Freezer Service Manual

i.Series® and Horizon Series™

Model Group	i.Series	Horizon Series
Plasma Storage	iPF120-4, iPF120-8, iPF125-4, iPF125-8	HPF120-4, HPF120-8, HPF125-4, HPF125-8
	iHPF120-4, iHPF120-8, iHPF125-4, iHPF125-8	HHPF120-4, HHPF120-8, HHPF125-4, HHPF125-8
Laboratory	iLF120, iLF125	HLF120, HLF125

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Document History

Revision	Date	CO	Supersession	Revision Description
R	02 MAY 2014*	9415	R supersedes A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q	Revised layout for ease of navigation and locating information.

* Date submitted for Change Order review. Actual release date may vary.

Contents

Section I: General Information

1 About this Manual

1.1 Intended Audience

This manual is intended for use by end users of the freezer and authorized service technicians.

1.2 Model References

Generic references are used throughout this manual to group models that contain similar features. For example, “125 models” refers to all models of that size (iPF125-4, iPF125-8, iHPF125-4, iHPF125-8, HPF125-4, HPF125-8, HHPF125-4, HHPF125-8, iLF125, HLF125). This manual covers all upright freezers, which may be identified singly, by their size, or by their respective “Series.”

1.3 Copyright and Trademark

Helmer, Inc., doing business as (DBA) Helmer Scientific and Helmer.

2 Safety

The operator or technician performing maintenance or service on Helmer Scientific products must (a) inspect the product for abnormal wear and damage, (b) choose a repair procedure which will not endanger his/her safety, the safety of others, the product, or the safe operation of the product, and (c) fully inspect and test the product to ensure the maintenance or service has been performed properly.

2.1 Safety Definitions

The following general safety alerts appear with all safety statements within this manual. Read and abide by the safety statement that accompanies the safety alert symbol.

WARNING The safety statement that follows this safety alert symbol indicates a hazardous situation which, if not avoided, could result in serious injury.

CAUTION The safety statement that follows this safety alert symbol indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE The safety statement that follows this safety alert symbol indicates a situation which, if not avoided, could result in damage to the product or stored inventory.

2.2 Product Labels

Caution: Risk of damage to equipment or danger to operator

Caution: Unlock all casters

Caution: Hot surface

Earth / ground terminal

Caution: Shock/electrical hazard

Protective earth / ground terminal

2.3 Avoiding Injury

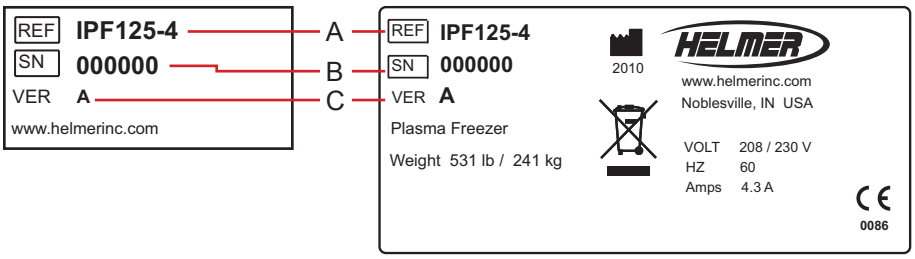
- ► Review safety instructions before installing, using, or maintaining the equipment.
- ► Before moving unit, ensure door is closed and casters are unlocked and free of debris.
- ► Before moving unit, disconnect the AC power cord and secure the cord.
- ► Never physically restrict any moving component.
- ► Avoid removing electrical service panels and access panels unless so instructed.
- ► Keep hands away from pinch points when closing the door.
- ► Avoid sharp edges when working inside the electrical compartment and refrigeration compartment.
- ► Ensure biological materials are stored at recommended temperatures determined by standards, literature, or good laboratory practices.
- ► Proceed with caution when adding and removing samples from the freezer.
- ► Use supplied power cord only.
- ► Using the equipment in a manner not specified by Helmer Scientific may impair the protection provided by the equipment.
- ► Decontaminate parts prior to sending for service or repair. Contact Helmer Scientific or your distributor for decontamination instructions and a Return Authorization Number.
- ► Ensure biological materials are stored safely, in accordance with all applicable organizational, regulatory, and legal requirements.
- ► The freezer is not considered to be a storage cabinet for flammable or hazardous materials.

3 Configuration

3.1 Model and Input Power

NOTE Service information varies depending on the model and power requirements.

This information appears on the product specification label, located on the rear of the freezer. The model also appears on a label located in the chamber on the upper side of the right wall.



Left: Chamber label. Right: Product specification label (located on the rear).

Label	Description
A	Model (REF)
B	Serial number (SN)
C	Version
D	Power requirements

3.2 Control System

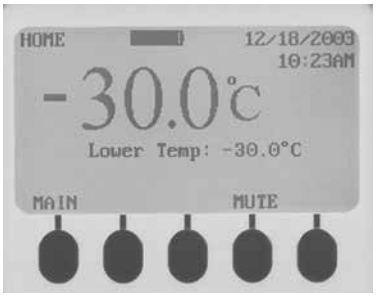
NOTE Service information varies depending on the control system.

Helmer freezers have one of three control systems installed. The type of control system varies by model.

3.2.1 i.Series Monitoring System and Independent Temperature Controller

NOTE This section applies to iPF, iLF, and iHPF models.

i.Series freezers are equipped with the i.Center monitoring system and independent temperature controller.



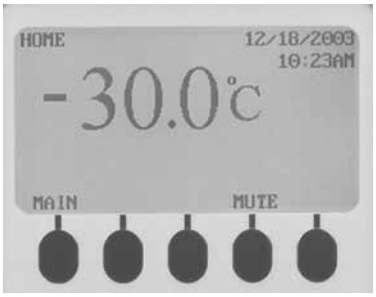
i.Center monitor.

Independent temperature controller.

3.2.2 Horizon Series Plasma Storage Monitoring System and Independent Temperature Controller

Horizon Series plasma storage freezers are equipped with the Horizon monitoring system and independent temperature controller.

NOTE This section applies to HPF models.



Horizon Series monitor.

Independent temperature controller.

3.2.3 Horizon Series Laboratory Monitoring and Control System

NOTE This section applies to HLF and HHPF models.

Horizon Series laboratory freezers and international Horizon Series plasma storage freezers are equipped with the laboratory monitor and temperature controller. The combined laboratory system controls chamber temperature and monitors and displays operational information.

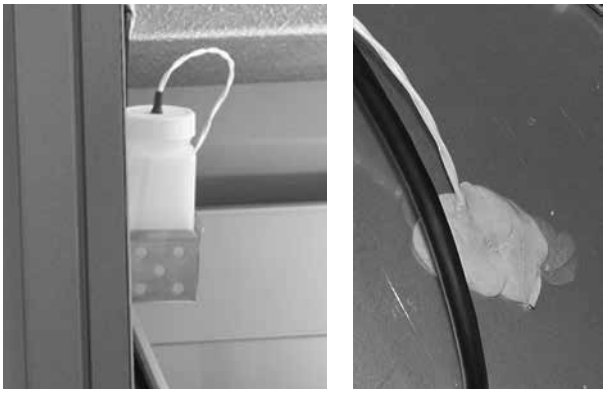
Laboratory monitoring and control system.

3.3 Temperature Probes

Number and location of probes varies by model. External probes may be introduced through existing top port and immersed in existing probe bottle.

For each probe bottle, use:

► Approximately 4 oz. (120 mL) of product simulation solution (1:1 ratio of water to propylene glycol or equivalent low-temperature fluid).



Left: Probe bottle with temperature probe. Right: Access port as seen from top of freezer.

3.3.1 Fill Temperature Probe Bottle

NOTICE Temperature probes are fragile; handle with care.

1. Remove all probes from bottle and remove bottle from bracket.
2. Remove cap and fill with approximately 4 oz. (120 mL) of product simulation solution.
3. Install cap and place bottle in bracket.
4. Replace probes, immersing at least 2” (50 mm) in solution.

3.3.2 Install Additional Probe Through Top Port

1. Peel back putty to expose port.
2. Insert probe through port into chamber.
3. Insert probe into bottle.
4. Replace putty, ensuring a tight seal.

3.4 Chart Recorder

If installed, refer to the Temperature Chart Recorder Operation and Service Manual on CD.

The chart recorder has a battery system, enabling a period of continuous operation if power is lost. Battery life varies by manufacturer as well as voltage level remaining. Providing full power is available, backup power for the temperature chart recorder is available for up to 14 hours.

Prior to use:

► Install battery.
► Add paper.
► Install the chart recorder probe in the probe bottle.
► Calibrate chart recorder to match chamber temperature.

3.4.1 Chart Recorder Access

NOTE
- ► The chart recorder is standard on plasma storage models (iPF, iHPF, HPF, HHPF).
- ► The chart recorder is optional on laboratory models (iLF, HLF).

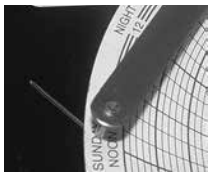
- ► iPF, iLF, iHPF models: Open door by pressing and releasing it.
- ► HPF, HLF, HHPF models: Pull door open.

iPF, iLF, and iHPF chart recorder door.

HPF, HLF, and HHPF chart recorder door.

3.4.2 Install Chart Paper

1 Press and hold **C** button. When stylus begins to move left, release button. The LED flashes to indicate current temperature range.
2 When stylus stops moving, remove chart knob then move knob up and away.
3 Place chart paper on chart recorder.
4 Gently lift stylus and rotate paper so current time line corresponds to time line groove.



5 Hold chart paper and reinstall chart knob.

NOTE For accurate temperature reading, ensure that current time is aligned with time line groove when chart knob is tightened.

6 Confirm temperature range is set to the correct value.
7 Press and hold **C** button. When stylus begins to move right, release button.
8 Confirm stylus is marking temperature correctly.

4 Alarm Reference

If an alarm condition is met, an alarm activates. Some alarms are visual only; others are visual and audible. Some alarms are sent through the remote alarm interface.

The table indicates if an alarm is audible (A), visual (V), or sent through the remote alarm interface (R).

Alarm	Alarm Type		
	iPF, iHPF, iLF	HPF	HHPF, HLF
Door Open	A, V, R	A, V, R	A, V, R
High temperature	A, V, R	A, V, R	A, V, R
Condenser temperature	A, V, R	-	-
Low battery	V	-	-
No battery	A, V, R	-	-
AC power failure	A, V, R	A, V, R	A, V, R
Change chart paper	V	V	-

5 Compliance

5.1 Regulatory Compliance

This device complies with the requirements of directive 93/42/EEC concerning Medical Devices, as amended by 2007/47/EC.

CE
0086

Sound level is less than 70 dB(A).

EC REP

Emergo Europe
Molenstraat 15
2513 BH
The Hague, Netherlands

5.2 WEEE Compliance

The WEEE (waste electrical and electronic equipment) symbol (right) indicates compliance with European Union Directive WEEE 2002/96/EC and applicable provisions. The directive sets requirements for labeling and disposal of certain products in affected countries.

When disposing of this product in countries affected by this directive:

- ► Do not dispose of this product as unsorted municipal waste.
- ► Collect this product separately.
- ► Use collection and return systems available locally.

For more information on the return, recovery, or recycling of this product, contact your local distributor.

6 Warranty

6.1 Rel.i™ Product Warranty USA and Canada

For technical service needs, please contact Helmer at 800-743-5637 or www.helmerinc.com. Have the model and serial number available when calling.

6.1.1 Rapid Resolution

When a warranty issue arises it is our desire to respond quickly and appropriately. The service department at Helmer is there for you. Helmer will oversee the handling of your warranty service from start to finish. Therefore, Helmer must give advance authorization for all service calls and/or parts needs relating to a warranty issue. Any repeat service calls must also be authorized as well. This allows for proper diagnosis and action. Helmer will not be responsible for charges incurred for service calls made by third parties prior to authorization from Helmer. Helmer retains the right to replace any product in lieu of servicing it in the field.

6.1.2 Compressor

For the warranty period listed below, Helmer will supply the refrigeration compressor, if it is determined to be defective, at no charge, including freight. Helmer will not be liable for installation, refrigerant, or miscellaneous charges required to install the compressor beyond the first year of the warranty period.

- ► i.Series model compressor warranty period is five (5) years.
- ► Horizon Series model compressor warranty period is three (3) years.

6.1.3 Parts

For a period of two (2) years, Helmer will supply at no charge, including freight, any part that fails due to defects in material or workmanship under normal use, with the exception of expendable items. Expendable items such as glass, filters, light bulbs, and door gaskets are excluded from this warranty coverage. Inspection of defective parts by Helmer will be final in determining warranty status. Warranty procedures must be followed in all events.

6.1.4 Labor

For a period of one (1) year, Helmer will cover repair labor costs (including travel) and the cost of refrigerant and supplies necessary to perform authorized repairs. Repair service must be performed by an authorized Helmer service agency following the authorization process detailed above. Alternatively, your facility's staff may work with a Helmer technician to make repairs. Labor costs for repairs made by unauthorized service personnel, or without the assistance of a Helmer technician, will be the responsibility of the end user.

6.1.5 Additional Warranty Information

The time periods set forth above begin two (2) weeks after the original date of shipment from Helmer. Warranty procedures set forth above must be followed in all events.

THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF. THIS WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. NO WARRANTIES OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE SHALL APPLY.

THE LIABILITY, IF ANY, OF HELMER FOR DIRECT DAMAGES WHETHER ARISING FROM A BREACH OF ANY SALES AGREEMENT, BREACH OF WARRANTY, NEGLIGENCE, OR INDEMNITY, STRICT LIABILITY OR OTHER TORT, OR OTHERWISE WITH RESPECT TO THE GOODS OR ANY

SERVICES IS LIMITED TO AN AMOUNT NOT TO EXCEED THE PRICE OF THE PARTICULAR GOODS OR SERVICES GIVING RISE TO THE LIABILITY. IN NO EVENT SHALL HELMER BE LIABLE FOR ANY INDIRECT, INCIDENTAL, CONSEQUENTIAL, OR SPECIAL DAMAGES, INCLUDING WITHOUT LIMITATION DAMAGES RELATED TO LOST REVENUES OR PROFITS, OR LOSS OF PRODUCTS.

This warranty does not cover damages caused in transit, during installation by accident, misuse, fire, flood, or acts of God. Further, this warranty will not be valid if Helmer determines that the failure was caused by a lack of performing recommended equipment maintenance (per Helmer manual) or by using the product in a manner other than for its intended use. Installation and calibration are not covered under this warranty agreement.

6.2 Outside of USA and Canada

Consult your local distributor for warranty information.

Section II: i.Series® - All Models

NOTE	This section applies to iPF, iLF, and iHPF models.

7 Product Configuration

7.1 Install Batteries for Backup Power

The monitoring system and chart recorder each have a battery system, enabling a period of continuous operation if power is lost.

NOTE	The monitoring system will not start on battery power alone. If the freezer was previously not connected to AC power and the batteries are installed, the monitoring system will not run on battery power.

Battery life varies by manufacturer as well as voltage level remaining. Providing full power is available and no battery-related alarms are active, backup power for the monitoring system is available for up to two hours.

NOTICE	When installing replacement batteries, use only batteries which meet the specifications outlined in chapter **10.7** (Supplies).

The batteries are located on the top of the freezer, behind the monitoring system.

Monitoring system backup batteries.

Five batteries are installed and one battery is included in the accessory package. Install the sixth battery to provide power to the monitoring system in the event of an AC power failure.

7.2 External Monitoring Devices

CAUTION

- The interface on the remote alarm monitoring system is intended for connection to the end user's central alarm system(s) that uses normally-open or normally-closed dry contacts.
- If an external power supply exceeding 30 V (RMS) or 60 V (DC) is connected to the remote alarm monitoring system's circuit, the remote alarm will not function properly; may be damaged; or may result in injury to the user.

NOTE In the event of a power failure, the power failure alarm condition is transmitted through the remote alarm contacts.

The remote alarm interface is a relay switch with three terminals:

- Common (COM)
- Normally Open (NO)
- Normally Closed (NC)

Terminals are dry contacts and do not supply voltage. Interface circuit is either normally open or normally closed, depending on terminals used. Requirements for your alarm system determine which alarm wires must connect to terminals.

- 0.5 A at 30 V (RMS): 1.0 A at 24 V (DC)

7.2.1 Connect to Remote Alarm Interface

1. Switch the AC ON/OFF switch **OFF**. Remove one battery from the monitoring system backup battery holder.
2. On back of freezer, locate the remote alarm terminals.
3. Connect remote alarm wires to appropriate terminals, according to requirements for your alarm system.
4. Use a cable tie to relieve strain on alarm wires (as necessary).
5. Reinstall the battery in the monitoring system backup battery holder. Switch the AC ON/OFF switch **ON**.
6. Touch **MUTE** to disable the high temperature alarm while freezer reaches operating temperature.

7.3 Automatic Defrost Cycle

The number of programmed defrost events is dependent on environmental conditions and the frequency of usage. The recommended number of daily defrost cycles is three to four, at even intervals. Defrost events should take place when the freezer door is opened infrequently.

NOTE Depending on the high temperature alarm setpoint and the actual temperature increase during the defrost cycle, frequent door openings may trigger repeated high temperature alarms.

The independent temperature controller is located in the electrical box on the back of the freezer. The controller can execute a maximum of four defrost events per day. Specify the number of defrost events per day and the execution times. The timing is based on the current time setting on the independent temperature controller.

Independent temperature controller.

Defrost Event	On/Off	Default Time
1	On	12:00 AM
2	On	8:00 AM
3	On	4:00 PM
4	Off	-

7.3.1 Set the Time on the Independent Temperature Controller

NOTE

- ► The current time on the independent temperature controller should be set to match the time on the i.Center monitoring system.
- ► To change the value for a parameter, first enter the program mode for that level.
- ► When there is no interaction for four minutes, the temperature controller exits program mode and returns to normal mode.

Defrost event times are based on the current time setting on the temperature/defrost controller. The current time is controlled by two parameters: P34 and P35.

Parameter	Description	Range
P34	Hour setting for current time (24-hour format)	00 (midnight) to 23
P35	Minute setting for current time	00 to 59

Set the current time:

1 On the independent temperature controller, press the **P** button to access the parameter menu.
   ► "PXX" is displayed, where "XX" is a parameter number.
2 Select the **Hour** parameter (P34).
   a Press the **UP** or **DOWN** arrow buttons until "P34" is displayed.
   b Press the **P** button.
   c The current hour setting is displayed in 24-hour time. Example: 2 PM is displayed as "14".
3 Change the **Hour** parameter.
   a Press the **UP** or **DOWN** arrow buttons until the desired hour is displayed.
4 Press the **P** button.
   ► The setting is changed and "P34" is displayed.
5 Select the **Minute** parameter (P35).
   a Press the **UP** or **DOWN** arrow buttons until "P35" is displayed.
   b Press the **P** button.
   c The current minute setting is displayed.
6 Change the **Minute** parameter.
   a Press the **UP** or **DOWN** arrow buttons until the desired minute is displayed.
7 Press the **P** button.
   ► The **Hour** and **Minute** parameters are changed and "P35" is displayed.

8 Exit program mode.
- **a** Press the **UP** or **DOWN** arrow buttons until “P01” is displayed, or
- **b** Do not press any buttons for four minutes. Parameter 01 (“P01”) is displayed.

7.3.2 Set Scheduled Defrost Times

Defrost event times are controlled by four parameters: P24, P25, P26, and P27.

Parameter	Description	Range	Default Setting
P24	Defrost event 1 time	000 to 235, or OFF	000
P25	Defrost event 2 time	000 to 235, or OFF	080
P26	Defrost event 3 time	000 to 235, or OFF	160
P27	Defrost event 4 time	000 to 235, or OFF	OFF

Each parameter is set either to OFF (indicating that the defrost event is disabled), or a three-digit number (representing the time of the defrost event).

► The first two digits represent the hour in 24-hour format.

► The third digit represents the minute, in 10-minute intervals.

NOTE
- ► 16X represents 4 PM
- ► XX2 represents 20 minutes
- ► 162 represents 4:20 PM
- ► 000 represents midnight

The defrost event time parameters are restricted through an access code. To view and change these parameter settings, the access code (the last parameter) must first be set to **88**.

Set the defrost time:

1 Ensure that the current time programmed in the independent temperature controller is correct and matches the time programmed in the i.Center monitoring system. Change the time if necessary.

2 Enter the access code.
- **a** Press the **UP** or **DOWN** arrow buttons until the last parameter is displayed.
- **b** Press the **P** button. The parameter is displayed.
- **c** Press the **UP** or **DOWN** arrow buttons to change the parameter to **88**.
- **d** Press the **P** button. The setpoint is changed and the last parameter is displayed.

3 Select the defrost time parameter setting (P24, P25, P26, or P27).
- **a** Press the **UP** or **DOWN** arrow buttons to display the desired defrost parameter.
- **b** Press the **P** button. The current setting is displayed.

4 Press the **UP** or **DOWN** arrow buttons to adjust the setting for the selected parameter.

5 Press the **P** button. The setting is changed and the parameter is displayed.

6 Repeat steps 3-5 for additional defrost parameters.

7.4 Move Drawers and Shelves

Storage features.

CAUTION

- ► Keep hands away from pinch points when closing the door.
- ► Before moving drawers, ensure they are completely empty for safe lifting.
- ► Maximum drawer or shelf load is 100 lbs (46 kg).

NOTICE Before moving storage components, protect stored items in freezer from extended exposure to adverse temperature.

Remove a drawer:

1. Pull drawer out until it stops.
2. Tilt the front of the drawer upward.
3. Pull drawer free of the slides.

Install a drawer:

1. Tilt the front of the drawer upward.
2. Set the wheels of the drawer in the slides in the cabinet.
3. Lower the front of the drawer.
4. Gently push the drawer into the chamber until it stops.
5. Pull drawer out until it stops; check for smooth operation.

Remove a shelf:

1. With one hand, lift front edge of the shelf from the front brackets.
2. With the other hand, reach under the shelf and bump rear edge of the shelf upward to disengage rear brackets.

Install a shelf:

1. Insert shelf into chamber, placing it on brackets.
2. Gently bump rear edge of the shelf downward to engage brackets.
3. Pulling shelf forward gently; shelf should not disengage from rear brackets.

7.5 Move Slides and Brackets

Remove drawer slides:

1. Using a screwdriver, remove front bracket retainers.
2. Tap front brackets upward to disengage standards.
3. Remove slides from standards.

Install drawer slides:

1. Insert slides into standard at appropriate height.
2. Tap front brackets downward to engage standards.
3. Using a screwdriver, install front bracket retainers.

Remove shelf brackets:

1. Using a screwdriver, remove front bracket retainers.
2. Tap front brackets upward to disengage standards.
3. Remove front brackets from standards.

Install shelf brackets:

1. Insert front brackets into standard at appropriate height.
2. Tap front brackets downward to engage standards.
3. Using a screwdriver, install front bracket retainers.

7.6 Optional Adapter Kits for Medication Dispensing Locks

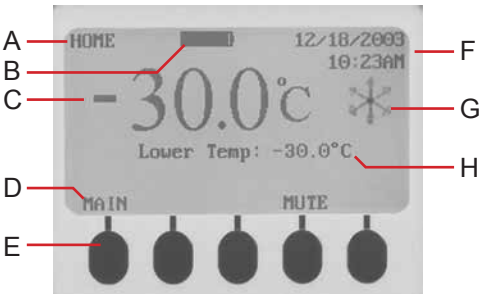
Contact Helmer Technical Service or your distributor for service documentation pertaining to medication dispensing locks.

8 Temperature Monitor Settings

8.1 Home Screen

The HOME screen appears when:

- ► The **HOME** button is pressed from any other screen
- ► There is no interaction for two minutes on any screen other than those used to enter a password



HOME screen on the monitoring system.

Label	Description
A	Screen name
B	Battery voltage level
C	Upper chamber probe temperature display
D	Button labels
E	Buttons
F	Date and time display
G	Defrost icon
H	Lower chamber probe temperature display

8.1.1 Home Screen Functions

NOTE Refer to chapter **14** (i.Center Screen Reference) for a complete list of screens in the i.Center monitoring system.

- ► View current temperature readings
- ► View the current time and date
- ► View detailed information about current or previous alarm events
- ► View the remaining backup battery charge
- ► View active alarms
- ► Mute audible alarms
- ► Adjust contrast
- ► View 24-hour chamber temperature graph
- ► Access Main screen to view and change settings

8.2 Main Screen

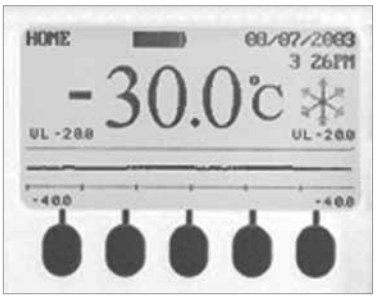
The Main screen displays functional options that allow access to all other screens in the system.

MAIN screen functional options.

Functions available from the Main screen:

Option	Function
Event Log	► View historical information about alarms, operational events, and defrost events
System Alarm Test and Status	► Start or stop an automatic test for temperature alarms ► View the number of days remaining before the paper for the temperature chart recorder needs to be changed ► View the current status of the door (OPEN or CLOSED) ► View the current condenser temperature
Edit Configuration (password required)	► Change the language used for text ► Change date and time information ► Change temperature units ► Change the volume and pattern for audible alarms ► Enable or disable the chart paper timer ► Enable or disable the temperature graph display ► Change alarm-related setpoints and timers ► Calibrate the temperature probe reading ► Change some settings to the factory default values ► Change the password, preventing unauthorized changes
View Configuration	► View the date and time formats ► View alarm-related setpoints and timers ► View the volume and pattern for audible alarms ► View the setting for the chart paper timer ► View the setting for the temperature graph display ► View the settings for temperature and time alarms
Product/Company Information	► View the software versions for control and display components of the monitoring system ► View information to contact Helmer
i.Help	► Access the on-board help system

8.3 Temperature Graph



The Temperature Graph screen appears when:

- ► The Temperature Graph feature is enabled
- ► There is no interaction for one minute on any screen
- ► There are no active alarms

NOTE: While there is power to the monitoring system, data from the chamber temperature probe is collected real-time, and the past 24 hours of collected data is stored and displayed.

In the event of an AC power failure, the monitoring system continues to collect and display temperature data as long as battery power is available. If AC power is restored before battery power fails, there is no interruption in data collection. The temperature that is displayed on the graph for eight hours earlier was the temperature eight hours ago.

If battery power fails, the monitoring system stops displaying temperature data and stops collecting new temperature data. The past 24 hours of data temperature data is retained. When AC power is restored, the stored data is displayed, and the monitor resumes collecting and displaying real-time temperature data. In this case, there is an interruption in data collection: the temperature displayed on the graph for eight hours earlier was the temperature at eight hours before the backup power failed.

8.3.1 Enable or Disable the Temperature Graph

The i.Center has a real-time temperature graph which displays temperature probe readings for the past 24 hours of operation. This graph appears on the bottom of the HOME screen when no button has been pressed for one minute, and if no alarm is active. The graph clears if a button is pressed or an alarm activates.

NOTE: The temperature graph is enabled by default.

