Freezer Service and Maintenance Manual

i.Series® and Horizon Series™

Laboratory

i.Series
iLF120, iLF125

Horizon Series
HLF120, HLF125

Plasma Storage
i.Series
iPF120, iPF125

Horizon Series
HPF120, HPF125

360370/B

Document History

Revision	Date	CO	Supersession	Revision Description
A	4 OCT 2016	12140	n/a	Initial release (all units with serial numbers 2035000 and greater).
B	28 FEB 2018	13358	B supersedes A	Updated amperage data Updated parts tables to include Heatcraft Fan Motor for 230V units Updated schematics to include change to Access Control Keypad Updated Emergo address

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

Document Updates

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The screenshots and component images appearing in this guide are provided for illustrative purposes only, and may vary slightly from the actual software screens and/or product components.

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ISO 13485:2003 CERTIFIED

Part No. 360370/B

Contents

1 About this Manual

This manual provides information on how to use i.Series® and Horizon Series™ laboratory and plasma storage freezers. It is intended for use by end users of the freezer and authorized service technicians.

Models are indicated by a distinguishing model number that corresponds to the series, type, number of doors, and capacity of the freezer. For example, “iLF125” refers to an i.Series Laboratory Freezer with 1 door and a capacity of 25 cu ft, while “HLF125” refers to a Horizon Series Laboratory Freezer with 1 door and a capacity of 25 cu ft.

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, HPF125, iLF125, HLF125). This manual covers all upright freezers, which may be identified singly, by their size, or by their respective “Series.”

1.1 Safety Precautions and Symbols

Symbols found in this document

The following symbols are used in this manual to emphasize certain details for the user:

Task Indicates procedures which need to be followed.

Note Provides useful information regarding a procedure or operating technique when using Helmer Scientific products.

NOTICE Advises the user against initiating an action or creating a situation which could result in damage to equipment; person injury is unlikely.

CAUTION Advises the user against initiating an action or creating a situation which could result in damage to equipment or impair the quality of the products or cause minor injury.

WARNING Advises the user against initiating an action or creating a situation which could result in damage to equipment and serious personal injury to a patient or the user.

Manufacturer

Authorized representative in the European Community

Symbols found on the units

The following symbols may be found on the freezer or freezer packaging:

CE Mark (European units only)

Caution: Risk of damage to equipment or danger to operator

Caution: Hot surface

Caution: Shock / electrical hazard

Caution: Unlock all casters

Earth / ground terminal

Protective earth / ground terminal

Compliance with Restriction of Hazardous Substances Directive

Product falls under the scope of the WEEE (Waste Electrical and Electronic Equipment) directive.

Avoiding Injury

- Review safety instructions before installing, using, or maintaining the equipment.
- Do not open multiple, loaded drawers at the same time.
- Do not move a unit whose load exceeds 900 lbs (408 kg).
- Before moving unit, ensure casters are unlocked and free of debris.
- Never physically restrict any moving component.
- Avoid removing electrical service panels and access panels unless so instructed.
- Use manufacturer supplied power cords only.
- Using the equipment in a manner not specified by Helmer Scientific may impair the protection provided by the equipment.
- Ensure biological materials are stored safely, in accordance with all applicable organizational, regulatory, and legal requirements.

CAUTION

Decontaminate parts prior to sending for service or repair. Contact Helmer Scientific or your distributor for decontamination instructions and a Return Authorization Number.

1.2 Model and Input Power

Note

Service information varies depending on the model and power requirements.

Table 1. Model and Input Power

Model	Voltage	Frequency	Current Draw
120	115V	60 Hz	8.5 A
	230V	50 Hz	3.8 A
	230V	60 Hz	4.3 A
125	115V	60 Hz	8.5 A
	230V	50 Hz	3.8 A
	230V	60 Hz	4.3 A

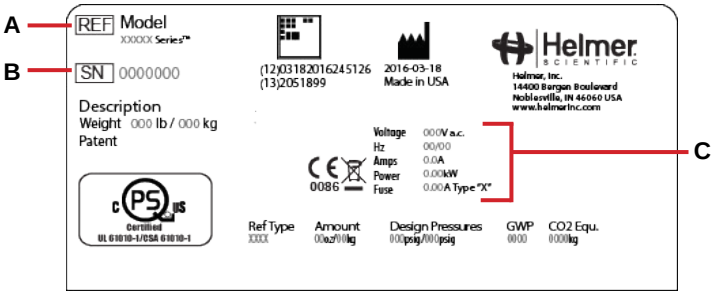
** Amperage values are subject to change. Refer to the product specification label on your unit for current values.*

1.3 Product Labels

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

Note

Information contained in the specification label varies depending on the model and power requirements.



Sample Specification label.

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

i.Series Information

2 Installation and Configuration

2.1 Location Requirements

- Grounded outlet meeting the electrical requirements listed on the product specification label.
- Clear of direct sunlight, high temperature sources, and heating and air conditioning vents.
- Minimum 3” (76 mm) of space behind unit.
- Meets limits specified for ambient temperature (15 °C to 32 °C) and relative humidity.

2.2 Placement and Leveling

CAUTION

To prevent tipping, ensure the casters are unlocked, leveling feet (if installed) are lifted, and the doors are closed before moving the freezer.

1. Move freezer into place. Lock casters if installed.
2. Ensure freezer is level.

Note

- Helmer recommends the use of leveling feet.
- Leveling feet (if installed) must be adjusted to provide unit cooler drainage.

2.3 Connect Back-Up Power

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

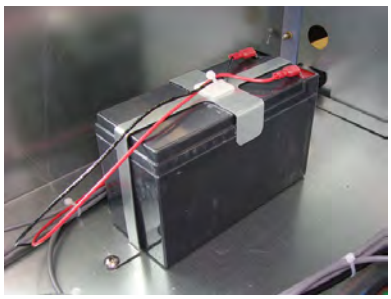
Battery life varies by manufacturer as well as voltage level remaining. Providing full power is available and no battery-related alarms are active, back-up power for the monitoring system is available for up to 20 hours. Providing full power is available, back-up power for the optional Access Control system is available for up to 2.5 hours.

CAUTION

Before installing or replacing batteries, switch AC power and back-up battery switch OFF. Disconnect freezer from AC power.

Notes

- The optional Access Control system uses the monitoring system back-up battery for back-up power in the event of power failure.
- The monitoring system will start on back-up battery power alone. If the freezer was not previously connected to AC power and the back-up battery is switched on, the monitoring system will begin running on back-up power.
- If AC power is lost, the monitoring system will automatically disable some features to prolong back-up battery power. Data collection will continue until back-up power is depleted.



Monitoring system back-up battery.

2.4 Prepare for Monitoring

The battery is located on the top of the freezer and is switched off for shipping. Switch battery on to provide monitoring system with back-up power in the event of AC power failure.

Temperature Probes

Notes

- Temperature probes are fragile; handle with care.
- The number and location of probes varies by model
- Remote probes may also be introduced through the existing top port and immersed in existing probe bottles.

The probe bottle along with a container of propylene glycol have been provided with this unit. The propylene glycol is mixed with water to create a solution which simulates the product stored in the freezer. The product simulation solution temperature reflects the product's temperature during normal operation.

The probe bottle should contain 4 oz. (120 mL) of product simulation solution at a 1:1 ratio of water to propylene glycol.

Probe bottle with temperature probes

Top access port

Fill Probe Bottle

1. Remove all probes from bottle and remove bottle from bracket.
2. Remove cap and fill with 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.

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.

Chart Recorder (if included)

Notes

- If chart recorder has been operating on battery power, the battery should be replaced to ensure the back-up source has proper charge.
- For complete information, refer to the Temperature Chart Recorder Operation and Service Manual included with the unit.

The chart recorder has a back-up 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, back-up power for the temperature chart recorder is available for up to 14 hours.

Prior to use:

Place probe in bottle with primary monitor probe.

Set Up and Operation

Access chart recorder by pressing and releasing the door.

Install Battery

Connect the leads to the battery to provide back-up power to the chart recorder.

Install / Replace Chart Paper

Notes

- For accurate temperature reading, ensure the current time is aligned with the time line groove when chart knob is tightened
- Contact Helmer Customer Service to reorder chart paper; part number 220419 (52 sheets).

Chart recorder stylus and time line groove

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 is fully tightened. *(Failure to fully tighten the knob can result in paper slipping and losing time.)*
6. Press and hold **C** button. When stylus begins to move right, release button.
7. Confirm stylus is marking on paper and stops at the correct temperature.
8. Calibrate chart recorder to match primary temperature if needed and close recorder door.

External Monitoring Devices

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.

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 and may cause damage to the control board or result in injury to the user.

The terminal on the remote alarm interface have the following maximum load capacity:

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

Connect to Remote Alarm Interface

1. On the electrical box, locate the remote alarm terminals.
2. Connect remote alarm wires to appropriate terminals, according to requirements for your alarm system.
3. Use a cable tie to relieve strain on alarm wires (as necessary).

2.5 Configure Storage

CAUTION

- Before moving drawers, ensure they are completely empty for safe lifting.
- Maximum basket, drawer, or shelf load is 100 lbs (46 kg).

Note

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

Product Loading Guidelines

When loading your freezer, take care to observe the following guidelines:

- Never load freezer beyond capacity.
- Always store items within shelves, drawers or baskets.
- Temperature uniformity is maintained by air circulation, which could be impeded if unit is overfilled, particularly at the top or back. Ensure proper clearance is provided below the fan.

Note

Products stacked against back wall may obstruct air flow and affect performance of unit.

Drawers and Baskets

Remove Drawer or Basket

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

Install a Drawer or Basket

1. Align end guides on drawer or basket with the slides.
2. Gently push drawer or basket into chamber until it stops.
3. Pull drawer or basket out until it stops; check for smooth operation.

Move Drawer Slides

1. Using a screwdriver, remove front bracket retainers.
2. Tap front brackets upward to disengage standards.
3. Remove slides from standards.
4. Insert slides into standard at appropriate height.
5. Tap front brackets downward to engage standards.
6. Using a screwdriver, install front bracket retainers.

Shelves

Remove 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 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.

Move Shelf Brackets

1. Using a screwdriver, remove front bracket retainers.
2. Tap front brackets upward to disengage standards.
3. Remove front brackets from standards.
4. Insert front brackets into standard at appropriate height.
5. Tap front brackets downward to engage standards.
6. Using a screwdriver, install front bracket retainers.

2.6 Optional Adapter Kits for Medication Dispensing Locks

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

3 Controls

i.Series models are equipped with the i.C³ monitoring and control system. The i.C³ system combines temperature control and monitoring into a single user interface.

Note

Please refer to the i.C³ User Guide for complete information regarding the i.C³ User Interface.

3.1 Home Screen and Screensaver

The Home Screen is the default screen and is displayed when:

- The Home icon is touched from any other screen.
- There is no interaction for two minutes on most screens other than those used to enter a password.

Home Screen

Screensaver

3.2 Home Screen Functions

Note

Refer to the i.C³ User Guide for options available on all i.C³ screens.

- View current interior cabinet temperature readings
- View min/max temperature occurance for a specified time period
- View the current system time and date
- Access any of the five homescreen applications (touch **i.C³ APPS** for additional applications)
- View information about current alarm events
- View whether the monitoring system is running on battery power
- Mute audible alarms
- View a graph of the chamber temperature
- View unit ID
- Shortcut to Event Log

3.3 Alarm Reference

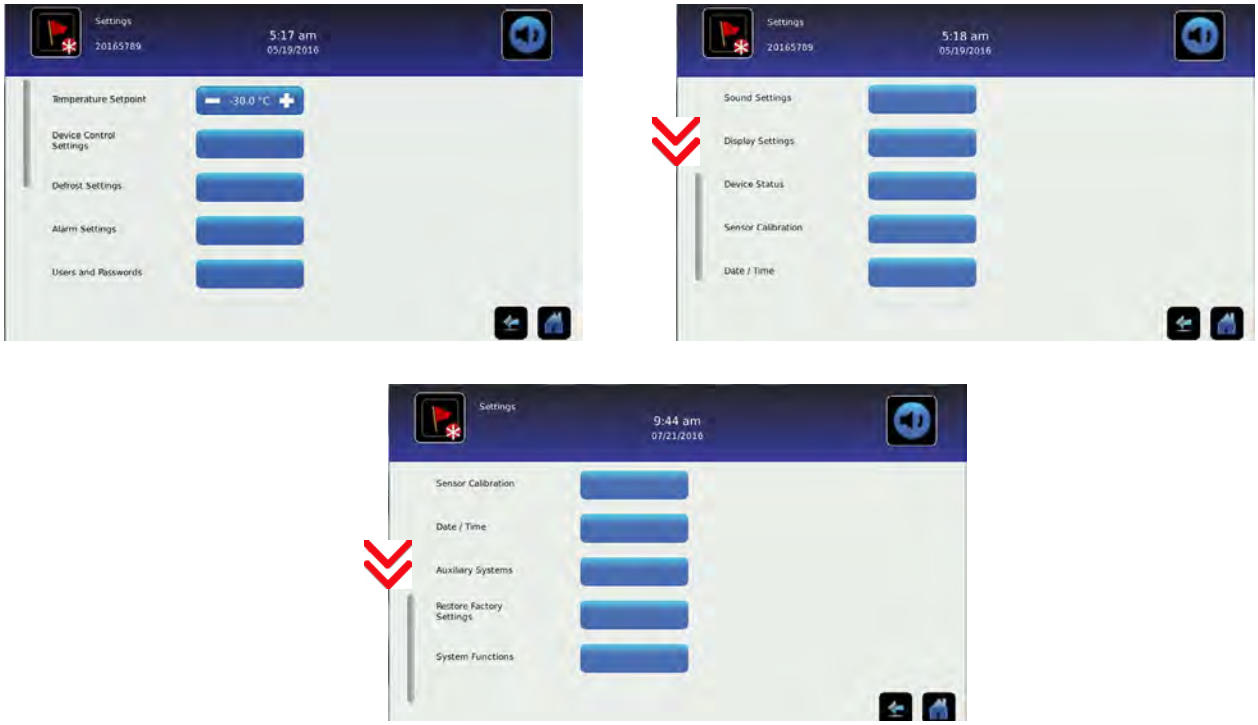
If an alarm condition is met, an alarm activates. Some alarms are visual only; others are visual and audible. Some alarms are sent through the remote alarm interface. The table indicates if an alarm is audible (A), visual (V), or sent through the remote alarm interface (R).

Table 2. i.Series Alarm Reference

Alarm	Alarm Type	Alarm	Alarm Type
High Temperature	A, V, R	Low Battery	V
Low Temperature	A, V, R	No Battery	A, V, R
Compressor Temperature	A, V, R	Probe Failure	A, V, R
Door Open (Time)	A, V, R	Communication Failure	A, V, R
Power Failure	A, V, R		

3.4 Settings

Through the i.C³ monitoring and control system, current settings may be viewed and changed. To view settings, touch **i.C³ APPS**, **Settings**. Use a touch-drag motion to scroll up or down to display additional settings.



