![Helmer Scientific logo]

Undercounter Refrigerator Service Manual
i.Series® and Horizon Series™

Model Group	i.Series	Horizon Series
Blood Bank	iB105 (Version A)	HB105 (Version A)
Laboratory/Pharmacy	iLR105 (Version A)	HLR105 (Version A)

CE
0086

ISO 13485:2003 CERTIFIED

Helmer

Document History

Revision	Date	CO	Supersession	Revision Description
E	16 JAN 2014*	8580	Supersedes A, B, C, D	Revised layout for ease of navigation and locating information.

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

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Contents

Section I: General Information

1   About this Manual

1.1   Intended Audience

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

1.2   Model References

Generic references are used throughout this manual to group models that contain similar features. For example, "105 models" refers to all models of that size (iB105, iLR105, HB105, HLR105). This manual covers all undercounter refrigerators, which may be identified singly, by their size, or by their respective "Series."

1.3   Copyright and Trademark

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

2   Safety

Includes general safety information for refrigerator operation.

2.1   Safety Definitions

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

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

2.2   Product Labels

	Caution: Risk of damage to equipment or danger to operator		Caution: Unlock all casters
	Caution: Hot surface		Earth / ground terminal
	Caution: Shock/electrical hazard		Protective earth / ground terminal

| 2.3 | Avoiding Injury |

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

► Before moving unit, ensure door is closed and casters (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 biological materials are stored at recommended temperatures determined by standards, literature, or good laboratory practices.

► Proceed with caution when adding and removing samples from the refrigerator.

► Use supplied power cord only.

► Using the equipment in a manner not specified by Helmer Scientific may impair the protection provided by the equipment.

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

► Ensure biological materials are stored safely, in accordance with all applicable organizational, regulatory, and legal requirements.

► The refrigerator is not considered to be a storage cabinet for flammable or hazardous materials.

3 Configuration

3.1 Model and Input Power

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

This information appears on the product specification label, located on the rear of the refrigerator. The model also appears on a label located in the chamber on the upper side of the right wall.
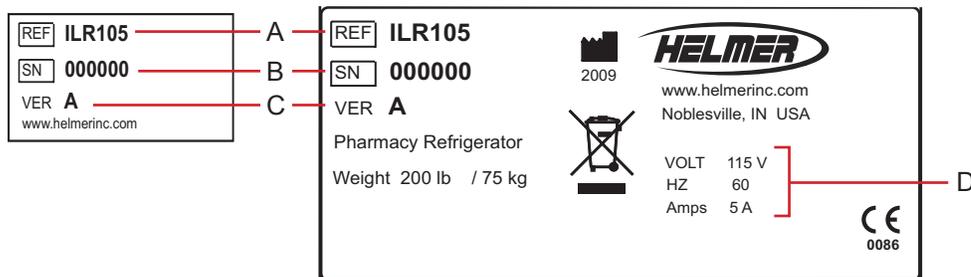
Left: Chamber label. Right: Product specification label (located on the rear at lower left).

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

3.2   **Control System**

> **NOTE**   Service information varies depending on the control system.

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

3.2.1   **i.Series Control System**

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

i.Center monitor   *Independent temperature controller.*

3.2.2   **Horizon Series Control System**

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

Horizon Series combined monitoring and control system (user interface).

| 3.3 | **Temperature Probes** |

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

For each probe bottle, use:
► Approximately 4 oz. (120 mL) of product simulation solution (10:1 ratio of water to glycerin).

Left: Probe bottle with temperature probe. Right: Access port on rear of refrigerator.

| 3.3.1 | **Fill Temperature Probe Bottle** |

> ⚠️ **NOTICE**   Temperature probes are fragile; handle with care.

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

| 3.3.2 | **Install Additional Probe Through Rear Port** |

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

| 3.4 | **Chart Recorder** |

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

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

Prior to use:
► Connect the chart recorder to AC power.
► Install battery.
► Add paper.
► Install the chart recorder probe in the probe bottle, through the rear port.
► Calibrate chart recorder to match chamber temperature.

3.4.1   Chart Recorder Access

Open door by pulling door open.
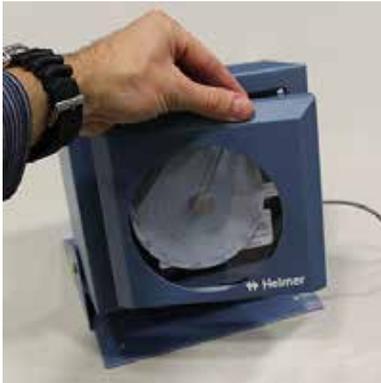
3.4.2   Install Chart Paper

1   Press and hold **C** button. When stylus begins to move left, release button. The LED flashes to
indicate current temperature range.

2   When stylus stops moving, remove chart knob then move knob up and away.

3   Place chart paper on chart recorder.

4   Gently lift stylus and rotate paper so current time line corresponds to time line groove.

5   Hold chart paper and reinstall chart knob.

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

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6   Confirm temperature range is set to the correct value.

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

8   Confirm stylus is marking temperature correctly.

4   Alarm Reference

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

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

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

5   Compliance

5.1   Regulatory Compliance

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

Sound level is less than 70 dB(A).

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EC	REP	Emergo Europe Molenstraat 15 2513 BH The Hague, Netherlands

5.2   WEEE Compliance

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

When disposing of this product in countries affected by this directive:
► Do not dispose of this product as unsorted municipal waste.
► Collect this product separately.
► Use collection and return systems available locally.

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

6 Warranty

6.1 Rel.i™ Product Warranty USA and Canada

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

6.1.1 Rapid Resolution

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

6.1.2 Compressor

For the warranty period listed below, Helmer will supply the refrigeration compressor, if it is determined to be defective, at no charge, including freight. Helmer will not be liable for installation, refrigerant, or miscellaneous charges required to install the compressor beyond the first year of the warranty period.
- ► i.Series model compressor warranty period is seven (7) years.
- ► Horizon Series model compressor warranty period is five (5) years.

6.1.3 Parts

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

6.1.4 Labor

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

6.1.5 Additional Warranty Information

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

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

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

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

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

6.2   Outside of USA and Canada

Consult your local distributor for warranty information.

Section II: i.Series® Models

7   Product Configuration

7.1   Install Battery for Backup Power

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

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

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

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

The batteries are located below the chamber, behind the front cover.

Monitoring system backup batteries.

Five batteries are installed and one battery is taped next to the backup battery holder. Install the sixth battery to provide power to the monitoring system in the event of an AC power failure.

7.2   External Monitoring Devices

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

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

The remote alarm interface is a relay switch with three terminals:
► Common (COM)
► Normally Open (NO)
► Normally Closed (NC)

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

The terminals on the remote alarm interface have the following maximum load capacity:
► 0.5 A at 125 V (AC): 1 A at 250 V (DC)

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

7.3   Move Drawers, Shelves, and Baskets

Storage features.

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

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

Remove a drawer or basket:
1   Pull drawer or basket out until it stops.
2   On the right rail, locate the release tab and press downward.
3   While holding the right release tab downward, locate the release tab on the left rail and press upward.
4   Pull drawer or basket free of the slides.

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

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

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

7.4   Drawer Labels

Drawer with sample label (not provided).

7.5   Move Slides and Brackets

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

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

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

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

7.6   Level the Refrigerator

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

Leveling feet must be adjusted to provide unit cooler drainage.

Front-to-back:

1   Rotate the leveling feet to raise or lower leveling feet.

2   When refrigerator is properly leveled, bottom of the unit cooler will slope downward from front to back (toward the condensate drain line).

Side-to-side:

1   Rotate the leveling feet to raise or lower leveling feet.

2   When refrigerator is properly leveled, bottom of the unit cooler will be horizontal (parallel to the floor).

7.7   Optional Adapter Kits for Medication Dispensing Locks

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

7.8   Reverse Door Hinge and Handle

⚠	**NOTICE**	Before reversing door hinge and handle, protect stored items in refrigerator from extended exposure to adverse temperature.

	NOTE	Refrigerator must be on the floor or on an elevated work surface with enough space in front of the refrigerator to lay the door face-down for disassembly.

7.8.1   Remove the Door and Hinges

1   Open the lower front control panel. Switch AC ON/OFF switch **OFF**. Remove one battery from the backup battery holder.

2   Remove the door handle assembly.

    a   Remove four screws holding the door handle assembly on the door.

    b   Set the door handle assembly aside.

Door handle assembly.

3   Remove door latch / door catch.

   a   Remove two screws holding the door latch plates and spacer bar on the cabinet.

   b   Set the latch plates and spacer bar aside.

Cabinet

Strike plate
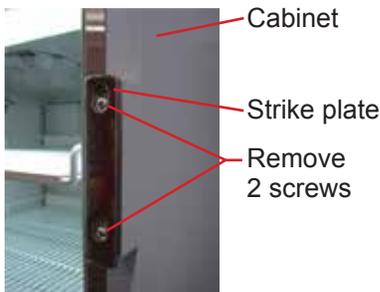
Remove
2 screws

Door latch plate.

4   With the door shut, remove the cover plate from both hinges.

5   Remove the spring assembly from the lower hinge.

   a   Use a J-hook tool to engage the left-most hole in the spring cap and rotate the spring cap from *left to right,* and hold.

   b   Remove the pin from the spring cap.

   c   Allow the spring to relax.

   d   Use a J-hook tool to engage any hole in the spring cap compress spring downward.

   e   Remove spring assembly from the lower hinge.

   f   Set the spring assembly aside.

⚠ **NOTICE**   A second person should assist by supporting the door while the hinges are removed.

NOTE   The two screws holding the hinge on the door are longer than the three screws holding the hinge on the cabinet. The screws must be installed in the same location when moving the hinge to the opposite side of the door.

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6   Remove the lower hinge.

   a   Support the door.

   b   Remove five screws attaching the lower hinge to the door and cabinet.

   c   Remove the lower hinge.

   d   Reverse the hinge manually (as if moving the hinge from a fully-closed to a fully-open position).

   e   Set the lower hinge aside.

   f   Continue to support the door.

7   Remove the upper hinge.

   a   Remove five screws attaching the upper hinge to the door and cabinet.

   b   Remove the upper hinge.

   c   Reverse the hinge manually (as if moving the hinge from a fully-closed to a fully-open position).

   d   Set the upper hinge aside.
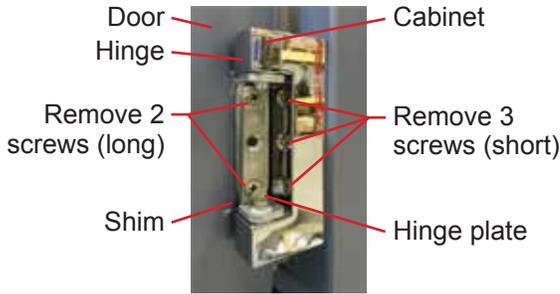
Hinge removal (lower hinge shown with spring removed).

8   Lay the door face-down in front of the cabinet.

7.8.2   **Reinstall the Door and Hinges**

1   Install the hinges and hinge plates on the door.

   a   Hand-thread two screws through each hinge and into the door.

   b   Leave the screws slightly loose.

   c   If a shim was used on the lower hinge, transfer the shim to the new hinge location.