Enable or disable the temperature graph:

1. On the HOME screen, press the **MAIN** button.
2. Press the **DOWN** button to select Edit Configuration. Press the **SELECT** button.
3. Enter the password when prompted.
4. Press the **DOWN** button to select Alarm Setpoints. Press the **SELECT** button.
5. Press the **DOWN** button to select Temperature Graph.
6. Press the **INC** or **DEC** buttons to select enable or disable the temperature graph.
7. Press the **BACK** button to return to the Edit Configuration screen, or press the **HOME** button to exit.

8.4 Change Configuration Password

The default password is 1234. A new password must use four digits, ranging from 1 to 5.

Change the password:

1. On the HOME screen, press the **MAIN** button.
2. Press the **DOWN** button to select Edit Configuration. Press the **SELECT** button.
3. Enter the password when prompted.
4. Press the **DOWN** button to select Change Password. Press the **SELECT** button.
5. Enter the new password, then re-enter the new password when prompted.
   - ► If password entries match, the “update” message is displayed.
   - ► If password entries do not match, the “incorrect match” message is displayed. Repeat the procedure to change the password.

8.5 Calibrate Chamber Temperature Probe

Verify the temperature probe is reading chamber temperature correctly by comparing the chamber probe reading to temperature read by an independent thermometer. If the chamber temperature probe is not reading correctly, change the value displayed on the temperature monitoring system.

NOTE If the variance is within acceptable limits for your organization, changing probe settings is optional.

- ► Default setting for chamber temperature is -30.0 °C
- ► Value is factory-preset

Obtain:

- ► Independent thermometer, calibrated and traceable per national standards

Measure the chamber temperature:

1. Remove the probe from the probe bottle.
2. Unscrew the cap from the bottle.
3. Insert the thermometer and temperature probe in the bottle. The probe and thermometer should be immersed at least 2” (50 mm).
4. Close the door and allow the chamber temperature to stabilize for 10 minutes.
5. Observe and note the thermometer temperature.

EXAMPLE
- ► Measured temperature (at the probe bottle) is -30.0 °C
- ► Displayed temperature is -32.0 °C
- ► Change displayed temperature to -30.0 °C

Enter the new calibration value:

1. On the HOME screen, press the **MAIN** button.
2. Press the **DOWN** button to highlight Edit Configuration. Press the **SELECT** button.
3. Enter the password when prompted.
4. Press the **DOWN** button to highlight Temperature Calibration. Press the **SELECT** button.
   - **a** The Select Temp Probe: (Upper or Lower) option is highlighted.
   - **b** Press the **INC** or **DEC** buttons to select the Upper or Lower probe option.
   - **c** Press the **DOWN** button to highlight Temperature.
   - **d** Press the **INC** or **DEC** buttons to change the temperature calibration value.

5 Press the **DOWN** button to highlight Store Calibration.
   a To save the new value, press the **ENTER** button. The “Calibration Memorized” message appears. New settings are saved.
   b To discard the new value, press the **BACK** button or **HOME** button to exit. New settings are not saved.
6 Remove thermometer and probe from bottle.
7 Replace bottle cap, ensuring a tight fit.
8 Place the probe in bottle, immersing at least 2” (50 mm).

NOTE
- ► The current temperature displayed by the monitoring system may change so that it no longer matches the new probe calibration value. This is normal.
- ► If a new probe value is entered but not saved, the new value will appear when the calibration setting for the probe is viewed. This is normal.

8.6 Factory Default Settings

Settings listed below may be simultaneously returned to factory default values.

NOTE The factory default settings may not be the same as the settings that were factory-calibrated before the freezer was shipped.

Setting	Restored Value
High Alarm Setpoint	-20.0 °C
Condenser Alarm Setpoint	50.0 °C
Door Ajar Timeout	3 minutes
Power Failure Timeout	3 minutes
Chart Paper Timer	6.5 days

8.7 Restore Factory Default Settings

Restore settings:

1 Press the **MAIN** button.
2 Press the **DOWN** button to highlight Edit Configuration. Press the **SELECT** button.
3 Enter the password when prompted.
4 Press the **DOWN** button to highlight Factory Default Settings. Press the **SELECT** button.
5 Do one of the following:
   - ► Press the **ENTER** button. Factory default settings are restored.
   - ► Press the **BACK** button. Factory default settings are not restored.

8.8 Alarm Settings

The following alarm settings may be changed by the operator. The setpoint for temperature alarms may be changed (where applicable), as well as the time delay between when the alarm condition commences and when the visual and audible alarms are initiated.

8.8.1 Alarm Volume

The alarm volume can be changed. The Alarm Volume controls volume for all audible alarms.

- ► Default setting is 10
- ► Setting can be changed from 1 to 10
- ► 1 is the quietest setting; 10 is the loudest setting

Change the alarm volume:

1. Press the **MAIN** button.
2. Press the **DOWN** button to highlight Edit Configuration. Press the **SELECT** button.
3. Enter the password when prompted.
4. Press the **DOWN** button to highlight System Options. Press the **SELECT** button.
5. Press the **DOWN** button to highlight Alarm Volume.
6. Press the **INC** or **DEC** buttons to change the setting.
7. Press the **BACK** button to return to the Edit Configuration screen, or press the **HOME** button to exit. The new settings are saved.

8.8.2 Alarm Pulse

The alarm pattern can be changed. This is useful if several freezers with alarms are collocated, and distinguishing the source of the alarm quickly is desirable.

- ► Default setting is Single.
- ► Setting can be changed between Single, Double, Triple, and Constant.

Change the alarm pulse:

1. Press the **MAIN** button.
2. Press the **DOWN** button to highlight Edit Configuration. Press the **SELECT** button.
3. Enter the password when prompted.
4. Press the **DOWN** button to highlight System Options. Press the **SELECT** button.
5. Press the **DOWN** button to highlight Alarm Pulse.
6. Press the **INC** or **DEC** buttons to change the setting.
7. Press the **BACK** button to return to the Edit Configuration screen, or press the **HOME** button to exit. The new settings are saved.

8.8.3 High Chamber Temperature Alarm

The High Alarm setpoint specifies the temperature at which the High Temperature Alarm activates. If the temperature detected by the chamber probe is greater than or equal to this value, the alarm activates.

- ► Default setpoint is -20.0 °C
- ► Setpoint can be changed from -40.0 °C to 0.0 °C

Change the setpoint:

1. Press the **MAIN** button.
2. Press the **DOWN** button to highlight Edit Configuration. Press the **SELECT** button.
3. Enter the password when prompted.
4. Press the **DOWN** button to highlight Alarm Setpoints. Press the **SELECT** button.
5. Press the **DOWN** button to highlight High Alarm Setpoint.
6. Press the **INC** or **DEC** buttons to change the setting.
7. Press the **BACK** button to return to the Edit Configuration screen, or press the **HOME** button to exit. The new settings are saved.

8.8.4 Condenser Temperature Alarm

The Condenser Alarm setpoint specifies the temperature at which the Condenser Temperature Alarm activates. If the temperature of the condenser discharge line is greater than or equal to this value, the alarm activates.

- ► Default setpoint is 50 °C
- ► Setpoint can be changed from -40 °C to +80 °C

NOTICE Condenser Temperature Alarm should not be changed unless directed by Helmer Technical Service.

Change the setpoint:

1. Press the **MAIN** button.
2. Press the **DOWN** button to highlight Edit Configuration. Press the **SELECT** button.
3. Enter the password when prompted.
4. Press the **DOWN** button to highlight Alarm Setpoints. Press the **SELECT** button.
5. Press the **DOWN** button to highlight Cond. Alarm Setpoint.
6. Press the **INC** or **DEC** buttons to change the setting.
7. Press the **BACK** button to return to the Edit Configuration screen, or press the **HOME** button to exit. The new settings are saved.

8.8.5 Door Ajar Alarm

The Door Ajar Timeout specifies longest time the freezer door can be open before the alarm activates. If the time elapsed since the last door opening is greater than or equal to this value, the alarm activates.

- ► Default delay setting is three minutes
- ► Setting can be changed from 0 minutes to 60 minutes

Change the alarm delay:

1. Press the **MAIN** button.
2. Press the **DOWN** button to highlight Edit Configuration. Press the **SELECT** button.
3. Enter the password when prompted.
4. Press the **DOWN** button to highlight Alarm Setpoints. Press the **SELECT** button.
5. Press the **DOWN** button to highlight Door Ajar Timeout.
6. Press the **INC** or **DEC** buttons to change the setting.

7 Press the **BACK** button to return to the Edit Configuration screen, or press the **HOME** button to exit. The new settings are saved.

8.8.6 Power Failure Alarm

The Power Failure Timeout specifies longest time the freezer can be without AC power before the alarm activates. If the time elapsed since the last power failure is greater than or equal to this value, the alarm activates.

- ► Default delay setting is three minutes
- ► Setting can be changed from 0 minutes to 60 minutes

Change the alarm delay:

1 Press the **MAIN** button.
2 Press the **DOWN** button to highlight Edit Configuration. Press the **SELECT** button.
3 Enter the password when prompted.
4 Press the **DOWN** button to highlight Alarm Setpoints. Press the **SELECT** button.
5 Press the **DOWN** button to highlight Power Failure Timeout.
6 Press the **INC** or **DEC** buttons to change the setting.
7 Press the **BACK** button to return to the Edit Configuration screen, or press the **HOME** button to exit. The new settings are saved.

8.8.7 Chart Paper Alarm

The default setting for the chart paper timer is Enabled. One sheet of chart paper records temperatures continuously for seven days. The timer activates an alarm 6.5 days from when the timer is reset. The timer period cannot be changed.

NOTE
- ► Available options are Enabled, Disabled, and Reset.
- ► Enabling the timer also resets the timer.

Change the setting:

1 Press the **MAIN** button.
2 Press the **DOWN** button to highlight Edit Configuration. Press the **SELECT** button.
3 Enter the password when prompted.
4 Press the **DOWN** button to highlight System Options. Press the **SELECT** button.
5 Press the **DOWN** button to highlight Chart Paper Timer.
6 Press the **INC** or **DEC** buttons to select Enabled, Disabled, or Reset.
7 Do one of the following:
   - ► If Enabled or Disabled is selected, press the **BACK** button to return to the System Options screen, or press the **HOME** button to exit. The new setting is saved.
   - ► If Reset is selected:
     - **a** Press the **DOWN** button.
     - **b** Press the **PAPER-CHANGED** button. The System Options screen appears with the Chart Paper Timer set to Enabled.
8 Press the **BACK** button to return to the System Options screen, or press the **HOME** button to exit. The new setting is saved.

8.9 Test Alarms

Test alarms to ensure they are working correctly. The freezer has alarms for chamber temperature, compressor temperature, door open (time), no battery, and power failure.

NOTICE Before testing alarms, protect items in the freezer from extended exposure to adverse temperature.

8.9.1 Automatic Chamber Temperature Alarm Test

NOTE
- ► Calibrate the chamber temperature probe prior to performing the Automatic Chamber alarm test.
- ► The test can be aborted by selecting the Cancel High Test option.
- ► The test takes less than five minutes.

When performing an automatic temperature alarm test, the Peltier device heats or cools the temperature probe until the high or low alarm setpoint is reached. An event is added to the Event Log to indicate a temperature alarm was activated.

Test the high alarm:

1 Identify the current setting for the high alarm setpoint.
2 Press the **MAIN** button.
3 Press the **DOWN** button to select System Alarm Test & Status. Press the **SELECT** button.
   ► The System Alarm Test & Status screen appears.
4 Press the **DOWN** button to select Start High Alarm Auto Test. Press the **SELECT** button.
   ► The “High Alarm Test in Progress” message appears.
   ► The alarm will activate when the alarm setpoint is reached.
   ► When the test is complete, the message clears.

Cancel the test:

1 Press the **MAIN** button.
2 Press the **DOWN** button to select System Alarm Test & Status. Press the **SELECT** button.
   ► The System Alarm Test & Status screen appears.
3 Press the **DOWN** button to select Cancel High Test. Press the **ENTER** button.
   ► The test is cancelled.

NOTE When cancelling an automatic test, the message indicating the test is in progress clears immediately. If a setpoint was reached before the test was cancelled, the alarm activates and clears, as described earlier.

8.9.2 Manual Chamber Alarm Test

NOTICE Before testing alarms, protect items in freezer from extended exposure to adverse temperature.

Obtain:

- ► Independent thermometer, calibrated and traceable per national standards
- ► (1) 4 oz. (120 mL) glass of product simulation solution (1:1 ratio of water to propylene glycol or equivalent low-temperature fluid)

NOTICE Temperature probes are fragile; handle with care.

Test the high alarm:

1. Identify setting for high alarm setpoint.
2. Immerse the independent thermometer in the glass of product simulation solution.
3. Place the glass in the freezer and close the door.
4. When the glass contents have stabilized at the chamber temperature, remove the glass from the freezer.
5. While stirring probe in product simulation solution, allow the glass contents to warm up to room temperature and observe the temperature on the monitor.
6. When high temperature alarm is activated, note the temperature on the independent thermometer.
7. Remove the probe from the glass.
8. Place probe in probe bottle, immersing it at least 2” (50mm).

8.9.3 Power Failure Alarm Test

NOTE

- ► During a power failure, the power failure alarm activates and the batteries provide power to the monitoring system.
- ► If AC power fails, the backup batteries will allow for continued data collection and temperature display.
- ► If the backup batteries fail, data is not collected and the temperature is not displayed.
- ► When power is restored, the 24 hours of data prior to the power loss are retained in the system memory. Stored temperature data is displayed on the graph and the monitoring system resumes data collection and display.

1. Confirm the freezer is connected to AC power.
2. Ensure the monitoring system backup batteries are installed.
3. Change Power Failure Timeout setting to 0 minutes.
   - **a** Press the **MAIN** button.
   - **b** Press the **DOWN** button to highlight Edit Configuration. Press the **SELECT** button.
   - **c** Enter the password when prompted.
   - **d** Press the **DOWN** button to highlight Alarm Setpoints. Press the **SELECT** button.
   - **e** Press the **DOWN** button to highlight Power Failure Timeout.
   - **f** Press the **DEC** button to change the setting to 0.
4. Switch the AC ON/OFF switch **OFF**. Power failure alarm will activate immediately.
5. Switch the AC ON/OFF switch **ON**. Power failure alarm will clear and audible alarm will cease.
6. Change the Power Failure Timeout setting to the original setting.

8.9.4 Door Ajar Alarm Test

1 Change Door Ajar Timeout setting to 0 minutes:
   - **a** Press the **MAIN** button.
   - **b** Press the **DOWN** button to highlight Edit Configuration. Press the **SELECT** button.
   - **c** Enter the password when prompted.
   - **d** Press the **DOWN** button to highlight Alarm Setpoints. Press the **SELECT** button.
   - **e** Press the **DOWN** button to highlight Door Ajar Timeout.
   - **f** Press the **DEC** button to change the setting to 0.
   - **g** Press the **BACK** button to return to the Edit Configuration screen, or press the **HOME** button to exit. New settings are saved.
2 Open the door. Door ajar alarm will activate immediately.
3 Close the door. Door ajar alarm will clear and audible alarm will cease.
4 Change the Door Ajar Timeout setting to the original setting.

8.9.5 No Battery Alarm Test

Test the no battery alarm to ensure the alarm provides warning of a low- or no-battery charge.

NOTE
- ► During an AC power failure, the power failure alarm activates and the batteries provide power to the monitoring system.
- ► If AC power fails, the backup batteries will allow for continued data collection and temperature display.
- ► If the backup batteries fail, data is not collected and the temperature is not displayed.

Test the alarm:

1 Ensure the monitoring system backup batteries are installed.
2 Remove one battery from the monitoring system backup battery holder.
   - **a** If the no battery alarm activates, no further action is needed. Reinstall the battery.
   - **b** If the no battery alarm does not activate, contact Helmer Technical Service.

NOTICE When installing replacement batteries, use only batteries which meet the specifications outlined in chapter **10.7** (Supplies).

8.10 Additional System Settings

8.10.1 Screen Contrast

The screen contrast can be changed for easier viewing.

NOTE
- ► During an AC power failure, the screen backlight is not illuminated to conserve backup battery power.
- ► During an AC power failure, the screen contrast cannot be changed.

Change screen contrast:

1 On the HOME screen, press the third button from the left to make the text appear lighter.
2 On the HOME screen, press the second button from the left to make the text appear darker.

8.10.2 Date and Time

The Date Format setting controls the order in which the month (mm) and day (dd) are displayed.

- ► Month is a 2-digit number (01-12)
- ► Day is a 2-digit number (01-31)
- ► Default date format is mm/dd/yyyy

The Clock Mode setting controls whether the time is displayed in a 12-hour or 24-hour format.

- ► When using the 12-hour format, AM or PM must be specified
- ► Default setting is 12-hour

Change date and time settings:

1. Press the **MAIN** button.
2. Press the **DOWN** button to highlight Edit Configuration. Press the **SELECT** button.
3. Enter the password when prompted.
4. Press the **DOWN** button to highlight Set Date & Time. Press the **SELECT** button.
5. Press the **UP** or **DOWN** buttons to select the date and time settings to change.
6. Press the **INC** or **DEC** buttons to change the setting.
7. Press the **BACK** button to return to the Edit Configuration screen, or press the **HOME** button to exit. The new settings are saved.

8.10.3 Display Language

The i.Center monitoring system stores two languages. English is the default language. If a different language is desired, it must be loaded from the flash memory card. If a flash memory card is not included with the freezer, the languages may have been loaded to the i.Center prior to shipment.

To obtain a flash memory card to load an alternate language, contact Helmer Technical Service.

NOTE Each time the freezer is powered on, the i.Center display language must be selected.

Set the display language on power-on:

1. Connect the freezer to AC power. Switch the AC ON/OFF switch **ON**.
2. Install the monitoring system battery that is included in the accessory package.
   - ► The freezer powers on and the i.Center will display the System Options screen.
3. Press the **INC** or **DEC** buttons to select the desired language. Press the **SELECT** button.
4. Press the **HOME** button to return to the HOME screen.
5. If a temperature alarm sounds, press the **MUTE** button.

Change the display language:

1. Press the **MAIN** button.
2. Press the **DOWN** button to highlight Edit Configuration. Press the **SELECT** button.
3. Enter the password when prompted.
4. Press the **DOWN** button to highlight System Options. Press the **SELECT** button.
5. Press the **UP** or **DOWN** buttons to select Language. Press the **SELECT** button.
6. Press the **INC** or **DEC** buttons to select the desired language.
7. Press the **BACK** button to return to the System Options screen, or press the **HOME** button to exit. The new settings are saved.

8.10.4 Temperature Units

Available options are Celsius (°C) or Fahrenheit (°F). The default temperature unit is Celsius.

Change temperature units:

1 Press the **MAIN** button.
2 Press the **DOWN** button to highlight Edit Configuration. Press the **SELECT** button.
3 Enter the password when prompted.
4 Press the **DOWN** button to highlight System Options. Press the **SELECT** button.
5 Press the **DOWN** button to highlight Temperature Units.
6 Press the **INC** or **DEC** buttons to select the desired temperature units.
7 Press the **BACK** button to return to the Edit Configuration screen, or press the **HOME** button to exit. The new setting is saved.

8.11 Event Log

The Event Log shows information from alarm events.

► 50 (most recent) events can be viewed on the Event Log screen.
► Number of door openings for the current and previous day can be viewed.

View the event log:

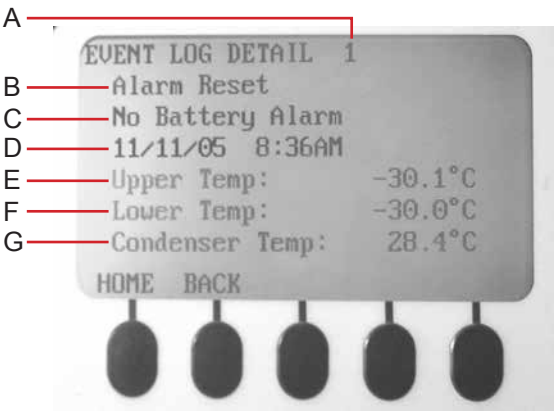
1 Press the **MAIN** button.
2 Press the **DOWN** button to highlight Event Log. Press the **SELECT** button.
► The Event Log screen is displayed.

Event log format:

EVENT LOG Door AA/AA BB/BB
Openings: C D
EE F GG HH/HH/HH II:IIJ KK.KK°L

Item	Description
AA/AA	Current date (month and day)
BB/BB	Previous date (month and day)
C	Number of door openings on current date
D	Number of door openings on previous date
EE	Event number. The most recent event is numbered as 1. Values can be 1-50.
F	Event. “S” indicates the start of an alarm condition. “R” indicates the alarm was reset and the system returned to normal.
GG	Alarm Type: DR Door Open HI High temperature CO Condenser temperature NB No Battery AC Power failure
HH/HH/HH	Date of event (month and day, and the last two digits of the year)
II:II	Time (hours and minutes) of event
J	Time (appears for 12-hour format). “A” indicates AM. “P” indicates PM.
KK.KK	Chamber temperature at time of event
L	Temperature units. C = Celsius. F = Fahrenheit.

8.11.1 Event Details



Event Log Detail screen.

Label	Description
A	Event number
B	Event type
C	Alarm type
D	Date and time of event
E	Upper chamber probe temperature at time of event
F	Lower chamber probe temperature at time of event
G	Condenser temperature at time of event

View an event:

1 Press the **MAIN** button.
2 Press the **DOWN** button to highlight Event Log. Press the **SELECT** button.
3 From the Event Log screen, press the **UP** or **DOWN** buttons to highlight the desired event number. Press the **SELECT** button.
► The Event Log Detail screen for the selected event is displayed.
4 Press the **BACK** button to return to the Event Log screen, or press the **HOME** button to exit.

NOTE If the event is highlighted the alarm for that event was caused by a system self-test, initiated by an operator.

8.12 Defrost Log

The Defrost Log screen displays information about the previous 50 defrost events.

View a defrost event:

1 Press the **MAIN** button.
► Logs is highlighted.
2 Press the **SELECT** button.
► Event Log is highlighted.
3 Press the **DOWN** button to highlight Defrost Log. Press the **SELECT** button.
► The Defrost Log screen is displayed.

The following is the format for the defrost log:

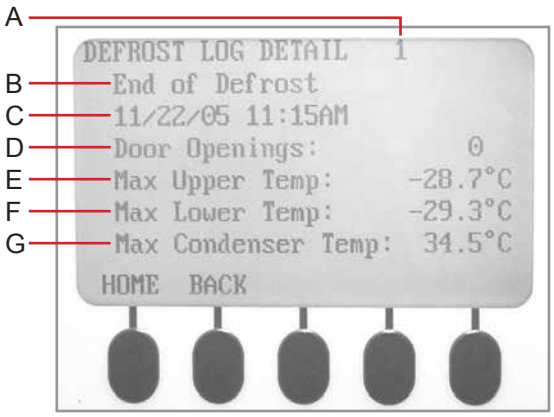
AA B CC/CC/CCCC DD:DD E FF.FF°G H

Item	Description
AA	Defrost event number. The most recent event is numbered as 1. Values can be 1-50.
B	Defrost event. S indicates the start of the defrost event. E indicates the end of the defrost event.
CC/CC/CCCC	Date of event
DD:DD	Time (hours and minutes) of event
E	Time (12 Hour format only). A indicates AM, and P indicates PM.
FF.FF	Highest upper chamber temperature recorded since the previous event.
G	Temperature measurement system. C indicates Celsius, F indicates Fahrenheit.
H	Number of door openings since the previous event.

View defrost event details:

1 From the Defrost Log screen, press the **UP** or **DOWN** arrow buttons until the desired defrost event is displayed. Press the **SELECT** button.

► The Defrost Log Detail screen for the selected event is displayed.



Defrost Log Detail screen.

Label	Description
A	Event number
B	Event type
C	Date and time of event
D	Number of door openings during the event
E	Highest upper chamber probe temperature recorded during the event
F	Highest lower chamber probe temperature recorded during the event
G	Highest condenser temperature recorded during the event

8.13 Upgrade System Firmware

Helmer may occasionally issue updates for the i.Center firmware. Follow upgrade instructions included with the firmware update.

8.14 Reset the i.Center Monitoring System

1 Remove 1 battery from the monitoring system backup battery holder.
2 Switch the AC ON/OFF switch **OFF**.
3 Switch the AC ON/OFF switch **ON**.
4 Reinstall the battery in the monitoring system backup battery holder.

8.15 View Manufacturer and Product Information

1 Press the **MAIN** button.
2 Press the **INC** or **DEC** buttons to select the Product/Company Information option. Press the **SELECT** button.
   ► Manufacturer contact information appears.
   ► Software version appears.

9 Temperature Controller Setpoints

Independent temperature controller.

The temperature controller is located in the electrical box on the back of the freezer. Temperature controller setpoints are programmed at the factory. Setpoints can be viewed and changed through the temperature controller.

9.1 Change the Freezer Setpoint

NOTICE Do not change the setpoint to a value outside the temperature control range.

NOTE
► Default setpoint is -32.0 °C (which causes the freezer to maintain a temperature of -30.0 °C).
► When there is no interaction for four minutes, the temperature controller exits program mode and returns to normal mode.
► The reference temperature displayed on the temperature controller may not be the same as the temperature displayed on the i.Center monitoring system.

1 Observe the chamber temperature displayed on the i.Center monitoring system, after the monitoring probe has been calibrated.
2 Determine how much the freezer setpoint will be changed.

EXAMPLE
► Current setpoint is -30.0 °C
► Target setpoint is -28.0 °C
► Setpoint adjustment value is +2.0 °C

3 On the temperature controller, press and hold the **P** button.
► "PXX" is displayed, where "XX" is a parameter value.
4 Adjust the freezer setpoint.
a Press the **UP** or **DOWN** arrow buttons until "P03" is displayed.
b Press the **P** button.
► The current setpoint is displayed.
c Press the **UP** or **DOWN** arrow buttons to change the temperature setpoint by the same value as determined in step 2.
d Press the **P** button.
► The setpoint is changed and "P03" is displayed.
5 Exit program mode:
a Press the **UP** or **DOWN** arrow buttons until "P01" is displayed, or
b Do not press any buttons for four minutes. Parameter 01 ("P01") is displayed.

9.2 Change the Hysteresis Value

► Default setpoint is 4.0 °C
► Allowable temperature variance above the freezer setpoint

NOTICE Hysteresis is factory-preset and should not be changed unless directed by Helmer Technical Service.

10 Maintenance

NOTICE
► Before performing maintenance, protect items in freezer from extended exposure to adverse temperature.
► Allow freezer temperature to stabilize at setpoint after performing service or after extended door opening.

NOTE Refer to the operation manual for the preventive maintenance schedule.

10.1 Recharge Refrigerant

CAUTION
► Review all safety instructions prior to recharging refrigerant. Refer to chapter **2** (Safety).
► Maintenance should only be performed by trained refrigeration technicians.

NOTICE Use only non-CFC R-404A refrigerant.

Full initial refrigerant charge varies by model and power requirements, which can be found on the product specification label.

Model	Initial Charge
120/125	29.0 oz. (822 g)

Obtain:
► Refrigerant
► Calibrated pressure gauge (0 psi to 220 psi (0 kPa to 1520 kPa))

Add refrigerant:

1 Attach pressure gauge to the fittings on the refrigeration lines.
2 Monitor the low side (suction) pressure through a full compressor cycle.
3 Measure the pressure at the end of the next cycle, immediately before the compressor stops.

NOTE Pressure varies depending on ambient air temperature.

