# New Brunswick™ Innova® U360 -86 °C Freezers

**Operating manual**

# Table of contents

# 1 Operating instructions
## 1.1 Using this manual

▸ Carefully read this operating manual before using the device for the first time.

▸ Also observe the operating manual enclosed with the accessories.

▸ The operating manual should be considered as part of the product and stored in a location that is easily accessible.

▸ When passing the device on to third parties, be sure to include this operating manual.

▸ If this manual is lost, please request another one. The latest version can be found on our website www.eppendorf.com (international) or www.eppendorfna.com (North America).

## 1.2 Danger symbols and danger levels
### 1.2.1 Hazard symbols

| | Hazard point | | Freezer burn |
|---|---|---|---|
| | Electric shock | | Material damage |
| | Crush | | |

### 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

| Example | Meaning |
|---------|---------|
| ▶ | You are requested to perform an action. |
| 1.<br>2. | Perform these actions in the sequence described. |
| • | List. |
| ⓘ | References useful information. |

## 1.4    Abbreviations used

**A**
Amp

**CFC**
Chlorofluorocarbons

**°C**
Degree Celsius

**HCFC**
Hydrochlorofluorocarbon

**HFC**
Hydrofluorocarbon

**Hz**
Hertz

**kg**
Kilogram

**lb**
Pound

**m**
Meter

**min**
Minute

**mm**
Millimeter

**N/A**
Not applicable

**rpm**
Revolutions per Minute (min$^{-1}$)

**ULT**
Ultra-Low Temperature

**V**
Volt

## 2      Safety
## 2.1      Intended use

Eppendorf line Innova freezers are designed to provide precise, ultra-low temperature environments for cold storage of scientific 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
### 2.2.1      Manual conventions used

**WARNING! Risk of personal injury**

▸ BEFORE connecting the freezer to the mains/electrical 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. The equipment should be connected to an earthed/grounded outlet socket.

**WARNING! Risk of personal injury**

▸ Flammable warning messages alert you to possible risks of personal injury and equipment damage: protect the system from sparks and flames.

**CAUTION! Risk of personal injury**

▸ Use freezer gloves at all times when loading or unloading the equipment. The temperature of operation is such that direct contact with the cold contents or inside the equipment can burn unprotected skin.

**CAUTION! Risk of personal injury**

▸ Do not use this equipment in a hazardous atmosphere or with hazardous materials for which the equipment was not designed.
▸ Please read the entire operating manual before attempting to use this equipment. If operational guidelines are not followed, personal injury may occur.

**CAUTION! Risk of personal injury**

▸ Crush Warning messages alert you to specific procedures or practices regarding heavy objects which, if not followed correctly, could result in serious personal injury.

**NOTICE! Risk of material damage**

▸ This equipment must be operated as described in this manual.
▸ Please read the entire operating manual before attempting to use this equipment. If operational guidelines are not followed, equipment damage may occur.

### 2.2.2 Health and safety at work act 1974

(FOR THE UNITED KINGDOM)

Eppendorf, as manufacturers and suppliers of laboratory equipment, are obliged under the terms of the above Act to provide our users with instructions on the safe installation, operation and maintenance of our equipment.

Our equipment is designed to acceptable standards and does not entail any hazard if used, as advised in the attached instructions.

The following safety precautions should be observed by all personnel using this equipment:

1. Read and understand this manual. If in doubt, contact your local Eppendorf sales office.
2. Do not remove any covers. There are no operable controls other than those referred to in this manual. There are voltages in excess of 41.5 volts AC behind the covers.
3. Observe good housekeeping practices, at all times keeping the equipment and the adjacent areas clean, dry and uncluttered.
4. Should any malfunctions occur or be suspected, immediately call a qualified service engineer to investigate.

# 3 Product description
## 3.1 Product overview
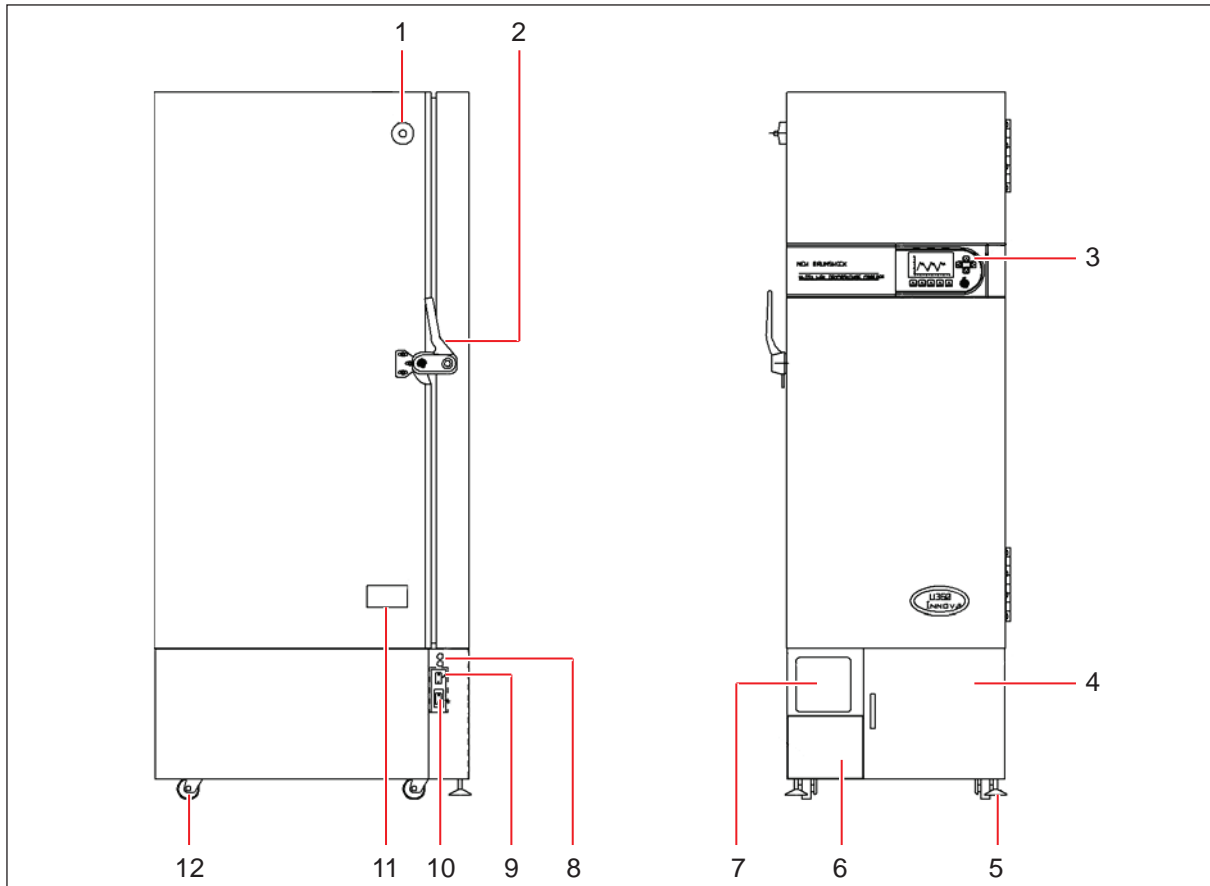


Fig. 3-1: U360 upright freezer - side and front views

1 Heated vent port

2 Door handle (lockable)

3 Control panel/display

4 Air filter (behind panel)

5 Adjustable feet

6 Voltage stabilizer (optional)

7 Chart recorder (optional)

8 PS2 connector

9 Battery switch (alarm) behind lockable panel

10 On/Off circuit breaker behind lockable panel

11 Specification plate

12 Transport castors

## 3.2      Delivery package
### 3.2.1      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 Order Department immediately.

### 3.2.2      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. If any part of your order was damaged during shipping, is missing, or fails to operate, fill out the "Customer Feedback" form, available online at http://newbrunswick.eppendorf.com/en/contact-us/.

---

**NOTICE! Risk of material damage**

▸ Vacuum insulation panels are used in the construction of these freezers. Inspect the cabinet panels for punctures or other damage that compromises the integrity of the product.
▸ These panels are mounted in the cavity against the steel outer wall of the freezer. Any drilling or puncture to the outer wall could release the vacuum from the panel, resulting in impaired freezer performance.
▸ Any unauthorized punctures or other damage deliberately made to the cabinet walls will invalidate the warranty.

---

## 3.3      Product versions
### 3.3.1      Introduction

This manual provides the user with the necessary information for installation and operation of Eppendorf line Innova® ultra-low temperature freezer with vacuum insulation panels. It also provides some preliminary user maintenance information.

This manual covers the U360 freezer models:

| Model (230 V, 50 Hz) | Capacity |
|---|---|
| U360 | 360 liters (12.7 cubic feet) |

| Model (115 V, 60 Hz) | Capacity |
|---|---|
| U360 | 360 liters (12.7 cubic feet) |

## 3.4    Features

The freezers are manufactured using high quality steel and electronics for long life. The cabinets are insulated with a combination of foamed-in-place polyurethane foam and vacuum insulation panels. This combination ensures superior insulation properties while maintaining an extra large internal capacity for the footprint of the freezer. The Innova freezers have many features designed to provide ease of use and maintenance, security and reliability to your ultra-low temperature storage needs. They are built to stringent regulatory requirements for safety and environmental friendliness and disposability, and they are CE and UL certified.

Features include:

- Designed to be exceptionally energy efficient and eco-friendly.
- A large ergonomically located backlit LCD display provides operational information about the freezer including temperature and setpoint info, on-screen messaging, programmable alarms, data graphing, and diagnostics.
- Vacuum insulation panel technology reduces the cabinet wall thickness while maintaining superb insulation characteristics to provide the largest internal volume per floor space used.
- Freezers are totally free of CFCs (Chlorofluorocarbons) and HCFCs (Hydrochlorofluorocarbons). They use industrial grade, commercially available HFCs (Hydrofluorocarbons) as refrigerants.
- Temperature alarms and door opening data are automatically stored for up to 30 days for on-screen graphing. Data is downloadable to PC with optional communications port for validation requirements.
- Upright models utilize gasketed and insulated inner doors to reduce cold air loss and recovery times, reduce internal temperature fluctuations and conserve energy.
- Heavy-duty commercially available compressors provide rapid temperature pull-down and recovery after door opening.
- The compressor housing is specially designed to reduce operating noise levels.
- A heated port with ice-clearing plunger prevents vacuum formation enabling the outer door to be easily opened at anytime.
- All interior panels and shelves are made of high grade corrosion-resistant stainless steel, making them durable and easy to keep clean and sterilize.
- Inner doors lift off their hinges without the use of tools to simplify cleaning.
- Heavy duty castors enable easy installation and relocation.
- Two access ports allow easy addition of sensors, or of back-up systems that can provide cooling protection for your samples in the case of a power outage or other system failure.
- An alarm contact is provided for connection to an external monitoring device or system.
- The freezers can be fitted with an optional 7-day circular chart recorder to provide independent temperature recording.
- An automatic reset restarts freezers at random 15 second intervals to protect the microprocessor controller from damage by electrical spikes caused by multiple freezers turning on at once.
- Lockable freezer handles on outer door provide added security from unauthorized users.
- Multiple accessories are offered, including $CO_2$/$LN_2$ back-up systems, remote monitoring systems, external voltage stabilizer, inventory racking, and more.

# 4 Installation
## 4.1 Preparing installation

**WARNING! Risk of personal injury**

▸ DO NOT attempt to lift any freezer by hand. Preferred lifting for loading and unloading is by mechanical lifting equipment.