Settings screens

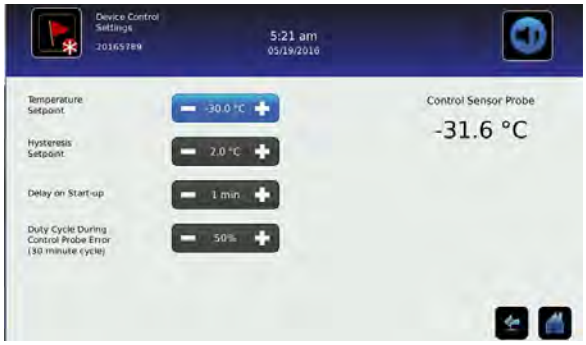
Note

- If the Settings screen is password protected enter appropriate password. If viewing settings for the first time, enter factory default password of “1234”.
- Default values for general settings, alarm settings, and display settings are available in the i.C³ User Guide.
- Changing temperature settings affects the operation of the freezer. Do not change settings unless instructed in product documentation or by Helmer Technical Service.

The i.C³ temperature monitor and controller is programmed at the factory. To change a setting, first enter the Settings screen, then the setting. The method for accessing the Settings mode for each setting varies.

Device Control Settings

Device control settings are programmed at the factory. Setpoints can be viewed and changed through the i.C³ monitoring and control system. To view temperature setpoints, touch **i.C³ APPS**, **Settings**, **Device Control Settings**.



Device Control Settings screen

Table 3. Setpoints

Setting	Model
	120 / 125
Temperature Setpoint	-30.0 °C
Hysteresis Setpoint	2.0 °C
Delay on Start-Up	2 minutes
Duty Cycle During Control Probe Error	100%

Temperature Setpoint

The setpoint is the temperature at which the unit operates.

Notes

- If the Settings screen is password protected enter appropriate password. If viewing for the first time, enter the factory default password of “1234”.
- Change the setpoint if your organization requires a chamber temperature other than -30.0 °C.

Change Temperature Setpoint

1. Touch **i.C³ APPS**, **i.C³ Settings**.
2. Enter the Settings password.
3. Touch minus (**–**) or plus (**+**) on the **Temperature Setpoint** spin box.

Hysteresis Setpoint

Hysteresis is the allowable temperature variance on each side of the freezer setpoint.

Delay on Start-Up

Compressor start-up is delayed to allow the i.C³ monitoring and control system to start first.

Duty Cycle During Control Probe Error

The duty cycle is the percentage of time the compressor will run in the event of a temperature control probe failure.

Note

Hysteresis, Delay on Start-up and Duty Cycle During Control Probe Error are factory-preset and should not be changed unless directed by Helmer Technical Service.

Defrost Settings

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.
- There must be a minimum of four hours between defrost cycles.

Defrost events may be scheduled to occur at specific times. A defrost event can be triggered on demand without affecting a programmed defrosting schedule. 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.

The i.C³ monitoring and control system can perform a maximum of four defrost cycles per day.

Schedule or Start a Defrost Event

1. Touch **i.C³ APPS**, **Defrost Settings**.
2. Toggle the **ON/OFF** button to schedule the defrost event(s), or
   Toggle the **Start/Stop** button. The Defrost icon will appear for the duration of the defrost cycle.
3. Touch the corresponding Time spin box to set the starting time for each defrost event slected.

Table 4. Default Defrost Cycles

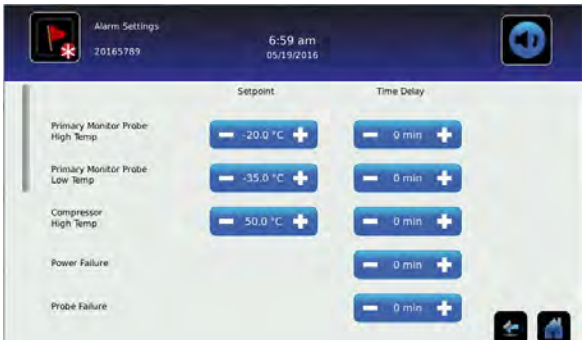
Defrost Event	On/Off	Default Time
1	On	12:15 AM
2	On	8:00 AM
3	On	4:00 PM
4	Off	6:00 PM

User Configurable 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.

Table 5. User Configurable Alarms

Setting		Description	Default Value	Default Time Delay
Primary Monitor Probe High Temp		High temperature at which alarm condition occurs	-20 °C	0 minutes
Primary Monitor Probe Low Temp		Low temperature at which alarm condition occurs	-35 °C	0 minutes
Compressor High Temp		High temperature at which alarm condition occurs	50 °C	0 minutes
Power Failure		Time after power failure occurs until alarm sounds		1 minutes
Probe Failure		Time after probe failure occurs until alarm sounds		0 minutes
Door Open (Time)		Time door remains open until alarm sounds		3 minutes
Secondary Monitor Probe High Temp	(if installed)	High temperature at which alarm condition occurs	-20 °C	0 minutes
Secondary Monitor Probe Low Temp		Low temperature at which alarm condition occurs	-35 °C	0 minutes
Low Battery		Triggered after approximately 18 hours of use	Not adjustable	



Alarm settings screens

Change an Alarm Setting

1. Touch **i.C³ APPS**, **Settings**.
2. Enter the Settings password (default password is “1234”).
3. Scroll down and touch **Alarm Settings.**
4. Touch the minus (-) or plus (+) on the corresponding **Setpoint** spin box to change an alarm setpoint.
5. Touch the minus (-) or plus (+) on the corresponding **Time Delay** spin box to change the time delay duration
6. Touch **Home** to exit the Alarm Settings screen.

Non-Configurable Alarms

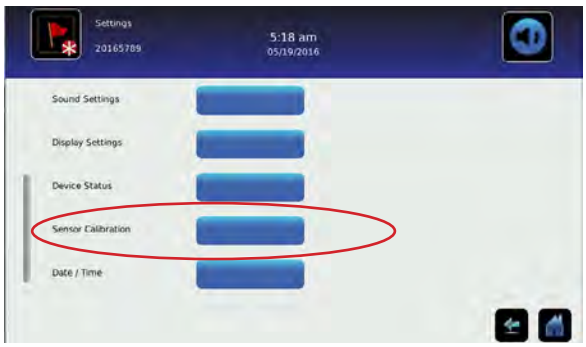
The following alarms indicate operational conditions which require the attention of the operator or a qualified service technician.

Table 6. Non-Configurable Alarm

Alarm	Description
Low Battery	Rechargeable battery voltage is low
Communication Failure	**Communication Failure 1** • Triggered if communication is lost between i.C³ display board and control board • Unit will continue to run with previously saved settings • Screen will not display temperature changes or alarm conditions • i.C³ system will continue to reset until connection is re-established **Communication Failure 2** • Triggered if communication is lost between i.C³ display board and internal system memory • Unit will continue to run with previously saved settings **Communication Failure 3** • Triggered if the database is corrupted • The database is archived and a new database is automatically created • Unit will continue to run with previously saved settings

3.5 Sensor Calibration

Sensor calibration values are programmed at the factory. Calibration values can be viewed and changed through the i.C³ monitoring and control system. To view calibration settings, touch **i.C³ APPS**, **Settings** and scroll down to **Sensor Calibration.**



Settings screen

Sensor Calibration screens

Notes

- If the Settings screen is password protected, enter the appropriate password. If viewing settings for the first time, enter factory default password of “1234”.
- After one hour of no interaction, the Home screen or Temperature Graph screensaver (if enabled) is displayed.
- The Compressor Probe Offset and Evaporator Defrost Probe Offset settings are factory-preset and should not be changed unless directed by Helmer Technical Service.

Primary Monitor Probe

Verify primary monitor probe is reading chamber temperature correctly by comparing probe reading to the temperature measured by calibrated reference thermometer. If the probe is not reading correctly, change the value displayed on the monitor.

The factory default setting for the primary monitor probe is -30.0 °C.

Notes

- Ensure product simulation bottle is full of solution.
- Probe in the bottle is connected to the monitoring system and senses chamber temperature. This probe activates the temperature alarms, but does not affect freezer setpoint.

Calibrate primary monitor probe

1. Remove monitor probe from the probe bottle.
2. Unscrew the cap from the bottle.
3. Attach the thermometer to the monitor 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. Touch, **i.C³ APPS**, **Settings**, **Sensor Calibration**.
7. Touch (-) or plus (+) on the corresponding spin box to increase or decrease the value to match the measured value. The message “New Setting Saved” appears next to the spin box.
8. Remove thermometer from probe.
9. Replace bottle cap, ensuring a tight fit.
10. Place probe in bottle, immersing at least 2” (50 mm).

Control Probe

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

The temperature controller adjusts chamber temperature around the freezer setpoint by activating the compressor when the control probe registers above the setpoint based on the hysteresis value.

Determine control probe offset

NOTICE

The monitor temperature must be verified and accurate prior to adjusting the Control Probe Offset.

1. View and record the freezer setpoint.
2. Allow the unit to run with calibrated monitor temperature for several compressor cycles, and record the average monitor temperature .
3. View and record the current Control Probe Offset value.
4. Subtract the freezer setpoint from the average monitor temperature and record the difference.
5. Add the current Control Probe Offset value to the recorded difference determined in the previous step to establish the new Control Probe Offset value.

EXAMPLE 1	EXAMPLE 2
Freezer temperature setpoint is -30.0	Freezer temperature setpoint is -30.0
Average monitor temperature is -29.2	Average monitor temperature is -31.2
Current Control Offset is 0.3	Current Control Offset is 0.3
Subtract: -29.2 - (-30.0) = 0.8 (difference between average temperature and setpoint)	Subtract: -31.2 - (-30.0) = -1.2 (difference between average temperature and setpoint)
Add 0.3 + 0.8 = 1.1; new Control Offset value	Add 0.3 + (-1.2) = -0.9; new Control Offset value

Enter the new offset value

1. Touch **i.C³ APPS**, **Settings**.
2. Enter the Settings password.
3. Touch **Sensor Calibration**.
4. Touch the minus (-) or plus (+) on the **Control Probe Offset** spin box.
   - ♦ Raise the offset value to lower chamber temperature; lower the offset value to raise chamber temperature.
5. Touch **Home** to return to home screen.

Compressor and Evaporator Probe

The compressor and evaporator temperature probes have been factory-calibrated. Changing the calibration settings is not typically necessary and should not be performed unless directed by Helmer Technical Service.

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.

Table 7. Restored Settings

Setting	Restored Value
Home Screen Application Icons	i.C³ APPS, Settings, Temperature Graph, Temperature Alarm Test, Information Logs
Display Brightness	High (3 symbols)
Password (for Settings screen)	1234
Sounds	On
Alarm Volume	9
Alarm Tone	3
Temperature Calibration Values	Not affected (values previously entered during setup)
Unit ID	Not affected (previously selected during setup)
Date Format	MM/DD/YYYY
Day	Not affected (maintained in real-time clock)
Month	
Year	
Time Format	12-hour
Minute	Not affected (maintained in real-time clock)
Hour	
AM/PM	
Language	Not affected (language previously selected during setup)
Temperature Units	°C
Password Protection (for Settings screen)	On
Temperature Graph Screensaver	On
Access Control (optional) as Home Page	On
High Temperature Alarm Setpoint	-20.0 °C
High Temperature Alarm Time Delay	0 minutes
Low Temperature Alarm Setpoint	-35.0 °C
Low Temperature Alarm Time Delay	0 minutes
Power Failure Alarm Time Delay	1 minute
Probe Failure Alarm Time Delay	0 minutes
Door Open (Time) Alarm Time Delay	3 minutes

Setting	Restored Value
Compressor Temperature Alarm Setpoint	50.0 °C
Compressor Temperature Alarm Time Delay	0 minutes
Chamber Setpoint	-30.0 °C
Chamber Hysteresis	2.0 °C
Delay on Start-Up	2 minutes
Control Relay Probe Failure Duty Cycle	100%
Defrost Event #1 On/Off	On
Defrost Event #1 Start Time	12:15 AM
Defrost Event #2 On/Off	On
Defrost Event #2 Start Time	8:00 AM
Defrost Event #3 On/Off	On
Defrost Event #3 Start Time	4:00 PM
Defrost Event #4 On/Off	Off
Defrost Event #4 Start Time	6:00 PM
Defrost Safety Operation Time	15 minutes

Restore Settings

1. Touch the **Settings** icon.
2. Scroll down and touch the **Restore Factory Settings** button. The Restore Factory Settings confirmation box appears.
3. Touch to confirm, or to cancel.

4 Maintenance

Maintenance tasks should be completed according to the schedule below.

CAUTION

Maintenance should only be performed by trained refrigeration technicians.

Notes

- The preventive maintenance schedule provides recommended minimum requirements. Regulations or physical conditions at your organization may require maintenance items be performed more frequently, or only by designated service personnel.
- 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.

Table 9. i.Series Preventive Maintenance Schedule

Task	Frequency			
	Quarterly	Annually	2 years	As Needed
Test the high and low temperature alarms.	✓			
Test the power failure alarm.	✓			
Test the door alarm (as required by your organization's protocols).				✓
Check the temperature calibration on the monitor and change it if necessary.	✓			
Replace the monitoring system back-up battery.			✓	
Check the level of the solution in the probe bottles. Refill or replace solution if necessary.				✓
Examine the probe bottles and clean or replace if necessary.		✓		
Clean the condenser grill.	✓			
Clean the door gaskets, interior, and exterior of the freezer.				✓
Inspect ground strap (Units prior to serial number 2022299)	✓			
Electrical compartment • Inspect electrical components and wiring terminals in the electrical box for discoloration. Contact Helmer Technical Service if any discoloration is found. • Inspect all wiring for terminals for secure connection. Tighten wiring terminal connections as necessary.	✓			
Models with Chart Recorders Check the backup battery for the chart recorder after an extended power failure and change it if necessary, or change the battery if it has been in service for one year. Refer to the Temperature Chart Recorder Operation and Service Manual.				✓

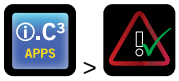
NOTICE

Clean the condenser grill on a quarterly basis.

Note

During a power failure, the back-up battery provides power to the monitoring system, power failure alarm, and optional Access Control. If the back-up battery is not functioning, the power failure alarm will not be activated and the battery should be replaced.

4.1 Alarm Tests



Test alarms to ensure they are working correctly. The freezer has alarms for chamber temperature, compressor temperature, door open (time), power failure, low battery, and power failure. To initiate alarm tests, touch **i.C³ APPS**, **Temperature Alarm Test**.