4 Add refrigerant. Check the pressure on the low side and high side.

Models with TXV expansion valve:

- ► Low side = 2 psi to 4 psi (14 kPa to 28 kPa)
- ► High side = 170 psi to 220 psi (1172 kPa to 1520 kPa)

Models with capillary tube:

- ► Low side = 4 psi to 7 psi (30 kPa to 50 kPa)
- ► High side = 100 psi to 220 psi (690 kPa to 1520 kPa)

5 Remove pressure gauge.

10.2 Test Monitoring System Backup Batteries

The i.Center monitoring system has visual indicators for battery charge level. If the batteries deplete to a particular voltage output, a flashing Low Battery alarm is initiated. If the batteries are missing or nearly depleted, the flashing No Battery alarm initiates.

Test backup batteries:

1 Switch the AC ON/OFF switch **OFF**.
- ► Screen should continue to display information without backlight.
- ► If the display is blank, replace the batteries.

2 Switch the AC ON/OFF switch **ON**.

10.3 Replace Monitoring System Backup Batteries

On the top of the freezer, remove six batteries and replace with six new batteries.

NOTICE When installing replacement batteries, use only batteries which meets the specifications outlined in chapter **10.7** (Supplies).

10.4 Clean the Freezer

10.4.1 Condenser Grill

In environments where freezer is exposed to excessive lint or dust, condenser grill may require cleaning more frequently than stated in preventive maintenance schedule.

Clean the condenser grill using a soft brush and a vacuum cleaner.

10.4.2 External Drain Line Fan

Clean the external drain line fan using a soft brush and a vacuum cleaner.

10.4.3 Exterior

Clean exterior surfaces with soft cotton cloth and non-abrasive liquid cleaner.

10.4.4 Interior

Clean painted surfaces with mild detergent. Clean stainless steel surfaces with a general-purpose laboratory cleaner suitable for stainless steel.

10.4.5 Door Gaskets

Clean with soft cloth and mild soap and water solution.

10.4.6 Clean and Refill Probe Bottles

NOTE A kit that includes a probe bottle and propylene glycol is available from Helmer.

Obtain:

- ► Fresh water-bleach solution (not provided)
  - ► 1:9 ratio of bleach to water
  - ► Bleach is 5% solution of commercial sodium hypochlorite (NaOCl)
  - ► Equivalent oxidizing cleaner/disinfectant approved by your organization may be substituted
- ► 4 oz. (120 mL) of product simulation solution per bottle
  - ► 1:1 ratio of water to propylene glycol (or equivalent low-temperature fluid)

Clean and refill bottle:

1. Remove probe from bottle.
2. Remove bottle from bracket.
3. Clean bottle with water-bleach solution.
4. Fill bottle with 4 oz. (120 mL) of product simulation solution.
5. Cap bottle tightly to minimize evaporation.
6. Place bottle in bracket.
7. Replace probe, immersing at least 2” (50 mm).

10.5 Defrost the Unit Cooler

Defrost cycles are programed to occur at specific times. A defrost cycle can be manually initiated, outside of the programmed defrost times, as described below.

Independent temperature controller (defrost lamp circled).

Start a defrost event:

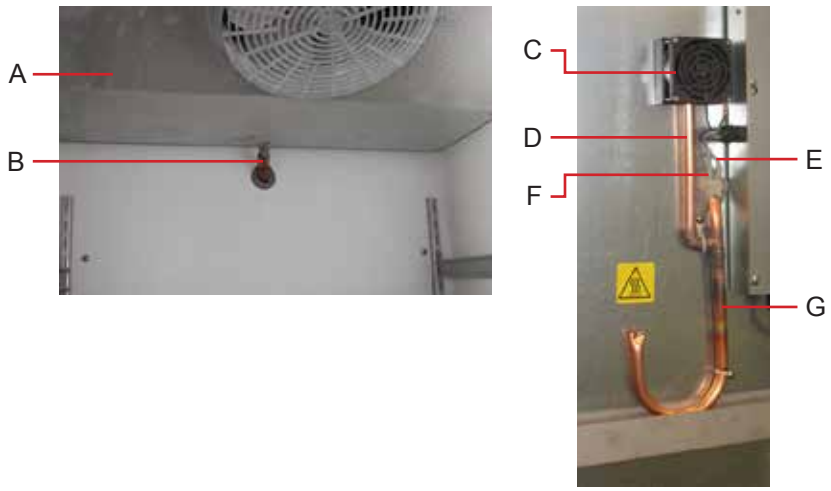
1. On the independent temperature controller, press the P button to access the parameter menu.
- ► “P03” is displayed.
2. Press the **DOWN** arrow button until “P37” is displayed.
3. Press the **P** button.
4. Press the **UP** arrow button to start the defrost event.
   - ► The defrost lamp illuminates.
   - ► The defrost icon on the i.Center monitoring system is displayed.
   - ► The defrost event is started.
5. To stop the defrost event, do one of the following:
   - **a** Press the **DOWN** arrow button, or
   - **b** The defrost event will stop when the defrost cycle is complete.

10.6 Unit Cooler Cover Removal and Installation

If unit cooler cover is not removed as detailed in this procedure the drain port may be damaged. Improper drainage may result in excessive icing and freezer's inability to maintain temperature.

Required tools:

- ► 5/16" socket wrench
- ► Tool to push putty away from the drain tube



Drain tube, fan, and heater components.

Label	Description
A	Unit cooler cover
B	Drain port
C	Drain fan
D	Fan tube
E	Heater wires
F	Heating element
G	Drain tube

10.6.1 Remove the Unit Cooler Cover

WARNING Disconnect the freezer from AC power when removing the unit cooler.

CAUTION The condensate evaporator and water evaporation tray are hot.

NOTICE
- ► Before removing the unit cooler cover, protect items in the freezer from extended exposure to adverse temperature.
- ► Allow freezer temperature to stabilize at setpoint after replacing unit cooler.

1. Remove one battery from the battery holder. Switch AC ON/OFF switch **OFF**. Disconnect the freezer from AC power.
2. Remove the top drawer, basket, or shelf from the chamber.

NOTE For iPF models, remove the Cold-Shield™ panel. Loosen three screws securing the panel to the cabinet then slide the panel to free it from the screws.

3. On the back of the cabinet, peel the putty back to expose the drain tube (G) and drain heater (F).
4. Verify the heating element is cool. Remove the screws and loosen the pipe straps securing the drain tube to the cabinet.
5. Remove the drain heater from the drain tube.
6. Remove the drain tube (G) by pulling it downward. The drain tube should separate from the fan tube (D) at the 90° elbow, leaving the fan tube (D) attached to the fan (C).
   - **a** Separate the drain hose inside the cabinet from the unit cooler drain port (B).
   - **b** Gently twist the drain hose from left to right to separate it from the unit cooler drain port.
   - **c** Pivot the drain tube and drain hose upward then remove the assembly from the cabinet.
7. Remove the unit cooler cover (A).
   - **a** Hold unit cooler cover in place to prevent it from dropping.
   - **b** Use the socket wrench to remove four screws securing the unit cooler cover.
   - **c** Carefully lower unit cooler cover to avoid damage to the fan wiring.

10.6.2 Install the Unit Cooler Cover

1. Verify unit cooler wiring is connected and routed correctly.
   - **a** Wiring should be routed above copper tube inside the unit cooler.
   - **b** Reconnect wires if they have separated.
2. Attach unit cooler cover.
   - **a** Lift unit cooler cover into place.
   - **b** Front edge of the cover should be behind the unit cooler case.
   - **c** Use the socket wrench to install four screws to secure the unit cooler cover.
3. Insert the drain tube and drain hose through the hole in the cabinet.
   - **a** Push drain tube and drain hose upward at an angle, toward the unit cooler drain port.
   - **b** Pivot the drain tube and drain hose downward then push the assembly upward.
   - **c** In the chamber, push the drain hose onto the drain hose.
4. Attach the drain tube to the fan tube.
5. Insert the drain line heater in the drain tube.
   - **a** Insert the heater at an upward angle.
   - **b** The black heating element should no longer be visible.
6. On the back of the cabinet, press putty around the drain tube and drain line heater.

7 Reinstall top drawer, basket, or shelf.

NOTE For iPF models, reinstall the Cold-Shield™ panel.

8 Reattach the pipe straps to secure the drain tube to the cabinet.

9 Reconnect the freezer to AC power. Switch AC ON/OFF switch **ON**. Reinstall the battery in the battery holder.

10 Press the **MUTE** button to disable the high temperature alarm while freezer reaches operating temperature.

10.7 Supplies

Refrigerant: non-CFC, R-404A

Chart paper: 220419 (52 sheets)

Propylene glycol solution: 400922-2

Monitoring system batteries: (6) 1.5 V, D-cell non-rechargeable alkaline batteries (or equivalent): 715031

Chart recorder battery (optional): (1) 9 V non-rechargeable alkaline (or equivalent): 120218

11 Troubleshooting

CAUTION
- ► Review all safety instructions prior to troubleshooting. Refer to chapter **2** (Safety).
- ► Troubleshooting should only be performed by trained refrigeration technicians.

11.1 General Operation Problems

Problem	Possible Cause	Action
Drawer does not slide easily.	Debris in the slides.	► Pull the drawer out and confirm the slides are free of debris. Clean if necessary.
	Ice buildup in the slides.	► Pull the drawer out and confirm slides are free of ice. De-ice and clean if necessary.
	Drawer is misaligned or not level.	► Confirm both slides for the drawer are mounted at the same height.
	A drawer slide is faulty.	► Confirm the slide is operating correctly. Replace if necessary.
Door does not open easily.	Debris in the hinges.	► Confirm the hinges are free of debris. Clean the hinges if necessary.
	Door hinges are not lubricated.	► Using a general-purpose grease, lubricate the pivots in the hinges.
	Hinge cam is faulty.	► Confirm the hinge cam is not damaged. Replace if necessary.
Monitor display is hard to read.	Screen contrast is set too low.	► Change the screen contrast.
Display on the temperature/defrost controller is flashing.	Defrost probe or temperature probe wiring is an open circuit, or a component is faulty or internal connections are loose.	► Check the continuity of the probe wiring and connections. Secure the connections if necessary. ► Confirm the probe is providing resistance in the range of 1191 Ω to 2000 Ω. Replace the probe if necessary.

11.2 Chamber Temperature Problems

Problem	Possible Cause	Action
Chamber temperature displayed is higher or lower than the actual temperature.	Connections for the chamber temperature probe are loose.	► Test the probe connections. Secure the connections if necessary.
	Temperature probe wiring is an open circuit.	► Check the continuity of the probe wiring. Replace the probe if necessary.
	Probe bottles are empty, or the amount of solution is too low.	► Check the level of product simulation solution in the bottles. Clean and refill the bottles if needed.
	Monitor is not calibrated.	► Confirm the upper temperature probe is reading correctly. Calibrate the probe if necessary.
	Solution in the probe bottle is frozen.	► Refill the bottle with new solution.
	Digital electronics are locked because of an interruption in power.	► Reset the monitoring system.
	A component is faulty or internal connections are loose.	► Contact a qualified service technician.
Compressor runs continuously.	Freezer setpoint is set too low.	► Confirm the setpoint is set within the operating range. Change the setpoint if necessary.
	Temperature control probe is faulty.	► Confirm the probe is providing resistance in the range of 1191 Ω to 2000 Ω. Replace the probe if necessary.
	Temperature controller is faulty.	► Confirm the temperature controller is operating correctly. Replace the board(s) if necessary.
	Solid state relay is faulty.	► Confirm the relay is operating correctly. Replace it if necessary.

Problem	Possible Cause	Action
Chamber temperature does not stabilize at the freezer setpoint.	Solid state relay is faulty.	► Confirm the relay is operating correctly. Replace the relay if necessary.
	Temperature/defrost controller is faulty.	► Confirm the monitor/control board or temperature/defrost controller is operating correctly. Replace the board or controller if necessary.
	Compressor fan is not running.	► Check the compressor fan connections. Replace the fan motor if necessary.
	Unit cooler fan is not running.	► Activate the door switch then check the voltage to the fan. Replace the fan motor or door switch if necessary.
	Refrigerant level is too low.	► Check the refrigerant level. Recharge the refrigerant if necessary.
	Compressor motor has seized.	► Replace the compressor.
	Temperature control probe is faulty.	► Confirm the probe is providing resistance in the range of 1191 Ω to 2000 Ω. Replace the probe if necessary.
	Condenser grill is dirty.	► Check the condenser grill. Clean it if necessary.
	Circulation at the top of the chamber is not adequate.	► Check if there are any items that may obstruct air flow and remove them if necessary. ► Check the unit cooler fan is working. If the fan is not working, contact a qualified service technician.
	Ambient air temperature around the freezer is too high.	► Confirm the freezer is placed appropriately.
	A component is faulty or internal connections are loose.	► Contact a qualified service technician.
	Evaporator is covered with ice and is not exchanging heat.	► Check for ice buildup on the evaporator. Shine a flashlight into the fan opening on the unit cooler and check for ice buildup. Also, feel behind the unit cooler for ice buildup. If there is significant ice buildup in either area, defrost the freezer.

11.3 Alarm Activation Problems

Problem	Possible Cause	Action
Freezer is in an alarm condition, but alarms are not audible.	A component is faulty or internal connections are loose.	► Confirm the circuit board and line connections are functioning correctly.
	Control board is faulty.	► Replace parts with those included in the control and display board kit.
	Alarm buzzer is faulty.	► Replace the alarm buzzer.

Problem	Possible Cause	Action
Freezer meets an alarm condition, but the appropriate alarm is not active.	Control board is faulty.	► Replace parts with those included in the control and display board kit.
	Alarm setpoint was changed.	► Check the current setpoints for the alarms. Change the setpoints if necessary.
	A component is faulty or internal connections are loose.	► Contact a qualified service technician.
Alarm monitor is not responding.	Digital electronics are locked because of an interruption in power.	► Reset the monitoring system.
Chamber temperature meets the high alarm condition, but the high temperature alarm is not active.	High temperature alarm setpoint was changed.	► Check the current setpoint for the high temperature alarm. Change the setpoint if necessary.
High Temperature alarm activates when the door is opened, then clears shortly after the door is closed.	Connections for the chamber temperature probe are loose.	► Test the probe connections. Secure the connections if necessary.
	Chamber temperature probe is faulty.	► Test the probe. Replace the probe if necessary.
	Unit cooler fan continues to run while the door is open.	► Test the door switch and unit cooler fan connections. Secure the connections if necessary. Replace the door switch or fan motor if necessary.
	Probe bottles are empty.	► Check the level of product simulation solution in the bottles. Refill the bottles if necessary.
	A component is faulty or internal connections are loose.	► Contact a qualified service technician.
	High temperature alarm setpoint is set too low.	► Check the setpoint. Change the setpoint if necessary.
Freezer is connected to power and turned on, but the AC Power Failure alarm is active.	Outlet connection is faulty.	► Verify power at the outlet. Repair the original outlet or connect to a different outlet if necessary.
	Power supply board is faulty.	► Replace the power supply board.
	Circuit breaker was tripped.	► Confirm the circuit breaker is seated. Push the circuit breaker to reset it if necessary.
	Power cord is faulty.	► Confirm the power cord is connected securely. Secure the power cord if necessary.
	A component is faulty or internal connections are loose.	► Contact a qualified service technician.

Problem	Possible Cause	Action
Door Open alarm is activating sporadically.	Door is not closing completely.	► Confirm the door is aligned, and the hinge cams are not damaged. Replace if necessary.
	Door is closing but not sealing completely.	► Confirm the door gasket seals completely. Replace the door gasket if necessary.
	Connections for the door switch are faulty.	► Test the switch connections. Secure the connections if necessary.
	Door switch is faulty.	► Replace the door switch.
	Control board is faulty.	► Replace parts with those included in the control and display board kit.
	Door Ajar Timeout is set to zero, causing the alarm to activate immediately when the door is opened).	► Check the current setpoint for the Door Ajar alarm. Change the setpoint if necessary.
	A component is faulty or internal connections are loose.	► Contact a qualified service technician.
All alarms are activating sporadically.	Alarm system is faulty.	► Confirm the circuit board and line connections are functioning correctly.
	Control board is faulty.	► Replace parts with those included in the control and display board kit.
	A component is faulty or internal connections are loose.	► Contact a qualified service technician.
Condenser alarm is active.	Refrigerant level is too low.	► Check the refrigerant level. Recharge the refrigerant if necessary.
	Connections for the condenser temperature probe are loose.	► Test the probe connections. Secure the connections if necessary.
	The condenser temperature probe is faulty.	► Test the probe. Replace the probe if necessary.
	Condensing unit fan motor is faulty.	► Replace the condensing unit fan motor.
	The condenser probe is not calibrated.	► Confirm the condenser probe is reading correctly. Calibrate the probe if necessary.
	Compressor is overheating due to lack of airflow.	► Check the condenser grill. Clean it if necessary. ► Confirm the freezer is placed appropriately. ► Contact a qualified service technician to confirm the condenser fan is working.
	Condenser alarm setpoint is too low.	► Confirm the alarm setpoint is set at the appropriate value.
	A component is faulty or internal connections are loose.	► Contact a qualified service technician.

Problem	Possible Cause	Action
An alarm activated, but the temperature recorded at activation does not match the alarm setpoint.	Monitor is not calibrated.	► Confirm the upper temperature probe is reading correctly. Calibrate the probe if necessary.
	Temperature changed slightly around the time of activation.	► No action needed.
High Temperature alarm is activating sporadically.	Upper chamber temperature probe is not immersed in the product simulation solution.	► Confirm the probe bottle is full of solution, and the probe is placed in it correctly.
	A component is faulty or internal connections are loose.	► Contact a qualified service technician.
	Upper chamber temperature probe is not calibrated.	► Confirm the upper temperature probe is reading correctly. Calibrate the probe if necessary.

11.4 Testing Problems

Problem	Possible Cause	Action
Automatic temperature test does not work.	Connections for the upper chamber temperature probe are loose.	► Test the probe connections. Secure the connections if necessary.
	Upper chamber temperature probe is faulty.	► Test the probe. Replace the probe if necessary.
	Control board is faulty.	► Replace parts with those included in the control and display board kit.
	High Alarm setpoint is set significantly higher than the default value.	► Confirm the alarm setpoint is set at the appropriate value. ► Test the temperature alarm manually.
	A component is faulty or internal connections are loose.	► Contact a qualified service technician.
No Battery alarm is activating sporadically.	Battery voltage level on the backup batteries for the monitoring system is low.	► Replace the backup batteries for the monitoring system.

11.5 Condensation Problems

Problem	Possible Cause	Action
Excessive water in the water evaporation tray.	Heater in the evaporation tray is faulty.	► Confirm the heater is hot and is drawing the appropriate current (approximately 0.21 A to 0.35 A). Replace the heater if necessary.
	Humid air is entering the chamber.	► Confirm the freezer is level, and the door is aligned, closing tightly, and sealing correctly. Contact a qualified service technician to correct issues as necessary.

Problem	Possible Cause	Action
Excessive ice in the chamber.	Humid air is entering the chamber.	► Confirm the freezer is level, and the door is aligned, closing tightly, and sealing correctly. Correct issues as necessary.
	Drain port on the unit cooler was damaged during removal of the unit cooler cover.	► Confirm the drain port on the unit cooler is intact.
	External drain fan is faulty.	► Confirm the external drain fan is running. Hold a piece of paper in front of the fan and check that the paper is being drawn toward the freezer. ► Confirm the connections are secure. Tighten the connections if necessary. ► Replace the external drain fan.
	Connection between the unit cooler and the drain line is loose.	► Confirm the connection is secure. Contact a qualified service technician to tighten the connection if necessary.
	Drain line is plugged.	► Confirm the drain tube is free of debris. Remove debris if necessary.
	External drain fan is not running.	► Confirm the external drain fan is running. Contact a qualified service technician to correct issues as necessary.
	Evaporator is covered with ice and is not exchanging heat.	► Check for ice buildup on the evaporator. Shine a flashlight into the fan opening on the unit cooler and check for ice buildup. Also, feel behind the unit cooler for ice buildup. If there is significant ice buildup in either area, defrost the freezer.
Excessive humidity on the door.	Humid air is entering the chamber.	► Confirm the freezer is level, and the door is aligned, closing tightly, and sealing correctly. Correct issues as necessary.
	Relative humidity around the freezer is too high.	► Confirm the freezer is placed appropriately.

Problem	Possible Cause	Action
After defrosting, no water flows into the water evaporation tray.	Drain line heater is faulty.	► Confirm the connections are secure. Tighten the connections if necessary. ► Confirm the drain line heater is warm to the touch. Replace the heater if necessary.
	Defrost heater on the evaporator in the unit cooler is faulty.	► After defrosting the freezer, monitor the evaporator for repeated ice buildup. ► Confirm the connections are secure. Tighten the connections if necessary. ► Confirm the drain line heater is hot and is drawing the appropriate current during a defrost event (approximately 3.9 A to 5.5 A). ► Replace the heater if necessary.
	Not enough time has elapsed since the end of the defrost cycle.	► Wait until approximately 20 minutes after the defrost cycle has ended.
	Drain line is plugged.	► Confirm the drain tube is free of debris. Remove debris if necessary.
	Defrost heater on the evaporator in the unit cooler is not working.	► Check for ice buildup on the evaporator. Shine a flashlight into the fan opening on the unit cooler and check for ice buildup. Also, feel behind the unit cooler for ice buildup. If there is significant ice buildup in either area, defrost the freezer.

12 Parts

NOTICE

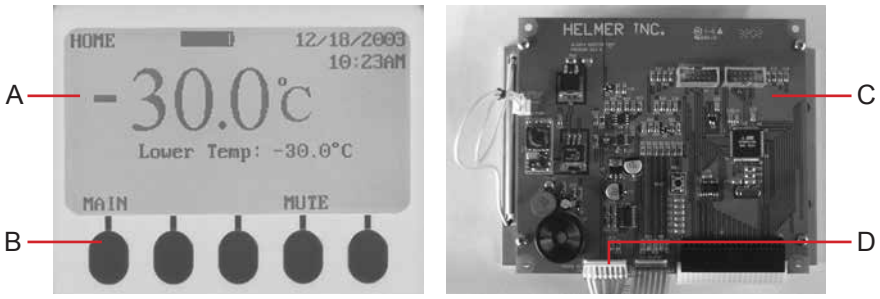
- ► Before replacing parts, protect items in freezer from extended exposure to adverse temperature.
- ► Allow freezer temperature to stabilize at setpoint after replacing parts or after extended door opening.

12.1 Front

Front features (iPF120-4 model shown).

Label	Description	Part Number	Schematic Label
A	Bezel with chart recorder door	Contact Helmer Technical Service	-
B	Chart recorder door	Contact Helmer Technical Service	-
C	i.Center display	Refer to subsequent section(s) for part numbers	K
D	Chart recorder	400409-5	X
E	Chart paper (52 sheets)	220419	-
F	Chart recorder backup battery (9 V alkaline, non-rechargeable)	120218	AD
Not shown	Caster (swivel with brake)	Serial number 974891 and earlier: 220380 Serial number 974892 and later: 220467	-

12.1.1 Display



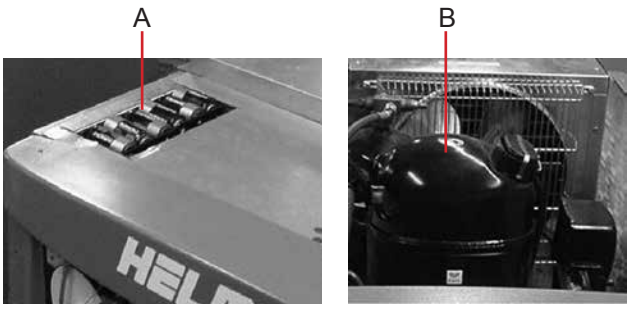
Left: Display assembly showing LCD and touchpad. Right: Display board.

Label	Description	Part Number	Schematic Label
A	LCD board	120452	K
B	Touchpad	320722-1	K
C	Display board	Included in the control and display board kit	K
D	Interface cable	400502-1	AF
Not shown	Display assembly (Includes LCD board and touchpad)	400509-1	K

NOTICE The i.Center display assembly is sensitive to static electricity and can be damaged by electrostatic discharge. Use proper ESD precautions when handling the display assembly.

NOTE Although the LCD display and touchpad may be replaced individually, Helmer recommends replacing the entire display assembly.

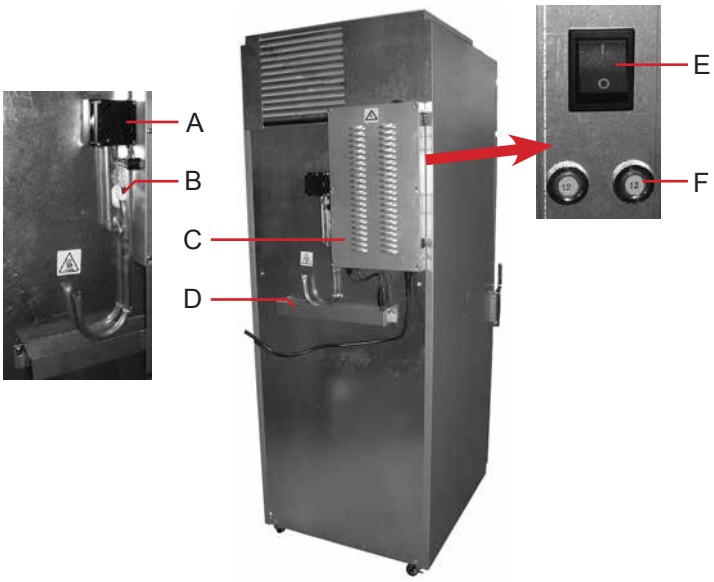
12.2 Top



Top features (iPF120-4 model shown).

Label	Description	Part Number	Schematic Label
A	Monitoring system backup batteries	715031	AE
B	Compressor unit	Contact Helmer Technical Service	A
Not shown	Condensing unit fan motor	230 V 60 Hz: 120493 230 V 50 Hz: 120515	U
	Condenser probe (with connector)	400674-1	AC
	Solenoid valve	220547	Y
	Solenoid coil	120647	AJ

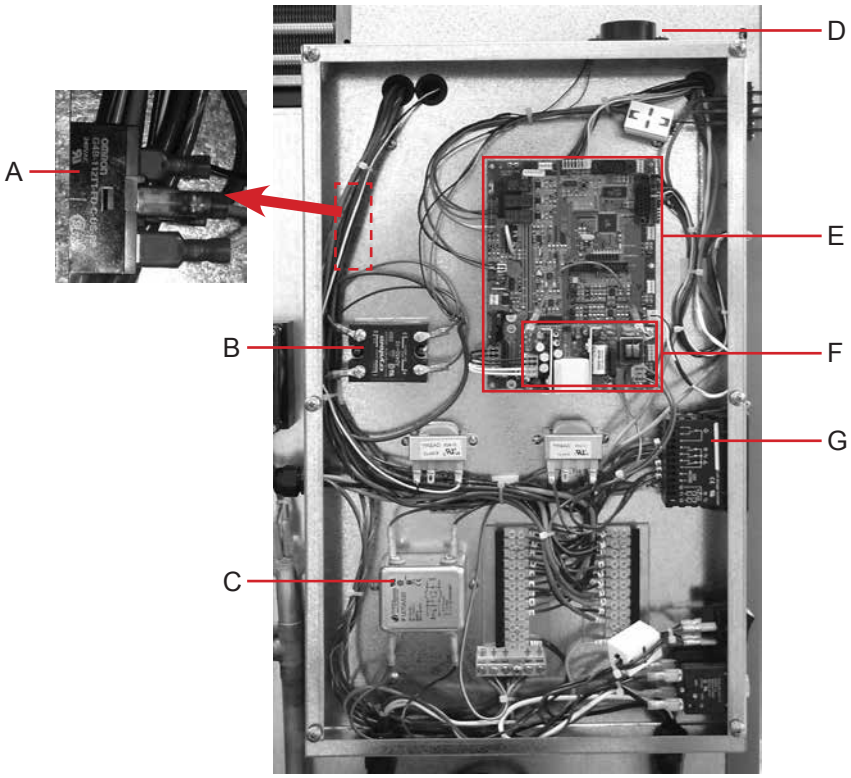
12.3 Rear



Rear features (iPF120-4 model shown).

