location of the condenser is illustrated below.
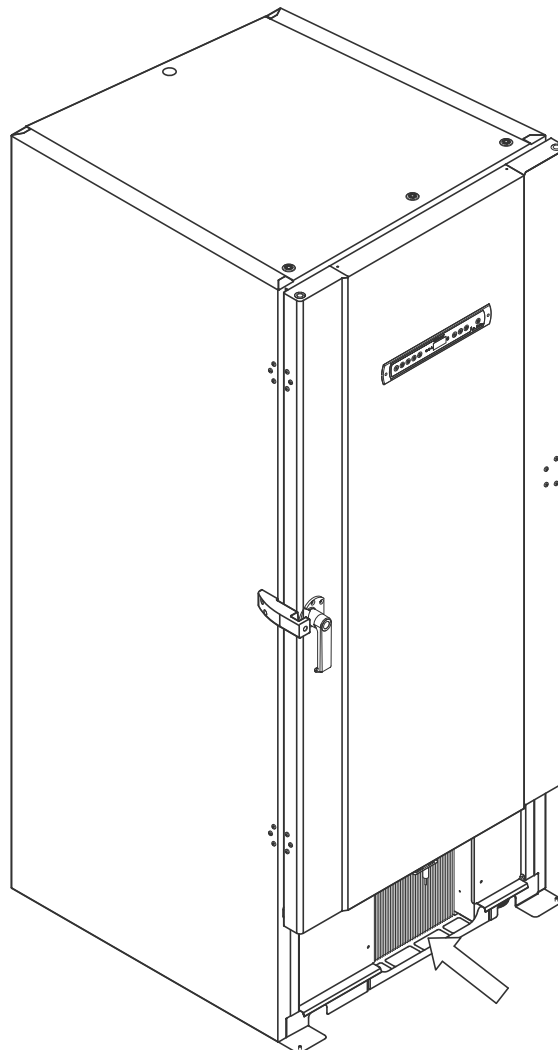
Door gasket

The following part covers the importance of a properly functioning door gasket.

Door gaskets are an important part of a cabinet, door gaskets with impaired functionality reduces a cabinets seal with the door. Impaired seals can lead to ice build-up (and thus reduced cooling capacity), and in some cases, decreased lifetime expectancy of the cabinet.

It is therefore very important to be aware of the door gaskets condition. Regular inspection is recommended.

The door gasket should be cleaned regularly with a mild soap solution and dried off with a dry cloth.

If a gasket needs to be replaced, please contact your local Gram BioLine distributor.

The illustration below shows the location of the gaskets.
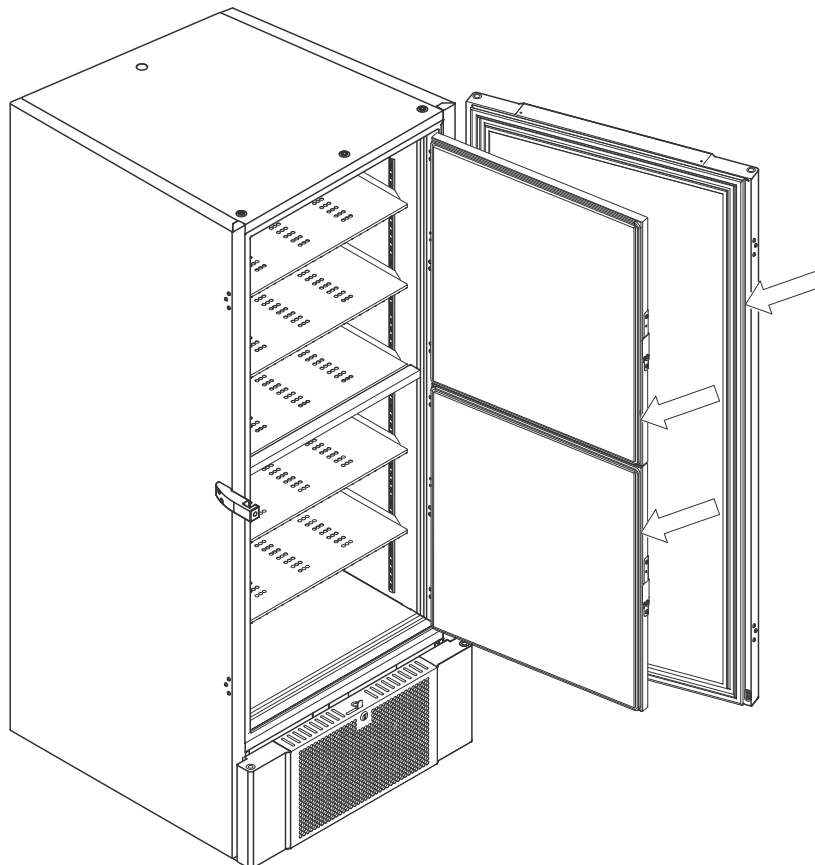
Defrost inner doors and cabinet

The following part covers the procedure for manually defrosting inner doors and cabinet.

The BioUltra has no automatic defrosting system and requires manual defrosting.

In the event of excessive frost and ice build-up, where it hinders performance, general use, and/or item safety, defrosting the chamber and inner doors is needed.

Please follow the procedure described below to clean the chamber and inner doors of frost.

↳   (If applicable) Turn off the back-up system
↳   Transfer the stored items to an appropriate environment
↳   Turn off the cabinet
↳   Open the inner doors more than 90°
↳   Lift off the inner doors and either let the ice thaw or manually defrost them
↳   Let the freezer defrost by thawing (with doors open) Thawing agents such as hot water must not be used.
↳   Collect the accumulated water in the bottom of the chamber
↳   After cleaning the inner doors and chamber, refit the inner doors to the cabinet
↳   Turn on the cabinet, according to the procedures in "Start-up"
↳   Put the items back in the chamber when the temperature has stabilized at the desired temperature
↳   (If applicable) Turn on the back-up system

Use the ice scraper included with the cabinet for any manual defrosting, do not hack or chip at the ice

If necessary, it is possible to defrost the inner doors periodically without taking the cabinet out of service. Unmount the inner doors according to the instructions on this page, and defrost manually or by thawing. Ensure that the outer door is closed while the inner doors are being defrosted.
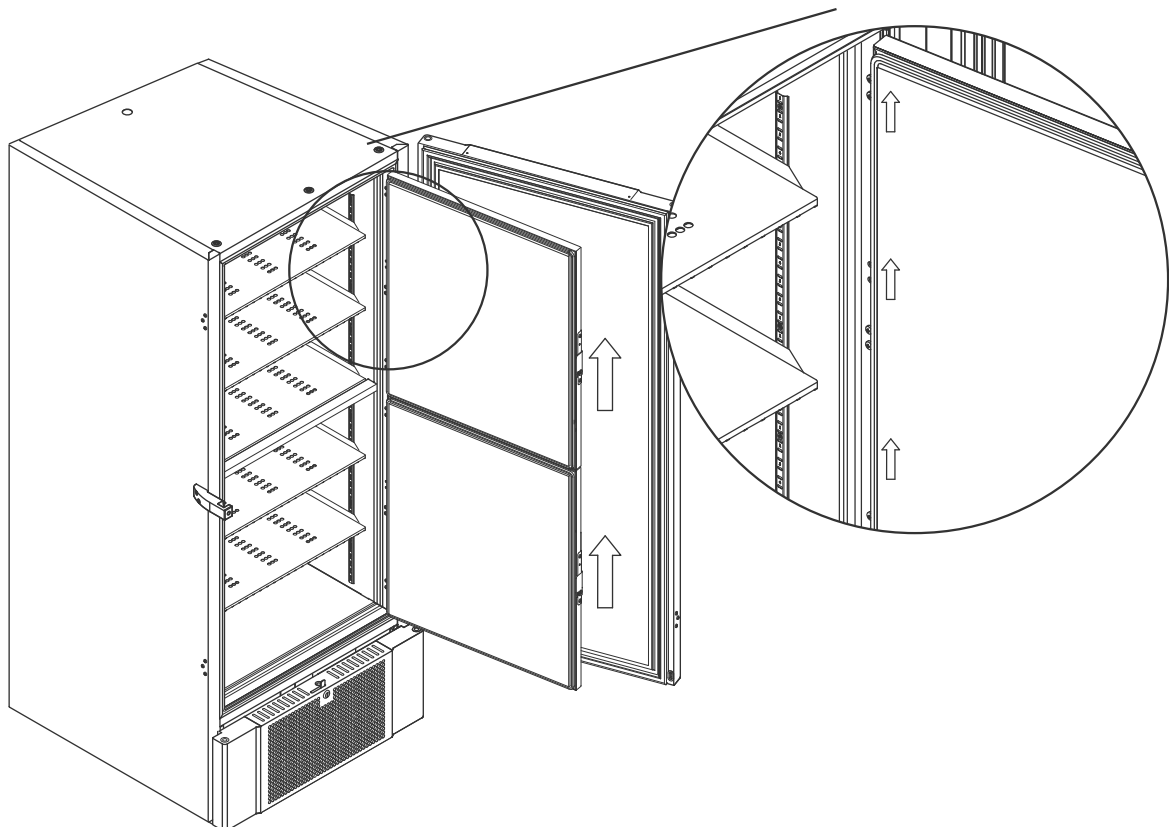
Equalisation valve

The equalisation valve may require cleaning depending on use and ambient conditions.