**NOTICE! Risk of material damage**

▸ Maintenance, adjustment and repair work should be carried out only by QUALIFIED, EXPERIENCED personnel who have been AUTHORIZED to undertake such work by Eppendorf or its authorized agents.
▸ Failure to use authorized service agents will invalidate the warranty.

### 4.1.1 Setup guide

The following is a quick-start guide to setting up the freezer. More detailed information is presented in subsequent sections to clarify the process.

1. Unpack the freezer and remove it from its packing pallet.
2. Place the freezer in its designated location.
3. Remove the contents from the inside of the freezer.
4. Unwrap and install the shelves (if provided).
5. Install the mains/power cord and lock it in place.
6. Install the keys in the door lock and the mains/power switch cover lock.
7. Plug the freezer into the mains/power supply and turn the freezer on.
8. Set the time, date and set temperatures (see *Operating temperature and alarm setpoints on p. 25)*.
9. Wait until the freezer has reached its setpoint temperature before placing anything inside the freezer.

## 4.2 Selecting the location

All U360 freezers are mounted on castors for ease of movement. Upright freezers have feet that provide both a leveling feature and a locking feature to stop the freezer from rolling once it is in place.

Position the freezer to allow disconnection to be made in respect to removal of the plug or appliance coupler, also the free air entry through the intake grille in the front and free air exit from the back. 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.

## 4.3 Mains/Power plugs and receptacles

Eppendorf line of freezers are offered with a variety of mains/power cords to accommodate local voltage requirements. To determine the mains/power receptacle required in your lab, first identify the plug we provide from the list below and check the freezer rating plate for mains/power requirements, then see the table which follows.

**NOTICE! Risk of material damage**

▸ Only use approved mains/power cords with the correct power rating. Contact your local Eppendorf sales office for replacement cords.

- All 115 V, 60 Hz freezers use plug B, with the exception of Innova U101 freezers which use plug A
- All 208 - 230 V, 60 Hz freezers use plug C
- All 230 V, 50 Hz freezers are provided with both plugs D and E

| Freezers with this Code | Have this Plug | Require this Receptacle | NEMA Reference | |
|---|---|---|---|---|
| | | | Plug | Receptacle |
| A | ⊕ | ⊕ | 5-15P | 5-15 |
| B | ⊕ | ⊕ | 5-20P | 5-20 |
| C | ⊖ | ⊖ | 6-15P | 6-15 |
| INTERNATIONAL | | | | |
| D | ⊙ | ⊙ | European (Schuko) | |
| E | ⊖ | ⊖ | UK Model | |

## 4.4 Installing the shelves

Models U360 is supplied with two adjustable shelves. These can be positioned in 12.7 mm (½-in) steps anywhere throughout the freezer. To effectively utilize racks within the freezer, be sure to position them so that each shelf is aligned with the bottom of each inner door.

Perform the following steps to install the shelves:

1. Ensure that the freezer is turned off and unplugged.
2. Remove the protective plastic coating from the shelf.
3. Position the four shelf clips evenly within the freezer by squeezing the clip, then inserting it into the shelf support within the freezer.
4. Place the shelf in the freezer, making sure all four shelf clips are supporting the weight of the shelf.

To readjust the shelf or shelf clips, gently squeeze the shelf clip to release it from the side of the freezer, then reposition it as needed.

### 4.4.1    Maximum freezer shelf load

| U360 | 30 kg (66 lb) |
|------|---------------|

## 4.5    Installing the voltage stabilizer

The voltage stabilizer is supplied as an optional removable slide-in module. The device can be installed in the freezer at any time. Perform the following steps to install the voltage stabilizer:

1. Ensure that the freezer is turned off and unplugged before you begin to install the voltage stabilizer.
2. Open the small front panel of the freezer (found at the bottom left of the compressor housing on upright models), directly below the chart recorder blanking plate.
3. Remove the upper attachment bolt first, then completely loosen the lower attachment bolt and remove the cover.
4. Remove the plug from the electrical socket at the back of the stabilizer slide.
5. Align the base of the voltage stabilizer module with the guide in the base of the freezer.
6. Slide the stabilizer toward the back of the freezer until it locks into position.
7. Close and secure the stabilizer access panel by tightening the lower attachment screw first, then the upper attachment screw.

For detailed information regarding the voltage stabilizer module, see Installation Guide IS 1011 supplied with the module.

## 4.6    Lockable freezer handle

Freezers are supplied with lockable handles.

The U360 upright freezer handle is fitted with barrel locks (push in and turn key to lock, turn key to unlock; the barrel will only lock when a key is turned to the lock position). The barrel lock may be removed from the upright freezer handle if the lock feature is not required.

An optional padlock adaptor can provide extra security by allowing the addition of a customer-supplied padlock to secure the freezer handle.

### 4.6.0.1   Removing the upright freezer handle barrel lock

Perform the following steps to remove the barrel lock from the upright freezer handle, if the lock feature is not required:

1. Open the freezer door and place the freezer handle in closed position.
2. Remove the two screws from behind the lock barrel.
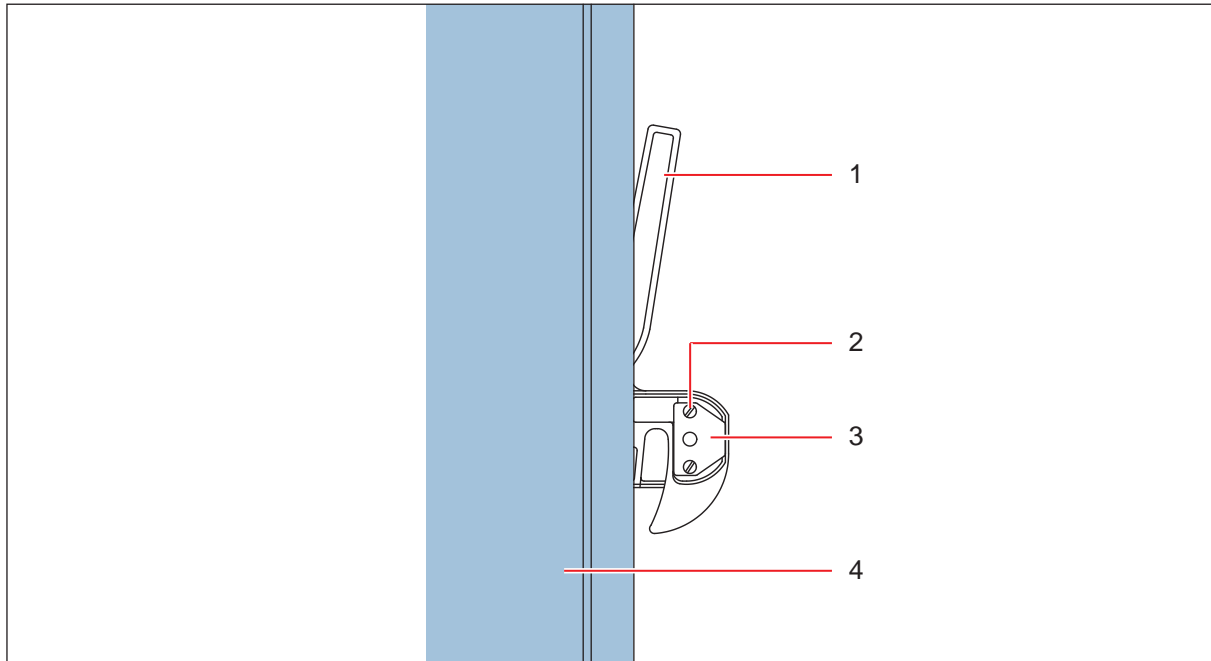
| | | | |
|---|---|---|---|
| **1** | **Freezer handle** | **3** | **Lining plate** |
| **2** | **Screw (1 of 2)** | **4** | **Freezer door wall** |

3. Remove the lining plate and lock barrel.

4. Insert the plastic blanking plug supplied.

5. Insert the lining plate and screw in the two screws.

> ℹ It is important that the handle lock lining plate be installed at all times.

---

**NOTICE! Risk of material damage**

▸ DO NOT SLAM THE DOOR WITH THE HANDLE IN THE CLOSED POSITION.

---

6. Place freezer handle in open position and close freezer door.

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.

# 5    Operating controls and function
## 5.1    Controls and function

The operating controls are located on the control panel mounted in the door of the U360 upright freezer.

Each Innova U360 freezer is equipped with a sophisticated control system and large backlit LCD display, that provides an immediate view of all freezer conditions, and access to programmable features including on-screen messaging, alarm functions, service and help information.
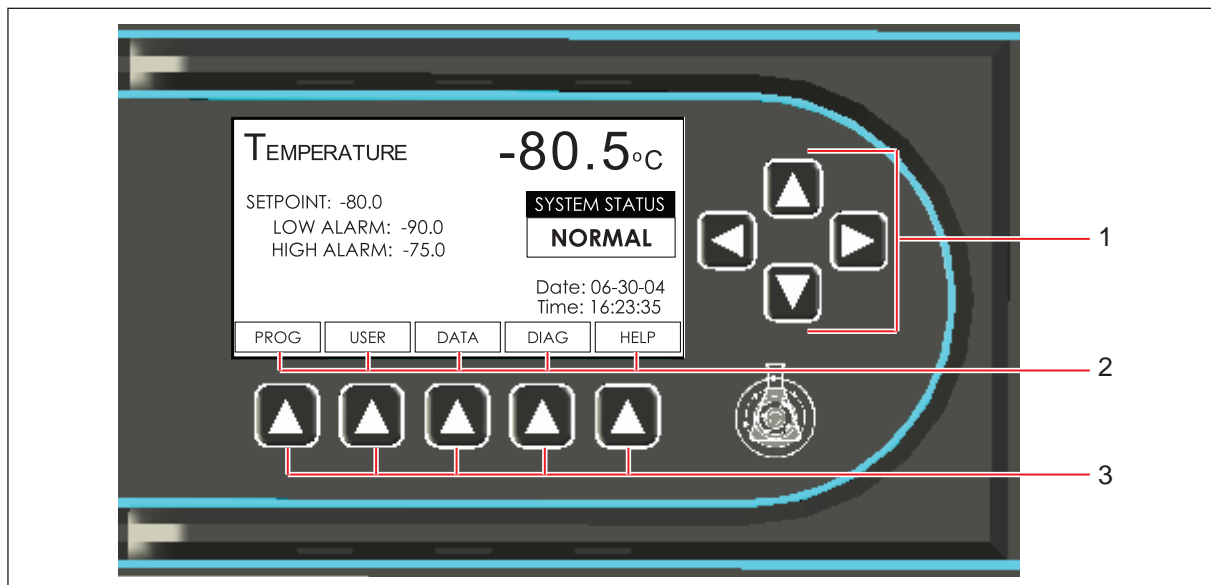


Fig. 5-1:    Operating controls

1   **Directional keypad**                    3   **Menu keypad**

2   **Menu selections**

All adjustable setpoints and features are controllable through the display touchpad (see Fig. 5-1 on p. 21). Four directional keys allow features to be selected or modified while menu keys provide access to specific functions listed at the bottom of the screen.

Changes to any menu can be saved by pressing the **SAVE** menu key.

The **EXIT** menu key can be pressed to return to the previous menu.

> If the **EXIT** menu key is pressed prior to pressing the **SAVE** menu key, any changes made within that screen will not be accepted.

