Refrigerator Service Manual

i.Series™ and Horizon Series™

Model Group	i.Series	Horizon Series
Blood Bank	iB111 (Version D) iB120, iB125, iB245, iB256 (Version D)	HB111 (Version D) HB120, HB125, HB245, HB256 (Version D)
Laboratory	iLR111 (Version D) iLR120, iLR125, iLR245, iLR256 (Version D)	HLR111 (Version D) HLR120, HLR125, HLR245, HLR256 (Version D)
Pharmacy	iPR111 (Version D) iPR120, iPR125, iPR245, iPR256 (Version D)	HPR111 (Version D) HPR120, HPR125, HPR245, HPR256 (Version D)

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Document History

Revision	Date	CO	Supersession	Revision Description
A	28 JAN 2013	6666	n/a	Initial release (as version D, revision A).
B	29 APR 2013*	8234	B supersedes A	► Added new part number for 120 V compressor on double-door models (245 and 256). ► Added serial number range for each compressor (existing and new). ► Applicable to i.Series and Horizon Series.

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

Contents

Section I: General Information

1 About this Manual

1.1 Intended Audience

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

1.2 Model References

Generic references are used throughout this manual to group models that contain similar features. For example, “125 models” refers to all models of that size (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.”

1.3 Copyright and Trademark

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

2 Safety

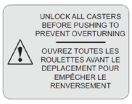
Includes general safety information for refrigerator operation.

2.1 Labels

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

2.2 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 free of debris.
- ► Never physically restrict any moving component.
- ► Avoid removing electrical service panels and access panels unless so instructed.
- ► Use supplied power cords only.

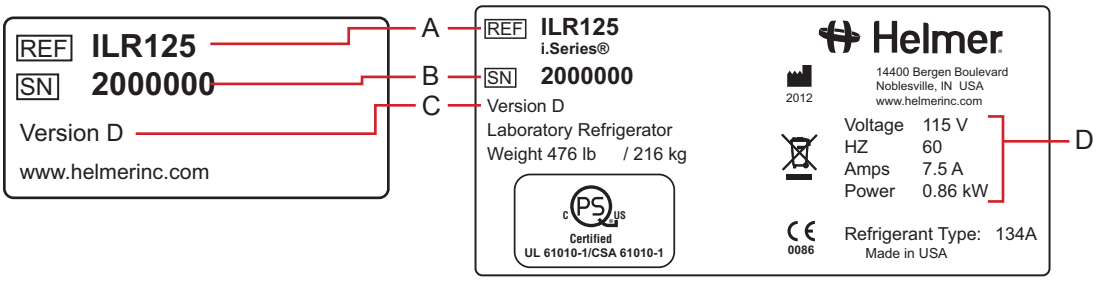
CAUTION Decontaminate parts prior to sending for service or repair. Contact Helmer or your distributor for decontamination instructions and a Return Authorization Number.

3 Configuration

3.1 Model and Input Power

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

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



Left: Chamber label. Right: Product Specification label.

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

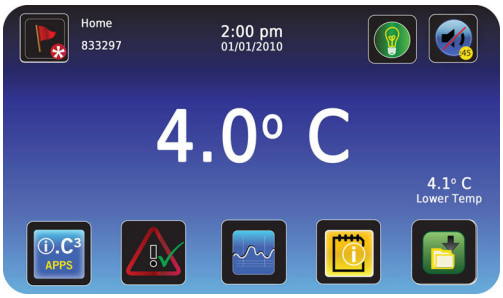
3.2 Control System

NOTE Service information varies depending on the control system.

Helmer refrigerators have one of two control systems installed. The type of control system varies by model.

3.2.1 i.C³® Control System

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



3.2.2 Horizon Series Control System

Horizon Series refrigerators feature the Horizon combined monitor and temperature controller. The Horizon Series system controls chamber temperature and monitors and displays operational information.

3.3 Temperature Probes

Number and location of probes varies by model. External probes may be introduced through existing top ports and immersed in existing probe bottles, or through side access port (availability varies by model).

For each probe bottle, use:

► Approximately 4 oz (120 ml) of product simulation solution (10:1 ratio of water to glycerin).



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

3.3.1 Fill Temperature Probe Bottle

NOTE Temperature probes are fragile; handle with care.

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

3.3.2 Install Additional Probe Through Top Port

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

3.3.3 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. Replace plugs, ensuring a tight seal.

3.4 Chart Recorder

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

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

Prior to use:

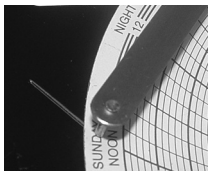
- ► Install battery.
- ► Add paper.
- ► Calibrate chart recorder to match upper chamber temperature.

3.4.1 Chart Recorder Access

Open door by either pressing and releasing, or by pulling door open.

3.4.2 Install Chart Paper

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



5. Hold chart paper and reinstall chart knob.

NOTE

- ► For accurate temperature reading, ensure that current time is aligned with time line groove when chart knob is tightened.
- ► Do not overtighten knob.

6 Confirm temperature range is set to the correct value.

7 Press and hold **C** button. When stylus begins to move right, release button.

8 Confirm stylus is marking temperature correctly.

4 References and Compliance

4.1 Alarm Reference

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

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

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

4.2 Regulatory Compliance

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

CE 0086

Sound level is less than 70 dB(A).

EC REP

Emergo Europe
Molenstraat 15
2513 BH
The Hague, Netherlands

4.3 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.

5 Warranty

5.1 Rel.i™ Product Warranty USA and Canada

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

5.1.1 Rapid Resolution

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

5.1.2 Compressor

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

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

5.1.3 Parts

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

5.1.4 Labor

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

5.1.5 Additional Warranty Information

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

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

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

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

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

5.2 Outside of USA and Canada

Consult your local distributor for warranty information.

Section II: i.Series™ Models

6 Product Configuration

6.1 Install Battery for Backup Power

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

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

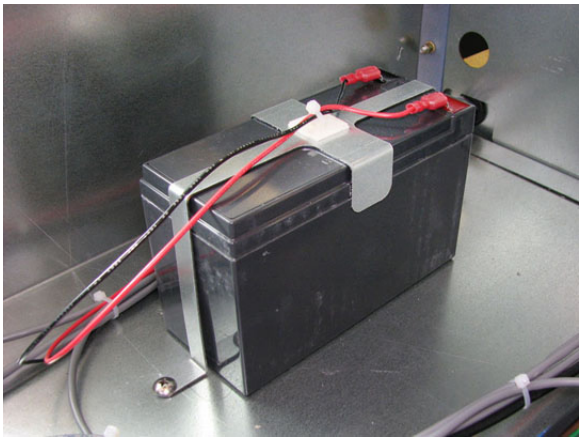
Battery life varies by manufacturer as well as voltage level remaining. Providing full power is available and no battery-related alarms are active, backup power for the monitoring system is available for up to 20 hours (the Low Battery alarm will activate after approximately 18 hours of battery use).

CAUTION

- ► Before installing or replacing batteries, switch the power and battery OFF. Disconnect the refrigerator from AC power.
- ► When installing a replacement battery, use only a battery which meets the specifications outlined in chapter **8.7** (Supplies).

NOTE If AC power is lost, the monitoring system will automatically disable some features to prolong battery power. Data collection will continue until battery power is depleted.

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



Models	Battery
iB, iLR, and iPR	(1) rechargeable 12 V lead acid sealed battery

Battery is switched off for shipping. Switch battery on to provide monitoring system with backup power in the event of AC power failure.

6.2 External Monitoring Devices

The remote alarm interface is a relay switch with 3 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.

NOTE Do not connect any monitoring device that exceeds the maximum load capacity.

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)

6.2.1 Connect to Remote Alarm Interface

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

6.3 Move Drawers, Shelves, and Baskets

Storage features.

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.

Remove a 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 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.

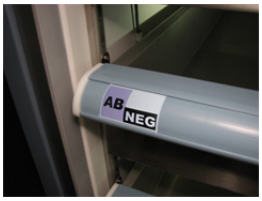
Remove a Shelf

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.

6.4 Drawer Labels



Drawer with sample label (not provided).

6.5 Move Slides and Brackets

Remove Drawer Slides

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

Install Drawer Slides

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

Remove Shelf Brackets

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

Install Shelf Brackets

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

6.6 Level the Refrigerator

NOTE

- ► Leveling feet are optional.
- ► Helmer recommends the use of leveling feet.
- ► A bubble level may be used to ensure the refrigerator is level.

Leveling feet must be adjusted to provide unit cooler drainage.

Front-to-Back

1. Using a wrench, raise or lower leveling feet.
2. When refrigerator is properly leveled, bottom of the unit cooler will slope downward from front to back (toward the condensate drain line).

Side-to-Side

1. Using a wrench, raise or lower leveling feet.
2. When refrigerator is properly leveled, bottom of the unit cooler will be horizontal (parallel to the floor).

6.7 Optional Adapter Kits for Medication Dispensing Locks

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

7 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 display additional settings.

NOTE

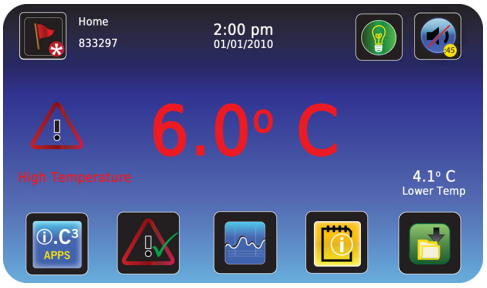
- ► If the Settings screen is password protected or if viewing settings for the first time, enter factory default password of “1234”.
- ► When there is no interaction for two minutes, the Temperature Setpoint screen closes and returns to the Home screen.
- ► Default values for general settings, alarm 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 mode, then the setting. The method for accessing the Settings mode for each setting varies.

7.1 Home Screen

The Home screen appears when:

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



7.1.1 Home Screen Functions

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

- ► View current temperature readings
- ► View the current system time and date
- ► Access any of the five customizable applications (touch **i.C³ APPS** for additional applications)
- ► View detailed information about current or previous alarm events or door open data
- ► 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

7.2 Temperature Settings

Temperature setpoint 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**. Details for each setpoint are displayed.

Temperature Controller Programs screen.

NOTE Default chamber temperature setpoint is 4.0 ºC.

Change the setpoint if:

- ► Your organization requires a chamber temperature other than 4.0 ºC.
- ► The normal chamber temperature is too high or low (after completing preventive maintenance and applicable troubleshooting tasks).

Confirm:

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

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

Perform the following:

1 Touch **i.C³ APPS**, **i.C³ Settings**.

2 Enter the Settings password.

3 Touch **Temperature Setpoints**.

4 Touch **+** or **–** on the **Temperature Setpoint** spin box.

- ► The setpoint is the temperature at which the refrigerator operates.

EXAMPLE

- ► Current setpoint is 4.0 ºC
- ► Target temperature is 4.5 ºC
- ► Setpoint adjustment value is +0.5 ºC

5 Touch **+** or **–** on the **Hysteresis Setpoint** spin box.

- ► The hysteresis setpoint is the allowable fluctuation in temperature, relative to the temperature setpoint.
- ► A lower hysteresis setpoint will limit the temperature variation to a smaller range.
- ► A higher setpoint will allow the temperature to vary across a larger range.

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

6 Touch **+** or **–** on the **Delay on Start-Up** spin box.

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

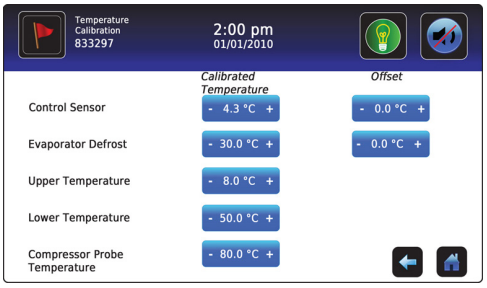
7 Touch **+** or **–** on the **Duty Cycle of Control Relay during Probe Failure** spin box.

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

Setting	Initial Factory Value
Temperature Setpoint	4.0 ºC
Hysteresis Setpoint	1.5 ºC (iB111) 0.8 ºC (iLR111 and iPR111) 1.0 ºC (iLR120, iLR125, iPR120, iPR125)
Delay on Start-Up	2 minutes
Duty Cycle of Control Relay during Probe Failure	50%

7.3 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**. Details for each setting are displayed.



Temperature Calibration screen.

NOTE

- If the Settings screen is password protected or if viewing settings for the first time, enter factory default password of “1234”.
- When there is no interaction for two minutes, the Temperature Setpoint screen closes and returns to the Home screen.
- 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.

7.3.1 Determine Control Sensor Offset

The temperature controller senses unit cooler temperature through a 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 unit cooler probe registers above the setpoint.

Obtain:

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

Perform the following:

1. Remove probes from upper probe bottle.
2. Unscrew cap from bottle.
3. Tape independent thermometer to temperature probe and place in bottle. Probe and thermometer should be immersed at least 2” (50 mm).
4. Close door and allow chamber temperature to stabilize for 10 minutes.
5. Observe independent thermometer temperature for 10 minutes and determine temperature range.
6. From the range, calculate the average temperature.
7. Remove thermometer and probe from bottle and remove tape.
8. Replace bottle cap, ensuring a tight fit.
9. Place probes in bottle, immersing at least 2” (50 mm).
10. Determine the change in value to reach desired setpoint.

EXAMPLE
- ► Current setpoint is 4.0 ºC
- ► Average temperature is 4.5 ºC
- ► Offset adjustment value is +0.5 ºC

Enter the 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** spin box.