NOTE   Ensure that the upper and lower hinges are not interchanged when moving the hinges to the opposite side of the door.

Attach hinge to door (lower hinge shown).

⚠️   **NOTICE**   A second person should assist by supporting the door while the hinges are installed.

2   Install the door on the cabinet.

   a   Lift the door to the cabinet.

   b   Align the holes in the hinges with the corresponding holes in the cabinet.

   c   Hand-thread three screws through each hinge and into the cabinet.

   d   Do not allow the weight of the door to rest on the hinges.

Attach hinge to cabinet (lower hinge shown).

3 Align the door and tighten screws.

    a Support the door so the top edge of the door is level.

    b Level the door using a shim if necessary.

    c Tighten all screws attaching both hinges to the door and to the cabinet.

NOTE   If a shim is necessary to level the door after hinge reversal, contact Helmer Technical Service to obtain a shim.

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4 Install the door handle on the opposite side of the door.

5 Install the latch plates and spacer bar on the opposite side of the cabinet.

6 Install the hinge spring and pin assembly.

    a Close the door.

    b Assemble the hinge spring assembly for the left side of the door *(Figure A)*.

    c Orient the bend in the coil toward the front of the refrigerator *(Figure B)*.

    d Slide the internal hex cap (with washer) on to the upper hex bolt in the lower hinge.

Washer
Internal hex cap
Spring
Pin
Spring cap
Bushing
A
B

    e Use a J-hook tool in the spring cap to compress the spring upward *(Figure C)*.

    f While compressing the spring, slide the spring cap over the lower hex bolt in the lower hinge *(Figure D)*.

C
D

    g Use a J-hook tool to engage the right-most hole in the spring cap and rotate the spring cap from *right to left,* and hold.

    h Count four holes, starting from and including the spring cap hole closest to the end of the coil.

    i Insert the pin in the fourth hole.

Rotate the spring using a J-hook tool then insert pin (left-hinged door shown).

7   Switch AC ON/OFF switch **ON**. Reinstall the battery in the backup battery holder.

8   Verify the door is level and the hinges operate smoothly and the door seals tightly.

9   Press the **MUTE** button to disable the high temperature alarm while refrigerator reaches operating temperature.

7.9   **Stacked Undercounter Units**

⚠ **WARNING**   ► For a stacked configuration, both units must have leveling feet installed.
                  ► The back brace bars and front stabilizing brackets must be installed.
                  ► When stacking a refrigerator and freezer (104 and/or 105 models), place the heavier unit on the bottom.
                  ► Do not open multiple, loaded drawers or baskets at the same time.

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

8   Temperature Monitor Settings

8.1   **Home Screen**

The HOME screen appears when:
► The **HOME** button is pressed from any other screen
► There is no interaction for two minutes on any screen other than those used to enter a password
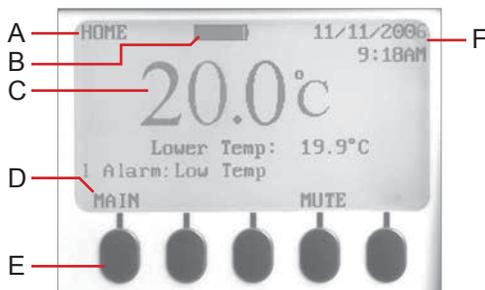
HOME screen on the monitoring system.

Label	Description	Label	Description
A	Screen name	D	Button labels
B	Battery voltage level	E	Buttons
C	Chamber temperature display	F	Date and time display

8.1.1 Home Screen Functions

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

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

8.2 Main Screen

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

MAIN screen functional options.

Functions available from the Main screen:

Option	Function
Event Log	► View historical information about alarms and operational events
System Alarm Test and Status	► Start or stop an automatic test for temperature alarms ► View the number of days remaining before the paper for the temperature chart recorder needs to be changed ► View the current status of the door (OPEN or CLOSED) ► View the current condenser temperature
Edit Configuration (password required)	► Change the language used for text ► Change date and time information ► Change temperature units ► Change the volume and pattern for audible alarms ► Enable or disable the chart paper timer ► Enable or disable the temperature graph display ► Change alarm-related setpoints and timers ► Calibrate the temperature probe reading ► Change some settings to the factory default values ► Change the password, preventing unauthorized changes

Option	Function
View Configuration	► View the date and time formats ► View alarm-related setpoints and timers ► View the volume and pattern for audible alarms ► View the setting for the chart paper timer ► View the setting for the temperature graph display ► View the settings for temperature and time alarms
Product/Company Information	► View the software versions for control and display components of the monitoring system ► View information to contact Helmer
i.Help	► Access the on-board help system ► View historical event logs and details

8.3 Temperature Graph
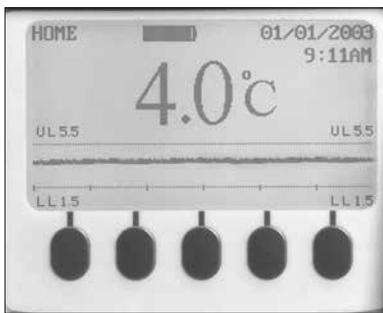
The Temperature Graph screen appears when:
► The Temperature Graph feature is enabled
► There is no interaction for one minute on any screen
► There are no active alarms

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

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

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

8.3.1 Enable or Disable the Temperature Graph

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

NOTE: The temperature graph is enabled by default.

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

8.4　　　**Change Configuration Password**

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

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

8.5　　　**Calibrate Chamber Temperature Probe**

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

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

► Default setting for chamber temperature is 4.0 °C
► Value is factory-preset

Obtain:
► Independent thermometer, calibrated and traceable per national standards

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

EXAMPLE	► Measured temperature (at the probe bottle) is 4.0 °C
	► Displayed temperature is 4.5 °C
	► Change displayed temperature to 4.0 °C

Enter the new calibration value:
1 On the HOME screen, press the **MAIN** button.
2 Press the **DOWN** button to highlight Edit Configuration. Press the **SELECT** button.
3 Enter the password when prompted.

4 Press the **DOWN** button to highlight Temperature Calibration. Press the **SELECT** button.

   a The Upper Probe option is displayed and the Temperature option is highlighted.

   b Press the **INC** or **DEC** buttons to change the displayed value to match the value measured by the independent thermometer.

5 Press the **DOWN** button to highlight Store Calibration.

   a To save the new value, press the **ENTER** button. The "Calibration Memorized" message appears. New settings are saved.

   b To discard the new value, press the **BACK** button to return to the Edit Configuration screen, or press the **HOME** button to exit. New settings are not saved.

6 Remove thermometer and probe from bottle.

7 Replace the probe in probe bottle.

8 Replace bottle cap, ensuring a tight fit.

9 Place the probe in bottle, immersing at least 2" (50 mm).

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

8.6 **Factory Default Settings**

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

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

Setting	Restored Value
High Alarm Setpoint	5.5 °C
Low Alarm Setpoint (1)	1.5 °C *
Condenser Alarm Setpoint	50.0 °C
Door Ajar Timeout	3 minutes
Power Failure Timeout	3 minutes
Chart Paper Timer	6.5 days

(1) This includes laboratory/pharmacy (iLR) models that were originally set at 2.0 °C.

NOTE	Unless your organization requires the Low Alarm Setpoint to be at the factory default level of 1.5 °C, it will be necessary to increase the setpoint to 2.0 °C after restoring factory defaults.

8.7 **Restore Factory Default Settings**

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

8.8 **Alarm Settings**

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

8.8.1 **Alarm Volume**

The alarm volume can be changed. The Alarm Volume controls volume for all audible alarms.
► Default setting is 10
► Setting can be changed from 1 to 10
► 1 is the quietest setting; 10 is the loudest setting

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

8.8.2 **Alarm Pulse**

The alarm pattern can be changed. This is useful if several refrigerators with alarms are collocated, and distinguishing the source of the alarm quickly is desirable.
► Default setting is Single.
► Setting can be changed between Single, Double, Triple, and Constant.

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

8.8.3   **High Chamber Temperature Alarm**

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

► Default setpoint is 5.5 °C

► Setpoint can be changed from -40 °C to +40 °C

Change the setpoint:

1   Press the **MAIN** button.

2   Press the **DOWN** button to highlight Edit Configuration. Press the **SELECT** button.

3   Enter the password when prompted.

4   Press the **DOWN** button to highlight Alarm Setpoints. Press the **SELECT** button.

5   Press the **DOWN** button to highlight High Alarm Setpoint.

6   Press the **INC** or **DEC** buttons to change the setting.

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

8.8.4   **Low Chamber Temperature Alarm**

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

► Default setpoint is 1.5 °C (iB models)

► Default setpoint is 2.0 °C (iLR models)

► Setpoint can be changed from -40 °C to +40 °C

Change the setpoint:

1   Press the **MAIN** button.

2   Press the **DOWN** button to highlight Edit Configuration. Press the **SELECT** button.

3   Enter the password when prompted.

4   Press the **DOWN** button to highlight Alarm Setpoints. Press the **SELECT** button.

5   Press the **DOWN** button to highlight Low Alarm Setpoint.

6   Press the **INC** or **DEC** buttons to change the setting.

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

8.8.5   **Condenser Temperature Alarm**

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

► Default setpoint is 50 °C

► Setpoint can be changed from -40 °C to +80 °C

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

Change the setpoint:

1   Press the **MAIN** button.

2   Press the **DOWN** button to highlight Edit Configuration. Press the **SELECT** button.

3   Enter the password when prompted.

4   Press the **DOWN** button to highlight Alarm Setpoints. Press the **SELECT** button.

5   Press the **DOWN** button to highlight Cond. Alarm Setpoint.

6   Press the **INC** or **DEC** buttons to change the setting.

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

8.8.6   **Door Ajar Alarm**

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

►   Default delay setting is three minutes

►   Setting can be changed from 0 minutes to 60 minutes

Change the alarm delay:

1   Press the **MAIN** button.

2   Press the **DOWN** button to highlight Edit Configuration. Press the **SELECT** button.

3   Enter the password when prompted.

4   Press the **DOWN** button to highlight Alarm Setpoints. Press the **SELECT** button.

5   Press the **DOWN** button to highlight Door Ajar Timeout.

6   Press the **INC** or **DEC** buttons to change the setting.

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

8.8.7   **Power Failure Alarm**

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

►   Default delay setting is three minutes

►   Setting can be changed from 0 minutes to 60 minutes

Change the alarm delay:

1   Press the **MAIN** button.

2   Press the **DOWN** button to highlight Edit Configuration. Press the **SELECT** button.

3   Enter the password when prompted.

4   Press the **DOWN** button to highlight Alarm Setpoints. Press the **SELECT** button.

5   Press the **DOWN** button to highlight Power Failure Timeout.

6   Press the **INC** or **DEC** buttons to change the setting.

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

8.8.8   **Chart Paper Alarm**

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

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

Change the setting:

1   Press the **MAIN** button.

2   Press the **DOWN** button to highlight Edit Configuration. Press the **SELECT** button.

3   Enter the password when prompted.

4 Press the **DOWN** button to highlight System Options. Press the **SELECT** button.

5 Press the **DOWN** button to highlight Chart Paper Timer.

6 Press the **INC** or **DEC** buttons to select Enabled, Disabled, or Reset.

7 Do one of the following:

  ► If Enabled or Disabled is selected, press the **BACK** button to return to the System Options screen, or press the **HOME** button to exit. The new setting is saved.

