Refrigerator Service and Maintenance Manual

i.Series® and Horizon Series™ - Upright

Laboratory

i.Series
iLR111, iLR120, iLR125, iLR245, iLR256 (Version D)

Horizon Series
HLR111, HLR120, HLR125, HLR245, HLR256 (Version D)

Pharmacy

i.Series
iPR111, iPR120, iPR125, iPR245, iPR256 (Version D)

Horizon Series
HPR111, HPR120, HPR125, HPR245, HPR256 (Version D)

Blood Bank

i.Series
iB111, iB120, iB125, iB245, iB256 (Version D)

Horizon Series
HB111, HB120, HB125, HB245, HB256 (Version D)

360127-D/F

Document History

Revision	Date	CO	Supersession	Revision Description
A	28 JAN 2013	6666	n/a	Initial release (as version D, revision A).
B	03 MAY 2013	8234	B supersedes A	• Added new part number for 120 V compressor on double-door models (245 / 256). • Added serial number range for each compressor (existing and new). • Applicable to i.Series and Horizon Series.
C	26 NOV 2013*	8934	C supersedes B	• Removed all references to mechanical Access Control. • Added references to magnetic Access Control.
D	03 MAR 2015	10317	D supersedes C	• Updated instruction in **Section III**, **Items 13.1 through 13.6.3** to reflect use of monitor and control interface with new Min/Max temperature recording feature**.** • Added Document Updates, to Document History page. • Added Confidential / Proprietary Notice, **Section I**, **Item 1.4** and Disclaimer, **Section I**, **Item 1.5**.
E	12 JAN 2016	11463	E supersedes D	• Reformatted content and layout for readability and ease of use. • Added inspection of ground strap to i.Series Preventive Maintenance table. • Added Product Loading Guidelines.
F	JUN 2016	11905	F supersedes E	• Updated spec label • Updated part numbers for unit cooler assembly and unit cooler fan motors. • Added new refrigerant charge for 245 amd 256 models.

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

Document Updates

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Disclaimer

This manual is intended as a guide to provide the operator with necessary instructions on the proper use and maintenance of certain Helmer Scientific products.

Any failure to follow the instructions as described could result in impaired product function, injury to the operator or others, or void applicable product warranties. Helmer Scientific accepts no responsibility for liability resulting from improper use or maintenance of its products.

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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Part No. 360127-D/ Rev F

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1 About This Manual

This manual provides information on i.Series® and Horizon Series™ upright laboratory, blood bank, and pharmacy refrigerators. It is intended for use by end users of the refrigerator 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 refrigerator. For example, “iLR125” refers to an i.Series Laboratory Refrigerator 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 (iB125, HB125, iLR125, HLR125, iPR125, HPR125). This manual covers all upright refrigerators, which may be identified singly, by their size, or by their respective “Series”.

1.1 Safety Symbols and Precautions

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 unit

The following symbols may be found on the refrigerator or refrigerator 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

Compliance with European Union Directive WEEE 2002/96/EC applicable provisions.

Safety Precautions

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 (single-door units) or 1350 lbs / 612 kg (double-door units).
- 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.

CAUTION

Decontaminate parts prior to sending for service or repair. Contact Helmer 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

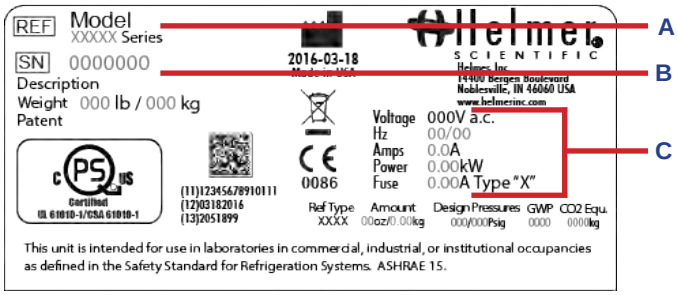
Model	Voltage	Frequency	Current Draw
111	115 V	60 Hz	7.0 A
	230 V	50 Hz	3.5 A
	230 V	60 Hz	3.5 A
120	115 V	60 Hz	7.5 A
	230 V	50 Hz	4.2 A
	230 V	60 Hz	4.2 A
125	115 V	60 Hz	7.5 A
	230 V	50 Hz	4.2 A
	230 V	60 Hz	4.2 A
245	115 V	60 Hz	11.5 A
	230 V	50 Hz	6.0 A
	230 V	60 Hz	6.0 A
256	115 V	60 Hz	11.5 A
	230 V	50 Hz	6.0 A
	230 V	60 Hz	6.0 A

1.3 Product Labels

This information appears on the product specification label, located on the rear of the refrigerator 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 Product Specification label.

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

Notes

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 8“ (203 mm) above, and minimum 3” (76 mm) behind.
- Meets limits specified for ambient temperature (15˚C to 32˚C) and relative humidity.

2.2 Placement and Leveling

CAUTION

- The water evaporation tray, located on the rear of the refrigerator, may be hot. Do not use the tray as a handle.
- To prevent tipping, ensure the casters are unlocked, leveling feet (if installed) are lifted, and doors are closed before moving the refrigerator.

1. Roll refrigerator into place and lock casters.
2. Ensure refrigerator is level.

Notes

- Helmer recommends the use of leveling feet.
- Use a wrench to raise or lower leveling feet. When the refrigerator is level, the bottom of the unit cooler will slope downward from front to back and be parallel to the floor.

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, 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, 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 OFF. Disconnect refrigerator from AC power.

Notes

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

The back-up battery is located on top of the refrigerator. For 111 models, a removable panel provides access to the back-up battery.

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

2.4 Prepare for Monitoring

The back-up battery switch is switched off for shipping. Switch the back-up battery switch ON to provide the monitoring system and optional Access Control 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 ,or through a side access port if available, and immersed in existing probe bottles.

The number and location of probes varies by model. External probes may be introduced through the existing top port and immersed in existing probe bottles, or through a side access port which is available in some models.

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

Each probe bottle should contain 4 oz. (120 mL) of product simulation solution at a 10:1 ratio of water to glycerin.

Left: Probe bottle with temperature and chart recorder probes.
Middle: Top access port. Right: Side 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.

Install Additional Probe Through Side Port

1. Remove interior and exterior plugs to expose side access port.
2. Insert probe through port into chamber.
3. Insert probe into bottle.
4. Ensure port is tightly sealed using putty.

Chart Recorder (if included)

Notes

- If chart recorder has been operating on battery power, the battery should be replaced to ensure the backup 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 backup battery system, enabling a period of continuous operation if power is lost. Battery life varies by manufacturer as well as voltage level remaining. Providing full power is available, backup power for the temperature chart recorder is available for up to 14 hours.

Prior to use:

Place probe in bottle with primary monitor probe.

Set up and Operation

Access chart recorder by pressing and releasing the door to open.

i.Series chart door

Install Battery

Connect the leads to the battery to provide backup 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 220366 (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.
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 33 V (RMS) or 70 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 terminals on the remote alarm interface have the following maximum load capacity:

- 0.5 A at 125 V (AC)
- 1 A at 250 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 refrigerator from extended exposure to adverse temperature.

Product Loading Guidelines

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

- Never load refrigerator 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. On the right rail, locate the release tab and press downward.
3. While holding the right release tab downward, locate the release tab on the left rail and press upward.
4. Pull drawer or basket free of the slides.

Install 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.

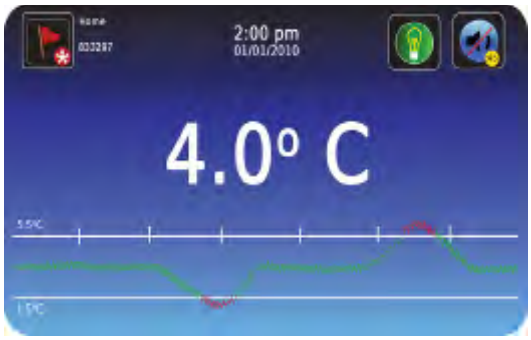
3.1 Home Screen and Screensaver

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 any screen other than those used to enter a password.

The Screensaver is automatically displayed after 2 minutes of inactivity on the Home Screen.

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 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
- Turn the chamber light on and off
- View a graph of the chamber temperature
- View unit ID
- Shortcut to Event Log

3.3 Alarm Reference

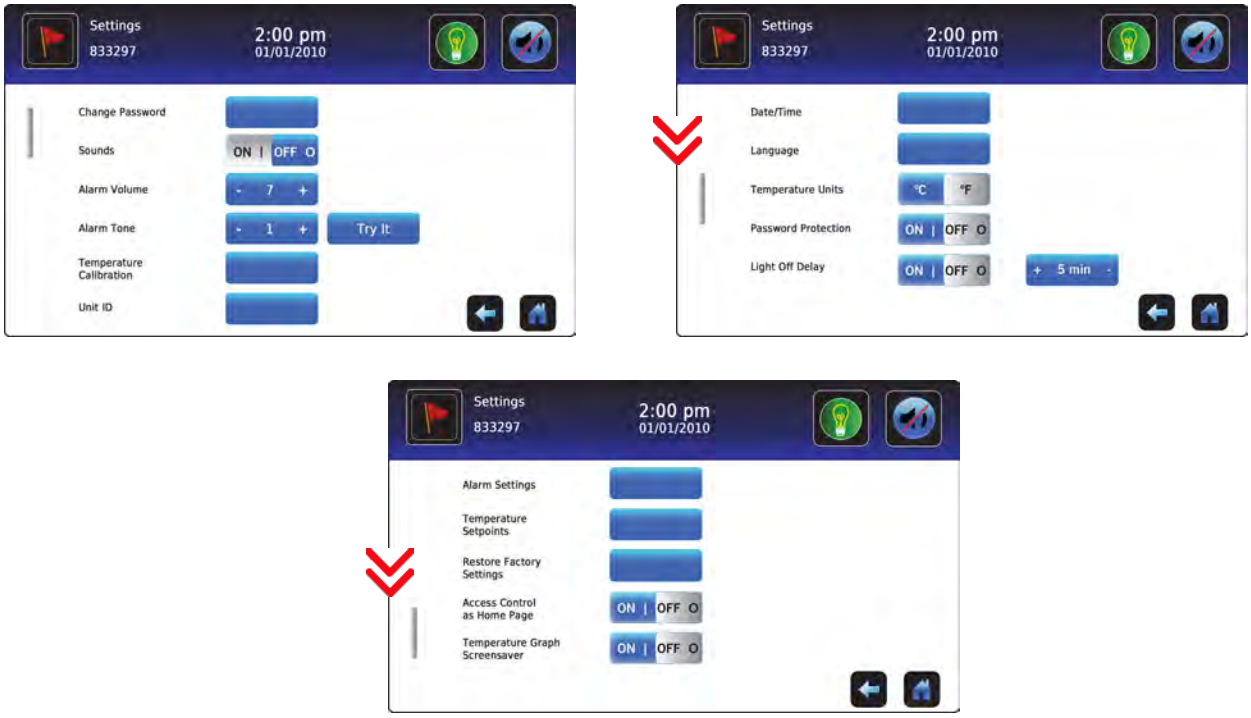
If an alarm condition is met, an alarm activates. Some alarms are visual only; others are visual and audible. Some alarms are sent through the remote alarm interface. The table below indicates if an alarm is audible (A), visual (V), or sent through the remote alarm interface (R).

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 **Home**, **i.C³ APPS**, **Settings**. Use a touch-drag motion to scroll up or down to select the desired setting.



Settings screens

Notes

- 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 operation of the refrigerator. 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 select the setting. The method for accessing the Settings mode for each setting varies.

Temperature Controller Programs

Temperature controller values are programmed at the factory. Setpoints can be viewed and changed through the i.C³ monitoring and control system. To view temperature setpoints, touch **Home**, **i.C³ APPS**, **Settings**. Scroll down and touch the button beside Temperature Setpoints to enter the Temperature Controller Programs screen.

Temperature Controller Programs screen.

Table 3. Setpoints

Setting	Initial Factory Value
Temperature Setpoint	4.0 °C
Hysteresis Setpoint	2.0 °C (iB111) 0.8 °C (iLR111 and iPR111) 1.0 °C (iLR120, iLR125, iPR120, iPR125) 1.5 °C (245, 256)
Delay on Start-Up	2 minutes
Control Relay Probe Error Duty Cycle	50%

Temperature Setpoint

The setpoint is the temperature at which the refrigerator operates.

Note

If the Settings screen is password protected enter appropriate password. If viewing settings for the first time, enter factory default password of “1234”

Change the setpoint if your organization requires a chamber temperature other than 4.0 °C.

1. Touch **i.C³ APPS**, **i.C³ Settings**.
2. Enter the Settings password.
3. Scroll down and touch **Temperature Setpoints**.
4. Touch **+** or **–** on the **Temperature Setpoint** spin box.

Hysteresis Setpoint

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

Delay on Start-Up

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

Control Relay Probe Error Duty Cycle

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

Note

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

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 4. User Configurable Alarms

Alarm	Description	Default Setpoint	Default Time Delay
High Temperature	Chamber temperature reading is above high temperature alarm setpoint	5.5 °C	0 minutes
Low Temperature	Chamber temperature reading is below temperature alarm setpoint	1.5 °C *(blood bank refrigerators)*	0 minutes
		2.0 °C *(laboratory and pharmacy refrigerators)*	
Power Failure	Power to unit has been disrupted	-	1 minute
Probe Failure	Temperature probe is not functioning properly	-	0 minutes
Door Open	Door is open beyond user-specified duration	-	3 minutes
Compressor Temperature	Compressor discharge temperature is too high	50 °C	0 minutes

Alarm setting 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 **+** or **–** on the spin box corresponding to the alarm setting to be changed.
5. 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 5. 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 Temperature Calibration

Temperature 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 **Home**, **i.C³ APPS**, **Settings**, and scroll down to **Temperature Calibration**.

Settings Screen

Temperature Calibration screen.

Notes

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

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 refrigerator setpoint by activating the compressor when the control probe registers above the setpoint based on the hysteresis value.

Determine Control Sensor Offset:

NOTICE

- Control Sensor Offset is factory-preset and should not be changed. Contact Helmer Technical Service for instructions regarding changing the Control Sensor Offset.
- Monitor temperature must be verified and accurate prior to adjusting the Control Sensor Offset.