Automatic Chamber Temperature Alarm Test

Temperature Alarm Test screen

Notes

- A test can be aborted by touching **Cancel Test** at any time.
- Test takes less than five minutes.
- If the temperature alarm test does not automatically complete within two minutes, restart the i.C³ monitoring system.

When performing an automatic temperature alarm test, the Peltier device heats or cools the monitor 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. The Alarm Test icon is displayed on the Temperature Graph to indicate the temperature alarm was test-induced.

Test the low alarm

1. Identify current setting for low alarm setpoint.
2. Touch **i.C³ APPS**, **Temperature Alarm Test**.
3. Touch **Low Alarm Test**.
4. “Peltier Test probe cooling” message appears.
5. When displayed temperature reaches the alarm setpoint, temperature reading turns red.
6. When completed, “Test Complete” appears.
7. Touch **i.C³ APPS**, **Information Logs**, **Event Log**. Touch the event to view event details.
8. Observe the temperature at the time of the low temperature alarm event. Compare this to the alarm setpoint.

Test the high alarm

1. Identify current setting for high alarm setpoint.
2. Touch **Home**, **i.C³ APPS**, **Temperature Alarm Test**.
3. Touch **High Alarm Test**.
4. “Peltier Test probe warming” message appears.
5. When displayed temperature reaches the alarm setpoint, the temperature reading turns red.
6. When completed, “Test Complete” appears.
7. Touch **i.C³ APPS**, **Information Logs**, **Event Log**. Touch the event to view event details.
8. Observe the temperature at the time of the high temperature alarm event. Compare this to the alarm setpoint.

Cancel alarm test

1. Touch the **Cancel Test** icon to end the alarm test. *"Test Stopped"* is displayed in the Test Status section of the display.

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.

Manual Chamber Alarm Test

NOTICE

- Perform the low alarm test before the high alarm test to control the temperature more closely and complete the testing more quickly.
- Before testing alarms, protect items in freezer from extended exposure to adverse temperature.
- Temperature probes are fragile; handle with care.

Test the high alarm

1. Identify setting for high alarm setpoint.
2. Place the glass of product simulation solution in the freezer.
3. When the product simulation solution has stabilized at the chamber temperature, remove the solution from the freezer.
4. Remove the monitor probe from the probe bottle and insert into the product simulation solution.
5. Observe the temperature on the i.C³ display at which the high temperature alarm sounds.
6. Compare the temperature at which the alarm sounds to the high alarm setpoint.
7. Remove probe from product simulation solution.
8. Place monitor probe in probe bottle, immersing it at least 2" (50 mm).

Power Failure Alarm Test

Note

During a power failure, the power failure alarm sounds and the battery provides power to the monitoring system.

Test power failure alarm

1. Change Power Failure delay setting to 0 minutes by touching **Settings**, **Alarm Settings** then touching **+** or **–** on the Power Failure spin box to change the value to 0.
2. Switch AC ON/OFF switch OFF. Power failure alarm will activate immediately.
3. Switch AC ON/OFF switch ON. Power failure alarm will clear and audible alarm will cease.
4. Change Power Failure time delay to the original setting.

Door Open Alarm Test

Test door open alarm

1. Change Door Open (Time) delay setting to 0 minutes by touching **Home**, **Settings**, **Alarm Settings,** then touching the minus (-) or plus (+) on the Door Open (Time) spin box to change the value to 0.
2. Open door. Alarm will activate immediately.
3. Close door. Alarm will clear and audible alarm will cease.
4. Change the Door Open (Time) setting to the original setting.

4.2 Upgrade System Firmware

Helmer may occasionally issue updates for the i.C³ firmware. Follow upgrade instructions included with the firmware update.

4.3 Test and Replace Back-up Batteries

i.C³ Monitoring System Back-up Battery

On all i.C³ screens, the Battery icon will appear in the header bar when the system is running on battery power and the screen brightness will automatically be reduced. The monitoring system will automatically disable some features to extend battery life.

Check the i.C³ Monitoring System back-up battery

1. Turn the AC On/OFF switch OFF. The screen should continue to display information with reduced brightness and the battery icon will appear on the screen.
2. If the display is blank, replace the battery.
3. Switch AC ON/OFF switch ON.

Note

Use a battery which meets manufacturer's specifications.

Access Control Back-up Battery

During an AC power failure, the Access Control back-up battery provides back-up power to power the magnetic Access Control lock.

Test the Access Control back-up battery

1. Ensure monitoring system / Access Control battery key switch is switched ON.
2. Switch AC ON/OFF switch OFF.
3. Attempt to open the cabinet door.
4. If the door remains locked, the battery is functional.
5. If the door does not remain locked, replace the battery.
6. Switch AC ON/OFF switch ON.

Chart Recorder Back-up Battery (if included)

Refer to 360076-1 Temperature Chart Recorder Operation and Service Manual.

4.4 Check Probe Bottle

Remove the probe bottle from the bracket and inspect for cracks. Replace the bottle if necessary.

Ensure the probe bottle has approximately 4 oz. (120 mL) of product simulation solution at a 1:1 ratio of water to propylene glycol. The propylene glycol is used to create a solution which simulates the product stored in the freezer. The product simulation solution temperature reflects the product's temperature during normal operation. Failure to fill the bottle may prevent the chamber temperature from stabilizing that the temperature setpoint. The probe should be immersed at least 2" (50 mm).

4.5 Clean Freezer

Cabinet Exterior

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

Cabinet Interior

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

Condenser Grill

CAUTION

Disconnect freezer from AC power when cleaning the condenser grill.

In environments where the freezer is exposed to excessive lint or dust, the 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.

Door Gaskets

Clean with soft cloth and mild soap and water solution.

Probe Bottles

Clean and refill probe bottles

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).

i.C³® Touchscreen

Clean touchscreen with a soft, dry cotton cloth.

5 Service

5.1 Refrigerant

CAUTION

- Review all safety instructions prior to recharging refrigerant. Refer to **Section 1.1** (Safety).
- Maintenance should only be performed by trained refrigeration technicians.

Notes

- Use only non-CFC R-404A refrigerant.
- Pressure readings may vary based on chamber temperature and ambient air temperature.
- Normal low side pressures are 2 psi to 4 psi when unit is functioning at standard operating temperatures and measured at the end of the compressor cycle.
- If a refrigerant leak is suspected, Helmer recommends finding and fixing the leak prior to recharging the unit.

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

Table 10. Refrigerant Charge

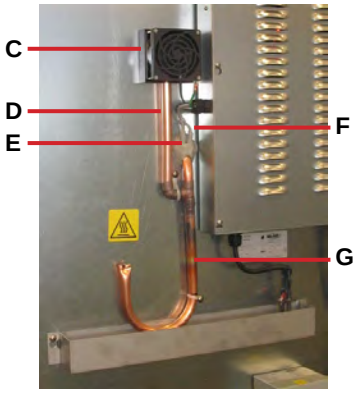
Model	Refrigerant	Power Requirements	Initial Charge
120 / 125	R404A	115 V, 60 Hz 230 V, 50/60 Hz	29.0 oz (822 g)

5.2 Remove / Replace Unit Cooler Cover

The unit cooler must be removed when servicing the control probe, fan motor(s), defrost element, defrost sensors, or coil.

NOTICE

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.



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

Remove unit cooler cover

CAUTION

The condensate evaporator and water evaporation tray are hot.

1. Switch AC ON/OFF switch OFF. Disconnect the battery.
2. On the back of the cabinet, peel the putty back to expose the drain tube and drain heater.
3. Verify the heating element is cool. Remove the screws and loosen the pipe straps securing the drain tube to the cabinet.
4. Remove the drain heater from the drain tube.
5. Remove the drain tube by pulling it downward. The drain tube should separate from the fan tube at the 90° elbow, leaving the fan tube attached to the fan.
6. Separate the drain hose inside the cabinet from the unit cooler drain port by gently twisting the drain hose from left to right

to separate it from the unit cooler drain port.

7. Pivot the drain tube and drain hose upward to remove the assembly from the cabinet.
8. Remove top drawer, basket, or shelf from the chamber.

Note

Units without the Cold-Shield panel proceed to Step 10.

9. Loosen three screws securing Cold-Shield panel to the cabinet and slide panel to disengage from screws and remove.
10. Using a 5/16” socket wrench, remove the four screws securing the unit cooler cover to the top of the cabinet while supporting the cover with one hand to prevent it from dropping.
11. Carefully lower the unit cooler cover to avoid damage to the fan wiring.

Install unit cooler cover

1. Verify unit cooler wiring is connected and routed correctly. Wiring should be routed above the copper tube inside the unit cooler. Reconnect wires if they have separated.
2. Lift the unit cooler cover into place and attach using four screws. Tighten using a 5/16” socket wrench to secure.
3. From the rear of the unit, insert the drain tube through the opening into the cabinet. The drain tube should be aligned with the unit cooler drain spout inside the chamber and the connection to the fan tube at back of the unit.
4. Attach the drain tube to the unit cooler drain spout and the fan tube.
5. Insert the drain line heater in the drain tube at an upward angle. The black heating element should no longer be visible.
6. Replace putty around the drain tube inside the cabinet.
7. Reinstall top drawer, basket, or shelf if previously removed.

Note

Units without the Cold-Shield panel proceed to Step 9.

8. Reinstall Cold-Shield panel and tighten screws to secure.
9. Reattach the pipe straps to secure the drain tube to the cabinet.
10. Switch AC ON/OFF switch ON. Reconnect the battery.
11. Touch **Mute** to disable the high temperature alarm while freezer reaches operating temperature

6 Troubleshooting

⚠ CAUTION

Review all safety instructions prior to troubleshooting. Refer to Section 1.1.

6.1 General Operation Problems

Problem	Possible Cause	Action
A drawer does not slide easily.	Ice buildup in the drawer slides.	Pull the drawer out and confirm the slides are free of ice. De-ice if necessary.
	Debris in the drawer slides.	Pull the drawer out and confirm the slides are free of debris. Clean if necessary.
	Drawer is misaligned or not level.	Confirm both slides for the drawer are mounted at the same height.
	Drawer slide is faulty.	Confirm the slide is operating correctly. Replace if necessary.
The door does not open easily.	Door handle is not aligned.	Properly align door handle.
	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 the cam if necessary.
The monitor display is hard to read.	Screen brightness is set too low.	Change the screen brightness.
The display/monitor is not responding.	Digital electronics are locked because of an interruption in power.	Reset the monitoring system
“Probe Failure” is displayed on the monitor.	Probe wiring is an open circuit	Check the continuity of the probe wiring and connections. Secure the connections if necessary
		Confirm the probe is providing resistance in the range of 86 Ω to 110 Ω. Replace the probe if necessary.
		Test CP board circuitry by removing the probe connector fromthe board and placing jumper across jumper pins. Display should show 4 °C +/- 2 °C. Contact Helmer Technical Service.

6.2 Chamber Temperature Problems

Problem	Possible Cause	Action
The chamber temperature displayed is higher or lower than the actual temperature.	Probe bottle is empty, or the amount of solution is too low.	Check the level of product simulation solution in the bottle. Clean and refill the bottle if necessary.
	Solution in probe bottle is frozen.	Refill the bottle with new solution.
	Primary monitor probe(s) is not calibrated.	Check the chamber temperature calibration. Change the calibration if necessary.
	Digital electronics are locked due to an interruption in power.	Reset the monitoring system.
	Connections for the primary monitor probe are loose.	Check primary monitor probe connections. Secure connections if necessary.
	A component is faulty or internal connections are loose.	Contact Helmer Technical Service.
Chamber temperature meets an alarm condition, but appropriate temperature alarm is not active.	Temperature alarm setpoint was changed.	Check the current setpoints for the temperature alarms. Change the setpoints if necessary.
	Component is faulty or connections are loose	Contact Helmer Technical Service.
The compressor runs continuously.	Freezer setpoint is set too low.	Confirm the setpoint is set within the operating range and change it if necessary.
	Control probe is not reading correctly.	Check control probe reading; adjust offset if necessary.
		Check probe connections at CP board.
		Test CP board circuitry by placing jumper across suspected failed probe. Display should show 4 °C +/- 2 °C. Contact Helmer Technical Service.
	Solid state relay is faulty.	Confirm the relay is operating correctly. Replace the relay if necessary.
The chamber temperature does not stabilize at the freezer setpoint	Circulation in the chamber is not adequate.	Check if there are any items that may obstruct air flow and remove them if necessary.
	Unit cooler fan is not running.	Check the voltage to the fan when door switch is activated. Replace the fan motor or door switch if necessary.
	Condenser grill is dirty.	Check the condenser grill. Clean it if necessary.
	Ambient air temperature around the freezer is too high.	Confirm freezer location meets requirements. Refer to the operation manual.
	Condensing unit fan is not running.	Check the condensing unit fan connections. Replace the fan motor if necessary.
	Evaporator is covered with ice and is not exchanging heat.	Initiate a freezer defrost cycle.
	Control probe is not reading correctly.	Check control probe reading; adjust offset if necessary.
		Check probe connections at CP board.
		Test CP board circuitry by placing jumper across suspected failed probe. Display should show 4 °C +/- 2 °C. Contact Helmer Technical Service.
	Refrigerant level is too low.	Check the refrigeration lines for leaks and repair them if necessary. Check the refrigerant level. Recharge the refrigerant if necessary.
	A component is faulty or internal connections are loose.	Contact Helmer Technical Service.

6.3 Alarm Activation Problems

Problem	Possible Cause	Action
The freezer is in an alarm condition, but alarms are not audible.	Audible alarms are muted.	Verify that audible alarms are not muted. If time remaining is greater than five minutes, change MUTE timer value to five minutes and wait until timer resets.
	Alarm system component is faulty or internal connections are loose.	Confirm the circuit board and line connections are functioning correctly. Contact Helmer Technical Service.
	Speaker is faulty.	Replace the speaker.
The freezer meets an alarm condition, but the appropriate alarm is not active.	Alarm setpoint was changed.	Check the current setpoints for the alarms.
	A component is faulty or internal connections are loose.	Contact Helmer Technical Service.