  ► If Reset is selected:

    a Press the **DOWN** button.

    b Press the **PAPER-CHANGED** button. The System Options screen appears with the Chart Paper Timer set to Enabled.

8 Press the **BACK** button to return to the System Options screen, or press the **HOME** button to exit. The new setting is saved.

8.9 Test Alarms

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

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

8.9.1 Automatic Chamber Temperature Alarm Test

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

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

Test the low alarm:

1 Identify the current setting for the low alarm setpoint.

2 Press the **MAIN** button.

3 Press the **DOWN** button to select System Alarm Test & Status. Press the **SELECT** button.

  ► The System Alarm Test & Status screen appears.

4 Press the **DOWN** button to select Start Low Alarm Auto Test. Press the **SELECT** button.

  ► The "Low Alarm Test in Progress" message appears. When the test is complete, the message clears.

5 View the Event Log. Note the temperature at which the low alarm occurred. Compare the temperature to the low alarm setpoint. If the values do not match, refer to chapter **11** (Troubleshooting).

Test the high alarm:

1 Identify the current setting for the high alarm setpoint.

2 Press the **MAIN** button.

3 Press the **DOWN** button to select System Alarm Test & Status. Press the **SELECT** button.

  ► The System Alarm Test & Status screen appears.

4 Press the **DOWN** button to select Start High Alarm Auto Test. Press the **SELECT** button.
► The "High Alarm Test in Progress" message appears. When the test is complete, the message clears.

5 View the Event Log. Note the temperature at which the low alarm occurred. Compare the temperature to the high alarm setpoint. If the values do not match, refer to chapter **11** (Troubleshooting).

Cancel the test:

1 Press the **MAIN** button.

2 Press the **DOWN** button to select System Alarm Test & Status. Press the **SELECT** button.
► The System Alarm Test & Status screen appears.

3 Press the **DOWN** button to select Cancel High or Low Test. Press the **ENTER** button.
► The test is cancelled.

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

8.9.2 **Manual Chamber Alarm Test**

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

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

Obtain:

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

⚠	NOTICE	Temperature probes are fragile; handle with care.

Test the low alarm:

1 Identify setting for low alarm setpoint.

2 Remove chamber temperature probe from bottle.

3 Immerse probe in chilled water.

4 While stirring probe in chilled water, add approximately one teaspoon (5 mL) of ice every 20 seconds. Ensure probe is at the bottom of the glass.

5 When low temperature alarm sounds, note the temperature on the i.Center display.

6 Compare the temperature at which the alarm sounds to the low alarm setpoint. If values do not match, refer to chapter **11** (Troubleshooting).

Test the high alarm:

1 Identify setting for high alarm setpoint.

2 While stirring probe in chilled water, add warm water so temperature increases 0.5 °C per minute.

3 When high temperature alarm sounds, note the temperature on the i.Center display.

4 Compare the temperature at which the alarm sounds to the high alarm setpoint. If values do not match, refer to chapter **11** (Troubleshooting).

5 Remove probe from warm water.

6 Place temperature probe in probe bottle, immersing it at least 2" (50 mm).

8.9.3 **Power Failure Alarm Test**

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

1 Confirm the refrigerator is connected to AC power.

2 Ensure the monitoring system backup batteries are installed.

3 Change Power Failure Timeout setting to 0 minutes.

    a Press the **MAIN** button.

    b Press the **DOWN** button to highlight Edit Configuration. Press the **SELECT** button.

    c Enter the password when prompted.

    d Press the **DOWN** button to highlight Alarm Setpoints. Press the **SELECT** button.

    e Press the **DOWN** button to highlight Power Failure Timeout.

    f Press the **DEC** button to change the setting to 0.

4 Switch the AC ON/OFF switch **OFF**. Power failure alarm will activate immediately.

5 Switch the AC ON/OFF switch **ON**. Power failure alarm will clear and audible alarm will cease.

6 Change the Power Failure Timeout setting to the original setting.

8.9.4 **Door Ajar Alarm Test**

1 Change Door Ajar Timeout setting to 0 minutes:

    a Press the **MAIN** button.

    b Press the **DOWN** button to highlight Edit Configuration. Press the **SELECT** button.

    c Enter the password when prompted.

    d Press the **DOWN** button to highlight Alarm Setpoints. Press the **SELECT** button.

    e Press the **DOWN** button to highlight Door Ajar Timeout.

    f Press the **DEC** button to change the setting to 0.

    g Press the **BACK** button to return to the Edit Configuration screen, or press the **HOME** button to exit. New settings are saved.

2 Open the door. Door ajar alarm will activate immediately.

3 Close the door. Door ajar alarm will clear and audible alarm will cease.

4 Change the Door Ajar Timeout setting to the original setting.

8.9.5 **No Battery Alarm Test**

Test the no battery alarm to ensure the batteries can provide enough power to the monitoring system and power failure alarm in the event of a power failure.

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

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

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

8.10 **Additional System Settings**

8.10.1 **Screen Contrast**

The screen contrast can be changed for easier viewing.

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

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

8.10.2 **Date and Time**

The Date Format setting controls the order in which the month (mm) and day (dd) are displayed.
► Month is a 2-digit number (01-12)
► Day is a 2-digit number (01-31)
► Default date format is mm/dd/yyyy

The Clock Mode setting controls whether the time is displayed in a 12-hour or 24-hour format.
► When using the 12-hour format, AM or PM must be specified
► Default setting is 12-hour

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

8.10.3 **Display Language**

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

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

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

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

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

8.10.4   Temperature Units

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

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

8.11   **Event Log**

The Event Log shows information from alarm events.

►   50 (most recent) events can be viewed on the Event Log screen.

►   Number of door openings for the current and previous day can be viewed.

View the event log:

1   Press the **MAIN** button.

2   Press the **DOWN** button to highlight Event Log. Press the **SELECT** button.

     ►   The Event Log screen is displayed.

Event log format:

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

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

8.11.1   Event Details
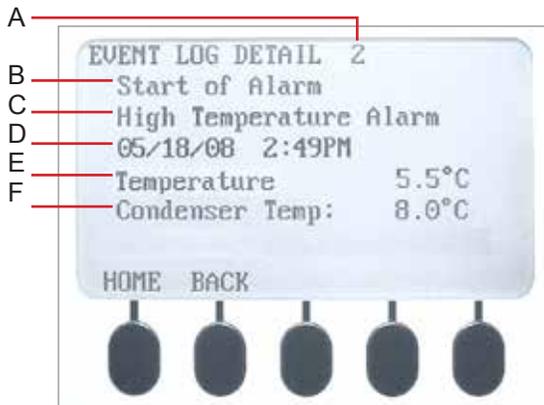
Event Log Detail screen.

Label	Description
A	Event number
B	Event
C	Alarm Type
D	Date and time of event
E	Chamber temperature at time of event
F	Condenser temperature at time of event

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

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

8.12   Upgrade System Firmware

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

8.13   Reset the i.Center Monitoring System
1   Remove 1 battery from the monitoring system backup battery holder.
2   Switch the AC ON/OFF switch **OFF**.
3   Switch the AC ON/OFF switch **ON**.
4   Reinstall the battery in the monitoring system backup battery holder.

8.14 **View Manufacturer and Product Information**

1 Press the **MAIN** button.

2 Press the **INC** or **DEC** buttons to select the Product/Company Information option. Press the **SELECT** button.

► Manufacturer contact information appears.

► Software version appears.

9 Temperature Controller Setpoints

Independent temperature controller.

Temperature controller setpoints are programmed at the factory. Setpoints can be viewed and changed through the temperature controller. Parameter values reside in three program levels.

Parameters are grouped into three levels:

► Operational (1)

► Control (2)

► Security (3)

⚠️	**NOTICE**	Changing parameter values affects refrigerator operation. Do not change parameter values unless instructed in product documentation or by Helmer Technical Service.

NOTE	► To change the value for a parameter, first enter the program mode for that level.
	► When there is no interaction for 25 seconds, the temperature controller exits program mode and returns to normal mode.

View or change parameter values:

1 Enter program mode:

a Press and hold the **UP** and **DOWN** arrow buttons simultaneously for approximately three seconds.

b The temperature controller is now in program mode.

2 Select the parameter to be changed:

a Press and release the **UP** or **DOWN** arrow buttons until the desired program level flashes on the display.

3 Change a parameter value:

a Press and release the **DOWN** arrow button until the desired parameter flashes on the display.

b Press and hold the **SET** button.

c While holding the **SET** button, press the **UP** or **DOWN** arrow buttons to change the value.

4 Release all buttons to exit the parameter. New settings are saved.

5 Repeat steps 2 through 4 to access another program level, or to view or change parameter values in the selected level.

6 Exit program mode:

    a Press and hold the **UP** and **DOWN** arrow buttons simultaneously for approximately one second.

    b The current chamber temperature is displayed.

9.1 Operational (Level 1) Parameters and Values (OU)

NOTE	► Parameters are listed in order of appearance.
	► The temperature controller is programmed at the factory to yield a refrigerator setpoint of 4.0 °C.

Parameter	Description	Default Value
o.LOL	Lower Limit of the setpoint	0.0
o.UPL	Upper limit of the setpoint	20.0
o.OFF	Offset value for the refrigerator	Varies [1]
o.HYS	Hysteresis value	2.0
o.PPn	Run time for compressor in the event of a probe failure	2.0
o.PPF	Off time	20.0

(1) Increase value to lower chamber temperature. Reduce value to raise chamber temperature.

9.2 Control (Level 2) Parameters and Values (Cn)

Parameter	Description	Default Value
C.tYP	Heat or cool	COOL
Unit	Fahrenheit or Celsius	°C
drES	Display resolution	Yes

9.3 Security (Level 3) Parameters and Values (SE)

Parameter	Description	Default Value
s.COd	Access code for security	0

9.4 Error Codes

Parameter	Description
PSC	Thermostat probe has short circuit
PFA	Thermostat probe is broken
- - - -	Temperature value is higher than the scale
- - - -	Temperature value is lower than the scale

| 9.5 | **Change the Refrigerator Setpoint** |

NOTE	►	Default setpoint is 4.0 °C.
	►	Parameter values are factory-preset and should not be changed unless directed by Helmer Technical Service.
	►	When there is no interaction for 25 seconds, the temperature controller exits program mode and returns to normal mode.
	►	The reference temperature displayed on the temperature controller may not be the same as the temperature displayed on the i.Center monitor.

1   Observe the chamber temperature displayed on the i.Center.
2   Determine how much the refrigerator setpoint will be changed.

