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CryoCube® F740

Operating manual

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CT0540-0000-013-00/032017

Table of contents

1 Operating instructions

1.1 Using this manual

- Read this operating manual completely before using the device for the first time. Also observe the instructions for use of the accessories.
- This operating manual is part of the product. Thus, it must always be easily accessible.
- Enclose this operating manual when transferring the device to third parties.
- You will find the current version of the operating manual for all available languages on our website under www.eppendorf.com/manuals.

1.2 Danger symbols and danger levels

1.2.1 Hazard symbols

	**Hazard point**		**Freezer burn**
	**Electric shock**		**Material damage**
	**Crush**		**Flammable**

1.2.2 Degrees of danger

The following degree levels are used in safety messages throughout this manual. Acquaint yourself with each item and the potential risk if you disregard the safety message.

DANGER	*Will* lead to severe injuries or death.
WARNING	*May* lead to severe injuries or death.
CAUTION	May lead to light to moderate injuries.
NOTICE	May lead to material damage.

1.3 Symbols used

Depiction	Meaning
1. 2.	Actions in the specified order
▸	Actions without a specified order
•	List:
Text	Display or software texts
ⓘ	Additional information

1.4 Abbreviations used

HC
Hydrocarbon

HFC
Hydrofluorocarbon

N/A
Not applicable

ULT
Ultra-Low Temperature

2 Safety

2.1 Intended use

CryoCube® freezers are designed to provide precise, ultra-low temperature environments for storage of biological materials for research purposes. They are designed to provide ultra-low temperature sample storage from -50 °C to -86 °C at 32 °C maximum ambient operating temperature.

2.2 Warnings for intended use

DANGER! Risk of injury due to tilting of the device.
If the device tips over and falls on a person, the person may sustain fatal injuries.

- Transport the device with a sufficient number of helpers.
- Do not transport the device over ramps at an angle > 17 % (10°). Transport the device sideways over ramps.
- Only lift the device with a transport aid.

WARNING! Risk of explosion.

- Do not operate the device in areas where work is completed with explosive substances.
- Do not store any explosive or highly reactive substances in this device.
- Do not store any substances in this device that could generate an explosive atmosphere.

WARNING! Lethal voltages inside the device.
Touching parts which are under high voltage may cause an electric shock. An electric shock injures the heart and causes respiratory paralysis.

- Ensure that the housing is closed and undamaged.
- Do not remove the housing.
- Ensure that no liquid can penetrate into the device.

Only authorized service staff may open the device.

WARNING! Electric shock due to damage to device or mains/power cord.

- Only switch on the device if the device and mains/power cord are undamaged.
- Only use devices that have been properly installed or repaired.
- In case of danger, disconnect the device from the mains/power supply. Pull the mains/power plug out of the device or the socket. Use the isolating device intended for this purpose (e.g., emergency switch in the laboratory).

WARNING! Risk from incorrect supply voltage.

- Only connect the device to voltage sources which correspond to the electrical requirements on the name plate.
- Only use sockets with a protective earth (PE) conductor and a suitable power cable.

WARNING! Damage to health from infectious liquids and pathogenic germs.

- When handling infectious liquids and pathogenic germs, observe the national regulations, the biological security level of your laboratory, the Safety Data Sheets, and the manufacturer's application notes.
- Wear your personal protective equipment.
- Consult the "Laboratory Biosafety Manual" (source: World Health Organization, Laboratory Biosafety Manual, as amended) for comprehensive regulations on the handling of germs or biological materials of risk group II or higher.

CAUTION! Risk of burns from direct contact with cold surfaces.
The temperature inside the device is low. Direct contact with the interior of the device or the samples can lead to burns.

- Wear cold protection gloves when loading and unloading the device.

CAUTION! Risk of crushing fingers during closing of the outer door

- Do not place your fingers between the device and the outer door.
- When closing the outer door, do not touch the peg and the covers of the door lock.

NOTICE! Radio interference.
This device is a category A product in accordance with EN 55011. There may be disturbance to radio reception in residential areas.

- Ensure that appropriate preventive measures are taken.

NOTICE! Damage to electronic components due to condensation.
Condensate can form in the device after it has been moved from a cool environment to a warmer environment.

- After installing the device, wait at least for 6 h. Only then connect the device to the mains/ power supply.

2.3 Electromagnetic compatibility

2.3.1 Europe

This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

2.3.2 U.S.A.

Any modification or changes made to this device, unless explicitly approved by Eppendorf, will invalidate the authorization of this device. Operation of an unauthorized device is prohibited under Section 302 of the Communications Act of 1934, as amended, and Subpart I of Part 2 of Chapter 47 of the Code of Federal Regulations.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the operating manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