1. View and record the Refrigerator 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 Offset value.
4. Subtract the Refrigerator 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 1	Example 2
Refrigerator setpoint is 4.0	Refrigerator setpoint is 4.0
Average monitor temperature is 5.2	Average monitor temperature is 2.8
Current Control Offset is 0.3	Current Control Offset is 0.3
Subtract: 5.2 - 4.0 = 1.2; difference between average temperature and setpoint.	Subtract: 2.8 - 4.0 = -1.2; difference between average temperature and setpoint.
Add: 0.3 + 1.2 = 1.5; new control offset value	Add: 0.3 + (-1.2)= -0.9; new control offset value

Enter New Offset Value:

1. Touch **Home**, **i.C³ APPS**, **Settings**.
2. Enter the Settings password.
3. Touch **Temperature Calibration**.
4. Touch **+** or **–** on the **Control Sensor 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.

Primary Monitor and Secondary Probes

Verify primary monitor and secondary probes are reading chamber temperature correctly by comparing probe readings to the temperature measured by a calibrated reference thermometer. If the probes are not reading correctly, change the value displayed on the monitor.

The factory default setting for the primary monitor and secondary probes is 4.0°C.

Notes

- Ensure product simulation bottle is full of solution.
- Probes in the bottles are connected to the monitoring system and sense chamber temperature. These probes activate the temperature alarms but do not affect refrigerator setpoint.

Calibrate Primary Monitor Probe:

1. Remove primary monitor probe from the upper probe bottle.
2. Unscrew the cap from the bottle.
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. Close the door and allow the chamber temperature to stabilize.
5. Observe and note the thermometer temperature.
6. Touch, **i.C³ APPS**, **Settings**, **Temperature Calibration**.
7. Touch **+** or **–** on the **Upper Temperature** 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).

Calibrate Secondary Probe:

1. Remove secondary probe from the lower probe bottle.
2. Unscrew the cap from the bottle.
3. Attach a calibrated independent reference thermometer traceable per national standards to the secondary 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.
5. Observe and note the thermometer temperature.
6. Touch, **i.C³ APPS**, **Settings**, **Temperature Calibration**.
7. Touch **+** or **–** on the **Lower Temperature** 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).

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 refrigerator was shipped.

Table 6. Default Settings

Setting	Restored Value
Home Screen Application Icons	i.C³ APPS, Temperature Alarm Test, Temperature Graph, Information Logs, Download
Display Brightness	High (3 symbols)
Password (for Settings screen)	1234
Sounds	On
Alarm Volume	9
Alarm Tone	3
Temperature Calibration Values	Not affected by restoring factory settings
Unit ID	Serial number entered at factory
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	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
Light Off Delay (on/off)	On
Light Off Delay	5 minutes
High Temperature Alarm Setpoint	5.5 °C
High Temperature Alarm Time Delay	0 minutes
Low Temperature Alarm Setpoint *	1.5 °C (iB models) 2.0 °C (iLR and iPR models)
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
Compressor Temperature Alarm Setpoint	50.0 °C
Compressor Temperature Alarm Time Delay	0 minutes
Chamber Setpoint	4.0 °C
Chamber Hysteresis	1.5 °C (iB111) 0.8 °C iLR111, iPR111) 1.0 °C (iLR120, iLR125, iPR120, iPR125)
Delay on Start-Up	2 minutes

** Includes laboratory (iLR) and pharmacy (iPR) models originally set at 2.0 °C*

Additional Factory Default Settings for Laboratory and Pharmacy Models

Table 7. Laboratory and Pharmacy Default Settings

Setting	Restored Value (120, 125, 245, and 256 models)	Restored Value (111 models)
Control Relay Probe Failure Duty Cycle	50%	50%
Defrost Event #1 On/Off	On	Off
Defrost Event #1 Start Time	12:00 AM	12:00 AM
Defrost Event #2 On/Off	On	On
Defrost Event #2 Start Time	8:00 AM	6:00 AM
Defrost Event #3 On/Off	On	Off
Defrost Event #3 Start Time	4:00 PM	4:00 PM
Defrost Event #4 On/Off	Off	On
Defrost Event #4 Start Time	n/a	6:00 PM
Defrost Time/Defrost Safety Operation Time	10 minutes	15 minutes

Note

Defrost event settings are only applicable to laboratory (iLR) and pharmacy (iPR) refrigerators.

Restore Settings:

1. Touch **Home**, **i.C³ APPS**, **Settings**, **Restore Factory Settings**.
2. "Are you sure you want to restore factory settings?" message appears.
3. Touch **Yes** to restore the factory settings or **No** to maintain the current settings and clear the message.

Factory Settings

The settings listed below are set at the factory and may be viewed and changed. Contact Helmer Technical Service to verify if changing factory settings is necessary, and for instructions in accessing Factory Settings screen.

Table 8. Factory Set Operating Functions

Setting	Function
Device Type	Toggle between max uniformity and low humidity
Lower Probe	Toggle the secondary probe on or off
Lower Probe Alarm	Toggle the secondary probe alarm on or off
Light Icon	Toggle the light icon on or off
Temperature Controller Page	Enable or disable the temperature controller screen

4 Maintenance

Maintenance tasks should be completed according to the schedule below. Refer to the service manual and the i.C³ User Guide for more detail on completing the various tasks.

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 refrigerator from extended exposure to adverse temperature.
- Allow refrigerator temperature to stabilize at setpoint after performing service or after extended door opening.

Table 9. i.Series Preventive Maintenance Schedule

Task	Frequency			
	Quarterly	1 year	2 years	As Needed
Test the high and low temperature alarms.				
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.				
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.				
Replace monitoring system back-up battery				
Check the level of the solution in the probe bottles. Refill or replace solution if necessary.				
Check solution level in probe bottle. Refill or replace solution if necessary.				
Examine the probe bottles and clean or replace if necessary.				
Check the chamber lights and replace them if necessary.				
Clean the condenser grill.				
Clean the door gaskets, interior, and exterior of the refrigerator.				
If applicable, test the ground fault circuit interrupter on the internal outlet.				
Inspect ground strap Units prior to serial number 2022299				

NOTICE

Clean the condenser grill on a quarterly basis.

Notes

- 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.
- During a power failure, the back-up battery continues to provide power to the optional Access Control lock (if equipped). If the back-up battery is not functioning, the optional Access Control lock will not secure the door.

4.1 Alarm Tests

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

Automatic Chamber Temperature Alarm Test

Notes

- Test can be aborted by touching **Cancel Test**.
- Test is only applicable to the primary monitor probe.
- Test takes less than five minutes.
- If the temperature alarm test does not complete successfully, restart the i.C³ monitoring system.

When performing an automatic temperature alarm test, the Peltier device heats or cools the primary 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 **Home**, **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, an alarm is activated.
6. When completed, “Test Complete” appears.
7. Touch **Home**, **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 **Home**, **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 the Test:

1. Touch **Home**, **i.C³ APPS, Temperature Alarm Test**.
2. Touch **Cancel Test**.

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 the unit from extended exposure to adverse temperature.
- Temperature probes are fragile; handle with care.

Test the Low Alarm:

1. Identify setting for low alarm setpoint.
2. Remove primary monitor probe from bottle.
3. Immerse probe in glass filled with water and crushed ice mixture.
4. When low temperature alarm sounds, note the temperature on the i.C³ display.
5. Compare the temperature at which the alarm sounds to the low alarm setpoint.

Test the High Alarm:

1. Identify setting for high alarm setpoint.
2. Immerse primary monitor probe in glass of luke warm water.
3. When high temperature alarm sounds, note the temperature on the i.C³ display.
4. Compare the temperature at which the alarm sounds to the high alarm setpoint.
5. Remove probe from warm water.
6. Place primary 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 and optional Access Control lock.

1. Change Power Failure delay setting to 0 minutes by touching **Home**, **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

1. Change Door Open (Time) delay setting to 0 minutes by touching **Home**, **Settings**, **Alarm Settings**, then touching **+** or **–** 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 battery by switching 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. If the display is blank, replace the battery. When completed, switch AC ON/OFF switch ON.

Note

Use a battery which meets manufacturer's specifications.

Access Control Back-up Battery (Optional)

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

Test 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 (10:1 ratio of water to glycerin). The glycerin is used to create a solution which simulates the product stored in the refrigerator. 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).

4.5 Clean Refrigerator

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 refrigerator from AC power when cleaning.

If the refrigerator 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 Gasket

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 (10:1 ratio of water to glycerin).
5. Cap bottle tightly to minimize evaporation.
6. Place bottle in bracket.
7. Replace probes, 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

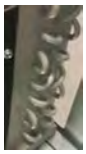
- Use only non-CFC R134A refrigerant.
- Pressure readings may vary based on chamber temperature and ambient air temperature.
- Normal low side pressures are 16 psi to 18 psi when unit is functioning at standard operating temperatures and measured at the end of the compressor cycle.
- If a refrigerant 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 and in the table below.

Table 10. Refrigerant Charge

Model	Refrigerant	Power Requirements	Initial Charge
111	R134A	115 V, 60 Hz 230 V, 50 Hz 230 V, 60 Hz	7.5 oz. (213 g)
120 and 125	R134A	115 V, 60 Hz 230 V, 50 Hz 230 V, 60 Hz	10.1 oz. (286 g)
245 and 256	R134A	115 V, 60 Hz 230 V, 50 Hz 230 V, 60 Hz	12.5 oz. (354 g) 10.5 oz. (298 g) *

* - units with light gray condensing coil.



5.2 Replace LED Lamp Strip

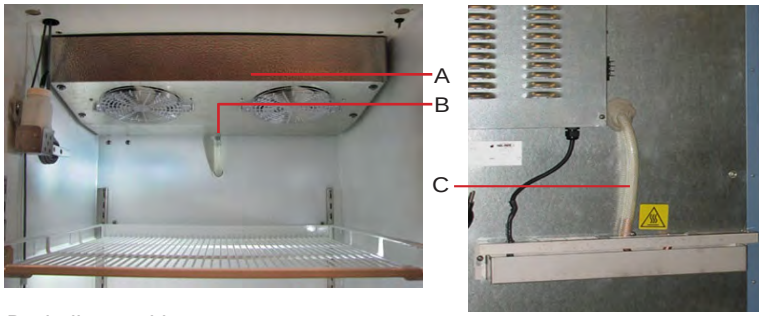
1. Switch battery switch OFF. Switch AC ON/OFF switch OFF.
2. Using a screwdriver, remove lamp strip from chamber wall.
3. Unsnap the defective LED and disconnect wires.
4. Snap new LED onto the lamp strip.
5. Connect the wires.
6. Using a screwdriver, attach lamp strip to chamber wall.
7. Switch AC ON/OFF switch ON. Switch battery switch ON.
8. Touch **Light** button or open door to test lamp.
9. Touch **Mute** to disable the high temperature alarm while refrigerator reaches operating temperature.

5.3 Remove / Replace Unit Cooler Cover

The unit cooler cover 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 refrigerator's inability to maintain temperature.



Label	Description
A	Unit cooler cover
B	Drain port
C	Drain hose

Drain line and hose.

Remove Unit Cooler Cover

CAUTION

The condensate evaporator and water evaporation tray are hot.

1. Switch AC ON/OFF switch OFF. Switch battery switch OFF.
2. Remove top drawer, basket, or shelf from the chamber.
3. On back of cabinet, peel putty back to expose drain hose.
4. Pull drain hose downward while gently twisting to remove from unit cooler drain port.
5. Push drain hose out through rear of chamber.
6. Hold unit cooler cover in place to prevent dropping. Using a 5/16"socket wrench, remove four screws securing the unit cooler cover.
7. Carefully lower unit cooler cover to avoid damage to the fan wiring.

Install Unit Cooler Cover

1. Verify unit cooler wiring is connected and routed correctly.
2. Lift unit cooler cover into place. Front edge of the cover should be behind the unit cooler case.
3. Using a 5/16" socket wrench, install four screws to secure the unit cooler cover.
4. Insert drain hose through hole in the rear of the refrigerator.
5. Push drain hose upward, toward the unit cooler drain port.
6. In the chamber, attach drain hose to unit cooler drain port.
7. Reinstall top drawer, basket, or shelf if previously removed.
8. Seal the opening around the drain hose on the back of the unit using putty.
9. Switch AC ON/OFF switch ON. Switch battery switch ON.
10. Touch **Mute** to disable the high temperature alarm while refrigerator 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 or basket does not slide easily.	Drawer slide is faulty.	Confirm the slide is operating correctly. Replace if necessary.
	Debris in the drawer slides.	Pull the drawer or basket out and confirm the slides are free of debris. Clean the slides if necessary.
	Drawer slides are not lubricated.	Using a lightweight oil, lubricate the bearings in the slides.
	Drawer or basket is misaligned or not level.	Confirm both slides for the drawer or basket are mounted at the same height.
A door does not open easily.	Debris in the hinges.	Confirm the hinges are free of debris. Clean the hinges if necessary.
	Door hinges are not lubricated.	Using a general-purpose grease, lubricate the pivots in the hinges.
	Hinge cam is faulty.	Confirm the hinge cam is not damaged. Replace the cam if necessary.
The monitor display is hard to read.	Screen brightness is set too low.	Change the screen brightness.
The alarm monitor is not responding.	Digital electronics are locked because of an interruption in power.	Reset the monitoring system.
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.
“Probe Failure” is displayed on the monitor.	Temperature 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.

6.2 Chamber Temperature Problems

Problem	Possible Cause	Action
The chamber temperature displayed is higher or lower than the actual temperature.	Probe bottles are empty, or the amount of solution is too low.	Check the level of product simulation solution in the bottles. Refill the bottles if necessary.
	Monitor is not calibrated.	Confirm the primary monitor probe is reading correctly. Calibrate the probe if necessary.
	Digital electronics are locked because of an interruption in power.	Reset the monitoring system.
	A component is faulty or internal connections are loose.	Contact Helmer Technical Service.