Problem	Possible Cause	Action
The High Temperature alarm activates when the door is opened, then clears shortly after the door is closed.	Probe bottle is empty.	Check the level of product simulation solution in the bottle. Clean and refill bottle if necessary.
	High temperature alarm setpoint is set too low.	Check the setpoint. Change the setpoint 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.
	A component is faulty or internal connections are loose.	Contact Helmer Technical Service.
The freezer is connected to power, but the AC Power Failure alarm is active.	ON/OFF AC power switch is OFF.	Turn the ON/OFF AC power switch to the ON position.
	Outlet connection is faulty.	Verify power at the outlet. Repair the original outlet or connect to a different outlet if necessary.
	Power cord is faulty.	Confirm the power cord is connected securely. Secure the power cord if necessary.
	Circuit breaker is tripped.	Reset or replace the circuit breaker.
	A component is faulty or internal connections are loose.	Contact Helmer Technical Service.
The Door Open alarm is activating sporadically.	Door is not closing completely.	Confirm the hinge cams are not damaged. Replace the cams if necessary.
	Doors are closing but not sealing completely.	Ensure door switch is being activated by the door switch plate. Adjust as needed.
	Door switch is faulty.	Replace the door switch.
	Door Open Timeout is set to zero, causing alarm to activate immediately when door is opened.	Check the time delay for the Door Open alarm. Change the time delay if necessary.
	Temperature monitor/controller board is faulty.	Contact Helmer Technical Service.
All alarms are activating sporadically.	Alarm system component is faulty or internal connections are loose..	Confirm the circuit board and line connections are functioning correctly. Contact Helmer Technical Service.
The condenser alarm is active.	Condenser fins are dirty.	Clean as necessary, or contact Helmer Technical Service or your distributor.
	Condenser fan motor is faulty.	Replace the condenser fan motor.
	Compressor is overheating due to ambient air temperature around freezer is too high.	Confirm the freezer is correctly located. Refer to the operation manual.
	Condenser alarm setpoint is too low.	Confirm the alarm setpoint is at the appropriate value.
	Condenser probe is not calibrated.	Confirm the condenser probe is reading correctly. Calibrate the probe if necessary.
	A component is faulty or internal connections are loose.	Contact Helmer Technical Service.
An alarm activated, but the temperature recorded at activation does not match the alarm setpoint.	Monitor settings are not calibrated.	Confirm the monitor probe is reading correctly. Calibrate the probe if necessary.
	Temperature changed slightly around the time of activation.	No action necessary.
The “No Battery” alarm is activating sporadically.	Battery voltage level on the back-up battery for the monitoring system is low.	Replace the backup battery for the monitoring system.
The “High Temperature” alarm is activating sporadically.	Primary monitor probe is not immersed in the product simulation solution.	Confirm the probe bottle is full of solution, and the probe is placed in the bottle correctly.
	Upper monitor probe is not calibrated.	Confirm the upper monitor probe is reading correctly. Calibrate the probe if necessary.
	A component is faulty or internal connections are loose.	Contact Helmer Technical Service.

6.4 Testing Problems

Problem	Possible Cause	Action
The automatic temperature tests do not work.	High Alarm setpoint is set significantly higher than the default value, or the Low Alarm setpoint is set significantly lower than the default value.	Confirm the alarm setpoints are set at the expected or correct values.
		Test the temperature alarms manually.
	Connections for the monitor probe are loose.	Test the monitor probe connections. Secure the connections if necessary.
	Monitor probe is faulty.	Test the monitor probe. Replace the probe if necessary.
	A component is faulty or internal connections are loose.	Contact Helmer Technical Service.

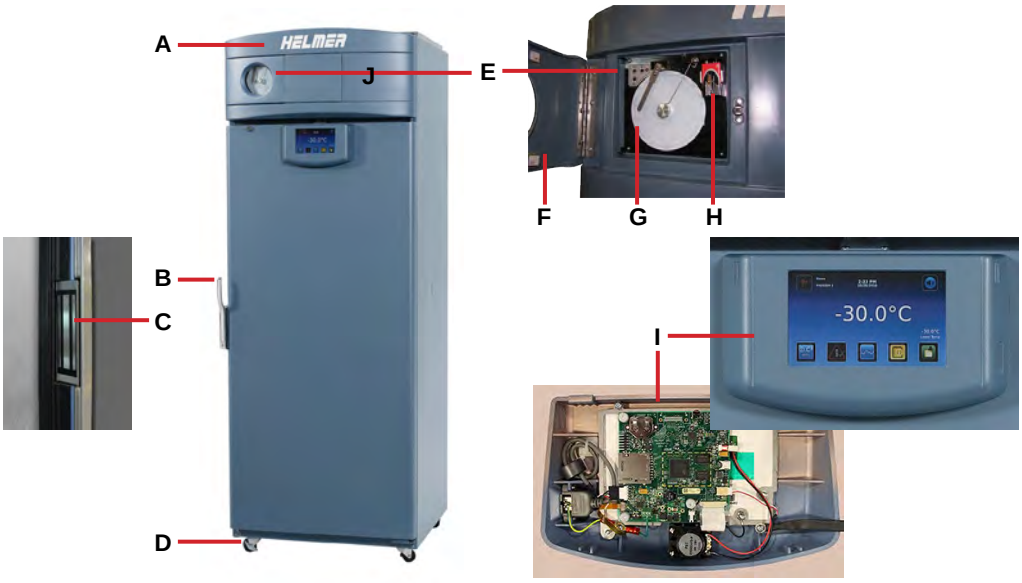
6.5 Condensation and Icing Problems

Problem	Possible Cause	Action
There is excessive water in the water evaporation tray.	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.
	Heater in the water evaporation tray is faulty.	Confirm the heater is hot and is drawing the correct current (approximately 0.21 A to 0.35 A for the 230V model, 0.36 to 0.56 for the 115V model). Replace the heater if necessary.
There is 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.
	Unit cooler drain line is damaged or restricted.	Confirm the unit cooler drain line is free of debris and is not restricted. Remove debris if necessary.
	Connection between the unit cooler and the drain line is loose.	Confirm the connection is secure. Tighten the connection if necessary.
There is excessive moisture on the door.	Humid air is entering the chamber.	Confirm the freezer is level, and the door is aligned, closing tightly, and sealing correctly.
	Relative humidity around freezer is too high.	Confirm freezer location meets requirements.
After a defrost cycle, no water flows into the water evaporation tray.	Drain line is plugged.	Confirm the drain tube is free of debris. Remove debris if necessary.
	Drain line heater is faulty.	Confirm the drain line heater is warm to the touch. Contact Helmer Technical Service to resolve issues as necessary.
	Defrost heater on the evaporator in the unit cooler is faulty.	Check for ice buildup on the evaporator by looking through the fan grill with a flashlight. If there is significant ice buildup inside or behind the unit cooler, initiate a defrost cycle of the freezer.
		Confirm defrost heater is hot and is drawing the appropriate current during a defrost event (approximately 3.3 A to 5.5 A for the 230V model, 7.8 A to 10.7 A for the 115V model).
		Replace the defrost heater if necessary.

7 i.Series® Parts

Note

- 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.
- The i.C³ display assembly is sensitive to static electricity and can be damaged by electrostatic discharge. Use proper ESD precautions when handling the display assembly.
- Although the touchscreen and display board may be replaced independently of the i.C³ display assembly, Helmer recommends replacing the complete assembly.



Letter	Description	Part #
A	Bezel * = without chart recorder door	800069-2
		400998-2*
B	Door handle	220426
C	Magnetic lock	800138-1
D	Caster (swivel with brake)	220467
E	Temperature chart recorder (standard on plasma freezer model, optional on laboratory freezer model)	800084-1

Letter	Description	Part #
F	Chart recorder door assembly	800070-1
G	Chart paper (52 sheets)	220419
H	Chart recorder back-up battery	120218
I	Display assembly (includes touchscreen display board, interface cable, speaker)	800042-1
Not shown	USB / Power cable for i.Center display	800010-1

Letter	Description	Model	Part #	Volts
A	Unit Cooler Assembly	-	800870-1	115
		-	800871-1	230
B	Unit Cooler Fan Motor (Heatcraft / Peerless)	-	800872-1	115
		-	800950-1	230
		-	800873-1	230
C	Unit Cooler Fan Blade (Heatcraft / Peerless)	-	800874-1	115/230
		-	800875-1	230
D	Unit Cooler Fan Guard (Heatcraft / Peerless)	-	800876-1	115/230
		-	800877-1	230
E	Unit Cooler Drain Pan (Heatcraft / Peerless)	-	800878-1	115/230
		-	800879-1	230
F	Control Probe	-	800048-1	-
G	Defrost Heater (Heatcraft / Peerless)	-	800880-1	115
		-	800881-1	230
		-	800882-1	230
H	Defrost heater high limit thermostat	-	800014-1	-
I	TXV (expansion) valve	-	800110-1	-
J	Chart recorder probe	-	800024-1	-
K	Primary monitor probe	-	800038-1	-
L	Probe bottle and propylene glycol kit	-	400922-2	-
M	Full Shelf (includes hardware)	120	400414-1	-
		125	400414-2	-
N	Drawer assembly (includes drawer, 2 slides, hardware)	120	400584-2	-
		125	400584-1	-
Not Shown	Drawer slide assembly (right side)	120	400541-3	-
		125	400541-1	-

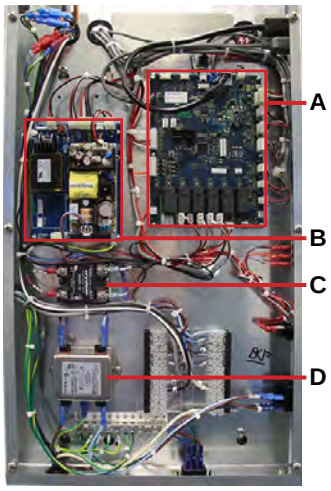
Letter	Description	Model	Part #	Volts
Not Shown	Drawer slide assembly (left side)	120	400541-4	-
		125	400541-2	-
	Roll-out basket assembly (optional includes basket, 2 slides, hardware)	120	400890-1	-
		125	400890-2	-
	Roll-out basket slide assembly (right side)	120	400541-3	-
		125	400541-1	-
	Roll-out basket slide assembly (left side)	120	400541-4	-
		125	400541-2	-
	Drawer slide wheel	-	320815-1	-
	Half shelf (includes hardware)	-	400413-1	-
O	Secondary monitor probe	-	800037-1	-
P	Door switch	-	120380	-
Q	Mullion heater (behind strike plates)	-	800883-1	115
		-	800884-1	230
Not Shown	Strike plate replacement kit	-	400687-1	-
R	Upper hinge assembly * = left ** = right (includes pin and bracket)	-	400960-2*	-
		-	400960-1**	-
S	Upper hinge bearing	-	220541	-
T	Door gasket	-	320726-1	-
U	Door bumper	-	220441	-
V	Lower hinge cam (quantity 2)	-	320742-1	-
W	Lower hinge bearing	-	220375	-
X	Door stop	-	320763-1	-
Y	Ground strap (units prior to SN 2022299)	-	120688	-
Z	Lower hinge bracket * = left ** = right	-	400377-2*	-
		-	400377-1**	

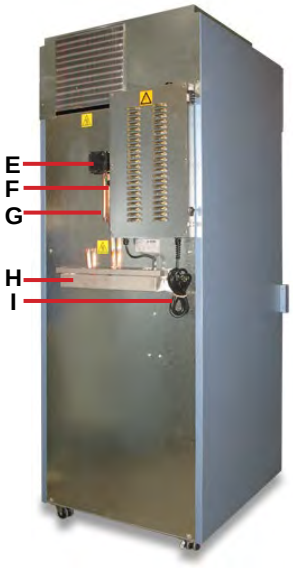
CAUTION

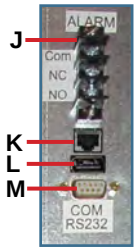
- Disconnect the freezer from AC power before opening the electrical box.
- Do not remove the cover from the condensate evaporator tray.

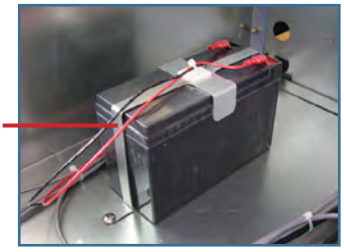
Note

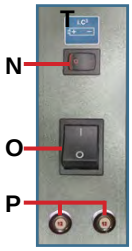
The i.C³ control board is sensitive to static electricity and can be damaged by electrostatic discharge. Use proper ESD precautions when handling the board.