### 5.1.1 Menu system

The menu system is made up of five main selection categories, (see Fig. 5-2 on p. 22): **PROG** (programming), **USER** (user-specific information), **DATA** (stored data), **DIAG** (diagnostics) and **HELP**.
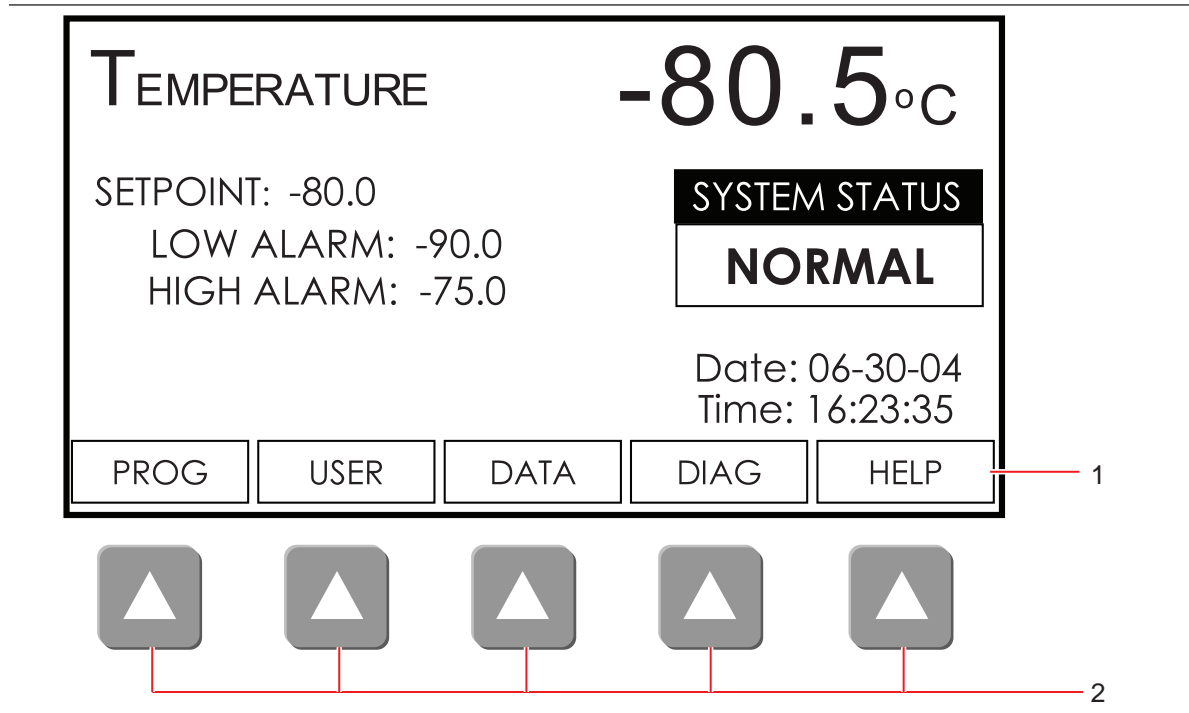


Fig. 5-2:    Main screen

**1   Menu selections**                                **2   Menu keys**

Each menu is accessed by pressing the menu key directly under the menu selection label on the display.

| Menu selection | Description |
|---|---|
| PROG | Menu of all setpoint values and access to **ALARMS** and **TIME & DATE** functions. |
| USER | Menu for entering user security information such as **USER ID** and **PASSWORDS**, and access to **ALARM ACKNOWLEDGEMENT**. |
| DATA | Menu for access to stored data such as the **ALARM LOG** and temperature graphs. |
| DIAG | Menu for access to general diagnostic information and to the freezer's engineering mode (**ENG**). |
| HELP | Menu for access to general Help files. |

# 6 Operation
## 6.1 Getting started

---

**WARNING! Risk of personal injury**

▸ BEFORE connecting the freezer to the mains/electrical 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. The equipment should be connected to an earthed/grounded outlet socket.

---

### 6.1.1 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.

---

**WARNING! Risk of personal injury**

▸ If the freezer's voltage rating does not match your mains/electrical supply, or if the plug on the mains/power cord does not fit the outlet, do not plug the freezer in.
▸ Contact your laboratory supervisor, safety officer, or qualified service or electrical engineer.

---

**NOTICE! Risk of material damage**

▸ Some freezers are supplied with more than one removable mains/power cord. Utilize the cord that matches your power receptacle. Check the voltage rating plate on the side of the freezer, to confirm that the freezer is compatible with your laboratory mains/power supply.

---

### 6.1.2 Turning the freezer On/Off

The **ON/OFF** circuit breaker is located within the lockable panel at the bottom left-hand corner of the freezer.

To remove the lockable panel and turn the circuit breaker and battery switch On/Off:

1. Insert and turn the key (provided) one quarter turn to the right.

   The key can be removed to prevent access.

2. Remove the panel.
3. Set the **ON/OFF** circuit breaker and battery switch to the **I (ON)** position.

   The temperature display illuminates immediately.
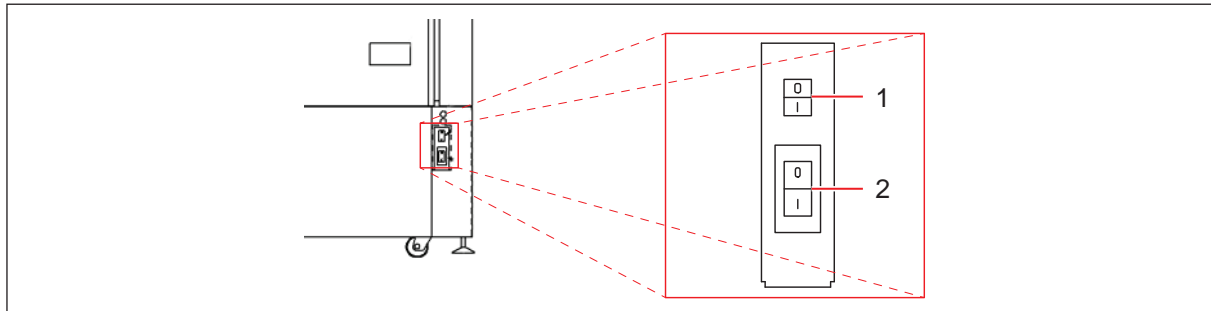
Fig. 6-1:    U360 switch location

**1   Battery switch**                          **2   On/Off circuit breaker switch**

ⓘ   The compressors will not operate for approximately one minute 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.

### 6.1.3    Alarm/battery activation

The equipment is delivered with the audible alarm and alarm battery deactivated. The Power Fail alarm is activated by the battery rocker switch within the lockable panel, which is located at the bottom left-hand corner. The switch is labelled **I** (**ON**) and **O** (**OFF**) (see Fig. 6-1 on p. 24).

▸ 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 and holding the **TEST** button within the **DIAG** menu of the display.

The audible alarm should sound.

ⓘ   Pull down time to -86 °C will be dependent on the freezer size and model (see *Specifications on p. 51)*. The alarm will sound every 30 minutes until the temperature setpoint is reached. Use the MUTE feature to mute the alarm during this initial pull-down period.

### 6.1.4    Remote alarm

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 or optional auto-dialer, (see *Alarm monitoring socket on p. 32)*. The remote alarm facility provides voltage-free contacts rated at 1 amp, 24 volts maximum.

To test the remote alarm:

▸ Place the freezer's mains/power switch to off (**O**) position, or Press and hold the **TEST** button within the **DIAG** menu of the display.

ⓘ   In a mains/power failure situation, the remote alarm socket will operate regardless of the state of the alarm battery or battery switch.

### 6.1.5     Vacuum effect

After closing the freezer door, a vacuum may be created. Before the door can be opened again, it may be necessary to wait two or three minutes for the vacuum to be released by the vent tube. **Do not try to force the door**. During the release of the vacuum, a slight hissing may be heard. In order to minimize vacuum formation, the vent heater assembly has a spring-loaded plunger to clear ice from the inside of the vent.

> **ⓘ**    Be careful not to place a rack directly against the vent, as this will inhibit the plunger's ability to operate correctly (see *Heated vent port on p. 40)*.

## 6.2      Operating temperature and alarm setpoints
### 6.2.1     Setting operating temperature and alarm setpoints

The freezer is pre-programmed to an operating setpoint of -80 °C. The high and low temperature alarm setpoints are automatically set to five degrees above and below the temperature setpoint whenever you adjust the temperature setpoint. You can manually adjust higher and lower temperature alarm setpoints; they cannot, however, be set fewer than 5 degrees from the chosen setpoint in either direction. The maximum high and low temperature alarm setpoints are -45 °C and -91 °C respectively.

To set the operating temperature and alarm setpoints:

1. Press the **PROG** menu key.

    The display will show the setpoint programming screen.



```
              SETPOINT PROGRAMMING

                                      ┌─────────────┐
                                      │   COLDER    │
                                      └─────────────┘
    LOW TEMP ALARM SETPOINT:           -91.0°C

    TEMPERATURE SETPOINT:              -86.0°C

    HIGH TEMP ALARM SETPOINT:          -81.0°C
                                      ┌─────────────┐
                                      │   WARMER    │
                                      └─────────────┘
   ┌────────┬────────┬────────┬────────┬────────┐
   │ ALARMS │  TIME  │  DATE  │  SAVE  │  EXIT  │
   └────────┴────────┴────────┴────────┴────────┘
```
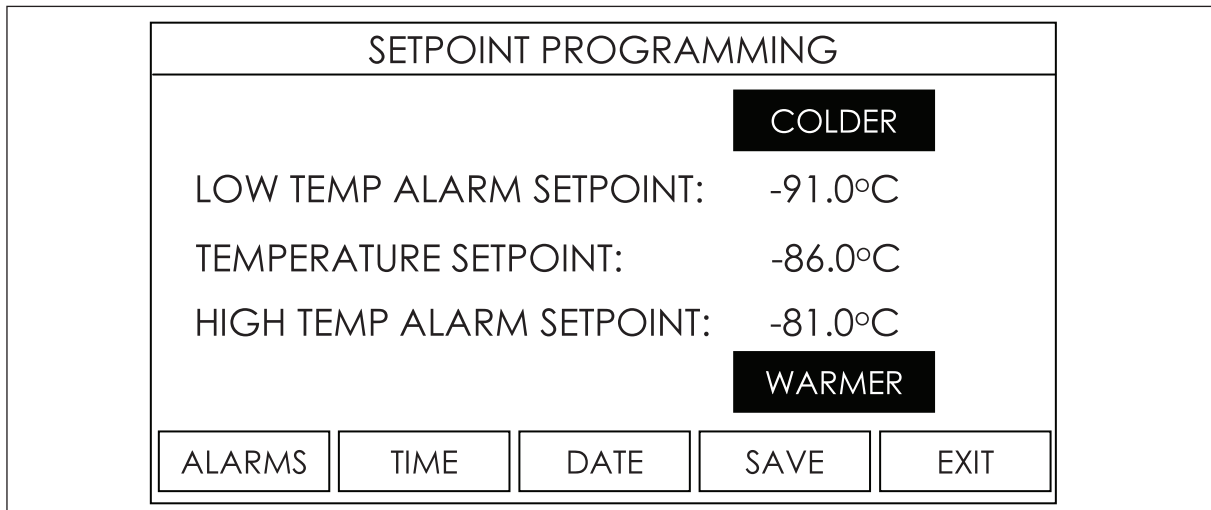
Fig. 6-2:     Setpoint programming screen

2. Use the ▲ and ▼ directional keys, (see Fig. 5-1 on p. 21) to select the setpoint you wish to adjust.
3. Use the ◄ and ► directional keys to select a value for the setpoint.
4. Press the **SAVE** menu key to store the new settings.