EXAMPLE	►	Current setpoint is 4.0 °C
	►	Target setpoint is 4.5 °C
	►	Setpoint adjustment value is +0.5 °C

3   On the temperature controller, press and hold the **SET** button.
4   While holding the **SET** button, press the **UP** or **DOWN** arrow buttons to change the temperature setpoint by the same value as determined in step 2.
5   Release all buttons. The temperature setpoint is changed.

| 9.6 | **Change the Control Sensor Offset** |

The temperature controller senses chamber temperature through a probe in the unit cooler. The chamber setpoint typically varies from the measured temperature, so an offset value is used by the control system to compensate for the difference.
►   Value is factory-preset and varies for each unit
►   Offset value can be changed from -10.0 °C to +10.0 °C

| ⚠ | **NOTICE** | Control sensor offset is factory-preset and should not be changed unless directed by Helmer Technical Service. |

| **NOTE** | If the variance is within acceptable limits for your organization, changing the offset value is optional. |

| 9.7 | **Change the Hysteresis Value** |
►   Default setpoint is 2.0 °C
►   Allowable temperature variance on each side of the refrigerator setpoint

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

10   Maintenance

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

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

10.1   Recharge Refrigerant

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

⚠	**NOTICE**	Use only non-CFC R-134A refrigerant.

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

Model	Initial Charge
105	9.5 oz. (269 g)

Obtain:
► Refrigerant
► Calibrated pressure gauge (0 psi to 25 psi (0 kPa to 175 kPa))

⚠	**NOTICE**	If the compressor has been changed, the refrigerant charge amount may be different than stated above. if the compressor has been changed, contact Helmer Technical Service for to verify the refrigerant charge amount.

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

NOTE	Pressure varies depending on ambient air temperature.

4   Add refrigerant. Check the pressure on the low side.
    ► Low side = 16 psi to 18 psi (110 kPa to 125 kPa)
5   Remove pressure gauge.

10.2   Test Monitoring System Backup Batteries

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

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

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

10.3   **Replace Monitoring System Backup Batteries**

   1   Open the access panel on the lower front of the refrigerator.

   2   Remove six batteries and replace with six new batteries.

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

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   3   Close the access panel.

10.4   **Replace the LED Lamp Strip**

   1   Switch battery switch **OFF**. Remove one battery from the monitoring system backup battery holder.

   2   Using a screwdriver, detach lamp strip from chamber.

   3   Unsnap the defective lamp strip and disconnect wires.

   4   Connect new lamp strip to the wires.

   5   Reattach lamp strip to chamber.

   6   Switch AC ON/OFF switch **ON**. Reinstall the battery in the monitoring system backup battery holder.

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

10.5   **Clean the Refrigerator**

10.5.1   **Condenser Grill**

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

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

10.5.2   **Exterior**

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

10.5.3   **Interior**

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

10.5.4   **Door Gaskets**

Clean with soft cloth and mild soap and water solution.

10.5.5   **Clean and Refill Probe Bottle**

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

Obtain:

►   Fresh water-bleach solution (not provided)
- ►   1:9 ratio of bleach to water
- ►   Bleach is 5% solution of commercial sodium hypochlorite (NaOCl)
- ►   Equivalent oxidizing cleaner/disinfectant approved by your organization may be substituted

►   4 oz. (120 mL) of product simulation solution per bottle
- ►   10:1 ratio of water to glycerin

Clean and refill bottle:

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

10.6 Unit Cooler Cover Removal and Installation

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

Required tools:

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

Drain line and hose.

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

10.6.1 Remove the Unit Cooler Cover

⚠ **CAUTION**   Disconnect the refrigerator from AC power when removing the unit cooler.

1   Switch AC ON/OFF switch **OFF**. Remove one battery from the monitoring system backup battery holder.
2   On the back of the cabinet, peel the putty back to expose the drain hose (C).
3   Remove top drawer, basket, or shelf from the chamber.
4   Remove drain hose from unit cooler drain port (B).
    a   Pull drain hose downward to separate from unit cooler.
    b   Twist drain hose while pulling to assist in removal.
5   Push the drain hose (C) out through rear of chamber.

6 Remove the unit cooler cover.
   a Hold unit cooler cover in place to prevent it from dropping.
   b Use the socket wrench to remove four screws securing the unit cooler cover.
   c Carefully lower unit cooler cover to avoid damage to the fan wiring.

10.6.2   Install the Unit Cooler Cover

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

10.7   Supplies

Refrigerant: non-CFC, R-134A

Chart paper: 220366 (52 sheets)

Glycerin solution: 400922-1

LED lamp strip (optional): 800023-1

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

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

11   Troubleshooting

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

11.1   General Operation Problems

Problem	Possible Cause	Action
Drawer or basket does not slide easily.	Debris in the drawer slides.	► Pull the drawer or basket out and confirm the slides are free of debris. Clean if necessary.
	Drawer slides are not lubricated.	► Using a lightweight oil, lubricate the bearings in the slides.
	Drawer or basket is misaligned or not level.	► Confirm both slides for the drawer or basket are mounted at the same height.
	Drawer slide is faulty.	► Contact a qualified service technician.

Problem	Possible Cause	Action
Door does not open easily.	Debris in the hinges.	► Confirm the hinges are free of debris. Clean the hinges if necessary.
	A hinge is faulty.	► Confirm the hinge spring or pin is not damaged. Replace entire hinge (lower hinge only), if necessary.
	Lower hinge spring and/or pin may be bent or faulty.	► Replace the entire lower hinge spring and pin assembly.
Monitor display is hard to read.	Screen contrast is set too low.	► Change the screen contrast.
Alarm monitor is not responding.	Digital electronics are locked because of an interruption in power.	► Reset the monitoring system.

11.2   Chamber Temperature Problems

Problem	Possible Cause	Action
Chamber temperature displayed is higher or lower than the actual temperature.	Probe bottle is empty, or the amount of solution is too low.	► Check the level of product simulation solution in the bottle. Clean and refill the bottle if necessary.
	Monitor is not calibrated.	► Confirm the temperature probe is reading correctly. Calibrate the chamber probe if necessary.
	Connections for the chamber temperature probe are loose.	► Test the chamber probe connections. Secure the connections if necessary.
	Temperature probe wiring is an open circuit.	► Check the continuity of the probe wiring. Replace the probe if necessary.
	Digital electronics are locked because of an interruption in power.	► Reset the monitoring system.
Compressor runs continuously.	Refrigerator setpoint is set too low.	► Confirm the setpoint is set within the operating range and change it if necessary.
	Temperature control probe in the unit cooler is faulty.	► Replace the probe.
	Solid state relay is faulty.	► Confirm the relay is operating correctly. Replace the relay if necessary.
	Temperature controller is faulty.	► Confirm the temperature controller board is operating correctly. Replace it if necessary.
	Defrost timer is faulty.	► Replace the defrost timer.

Problem	Possible Cause	Action
Chamber temperature does not stabilize at the refrigerator setpoint.	Probe bottle is empty, or the amount of solution is too low.	► Check the level of product simulation solution in the bottle. Clean and refill the bottle if necessary.
	Condenser grill is dirty.	► Check the condenser grill. Clean it if necessary.
	Ambient air temperature around the refrigerator is too high.	► Confirm refrigerator location meets requirements. Refer to the operation manual.
	Circulation in the chamber is not adequate.	► Check if there are any items that may obstruct air flow and remove them if necessary.
	Unit cooler fan is not running.	► Check the voltage to the fan when door switch is activated. Replace the fan motor or door switch if necessary.
	Condensing unit fan is not running.	► Check the condensing unit fan connections. Replace the fan motor if necessary.
	Compressor starting relay is faulty.	► Confirm the relay is operating correctly. Replace the relay if necessary.
	Compressor motor has seized.	► Replace the compressor.
	Temperature control probe is faulty.	► Replace the probe.
	The temperature controller is faulty.	► Confirm the temperature controller board is operating correctly. Replace it if necessary.
	A component is faulty or internal connections are loose.	► Contact a qualified service technician.
	Refrigerant level is too low.	► Check the refrigeration lines for leaks and repair them if necessary. Check the refrigerant level. Recharge the refrigerant if necessary.

11.3 Alarm Activation Problems

Problem	Possible Cause	Action
Refrigerator is in an alarm condition, but alarms are not audible.	Audible alarms are muted.	► Verify that audible alarms are not muted. If time remaining is greater than five minutes, change MUTE timer value to five minutes and wait until timer resets.
	A component is faulty or internal connections are loose.	► Contact a qualified service technician.
	The alarm buzzer is faulty.	► Replace the alarm buzzer.
	The alarm system is faulty.	► Confirm the circuit board and line connections are functioning correctly.
	The control board is faulty.	► Replace control parts with those included in the control and display board kit.

Problem	Possible Cause	Action
Refrigerator meets an alarm condition, but the appropriate alarm is not active.	The alarm setpoint was changed.	► Check the current setpoints for the temperature alarms. Change the setpoints if necessary.
	A component is faulty or internal connections are loose.	► Contact a qualified service technician.
	The control board is faulty.	► Replace control parts with those included in the control and display board kit.
High Temperature alarm activates when the door is opened, then clears shortly after the door is closed.	The probe bottle is empty.	► Check the level of product simulation solution in the bottle. Clean and refill bottle if needed.
	The high temperature alarm setpoint is set too low.	► Check the setpoint. Change the setpoint if necessary.
	Unit cooler fan continues to run while the door is open.	► Test the door switch and unit cooler fan connections. Secure the connections if necessary. Replace the door switch or fan motor if necessary.
	Connections for the chamber temperature probe are loose.	► Test the chamber temperature probe connections. Secure the connections if necessary.
	Chamber probe is faulty.	► Test the probe. Replace the probe if necessary.
	A component is faulty or internal connections are loose.	► Contact a qualified service technician.
Refrigerator is connected to power, but the AC Power Failure alarm is active.	The ON/OFF AC power switch is OFF.	► Switch the AC ON/OFF power switch to the **ON** position.
	Outlet connection is faulty.	► Verify power at the outlet. Repair the original outlet or connect to a different outlet if necessary.
	Power cord is faulty.	► Confirm the power cord is connected securely. Secure the power cord if necessary.
	The ON/OFF AC power switch located inside the front lower panel is faulty.	► Replace the AC ON/OFF power switch.
	A component is faulty or internal connections are loose.	► Contact a qualified service technician.