Label	Description	Part Number	Schematic Label
A	External drain line fan	120511	Z
B	Drain line heater	120485	O
C	Electrical box	Refer to subsequent section(s) for part numbers	-
D	Condensate evaporator kit (Includes the condensate evaporator and water evaporation tray)	400790-2	J
E	Main power switch	120478	Q
F	Circuit breaker, 12 A	120220	P

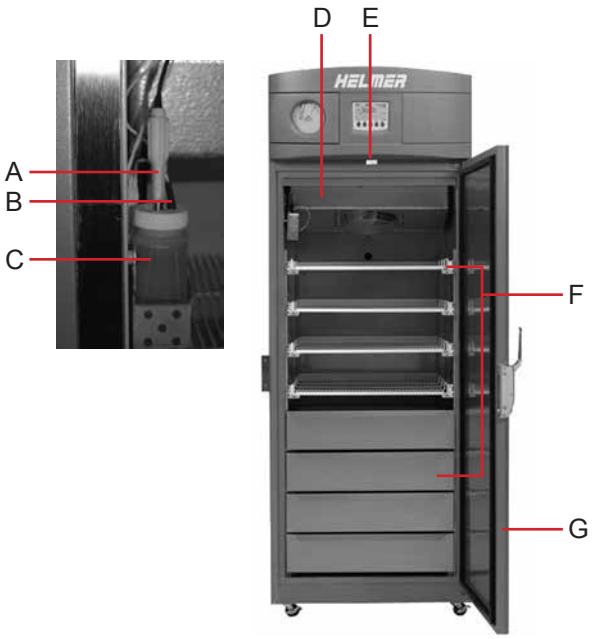
12.3.1 Electrical Box



Electrical box features (iLF120 model shown).

Label	Description	Part Number	Schematic Label
A	Defrost relay	120475	V
B	Compressor relay	120512	AA
C	Power line filter	120400	AK
D	Alarm buzzer	120457	D
E	Control board	Included in the control and display board kit	E
F	Power supply board	400633-1	AH
G	Temperature/defrost controller (programmed)	400540-1	B
Not shown	Control and display board kit (includes control board, display board, power supply board, and interface cable)	400649-1	K,E

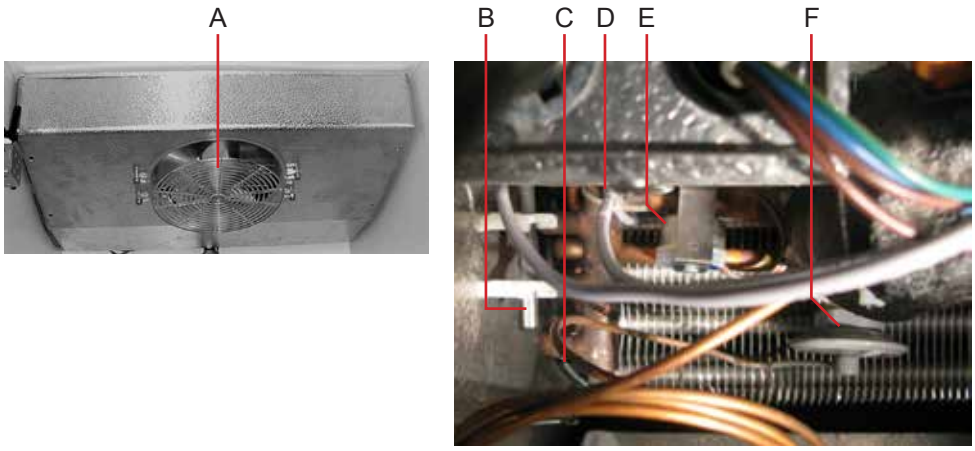
12.4 Interior



Interior features (iPF120-4 model shown).

Label	Description	Part Number	Schematic Label
A	Chart recorder probe	400855-1	AI
B	Upper chamber probe	400510-1	AB
C	Probe bottle and propylene glycol kit	400922-2	-
D	Unit cooler	Refer to subsequent section(s) for part numbers	AG
E	Door switch	120380	I
F	Storage parts	Refer to subsequent section(s) for part numbers	-
G	Door	Refer to subsequent section(s) for part numbers	-
Not shown	Lower chamber probe	800108-1	N
	Mullion heater (located under strike plates)	120481	C
	Strike plate replacement kit (includes strike plates with pre-applied foam tape, foil tape, and replacement instructions)	400687-1	-

12.4.1 Unit Cooler



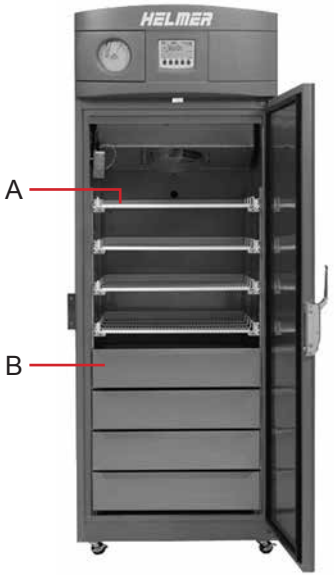
Left: Unit cooler. Right: Unit cooler parts.

Label	Description	Part Number	Schematic Label
A	Unit cooler fan blade	Serial number 982859 and earlier: 220447 Serial number 982860 and later: 220497	-
B	Temperature control probe	120495	G
C	Defrost heater	Serial number 982859 and earlier: 120494 Serial number 982860 and later: 120567	R
D	Defrost control probe	120495	M
E	Defrost heater limit thermostat	Serial number 982859 and earlier: 120492 Serial number 982860 and later: 120566	S
F	TXV (expansion) valve	220495	-
Not shown	Unit cooler fan motor	Serial number 982859 and earlier: 120497 Serial number 982860 and later: 120548	H

NOTE

- ► Some freezers will include a capillary tube in place of the TXV valve.
- ► The part number for the capillary tube is 211117-1.

12.4.2 Storage



Storage features (iPF120-4 model shown).

Label	Description	Part Number
A	Full shelf (includes hardware)	120 models: 400414-1 125 models: 400414-2
B	Drawer assembly (includes drawer, 2 slides, and hardware)	120 models: 400584-2 125 models: 400584-1
Not shown	Drawer slide assembly (right side)	120 models: 400541-3 125 models: 400541-1
	Drawer slide assembly (left side)	120 models: 400541-4 125 models: 400541-2
	Roll-out basket assembly (optional, includes basket, 2 slides, and hardware)	120 models: 400890-1 125 models: 400890-2
	Roll-out basket slide assembly (right side)	120 models: 400541-3 125 models: 400541-1
	Roll-out basket slide assembly (left side)	120 models: 400541-4 125 models: 400541-2
	Drawer slide wheel	320815-1
	Half shelf (includes hardware)	400413-1

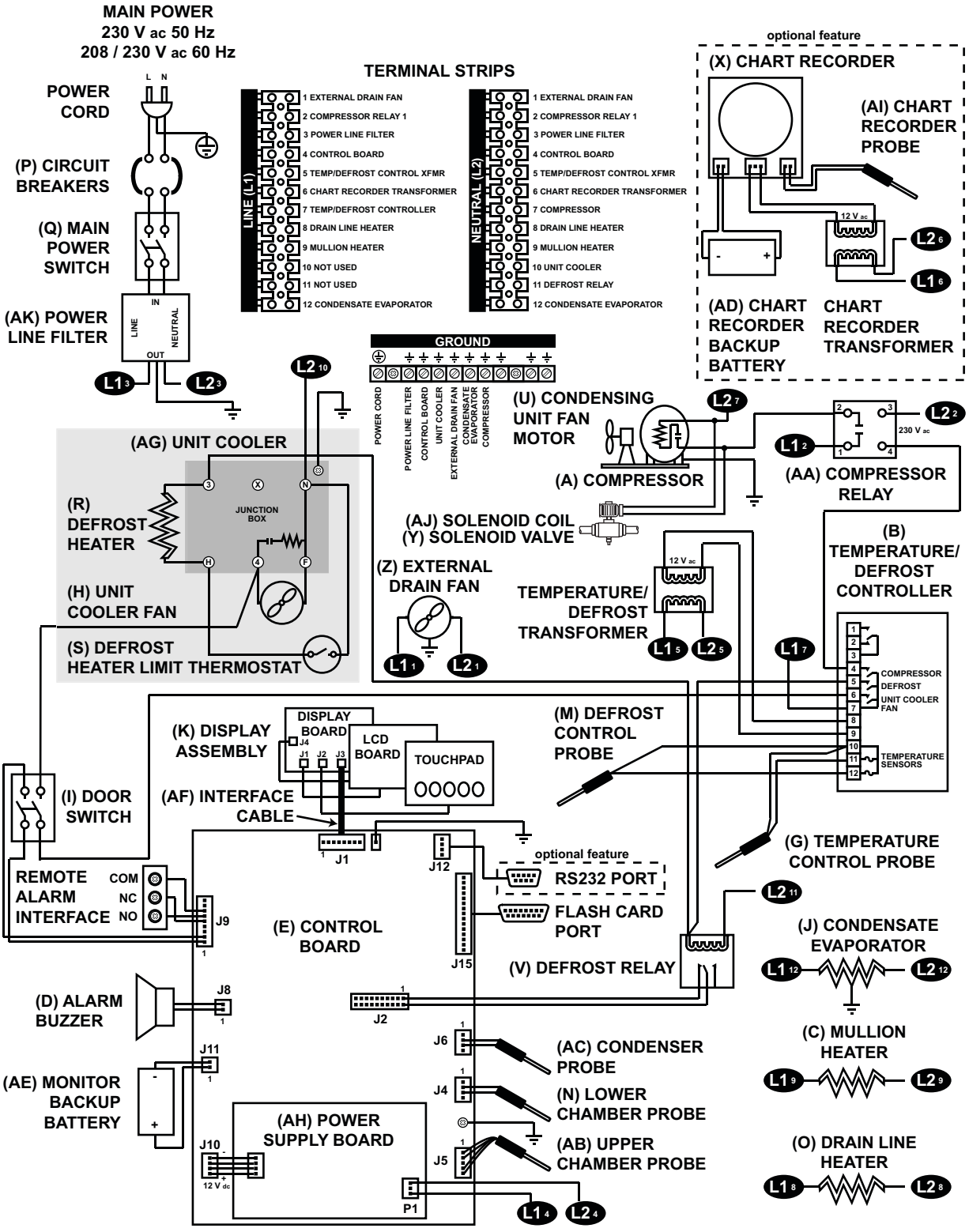
12.4.3 Door and Hinge

Door and hinge features (iPF120-4 model shown).

Label	Description	Part Number
A	Door handle with lock	220426
B	Door bumper	220441
C	Hinge bearing	220375
D	Upper hinge bracket	Right hinge: 400376-1 Left hinge: 400376-2
E	Door gasket	321271-1
F	Hinge cam	320742-1
G	Door stop	320763-1
H	Lower hinge bracket	Right hinge: 400377-1 Left hinge: 400377-2

13 Schematics

13.1 iPF, iLF, and iHPF Models; 20 and 25 Cubic Feet



14 i.Center Screen Reference

HOME screen
- **MAIN** button
  - **MAIN** screen
- **MUTE** button (changes mute timer)

MAIN screen
- **Event Log** option
  - (Press the **SELECT** button)
  - **EVENT LOG** screen
- **System Alarm Test & Status** option
  - **SYSTEM ALARM TEST & STATUS** screen
- **Edit Configuration** option
  - (Enter the password)
  - **CONFIGURATION** screen
- **View Configuration** option
  - **VIEW CONFIGURATION** screen
- **Product/Company Information** option
  - **INFORMATION** screen
- **i.Help Index** option
  - **i.Help** screen

EVENT LOG screen
- **EVENT LOG DETAIL** screen

SYSTEM ALARM TEST & STATUS screen
- **Start High Alarm Auto Test** option
- **Cancel High Test** option
- **Chart Paper Days Left or Chart Paper Timer** display
- **Door Status** display
- **Condenser Temp** display

CONFIGURATION screen
- **Set Date & Time** option
  - **SET DATE & TIME** screen
- **System Options** option
  - **SYSTEM OPTIONS** screen
- **Alarm Setpoints** option
  - **SET ALARM SETPOINT** screen
- **Temperature Calibration** option
  - **TEMPERATURE CALIBRATION** screen
- **Factory Default Settings** option
  - **FACTORY DEFAULT SETTINGS** screen
- **Change Password** option
  - (Enter a new password)

SYSTEM OPTIONS screen
- **Language** option
- **Date Format** option
- **Alarm Volume** option
- **Alarm Pulse** option
- **Temperature Units** option
- **Chart Paper Timer** option

SET ALARM SETPOINT screen
- **High Alarm Setpoint** option
- **Cond. Alarm Setpoint** option
- **Door Ajar Timeout** option
- **Power Failure Timeout** option
- **Temperature Graph** option

TEMPERATURE CALIBRATION screen
- **Select Temp Probe** option
- **Temperature** option

VIEW CONFIGURATION screen
- **Clock Mode** display
- **Date Format** display
- **Door Ajar Timeout** display
- **Pwr Failure Timeout** display
- **High Alarm Setpoint** display
- **Cond. Alarm Setpoint** display
- **Alarm Volume** display
- **Alarm Pulse** display
- **Chart Paper Days Left** or **Chart Paper Timer** display
- **Temperature Graph** display

Section III: Horizon Series™ - Plasma Storage Models

NOTE This section applies to HPF models.

15 Product Configuration

15.1 Install Batteries for Backup Power

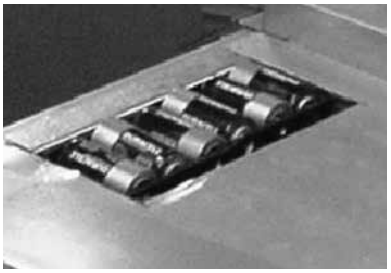
The monitoring system and chart recorder each have a battery system, enabling a period of continuous operation if power is lost.

NOTE The monitoring system will not start on battery power alone. If the freezer was previously not connected to AC power and the batteries are installed, the monitoring system will not run on battery power.

Battery life varies by manufacturer as well as voltage level remaining. Providing full power is available and no battery-related alarms are active, backup power for the monitoring system is available for up to two hours.

NOTICE When installing replacement batteries, use only batteries which meets the specifications outlined in chapter **18.7** (Supplies).

The batteries are located on the top of the freezer, behind the monitoring system.



Monitoring system backup batteries.

Five batteries are installed and one battery is included in the accessory package. Install the sixth battery to provide power to the monitoring system in the event of an AC power failure.

15.2 External Monitoring Devices

CAUTION

- The interface on the remote alarm monitoring system is intended for connection to the end user's central alarm system(s) that uses normally-open or normally-closed dry contacts.
- If an external power supply exceeding 30 V (RMS) or 60 V (DC) is connected to the remote alarm monitoring system's circuit, the remote alarm will not function properly; may be damaged; or may result in injury to the user.

NOTE In the event of a power failure, the power failure alarm condition is transmitted through the remote alarm contacts.

The remote alarm interface is a relay switch with three terminals:

- Common (COM)
- Normally Open (NO)
- Normally Closed (NC)

Terminals are dry contacts and do not supply voltage. Interface circuit is either normally open or normally closed, depending on terminals used. Requirements for your alarm system determine which alarm wires must connect to terminals.

- 0.5 A at 30 V (RMS): 1.0 A at 24 V (DC)

15.2.1 Connect to Remote Alarm Interface

1. Switch the AC ON/OFF switch **OFF**. Remove one battery from the monitoring system backup battery holder.
2. On back of freezer, locate the remote alarm terminals.
3. Connect remote alarm wires to appropriate terminals, according to requirements for your alarm system.
4. Use a cable tie to relieve strain on alarm wires (as necessary).
5. Reinstall the battery in the monitoring system backup battery holder. Switch the AC ON/OFF switch **ON**.
6. Touch **MUTE** to disable the high temperature alarm while freezer reaches operating temperature.

15.3 Automatic Defrost Cycle

The number of programmed defrost events is dependent on environmental conditions and the frequency of usage. The recommended number of daily defrost cycles is three to four, at even intervals. Defrost events should take place when the freezer door is opened infrequently.

NOTE Depending on the high temperature alarm setpoint and the actual temperature increase during the defrost cycle, frequent door openings may trigger repeated high temperature alarms.

The independent temperature controller is located in the electrical box on the back of the freezer. The controller can execute a maximum of four defrost events per day. Specify the number of defrost events per day and the execution times. The timing is based on the current time setting on the independent temperature controller.

Independent temperature controller.

Defrost Event	On/Off	Default Time
1	On	12:00 AM
2	On	8:00 AM
3	On	4:00 PM
4	Off	-

15.3.1 Set the Time on the Independent Temperature Controller

NOTE

- ► The current time on the independent temperature controller should be set to match the time on the Horizon Series monitoring system.
- ► To change the value for a parameter, first enter the program mode for that level.
- ► When there is no interaction for four minutes, the temperature controller exits program mode and returns to normal mode.

Defrost event times are based on the current time setting on the temperature/defrost controller. The current time is controlled by two parameters: P34 and P35.

Parameter	Description	Range
P34	Hour setting for current time (24-hour format)	00 (midnight) to 23
P35	Minute setting for current time	00 to 59

Set the current time:

1 On the independent temperature controller, press the **P** button to access the parameter menu.
   ► "PXX" is displayed, where "XX" is a parameter number.
2 Select the **Hour** parameter (P34).
   a Press the **UP** or **DOWN** arrow buttons until "P34" is displayed.
   b Press the **P** button.
   c The current hour setting is displayed in 24-hour time. Example: 2 PM is displayed as "14".
3 Change the **Hour** parameter.
   a Press the **UP** or **DOWN** arrow buttons until the desired hour is displayed.
4 Press the **P** button.
   ► The setting is changed and "P34" is displayed.
5 Select the **Minute** parameter (P35).
   a Press the **UP** or **DOWN** arrow buttons until "P35" is displayed.
   b Press the **P** button.
   c The current minute setting is displayed.
6 Change the **Minute** parameter.
   a Press the **UP** or **DOWN** arrow buttons until the desired minute is displayed.
7 Press the **P** button.
   ► The **Hour** and **Minute** parameters are changed and "P35" is displayed.

8 Exit program mode.

a Press the **UP** or **DOWN** arrow buttons until “P01” is displayed, or

b Do not press any buttons for four minutes. Parameter 01 (“P01”) is displayed.

15.3.2 Set Scheduled Defrost Times

Defrost event times are controlled by four parameters: P24, P25, P26, and P27.

Parameter	Description	Range	Default Setting
P24	Defrost event 1 time	000 to 235, or OFF	000
P25	Defrost event 2 time	000 to 235, or OFF	080
P26	Defrost event 3 time	000 to 235, or OFF	160
P27	Defrost event 4 time	000 to 235, or OFF	OFF

Each parameter is set either to OFF (indicating that the defrost event is disabled), or a three-digit number (representing the time of the defrost event).

► The first two digits represent the hour in 24-hour format.

► The third digit represents the minute, in 10-minute intervals.

NOTE

► 16X represents 4 PM

► XX2 represents 20 minutes

► 162 represents 4:20 PM

► 000 represents midnight

The defrost event time parameters are restricted through an access code. To view and change these parameter settings, the access code (the last parameter) must first be set to **88**.

Set the defrost time:

1 Ensure that the current time programmed in the independent temperature controller is correct and matches the time programmed in the Horizon Series monitoring system. Change the time if necessary.

2 Enter the access code.

a Press the **UP** or **DOWN** arrow buttons until the last parameter is displayed.

b Press the **P** button. The parameter is displayed.

c Press the **UP** or **DOWN** arrow buttons to change the parameter to **88**.

d Press the **P** button. The setpoint is changed and the last parameter is displayed.

3 Select the defrost time parameter setting (P24, P25, P26, or P27).

a Press the **UP** or **DOWN** arrow buttons to display the desired defrost parameter.

b Press the **P** button. The current setting is displayed.

4 Press the **UP** or **DOWN** arrow buttons to adjust the setting for the selected parameter.

5 Press the **P** button. The setting is changed and the parameter is displayed.

6 Repeat steps 3-5 for additional defrost parameters.

15.4 Move Drawers and Shelves

Storage features.

CAUTION

- ► Keep hands away from pinch points when closing the door.
- ► Before moving drawers, ensure they are completely empty for safe lifting.
- ► Maximum drawer or shelf load is 100 lbs (46 kg).

NOTICE Before moving storage components, protect stored items in freezer from extended exposure to adverse temperature.

Remove a drawer:

1. Pull drawer out until it stops.
2. Tilt the front of the drawer upward.
3. Pull drawer free of the slides.

Install a drawer:

1. Tilt the front of the drawer upward.
2. Set the wheels of the drawer in the slides in the cabinet.
3. Lower the front of the drawer.
4. Gently push the drawer into the chamber until it stops.
5. Pull drawer out until it stops; check for smooth operation.

Remove a shelf:

1. With one hand, lift front edge of the shelf from the front brackets.
2. With the other hand, reach under the shelf and bump rear edge of the shelf upward to disengage rear brackets.

Install a shelf:

1. Insert shelf into chamber, placing it on brackets.
2. Gently bump rear edge of the shelf downward to engage brackets.
3. Pulling shelf forward gently; shelf should not disengage from rear brackets.

15.5 Move Slides and Brackets

Remove drawer slides:

1. Using a screwdriver, remove front bracket retainers.
2. Tap front brackets upward to disengage standards.
3. Remove slides from standards.

Install drawer slides:

1. Insert slides into standard at appropriate height.
2. Tap front brackets downward to engage standards.
3. Using a screwdriver, install front bracket retainers.

Remove shelf brackets:

1. Using a screwdriver, remove front bracket retainers.
2. Tap front brackets upward to disengage standards.
3. Remove front brackets from standards.

Install shelf brackets:

1. Insert front brackets into standard at appropriate height.
2. Tap front brackets downward to engage standards.
3. Using a screwdriver, install front bracket retainers.

15.6 Optional Adapter Kits for Medication Dispensing Locks

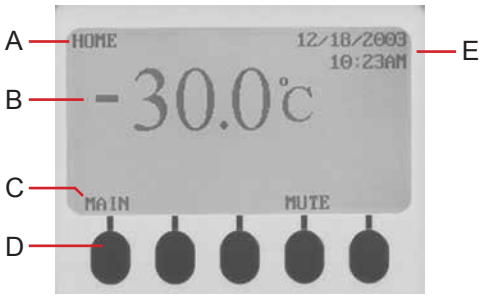
Contact Helmer Technical Service or your distributor for service documentation pertaining to medication dispensing locks.

16 Temperature Monitor Settings

16.1 Home Screen

The HOME screen appears when:

- ► The **HOME** button is pressed from any other screen
- ► There is no interaction for two minutes on any screen other than those used to enter a password



HOME screen on the monitoring system.

Label	Description
A	Screen name
B	Chamber probe temperature display
C	Button labels
D	Buttons
E	Date and time display

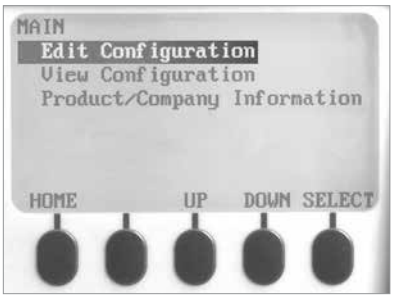
16.1.1 Home Screen Functions

NOTE Refer to chapter **22** (Horizon Series Screen Reference) for a complete list of screens in the Horizon Series monitoring system.

- ► View current temperature readings
- ► View the current time and date
- ► View active alarms
- ► Mute audible alarms
- ► Adjust contrast
- ► Access Main screen to view and change settings

16.2 Main Screen

The Main screen displays functional options that allow access to all other screens in the system.



MAIN screen functional options.

Option	Function
Edit Configuration (password required)	► Change the language used for text ► Change date and time information ► Change temperature units ► Change the volume and pattern for audible alarms ► Enable or disable the chart paper timer ► Change alarm-related setpoints and timers ► Calibrate the temperature probe reading ► Change some settings to the factory default values ► Change the password, preventing unauthorized changes
View Configuration	► View the date and time formats ► View alarm-related setpoints and timers ► View the volume and pattern for audible alarms ► View the setting for the chart paper timer ► View the settings for temperature and time alarms
Product/Company Information	► View the software versions for control and display components of the monitoring system ► View information to contact Helmer

16.3 Change Configuration Password

The default password is 1234. A new password must use four digits, ranging from 1 to 5.

Change the password:

1 On the HOME screen, press the **MAIN** button.
2 Press the **DOWN** button to select Edit Configuration. Press the **SELECT** button.
3 Enter the password when prompted.
4 Press the **DOWN** button to select Change Password. Press the **SELECT** button.
5 Enter the new password, then re-enter the new password when prompted.
   ► If password entries match, the “update” message is displayed.
   ► If password entries do not match, the “incorrect match” message is displayed. Repeat the procedure to change the password.

16.4 Calibrate Chamber Temperature Probe

Verify the temperature probe is reading chamber temperature correctly by comparing the chamber probe reading to temperature read by an independent thermometer. If the chamber temperature probe is not reading correctly, change the value displayed on the temperature monitoring system.

NOTE If the variance is within acceptable limits for your organization, changing probe settings is optional.

- ► Default setting for chamber temperature is -30.0 °C
- ► Value is factory-preset

Obtain:

- ► Independent thermometer, calibrated and traceable per national standards

Measure the chamber temperature:

1. Remove the probe from the probe bottle.
2. Unscrew the cap from the bottle.
3. Insert the thermometer and temperature probe in the bottle. The probe and thermometer should be immersed at least 2” (50 mm).
4. Close the door and allow the chamber temperature to stabilize for 10 minutes.
5. Observe and note the thermometer temperature.

EXAMPLE

- ► Measured temperature (at the probe bottle) is -30.0 °C
- ► Displayed temperature is -32.0 °C
- ► Change displayed temperature to -30.0 °C

Enter the new calibration value:

1. On the HOME screen, press the **MAIN** button.
2. Press the **DOWN** button to highlight Edit Configuration. Press the **SELECT** button.
3. Enter the password when prompted.
4. Press the **DOWN** button to highlight Temperature Calibration. Press the **SELECT** button.
   - ► Temperature is highlighted.
   - **a** Press the **INC** or **DEC** buttons to change the temperature calibration value.
5. Press the **DOWN** button to highlight Store Calibration.
   - **a** To save the new value, press the **ENTER** button. The “Calibration Memorized” message appears. New settings are saved.
   - **b** To discard the new value, press the **BACK** button or **HOME** button to exit. New settings are not saved.
6. Remove thermometer and probe from bottle.
7. Replace bottle cap, ensuring a tight fit.
8. Place the probe in bottle, immersing at least 2” (50 mm).