Problem	Possible Cause	Action
The chamber temperature does not stabilize at the refrigerator setpoint.	Probe bottles are empty.	Check product simulation solution level in bottles. Refill bottles if necessary.
	Display temperature is not calibrated.	Calibrate primary monitor probe.
	Inadequate air flow in chamber	Ensure all products are contained within the storage compartments and not blocking air flow. Adjust if necessary.
		Confirm 6” clearance below the evaporator fan.
		Check if there are products touching the sides or back of unit and ensure 2” clearance.
	Ambient air temperature around the refrigerator is too high.	Confirm the refrigerator is placed appropriately.
	Condenser grill is dirty.	Check the condenser grill. Clean the grill if necessary.
	Condensing unit fan is not running.	Check the condensing unit fan connections. Replace the fan motor 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.
	Control probe is out of calibration.	Confirm the probe is providing accurate temperature readings.
	Control probe is faulty.	Confirm the probe is providing resistance in the range of 98 Ω to 110 Ω. Replace the probe if necessary.
	Compressor starting relay is faulty.	Confirm the relay is operating correctly. Replace the relay if necessary.
	Compressor motor has seized.	Replace the compressor.
	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.
The compressor runs continuously.	Refrigerator setpoint is set too low.	Confirm the setpoint is set within the operating range and change it if necessary.
	Control probe is out of calibration.	Confirm the probe is providing accurate temperature readings.
	Control probe is faulty.	Confirm the probe is providing resistance in the range of 98 Ω to 110 Ω. Replace the probe if necessary.
	Solid state relay is faulty.	Confirm the relay is operating correctly. Replace the relay if necessary.

6.3 Alarm Activation Problems

Problem	Possible Cause	Action
The refrigerator is in an alarm condition, but alarms are not audible.	Alarm system is locked.	Reset unit by turning both main power and battery power off, then power unit back on.
	Alarm speaker is faulty.	Replace the speaker.
	Audible alarms have been muted.	Verify audible alarms are not muted. Touch the **Mute** button repeatedly until the Mute timer indicates no time delay.
	A component is faulty or internal connections are loose.	Contact Helmer Technical Service.
The refrigerator meets an alarm condition, but the appropriate alarm is not active.	Alarm setpoint was changed.	Check the current setpoints for the alarms. Change the setpoints if necessary.
	A component is faulty or internal connections are loose.	Contact Helmer Technical Service.
The High Temperature alarm activates when the door is opened, then clears shortly after the door is closed.	Probe bottles are empty.	Check product simulation solution level in bottles. Refill bottles if necessary.
	High temperature alarm setpoint is set too low.	Check the setpoint. Change the setpoint if necessary.
	Primary monitor or secondary probe is faulty.	Test the probe. Replace the probe if necessary.
	Connections for primary monitor or secondary probe are loose.	Check the probe connections. Secure the connections if necessary.
	A component is faulty or internal connections are loose.	Contact Helmer Technical Service.

Problem	Possible Cause	Action
The refrigerator is connected to power, but the AC Power Failure alarm is active.	Outlet connection is faulty.	Verify power at the outlet. Repair the original outlet or connect to a different outlet if necessary.
	Power cord is loose.	Confirm the power cord is connected securely. Secure the power cord if necessary.
	ON/OFF AC power switch located inside the front lower panel is faulty.	Replace the ON/OFF AC power switch.
	ON/OFF AC power switch is OFF.	Turn the ON/OFF AC power switch to the ON position.
	A component is faulty or internal connections are loose.	Contact Helmer Technical Service.
	Circuit breaker is tripped.	Reset or replace the circuit breaker.
The Door Open alarm is activating sporadically.	Doors are not closing completely.	Confirm the hinge cams are not damaged. Replace the cams if necessary.
	Doors are closing but not sealing completely.	Confirm the door gasket seals completely. Replace the door gasket if necessary.
	Connections for the door switch are faulty.	Test the switch connections. Secure the connections if necessary.
	One or both door switches are faulty.	Replace the door switch or switches.
	Temperature monitor/controller board is faulty.	Replace parts with those included in the control board kit, or replace the monitor/control board.
	Door Open Time-out is set to zero, causing the alarm to activate immediately when the door is opened.	Check the time delay for the Door Open alarm. Change the time delay if necessary.
The condenser alarm is active.	Condenser alarm setpoint is too low.	Confirm the alarm setpoint is at the appropriate value.
	Condenser fins are dirty.	Clean as necessary, or order new ones from Helmer or your distributor.
	Compressor is overheating due to a lack of air flow.	Check the condenser grill and clean if necessary.
		Confirm the refrigerator is correctly located. Refer to the operation manual.
	Condenser fan motor is faulty.	Replace the condenser fan motor.
	Condenser probe is not calibrated.	Confirm the condenser probe is reading correctly. Calibrate the probe if necessary.
	Connections for the condenser temperature probe are loose.	Test the probe connections. Secure the connections if necessary.
	Condenser temperature probe is faulty.	Test the probe. Replace the probe if necessary.
An alarm is activated but the temperature recorded at activation does not match the alarm setpoint.	Temperature changed slightly around the time of activation.	No action necessary.
The No Battery alarm is activating sporadically.	Battery voltage level on the backup battery for the monitoring system is low.	Replace the battery for the monitoring system.

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 appropriate values
		Test the temperature alarms manually.
	Connections for the primary monitor probe are loose.	Test the probe connections. Secure the connections if necessary.
	Primary monitor probe is out of calibration.	Confirm the probe is providing accurate temperature readings.
	Primary monitor probe is faulty.	Confirm the probe is reading correctly. Calibrate the probe if necessary.
		Confirm the probe is providing resistance in the range of 98 Ω to 110 Ω. Replace the probe if necessary.
	Temperature monitor/controller board is faulty.	Replace parts with those included in the control board kit, or replace the monitor/control board.

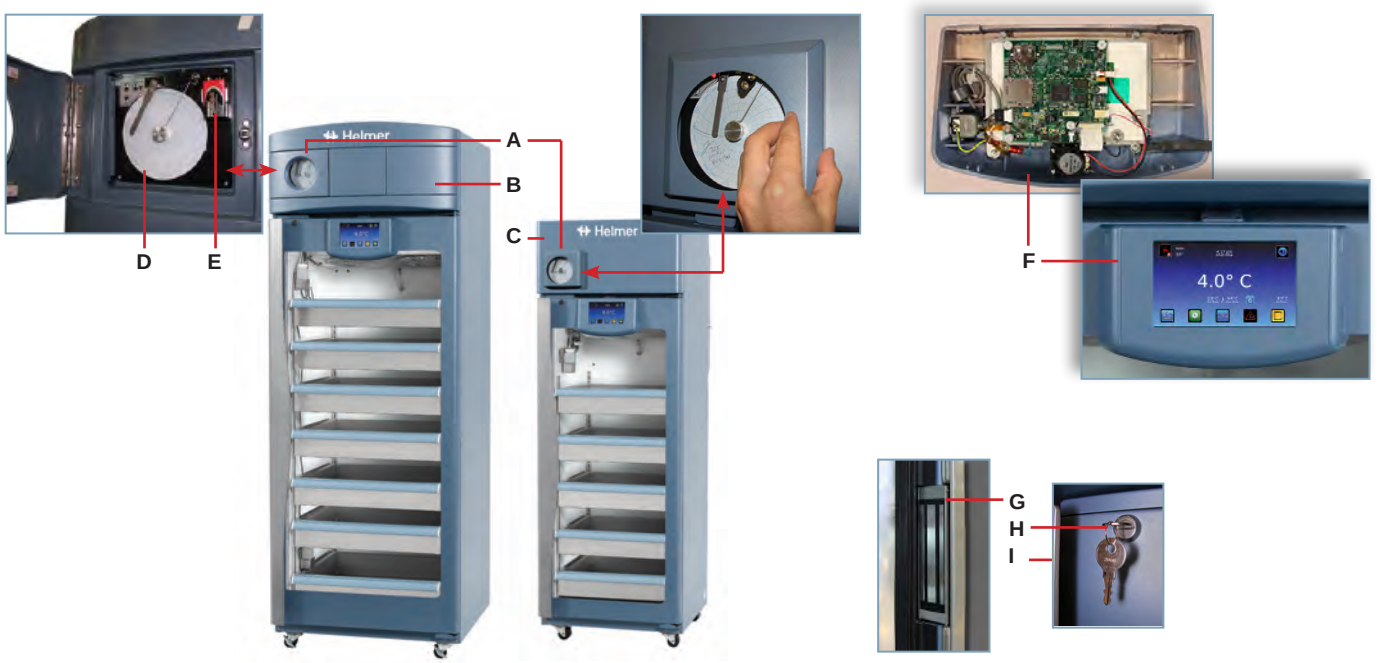
6.5 Condensation Problems

Problem	Possible Cause	Action
There is excessive water in the water evaporation tray.	Heater in the evaporation tray is faulty.	Confirm the heater is hot and is drawing the appropriate current
		For 115 V refrigerators, the current should be approximately 0.43 A to 0.55 A.
		For 230 V refrigerators, the current should be approximately 0.21 A to 0.35 A.
	Humid air is entering the chamber.	Confirm the refrigerator is level, and the doors are aligned, closing tightly, and sealing correctly. Correct issues as necessary.
There is excessive water in the chamber.	Humid air is entering the chamber.	Confirm the refrigerator is level, and the doors are aligned, closing tightly, and sealing correctly. Correct issues as necessary.
	Connection between the unit cooler and the drain tube is loose.	Confirm the connection is secure. Tighten the connection if necessary.
	Drain line is plugged.	Confirm the drain tube is free of debris. Remove debris if necessary.
There is excessive humidity on the doors.	Humid air is entering the chamber.	Confirm the refrigerator is level, and the doors are aligned, closing tightly, and sealing correctly. Correct issues as necessary.
	Relative humidity around the refrigerator is too high.	Confirm the refrigerator is placed properly. Refer to the refrigerator operation manual.

7 i.Series Parts

Notes

- Before replacing parts, protect items in refrigerator from extended exposure to adverse temperature.
- Allow refrigerator 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.



Letter	Description	Part Number	Volts
A	Temperature chart recorder (standard on blood bank models except iB111; optional on laboratory and pharmacy models except iLR111 and iPR111)	800026-1	120
		800026-2	230
	Temperature chart recorder (standard on iB111 model; optional on iLR111 and iPR111 model)	800025-1	120
		800025-2	230
B	Bezel with chart recorder door (shown) (models except 111)	400999-1	
	Bezel without chart recorder door (models except 111)	400998-1	
C	Bezel (shown) (111 model with chart recorder door)	800056-1	
	Bezel (111 model without chart recorder door)	800055-1	
Not Shown	Chart recorder door assembly (models except 111)	800070-1	
	Chart recorder door assembly (111 model)	320739-1	

Letter	Description	Part Number
D	Chart paper (52 sheets)	220366
E	Chart recorder battery	120218
F	Display assembly (111 models)	800041-1
	Display assembly (120, 125, 245, 256 models)	800042-1
Not Shown	USB / Power cable for i.Center display	800009-1
G	Magnetic lock (right-hand solid door)	800140-1
	Magnetic lock (glass door)	800138-1
H	Door lock	220540
I	Door lock key	220630
Not Shown	Door handle pad	320684-1

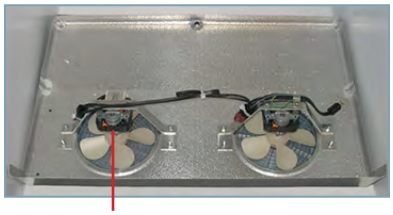
CAUTION

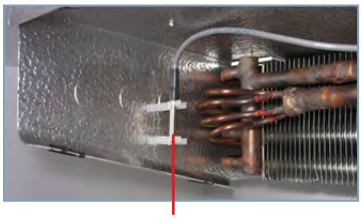
Disconnect refrigerator from power when replacing LED lamps.

Letter	Description	Part Number	Model
A	Door switch	120380	
B	Full shelf (includes hardware)	400414-3	111
	Full shelf (includes hardware)	400414-1	120/245
	Full shelf (includes hardware)	400414-2	125/256
C	Roll out basket assembly (includes basket, 2 slides, and hardware)	400751-1	111
	Roll out basket assembly (includes basket, 2 slides, and hardware)	400415-1	120/245
	Roll out basket assembly (includes basket, 2 slides, and hardware)	400415-2	125/256
D	Drawer assembly (includes drawer, 2 slides, and hardware)	400752-1	111 (glass door)
	Drawer assembly (includes drawer, 2 slides, and hardware)	400370-1	120/245 (glass door)
	Drawer assembly (includes drawer, 2 slides, and hardware)	400370-2	125/256 (glass door)
	Drawer assembly (includes drawer, 2 slides, and hardware)	400752-2	111 (solid door)
	Drawer assembly (includes drawer, 2 slides, and hardware)	400370-3	120/245 (solid door)
	Drawer assembly (includes drawer, 2 slides, and hardware)	400370-4	125/256 (solid door)
Not shown	Half shelf (includes hardware)	400413-1	120, 125, 245, 256
	Slide assembly (includes 2 slides)	400753-1	111
	Slide assembly (includes 2 slides)	400714-1	120/245
	Slide assembly (includes 2 slides)	400714-2	125/256

Letter	Description	Part Number	Model
Not shown	Bridge Shelf 18” depth	400845-1	
	Bridge Shelf 24” depth	400845-2	
	Pole mast for chromatography (iLR model with chromatography option)	400478-1	
E	LED lamp	800049-1	
F	Chart recorder probe	800024-1	
G	Primary monitor probe	800038-1	
H	Probe bottle and glycerin kit	400922-1	
I	Secondary probe	800037-1	120, 125, 245, 256
J	Upper hinge assembly (includes pin and bracket)	400960-2 (left)	
		400960-1 (right)	
K	Upper hinge bearing	322377-1	
L	Door gasket	321082-1	111
	Door gasket	320726-1	120, 125, 245, 256
M	Lower hinge cam (quantity 2)	320742-1	
N	Lower hinge bearing	220375	
O	Lower hinge bracket	400377-1(right)	
	Lower hinge bracket	400377-2 (left)	
P	Door stop	320763-1	

A


B


C

Letter	Description	Model	Part Number	Volts
A	Unit cooler assembly	111	800825-1	115
		111	800826-1	230
		120/125	800827-1	115
		120/125	800828-1	230
		245	800829-1	115
		245	800830-1	230