Problem	Possible Cause	Action
Door Open alarm is activating sporadically.	The door is not closing completely.	► Clean hinges if debris is present. ► Confirm door is aligned. ► Confirm hinge spring and/or pin are not damaged. Replace hinge (lower only) if necessary.
	The door is closing but not sealing completely.	► Confirm the door gasket seals completely. Replace the door gasket if necessary.
	Connections for the door switch are faulty.	► Test the switch connections. Secure the connections if necessary.
	The door switch is faulty.	► Replace the door switch.
	The control board is faulty.	► Replace control parts with those included in the control and display board kit, or replace the monitor/control board.
	A component is faulty or internal connections are loose.	► Contact a qualified service technician.
	The Door Ajar Timeout is set to zero, causing the alarm to activate immediately when the door is opened.	► Check the current setpoint for the Door Ajar alarm. Change the setpoint if necessary.
All alarms are activating sporadically.	Alarm system is faulty.	► Confirm the circuit board and line connections are functioning correctly.
	Control board is faulty.	► Replace control parts with those included in the control and display board kit.
	A component is faulty or internal connections are loose.	► Contact a qualified service technician.
Condenser alarm is active.	Condenser fins are dirty.	► Clean as necessary, or order new ones from Helmer or your distributor.
	Ambient temperature is too high.	► Check to ensure the refrigerator is placed according to the operating specifications in the operation manual.
	Condenser fan motor is faulty.	► Replace the condenser fan motor.
	Condenser probe is not calibrated.	► Confirm the condenser probe is reading correctly. Calibrate the probe if necessary.
	Condenser temperature probe is faulty.	► Test the probe. Replace the probe if necessary.
	Connections for the condenser temperature probe are loose.	► Test the probe connections. Secure the connections if necessary.
	Refrigerant level is too low.	► Check refrigeration lines for leaks and repair if needed. Check refrigerant level. Recharge if low.

Problem	Possible Cause	Action
An alarm activated, but the temperature recorded at activation does not match the alarm setpoint.	Monitor settings are not calibrated.	► Confirm the temperature probe is reading correctly. Calibrate the probe if necessary.
	Temperature changed slightly around the time of activation.	► No action needed.
The No Battery alarm is activating sporadically.	Battery voltage level on the backup batteries for the monitoring system is low.	► Replace the backup batteries for the monitoring system.

11.4 Testing Problems

Problem	Possible Cause	Action
Automatic temperature tests do not work.	Connections for the chamber temperature probe are loose.	► Test the chamber temperature probe connections. Secure the connections if necessary.
	Chamber temperature probe is faulty.	► Test the chamber temperature probe. Replace the probe if necessary.
	Control board is faulty.	► Replace parts with those included in the control and display board kit.
	High Alarm setpoint is set significantly higher than the default value, or the Low Alarm setpoint is set significantly lower than the default value.	► Confirm the alarm setpoints are set at the expected or correct values. ► Test the temperature alarms manually.
	A component is faulty or internal connections are loose.	► Contact a qualified service technician.

11.5   **Condensation Problems**

Problem	Possible Cause	Action
Excessive water in the water evaporation tray inside the lower compartment in the back of the unit.	Humid air is entering the chamber	► Confirm the refrigerator is level, and the door is aligned, closing tightly, and sealing correctly. Correct issues as necessary.
Excessive water in the chamber.	Humid air is entering the chamber.	► Confirm the refrigerator is level, and the door is aligned, closing tightly, and sealing correctly. Correct issues as necessary.
	Connection between the unit cooler and the drain tube is loose.	► Confirm the connection is secure. Tighten the connection if necessary.
	Defrost timer bypass switch may be in the ON position.	► Check the defrost timer bypass switch on the circuit board. If in the **ON** position, switch to the **OFF** position. If the problem persists, replace the defrost timer.
	Drain line is plugged.	► Confirm the drain tube is free of debris. Remove debris if necessary.
Excessive moisture on the doors.	Humid air is entering the chamber.	► Confirm the refrigerator is level, and the door is aligned, closing tightly, and sealing correctly.
	Relative humidity around refrigerator is too high.	► Confirm refrigerator location meets requirements.
Water leaks from the bottom of the refrigerator.	Humid air is entering the chamber.	► Confirm the refrigerator is level, and the door is aligned, closing tightly, and sealing correctly.
	Excessive water is found in the evaporation tray inside the refrigerator.	► Contact a qualified service technician.

12 Parts

⚠️ **NOTICE**
► 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.

12.1 Front

12.1.1 Monitoring System
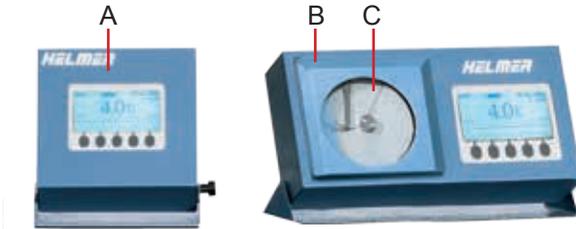
Monitoring features.

Label	Description	Part Number
A	i.Center stand-alone monitoring system (standard on iLR105)	-
B	Combined i.Center monitoring system and temperature chart recorder (standard on iB105)	-
C	Chart paper	220366 (52 sheets)
Not shown	Chart recorder backup battery	120218

12.1.2 **i.Center Display Parts**
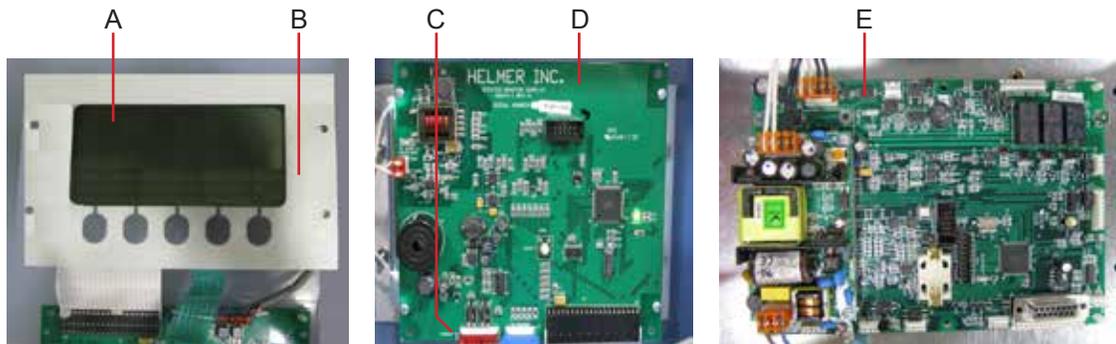
Left: Display assembly including LCD display and touchpad. Middle: Display board. Right: Control board.

Label	Description	Part Number	Schematic Label
A	LCD display (see note below)	120452	K
B	Touchpad	320722-1	K
C	Interface cable	400831-1	-
D	Display board	Included in the control and display board kit	K
E	Control board assembly (includes display and control board)	400651-3	E
Not shown	Display assembly	400509-1 (includes LCD board and touchpad)	-

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

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

12.1.3 **Lower Panel**
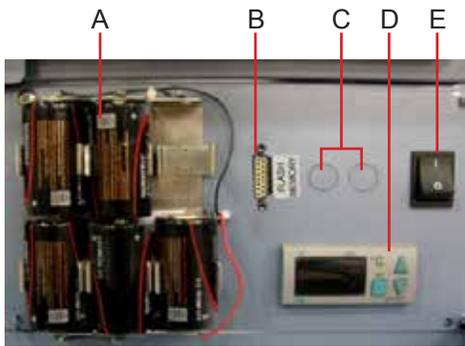
Front panel features.

Label	Description	Part Number	Schematic Label
A	Monitoring system backup batteries	715031	AE
B	Flash port	-	J15
C	Circuit breakers (230 V models only; knockouts shown on 115 V model)	230 V / 50 Hz 120272 230 V / 60 Hz 120288	P
D	Temperature controller	400835-1	B
E	Main power switch	120478	Q

12.2   Rear

Rear features.

Label	Description	Part Number	Schematic Label
A	Nut flanges for brace bars used in stacking undercounter units (four shown)	-	-
B	Rear access port	-	-
C	Drain line (copper tube segment)	321190-1	-
D	Product specification label	-	-
E	Power cord connector	120299	-
F	Compressor/component rear compartment door	321184-1	-
G	Remote alarm contacts	-	-
H	i.Center monitoring system data port	-	-
I	RS-232 COM port (optional)	-	-
J	Power cord	-	-
K	Condenser probe	400674-1	AC
L	Compressor	Contact Helmer	A
M	Condensing unit fan motor	Contact Helmer	U
Not shown	Compressor solid state relay	400841-1	AD
	Defrost timer	800120-1	F
	Caster (optional, swivel with brake)	220380	-

12.2.1   **Electrical Tray**

Kick plate (removed). Pull-out electrical components tray (open).

⚠	**WARNING**	Disconnect the refrigerator from AC power before accessing the electrical tray.
⚠	**NOTICE**	The control board is sensitive to static electricity and can be damaged by electrostatic discharge. Use proper ESD precautions when handling the board.

12.3   Interior

Interior features.

Label	Description	Part Number	Schematic Label
A	Door	**Solid door** Stainless steel: 400916-1 Powder coated: 400916-2 **Glass door (optional)** Stainless steel: 400917-1 Powder coated: 400917-2	-
B	Drawer (blood bank model)	400752-3	-
C	Door switch	120380	M
D	Roll-out basket (optional)	400815-1	-
E	Standard for shelf, drawer, or roll out basket	321173-1	-
F	Chamber temperature probe	400510-1	AB
G	Drawer slide for drawer or roll out basket	400753-2	-
H	Probe bottle and glycerin kit	400922-1	-
I	Shelf (laboratory / pharmacy model)	400814-1	-

12.3.1 **Lighting**
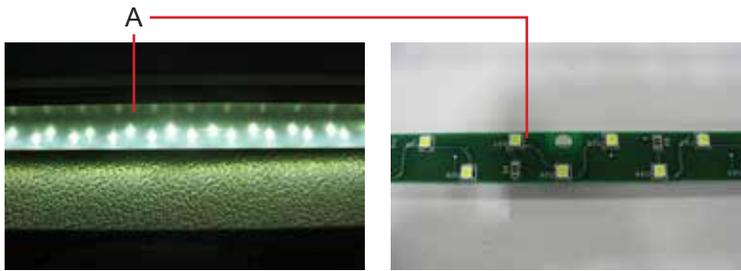
Light features (partial views).

Label	Description	Part Number	Schematic Label
A	Light assembly (includes circuit board and cover)	800023-1	P
Not shown	Light cover	-	-

12.3.2 **Unit Cooler**
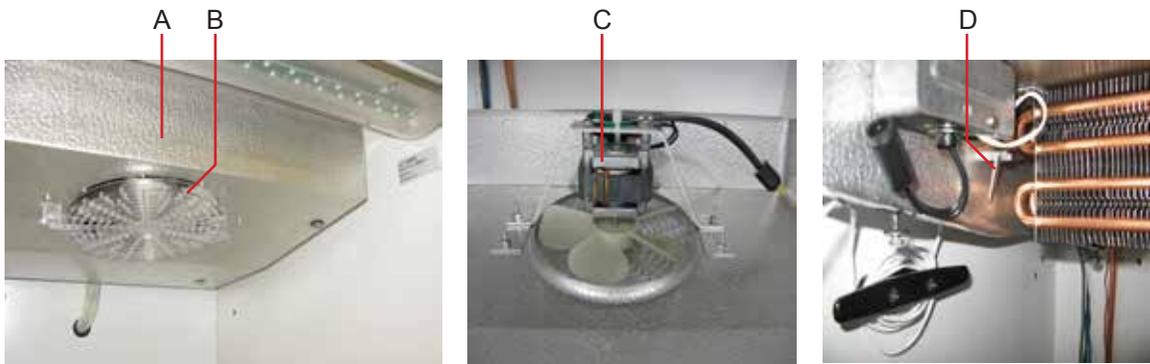
Left: Unit cooler with fan guard. Middle: Unit cooler fan. Right: Temperature control probe.

