Refrigerator Service and Maintenance Manual

i.Series® and Horizon Series™ - Undercounter

Blood Bank

i.Series
iBR105-GX

Horizon Series
HBR105-GX

Laboratory

i.Series
iLR105-GX

Horizon Series
HLR105-GX

Pharmacy

i.Series
iPR105-GX

Horizon Series
HPR105-GX

360398/B

Document History

Revision	Date	CO	Supersession	Revision Description
A	15 JAN 2019	14198	n/a	Initial release.
B	24 JAN 2019	15262	B supersedes A	• Updated Location Requirements to include reference to Product Specifications. • Updated instructions for reversing door hinges to accomodate units without a center panel. • Updated PM schedules with regard to hinge lubrication and monitoring system back-up battery. • Updated Troubleshooting table to include problem resulting from use of GFCI outlet and possible action. • Updated caution symbols throughout the document • Removed Compliance information as it can be found in the Operation Manual.

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

Document Updates

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

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

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Part No. 360398/B

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1 About This Manual

1.1 Intended Audience

This manual provides information on how to use i.Series® and Horizon Series™ undercounter laboratory, blood bank, and pharmacy refrigerators. It is intended for use by end users of the refrigerator and authorized service technicians.

1.2 Model Reference

Models are indicated by a distinguishing model number that corresponds to the series, type, number of doors, and capacity of the refrigerator. For example, “iLR105-GX” refers to an i.Series Laboratory Refrigerator with 1 door and a capacity of 5 cu ft.

1.3 Intended Use

Note

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Helmer refrigerators are intended for the storage of blood products and other medical and scientific products.

1.4 Safety Symbols and Precautions

Symbols found in this document

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

Task Indicates procedures which need to be followed.

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

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

Symbols found on the unit

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

Caution: Risk of damage to equipment or danger to operator

Warning: Crushing of hands / fingers

Caution: Hot surface

Warning: Flammable material

Caution: Shock / electrical hazard

Refer to documentation

1.5 Avoiding Injury

- Do not use mechanical devices or other means to accelerate the defrosting process, other than those recommended by the manufacturer.
- Do not damage the refrigerant circuit.

Review safety instructions before installing, using, or maintaining the equipment.

- Before moving unit, ensure door is closed and casters (if installed) are unlocked and free of debris.
- Before moving unit, disconnect the AC power cord and secure the cord.
- Never physically restrict any moving component.
- Avoid removing electrical service panels and access panels unless so instructed.
- Keep hands away from pinch points when closing the door.
- Avoid sharp edges when working inside the electrical compartment and refrigeration compartment.
- Ensure products are stored at recommended temperatures determined by standards, literature, or good laboratory practices.
- Proceed with caution when adding and removing product from the refrigerator.
- Do not open multiple loaded drawers at the same time.
- Use manufacturer supplied power cord only.
- Avoid risk of ignition by using only manufacturer supplied components and authorized personnel when servicing the unit.
- Using the equipment in a manner not specified by the manufacturer may impair the protection provided by the equipment.
- Ensure product is stored safely, in accordance with all applicable organizational, regulatory, and legal requirements.
- The refrigerator is not considered to be a storage cabinet for flammable or hazardous materials.
- Use caution when moving a stacked configuration.
- **REQUIRED:** Decontaminate parts prior to sending for service or repair. Contact Helmer or your distributor for decontamination instructions and a Return Authorization Number.

1.6 Model and Input Power

Note

Service information varies depending on the model and power requirements.

Table 1. Model and Input Power

Model	Voltage	Frequency	Current Draw
105	115V	60 Hz	1.4 A
	220-240V	50 Hz	0.85 A
	220-240V	60 Hz	0.85 A

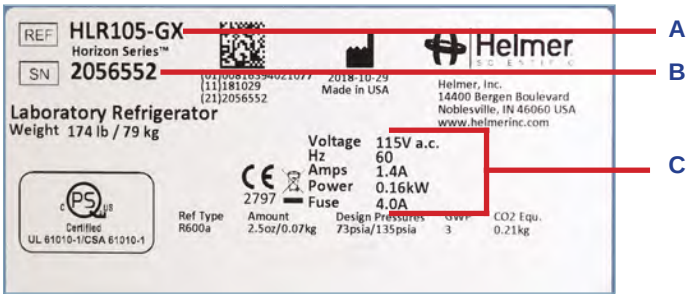
** Amperage values are subject to change. Refer to the product specification label on your unit for current values.*

1.7 Product Labels

This information appears on the product specification label, located on the rear of the refrigerator toward the bottom left corner. The model also appears on a label located in the chamber on the upper side of the right wall.

Note

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



Sample Product Specification label.

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

i.Series Information

2 Installation and Configuration

2.1 Location Requirements

Keep all ventilation openings in the enclosure or, in the structure for building-in, clear of obstruction.

- Has a grounded outlet meeting the electrical requirements listed on the product specification label.
- Is clear of direct sunlight, high temperature sources, and heating and air conditioning vents.
- Has a minimum 3“ (76 mm) of space behind the refrigerator for clearance and feature access.
- Meets specified limits for ambient temperature and relative humidity as stated in the Product Specifications section of the Refrigerator Instructions for Use and Operation manual.

2.2 Placement and Leveling

NOTICE

- To prevent tipping, ensure the casters (if installed) are unlocked and the door is closed before moving the refrigerator.
- Use of leveling feet or casters is required.
- Do not sit, lean, push or place heavy objects on top surface.
- Do not lean on or push down on an open door or extended drawers.
- To avoid damaging refrigerant tubing or risking refrigerant leak, use caution when moving or operating the unit.

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

Note

Helmer recommends the use of leveling feet and wall and floor brackets (PN 400472-2) for stabilization. Contact Helmer Technical Service for parts and instruction.

2.3 Stacked Undercounter Units

NOTICE

- For stacked configuration, both units must have leveling feet installed.
- Back brace bars and front stabilizing brackets must be installed (Blue - PN 400821-1; Stainless Steel - PN 400821-2).
- When stacking units, place the heavier unit on the bottom.
- Do not open multiple loaded drawers at the same time.
- Do not lean on or push down on an open door or extended drawers.

Contact Helmer or your distributor for more information regarding the stacking kit and methods to secure both units to the wall and/or floor.

2.4 Connect Back-Up Power

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

Battery life varies by manufacturer, voltage level remaining as well as whether optional Access Control is installed. Providing full power is available, Access Control is not installed and no battery-related alarms are active, back-up power for the monitoring system is available for up to 20 hours (the Low Battery alarm will activate after approximately 18 hours of battery use). Providing full power is available, back-up power for the monitoring system and optional Access Control system is available for up to 2.5 hours.

NOTICE

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

Notes

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

The back-up battery is located below the chamber, behind the right side panel. The panel cover must be removed to access the battery.

Monitoring system back-up battery.

2.5 Prepare for Monitoring

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

Temperature Probes

Notes

- Temperature probes are fragile; handle with care.
- Remote probes may also be introduced through the existing port and immersed in existing probe bottles.
- External probes should not be routed into the chamber through the door opening as this may cause issues with the door seal.
- Solid ballast (if installed) should be placed in the bracket in a horizontal position.

A solid ballast or probe bottle and container of glycerin have been provided with this unit. When using the probe bottle, mix the glycerin with water to create a solution which simulates the product stored in the refrigerator. The product simulation solution temperature reflects the product's temperature during normal operation.

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

Probe bottle with probe.

Solid ballast with probe.

Rear access port.

Fill Probe Bottle (if included)

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

Install Additional Probe Through Rear Port

1. Peel back putty to expose port.
2. Insert probe through port into chamber.
3. Insert probe into bottle or secure in ballast with thumbscrew.
4. Replace putty, ensuring a tight seal.

Chart Recorder (if included)

Notes

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

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

Prior to use:

Route the chart recorder probe through the rear access port and place in bottle with primary monitor probe, or install in ballast and secure with thumb screw.

Set up and Operation

Access chart recorder by pulling the door to open.

Install Battery

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

Install / Replace Chart Paper

Notes

- For accurate temperature reading, ensure the current time is aligned with the time line groove when chart knob is fully tightened.
- Contact Helmer Customer Service or your distributor to reorder chart paper; part number 220366 (52 sheets).

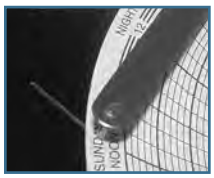


Chart recorder stylus and time line groove

1. Press and hold **C** button. When stylus begins to move left, release button. The LED flashes.
2. When stylus stops moving, remove chart knob then move knob up and away.
3. Place chart paper on chart recorder.
4. Gently lift stylus and rotate paper so current time line corresponds to time line groove.
5. Hold chart paper in place while making sure the chart knob is fully tightened. *(Failure to fully tighten the knob can result in paper slipping and losing time.)*
6. Press and hold C button. When stylus begins to move right, release button.
7. Confirm stylus is marking on paper and stops at the correct temperature.
8. Calibrate chart recorder to match primary temperature if needed and close recorder door.

External Monitoring Devices

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

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

Terminals are dry contacts and do not supply voltage. Interface circuit is either normally open or normally closed, depending on terminals used.

Requirements for your alarm system determine which alarm wires must connect to terminals.

NOTICE

- The interface on the remote alarm monitoring system is intended for connection to the end user's central alarm system(s) that uses normally-open or normally-closed dry contacts.
- If an external power supply exceeding 33 V (RMS) or 70 V (DC) is connected to the remote alarm monitoring system's circuit, the remote alarm will not function properly and may cause damage to the control board or result in injury to the user.

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

- 115V or 230V: 1 A at 33 V (AC) RMS or 70 V (DC)

Connect to Remote Alarm Interface

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

2.6 Configure Storage

NOTICE

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

Note

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

Product Loading Guidelines

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

- Never load refrigerator beyond capacity.
- Always store items within shelves or drawers.
- Temperature uniformity is maintained by air circulation, which could be impeded if unit is overfilled, particularly at the top or back. Ensure a minimum of 2” (50 mm) clearance is provided below the fan.

Note

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

Drawers

Remove Drawer

1. Pull drawer 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 free of slides.

Install Drawer

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

Move Drawer Slides

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

Shelves

Remove Shelf

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

Install Shelf

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

Move Shelf Brackets

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

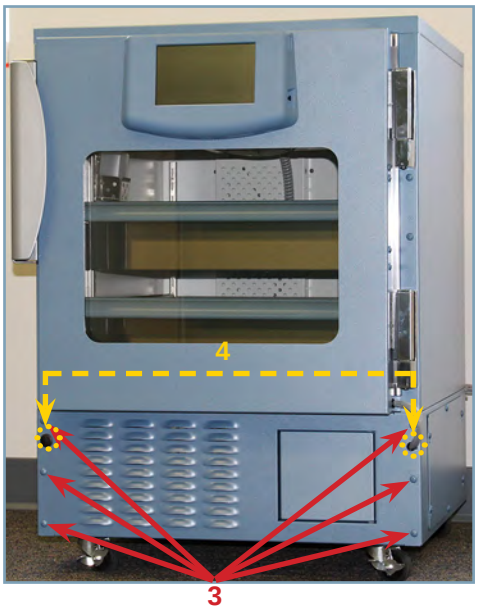
2.7 Optional Adapter Kits for Medication Dispensing Locks

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

2.8 Reverse Door Hinges and Handle

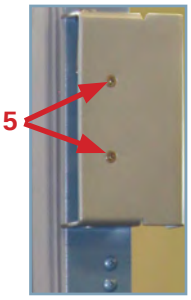
Notes

- A new handle assembly is necessary when reversing the door hinges. (PN 800891-1, right hinged; PN 800891-2, left hinged)
- The following instructions apply to reversing a right-hinged door to a left-hinged door. Some steps will need to be reversed if changing from left-hinged to right-hinged.
- Door hinge and handle cannot be reversed on units equipped with Access Control.
- Unit must be on floor or an elevated work surface with adequate space to place door face-down in front of unit.
- To prevent personal injury and/or damage to the door, Helmer recommends two people for this procedure.

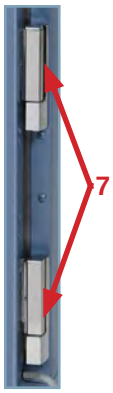


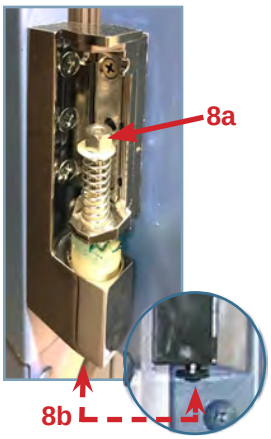
Remove Door and Hinges

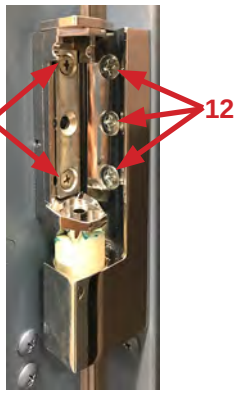
1. Press and release door to open the access panel. Switch the AC power switch to OFF and switch the back-up battery switch to OFF.
2. Disconnect AC power cord from power receptacle.
3. Remove six screws securing the front access panel to the unit and carefully place it in front of the refrigerator ensuring there is no strain on the wiring.
4. Remove plug from access panel on handle-side of unit. Remove grommet from hole on hinged-side of unit and slide braided sleeve out of the slot.



5. Remove two (2) screws securing door handle assembly to the door and set assembly aside.
6. Remove two (2) screws attaching the latch plate to the unit and set aside.

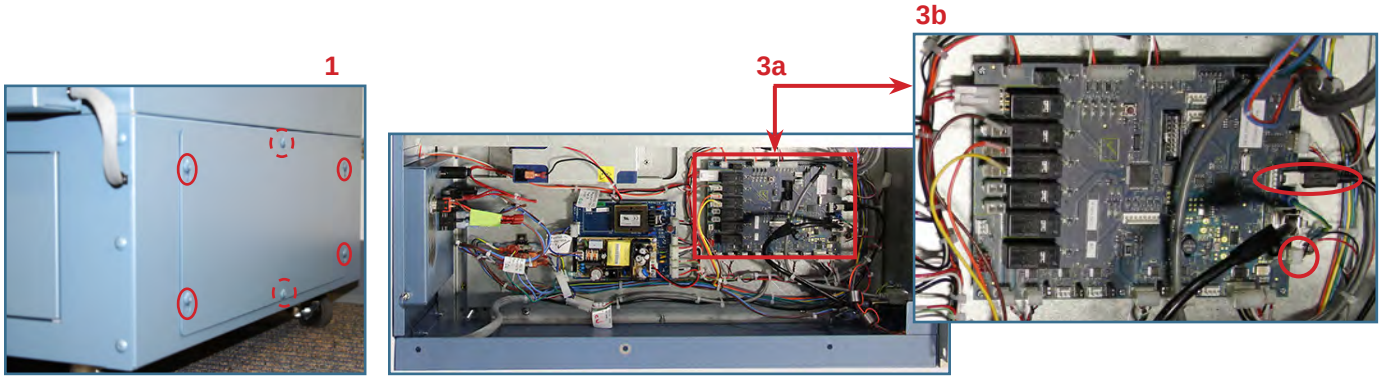




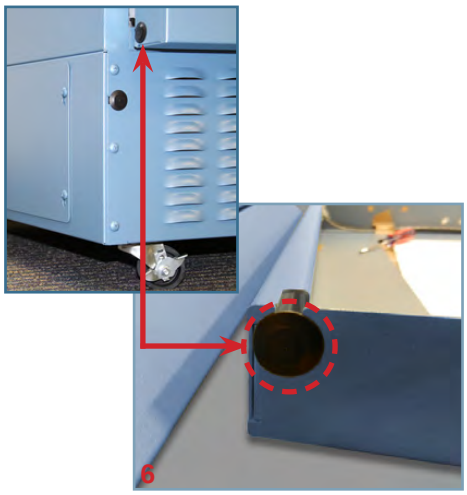


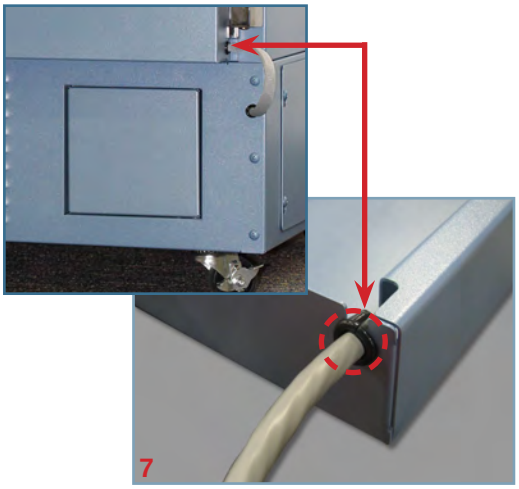
7. With the door shut, remove the cover plate from both hinges.
8. Using a 3/8" wrench, loosen the hex nut on each hinge spring. The hinge pin will drop from below allowing the spring to be removed. Set the hinge pins and springs aside.
9. Carefully lift the door and off the hinge and place it face-down in front of the unit taking care not to damage the display assembly and ensuring there is no strain on cables running from the cabinet to the door.
10. Remove the two (2) screws attaching the upper and lower hinges to the door using a #2 Phillips screwdriver and set aside.
11. Using a #2 Phillips screwdriver, remove the 3 screws securing the upper and lower hinges to the unit and set aside.