► Value is factory-preset to match the temperature measured in the unit cooler (at the control sensor) by an independent thermometer.

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

5 Touch **+** or **–** on the **Control Sensor Offset** spin box.

► The offset should be equal to the difference between the refrigerator setpoint and the average temperature measured by an independent thermometer (at the upper probe bottle).

► Raise the offset value to lower chamber temperature; lower the offset value to raise chamber temperature.

EXAMPLE
- ► Measured temperature (at the upper probe bottle) is 4.0 ºC
- ► Current setpoint is 4.5 ºC
- ► Offset adjustment value is +0.5 ºC

6 Touch **Home** to return to home screen.

7.3.2 Calibrate Chamber Temperature Probes

Verify temperature probes are reading chamber temperature correctly by comparing chamber probe readings to temperature read by an independent thermometer. If chamber temperature probes are not reading correctly, change the value displayed on the monitor.

NOTE
- ► If the variance is within acceptable limits for your organization, changing probe settings is optional.
- ► Probes in the bottles are connected to the monitoring system and sense chamber temperature. These probes do not affect refrigerator setpoint.

► Default setting for chamber temperature probes is 4.0 ºC.

► Value is factory-preset.

► Value can be changed from -100.0 ºC to +50.0 ºC.

Obtain:

► Independent thermometer, calibrated and traceable per national standards.

► Tape, to attach thermometer to temperature probe.

Calibrate probes:

1 Remove probe from the upper probe bottle.

2 Unscrew the cap from the bottle.

3 Tape the thermometer to the temperature probe, and place them in the bottle. The probe and thermometer should be immersed at least 2” (50 mm).

4 Close the door and allow the chamber temperature to stabilize for 10 minutes.

5 Observe and note the thermometer temperature.
6 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.

NOTE After saving the new temperature value, the displayed temperature may not match the new value. This is normal.

8 Replace the probe in probe bottle.
9 Remove thermometer and probe from bottle and remove tape.
10 Replace bottle cap, ensuring a tight fit.
12 Place probe in bottle, immersing at least 2” (50 mm).

7.3.3 Calibrate 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.

7.3.4 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.

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	On
Temperature Calibration Values	Values previously entered during setup
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	ºC
Password Protection (for Settings screen)	On
Temperature Graph Screensaver	On
Access Control (optional) as Home Page	On

Setting	Restored Value
Light Off Delay (on/off)	On
Light Off Delay	5 minutes
High Temperature Alarm Setpoint	5.5 ºC
High Temperature Alarm Time Delay	0 minutes
Low Temperature Alarm Setpoint *	1.5 ºC
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 ºC
Compressor Temperature Alarm Time Delay	0 minutes
Chamber Setpoint	4.0 ºC
Chamber Hysteresis	1.5 ºC (iB111); 0.8 ºC iLR111, iPR111); 1.0 ºC (iLR120, iLR125, iPR120, iPR125)
Delay on Start-Up	2 minutes

* Includes laboratory (iLR) and pharmacy (iPR) models originally set at 2.0 ºC.

7.3.5 Additional Factory Default Settings for Laboratory and Pharmacy Models

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

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

7.3.6 Restore Factory Default Settings

Restore settings:

1 Touch **Home**, **i.C³ APPS**, **Settings**, **Restore Factory Settings**.

2 A “Are you sure you want to restore factory settings?” message appears. Do one of the following:

- ► Touch **Yes**. The message screen closes and factory settings are restored.
- ► Touch **No**. The message screen closes and factory settings are not restored.

7.3.7 Change Factory Settings

Several of the refrigerator operating parameters are configured at the factory. The settings listed below are set at the factory, and may be changed at the direction of Helmer Technical Service.

Setting	Description
Lower Probe	Toggle the lower temperature probe on or off
Lower Probe Alarm	Toggle the lower temperature probe alarm on or off
Light Icon	Toggle the light icon on or off
Temperature Controller Page	Enable or disable the temperature controller screen

Factory settings 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.

7.4 Test Alarms

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.

7.4.1 Automatic Chamber Temperature Alarm Test

NOTE

- Test can be aborted by touching **Cancel Test**.
- Test is only applicable to the upper chamber probe.
- Test takes less than 5 minutes.
- If the temperature alarm test does not automatically complete within 2 minutes, restart the i.C³ monitoring system.

When performing an automatic temperature alarm test, the Peiltier device heats or cools the temperature probe until the high or low alarm setpoint is reached. An event is added to the Event Log to indicate a temperature alarm was activated. 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, 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 low temperature alarm event. Compare this to the alarm setpoint. If values do not match, refer to chapter **9** (Troubleshooting).

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. If values do not match, refer to chapter **9** (Troubleshooting).

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.

7.4.2 Manual Chamber Alarm Test

IMPORTANT Perform the low alarm test before the high alarm test to control the temperature more closely and complete the testing more quickly.

NOTE Before testing alarms, protect items in refrigerator from extended exposure to adverse temperature.

Obtain:

► (2) 8 oz (250 ml) glass half-full of chilled water.
► (1) glass filled with crushed ice.
► (1) 8 oz (250 ml) glass half-full of warm water.

NOTE Temperature probes are fragile; handle with care.

Test the low alarm:

1 Identify setting for low alarm setpoint.
2 Remove chamber temperature probe from bottle.
3 Immerse probe in chilled water.
4 While stirring probe in chilled water, add approximately 1 teaspoon (5 ml) of ice every 20 seconds. Ensure probe is at the bottom of the glass.
5 When low temperature alarm sounds, note the temperature on the monitoring system display.
6 Compare the temperature at which the alarm sounds to the low alarm setpoint. If values do not match, refer to chapter **9** (Troubleshooting).

Test the high alarm:

1 Identify setting for high alarm setpoint.
2 While stirring probe in chilled water, add warm water so temperature increases 0.5 ºC per minute.
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. If values do not match, refer to chapter **9** (Troubleshooting).

5 Remove probe from warm water.
6 Place temperature probe in probe bottle, immersing it at least 2” (50 mm).

7.4.3 Power Failure Alarm Test

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

1 Change Power Failure delay setting to 0 minutes.
   a Touch **Home**, **Settings**, **Alarm Settings**.
   b Touch **+** 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.

7.4.4 Door Open Alarm Test

1 Change Door Open (Time) delay setting to 0 minutes.
   a Touch **Home**, **Settings**, **Alarm Settings**.
   b Touch **+** 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.

7.5 Upgrade System Firmware

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

7.6 Calibrate the Touchscreen

The i.C³ touchscreen has been calibrated at the factory to ensure that when the screen is touched, the desired key touch is selected. If the i.C³ touchscreen or display circuit board is replaced after the refrigerator has been shipped from the factory, the touchscreen must be recalibrated. If the screen must be recalibrated, contact Helmer Technical Service to obtain the calibration file.

Calibrate the screen:

1 Insert the flash memory device with the calibration program into the USB port on the i.C³ bezel. The flash memory device can be inserted while any screen displayed on the i.C³.
2 Wait 15 to 30 seconds for the calibration file to load.
3 When the calibration screen appears, remove the flash memory device from the USB port.
4 Follow the on-screen instructions, touching the crosshair icons as they appear on the screen.

NOTE For accurate calibration results and to avoid damage to the touchscreen, touch the crosshairs with the eraser end of a pencil.

5 After all crosshairs have been touched, the i.C³ will reboot and display the language screen.

NOTE
- ► For accurate calibration results and to avoid damage to the touchscreen, touch the crosshairs with the eraser end of a pencil.
- ► If the screen was unintentionally touched outside of any of the crosshair icons during calibration, the screen may be recalibrated using the process outlined above.

7.7 View Manufacturer and Product Information

View version information for contacting Helmer.

1 Touch **i.C³ APPS**, **Contact Helmer**.
2 Manufacturer contact information appears.
3 Software version appears.

8 Maintenance

NOTE

- ► Refer to the operation manual for the preventive maintenance schedule.
- ► Before performing maintenance, protect items in refrigerator from extended exposure to adverse temperature.
- ► Allow refrigerator temperature to stabilize at setpoint after performing serivce or after extended door opening.

8.1 Recharge Refrigerant

CAUTION

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

NOTE Use only non-CFC R-134A refrigerant.

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

Model	Power Requirements	Initial Charge
111 model (single door)	115 V, 60 Hz 230 V, 50 Hz 230 V, 60 Hz	7.5 oz (213 g)
120 and 125 models (single-door)	115 V, 60 Hz 230 V, 50 Hz 230 V, 60 Hz	10.1 oz (286 g)
245 and 256 models (double-door)	115 V, 60 Hz 230 V, 50 Hz 230 V, 60 Hz	12.5 oz (354 g)

Obtain:

- ► Refrigerant
- ► Calibrated pressure gauge (0 lbs/in² to 25 lbs/in² (0 kPa to 175 kPa))

Add refrigerant:

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

NOTE Pressure varies depending on ambient air temperature.

4 Add refrigerant so the low side pressure is within acceptable range (16 lbs/in² to 18 lbs/in² (110 kPa to 125 kPa)).
5 Remove pressure gauge.

8.2 Check Monitoring System 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:

1 Switch AC ON/OFF switch OFF.
   - ► Screen should continue to display information with reduced brightness.
   - ► Battery icon will appear on the screen.
   - ► If the display is blank, replace battery.

2 Switch AC ON/OFF switch ON.

NOTE Use a battery which meets specifications outlined in chapter **8.7** (Supplies).

8.3 Replace LED Lamps

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.

8.4 Clean the Refrigerator

8.4.1 Condenser Grill

⚠ **CAUTION** Disconnect refrigerator from AC power when cleaning.

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

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

8.4.2 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.

8.4.3 Interior

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

8.4.4 Door Gaskets

Clean with soft cloth and mild soap and water solution.

8.4.5 Clean and Refill Probe Bottles

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

Obtain:

- ► Fresh water-bleach solution (not provided)
  - ► 1:9 ratio of bleach to water
  - ► Bleach is 5% solution of commercial sodium hypochlorite (NaOCl)
  - ► Equivalent oxidizing cleaner/disinfectant approved by your organization may be substituted
- ► 4 oz (120 ml) of product simulation solution per bottle
  - ► 10:1 ratio of water to glycerin

Clean and refill bottles:

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

8.4.6 i.C³® Touchscreen

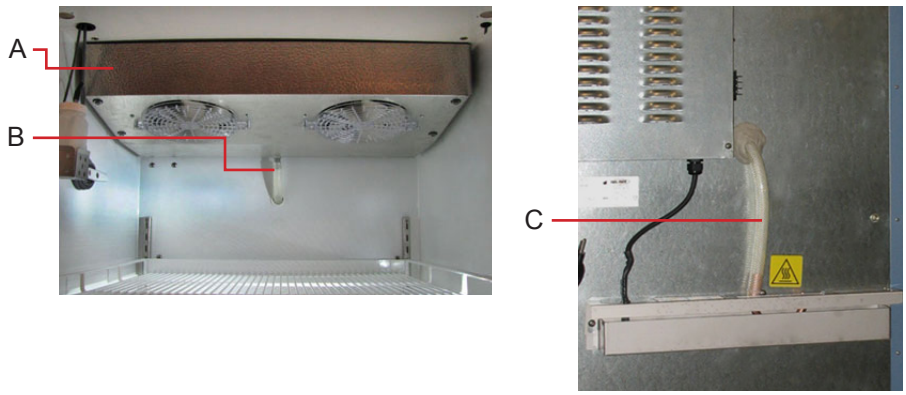
Clean touchscreen with a soft, dry cotton cloth.

8.5 Unit Cooler Cover Removal and Installation

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

Required tools:

- ► 5/16” socket wrench
- ► Tool to push putty away from the drain hose



Drain line and hose.

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

8.5.1 Remove the Unit Cooler Cover

1. Switch AC ON/OFF switch OFF. Switch battery switch OFF.
2. Remove top drawer, basket, or shelf from the chamber.
3. On the back of the camber, peel putty back to expose drain hose (C).

CAUTION The condensate evaporator and water evaporation tray are hot.

4. Remove drain hose from unit cooler drain port (B).
   a. Pull drain hose downward to separate from unit cooler.
   b. Twist drain hose while pulling to assist in removal.
5. Push the drain hose (C) out through rear of chamber.
6. Remove the unit cooler cover.
   a. Hold unit cooler cover in place to prevent it from dropping.
   b. Use the socket wrench to remove 4 screws securing the unit cooler cover.
   c. Carefully lower unit cooler cover to avoid damage to the fan wiring.

8.5.2 Install the Unit Cooler Cover

1. Verify unit cooler wiring is connected and routed correctly.
   a. Wiring should be routed above copper tube inside the unit cooler.
   b. Reconnect wires if they have separated.
2. Attach unit cooler cover.
   a. Lift unit cooler cover into place.
   b. Front edge of the cover should be behind the unit cooler case.
   c. Use the socket wrench to install 4 screws to secure the unit cooler cover.
3. Insert the drain hose through hole in the refrigerator.
   a. Push drain hose upward, toward the unit cooler drain port.
   b. In the chamber, push drain hose onto unit cooler drain port.
4. Reinstall top drawer, basket, or shelf if previously removed.
5. On the back of the chamber, press putty around the drain hose.
6. Switch AC ON/OFF switch ON. Switch battery switch ON.
7. Touch **Mute** to disable the high temperature alarm while refrigerator reaches operating temperature.

8.6 Access Control Cartridge Removal and Installation

The Access Control lock cartridge is a serviceable assembly installed on the cabinet.