Over the duration of some weeks, a small amount of ice can form around the inside of the pressure equalisation valve. If allowed to build up, pressure equalisation will be impeded to the point where the cabinet is not able to equalise through the valve after a door opening.

This in turn forces the equalisation to occur over the door gaskets. Thereby potentially damaging gaskets, creating unwanted ice formations around the door and exceedingly long equalisations.

Routinely make sure that the equalisation valve and the port leading into the storage chamber is free of ice and is in proper working order.
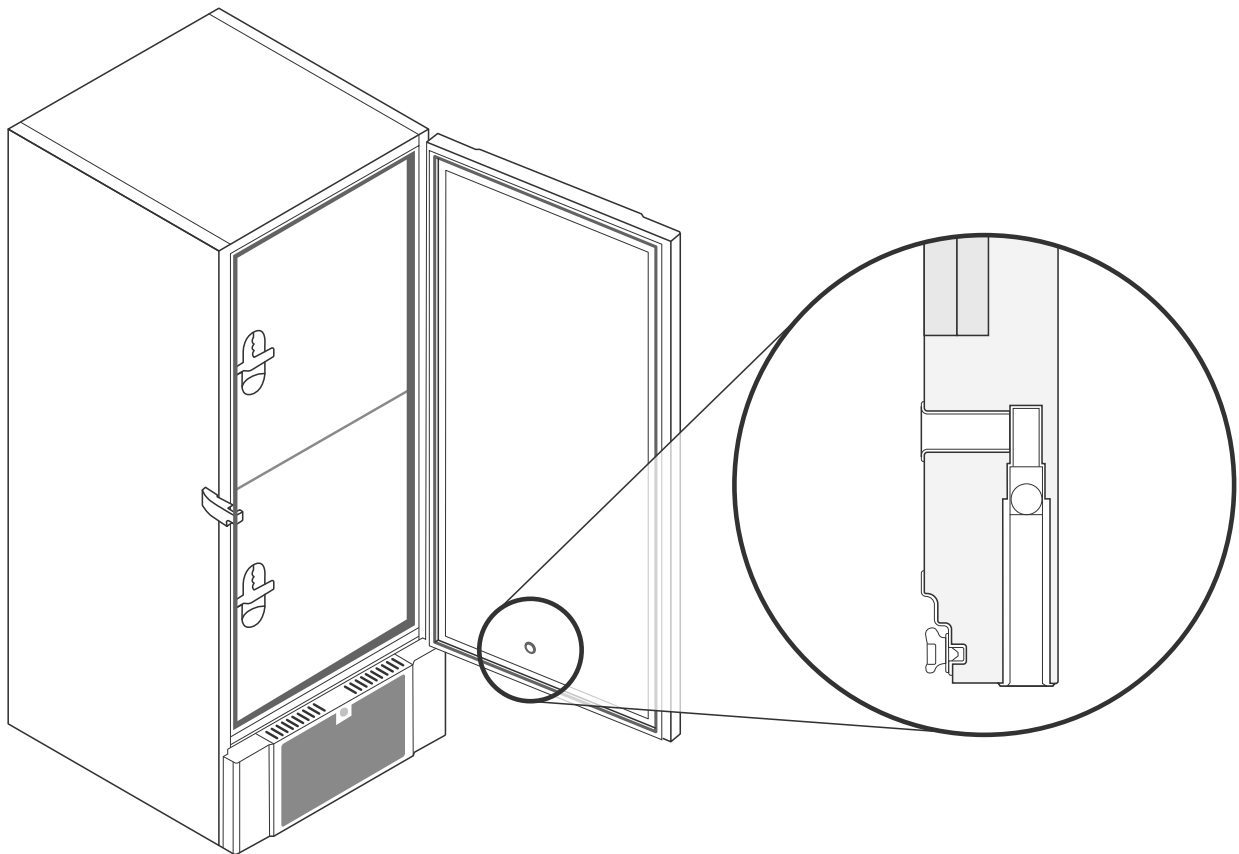
The illustrations above shows the location of the equalisation valve.

General info

Service

Read the following carefully, for information on technical safety and responsibility on Gram BioLine products.

WARNING –
DO NOT OPEN, MAINTAIN OR SERVICE IN AN AREA WHEN AN EXPLOSIVE ATMOSPHERE IS PRESENT

When servicing –
Make sure the appliance is switched Off at the socket before service is performed on the cabinet.
It is not sufficient to switch Off the cabinet on the On/Off ⏻ button, as current will persist in some electrical parts of the cabinet.

Warranty may be void in the instance the cabinet is being used for applications other than its intended use, or otherwise not in accordance with the guidelines stipulated in the instructions for use.

Defective parts must be replaced with original parts from Gram BioLine. Gram BioLine can only guarantee functional and safety requirements on the cabinets, if above mentioned is adhered to.

The cabinet should be checked at least once yearly by a Gram BioLine-authorised technician. The refrigeration system and the hermetically sealed compressor require no maintenance. However the condenser requires regular cleaning.

Be aware that cabinets using hydrocarbons (HC) as refrigerant, may require special handling by qualified technicians.

Type/number plate

If refrigeration fails, first look to see whether the cabinet has been unintentionally switched off, or whether a fuse has blown.

If the cause of failure cannot be found, contact your supplier quoting Type and S/N. This information can be found on the type/number-plate.

Access port

All BioLine cabinets are equipped with an access port on the back of the cabinets, this can be used to easily fit external sensors and the like.

The illustration below shows an access port on a BioUltra cabinet.
The access ports are constructed in the same fashion, with two conical polystyrene plugs (fitted from the back of the cabinet and the inside of the cabinet).

Please note, it is very important to ensure that the access port is sealed properly prior to start up after mounting sensor, probe etc.

Failing to do so can result in lowered performance or malfunction of the cabinet.
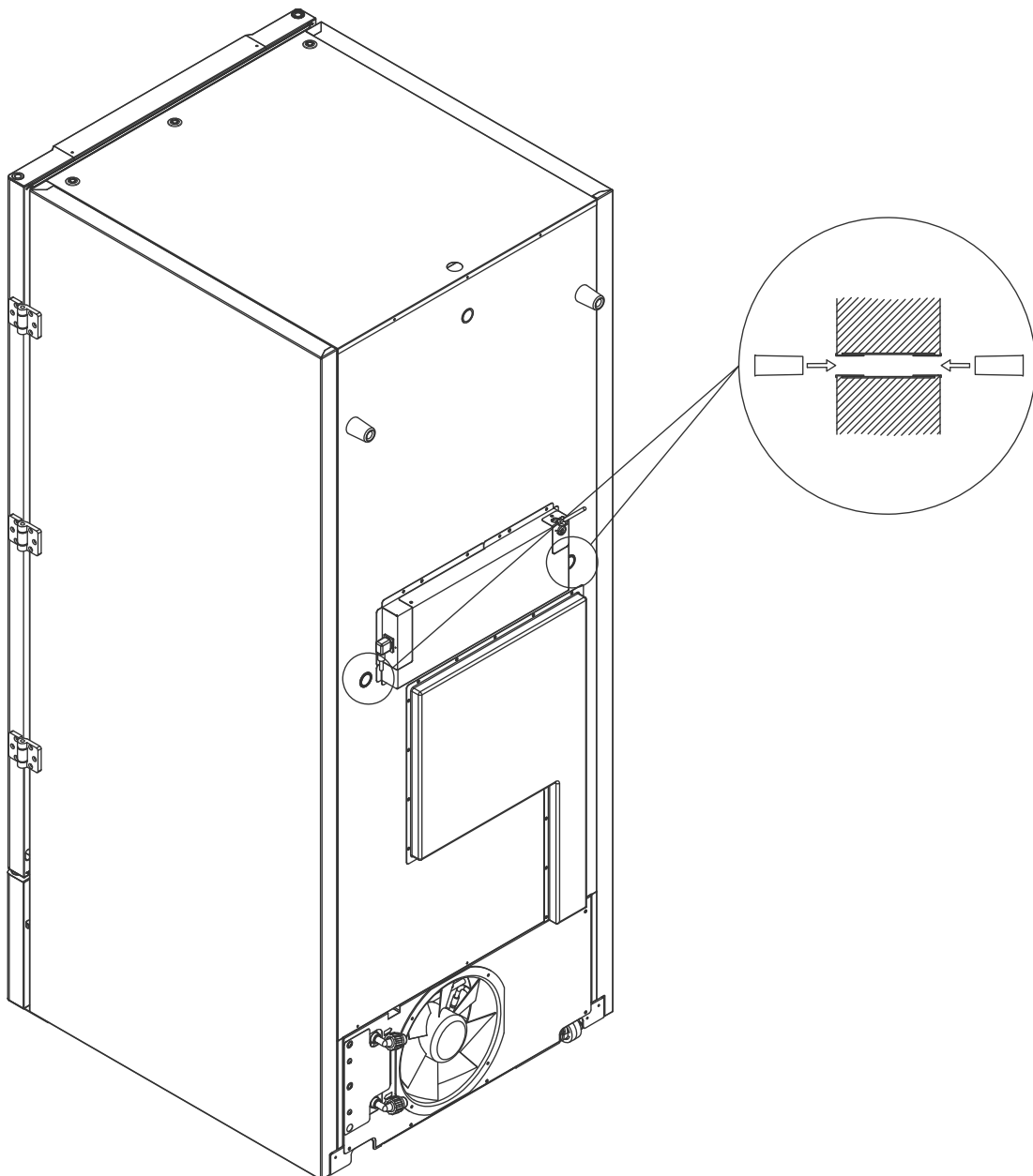
Boxes and racks