Reroute Communication Cables

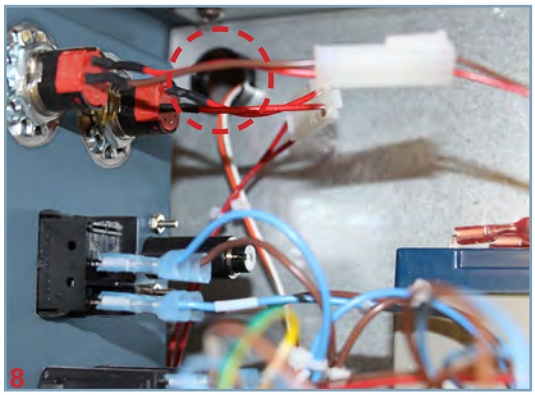


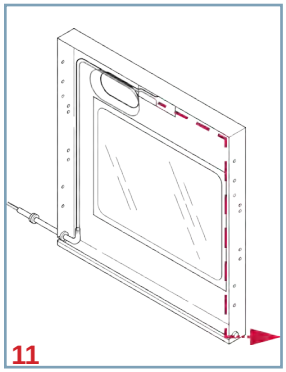
1. Access the electrical compartment by using a #2 Phillips head screwdriver to remove the top and bottom center screws from the right-side panel, and loosening the remaining screws in each corner of the panel.
2. Slide the panel upward to disengage the four (4) screws from the keyhole openings and remove the panel.
3. Locate the control board and disconnect the display power and communication cables.

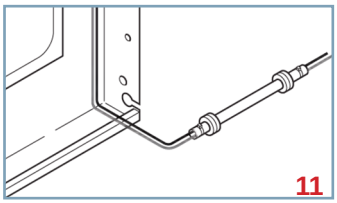




4. Remove the remaining screws from the door assembly.
5. Using a punch or J-hook tool along the bottom edge, lift the inner door frame out of the outer door frame.
6. Remove the plug from the door on the handle-side and set aside.
7. Pull grommet out of hole in door on hinged-side and slide the braided sleeve out of the slot.







8. If a center panel is installed, thread the display power and communication cables through the front opening in the center panel which divides the electrical compartment from the refrigeration compartment. (Continue to step 10.)
9. If a center panel is not installed, cut the zip tie securing the door switch wires.
10. Secure the door switch wires along with the display power and communication cables to the zip tie holder using a zip tie.
11. Reroute the display power and communication cables along the inside edge of the door and through the slot in the corner opposite their initial location.
12. Tape cables to inside of door ensuring any excess cable is on the outside of the door.
13. Cut the zip ties securing the braided sleeve, and slide the sleeve and grommets along the cables toward the door.
14. Slip the braided sleeve through the slot in the door and insert the door-side grommet into the hole in the door.
15. Secure the braided sleeve around cables using zip ties at each end to prevent the sleeve from sliding.

Reassemble Door / Reverse Hinges

1. Reinstall the inner door panel and secure with screws in the holes opposite the original configuration.
2. Reinstall the door hinge plates onto the opposite side of the door frame by aligning holes in the hinge plates with the holes in the door frame and hand-threading the two (2) long screws in each hinge (leave screws slightly loose).
3. Reinstall the corresponding hinge plates to the unit by hand-threading the three (3) short screws through the hinge and into the cabinet.
4. Remove the centering cam from the upper and lower hinges on the refrigerator. Rotate the cams and reinstall.
5. Align the upper hinge cams on the door with the lower hinge cams on the refrigerator as you carefully reattach the door to the unit.
6. Level the door and tighten all screws securing hinges to the unit.
7. Slide the braided sleeve through the slot in the front access panel allowing approximately 3” (76 mm) of slack between the door and the cabinet so the door can open and close without straining cables. Install the grommet in the access panel.
8. Attach the door handle on the opposite side of the door with two (2) screws.
9. Attach the strike plate to the opposite side of the unit with two (2) screws. Test the locking mechanism to ensure proper functionality.
10. With the door closed, reinstall the hinge pin and spring in the upper hinge. Secure with hex nut using a 3/8" wrench *(the hex nut should be tightened until it stops turning)*. Repeat the process for the lower hinge.
11. Replace the hinge cover plates.
12. Reconnect the display power and communication cables to the control board.
13. Reinstall the right-side access panel by engaging the four (4) screws in the unit base with the keyhole openings in the panel. Insert the top and bottom center screws and tighten all screws using a #2 Phillips screwdriver.
14. Reinstall the front access panel and secure with six (6) screws.
15. Plug the power cord into the power receptacle. Switch the AC power switch ON. Switch the back-up battery switch ON.
16. Verify the door is level, hinges operate smoothly and door seals tightly.
17. Allow the temperature to stabilize at the setpoint before moving inventory back into the unit.

3 Controls

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

Note

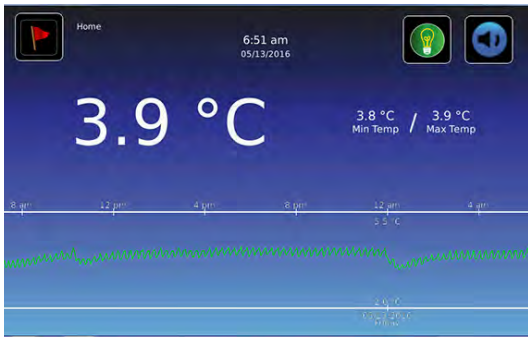
Please refer to the i.C³ User Guide for complete information regarding the i.C³ User Interface.

3.1 Home Screen and Screensaver

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

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

Home Screen



Screensaver

3.2 Home Screen Functions

Note

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

- View current interior cabinet temperature readings
- View the current system time and date
- Access any of the five home screen applications (touch **i.C³ APPS** for additional applications)
- View information about current alarm events
- View whether the monitoring system is running on battery power
- Mute audible alarms
- Turn the chamber light on and off (if applicable)
- View a graph of the chamber temperature
- View unit ID
- Shortcut to Event Log

3.3 Alarm Reference

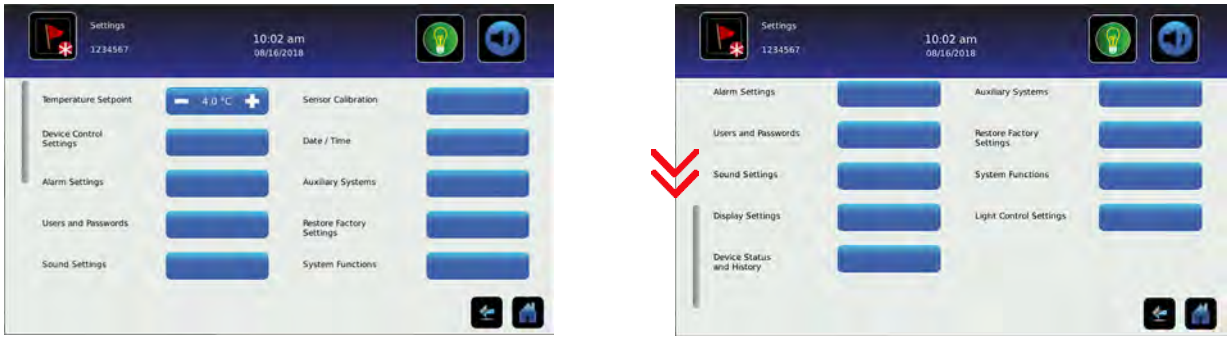
If an alarm condition is met, an alarm activates. Some alarms are visual only; others are visual and audible. Some alarms are sent through the remote alarm interface. The table below indicates if an alarm is audible (A), visual (V), or sent through the remote alarm interface (R).

Table 2. i.Series Alarm Reference

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

3.4 Settings

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



Settings screens

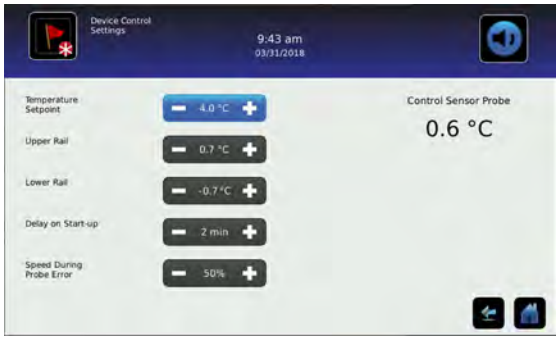
Notes

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

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

Device Control Settings

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



Device Control Settings screen.

Table 3. Setpoints

Setting	Initial Factory Value
Temperature Setpoint	4.0 °C (iLR and iBR models); 5.0 °C (iPR models)
Upper Rail	0.7 °C
Lower Rail	-0.7 °C
Delay on Start-Up	2 minutes
Speed During Probe Error	50%

Temperature Setpoint

The setpoint is the temperature at which the refrigerator operates. The factory default setting for the primary monitor probe is 4.0°C for iLR and iBR models, or 5.0 °C for iPR models.

Notes

- If the Settings screen is password protected enter the appropriate password. If viewing settings for the first time, enter the factory default password of “1234”.
- Temperature Setpoint can be adjusted through the main Settings screen and Device Control Settings screen.
- Change the setpoint if your organization requires a chamber temperature other than 4.0 °C for iLR and iBR models, or 5.0 °C for iPR models.

Change Temperature Setpoint

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

Upper Rail

Upper rail is the maximum control temperature at which the compressor will turn on.

Lower Rail

Lower rail is the minimum control temperature at which the compressor will turn off.

Delay on Start-Up

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

Speed During Probe Error

The compressor will run as a percent of maximum if both the monitor and control probe fail.

NOTICE

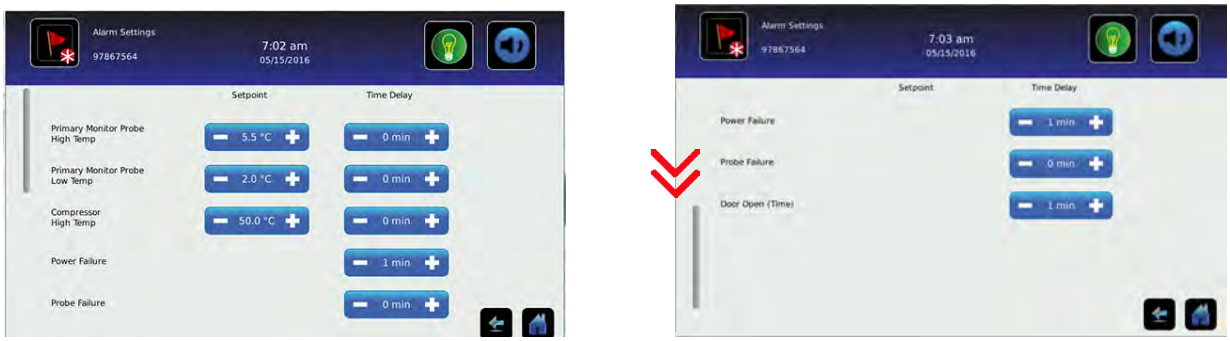
Upper Rail, Lower Rail, Delay on Start-up and Speed During Probe Error are factory-preset and should not be changed unless directed by Helmer Technical Service.

User Configurable Alarm Settings

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

Table 4. User Configurable Alarms

Alarm	Description	Default Value	Default Time Delay
Primary Monitor Probe High Temp	High temperature at which alarm condition occurs	5.5 °C *(iBR and iLR models)*	0 minutes
		6.5 °C *(iPR models)*	
Primary Monitor Probe Low Temp	Low temperature at which alarm condition occurs	1.5 °C *(iBR models)*	0 minutes
		2.0 °C *(iLR and iPR models)*	
Compressor High Temp	High temperature at which alarm condition occurs	50 °C	0 minutes
Power Failure	Time after power failure occurs until alarm sounds	-	1 minute
Probe Failure	Time after probe failure occurs until alarm sounds	-	0 minutes
Door Open (Time)	Time door remains open until alarm sounds	-	3 minutes



Alarm setting screens

Change an Alarm Setting

1. Touch **i.C³ APPS**, **Settings**.
2. Enter the Settings password (default password is “1234”).
3. Scroll down and touch **Alarm Settings**.
4. Touch minus (**–**) or plus (**+**) on the spin box corresponding to the alarm setting to be changed.
5. Touch **Home** to exit the Alarm Settings screen.

Non-Configurable Alarms

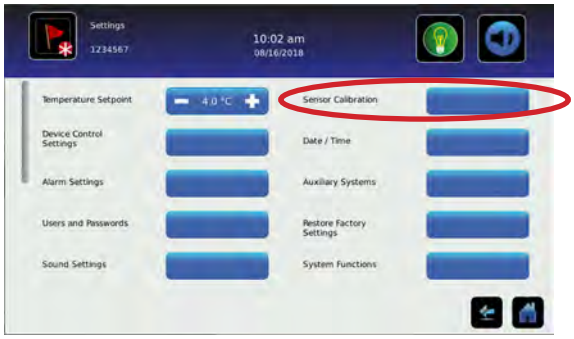
The following alarms indicate operational conditions which require the attention of the operator or a qualified service technician.

Table 5. Non-Configurable Alarm

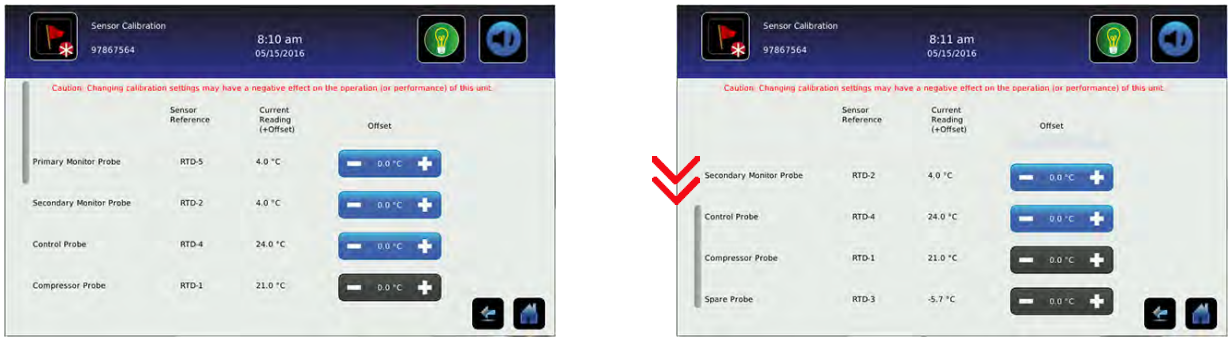
Alarm	Description
Low Battery	Monitoring system rechargeable battery voltage is low
Drive Space Low	• Triggered if SD card containing downloadable historical date is approaching capacity • New data will continue to be saved for up to 3 more months • Data can be downloaded, but doing so will not free up capacity (SD card replacement recommended)
Drive Space Full	• Triggered if the SD card containing downloadable historical data has reached its capacity • No new data will be saved • Data can be downloaded, but doing so will not free up capacity (SD card replacement required)
Communication Failure	**Communication Failure 1** • Triggered if communication is lost between i.C³ display board and control board. • Unit will continue to run with previously saved settings • Screen will not display temperature changes or alarm conditions • i.C³ system will continue to reset until connection is re-established **Communication Failure 2** • Triggered if communication is lost between i.C³ display board and internal system memory • Unit will continue to run with previously saved settings **Communication Failure 3** • Triggered if the database is corrupted • The database is archived and a new database is automatically created • Unit will continue to run with previously saved settings
Inverter Communication Failure	• Triggered if there is a problem with the refrigeration system Contact Helmer Technical Service for more information

3.5 Sensor Calibration

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



Settings Screen



Sensor Calibration screens

Notes

- If the Settings screen is password protected enter appropriate password. If viewing settings for the first time, enter factory default password of “1234”.
- Offset values are adjusted to the tenth of a degree (0.1).
- After one hour of no interaction, the Home screen or Temperature Graph screensaver (if enabled) is displayed.
- The Compressor Probe offset is factory-preset and should not be changed unless directed by Helmer Technical Service.

View Sensor Calibration Values

1. Touch the **Settings** icon.
2. Enter the Settings password.
3. Touch **Sensor Calibration**. Sensor offset values and their current temperature readings are displayed.
4. Touch **Home** to return to the Home screen.

Primary Monitor Probe

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

Notes

- Ensure product simulation bottle is full of solution.
- The probe in the bottle or ballast is connected to the monitoring system and senses chamber temperature. This probe activates the temperature alarms but does not affect temperature control.