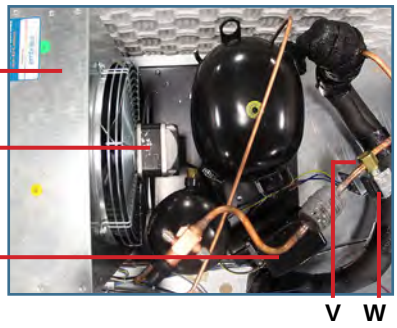










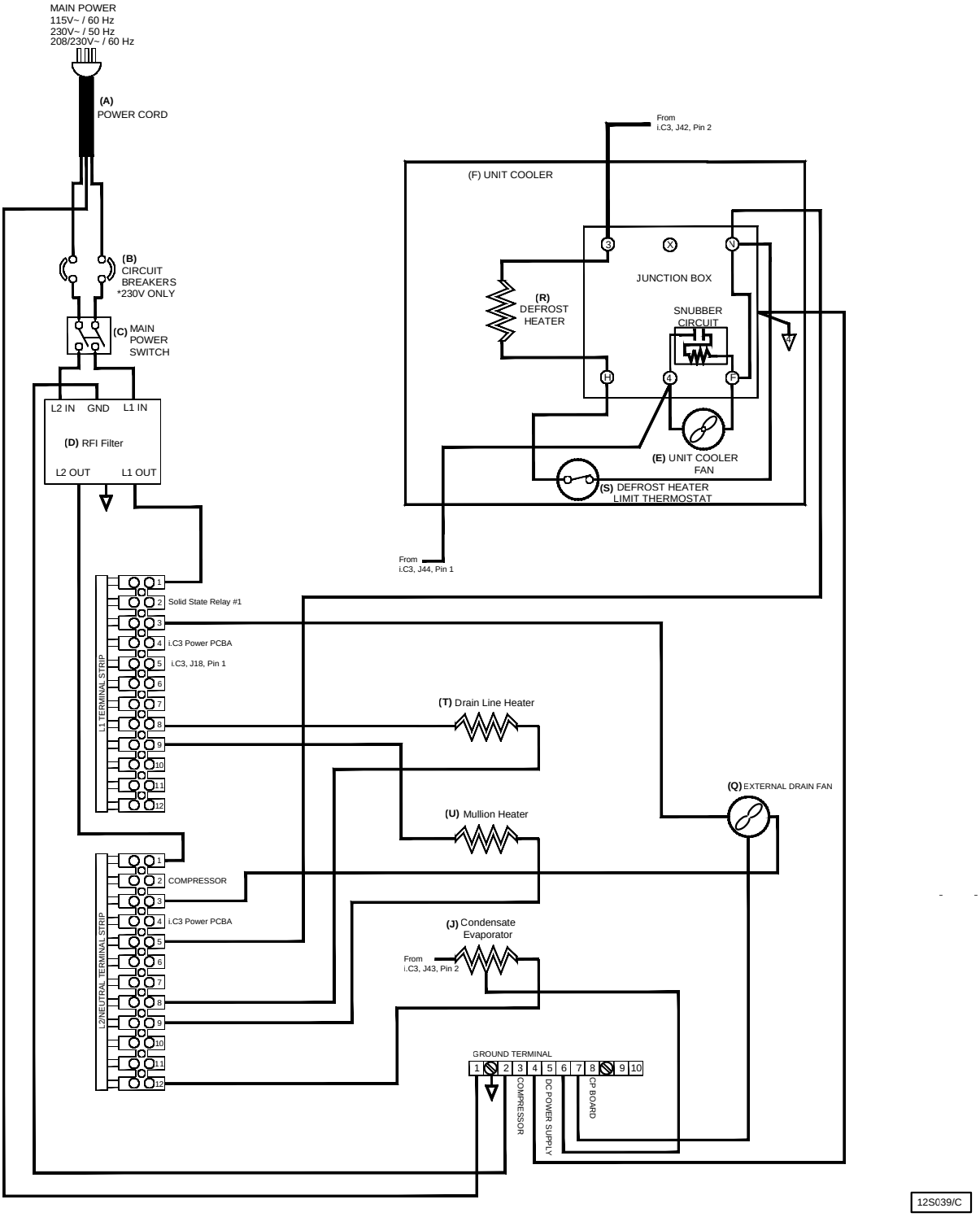


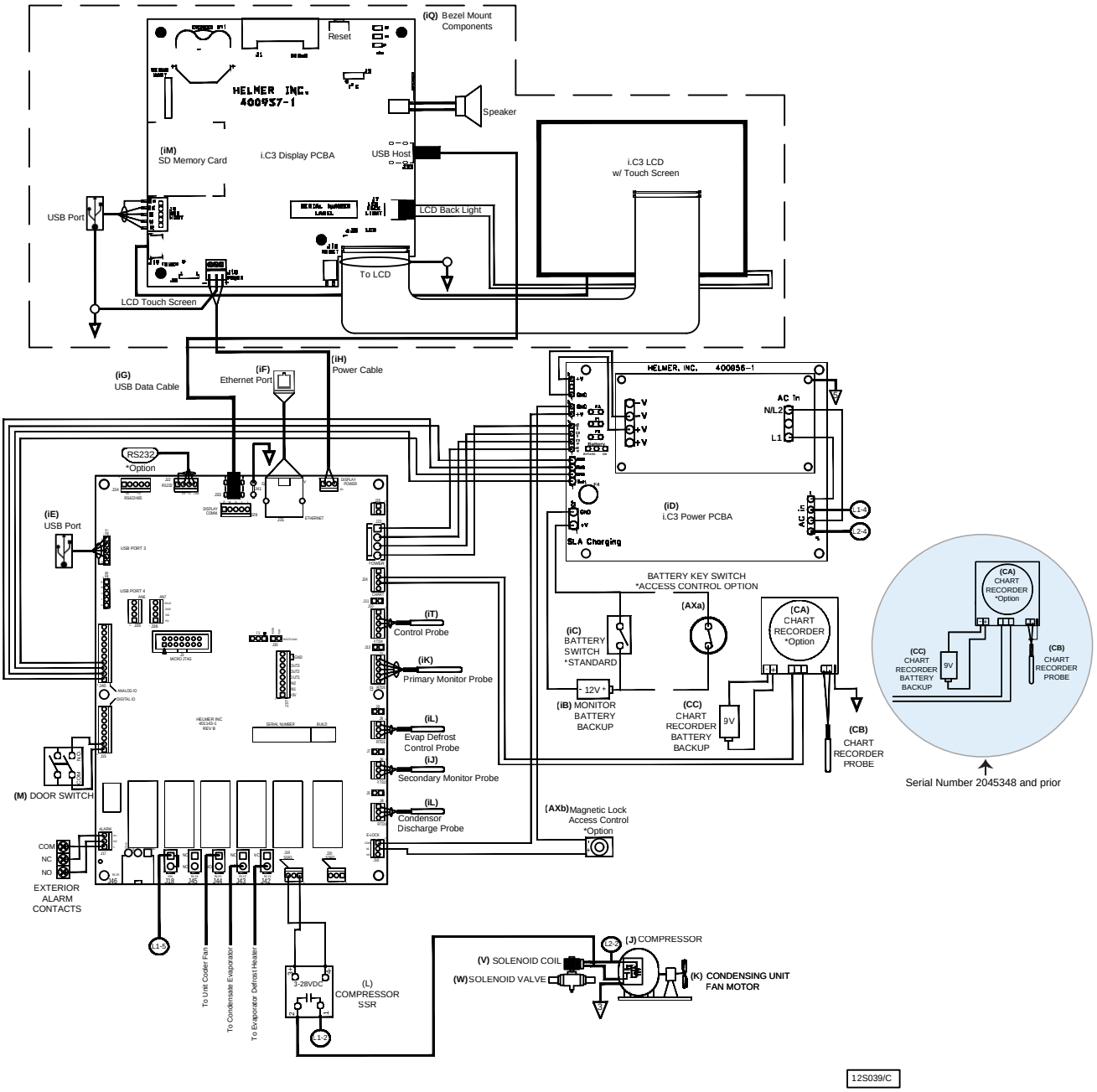
Letter	Description	Part #	Volts
A	i.C³ control board (blue board)	800034-4	-
	i.C³ control board (green board)	800034-3	-
B	Power supply board	800035-1	-
C	Solid state relay	120426	-
D	Power line filter	120400	-
E	Drain Line Fan	800885-1	115
		800886-1	230
F	Drain Line Heater	800887-1	115
		800279-1	230
G	Drain Line	-	-
H	Condensate Evaporator Assembly (includes condensate evaporator, tray and cover)	400790-1	115
		400790-2	230
I	Power Cable * = European models	800001-1	115
		800002-1	230
		800003-1*	230
J	Remote alarm contacts	-	-
K	RJ-45 Ethernet port	800008-1	-
L	USB port	120633	-
M	RS-232 serial port (optional)	-	-

Letter	Description	Part #	Volts	Hz
N	Battery back-up switch	120202	-	-
O	Main power switch	120478	-	-
P	Circuit breaker, 12 A	120220	230	-
Q	Back-up battery key switch (optional Access Control)	401220-1	-	-
R	Monitoring system battery (optional Access Control)	120628	-	-
S	Condensing Unit	800866-1	115	60
		800867-2	230	50
		800867-1	230	60
T	Condenser Fan Motor	800868-1	115	60
		800869-2	230	50
		800869-1	230	60
U	Compressor Electrical Components	800864-1	115	60
		800865-2	230	50
		800865-1	230	60
V	Solenoid valve	220547	-	-
W	Solenoid coil	800863-1	115	-
		800017-1	230	-
Not Shown	Condenser probe	800039-1	-	-

8 Schematics

8.1 iPF and iLF Models; 120 and 125 Configurations





Horizon Series™ Information

9 Installation and Configuration

9.1 Location Requirements

- Grounded outlet meeting the electrical requirements listed on the product specification label.
- Clear of direct sunlight, high temperature sources, and heating and air conditioning vents.
- Minimum 3” (76 mm) of space behind unit.
- Meets limits specified for ambient temperature (15 °C to 32 °C) and relative humidity.

9.2 Placement and Leveling

⚠ CAUTION

To prevent tipping, ensure the casters are unlocked, leveling feet (if installed) are lifted, and doors are closed before moving the freezer.

- Roll freezer into place and lock casters
- Ensure freezer is level.

Notes

- Helmer recommends the use of leveling feet.
- Leveling feet (if installed) must be adjusted to provide unit cooler drainage.

9.3 Connect Back-up Power

The monitoring system and chart recorder each have 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 and no battery-related alarms are active, backup power for the monitoring system is available for up to 20 hours (the Low Battery alarm will activate after approximately 18 hours of battery use). Providing full power is available, backup power for the optional Access Control system is available for up to 2.5 hours.

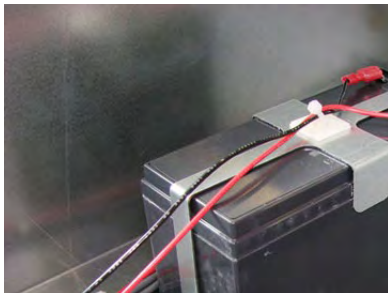
⚠ CAUTION

- Before installing or replacing batteries, switch the power and battery OFF. Disconnect the freezer from AC power.
- When installing a replacement battery, use only a battery which meets the manufacturer’s specifications.

Notes

- The optional Access Control system uses the monitoring system battery for back-up power, in the event of a power failure.
- The monitoring system will start on battery power alone. If the freezer was previously not connected to AC power and the battery is switched on, the monitoring system will begin running on battery power.

The battery is located on the top of the freezer.



Monitoring system back-up battery (supplies power to optional Access Control system).

9.4 Prepare for Monitoring

The back-up battery is switched OFF for shipping. Switch the back-up battery switch ON to provide monitoring system with back-up power in the event of AC power failure.

Temperature Probes

Notes

- Temperature probes are fragile; handle with care.
- The number and location of probes varies by model
- Remote probes may also be introduced through existing top ports and immersed in existing probe bottles.

Probe bottle(s) along with propylene glycol have been provided with this unit. The propylene glycol is used to create a solution which simulates the product stored in the freezer. The product simulation solution temperature reflects the product's temperature during normal operation.

Each bottle should contain 4 oz (120 mL) of product simulation solution at a 1:1 ratio of water to propylene glycol.

Probe bottle.

Top access port.

Fill Probe Bottle

1. Remove all probes from bottle and remove bottle from bracket.
2. Remove cap and fill with 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.

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.

Chart Recorder (if included)

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, back-up power for the temperature chart recorder is available for up to 14 hours.

Notes

- If chart recorder has been operating on back-up battery power, the battery should be replaced to ensure the back-up source has proper charge.
- For complete information, refer to the Temperature Chart Recorder Operation and Service Manual included with this unit.

Prior to use:

Place probe in bottle with primary monitor probe

Set-up and Operation

Access chart recorder by pulling the door open.

Install Battery

Connect the leads to the battery to provide back-up power to the chart recorder.

Install / Replace Chart Paper

Notes

- For accurate temperature reading, ensure the current time is aligned with the time line groove when chart knob is tightened.
- Contact Helmer Technical Service to reorder chart paper, part number 220419 (52 sheets)

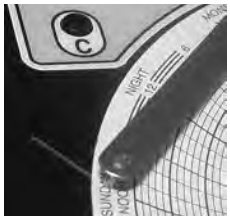


Chart recorder stylus and time line groove.

1. Press and hold **C** button. hen stylus begins to move left, release button. The LED flashes.
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 in place while making sure the chart knob is fully tightened. *(Failure to fully tighten the knob can result in paper slipping and losing time.)*.
6. Press and hold **C** button. When stylus begins to move right, release button.
7. Confirm stylus is marking on paper and stops at the correct temperature.
8. Calibrate chart recorder to match primary temperature if needed and close recorder door.

External Monitoring Devices

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.

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

The terminals on the remote alarm interface have the following maximum load capacity:

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

Connect to Remote Alarm Interface

1. On the electrical box, locate the remote alarm terminals.
2. Connect remote alarm wires to appropriate terminals, according to requirements for your alarm system.
3. Use a cable tie to relieve strain on alarm wires (as necessary).

9.5 Configure Storage

CAUTION

- Before moving drawers, ensure they are completely empty for safe lifting.
- Maximum basket, drawer, or shelf load is 100 lbs (46 kg).

Note

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

Product Loading Guidelines

When loading your freezer, take care to observe the following guidelines:

- Never load freezer beyond capacity.
- Always store items within shelves, drawers or baskets.
- Temperature uniformity is maintained by air circulation, which could be impeded if unit is overfilled, particularly at the top or back. Ensure proper clearance is provided below the fan.

Note

Products stacked against back wall may obstruct air flow and affect performance of unit.

Drawers and Baskets

Remove a drawer or basket

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

Install a drawer or basket

1. Align end guides on drawer or basket with the slides.
2. Gently push drawer or basket into chamber until it stops.
3. Pull drawer or basket out until it stops; check for smooth operation.

Move drawer slides

1. Using a screwdriver, remove front bracket retainers.
2. Tap front brackets upward to disengage standards.
3. Remove slides from standards
4. Insert slides into standard at appropriate height.
5. Tap front brackets downward to engage standards.
6. Using a screwdriver, install front bracket retainers.

Shelves

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.

Move shelf brackets

1. Using a screwdriver, remove front bracket retainers.
2. Tap front brackets upward to disengage standards.
3. Remove front brackets from standards.
4. Insert front brackets into standard at appropriate height.
5. Tap front brackets downward to engage standards.
6. Using a screwdriver, install front bracket retainers.

9.6 Optional Adapter Kits for Medication Dispensing Locks

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

10 Controls

Horizon Series models are equipped with a monitor and optional control system which allows users to view and change current settings.

10.1 Monitor and Control Interface

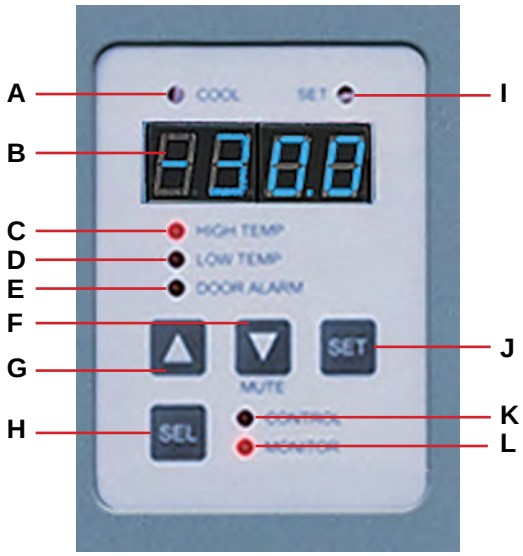


Table 11. Monitor and Control Indications

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 the high alarm temperature setpoint is being changed.
D	LOW TEMP lamp	Indicates when the freezer is in a low temperature alarm condition. Also indicates the low alarm temperature setpoint is being changed.
E	DOOR ALARM lamp	Indicates when the door is open.
F	DOWN ARROW button	Decreases a temperature setting. Also mutes the audible alarm for five minutes.
G	UP ARROW button	Increases a temperature setting.
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 probe is displayed.
L	MONITOR lamp	Indicates when the display is showing temperature readings from the monitor probe. Also indicates when alarm setpoints are being changed.

Display Minimum and Maximum Monitor Temperature Recordings

Notes

- This feature is standard on Horizon Series™ models with serial numbers of 2015494 or higher. Some exceptions may exist. For confirmation on your unit, please contact Helmer Technical Service.
- Units that do not include the minimum and maximum recording feature will not display .C or .F when entering the program mode. All temperature readings will appear in .C only.
- The following steps only apply to the primary monitor probe.