> **ⓘ**    Press the EXIT menu key to cancel and return to the previous menu without storing the new values.

### 6.2.2    Checking temperature settings

The operating temperature setpoint, and high and low temperature alarm setpoints are continuously displayed on the main screen of the display.

▸ Check the main screen to view the current temperature settings.

### 6.2.3    Setting time and date

The freezer is provided with a microprocessor that measures and displays a 24-hour clock, and both European or US style dating. This feature allows for alarms and other critical activities to be time/ date-stamped for tracking purposes.

To change the Time or Date from the main menu screen:

1.  Press the **PROG** menu key.
2.  Press either the **TIME** or **DATE** menu key.
    The Time/Date editing menu will open.
3.  Using the ▲ and ▼ directional keys, select the time or date character positions and modify as desired.
4.  Press **SAVE** to save the settings or **EXIT** to return to the previous menu without saving.
5.  If you wish to change from European (DD/MM/YY) to U.S. (MM/DD/YY) dating format or vice versa, select the **DATE FORMAT** menu with the ▲ and ▼ directional keys, and modify the format selection using the ◂ and ▸ directional keys.
6.  Press **SAVE** to save your changes.

## 6.3    Alarm functions and system sensors

The freezer is equipped with multiple sensors that monitor and record critical information about the freezer and its environment. Many of these sensors are linked to alarms that can be controlled or modified through the menu system.

The sensors are linked to a sophisticated monitoring system that can identify and advise of multiple alarm conditions, whether they are temperature- or operation-based. The temperature-based alarms warn of any temperature deviations, both inside and outside the freezer cabinet. The operational alarms warn of a malfunction of any of the major components of the system or sensors within the system.

The following is a list of all temperature-based alarms:

• Cabinet temperature high alarm
• Cabinet temperature low alarm
• Ambient temperature high alarm (fixed at 34 °C)
• Ambient temperature low alarm (fixed at 10 °C)
• Air filter clogged/High condensor temperature alarm
• High cascade condensor temperature alarm

The following is a list of all operational based alarms:

- Door open alarm
- Power failure alarm
- Electrical fault
- Sensor failure
  - Cabinet temperature sensor
  - Ambient temperature sensor
  - Air-cooled condensor temperature sensor
  - Cascade condenser temperature sensor

Each alarm is displayed on the main screen for the duration of the alarm or fault condition. All alarms, including a time/date stamp of their occurrence, are also stored in the alarm log, found in the **DATA** menu screen.

### 6.3.1    Modifying alarm functions

To modify the alarm functions:

1. Press the **PROG** menu key.

   The display will show the setpoint programming screen, (see Fig. 6-2 on p. 25).

2. Press the ALARMS menu key.

   The alarm programming screen will be displayed.

```
┌──────────────────────────────────────────────────┐
│     ┌──────────────────────────────────────┐      │
│     │          ALARM PROGRAMMING           │      │
│     ├──────────────────────────────────────┤      │
│     │                                       │      │
│     │  TEMPERATURE ALARM DELAY:    60 MIN   │      │
│     │                                       │      │
│     │  DOOR OPEN ALARM DELAY:      1  MIN   │      │
│     │                                       │      │
│     │  AUDIBLE ALARM MUTE:         30 MIN   │      │
│     │                                       │      │
│     │  ALARM SOCKET DELAY:         30 MIN   │      │
│     │                                       │      │
│     │  ┌──────┐┌────┐┌────┐┌──────┐┌──────┐ │      │
│     │  │ HELP ││    ││    ││ SAVE ││ EXIT │ │      │
│     │  └──────┘└────┘└────┘└──────┘└──────┘ │      │
│     └──────────────────────────────────────┘      │
└──────────────────────────────────────────────────┘
```
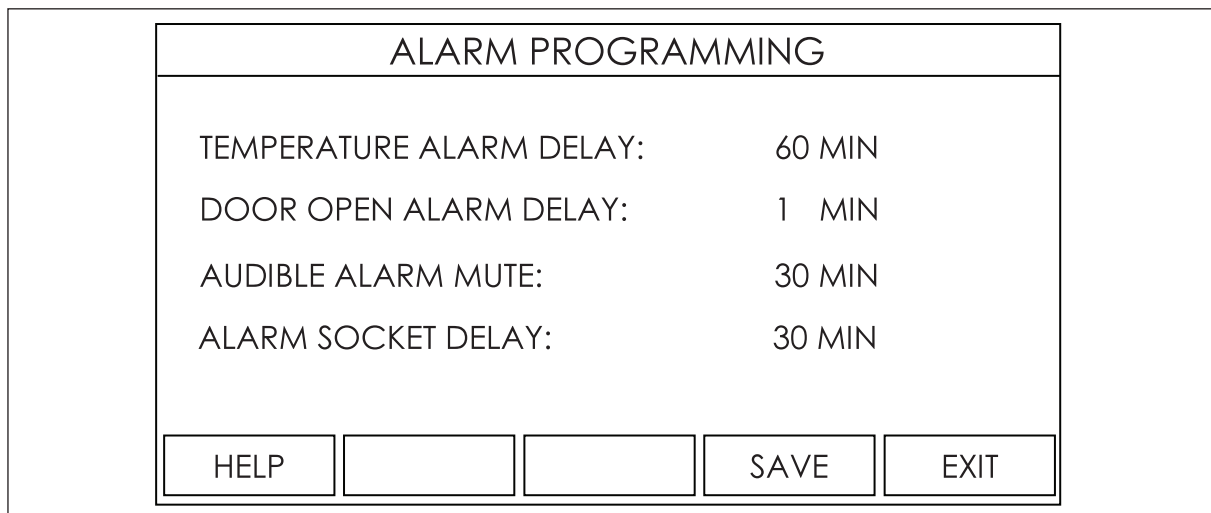
Fig. 6-3:    Alarm programming screen

3. Using the ▲ and ▼ directional keys, select the alarm function to modify.
4. Use the ◄ and ► directional keys to select among the preset options for each alarm feature.
5. Press the **SAVE** menu key to save your changes.

### 6.3.2    Temperature alarm delay

When the cabinet temperature is disturbed by opening the door, the temperature fluctuation can inadvertently trigger a high temperature alarm. The **TEMPERATURE ALARM DELAY**, programmable from 5 to 180 minutes, helps prevent false high temperature alarms by delaying the high temperature alarm for a set period of time after the outer door is opened. If the freezer temperature recovers to within the high and low temperature alarm settings during the set delay period, no alarm will be triggered. If the freezer has not recovered within the set delay period, an alarm will be triggered. The subsequent alarm can be muted (see *Alarm mute and acknowledgement on p. 29)*.

This programmable feature does not affect low temperature alarms, nor will it prevent an alarm in the advent of a temperature fluctuation that is not the result of a door opening (for example, a power failure).

### 6.3.3    Door open alarm delay

The **DOOR OPEN ALARM DELAY**, programmable from 1 to 10 minutes, provides the user with an audible warning that the outer door has not been closed properly, or that the door is being held open for a prolonged period of time. When the outer door is opened, a timer counts down the programmed period of delay, after which the alarm is triggered if the door is still open.

### 6.3.4    Audible alarm mute

The **AUDIBLE ALARM MUTE**, programmable from 5 to 60 minutes, provides the user with a means to delay the audible alarm from re-activating after an audible alarm has been muted.

When an audible alarm is activated, **the alarm can be muted by pressing any directional key when the main screen is displayed**. The audible alarm will then be muted for the programmed delay period before reactivating.

If the alarm condition clears before the delay period is over, the audible alarm will not re-activate and the delay countdown will be cancelled.

### 6.3.5    Alarm socket delay

The **ALARM SOCKET DELAY**, programmable from 5 to 180 minutes, allows you to delay the activation of the alarm monitoring socket during a temperature alarm.

When a temperature alarm is activated, alarm socket activation will be delayed for the programmed period. If the alarm condition is still active after the delay period, the alarm socket will activate.

In the case of a power failure or any non-temperature-based alarm (e.g., a sensor failure), the alarm socket will activate immediately, and the delay period will be ignored.

### 6.3.6 Alarm mute and acknowledgement

When an alarm occurs, the audible alarm can be muted when the main screen is displayed by pressing any directional key. The alarm log will record the time and date when the alarm was muted, and the alarm will be muted for the selected delay period. The mute function will silence all alarms active at the moment the mute button is pressed.

As an added level of security, alarm acknowledgment can be required. When alarm acknowledgment function is turned on, a **USER ID** will be required to silence the alarm. When an alarm is triggered, any attempt to mute an alarm will cause a **USER ID** selection screen to open. The user will need to enter a **USER ID**, which will automatically be logged in the **ALARM LOG** to identify the person who acknowledged or muted the alarm.

The alarm acknowledgement feature requires at least one **USER ID** to exist in the system. To enter a **USER ID**:

1. Press the **USER** menu key.
2. Use the directional keys to select **USER ID & PASSWORD** from the list and press **SELECT**.
3. To enter a **USER ID**, use the directional arrow keys to select a **USER ID** position on the screen to store the **ID** (any open position can be used), then press **SELECT**.
4. A menu-based alphanumeric selection window will appear. Use the directional arrow keys to select each character and use the **SELECT** key to store each character. Use the ← menu key to delete an entered character or **DELETE** to erase the entire **ID**.
5. When finished, press **SAVE** to store the new **USER ID**, then press **EXIT** to return to the previous screen. If you press **EXIT** before you press **SAVE**, your changes will be discarded.
6. Once entered, the **USER ID** is functional and the **ALARM ACKNOWLEDGMENT** feature is automatically activated.
7. If desired, **ALARM ACKNOWLEDGMENT** can be set to **INACTIVE** in the **USER** menu using the directional keys without deleting any **USER ID**.
8. A **USER ID** can be deleted by opening the **USER ID** alphanumeric selection screen and pressing the **DELETE** key, then the **SAVE** key.

### 6.3.7 Setpoint and security control

The freezer is delivered with all settings accessible to general users. Changes to the freezer settings can, however, be protected from inadvertent or unauthorized changes. Up to eight user names and passwords can be entered into the system so that only the specified users with passwords may make changes to the freezer settings.

1. To activate setpoint and ID security, press the **USER** menu key.
2. Use the directional keys to select **USER ID & PASSWORD** from the list and press **SELECT**.
3. If you wish to enter a **USER ID**, follow the instructions in (see *Alarm mute and acknowledgement on p. 29)*, Steps 3 - 5.
4. To require a **PASSWORD** when making any changes to the system settings, scroll the cursor to the password position corresponding to the **USER ID** that requires the password and press **SELECT**.

When you press **SELECT**, a menu-based alphanumeric selection window will appear. Use the directional arrow keys to select each character and use the **SELECT** key (not the **SAVE** key) to store each character. Use the ← menu key to delete an entered character or **DELETE** to erase the entire password. All the characters you choose will appear as ***.

5. When finished, press **SAVE** to store the new **PASSWORD**, then press **EXIT** to return to the previous screen. If you press **EXIT** before you press **SAVE**, your changes will be discarded.

6. Once saved, the password position next to the **USER ID** will be marked as **ACTIVE**. The only way to deactivate a password is to delete it.

7. A **PASSWORD** can be deleted by opening the password alphanumeric selection screen and pressing the **DELETE** key, then the **SAVE** key.

If a **USER ID** is entered, **ALARM ACKNOWLEDGEMENT** is automatically activated. If alarm acknowledgment is not required with the use of a password, this feature may be deactivated in the **USER** menu system without affecting password control. Adding or adjusting a **PASSWORD** only will not automatically turn on **ALARM ACKNOWLEDGEMENT**.