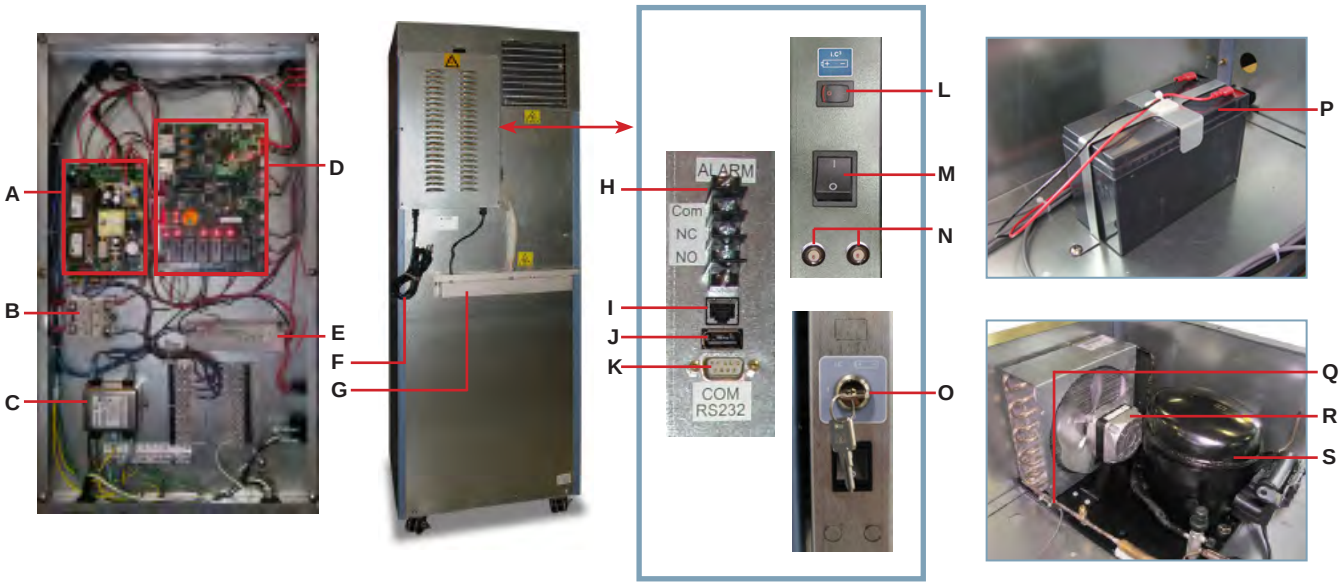
Letter	Description	Part Number	Volts
B	Unit cooler fan motor	800836-1	115
		800835-1	230
C	Control probe (includes connector)	800048-1	

CAUTION

- Disconnect the refrigerator 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. User proper ESD precautions when handling the board.

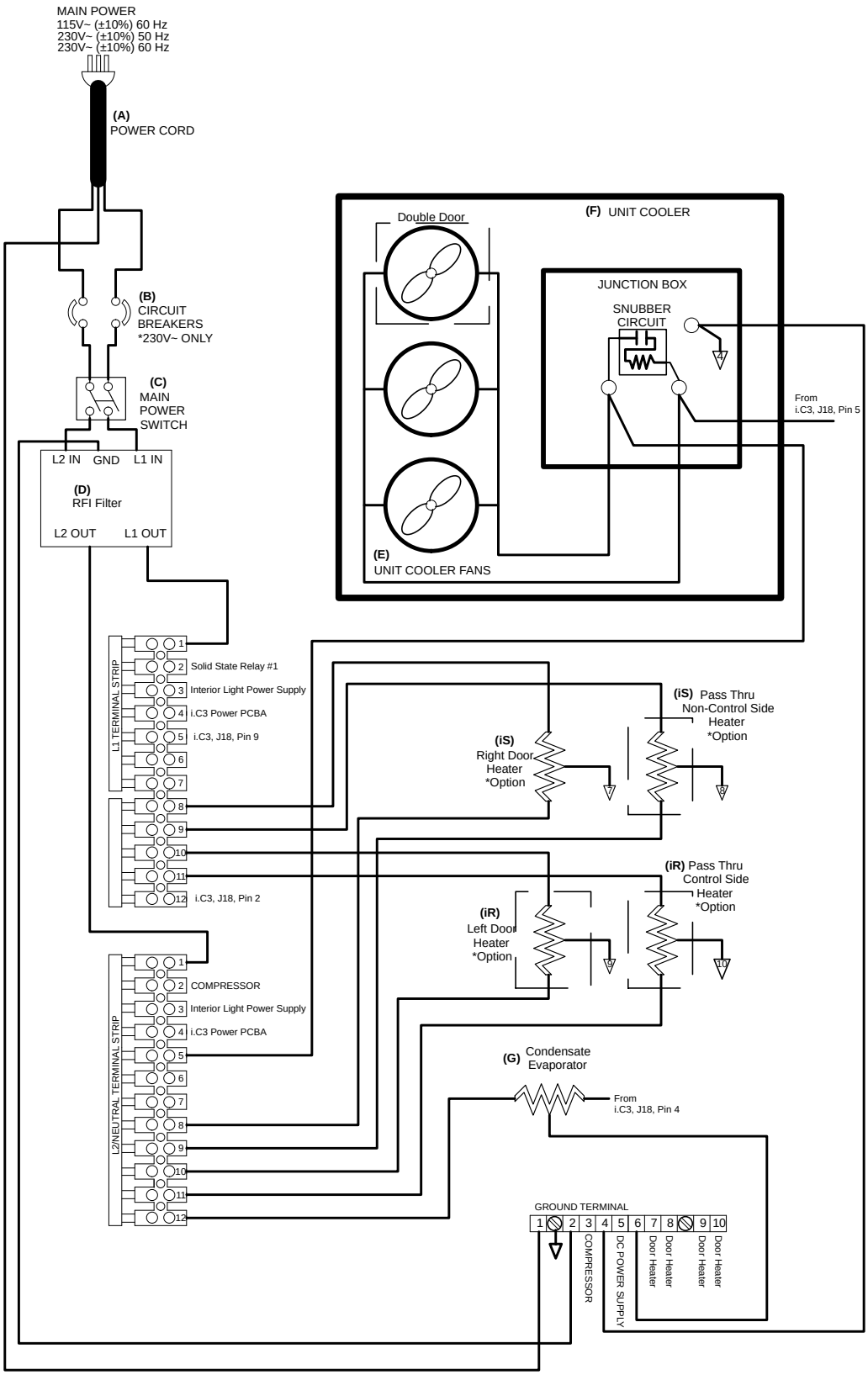


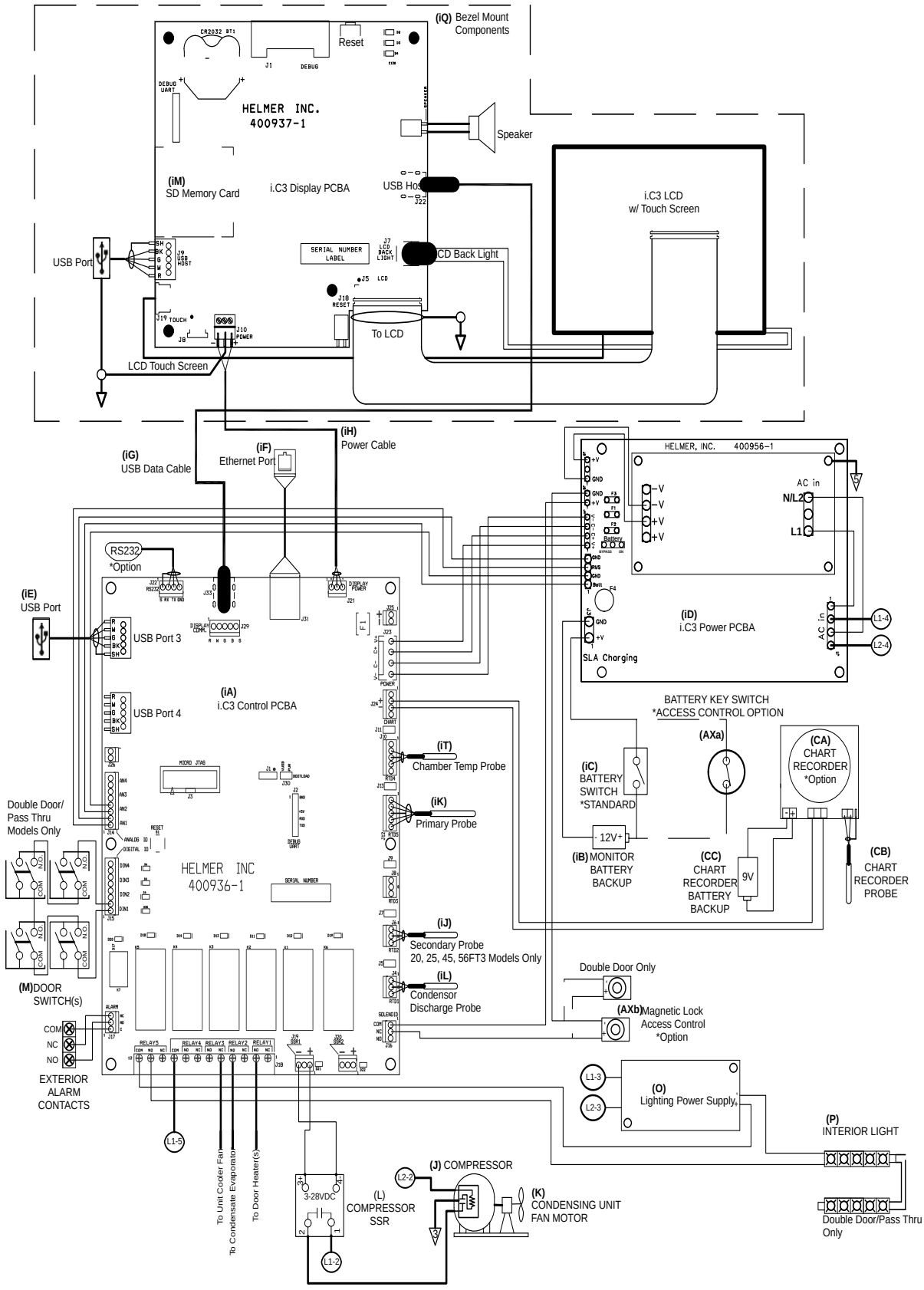
Letter	Description	Part Number	Volts
A	Power supply board	800035-1	
B	Compressor relay	120426	
C	Power line filter	120400	
D	i.C³ control board	800034-1	
E	Lighting power supply	120624	
F	Power cable (North American models)	120630	120
		120631	230
	Power cable (European models)	120156	230
G	Condensate evaporator assembly 111 models (includes condensate evaporator, tray, and cover)	400791-1	115
		400791-2	230
	Condensate evaporator assembly 120, 125, 245, and 256 models (includes condensate evaporator, tray, and cover)	400790-1	115
		400790-2*	230
H	Remote alarm contact	-	
I	RJ-45 Ethernet port	800008-1	
J	USB port	120633	
K	RS-232 serial port (optional)	-	
L	Back-up battery switch (without Access Control)	120202	
M	Main power switch	120478	
N	Circuit breaker (single door models)	120429	230
	Circuit breaker (double door models)	120428	230

Letter	Description	Part Number	Volts	Hz
O	Back-up battery key switch (with Access Control)	401220-1		
P	Monitoring system battery (supplies backup power to optional Access Control system)	120628		
Q	Condenser probe	800039-1		
R	Condenser fan motor 111 model	120451	120	
		120561	230	
	Condenser fan motor 120 / 125 models	120467	120	
		120471	230	
	Condenser fan motor 245 / 256 models	120469	120	
		120473	230	
S	Compressor 111 models	800005-1	120	-
		800005-2	230	50
		800005-3	230	60
	Compressor 120 / 125 models	800111-1	120	-
		800111-2	230	50
		800111-3	230	60
	Compressor 245 / 256 models (* = serial #'s 2000000 - 2002949) (** = serial #'s 2002950 - and greater)	800113-1*	120	-
		800113-5**	120	-
		800113-2	230	50
		800113-3	230	60

8 Schematics

8.1 iB, iLR, iPR Models; 11, 20, 25, 45, 56 Cubic Feet




(iQ) Bezel Mount Components
Reset
HELMER INC.
400937-1
Speaker
(iM) SD Memory Card
i.C3 Display PCBA
USB Host
i.C3 LCD w/ Touch Screen
USB Port
SERIAL NUMBER LABEL
LCD Back Light
To LCD
LCD Touch Screen
(iH) Power Cable
(iG) USB Data Cable
(iF) Ethernet Port
HELMER, INC. 400956-1
AC in
N/L2
L1
RS232 *Option
(iE) USB Port
USB Port 3
USB Port 4
(iA) i.C3 Control PCBA
(iD) i.C3 Power PCBA
SLA Charging
L1-4
L2-4
BATTERY KEY SWITCH *ACCESS CONTROL OPTION
(AXa)
(CA) CHART RECORDER *Option
(iC) BATTERY SWITCH *STANDARD
(iT) Chamber Temp Probe
(iK) Primary Probe
Double Door/ Pass Thru Models Only
(iB) MONITOR BATTERY BACKUP
(CC) CHART RECORDER BATTERY BACKUP
9V
(CB) CHART RECORDER PROBE
HELMER INC
400936-1
(iJ) Secondary Probe 20, 25, 45, 56FT3 Models Only
(iL) Condensor Discharge Probe
Double Door Only
(AXb) Magnetic Lock Access Control *Option
(M) DOOR SWITCH(s)
COM
NC
NO
EXTERIOR ALARM CONTACTS
L1-3
L2-3
(O) Lighting Power Supply
(P) INTERIOR LIGHT
L1-5
To Unit Cooler Fan
To Condensate Evaporator
To Door Heater(s)
3-28VDC
(L) COMPRESSOR SSR
L2-2
(J) COMPRESSOR
(K) CONDENSING UNIT FAN MOTOR
L1-2
Double Door/Pass Thru Only

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 8“ (203 mm) above, and minimum 3” (76 mm) behind.
- Meets limits specified for ambient temperature (15˚C to 32˚C) and relative humidity.

9.2 Placement and Leveling

CAUTION

- The water evaporation tray, located on the rear of the refrigerator, may be hot. Do not use the tray as a handle.
- To prevent tipping, ensure the casters are unlocked, leveling feet (if installed) are lifted, and the doors are closed before moving the refrigerator.