NOTE

- ► The current temperature displayed by the monitoring system may change so that it no longer matches the new probe calibration value. This is normal.
- ► If a new probe value is entered but not saved, the new value will appear when the calibration setting for the probe is viewed. This is normal.

16.5 Factory Default Settings

Settings listed below may be simultaneously returned to factory default values.

NOTE The factory default settings may not be the same as the settings that were factory-calibrated before the freezer was shipped.

Setting	Restored Value
High Alarm Setpoint	-20.0 °C
Door Ajar Timeout	3 minutes
Power Failure Timeout	3 minutes
Chart Paper Timer	6.5 days

16.6 Restore Factory Default Settings

Restore settings:

1. Press the **MAIN** button.
2. Press the **DOWN** button to highlight Edit Configuration. Press the **SELECT** button.
3. Enter the password when prompted.
4. Press the **DOWN** button to highlight Factory Default Settings. Press the **SELECT** button.
5. Do one of the following:
   - ► Press the **ENTER** button. Factory default settings are restored.
   - ► Press the **BACK** button. Factory default settings are not restored.

16.7 Alarm Settings

The following alarm settings may be changed by the operator. The setpoint for temperature alarms may be changed (where applicable), as well as the time delay between when the alarm condition commences and when the visual and audible alarms are initiated.

16.7.1 Alarm Volume

The alarm volume can be changed. The Alarm Volume controls volume for all audible alarms.

- ► Default setting is 10
- ► Setting can be changed from 1 to 10
- ► 1 is the quietest setting; 10 is the loudest setting

Change the alarm volume:

1. Press the **MAIN** button.
2. Press the **DOWN** button to highlight Edit Configuration. Press the **SELECT** button.
3. Enter the password when prompted.
4. Press the **DOWN** button to highlight System Options. Press the **SELECT** button.
5. Press the **DOWN** button to highlight Alarm Volume.
6. Press the **INC** or **DEC** buttons to change the setting.
7. Press the **BACK** button to return to the Edit Configuration screen, or press the **HOME** button to exit. The new settings are saved.

16.7.2 Alarm Pulse

The alarm pattern can be changed. This is useful if several freezers with alarms are collocated, and distinguishing the source of the alarm quickly is desirable.

- ► Default setting is Single.
- ► Setting can be changed between Single, Double, Triple, and Constant.

Change the alarm pulse:

1. Press the **MAIN** button.
2. Press the **DOWN** button to highlight Edit Configuration. Press the **SELECT** button.
3. Enter the password when prompted.
4. Press the **DOWN** button to highlight System Options. Press the **SELECT** button.
5. Press the **DOWN** button to highlight Alarm Pulse.
6. Press the **INC** or **DEC** buttons to change the setting.
7. Press the **BACK** button to return to the Edit Configuration screen, or press the **HOME** button to exit. The new settings are saved.

16.7.3 High Chamber Temperature Alarm

The High Alarm setpoint specifies the temperature at which the High Temperature Alarm activates. If the temperature detected by the chamber probe is greater than or equal to this value, the alarm activates.

- ► Default setpoint is -20.0 °C
- ► Setpoint can be changed from -40.0 °C to 0.0 °C

Change the setpoint:

1. Press the **MAIN** button.
2. Press the **DOWN** button to highlight Edit Configuration. Press the **SELECT** button.
3. Enter the password when prompted.
4. Press the **DOWN** button to highlight Alarm Setpoints. Press the **SELECT** button.
5. Press the **DOWN** button to highlight High Alarm Setpoint.
6. Press the **INC** or **DEC** buttons to change the setting.
7. Press the **BACK** button to return to the Edit Configuration screen, or press the **HOME** button to exit. The new settings are saved.

16.7.4 Door Ajar Alarm

The Door Ajar Timeout specifies longest time the freezer door can be open before the alarm activates. If the time elapsed since the last door opening is greater than or equal to this value, the alarm activates.

- ► Default delay setting is three minutes
- ► Setting can be changed from 0 minutes to 60 minutes

Change the alarm delay:

1. Press the **MAIN** button.
2. Press the **DOWN** button to highlight Edit Configuration. Press the **SELECT** button.
3. Enter the password when prompted.
4. Press the **DOWN** button to highlight Alarm Setpoints. Press the **SELECT** button.
5. Press the **DOWN** button to highlight Door Ajar Timeout.
6. Press the **INC** or **DEC** buttons to change the setting.
7. Press the **BACK** button to return to the Edit Configuration screen, or press the **HOME** button to exit. The new settings are saved.

16.7.5 Power Failure Alarm

The Power Failure Timeout specifies longest time the freezer can be without AC power before the alarm activates. If the time elapsed since the last power failure is greater than or equal to this value, the alarm activates.

- ► Default delay setting is three minutes
- ► Setting can be changed from 0 minutes to 60 minutes

Change the alarm delay:

1. Press the **MAIN** button.
2. Press the **DOWN** button to highlight Edit Configuration. Press the **SELECT** button.
3. Enter the password when prompted.
4. Press the **DOWN** button to highlight Alarm Setpoints. Press the **SELECT** button.
5. Press the **DOWN** button to highlight Power Failure Timeout.
6. Press the **INC** or **DEC** buttons to change the setting.
7. Press the **BACK** button to return to the Edit Configuration screen, or press the **HOME** button to exit. The new settings are saved.

16.7.6 Chart Paper Alarm

The default setting for the chart paper timer is Enabled. One sheet of chart paper records temperatures continuously for seven days. The timer activates an alarm 6.5 days from when the timer is reset. The timer period cannot be changed.

NOTE

- ► Available options are Enabled, Disabled, and Reset.
- ► Enabling the timer also resets the timer.

Change the setting:

1. Press the **MAIN** button.
2. Press the **DOWN** button to highlight Edit Configuration. Press the **SELECT** button.
3. Enter the password when prompted.
4. Press the **DOWN** button to highlight System Options. Press the **SELECT** button.
5. Press the **DOWN** button to highlight Chart Paper Timer.
6. Press the **INC** or **DEC** buttons to select Enabled, Disabled, or Reset.
7. Do one of the following:
   - ► If Enabled or Disabled is selected, press the **BACK** button to return to the System Options screen, or press the **HOME** button to exit. The new setting is saved.
   - ► If Reset is selected:
     - **a** Press the **DOWN** button.
     - **b** Press the **PAPER-CHANGED** button. The System Options screen appears with the Chart Paper Timer set to Enabled.
8. Press the **BACK** button to return to the System Options screen, or press the **HOME** button to exit. The new setting is saved.

16.8 Test Alarms

Test alarms to ensure they are working correctly. The freezer has alarms for chamber temperature, door open (time), and power failure.

NOTICE Before testing alarms, protect items in the freezer from extended exposure to adverse temperature.

16.8.1 Manual Chamber Alarm Test

NOTICE Before testing alarms, protect items in freezer from extended exposure to adverse temperature.

Obtain:

- ► Independent thermometer, calibrated and traceable per national standards
- ► (1) 4 oz. (120 mL) glass of product simulation solution (1:1 ratio of water to propylene glycol or equivalent low-temperature fluid)

NOTICE Temperature probes are fragile; handle with care.

Test the high alarm:

1. Identify setting for high alarm setpoint.
2. Immerse the independent thermometer in the glass of product simulation solution.
3. Place the glass in the freezer and close the door.
4. When the glass contents have stabilized at the chamber temperature, remove the glass from the freezer.
5. While stirring probe in product simulation solution, allow the glass contents to warm up to room temperature and observe the temperature on the monitor.
6. When high temperature alarm is activated, note the temperature on the independent thermometer.
7. Remove the probe from the glass.
8. Place probe in probe bottle, immersing it at least 2” (50mm).

16.8.2 Power Failure Alarm Test

NOTE

- ► During a power failure, the power failure alarm activates and the batteries provide power to the monitoring system.
- ► If AC power fails, the backup batteries will allow for continued data collection and temperature display.
- ► If the backup batteries fail, data is not collected and the temperature is not displayed.
- ► When power is restored, the 24 hours of data prior to the power loss are retained in the system memory. Stored temperature data is displayed on the graph and the monitoring system resumes data collection and display.

1. Confirm the freezer is connected to AC power.
2. Ensure the monitoring system backup batteries are installed.
3. Change Power Failure Timeout setting to 0 minutes.
   a. Press the **MAIN** button.
   b. Press the **DOWN** button to highlight Edit Configuration. Press the **SELECT** button.
   c. Enter the password when prompted.
   d. Press the **DOWN** button to highlight Alarm Setpoints. Press the **SELECT** button.
   e. Press the **DOWN** button to highlight Power Failure Timeout.
   f. Press the **DEC** button to change the setting to 0.
4. Switch the AC ON/OFF switch **OFF**. Power failure alarm will activate immediately.
5. Switch the AC ON/OFF switch **ON**. Power failure alarm will clear and audible alarm will cease.
6. Change the Power Failure Timeout setting to the original setting.

16.8.3 Door Ajar Alarm Test

1. Change Door Ajar Timeout setting to 0 minutes:
   a. Press the **MAIN** button.
   b. Press the **DOWN** button to highlight Edit Configuration. Press the **SELECT** button.
   c. Enter the password when prompted.
   d. Press the **DOWN** button to highlight Alarm Setpoints. Press the **SELECT** button.
   e. Press the **DOWN** button to highlight Door Ajar Timeout.
   f. Press the **DEC** button to change the setting to 0.
   g. Press the **BACK** button to return to the Edit Configuration screen, or press the **HOME** button to exit. New settings are saved.
2. Open the door. Door ajar alarm will activate immediately.
3. Close the door. Door ajar alarm will clear and audible alarm will cease.
4. Change the Door Ajar Timeout setting to the original setting.

16.9 Additional System Settings

16.9.1 Screen Contrast

The screen contrast can be changed for easier viewing.

NOTE

- ► During an AC power failure, the screen backlight is not illuminated to conserve backup battery power.
- ► During an AC power failure, the screen contrast cannot be changed.

Change screen contrast:

1. On the HOME screen, press the third button from the left to make the text appear lighter.
2. On the HOME screen, press the second button from the left to make the text appear darker.

16.9.2 Date and Time

The Date Format setting controls the order in which the month (mm) and day (dd) are displayed.

- ► Month is a 2-digit number (01-12)
- ► Day is a 2-digit number (01-31)
- ► Default date format is mm/dd/yyyy

The Clock Mode setting controls whether the time is displayed in a 12-hour or 24-hour format.

- ► When using the 12-hour format, AM or PM must be specified
- ► Default setting is 12-hour

Change date and time settings:

1. Press the **MAIN** button.
2. Press the **DOWN** button to highlight Edit Configuration. Press the **SELECT** button.
3. Enter the password when prompted.
4. Press the **DOWN** button to highlight Set Date & Time. Press the **SELECT** button.
5. Press the **UP** or **DOWN** buttons to select the date and time settings to change.
6. Press the **INC** or **DEC** buttons to change the setting.
7. Press the **BACK** button to return to the Edit Configuration screen, or press the **HOME** button to exit. The new settings are saved.

16.9.3 Display Language

The Horizon Series monitoring system stores two languages. English is the default language. If a different language is desired, it must be loaded from the flash memory card. If a flash memory card is not included with the freezer, the languages may have been loaded to the Horizon Series monitoring system prior to shipment.

To obtain a flash memory card to load an alternate language, contact Helmer Technical Service.

NOTE	Each time the freezer is powered on, the Horizon Series monitoring system display language must be selected.

Set the display language on power-on:

1. Connect the freezer to AC power. Switch the AC ON/OFF switch **ON**.
2. Install the monitoring system battery that is included in the accessory package.
   - ► The freezer powers on and the Horizon Series monitoring system will display the System Options screen.
3. Press the **INC** or **DEC** buttons to select the desired language. Press the **SELECT** button.
4. Press the **HOME** button to return to the HOME screen.
5. If a temperature alarm sounds, press the **MUTE** button.

Change the display language:

1. Press the **MAIN** button.
2. Press the **DOWN** button to highlight Edit Configuration. Press the **SELECT** button.
3. Enter the password when prompted.
4. Press the **DOWN** button to highlight System Options. Press the **SELECT** button.
5. Press the **UP** or **DOWN** buttons to select Language. Press the **SELECT** button.
6. Press the **INC** or **DEC** buttons to select the desired language.
7. Press the **BACK** button to return to the System Options screen, or press the **HOME** button to exit. The new settings are saved.

16.9.4 Temperature Units

Available options are Celsius (°C) or Fahrenheit (°F). The default temperature unit is Celsius.

Change temperature units:

1. Press the **MAIN** button.
2. Press the **DOWN** button to highlight Edit Configuration. Press the **SELECT** button.
3. Enter the password when prompted.
4. Press the **DOWN** button to highlight System Options. Press the **SELECT** button.
5. Press the **DOWN** button to highlight Temperature Units.
6. Press the **INC** or **DEC** buttons to select the desired temperature units.
7. Press the **BACK** button to return to the Edit Configuration screen, or press the **HOME** button to exit. The new setting is saved.

16.10 Upgrade System Firmware

Helmer may occasionally issue updates for the Horizon Series monitoring system firmware. Follow upgrade instructions included with the firmware update.

16.11 Reset the Horizon Series Monitoring System

1. Remove 1 battery from the monitoring system backup battery holder.
2. Switch the AC ON/OFF switch **OFF**.
3. Switch the AC ON/OFF switch **ON**.
4. Reinstall the battery in the monitoring system backup battery holder.

16.12 View Manufacturer and Product Information

1. Press the **MAIN** button.
2. Press the **INC** or **DEC** buttons to select the Product/Company Information option. Press the **SELECT** button.
   - ► Manufacturer contact information appears.
   - ► Software version appears.

17 Temperature Controller Setpoints

Independent temperature controller.

The temperature controller is located in the electrical box on the back of the freezer. Temperature controller setpoints are programmed at the factory. Setpoints can be viewed and changed through the temperature controller.

17.1 Change the Freezer Setpoint

NOTICE Do not change the setpoint to a value outside the temperature control range.

NOTE

- ► Default setpoint is -32.0 °C (which causes the freezer to maintain a temperature of -30.0 °C).
- ► When there is no interaction for four minutes, the temperature controller exits program mode and returns to normal mode.
- ► The reference temperature displayed on the temperature controller may not be the same as the temperature displayed on the i.Center monitoring system.

1 Observe the chamber temperature displayed on the Horizon Series monitoring system, after the monitoring probe has been calibrated.

2 Determine how much the freezer setpoint will be changed.

EXAMPLE

- ► Current setpoint is -30.0 °C
- ► Target setpoint is -28.0 °C
- ► Setpoint adjustment value is +2.0 °C

3 On the temperature controller, press and hold the **P** button.

► "PXX" is displayed, where "XX" is a parameter value.

4 Adjust the freezer setpoint.

a Press the **UP** or **DOWN** arrow buttons until "P03" is displayed.

b Press the **P** button.

► The current setpoint is displayed.

c Press the **UP** or **DOWN** arrow buttons to change the temperature setpoint by the same value as determined in step 2.

d Press the **P** button.

► The setpoint is changed and "P03" is displayed.

5 Exit program mode:

a Press the **UP** or **DOWN** arrow buttons until "P01" is displayed, or

b Do not press any buttons for four minutes. Parameter 01 ("P01") is displayed.

17.2 Change the Hysteresis Value

- ► Default setpoint is 4.0 °C
- ► Allowable temperature variance above the freezer setpoint

NOTICE Hysteresis is factory-preset and should not be changed unless directed by Helmer Technical Service.

18 Maintenance

NOTICE

- ► Before performing maintenance, protect items in freezer from extended exposure to adverse temperature.
- ► Allow freezer temperature to stabilize at setpoint after performing service or after extended door opening.

NOTE Refer to the operation manual for the preventive maintenance schedule.

18.1 Recharge Refrigerant

CAUTION

- ► Review all safety instructions prior to recharging refrigerant. Refer to chapter **2** (Safety).
- ► Maintenance should only be performed by trained refrigeration technicians.

NOTICE Use only non-CFC R-404A refrigerant.

Full initial refrigerant charge varies by model and power requirements, which can be found on the product specification label.

Model	Initial Charge
120/125	29.0 oz. (822 g)

Obtain:

- ► Refrigerant
- ► Calibrated pressure gauge (0 psi to 220 psi (0 kPa to 1520 kPa))

Add refrigerant:

1 Attach pressure gauge to the fittings on the refrigeration lines.
2 Monitor the low side (suction) pressure through a full compressor cycle.
3 Measure the pressure at the end of the next cycle, immediately before the compressor stops.

NOTE Pressure varies depending on ambient air temperature.

4 Add refrigerant. Check the pressure on the low side and high side.

Models with TXV expansion valve:

- ► Low side = 2 psi to 4 psi (14 kPa to 28 kPa)
- ► High side = 170 psi to 220 psi (1172 kPa to 1520 kPa)

Models with capillary tube:

- ► Low side = 4 psi to 7 psi (30 kPa to 50 kPa)
- ► High side = 100 psi to 220 psi (690 kPa to 1520 kPa)

5 Remove pressure gauge.

18.2 Test Monitoring System Backup Batteries

The Horizon Series monitoring system does not have visual indicators for battery charge level. If the batteries deplete to a particular voltage output, the batteries will not provide power to the monitoring system.

Test backup batteries:

1 Switch the AC ON/OFF switch **OFF**.
   - ► Screen should continue to display information without backlight.
   - ► If the display is blank, replace the batteries.

2 Switch the AC ON/OFF switch **ON**.

18.3 Replace Monitoring System Backup Batteries

On the top of the freezer, remove six batteries and replace with six new batteries.

NOTICE When installing replacement batteries, use only batteries which meets the specifications outlined in chapter **18.7** (Supplies).

18.4 Clean the Freezer

18.4.1 Condenser Grill

In environments where freezer is exposed to excessive lint or dust, condenser grill may require cleaning more frequently than stated in preventive maintenance schedule.

Clean the condenser grill using a soft brush and a vacuum cleaner.

18.4.2 External Drain Line Fan

Clean the external drain line fan using a soft brush and a vacuum cleaner.

18.4.3 Exterior

Clean exterior surfaces with soft cotton cloth and non-abrasive liquid cleaner.

18.4.4 Interior

Clean painted surfaces with mild detergent. Clean stainless steel surfaces with a general-purpose laboratory cleaner suitable for stainless steel.

18.4.5 Door Gaskets

Clean with soft cloth and mild soap and water solution.

18.4.5 Clean and Refill Probe Bottle

NOTE A kit that includes a probe bottle and propylene glycol is available from Helmer.

Obtain:

- ► Fresh water-bleach solution (not provided)
  - ► 1:9 ratio of bleach to water
  - ► Bleach is 5% solution of commercial sodium hypochlorite (NaOCl)
  - ► Equivalent oxidizing cleaner/disinfectant approved by your organization may be substituted
- ► 4 oz. (120 mL) of product simulation solution per bottle
  - ► 1:1 ratio of water to propylene glycol (or equivalent low-temperature fluid)

Clean and refill bottle:

1. Remove probe from bottle.
2. Remove bottle from bracket.
3. Clean bottle with water-bleach solution.
4. Fill bottle with 4 oz. (120 mL) of product simulation solution.
5. Cap bottle tightly to minimize evaporation.
6. Place bottle in bracket.
7. Replace probe, immersing at least 2” (50 mm).

18.5 Defrost the Unit Cooler

Defrost cycles are programed to occur at specific times. A defrost cycle can be manually initiated, outside of the programmed defrost times, as described below.

Independent temperature controller (defrost lamp circled).

Start a defrost event:

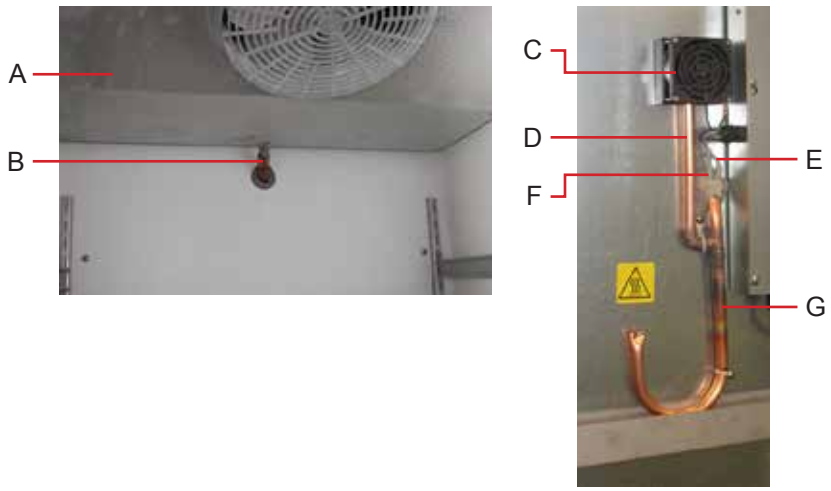
1. On the independent temperature controller, press the P button to access the parameter menu.
- ► “P03” is displayed.
2. Press the **DOWN** arrow button until “P37” is displayed.
3. Press the **P** button.
4. Press the **UP** arrow button to start the defrost event.
   - ► The defrost lamp illuminates.
   - ► The defrost icon on the i.Center monitoring system is displayed.
   - ► The defrost event is started.
5. To stop the defrost event, do one of the following:
   - **a** Press the **DOWN** arrow button, or
   - **b** The defrost event will stop when the defrost cycle is complete.

18.6 Unit Cooler Cover Removal and Installation

If unit cooler cover is not removed as detailed in this procedure the drain port may be damaged. Improper drainage may result in excessive icing and freezer's inability to maintain temperature.

Required tools:

- ► 5/16" socket wrench
- ► Tool to push putty away from the drain tube



Drain tube, fan, and heater components.

Label	Description
A	Unit cooler cover
B	Drain port
C	Drain fan
D	Fan tube
E	Heater wires
F	Heating element
G	Drain tube

18.6.1 Remove the Unit Cooler Cover

WARNING Disconnect the freezer from AC power when removing the unit cooler.

CAUTION The condensate evaporator and water evaporation tray are hot.

NOTICE
- ► Before removing the unit cooler cover, protect items in the freezer from extended exposure to adverse temperature.
- ► Allow freezer temperature to stabilize at setpoint after replacing unit cooler.

1. Remove one battery from the battery holder. Switch AC ON/OFF switch **OFF**. Disconnect the freezer from AC power.
2. Remove the top drawer, basket, or shelf from the chamber.

NOTE Remove the Cold-Shield™ panel. Loosen three screws securing the panel to the cabinet then slide the panel to free it from the screws.

3. On the back of the cabinet, peel the putty back to expose the drain tube (G) and drain heater (F).
4. Verify the heating element is cool. Remove the screws and loosen the pipe straps securing the drain tube to the cabinet.
5. Remove the drain heater from the drain tube.
6. Remove the drain tube (G) by pulling it downward. The drain tube should separate from the fan tube (D) at the 90° elbow, leaving the fan tube (D) attached to the fan (C).
   - **a** Separate the drain hose inside the cabinet from the unit cooler drain port (B).
   - **b** Gently twist the drain hose from left to right to separate it from the unit cooler drain port.
   - **c** Pivot the drain tube and drain hose upward then remove the assembly from the cabinet.
7. Remove the unit cooler cover (A).
   - **a** Hold unit cooler cover in place to prevent it from dropping.
   - **b** Use the socket wrench to remove four screws securing the unit cooler cover.
   - **c** Carefully lower unit cooler cover to avoid damage to the fan wiring.

18.6.2 Install the Unit Cooler Cover

1. Verify unit cooler wiring is connected and routed correctly.
   - **a** Wiring should be routed above copper tube inside the unit cooler.
   - **b** Reconnect wires if they have separated.
2. Attach unit cooler cover.
   - **a** Lift unit cooler cover into place.
   - **b** Front edge of the cover should be behind the unit cooler case.
   - **c** Use the socket wrench to install four screws to secure the unit cooler cover.
3. Insert the drain tube and drain hose through the hole in the cabinet.
   - **a** Push drain tube and drain hose upward at an angle, toward the unit cooler drain port.
   - **b** Pivot the drain tube and drain hose downward then push the assembly upward.
   - **c** In the chamber, push the drain hose onto the drain hose.
4. Attach the drain tube to the fan tube.
5. Insert the drain line heater in the drain tube.
   - **a** Insert the heater at an upward angle.
   - **b** The black heating element should no longer be visible.
6. On the back of the cabinet, press putty around the drain tube and drain line heater.

7 Reinstall top drawer, basket, or shelf.

NOTE Reinstall the Cold-Shield™ panel.

8 Reattach the pipe straps to secure the drain tube to the cabinet.

9 Reconnect the freezer to AC power. Switch AC ON/OFF switch **ON**. Reinstall the battery in the battery holder.

10 Press the **MUTE** button to disable the high temperature alarm while freezer reaches operating temperature.

18.7 Supplies

Refrigerant: non-CFC, R-404A

Chart paper: 220419 (52 sheets)

Propylene glycol solution: 400922-2

Monitoring system batteries: (6) 1.5 V, D-cell non-rechargeable alkaline batteries (or equivalent): 715031

Chart recorder battery (optional): (1) 9 V non-rechargeable alkaline (or equivalent): 120218

19 Troubleshooting

CAUTION
- ► Review all safety instructions prior to troubleshooting. Refer to chapter **2** (Safety).
- ► Troubleshooting should only be performed by trained refrigeration technicians.

19.1 General Operation Problems

Problem	Possible Cause	Action
Drawer does not slide easily.	Debris in the slides.	► Pull the drawer out and confirm the slides are free of debris. Clean if necessary.
	Ice buildup in the slides.	► Pull the drawer out and confirm slides are free of ice. De-ice and clean if necessary.
	Drawer is misaligned or not level.	► Confirm both slides for the drawer are mounted at the same height.
	A drawer slide is faulty.	► Confirm the slide is operating correctly. Replace if necessary.
Door does not open easily.	Debris in the hinges.	► Confirm the hinges are free of debris. Clean the hinges if necessary.
	Door hinges are not lubricated.	► Using a general-purpose grease, lubricate the pivots in the hinges.
	Hinge cam is faulty.	► Confirm the hinge cam is not damaged. Replace if necessary.
Monitor display is hard to read.	Screen contrast is set too low.	► Change the screen contrast.
Display on the temperature/defrost controller is flashing.	Defrost probe or temperature probe wiring is an open circuit, or a component is faulty or internal connections are loose.	► Check the continuity of the probe wiring and connections. Secure the connections if necessary. ► Confirm the probe is providing resistance in the range of 1191 Ω to 2000 Ω. Replace the probe if necessary.