This part covers quantity of racks stored in the cabinet.
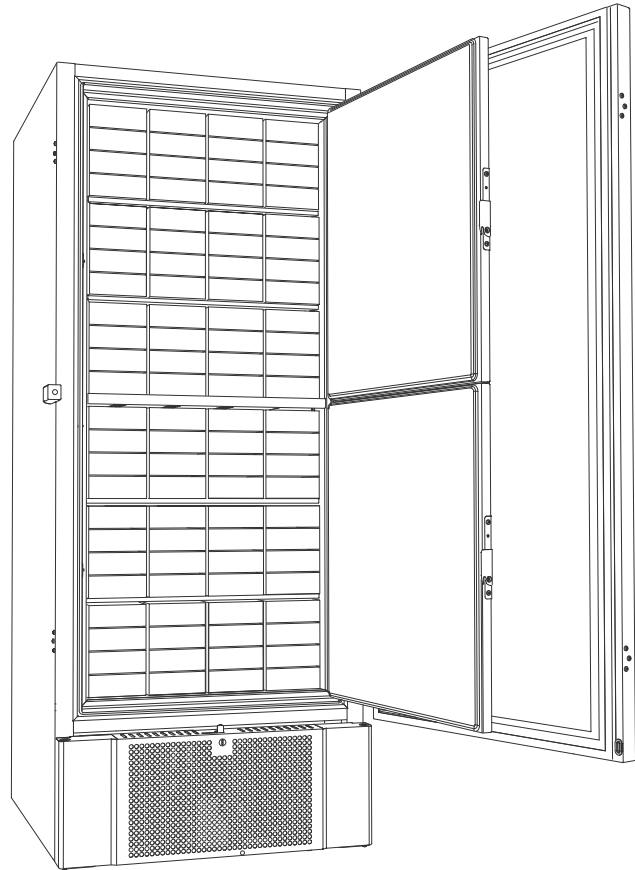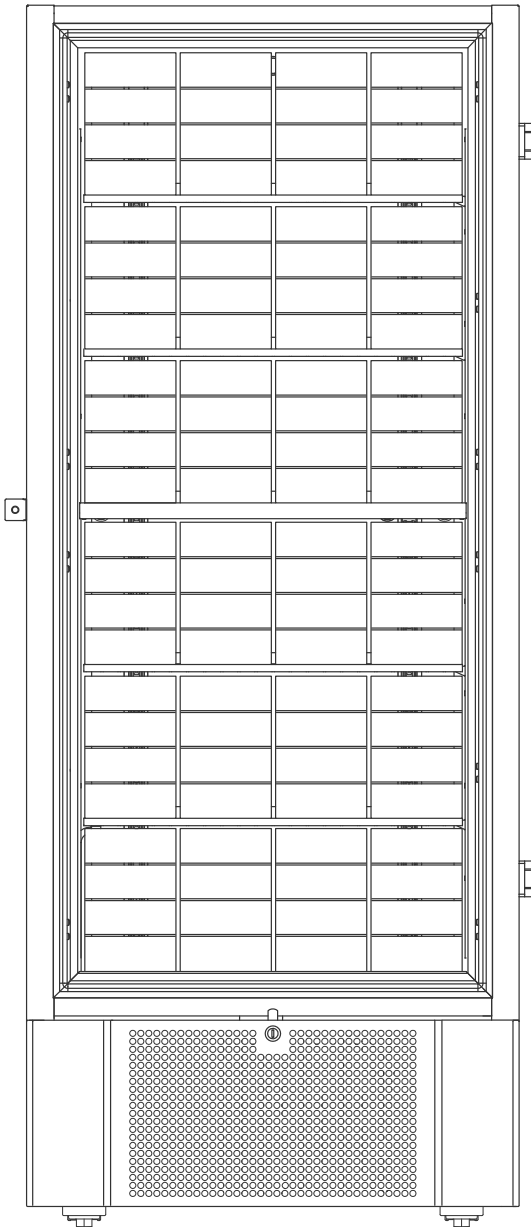
Box size	Number of Boxes	Number of Racks
2" / 50 mm	384	24 (4 x 4 racks)
3" / 75 mm	192	16 (3 x 4 racks)
4" / 100 mm	192	24 (2 x 4 racks)

Mount / Unmount door handle

The door handle can easily be unmounted and mounted again.

In the case of the handle needing to be taken off, make sure that it is mounted back onto the cabinet prior to starting up again.
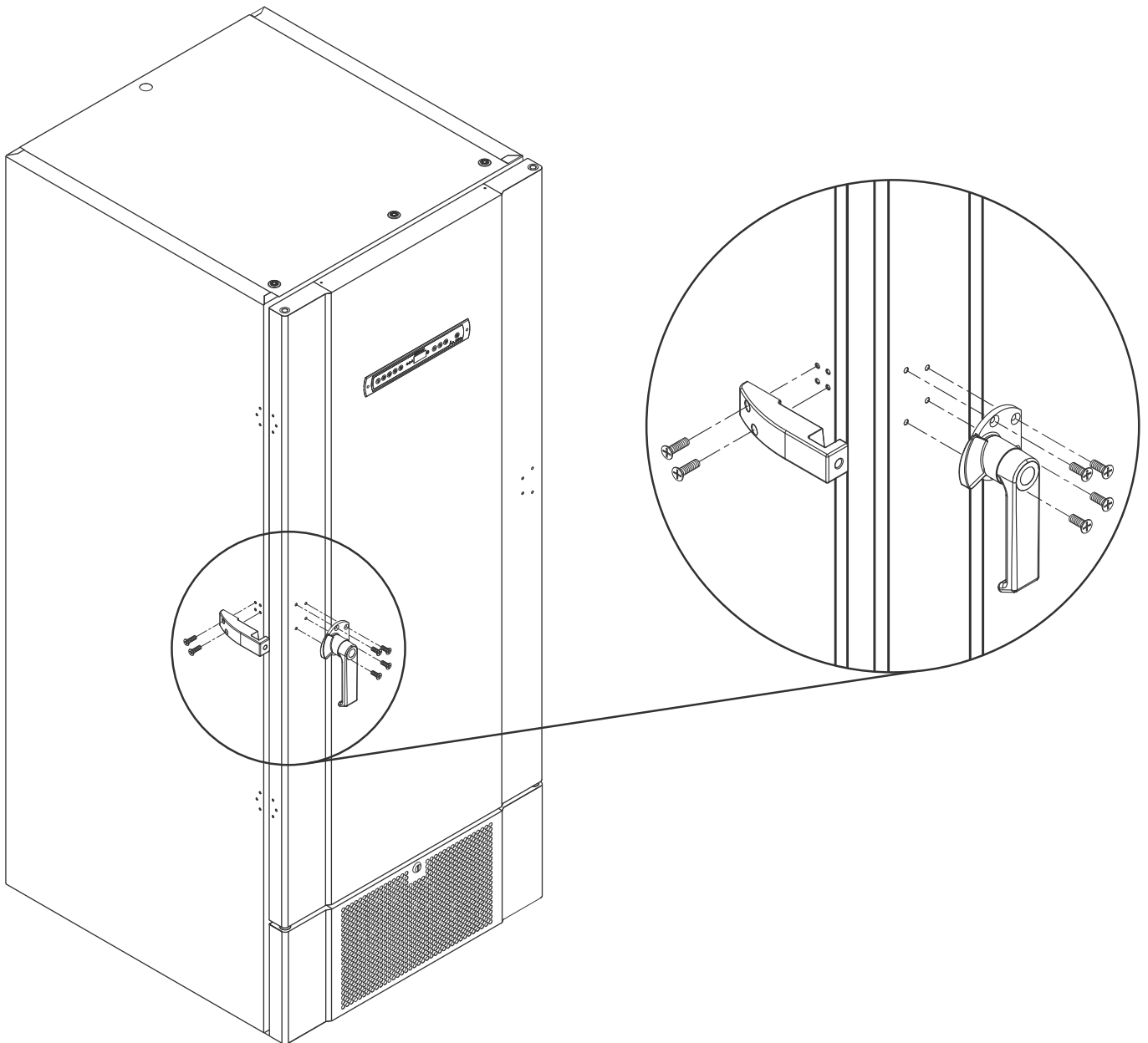
ATTENTION –
The cabinet must not operate without door handle.