Once activated, a single password will lock the entire system and prevent any subsequent changes to system settings, IDs or passwords without the use of a specific password matched to a specific **USER ID**. Each combination of **USER ID** and **PASSWORD** is unique (one **USER ID** cannot use the **PASSWORD** of another **USER ID** to make system changes).

The **USER ID**s can be viewed at any time. Once a password is set, the **USER SCREEN** is not generally accessible, and can only be accessed by a user who has a valid password. Passwords are never visible to general users. Passwording does not prevent general users from viewing data on the system at any time, including the alarm log.

ⓘ Take care to note your password somewhere. If a password is forgotten, you must contact a customer service representative to recover or delete the forgotten password.

### 6.3.8 Setting the temperature offset

The calibration of the control system is carried out via the **ENGINEERING (ENG)** screen on the display. To access the ENG screen, you will be required to enter the engineers' code (*******).

1. Press the **DIAG** button, then press the **ENG** button.
2. Enter **ENG** code when prompted.
3. Press the left or right buttons on the directional keypad to the desired temperature offset values within the range of -10 to +10 °C.
4. Press EXIT to save and return to the main screen.

## 6.4 Audible alarm battery backup

The alarm system is protected by a battery backup system in the case of power and/or system failure. The battery is designed to operate the audible alarm and data recording system for up to 24 hours. When a power failure occurs, with the battery switched on, the mains/power failure audible alarm sounds immediately and the main display shuts off to conserve power.

You can activate the LCD screen by pressing any directional key. When you do, the internal temperature will be displayed on the screen, which will remain on briefly, then shut down again to conserve power. Be sure to take note of the following cautions:

**NOTICE! Risk of material damage**

‣ Frequent operation of the display during a mains/power failure will substantially reduce the life of the alarm battery.
‣ Opening the freezer door during a mains/power failure will increase the cabinet temperature.
‣ Failure to turn on the alarm battery switch will disable the audible alarm system and data recording during a mains/power failure.

The alarm battery backup system does not affect the external alarm monitoring socket. The alarm socket is designed to operate regardless of the condition or state of the freezer or alarm battery.

The audible alarm should be checked periodically to verify its function:

1. Press the **DIAG** menu key to enter the diagnostics system.
2. Press and hold the **TEST** menu key for at least 5 seconds.
3. The audible alarm should sound repeatedly.
4. Press the **EXIT** menu key to return to the main screen.

## 6.5 RS-485 Connection

**NOTICE! Risk of material damage**

‣ RS-485 Interface external device 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.

## 6.6 Alarm monitoring socket

The freezers are provided with an alarm monitoring socket at the rear of the freezer and a matching plug for external monitoring. This plug can be connected either to a central monitoring system such as a building management system, or to a remote alarm.
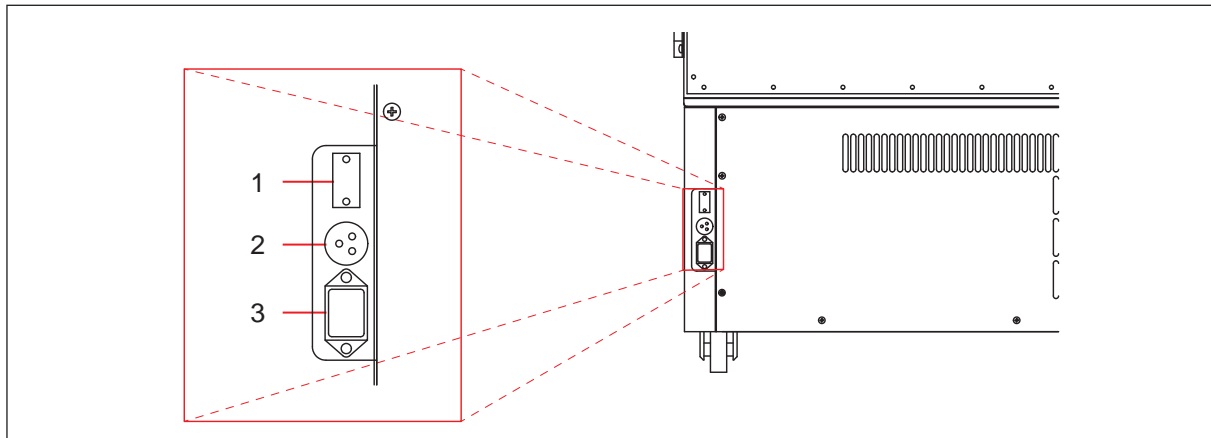


Fig. 6-4: Alarm monitoring socket

**1 RS-485 connector (optional)**          **3 Mains/power socket**

**2 Alarm monitoring socket**

The configuration of the socket is shown in (Fig. 6-5 on p. 33), as viewed from the rear of the freezer. Within the freezer, the socket is connected to voltage-free contacts rated at 24 volts, 1 amp. In normal operation, with the mains/power on, pin 1 is connected to pin 2, and in the alarm condition, with mains/power off, pin 1 is connected to pin 3.

The alarm socket should be checked periodically to verify its function.

1. Press the **DIAG** menu key to enter the diagnostics system.
2. Press and hold the **TEST** menu key for at least 5 seconds.
3. The alarm socket will switch to its alarm mode.
4. This can be verified by connecting an appropriately rated continuity testing device across the contacts as described in the alarm socket diagram (Fig. 6-5 on p. 33).
5. Press the **EXIT** menu key to return the main screen.

---

**NOTICE! Risk of material damage**

▸ Hazardous voltages must not be connected to the remote alarm socket. Max Rating 24 V 1 A.
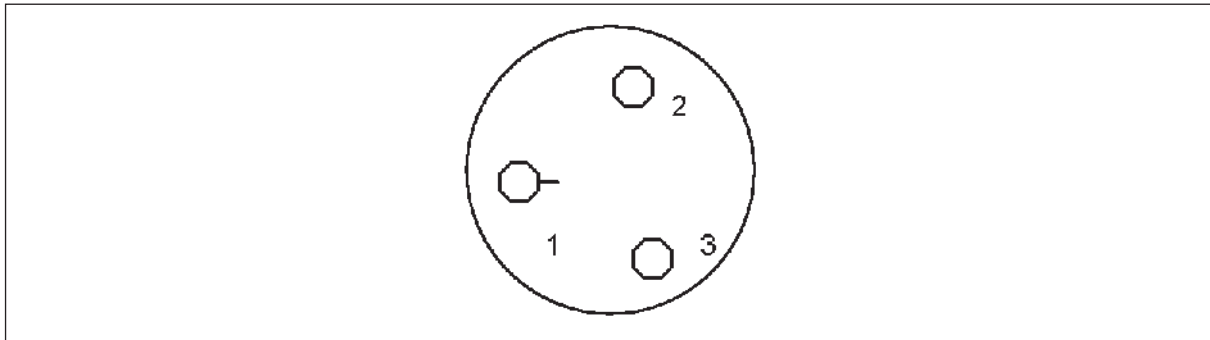
---

Fig. 6-5:    Remote alarm socket - upright freezer

## 6.7    Data storage and viewing

The freezer is equipped with multiple sensors that help to maintain its operation and to warn of conditions that can affect performance. Among the sensors are:

- A cabinet temperature probe
- An air-cooled condenser probe
- A cascade condenser probe
- An ambient temperature probe
- A door position sensor

The information from each sensor is recorded by the system processor, and updated to the display screen and memory log. The system stores data from each of the sensors every 60 seconds.

Up to 30 days worth of stored data can be viewed anytime by pressing the **DATA** menu key and selecting one of the **DATA LOG** choices.

- ALARM LOG
- CABINET & AMBIENT TEMPERATURE GRAPH
- 1ST STAGE CYCLING & CONDENSER TEMPERATURE GRAPH
- 2ND STAGE CYCLING & CONDENSER TEMPERATURE GRAPH

### 6.7.1    Alarm log

The alarm log records all alarms activated on the system in sequential order based upon their time/date stamp. The most recent alarm appears at the bottom of the screen (see Fig. 6-6 on p. 34). This log also records any alarm mute activity and alarm acknowledgements, including the **USER ID** and time and date of acknowledgment.

Use the ▲ and ▼ directional keys to review any historical log data that is not visible on the screen.

The entire log can be cleared at any time by pressing the **CLEAR** menu button. To leave this screen, press the **EXIT** menu key.

```
┌─────────────────────────────────────────────────────────┐
│  ┌─────────────────────────────────────────────────┐    │
│  │                 ALARM LOG                       │    │
│  ├─────────────────────────────────────────────────┤    │
│  │                                                 │    │
│  │   DOOR OPEN ALARM          06/07/04 13:24:21    │    │
│  │   DOOR OPEN ALARM          07/09/04 08:24:32    │    │
│  │   HIGH TEMP ALARM          07/10/04 11:24:41    │    │
│  │   J.FERGUSON               07/10/04 13:32:01    │    │
│  │   POWER FAIL               08/10/04 13:24:21    │    │
│  │   MUTED                    08/10/04 14:32:01    │    │
│  │  ┌──────┐ ┌────┐ ┌────┐ ┌────┐ ┌──────┐         │    │
│  │  │CLEAR │ │    │ │    │ │    │ │ EXIT │         │    │
│  │  └──────┘ └────┘ └────┘ └────┘ └──────┘         │    │
│  └─────────────────────────────────────────────────┘    │
└─────────────────────────────────────────────────────────┘
```

Fig. 6-6:    Alarm log screen

### 6.7.2    Cabinet and ambient temperature graph

Information about the internal cabinet temperature and ambient room temperature is viewable through the **CABINET & AMBIENT TEMPERATURE GRAPH**. This graph provides a running display of cabinet and ambient temperatures; it also identifies the time and duration of outer door openings (see Fig. 6-7 on p. 35).

To allow for more detailed viewing, both the time and temperature scales may be expanded or contracted by pressing the **ZOOM X** button to scale the **X** or time axis, and the **ZOOM Y** button to scale the **Y** or temperature axis. The entire temperature log may be deleted by pressing the **DELETE** key (see Fig. 6-7 on p. 35).