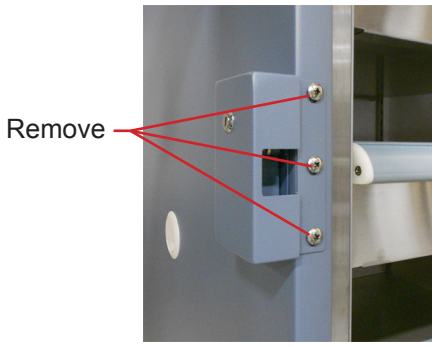
Required tools:

- ► Wire cutter
- ► #2 Phillips screwdriver

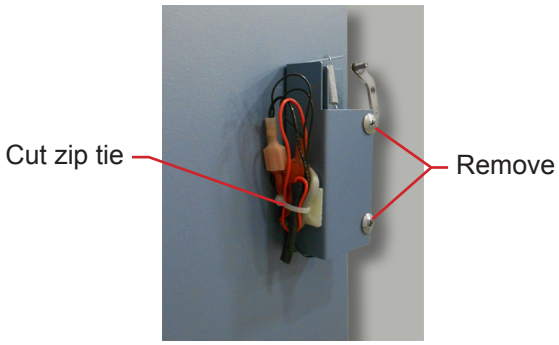
8.6.1 Cartridge Removal

1. Switch AC ON/OFF switch OFF. Switch battery switch OFF.
2. Open refrigerator door and prop the door open.
   ► If door is locked, use the key to override the Access Control lock, then open door.
3. Use a screwdriver to remove 3 screws securing the Access Control cartridge cover.

4 Remove cover.



5 Cut the zip tie securing the bundled wires to the cartridge. Separate the spade connectors.
6 Use a screwdriver to remove 2 screws securing the cartridge assembly.



7 Remove cartridge assembly.

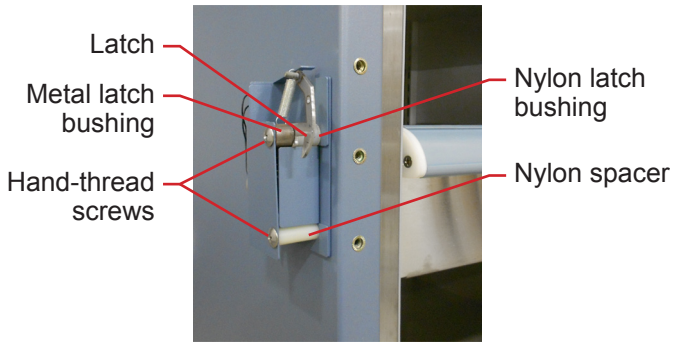
8.6.2 Cartridge Installation

1 Insert upper screw through:
- ► Upper hole in cartridge body
- ► Metal latch bushing
- ► Door latch
- ► Nylon latch bushing

2 Insert lower screw through:
- ► Lower hole in cartridge body
- ► Nylon spacer

3 Place the cartridge against the cabinet and align the screws with the holes in the cabinet.

4 Hand-thread 2 screws into the holes in the cabinet.



NOTE Ensure wires are not pinched between the cartridge and the cabinet.

5 Using a screwdriver, tighten the screws.
6 Connect the electrical wires from the cabinet to the wires from the cartridge.
7 Bundle the excess wiring and secure it to the back of the cartridge with a zip tie.

NOTE Latch must be in the unlocked position (rotated toward the back of refrigerator) before installing cartridge cover.

8 Install the Access Control cartridge cover.
   a Place the cover over the cartridge and align the screw holes with the holes in the cabinet.
   b Hand-thread 3 screws into the holes in the cabinet.
   c Using a screwdriver, tighten the screws.
9 Close refrigerator door.
10 Switch AC ON/OFF switch ON. Switch battery switch ON.
11 Touch **Mute** to disable the high temperature alarm while refrigerator reaches operating temperature.

8.7 Supplies

Refrigerant: non-CFC, R-134A

Chart paper: 220366 (52 sheets)

Glycerin solution: 400922-1

LED lamp: 400954-1, ≈ 1.3 W

(1) 12 V, 7 Ah rechargeable sealed lead acid battery: 120628

(1) 9 V non-rechargeable alkaline (or equivalent): 120218

9 Troubleshooting

CAUTION Review all safety instructions prior to troubleshooting. Refer to chapter **2** (Safety).

9.1 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.
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 upper temperature 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.	Condenser grill is dirty.	► Check the condenser grill. Clean the grill if necessary.
	Air circulation at the top of the chamber is not adequate.	► Check if there are any items that may obstruct air flow and remove them if necessary.
	Ambient air temperature around the refrigerator is too high.	► Confirm the refrigerator is placed appropriately.
	Refrigerant level is too low.	► Check refrigeration lines for leaks and repair if necessary. Check the refrigerant level. Recharge refrigerant if necessary.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
"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.

9.2 Chamber Temperature Problems

Problem	Possible Cause	Action
The chamber temperature displayed is higher or lower than the actual temperature.	Chamber temperature probe(s) is not calibrated.	► Check the chamber temperature calibration. Change the calibration if necessary.
	Connections for the chamber temperature probe are loose.	► Test the probe connections. Secure the connections if necessary.
	Temperature probe wiring is an open circuit.	► Check the continuity of the probe wiring. Replace the probe if necessary.
	Probe bottles are empty, or the amount of solution is too low.	► Check the level of product simulation solution in the bottles. Refill the bottles if necessary. Refer to the Refrigerator operation manual.

Problem	Possible Cause	Action
The chamber temperature does not stabilize at the refrigerator setpoint.	Compressor starting relay is faulty.	► Confirm the relay is operating correctly. Replace the relay if necessary.
	Temperature monitor/ controller board is faulty.	► Replace parts with those included in the control board kit, or replace the monitor/control board.
	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.
	Compressor motor has seized.	► Replace the compressor.
	Temperature control probe is out of calibration.	► Confirm the probe is providing accurate temperature readings.
	Temperature control probe is faulty.	► Confirm the probe is providing resistance in the range of 98 Ω to 110 Ω. Replace the probe if necessary.
	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.
The compressor runs continuously.	Refrigerator setpoint is set too low.	► Confirm the setpoint is set within the operating range and change it if necessary.
	Temperature control probe is out of calibration.	► Confirm the probe is providing accurate temperature readings.
	Temperature control probe is faulty.	► 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.
	Compressor starting relay is faulty.	► Confirm the relay is operating correctly. Replace the relay if necessary.
	Temperature monitor/ controller board is faulty.	► Replace parts with those included in the control board kit, or replace the monitor/control board.

9.3 Alarm Activation Problems

Problem	Possible Cause	Action
The refrigerator is in an alarm condition, but alarms are not audible.	Alarm system is faulty.	► Replace parts with those included in the control board kit, or replace the monitor/control board.
	Temperature monitor/ controller board is faulty.	► Replace parts with those included in the control board kit, or replace the monitor/control board.
	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.	Temperature monitor/ controller board is faulty.	► Replace parts with those included in the control board kit, or replace the monitor/control board.
	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.	Connections for the chamber temperature probe are loose.	► Test the probe connections. Secure the connections if necessary.
	Chamber temperature probe is faulty.	► Test the probe. Replace the probe if necessary.
	Unit cooler fan continues to run while the door is open.	► Test the door switch and unit cooler fan connections. Secure the connections if necessary. Replace the door switch or fan motor if necessary.
	Probe bottles are empty.	► Check level of product simulation solution in the bottles. Refill bottles if necessary.
	High temperature alarm setpoint is set too low.	► Check the setpoint. Change the setpoint 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 faulty.	► 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.
	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 Timeout 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.
All alarms are activating sporadically.	Alarm system is faulty.	► Replace parts with those included in the control board kit, or replace the monitor/control board.
	Temperature monitor/ controller board is faulty.	► Replace parts with those included in the control board kit, or replace the monitor/control board.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.

Problem	Possible Cause	Action
The condenser alarm is active.	Refrigerant level is too low.	► Check refrigeration lines for leaks and repair if necessary. Check refrigerant level. Recharge if low.
	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.
	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 probe is not calibrated.	► Confirm the condenser probe is reading correctly. Calibrate the probe if necessary.
	Condenser alarm setpoint is too low.	► Confirm the alarm setpoint is at the appropriate value.
	Condenser fan motor is faulty.	► Replace the condenser fan motor.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
An alarm is activated but the temperature recorded at activation does not match the alarm setpoint.	Temperature monitor is not calibrated.	► Confirm the upper temperature probe is reading correctly. Calibrate the probe if necessary.
	Temperature changed slightly around the time of activation.	► No action 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.

9.4 Testing Problems

Problem	Possible Cause	Action
The automatic temperature tests do not work.	Connections for the upper chamber temperature probe are loose.	► Test the probe connections. Secure the connections if necessary.
	Upper chamber probe is out of calibration.	► Confirm the probe is providing accurate temperature readings.
	Upper chamber temperature 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.
	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.

9.5 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.
	Temperature monitor/ controller board is faulty.	► Replace parts with those included in the control board kit, or replace the monitor/control board.
	Drain line is plugged.	► Confirm the drain tube is free of debris. Remove debris if necessary.

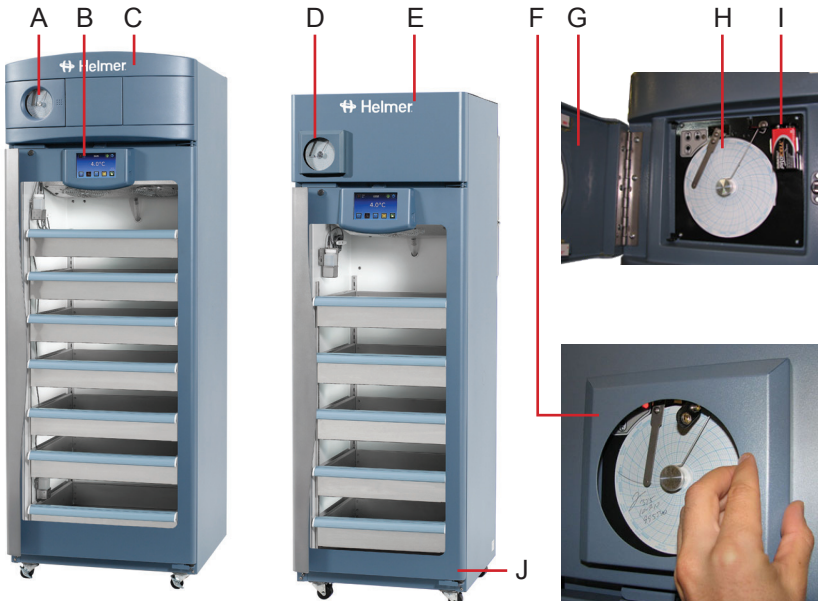
Problem	Possible Cause	Action
There is excessive humidity on the doors.	Humid air is entering the chamber.	► Confirm the refrigerator is level, and the doors are aligned, closing tightly, and sealing correctly. Correct issues as necessary.
	Relative humidity around the refrigerator is too high.	► Confirm the refrigerator is placed properly. Refer to the refrigerator operation manual.
Water leaks from the bottom of the refrigerator.	Humid air is entering the chamber.	► Confirm the refrigerator is level, and the door is aligned, closing tightly, and sealing correctly.
	Excessive water is found in the evaporation tray inside the refrigerator.	► Contact Helmer Technical Service to correct issues as necessary.

10 Parts

NOTE

► 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.

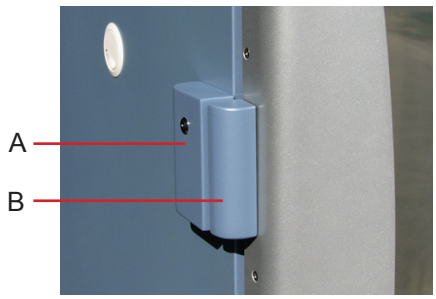
10.1 Front



Left: iB120 refrigerator. Center: iB111 refrigerator.
Top-right: Chart recorder and door (except 111 model).
Bottom-right: 111 model chart recorder and door.

Label	Description	Part Number	Schematic Label
A	Temperature chart recorder (standard on blood bank models except iB111; optional on laboratory and pharmacy models except iLR111 and iPR111)	**120 V:** 800026-1 **230 V:** 800026-2	CA
B	i.C³ monitoring and control system	Refer to subsequent section(s) for part numbers	-
C	Bezel (all models except 111)	With chart recorder door: 400999-1 Without chart recorder door: 400998-1	-
D	Temperature chart recorder (standard on iB111 model; optional on iLR111 and iPR111 model)	**120 V:** 800025-1 **230 V:** 800025-2	CA
E	Bezel (111 model)	With chart recorder door: 800056-1 Without chart recorder door: 800055-1	-
F	Chart recorder door assembly (111 model)	320739-1	-
G	Chart recorder door assembly (all models except 111)	800070-1	-
H	Chart paper (52 sheets)	220366	-
I	Chart recorder battery	120218	CC
J	Caster (swivel with brake)	220467	-

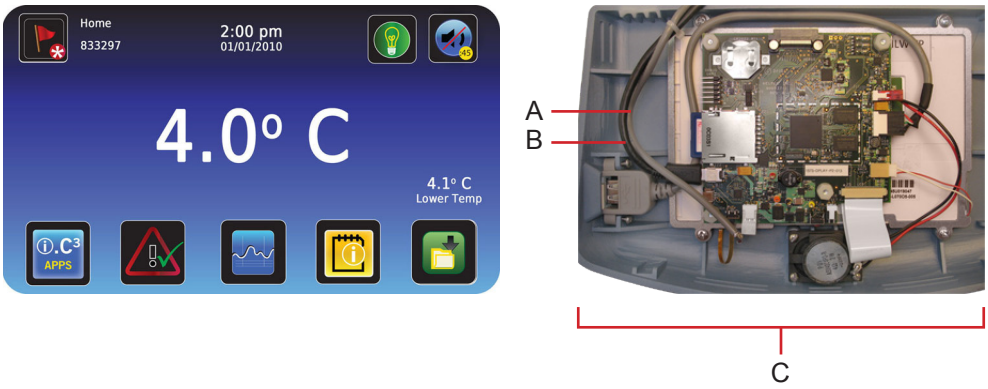
10.1.1 Access Control Option



Optional Access Control door lock.