Important

⚠ IMPORTANT!

1. There may occur sharp edges on the cabinet housing, compressor room, and interior furnishings. Show due diligence when handling the cabinet, neglect of these precautions can lead to injuries.

2. Danger of wedging of body parts in the frame slot between the door and the cabinet, show due diligence when opening and closing the cabinet door. Negligence of these precautions can lead to injuries.

3. Castors where the legs aren't deployed can lead to unexpected movements of the cabinet. Lock the castors after installation. Negligence of these precautions can lead to injuries.

4. When the cabinet is positioned, ensure that at least two of the legs of the cabinet are deployed.

5. The fan may cause injury during operation, avoiding touching the fans while the cabinet is connected to the mains. Negligence of these precautions can lead to injuries.

6. Thawing agents such as hot water must not be used when thawing the cabinet.

7. Cabinets with water cooling must not leak.

8. No unauthorized modification allowed

Disposal

Electrical and electronic equipment (EEE) contains materials, components and substances that can be dangerous and harmful to human health and the environment if the waste (WEEE) is not disposed of properly.

Products that are labelled with a "crossed-out wheelie bin" is electric and electronic equipment. The crossed out wheelie bin symbolizes that waste of this type can not be disposed of with unsorted municipal waste, but must be collected separately.
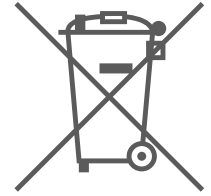
(i) Contact your local Gram BioLine distributor when the cabinet needs to be disposed of. For additional information, see our website: **www.gram-bioline.com**

Data sheet

BioUltra UL570

General data: BioUltra UL570

Technical specifications	Data
Ambient temperature range	+10/+30 °C
Temperature range	-86/-60 °C
Control Unit	Gram BioLine MPC-46
Alarms	Acoustic and visual temperature alarm
Alarm ports	Voltage free contact (230 VAC/8A)
Access port	2 pcs. Ø24 mm
Gross volume	570 litres
Door	Right or left hinged
Material interior	White lacquered steel, inside of doors and bottom panel in stainless steel 4016
Materiale exterior	White lacquered steel or stainless steel 4016
Wall thickness	70 mm in sides 90 mm in back
Door thickness – Solid door	115 mm
Insulation	Polyurethane foam and vacuum panels
K-Value	0.2079 W/(m2*K)
Dimensions: H x B x D	1986/1996 x 856 x 979 mm
Defrost system	Manuel defrost
IP class	IP21
ATEX certifikate	DTI 22ATEX0248X
ATEX Marking	II 3G Ex ec nC ic IIB T4 Gc

BioUltra UL570H, 50 Hz

Technical specifications	Data
Refrigerant	R404A/R508b/R601
Refrigerant charge	215/300/30 g
GWP – CO2e	R404A/R508b = 844/4019
Connection	230 VAC / 50 Hz (16A)
SW variant	E3+
Refrigeration capacity at -90 °C	497 Watt
Energy consumption -80/20*	12.2 kWh/24h
Energy consumption -80/25*	13.1 kWh/24h
Energy consumption – lowest setpoint	19.1 kWh/24h
Heat emission 100%	980 Watt
Heat emission default setpoint	798 Watt
Nominel consumption	1191 Watt / 6.3 A
Start current	25.7 A
Gross weight	283 kg
Net weight	257 kg
Sound level	49 dB(A)

BioUltra UL570H, 60 Hz

Technical specifications	Data
Refrigerant	R404A/R508b/R601
Refrigerant charge	425/304/30 g
GWP – CO2e	R404A/R508b = 1668/4072
Connection	230 VAC / 60 Hz (16A)
SW variant	E6+
Refrigeration capacity at -90 °C	497 Watt
Energy consumption -80/20*	12.2 kWh/24h
Energy consumption – lowest setpoint	17.5 kWh/24h
Heat emission 100%	951 Watt
Heat emission default setpoint	733 Watt
Nominel consumption	1008 Watt / 5.4 A
Start current	25.7 A
Gross weight	283 kg
Net weight	257 kg
Sound level	48.8 dB(A)

* setpoint temperature/ambient temperature

BioUltra UL570G, 50 Hz

Technical specifications	Data
Refrigerant	R290/R170/R601
Refrigerant charge	200/105/14 g
GWP – CO2e	N/A
Connection	230 VAC / 50 Hz (16A)
SW variant	E6+
Refrigeration capacity at -90 °C	497 Watt
Energy consumption -80/20*	11.75 kWh/24h
Energy consumption – lowest setpoint	16.8 kWh/24h
Heat emission 100%	912 Watt
Heat emission default setpoint	725 Watt
Nominel consumption	1008 Watt / 5.9 A
Start current	25.7 A
Gross weight	283 kg
Net weight	257 kg
Sound level	45.6 dB(A)

BioUltra UL570G, 50 Hz – Hybrid

Technical specifications	Data
Refrigerant	R290/R170
Refrigerant charge	200/80 g
GWP – CO2e	N/A
Connection	230 VAC / 50 Hz (16A)
SW variant	E6+
Refrigeration capacity at -90 °C	497 Watt
Energy consumption -80/20*	10.5 kWh/24h
Energy consumption – lowest setpoint	16.2 kWh/24h
Heat emission 100%	832 Watt
Heat emission default setpoint	676 Watt
Nominel consumption	1005 Watt / 5.9 A
Start current	25.7 A
Gross weight	283 kg
Net weight	257 kg
Sound level	45.6 dB(A)
Water connection	½" inlet and outlet
Water consumption setpoint -90 °C	120l/h
Energy transferred to water	75% of power consumption

BioUltra UL570H, 50 Hz – Hybrid

Technical specifications	Data
Refrigerant	R404A/R508b/R601
Refrigerant charge	215/300/30 g
GWP – CO2e	N/A
Connection	230 VAC / 50 Hz (16A)
SW variant	E6+
Refrigeration capacity at -90°C	497 Watt
Energy consumption -80/20*	12.2 kWh/24h
Energy consumption – lowest setpoint	19.1 kWh/24h
Heat emission 100%	980 Watt (with no water cooling)
Heat emission default setpoint	798 Watt (with no water cooling)
Nominel consumption	1191 Watt / 6.3 A
Start current	25.7 A
Gross weight	283 kg
Net weight	257 kg
Sound level	49 dB(A)
Water connection	½" inlet and outlet
Water consumption setpoint -90°C	120l/h
Energy transferred to water	75% of power consumption