19.2 Chamber Temperature Problems

Problem	Possible Cause	Action
Chamber temperature displayed is higher or lower than the actual temperature.	Connections for the chamber temperature probe are loose.	► Test the probe connections. Secure the connections if necessary.
	Temperature probe wiring is an open circuit.	► Check the continuity of the probe wiring. Replace the probe if necessary.
	Probe bottles are empty, or the amount of solution is too low.	► Check the level of product simulation solution in the bottles. Clean and refill the bottles if needed.
	Monitor is not calibrated.	► Confirm the upper temperature probe is reading correctly. Calibrate the probe if necessary.
	Solution in the probe bottle is frozen.	► Refill the bottle with new solution.
	Digital electronics are locked because of an interruption in power.	► Reset the monitoring system.
	A component is faulty or internal connections are loose.	► Contact a qualified service technician.
Compressor runs continuously.	Freezer setpoint is set too low.	► Confirm the setpoint is set within the operating range. Change the setpoint if necessary.
	Temperature control probe is faulty.	► Confirm the probe is providing resistance in the range of 1191 Ω to 2000 Ω. Replace the probe if necessary.
	Temperature controller is faulty.	► Confirm the temperature controller is operating correctly. Replace the board(s) if necessary.
	Solid state relay is faulty.	► Confirm the relay is operating correctly. Replace it if necessary.

Problem	Possible Cause	Action
Chamber temperature does not stabilize at the freezer setpoint.	Solid state relay is faulty.	► Confirm the relay is operating correctly. Replace the relay if necessary.
	Temperature/defrost controller is faulty.	► Confirm the monitor/control board or temperature/defrost controller is operating correctly. Replace the board or controller if necessary.
	Compressor fan is not running.	► Check the compressor fan connections. Replace the fan motor if necessary.
	Unit cooler fan is not running.	► Activate the door switch then check the voltage to the fan. Replace the fan motor or door switch if necessary.
	Refrigerant level is too low.	► Check the refrigerant level. Recharge the refrigerant if necessary.
	Compressor motor has seized.	► Replace the compressor.
	Temperature control probe is faulty.	► Confirm the probe is providing resistance in the range of 1191 Ω to 2000 Ω. Replace the probe if necessary.
	Condenser grill is dirty.	► Check the condenser grill. Clean it if necessary.
	Circulation at the top of the chamber is not adequate.	► Check if there are any items that may obstruct air flow and remove them if necessary. ► Check the unit cooler fan is working. If the fan is not working, contact a qualified service technician.
	Ambient air temperature around the freezer is too high.	► Confirm the freezer is placed appropriately.
	A component is faulty or internal connections are loose.	► Contact a qualified service technician.
	Evaporator is covered with ice and is not exchanging heat.	► Check for ice buildup on the evaporator. Shine a flashlight into the fan opening on the unit cooler and check for ice buildup. Also, feel behind the unit cooler for ice buildup. If there is significant ice buildup in either area, defrost the freezer.

19.3 Alarm Activation Problems

Problem	Possible Cause	Action
Freezer is in an alarm condition, but alarms are not audible.	A component is faulty or internal connections are loose.	► Confirm the circuit board and line connections are functioning correctly.
	Control board is faulty.	► Replace parts with those included in the control and display board kit.
	Alarm buzzer is faulty.	► Replace the alarm buzzer.

Problem	Possible Cause	Action
Freezer meets an alarm condition, but the appropriate alarm is not active.	Control board is faulty.	► Replace parts with those included in the control and display board kit.
	Alarm setpoint was changed.	► Check the current setpoints for the alarms. Change the setpoints if necessary.
	A component is faulty or internal connections are loose.	► Contact a qualified service technician.
Alarm monitor is not responding.	Digital electronics are locked because of an interruption in power.	► Reset the monitoring system.
Chamber temperature meets the high alarm condition, but the high temperature alarm is not active.	High temperature alarm setpoint was changed.	► Check the current setpoint for the high temperature alarm. Change the setpoint if necessary.
High Temperature alarm activates when the door is opened, then clears shortly after the door is closed.	Connections for the chamber temperature probe are loose.	► Test the probe connections. Secure the connections if necessary.
	Chamber temperature probe is faulty.	► Test the probe. Replace the probe if necessary.
	Unit cooler fan continues to run while the door is open.	► Test the door switch and unit cooler fan connections. Secure the connections if necessary. Replace the door switch or fan motor if necessary.
	Probe bottles are empty.	► Check the level of product simulation solution in the bottles. Refill the bottles if necessary.
	A component is faulty or internal connections are loose.	► Contact a qualified service technician.
	High temperature alarm setpoint is set too low.	► Check the setpoint. Change the setpoint if necessary.
Freezer is connected to power and turned on, but the AC Power Failure alarm is active.	Outlet connection is faulty.	► Verify power at the outlet. Repair the original outlet or connect to a different outlet if necessary.
	Power supply board is faulty.	► Replace the power supply board.
	Circuit breaker was tripped.	► Confirm the circuit breaker is seated. Push the circuit breaker to reset it if necessary.
	Power cord is faulty.	► Confirm the power cord is connected securely. Secure the power cord if necessary.
	A component is faulty or internal connections are loose.	► Contact a qualified service technician.

Problem	Possible Cause	Action
Door Open alarm is activating sporadically.	Door is not closing completely.	► Confirm the door is aligned, and the hinge cams are not damaged. Replace if necessary.
	Door is closing but not sealing completely.	► Confirm the door gasket seals completely. Replace the door gasket if necessary.
	Connections for the door switch are faulty.	► Test the switch connections. Secure the connections if necessary.
	Door switch is faulty.	► Replace the door switch.
	Control board is faulty.	► Replace parts with those included in the control and display board kit.
	Door Ajar Timeout is set to zero, causing the alarm to activate immediately when the door is opened.	► Check the current setpoint for the Door Ajar alarm. Change the setpoint if necessary.
	A component is faulty or internal connections are loose.	► Contact a qualified service technician.
All alarms are activating sporadically.	Alarm system is faulty.	► Confirm the circuit board and line connections are functioning correctly.
	Control board is faulty.	► Replace parts with those included in the control and display board kit.
	A component is faulty or internal connections are loose.	► Contact a qualified service technician.
An alarm activated, but the temperature recorded at activation does not match the alarm setpoint.	Monitor is not calibrated.	► Confirm the upper temperature probe is reading correctly. Calibrate the probe if necessary.
	Temperature changed slightly around the time of activation.	► No action needed.
High Temperature alarm is activating sporadically.	Upper chamber temperature probe is not immersed in the product simulation solution.	► Confirm the probe bottle is full of solution, and the probe is placed in it correctly.
	A component is faulty or internal connections are loose.	► Contact a qualified service technician.
	Upper chamber temperature probe is not calibrated.	► Confirm the upper temperature probe is reading correctly. Calibrate the probe if necessary.

19.4 Condensation Problems

Problem	Possible Cause	Action
Excessive water in the water evaporation tray.	Heater in the evaporation tray is faulty.	► Confirm the heater is hot and is drawing the appropriate current (approximately 0.21 A to 0.35 A). Replace the heater if necessary.
	Humid air is entering the chamber.	► Confirm the freezer is level, and the door is aligned, closing tightly, and sealing correctly. Contact a qualified service technician to correct issues as necessary.
Excessive ice in the chamber.	Humid air is entering the chamber.	► Confirm the freezer is level, and the door is aligned, closing tightly, and sealing correctly. Correct issues as necessary.
	Drain port on the unit cooler was damaged during removal of the unit cooler cover.	► Confirm the drain port on the unit cooler is intact.
	External drain fan is faulty.	► Confirm the external drain fan is running. Hold a piece of paper in front of the fan and check that the paper is being drawn toward the freezer. ► Confirm the connections are secure. Tighten the connections if necessary. ► Replace the external drain fan.
	Connection between the unit cooler and the drain line is loose.	► Confirm the connection is secure. Contact a qualified service technician to tighten the connection if necessary.
	Drain line is plugged.	► Confirm the drain tube is free of debris. Remove debris if necessary.
	External drain fan is not running.	► Confirm the external drain fan is running. Contact a qualified service technician to correct issues as necessary.
	Evaporator is covered with ice and is not exchanging heat.	► Check for ice buildup on the evaporator. Shine a flashlight into the fan opening on the unit cooler and check for ice buildup. Also, feel behind the unit cooler for ice buildup. If there is significant ice buildup in either area, defrost the freezer.
Excessive humidity on the door.	Humid air is entering the chamber.	► Confirm the freezer is level, and the door is aligned, closing tightly, and sealing correctly. Correct issues as necessary.
	Relative humidity around the freezer is too high.	► Confirm the freezer is placed appropriately.

Problem	Possible Cause	Action
After defrosting, no water flows into the water evaporation tray.	Drain line heater is faulty.	► Confirm the connections are secure. Tighten the connections if necessary. ► Confirm the drain line heater is warm to the touch. Replace the heater if necessary.
	Defrost heater on the evaporator in the unit cooler is faulty.	► After defrosting the freezer, monitor the evaporator for repeated ice buildup. ► Confirm the connections are secure. Tighten the connections if necessary. ► Confirm the drain line heater is hot and is drawing the appropriate current during a defrost event (approximately 3.9 A to 5.5 A). ► Replace the heater if necessary.
	Not enough time has elapsed since the end of the defrost cycle.	► Wait until approximately 20 minutes after the defrost cycle has ended.
	Drain line is plugged.	► Confirm the drain tube is free of debris. Remove debris if necessary.
	Defrost heater on the evaporator in the unit cooler is not working.	► Check for ice buildup on the evaporator. Shine a flashlight into the fan opening on the unit cooler and check for ice buildup. Also, feel behind the unit cooler for ice buildup. If there is significant ice buildup in either area, defrost the freezer.

20 Parts

NOTICE

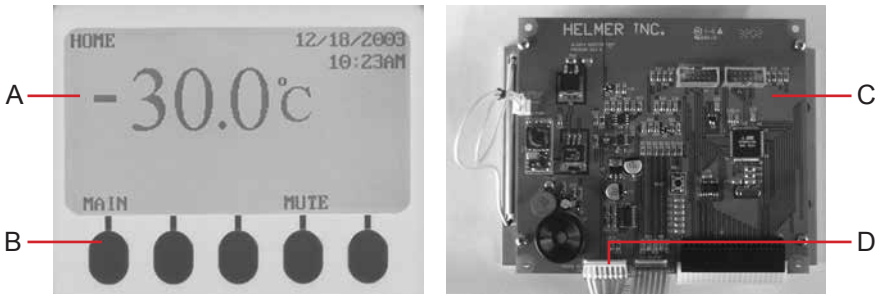
- ► Before replacing parts, protect items in freezer from extended exposure to adverse temperature.
- ► Allow freezer temperature to stabilize at setpoint after replacing parts or after extended door opening.

20.1 Front

Front features (HPF120-4 model shown).

Label	Description	Part Number	Schematic Label
A	Bezel with chart recorder door	Contact Helmer Technical Service	-
B	Chart recorder door	Contact Helmer Technical Service	
C	Horizon Series display	Refer to subsequent section(s) for part numbers	K
D	Chart recorder	400409-6	X
E	Chart paper (52 sheets)	220419	-
F	Chart recorder backup battery (9 V alkaline, non-rechargeable)	120218	AD
Not shown	Caster (swivel with brake)	Serial number 974891 and earlier: 220380 Serial number 974892 and later: 220467	-

20.1.1 Display



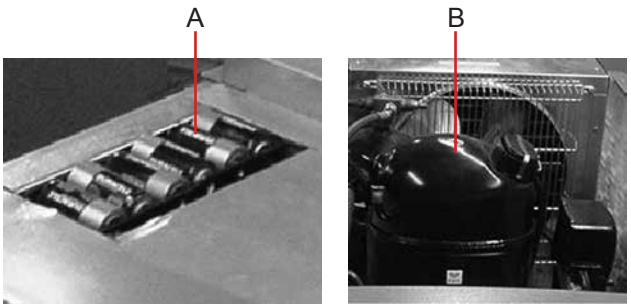
Left: Display assembly showing LCD and touchpad. Right: Display board.

Label	Description	Part Number	Schematic Label
A	LCD board	120452	K
B	Touchpad	320722-1	K
C	Display board	Included in the control and display board kit	K
D	Interface cable	400502-1	AF
Not shown	Display assembly (Includes LCD board and touchpad)	400509-1	K

NOTICE The Horizon Series display assembly is sensitive to static electricity and can be damaged by electrostatic discharge. Use proper ESD precautions when handling the display assembly.

NOTE Although the LCD display and touchpad may be replaced individually, Helmer recommends replacing the entire display assembly.

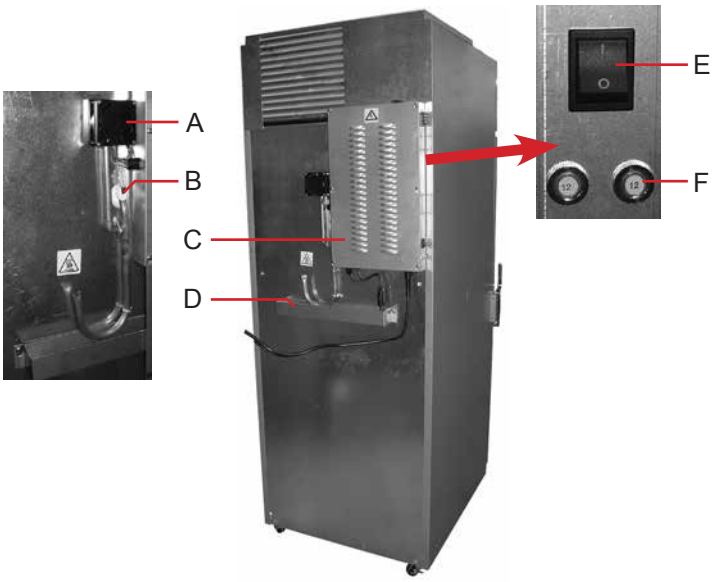
20.2 Top



Top features (HPF120-4 model shown).

Label	Description	Part Number	Schematic Label
A	Monitoring system backup batteries	715031	AE
B	Compressor unit	Contact Helmer Technical Service	A
Not shown	Condensing unit fan motor	230 V 60 Hz: 120493 230 V 50 Hz: 120515	U
	Solenoid valve	220547	Y
	Solenoid coil	120647	AJ

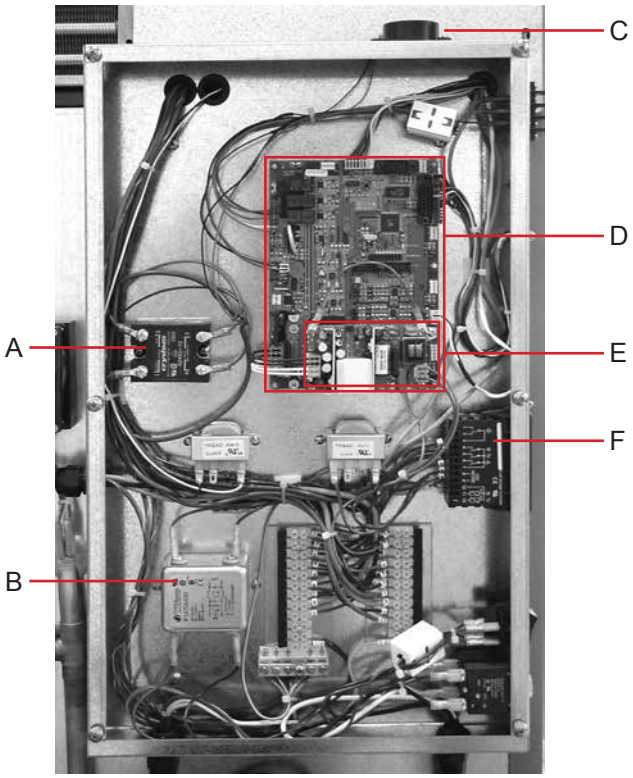
20.3 Rear



Rear features (HPF120-4 model shown).

Label	Description	Part Number	Schematic Label
A	External drain line fan	120511	Z
B	Drain line heater	120485	O
C	Electrical box	Refer to subsequent section(s) for part numbers	-
D	Condensate evaporator kit (Includes the condensate evaporator and water evaporation tray)	400790-2	J
E	Main power switch	120478	Q
F	Circuit breaker, 12 A	120220	P

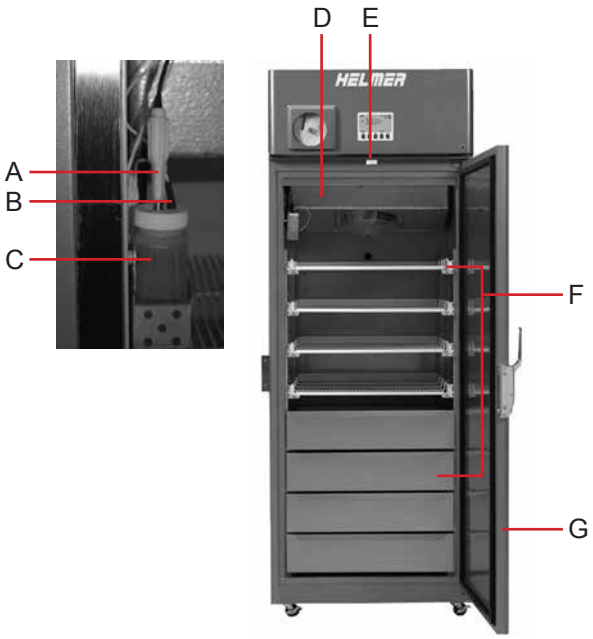
20.3.1 Electrical Box



Electrical box features (HLF120 model shown).

Label	Description	Part Number	Schematic Label
A	Compressor relay	120512	AA
B	Power line filter	120400	AK
C	Alarm buzzer	120457	D
D	Control board	Included in the control and display board kit.	E
E	Power supply board	400633-1	AH
F	Temperature/defrost controller (programmed)	400540-1	B
Not shown	Control and display board kit (Includes control board, display board, power supply board, and interface cable)	400649-2	K,E

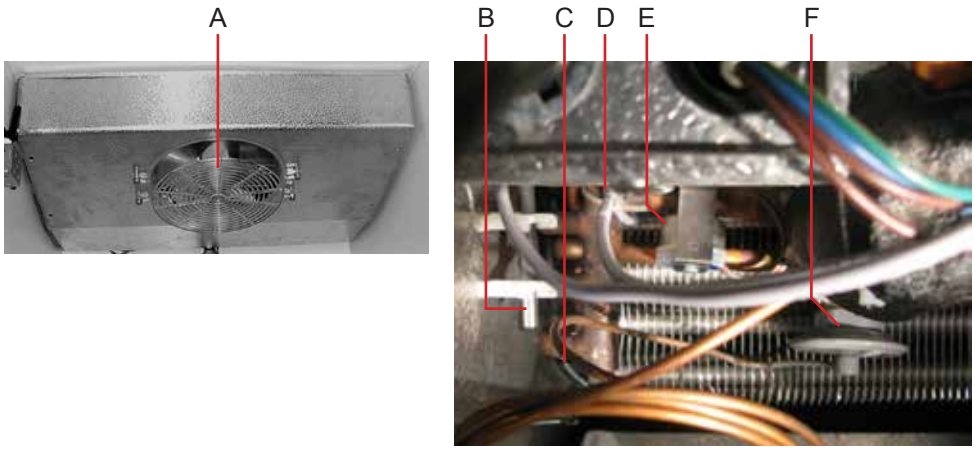
20.4 Interior



Interior features (HPF120-4 model shown).

Label	Description	Part Number	Schematic Label
A	Chart recorder probe	400855-1	AI
B	Chamber probe	800108-1	AB
C	Probe bottle and propylene glycol kit	400922-2	-
D	Unit cooler	Refer to subsequent section(s) for part numbers	AG
E	Door switch	120380	I
F	Storage parts	Refer to subsequent section(s) for part numbers	-
G	Door	Refer to subsequent section(s) for part numbers	-
Not shown	Mullion heater (located under strike plates)	120481	C
	Strike plate replacement kit (includes strike plates with pre-applied foam tape, foil tape, and replacement instructions)	400687-1	-

20.4.1 Unit Cooler



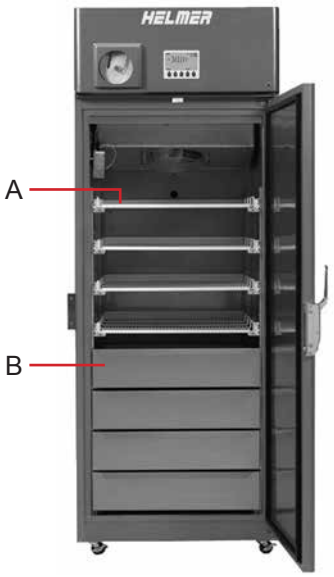
Left: Unit cooler. Right: Unit cooler interior.

Label	Description	Part Number	Schematic Label
A	Unit cooler fan blade	Serial number 982859 and earlier: 220447 Serial number 982860 and later: 220497	-
B	Temperature control probe	120495	G
C	Defrost heater	Serial number 982859 and earlier: 120494 Serial number 982860 and later: 120567	R
D	Defrost control probe	120495	M
E	Defrost heater limit thermostat	Serial number 982859 and earlier: 120492 Serial number 982860 and later: 120566	S
F	TXV (expansion) valve	220495	-
Not shown	Unit cooler fan motor	Serial number 982859 and earlier: 120497 Serial number 982860 and later: 120548	H

NOTE

- ► Some freezers will include a capillary tube in place of the TXV valve.
- ► The part number for the capillary tube is 211117-1.

20.4.2 Storage



Storage features (HPF120-4 model shown).

Label	Description	Part Number
A	Full shelf (includes hardware)	120 models: 400414-1 125 models: 400414-2
B	Drawer assembly (includes drawer, 2 slides, and hardware)	120 models: 400584-2 125 models: 400584-1
Not shown	Drawer slide assembly (right side)	120 models: 400541-3 125 models: 400541-1
	Drawer slide assembly (left side)	120 models: 400541-4 125 models: 400541-2
	Roll-out basket assembly (optional, includes basket, 2 slides, and hardware)	120 models: 400890-1 125 models: 400890-2
	Roll-out basket slide assembly (right side)	120 models: 400541-3 125 models: 400541-1
	Roll-out basket slide assembly (left side)	120 models: 400541-4 125 models: 400541-2
	Drawer slide wheel	320815-1
	Half shelf (includes hardware)	400413-1

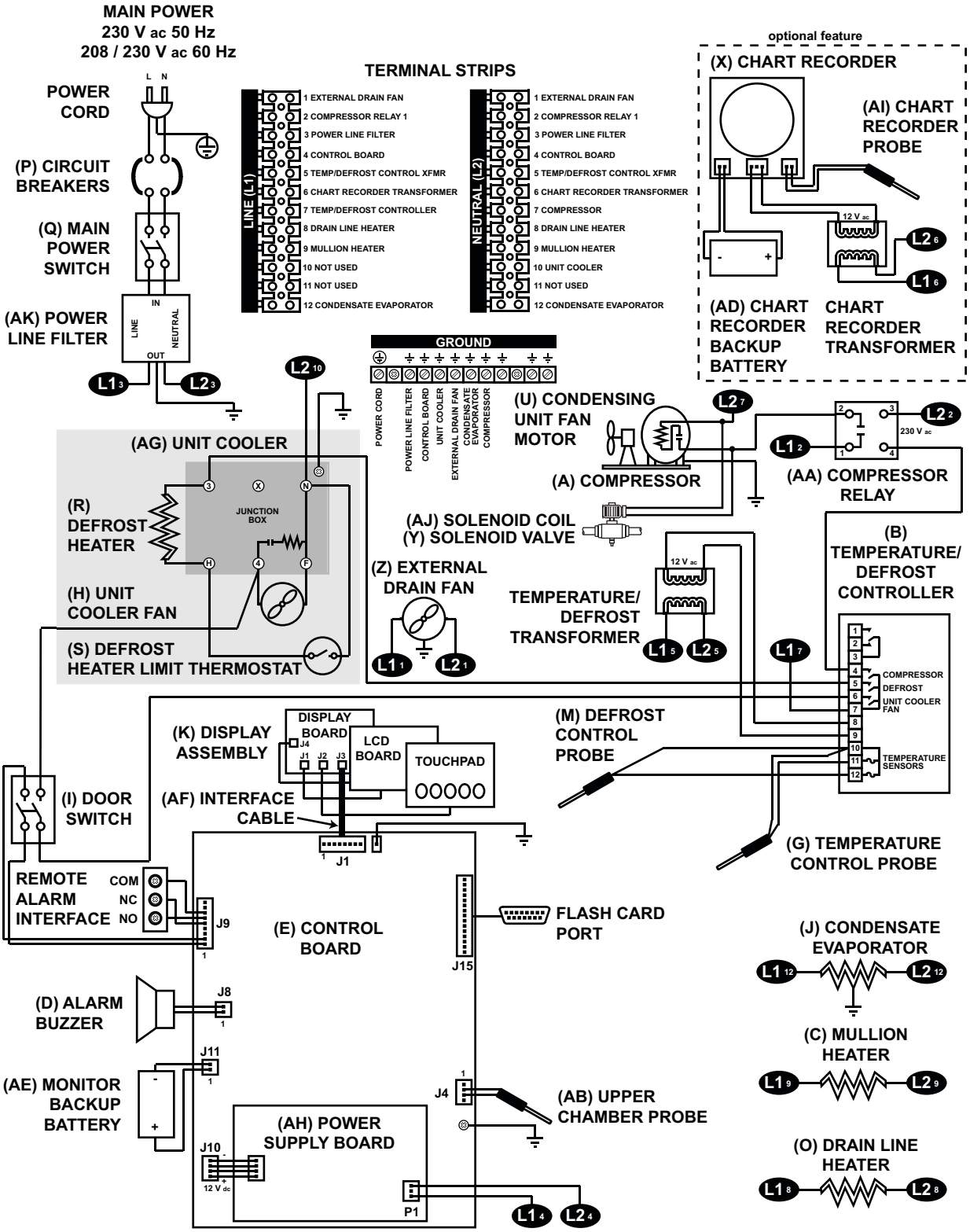
20.4.3 Door and Hinge

Door and hinge features (HPF120-4 model shown).

Label	Description	Part Number
A	Door handle with lock	220426
B	Door bumper	220441
C	Hinge bearing	220375
D	Upper hinge bracket	Right hinge: 400376-1 Left hinge: 400376-2
E	Door gasket	321271-1
F	Hinge cam	320742-1
G	Door stop	320763-1
H	Lower hinge bracket	Right hinge: 400377-1 Left hinge: 400377-2

21 Schematics

21.1 HPF Models; 20 and 25 Cubic Feet



22 Horizon Series Screen Reference

HOME screen
- **MAIN** button
  - **MAIN** screen
- **MUTE** button (changes mute timer)

MAIN screen
- **Edit Configuration** option
  - (Enter the password)
  - **CONFIGURATION** screen
- **View Configuration** option
  - **VIEW CONFIGURATION** screen
- **Product/Company Information** option
  - **INFORMATION** screen

CONFIGURATION screen
- **Set Date & Time** option
  - **SET DATE & TIME** screen
- **System Options** option
  - **SYSTEM OPTIONS** screen
- **Alarm Setpoints** option
  - **SET ALARM SETPOINT** screen
- **Temperature Calibration** option
  - **TEMPERATURE CALIBRATION** screen
- **Factory Default Settings** option
  - **FACTORY DEFAULT SETTINGS** screen
- **Change Password** option
  - (Enter a new password)

SYSTEM OPTIONS screen
- **Language** option
- **Date Format** option
- **Alarm Volume** option
- **Alarm Pulse** option
- **Temperature Units** option
- **Chart Paper Timer** option

SET ALARM SETPOINT screen
- **High Alarm Setpoint** option
- **Door Ajar Timeout** option
- **Power Failure Timeout** option

TEMPERATURE CALIBRATION screen
- **Upper Temperature Probe** display
- **Temperature** option

VIEW CONFIGURATION screen

- **Clock Mode** display
- **Date Format** display
- **Door Ajar Timeout** display
- **Pwr Failure Timeout** display
- **High Alarm Setpoint** display
- **Alarm Volume** display
- **Alarm Pulse** display
- **Chart Paper Days Left** or **Chart Paper Timer** display

Section IV: Horizon Series™ - Laboratory and International Plasma Storage Models

NOTE This section applies to HLF and HHPF models.