Historical data may be viewed by pressing the ◄ and ► directional keys. The graph data may also be adjusted up and down on the temperature scale using the ▲ and ▼ directional keys to realign the graph for better viewing.
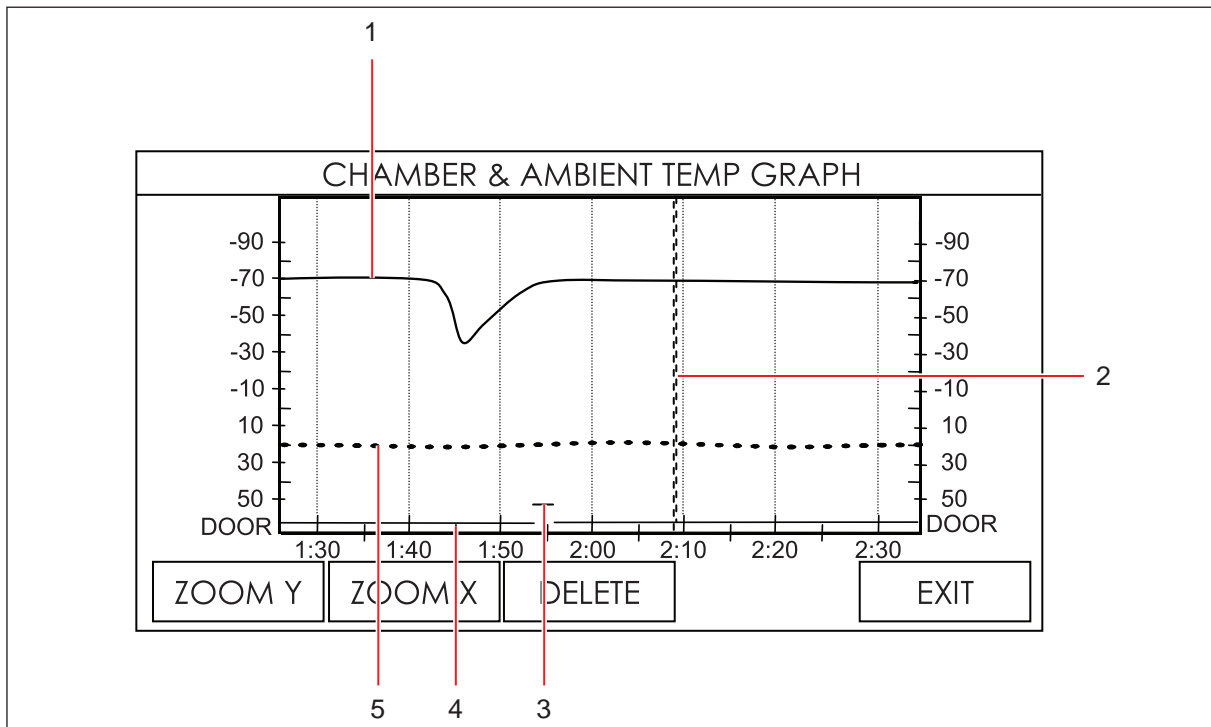
Fig. 6-7:    Chamber & ambient temperature graph screen

| | |
|---|---|
| **1  Cabinet temperature** | **4  Door closed** |
| **2  Mains/power failure marking** | **5  Ambient temperature** |
| **3  Door opened** | |

### 6.7.3    1st and 2nd stage cycling and condenser temperature graph

For diagnostic purposes, the system records and displays system temperatures relating to the first and second stage refrigeration system. These graphs provide immediate access to vital information regarding compressor operation and critical refrigeration temperatures. This information is highly useful for evaluating or troubleshooting any performance issues. You can move around in these graphs as in the **CHAMBER & AMBIENT TEMPERATURE GRAPH** above. Each graph also displays the ambient temperature for reference.
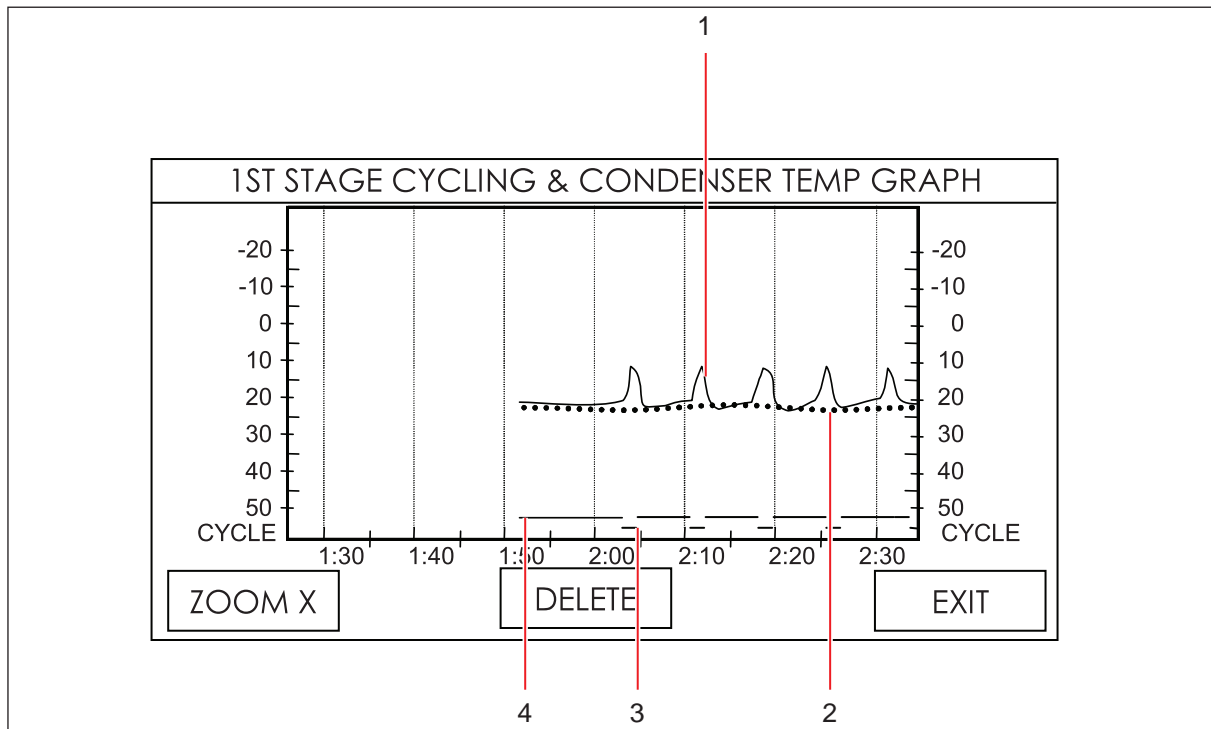
Fig. 6-8:    Chamber & ambient temperature graph screen

| | | | |
|---|---|---|---|
| **1** | **Condenser temperature** | **3** | **Compressor off** |
| **2** | **Ambient temperature** | **4** | **Compressor on** |

## 6.8 Diagnostics

In order to quickly provide critical information for troubleshooting and monitoring performance issues, the **DIAG** menu button opens the **DIAGNOSTIC INFORMATION** screen (see Fig. 6-9 on p. 37), which provides an immediate overview of all critical parameters and also allows the user to test critical functions.
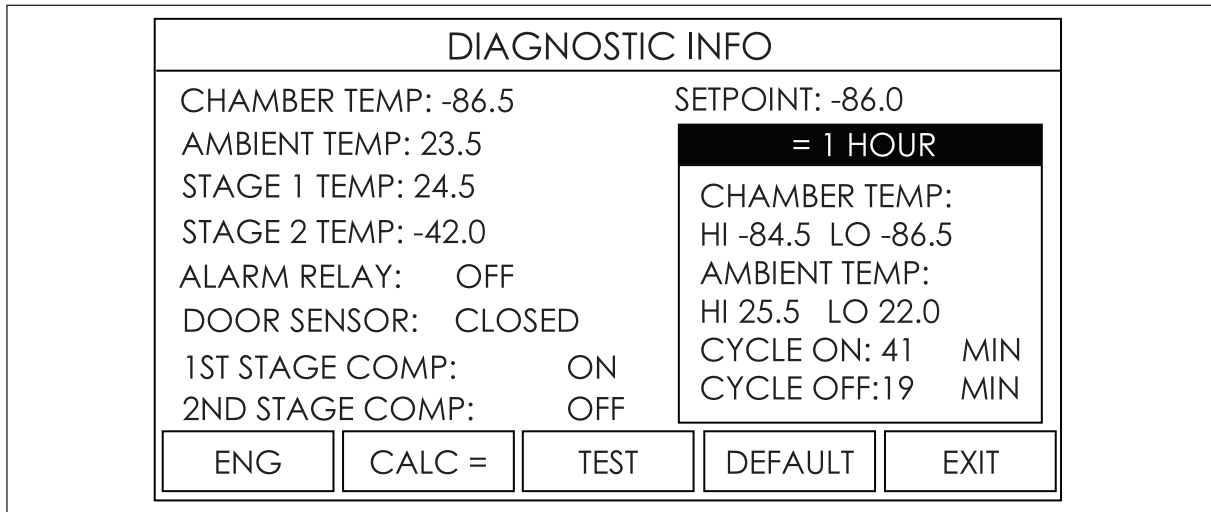
```
┌─────────────────────────────────────────────────────────┐
│  ┌───────────────────────────────────────────────────┐  │
│  │              DIAGNOSTIC INFO                       │  │
│  ├───────────────────────────────────────────────────┤  │
│  │  CHAMBER TEMP: -86.5      SETPOINT: -86.0         │  │
│  │  AMBIENT TEMP: 23.5      ┌──────────────────────┐ │  │
│  │  STAGE 1 TEMP: 24.5      │      = 1 HOUR         │ │  │
│  │  STAGE 2 TEMP: -42.0     ├──────────────────────┤ │  │
│  │  ALARM RELAY:    OFF     │ CHAMBER TEMP:        │ │  │
│  │  DOOR SENSOR:  CLOSED    │ HI -84.5  LO -86.5   │ │  │
│  │  1ST STAGE COMP:    ON   │ AMBIENT TEMP:        │ │  │
│  │  2ND STAGE COMP:   OFF   │ HI 25.5   LO 22.0    │ │  │
│  │                          │ CYCLE ON: 41    MIN  │ │  │
│  │                          │ CYCLE OFF:19    MIN  │ │  │
│  │  ┌─────┬───────┬──────┬─────────┬──────┐        │  │
│  │  │ ENG │ CALC =│ TEST │ DEFAULT │ EXIT │        │  │
│  │  └─────┴───────┴──────┴─────────┴──────┘        │  │
│  └───────────────────────────────────────────────────┘  │
└─────────────────────────────────────────────────────────┘
```

Fig. 6-9:    Diagnostic information screen

See (Tab.  on p. 37) for a description of each menu button function.

| DIAG Screen Button | Description |
|---|---|
| ENG | This button is ONLY for use by qualified service personnel. It requires a factory-set password. |
| CALC = | Pressing this button allows the user to quickly view historical minimum and maximum (HI and LO) temperatures and to view compressor cycle run times over a period of 1, 2, 3 or 6 hours, by sequentially pressing the button. |
| TEST | Pressing this button allows the user to verify the function of the audible alarm and the alarm socket relay. |
| DEFAULT | Pressing this button quickly reverts all adjustable setpoints to the factory setpoints. This action does NOT delete USER ID or PASSWORD information, graph data or alarm log data. |
| EXIT | Pressing this button returns you to the DATA LOG screen. |

## 6.9    PS2 service data ports

The freezer is equipped with two PS2 data ports. They provide the ability for service personnel to record information from the operating system and to upload revisions to the system's firmware.

## 6.10    Voltage stabilizer

The U360 freezer (model 115 V, 60 Hz) has the option of an internal voltage stabilizer.

The optional internal voltage stabilizer automatically compensates for variations in the supply voltage (in case of over-voltage, brown-outs, dips, sags and surges). The output is only switched if the power disturbance is sustained for at least two seconds. (see *Installing the voltage stabilizer on p. 19)*.

The voltage stabilizer unit indication is displayed on the lower left front panel of the U360 freezer. (see Fig. 3-1 on p. 13).

When you switch the freezer on, if the input voltage is within the specified range, the green LED **NORMAL** will illuminate. If the voltage stays within the specified range, the green LED will remain illuminated.

Sustained variations in the input power will be automatically compensated for by the stabilizer circuit and indicated by a red LED for HIGH voltage or an amber LED for **LOW** voltage.