* setpoint temperature/ambient temperature

Refrigeration circuits

UL570H, Air cooled, 50 Hz
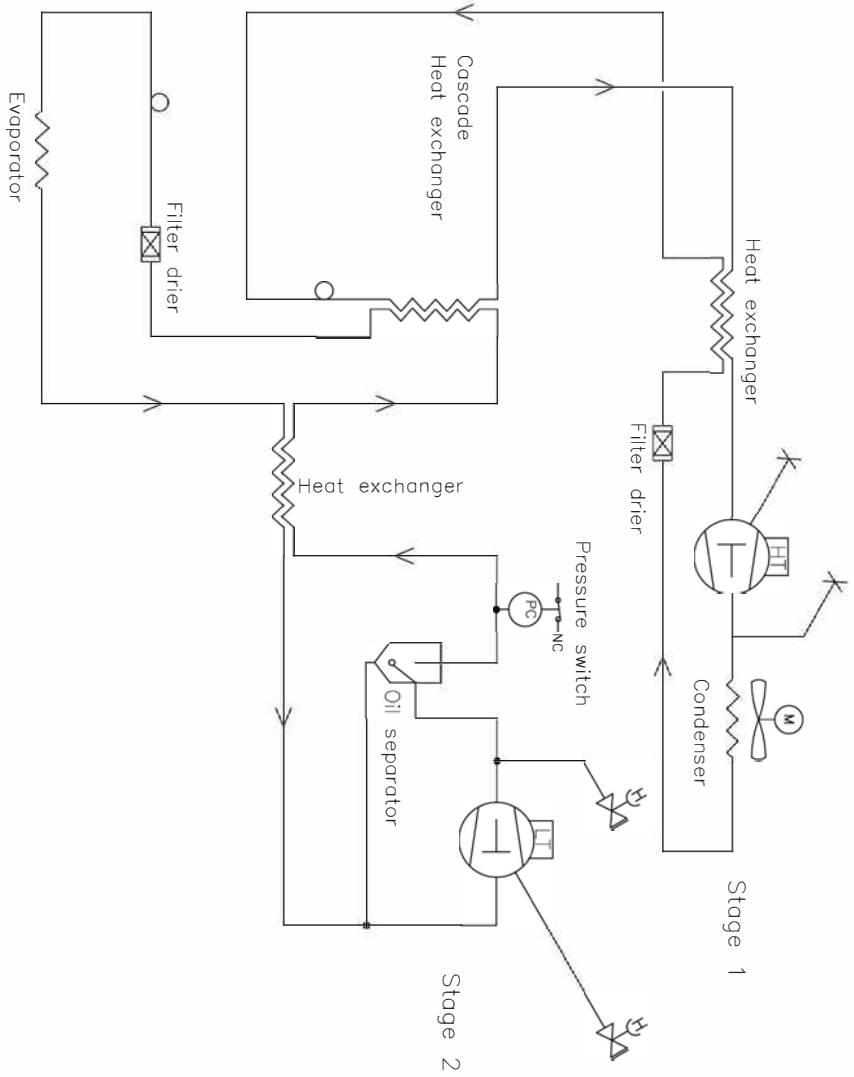
Evaporator

Cascade Heat exchanger

Filter drier

Heat exchanger

Heat exchanger

Filter drier

Pressure switch

NC

PC

Oil separator

Condenser

M

Stage 1

Stage 2

Revision				
Description.				
Piping diagram BioUltra HFC, air cooled, 50Hz				

	Date	Sign.	SheetSize	Drawing no.	Sheet no.
Gram Scientific ApS VOJENS DENMARK	03-01-2023	JABP	3	76504 1577	1 of 1

General tolerance: ISO 2768-m.: ISO 286-2

Inspection / important Dimension marked with

X.XX

Rev. 005

Evaporator

Filter drier

Cascade Heat exchanger

TC

Heat exchanger

Heat exchanger

Oil separator

Pressure switch

PC

NC

Filter drier

Heat exchanger

Condenser

M

Stage 1

Stage 2

Revision

Description:
Piping diagram BioUltra HFC 60Hz

Gram Scientific ApS
VOJENS
DENMARK

Date	Sign.	Sheet size
03-01-2023	JMRP	3

Drawing no.
76504326

Sheet no. 1 of 1

Rev. 001

Inspection / important
Dimension marked with

X.XX

Generel tolerance:
ISO 2768-m ; ISO 286-2

Evaporator

Filter drier

Cascade
Heat exchanger

Heat exchanger

Heat exchanger

Filter drier

Oil separator

Pressure switch

PC

NC

Condenser

M

Revision				Drawing no.		Sheet no.	Rev.
Description.							

Piping diagram BioUltra HFC hybrid

	Date	Sign.	SheetSize				
Gram Scientific ApS
VOJENS
DENMARK	03-01-2023	JMBP	3				

76504 2325

Inspection / important
Dimension marked with
X.XX

General tolerance:
ISO 2768-m : ISO 286-2

Sheet no.	Rev.
1 of 1	000

UL570G, Air cooled

Evaporator

Filter drier

Cascade
Heat exchanger

TC

Heat exchanger

Heat exchanger

Filter drier

HT

Condenser

M

Stage 1

Pressure switch

PC

NC

Oil separator

LT

Stage 2

Revision

Description:
Piping diagram BioUltra HC w/TX valve

Gram Scientific ApS
(CVR-nr. 43122193)
Aage Grams Vej 1
6500 Vojens

Date	Sign.	SheetSize
03-01-2023	JABP	3

Drawing no.
765042497

Sheet no.
1 of 1

Rev.
000

Inspection / Important
Dimension marked with
X.XX

Generel tolerance:
ISO 2768-m : ISO 286-2

Evaporator

Filter drier

Cascade
Heat exchanger

TC

Heat exchanger

Filter drier

Heat exchanger

Pressure switch

PC — NC

Oil separator

M

Condenser

Revision

Description.
Piping diagram BioUltra HC hybrid

Gram Scientific ApS
(CVR-nr. 43 122 193)
Aage Grams Vej 1
6500 Vojens

Date	Sign.	SheetSize
03-01-2023	JMP	3

Drawing no.
76504 2498

Inspection / important
Dimension marked with
X.XX

Generel tolerance:
ISO 2768-m : ISO 286-2

Sheet no.	Rev.
1 of 1	000

Wiring diagram

bioline

UL570

Wire codes:

L: brown
N: blue
B: black
R: red
W: white
GR: grey
PE: yellow/green (Protective Earth) ————
FE: black (Functional Earth) ————

Compressor LT — M2
Compressor HT — M1
Defrost heater — R1
SSR
Resistor 15 kΩ
Resistor 15 kΩ
Condenser fan — M3
Frame heater — R2
Door
EMC layer
Controller keypad
Display PCB
Power supply PCB
Pressure switch
Extra sensor PT 10k
Condenser sensor NTC 5k
Cascade sensor NTC 5k
Cabinet sensor PT 10k
Alarm
Alarm output
EMC/EMI Filter
Fuse
230 V AC
16 A

Gram Scientific ApS
CVR-nr. 43122193
Aage Grams Vej 1
6500 Vojens

Description:
El-diagram BioUltra UL570

Date 03-01-2023
Sign. JMP
Sheet size 3

765072813
Sheet no. 1 / 1
Rev. 010

Revision:

Inspection / Important
Dimension marked with
X.XX
General Tolerance
ISO 2768-m / ISO 2864-2