Label	Description	Part Number	Schematic Label
A	Access Control cartridge cover	-	-
B	Access Control door catch (door side)	-	-
Not shown	Access Control cartridge assembly (includes manual override key)	Left-hinged door: 800020-1 Right-hinged door: 800020-2	N

10.1.2 Control System and Display



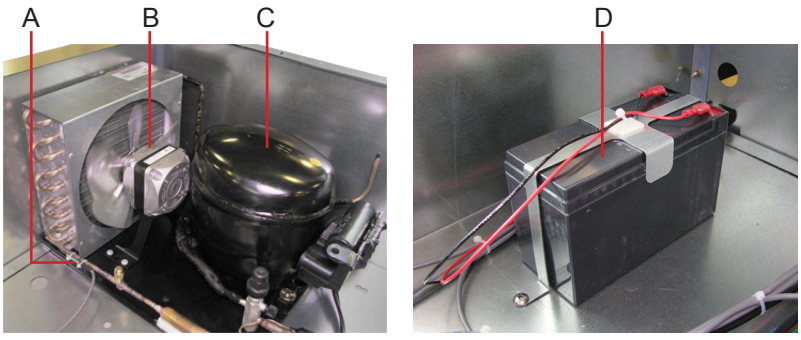
Left: Front view, LCD touchscreen. Right: Rear view showing display board.

Label	Description	Part Number	Schematic Label
A	Interface cable	800010-1	IG
B	Power cable	800010-1	IH
C	Display assembly (includes touchscreen, display board, interface cable, speaker)	800041-1 (111 models) 800042-1 (120, 125, 245, 256 models)	IQ

NOTE

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

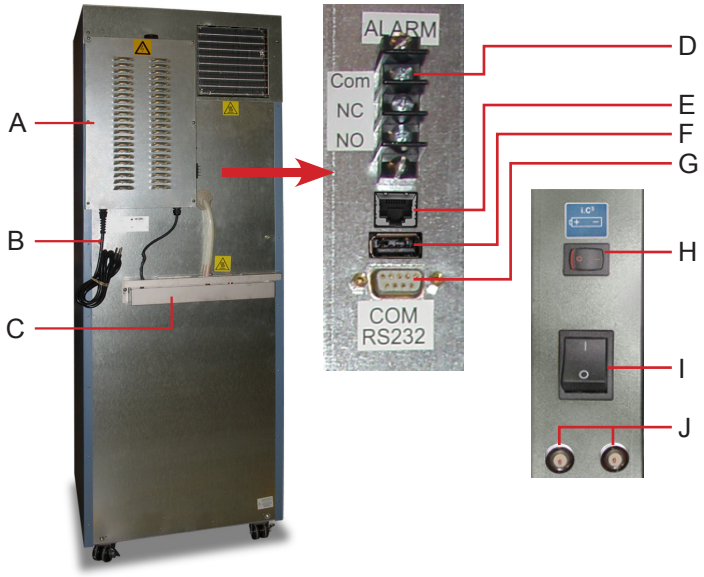
10.2 Top



Top features.

Label	Description	Part Number	Schematic Label
A	Condenser probe	800039-1	IL
B	Condenser fan motor	**120 V** 111 model: 120451 120 and 125 models: 120467 245 and 256 models: 120469 **230 V** 111 model: 120561 120 and 125 models: 120471 245 and 256 models: 120473	K
C	Compressor	**120 V** 111 model: 800005-1 120 and 125 models: 800111-1 245 and 256 models: 800113-1 *(for serial numbers 2000000 through 2002949)* 245 and 256 models: 800113-5 *(for serial numbers 2002950 and greater)* **230 V / 50 Hz** 111 model: 800005-2 120 and 125 models: 800111-2 245 and 256 models: 800113-2 **230 V / 60 Hz** 111 model: 800005-3 120 and 125 models: 800111-3 245 and 256 models: 800113-3	J
D	Monitoring system battery	120628	IB

10.3 Rear

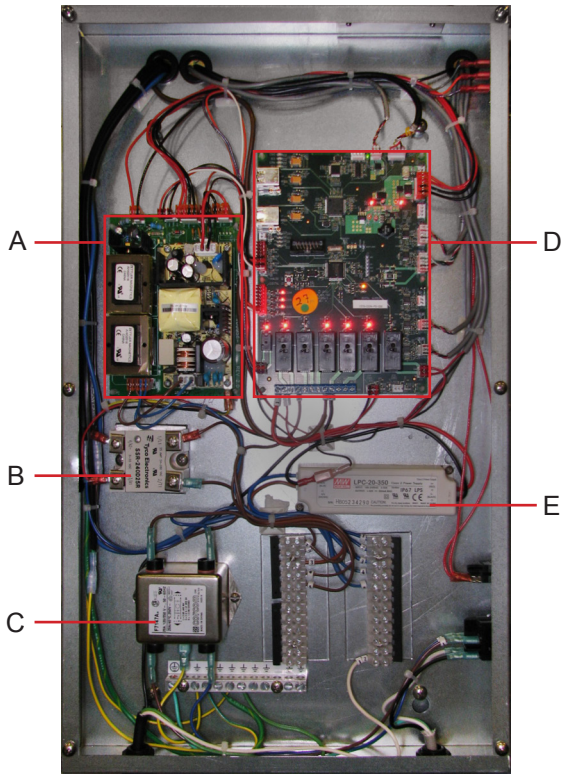


Rear features (iB111 model shown).

Label	Description	Part Number	Schematic Label
A	Electrical box	Refer to subsequent section(s) for part numbers.	-
B	Power cable	North American models 120 V: 120630 230 V: 120631 European models 230 V: 120156	A
C	Condensate evaporator assembly (includes condensate evaporator, tray, and cover)	**115 V** 111 model: 400791-1 120, 125, 245, 256 models: 400790-1 **230 V** 111 model: 400791-2 120, 125, 245, 256 models: 400790-2	G
D	Remote alarm contacts	-	-
E	RJ-45 Ethernet port	800008-1	IF
F	USB port	120633	IE
G	RS-232 serial port (optional)	-	-
H	Battery switch	120202	AC
I	Main power switch	120478	C
J	Circuit breaker (230 V models)	Single-door models (6 A): 120429 Double-door models (7 A): 120428	B

CAUTION Do not remove the cover from the condensate evaporator tray.

10.3.1 Electrical Box



Electrical box features (iPR125 model shown).

CAUTION Disconnect the refrigerator from AC power before opening the electrical box.

Label	Description	Part Number	Schematic Label
A	Power supply board	800035-1	ID
B	Compressor relay	120426	L
C	Power line filter	120400	D
D	i.C³ control board	8000034-1	IA
E	Lighting power supply	120624	O

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

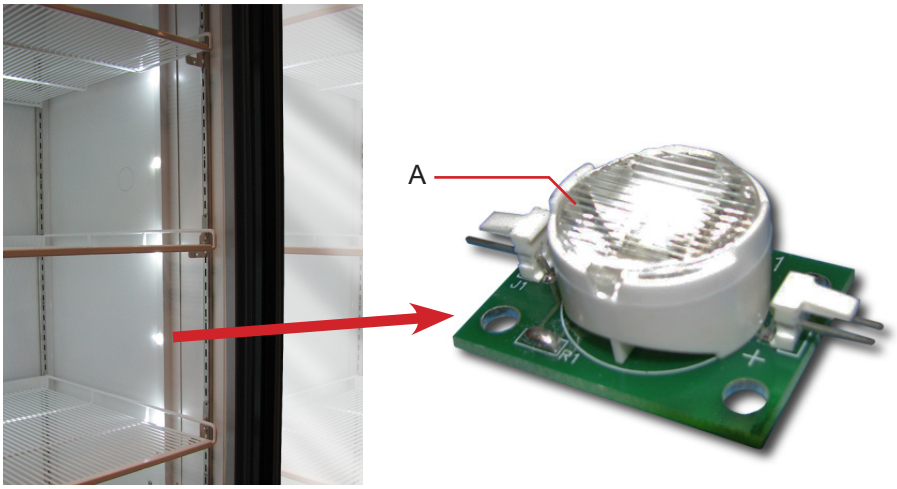
10.4 Interior

Interior features (iPR245 model shown).

Label	Description	Part Number	Schematic Label
A	Chart recorder probe	800024-1	CB
B	Upper chamber probe	800038-1	IK
C	Probe bottle and glycerin kit	400922-1	-
D	Lower chamber probe (except 111 model)	800037-1	IJ
E	Lamp assemblies	Refer to subsequent section(s) for part numbers.	P
F	Unit cooler	Refer to subsequent section(s) for part numbers.	F
G	Door switch	120380	M
H	Door	-	-
I	Storage parts	Refer to subsequent section(s) for part numbers.	-

10.4.1 Lighting

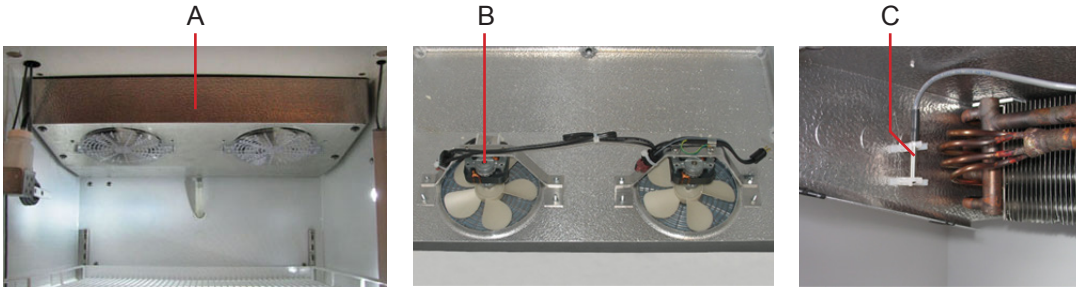
CAUTION Disconnect refrigerator from power when replacing LED lamps.



Light features.

Label	Description	Part Number	Schematic Label
A	LED lamp	800049-1	P

10.4.2 Unit Cooler



Left: Unit cooler (single-door model shown). Center and right: Unit cooler parts.

Label	Description	Part Number	Schematic Label
A	Unit cooler assembly	**115 V** 111 model: 120536 120 and 125 models: 120594 245 model: 120595 **230 V** 111 model: 120553 120 and 125 models: 120615 245 model: 120616	F
B	Unit cooler fan motor	115 V models: 120540 230 V models: 120560	E
C	Temperature control probe (includes connector)	800048-1	IT

10.4.3 Storage

Storage features (iPR245 model shown).

Label	Description	Part Number
Not shown	Half shelf (includes hardware)	120, 125, 245, and 256 models: 400413-1
A	Full shelf (includes hardware)	111 model: 400414-3 120 and 245 models: 400414-1 125 and 256 models: 400414-2
B	Roll out basket assembly (includes basket, 2 slides, and hardware)	111 model: 400751-1 120 and 245 models: 400415-1 125 and 256 models: 400415-2
C	Drawer assembly (includes drawer, 2 slides, and hardware)	111 model with glass door: 400752-1 120 and 245 models with glass doors: 400370-1 125 and 256 models with glass doors: 400370-2 111 model with solid door: 400752-2 120 and 245 models with solid doors: 400370-3 125 and 256 models with solid doors: 400370-4
Not shown	Slide assembly (includes 2 slides)	111 model: 400753-1 120 and 245 models: 400714-1 125 and 256 models: 400714-2
Not shown	Bridge shelf	18” depth: 400845-1 24” depth: 400845-2
Not shown	Pole mast for chromatography (iLR model with chromatography option)	400478-1