2.4 Danger symbols on device

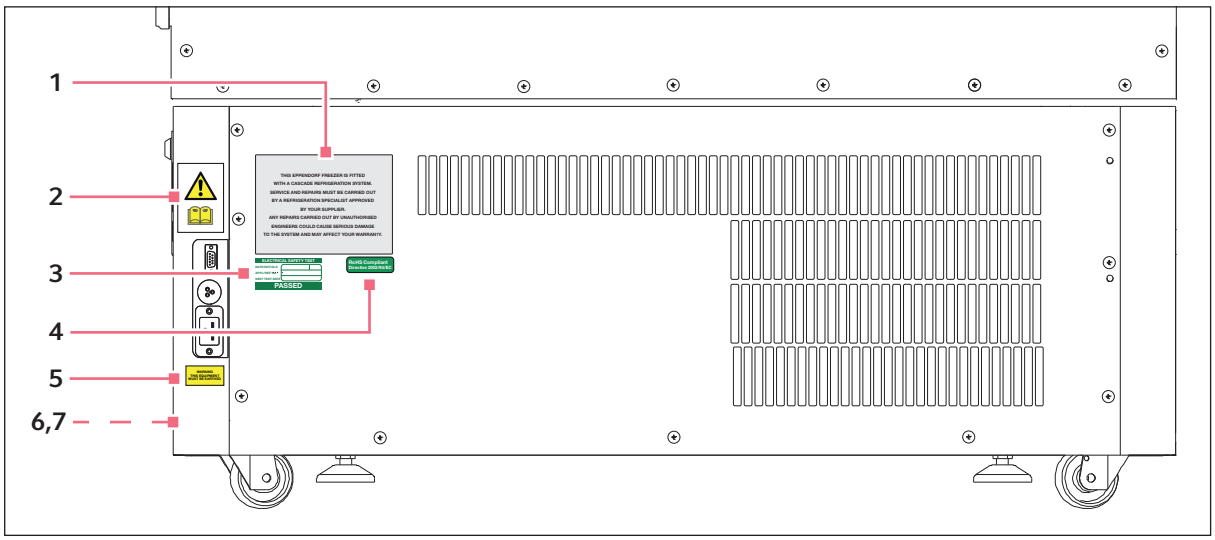


Fig. 2-1: Danger symbols on right side panel and rear panel

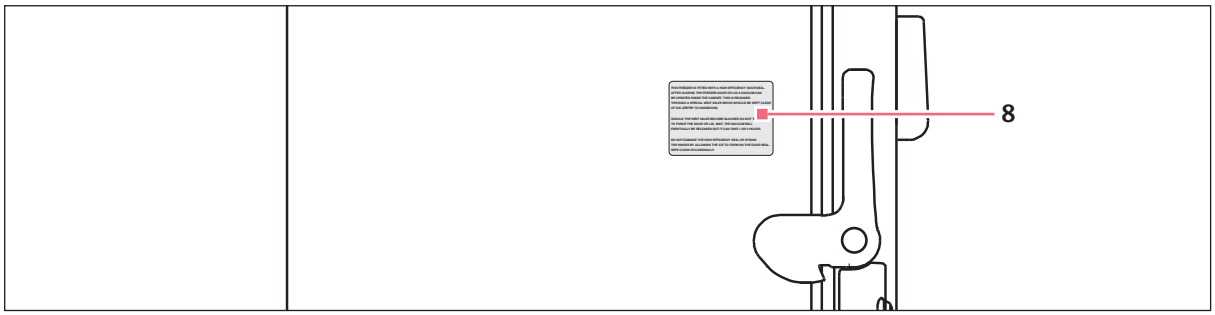


Fig. 2-2: Danger symbols on door handle

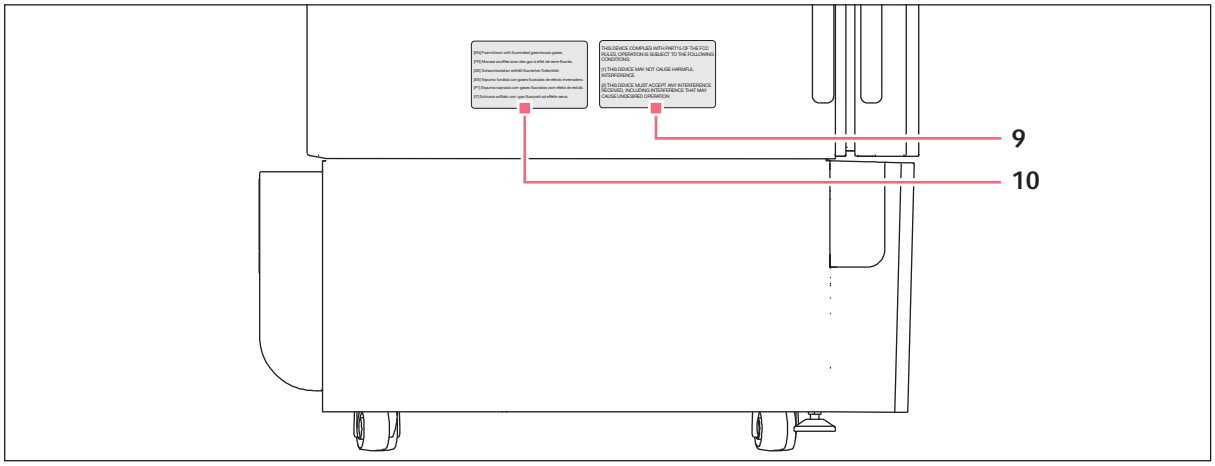


Fig. 2-3: Danger symbols on the left side panel

	Danger symbol	Meaning
1	THIS EPPENDORF FREEZER IS FITTED WITH A CASCADE REFRIGERATION SYSTEM. SERVICE AND REPAIRS MUST BE CARRIED OUT BY A REFRIGERATION SPECIALIST APPROVED BY YOUR SUPPLIER. ANY REPAIRS CARRIED OUT BY UNAUTHORISED ENGINEERS COULD CAUSE SERIOUS DAMAGE TO THE SYSTEM AND MAY AFFECT YOUR WARRAN1Y.	The device must be serviced and repaired by a qualified refrigeration engineer authorized by Eppendorf AG. If the device is serviced or repaired by an unauthorized person, the liability of Eppendorf AG will be void.
2		Caution Observe the operating manual.
3	ELECTRICAL SAFETY TEST DATE/INITIALS APPL/REF No. NEXT TEST DATE PASSED	The device has passed the electrical safety test.
4	RoHS Compliant Directive 2002/95/EC	The device complies with the RoHS Directive 2002/95 / EC.
5	WARNING THIS EQUIPMENT MUST BE EARTHED	The device may only be connected to a mains/power supply with a protective conductor.
6		Danger of electric shock
7	Danger Disconnect the mains supply before removing this cover	Danger of electric shock Disconnect the power cord before removing the side panel.

	Danger symbol	Meaning
8	THIS FREEZER IS FITTED WITH A HIGH EFFICIENCY DOOR SEAL. AFTER CLOSING THE FREEZER DOOR OR LID A VACUUM CAN BE CREATED INSIDE THE CABINET. THIS IS RELEASED THROUGH A SPECIAL VENT VALVE WHICH SHOULD BE KEPT CLEAR OF ICE. (REFER TO HANDBOOK) SHOULD THE VENT VALVE BECOME BLOCKED DO NOT TRY TO FORCE THE DOOR OR LID, WAIT, THE VACUUM WILL EVENTUALLY BE RELEASED BUT IT CAN TAKE 1 OR 2 HOURS. DO NOT DAMAGE THE HIGH EFFICIENCY SEAL OR STRAIN THE HINGES BY ALLOWING THE ICE TO FORM ON THE DOOR SEAL. WIPE CLEAN OCCASIONALLY.	The outer door of the device has a strong seal. When the outer door or the lid is closed, a vacuum can occur in the interior. The vacuum is compensated by a vent valve. Keep the vent valve free of ice. If the vent valve is blocked, do not try to open the door or the lid forcibly. Wait for the pressure compensation to take place. The pressure compensation can take 1 h – 2 h. When ice forms in the gasket, the gasket and hinges will be damaged. To prevent damage, clean the seal of ice.
9	THIS DEVICE COMPLIES WITH PART15 OF THE FCC RULES. OPERATION IS SUBJECT TO THE FOLLOWING CONDITIONS: (1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE (2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED, INCLUDING INTERFERENCE THAT MAY CAUSE UNDESIRED OPERATION	This device complies with Part 15 of the FCC rules. Operation is subject to the following conditions: 1. The device may not cause harmful interference. 2. This device must accept any interference received, including interference that may cause undesired operation.
10	[EN] Foam blown with fluorinated greenhouse gases. [FR] Mousse soufflée avec des gaz à effet de serre fluorés. [DE] Schaumisolation enthält fluoriertes Treibmittel. [ES] Espuma fundida con gases fluorados de efecto invernadero. [P1] Espuma soprada com gases fluorados com efeito de estufa. [IT] Schiuma soffiato con i gas fluorurati ad effetto serra.	Foam blown with fluorinated greenhouse gases.

2.5 User profile

The device and accessories may only be operated by trained and skilled personnel.

Before using the device, read the operating manual carefully and familiarize yourself with the device's mode of operation.

2.6 Information on product liability

In the following cases, the designated protection of the device may be compromised. Liability for any resulting property damage or personal injury is then transferred to the operator:

- The device is not used in accordance with the operating manual.
- The device is used outside of its intended use.
- The device is used with accessories or consumables which are not recommended by Eppendorf.
- The device is maintained or repaired by people not authorized by Eppendorf.
- The user makes unauthorized changes to the device.