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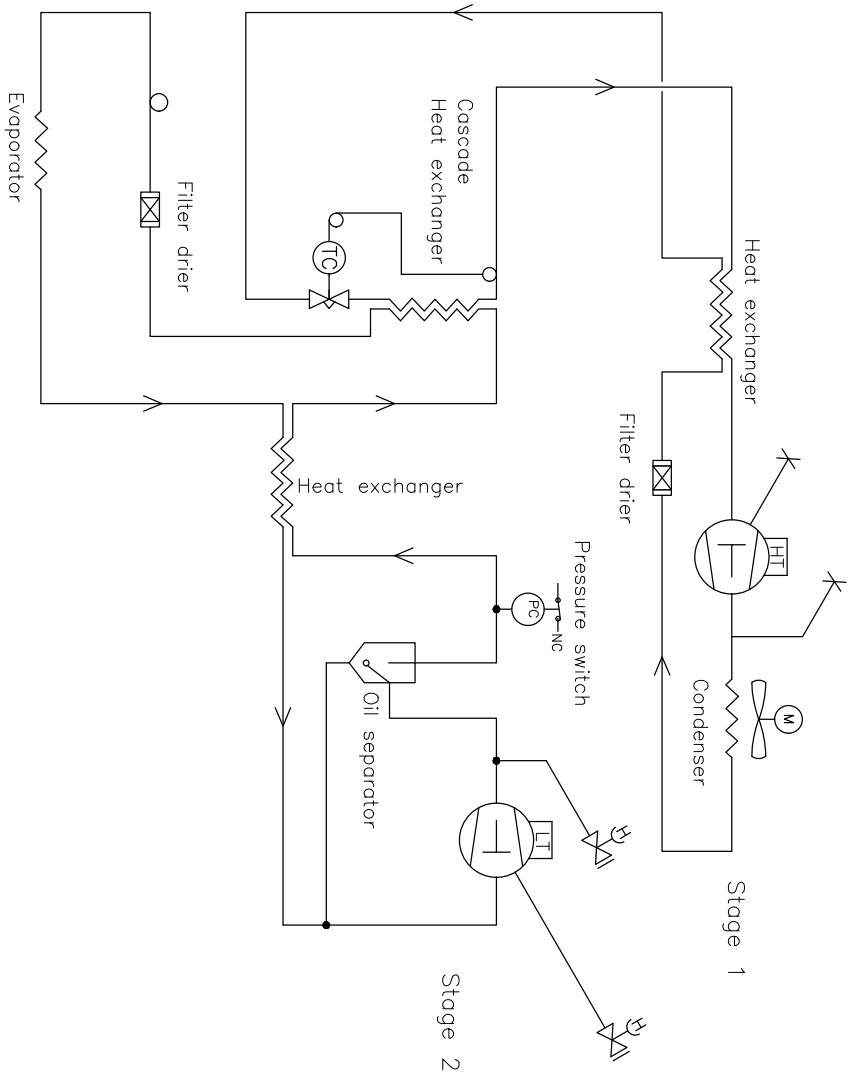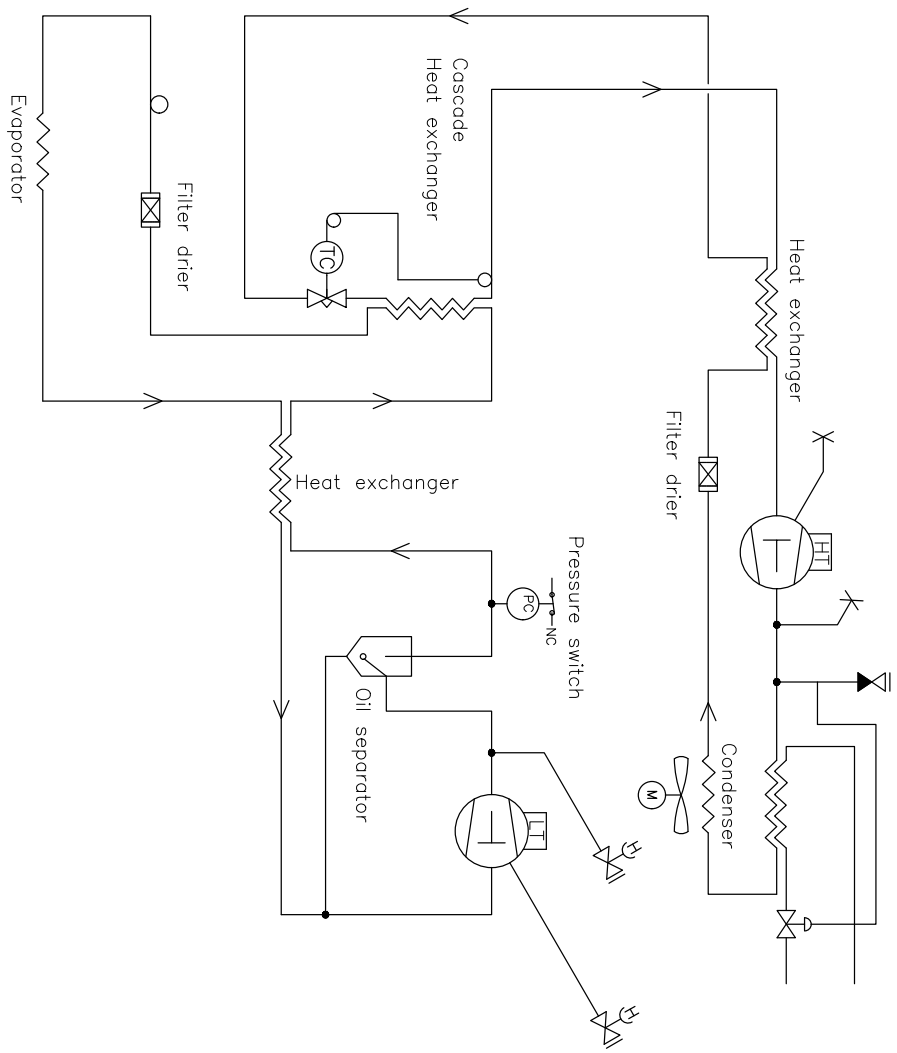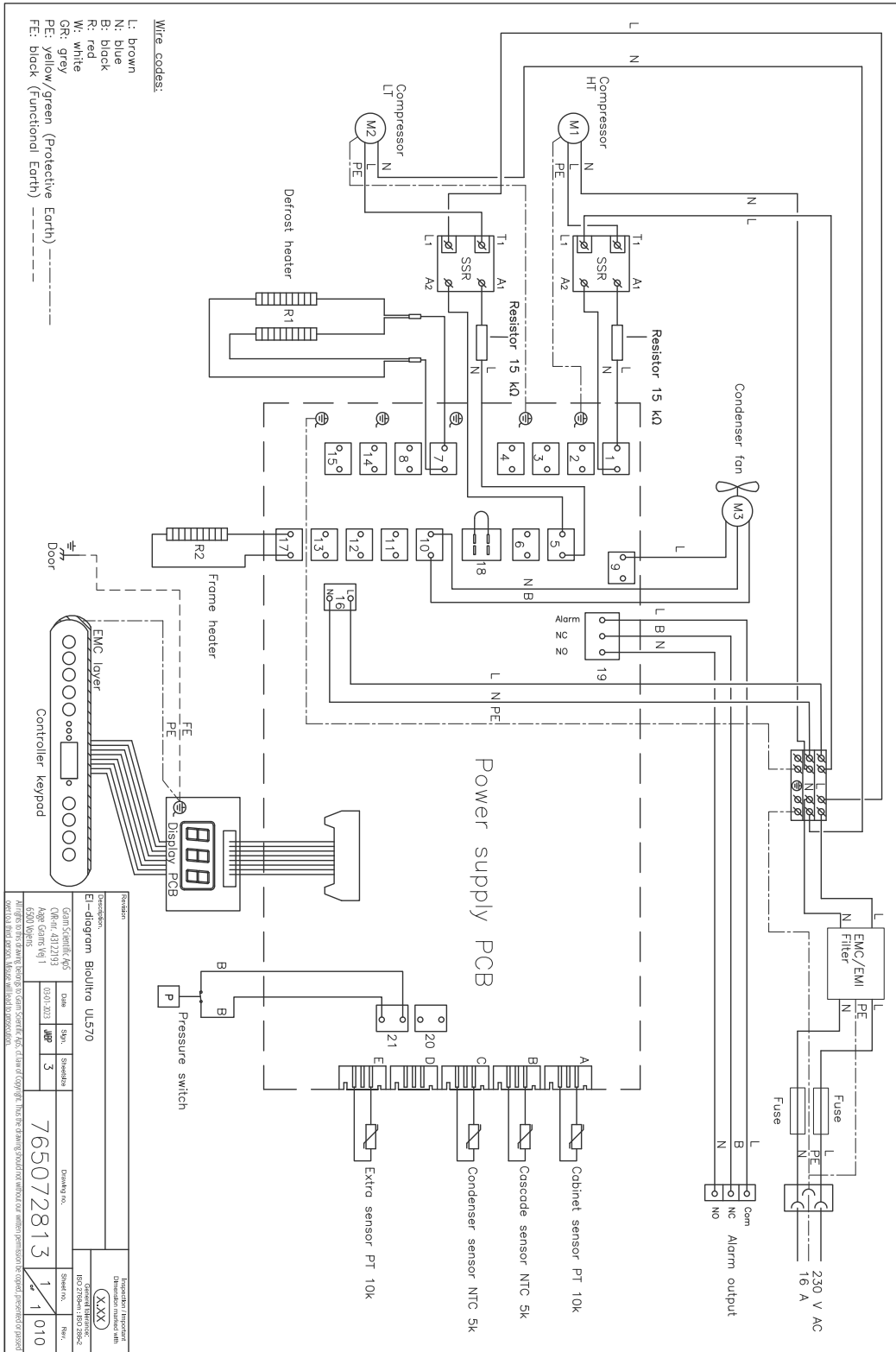
Declaration of conformity

GRAM

English EC Declaration of Conformity

We, **Gram Scientific ApS** declare under sole responsibility that the following products:

Range:	**BioUltra**
Model:	UL570
Rerigerant:	HC: R290 & R170 (R601 as additive)
	HFC: R404A & R508B (R601 as additive)
Product description:	Extreme low temperature freezers for storing biomedical materials
Valid from (Year/Week):	2023/01

To which this declaration relates, is in compliance with all the applicable essential requirements, and other provisions of the European Council Directive and regulations.