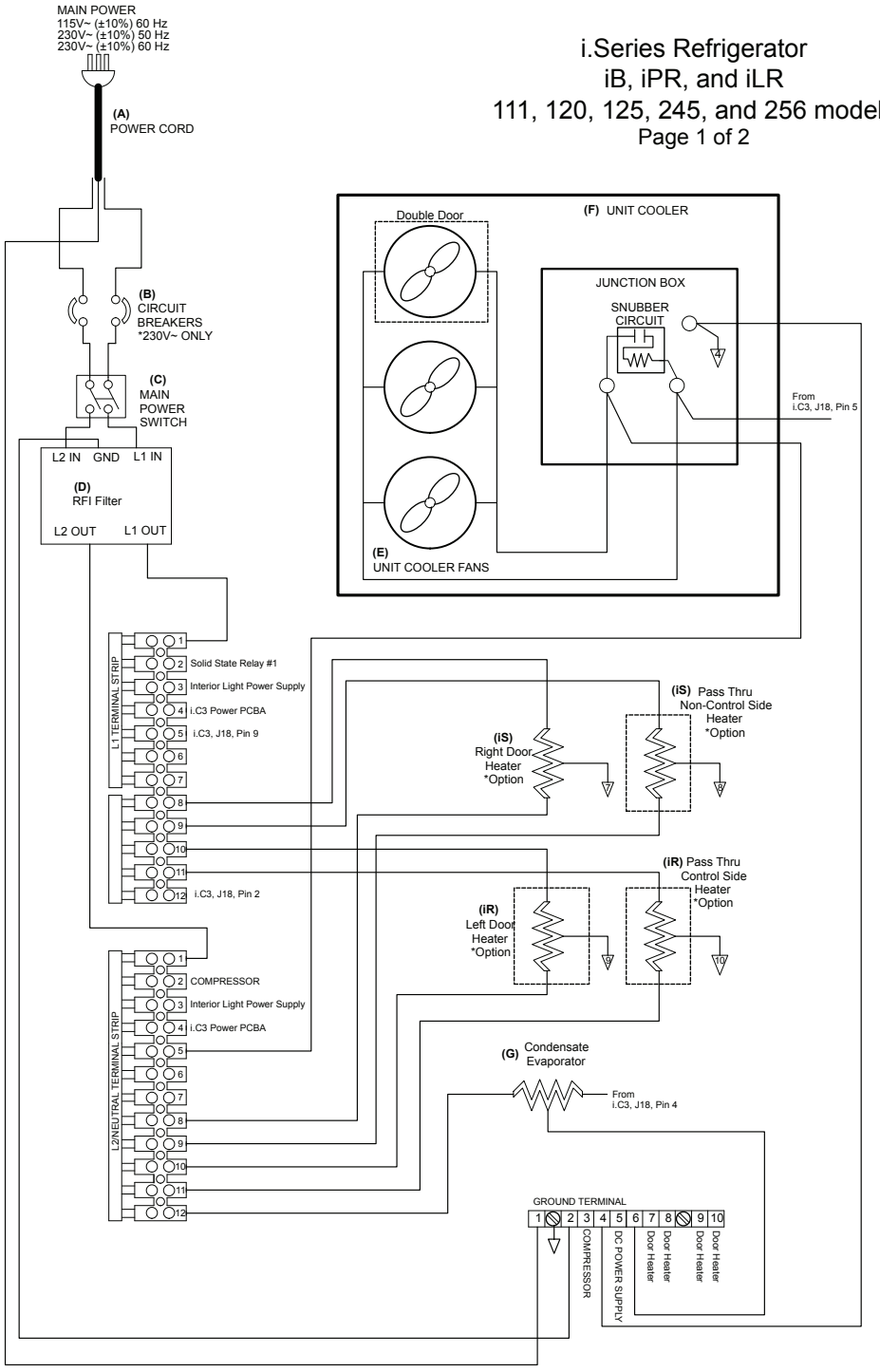
10.4.4 Door and Hinge

Door and hinge features (iLR120 model shown).

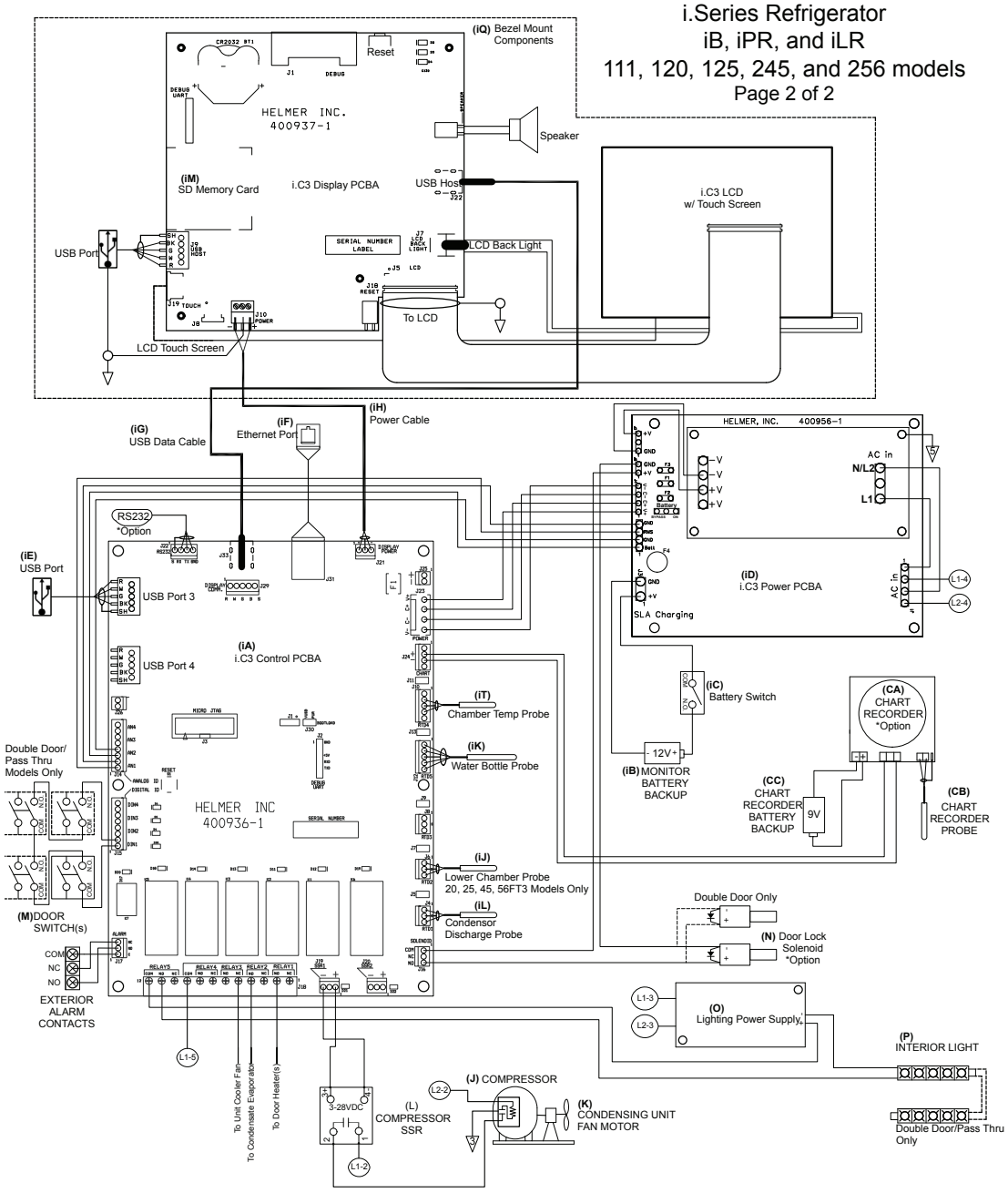
Label	Description	Part Number
A	Door lock	220540
B	Door handle pad	320684-1
C	Upper hinge assembly (includes pin and bracket)	Left hinge: 400960-2 Right hinge: 400960-1
D	Upper hinge bearing	220541
E	Door gasket	111 model: 321082-1 120, 125, 245, and 456 models: 320726-1
F	Lower hinge cam (quantity 2)	320742-1
G	Lower hinge bearing	220375
H	Door stop	320763-1
I	Lower hinge bracket	Right hinge: 400377-1 Left hinge: 400377-2

11 Schematics

11.1 iB, iLR, and iPR Models; 111, 120, 125, 245, and 256 Configurations



i.Series Refrigerator
iB, iPR, and iLR
111, 120, 125, 245, and 256 models
Page 2 of 2



Section III: Horizon Series™ Models

12 Product Configuration

12.1 Install Battery for Backup Power

The monitoring system has a battery system, enabling a period of continuous operation if power is lost.

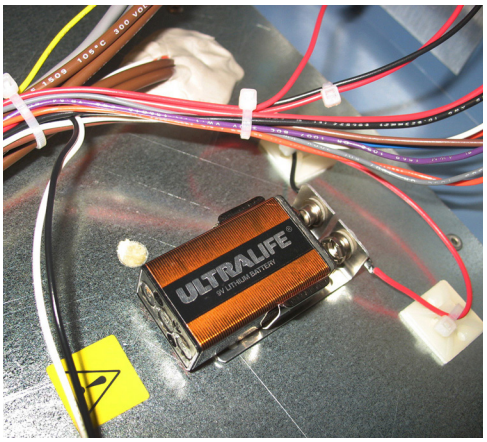
NOTE The monitoring system will start on battery power alone. If the refrigerator was previously not connected to AC power and the battery is connected, the monitoring system will begin running on battery power.

Battery life varies by manufacturer as well as voltage level remaining. Providing full power is available, and no battery-related alarms are active, backup power for the monitoring system is available for up to 2 hours.

CAUTION

- ► Before installing or replacing batteries, switch the power OFF. Disconnect the refrigerator from AC power.
- ► When installing a replacement battery, use only a battery which meets the specifications outlined in chapter **14.7** (Supplies).

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



Models	Battery
HB, HLR, and HPR	(1) non-rechargeable 9 V lithium (or equivalent) battery

Battery is taped next to the battery holder. Install and connect the battery to provide monitoring system with backup power in the event of AC power failure.

12.2 External Monitoring Devices

The remote alarm interface is a relay switch with 3 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.

NOTE Do not connect any monitoring device that exceeds the maximum load capacity.

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)

12.2.1 Connect to Remote Alarm Interface

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

12.3 Move Drawers, Shelves, and Baskets

Storage features.

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.

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.

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.

12.4 Move Slides and Brackets

Remove Drawer Slides

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

Install Drawer Slides

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

Remove Shelf Brackets

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

Install Shelf Brackets

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

12.5 Level the Refrigerator

NOTE

- ► Leveling feet are optional.
- ► Helmer recommends the use of leveling feet.
- ► A bubble level may be used to ensure the refrigerator is level.

Leveling feet must be adjusted to provide unit cooler drainage.

Front-to-Back

1 Using a wrench, raise or lower leveling feet.
2 When refrigerator is properly leveled, bottom of the unit cooler will slope downward from front to back (toward the condensate drain line).

Side-to-Side

1 Using a wrench, raise or lower leveling feet.
2 When refrigerator is properly leveled, bottom of the unit cooler will be horizontal (parallel to the floor).

12.6 Optional Adapter Kits for Medication Dispensing Locks

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

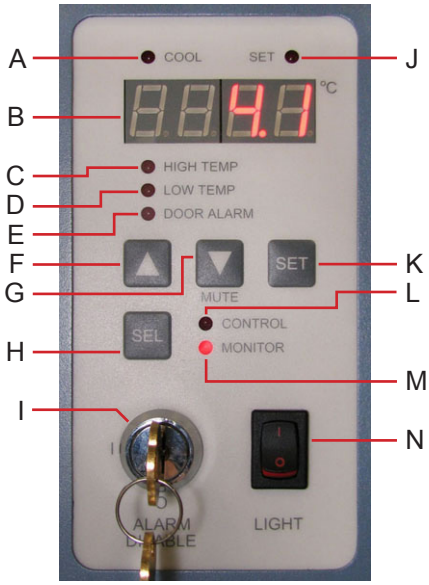
13 Settings

Through the Horizon Series monitoring and control system, current settings may be viewed and changed.

NOTE

- Control Sensor Offset and Hysteresis settings are factory-preset and should not be changed unless directed by Helmer Technical Service.
- Changing temperature settings affects operation of the refrigerator. Do not change settings unless instructed in product documentation or by Helmer Technical Service.

13.1 Monitor and Controller Interface



Label	Description	Function
A	COOL lamp	Indicates the compressor is running.
B	Display	Displays real-time temperature information, setpoints, and alarms.
C	HIGH TEMP lamp	Indicates when the 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.

Label	Description	Function
L	CONTROL lamp	Indicates when the reading from the temperature 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.

NOTE The Alarm Disable key switch disables all audible alarms. This switch does not affect alarm lamps or signals sent through the remote alarm interface.

13.2 Refrigerator Setpoint

NOTE Default setpoint is 4.0 ºC.

Change the setpoint if:

- ► Your organization requires a chamber temperature other than 4.0 ºC.
- ► The normal chamber temperature is too high or low (after completing preventive maintenance and applicable troubleshooting tasks).

Confirm:

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

Change setpoint:

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

EXAMPLE

- ► Current setpoint is 4.0 ºC
- ► Target setpoint is 5.0 ºC
- ► Setpoint adjustment value is +1.0 ºC

3. On the monitoring system, press and release **SEL** to change to Control mode. CONTROL lamp will illuminate.
4. Press and hold **SET** to display the reference temperature.

NOTE Reference temperature is typically higher than the chamber temperature.

5. Hold **SET** and press **Up Arrow** and **Down Arrow** as necessary to set the adjustment value determined in step 2.
6. Release all buttons; the setpoint is changed.
7. Press and release **SEL** to return to Monitor mode. MONITOR lamp will illuminate.

13.3 Temperature Alarm Setpoints

View setpoints:

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

5 Hold **Up Arrow** and **Down Arrow** for 3 seconds. MONITOR lamp stops flashing to indicate exit from program mode.

Flashing Lamp	Selected Setting
HIGH TEMP and MONITOR	High Temp alarm setpoint
LOW TEMP and MONITOR	Low Temp alarm setpoint
MONITOR only	Monitor Offset
CONTROL only	Control Sensor Offset
CONTROL only	Control Hysteresis

13.3.1 High Temperature Alarm

- ► Specifies the temperature at which the High Temperature Alarm activates.
- ► Default setpoint is 5.5 ºC.
- ► Setpoint can be changed from -40.0 ºC to +25.0 ºC.