23 Product Configuration

23.1 Install Battery for Backup Power

The monitoring system and chart recorder each have a battery system, enabling a period of continuous operation if power is lost.

NOTE The monitoring system will start on battery power alone. If the freezer was previously not connected to AC power and the battery is connected, the monitoring system will begin running on battery power.

Battery life varies by manufacturer as well as voltage level remaining. Providing full power is available and no battery-related alarms are active, backup power for the monitoring system is available for up to two hours.

NOTICE When installing replacement batteries, use only batteries which meets the specifications outlined in chapter **25.6** (Supplies).

The battery is located on the top of the freezer, behind the monitoring system.

Monitoring system backup battery.

Monitoring system battery is included in the accessory package. Install and connect the battery to provide power to the monitoring system in the event of an AC power failure.

23.2 External Monitoring Devices

CAUTION

- The interface on the remote alarm monitoring system is intended for connection to the end user's central alarm system(s) that uses normally-open or normally-closed dry contacts.
- If an external power supply exceeding 30 V (RMS) or 60 V (DC) is connected to the remote alarm monitoring system's circuit, the remote alarm will not function properly; may be damaged; or may result in injury to the user.

NOTE In the event of a power failure, the power failure alarm condition is transmitted through the remote alarm contacts.

The remote alarm interface is a relay switch with three terminals:

- Common (COM)
- Normally Open (NO)
- Normally Closed (NC)

Terminals are dry contacts and do not supply voltage. Interface circuit is either normally open or normally closed, depending on terminals used. Requirements for your alarm system determine which alarm wires must connect to terminals.

- 0.25 A at 30 V (RMS); 0.25 A at 60 V (DC)

23.2.1 Connect to Remote Alarm Interface

1. Switch the AC ON/OFF switch **OFF**. Disconnect the monitoring system backup battery.
2. On the electrical box, locate the remote alarm terminals.
3. Connect remote alarm wires to appropriate terminals, according to requirements for your alarm system.
4. Use a cable tie to relieve strain on alarm wires (as necessary).
5. Reconnect the monitoring system backup battery. Switch the AC ON/OFF switch **ON**.
6. Press the **MUTE** button to disable the high temperature alarm while freezer reaches operating temperature.

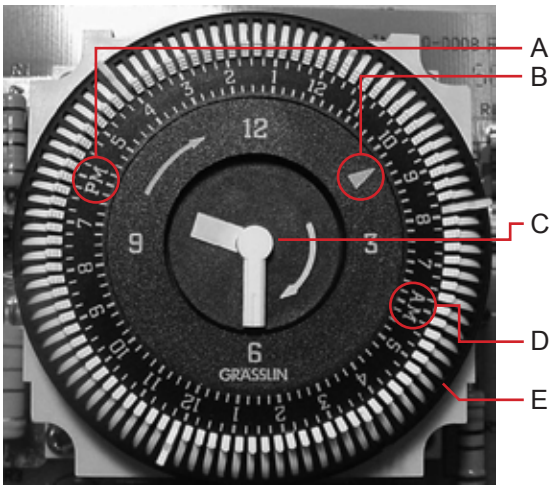
23.3 Schedule Defrost Events

Defrost events may be scheduled to occur at specific times.

The defrost controller is located in the electrical box, on the back of the freezer.

Specify the number of defrost events to execute per day, as well as the time at which to initiate each defrost cycle. The cycles are based on the current time settings on the defrost controller.

The defrost controller features two time indicators and a time adjustment ring. The hour and minute hands show the current time in hours and minutes. The outer ring shows the current time including AM or PM, to the nearest 15-minute interval.



Defrost controller with current time set to approximately 9:30 AM.

Label	Description
A	PM indicator
B	Current time indicator (includes AM/PM, to the nearest 15-minute interval)
C	Current time indicator (hour and minutes only)
D	AM indicator
E	Time adjustment ring

23.3.1 Set Current Time

1. Switch the AC ON/OFF switch **OFF**. Turn the Alarm Disable key switch **OFF**.
2. Remove the cover on the electrical box.
3. Rotate the time adjustment ring clockwise until the current time indicators show the current time.
4. Reinstall the cover on the electrical box.
5. Switch the AC ON/OFF switch **ON**. Turn the Alarm Disable key switch **ON**.
6. Press the **Mute** button to disable the high temperature alarm while freezer reaches operating temperature.

23.3.2 Set Defrost Time

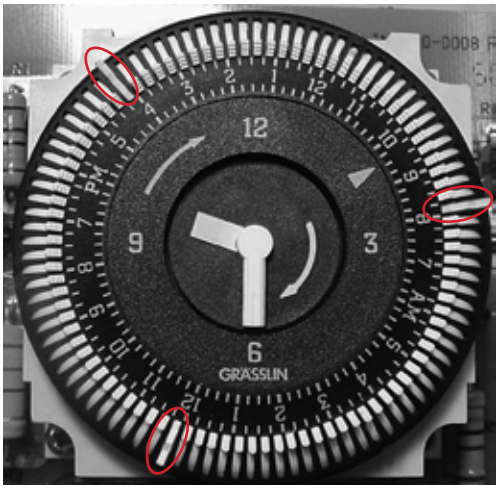
- ► Default setting of three defrost events per day
- ► Default times are 12:00 AM, 8:00 AM, 4:00 PM
- ► Defrost events can be added or removed
- ► Defrost events can be scheduled for any time of day (in 15-minute intervals)
- ► Defrost cycle lasts 15 to 30 minutes
- ► Defrost events must be at least one hour apart

NOTICE Three defrost cycles are recommended for consistent freezer operation.

23.3.3 Schedule a Defrost Event

- ► Switch defrost event switch(es) to the **ON** position (outside) to initiate a defrost event at that time.
- ► Switch defrost event switch(es) to the **OFF** position (inside) to cancel a defrost event at that time.

1. Switch the AC ON/OFF switch **OFF**. Turn the Alarm Disable key switch **OFF**.
2. Remove the cover on the electrical box.
3. Add a defrost event:
   - ► At the appropriate time mark, position the switch **ON** (toward the outer ring).
4. Remove a defrost event:
   - ► At the appropriate time mark, position the switch **OFF** (toward the inside ring).
5. Reinstall the cover on the electrical box.
6. Switch the AC ON/OFF switch **ON**. Turn the Alarm Disable key switch **ON**.
7. Press the **Mute** button to disable the high temperature alarm while freezer reaches operating temperature.



Defrost controller with defrost times set to On position at 12:00 AM, 8:00 AM, and 4:00 PM.

23.4 Move Drawers, Shelves, and Baskets

Storage features.

CAUTION

- ► Keep hands away from pinch points when closing the door.
- ► Before moving drawers, ensure they are completely empty for safe lifting.
- ► Maximum drawer or shelf load is 100 lbs (46 kg).

NOTICE Before moving storage components, protect stored items in freezer from extended exposure to adverse temperature.

Remove a drawer:

1. Pull drawer out until it stops.
2. Tilt the front of the drawer upward.
3. Pull drawer free of the slides.

Install a drawer:

1. Tilt the front of the drawer upward.
2. Set the wheels of the drawer in the slides in the cabinet.
3. Lower the front of the drawer.
4. Gently push the drawer into the chamber until it stops.
5. Pull drawer out until it stops; check for smooth operation.

Remove a shelf:

1. With one hand, lift front edge of the shelf from the front brackets.
2. With the other hand, reach under the shelf and bump rear edge of the shelf upward to disengage rear brackets.

Install a shelf:

1. Insert shelf into chamber, placing it on brackets.
2. Gently bump rear edge of the shelf downward to engage brackets.
3. Pulling shelf forward gently; shelf should not disengage from rear brackets.

23.5 Move Slides and Brackets

Remove drawer slides:

1. Using a screwdriver, remove front bracket retainers.
2. Tap front brackets upward to disengage standards.
3. Remove slides from standards.

Install drawer slides:

1. Insert slides into standard at appropriate height.
2. Tap front brackets downward to engage standards.
3. Using a screwdriver, install front bracket retainers.

Remove shelf brackets:

1. Using a screwdriver, remove front bracket retainers.
2. Tap front brackets upward to disengage standards.
3. Remove front brackets from standards.

Install shelf brackets:

1. Insert front brackets into standard at appropriate height.
2. Tap front brackets downward to engage standards.
3. Using a screwdriver, install front bracket retainers.

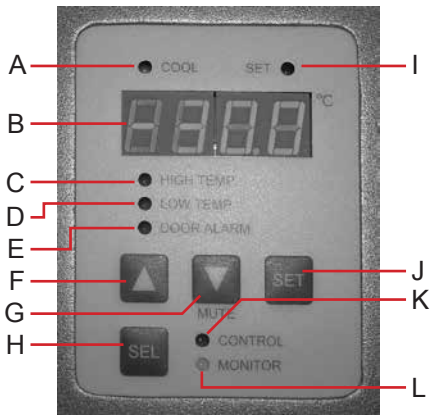
23.6 Optional Adapter Kits for Medication Dispensing Locks

Contact Helmer Technical Service or your distributor for service documentation pertaining to medication dispensing locks.

24 Settings

Through the Laboratory combined monitor and controller, current settings may be viewed and changed.

24.1 Monitor and Controller Interface



Label	Description	Function
A	COOL lamp	Indicates the compressor is running.
B	Display	Displays real-time temperature information, setpoints, and alarms.
C	HIGH TEMP lamp	Indicates when the freezer is in a high temperature alarm condition. Also indicates high alarm temperature setpoint is being changed.
D	LOW TEMP lamp	Indicates when the freezer is in a low temperature alarm condition. Also indicates low alarm temperature setpoint is being changed.
E	DOOR ALARM lamp	Indicates when the door is open.
F	UP ARROW button	Increases a temperature setting.
G	DOWN ARROW / MUTE ALARM button	Decreases a temperature setting. Also mutes the audible alarm for five minutes.
H	SEL button	Toggles between alarm monitor and control modes.
I	SET lamp	Indicates when temperature setpoint or alarm setpoint is being changed.
J	SET button	Allows settings to be selected, prior to changing settings.
K	CONTROL lamp	Indicates when the reading from the control temperature probe is displayed.
L	MONITOR lamp	Indicates when the display is showing temperature readings from the chamber probe. Also indicates when alarm setpoints are being changed.

24.2 Freezer Setpoint

NOTE Default setpoint is -30.0 °C.

Change the setpoint if:

- ► Your organization requires a chamber temperature other than -30.0 °C.
- ► The normal chamber temperature is too high or low (after completing preventive maintenance and applicable troubleshooting tasks).

Confirm:

- ► Freezer has been placed per location requirements in the operation manual.
- ► Preventive maintenance has been completed per operation manual.
- ► Troubleshooting items associated with chamber temperature have been reviewed (if necessary).

Change setpoint.

1 Determine the change in value to reach desired setpoint. Adjustment should be the difference between current setpoint and new setpoint.

EXAMPLE
- ► Current setpoint is -30.0 °C
- ► Target setpoint is -28.0 °C
- ► Setpoint adjustment value is +2.0 °C

2 On the monitoring system, press and release **SEL** to change to Control mode. CONTROL lamp will illuminate.
3 Press and hold **SET** to display the reference temperature.
4 Hold **SET** and press **Up Arrow** or **Down Arrow** as necessary to set the adjustment value determined in step 2.
5 Release all buttons; the setpoint is changed.
6 Press and release **SEL** to return to Monitor mode. MONITOR lamp will illuminate.

24.3 Temperature Alarm Setpoints

View setpoints:

1 Hold **Up Arrow** and **Down Arrow** for three seconds. MONITOR lamp will flash to indicate entry into program mode.
2 Press **SEL** until desired setting appears.
3 Observe the setting.
4 To view another setting, press **SEL** again (optional).
5 Hold **Up Arrow** and **Down Arrow** for three seconds. MONITOR lamp stops flashing to indicate exit from program mode.

Flashing Lamp	Selected Setting
HIGH TEMP and MONITOR	High temp alarm setpoint
LOW TEMP and MONITOR	Low temp alarm setpoint
MONITOR only	Monitor offset
CONTROL only	Control sensor offset
CONTROL only	Control hysteresis

NOTICE The Low Alarm Setpoint is not used in Helmer freezers.

24.3.1 High Temperature Alarm

- ► Specifies the temperature at which the High Temperature Alarm activates.
- ► Default setpoint is -20.0 °C.
- ► Setpoint can be changed from -40.0 °C to +25.0 °C.

Change the setpoint:

1. Hold **Up Arrow** and **Down Arrow** for three seconds. MONITOR lamp will flash to indicate entry into program mode.
2. Press **SEL** until HIGH TEMP and MONITOR lamps flash.
3. Hold **SET**, then press **Up Arrow** or **Down Arrow** to change the setpoint.
4. Release **SET** button.
5. Hold **Up Arrow** and **Down Arrow** for three seconds. MONITOR lamp stops flashing to indicate exit from program mode. New settings are saved.

24.3.2 Low Temperature Alarm

NOTICE The Low Alarm Setpoint is not used in Helmer freezers.

24.4 Temperature Calibration Setpoints

View setpoints:

1. Hold **Up Arrow** and **Down Arrow** for three seconds. MONITOR lamp will flash to indicate entry into program mode.
2. Press **SEL** until desired setting appears.
3. Observe the setting.
4. To view another setting, press **SEL** again (optional).
5. Hold **Up Arrow** and **Down Arrow** for three seconds. MONITOR lamp stops flashing to indicate exit from program mode.

Flashing Lamp	Selected Setting
HIGH TEMP and MONITOR	High temp alarm setpoint
LOW TEMP and MONITOR	Low temp alarm setpoint
MONITOR only	Monitor offset
CONTROL only	Control sensor offset
CONTROL only	Control hysteresis

24.4.1 Monitor Offset

- ► Adjust if temperature displayed on the monitor does not match measured chamber temperature.
- ► Value is factory-set to match an independent thermometer.
- ► Value can be changed from -10.0 °C to +10.0 °C.

NOTE

- ► If the variance is within acceptable limits, changing the offset value is optional.
- ► Probes in the bottle are connected to the monitoring system and sense chamber temperature. These probes do not affect freezer setpoint.

Obtain:

- ► Independent thermometer, calibrated and traceable per national standards.
- ► Tape, to attach thermometer to temperature probe.

Measure the chamber temperature:

1. Remove the probe from the probe bottle.
2. Unscrew the cap from the bottle.
3. Tape the thermometer to the temperature probe, and place them in the bottle. The probe and thermometer should be immersed at least 2” (50 mm).
4. Close the door and allow the chamber temperature to stabilize for 10 minutes.
5. Observe and note the thermometer temperature.
6. Remove thermometer and probe from bottle and remove tape.
7. Replace bottle cap, ensuring a tight fit.
8. Place the probe in bottle, immersing at least 2” (50 mm).

Enter the new offset value:

- ► Lower the offset value to lower the displayed monitor temperature.
- ► Raise the offset value to raise the displayed monitor temperature.

EXAMPLE

- ► Measured temperature (at the probe bottle) is -30.0 °C
- ► Displayed temperature is -28.0 °C
- ► Offset adjustment value is -2.0 °C

1. Hold **Up Arrow** and **Down Arrow** for three seconds. MONITOR lamp will flash to indicate entry into program mode.
2. Press **SEL** until only the MONITOR lamp flashes.
3. Hold **SET**, then press **Up Arrow** or **Down Arrow** to change the setpoint.
4. Release **SET** button.
5. Hold **Up Arrow** and **Down Arrow** for three seconds. MONITOR lamp stops flashing to indicate exit from program mode. New settings are saved.

24.4.2 Control Sensor Offset

The temperature controller senses chamber temperature through a probe in the unit cooler. The chamber setpoint typically varies from the measured temperature, so an offset value is used by the control system to compensate for the difference.

- ► Value is factory-preset and varies for each unit
- ► Offset value can be changed from -10.0 °C to +10.0 °C

NOTICE Control Sensor Offset is factory-preset and should not be changed unless directed by Helmer Technical Service.

24.4.3 Hysteresis

- ► Default setpoint is 2.0 °C
- ► Allowable temperature variance on each side of the freezer setpoint.

NOTICE Hysteresis is factory-preset and should not be changed unless directed by Helmer Technical Service.

24.5 Test Alarms

Test alarms to ensure they are working correctly. The freezer has alarms for chamber temperature, power failure, and door open (time).

NOTICE Before testing alarms, protect items in freezer from extended exposure to adverse temperature.

24.5.1 Chamber Temperature Alarm

- ► Independent thermometer, calibrated and traceable per national standards
- ► (1) 4 oz. (120 mL) glass of product simulation solution (1:1 ratio of water to propylene glycol or equivalent low-temperature fluid).

NOTICE Temperature probes are fragile; handle with care.

Test the high alarm:

1. Identify setting for high alarm setpoint.
2. Immerse the independent thermometer in the glass of product simulation solution.
3. Place the glass in the freezer and close the door.
4. When the glass contents have stabilized at the chamber temperature, remove the glass from the freezer.
5. While stirring probe in product simulation solution, allow the glass contents to warm up to room temperature and observe the temperature on the monitor.
6. When high temperature alarm is activated, note the temperature on the independent thermometer.
7. Remove the probe from the glass.
8. Place probe in probe bottle, immersing it at least 2” (50mm).

24.5.2 Power Failure Alarm

1. Switch AC ON/OFF switch **OFF**. Power failure alarm will activate immediately and “PoFF” (power off) will appear on the display.
2. Switch AC ON/OFF switch **ON**. Power failure alarm will cease and “PoFF” will clear from the display.

24.5.3 Door Open Alarm

- ► Factory-set to three minutes.
- ► Value can not be changed.

NOTICE Before testing alarms, protect items in freezer from extended exposure to adverse temperature.

Test the alarm:

1. Open freezer door and note the time.
2. After three minutes, audible alarm will activate and DOOR ALARM lamp will flash.
3. Close freezer door. Audible door open alarm will cease and DOOR ALARM lamp will stop flashing.

25 Maintenance

NOTICE

- ► Before performing maintenance, protect items in freezer from extended exposure to adverse temperature.
- ► Allow freezer temperature to stabilize at setpoint after performing service or after extended door opening.

NOTE Refer to the operation manual for the preventive maintenance schedule.

25.1 Recharge Refrigerant

CAUTION

- ► Review all safety instructions prior to recharging refrigerant. Refer to chapter **2** (Safety).
- ► Maintenance should only be performed by trained refrigeration technicians.

NOTICE Use only non-CFC R-404A refrigerant.

Full initial refrigerant charge varies by model and power requirements, which can be found on the product specification label.

Model	Initial Charge
120/125	29.0 oz. (822 g)

Obtain:

- ► Refrigerant
- ► Calibrated pressure gauge (0 psi to 220 psi (0 kPa to 1520 kPa))

Add refrigerant:

1. Attach pressure gauge to the fittings on the refrigeration lines.
2. Monitor the low side (suction) pressure through a full compressor cycle.
3. Measure the pressure at the end of the next cycle, immediately before the compressor stops.

NOTE Pressure varies depending on ambient air temperature.

4 Add refrigerant. Check the pressure on the low side and high side.

Models with TXV expansion valve:

- ► Low side = 2 psi to 4 psi (14 kPa to 28 kPa)
- ► High side = 170 psi to 220 psi (1172 kPa to 1520 kPa)

Models with capillary tube:

- ► Low side = 4 psi to 7 psi (30 kPa to 50 kPa)
- ► High side = 100 psi to 220 psi (690 kPa to 1520 kPa)

5 Remove pressure gauge.

25.2 Test Monitoring System Backup Battery

The monitoring system does not indicate the charge level of the battery. Regularly test the battery. Replace battery if the test fails or if the battery has been in use for one year.

Test the battery:

1 Switch the AC ON/OFF switch **OFF**.

a Display should continue to display information.

b If the display is blank, replace battery.

2 Switch AC ON/OFF switch **ON**.

25.3 Replace Monitoring system Backup Battery

On the top of the freezer, remove the battery and replace with a new battery.

NOTICE When installing a replacement battery, use only a battery which meets the specifications outlined in chapter **25.6** (Supplies).

25.4 Clean the Freezer

25.4.1 Condenser Grill

In environments where freezer is exposed to excessive lint or dust, condenser grill may require cleaning more frequently than stated in preventive maintenance schedule.

Clean the condenser grill using a soft brush and a vacuum cleaner.

25.4.2 External Drain Line Fan

Clean the external drain line fan using a soft brush and a vacuum cleaner.

25.4.3 Exterior

Clean exterior surfaces with soft cotton cloth and non-abrasive liquid cleaner.

25.4.4 Interior

Clean painted surfaces with mild detergent. Clean stainless steel surfaces with a general-purpose laboratory cleaner suitable for stainless steel.

25.4.5 Door Gaskets

Clean with soft cloth and mild soap and water solution.

25.4.5 Clean and Refill Probe Bottle

NOTE A kit that includes a probe bottle and propylene glycol is available from Helmer.

Obtain:

- ► Fresh water-bleach solution (not provided)
  - ► 1:9 ratio of bleach to water
  - ► Bleach is 5% solution of commercial sodium hypochlorite (NaOCl)
  - ► Equivalent oxidizing cleaner/disinfectant approved by your organization may be substituted
- ► 4 oz. (120 mL) of product simulation solution per bottle
  - ► 1:1 ratio of water to propylene glycol (or equivalent low-temperature fluid)

Clean and refill bottle:

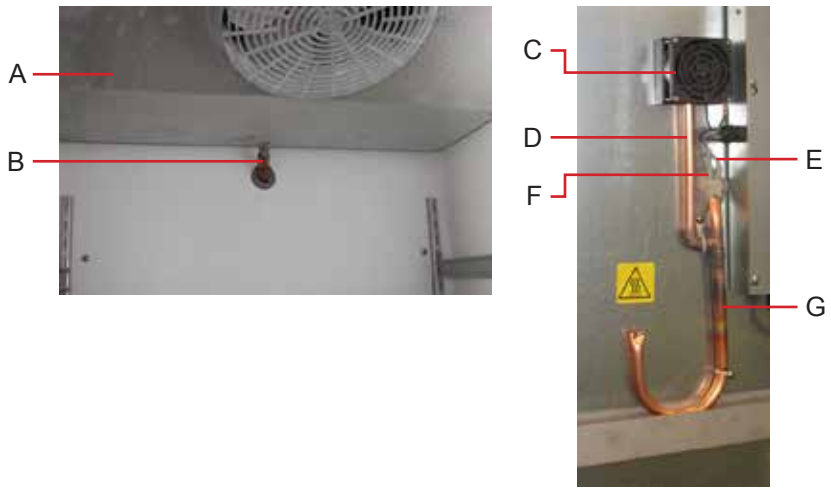
1. Remove probe from bottle.
2. Remove bottle from bracket.
3. Clean bottle with water-bleach solution.
4. Fill bottle with 4 oz. (120 mL) of product simulation solution.
5. Cap bottle tightly to minimize evaporation.
6. Place bottle in bracket.
7. Replace probe, immersing at least 2” (50 mm).

25.5 Unit Cooler Cover Removal and Installation

If unit cooler cover is not removed as detailed in this procedure the drain port may be damaged. Improper drainage may result in excessive icing and freezer's inability to maintain temperature.

Required tools:

- ► 5/16" socket wrench
- ► Tool to push putty away from the drain tube



Drain tube, fan, and heater components.

Label	Description
A	Unit cooler cover
B	Drain port
C	Drain fan
D	Fan tube
E	Heater wires
F	Heating element
G	Drain tube

25.5.1 Remove the Unit Cooler Cover

WARNING Disconnect the freezer from AC power when removing the unit cooler.

CAUTION The condensate evaporator and water evaporation tray are hot.

NOTICE
- ► Before removing the unit cooler cover, protect items in the freezer from extended exposure to adverse temperature.
- ► Allow freezer temperature to stabilize at setpoint after replacing unit cooler.

1. Disconnect the backup battery. Switch AC ON/OFF switch **OFF**. Disconnect the freezer from AC power.
2. Remove the top drawer, basket, or shelf from the chamber.

NOTE For HHPF models, remove the Cold-Shield™ panel. Loosen three screws securing the panel to the cabinet then slide the panel to free it from the screws.

3. On the back of the cabinet, peel the putty back to expose the drain tube (G) and drain heater (F).
4. Verify the heating element is cool. Remove the screws and loosen the pipe straps securing the drain tube to the cabinet.
5. Remove the drain heater from the drain tube.
6. Remove the drain tube (G) by pulling it downward. The drain tube should separate from the fan tube (D) at the 90° elbow, leaving the fan tube (D) attached to the fan (C).
   - **a** Separate the drain hose inside the cabinet from the unit cooler drain port (B).
   - **b** Gently twist the drain hose from left to right to separate it from the unit cooler drain port.
   - **c** Pivot the drain tube and drain hose upward then remove the assembly from the cabinet.
7. Remove the unit cooler cover (A).
   - **a** Hold unit cooler cover in place to prevent it from dropping.
   - **b** Use the socket wrench to remove four screws securing the unit cooler cover.
   - **c** Carefully lower unit cooler cover to avoid damage to the fan wiring.

25.5.2 Install the Unit Cooler Cover

1. Verify unit cooler wiring is connected and routed correctly.
   - **a** Wiring should be routed above copper tube inside the unit cooler.
   - **b** Reconnect wires if they have separated.
2. Attach unit cooler cover.
   - **a** Lift unit cooler cover into place.
   - **b** Front edge of the cover should be behind the unit cooler case.
   - **c** Use the socket wrench to install four screws to secure the unit cooler cover.
3. Insert the drain tube and drain hose through the hole in the cabinet.
   - **a** Push drain tube and drain hose upward at an angle, toward the unit cooler drain port.
   - **b** Pivot the drain tube and drain hose downward then push the assembly upward.
   - **c** In the chamber, push the drain hose onto the drain hose.
4. Attach the drain tube to the fan tube.
5. Insert the drain line heater in the drain tube.
   - **a** Insert the heater at an upward angle.
   - **b** The black heating element should no longer be visible.
6. On the back of the cabinet, press putty around the drain tube and drain line heater.

7 Reinstall top drawer, basket, or shelf.

NOTE For HHPF models, reinstall the Cold-Shield™ panel.

8 Reattach the pipe straps to secure the drain tube to the cabinet.

9 Reconnect the freezer to AC power. Switch AC ON/OFF switch **ON**. Reconnect the backup battery.

10 Press the **MUTE button** to disable the high temperature alarm while freezer reaches operating temperature.

25.6 Supplies

Refrigerant: non-CFC, R-404A

Chart paper: 220419 (52 sheets)

Propylene glycol solution: 400922-2

Monitoring system battery: (1) 9 V, non-rechargeable lithium battery (or equivalent): 120399

Chart recorder battery (optional): (1) 9 V non-rechargeable alkaline (or equivalent): 120218

26 Troubleshooting

CAUTION
- ► Review all safety instructions prior to troubleshooting. Refer to chapter **2** (Safety).
- ► Troubleshooting should only be performed by trained refrigeration technicians.