The minimum and maximum recording feature allows the user to view a minimum temperature occurrence and a maximum temperature occurrence within a given period of time. The timer provides a time reference in which those temperatures occurred.

View *minimum* temperature recording.

- Press and hold the **Down Arrow** button for 1 second and listen for a single beep. 
- The display will alternate between **LO** and a valid temperature value five (5) times followed by a single beep to indicate exit back to the temperature display.

View *maximum* temperature recording.

- Press and hold the **Up Arrow** button for 1 second and listen for a single beep. 
- The display will alternate between **HI** and a valid temperature value five (5) times followed by a single beep to indicate exit back to the temperature display.

View recorded temperature timer.

Notes

- The timer denotes the period of time that has elapsed. It does not display the time at which a minimum or maximum temperature occurred.
- The maximum period of time the timer can record is 99:59 (99 hours and 59 minutes).

- Press and hold either the **Up** or **Down Arrow** button for 1 second.  or 
- While the display is flashing the **HI** or **LO** value, press and hold the **SET** button for 1 second.
- The display will alternate five (5) times between **CLr** and a value representing the number of hours and minutes that have elapsed since the last recording (example: 12:47 would represent 12 hours and 47 minutes). A single beep will follow to indicate exit back to temperature display.

Clear minimum and maximum temperature recordings.

- Press and hold either the **Up** or **Down Arrow** button for 1 second.  or 
- While the display is flashing the **HI** or **LO** value, press and hold the **SET** button for 1 second and listen for a single beep.
- While the display is flashing the elapsed time since last reset, press and hold the **SET** button for 2 seconds. **CLr** will be displayed followed by a series of 3 beeps to indicate exit back to the temperature display.

Notes

The minimum and maximum temperature and timer will reset when:

- the unit is powered off and battery backup is not engaged, or
- after 99 hours and 59 minutes have elapsed.

10.2 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).

Table 12. Alarm Indications

Alarm	Alarm Type
High Temperature	A, V, R
Low Temperature	A, V, R
Door Open (Time)	A, V, R
Power Failure	A, V, R
Probe Failure	A, V, R

10.3 Settings

Temperature Settings

Temperature settings are factory pre-set. Settings can be viewed and changed through the Monitor and Control interface.

Table 13. Parameters, Indicators and Settings

Parameter	Visual Indicator	Range	Default
Celsius or Fahrenheit	None	.C, .F	.C
High Temperature	MONITOR Lamp & HIGH Lamp	-40.0 to 40.0 (°C) -40 to 104 (°F)	-20.0°C
Low Temperature	MONITOR Lamp & LOW Lamp	-40.0 to 40.0 (°C) -40 to 104 (°F)	-40.0°C
Monitor Offset	MONITOR Lamp	-10.0 to 10.0 (°C) -18 to 18 (°F)	Varies
Control Offset	CONTROL Lamp	-10.0 to 10.0 (°C) -18 to 18 (°F)	Varies
Hysteresis	COOL Lamp	0.5 to 2.5 (°C) 1 to 5 (°F)	2.0°C

View settings and offset values

1. Press and hold the **Up** and **Down Arrows** simultaneously for 3 seconds to enter program mode.
2. The LED Display will show .C or .F to indicate Celsius or Fahrenheit.
3. Press and release **SEL** to scroll through the parameters and view settings.
4. Hold **Up** and **Down Arrows** simultaneously for 3 seconds to exit program mode.
5. The LED Display will show current monitor temperature.

Temperature setpoint

The default setpoint for the freezer is -30.0 °C. This can be changed if your organization requires a chamber temperature other than -30.0 °C.

Change setpoint:

Note
The current temperature setpoint is typically higher than the chamber temperature.

1. On the monitoring system, press and release **SEL** to change to Control mode. The CONTROL lamp will illuminate.
2. Press and hold **SET** to display the current temperature setpoint.
3. Hold **SET** and press **Up** or **Down Arrow** as necessary to set the desired value.
4. Release **SET** button. The new setting is saved.
5. Press and release **SEL** to return to Monitor mode. The MONITOR lamp will illuminate.

Temperature Units

Note
If temperature units are changed, the temperature setpoints, offsets and alarm settings must be recalibrated.

Select temperature units

1. Press and hold the **Up** and **Down Arrows** simultaneously for 3 seconds to enter program mode.
2. The LED Display will show .C or .F to indicate Celsius or Fahrenheit.
3. Press and hold the **SET** button while pressing the **Up** or **Down Arrow** to select the desired temperature unit parameter.
4. Release **SET** button. The new setting is saved.
5. Press and hold **Up** and **Down Arrows** simultaneously for 3 seconds to exit program mode

Alarm Settings

The high and low temperature alarm settings may be changed by the operator. Temperature alarm setpoints specify the temperature at which an alarm activates. The setpoint for temperature alarms may be changed.

High Temperature Alarm

Change the alarm setpoint

1. Press and hold the **Up** and **Down Arrows** simultaneously for 3 seconds to enter program mode.
2. The LED Display will show .C or .F to indicate Celsius or Fahrenheit.
3. Press **SEL** until HIGH TEMP and MONITOR lamps flash.
4. Hold **SET**, then press **Up** or **Down Arrow** to change the setpoint.
5. Release **SET** button. The new setting is saved.
6. Press and hold **Up** and **Down Arrows** simultaneously for 3 seconds to exit program mode.

Low Temperature Alarm

Change the alarm setpoint

1. Press and hold the **Up** and **Down Arrows** simultaneously for 3 seconds to enter program mode.
2. The LED Display will show .C or .F to indicate Celsius or Fahrenheit.
3. Press **SEL** until LOW TEMP and MONITOR lamps flash.
4. Hold **SET**, then press **Up** or **Down Arrow** to change the setpoint.
5. Release **SET** button. The new setting is saved.
6. Press and hold **Up** and **Down Arrows** simultaneously for 3 seconds to exit program mode.

Primary Monitor Probe

Verify the primary monitor probe is reading chamber temperature correctly by comparing primary monitor probe readings to the temperature measured by a calibrated reference thermometer. If the primary monitor probe is not reading correctly, change the monitor offset value displayed.

Notes

- Ensure product simulation bottle is full of solution.
- The probe in the bottle is connected to the monitoring system and represents product storage temperature. This probe does not affect the freezer setpoint.

Calibrate primary monitor probe:

1. Remove primary monitor probe from probe bottle.
2. Unscrew cap from the bottle and remove.
3. Attach a calibrated independent reference thermometer traceable per national standards to the primary monitor probe, and place them in the bottle. The probe and thermometer should be immersed at least 2” (50 mm).
4. Note the temperature on the calibrated reference thermometer and compare to the chamber temperature displayed on the monitor.
5. Adjust the monitor offset value higher or lower to reflect the difference between the chamber temperature displayed on the monitor and the temperature reading from the calibrated reference thermometer.
6. Remove reference thermometer from probe.
7. Replace the bottle cap, ensuring a tight fit.
8. Place primary monitor probe in bottle, immersing at least 2” (50 mm).

Enter the new offset value:

1. Press and hold the **Up** and **Down Arrows** simultaneously for 3 seconds to enter program mode.
2. The display will show .C or .F to indicate Celsius or Fahrenheit.
3. Press **SEL** until only the MONITOR lamp flashes.
4. Hold **SET**, then press **Up** or **Down Arrow** to change the monitor offset.
5. Release **SET** button. The new setting is saved.
6. Press and hold **Up** and **Down Arrows** simultaneously for 3 seconds to exit program mode.

Control Sensor

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

The temperature controller adjusts chamber temperature around the freezer setpoint by activating the compressor when the control probe registers above the setpoint based on the hysteresis value.

Determine control sensor offset:

Notes

- Control Sensor Offset is factory-preset and changing this value is not recommended. Contact Helmer Technical Service for questions regarding the Control Sensor Offset.

1. View and record the Freezer Setpoint. (Reference Section 10.3)
2. Allow the unit to run with calibrated monitor temperature for several compressor cycles, and record the average monitor temperature. *(If the monitor temperature remains close to the freezer setpoint no further action is needed.)*
3. View and record the current Control Offset value.
4. Subtract the Freezer Setpoint from the average monitor temperature and record the difference.
5. Add the current Control Offset value to the recorded difference determined in the previous step to establish the new Control Offset value.

Example
Freezer setpoint is -30.0
Average monitor temperature is -31.2
Current Control Offset is 0.3
Subtract: -31.2 - (-30.0) = -1.2; difference between average temperature and setpoint.
Add: 0.3 + (-1.2) = -0.9; new control offset value

Enter the new offset value:

Notes

- Ensure Control Sensor Offset is being changed, and not Hysteresis.
- Control Sensor Offset and Hysteresis have the same visual indicator.

1. Press and hold the **Up** and **Down Arrows** simultaneously for 3 seconds to enter program mode.
2. The Display will show .C or .F to indicate Celsius or Fahrenheit.
3. Press **SEL** until only the CONTROL lamp flashes.
4. Hold **SET**, then press **Up** or **Down Arrow** to change the setpoint.
5. Release **SET** button. The new setting is saved.
6. Press and hold **Up** and **Down Arrows** simultaneously for 3 seconds to exit program mode.

Hysteresis

Hysteresis is the allowable temperature control variance on each side of the freezer setpoint.

Note

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

Non-Configurable Alarms

The Power Failure and Door Open alarms indicate operational conditions which may require the attention of the operator or a qualified service technician. The Power Failure alarm will activate immediately upon loss of power. The Door Open alarm will activate once the door has remained open for approximately three minutes. These settings are factory-preset and may not be changed.

11 Maintenance

Maintenance tasks should be completed according to the schedule below.

CAUTION

Maintenance should only be performed by trained refrigeration technicians.

Notes

- The preventive maintenance schedule provides recommended minimum requirements. Regulations or physical conditions at your organization may require maintenance items be performed more frequently, or only by designated service personnel.
- 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.

Table 14. Horizon Series Preventive Maintenance Schedule

Task	Frequency			
	Quarterly	Annually	2 years	As Needed
Test the high temperature alarm.	✓			
Test the power failure alarm (as required by your organization's protocols).	✓			
Test the door alarm (as required by your organization's protocols).				✓
Check the temperature calibration on the monitor and change it if necessary.	✓			
Replace the monitoring system back-up battery.		✓		
Check the level of the solution in the probe bottles. Refill or replace solution if necessary.				✓
Examine the probe bottles and clean or replace if necessary.		✓		
Clean the condenser grill.	✓			
Clean the door gaskets, interior, and exterior of the freezer.				✓
Electrical compartment • Inspect electrical components and wiring terminals in the electrical box for discoloration. Contact Helmer Technical Service if any discoloration is found. • Inspect all wiring for terminals for secure connection. Tighten wiring terminal connections as necessary.	✓			
Models with Chart Recorders Check the backup battery for the chart recorder after an extended power failure and change it if necessary, or change the battery if it has been in service for one year. Refer to the Temperature Chart Recorder Operation and Service Manual.				✓
Models with Access Control Test the Access Control battery.	✓			
Replace Access Control back-up battery.			✓	

NOTICE

Clean the condenser grill on a quarterly basis.

Note

During a power failure, the back-up battery provides power to the monitoring system, power failure alarm, and optional Access Control. If the back-up battery is not functioning, the power failure alarm will not be activated and the battery should be replaced.

11.1 Alarm Tests

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

Chamber Temperature Alarm Test

NOTICE

- Before testing alarms, protect items stored in the unit from extended exposure to adverse temperature.
- Temperature probes are fragile; handle with care.

Test the high alarm:

1. Identify setting for high alarm setpoint.
2. Place the glass of product simulation solution in the freezer.
3. When the product simulation solution has stabilized at the chamber temperature, remove the solution from the freezer.
4. Remove the monitor probe from the probe bottle.
5. Place the probe in the product simulation solution, observe the temperature on the monitoring system display at which the high temperature alarm sounds.
6. Compare the temperature at which the alarm sounds to the high alarm setpoint.
7. Remove probe from product simulation solution.
8. Place monitor probe in probe bottle, immersing it at least 2” (50 mm).

Power Failure Alarm Test

Note

During a power failure, the back-up battery should continue to provide power to the monitoring system.

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

Door Open Alarm Test

Note

Factory-set to three minutes and can not be changed.

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.

11.2 Test and Replace Back-up Batteries

Check Monitoring System Battery

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

Note

Use only a battery which meets manufacturer’s specifications.

Test the battery:

1. Switch the AC ON/OFF switch OFF.
2. Display should continue to display information and the No Battery alarm should activate.
3. If the display is blank, replace battery.
4. Switch AC ON/OFF switch ON.

Check Optional Access Control System Battery

During an AC power failure, the Access Control back-up battery provides back-up power to the magnetic Access Control lock. Test the Access Control back-up battery to ensure it is working properly.

Test the battery:

1. Ensure Access Control back-up battery key switch is switched ON.
2. Switch AC ON/OFF switch OFF.
3. Verify “PoFF” (power failure) message is displayed.
4. Attempt to open the cabinet door, if the door remains locked, the battery is functional. If the door does not remain locked, replace the battery.
5. Switch AC ON/OFF switch ON.

Chart Recorder Back-up Battery (if included)

Refer to 360076-1 Temperature Chart Recorder Operation and Service Manual.

11.3 Check Probe Bottle

Remove the probe bottle from the bracket and inspect for cracks. Replace the bottle if necessary.

Ensure the probe bottle has approximately 4 oz. (120 mL) of product simulation solution (1:1 ratio of water to propylene glycol). The propylene glycol is used to create a solution which simulates the product stored in the freezer. The product simulation solution temperature reflects the product’s temperature during normal operation. Failure to fill the bottle may prevent the chamber temperature from stabilizing at the temperature setpoint. The probe should be immersed at least 2” (50 mm).

11.4 Clean the Freezer

Cabinet Exterior

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

CAUTION

The condensate evaporator and water evaporation tray are hot.

Cabinet Interior

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

Condenser Grill

CAUTION

Disconnect freezer from AC power when cleaning condenser grill.

If the freezer is located in an environment where it is exposed to excessive lint or dust, the 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.

Door Gaskets

Clean with soft cloth and mild soap and water solution.

Probe Bottles

Clean and Refill Probe Bottles

1. Remove all probes from bottle.
2. Remove bottle from bracket and empty any remaining solution
3. Clean bottle with a 1:9 ratio of bleach to water solution or a company approved equivalent oxidizing cleaner/disinfectant.
4. Refill bottle with 4 oz. (120 mL) of product simulation solution (1:1 ratio of water to propylene glycol).
5. Cap bottle tightly to minimize evaporation.
6. Place bottle in bracket.
7. Replace probes, immersing at least 2” (50 mm).

12 Service

12.1 Refrigerant

CAUTION

- Review all safety instructions prior to recharging refrigerant. Refer to Section 1.1.
- Maintenance should only be performed by trained refrigeration technicians.