3 Product description
3.1 Product overview
3.1.1 Front view

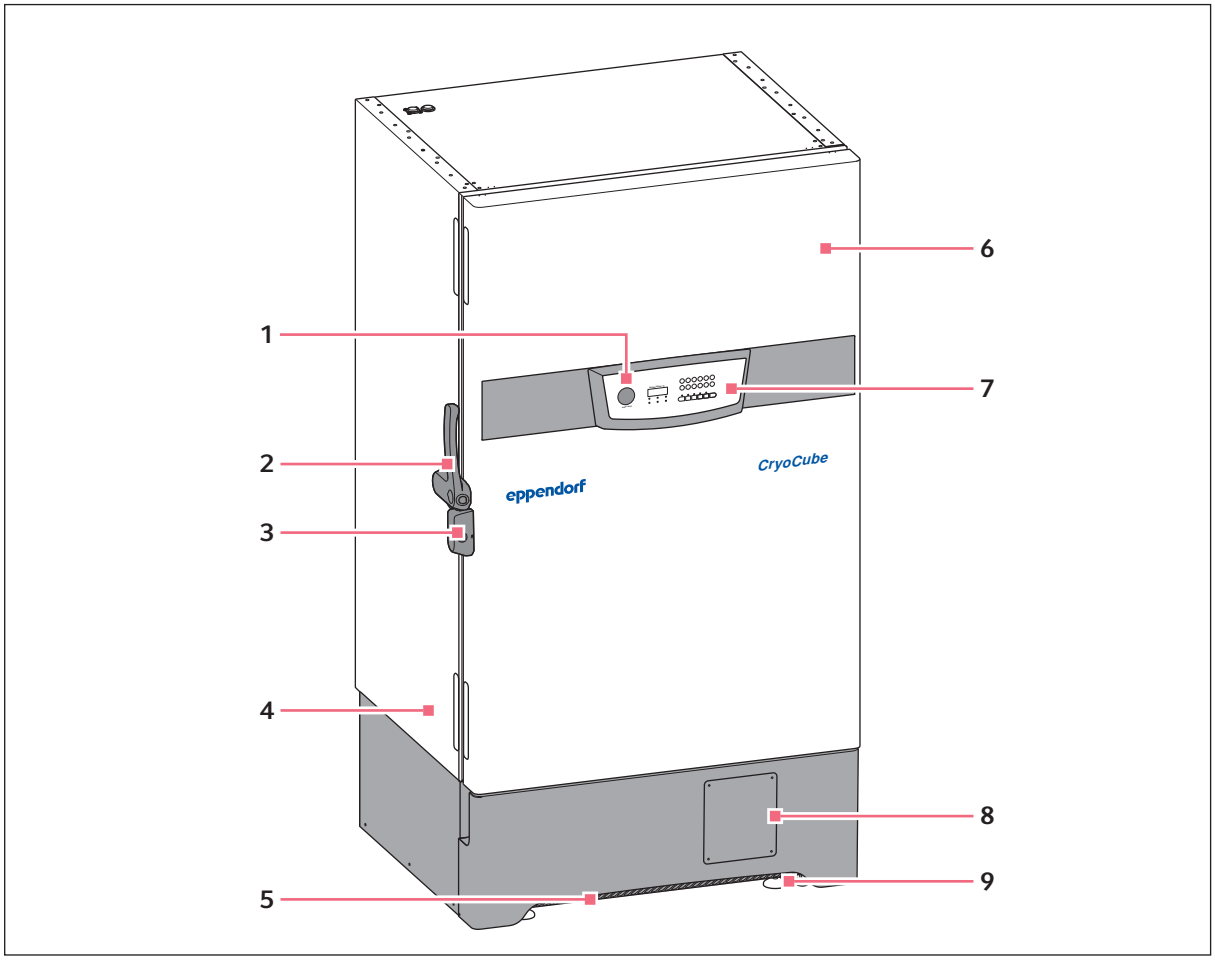


Fig. 3-1: Front view - model with the door mounted on the right

1 ***auto vent*** **valve**
Automatic pressure compensation

2 **Door handle**

3 **Mechanical lock**

4 **Name plate**

5 **Air filter**
Filter grille and filter mat

6 **Outer door**

7 **Control panel**
Display and operating controls

8 **Cover plate**
Assembly of optional analog chart recorder

9 **Leveling feet**
Stability and alignment of the device

3.1.2 Side view

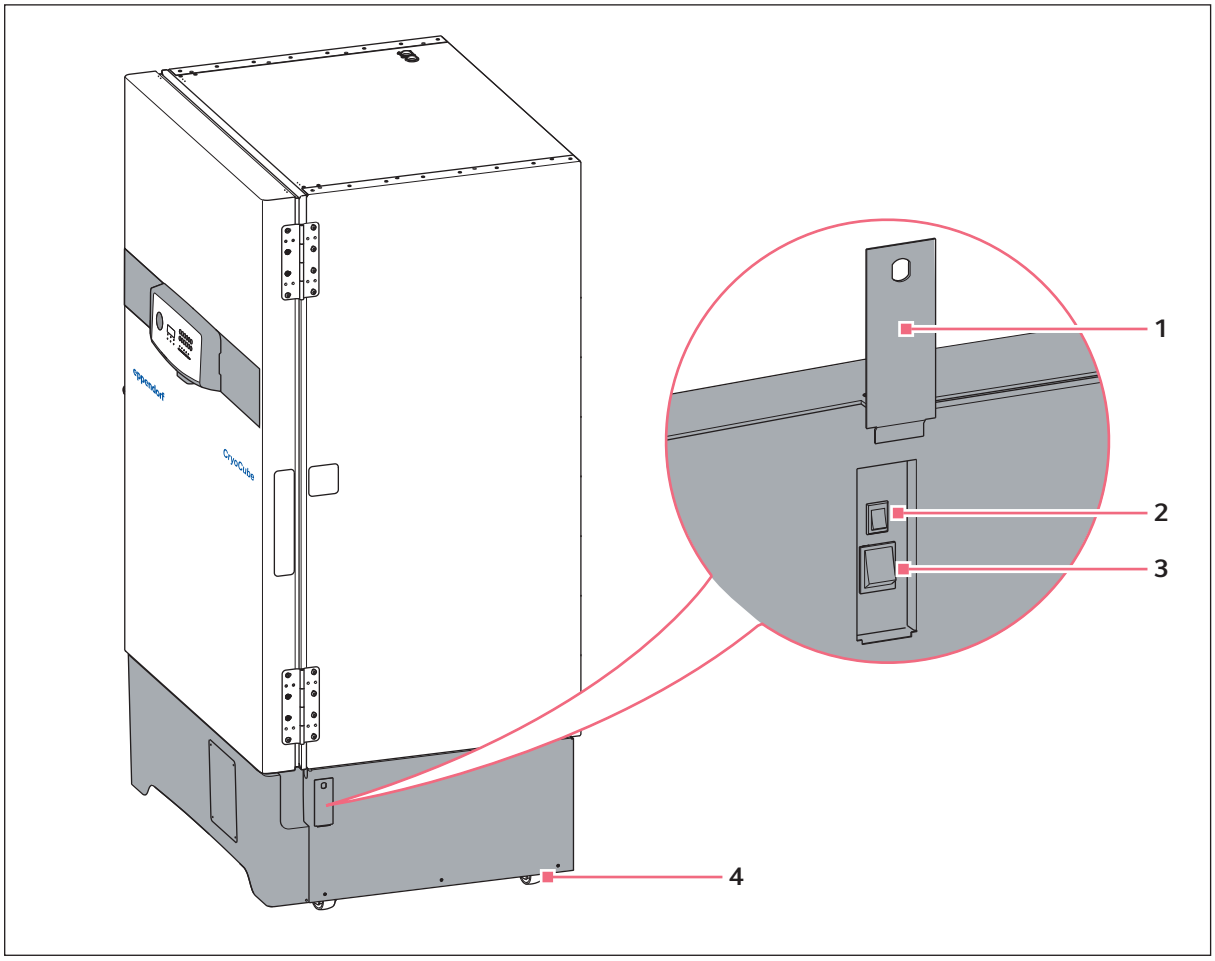


Fig. 3-2: Side view

1 Switch locking plate
Lockable plate cover for mains/power switch and battery switch

2 Battery switch
Activating the safety circuit (I = On, 0 = Off)

3 Mains/power switch
Switching the device on or off (I = On, 0 = Off)

4 Heavy-duty castors

3.1.3 Rear view

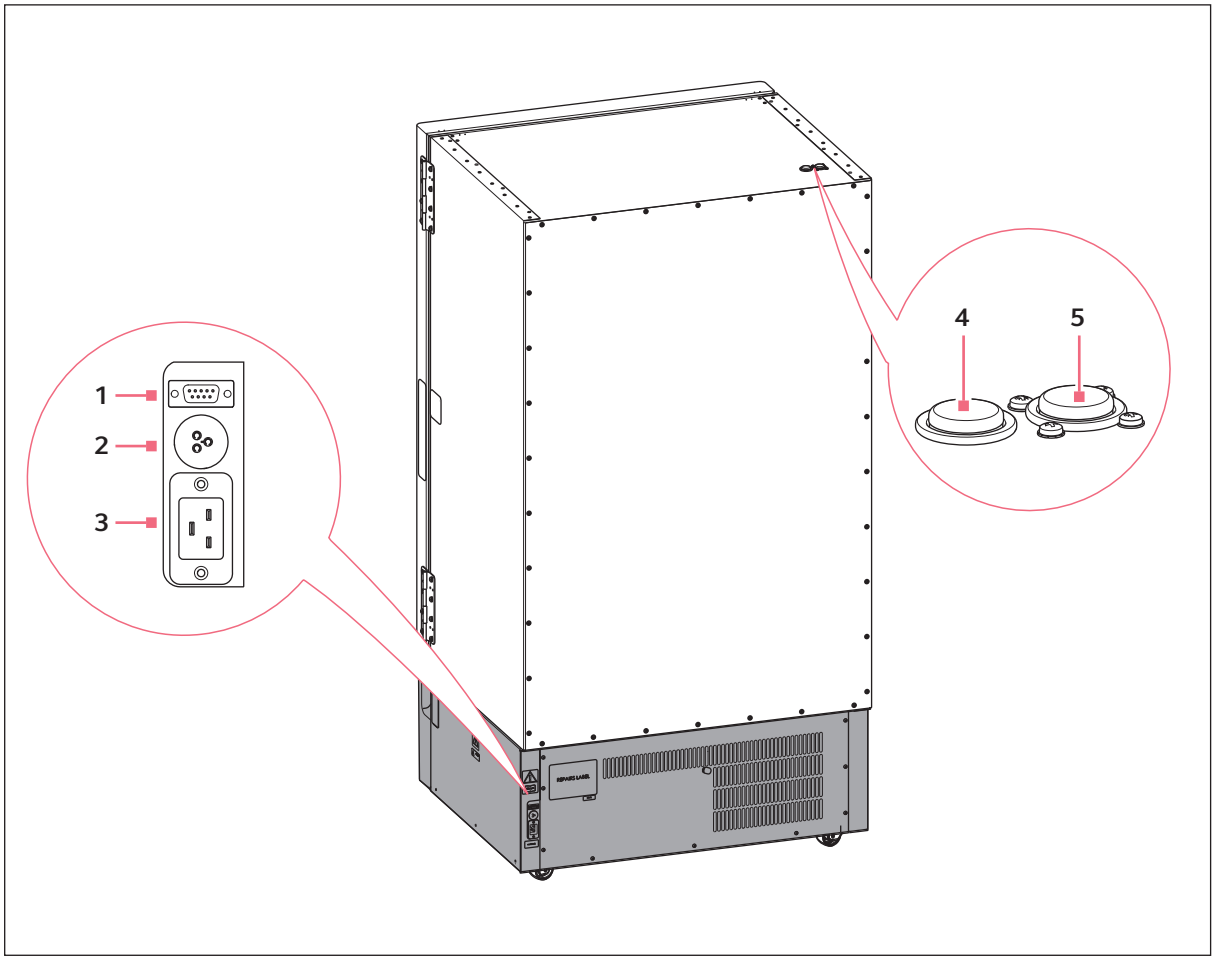


Fig. 3-3: Rear view

1 Serial interface
For service personnel only

2 Port for building management system

3 Port for mains/power cord
With safety clamp

4 Access port for external sensors

5 Access port for external sensors
Port for optional emergency cooling system (e.g. CO_2 safety system)

3.1.4 Internal view

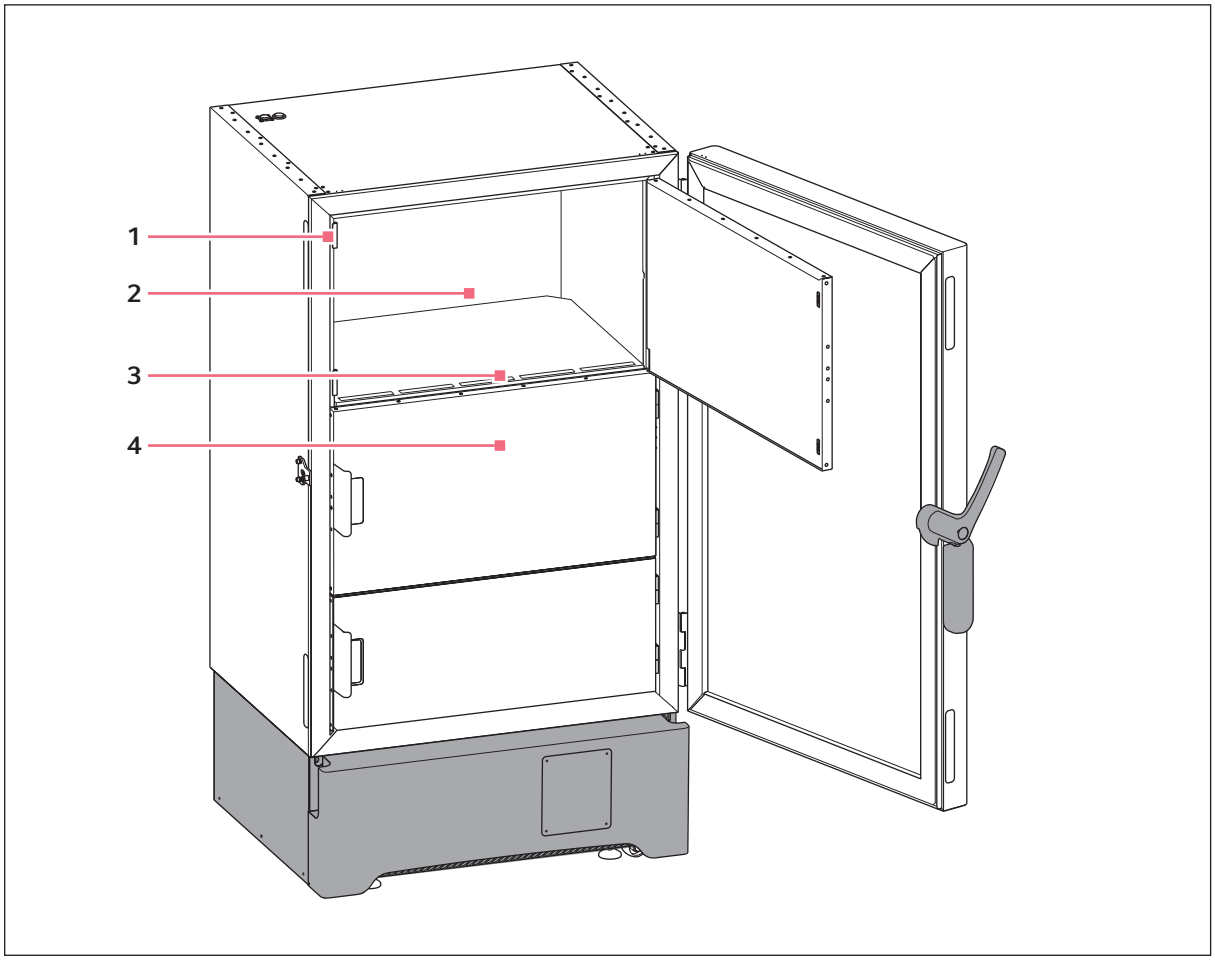


Fig. 3-4: Exemplary view of the interior of a model with 3 inner doors

1 Magnetic closure of inner door
2 Inner compartment
3 Inner shelf
4 Inner door

3.2 Keypad Controls