1. Roll refrigerator into place and lock casters.
2. Ensure refrigerator is level.

Notes

- Helmer recommends the use of leveling feet.
- Use a wrench to raise or lower leveling feet. When the refrigerator is level, the bottom of the unit cooler will slope downward from front to back and be parallel to the floor.

9.3 Connect Back-Up Power

The monitoring system 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 battery power is available, back-up power for the monitoring system is available for up to two hours. Providing full power is available, back-up power for the optional Access Control system is available for up to 2.5 hours.

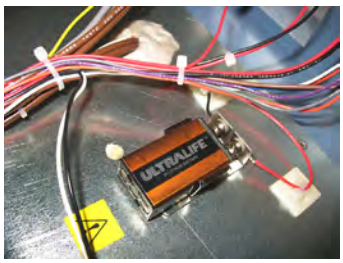
CAUTION

Before installing or replacing batteries, switch the AC power OFF and disconnect the refrigerator from AC power.

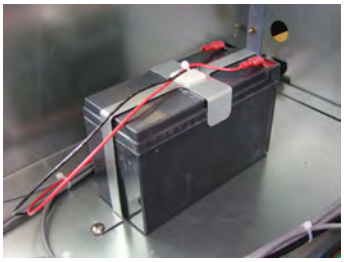
Notes

- The optional Access Control system uses an independent battery for back-up power.
- The monitoring system will start on back-up battery power alone. If the refrigerator was not previously connected to AC power and the back-up battery is connected, the monitoring system will begin running on battery power.

The monitoring system and optional Access Control back-up batteries are located on the top of the refrigerator. For 111 models, a removable panel provides access to the batteries.



Monitoring system back-up battery.



Optional Access Control back-up battery.

9.4 Prepare for Monitoring

Monitoring system back-up battery is included in the literature box. Install and connect the battery to provide monitoring system with back-up power in the event of AC power failure. If included, switch the Access Control back-up battery ON to provide the optional Access Control system with back-up power in the event of an 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 or through a side access port if available and immersed in existing probe bottles.

The number and location of probes varies by model. External probes may be introduced through existing top port and immersed in existing probe bottles, or through a side access port which is available in some models.

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

Each probe bottle should contain 4 oz. (120 mL) of product simulation solution at a 10:1 ratio of water to glycerin.

Left: Probe bottle with temperature and chart recorder probes.
Middle: Top access port. Right: Side 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.

Install Additional Probe Through Side Port

1. Remove interior and exterior plugs to expose side access port.
2. Insert probe through port into chamber.
3. Insert probe into bottle.
4. Ensure port is tightly sealed using putty.

Chart Recorder (if included)

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.

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.

Horizon Series chart 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 Technical Service to reorder chart paper; part number 220366 (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.
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 33 V (RMS) or 70 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 terminals on the remote alarm interface have the following maximum load capacity:

- 0.5 A at 125 V (AC)
- 1 A at 250 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 refrigerator from extended exposure to adverse temperature.

Product Loading Guidelines

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

- Never load refrigerator 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

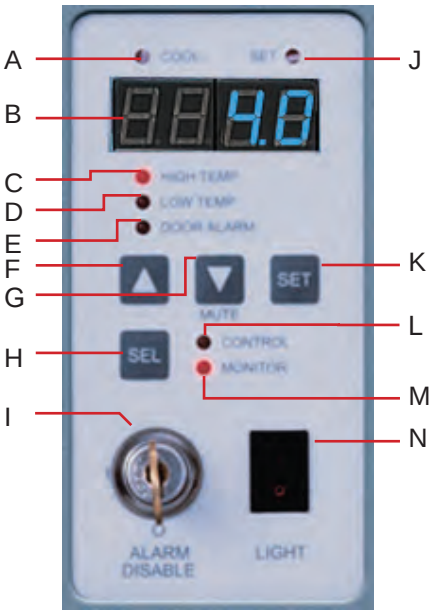


Table 11. Monitor and Control Indications

Label	Description	Function
A	COOL lamp	Indicates the compressor is running.
B	LED Display	Displays real-time and stored temperature information, setpoints, and alarms.
C	HIGH TEMP lamp	Indicates when the refrigerator is in a high temperature alarm condition. Also indicates the high alarm temperature setpoint is being changed.
D	LOW TEMP lamp	Indicates when the refrigerator 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	UP ARROW button	Increases a temperature setting.
G	DOWN ARROW button	Decreases a temperature setting. Also mutes the audible alarm for 5 minutes.
H	SEL button	Toggles between alarm monitor and control modes.
I	ALARM DISABLE key switch	Disables all audible alarms. Does not affect alarm lamps or signals sent through the remote alarm interface.
J	SET lamp	Indicates when temperature setpoint or alarm setpoint is being changed.
K	SET button	Allows settings to be selected, prior to changing settings.
L	CONTROL lamp	Indicates when the reading from the control probe is displayed.
M	MONITOR lamp	Indicates when the display is showing temperature readings from the monitor probe. Also indicates when alarm setpoints are being changed.
N	LIGHT switch	Turns the chamber light on or off.

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 back-up 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	TEMPERATURE UNITS, LED display	.C, .F	.C
High Temperature	MONITOR Lamp & HIGH Lamp	-40.0 to 25.0 (°C) -40 to 77 (°F)	5.5 °C
Low Temperature	MONITOR Lamp & LOW Lamp	-40.0 to 25.0 (°C) -40 to 77 (°F)	1.5 °C (HB); 2.0 °C (HLR & HPR)
Monitor Offset	MONITOR Lamp only	-10.0 to 10.0 (°C) -18 to 18 (°F)	Varies
Control Offset	CONTROL Lamp only	-10.0 to 10.0 (°C) -18 to 18 (°F)	Varies
Hysteresis	CONTROL Lamp only	0.5 to 2.5 (°C) 1 to 5 (°F)	2.0 °C (HB111) 0.8 °C (HLR111 and HPR111) 1.0 °C (120, 125) 1.5 °C (245, 256)

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 refrigerator is 4.0 °C. This can be changed if your organization requires a chamber temperature other than 4.0 °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 refrigerator 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 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 refrigerator setpoint by activating the compressor when the control probe registers above the setpoint based on the hysteresis value.

Determine Control Sensor Offset:

Note

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 Refrigerator 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 refrigerator setpont no further action is needed.)*
3. View and record the current Control Offset value.
4. Subtract the Refrigerator 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 1	Example 2
Refrigerator setpoint is 4.0	Refrigerator setpoint is 4.0
Average monitor temperature is 5.2	Average monitor temperature is 2.8
Current Control Offset is 0.3	Current Control Offset is 0.3
Subtract: 5.2 - 4.0 = 1.2; difference between average temperature and setpoint.	Subtract: 2.8 - 4.0 = -1.2; difference between average temperature and setpoint.
Add: 0.3 + 1.2 = 1.5; new control offset value	Add: 0.3 + (-1.2)= -0.9; new control offset value

Enter 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 refrigerator 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. Refer to the service manual and the i.C³ User Guide for more detail on the various tasks.

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

- The preventive maintenance schedule provides recommended minimum requirements. Regulations or physical conditions at your organization may require maintenance items to be performed more frequently, or only by designated service personnel.
- Before performing maintenance, protect items in refrigerator from extended exposure to adverse temperature.
- Allow refrigerator temperature to stabilize at setpoint after performing service or after extended door opening.

Table 14. Horizon Series Preventive Maintenance Schedule

Task	Frequency			
	Quarterly	1 year	2 years	As Needed
Test the high and low temperature alarms.				
Test the power failure alarm (as required by your organization's protocols).				
Models with Access Control Test the Access Control battery.				
Replace the optional Access Control back-up battery.				
Test the door alarm (as required by your organization's protocols).				
Check the temperature calibration on the monitor and change it if 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.				
Replace 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.				
Check the chamber lights and replace them if necessary.				
Clean the condenser grill.				
Clean the door gaskets, interior, and exterior of the refrigerator.				
If applicable, test the ground fault circuit interrupter on the internal outlet.				

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 refrigerator has alarms for chamber temperature, power failure, and door open (time).

Chamber Temperature 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 stored in the unit from extended exposure to adverse temperature.
- Temperature probes are fragile; handle with care.

Test the Low Alarm:

1. Identify setting for low alarm setpoint.
2. Remove primary monitor probe from bottle.
3. Immerse probe in glass filled with water and crushed ice mixture.
4. When low temperature alarm sounds, note the temperature on the LED display.

Test the High Alarm:

1. Identify setting for high alarm setpoint
2. Immerse probe in glass of luke warm water.
3. When high temperature alarm sounds, note the temperature on the LED display.
4. Remove probe from warm water.
5. Place primary 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-preset to three minutes and can not be changed.

1. Open refrigerator door and note the time.
2. After three minutes, audible alarm will activate and DOOR ALARM lamp will flash.
3. Close refrigerator 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 (10:1 ratio of water to glycerin). The glycerin is used to create a solution which simulates the product stored in the refrigerator. 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 Refrigerator

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 refrigerator from AC power when cleaning condenser grill.

If the refrigerator 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 (10:1 ratio of water to glycerin).
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 R134A refrigerant.
- Pressure readings may vary based on chamber temperature and ambient air temperature.
- Normal low side pressures are 16 psi to 18 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
111	R134A	115 V, 60 Hz 230 V, 50 Hz 230 V, 60 Hz	7.5 oz. (213 g)
120 and 125	R134A	115 V, 60 Hz 230 V, 50 Hz 230 V, 60 Hz	10.1 oz. (286 g)
245 and 256	R134A	115 V, 60 Hz 230 V, 50 Hz 230 V, 60 Hz	12.5 oz. (354 g) 10.5 oz. (298 g)*

* - units with light gray condensing coil.

12.2 Replace LED Lamps

1. Switch AC ON/OFF switch OFF. Disconnect the battery.
2. Using a screwdriver, remove lamp strip from chamber wall.
3. Unsnap the defective LED and disconnect wires.
4. Snap new LED onto the lamp strip.
5. Connect the wires.
6. Using a screwdriver, attach lamp strip to chamber wall.
7. Switch AC ON/OFF switch ON. Reconnect the battery.
8. Press the MUTE button to disable the high temperature alarm while refrigerator reaches operating temperature.

12.3 Remove / Replace Unit Cooler Cover

The unit cooler cover must be removed when service to the control probe, fan motor(s) or coil is performed.

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 refrigerator's inability to maintain temperature.

Label	Description
A	Unit cooler cover
B	Drain port
C	Drain hose

Drain line and hose.

Remove the Unit Cooler Cover

CAUTION

The condensate evaporator and water evaporation tray are hot.

1. Switch AC ON/OFF switch OFF. Disconnect the back-up battery.
2. Remove top drawer, basket, or shelf from the chamber.
3. On the back of the chamber, peel putty back to expose drain hose.
4. Pull drain hose downward while gently twisting to remove from unit cooler drain port.
5. Push drain hose out through rear of chamber.
6. Hold unit cooler cover in place to prevent dropping. Using a 5/16"socket wrench, remove four screws securing the unit cooler cover.
7. Carefully lower unit cooler cover to avoid damage to the fan wiring.

Install the Unit Cooler Cover

1. Verify unit cooler wiring is connected and routed correctly.
2. Lift unit cooler cover into place. Front edge of the cover should be behind the unit cooler case.
3. Using a 5/16" socket wrench, install four screws to secure the unit cooler cover.
4. Insert drain hose through hole in the rear of the refrigerator.
5. Push drain hose upward, toward the unit cooler drain port.
6. In the chamber, attach drain hose to unit cooler drain port.
7. Reinstall top drawer, basket, or shelf if previously removed.
8. On the back of the chamber, press putty around the drain hose.
9. Switch AC ON/OFF switch ON. Switch battery switch ON.
10. Touch **Mute** to disable the high temperature alarm while refrigerator 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 or basket does not slide easily.	Drawer slide is faulty.	Confirm the slide is operating correctly. Replace if necessary.
	Debris in the drawer slides.	Pull the drawer or basket out and confirm the slides are free of debris. Clean the slides if necessary.
	Drawer slides are not lubricated.	Using a lightweight oil, lubricate the bearings in the slides.
	Drawer or basket is misaligned or not level.	Confirm both slides for the drawer or basket are mounted at the same height.
A door does not open easily.	Debris in the hinges.	Confirm the hinges are free of debris. Clean the hinges if necessary.
	Door hinges are not lubricated.	Using a general-purpose grease, lubricate the pivots in the hinges.
	Hinge cam is faulty.	Confirm the hinge cam is not damaged. Replace the cam if necessary.
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.

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. Refill the bottle if necessary.
	Monitor is not calibrated.	Confirm primary monitor probe is reading correctly. Calibrate the probe if necessary.
	Digital electronics are locked due to an interruption in power.	Reset the monitoring system.
	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.	Connections for the primary monitor probe are loose.	Test the probe connections. Secure the connections if necessary.
	Primary 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.
	A component is faulty.	Contact Helmer Technical Service.

Problem	Possible Cause	Action
The chamber temperature does not stabilize at the refrigerator setpoint.	Probe bottles are empty.	Check product simulation solution level in bottles. Refill bottles if necessary.
	Display temperature is not calibrated.	Calibrate primary monitor probe.
	Inadequate air flow in chamber	Ensure all products are contained within the storage compartments and not blocking air flow. Adjust if necessary.
		Confirm 6” clearance below the evaporator fan.
		Check if there are products touching the sides or back of unit and ensure 2” clearance.
	Ambient air temperature around the refrigerator is too high.	Confirm the refrigerator is placed appropriately.
	Condenser grill is dirty.	Check the condenser grill. Clean the grill if necessary.
	Condensing unit fan is not running.	Check the condensing unit fan connections. Replace the fan motor 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.
	Control probe is out of calibration.	Confirm the probe is providing accurate temperature readings.
	Control probe is faulty.	Confirm the probe is providing resistance in the range of 98 Ω to 110 Ω. Replace the probe if necessary.
	Compressor starting relay is faulty.	Confirm the relay is operating correctly. Replace the relay if necessary.
	Compressor motor has seized.	Replace the compressor.
	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.
The compressor runs continuously.	Refrigerator setpoint is set too low.	Confirm the setpoint is set within the operating range and change it if necessary.
	Control probe is out of calibration.	Confirm the probe is providing accurate temperature readings.
	Control probe is faulty.	Confirm the probe is providing resistance in the range of 98 Ω to 110 Ω. Replace the probe if necessary.
	Solid state relay is faulty.	Confirm the relay is operating correctly. Replace the relay if necessary.