Calibrate Primary Monitor Probe *(probe bottle installed)*

1. Remove primary monitor probe from the probe bottle.
2. Unscrew the cap from the bottle.
3. Attach a calibrated independent reference thermometer traceable per national standards to the primary monitor probe, and place them in the bottle. The probe and thermometer should be immersed at least 2” (50 mm).
4. Close the door and allow the chamber temperature to stabilize.
5. Observe and note the thermometer temperature. If the independent thermometer corresponds to the displayed temperature, proceed to **Step 11**.
6. Subtract the displayed temperature reading from the independent probe reading to determine the offset value.
7. Touch, **i.C³ APPS**, **Settings**
8. Enter the Settings password (default password is “1234”).
9. Touch **Sensor Calibration**.
10. Touch minus (**-**) or plus (**+**) on the **corresponding** spin box to increase or decrease the value by the value calculated in **Step 6**. The message “New Setting Saved” appears next to the spin box.
11. Remove thermometer from probe.
12. Replace bottle cap, ensuring a tight fit.
13. Place probe in bottle, immersing at least 2” (50 mm).

Calibrate Primary Monitor Probe *(solid ballast installed)*

1. Ensure the Primary Monitor Probe is securely installed in the ballast.
2. Place a calibrated independent reference thermometer in one of the remaining probe holes in the ballast and tighten thumb screw to secure. This may involve temporarily removing an additional probe to provide an opening for the independent reference thermometer.
3. Place the reference thermometer in an available probe hole. Tighten the thumb screw until the thermometer is secure (Take care not to over-tighten the thumb screw).
4. Close the door and allow the chamber temperature to stabilize.
5. Observe and note the thermometer temperature. If the independent thermometer corresponds to the displayed temperature, proceed to Step 7.
6. Adjust the Primary Monitor Probe offset value higher or lower to reflect the difference between the chamber temperature displayed on the monitor and the temperature reading from the calibrated reference thermometer.
7. Loosen the thumb screw and remove calibrated independent reference thermometer from ballast.
8. Replace any additional probe that may have been removed previously, and tighten the thumb screw ensuring a snug fit.
9. Replace any removed putty.

Control Probe

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

Chamber temperature will be controlled as required to match the temperature set point based on the control probe reading.

Determine Control Probe Offset

NOTICE

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

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

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

Enter New Offset Value:

1. Touch **i.C³ APPS**, **Settings**.
2. Enter the Settings password (default password is “1234”).
3. Touch **Sensor Calibration**.
4. Touch minus (**-**) or plus (**+**) on the **Control Probe Offset** spin box.
   - ♦ Raise the offset value to lower chamber temperature; lower the offset value to raise chamber temperature.
5. Touch **Home** to return to home screen.

Compressor Probe

The compressor temperature probe has been factory-calibrated. Changing the calibration setting is not typically necessary and should not be performed unless directed by Helmer Technical Service.

Factory Default Settings

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

Note

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

Table 6. Default Settings

Setting	Restored Value
Home Screen Application Icons	i.C³ APPS, Settings, Temperature Graph, Temperature Alarm Test, Information Logs
Display Brightness	High (level 3)
Password (for Settings screen)	1234
Sounds	On
Alarm Volume	9
Alarm Tone	3
Temperature Calibration Values	Not affected (values previously entered during setup)
Unit ID	Not affected (previously selected during setup)
Date Format	MM/DD/YY
Day	Not affected (maintained in real-time clock)
Month	
Year	
Time Format	12-hour
Minute	Not affected (maintained in real-time clock)
Hour	
AM/PM	
Language	Not affected (Language previously selected during setup)
Temperature Units	°C
Password Protection (for Settings screen)	On
Temperature Graph Screensaver	On
Access Control (optional) as Home Page	On
Light Off Delay (on/off)	On
Light Off Delay	5 minutes
High Temperature Alarm Setpoint	5.5 °C (iBR and iLR models); 6.5 °C (iPR models)
High Temperature Alarm Time Delay	0 minutes
Low Temperature Alarm Setpoint	1.5 °C (iBR models); 2.0 °C (iLR and iPR models)
Low Temperature Alarm Time Delay	0 minutes
Power Failure Alarm Time Delay	1 minute
Probe Failure Alarm Time Delay	0 minutes
Door Open (Time) Alarm Time Delay	3 minutes
Compressor Temperature Alarm Setpoint	50.0 °C
Compressor Temperature Alarm Time Delay	1 minute
Chamber Setpoint	4.0 °C (iBR and iLR models); 5.0 °C (iPR models)
Upper Rail	0.7 °C
Lower Rail	-0.7 °C
Delay on Start-Up	2 minutes
Speed During Probe Error	50%

Restore Settings:

1. Touch the **Settings** icon.
2. Scroll down and touch the **Restore Factory Settings** button. The Restore Factory Settings confirmation box appears.
3. Touch ☑ to restore the factory settings or ☒ to maintain the current settings and clear the message.

4 Maintenance

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

NOTICE

Maintenance should only be performed by trained refrigeration technicians.

Notes

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

Table 9. i.Series Preventive Maintenance Schedule

Task	Frequency			
	1 year	2 years	5 years	As Needed
Test the high temperature *(over maximum temperature limit)* and low temperature *(below minimum temperature limit)* alarms *(as required by your organization's protocols)*.				✓
Test the power failure alarm *(as required by your organization's protocols)*.				✓
Test the door alarm *(as required by your organization's protocols)*.				✓
Verify the temperature calibration on the monitor and change it if necessary.	✓			
Replace monitoring system back-up battery.		✓		
Examine probe bottle(s) and clean or replace if necessary.	✓			
Check the solution level in the probe bottle(s). Refill or replace if necessary.				✓
Check the chamber lights and replace if necessary.				✓
Re-apply silver conductive grease in both upper and lower hinge.			✓	
Replace Display Board CR2032 battery.			✓	
Clean the door gaskets, interior, and exterior of the refrigerator.				✓
Clean the condenser grill.				✓
Models with chart recorders Check the back-up battery for the chart recorder after an extended power failure and change it if necessary, or change the battery if it has been in service for one year. Refer to the Temperature Chart Recorder Operation and Service Manual.				✓

NOTICE

Clean the condenser grill regularly. Dust accumulation on the condenser coil will vary based on the environment. Some environments require quarterly cleaning.

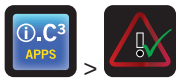
Notes

- During a power failure the back-up battery provides power to the monitoring system, power failure alarm, and optional Access Control. If the back-up battery is not functioning, the power failure alarm will not be activated and the battery should be replaced.
- During a power failure, the back-up battery continues to provide power to the optional Access Control lock (if equipped). If the back-up battery is not functioning, the optional Access Control lock will not secure the door.

4.1 Alarm Tests

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

Automatic Chamber Temperature Alarm Test



Temperature Alarm Test screen

Notes

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

When performing an automatic temperature alarm test, the Peltier device heats or cools the primary monitor probe until the high or low alarm setpoint is reached. An event is added to the Event Log to indicate a temperature alarm was activated. The Alarm Test icon is displayed on the Temperature Graph to indicate the temperature alarm was test-induced.

Test the Low Alarm:

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

Test the High Alarm:

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

Cancel the Test:

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

Note

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

Manual Chamber Alarm Test

NOTICE

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

Test the Low Alarm:

1. Identify setting for low alarm setpoint.
2. Remove primary monitor probe from bottle or ballast.
3. Immerse probe in glass filled with water that is approximately 4 °C. Slowly add crushed ice to lower temperature.
4. When low temperature alarm sounds, note the temperature on the i.C³ display.
5. Compare the temperature at which the alarm sounds to the low alarm setpoint.

Test the High Alarm:

1. Identify setting for high alarm setpoint.
2. Immerse probe in glass filled with water that is approximately 4 °C. Slowly add warm water to raise temperature.
3. When high temperature alarm sounds, note the temperature on the i.C³ display.
4. Compare the temperature at which the alarm sounds to the high alarm setpoint.
5. Remove probe from warm water.
6. Place primary monitor probe in probe bottle, immersing it at least 2” (50 mm), or place in ballast and secure with thumbscrew taking care not to overtighten.

Power Failure Alarm Test

Note

During a power failure, the power failure alarm sounds and the battery provides power to the monitoring system and optional Access Control lock.

1. Change Power Failure delay setting to 0 minutes by touching **Home**, **Settings**
2. Enter the Settings password (default password is “1234”).
3. Touch **Alarm Settings**, then touch (**+)** or (**–**) on the Power Failure spin box to change the value to 0.
4. Switch AC power switch OFF. Power failure alarm will activate immediately.
5. Switch AC power switch ON. Power failure alarm will clear and audible alarm will cease.
6. Change Power Failure time delay to the original setting.

Door Open Alarm Test

1. Change Door Open (Time) delay setting to 0 minutes by touching **Home**, **Settings**,
2. Enter the Settings password (default password is “1234”).
1. Touch **Alarm Settings**, then 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.

4.2 Test and Replace Back-up Batteries

i.C³ Monitoring System Back-up Battery

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

Check the Battery.

1. Ensure battery switch and/or key switch is set to ON.
2. Switch AC power switch OFF.
3. The screen should continue to display information with reduced brightness and the battery icon will appear on the screen. If the display is blank, replace the battery.
4. When completed, switch AC power switch ON.

Note

Use only a battery which meets manufacturer's specifications.

Access Control Back-up Battery (Optional)

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

Test Access Control Back-up Battery.

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

Remove and Replace Battery

NOTICE

Take care not to short battery terminals to bracket or to each other when removing or attaching terminal connectors, bracket or bracket screws.

1. Switch battery back-up switch OFF; switch AC power switch OFF; disconnect the AC power cord from the power receptacle.
2. Use #2 Phillips screwdriver to remove the top and bottom center screws and loosen the 4 screws in the corners of the right-side panel.
3. Slide the cover upward to disengage the 4 screws from the keyhole openings and carefully rotate the panel outward.
4. Locate 12V Battery, remove wires from terminals and using #2 Phillips screwdriver remove screw from mounting bracket. Remove the old battery.
5. Place the new battery in the same location as the one removed.
6. Install the bracket over the battery and secure with single screw.
7. Reconnect the wires to the correct terminals.
8. Reinstall the right-side panel by placing the keyhole openings in the 4 corners of the panel over the 4 screws and slide downward making sure not to pinch wires between the panel and the base of the unit. Tighten screws using a #2 Phillips screwdriver.
9. Install the remaining 2 screws and tighten.
10. Reconnect the AC power cord; switch the AC power switch to ON; switch the battery back-up switch to ON.

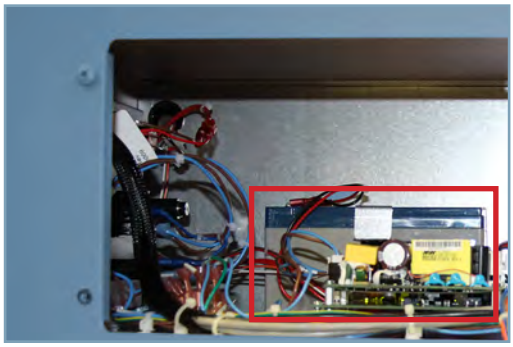


Chart Recorder Back-up Battery (if included)

Refer to Temperature Chart Recorder Operation and Service Manual.

4.3 Check Probe Bottle

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

Ensure the probe bottle has approximately 4 oz. (120 mL) of product simulation solution (10:1 ratio of water to glycerin). The glycerin is used to create a solution which simulates the product stored in the refrigerator. The product simulation solution temperature reflects the product's temperature during normal operation. Failure to fill the bottle may prevent the chamber temperature from stabilizing at the temperature setpoint. The probe should be immersed at least 2" (50 mm).

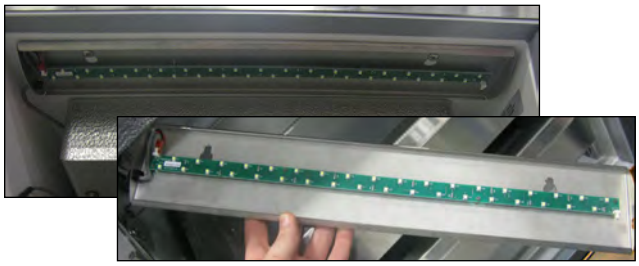
4.4 LED Lamp Strip

Check LED Lamp Strip

Ensure the chamber light turns on when the refrigerator door is opened.

Remove and Replace LED Lamp Strip

1. Switch battery back-up switch OFF; switch AC power switch OFF; disconnect the AC power cord from the power receptacle..
2. Gently pinch together the outer edges of the plastic light cover and remove.
3. Loosen two (2) screws on the top of the cabinet and slide the light fixture so the keyhole openings are disengaged from the screws and remove the fixture.
4. Disconnect the power wire from the circuit board.
5. Pull the circuit board off the mounting pegs and remove it from the unit.
6. Gently press the new circuit board onto the mounting pegs on the fixture.



7. Connect the power wire to the new circuit board.
8. Align the keyhole openings in the fixture with the screws at the top of the cabinet and slide the fixture to engage the screws. Tighten screws using a #2 Phillips screwdriver.
9. Reinstall the plastic cover over the light fixture.
10. Reconnect the AC power cord; switch the AC power switch to ON; switch the battery back-up switch to ON.

4.5 Upper and Lower Door Hinge Cams

Lubricate Upper and Lower Door Hinge Cams

1. Using a flathead screwdriver, carefully pry hinge covers off the hinges.
2. Using a 1/16" Allen wrench, loosen the set screw inside the hex nut on top of the spring.
3. Using a 7/16" wrench, loosen the hex nut. The hinge pin will drop from below allowing the spring to be removed. Set the hinge pins and springs aside.
4. Separate upper and lower hinge cams and apply grease.
5. Press hinge covers into place to reinstall.

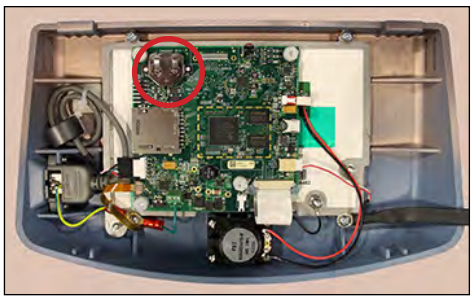
4.6 Display Board Battery

NOTICE

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

Replace Display Board Battery

1. Switch the main power switch to OFF, switch the battery back-up and Access Control switches to OFF; disconnect the AC power cord from the power receptacle.
2. Use #2 Phillips screwdriver to remove (2) screws from the bottom of the i.C³ bezel.
3. Gently lift the bezel to disconnect it from the mounting bracket on the front of the unit.
4. Locate the CR2032 battery and use a small flat head screwdriver to push the old battery out of the slot.
5. Install new CR2032 battery into the slot.
6. Mount bezel to cabinet using (2) screws.
7. Reconnect the AC power cord; switch the main power switch to ON; switch the battery back-up switch to ON.
8. Allow temperature to stabilize at setpoint before moving inventory back into unit.



4.7 Upgrade System Firmware

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

4.8 Clean the Refrigerator

Cabinet Exterior

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

Cabinet Interior

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

Condenser Grill

NOTICE

Disconnect refrigerator from AC power when cleaning.

If the refrigerator is located in an environment where it is exposed to excessive lint or dust, the condenser grill may require cleaning more frequently than stated in preventive maintenance schedule.

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

Door Gasket

Clean with soft cloth and mild soap and water solution.

Probe Bottles (if installed)

Clean and Refill Probe Bottles

1. Remove all probes from bottle.
2. Remove bottle from bracket and empty any remaining solution
3. Clean bottle with a 1:9 ratio of bleach to water solution or a company approved cleaner/disinfectant.
4. Refill bottle with 4 oz. (120 mL) of product simulation solution (10:1 ratio of water to glycerin).
5. Cap bottle tightly to minimize evaporation.
6. Place bottle in bracket.
7. Replace probes, immersing at least 2” (50 mm).

i.C³® Touchscreen

Clean touchscreen with a soft, dry cotton cloth.

5 Service

5.1 Refrigerant

Risk of fire or explosion. Flammable refrigerant used. To be repaired only by trained service personnel. DO NOT puncture refrigerant tubing.

NOTICE

- Review all safety instructions prior to recharging refrigerant.
- Maintenance should only be performed by trained refrigeration technicians familiar with hydrocarbon refrigerants.

Table 8. Refrigerant Charge

Refrigerant	Initial Charge
R600a	2.5 oz. (70 g)

5.2 Remove / Replace Unit Cooler Cover

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

NOTICE

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

Label	Description
A	Unit cooler cover
B	Drain port

Drain line and hose.

Remove Unit Cooler Cover

1. Switch AC power switch OFF. Switch back-up battery switch OFF.
2. Using wire cutters, cut the wire tie securing the drain hose to the evaporator drain port.
3. Pull drain hose downward while gently twisting to remove from unit cooler drain port.
4. Remove top drawer, or shelf from the chamber.
5. Hold unit cooler cover in place to prevent dropping. Using a 8mm socket driver, remove four screws securing the unit cooler cover.
6. Carefully lower unit cooler cover to avoid damage to the fan wiring.

Install Unit Cooler Cover

1. Verify unit cooler wiring is connected and routed correctly.
2. Lift unit cooler cover into place. Front edge of the cover should be behind the unit cooler case.
3. Secure the unit cooler cover with four (4) screws using a 8mm socket driver.
4. In the chamber, attach drain hose to unit cooler drain port and secure with wire tie.
5. Reinstall top drawer, or shelf if previously removed.
6. Switch AC power switch ON. Switch back-up battery switch ON.
7. Touch **Mute** to disable the high temperature alarm while refrigerator reaches operating temperature.