Directives and Regulations of the European Parliament and of the Council:

Machinery Directive 2006/42/EC
- ATEX Directive 2014/34/EU
- Pressure Equipment Directive 2014/68/EU
- Low Voltage Directive 2014/35/EU
- EMC Directive 2014/30/EU
- RoHS Directive 2011/65/EU
- REACH EC No.1907/2006
- F-Gas Regulation (EU) No 517/2014

Product compliance has been demonstrated on the basis of:

Harmonized Standards:	Text:
EN 60601-1:2006	Medical electrical equipment – Part 1: General requirements for basic safety and essential performance
EN 60601-1-2:2015	Medical electrical equipment – Part 1-2: General requirements for basic safety and essential performance – Collateral Standard: Electromagnetic disturbances – Requirements and tests
EN 61010-1:2010	Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements
EN 61326-1:2013	Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 1: General requirements
EN IEC 61000-3-2:2019	Electromagnetic compatibility (EMC) – Part 3-2: Limits – Limits for harmonic current emissions (equipment input current =16 A per phase)
EN 61000-3-3:2013	Electromagnetic compatibility (EMC) – Part 3-3: Limits – Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current <= 16 A per phase and not subject to conditional connection
EN IEC 60079-0:2018 EN IEC 60079-0:2018/AC:2020	Explosive atmospheres – Part 0: Equipment – General requirements
EN 60079-7:2015 EN 60079-7:2015/A1:2018	Explosive atmospheres – Part 7: Equipment protection by increased safety "e"
EN 60079-11:2012	Explosive atmospheres – Part 11: Equipment protection by intrinsic safety "i"
EN IEC 60079-15:2019	Explosive atmospheres – Part 15: Equipment protection by type of protection "n"
EN 60079-18:2015	Explosive atmospheres – Part 18: Equipment protection by encapsulation "m"
EN ISO 3744:2010	Acoustics – Determination of sound power levels and sound energy levels of noise sources using sound pressure – Engineering methods for an essentially free field over a reflecting plane
EN ISO 9001:2015	Quality management systems – Requirements
EN ISO 14001:2015	Environmental management systems – Requirements with guidance for use

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Denmark
Telephone: + 45 73 20 13 00

Vojens, 13.12.2022

John B. S. Petersen
Approval Manager

Rev. 008 – 13.12.2022

IQ & OQ

Installation & Operation Qualification

The following IQ / OQ is intended to be a guideline, local IQ / OQ procedures can vary depending on application and items stored in the Gram BioLine cabinet.
Deviations from the specifications dictated in the PQ are to be reported in the deviation report.

The PQ is concluded if all criteria of acceptance are approved and the possible deviations are rectified or accepted.

Customer:

_____

_____

_____

Location of installation:

_____

_____

_____

Model:

_____

Serial number:

_____

Item number – manual:

_____

Status of operation:

○ Active

○ Inactive

Name of distributor:

_____

_____

_____

Warranty:

Start: _____

End: _____

Model: _____   SN: _____

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Instructions on use to starting the cabinet:

1. Training of the responsible party   Date: _____ By: _____

2. Operational test of the cabinet   Date: _____ By: _____

3. Responsible party   _____ Tel: _____

Instructions to users:

The responsible party is trained in use of the cabinet in reference to the user manual

○ General use of cabinet   Objections to the mentioned:

○ Service & maintenance   _____

                                           _____
○ The cabinet was delivered without defects/damage.
   The cabinet started as specified in the user manual   _____

                                           _____

Set values:

○ Setpoint temperature   _____ °C

Local alarm settings

○ High temperature alarm   _____ °C
○ Low temperature alarm   _____ °C

External alarm settings
(See voltage free contact in user manual)

○ High temperature alarm   _____ °C
○ Low temperature alarm   _____ °C

Factory settings:

Model / Setpoint temp.		LHL	LLL	EHL	ELL
UL 570	-80 °C	+25 °C	-99 °C	+25 °C	-99 °C

Date: Name of trained user: Signature: Name of instructor: Signature:

_____ _____ _____ _____ _____

_____ _____ _____ _____ _____

_____ _____ _____ _____ _____

_____ _____ _____ _____ _____

Model: _____   SN: _____

Installation Qualification – IQ

ID	Description of installation	Reference in manual	Comply		Attachment	Notes
			YES	NO		
I-1	Ensure the cabinet is installed indoors.	page 8				
I-2	Ensure the cabinet is installed in a dry and sufficiently ventilated area.	page 8				
I-3	Ensure the cabinet is not in direct contact with sunlight or other heat sources.	page 8				
I-4	Ensure that the ambient operating temperature is within the allowed range.	page 8				
I-5	Ensure that the cabinet is not installed in a chloric/acidic environment.	page 8				
I-6	Ensure that the protective film on the cabinet is removed.	page 8				
I-7	Ensure that the cabinet is cleaned with a mild soap solution	page 8				
I-8	Ensure that the cabinet has stood upright for 24 hours if the cabinet has been laying down.	page 8				
I-9	Ensure that the cabinet is levelled if it is equipped with legs.	page 9				
I-10	Ensure a level surface if the cabinet is equipped with wheels/casters.	page 9				
I-11	If equipped with wheels/castors: Ensure wheels/casters are locked after positioning	page 9				
I-12	If equipped with drawers and/or glass door: Ensure that tilt-bracket is mounted.	page 10				
I-13	Ensure that the cabinet is maximum 75 mm from the back wall	page 10				
I-14	Ensure that there is minimum a gap of 30 mm between cabinets.	page 11				
I-15	Ensure that the upper top of the cabinet is not covered.	page 11				
I-16	Ensure that electrical appliances are not being used inside the cabinet.	page 12				
I-17	Ensure connection from voltage-free contact to external monitoring system (optional).	page 13				

Installation Qualification – IQ

ID	Description of installation	Reference in manual	Comply YES	Comply NO	Attachment	Notes
I-18	Ensure that the inner doors can operate in accordance with the instructions.	page 14				
I-19	Ensure the correct electrical connection (compare local values with type/nr plate)	page 16				
I-20	Ensure that the power cord is secured in the terminal box with hanger.	page 16				
I-21	Mark power cord with: "Do not separate when energized".	page 16				

Model: _____   SN: _____

Operation Qualification – OQ

ID	Description of installation	Reference in manual	Comply		Attachment	Notes
			YES	NO		
O-1	Turn on the cabinet – Display test (software version and variant).	page 20				
O-2	Set/adjust set-point temperature.	page 20				
O-3	Set/adjust LHL – Upper alarm limit (local).	page 24				
O-4	Set/adjust LLL – Lower alarm limit (local).	page 24				
O-5	Set/adjust LHd – Delay for upper alarm limit (local).	page 25				
O-6	Set/adjust LLd – Delay for lower alarm limit (local).	page 25				
O-7	Activate / deactivate bU - Acoustic alarms (local).	page 26				
O-8	Set/adjust EHL – Upper alarm limit (external).	page 27				
O-9	Set/adjust ELL – Lower alarm limit (external)	page 27				
O-10	Set/adjust EHd – Delay for upper alarm limit (external).	page 28				
O-11	Set/adjust ELd – Delay for lower alarm limit (external).	page 28				
O-12	Activate / deactivate bU - Acoustic alarms (external).	page 29				
O-13	Select reference sensor for the display (A or E).	page 30				

Model: _____   SN: _____

Deviation Report

Deviations to the criteria of acceptance are to be documented in the deviation report. A separate deviation report shall be made for each deviation. Mark the entry with the relevant "-ID" specified in the left column in the test specifications.

-ID: _____

Description of deviation:

_____
_____
_____
_____
_____

Extent to which the deviation has been alleviated:

_____
_____
_____
_____
_____

Additional notes:

_____
_____
_____
_____
_____

Person responsible for test:	Person responsible for verification of test:
Name: _____	Name: _____
Date: _____	Date: _____
Company: _____	Company: _____
Signature: _____	Signature: _____

Model: _____   SN: _____

Approval of test results – Installation Qualification (IQ)

◯ The steps in the Installation Qualification – IQ were completed with positive results

◯ The steps in the Installation Qualification – IQ were completed with negative results

ID of steps with negative results: _____

Approval of test results – Operation Qualification (OQ)

◯ The steps in the Operation Qualification – OQ were completed with positive results

◯ The steps in the Operation Qualification – OQ were completed with negative results

ID of steps with negative results: _____

Customer / Responsible party:

_____
Stamp & Signature

_____
Tel.

_____
E-mail

_____
Location & Date

Trainer / Responsible party:

_____
Stamp & Signature

_____
Tel.

_____
E-mail

_____
Location & Date

Model: _____   SN: _____

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NOTES:

Model: _____   SN: _____

PQ

Performance Qualification

Customer: _____

Location of installation: _____

_____

_____

_____

_____

Model: _____ SN: _____ Item number: _____
(manual)

The PQ consists of inspections of the correct operation of the cabinet under predefined conditions and procedures. Prerequisites for the PQ are IQ (Installation Qualification) and OQ (Operation Qualification), these must be concluded successfully prior to the initiation of the PQ.