Tab. 6-1:    Voltage stabilizer specifications

| Model | P0625-1090 |
|---|---|
| Power Input | 86 V - 140 V |
| Current Rating | 18 A Max |
| Power Output | 2300 Watts Max |
| Normal Freezer Operating Voltage | 115 V |
| Normal Voltage Stabilizer Operating Range (LED Green) | 106 - 123 V ± 2.5 V |
| Low (Boost) Voltage Limit (LED Amber) | < 106 V |
| High (Buck) Voltage Limit (LED Red) | > 123 V |

# 7 Maintenance
## 7.1 Cleaning

---

**NOTICE! Risk of material damage**

▶ Maintenance, adjustment and repair work should be carried out only by QUALIFIED, EXPERIENCED personnel who have been AUTHORIZED to undertake such work by Eppendorf or its authorized agents.
▶ Failure to use authorized service agents will invalidate the warranty.

---

### 7.1.1 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**.

### 7.1.2 Interior and shelves

The interior panels and shelves are made of stainless steel. They may be cleaned using a recommended cleaning solvent, 70 % Isopropyl alcohol 30 % distilled water applied with a lint free cloth.

### 7.1.3 Air intake grille and filter

---

**NOTICE! Risk of material damage**

▶ Serious damage to the freezer may result if the air intake is blocked. Check that there is no obstruction of the airflow to the freezer. The air intake filter must also be cleaned regularly.
▶ Remove the filter from behind the grille by turning the thumbscrews ¼ turn and opening grille downward. The filter should be washed in warm soapy water and left to air dry before replacing.

---

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

▶ Brush the grille with a soft brush and, if a vacuum cleaner is available, vacuum the dust from the grille.

### 7.1.4    Heated vent port

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

Over a period of a few weeks, depending on how often the freezer is being used, a small mushroom of ice will form around the end of the vent port. If the vent port is allowed to become blocked, a vacuum will be created when the door is closed. It will not be possible to open the door or lift the lid until the vacuum has leaked away through the seal, which can take up to two hours due to the high quality of the seals.

The vent port is located on the left-hand side of the freezers.

▸ If the door cannot be opened, clear the vent port by pressing the manual plunger on the outside of the air vent.
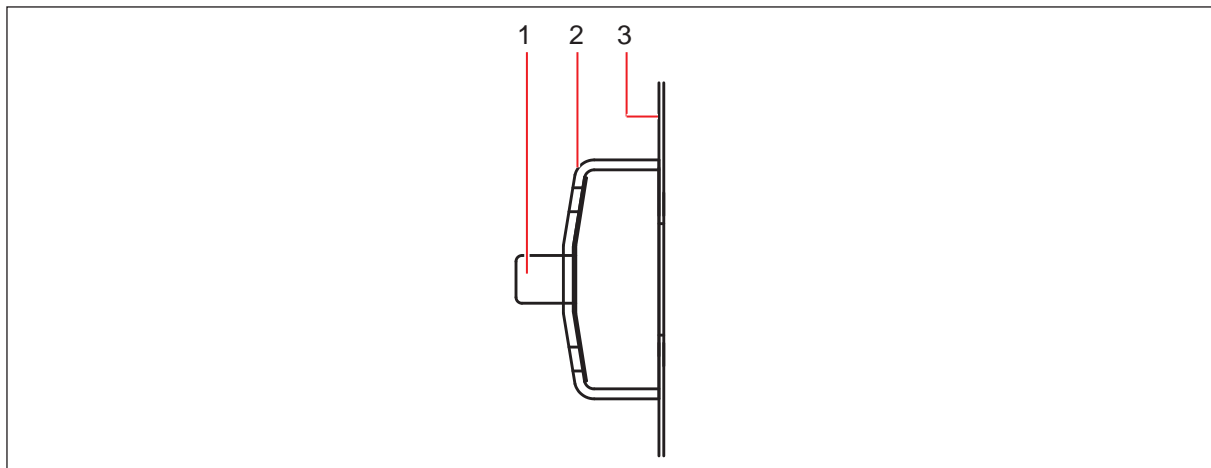


| 1 | Plunger | | 3 | Freezer outer wall |
|---|---------|---|---|--------------------|
| 2 | Cover   | | | |

### 7.1.5    Door or lid seal

Be sure to treat the door or lid 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.

## 7.2 Routine maintenance

**NOTICE! Risk of material damage**

▸ Maintenance, adjustment and repair work should be carried out only by QUALIFIED, EXPERIENCED personnel who have been AUTHORIZED to undertake such work by Eppendorf or its authorized agents.
▸ Failure to use authorized service agents will invalidate the warranty.

### 7.2.1 Lubrication

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

### 7.2.2 Defrosting

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

**NOTICE! Risk of material damage**

▸ Do not attempt to chip or scrape the ice with a sharp instrument. Allow the ice to melt naturally.

1. De-activate the alarm by switching the battery (alarm) switch (located behind the lockable panel on the front of the freezer) to (**O**).
2. Unplug the freezer from the mains/electrical 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/electrical supply.
8. Turn the mains/power switch on (**I**) and re-activate the battery (alarm) switch.

### 7.2.3    Removing the inner doors

The inner doors of the freezer can be removed for defrosting and cleaning.

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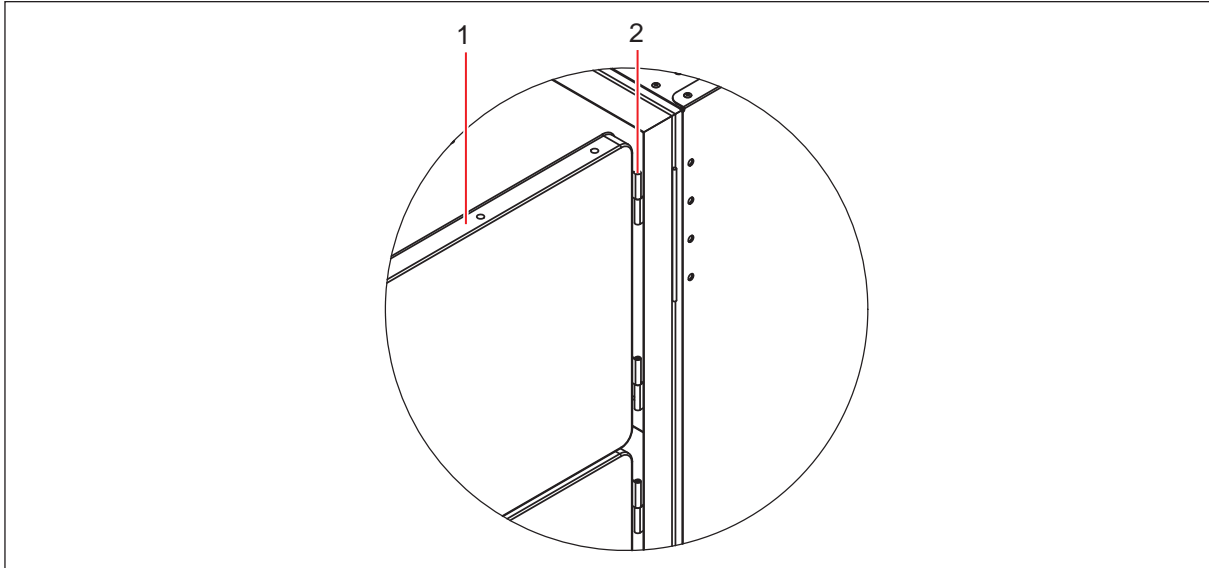3. Lift off inner door from hinges and set aside.



Fig. 7-1:    Lift-off inner door

**1  Inner door**                                      **2  Lift-off hinge**

Repeat procedure for each door.

### 7.2.4    Replacing the inner door

1. Fully open the outer door of the freezer.
2. Fit door to hinge pins and close.
3. Check to ensure that inner door gasket is sealing against the freezer trim.
4. If required, adjust the latch retainer by loosening the screws and moving forward or backwards.
5. Close outer door.

## 7.2.5 Electrical components

**WARNING! Risk of personal injury**

▸ All electrical components that could cause possible ignition of refrigerant vapor during normal operation have been enclosed in an IP65 enclosure.
▸ During routine maintenance, care must be taken to avoid any damage to the gaskets and sealing grommets of these enclosures; also check the gaskets and sealing grommets routinely to ensure their integrity. Should any damage or deformity be detected, the gasket and/or sealing grommet must be replaced immediately.
▸ Failure to observe this safety warning will invalidate the warranty and could result in a dangerous situation.

### 7.2.5.1 Audible alarms

Regularly check the audible alarm:

▸ Press and hold the **TEST** key in the **DIAGNOSTIC INFORMATION** screen.

### 7.2.5.2 Battery replacement

The 6.0 V Cyclon battery is mounted within the compressor housing, near the interface board, located behind the left-hand base cover on the freezers.

**NOTICE! Risk of material damage**

▸ Use only a replacement battery of the correct type and part number.
▸ The battery must be fitted so the terminals correspond to the polarity labels on the electrical panel.

To replace the battery:

1. Switch off the mains/power switch and disconnect the mains/power supply.
2. Remove the side cover and the screws that secure the battery to the housing panel.
3. Disconnect the battery terminals.
4. Install the new battery, fixing screws, and the side cover.

   Be certain, when reconnecting the battery, to respect the correct polarity (red is + positive and black is – negative).
5. Reconnect the freezer to the mains/power supply and turn the mains/power switch on (**I**).

### 7.2.5.3 Fuses

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

## 7.3 Service safety checklist

**NOTICE! Risk of damage to equipment**

▸ Please fill in this form before servicing. This form must be handed to service engineer to keep for safety records.

**eppendorf**

1.  Freezer contents                    ☐Yes  ☐No
    Risk of infection                   ☐Yes  ☐No
    Risk of toxicity                    ☐Yes  ☐No
    Risk from radioactive sources       ☐Yes  ☐No

    (List all potentially hazardous materials that have been stored in this unit.)
    Notes:

2.  Contamination of the unit:
    Unit interior                       ☐Yes  ☐No
    No contamination                    ☐Yes  ☐No
    Decontaminated                      ☐Yes  ☐No
    Contaminated                        ☐Yes  ☐No
    Others

3.  Instructions for safe repair/maintenance of the unit:
    a) The unit is safe to work on      ☐Yes  ☐No
    b) There is some danger (see below) ☐Yes  ☐No
    Procedure to be adhered to in order to reduce safety risk indicated in b) below.

Date :
Signature :
Address, Division :
Telephone :

Product name :
Model :
Serial number :
Date of installation :

*Please decontaminate the unit yourself before calling the service engineer.*

www.eppendorf.com

# 8 Troubleshooting
## 8.1 General errors

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

| Symptom/ message | Cause | Remedy |
|---|---|---|
| Door will not open | • The door handle is locked.<br>• The heated vent port is blocked. | ▶ Unlock the door handle.<br>▶ Break up the ice in the vent port using the hand bolt (see *Heated vent port on p. 40)*.<br>If the door will not open:<br><br>▶ Call Eppendorf Service. |
| More than one voltage stabilizer LED lights up | • Voltage stabilizer may have failed. | ▶ Call Eppendorf Service. |
| No voltage stabilizer LED lights up | • Voltage stabilizer may have failed. | ▶ Call Eppendorf Service. |

### 8.1.1 Safety alarms

The system is designed to prevent the user from accidentally turning the alarm system off. The system will trigger the temperature alarms if the freezer temperature is outside the alarm temperature setpoints when any of the following occurs:

- Initial System Start-up
- Mains/Power Failure (then return to operation)
- Temperature Setpoint Change

The alarm can be muted until the freezer returns to within the alarm setpoints.

### 8.1.2 Mains/power failure

If mains/power cannot be restored in a timely fashion, the audible alarm and controller/display power can be permanently disabled by opening the lockable mains/power switch cover plate and physically placing the battery alarm switch in its off position. This will also shut down all data recording.