6 Troubleshooting

NOTICE

Review all safety instructions prior to troubleshooting. Refer to Section 1.

6.1 Access System Problems

Problem	Possible Cause	Action
Door does not lock	Lock mechanism is damaged.	Inspect lock/latch, Replace if necessary.
Door does not lock (Magnetic Access Control Option)	Magnetic door lock is not aligned with the strike plate.	Align lock/door to the match strike plate.
	Magnetic lock is not receiving power.	Trace voltage to the lock using the schematic, replace lock if needed.

6.2 Chamber Temperature Problems

Problem	Possible Cause	Action
Display temperature does not match actual chamber temperature	Display temperature needs to be calibrated.	Follow temperature calibration procedure.
	Probe bottle is empty, or probe is out of bottle or ballast.	Check the level of product simulation solution in the bottle. Verify probe is fully inserted in bottle or ballast.
Displayed temperature is too warm or too cold.	Probe bottle is empty, or probe is out of bottle or ballast.	Check the level of product simulation solution in the bottle. Verify probe is fully inserted in bottle or ballast.
	Primary Monitor probe needs to be calibrated.	Calibrate Primary Monitor probe.
	Door was recently opened or opened for an extended time.	Close door and allow temperature to stabilize.
	Condenser coil is dirty	Clean the condenser coil.
	Lack of air flow around unit/ high ambient condition.	Check for proper spacing around unit, any foreign objects blocking air flow, and ambient temperature is within location specifications.
	Lack of air flow inside of chamber.	Check product placement and move products that block air flow around evaporator fan or products which hang over shelves against the back wall.
	Temperature setpoint was adjusted.	Check temperature setpoint and temperature settings. Change to default settings or desired setpoint if necessary.
	Control probe is reading too high/low.	Check control offset setting. Adjust if necessary.
	Unit cooler fan motor (inside chamber) is not running.	Check voltage to the fan motor using schematic. Replace fan motor if necessary.
	Condenser fan motor (exterior) is not running.	Check voltage to the fan motor using schematic. Replace fan motor if necessary.
	Compressor is not running.	Check voltage to the compressor using schematic. Replace compressor start components if necessary.

6.3 Alarm Activation Problems

Problem	Possible Cause	Action
A Battery alarm is active. *(Monitoring system/optional Access Control battery back-up)*	The battery key switch is in the off “o” position.	Turn the key to on “-” position.
	Battery is low due to a power failure.	Allow the battery to recharge.
	Faulty battery or wiring connection.	Check wiring and replace battery.
A Probe Failure alarm is active.	Faulty probe or wiring connection.	Check corresponding probe connection. Test resistance of probe (86Ω to 110Ω). Replace probe if necessary.
The Power Failure alarm is active.	Power was interrupted to refrigerator.	Restore facility power.
	Power switch is in the off “o” position.	Turn power switch to the on “-” position.
	Power cord is loose.	Check both ends of the power cord at the wall outlet and the refrigerator.
	GFI/FGCI outlet has tripped.	Move to standard outlet. Helmer does not recommend operating this unit on a GFI outlet.
The Door Open alarm is activating sporadically.	Door is not closed completely.	Close door.
	Door Alarm delay is set to 0 min.	Check door alarm delay (Default setting - 3 min)
	Faulty door switch or wiring connection.	Check wiring and continuity of switch contacts. Replace switch if necessary.
The Compressor Probe High Temperature alarm is active	Condenser fins are dirty.	Clean condenser coil.
	Condenser probe is out of calibration.	Calibrate condenser probe.
	Condenser probe is faulty.	Check condenser probe connection. Test resistance of probe (86Ω to 110Ω). Replace the probe if needed.
	Ambient conditions are outside of specifications.	Ensure ambient conditions are within location specifications.
A Communication alarm is active.	Communication is lost between i.C3 display board and control board.	Reboot/power cycle the refrigerator. Turn off both main power and battery power, then turn power back on.
	Configuration file is corrupt.	
	i.C³ is unable to access the configuration file.	
	Corrupt database.	
The Drive Space Low/Drive Space Full alarm is active	SD card is approaching capacity or is full	Replace SD card.

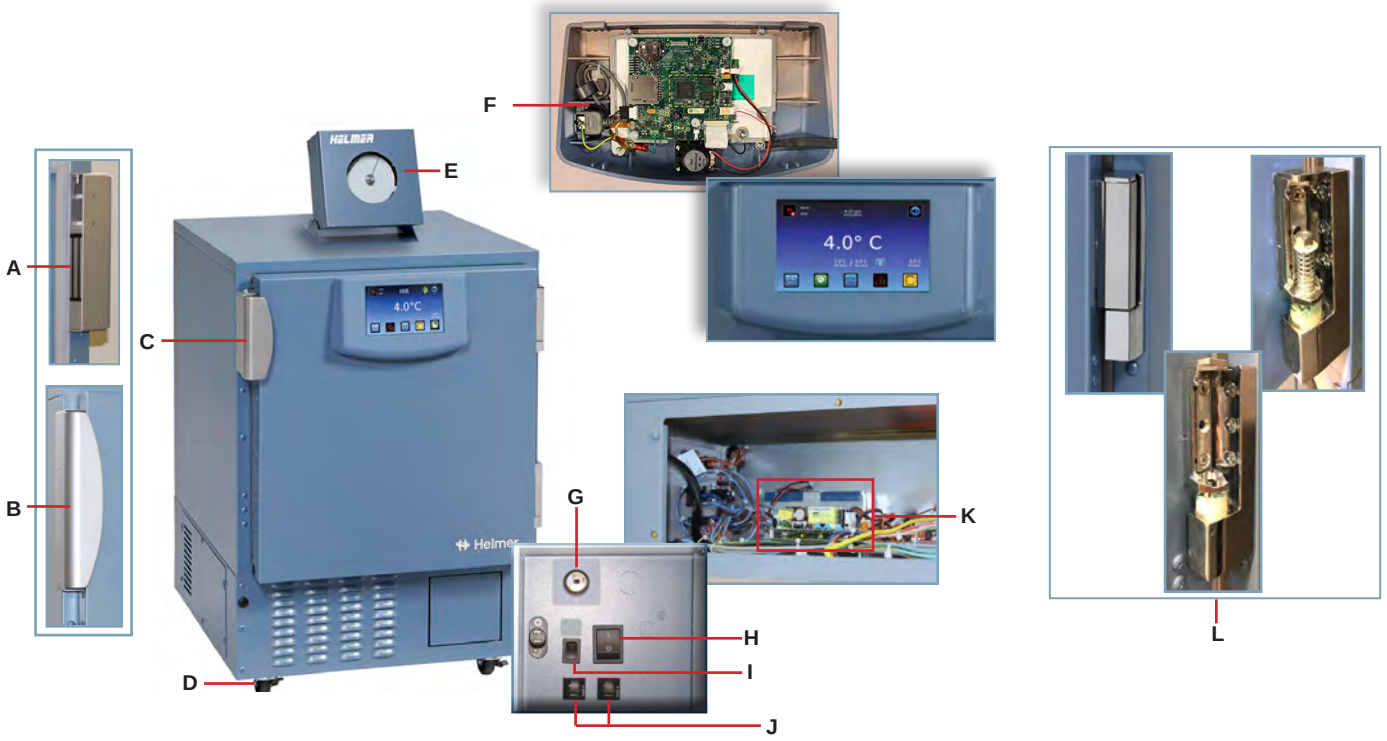
6.4 Condensation Problems

Problem	Possible Cause	Action
Excess condensation/ moisture inside chamber.	Foreign liquid spilled within the chamber.	Verify stored liquid products are properly sealed. Clean chamber.
	Unit cooler condensation pan is not draining.	Ensure refrigerator and unit cooler pan are level. Level if necessary for proper gravity fed drainage.
		Check drain line for debris. Flush drain line if necessary.
	Door was open for an extended time.	Close door and allow chamber to stabilize
	Door seal is deficient.	Inspect door seal for damage. Replace seal if necessary.
		Check for wires routed through the door seal. Reroute wires through available access port if necessary.
		Check through holes and ensure they are sealed. Reseal if necessary.

7 i.Series Parts

Notes

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

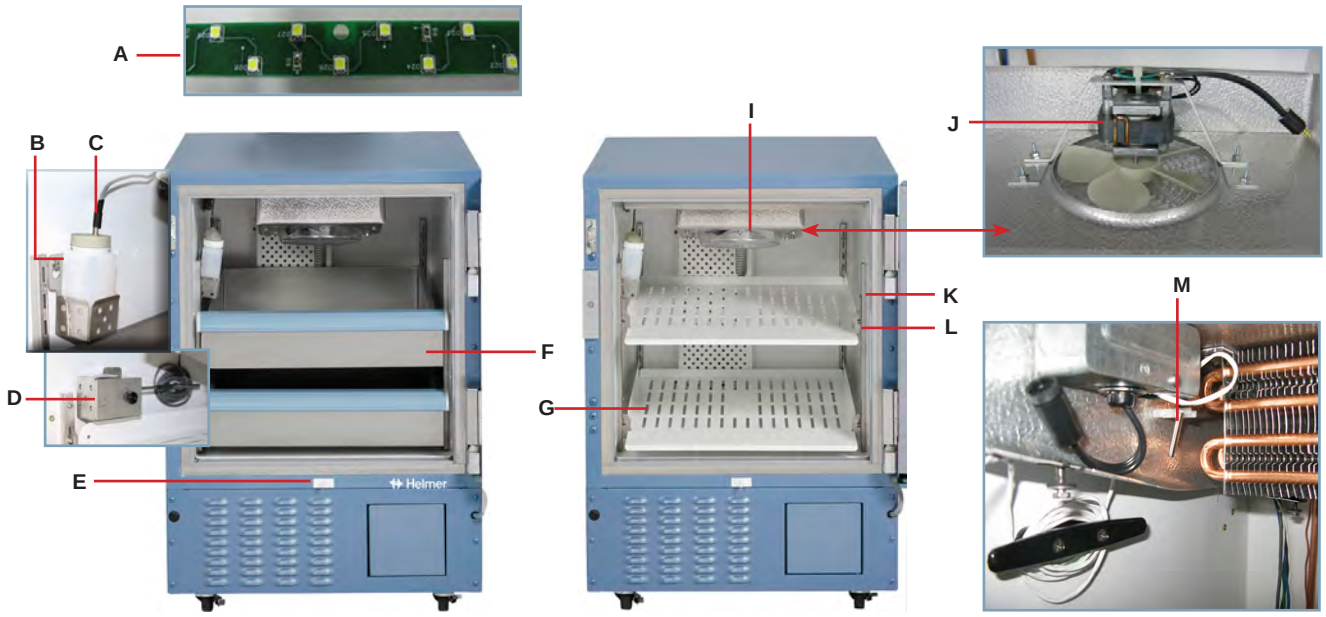


Letter	Description	Part Number	Volts
A	Magnetic lock (optional Access Control) *= right hinged, left handle **= left hinged, right handle	401882-2-068* 401882-1-068**	- -
B	Door handle (optional Access Control)	322000-1	-
C	Low profile handle *= right hinged, left handle **= left hinged, right handle	800891-1* 800891-2**	- -
Not shown	Door key	220460	-
D	Caster - swivel with brake	220380	-
	Casters (includes 4 casters and hardware)	400819-2	-
E	Temperature chart recorder (Contact Helmer Technical Service regarding 230V models)	500612-1	115

Letter	Description	Part Number
Not shown	Chart paper (52 sheets)	220366
	Chart recorder battery	120218
F	Display assembly	800041-1
Not shown	USB / Power cable for i.Center display	800009-1
G	Battery key switch (optional Access Control)	401220-1
H	Main power switch	120478
I	Battery switch	120202
J	Circuit breakers *(4 A; quantity 2)*	120279
K	Monitoring system back-up battery	121018
L	Hinge assembly	220708

NOTICE

Disconnect unit from AC power when replacing LED lamps.



Letter	Description	Part Number
A	Light assembly (circuit board and cover)	800023-1
B	Probe bottle and glycerin kit	400922-1
C	Primary monitor probe	800038-1
D	Solid ballast	402062-1
Not Shown	Chart recorder probe	400799-1
E	Door switch	120380
F	Drawer assembly	401865-2-000

Letter	Description	Part Number
G	Full shelf	401956-1-069
H	Ventilated drawer	401981-1-069
I	Unit cooler assembly	800982-1
J	Unit cooler fan motor	800995-1
K	Standard (shelf, drawer)	-
L	Slide assembly	-
M	Control probe	800048-1

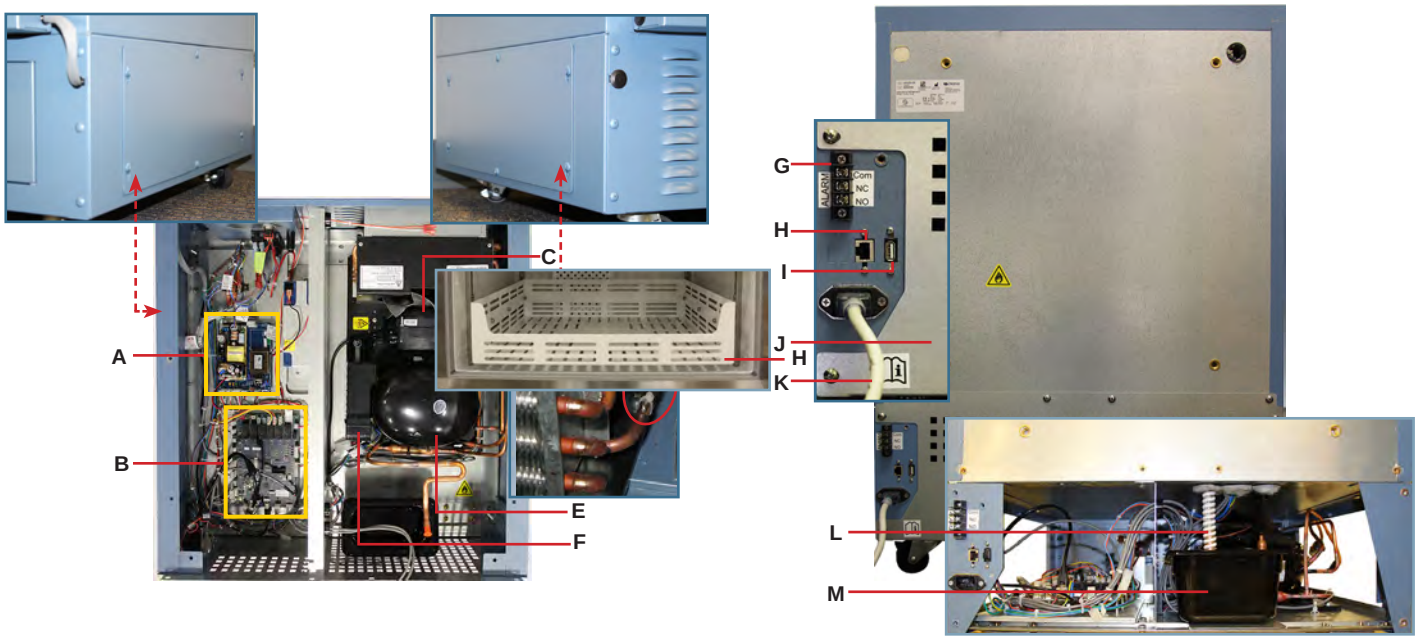
Risk of fire or explosion. Flammable refrigerant used. To be repaired only by trained service personnel. DO NOT puncture refrigerant tubing.

NOTICE

Disconnect unit from AC power before accessing the electrical tray.

Note

Circuit boards are sensitive to static electricity and can be damaged by electrostatic discharge. User proper ESD precautions when handling board.