Person responsible for the cabinet:

Name: _____
Date: _____
Signature: _____

Person responsible for test:

Name: _____
Date: _____
Company: _____
Signature: _____

Person responsible for verification of test:

Name: _____
Date: _____
Company: _____
Signature: _____

Test duration:

Initation (date/time): _____
Conclusion (date/time): _____
Date: _____
Company: _____
Signature: _____

Model: _____ SN: _____

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Date	Name	Company	Signature

Name list – Persons involved in the test procedure and subsequent report

Model: _____   SN: _____

Deviations from the specifications dictated in the PQ, are to be reported in the deviation report.
The PQ is concluded if all criteria of acceptance are approved and the possible deviations are rectified or accepted.

Measurement – Prerequisites

ID	Description	Accepted	
		Yes	No
P-1	The cabinet must be empty while conducting tests, ie without interior fittings such as drawers, shelves etc. Attachment: Notes:		
P-2	The measurements must be conducted in accordance to IEC 60068-3-5. Attachment: Notes:		
P-3	The positioning of the sensors in the cabinet must be documented with a sketch and/or a photograph. Attachment: Notes:		

	Name:	Signature:	Approved (Yes / No):	Date:
Conducted by:	_____	_____	_____	_____
Inspected / verified by:	_____	_____	_____	_____

Model: _____   SN:_____

Deviations from the specifications dictated in the PQ, are to be reported in the deviation report.
The PQ is concluded if all criteria of acceptance are approved and the possible deviations are rectified or accepted.

Measurement – Prerequisites

ID	Description	Accepted	
		Yes	No
P-4	Measurements made during the PQ tests must be documented and attached to the PQ. Attachment: Notes:		
P-5	Specify setpoint temperature: _____ °C Specify the ambient temperature: _____ °C Attachment: Notes:		
P-6	Allowed tolerances – Select the tolerance, according to the model being tested. Find model-specific tolerances in appendix. Tolerance: +/- _____ K Attachment: Notes:		

	Name:	Signature:	Approved (Yes / No):	Date:
Conducted by:	_____	_____	_____	_____
Inspected / verified by:	_____	_____	_____	_____

Model: _____ SN:_____

Deviations from the specifications dictated in the PQ, are to be reported in the deviation report.
The PQ is concluded if all criteria of acceptance are approved and the possible deviations are rectified or accepted.

Measurement – Temperature stabilization

ID	Description	Accepted	
		Yes	No
P-7	The test is intended to provide substantiation for the temperature stability inside the cabinet during normal operation. The temperature inside the cabinet must be stabilized – where all the points in the working space have reached and maintained the same temperature. When the system is stable, document ordinary operation of the cabinet at the setpoint temperature and ambient temperature specified in P-5. Duration: _____ The measurements throughout the operation test, must be documented and attached the PQ. Attachment: Notes:		
P-8	Are the measurements inside the allowed tolerances specified in P-6 ? Attachment: Notes:		

	Name:	Signature:	Approved (Yes / No):	Date:
Conducted by:	_____	_____	_____	_____
Inspected / verified by:	_____	_____	_____	_____

Model: _____   SN: _____

Deviations from the specifications dictated in the PQ, are to be reported in the deviation report.
The PQ is concluded if all criteria of acceptance are approved and the possible deviations are rectified or accepted.

Measurement – Door opening test

ID	Description	Accepted	
		Yes	No
P-9	The test is intended to provide substantiation for the temperature recovery time inside the cabinet subsequently after a door opening. The temperature inside the cabinet must be stabilized – where all the points in the working space have reached and maintained the same temperature, the setpoint temperature is specified in P-5. When the system is stable, open the door at 90° for 60 seconds. The measurements, throughout the door opening test, must be documented and attached the PQ. Duration: _____ Attachment: Notes:		
P-10	Has the setpoint temperature specified in P-5, measured in the absolute centre of the cabinet, been achieved within the set time-frame specified in the appendix? Attachment: Notes:		

Name: Signature: Approved (Yes / No):   Date:

Conducted by: _____ _____ _____ _____

Inspected / verified by: _____ _____ _____ _____

Model: _____   SN: _____

Deviations from the specifications dictated in the PQ, are to be reported in the deviation report.
The PQ is concluded if all criteria of acceptance are approved and the possible deviations are rectified or accepted.

Measurement – Pull-down

ID	Description	Accepted	
		Yes	No
P-11	The test is intended to provide substantiation for the time it takes for the inside of the cabinet to reach the setpoint temperature specified in P-5. The initial temperature in the working space is the ambient temperature specified in P-5. The temperature inside the cabinet must be stabilized in all points of the working space. When the system is stable. Turn on the power to the cabinet. The measurements, throughout the pull-down test, must be documented and attached the PQ. Duration: _____ Attachment: Notes:		
P-12	The time it takes the inside of the cabinet to achieve the setpoint temperature measured in the absolute centre, must not exceed the time-frame specified in the appendix. Have the criteria been met? Attachment: Notes:		

	Name:	Signature:	Approved (Yes / No):	Date:
Conducted by:	_____	_____	_____	_____
Inspected / verified by:	_____	_____	_____	_____

Model: _____   SN: _____

Deviations from the specifications dictated in the PQ, are to be reported in the deviation report.
The PQ is concluded if all criteria of acceptance are approved and the possible deviations are rectified or accepted.

Measurement – Hold-over

ID	Description	Accepted	
		Yes	No
P-13	The test is intended to provide substantiation for the time it takes for the temperature inside the cabinet to reach the end temperature specified in the appendix. Ambient temperature and setpoint temperature is specified in P-5. The temperature inside the cabinet must be stabilized – where all the points in the working space have reached and maintained the same temperature throughout, the tolerances are specified in P-6. When the system is stable, turn off the power to the cabinet. The measurements, throughout the hold-over test, must be documented and attached the PQ. Attachment: Notes:		
P-14	The times it takes the inside of the cabinet to reach the end temperature, must at least be the time specified in the appendix. Duration: _____ Have the criteria been met? Attachment: Notes:		

	Name:	Signature:	Approved (Yes / No):	Date:
Conducted by:	_____	_____	_____	_____
Inspected / verified by:	_____	_____	_____	_____

Model: _____   SN: _____

Deviation Report

Deviations to the criteria of acceptance are to be documented in the deviation report. A separate deviation report shall be made for each deviation. Mark the entry with the relevant "P-ID" specified in the left column in the test specifications.

P-ID: _____

Description of deviation:

_____
_____
_____
_____
_____

Extent to which the deviation has been alleviated:

_____
_____
_____
_____
_____

Additional notes:

_____
_____
_____
_____
_____

Person responsible for test:	Person responsible for verification of test:
Name: _____	Name: _____
Date: _____	Date: _____
Company: _____	Company: _____
Signature: _____	Signature: _____

Model: _____   SN: _____

Approval of test results – Performance Qualification (PQ)

◯ The steps in the Performance Qualification – PQ were completed with positive results

◯ The steps in the Performance Qualification – PQ were completed with negative results

ID of steps with negative results: _____

Additional notes:

_____

_____

_____

_____

_____

Customer / Responsible party: _____   Trainer / Responsible party: _____

_____   _____
Stamp & Signature   Stamp & Signature

_____   _____
Tel.   Tel.

_____   _____
E-mail   E-mail

_____   _____
Location & Date   Location & Date

Model: _____   SN: _____

NOTES:

Model: _____   SN: _____

Appendix:

	Model	Tolerances	Door opening – recovery time	Pull-down	Hold-over range*	Hold-over
UL	BioUltra UL570	+/- 5K	45 Minutes	300 Minutes	-80/-60 °C	150 Minutes

* The temperature span between the initial temperature and the end temperature in the hold-over test P-13,14.

	Name:	Signature:	Approved (Yes / No):	Date:
Conducted by:	_____	_____	_____	_____
Inspected / verified by:	_____	_____	_____	_____

Model: _____   SN: _____

GRAM

Biostorage you can depend on