13.3 Alarm Activation Problems

Problem	Possible Cause	Action
The refrigerator is in an alarm condition, but the appropriate alarm is not audible or active.	Alarm key switch is OFF.	Switch the alarm key switch ON.
	Alarm system is locked.	Reset unit by turning both main power and back-up battery power off, then power unit back on.
	Alarm buzzer is faulty.	Replace the alarm buzzer.
	Audible alarms have been muted.	Verify audible alarms are not muted. Verify the Alarm Disable key switch is not turned off.
	A component is faulty or internal connections are loose.	Contact Helmer Technical Service.
	Alarm setpoint was changed.	Check current setpoints for alarms. Change the setpoints if necessary.
The High Temperature alarm activates when the door is opened, then clears shortly after the door is closed.	Probe bottle is empty.	Check level of product simulation solution in the bottle. Refill bottle if necessary.
	High temperature alarm setpoint is set too low.	Check the setpoint. Change the setpoint if necessary.
	Connections for the primary monitor probe are loose.	Test the probe connections. Secure the connections if necessary.
	Primary monitor probe is faulty.	Test the probe. Replace the probe if necessary.
	A component is faulty or internal connections are loose.	Contact Helmer Technical Service.
The refrigerator is connected to power, but the AC Power Failure alarm is active.	Outlet connection is faulty.	Verify power at the outlet. Repair the original outlet or connect to a different outlet if necessary.
	Power cord is loose.	Confirm the power cord is connected securely. Secure the power cord if necessary.
	Temperature control transformer (HB, HLR, HPR models) is faulty.	Replace the power supply board or the temperature control transformer.
	Circuit breaker was tripped (230 V models).	Confirm the circuit breaker is seated. Push the circuit breaker to reset it if necessary.
	A component is faulty or internal connections are loose.	Contact Helmer Technical Service.
The Door Open alarm is activating sporadically.	Door(s) are not closing completely.	Confirm the hinge cams are not damaged. Replace the cams if necessary.
	Door(s) are closing but not sealing completely.	Confirm the door gasket seals completely. Replace the door gasket if necessary.
	Connections for the door switch(s) are faulty.	Test the switch connections. Secure the connections if necessary.
	Door switch(es) is faulty.	Replace the door switch or switches.
An alarm is activated but the temperature recorded at activation does not match the alarm setpoint.	Temperature changed slightly around the time of activation.	No action necessary.

13.4 Condensation Problems

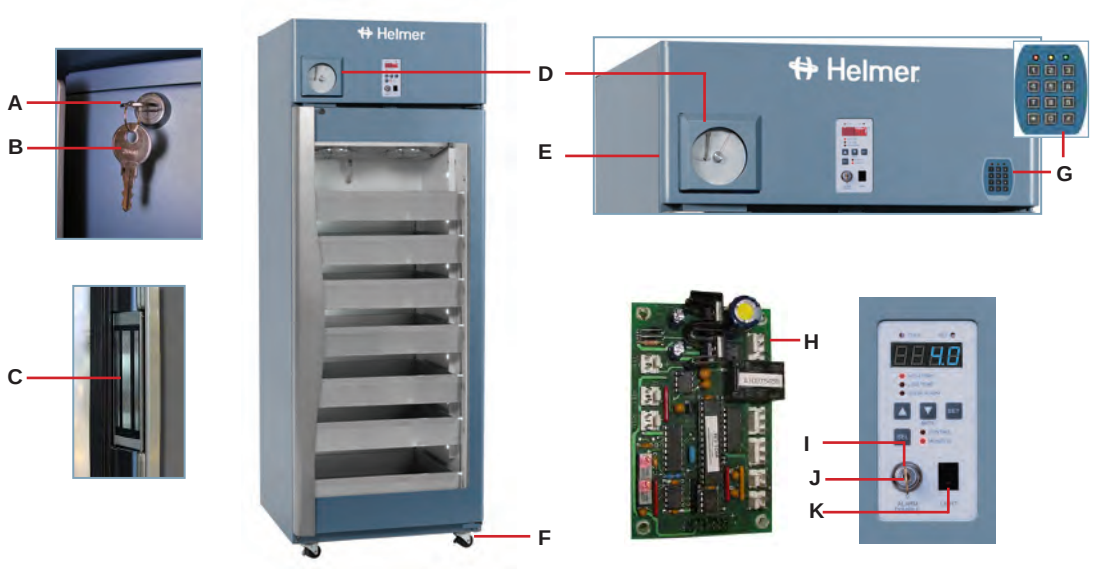
Problem	Possible Cause	Action
There is excessive water in the water evaporation tray.	Heater in the evaporation tray is faulty.	Confirm the heater is hot and is drawing the appropriate current.
		For 115 V refrigerators, the current should be approximately 0.43 A to 0.55 A.
		For 230 V refrigerators, the current should be approximately 0.21 A to 0.35 A.
	Humid air is entering the chamber.	Confirm the refrigerator is level, and the doors are aligned, closing tightly, and sealing correctly. Correct issues as necessary.

Problem	Possible Cause	Action
There is excessive water in the chamber.	Humid air is entering the chamber.	Confirm the refrigerator is level, and the doors are aligned, closing tightly, and sealing correctly. Correct issues as necessary.
	Connection between the unit cooler and the drain tube is loose.	Confirm the connection is secure. Tighten the connection if necessary.
	Drain line is plugged.	Confirm the drain tube is free of debris. Remove debris if necessary.
There is excessive humidity on the doors.	Humid air is entering the chamber.	Confirm the refrigerator is level, and the doors are aligned, closing tightly, and sealing correctly. Correct issues as necessary.
	Relative humidity around the refrigerator is too high.	Confirm the refrigerator is placed properly. Refer to the refrigerator operation manual.
Water leaks from the bottom of the refrigerator.	Excessive water is found in the evaporation tray inside the refrigerator.	Contact Helmer Technical Service to correct issues as necessary.

14 Horizon Series Parts

Notes

- Before replacing parts, protect items in refrigerator from extended exposure to adverse temperature.
- Allow refrigerator temperature to stabilize at setpoint after replacing parts or after extended door opening.
- The display board is sensitive to static electricity and can be damaged by electrostatic discharge. Use proper ESD precautions when handling the board.



Letter	Description	Part Number	Volts
A	Door lock	220540	
B	Door lock key	220630	
C	Magnetic lock (right-hand solid door)	800140-1	
	Magnetic lock (glass door)	800138-1	
D	Temperature chart recorder (standard on blood bank models; optional on laboratory/pharmacy models)	800025-1	120
		800025-2	230
E	Bezel with chart recorder (111 model)	800056-1	
	Bezel without chart recorder (111 model)	800055-1	
	Bezel with chart recorder (all models except 111)	800072-1	
	Bezel without chart recorder (all models except 111)	800071-1	

Letter	Description	Part Number
F	Caster (swivel with brake)	220467
G	Access Control keypad (optional)	800007-1
H	Control board assembly ()	800006-1*
	* = prior to serial # 2015494	
	** = serial #'s 2015494 and greater	800276-1**
I	Alarm key switch	120227
J	Alarm switch key	220519
K	Light switch	120202

⚠ CAUTION

Disconnect refrigerator from power when removing and replacing LED lamps.

Letter	Description	Model	Part Number
A	Door switch		120380
B	Chart recorder probe		800024-1
C	Primary monitor probe		800029-1
D	Probe bottle and glycerin kit		400922-1
E	Full shelf (includes hardware)	111	400414-3
		120/245	400414-1
		125/256	400414-2
F	Roll out basket assembly (includes 2 slides, and hardware)	111	400751-1
		120/245	400415-1
		125/256	400415-2
G	Drawer assembly (includes 2 slides, and hardware)	111	400752-2
		120/245	400370-3
		125/256	400370-4
Not shown	Half shelf (all models except 111; includes hardware)		400413-1
	Bridge shelf 18” depth		400845-1
	Bridge shelf 24” depth		400845-2
	Slide assembly (includes 2 slides)	111	400753-1
		120/245	400714-1
		125/256	400714-2

Letter	Description	Model	Part Number	Volts
H	LED lamp		800049-1	
I	Upper hinge bracket		400376-2 (left)	
			400376-1 (right)	
J	Hinge bearings		220375	
K	Door gasket	111	321082-1	
	Door gasket (all models except 111)		320726-1	
L	Lower hinge cam (quantity 2)		320742-1	
M	Lower hinge bracket		400377-2 (left)	
			400377-1 (right)	
N	Door stop		320763-1	
O	Unit cooler assembly	111	800825-1	115
		111	800826-1	230
	Unit cooler assembly	120/125	800827-1	115
		120/125	800828-1	230
	Unit cooler assembly	245	800829-1	115
		245	800830-1	230
P	Unit cooler fan motor		800836-1	115
			800835-1	230
Q	Control probe		800028-1	

CAUTION

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

Note

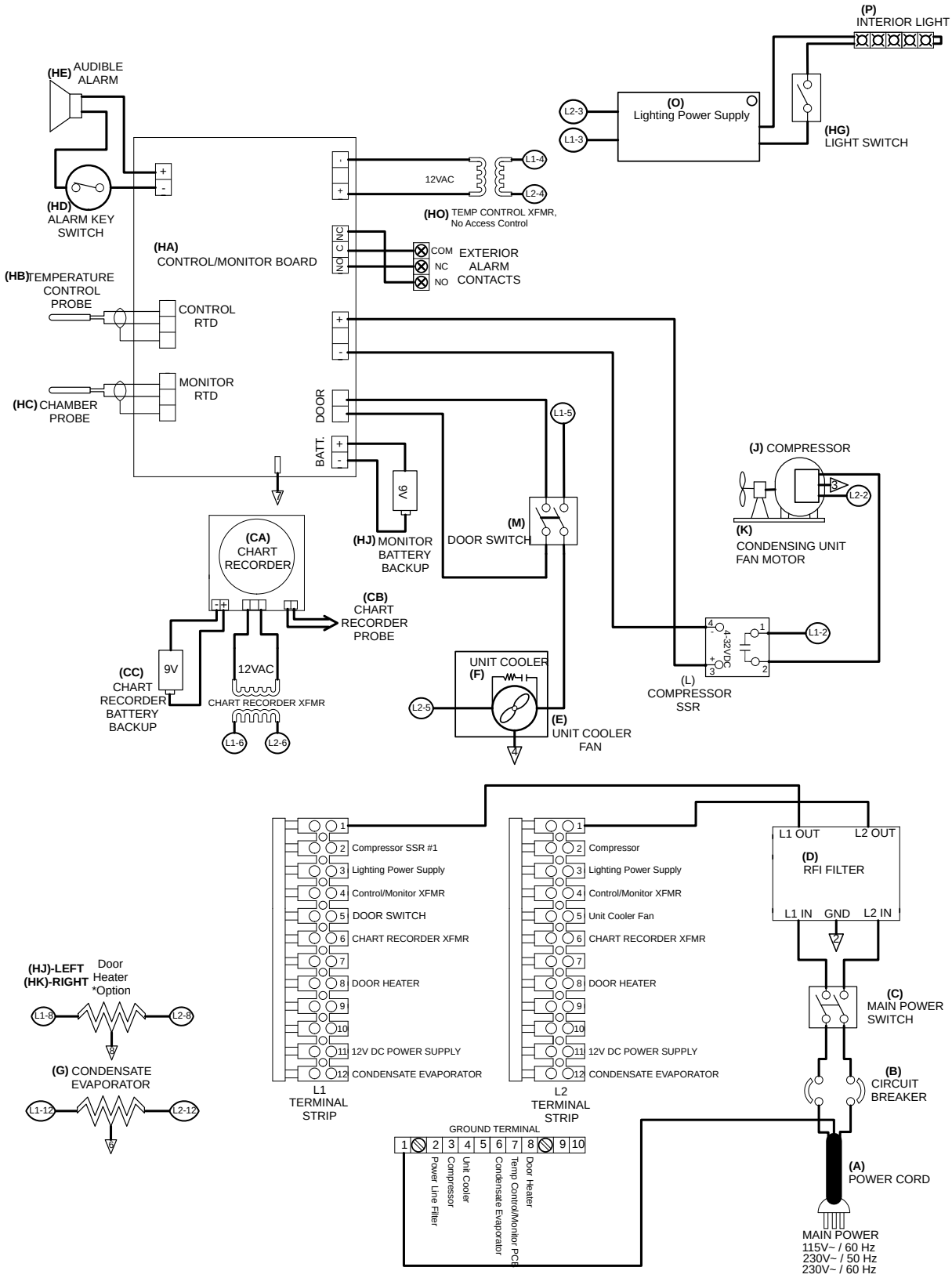
The control board is sensitive to static electricity and can be damaged by electrostatic discharge. Use proper ESD precautions when handling the board.