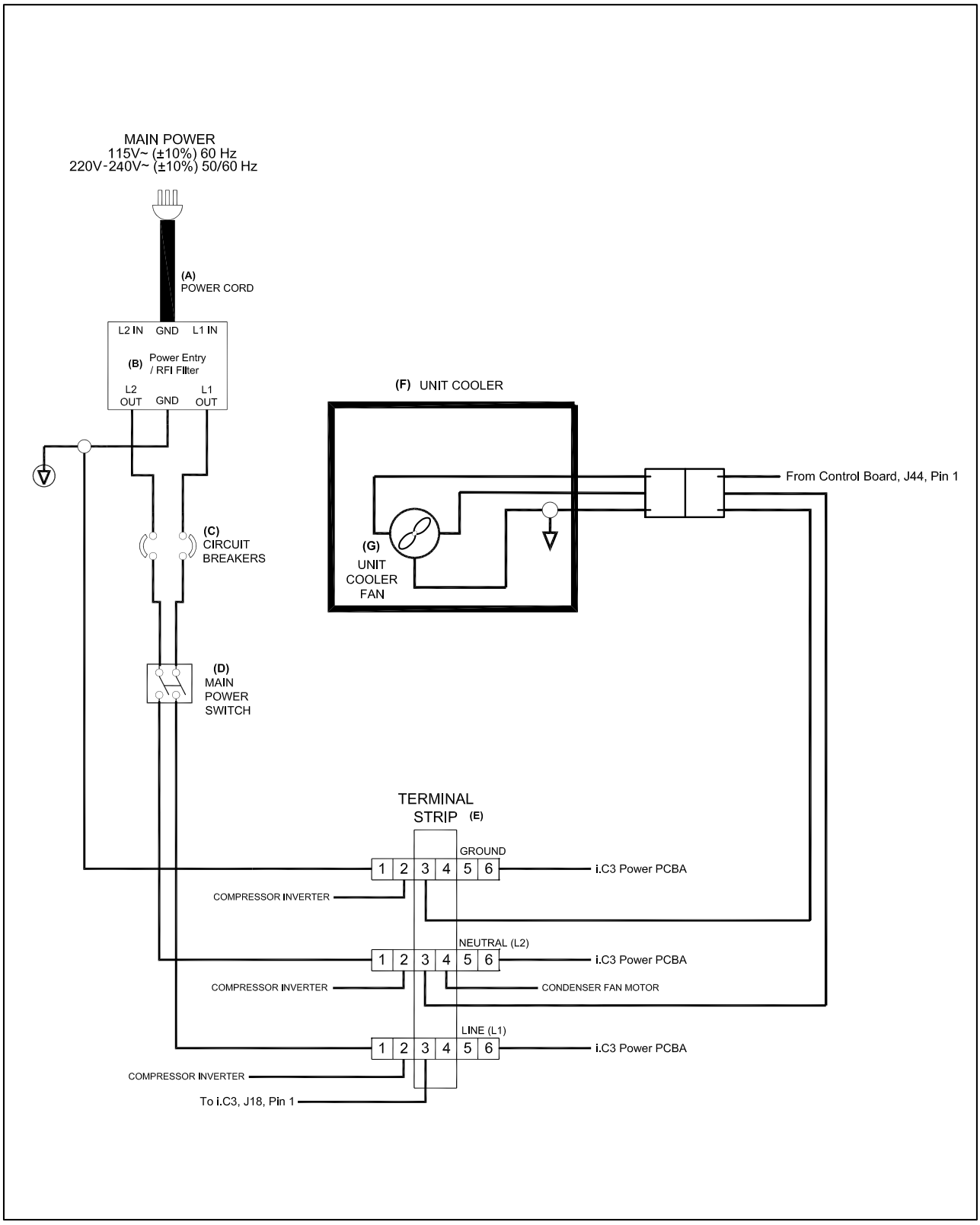


Letter	Description	Part Number	Volts
A	i.C³ power supply board	800916-1	-
B	i.C³ control board	800034-4	-
C	Condenser fan motor assembly	800996-1	-
D	Condenser temperature probe	800039-1	-
E	Compressor	800991-1	115
		801013-1	230
F	Compressor inverter	800997-1	115
		800998-1	230

Letter	Description	Part Number	Volts
G	Remote alarm contacts	-	-
H	RJ45 Ethernet port	-	-
I	USB port	120633	-
J	Rear cover	-	-
K	Power cord	120630	115
L	Drain tube	-	-
M	Condensate evaporator tray	-	-

8 Schematics

8.1 iBR, iPR and iLR Models



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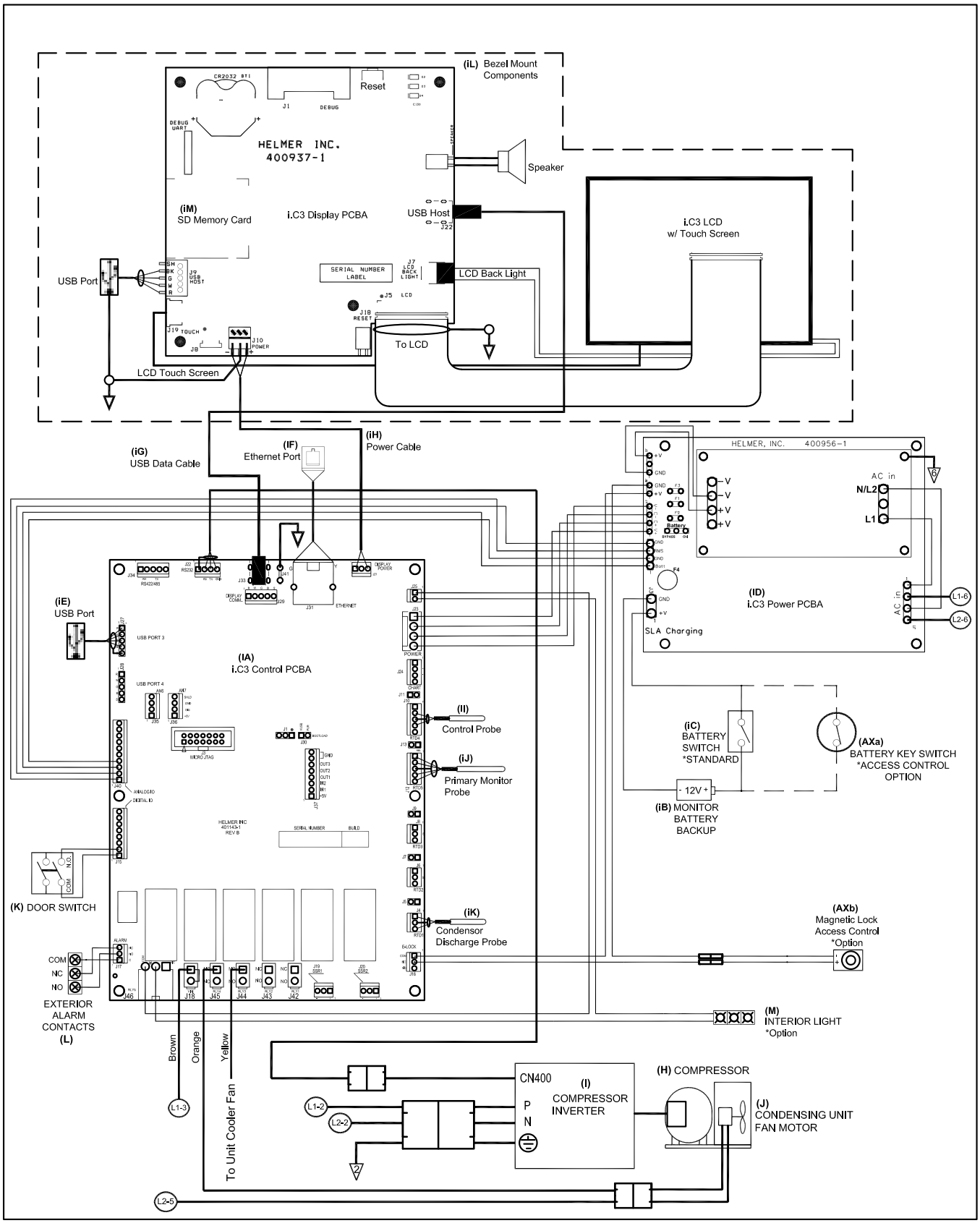

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Horizon Series Information

9 Installation and Configuration

9.1 Location Requirements

Keep all ventilation openings in the enclosure or, in the structure for building-in, clear of obstruction.

- Has a grounded outlet meeting the electrical requirements listed on the product specification label.
- Is clear of direct sunlight, high temperature sources, and heating and air conditioning vents.
- Has a minimum 3“ (76 mm) of space behind the refrigerator for clearance and feature access.
- Meets specified limits for ambient temperature and relative humidity as stated in the Product Specifications section of the Refrigerator Instructions for Use and Operation manual.

9.2 Placement and Leveling

NOTICE

- To prevent tipping, ensure the casters (if installed) are unlocked and the door is closed before moving the refrigerator.
- Use of leveling feet or casters is required.
- Do not sit, lean, push or place heavy objects on top surface.
- Do not lean on or push down on an open door or extended drawers.
- To avoid damaging refrigerant tubing or risking refrigerant leak, use caution when moving or operating the unit.

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

Note

Helmer recommends the use of leveling feet and wall and floor brackets (PN 400472-2) for stabilization. Contact Helmer Technical Service for parts and instruction.

9.3 Stacked Undercounter Units

NOTICE

- For stacked configuration, both units must have leveling feet installed.
- Back brace bars and front stabilizing brackets must be installed (Blue - PN 400821-1; Stainless Steel - PN 400821-2).
- When stacking units, place the heavier unit on the bottom.
- Do not open multiple loaded drawers at the same time.
- Do not lean on or push down on an open door or extended drawers.

Contact Helmer or your distributor for more information regarding the stacking kit and methods to secure both units to the wall and/or floor.

9.4 Connect Back-Up Power

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

Battery life varies by manufacturer as well as voltage level remaining. Providing full battery power is available, back-up power for the monitoring system is available for up to two hours. Providing full power is available, back-up power for the optional Access Control system is available for up to 2.5 hours.

NOTICE

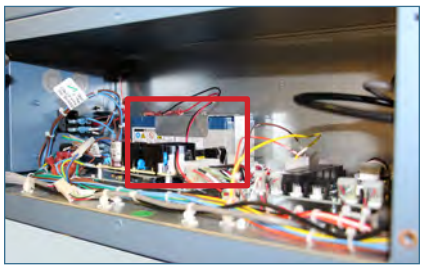
Before installing or replacing batteries, switch main power OFF and disconnect the refrigerator from AC power.

Notes

- The optional Access Control system uses an independent battery for back-up power.
- If AC power is lost, the monitoring system will automatically disable some features to prolong back-up battery power. Data collection will continue until back-up battery power is depleted.

The monitoring system back-up battery is located below the chamber, behind the front access panel. The right side panel cover must be removed to access the optional Access Control back-up battery.

Monitoring system back-up battery.



Optional Access Control back-up battery.

9.5 Prepare for Monitoring

Monitoring system back-up battery is included in the literature box. Install and connect the battery to provide monitoring system with back-up power in the event of AC power failure. If included, switch the Access Control back-up battery ON to provide the optional Access Control system with back-up power in the event of an AC power failure.

Temperature Probes

Notes

- Temperature probes are fragile; handle with care.
- Remote probes may also be introduced through the existing rear port and immersed in existing probe bottle.
- External probes should not be routed into the chamber through the door opening as this can cause issues with the door seal.
- Solid ballast (if installed) should be placed in the bracket in a horizontal position.

A solid ballast or probe bottle and container of glycerin have been provided with this unit. When using the probe bottle, mix the glycerin with water to create a solution which simulates the product stored in the refrigerator. The product simulation solution temperature reflects the product's temperature during normal operation.

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

Probe bottle with probe.

Solid ballast with probe.

Rear access port.

Fill Probe Bottle (if included)

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

Install Additional Probe Through Rear Access Port

1. Peel back putty to expose port.
2. Insert probe through port into chamber.
3. Insert probe into bottle or secure in ballast with thumb screw.
4. Replace putty, ensuring a tight seal.

Chart Recorder (if included)

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

Notes

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

Prior to use:

Route the chart recorder probe through the rear access port and place in bottle with primary monitor probe, or install in ballast and secure with thumb screw.

Set up and Operation

Access chart recorder by pulling the door open.

Install Battery

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

Install / Replace Chart Paper

Note

- For accurate temperature reading, ensure the current time is aligned with the time line groove when chart knob is tightened.
- Contact Helmer Technical Service to reorder chart paper; part number 220366 (52 sheets).

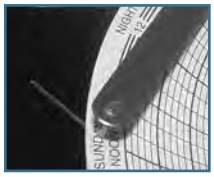


Chart recorder stylus and time line groove

1. Press and hold **C** button. When stylus begins to move left, release button. The LED flashes.
2. When stylus stops moving, remove chart knob then move knob up and away.
3. Place chart paper on chart recorder.
4. Gently lift stylus and rotate paper so current time line corresponds to time line groove.
5. Hold chart paper in place while making sure the chart knob is fully tightened. *(Failure to fully tighten the knob can result in paper slipping and losing time.)*
6. Press and hold C button. When stylus begins to move right, release button.
7. Confirm stylus is marking on paper and stops at the correct temperature.
8. Calibrate chart recorder to match primary temperature if needed and close recorder door.

External Monitoring Devices

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

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

Terminals are dry contacts and do not supply voltage. Interface circuit is either normally open or normally closed, depending on terminals used.

Requirements for your alarm system determine which alarm wires must connect to terminals.

NOTICE

- The interface on the remote alarm monitoring system is intended for connection to the end user's central alarm system(s) that uses normally open or normally closed dry contacts.
- If an external power supply exceeding 33 V (RMS) or 70 V (DC) is connected to the remote alarm monitoring system's circuit, the remote alarm will not function properly and may cause damage to the control board or result in injury to the user.

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

- 115V or 230V: 1 A at 33 V (AC) RMS or 70 V (DC)

Connect to Remote Alarm Interface

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

9.6 Configure Storage

NOTICE

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

Note

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

Product Loading Guidelines

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

- Never load refrigerator beyond capacity.
- Always store items within shelves or drawers.
- Temperature uniformity is maintained by air circulation, which could be impeded if unit is overfilled, particularly at the top or back. Ensure a minimum of 2” (50 mm) clearance is provided below the fan.

Note

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

Drawers

Remove a Drawer

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

Install a Drawer

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

Move Drawer Slides

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

Shelves

Remove a Shelf

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

Install a Shelf

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

Move Shelf Brackets

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

9.7 Optional Adapter Kits for Medication Dispensing Locks

Contact Helmer Technical Service or your distributor for service documentation pertaining to medication dispensing lock adapter kits.

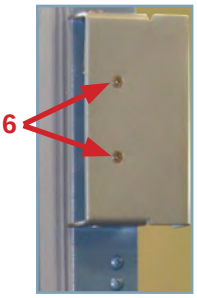
9.8 Reverse Door Hinges and Handle

Notes

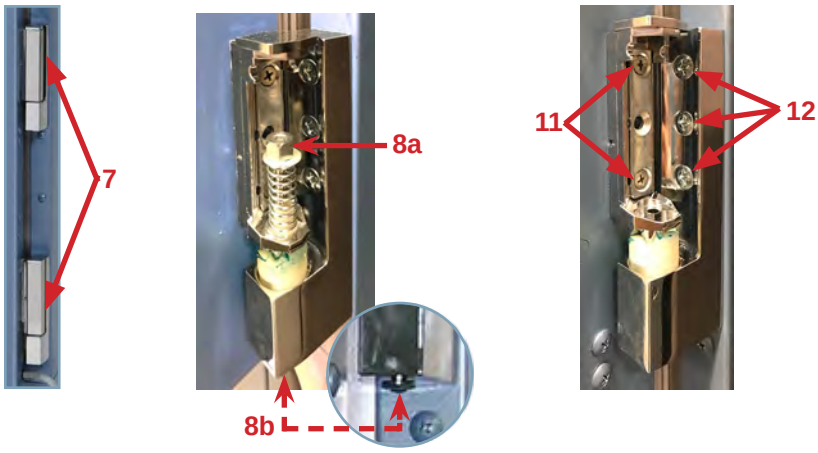
- A new handle assembly is necessary when reversing the door hinges. (PN 800891-1, right hinged; PN 800891-2, left hinged)
- The following instructions apply to reversing a right-hinged door to a left-hinged door. Some steps will need to be reversed if changing from left-hinged to right-hinged.
- Door hinge and handle cannot be reversed on units equipped with Access Control.
- Unit must be on floor or an elevated work surface with adequate space to place door face-down in front of unit.
- To prevent personal injury and/or damage to the door, Helmer recommends two people for this procedure.

Remove Door and Hinges

1. Press and release door to open the access panel. Switch the AC power switch to OFF and switch the back-up battery switch to OFF.
2. Disconnect AC power cord from power receptacle.
3. Remove six (6) screws securing the front access panel to the unit and carefully place it in front of the refrigerator ensuring there is no strain on the wiring.
4. Remove plug from access panel on handle-side of unit. Remove grommet from hole on hinged-side of unit and slide braided sleeve out of the slot.



5. Remove the two (2) screws securing door handle assembly to the door and set assembly aside.
6. Remove the two (2) screws attaching the latch plate to the unit and set aside.



7. With the door shut, remove the cover plate from both hinges.
8. Using a 3/8” wrench, loosen the hex nut on each hinge spring. The hinge pin will drop from below allowing the spring to be removed. Set the hinge pins and springs aside.
9. Carefully lift the door and off the hinge and place it face-down in front of the unit taking care not to damage the display assembly and ensuring there is no strain on cables running from the cabinet to the door.
10. Remove the two (2) screws attaching the upper and lower hinges to the door using a #2 Phillips screwdriver and set aside.
11. Using a #2 Phillips screwdriver, remove the three (3) screws securing the upper and lower hinges to the unit and set aside.

Reroute Communication Cables

1. Access the electrical compartment by using a #2 Phillips head screwdriver to remove the top and bottom center screws from the right-side panel, and loosening the remaining screws in each corner of the panel.
2. Slide the panel upward to disengage the four (4) screws from the keyhole openings and remove the panel.
3. Locate the control board and disconnect the power/communication cable.
4. Using a #2 Phillips screwdriver, disconnect the ground wire.