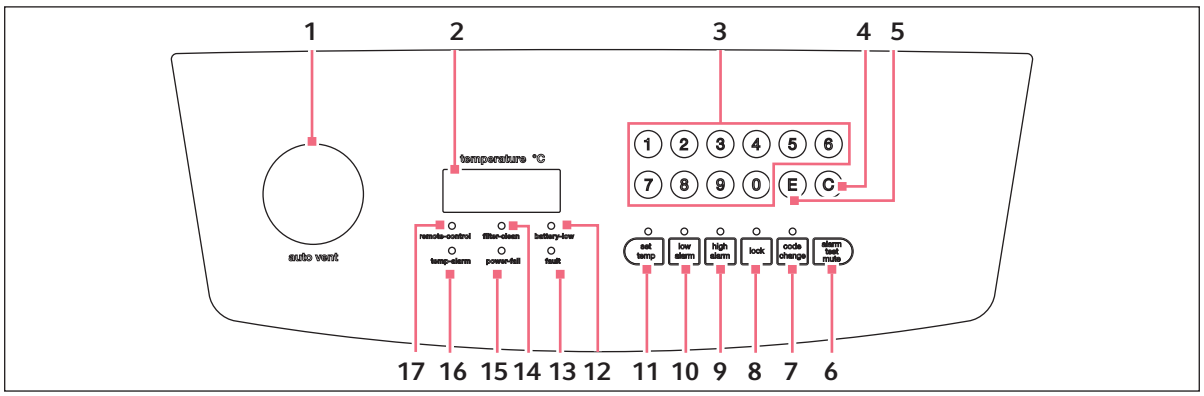


Fig. 3-5: Display panel and keypad

1 Auto vent button

2 Display
Displays temperature, alarm settings, and ambient temperature

3 Numerical keys
0 – 9

4 C key
Used to clear data

5 E key
Used to enter data

6 Alarm test/mute key
Sounds the audible alarm
Mutes the audible alarm if an alarm condition occurs

7 Code change key
Used to change freezer lock codes

8 Lock key
Locks and unlocks the control panel for programming

9 High alarm key
Displays current high alarms
Used to program high alarms

10 Low alarm key
Displays current low alarms
Used to program low alarm

11 Set temperature key
Displays current temperature setting
Used to change temperature settings

12 Battery low indicator
Illuminates or flashes when battery voltage is too low

13 Fault indicator
Illuminates if there is a system fault within the freezer

14 Filter clean indicator
Illuminates to indicate a blocked or dirty filter
Audible alarm will sound when indicator is flashing

15 Power fail indicator
Flashes to indicate mains/power failure
Audible alarm will sound when indicator is flashing

16 Temperature alarm indicator
Illuminates when setpoint is passed

17 Remote control indicator
Illuminates when freezer is operating under remote computer control

3.3 Features

Eppendorf ULT freezers are built to stringent regulatory requirements for energy-efficiency, safety and environmental friendliness and disposability, and are CE and UL certified.