Notes

- Use only non-CFC R404A refrigerant.
- Pressure readings may vary based on chamber temperature and ambient air temperature.
- Normal low side pressures are 2 psi to 4 psi when unit is functioning at standard operating temperatures and measured at the end of the compressor cycle.
- If a refrigerant leak is suspected, Helmer recommends finding and fixing the leak prior to recharging the unit.

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

Table 15. Initial Charge by Model

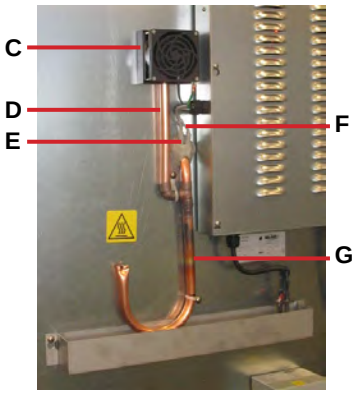
Model	Refrigerant	Power Requirements	Initial Charge
120 and 125 models	R404A	115 V, 60 Hz 230 V, 50/60 Hz	29.0 oz. (822 g)

12.2 Remove / Replace Unit Cooler Cover

The unit cooler must be removed when servicing the control probe, fan motor(s) or coil.

NOTICE

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.



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

Remove unit cooler cover

CAUTION

The condensate evaporator and water evaporation tray are hot.

1. Switch AC ON/OFF switch OFF. Disconnect the battery.
2. On the back of the cabinet, peel the putty back to expose the drain tube and drain heater.
3. Verify the heating element is cool. Remove the screws and loosen the pipe straps securing the drain tube to the cabinet.
4. Remove the drain heater from the drain tube.
5. Remove the drain tube by pulling it downward. The drain tube should separate from the fan tube at the 90° elbow, leaving the fan tube attached to the fan.
6. Separate the drain hose inside the cabinet from the unit cooler drain port by gently twisting the drain hose from left to right to separate it from the unit cooler drain port.
7. Pivot the drain tube and drain hose upward to remove the assembly from the cabinet.
8. Remove top drawer, basket, or shelf from the chamber.

Note

Units without the Cold-Shield panel proceed to Step 10.

9. Loosen three screws securing Cold-Shield panel to the cabinet and slide panel to disengage from screws and remove.
10. Using a 5/16” socket wrench, remove the four screws securing the unit cooler cover to the top of the cabinet while supporting the cover with one hand to prevent it from dropping.
11. Carefully lower the unit cooler cover to avoid damage to the fan wiring.

Install unit cooler cover

1. Verify unit cooler wiring is connected and routed correctly. Wiring should be routed above the copper tube inside the unit cooler. Reconnect wires if they have separated.
2. Lift the unit cooler cover into place and attach using four screws. Tighten using a 5/16” socket wrench to secure.
3. From the rear of the unit, insert the drain tube through the opening into the cabinet. The drain tube should be aligned with the unit cooler drain spout inside the chamber and the connection to the fan tube at back of the unit.
4. Attach the drain tube to the unit cooler drain spout and the fan tube.
5. Insert the drain line heater in the drain tube at an upward angle. The black heating element should no longer be visible.
6. Replace putty around the drain tube inside the cabinet.
7. Reinstall top drawer, basket, or shelf if previously removed.

Note

Units without the Cold-Shield panel proceed to Step 9.

8. Reinstall Cold-Shield panel and tighten screws to secure.
9. Reattach the pipe straps to secure the drain tube to the cabinet.
10. Switch AC ON/OFF switch ON. Reconnect the battery.
11. Touch **Mute** to disable the high temperature alarm while freezer reaches operating temperature

13 Troubleshooting

CAUTION

Review all safety instructions prior to troubleshooting. Refer to Section 1.1.

13.1 General Operation Problems

Problem	Possible Cause	Action
A drawer does not slide easily.	Ice buildup in the drawer slides.	Pull the drawer out and confirm the slides are free of ice. De-ice if necessary.
	Debris in the drawer slides.	Pull the drawer out and confirm the slides are free of debris. Clean if necessary.
	Drawer is misaligned or not level.	Confirm both slides for the drawer are mounted at the same height.
	Drawer slide is faulty.	Confirm the slide is operating correctly. Replace if necessary.
The door does not open easily.	Door handle is not aligned.	Properly align door handle.
	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 the cam if necessary.
The display/monitor is not responding.	Digital electronics are locked because of an interruption in power.	Reset the monitoring system
“Probe Failure” is displayed on the monitor.	Probe wiring is an open circuit	Check the continuity of the probe wiring and connections. Secure the connections if necessary
		Confirm the probe is providing resistance in the range of 86 Ω to 110 Ω. Replace the probe if necessary.

13.2 Chamber Temperature Problems

Problem	Possible Cause	Action
The chamber temperature displayed is higher or lower than the actual temperature.	Probe bottle is empty, or the amount of solution is too low.	Check the level of product simulation solution in the bottle. Clean and refill the bottle if necessary.
	Solution in probe bottle is frozen.	Refill the bottle with new solution.
	Primary monitor probe(s) is not calibrated.	Check the chamber temperature calibration. Change the calibration if necessary.
	Digital electronics are locked due to an interruption in power.	Reset the monitoring system.
	Connections for the primary monitor probe are loose.	Check primary monitor probe connections. Secure connections if necessary.
	A component is faulty or internal connections are loose.	Contact Helmer Technical Service.
“Prob” appears on the display, but the chamber temperature is set correctly.	Monitor probe wiring is an open circuit.	Check the continuity of the probe wiring and connections. Secure the connections or replace the probe if necessary.
	Connections for the monitor probe are loose.	Test the probe connections. Secure the connections if necessary.
	A component is faulty.	Contact Helmer Technical Service.
An error code displays on the monitor.	A component is faulty or internal connections are loose.	Contact Helmer Technical Service.
The chamber temperature meets an alarm condition, but the appropriate temperature alarm is not active.	Temperature alarm setpoint was changed.	Check the current setpoints for the temperature alarms. Change the setpoints if necessary.
		Contact Helmer Technical Service.
The compressor runs continuously.	Freezer setpoint is set too low.	Confirm the setpoint is set within the operating range and change it if necessary.
	Control probe is not reading correctly.	Check control probe reading; adjust offset if necessary.
		Check probe connections at control board.
	Solid state relay is faulty.	Confirm the relay is operating correctly. Replace the relay if necessary.

Problem	Possible Cause	Action
The chamber temperature does not stabilize at the freezer setpoint.	Circulation in the chamber is not adequate.	Check if there are any items that may obstruct air flow and remove them if necessary.
	Unit cooler fan is not running.	Check the voltage to the fan when door switch is activated. Replace the fan motor or door switch if necessary.
	Condenser grill is dirty.	Check the condenser grill. Clean it if necessary.
	Ambient air temperature around the freezer is too high.	Confirm freezer location meets requirements. Refer to the operation manual.
	Condensing unit fan is not running.	Check the condensing unit fan connections. Replace the fan motor if necessary.
	Evaporator is covered with ice and is not exchanging heat.	Initiate a freezer defrost cycle.
	Control probe is not reading correctly.	Check control probe reading; adjust offset if necessary.
		Check probe connections at control board.
	Refrigerant level is too low.	Check the refrigeration lines for leaks and repair them if necessary. Check the refrigerant level. Recharge the refrigerant if necessary.
	A component is faulty or internal connections are loose.	Contact Helmer Technical Service.

13.3 Alarm Activation Problems

Problem	Possible Cause	Action
The freezer meets an alarm condition, but the appropriate alarm is not active.	Alarm setpoint was changed.	Check the current setpoints for the alarms.
	A component is faulty or internal connections are loose.	Contact Helmer Technical Service.
The High Temperature alarm activates when the door is opened, then clears shortly after the door is closed.	Probe bottle is empty.	Check the level of product simulation solution in the bottle. Clean and refill bottle if necessary.
	High temperature alarm setpoint is set too low.	Check the setpoint. Change the setpoint 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.
	A component is faulty or internal connections are loose.	Contact Helmer Technical Service.
The freezer is connected to power, but the AC Power Failure alarm is active.	ON/OFF AC power switch is OFF.	Turn the ON/OFF AC power switch to the ON position.
	Outlet connection is faulty.	Verify power at the outlet. Repair the original outlet or connect to a different outlet if necessary.
	Power cord is faulty.	Confirm the power cord is connected securely. Secure the power cord if necessary.
	Circuit breaker is tripped.	Reset or replace the circuit breaker.
	A component is faulty or internal connections are loose.	Contact Helmer Technical Service.
The Door Open alarm is activating sporadically.	Door is not closing completely.	Confirm the hinge cams are not damaged. Replace the cams if necessary.
	Doors are closing but not sealing completely.	Ensure door switch is being activated by the door switch plate. Adjust as needed.
	Door switch is faulty.	Replace the door switch.
	Temperature monitor/controller board is faulty.	Contact Helmer Technical Service.
All alarms are activating sporadically.	Alarm system component is faulty or internal connections are loose..	Confirm the circuit board and line connections are functioning correctly. Contact Helmer Technical Service.
The “High Temperature” alarm is activating sporadically.	Primary monitor probe is not immersed in the product simulation solution.	Confirm the probe bottle is full of solution, and the probe is placed in the bottle correctly.
	Upper monitor probe is not calibrated.	Confirm the upper monitor probe is reading correctly. Calibrate the probe if necessary.
	A component is faulty or internal connections are loose.	Contact Helmer Technical Service.

13.4 Condensation and Icing Problems

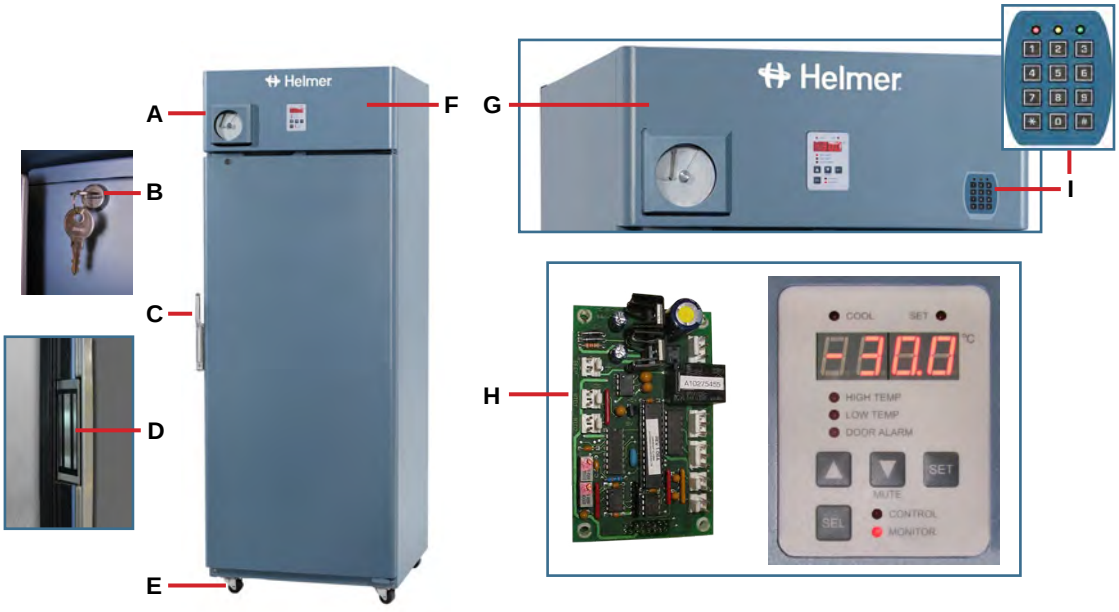
Problem	Possible Cause	Action
There is excessive water in the water evaporation tray.	Humid air is entering the chamber	Confirm the freezer is level, and the door is aligned, closing tightly, and sealing correctly. Correct issues as necessary.
	Heater in the water evaporation tray is faulty.	Confirm the heater is hot and is drawing the correct current (approximately 0.21 A to 0.35 A for 230V model, 0.36 A to 0.56 A for 115V model). Replace the heater if necessary.
There is 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.
	Unit cooler drain line is damaged or restricted.	Confirm the unit cooler drain line is free of debris and is not restricted. Remove debris if necessary.
	Connection between the unit cooler and the drain line is loose.	Confirm the connection is secure. Tighten the connection if necessary.
There is excessive moisture on the door.	Humid air is entering the chamber.	Confirm the freezer is level, and the door is aligned, closing tightly, and sealing correctly.
	Relative humidity around freezer is too high.	Confirm freezer location meets requirements.

Problem	Possible Cause	Action
After a defrost cycle, no water flows into the water evaporation tray.	Drain line is plugged.	Confirm the drain tube is free of debris. Remove debris if necessary.
	Drain line heater is faulty.	Confirm the drain line heater is warm to the touch. Contact Helmer Technical Service to resolve issues as necessary.
	Defrost heater on the evaporator in the unit cooler is faulty.	Check for ice buildup on the evaporator by looking through the fan grill with a flashlight. If there is significant ice buildup inside or behind the unit cooler, initiate a defrost cycle of the freezer.
		Confirm defrost heater is hot and is drawing the appropriate current during a defrost event (approximately 3.3 A to 5.5 A for 230V model, 7.8 A to 10.7 A for 115V model).
		Replace the defrost heater if necessary.

14 Horizon Series™ Parts

Note

- 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.
- The control board assembly is sensitive to static electricity and can be damaged by electrostatic discharge. Use proper ESD precautions when handling the control board assembly.