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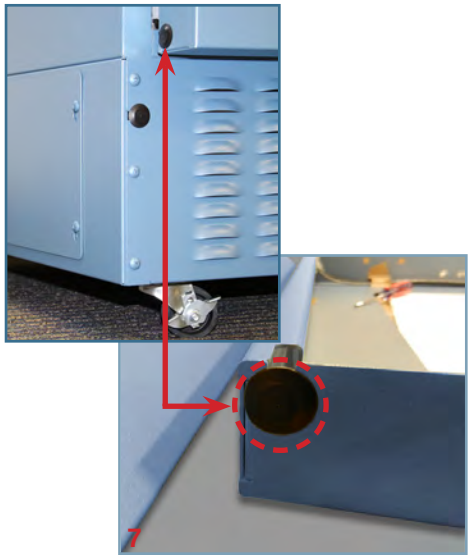
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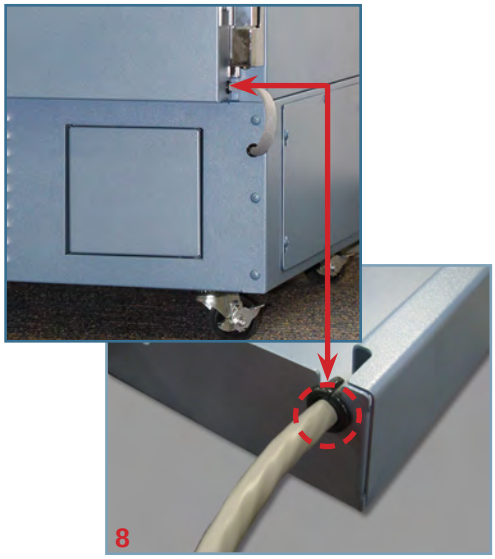
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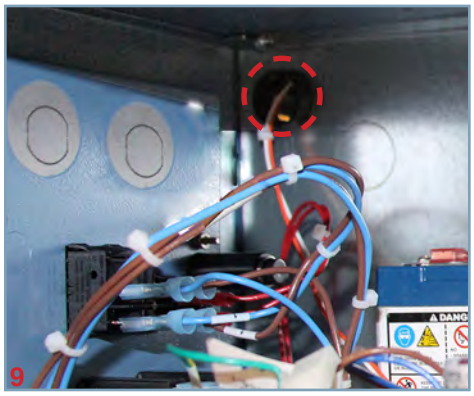
5. Remove the remaining screws from the door assembly.
6. Using a punch or J-hook tool along the bottom edge, lift the inner door frame out of the outer door frame.
7. Remove the plug from the door on the handle-side and set aside.
8. Pull grommet out of hole in door on hinged-side and slide the braided sleeve out of the slot.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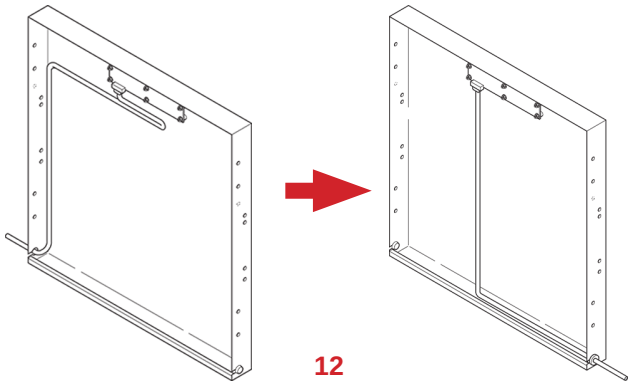
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9. If a center panel is installed, thread the power/communication cable through the front opening in the center panel dividing the electrical compartment from the refrigeration compartment. (Continue to step 11.)
10. If a center panel is not installed, cut the zip tie securing the door switch wires to the zip tie holder.
11. Secure the door switch wires along with the display power and communication cables to the zip tie holder using a zip tie.
12. Reroute the power/communication cable inside the door and out through the slot in the corner opposite from where the cable had previously exited the door. The cable should follow the bottom edge of the door frame.
13. Tape the cable to the inside of the door ensuring any excess cable is on the outside of the door.
14. Cut zip ties securing the braided sleeve and slide the sleeve and grommets along the cables toward the door.
15. Slip the cable through the slot in the door and insert the door-side grommet into the hole in the door.
16. Secure the braided sleeve around the cable using sip ties at each end to prevent the sleeve from sliding.

Reassemble Door / Reverse Hinges

1. Reinstall the inner door panel and secure with screws in the holes opposite the original configuration.
2. Reinstall the door hinge plates onto the opposite side of the door frame by aligning holes in the hinge plates with the holes in the door frame and hand-threading the two (2) long screws in each hinge (leave screws slightly loose).
3. Reinstall the corresponding hinge plates to the unit by hand-threading the three (3) short screws through the hinge and into the cabinet.
4. Remove the centering cam from the upper and lower hinges on the refrigerator. Rotate the cams and reinstall.
5. Align the upper hinge cams on the door with the lower hinge cams on the refrigerator as you carefully reattach the door to the unit.
6. Level the door and tighten all screws securing hinges to the unit.
7. Slide the braided sleeve through the slot in the front access panel allowing approximately 3” (76 mm) of slack between the door and the cabinet so the door can open and close without straining cables. Install the grommet in the access panel.
8. Attach the door handle on the opposite side of the door with two (2) screws.
9. Attach the strike plate to the opposite side of the unit with two (2) screws. Test the locking mechanism to ensure proper functionality.
10. With the door closed, reinstall the hinge pin and spring in the upper hinge. Secure with hex nut using a 3/8" wrench *(the hex nut should be tightened until it stops)*. Repeat the process for the lower hinge.
11. Replace the hinge cover plates.
12. Reconnect the power/communication cable to the control board.
13. Using a #2 Phillips screwdriver, reconnect the ground wire.
14. Reinstall the right-side access panel by engaging the four (4) screws in the unit base with the keyhole openings in the panel. Insert the top and bottom center screws and tighten all screws using a #2 Phillips screwdriver.
15. Reinstall the front access panel and secure with six (6) screws.
16. Plug the power cord into the power receptacle. Switch the AC power switch ON. Switch the back-up battery switch ON.
17. Verify the door is level, hinges operate smoothly and door seals tightly.
18. Allow the temperature to stabilize at the setpoint before moving inventory back into the unit.

10 Controls

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

10.1 Monitor and Control Interface

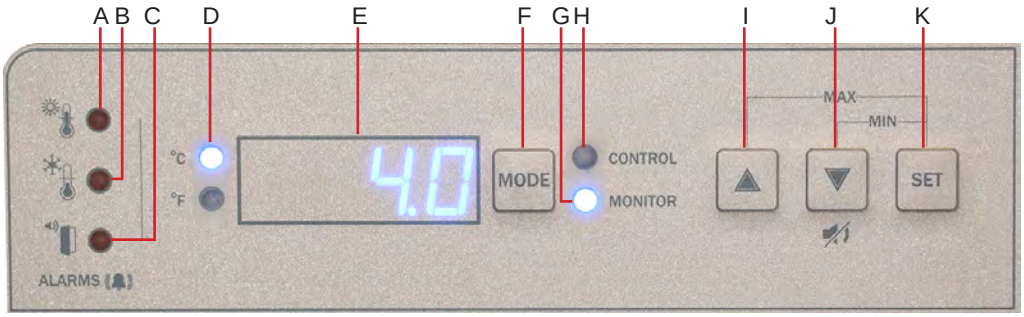


Table 9. Monitor and Control Indications

Label	Description	Function
A	HIGH TEMP lamp	Indicates when the refrigerator is in a high temperature alarm condition. Also indicates the high alarm temperature setpoint is being changed.
B	LOW TEMP lamp	Indicates when the refrigerator is in a low temperature alarm condition. Also indicates the low alarm temperature setpoint is being changed.
C	DOOR OPEN lamp	Indicates when refrigerator door is open.
D	Temperature Unit Indicator	Indicates temperature reading is in °C or °F.
E	Display	Displays real-time temperature information, setpoints, and alarms.
F	MODE button	Allows selection of CONTROL or MONITOR mode.
G	MONITOR lamp	Indicates when the display is showing temperature readings from the monitor probe. Also indicates when alarm setpoints are being changed.
H	CONTROL lamp	Indicates when the reading from the control probe is displayed.
I	UP ARROW button	Increases a temperature setting.
J	DOWN ARROW / MUTE ALARM button	Decreases a temperature setting. Also mutes the audible alarm for 5 minutes.
K	SET button	Allows settings to be selected, prior to changing settings.

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.

Display Minimum and Maximum Monitor Temperature Recordings

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

View *Minimum* Temperature Recording

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

View *Maximum* Temperature Recording

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

View Recorded Temperature Timer

Notes

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

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

Clear Minimum and Maximum Temperature Recordings

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

Notes

The minimum and maximum temperature and timer will reset when:

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

10.2 Alarm Reference

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

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

Note

If the system is in Power Failure (PoFF) alarm, an Er05 error can be expected as a result of the absence of power to the compressor inverter.

Table 10. Alarm Indications

Alarm		Alarm Type	Visual Indicator
High Temperature (Primary Monitor Probe)		A, V, R	HIGH TEMP Lamp
Low Temperature *(Primary Monitor Probe)*		A, V, R	LOW TEMP Lamp
Display/Control Board Communication Error		A, V, R	Er04
Control Board to Compressor Inverter Error		A, V, R	Er05
Door Open *(Time)*		A, V, R	DOOR OPEN Lamp *(flashes after 3 minutes)*
Power Failure		A, V, R	PoFF
Probe Failure	Primary Monitor *(RTD1)*	A, V, R	Er01
	Control *(RTD2)*	A, V, R	Er02
No Battery		V	Er06
Configuration Error		A, V, R	Er07

10.3 Settings

Temperature Setpoint

The default setpoint for the refrigerator is 4.0 °C for HBR and HLR models, and 5.0 °C for HPR models. This can be changed if your organization requires a chamber temperature other than the default setting.

Change Setpoint:

Note

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

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

Temperature Settings

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

Table 11. Parameters, Indicators and Settings

Parameter	Visual Indicator	Range	Default
Celsius or Fahrenheit	°C Lamp or °F Lamp	.C, .F	.C
High Temperature	MONITOR Lamp & HIGH Lamp	-40.0 to 25.0 (°C); -40 to 77 (°F)	5.5 °C *(HBR and HLR models)*
			6.5 °C *(HPR models)*
Low Temperature	MONITOR Lamp & LOW Lamp	-40.0 to 25.0 (°C); -40 to 77 (°F)	1.5 °C *(HBR models)*
			2.0 °C *(HLR and HPR models)*
Monitor Offset	MONITOR Lamp only	-10.0 to 10.0 (°C); -18 to 18 (°F)	Varies
Control Offset	CONTROL Lamp only	-10.0 to 10.0 (°C); -18 to 18 (°F)	Varies
Upper Rail Limit	CONTROL Lamp and HIGH Lamp	0.1 to 10.0 (°C); 1 to 18 (°F)	0.7 °C
Lower Rail Limit	CONTROL Lamp and LOW Lamp	0.1 to 10.0 (°C); 1 to 18 (°F)	-0.7 °C

View Settings and Offset Values

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

Temperature Units

Note

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

Select Temperature Units

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

Alarm Settings

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

High Temperature Alarm

Change the Alarm Setpoint

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

Low Temperature Alarm

Change the Alarm Setpoint

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

Primary Monitor Probe

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

Notes

- Ensure product simulation bottle (if installed) is full of solution.
- The probe in the bottle or ballast is connected to the monitoring system and represents product storage temperature. This probe does not affect the temperature control.

Calibrate Primary Monitor Probe *(probe bottle installed)*

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

Calibrate Primary Monitor Probe *(solid ballast installed)*

1. Ensure the Primary Monitor Probe is securely installed in the ballast.
2. Place a calibrated independent reference thermometer in one of the remaining probe holes in the ballast and tighten thumb screw to secure. This may involve temporarily removing an additional probe to provide an opening for the independent reference thermometer.
3. Place the reference thermometer in an available probe hole. Tighten the thumb screw until the thermometer is secure (Take care not to over-tighten the thumb screw).
4. Close the door and allow the chamber temperature to stabilize.
5. Observe and note the thermometer temperature. If the independent thermometer corresponds to the displayed temperature, proceed to Step 7.
6. Adjust the Primary Monitor Probe offset value higher or lower to reflect the difference between the chamber temperature displayed on the monitor and the temperature reading from the calibrated reference thermometer.
7. Loosen the thumb screw and remove calibrated independent reference thermometer from ballast.
8. Replace any additional probe that may have been removed previously, and tighten the thumb screw ensuring a snug fit.
9. Replace any removed putty.

Enter the New Offset Value:

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

Control Sensor

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

The temperature controller adjusts chamber temperature around the refrigerator setpoint.

Determine Control Sensor Offset:

Notes

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

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

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

Enter the New Offset Value:

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

Upper Rail

The Upper Rail Limit is the maximum control temperature at which the compressor will turn on.

Lower Rail

The Lower Rail Limit is the minimum control temperature at which the compressor will turn off.

NOTICE

The Upper Rail and Lower Rail values are factory-preset and should not be changed unless directed by Helmer Technical Service.

Non-Configurable Alarms

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

11 Maintenance

Maintenance tasks should be completed according to the schedule below.

NOTICE

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

Notes

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

Table 11. Horizon Series Preventive Maintenance Schedule

Task	Frequency			
	1 year	2 years	5 years	As Needed
Test the high temperature *(over maximum temperature limit)* and low temperature *(below minimum temperature limit)* alarms *(as required by your organization's protocols)*.				✓
Test the power failure alarm *(as required by your organization's protocols)*.				✓
Test the door alarm *(as required by your organization's protocols)*.				✓
Verify the temperature calibration on the monitor and change it if necessary.	✓			
Replace monitoring system back-up battery.	✓			
Examine probe bottle *(if installed)* and clean or replace if necessary.	✓			
Check the solution level in the probe bottle *(if installed)*. Refill or replace if necessary.				✓
Check the chamber lights and replace if necessary.				✓
Re-apply silver conductive grease in both upper and lower hinge.			✓	
Clean the door gaskets, interior, and exterior of the refrigerator.				✓
Clean the condenser grill.				✓
Replace optional Access Control back-up battery.		✓		
Models with chart recorders Check the back-up battery for the chart recorder after an extended power failure and change it if necessary, or change the battery if it has been in service for one year. Refer to the Temperature Chart Recorder Operation and Service Manual.				✓

NOTICE

Clean the condenser grill regularly. Dust accumulation on the condenser coil will vary based on the environment. Some environments require quarterly cleaning.

Note

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

11.1 Alarm Tests

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

Chamber Temperature Alarm Test

NOTICE

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

Test the Low Alarm:

1. Identify setting for low alarm setpoint.
2. Remove primary monitor probe from bottle or solid ballast.
3. Immerse probe in glass filled with water that is approximately 4 °C. Slowly add crushed ice to lower temperature.
4. When low temperature alarm sounds, note the temperature on the LED display.
5. Compare the temperature at which the alarm sounds to the low alarm setpoint.

Test the High Alarm:

1. Identify setting for high alarm setpoint
2. Immerse probe in glass filled with water that is approximately 4 °C. Slowly add warm water to raise temperature.
3. When high temperature alarm sounds, note the temperature on the LED display.
4. Compare the temperature at which the alarm sounds to the high alarm setpoint.
5. Remove probe from warm water.
6. Place primary monitor probe in probe bottle immersing it at least 2” (50 mm), or place in ballast and secure with thumbscrew taking care not to overtighten.

Power Failure Alarm Test

Note

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

1. Switch AC power switch OFF. Audible power failure alarm will activate by displaying “PoFF” (power off) and an audible tone can be heard approximately every 30 seconds.
2. Switch AC power switch ON. Audible power failure alarm will cease and “PoFF” will clear from the display.

Door Open Alarm Test

Note

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

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

11.2 Test and Replace Back-up Batteries

Check Monitoring System Battery

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

Note

Use only a battery which meets manufacturer's specifications.

Test the Battery:

1. Switch the AC power switch OFF.
2. Display should continue to display information.
3. If the display is blank, replace battery.
4. Switch AC power switch ON.

Check Optional Access Control System Battery

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

Test the Battery:

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

Remove and Replace Battery

NOTICE

Take care not to short battery terminals to bracket or to each other when removing or attaching terminal connectors, bracket or bracket screws.

1. Switch battery back-up key switch OFF; switch AC power switch OFF; disconnect the AC power cord from the power receptacle.
2. Use #2 Phillips screwdriver to remove the top and bottom center screws and loosen the 4 screws in the corners of the right-side panel.
3. Slide the cover upward to disengage the 4 screws from the keyhole openings and carefully rotate the panel outward.
4. Locate 12V Battery, remove wires from terminals and using #2 Phillips screwdriver remove screw from mounting bracket. Remove the old battery.
5. Place the new battery in the same location as the one removed.
6. Install the bracket over the battery and secure with single screw.
7. Reconnect the wires to the correct terminals.
8. Reinstall the right-side panel by placing the keyhole openings in the 4 corners of the panel over the 4 screws and slide downward making sure not to pinch wires between the panel and the base of the unit. Tighten screws using a #2 Phillips screwdriver.
9. Install the remaining 2 screws and tighten.
10. Reconnect the AC power cord; switch the AC power switch to ON; switch the battery back-up key switch to ON.