Letter	Description	Part Number	Volts
A	Alarm buzzer	120160	
B	Chart recorder transformer (optional)	-	
C	Access Control power supply (optional)	800035-1	
D	Defrost timer (111 model)	800120-1	115
	Defrost timer (120, 125, 245 and 256 models) * = prior to serial # 2004286 ** = serial #'s 2004286 and greater	800127-1*	115
		800120-1**	230
E	Temperature control transformer	800086-1	115
		800086-2	230
F	Compressor relay	120426	
G	12 V cabinet lighting power supply	120624	
H	Power line filter	120400	
I	Remote alarm contacts	-	
J	Main power switch	120478	
K	Circuit breaker (single door)	120429	230
	Circuit breaker (double door)	120428	230
L	Back-up battery key switch (Access Control)	401220-1	
M	Power cable (North American models)	120630	120
		120631	230
	Power cable (European models)	120156	230
N	Condensate evaporator assembly 111 models (includes condensate evaporator, tray, and cover)	400791-1	115
		400791-2	230
	Condensate evaporator assembly 120, 125, 245, and 256 models (includes condensate evaporator, tray, and cover) * = serial #'s 2004286 and greater	400790-1	115
		800030-1*	230

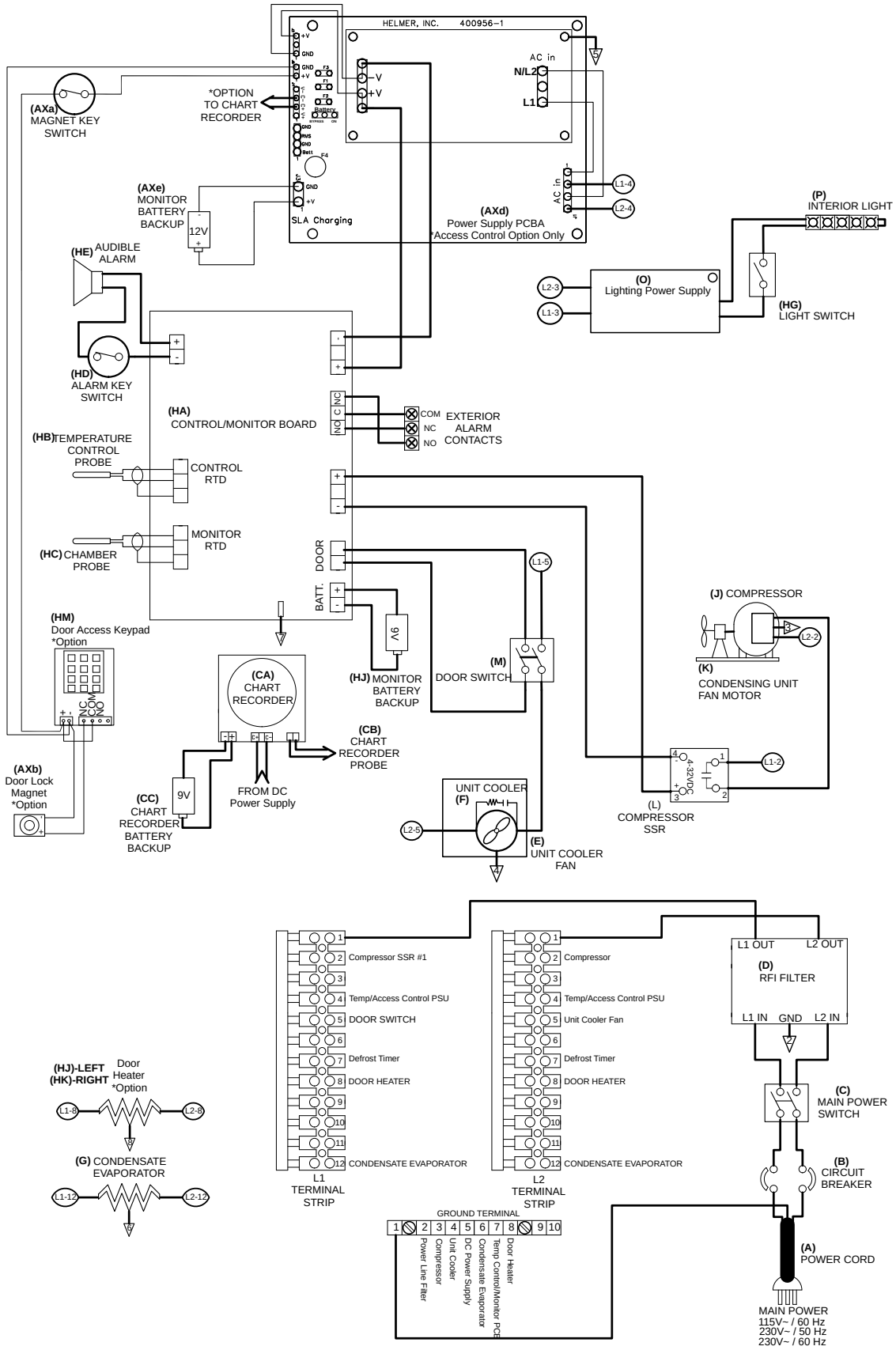
Letter	Description	Part Number	Volts	Hz
O	Condenser fan motor 111 model	120451	120	
		120561	230	
	Condenser fan motor 120 / 125 models	120467	120	
		120471	230	
	Condenser fan motor 245 / 256 models	120469	120	
		120473	230	
P	Compressor 111 model	800005-1	120	60
		800005-2	230	50
		800005-3	230	60
	Compressor 120 / 125 models	800111-1	120	60
		800111-2	230	50
		800111-3	230	60
	Compressor 245 /256 models * = serial #'s 2000000 - 2002949 ** = serial #'s 2002950 and greater	800113-1*	120	60
		800113-5**		
		800113-2	230	50
		800113-3	230	60
Q	Monitoring system back-up battery	120399		
R	Access Control Back-up battery	120628		

15 Schematics

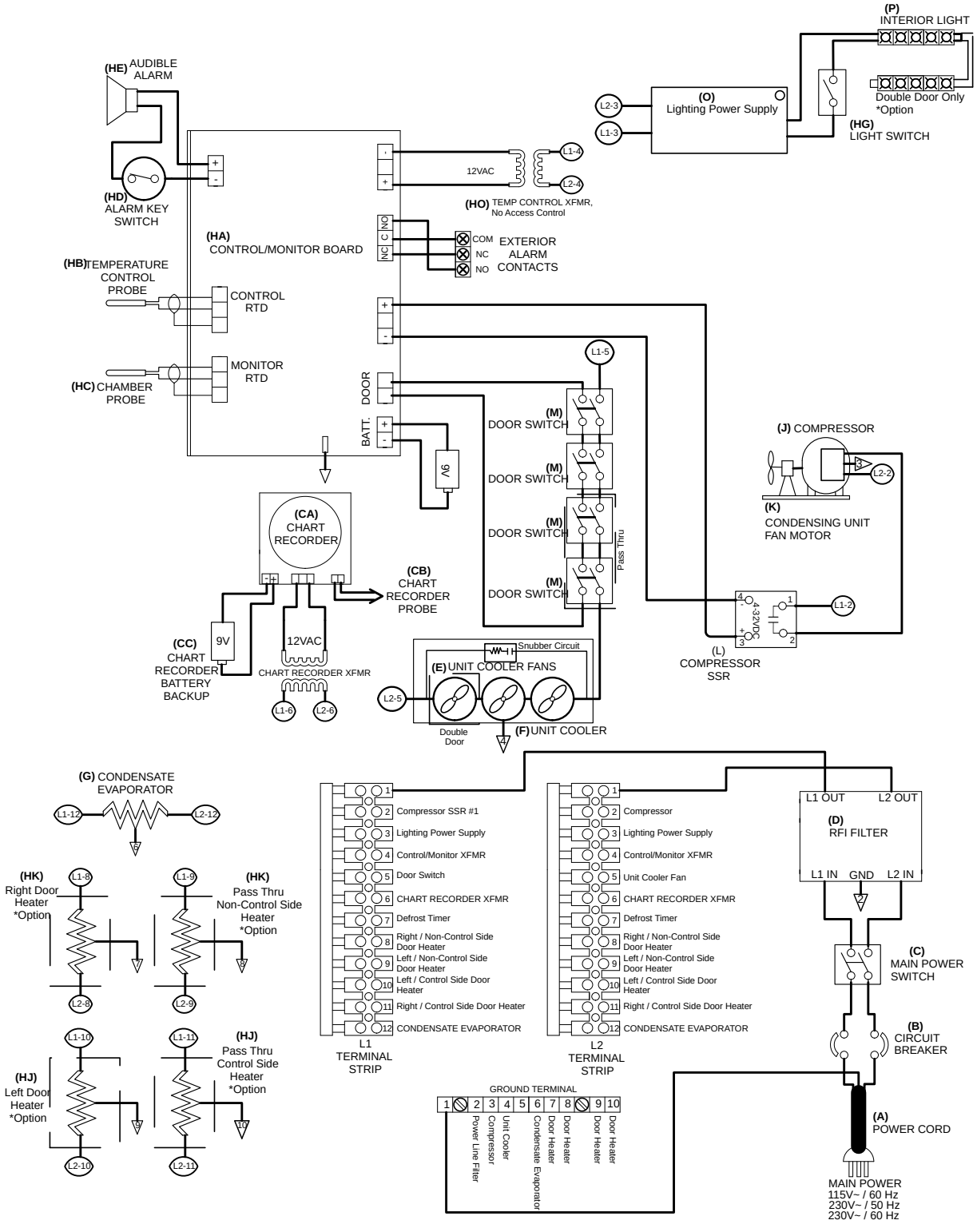
15.1 HB Model; 11 Cubic Feet (Without Access Control)



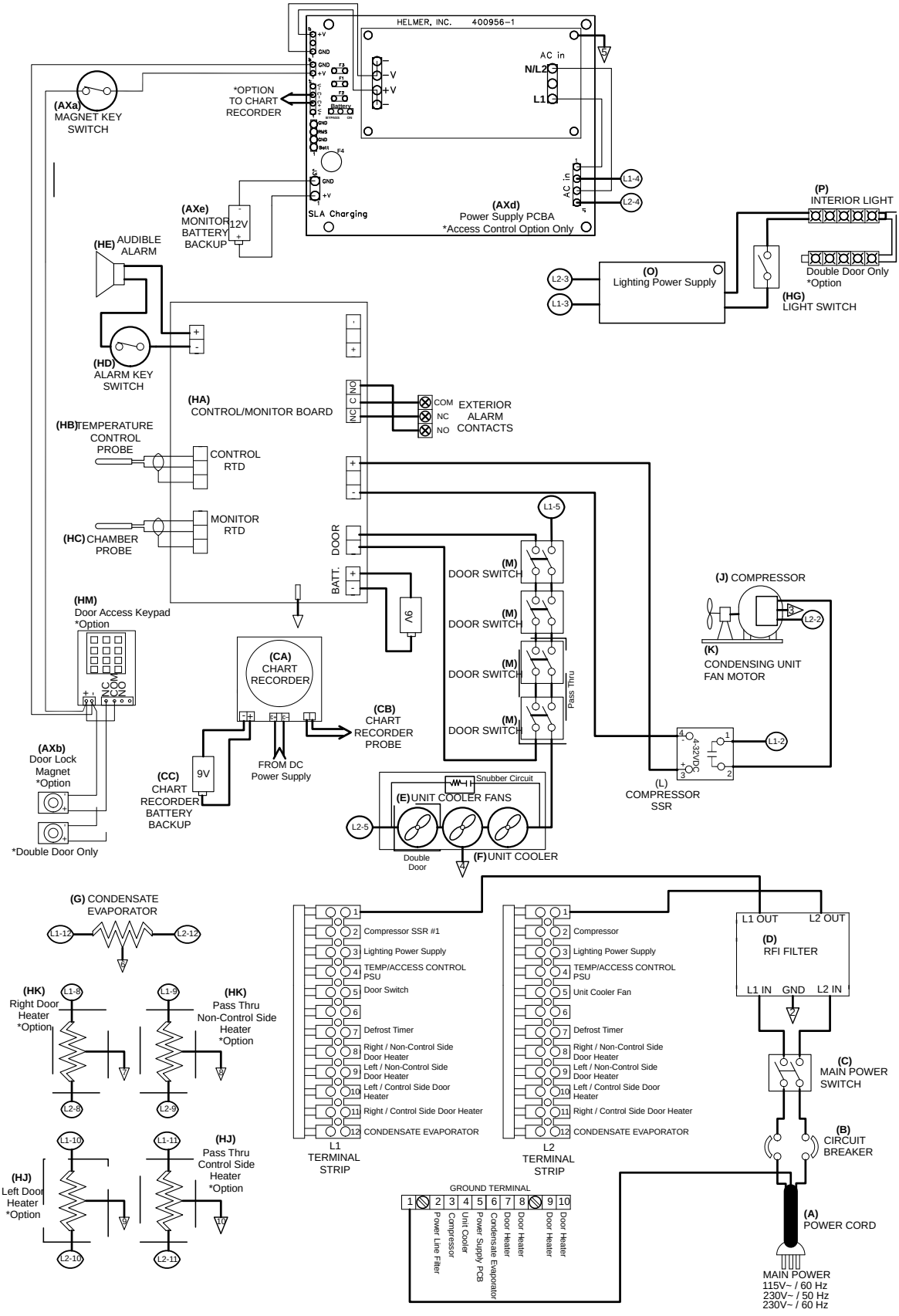
15.2 HB Model; 11 Cubic Feet (With Access Control)



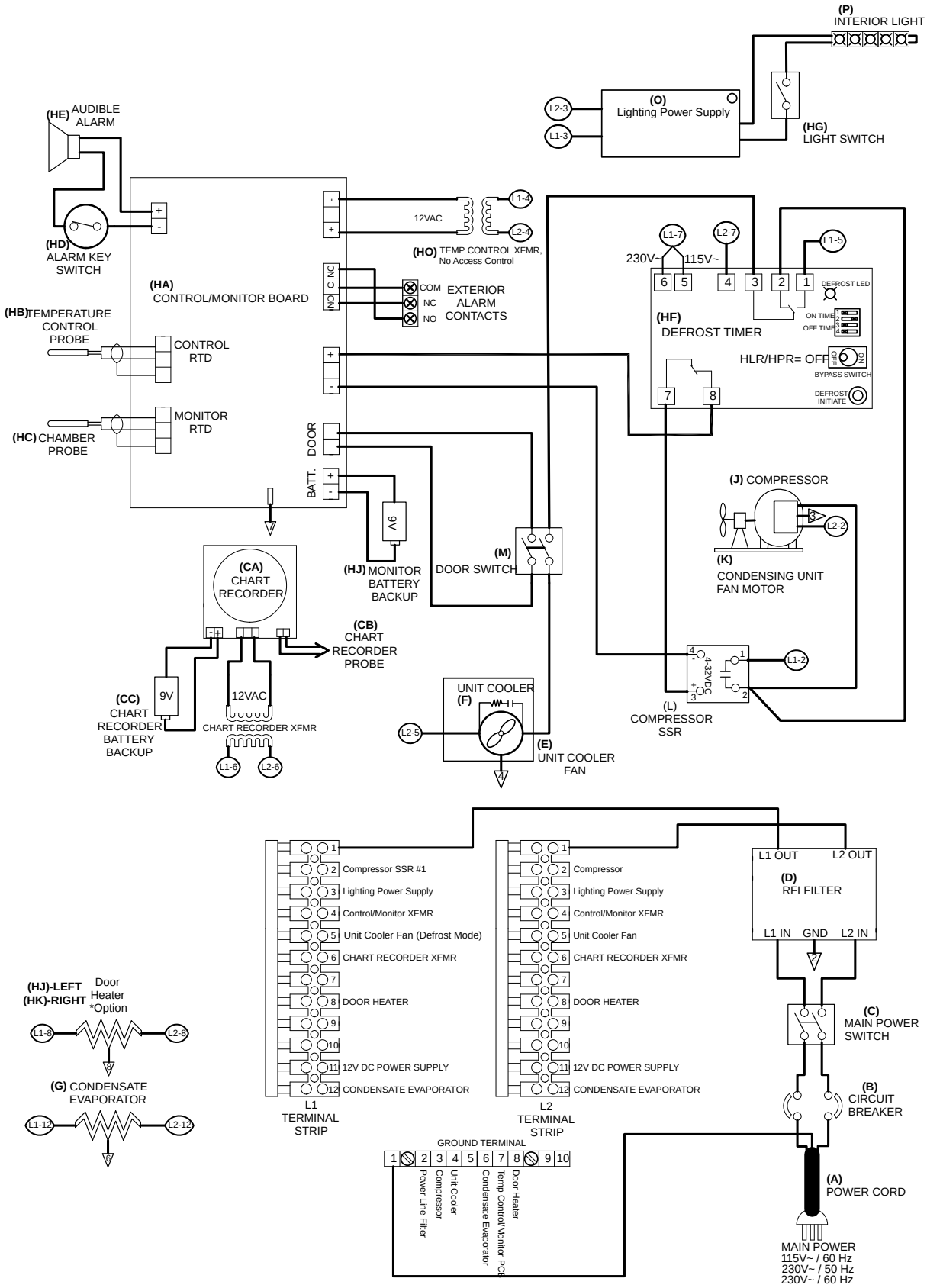
15.3 HB Model; 20, 25, 45, 56 Cubic Feet (Without Access Control)