Label	Description	Part Number	Schematic Label
A	Unit cooler	-	-
B	Fan guard	-	-
C	Unit cooler fan	115 V: 120540 230 V: 120560	H
D	Temperature control probe	120579	M

12.4   **Door Hinges**

Hinge, hinge spring and pin assembly, and door handle with key lock.

NOTE	Spring tension is controlled at the point where the pin is stopped by the side plate (C, D).

Label	Description	Part Number
A	Hinge, covered, edge mount	220506
B	Hinge, uncovered, without spring assembly	-
C	Hinge, uncovered, spring and pin assembly	-
D	Close up, hinge spring and pin assembly	-
E	Door handle - Magnetic offset latch with key lock	220426
F	Door key lock with key, close-up	-

12.5   **Side Access Panel**

Undercounter refrigerators feature easy access for servicing, removal, and replacement of the compressor and condenser. The compressor is accessible from the rear and the side.

Side access panel.

13 Schematics

13.1 i.Series Schematic

i.SERIES, UNDERCOUNTER REFRIGERATOR

14   i.Center Screen Reference

HOME screen
    MAIN button
        MAIN screen
    MUTE button (changes mute timer)
    LIGHT button (turns light on or off, if option installed)

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

EVENT LOG screen
    EVENT LOG DETAIL screen

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

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

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

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

TEMPERATURE CALIBRATION screen
    Temperature probe display
    Temperature option

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

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Section III: Horizon Series™ Models

15 Product Configuration

15.1 Install Battery for Backup Power

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

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

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

⚠	NOTICE	When installing a replacement battery, use only a battery which meets the specifications outlined in chapter **17.6** (Supplies).

The the battery is located below the chamber, behind the front cover.

Monitoring system backup battery.

Monitoring system battery is installed backwards in the battery holder. Reverse the installation and connect the battery to provide monitoring system with backup power in the event of AC power failure.

15.2 External Monitoring Devices

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

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

The remote alarm interface is a relay switch with three terminals:
► Common (COM)
► Normally Open (NO)
► Normally Closed (NC)

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

The terminals on the remote alarm interface have the following maximum load capacity:
► 0.5 A at 125 V (AC): 1 A at 250 V (DC)

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

15.3 Move Drawers, Shelves, and Baskets

Storage features.

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

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

Remove a drawer or basket:
1 Pull drawer or basket out until it stops.
2 On the right drawer slide, press the release tab down.
3 While holding the right-side release tab down, press the release tab up on the left drawer slide.
4 Pull drawer or basket free of the slides.

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

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

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

15.4   Move Slides and Brackets

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

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

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

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

15.5   Level the Refrigerator

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

Leveling feet must be adjusted to provide unit cooler drainage.

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

Side-to-side:
1   Rotate the leveling feet to raise or lower leveling feet.
2   When refrigerator is properly leveled, bottom of the unit cooler will be horizontal (parallel to the floor).

15.6   Optional Adapter Kits for Medication Dispensing Locks

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

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15.7   **Reverse Door Hinge and Handle**

⚠ **NOTICE**   Before reversing door hinge and handle, protect stored items in refrigerator from extended exposure to adverse temperature.

NOTE   Refrigerator must be on the floor or on an elevated work surface with enough space in front of the refrigerator to lay the door face-down for disassembly.

15.7.1   **Remove the Door and Hinges**

1   Open the lower front control panel. Switch AC ON/OFF switch OFF. Disconnect the battery. Disconnect AC power.

2   Remove four screws holding the kick panel on the cabinet. Set the kick panel aside.

Kick panel

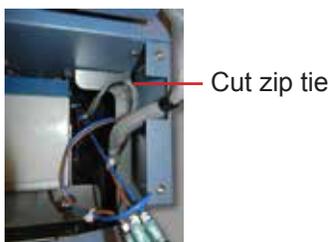Remove   Remove

3   Remove six screws holding the access panel and cover on the cabinet. Lay the panel in front of the cabinet, ensuring there is no strain on the power switch wires.

Remove   Remove
Access panel   Access
                                         panel cover
Access
panel cover   Access panel
Remove   Remove

4   Remove plug from the access panel (on the handle-side of the refrigerator). Remove grommet from the hole (on the hinge-side of the refrigerator). Slide the data cable out of the slot (on the kick plate).

Pull plug out   Pull grommet
                                         out

                                         Slide sleeve
                                         out of slot

**5**   Cut the zip tie inside the cabinet.

Cut zip tie

6 Remove the door handle assembly.

    a Remove four screws holding the door handle assembly on the door.

    b Set the door handle assembly aside.

Remove

Door handle assembly.

7 Remove door latch / door catch.

    a Remove two screws holding the door latch plates and spacer bar on the cabinet

    b Set the latch plates and spacer bar aside.

Cabinet

Strike plate
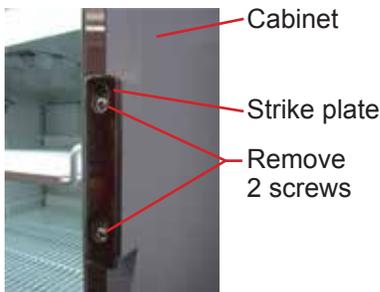
Remove
2 screws

Door latch plates.

8 With the door shut, remove the cover plate from both hinges.

9 Remove the spring assembly from the lower hinge.

    a Use a J-hook tool to engage the left-most hole in the spring cap and rotate the spring cap from *left to right,* and hold.

    b Remove the pin from the spring cap.

    c Allow the spring to relax.

    d Use a J-hook tool to engage any hole in the spring cap compress spring downward.

    e Remove spring assembly from the lower hinge.

    f Set the spring assembly aside.

⚠️ **NOTICE** A second person should assist by supporting the door while the hinges are removed.

NOTE The two screws holding the hinge on the door are longer than the three screws holding the hinge on the cabinet. The screws must be installed in the same location when moving the hinge to the opposite side of the door.

---

10 Remove the lower hinge.

   a Support the door.

   b Remove five screws attaching the lower hinge to the door and cabinet.

   c Remove the lower hinge.

   d Reverse the hinge manually (as if moving the hinge from a fully-closed to a fully-open position).

   e Set the lower hinge aside.

   f Continue to support the door.

11 Remove the upper hinge.

   a Remove five screws attaching the upper hinge to the door and cabinet.

   b Remove the upper hinge.

   c Reverse the hinge manually (as if moving the hinge from a fully-closed to a fully-open position).

   d Set the upper hinge aside.
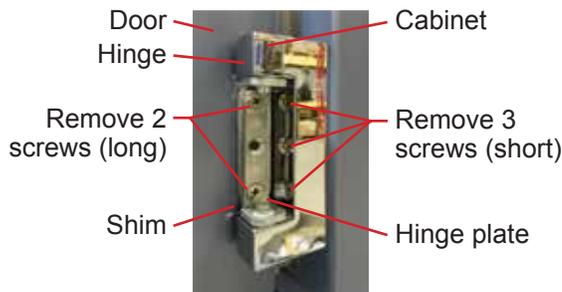
Hinge removal (lower hinge shown with spring removed).

12 Lay the door face-down in front of the cabinet. Ensure that there is no strain on the data cable passing from the cabinet to the door.

15.7.2   Reverse the Cable Routing in the Door

The undercounter door consists of an inner frame and outer frame. The data cable is connected to the display circuit board on the front of the door.

The length of the cable inside the door is approximately three feet. The cable follows a channel along the top and side of the outer frame. Additional slack has been bundled in the cable.
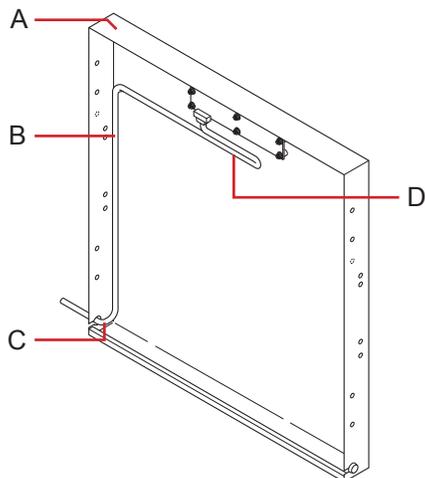
Outer door frame (right-hinged solid door shown) and data cable.

| Label	Description
A	Outer door frame
B	Data cable (gray)
C	Cable exit (corner of door)
D	Additional cable slack

1 Lay the door assembly face-down on a solid work surface.

2 Remove remaining screws from both sides of the door assembly.

3 Lift the inner door frame out of the outer door frame and set aside. A J-hook tool may be used along the bottom edge of the door assembly to lift the inner frame.

4 Remove the plug from the handle-side of the door. Set the plug aside.

Pull plug out
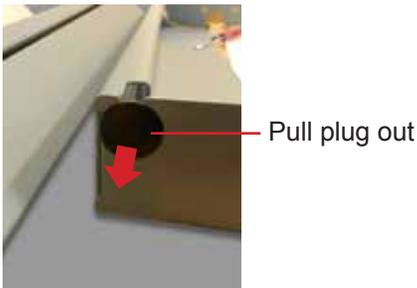
5 Pull the grommet out of the hole in the door. Slide the data cable out of the slot.

Slide cable out of slot

Pull grommet out
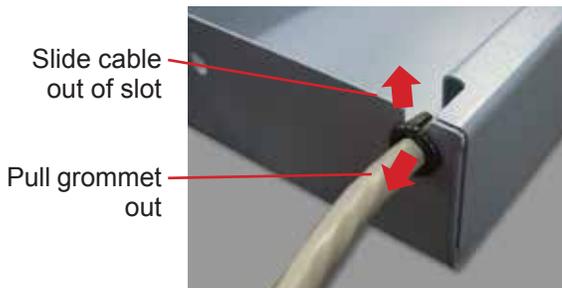
6 Re-route the data cable.

   a Route the data cable inside the door and out through the slot in the corner opposite from where the cable had previously exited the door.

   b Cable should follow the bottom edge of the door frame, as closely as possible.

   c Tape the cable to the door frame.

   d Excess slack in the cable should be outside of the door.
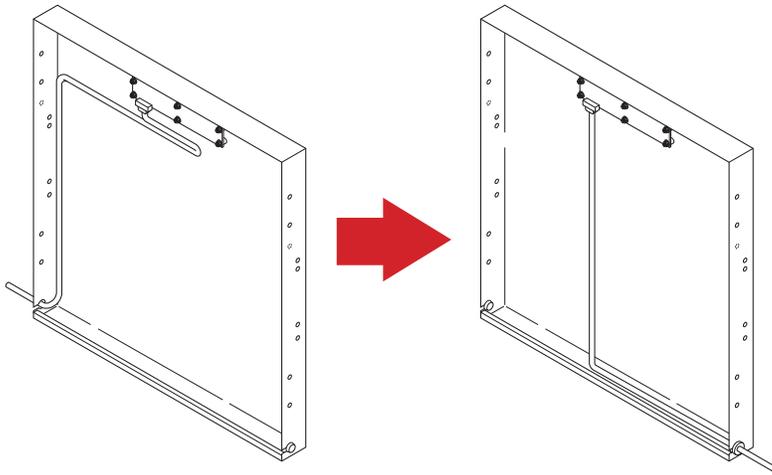
Left: Original cable routing (right-hinged door). Right: New cable routing (left-hinged door).