3.3.1 Control panel

A digital temperature readout and setpoint keypad are provided on the control panel. Indicator lights provide warning of the following conditions:

- Power loss
- System failure
- Exceeding high or low temperature setpoints
- Low battery voltage
- Filter blockage

3.3.2 Setpoint protection

To protect the freezer settings from unwanted modification, the control panel features a setpoint protection mode. The setpoint protection mode is enabled upon delivery. The default unlocking code is 0000. To change setpoints for temperature or alarms, disable the setpoint protection. You can change the unlocking code using the keyboard.

3.3.3 Security

A lockable freezer handle on the outer door provides added security against unauthorized users.

3.3.4 Compressors

Heavy-duty compressors provide rapid temperature pull-down and recovery after door opening.

3.3.5 Vent port

The CryoCube F740 freezer features an automatically heated vent port, which enables the outer door to be easily opened at any time.

3.3.6 Construction

The CryoCube freezers are manufactured using high quality steel and electronics for long life, and have many features designed to provide ease of use and maintenance, security and reliability to your ultra-low temperature storage needs.

All freezers are mounted on heavy-duty castors for ease of movement. Upright freezers have feet that provide both a leveling and locking feature to stop the freezer from rolling once it is in place.

All interior panels and shelves are constructed from durable, high grade, corrosion-resistant stainless steel and are easy to decontaminate and keep clean.

3.3.7 Shelves

The internal shelves are level with the rubber seal of each inner door, so that loss of cold air is prevented when the inner doors are kept closed.

3.3.8 Access ports

Two access ports allow sensors or back-up systems to be easily installed. This optional equipment can provide cooling protection for your samples in the case of a power outage or system failure.

3.3.9 External monitoring

An alarm contact is provided for connection to an external monitoring device or system.

The freezers can also be fitted with an optional circular chart recorder to provide independent temperature recording, or a TCA-3 temperature monitoring system.

3.4 Delivery package

3.4.1 Inspection of boxes

Inspect the boxes carefully for any damage that may have occurred during shipping. Report any damage to the carrier and to your local Eppendorf Sales Representative immediately.

3.4.2 Packing list verification

Unpack your order, saving the packing materials for possible future use. Save the operating manual for instruction and reference. Verify against your packing list that you have received the correct materials, and that nothing is missing.

Amount	Description
1	Eppendorf CryoCube F740 ULT Freezer
1	Power cord
2	Outer door keys
2	Mains switch panel keys
1	Operating manual
1	Unpacking guide
1	Certificate of Quality
1	Tool for dismounting the ramp of the pallet

4 Installation

4.1 Selecting the location

Position the freezer to allow sufficient room for:

- Plug disconnection
- Appliance coupler removal
- Free air entry through the intake grill
- Free air exit from the back of the unit

Provide a clearance of at least 150 mm (6 in) on all sides.

For efficient temperature control, the freezer should be placed in a shaded area, away from sources of excessive heat. For maximum cooling capability, the product should be located in an air-conditioned room.

Lock the freezer in place with its locking feet before putting it to operation.

4.2 Preparing installation

DANGER! Tip over hazard.
If the device tips and falls onto a person, the person can be fatally injured.

- ▸ Transport the device with a sufficient number of helpers.
- ▸ Do not transport the device via ramps with an angle> 17% (10 °). Always transport the device sideways over ramps.
- ▸ Only lift the device using a transport aid.

NOTICE! Device damage by lifting the device without the original pallet.
If you lift the device without the original pallet, the bottom of the device will be damaged.

- ▸ Place the device on the original pallet.
- ▸ Secure the device.
- ▸ Use a transport aid to lift the device.

NOTICE! Risk of material damage

- ▸ Maintenance, adjustment and repair work must be carried out only by QUALIFIED, EXPERIENCED persons who have been AUTHORIZED to undertake such work by Eppendorf or its authorized agents.

NOTICE! Risk of material damage due to improper door handling

- ▸ Do not slam the door with the handle in the closed position.
- ▸ Do not move the freezer by pulling or pushing on the handle.

4.3 Mains/power plugs and sockets

WARNING! Electric shock due to damage to device or mains/power cord.

- Only switch on the device if the device and mains/power cord are undamaged.
- Only use devices that have been properly installed or repaired.
- In case of danger, disconnect the device from the mains/power supply. Pull the mains/power plug out of the device or the socket. Use the isolating device intended for this purpose (e.g., emergency switch in the laboratory).

WARNING! Risk of personal injury from electric shock and mains/power supply.

- Before connecting the CryoCube Freezer to the mains/power supply, make sure that the mains/power supply matches the requirements of the equipment.
- Check the specification plate (located on the side of the freezer) for the electrical requirements.
- Ensure the CryoCube Freezer is connected to an earth/grounded socket.

Eppendorf freezers are delivered with a mains/power cord as required in your country. Use the supplied mains/power cord to connect the freezer.

4.3.1 Plug in

Once you have verified that the mains/power supply matches the electrical requirements of the freezer, connect the product to the mains/power supply using the mains/power cord provided.

NOTICE! Risk of material damage due to incorrect power cords
Some ULT freezers are delivered with several removable power cords. Use the power cord that fits into your earth/grounded socket.

- Check on the name plate if the ULT freezer is compatible with the mains/power supply in your lab.
- Only use approved mains/power cords with the correct power rating.
- Contact your local Eppendorf sales office for replacement cords.

4.4 Lockable freezer handle

The door handle has a cam action to pull the door closed and a reverse cam action to break the seal so the door can be opened. When closing the outer door, ensure that the cam is engaged for correct operation. The initial vacuum inside the cabinet may cause the door to appear closed, but when the vacuum releases, the door will open. Always ensure the handle is properly engaged. It is important that the heated vent port is kept clear. This will avoid putting undue stress on the handle mechanism.

Freezers are supplied with lockable handles.

NOTICE! Risk of material damage due to improper door handling

- Do not slam the door with the handle in the closed position.

4.5 Remote alarm socket

CAUTION!

- Hazardous voltages must not be connected to the remote alarm socket.
- Maximum rating is 24 V, 1 A.

The freezers are provided with an alarm monitoring socket at the rear of the freezer and a matching plug for external monitoring purposes. This plug can also be connected to either a central monitoring system or to a remote alarm via an auto-dialer.

Within the freezer, the socket is connected to voltage-free contacts rated as 24 V, 1 A.

Connections to the remote alarm socket must have double or reinforced insulations from mains voltage (according to 61010-1).

In normal operation, with the power on:

- Pin 1 is connected to pin 2 on the alarm monitor socket (N/C).

While in the alarm condition (power failure with battery switch set to I or high temperature alarm):

- Pin 1 ist connected to pin 3 on the socket (N/O).

The high temperature alarm output to the remote alarm monitoring socket can be programmed to a set time delay.

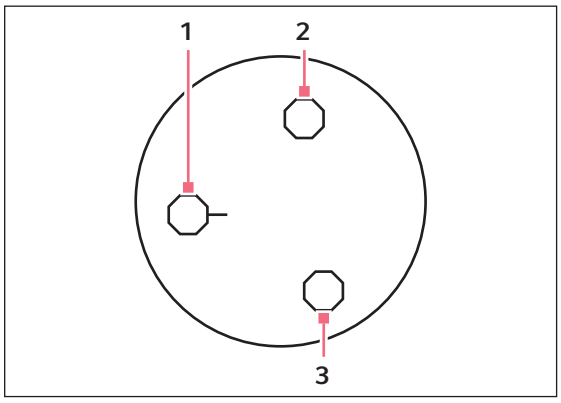


Fig. 4-1: Remote alarm socket - upright freezer

4.6 RS-485 connection

RS-485 interface shall secure double/reinforced insulation from mains voltage (According to 61010-1).

An optional serial I/O connection rated 5 V max for RS-485 connection can be fitted. Contact your local Eppendorf distributor for details.

5 Operation

5.1 Getting started

WARNING! Risk of personal injury from electric shock and mains/power supply.

- Before connecting the CryoCube Freezer to the mains/power supply, make sure that the mains/power supply matches the requirements of the equipment.
- Check the specification plate (located on the side of the freezer) for the electrical requirements.
- Ensure the CryoCube Freezer is connected to an earth/grounded socket.

5.1.1 Turning the freezer on/off

The **on/off** main switch is located within the lockable panel at the bottom right-hand corner of the freezer.