Change the setpoint:

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

13.3.2 Low Temperature Alarm

- ► Specifies the temperature at which the Low Temperature Alarm activates.
- ► Default setpoint for HB (blood bank) models is 1.5 ºC.
- ► Default setpoint for HLR and HPR (laboratory and pharmacy) models is 2.0 ºC.
- ► Setpoint can be changed from -40.0 ºC to +25.0 ºC.

Change the setpoint:

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

13.4 Temperature Calibration Setpoints

View setpoints:

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

Flashing Lamp	Selected Setting
HIGH TEMP and MONITOR	High Temp alarm setpoint
LOW TEMP and MONITOR	Low Temp alarm setpoint
MONITOR only	Monitor Offset
CONTROL only	Control Sensor Offset
CONTROL only	Control Hysteresis

13.4.1 Monitor Offset

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

NOTE

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

Obtain:

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

Measure the chamber temperature:

1. Remove all probes from the probe bottle.
2. Unscrew the cap from the bottle.
3. Tape the thermometer to the temperature probe, and place them in the bottle. The probe and thermometer should be immersed at least 2” (50 mm).
4. Close the door and allow the chamber temperature to stabilize for 10 minutes.
5. Observe and note the thermometer temperature.
6. Lower the Offset Value to lower displayed monitor temperature; raise the Offset Value to raise displayed monitor temperature.

EXAMPLE

- ► Measured temperature (at the upper probe bottle) is 4.0 ºC
- ► Displayed temperature is is 4.5 ºC
- ► Offset adjustment value is +0.5 ºC

7. Remove thermometer and probe from bottle and remove tape.
8. Replace the probes in probe bottle.
9. Replace bottle cap, ensuring a tight fit.
10. Place probes in bottle, immersing at least 2” (50 mm).

Enter the new offset value:

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

13.4.2 Control Sensor Offset

- ► Controls chamber temperature.
- ► Factory-preset.
- ► Varies for each refrigerator.

Determine control sensor offset:

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

Obtain:

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

Measure the chamber temperature:

1. Remove probes from probe bottle.
2. Unscrew cap from bottle.
3. Tape independent thermometer to temperature probe and place in bottle. Probe and thermometer should be immersed at least 2” (50 mm).
4. Close door and allow chamber temperature to stabilize for 10 minutes.
5. Observe independent thermometer temperature for 10 minutes and determine temperature range.
6. From the range, calculate the average temperature.
7. Remove thermometer and probe from bottle and remove tape.
8. Replace bottle cap, ensuring a tight fit.
9. Place probes in bottle, immersing at least 2” (50 mm).
10. Determine the change in value to reach desired setpoint.

EXAMPLE

- ► Current setpoint is 4.0 ºC
- ► Average temperature is 5.0 ºC
- ► Offset adjustment value is +1.0 ºC

Enter the new offset value:

1. Hold **Up Arrow** and **Down Arrow** for 3 seconds. MONITOR lamp will flash to indicate entry into program mode.
2. Press **SEL** until only the CONTROL lamp flashes.

NOTE

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

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3. Hold **SET**, then press **Up Arrow** or **Down Arrow** to change the setpoint.
4. Release **SET** button.
5. Hold **Up Arrow** and **Down Arrow** for 3 seconds. CONTROL lamp stops flashing to indicate exit from program mode. New settings are saved.

13.4.3 Hysteresis

- ► Default setpoint for HB (blood bank) models is 2.0 ºC.
- ► Default setpoint for HLR111 and HPR111 (laboratory and pharmacy) models is 0.8 ºC.
- ► Default setpoint for all other Horizon HLR and HPR (laboratory and pharmacy) models is 2.0 ºC.
- ► Allowable temperature variance on each side of the refrigerator setpoint.

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

13.5 Test Alarms

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

NOTE Before testing alarms, protect items in refrigerator from extended exposure to adverse temperature.

13.5.1 Chamber Temperature Alarm

IMPORTANT Perform the low alarm test before the high alarm test to control the temperature more closely and complete the testing more quickly.

Obtain:

- ► (1) 8 oz (250 ml) glass half-full of chilled water.
- ► (1) glass filled with crushed ice.
- ► (1) 8 oz (250 ml) glass half-full of warm water.

NOTE Temperature probes are fragile; handle with care.

Test the low alarm:

1. Identify setting for low alarm setpoint.
2. Remove chamber temperature probe from bottle.
3. Immerse probe in chilled water.
4. While stirring probe in chilled water, add approximately 1 teaspoon (5 ml) of ice every 20 seconds. Ensure probe is at the bottom of the glass.
5. When low temperature alarm sounds, note the temperature on the monitoring system display.
6. Compare the temperature at which the alarm sounds to the low alarm setpoint. If values do not match, refer to chapter **15** (Troubleshooting).

Test the high alarm:

1. Identify setting for high alarm setpoint.
2. While stirring probe in chilled water, add warm water so temperature increases 0.5 ºC per minute.
3. When high temperature alarm sounds, note the temperature on the monitoring system display.
4. Compare the temperature at which the alarm sounds to the high alarm setpoint. If values do not match, refer to chapter **15** (Troubleshooting).
5. Remove probe from warm water.
6. Place temperature probe in probe bottle, immersing it at least 2” (50 mm).

13.5.2 Power Failure Alarm

NOTE During a power failure, the 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.

13.5.3 Door Open Alarm

- ► Factory-set to 3 minutes.
- ► Value can not be changed.

Test the alarm:

1 Open refrigerator door and note the time.
2 After 3 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.

14 Maintenance

NOTE

- ► Refer to the operation manual for the preventive maintenance schedule.
- ► 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.

14.1 Recharge Refrigerant

CAUTION

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

NOTE Use only non-CFC R-134A refrigerant.

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

Model	Power Requirements	Initial Charge
Single-door models (111)	115 V, 60 Hz 230 V, 50 Hz 230 V, 60 Hz	7.5 oz (213 g)
Single-door models (120 and 125)	115 V, 60 Hz 230 V, 50 Hz 230 V, 60 Hz	10.1 oz (286 g)
Double-door models (245 and 256)	115 V, 60 Hz 230 V, 50 Hz 230 V, 60 Hz	12.5 oz (354 g)

Obtain:

- ► Refrigerant
- ► Calibrated pressure gauge (0 lbs/in² to 25 lbs/in² (0 kPa to 175 kPa))

Add refrigerant:

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

NOTE Pressure varies depending on ambient air temperature.

4. Add refrigerant so the low side pressure is within acceptable range (16 lbs/in² to 18 lbs/in² (110 kPa to 125 kPa)).
5. Remove pressure gauge.

14.2 Check Monitoring System Battery

The monitoring system does not indicate the charge level of the battery. Regularly test the battery. Replace battery if the test fails or if the battery has been in use for 1 year.

Test the battery:

1. Switch the AC ON/OFF switch OFF.
   - **a** Display should continue to display information.
   - **b** If the display is blank, replace battery.
2. Switch AC ON/OFF switch ON.

NOTE Use a battery which meets specifications outlined in chapter **14.7** (Supplies).

14.3 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.

14.4 Clean the Refrigerator

14.4.1 Condenser Grill

CAUTION Disconnect refrigerator from AC power when cleaning.

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

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

14.4.2 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.

14.4.3 Interior

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

14.4.4 Door Gaskets

Clean with soft cloth and mild soap and water solution.

14.4.5 Clean and Refill Probe Bottle

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

Obtain:

- Fresh water-bleach solution (not provided)
  - 1:9 ratio of bleach to water
  - Bleach is 5% solution of commercial sodium hypochlorite (NaOCl)
  - Equivalent oxidizing cleaner/disinfectant approved by your organization may be substituted
- 4 oz (120 ml) of product simulation solution per bottle
  - 10:1 ratio of water to glycerin

Clean and refill bottle:

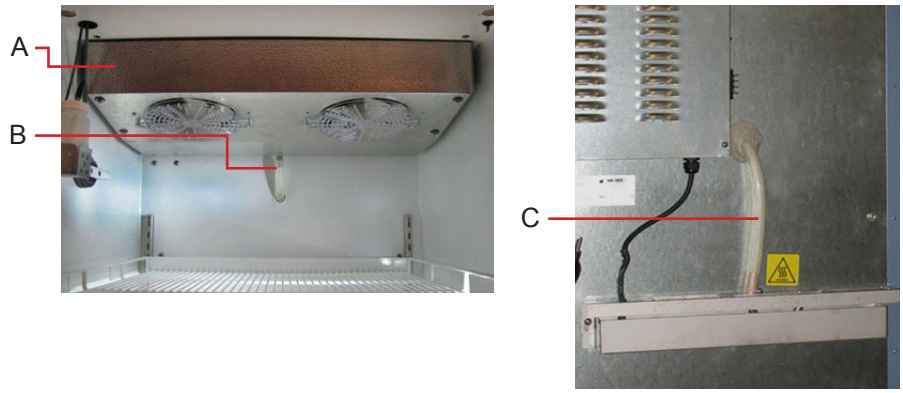
1. Remove all probes from bottle.
2. Remove bottle from bracket.
3. Clean bottle with water-bleach solution.
4. Fill bottle with 4 oz (120 ml) of product simulation solution.
5. Cap bottle tightly to minimize evaporation.
6. Place bottle in bracket.
7. Replace probes, immersing at least 2” (50 mm).

14.5 Unit Cooler Cover Removal and Installation

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

Required tools:

- 5/16” socket wrench
- Tool to push putty away from the drain hose



Drain line and hose.

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

14.5.1 Remove the Unit Cooler Cover

1 Switch AC ON/OFF switch OFF. Disconnect the battery.
2 Remove top drawer, basket, or shelf from the chamber.
3 On the back of the camber, peel putty back to expose drain hose (C).

CAUTION The condensate evaporator and water evaporation tray are hot.

4 Remove drain hose from unit cooler drain port (B).
   a Pull drain hose downward to separate from unit cooler.
   b Twist drain hose while pulling to assist in removal.
5 Push the drain hose (C) out through rear of chamber.
6 Remove the unit cooler cover.
   a Hold unit cooler cover in place to prevent it from dropping.
   b Use the socket wrench to remove 4 screws securing the unit cooler cover.
   c Carefully lower unit cooler cover to avoid damage to the fan wiring.

14.5.2 Install the Unit Cooler Cover

1 Verify unit cooler wiring is connected and routed correctly.
   a Wiring should be routed above copper tube inside the unit cooler.
   b Reconnect wires if they have separated.
2 Attach unit cooler cover.
   a Lift unit cooler cover into place.
   b Front edge of the cover should be behind the unit cooler case.
   c Use the socket wrench to install 4 screws to secure the unit cooler cover.
3 Insert the drain hose through hole in the refrigerator.
   a Push drain hose upward, toward the unit cooler drain port.
   b In the chamber, push drain hose onto unit cooler drain port.
4 Reinstall top drawer, basket, or shelf if previously removed.
5 On the back of the chamber, press putty around the drain hose.
6 Switch AC ON/OFF switch ON. Reconnect the battery.

7 Press the **Mute** button to disable the high temperature alarm while refrigerator reaches operating temperature.

14.6 Access Control Cartridge Removal and Installation

The Access Control lock cartridge is a serviceable assembly installed on the refrigerator cabinet.

Required tools:

- ► Wire cutter
- ► #2 Phillips screwdriver

14.6.1 Cartridge Removal

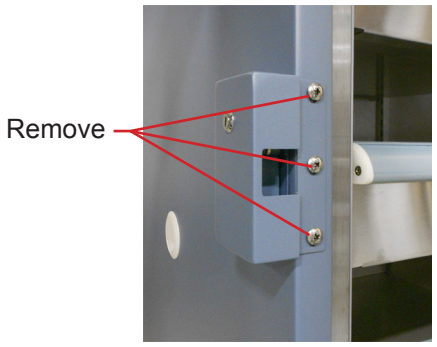
1 Switch AC ON/OFF switch OFF. Disconnect the battery.

2 Open refrigerator door and prop the door open.

- ► If door is locked, use the key to override the Access Control lock, then open door.

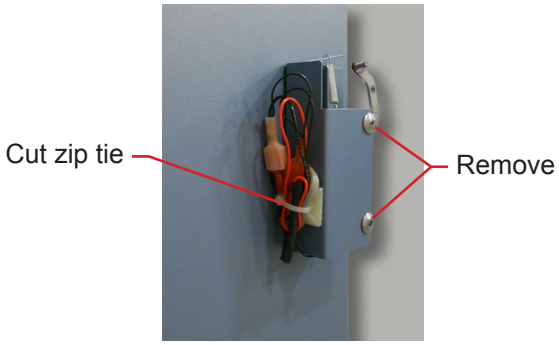
3 Use a screwdriver to remove 3 screws securing the Access Control cartridge cover.

4 Remove cover.



5 Cut the zip tie securing the bundled wires to the cartridge. Separate the spade connectors.

6 Use a screwdriver to remove 2 screws securing the cartridge assembly.



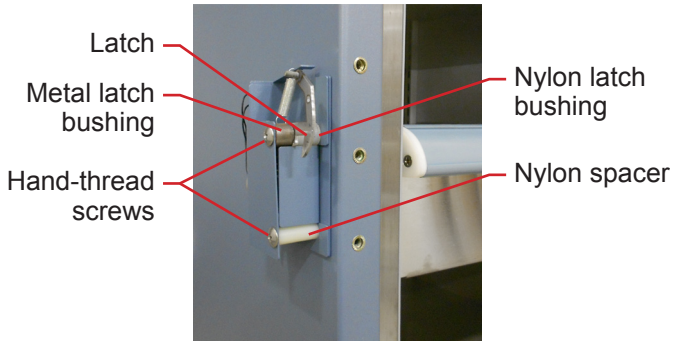
7 Remove cartridge assembly.