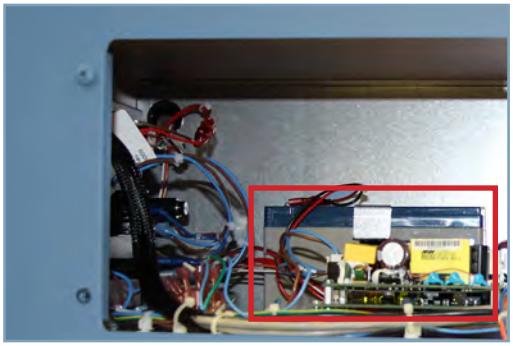


Chart Recorder Back-up Battery (if included)

Refer to the Temperature Chart Recorder Operation and Service Manual.

11.3 Check Probe Bottle (if installed)

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

Ensure the probe bottle has approximately 4 oz. (120 mL) of product simulation solution (10:1 ratio of water to glycerin). The glycerin is mixed with water to create a solution which simulates the product stored in the refrigerator. The product simulation solution temperature reflects the product's temperature during normal operation. Failure to fill the bottle may prevent the chamber temperature from stabilizing at the temperature setpoint. The probe should be immersed at least 2" (50 mm).

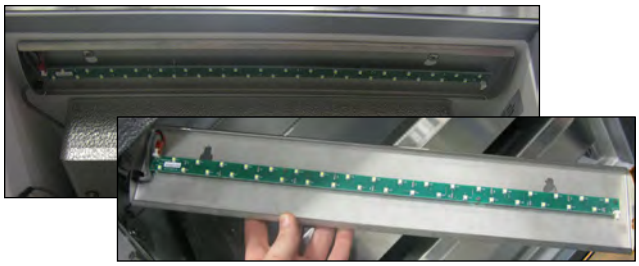
11.4 LED Lamp Strip

Check LED Lamp Strip

Ensure the chamber light turns on when the refrigerator door is opened.

Remove and Replace LED Lamp Strip

1. Switch battery back-up switch OFF; switch AC power switch OFF; disconnect the AC power cord from the power receptacle..
2. Gently pinch together the outer edges of the plastic light cover and remove.
3. Loosen two (2) screws on the top of the cabinet and slide the light fixture so the keyhole openings are disengaged from the screws and remove the fixture.
4. Disconnect the power wire from the circuit board.
5. Pull the circuit board off the mounting pegs and remove it from the unit.
6. Gently press the new circuit board onto the mounting pegs on the fixture.
7. Connect the power wire to the new circuit board.
8. Align the keyhole openings in the fixture with the screws at the top of the cabinet and slide the fixture to engage the screws. Tighten screws using a #2 Phillips screwdriver.
9. Reinstall the plastic cover over the light fixture.
10. Reconnect the AC power cord; switch the AC power switch to ON; switch the battery back-up switch to ON.



11.5 Upper and Lower Door Hinge Cams

Lubricate Upper and Lower Door Hinge Cams

1. Using a flathead screwdriver, carefully pry hinge covers off the hinges.
2. Using a 1/16" Allen wrench, loosen the set screw inside the hex nut on top of the spring.
3. Using a 7/16" wrench, loosen the hex nut. The hinge pin will drop from below allowing the spring to be removed. Set the hinge pins and springs aside.
4. Separate upper and lower hinge cams and apply grease.
5. Press hinge covers into place to reinstall.

11.6 Clean the Refrigerator

Cabinet Exterior

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

Cabinet Interior

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

Condenser Grill

NOTICE

Disconnect refrigerator from AC power when cleaning condenser grill.

If the refrigerator is located in an environment where it is exposed to excessive lint or dust, the condenser grill may require cleaning more frequently than stated in preventive maintenance schedule.

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

Door Gaskets

Clean with soft cloth and mild soap and water solution.

Probe Bottle (if installed)

Clean and Refill Probe Bottle

1. Remove all probes from bottle.
2. Remove bottle from bracket and empty any remaining solution.
3. Clean bottle with a 1:9 ratio of bleach to water solution or a company approved equivalent oxidizing cleaner/disinfectant.
4. Refill bottle with 4 oz. (120 mL) of product simulation solution (10:1 ratio of water to glycerin).
5. Cap bottle tightly to minimize evaporation.
6. Place bottle in bracket.
7. Replace probes, immersing at least 2” (50 mm).

12 Service

12.1 Refrigerant

Risk of fire or explosion. Flammable refrigerant used. To be repaired only by trained service personnel. DO NOT puncture refrigerant tubing.

NOTICE

- Review all safety instructions prior to recharging refrigerant.
- Maintenance should only be performed by trained refrigeration technicians familiar with hydrocarbon refrigerants.

Table 8. Refrigerant Charge

Refrigerant	Initial Charge
R600a	2.5 oz. (70 g)

12.2 Remove / Replace Unit Cooler Cover

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

NOTICE

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

Label	Description
A	Unit cooler cover
B	Drain port

Drain line and hose.

Remove the Unit Cooler Cover

1. Switch AC power switch OFF. Switch back-up battery switch OFF.
2. Using wire cutters, cut the wire tie securing the drain hose to the evaporator drain port.
3. Pull drain hose downward while gently twisting to remove from unit cooler drain port.
4. Remove top drawer, or shelf from the chamber.
5. Hold unit cooler cover in place to prevent dropping. Using a 8mm socket driver, remove four (4) screws securing the unit cooler cover.
6. Carefully lower unit cooler cover to avoid damage to the fan wiring.

Install the Unit Cooler Cover

1. Verify unit cooler wiring is connected and routed correctly.
2. Lift unit cooler cover into place. Front edge of the cover should be behind the unit cooler case.
3. Secure the unit cooler cover with four (4) screws using a 8mm socket driver.
4. In the chamber, attach drain hose to unit cooler drain port and secure with wire tie.
5. Reinstall top drawer, or shelf if previously removed.
6. Switch AC power switch ON. Switch battery switch ON.
7. Touch **Mute** to disable the high temperature alarm while refrigerator reaches operating temperature.

13 Troubleshooting

NOTICE

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

13.1 Access System Problems

Problem	Possible Cause	Action
Door does not lock	Lock mechanism is damaged.	Inspect lock/latch, Replace if necessary.
Door does not lock (Magnetic Access Control Option)	Magnetic door lock is not aligned with the strike plate.	Align lock/door to the match strike plate.
	Magnetic lock is not receiving power.	Trace voltage to the lock using the schematic, replace lock if needed.

13.2 Chamber Temperature Problems

Problem	Possible Cause	Action
Display temperature does not match actual chamber temperature	Display temperature needs to be calibrated.	Follow temperature calibration procedure.
	Probe bottle is empty, or probe is out of bottle or ballast.	Check the level of product simulation solution in the bottle. Verify probe is fully inserted in bottle or ballast.
Displayed temperature is too warm or too cold.	Probe bottle is empty, or probe is out of bottle or ballast.	Check the level of product simulation solution in the bottle. Verify probe is fully inserted in bottle or ballast.
	Primary Monitor probe needs to be calibrated.	Calibrate Primary Monitor probe.
	Door was recently opened or opened for an extended time.	Close door and allow temperature to stabilize.
	Condenser coil is dirty	Clean the condenser coil.
	Lack of air flow around unit/ high ambient condition.	Check for proper spacing around unit, any foreign objects blocking air flow, and ambient temperature is within location specifications.
	Lack of air flow inside of chamber.	Check product placement and move products that block air flow around evaporator fan or products which hang over shelves against the back wall.
	Temperature setpoint was adjusted.	Check temperature setpoint and temperature settings. Change to default settings or desired setpoint if necessary.
	Control probe is reading too high/low.	Check control offset setting. Adjust if necessary.
	Unit cooler fan motor (inside chamber) is not running.	Check voltage to the fan motor using schematic. Replace fan motor if necessary.
	Condenser fan motor (exterior) is not running.	Check voltage to the fan motor using schematic. Replace fan motor if necessary.
	Compressor is not running.	Check voltage to the compressor using schematic. Replace compressor start components if necessary.

13.3 Alarm Activation Problems

Problem	Possible Cause	Action
Probe failure alarm is active (ER01 monitor or ER02 control)	Faulty probe or wiring connection.	Check corresponding probe connection.
		Test resistance of probe (86Ω to 110Ω). Replace probe if necessary.
Battery alarm is active (ER06)	Back-up battery is dead or not installed.	Replace or install 9V back-up battery.
Power failure alarm is active. (POFF)	Power was interrupted to refrigerator.	Restore facility power.
	Power switch is in the off “o” position.	Turn power switch to the on “-” position.
	Power cord is loose.	Check the power cord at the power receptacle on the wall and on the refrigerator.
	GFI/FGCI outlet has tripped.	Move to standard outlet. Helmer does not recommend operating this unit on a GFI outlet.
The Door Open alarm is active.	Door is not closed completely.	Close door.
	Door switch or wiring connection is faulty.	Check wiring and continuity of switch contacts. Replace the door switch if necessary.
Alarm is active, but not audible.	Key switch is in the OFF position	Turn key switch to ON position.

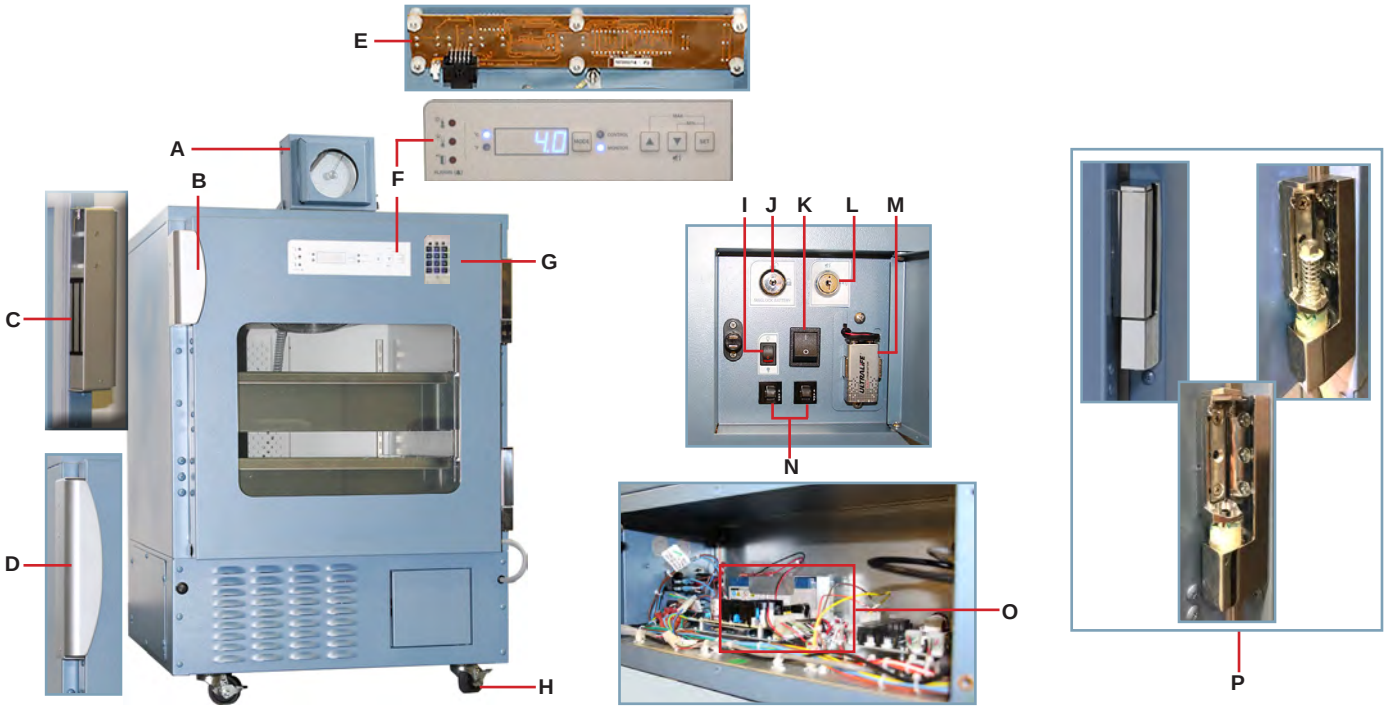
13.4 Condensation Problems

Problem	Possible Cause	Action
Excess condensation/moisture inside chamber.	Foreign liquid spilled within the chamber.	Verify stored liquid products are properly sealed. Clean chamber.
	Unit cooler condensation pan is not draining.	Ensure refrigerator and unit cooler pan are level. Level if necessary for proper gravity fed drainage.
		Check drain line for debris. Flush drain line if necessary.
	Door was open for an extended time.	Close door and allow chamber to stabilize
	Door seal is deficient.	Inspect door seal for damage. Replace seal if necessary.
		Check for wires routed through the door seal. Reroute wires through available access port if necessary.
		Check through holes and ensure they are sealed. Reseal if necessary.

14 Horizon Series Parts

Notes

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



Letter	Description	Part Number	Volts
A	Temperature chart recorder (Contact Helmer Technical Service regarding 230V models)	500612-1	115
Not shown	Chart paper (52 sheets)	220366	-
	Chart recorder battery	120218	-
B	Door handle * = right handle; ** = left handle	800891-1*	-
		800891-2**	-
C	Magnetic lock (optional Access Control) * = right hinged ** = left hinged	401882-2-068*	-
		401882-1-068**	
D	Door handle (optional Access Control)	322000-1	-
E	Display circuit board assembly	801016-1	-
F	Membrane	370225-1	-
G	Access Control keypad	-	-

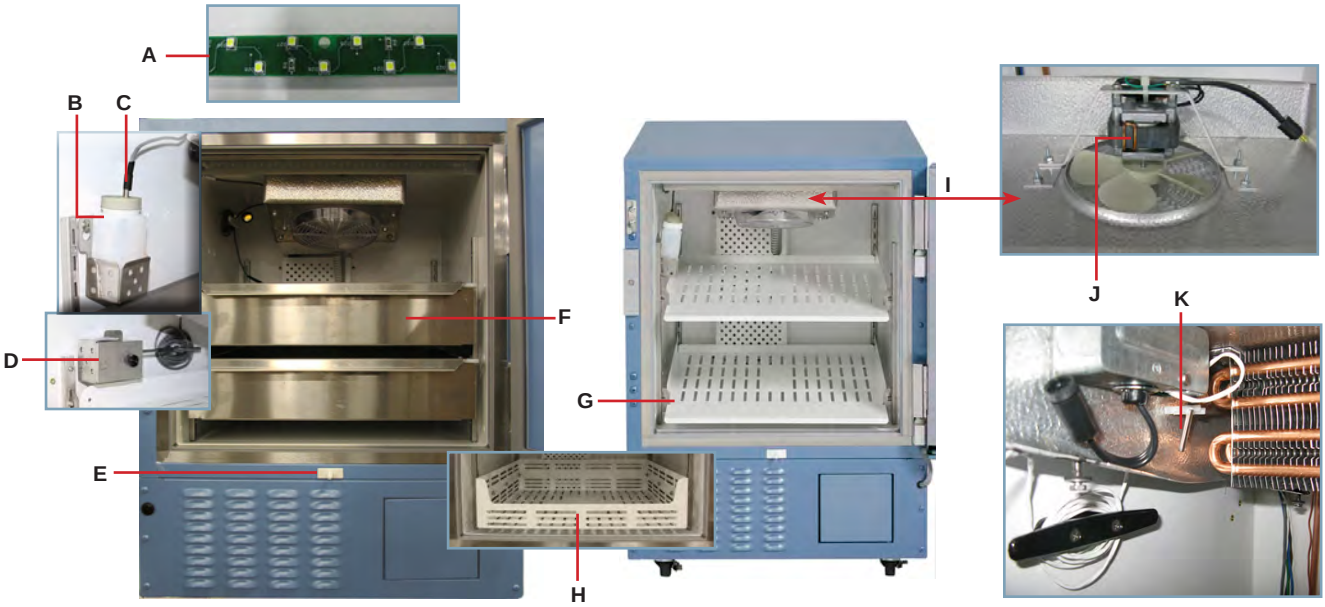
Letter	Description	Part Number
H	Caster - swivel with brake	220380
	Casters (includes 4 casters and hardware)	400819-2
I	Chamber light switch (optional)	120202
J	Back-up battery key switch (optional Access Control)	401887-1
K	Main power switch	120478
L	Alarm on/off key switch	120984
M	Monitoring system back-up battery	120399
N	Circuit breakers	120279
O	Back-up battery (optional Access Control)	121018
P	Hinge assembly	220708
Not shown	Interface cable	401796-1
	Door key	220460

NOTICE

Disconnect unit from AC power when removing and replacing LED lamps.

Note

The chamber light is optional on Horizon Series refrigerators.