To remove the lockable panel and turn the mains switch and battery switch on/off:

1. Unlock and remove the panel.
2. Set the **on/off** main switch and battery switch to the **I** (**ON**) position.
   The temperature display illuminates immediately.
3. Install the panel and lock it.

The compressors will not operate for approximately three minutes after connection of the mains/power supply, because there is an automatic delay device in the circuit. Temperature and alarm settings can be adjusted immediately.

5.1.2 Alarm/battery activation

The equipment is delivered with the battery deactivated. The power fail alarm is activated by the battery rocker switch within the lockable panel, which is located at the bottom right-hand corner. The switch is labelled **I** (**ON**) and **O** (**OFF**).

- To activate the alarm, place the battery switch in the **I** position.

Failure to turn on the battery switch may lead to a discharged battery, low battery alarm indication, and/or a disabled alarm system.

- After activating the alarm, test its operation by pressing the **ALARM TEST/MUTE** key on the display.
  The audible alarm should sound.

The **ALARM TEST/MUTE** key also tests the LED indicators. All of the LEDs should light up together when the button is pressed.

Pull down time to -86 °C will be dependent on the freezer size and model. The alarm will sound every 30 min until the temperature setpoint is reached. Use the ALARM TEST/MUTE key to mute the alarm during this initial pull-down period.

If the freezer is turned off during the initial pull-down period, the alarm will activate 30 min after switching it back on.

The factory-set temperature is -80 °C.

5.1.3 Testing the alarm monitoring socket

The freezer is fitted with a remote alarm socket for testing power-fail and low battery alarms, and for connection to an external building monitoring system. To test the alarm monitoring socket:

- Turn off (**O**) the **on/off** main switch.
  This will test the **POWER FAIL** and **ALARM** output at the same time.

The battery must be switched on to test the **POWER FAIL**. The remote alarm facility provides voltage-free contacts rated at 1 A, 24 V maximum.

5.1.4 Door operation

CAUTION! Risk of crushing fingers when closing the outer door handle.

- When closing the door do not touch the latch plate or put your fingers in the gap between the door and the body of the freezer.

After closing the freezer door, a vacuum may be created. Before the door can be opened again, it may be necessary to wait 1 or 2 min for the vacuum to be released by the vent port. Do not try to force the door open. During the release of the vacuum, a slight hissing sound may be heard. The heated vent is designed to keep the port clear of ice.

5.2 Inner doors

Inner doors seal the inner compartments. When they are closed, cold air loss is minimized and ice formation is reduced.

- Only open one inner door
  Keep the other inner doors closed
- Always close all inner doors first before closing the outer door to avoid damage.

5.3 Programming the freezer

Set the freezer to any temperature within the range from -50 °C to -86 °C.

All temperature setpoints are automatically negative °C.

5.3.1 Setting operating temperature

To set the operating temperature for the freezer:

1. Press the **LOCK** key.

   The **LOCK** indicator will flash if a lock code (password protection) is required.

   The **LOCK** indicator will illuminate, indicating the system is unlocked and parameters can be changed.
2. Press the **SET TEMP** key.
   Its indicator will flash and the display will indicate 0.
3. Using the numerical keys, enter a new temperature (from -50 °C to -86 °C).
   The temperature selected will appear in the **TEMPERATURE** display.
4. When the correct temperature is displayed, press the **E** key to enter the data.
   The **SET TEMP** indicator will go off.
5. Press the **LOCK** key to exit programming.
   The **LOCK** indicator will go off and the freezer will return to normal mode.

Press the **C** key to clear the display during programming.

5.3.2 Setting high alarm setpoint

The high alarm setpoint may not be warmer than -10 °C and may not be less than within +5 °C of the operating temperature. The default setting is +5 °C from the temperature setpoint.

1. Press the **LOCK** key.

   The **LOCK** indicator will flash if a lock code (password protection) is required.

   The **LOCK** indicator will illuminate, indicating the system is unlocked and parameters can be changed.
2. Press the **HIGH ALARM** key.
   Its indicator will flash and the display will indicate 0.
3. Using the numerical keys, enter a new alarm setpoint temperature.
   The selected temperature will appear in the **TEMPERATURE** display.
4. When the correct temperature is displayed, press the **E** (Enter) key to enter the data.
   The **HIGH ALARM** indicator will turn off.
5. Press the **LOCK** key to exit programming.
   The **LOCK** indicator will go off and the freezer will return to normal mode.

Press the **C** key to clear the display during programming.

5.3.3 Setting low alarm setpoint

The low alarm setpoint may not be colder than -91 °C and may not be more than within -5 °C of the operating temperature. The default setting is -5 °C from the temperature setpoint.

1. Press the **LOCK** key.

   The **LOCK** indicator will flash if a lock code (password protection) is required.

   The **LOCK** indicator will illuminate, indicating the system is unlocked and parameters can be changed.
2. Press the **LOW ALARM** key.

   Its indicator will flash and the display will indicate 0.
3. Using the numerical keys, enter a new alarm setpoint temperature.

   The selected temperature will appear in the **TEMPERATURE** display.
4. When the correct temperature is displayed, press the **E** (Enter) key to enter the data.

   The **LOW ALARM** indicator will turn off.
5. Press the **LOCK** key to exit programming.

   The **LOCK** indicator will go off and the freezer will return to normal mode.

Press the **C** key to clear the display during programming.

5.3.4 Checking temperature and alarm setpoint settings

To view the currently set operating temperature, high alarm setpoint, or low alarm setpoint for the freezer.

- Press the **SET TEMP** key, **HIGH ALARM** key, or the **LOW ALARM** key and read the display.

If you press the **SET TEMP**, **HIGH ALARM** or **LOW ALARM** key while the **LOCK** key indicator is flashing, the display will read ---- , which indicates that the freezer is locked.

5.3.5 Setting the alarm delay

The **HIGH ALARM** audible alarm and the **REMOTE ALARM** monitoring socket can be programmed to a time delay set between 0 – 40 min.

The default time delay is 30 min. If the time delay is set to 0 min, the system will program it as 15 s.

Press **KEY 8** to display the High Temperature audible alarm delay, and press **KEY 9** to display the Remote Alarm Socket switching delay.

To set the audible **HIGH ALARM** delay (**KEY 8**):

1. Press the **LOCK** key.
   The **LOCK** indicator illuminates, indicating the system is unlocked and parameters can be changed.
2. Press keypad button **8**.
   pp flashes on the display.
3. Enter the desired value (e.g., press keypad buttons **1** and **0** to designate 10 min).
4. Press the **E** (Enter) key.
   The **LOCK** indicator goes out.

To set the **REMOTE ALARM** socket time delay (**KEY 9**):

1. Press the **LOCK** key.
   The **LOCK** indicator illuminates, indicating the system is unlocked and parameters can be changed.
2. Press keypad button **9**.
   pp flashes on the display.
3. Enter the desired value (e.g., press keypad button **5** to designate 5 min).
4. Press the **E** (Enter) key.
   The **LOCK** indicator goes out.

If the number entered is valid, **---** flashes on the display, the value has been stored, and the **LOCK** indicator goes out. (This is a one-shot operation.)

If the number entered is out of range, **–EE–** shows on the display and the operation will need to be repeated using a valid number.

5.3.6 Changing lock codes

If you enter a lock code when there is none, or if you replace an existing lock code with a new one, take note of the new code before you enter it.
If the code is forgotten, you will need to contact Customer Service to regain access to the programming mode of the freezer.

The freezer is delivered unlocked. To change the code, the freezer must be unlocked. If a lock code has already been set (indicated by the **LOCK** indicator flashing when the **LOCK** key is pressed), that same code must be entered to unlock the freezer. When the freezer is unlocked, the **LOCK** indicator is on (not flashing).

Once the freezer is unlocked, follow these steps to set a new lock code:

1. Press the **CODE CHANGE** key.
   The indicator will flash and the display will go blank.
2. Using the numerical keys, enter the new four-digit number. Check it on the display.
3. Press the **C** key to cancel the entry if the display shows it to be incorrect, then enter the correct number.
4. When the number is correct, record the new number somewhere secure. Then press the **E** (Enter) key.
   The **CODE CHANGE** indicator will turn off.
5. Press the **LOCK** key.
   Its indicator will turn off.

The freezer now has a new lock code. If at any time you wish to change this code, you will have to enter this code to unlock the system before you can enter a new code.

Setting the lock code to **0000** disables the lock completely. With the **0000** code, press the **LOCK** key to reprogram the freezer.

5.3.7 Setting the temperature offset

The temperature offset function enables to add a temperature offset to the factory defined temperature settings.