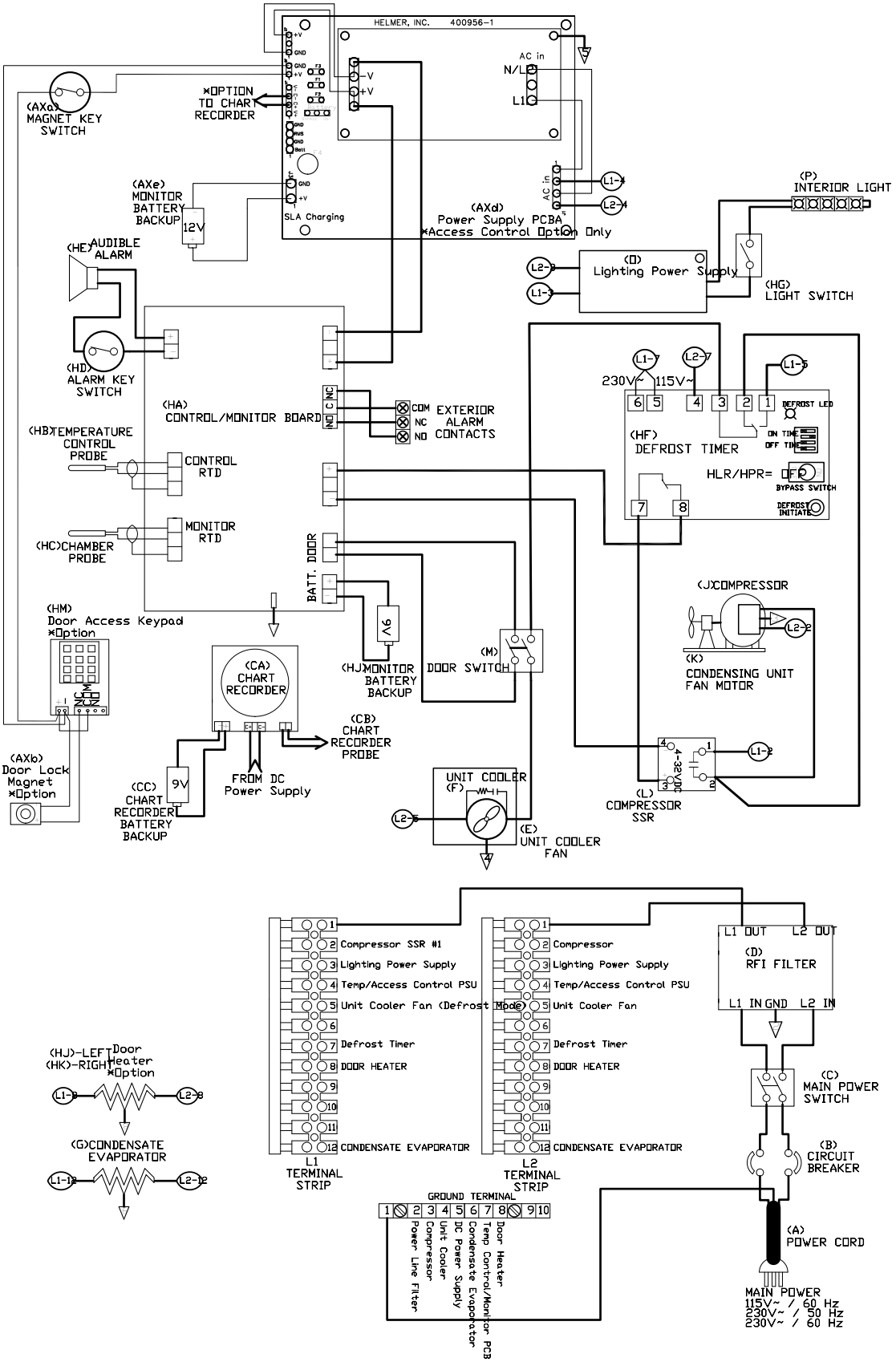
15.4 HB Model; 20, 25, 45, 56 Cubic Feet (With Access Control)



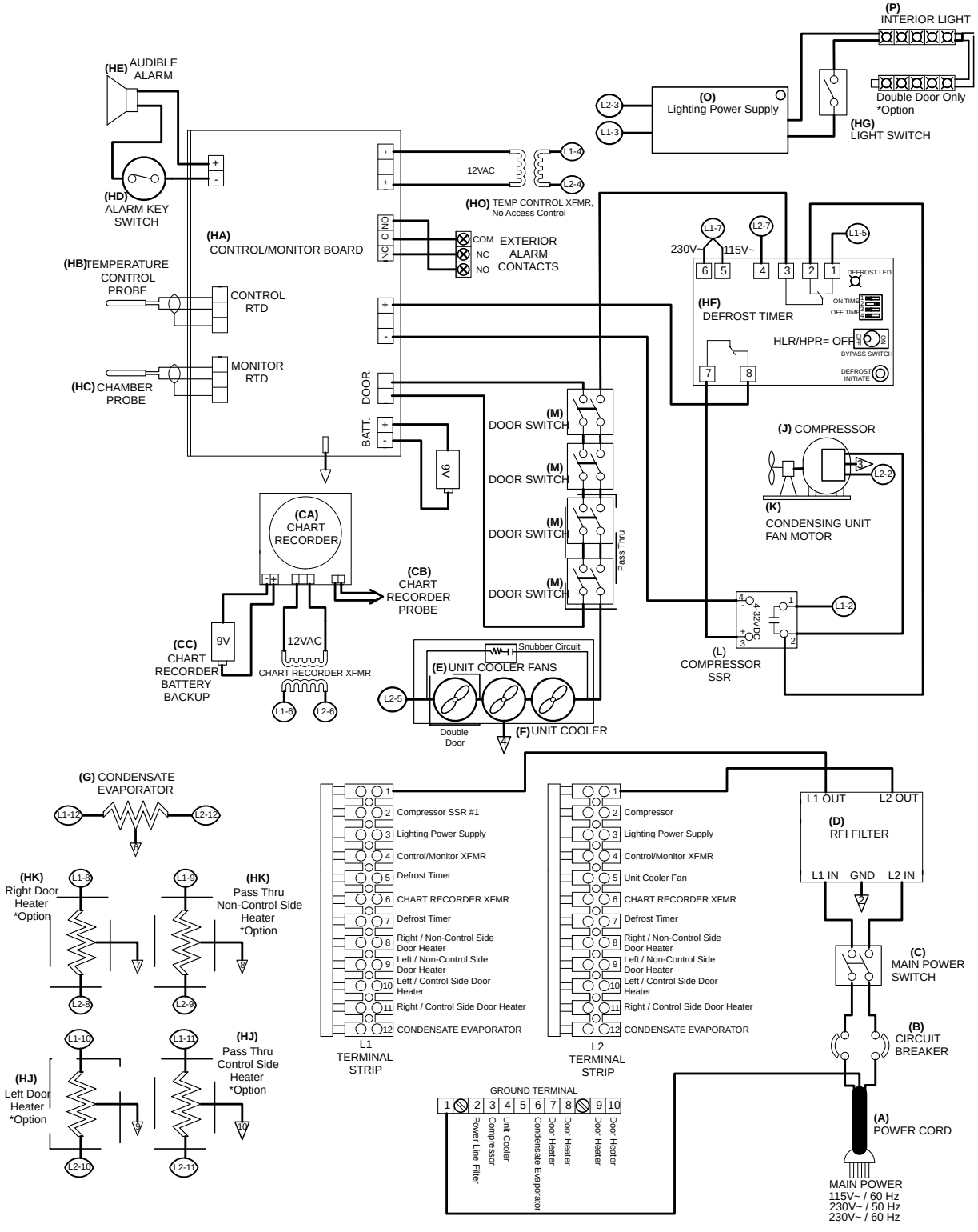
15.5 HLR and HPR Models; 11 Cubic Feet (Without Access Control)



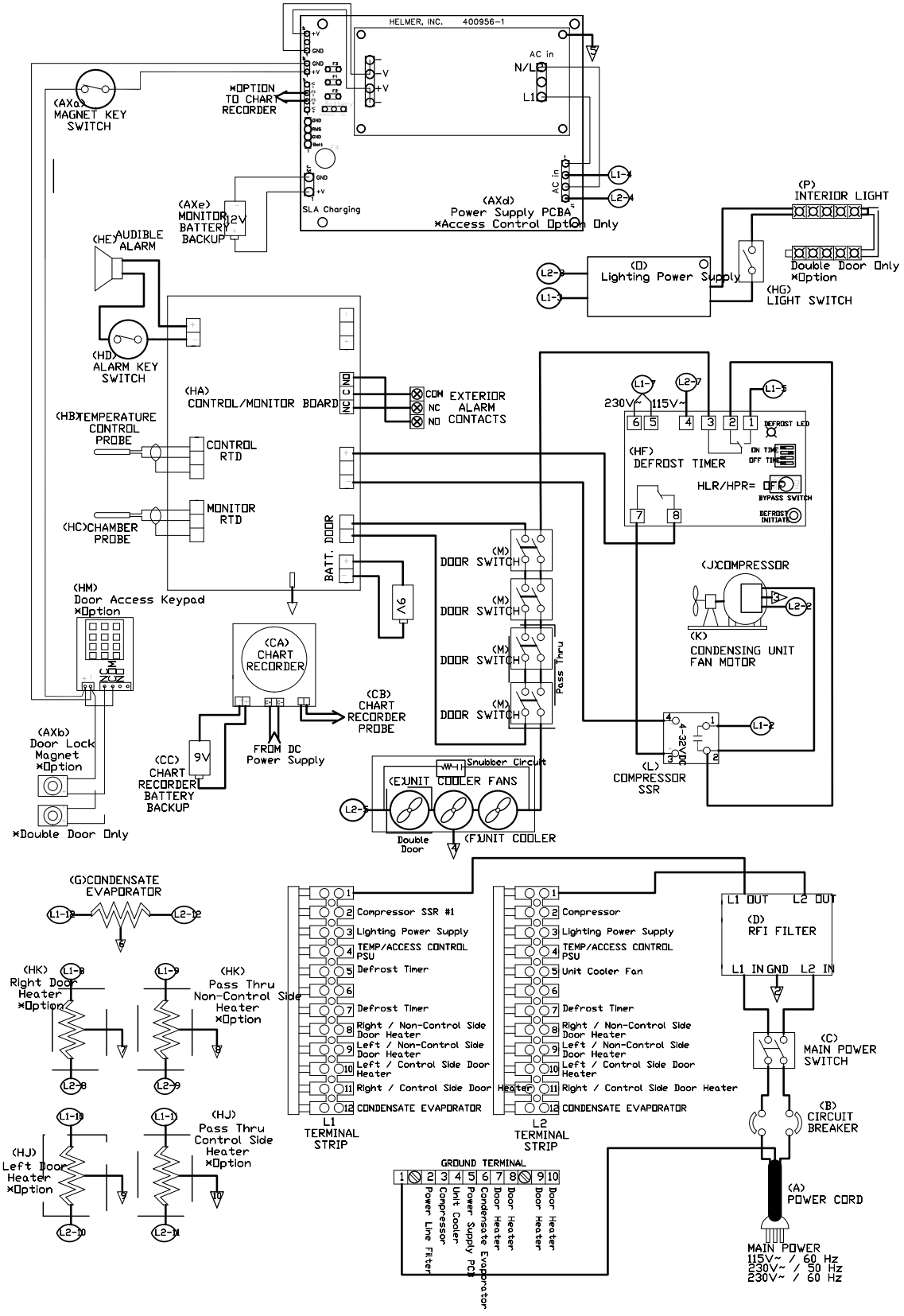
15.6 HLR and HPR Models; 11 Cubic Feet (With Access Control)



15.7 HLR and HPR Models; 20, 25, 45, 56 Cubic Feet (Without Access Control)



15.8 HLR and HPR Models; 20, 25, 45, 56 Cubic Feet (With Access Control)



Appendix A: Compliance

CE

0086

Regulatory Compliance

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
Molenstraat 15
2513 BH
The Hague, Netherlands

RoHS COMPLIANT

WEEE Compliance

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

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

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

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

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 seven (7) years.
- Horizon Series model compressor warranty period is five (5) 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.

END OF MANUAL

Notes

Helmer Scientific
14400 Bergen Boulevard, Noblesville, IN 46060 USA

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