Letter	Description	Part Number
A	Light assembly (circuit board and cover)	800023-1
B	Probe bottle and glycerin kit	400922-1
C	Primary monitor probe	801017-1
D	Solid ballast	402062-1
Not Shown	Chart recorder probe	400799-1
E	Door switch	120380

Letter	Description	Part Number
F	Drawer assembly (Blood Bank)	401865-1-000
G	Full shelf	401956-1-069
H	Vented drawer	401981-1-069
I	Unit cooler assembly	800982-1
J	Unit cooler fan motor	800995-1
K	Control probe	801018-1

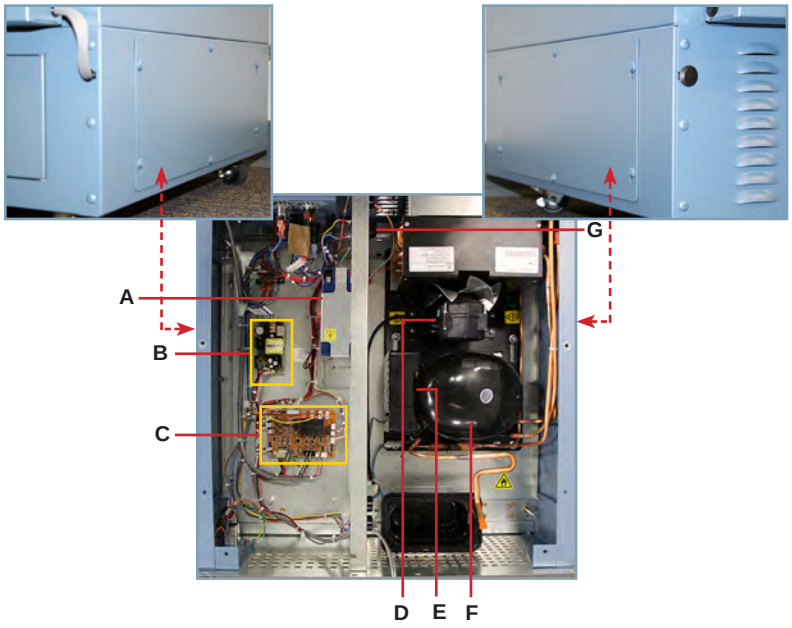
Risk of fire or explosion. Flammable refrigerant used. To be repaired only by trained service personnel. DO NOT puncture refrigerant tubing.

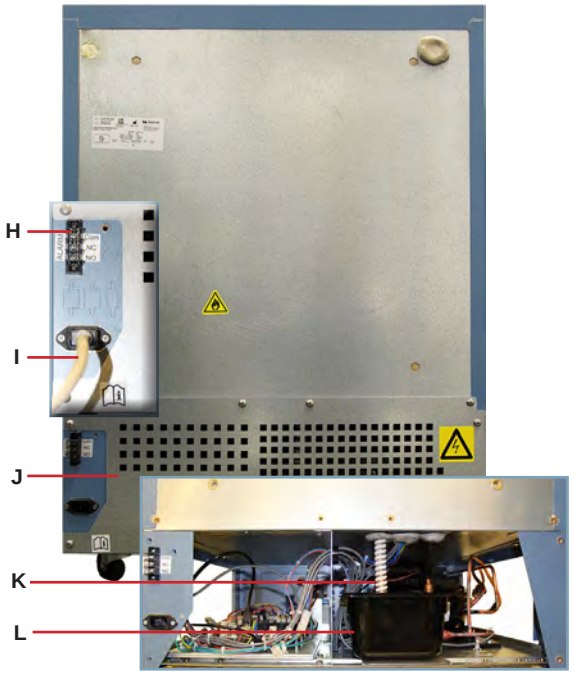
NOTICE

- Disconnect unit from AC power before opening the electrical box.

Note

Circuit boards are sensitive to static electricity and can be damaged by electrostatic discharge. Use proper ESD precautions when handling the board.



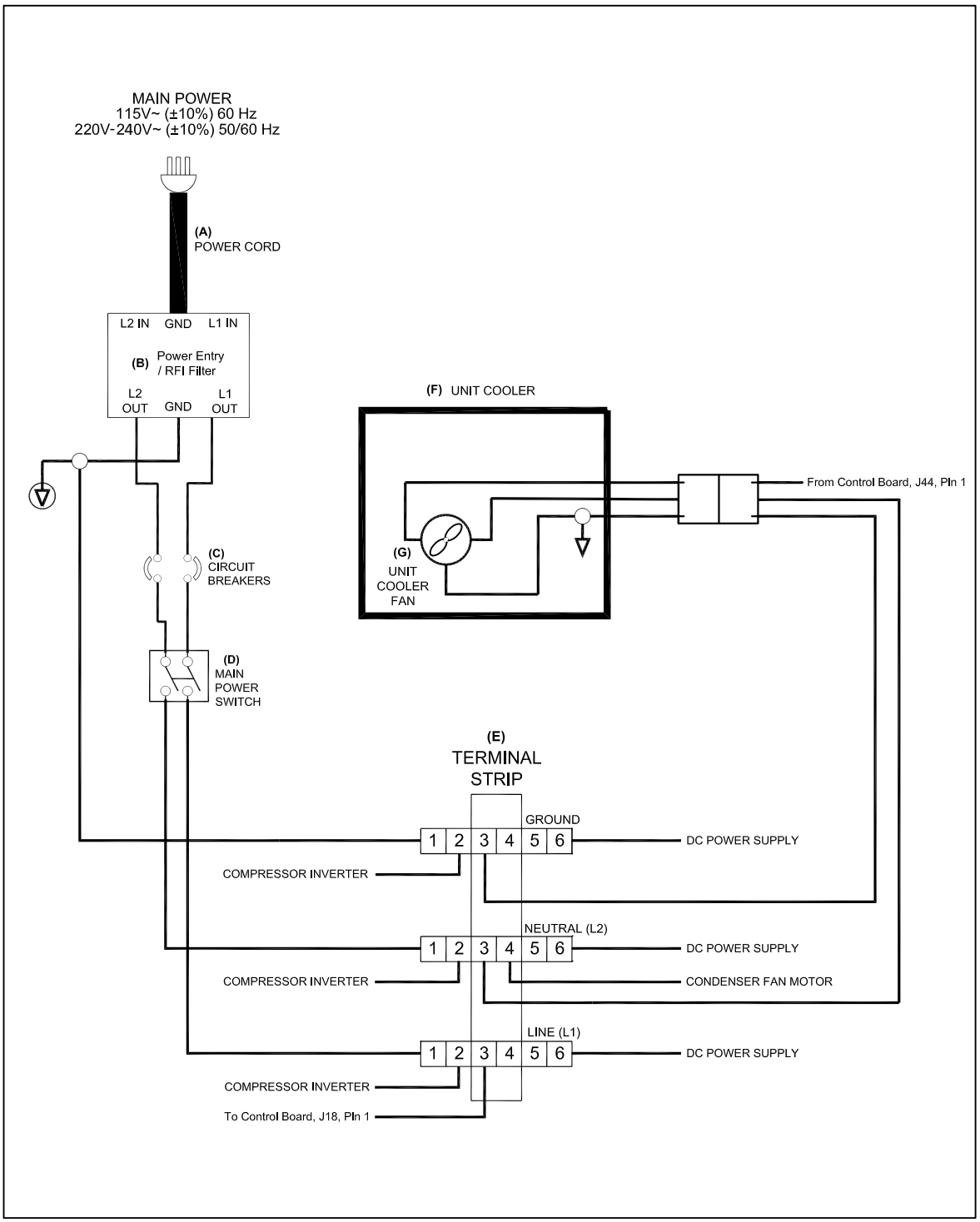


Letter	Description	Part Number	Volts
A	Back-up battery (optional Access Control)	120628	-
B	Power supply board	120627	-
C	Control board	801015-1	-
D	Condenser fan motor assembly	800996-1	-
E	Compressor inverter	800997-1	115
		800998-1	230
F	Compressor	800991-1	115
		801013-1	230

Letter	Description	Part Number	Volts
G	Alarm buzzer	120160	-
H	Remote alarm contacts	-	-
I	Power cord	120630	115
J	Rear cover	-	-
K	Drain tube	-	-
L	Condensate evaporator tray	-	-

15 Schematics

15.1 HBR, HLR and HPR Models



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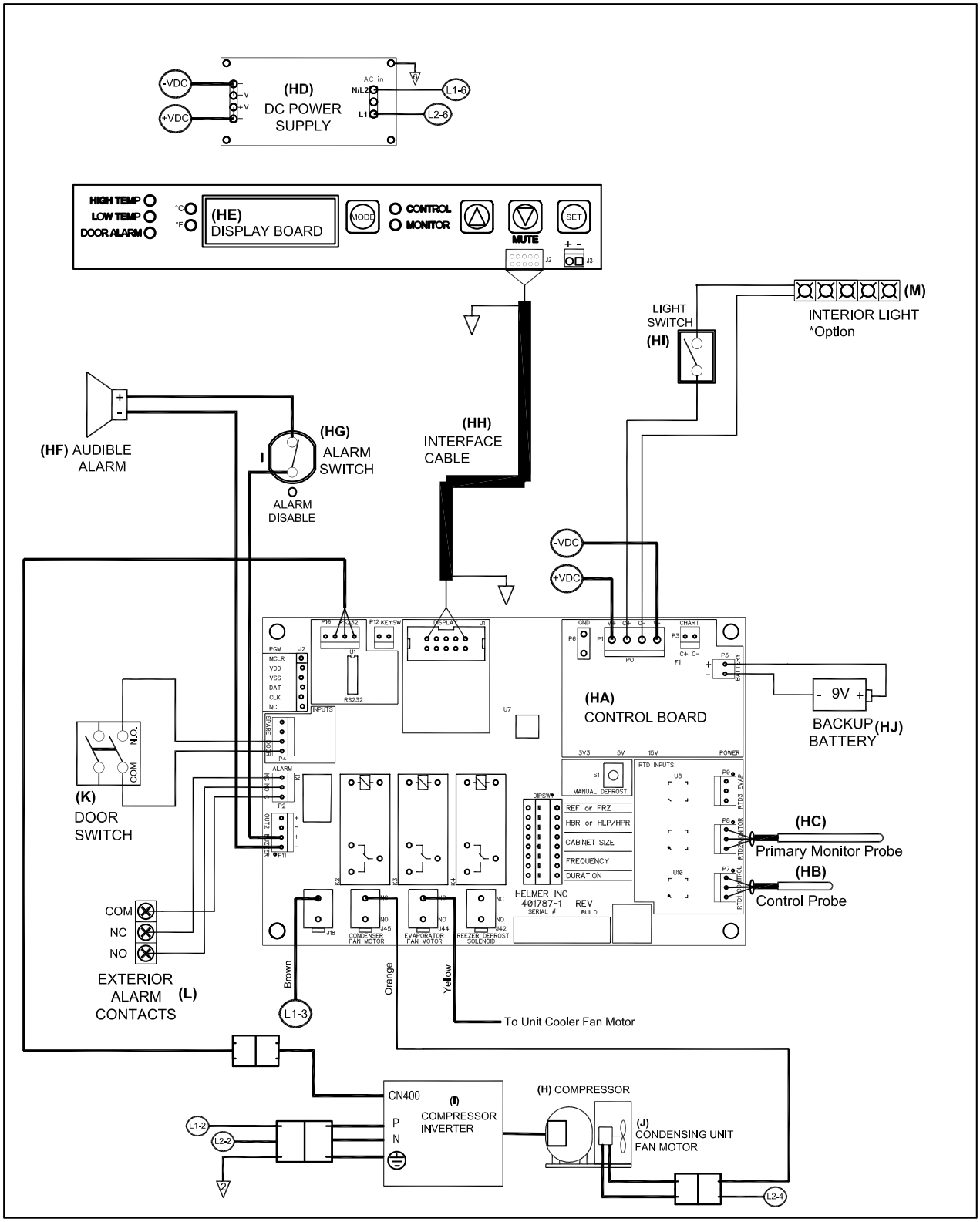
15.2 HBR, HLR and HPR Models (without Access Control)



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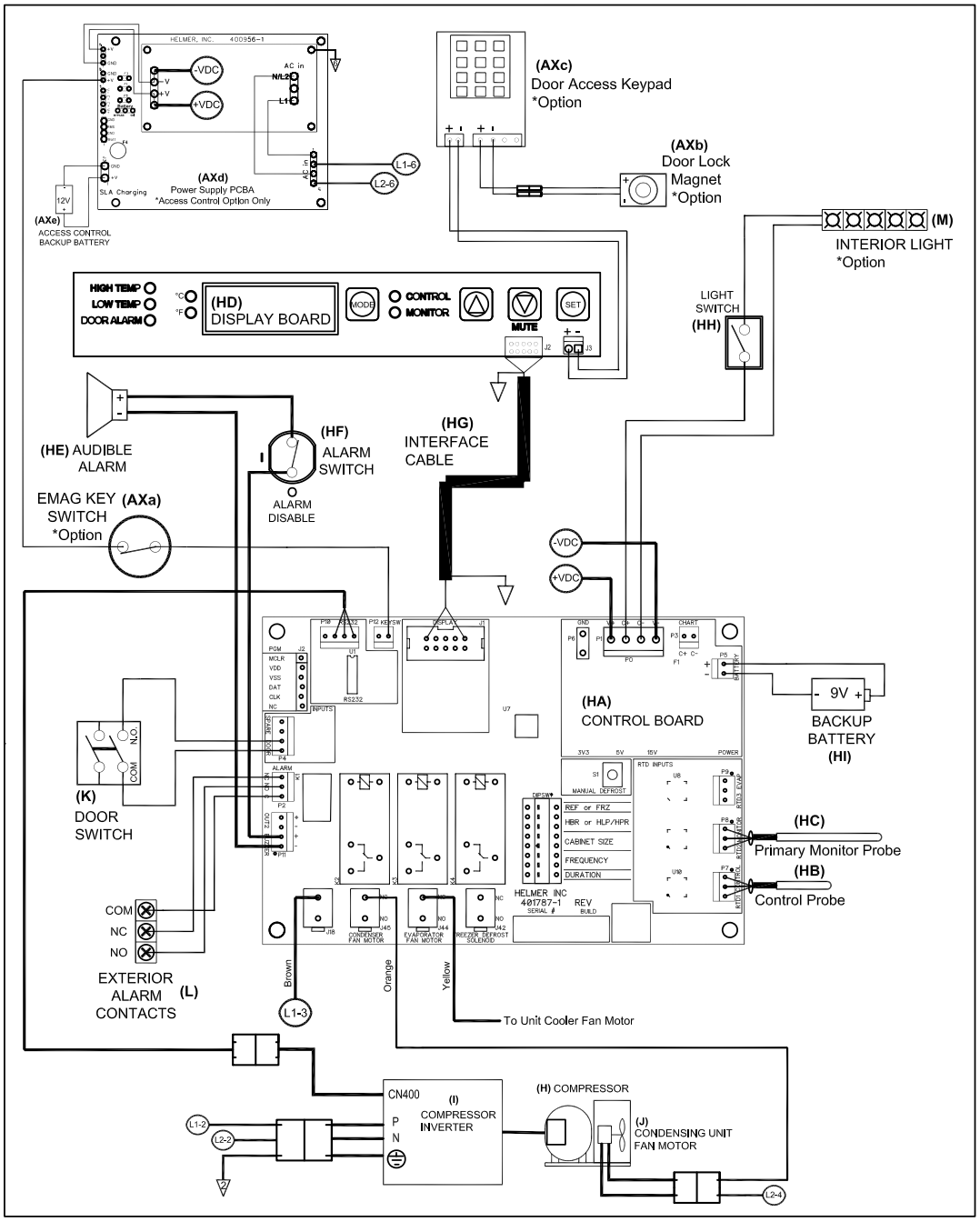
15.3 HBR, HLR and HPR Models (with Access Control)



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Appendix A: Warranty

Rel.i™ Product Warranty USA and Canada

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

Rapid Resolution

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

Compressor

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

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

Parts

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

Labor

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

Additional Warranty Information

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

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

THE LIABILITY, IF ANY, OF HELMER FOR DIRECT DAMAGES WHETHER ARISING FROM A BREACH OF ANY SALES AGREEMENT, BREACH OF WARRANTY, NEGLIGENCE, OR INDEMNITY, STRICT LIABILITY OR OTHER TORT, OR OTHERWISE WITH RESPECT TO THE GOODS OR ANY SERVICES IS LIMITED TO AN AMOUNT NOT TO EXCEED THE PRICE OF THE PARTICULAR GOODS OR SERVICES GIVING RISE TO THE LIABILITY. IN NO EVENT SHALL HELMER BE LIABLE FOR ANY INDIRECT, INCIDENTAL, CONSEQUENTIAL, OR SPECIAL DAMAGES, INCLUDING WITHOUT LIMITATION DAMAGES RELATED TO LOST REVENUES OR PROFITS, OR LOSS OF PRODUCTS.

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

Outside of USA and Canada

Consult your local distributor for warranty information.

END OF MANUAL

Helmer Scientific
14400 Bergen Boulevard, Noblesville, IN 46060 USA

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