1. Press the **LOCK** Key.
2. Press the **C** key to access the offset function.
3. Press **0**, **1**, **2**, **3**, or **4** key to set the offset in degrees.
4. Press the **ENTER** key to confirm selection.

Set temperature offset to "0" for no offset.

5.3.8 Displaying the ambient temperature

1. Press and hold the **0** key.
   The display shows the ambient temperature.

5.3.9 Setting the filter-clean notification

The filter-clean indicator flashes after a period of time. To set the notification period in months:

1. Press the **LOCK** Key.
2. Press the **E** key.
3. Press the **ALARM TEST/MUTE** key.
4. Enter number of months (**1** to **12**) for the filter-clean notification period.
   Default setting is **3** months.
   Entering **0** disables the filter-clean notification.
5. Press the **E** key to confirm the input.

5.3.10 Displaying the remaining time until next filter clean notification

1. Press and hold the **E** key for 5 seconds.
   The display shows the remaining time in months until next filter clean is due.

5.3.11 Acknowledging the filter-clean notification

If the filter-clean indicator flashes:

1. Clean the filter as described in Maintenance.
2. Press and hold the **C** key for 10 seconds.

The filter-clean indicator is switched off.

The display shows the time in months until next filter clean is due.

5.4 Battery backup switch

This is a rocker switch labeled **I/O** behind the locked front panel. In the **O** position, the battery is disconnected. This position should only be used while in transit, in storage, or to change the battery.

At all other times the switch should be kept in the **I** position for the battery to be charged, and for the alarm function to be available in the event of mains/power failure. **(Failure to set the switch may result in impaired battery life, and the alarm will not trigger if the mains/power fails.)**

With the battery switch on, during a mains/power failure, the internal freezer temperature will be displayed at ten-second intervals, and the audio alarm will also sound. The audible alarm may be muted by pressing the **ALARM TEST/MUTE** key on the control panel, but will sound again after 30 min if the fault has not been corrected. Pressing the same button again will mute the alarm for an additional 30 min; the pattern will continue to repeat until the initial problem is corrected.

6 Maintenance

6.1 Removing the shelves

The shelves can be removed for cleaning and decontamination. To ensure sealing of the inner doors during normal operation, the shelves should be installed in their original positions.

Prerequisites

- 3 mm Allen key (not contained in the delivery package)

1. Loosen the shelf supports on the left and right side wall of the cabinet.
2. Lift shelf upwards to release from the support.

6.1.1 Installing the shelves

Prerequisites

- 3 mm Allen key (not contained in the delivery package)

1. Insert the shelf to the shelf supports aligning the notches of the shelf with the grooves of the support.
2. Tighten the supports using the Allen key.

6.2 Cleaning

NOTICE! Risk of material damage from unauthorized maintenance.
Using unauthorized service agents can result in damage to the device.

- Maintenance, adjustment, and repair work should only be carried out by qualified and experienced personnel who have been authorized by Eppendorf or its authorized agents to undertake such work.

6.2.1 Painted surfaces

All exterior paint work and inner doors should be cleaned using a solution of mild detergent in water. Do not use abrasive cleaners or solvents.

6.2.2 Panels and shelves

The interior panels and shelves are made of stainless steel. They may be cleaned and sterilized.

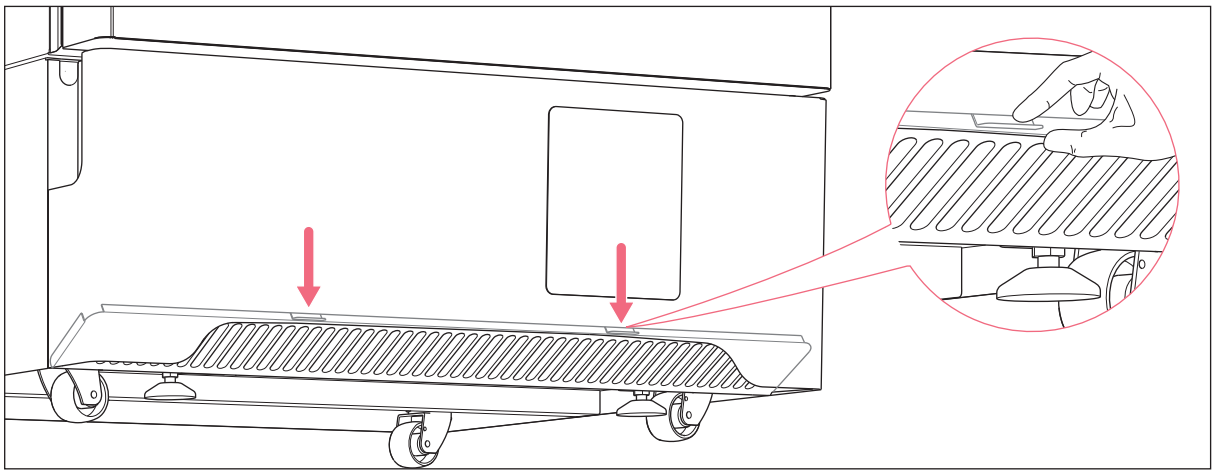
- Apply the recommended cleaning solvent (70 % Isopropyl alcohol, 30 % distilled water) with a soft, lint-free cloth.

6.2.3 Air intake grill and filter

NOTICE! Risk of material damage due to blocked airflow
Serious damage to the CryoCube freezer may result if the air intake is blocked.

- Check that there is no obstruction of the airflow to the freezer.

The air intake grill must be cleaned regularly to keep it free from dust and debris. Under normal conditions, clean the grill once every 3 months. If the area around the freezer is very dusty or dirty, clean the grill more often.



1. Push the grill by the two handles downwards to release it.
2. Remove the filter from the grill and clean it.
3. After the filter is completely dry, push it back in place on the filter grill.
4. Fold the filter grill upwards until its snaps in place.

6.2.4 Electrically-heated automatic vent port

There is an electrically-heated automatic vent port in the freezer which must not be allowed to become blocked or sealed off.

On upright freezers, the vent port is located in the outer door. This vent will automatically activate each time the door is opened and closed. To manually override, press the auto vent button on the front face.

Over time, ice may build up on the inner door area behind the vent port. To prevent blocking of the vent port, remove the ice from the inner door as described in Defrosting.

6.2.5 Door seal

Be sure to treat the door seal with care. Avoid damaging this seal in any way. The freezer cannot operate properly with a defective seal.

- It is advisable to wipe both the seal and the surface against which it seals with a soft dry cloth once a month.

6.3 Routine maintenance

NOTICE! Risk of material damage from removal of parts
There are no user controls behind any panels. The removal of any part or panels from the CryoCube Freezer may damage the product.

- Only qualified and authorized service technicians are allowed to remove parts and carry out maintenance work.

6.3.1 Lubrication

Every 12 months the outer door hinges and the handle mechanism should be lightly lubricated using general-purpose oil or spray grease.

6.3.2 Defrosting

After an extended period of operation, defrosting may become necessary:

NOTICE! Material damage due to scraping to remove ice.
Using a sharp object to remove ice might damage the device.

- Wait until the ice has defrosted by itself.

CAUTION! Slipping hazard
During defrosting water may collect on the floor of the lab.

- Mop up water from defrosting immediatlely.

1. De-activate the alarm by switching the battery (alarm) switch (located behind the lockable panel on the front of the freezer) to off (**O**).
2. Unplug the freezer from the mains/power supply.
3. Leave the inner and outer doors or lids open.
4. Allow the accumulated ice to melt.
5. Mop up the resulting water.
6. Dry and decontaminate the interior of the freezer.
7. When defrosting is complete, reconnect the freezer to the mains/power supply.
8. Turn the mains/power switch on (**I**) and re-activate the battery (alarm) switch.

6.3.3 Removing the inner doors

To remove the inner doors of the freezer:

1. Fully open the outer door of the freezer.
2. Fully open the inner door.
3. Lift off inner door from hinges and set aside.

Repeat procedure for each door.

6.3.4 Replacing the inner door

To replace the inner door of the freezer:

1. Fully open the outer door of the freezer.
2. Fit door to hinge pins and close.
3. Close outer door.

6.3.5 Electrical components

6.3.5.1 Indicators

Regularly check the indicators:

- Press the **ALARM TEST/MUTE** key.
  All of the indicators should illuminate, and the display should read **8888**.

6.3.5.2 Alarm

Regularly check the alarm:

- Press the **ALARM TEST/MUTE** key.
  The **TEMP** indicator should illuminate and the audible alarm should sound.