26.1 General Operation Problems

Problem	Possible Cause	Action
Drawer does not slide easily.	Debris in the slides.	► Pull the drawer out and confirm the slides are free of debris. Clean if necessary.
	Ice buildup in the slides.	► Pull the drawer out and confirm slides are free of ice. De-ice and clean if necessary.
	Drawer is misaligned or not level.	► Confirm both slides for the drawer are mounted at the same height.
	A drawer slide is faulty.	► Confirm the slide is operating correctly. Replace if necessary.
Door does not open easily.	Debris in the hinges.	► Confirm the hinges are free of debris. Clean the hinges if necessary.
	Door hinges are not lubricated.	► Using a general-purpose grease, lubricate the pivots in the hinges.
	Hinge cam is faulty.	► Confirm the hinge cam is not damaged. Replace if necessary.

26.2 Chamber Temperature Problems

Problem	Possible Cause	Action
"Prob" appears on the display, but the chamber temperature is set correctly.	Connections for the chamber temperature probe are loose.	► Test the probe connections. Secure the connections if necessary.
	Temperature probe wiring is an open circuit.	► Check the continuity of the probe wiring and connections. Secure the connections or replace the probe if necessary.
Compressor runs continuously.	Freezer setpoint is set too low.	► Confirm the setpoint is set within the operating range. Change the setpoint if necessary.
	Temperature control probe is faulty.	► Replace the probe if necessary.
	Temperature controller is faulty.	► Confirm the temperature controller is operating correctly. Replace the board(s) if necessary.
	Solid state relay is faulty.	► Confirm the relay is operating correctly. Replace it if necessary.
Chamber temperature does not stabilize at the freezer setpoint.	Compressor starting relay is faulty.	► Confirm the relay is operating correctly. Replace the relay if necessary.
	Monitor/control board is faulty.	► Confirm the monitor/control board or temperature/defrost controller is operating correctly. Replace the board or controller if necessary.
	Compressor fan is not running.	► Check the compressor fan connections. Replace the fan motor if necessary.
	Unit cooler fan is not running.	► Activate the door switch then check the voltage to the fan. Replace the fan motor or door switch if necessary.
	Refrigerant level is too low.	► Check the refrigerant level. Recharge the refrigerant if necessary.
	Compressor motor has seized.	► Replace the compressor.
	Temperature control probe is faulty.	► Replace the probe if necessary.
	Condenser grill is dirty.	► Check the condenser grill. Clean it if necessary.
	Circulation at the top of the chamber is not adequate.	► Check if there are any items that may obstruct air flow and remove them if necessary. ► Check the unit cooler fan is working. If the fan is not working, contact a qualified service technician.
	Ambient air temperature around the freezer is too high.	► Confirm the freezer is placed appropriately.
	A component is faulty or internal connections are loose.	► Contact a qualified service technician.
	Evaporator is covered with ice and is not exchanging heat.	► Check for ice buildup on the evaporator. Shine a flashlight into the fan opening on the unit cooler and check for ice buildup. Also, feel behind the unit cooler for ice buildup. If there is significant ice buildup in either area, defrost the freezer.

26.3 Alarm Activation Problems

Problem	Possible Cause	Action
Freezer is in an alarm condition, but alarms are not audible.	A component is faulty or internal connections are loose.	► Confirm the circuit board and line connections are functioning correctly.
	Alarm buzzer is faulty.	► Replace the alarm buzzer.
Alarm monitor is not responding.	Digital electronics are locked because of an interruption in power.	► Reset the monitoring system.
Chamber temperature meets the high alarm condition, but the high temperature alarm is not active.	High temperature alarm setpoint was changed.	► Check the current setpoint for the high temperature alarm. Change the setpoint if necessary.
Freezer meets an alarm condition, but the appropriate alarm is not active.	Alarm setpoint was changed.	► Check the current setpoints for the alarms. Change the setpoints if necessary.
	A component is faulty or internal connections are loose.	► Contact a qualified service technician.
High Temperature alarm activates when the door is opened, then clears shortly after the door is closed.	Connections for the chamber temperature probe are loose.	► Test the probe connections. Secure the connections if necessary.
	Chamber temperature probe is faulty.	► Test the probe. Replace the probe if necessary.
	Unit cooler fan continues to run while the door is open.	► Test the door switch and unit cooler fan connections. Secure the connections if necessary. Replace the door switch or fan motor if necessary.
	Probe bottles are empty.	► Check the level of product simulation solution in the bottles. Refill the bottles if necessary.
	A component is faulty or internal connections are loose.	► Contact a qualified service technician.
	High temperature alarm setpoint is set too low.	► Check the setpoint. Change the setpoint if necessary.
Freezer is connected to power and turned on, but the AC Power Failure alarm is active.	Outlet connection is faulty.	► Verify power at the outlet. Repair the original outlet or connect to a different outlet if necessary.
	Circuit breaker was tripped.	► Confirm the circuit breaker is seated. Push the circuit breaker to reset it if necessary.
	Power cord is faulty.	► Confirm the power cord is connected securely. Secure the power cord if necessary.
	A component is faulty or internal connections are loose.	► Contact a qualified service technician.

Problem	Possible Cause	Action
Door Open alarm is activating sporadically.	Door is not closing completely.	► Confirm the door is aligned, and the hinge cams are not damaged. Replace if necessary.
	Door is closing but not sealing completely.	► Confirm the door gasket seals completely. Replace the door gasket if necessary.
	Connections for the door switch are faulty.	► Test the switch connections. Secure the connections if necessary.
	Door switch is faulty.	► Replace the door switch.
	A component is faulty or internal connections are loose.	► Contact a qualified service technician.
All alarms are activating sporadically.	Alarm system is faulty.	► Confirm the circuit board and line connections are functioning correctly.
	A component is faulty or internal connections are loose.	► Contact a qualified service technician.
An alarm activated, but the temperature recorded at activation does not match the alarm setpoint.	Temperature changed slightly around the time of activation.	► No action needed.
High Temperature alarm is activating sporadically.	Upper chamber temperature probe is not immersed in the product simulation solution.	► Confirm the probe bottle is full of solution, and the probe is placed in it correctly.
	A component is faulty or internal connections are loose.	► Contact a qualified service technician.
	Upper chamber temperature probe is not calibrated.	► Confirm the upper temperature probe is reading correctly. Calibrate the probe if necessary.

26.4 Condensation Problems

Problem	Possible Cause	Action
Excessive water in the water evaporation tray.	Heater in the evaporation tray is faulty.	► Confirm the heater is hot and is drawing the appropriate current (approximately 0.21 A to 0.35 A). Replace the heater if necessary.
	Humid air is entering the chamber.	► Confirm the freezer is level, and the door is aligned, closing tightly, and sealing correctly. Contact a qualified service technician to correct issues as necessary.

Problem	Possible Cause	Action
Excessive ice in the chamber.	Humid air is entering the chamber.	► Confirm the freezer is level, and the door is aligned, closing tightly, and sealing correctly. Correct issues as necessary.
	Drain port on the unit cooler was damaged during removal of the unit cooler cover.	► Confirm the drain port on the unit cooler is intact.
	External drain fan is faulty.	► Confirm the external drain fan is running. Hold a piece of paper in front of the fan and check that the paper is being drawn toward the freezer. ► Confirm the connections are secure. Tighten the connections if necessary. ► Replace the external drain fan.
	Connection between the unit cooler and the drain line is loose.	► Confirm the connection is secure. Contact a qualified service technician to tighten the connection if necessary.
	Drain line is plugged.	► Confirm the drain tube is free of debris. Remove debris if necessary.
	External drain fan is not running.	► Confirm the external drain fan is running. Contact a qualified service technician to correct issues as necessary.
	Evaporator is covered with ice and is not exchanging heat.	► Check for ice buildup on the evaporator. Shine a flashlight into the fan opening on the unit cooler and check for ice buildup. Also, feel behind the unit cooler for ice buildup. If there is significant ice buildup in either area, defrost the freezer.
Excessive humidity on the door.	Humid air is entering the chamber.	► Confirm the freezer is level, and the door is aligned, closing tightly, and sealing correctly. Correct issues as necessary.
	Relative humidity around the freezer is too high.	► Confirm the freezer is placed appropriately.

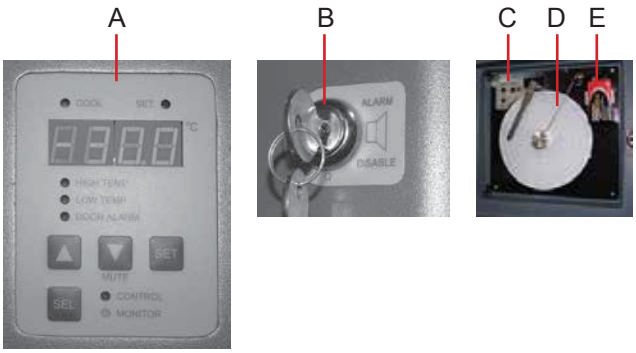
Problem	Possible Cause	Action
After defrosting, no water flows into the water evaporation tray.	Drain line heater is faulty.	► Confirm the connections are secure. Tighten the connections if necessary. ► Confirm the drain line heater is warm to the touch. Replace the heater if necessary.
	Defrost heater on the evaporator in the unit cooler is faulty.	► After defrosting the freezer, monitor the evaporator for repeated ice buildup. ► Confirm the connections are secure. Tighten the connections if necessary. ► Confirm the drain line heater is hot and is drawing the appropriate current during a defrost event (approximately 3.9 A to 5.5 A). ► Replace the heater if necessary.
	Not enough time has elapsed since the end of the defrost cycle.	► Wait until approximately 20 minutes after the defrost cycle has ended.
	Drain line is plugged.	► Confirm the drain tube is free of debris. Remove debris if necessary.
	Defrost heater on the evaporator in the unit cooler is not working.	► Check for ice buildup on the evaporator. Shine a flashlight into the fan opening on the unit cooler and check for ice buildup. Also, feel behind the unit cooler for ice buildup. If there is significant ice buildup in either area, defrost the freezer.

27 Parts

NOTICE

- ► Before replacing parts, protect items in freezer from extended exposure to adverse temperature.
- ► Allow freezer temperature to stabilize at setpoint after replacing parts or after extended door opening.

27.1 Front



Front features (HLF120 model shown).

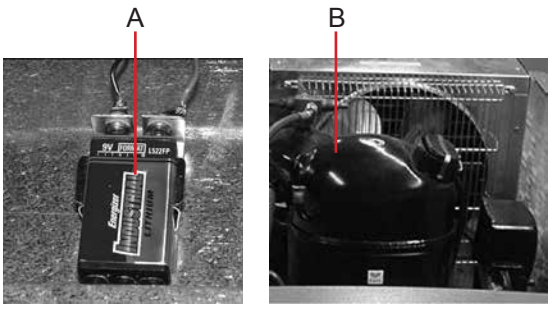
Label	Description	Part Number	Schematic Label
A	Laboratory display	Refer to subsequent section(s) for part numbers	L
B	Alarm key switch	120227	W
C	Chart recorder	400409-6	X
D	Chart paper (52 sheets)	220419	-
E	Chart recorder backup battery (9 V alkaline, non-rechargeable)	120218	AD
Not shown	Caster (swivel with brake)	Serial number 974891 and earlier: 220380 Serial number 974892 and later: 220467	-

27.1.1 Laboratory Display

Left: Laboratory display with touchpad. Right: Rear view of display showing monitor/control board.

Label	Description	Part Number	Schematic Label
A	Monitor/control board	120402	L

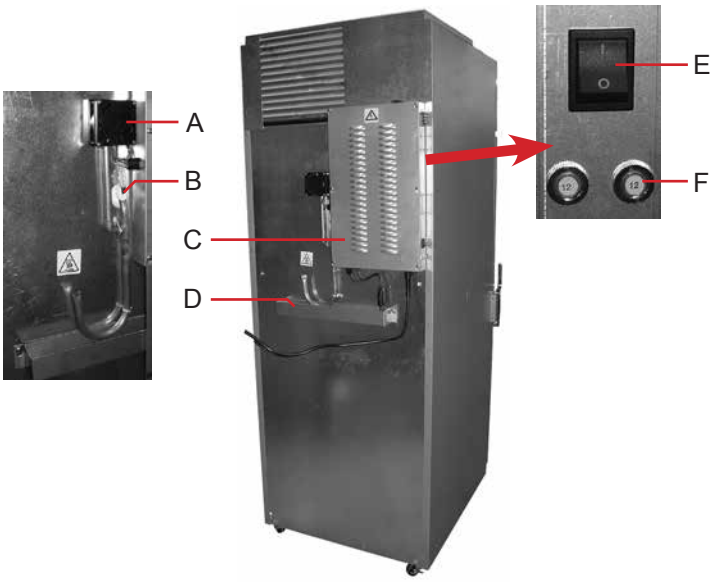
27.2 Top



Top features (HLF120 model shown).

Label	Description	Part Number	Schematic Label
A	Monitoring system backup battery	120399	AE
B	Compressor unit	Contact Helmer Technical Service	A
Not shown	Condensing unit fan motor	230 V 60 Hz: 120493 230 V 50 Hz: 120515	U
	Solenoid valve	220547	Y
	Solenoid coil	120647	AJ

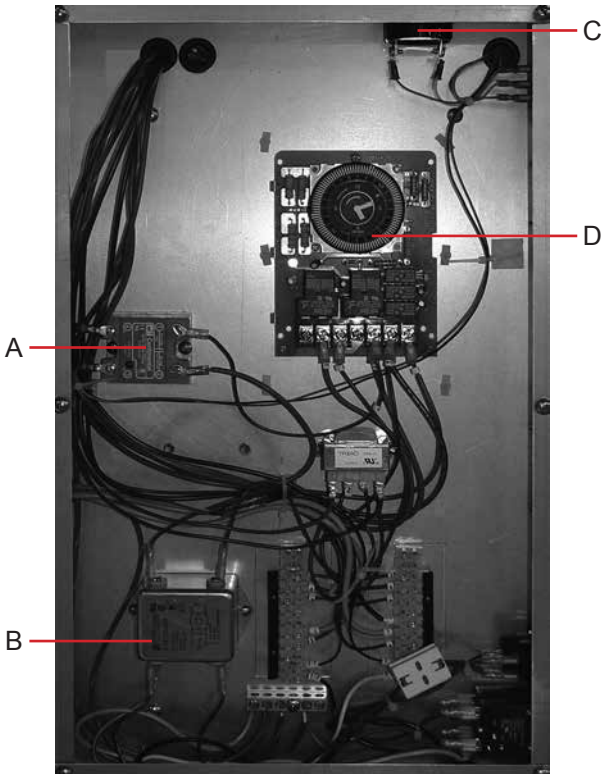
27.3 Rear



Rear features (HHPF120-4 model shown).

Label	Description	Part Number	Schematic Label
A	External drain fan	120511	Z
B	Drain line heater	120485	O
C	Electrical box	Refer to subsequent section(s) for part numbers	-
D	Condensate evaporator kit (Includes the condensate evaporator and water evaporation tray)	400790-2	J
E	Main power switch	120478	Q
F	Circuit breaker, 12 A	120220	P

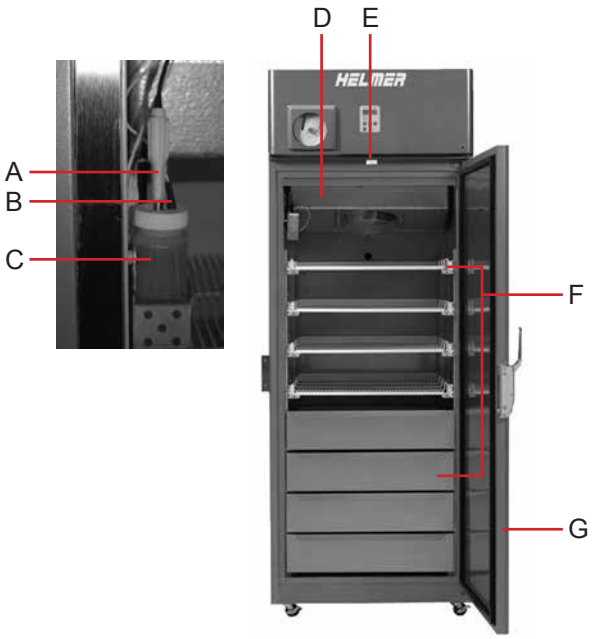
27.3.1 Electrical Box



Electrical box features (HLF120 model shown).

Label	Description	Part Number	Schematic Label
A	Compressor relay	120426	AA
B	Power line filter	120400	AK
C	Alarm buzzer	120160	D
D	Defrost controller	800200-1	F

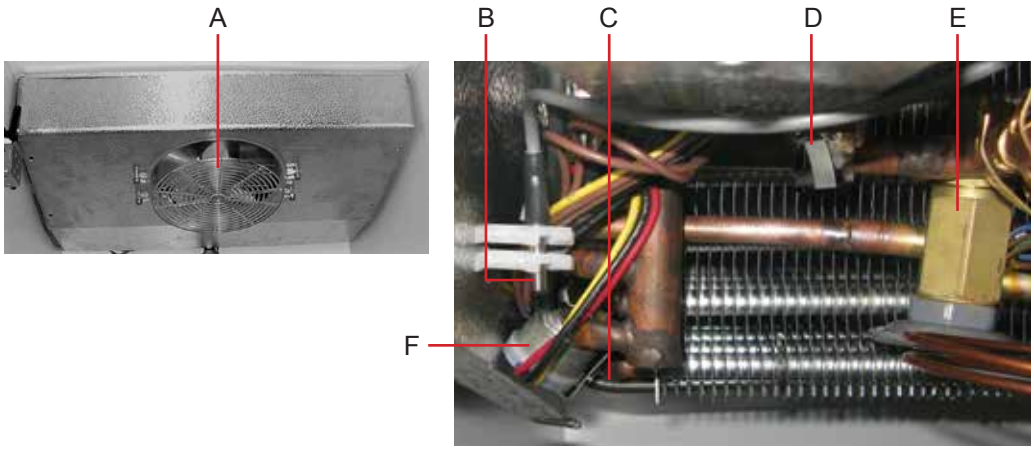
27.4 Interior



Interior features (HHPF120-4 model shown).

Label	Description	Part Number	Schematic Label
A	Chart recorder probe	400855-1	AI
B	Chamber probe	400512-1	AB
C	Probe bottle and propylene glycol kit	400922-2	-
D	Unit cooler	Refer to subsequent section(s) for part numbers	AG
E	Door switch	120380	I
F	Storage parts	Refer to subsequent section(s) for part numbers	-
G	Door	Refer to subsequent section(s) for part numbers	-
Not shown	Mullion heater (located under strike plates)	120481	C
	Strike plate replacement kit Includes strike plates with pre-applied foam tape, foil tape, and replacement instructions	400687-1	-

27.4.1 Unit Cooler



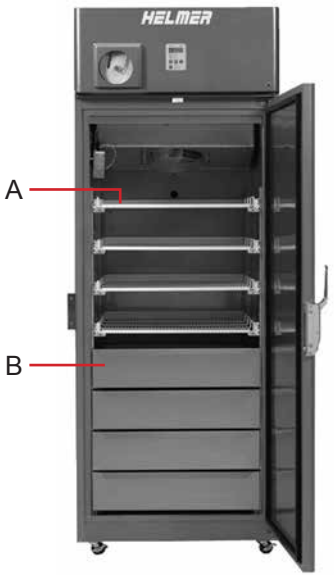
Left: Unit cooler. Right: Unit cooler interior.

Label	Description	Part Number	Schematic Label
A	Unit cooler fan blade	Serial number 982859 and earlier: 220447 Serial number 982860 and later: 220497	-
B	Temperature control probe	400511-1	G
C	Defrost heater	Serial number 982859 and earlier: 120494 Serial number 982860 and later: 120567	R
D	Defrost heater limit thermostat	Serial number 982859 and earlier: 120492 Serial number 982860 and later: 120566	S
E	TXV (expansion) valve	220495	-
F	Fan delay for defrost termination thermostat (HLF models)	Serial number 982859 and earlier: 120496 Serial number 982860 and later: 120568	-
Not shown	Unit cooler fan motor	Serial number 982859 and earlier: 120497 Serial number 982860 and later: 120548	H

NOTE

- ► Some freezers will include a capillary tube in place of the TXV valve.
- ► The part number for the capillary tube is 211117-1.

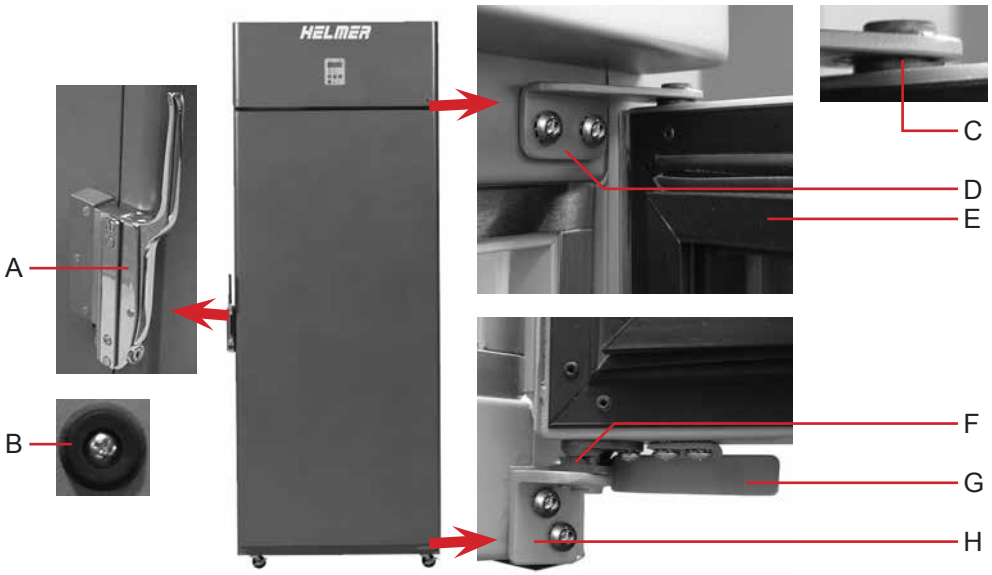
27.4.2 Storage



Storage features (HHPF120-4 model shown).

Label	Description	Part Number
A	Full shelf (includes hardware)	120 models: 400414-1 125 models: 400414-2
B	Drawer assembly (includes drawer, 2 slides, and hardware)	120 models: 400584-2 125 models: 400584-1
Not shown	Drawer slide assembly (right side)	120 models: 400541-3 125 models: 400541-1
	Drawer slide assembly (left side)	120 models: 400541-4 125 models: 400541-2
	Roll-out basket assembly (optional, includes basket, 2 slides, and hardware)	120 models: 400890-1 125 models: 400890-2
	Roll-out basket slide assembly (right side)	120 models: 400541-3 125 models: 400541-1
	Roll-out basket slide assembly (left side)	120 models: 400541-4 125 models: 400541-2
	Drawer slide wheel	320815-1
	Half shelf (includes hardware)	400413-1

27.4.3 Door and Hinge

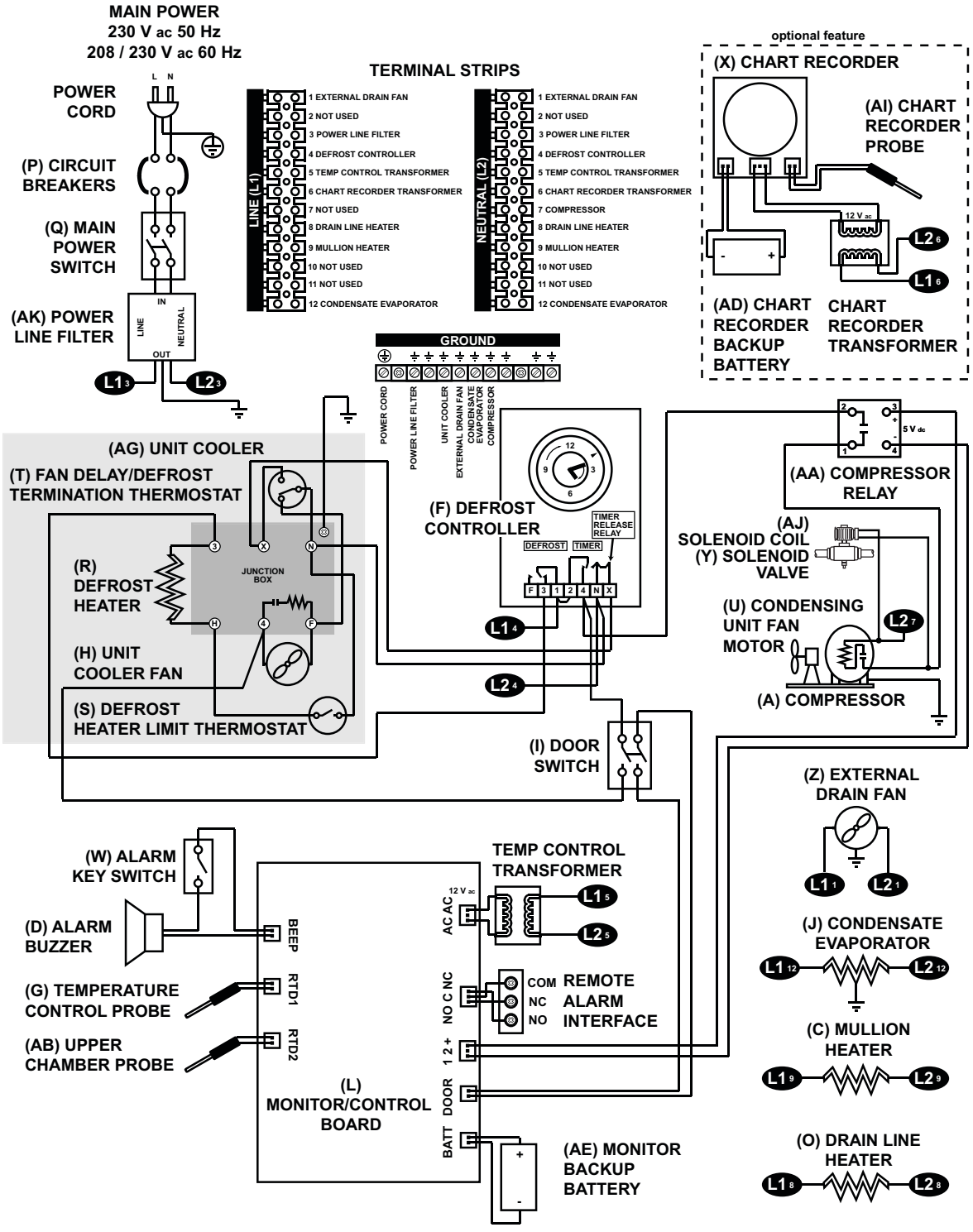


Door and hinge features (HLF120 model shown).

Label	Description	Part Number
A	Door handle with lock	220426
B	Door bumper	220441
C	Hinge bearing	220375
D	Upper hinge bracket	Right hinge: 400376-1 Left hinge: 400376-2
E	Door gasket	321271-1
F	Hinge cam	320742-1
G	Door stop	320763-1
H	Lower hinge bracket	Right hinge: 400377-1 Left hinge: 400377-2

28 Schematics

28.1 HLF and HHPF Models; 20 and 25 Cubic Feet



END OF MANUAL

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