7   Route the data cable out of the door.
- **a**   Slide the data cable through the slot in the door.
- **b**   Insert the door-side grommet into the hole in the door.

8   Reinstall the inner door frame inside the outer door frame. Install screws in the unused holes on the door where hinges were originally installed.

15.7.3   Reinstall the Door and Hinges

1   Install the hinges and hinge plates on the door.
- **a**   Hand-thread two screws through each hinge and into the door.
- **b**   Leave the screws slightly loose.
- **c**   If a shim was used on the lower hinge, transfer the shim to the new hinge location.

NOTE	Ensure that the upper and lower hinges are not interchanged when moving the hinges to the opposite side of the door.

Attach hinge to door (lower hinge shown).

⚠️	**NOTICE**	A second person should assist by supporting the door while the hinges are installed.

2   Install the door on the cabinet.
- **a**   Lift the door to the cabinet.
- **b**   Align the holes in the hinges with the corresponding holes in the cabinet.
- **c**   Hand-thread three screws through each hinge and into the cabinet.
- **d**   Do not allow the weight of the door to rest on the hinges.

Attach hinge to cabinet (lower hinge shown).

3   Align the door and tighten screws.
    a   Support the door so the top edge of the door is level.
    b   Level the door using a shim if necessary.
    c   Tighten all screws attaching both hinges to the door and to the cabinet.

NOTE	If a shim is necessary to level the door after hinge reversal, contact Helmer Technical Service to obtain a shim.

4   Route the data cable across the front of the cabinet. Attach the cable to the zip tie holder under the cabinet on the hinge side.

*Data cable secured at the hinge-side of the cabinet after hinge reversal.*

5   Install the data cable in the door.
    a   Slide the data cable through the slot in the access panel.
    b   Install the grommet in the hole.
    c   Install the plug in the access panel on the opposite side.
    d   Allow enough slack (approximately 3") in the data cable between the door and the cabinet so the door can pivot open and closed without straining the cable.
6   Install the access panel and cover.
7   Install the kick panel.
8   Install the door handle on the opposite side of the door.
9   Install the latch plates and spacer bar on the opposite side of the cabinet.
10 Install the hinge spring and pin assembly.
    a   Close the door.
    b   Assemble the hinge spring assembly for the left side of the door (Figure A).
    c   Orient the bend in the coil toward the front of the refrigerator (Figure B).
    d   Slide the internal hex cap (with washer) on to the upper hex bolt in the lower hinge.
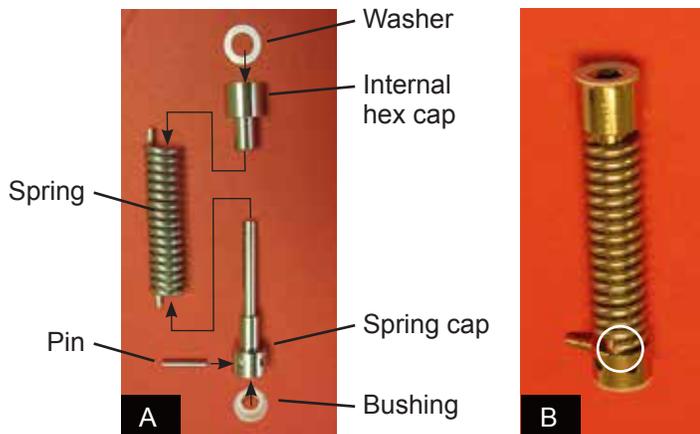
e   Use a J-hook tool in the spring cap to compress the spring upward *(Figure C)*.

f   While compressing the spring, slide the spring cap over the lower hex bolt in the lower hinge *(Figure D)*.
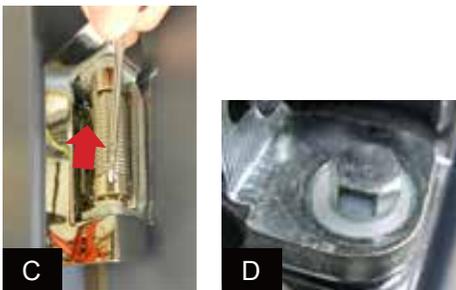
g   Use a J-hook tool to engage the right-most hole in the spring cap and rotate the spring cap from *right to left,* and hold.

h   Count four holes, starting from and including the spring cap hole closest to the end of the coil.

i   Insert the pin in the fourth hole.
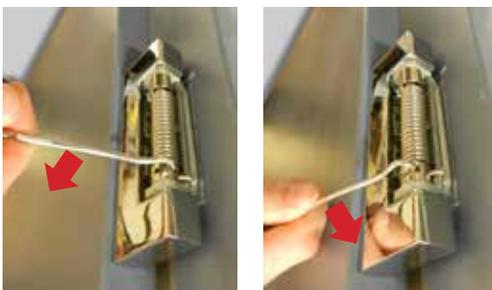
Rotate the spring using a J-hook tool then insert pin (left-hinged door shown).

11   Switch AC ON/OFF switch ON. Reconnect the battery.

12   Close the lower front control panel.

13   Press the **MUTE** button to disable the high temperature alarm while refrigerator reaches operating temperature.

14   Verify the door is level and the hinges operate smoothly and the door seals tightly.

15.8	**Stacked Undercounter Units**

⚠ **WARNING**
- ► For a stacked configuration, both units must have leveling feet installed.
- ► The back brace bars and front stabilizing brackets must be installed.
- ► When stacking a refrigerator and freezer (104 and/or 105 models), place the heavier unit on the bottom.
- ► Do not open multiple, loaded drawers or baskets at the same time.

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

16 Settings

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

⚠ **NOTICE**
- ► Control Sensor Offset and Hysteresis settings are factory-preset and should not be changed unless directed by Helmer Technical Service.
- ► Changing temperature settings affects operation of the refrigerator. Do not change settings unless instructed by Helmer Technical Service.

16.1 Monitor and Controller Interface
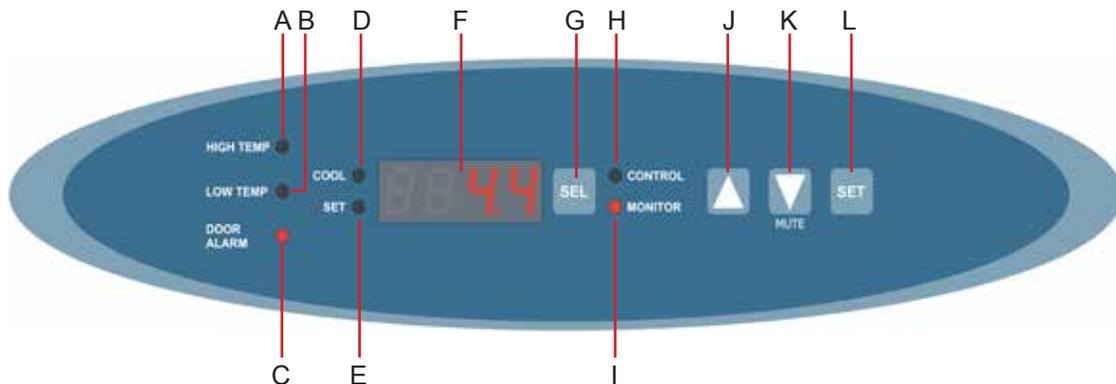
Label	Description	Function
A	HIGH TEMP lamp	Indicates when the refrigerator is in a high temperature alarm condition. Also indicates high alarm temperature setpoint is being changed.
B	LOW TEMP lamp	Indicates when the refrigerator is in a low temperature alarm condition. Also indicates low alarm temperature setpoint is being changed.
C	DOOR ALARM lamp	Indicates when the door is open.
D	COOL lamp	Indicates the compressor is running.
E	SET lamp	Indicates when temperature setpoint or alarm setpoint is being changed.
F	Display	Displays real-time temperature information, setpoints, and alarms.
G	SEL button	Toggles between alarm monitor and control modes.
H	CONTROL lamp	Indicates when the reading from the control temperature probe is displayed.
I	MONITOR lamp	Indicates when the display is showing temperature readings from the chamber probe. Also indicates when alarm setpoints are being changed.
J	UP ARROW button	Increases a temperature setting.

Label	Description	Function
K	DOWN ARROW / MUTE ALARM button	Decreases a temperature setting. Also mutes the audible alarm for five minutes.
L	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.

16.2   **Refrigerator Setpoint**

NOTE	Default setpoint is 4.0 °C.

Change the setpoint if:
- ► Your organization requires a chamber temperature other than 4.0 °C.
- ► The normal chamber temperature is too high or low (after completing preventive maintenance and applicable troubleshooting tasks).

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

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

EXAMPLE	► Current setpoint is 4.0 °C ► Target setpoint is 5.0 °C ► Setpoint adjustment value is +1.0 °C

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

16.3   **Temperature Alarm Setpoints**

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

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

16.3.1 High Temperature Alarm

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

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

16.3.2 Low Temperature Alarm

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

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

16.4 Temperature Calibration Setpoints

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

Flashing Lamp	Selected Setting
HIGH TEMP and MONITOR	High Temp alarm setpoint
LOW TEMP and MONITOR	Low Temp alarm setpoint

Flashing Lamp	Selected Setting
MONITOR only	Monitor Offset
CONTROL only	Control Sensor Offset
CONTROL only	Control Hysteresis

16.4.1   **Monitor Offset**

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

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

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

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

EXAMPLE   ► Measured temperature (at the probe bottle) is 4.0 °C
► Displayed temperature is 4.5 °C
► Offset adjustment value is -0.5 °C

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

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

16.4.2   Control Sensor Offset

The temperature controller senses chamber temperature through a probe in the unit cooler. The chamber setpoint typically varies from the measured temperature, so an offset value is used by the control system to compensate for the difference.
► Value is factory-preset and varies for each unit
► Offset value can be changed from -10.0 °C to +10.0 °C

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

	NOTE	If the variance is within acceptable limits for your organization, changing the offset value is optional.

16.4.3   Hysteresis
► Default setpoint is 1.0 °C
► Allowable temperature variance on each side of the refrigerator setpoint.

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

16.5   Test Alarms

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

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

16.5.1   Chamber Temperature Alarm

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

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

⚠	NOTICE	Temperature probes are fragile; handle with care.

Test the low alarm:
1   Identify setting for low alarm setpoint.
2   Remove chamber temperature probe from bottle.
3   Immerse probe in chilled water.
4   While stirring probe in chilled water, add approximately one teaspoon (5 mL) of ice every 20 seconds. Ensure probe is at the bottom of the glass.
5   When low temperature alarm sounds, note the temperature on the monitoring system display.

    6   Compare the temperature at which the alarm sounds to the low alarm setpoint. If values do not match, refer to chapter **18** (Troubleshooting).