6.3.5.3 Fuses

Fuses must be replaced by an Eppendorf service engineer. Contact Eppendorf Service.

7 Troubleshooting

7.1 General errors

If you are experiencing a problem with your freezer, check the following troubleshooting guides before contacting your Eppendorf authorized Service technician.

Problem	Cause	Solution
Door will not open.	• Door handle is locked.	▸ Unlock the door handle.
FILTER-CLEAN indicator lights.	• Filter is clogged	▸ Clean the filter. ▸ Acknowledge the filter-clean notification (see Operation).

7.2 Error messages

Your electronically-controlled Eppendorf freezer incorporates the unique Systems Monitoring And Reporting Technology (S.M.A.R.T. Plus™) self-diagnostic software to diagnose faults in its electronic systems, its probes and/or its refrigeration system.

This table interprets error codes that may appear in the control panel display:

Problem	Cause	Solution
E-01	• Temperature probe 1 failure. • This probe, located inside the freezer cabinet, indicates cabinet temperature.	▸ Call the Eppendorf service department.
E-02	• Temperature probe 2 failure. • This probe monitors the cascade condenser.	
E-03	• This probe monitors the air-cooled condenser.	
E-04	• Filter may be blocked.	▸ Clean the filter according to the instructions.
	• Ambient temperature may be too high.	▸ Cool the room.
E-04: The alarm continues to sound.	• Fan may have failed.	▸ Call the Eppendorf service department.
E-05	• Ambient temperature probe failure	▸ Call the Eppendorf service department.

7.3 After a mains/power failure

If mains/power is interrupted, the **POWER-FAIL** indicator will illuminate. In addition, the audible alarm will sound and the display will flash at approximately 10-second intervals.

When mains/power is restored, both alarm and indicator will automatically be cancelled.

If mains/power has been interrupted for only a short time, the internal temperature of the freezer will not have risen above the temperature setpoint (the user-set alarm threshold), so normal operation will be resumed immediately.

If the interruption was long enough for the internal temperature to rise above the temperature setpoint, the **TEMP-ALARM** indicator will illuminate. If the internal temperature does not fall below the temperature setpoint within the programmed time after mains/power was restored, the audible alarm will sound again. The TEMP-ALARM indicator will extinguish when the internal temperature reaches the High Alarm temperature set point.

7.4 Interior warming

If the door is left open long enough for the internal temperature to rise above the temperature setpoint, the same effects will be observed as described above regarding power failure.

To minimize the risk of this happening, the door should only be opened when necessary, for a short period of time.

The freezer is fitted with internal doors which latch shut, minimizing temperature rise when the outer door is opened.

8 Transport, storage and disposal

8.1 Transport

DANGER! Tip over hazard.
If the device tips and falls onto a person, the person can be fatally injured.

- Transport the device with a sufficient number of helpers.
- Do not transport the device via ramps with an angle> 17% (10 °). Always transport the device sideways over ramps.
- Only lift the device using a transport aid.

NOTICE! Device damage by lifting the device without the original pallet.
If you lift the device without the original pallet, the bottom of the device will be damaged.

- Place the device on the original pallet.
- Secure the device.
- Use a transport aid to lift the device.

NOTICE! Risk of material damage
Vibrations and impacts can cause the hermetically sealed compressors to slip out of their suspension system.

- Do not tilt the equipment.
- Avoid vibrations and impacts.

Perform the following steps if relocation is necessary:

1. Disconnect the freezer from mains power and remover the power cord.
2. Remove all contents from the freezer.
3. Carefully move the freezer.

In order to move the freezer through narrow doors, protruding parts may be dismounted. Please contact your local Eppendorf Service organizations for assistance.

8.2 Shut down

1. Switch the battery switch off before transporting or storing the equipment.

8.3 Removing the closing mechanism of the door

DANGER! Risk of suffocation.
Persons may become trapped inside and suffocate. The outer door cannot be opened from the inside.

- Remove the support plate prior to disposal of the freezer.

8.3.1 Unscrewing the support plate

1. Unscrew the support plate with locking bolt from the side panel.
2. Dispose of the support plate separately.

8.4 Disposal

In case the product is to be disposed of, the relevant legal regulations are to be observed.

Information on the disposal of electrical and electronic devices in the European Community:

Within the European Community, the disposal of electrical devices is regulated by national regulations based on EU Directive 2012/19/EU pertaining to waste electrical and electronic equipment (WEEE).

According to these regulations, any devices supplied after August 13, 2005, in the business-to-business sphere, to which this product is assigned, may no longer be disposed of in municipal or domestic waste. To document this, they have been marked with the following identification:

Because disposal regulations may differ from one country to another within the EU, please contact your supplier if necessary.

9 Technical data

9.1 Power supply

Mains/power connection	100 V – 230 V, 50 Hz – 60 Hz
Current consumption	100 V - 15 A 115 V - 12 A 208 V - 9 A 230 V - 6 A

9.2 Ambient conditions

- Indoor use
- Ambient temperature 10 °C – 32 °C
- Maximum relative humidity 80 %.
- Maximum altitude of use 2000 m
- Mains/power supply voltage fluctuations ±10 % of the nominal voltage
- Installation category II
- Pollution degree 2

9.3 Weight/dimensions

External dimensions[1]	**Width**	**Depth**	**Height**
	1100 mm	910 mm	1973 mm
Internal dimensions	**Width**	**Depth**	**Height**
	865 mm	597 mm	1390 mm
Capacity	740 L		
Net weight 3-compartment	308 kg		
Net weight 5-compartment	317 kg		

[1] Dimensions are including the handle and bezel.

9.4 CryoCube F740

Lock	Manual Lock
No. Compartments	3 or 5
Interior	Stainless steel grade 304 2B
Maximum load per shelf	85 kg
Maximum total load	420 kg
Alarms	High/Low temperature, power fail, battery low, filter clean
Insulation material	Vacuum insulation panels and polyurethane foam
Remote alarm port	Standard
Communication interface	RS-485
Refrigerants	High Stage: R404A (200 g) Low Stage: R508B (274 g) and R290 (10 g)
Performance	-50 °C – -86 °C at 32 °C maximum ambient operating temperature

10 Ordering information

10.1 CryoCube F740

Order no. (International)	Order no. (North America)	Description
		CryoCube F740 ULT freezer
		230 V/50 Hz, with EU-plug
F740300011	F740300011	3 inner compartments, outer door handle left, air-cooled
F740300031	F740300031	5 inner compartments, outer door handle left, air-cooled
F740300021	F740300021	3 inner compartments, outer door handle right, air-cooled
F740300041	F740300041	5 inner compartments, outer door handle right, air-cooled

10.2 Accessories

A number of accessories are available for Eppendorf ultra-low temperature freezers. Contact your local Eppendorf representative or distributor for details.

10.2.1 TCA-3 temperature monitoring system

The TCA-3 system is an independent temperature monitor with alarm, electronic chart recorder, and auto-dialer that communicates via the internet for remote monitoring from anywhere in the world. Ask your Eppendorf sales representative for availability.

10.2.2 Temperature probes

Additional Temperature Probes (such as the Eppendorf TCA-3 monitoring system) can be installed upon request for an external alarm system or for validation.

10.2.3 Validation packages

Installation and operational qualifications are available.

10.2.4 CO_2 and LN_2 back-up systems

These systems are available to temporarily protect the contents of the freezer against the consequences of freezer failure or power failure. In an emergency, the system can inject either liquid carbon dioxide or liquid nitrogen from a storage bottle. Carbon dioxide back-up systems will maintain temperatures between -50 °C and -70 °C (subject to environmental conditions) for a period of up to 48 h, during which time the freezer can be repaired. Liquid nitrogen back-up systems will maintain the freezer temperature at -85 °C.

CO_2 and LN_2 back up systems can be retrofitted by the Eppendorf Service. Contact your local Eppendorf distributor for options available.

10.2.5 Inventory racking systems

A very comprehensive set of racks is available. These are designed to accommodate various sizes of boxes neatly, while giving maximum packing density in the freezer. Waterproof boxes are also available.

10.2.6 Chart recorder

A chart recorder is available to provide a continuous record of the temperature inside the freezer over a period of seven days. The record is presented on a circular chart.

Please contact your local Eppendorf distributor for available chart recorders and accessories.

Evaluate Your Manual

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www.eppendorf.com/manualfeedback

Your local distributor: www.eppendorf.com/contact
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