14.6.2 Cartridge Installation

1 Insert upper screw through:

- ► Upper hole in cartridge body
- ► Metal latch bushing
- ► Door latch
- ► Nylon latch bushing

2 Insert lower screw through:
   ► Lower hole in cartridge body
   ► Nylon spacer
3 Place the cartridge against the cabinet and align the screws with the holes in the cabinet.
4 Hand-thread 2 screws into the holes in the cabinet.



NOTE Ensure wires are not pinched between the cartridge and the cabinet.

5 Using a screwdriver, tighten the screws.
6 Connect the electrical wires from the cabinet to the wires from the cartridge.
7 Bundle the excess wiring and secure it to the back of the cartridge with a zip tie.

NOTE Latch must be in the unlocked position (rotated toward the back of refrigerator) before installing cartridge cover.

8 Install the Access Control cartridge cover.
   a Place the cover over the cartridge and align the screw holes with the holes in the cabinet.
   b Hand-thread 3 screws into the holes in the cabinet.
   c Using a screwdriver, tighten the screws.
9 Close refrigerator door.
10 Switch AC ON/OFF switch ON. Reconnect the battery.
11 Press the **Mute** button to disable the high temperature alarm while refrigerator reaches operating temperature.

14.7 Supplies

Refrigerant: non-CFC, R-134A

Chart paper: 220366 (52 sheets)

Glycerin solution: 400922-1

LED lamp: 400954-1, ≈ 1.3 W

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

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

15 Troubleshooting

CAUTION Review all safety instructions prior to troubleshooting. Refer to chapter **2** (Safety).

15.1 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.
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 the temperature 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.

15.2 Chamber Temperature Problems

Problem	Possible Cause	Action
“Prob” appears on the display, but the chamber temperature is set correctly.	Connections for the chamber temperature probe are loose.	► Test the probe connections. Secure the connections if necessary.
	Temperature probe wiring is an open circuit.	► Check the continuity of the probe wiring and connections. Secure the connections or replace the probe if necessary.
	A component is faulty.	► Contact Helmer Technical Service.

Problem	Possible Cause	Action
The chamber temperature does not stabilize at the refrigerator setpoint.	Monitor/control board is faulty.	► Confirm the temperature controller or monitor/ control board is operating correctly. Replace it if necessary.
	Compressor starting relay is faulty.	► Confirm the relay is operating correctly. Replace the relay if necessary.
	Temperature monitor/ controller board is faulty.	► Confirm the temperature monitor/controller board is operating correctly. Replace the board 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.
	Compressor motor has seized.	► Replace the compressor.
	Temperature control probe is out of calibration.	► Confirm the probe is providing accurate temperature readings.
	Temperature control probe is faulty.	► Confirm the probe is providing resistance in the range of 98 Ω to 110 Ω. Replace the probe if necessary.
	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.
	Probe bottle is empty.	► Refill the probe bottle.
	Condenser grill is dirty.	► Check the condenser grill. Clean the grill if necessary.
	Air circulation at the top of the chamber is not adequate.	► Check if there are any items that may obstruct air flow and remove them if necessary.
	Ambient air temperature around the refrigerator is too high.	► Confirm the refrigerator is placed appropriately.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.

Problem	Possible Cause	Action
The compressor runs continuously.	Refrigerator setpoint is set too low.	► Confirm the setpoint is set within the operating range and change it if necessary.
	Temperature control probe is out of calibration.	► Confirm the probe is providing accurate temperature readings.
	Temperature control probe is faulty.	► 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.	► Confirm the temperature monitor/controller board is operating correctly. Replace the board if necessary.
	Compressor starting relay is faulty.	► Confirm the relay is operating correctly. Replace the relay if necessary.

15.3 Alarm Activation Problems

Problem	Possible Cause	Action
The refrigerator is in an alarm condition, but the appropriate alarm is not audible or active.	Alarm system is faulty.	► Confirm the monitor/controller board and line connections are functioning correctly. Replace the board if necessary.
	Temperature monitor/ controller board is faulty.	► Confirm the temperature monitor/controller board is operating correctly. Replace the board if necessary.
	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 the current setpoints for the alarms. Change the setpoints if necessary.
The High Temperature alarm activates when the door is opened, then clears shortly after the door is closed.	Connections for the chamber temperature probe are loose.	► Test the probe connections. Secure the connections if necessary.
	Chamber temperature probe is faulty.	► Test the probe. Replace the probe if necessary.
	Unit cooler fan continues to run while the door is open.	► Test the door switch and unit cooler fan connections. Secure the connections if necessary. Replace the door switch or fan motor if necessary.
	Probe 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.
	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 faulty.	► 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 switche(s) are faulty.	► Replace the door switch or switches.
	Temperature monitor/ controller board is faulty.	► Confirm the temperature monitor/controller board is operating correctly. Replace the board if necessary.
All alarms are activating sporadically.	Alarm system is faulty.	► Confirm the monitor/controller board and line connections are functioning correctly. Replace the board if necessary.
	Temperature monitor/ controller board is faulty.	► Confirm the temperature monitor/controller board is operating correctly. Replace the board if necessary.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
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.

15.5 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.
Water leaks from the bottom of the refrigerator.	Humid air is entering the chamber.	► Confirm the refrigerator is level, and the door is aligned, closing tightly, and sealing correctly.
	Excessive water is found in the evaporation tray inside the refrigerator.	► Contact Helmer Technical Service to correct issues as necessary.

16 Parts

NOTE

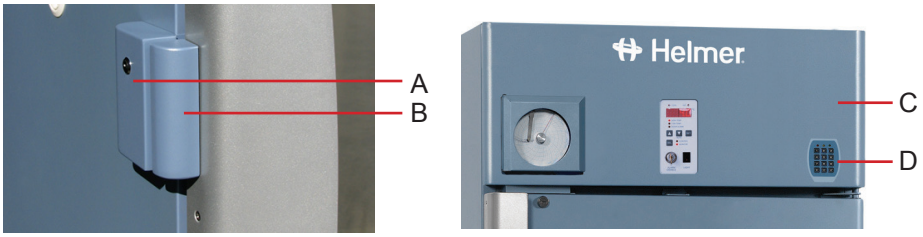
- ► Before replacing parts, protect items in refrigerator from extended exposure to adverse temperature.
- ► Allow refrigerator temperature to stabilize at setpoint after replacing parts or after extended door opening.

16.1 Front

Front features (HB120 model shown).

Label	Description	Part Number	Schematic Label
A	Temperature chart recorder (standard on blood bank models; optional on laboratory/ pharmacy models)	120 V: 800025-1 230 V: 800025-2	CA
Not shown	Chart recorder battery	120218	CC
Not shown	Chart paper (52 sheets)	220366	-
B	Horizon Series monitoring and control system	Refer to subsequent section(s) for part numbers	-
C	Bezel (all models except 111)	With chart recorder: 800072-1 Without chart recorder: 800071-1	-
	Bezel (111 model)	With chart recorder: 800056-1 Without chart recorder: 800055-1	-
D	Caster (swivel with brake)	220467	-

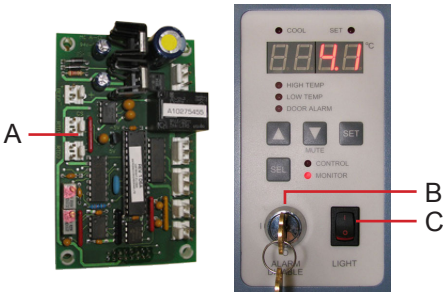
16.1.1 Access Control Option



Optional Access Control door lock and keypad.

Label	Description	Part Number	Schematic Label
A	Access Control cartridge cover	-	-
B	Access Control door catch (door side)	-	-
Not shown	Access Control cartridge assembly (includes manual override key)	Left-hinged door: 800020-1 Right-hinged door: 800020-2	N
C	Bezel (all models except 111)	With chart recorder: 800074-1 Without chart recorder: 800073-1	-
	Bezel (111 model)	With chart recorder: 800058-1 Without chart recorder: 800057-1	-
D	Access control keypad	800007-1	HM

16.1.2 Control System and Display

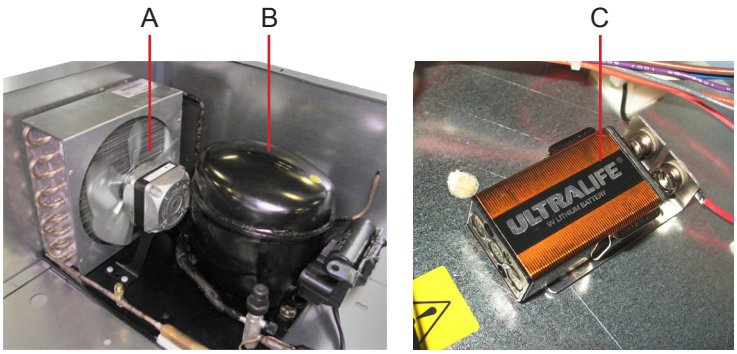


Left: Control board. Right: Display with touchpad.

Label	Description	Part Number	Schematic Label
A	Control board assembly	800006-1	HA
B	Alarm key switch	120227	HD
C	Light switch	120202	HG

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

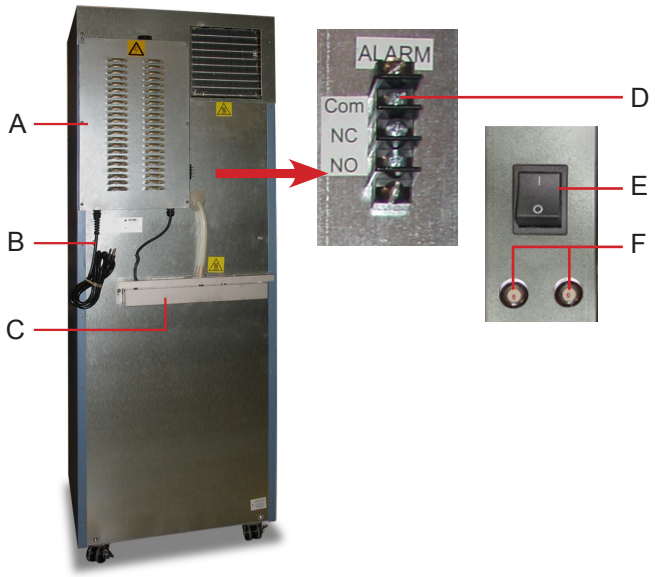
16.2 Top



Top features.

Label	Description	Part Number	Schematic Label
A	Condenser fan motor	**120 V** 111 model: 120451 120 and 125 models: 120467 245 and 256 models: 120469 **230 V** 111 model: 120561 120 and 125 models: 120471 245 and 256 models: 120473	K
B	Compressor	**120 V** 111 model: 800005-1 120 and 125 models: 800111-1 245 and 256 models: 800113-1 *(for serial numbers 2000000 through 2002949)* 245 and 256 models: 800113-5 *(for serial numbers 2002950 and greater)* **230 V / 50 Hz** 111 model: 800005-2 120 and 125 models: 800111-2 245 and 256 models: 800113-2 **230 V / 60 Hz** 111 model: 800005-3 120 and 125 models: 800111-3 245 and 256 models: 800113-3	J
C	Monitoring system battery	120399	HH, HJ

16.3 Rear

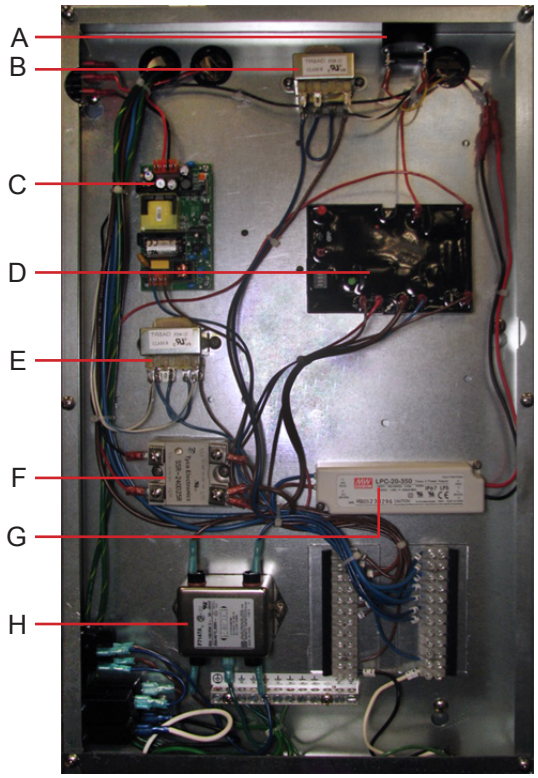


Rear features (HB111 model shown).

Label	Description	Part Number	Schematic Label
A	Electrical box	Refer to subsequent section(s) for part numbers	-
B	Power cable	North American models 120 V: 120630 230 V: 120631 European models 230 V: 120156	A
C	Condensate evaporator assembly (includes condensate evaporator, tray, and cover)	**115 V** 111 model: 400791-1 120, 125, 245, 256 models: 400790-1 **230 V** 111 model: 400791-2 120, 125, 245, 256 models: 400790-2	G
D	Remote alarm contacts	-	-
E	Main power switch	120478	C
F	Circuit breaker (230 V models)	Single-door models (6 A): 120429 Double-door models (7 A): 120428	B

CAUTION Do not remove the cover from the condensate evaporator tray.

16.3.1 Electrical Box



Electrical box features (HPR111 model shown).

CAUTION Disconnect the refrigerator from AC power before opening the electrical box.