Letter	Description	Part #
A	Temperature chart recorder (standard on plasma freezer model, optional on laboratory freezer model)	800083-1
Not shown	Chart paper (52 sheets)	220419
	Chart recorder back-up battery	120218
B	Door lock (functions as Access Control manual override lock on models equipped with Access Control)	220540
C	Door handle	220426
D	Magnetic lock	800138-1
E	Caster (swivel with brake)	220467

Letter	Description	Part #
F	Bezel without optional Access Control * = with chart recorder door	800093-1*
		800092-1
G	Bezel with optional Access Control * = with chart recorder door	800095-1
		800094-1
Not shown	Alarm disable key switch	120227
H	Control board assembly (Monitoring and Control system) * = serial #'s 2015494 and greater	800006-1
		800276-1*
I	Keypad (Optional Access Control)	800007-1

Letter	Description	Part #	Volts
A	Chart recorder probe	800024-1	-
B	Primary monitor probe	800029-1	-
C	Probe bottle and propylene glycol kit	400922-1	-
D	Unit Cooler Assembly	800870-1	115
		800871-1	230
E	Unit Cooler Fan Guard (Heatcraft / Peerless)	800876-1	115/230
		800877-1	230
F	Unit Cooler Fan Motor (Heatcraft / Peerless)	800872-1	115
		800950-1	230
		800873-1	230
G	Unit Cooler Fan Blade (Heatcraft / Peerless)	800874-1	115/230
		800875-1	230
H	Unit Cooler Drain Pan (Heatcraft / Peerless)	800878-1	115/230
		800879-1	230
I	Control Probe	800028-1	-
J	Fan delay/defrost termination thermostat	800085-1	-
K	Defrost Heater (Heatcraft / Peerless)	800880-1	115
		800881-1	230
		800882-1	230
L	TXV (expansion) valve	800110-1	-
M	Defrost heater high limit thermostat	800014-1	-
N	Door switch	120380	-
O	Strike plate replacement kit	400687-1	-
P	Mullion heater (behind strike plates)	800883-1	115
		800884-1	230

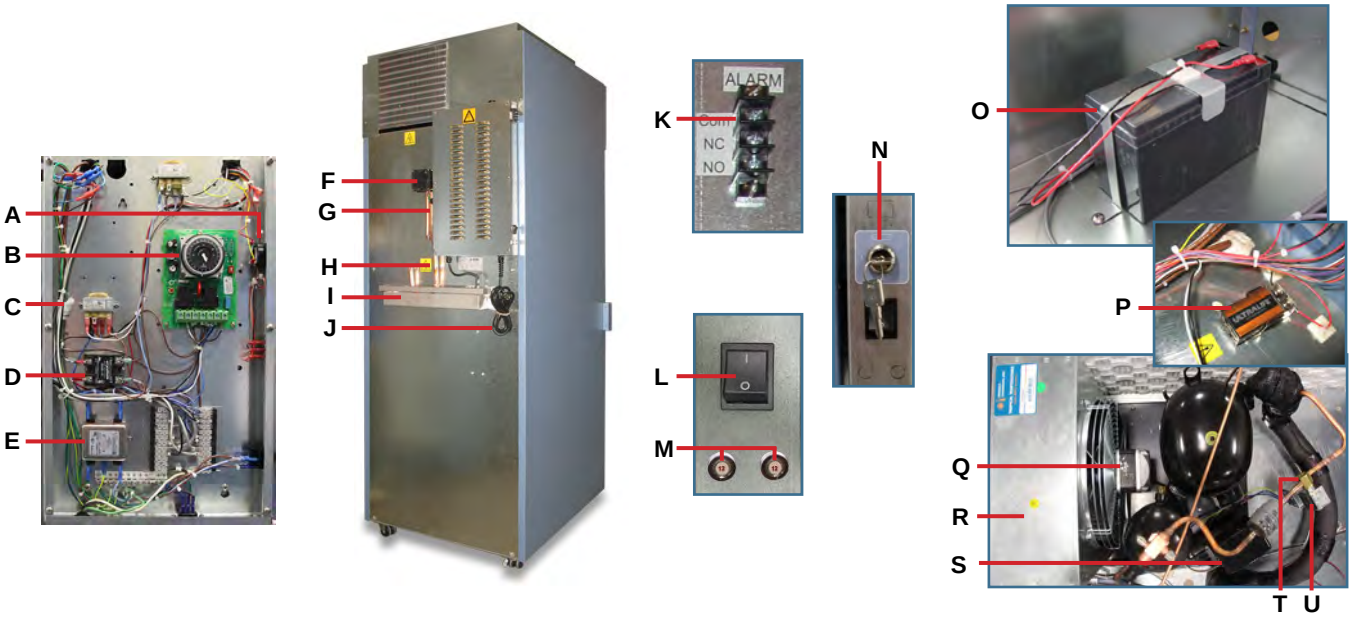
Letter	Description	Model	Part #
Q	Full shelf (includes hardware)	120	400414-1
		125	400414-2
R	Drawer assembly (includes drawer, 2 slides, hardware)	120	400584-2
		125	400584-1
Not Shown	Drawer slide wheel	-	320815-1
	Drawer slide assembly (right side)	120	400541-3
		125	400541-1
	Drawer slide assembly (left side)	120	400541-4
		125	400541-2
	Roll-out basket assembly (optional includes basket, 2 slides, hardware)	120	400890-1
		125	400890-2
	Roll-out basket slide assembly (right side)	120	400541-3
		125	400541-1
	Roll-out basket slide assembly (left side)	120	400541-4
		125	400541-2
	Half shelf (includes hardware)	-	400413-1
S	Upper hinge bracket * = left ** = right	-	400376-2*
		-	400346-1**
T	Hinge bearings	-	220375
U	Door gasket	-	320726-1
V	Door bumper	-	220441
W	Lower hinge cam (quantity 2)	-	320742-1
X	Door stop	-	320763-1
Y	Lower hinge bracket * = left ** = right	-	400377-2*
		-	400377-1**

CAUTION

- Disconnect the freezer from AC power before opening the electrical box.
- Do not remove the cover from the condensate evaporator tray.

Note

The control board is sensitive to static electricity and can be damaged by electrostatic discharge. Use proper ESD precautions when handling the board

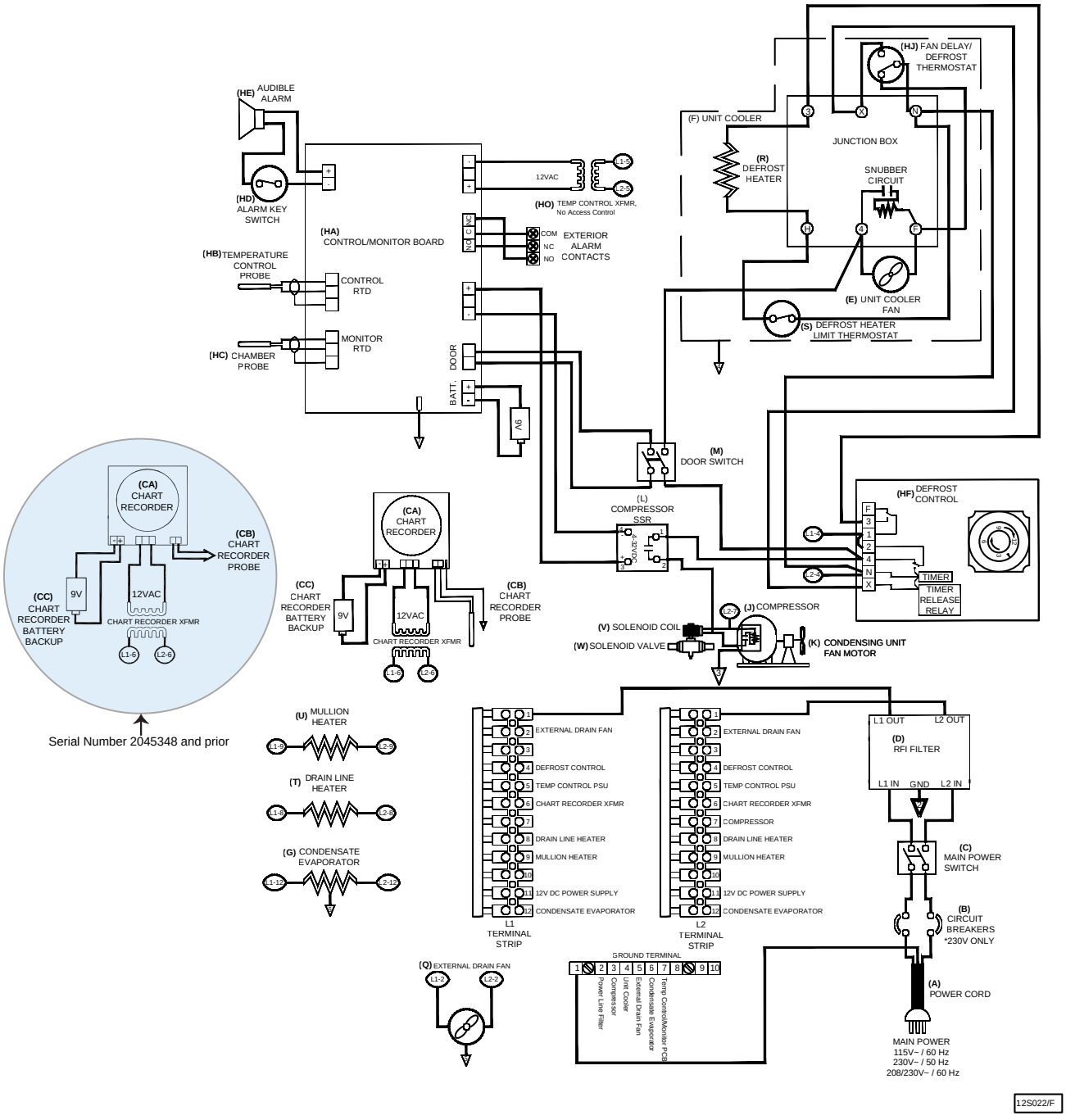


Letter	Description	Part #	Volts
A	Alarm buzzer	120227	-
B	Defrost timer	800015-1	-
C	Temperature control transformer	800119-1	115
		800125-1	230
D	Solid state relay	120426	-
E	Power line filter	120400	-
Not Shown	Access Control power supply (optional)	800035-1	-
F	Drain line fan	800885-1	115
		800886-1	230
G	Drain line heater	800278-1	115
		800279-1	230
H	Drain line	-	-
I	Condensate evaporator assembly (includes condensate evaporator, tray, and cover)	400790-1	115
		400790-2	230
J	Power Cable * = European models	800001-1	115
		800002-1	230
		800003-1*	230
K	Remote alarm contacts	-	-

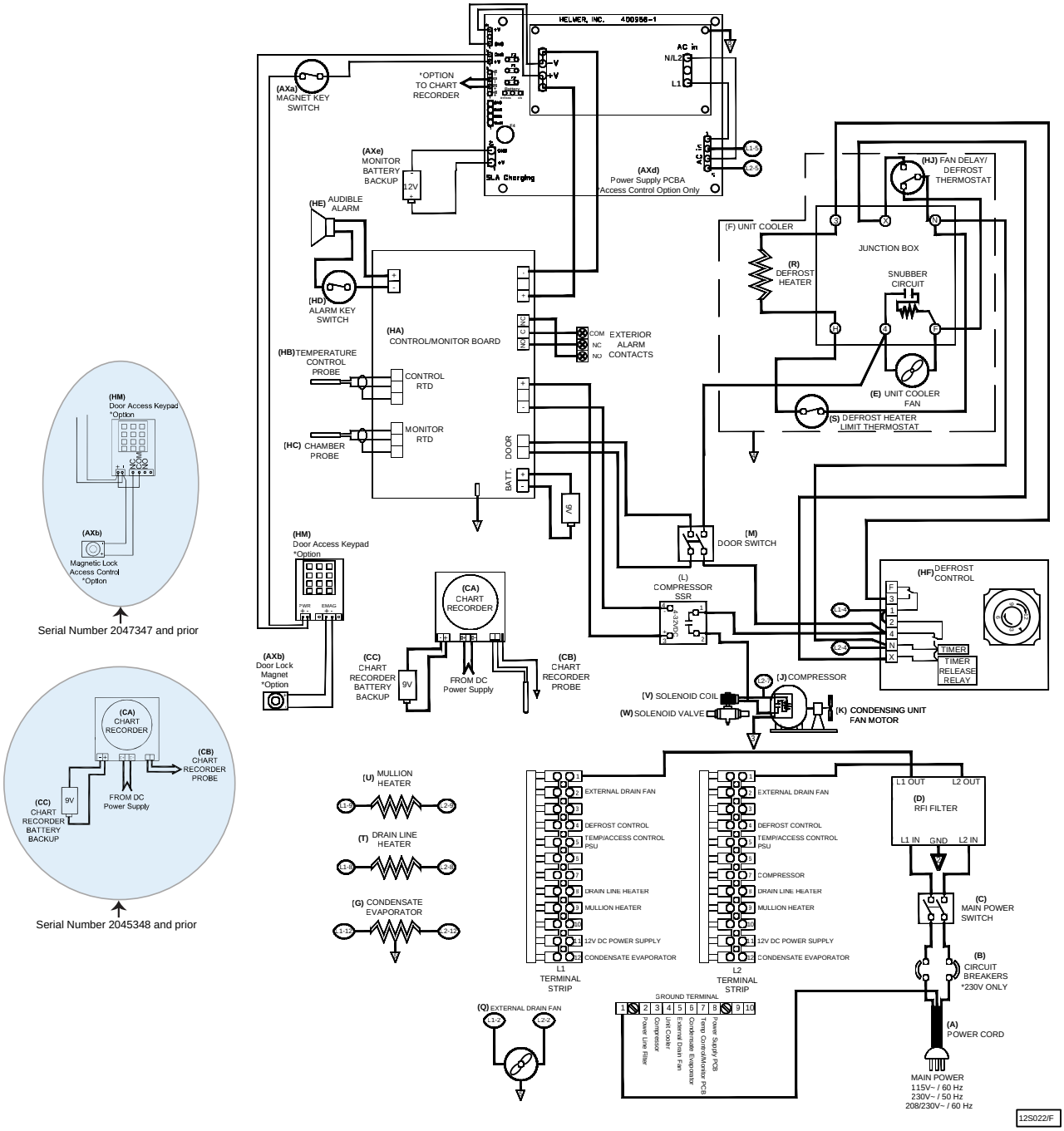
Letter	Description	Part #	Volts	Hz
L	Main power switch	120478	-	-
M	Circuit breaker, 12 A	120220	230	-
N	Back-up battery key switch (optional Access Control)	401220-1	-	-
O	Back-up battery (optional Access Control)	120628	-	-
P	Monitoring system back-up battery	120399	-	-
Q	Condenser Fan Motor	800868-1	115	60
		800869-2	230	50
		800869-1	230	60
R	Condensing Unit	800866-1	115	60
		800867-2	230	50
		800867-1	230	60
S	Compressor Electrical Components	800864-1	115	60
		800865-2	230	50
		800865-1	230	60
T	Solenoid Valve	220547	-	-
U	Solenoid Coil	800863-1	115	-
		800017-1	230	-

15 Schematics

15.1 HPF and HLF Models; 120 and 125 Configurations without Access Control



15.2 HPF and HLF Models; 120 and 125 Configurations with Access Control



Appendix A: Compliance

Regulatory Compliance

CE 0086

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

Sound level is less than 70 dB(A).

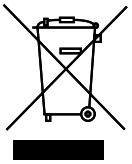
EC REP

Emergo Europe
Prinsessegracht 20
2514 AP The Hague
The Netherlands

RoHS COMPLIANT

WEEE Compliance

The WEEE symbol (right) indicates this product falls under the scope of the WEEE (Waste Electrical and Electronic Equipment) directive.



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.

Appendix B: Warranty

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.

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.

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.

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.

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.

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.

Outside of USA and Canada

Consult your local distributor for warranty information.

Helmer Scientific
14400 Bergen Boulevard, Noblesville, IN 46060 USA