### 8.1.3 Inner doors

The upright freezers are fitted with internal doors which latch shut, minimizing temperature rise when the outer door is opened. Inner door gaskets require the door to be latched at all times when the freezer is running in order to be effective. Failure to latch the inner doors properly will lead to ice buildup between the outer and inner doors, and under the inner door seals. The inner doors can easily be removed and de-iced via their lift-off hinges. Make sure they are thoroughly dry before returning them to service.

## 8.2 Error messages

Your electronically-controlled freezer incorporates a microprocessor-controlled system to troubleshoot, diagnose and report faults and problems in its electronic and refrigeration systems. The system uses plain language where appropriate to describe the problem and suggest corrective actions.

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

| Symptom/message | Cause | Remedy |
| --- | --- | --- |
| HIGH CONDENSER TEMP CHECK AIR FILTER | Air-cooled condenser temperature too high:<br>1. Filter may be blocked.<br><br>2. Ambient temperature may be too high.<br><br>If alarm continues to sound:<br>• Fan may have failed. | 1. Clean filter according to the instructions (see *Air intake grille and filter on p. 39)*.<br>2. Cool the room.<br><br>▶ Call Eppendorf service department. |
| HIGH CONDENSER TEMP CHECK ROOM TEMP | Air-cooled condenser temperature too high:<br>1. Ambient temperature may be too high.<br>2. Freezer airflow may be blocked or heated air from other equipment is being drawn into the freezer's air intake.<br><br>If alarm continues to sound:<br>• Fan may have failed. | 1. Reduce the room temperature.<br>2. Remove restrictions to air flow and make sure no other equipment is forcing hot air into the freezer intake.<br><br>▶ Call Eppendorf service department. |
| EXCESSIVE CONDENSER TEMP THERMAL OVERLOAD FREEZER WILL REMAIN OFF UNTIL SYSTEM COOLS | Freezer will automatically shut down if critical condenser temperature is reached to avoid system damage. | Thermal fuse will automatically reset after system cools. |
| HIGH CASCADE TEMPERATURE | A high cascade condenser temperature may indicate a refrigeration problem. | Call Eppendorf service department. |
| HIGH AMBIENT TEMPERATURE | Room temperature has exceeded 34 °C. If room temperature is not reduced, it may affect freezer performance. | Reduce room temperature |

| Symptom/message | Cause | Remedy |
|---|---|---|
| LOW AMBIENT TEMPERATURE | Room temperature has dropped below 10 °C. If room temperature is not increased, low ambient temperature may affect performance. | Increase room temperature |
| DOOR OPEN ALARM DOOR OPEN: X SEC (MIN) | System records & displays time during which outer door is held open. | Close freezer outer door. |
| LOW BATTERY ALARM BATTERY CHARGE IS LOW | Message is displayed when the alarm battery charge is low. Chronic low battery charge is indicative of a defective or worn battery. | Replace battery, (see *Battery replacement on p. 43*). |
| CHAMBER SENSOR FAILURE | PT100 Probe 1 failure. This probe, located inside the freezer cabinet, indicates cabinet temperature. | Call Eppendorf service department. |
| CASCADE SENSOR FAILURE | This probe monitors the cascade condenser. | Call Eppendorf service department. |
| CONDENSER SENSOR FAILURE | This probe monitors the air-cooled condenser temperature. | Call Eppendorf service department. |
| AMBIENT SENSOR FAILURE | This probe monitors the ambient air temperature. | Call Eppendorf service department. |
| ELECTRICAL FAULT | General message for electrical faults not including those listed above. | Call Eppendorf service department. |
| POWER FAILURE POWER OFF: X SEC (MIN, HRS) | System records & displays accumulated time since a power failure occurred. | N/A |
| ALARM MUTED X SEC (MIN) | Whenever an alarm is muted, the alarm delay countdown is displayed to advise when the audible alarm will reactivate. | N/A |
| SYSTEM WILL RE-LOCK AFTER X SEC | Whenever a password is used to unlock the system, the system will automatically relock to prevent further changes after the system returns to the main screen. | N/A |

# 9 Technical data
## 9.1 Specifications

| Model No. | U360 |
|---|---|
| **Part No.** | U9425-000**X**\* |
| **Internal Dimensions:**<br>**Height x Width x Depth** | 1365 x 440 x 615 mm<br>53.7 x 17.3 x 24.2 in |
| **External Dimensions:**<br>**Height x Width x Depth** | 1950 x 600 x 867 mm<br>76.8 x 23.6 x 34.1 in |
| **Capacity** | 360 Liters<br>12.7 cubic feet |
| **Net Weight** | 230 kg<br>506 lb |
| **Lock** | Standard |
| **No. Compartments** | 3 |
| **Interior** | Stainless steel grade 304L |
| **Alarms** | High/Low temperature, power fail, battery low, filter clean, door open, electrical fault |
| **Insulation Material** | Vacuum insulation panels and urethane foam |
| **^Noise level** | 54 dB |
| **Remote alarm port** | Standard |
| **PS2 Ports (2)** | Standard |
| **RS-485 interface** | Optional |
| **Refrigerants:** | High Stage Refrigerant: R404A / Low Stage Refrigerant: R508B |
| **‡Power Consumption:** | |
| • **115 V electrical supply** | 487 Watts |
| • **230 V electrical supply** | 492 Watts |
| **Mains/Power Source and Current Rating:** | |
| **115 V, 60 Hz** | 16.5 A |
| **230 V, 50 Hz** | 6.5 A |
| **Pull Down Time: From +25 °C to -85 °C (freezer empty; 230 V, 50 Hz electrical supply)** | |
| | ~5.7 hours |
| **Performance** | -50 °C to -86 °C at 32 °C maximum ambient operating temperature |

| Model No. | U360 |
|---|---|
| **Environmental Conditions** | All freezers use components tested to CE/UL specifications listed below:<br>• Indoor use<br>• Altitude limit up to 2000 m (2187.23 yd)<br>• Ambient temperature range 10 °C to 32 °C<br>• Maximum relative humidity 80 % for temperatures up to 31 °C, decreasing linearly to 50 % relative humidity at 40 °C<br>• Mains/power supply voltage fluctuations not to exceed ± 10 % of the nominal voltage<br>• Installation category II<br>• Pollution degree 2 |

* **X** = 0 for 115 V, or 1 for 230 V

^ Noise test conditions - Measurements taken from a distance of 1.5 m and 1 m from the floor. Background noise level = 30 dB

‡ Power consumption values are average readings conducted under controlled conditions - Freezer set to -80 °C, ambient 20 - 25 °C at rated mains/electrical supply. No load

# 10 Ordering information
## 10.1 Accessories

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

### 10.1.1 TCA-3 temperature monitoring system

The TCA-3 monitoring system is a 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.

### 10.1.2 Auto-dialers

Auto-dialers can call a set of preprogrammed telephone numbers in the event of an alarm condition and connect right into the freezer's remote alarm port.

### 10.1.3 Temperature probes

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

### 10.1.4 Validation packages

Installation and operational qualifications are available.

### 10.1.5 Padlock adapter kits

Padlock adapter kits allow up to two user-supplied padlocks to be secured to outer door handle for extra security.

### 10.1.6 $CO_2$ 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 -40 °C and -70 °C (subject to environmental conditions) for a period of up to 48 hours, during which time the freezer can be repaired. Liquid nitrogen back-up systems will maintain the freezer temperature at -86 °C.

$CO_2$ and $LN_2$ back up systems can be retrofitted by the user. Contact your local Eppendorf distributor for options available. Instructions are included in the kit.

| Order No. (International) | Description | Quantity |
|---|---|---|
| U9043-0002 | $CO_2$ Back-up System, 115 V, 60 Hz | 1 |
| U9043-0004 | $CO_2$ Back-up System, 230 V, 50 Hz | 1 |
| U9044-0002 | $LN_2$ Back-up System, 115 V, 60 Hz | 1 |
| U9044-0004 | $LN_2$ Back-up System, 230 V, 50 Hz | 1 |

### 10.1.7 Inventory racking systems

A very comprehensive set of anodized aluminium racks is available. These are designed to accommodate various sizes of boxes neatly, while giving maximum packing density in the freezer. Stainless-steel shelves and water proof boxes as well as custom racking are also available.

| Order No. (International) | Description | Quantity |
|---|---|---|
| K0641-3000 | 2″ Aluminum Box Rack | 1 |
| K0641-3001 | 3″ Aluminum Box Rack | 1 |
| K0641-3002 | 4″ Aluminum Box Rack | 1 |

### 10.1.8 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.

The following items are available for all freezer models:

| Order No. (International) | Description | Quantity |
|---|---|---|
| P0625-2100 | Chart Recorder Kit | 1 |
| P0625-2110 | Chart Recorder Paper, Range -50 °C to -100 °C | |
| P0625-2111 | Chart Recorder Paper, Range 0 °C to -50 °C | |
| K0660-0051 | Chart Recorder Pens | 3 |

### 10.1.9 BioCommand SFI datalogging software (RS-485 interface)

BioCommand® SFI Track and Trend software is available to trend and archive data from as many as 32 shakers, $CO_2$ incubators, and/or freezers, simultaneously. This PC-based software works with any OPC-compliant equipment with an RS-232 or RS-485 port.

## 11    Transport, storage and disposal
## 11.1    Shut down

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

## 11.2    Transport

**WARNING! Risk of personal injury**
Lifting and transporting the freezer without suitable equipments can result in crushing and other injuries.

‣ Use a mechanical lifting equipment to load and unload the freezer.

**CAUTION! 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. Remove all shelves, racks, and boxes.
2. Carefully move the freezer.

## 11.3     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 2002/96/EC 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.

In Germany, this is mandatory from March 23, 2006. From this date, the manufacturer has to offer a suitable method of return for all devices supplied after August 13, 2005. For all devices supplied before August 13, 2005, the last user is responsible for the correct disposal.

## 12 Certificates

**eppendorf**

# Declaration of Conformity

The products named below fulfill the requirements of directives and standards listed. In the case of unauthorized modifications to the product or an unintended use this declaration becomes invalid.

**Product name:**

Innova®:Model No. U101-86, U360-86, U535-86, U725-86, C585-86 & C760-86

including accessories

**Product type:**

U Prefix designates Upright Freezer

C Prefix designates Chest Freezer

**Relevant directives / standards:**

2006/95/EC: EN 61010-1,

UL 61010-1, CSA C22.2 No. 61010-1 (US Voltage 60 Hz Models)

2004/108/EC: EN 61326-1

FCC Part 15 Class B (US Voltage 60Hz Models)

2011/65/EU

2012/19/EU

**Management Board**

**Portfolio Management**

**Date:** November 25, 2013

**Your local distributor: www.eppendorf.com/contact**
Eppendorf AG · 22331 Hamburg · Germany
eppendorf@eppendorf.com

Eppendorf® and the Eppendorf Logo are registered trademarks of Eppendorf AG Hamburg/Germany.
All rights reserved incl. graphics and pictures. Copyright 2013 © by Eppendorf AG.

| ISO 9001 Certified | ISO 13485 Certified | ISO 14001 Certified |

U9420-9999-00

The following relates to 115 V, 60 Hz and 208 - 230 V, 60 Hz products only

---

**WARNING!**

‣ 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 1 of Part 2 of Chapter 47 of the Code of Federal Regulations./Paragraph

---

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
  • Reorient or relocate the receiving antenna.
  • Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
  • Increase the separation between the equipment and receiver.
  • Consult the dealer or an experienced radio/TV technician for help.

# Index

# Evaluate Your Manual

Give us your feedback.
www.eppendorf.com/manualfeedback