Label	Description	Part Number	Schematic Label
A	Alarm buzzer	120160	HE
B	Chart recorder transformer (optional)	-	-
C	12 V DC power supply for Access Control (optional)	120505	HN
D	Defrost timer	**115 V** 111 model: 800030-1 **115 V and 230 V** 120, 125, 245, and 256 models: 120556	HF
E	Temperature control transformer	115 V models: 800086-1 230 V models: 800086-2	HO
F	Compressor relay	120426	L
G	12 V cabinet lighting power supply	120624	O
H	Power line filter	120400	D

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

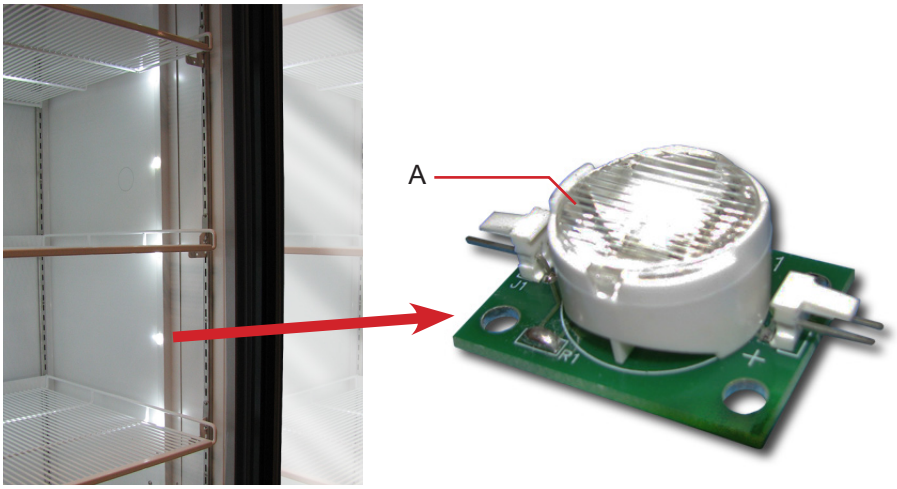
16.4 Interior

Interior features (HPR245 model shown).

Label	Description	Part Number	Schematic Label
A	Chart recorder probe	800024-1	CB
B	Chamber probe	800029-1	IK
C	Probe bottle and glycerin kit	400922-1	-
D	Lamp assemblies	Refer to subsequent section(s) for part numbers	P
E	Unit cooler	Refer to subsequent section(s) for part numbers	F
F	Door switch	120380	M
I	Door	-	-
J	Storage parts	Refer to subsequent section(s) for part numbers	-

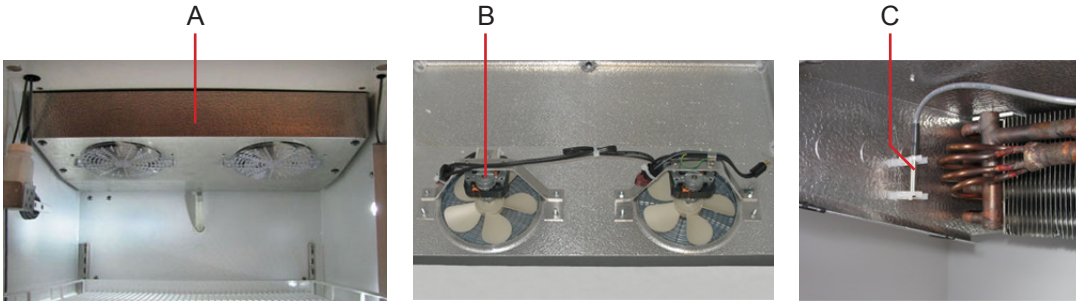
16.4.1 Lighting

CAUTION Disconnect refrigerator from power when removing and replacing LED lamps.



Label	Description	Part Number	Schematic Label
A	LED lamp	800049-1	P

16.4.2 Unit Cooler



Left: Unit cooler (single-door model shown). Center and right: Unit cooler parts.

Label	Description	Part Number	Schematic Label
A	Unit cooler assembly	**115 V** 111 model: 120536 120 and 125 models: 120594 245 models: 120595 **230 V** 111 model: 120553 120 and 125 models: 120615 245 models: 120616	F
B	Unit cooler fan motor	115 V models: 120540 230 V models: 120560	E
C	Temperature control probe	800028-1	HB

16.4.3 Storage

Storage parts (HPR245 model shown).

Label	Description	Part Number
Not shown	Half shelf (includes hardware)	120, 125, 245, and 256 models: 400413-1
A	Full shelf (includes hardware)	111 model: 400414-3 120 and 245 models: 400414-1 125 and 256 models: 400414-2
B	Roll out basket assembly (includes basket, 2 slides, and hardware)	111 model: 400751-1 120 and 245 models: 400415-1 125 and 256 models: 400415-2
C	Drawer assembly (includes drawer, 2 slides, and hardware)	111 model: 400752-2 120 and 245 models: 400370-3 125 and 256 models: 400370-4
Not shown	Slide assembly (includes 2 slides)	111 model: 400753-1 120 and 245 models: 400714-1 125 and 256 models: 400714-2
Not shown	Bridge shelf	18” depth: 400845-1 24” depth: 400845-2

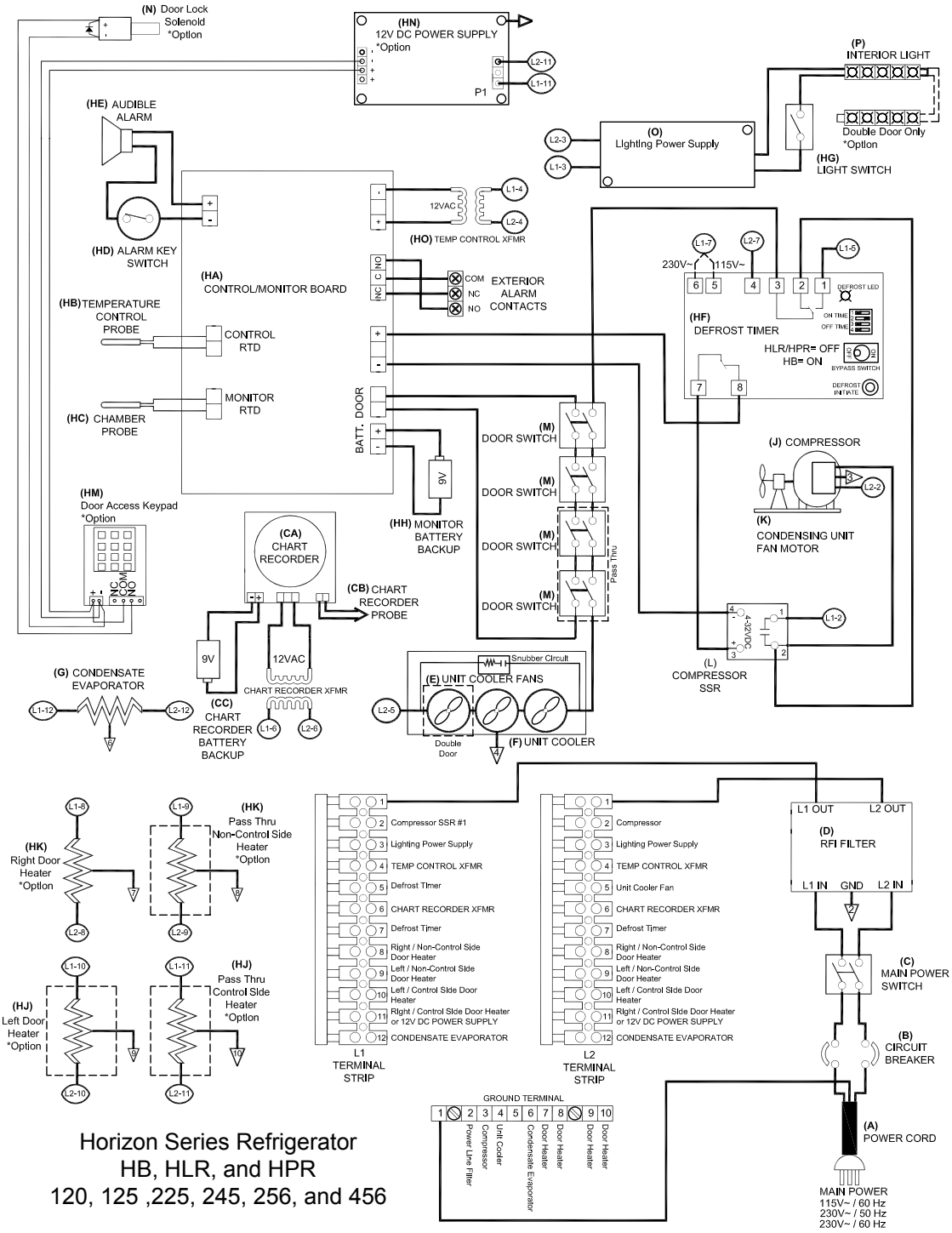
16.4.4 Door and Hinge

Door and hinge features (HLR120 model shown).

Label	Description	Part Number
A	Door lock	220540
B	Upper hinge bracket	Left hinge: 400376-2 Right hinge: 400376-1
C	Hinge bearings	220375
D	Door gasket	111 model: 321082-1 120, 125, 245, and 456 models: 320726-1
E	Lower hinge cam (quantity 2)	320742-1
F	Door stop	320763-1
G	Lower hinge bracket	Right hinge: 400377-1 Left hinge: 400377-2

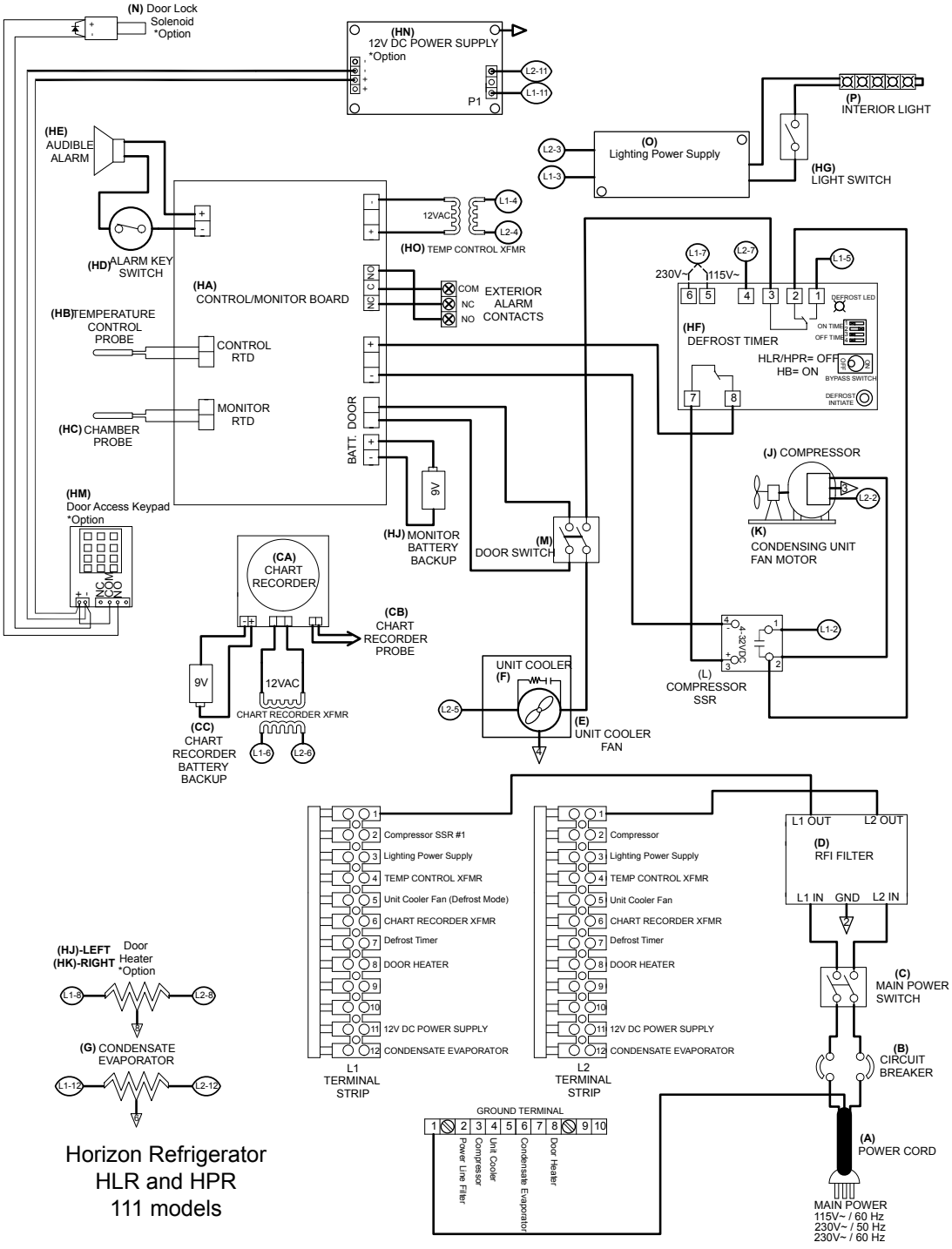
17 Schematics

17.1 HB, HLR, and HPR Models; 120, 125, 245, and 256 Configurations



Horizon Series Refrigerator
HB, HLR, and HPR
120, 125 ,225, 245, 256, and 456

17.2 HLR and HPR Models; 111 Configuration



Horizon Refrigerator
HLR and HPR
111 models

END OF MANUAL

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