Test the high alarm:

1   Identify setting for high alarm setpoint.

2   While stirring probe in chilled water, add warm water so temperature increases 0.5 °C per minute.

3   When high temperature alarm sounds, note the temperature on the monitoring system display.

4   Compare the temperature at which the alarm sounds to the high alarm setpoint. If values do not match, refer to chapter **18** (Troubleshooting).

5   Remove probe from warm water.

6   Place temperature probe in probe bottle, immersing it at least 2" (50 mm).

16.5.2   **Power Failure Alarm**

1   Switch AC ON/OFF switch **OFF**. Audible power failure alarm will activate immediately and "PoFF" (power off) will appear on the display.

2   Switch AC ON/OFF switch **ON**. Audible power failure alarm will cease and "PoFF" will clear from the display.

16.5.3   **Door Open Alarm**

►   Factory-set to three minutes.

►   Value can not be changed.

Test the alarm:

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.

17   Maintenance

⚠	**NOTICE**	►	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.

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

17.1   Recharge Refrigerant

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

⚠	**NOTICE**	Use only non-CFC R-134A refrigerant.

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

Model	Initial Charge
105	9.5 oz. (269 g)

Obtain:
► Refrigerant
► Calibrated pressure gauge (0 psi to 25 psi (0 kPa to 175 kPa))

⚠	**NOTICE**	If the compressor has been changed, the refrigerant charge amount may be different than stated above. if the compressor has been changed, contact Helmer Technical Service for to verify the refrigerant charge amount.

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

NOTE	Pressure varies depending on ambient air temperature.

4   Add refrigerant. Check the pressure on the low side.
   ► Low side = 16 psi to 18 psi (110 kPa to 125 kPa)
5   Remove pressure gauge.

17.2   Test Monitoring System Battery

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

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

⚠️ **NOTICE**   When installing a replacement battery, use only a battery which meets the specifications outlined in chapter **17.6** (Supplies).

17.3 Replace LED Lamp Strip (Optional)

1 Disconnect the monitoring system backup battery. Switch AC ON/OFF switch **OFF**.
2 Using a screwdriver, detach lamp strip from chamber.
3 Unsnap the defective lamp strip and disconnect wires.
4 Connect new lamp strip to the wires.
5 Reattach lamp strip to chamber.
6 Switch AC ON/OFF switch **ON**. Reconnect the monitoring system backup battery.
7 Press the **MUTE** button to disable the high temperature alarm while refrigerator reaches operating temperature.

17.4 Clean the Refrigerator

17.4.1 Condenser Grill

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

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

17.4.2 Exterior

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

17.4.3 Interior

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

17.4.4 Door Gaskets

Clean with soft cloth and mild soap and water solution.

17.4.5 Clean and Refill Probe Bottle

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

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

Clean and refill bottle:
1 Remove probe from bottle.
2 Remove bottle from bracket.
3 Clean bottle with water-bleach solution.
4 Fill bottle with 4 oz. (120 mL) of product simulation solution.
5 Cap bottle tightly to minimize evaporation.

6   Place bottle in bracket.

7   Replace probe, immersing at least 2" (50 mm).

17.5   Unit Cooler Cover Removal and Installation

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

Required tools:
► 5/16" socket wrench
► Tool to push putty away from the drain hose

Drain line and hose.

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

17.5.1   Remove the Unit Cooler Cover

CAUTION   Disconnect refrigerator from AC power when removing the unit cooler cover.

1   Switch AC ON/OFF switch **OFF**. Disconnect the monitoring system backup battery.
2   On the back of the cabinet, peel the putty back to expose the drain hose (C).
3   Remove top drawer, basket, or shelf from the chamber.
4   Remove drain hose from unit cooler drain port (B).
    a   Pull drain hose downward to separate from unit cooler.
    b   Twist drain hose while pulling to assist in removal.
5   Push the drain hose (C) out through rear of chamber.
6   Remove the unit cooler cover.
    a   Hold unit cooler cover in place to prevent it from dropping.
    b   Use the socket wrench to remove four screws securing the unit cooler cover.
    c   Carefully lower unit cooler cover to avoid damage to the fan wiring.

17.5.2   Install the Unit Cooler Cover

1   Verify unit cooler wiring is connected and routed correctly.
    a   Wiring should be routed above copper tube inside the unit cooler.
    b   Reconnect wires if they have separated.

2   Attach unit cooler cover.
   a   Lift unit cooler cover into place.
   b   Front edge of the cover should be behind the unit cooler case.
   c   Use the socket wrench to install four screws to secure the unit cooler cover.
3   Insert the drain hose through hole in the refrigerator.
   a   Push drain hose upward, toward the unit cooler drain port.
   b   In the chamber, push drain hose onto unit cooler drain port.
4   Reinstall top drawer, basket, or shelf if previously removed.
5   On the back of the cabinet, press putty around the drain hose.
6   Switch AC ON/OFF switch **ON**. Reconnect the monitoring system backup battery.
7   Press the **MUTE** button to disable the high temperature alarm while refrigerator reaches operating temperature.

17.6   Supplies

Refrigerant: non-CFC, R-134A

Chart paper: 220366 (52 sheets)

Glycerin solution: 400922-1

LED lamp strip (optional): 800023-1

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

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

18 Troubleshooting

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

18.1 General Operation Problems

Problem	Possible Cause	Action
A drawer or basket does not slide easily.	Debris in the drawer slides.	► Pull the drawer or basket out and confirm the slides are free of debris. Clean if necessary.
	Drawer slides are not lubricated.	► Using a lightweight oil, lubricate the bearings in the slides.
	Drawer or basket is misaligned or not level.	► Confirm both slides for the drawer or basket are mounted at the same height.
	A drawer slide is faulty.	► Contact a qualified service technician.
Door does not open easily.	Debris in the hinges.	► Confirm the hinges are free of debris. Clean the hinges if necessary.
	A hinge is faulty.	► Confirm the hinge spring or pin is not damaged. Replace entire hinge (lower hinge only), if necessary.
	Lower hinge spring and/or pin may be bent or faulty.	► Replace the entire lower hinge spring and pin assembly.

18.2 Chamber Temperature Problems

Problem	Possible Cause	Action
"Prob" (probe) appears on display, but chamber temperature is set correctly.	Connections for the chamber temperature probe are loose.	► Test the chamber probe connections. Secure the connections if necessary. ► Calibrate the probe if necessary.
	Chamber temperature probe wiring is an open circuit.	► Check the continuity of the chamber probe wiring and connections. Secure the connections or replace the probe if necessary.
Compressor runs continuously.	Refrigerator setpoint is set too low.	► Confirm the setpoint is set within the operating range and change it if necessary.
	Temperature control probe in the unit cooler is faulty.	► Confirm the unit cooler probe is providing resistance in the range of 98 Ω to 110 Ω. Replace the probe if necessary.
	Monitor/control board is faulty.	► Confirm the monitor/control board is operating correctly. Replace it if necessary.
	Compressor starting relay is faulty.	► Confirm the relay is operating correctly. Replace the relay if necessary.

Problem	Possible Cause	Action
Chamber temperature does not stabilize at the refrigerator setpoint.	Monitor/control board is faulty.	► Confirm the monitor/control board is operating correctly. Replace it if necessary.
	Condensing unit fan is not running.	► Check the condensing unit fan connections. Replace the fan motor if necessary.
	Unit cooler fan is not running.	► Check the voltage to the fan when door switch is activated. Replace the fan motor or door switch if necessary.
	Compressor motor has seized.	► Replace the compressor.
	Temperature control probe is faulty.	► Confirm the probe is providing resistance in the range of 98 Ω to 110 Ω. Replace the probe if necessary.
	Refrigerant level is too low.	► Check the refrigeration lines for leaks and repair them if necessary. Check the refrigerant level. Recharge the refrigerant if necessary.
	Compressor starting relay is faulty.	► Confirm the relay is operating correctly. Replace the relay if necessary.
	Condenser grill is dirty.	► Check the condenser grill. Clean it if necessary.
	Circulation in the chamber is not adequate.	► Check if there are any items that may obstruct air flow and remove them if necessary.
	Ambient air temperature around the refrigerator is too high.	► Confirm refrigerator location meets requirements. Refer to the operation manual.
	A component is faulty or internal connections are loose.	► Contact a qualified service technician.

18.3　　　　Alarm Activation Problems

Problem	Possible Cause	Action
Refrigerator is in an alarm condition, but alarms are not audible.	Alarm system is faulty.	► Confirm the circuit board and line connections are functioning correctly.
	Monitor/control board is faulty.	► Replace the monitor/control board.
	Alarm buzzer is faulty.	► Replace the alarm buzzer.
	A component is faulty or internal connections are loose.	► Contact a qualified service technician.
	Alarm Disable key is in the OFF position.	► Switch the Alarm Disable key to the **ON** position.
	Audible alarms are muted.	► Verify that audible alarms are not muted.

Problem	Possible Cause	Action
Refrigerator meets an alarm condition, but the appropriate alarm is not active.	Monitor/control board is faulty.	► Replace the monitor/control board.
	Alarm setpoint was changed.	► Check the current setpoints for the temperature alarms. Change the setpoints if necessary.
	A component is faulty or internal connections are loose.	► Contact a qualified service technician.
High Temperature alarm activates when the door is opened, then clears shortly after the door is closed.	Connections for the chamber temperature probe are loose.	► Test the chamber temperature probe connections. Secure the connections if necessary.
	Chamber probe is faulty.	► Test the probe. Replace the probe if necessary.
	Unit cooler fan continues to run while the door is open.	► Test the door switch and unit cooler fan connections. Secure the connections if necessary. Replace the door switch or fan motor if necessary.
	Probe bottle is empty.	► Check the level of product simulation solution in the bottle. Clean and refill bottle if needed.
	High temperature alarm setpoint is set too low.	► Check the setpoint. Change the setpoint if necessary.
	A component is faulty or internal connections are loose.	► Contact a qualified service technician.
Refrigerator is connected to power, but the AC Power Failure alarm is active.	Outlet connection is faulty.	► Verify power at the outlet. Repair the original outlet or connect to a different outlet if necessary.
	Power cord is faulty.	► Confirm the power cord is connected securely. Secure the power cord if necessary.
	AC ON/OFF power switch located inside the front lower panel is faulty.	► Replace the AC ON/OFF power switch.
	AC ON/OFF power switch is OFF.	► Switch the AC ON/OFF power switch to the **ON** position.
	A component is faulty or internal connections are loose.	► Contact a qualified service technician.
	A component is faulty or internal connections are loose.	► Contact a qualified service technician.

Problem	Possible Cause	Action
Door Open alarm is activating sporadically.	Door is not closing completely.	▶ Clean hinges if debris is present. ▶ Confirm door is aligned. ▶ Confirm hinge spring and/or pin are not damaged. Replace hinge (lower only) if necessary.
	Door is closing but not sealing completely.	▶ Confirm the door gasket seals completely. Replace the door gasket if necessary.
	Connections for the door switch are faulty.	▶ Test the switch connections. Secure the connections if necessary.
	Door switch is faulty.	▶ Replace the door switch.
	Monitor/control board is faulty.	▶ Replace the monitor/control board.
	A component is faulty or internal connections are loose.	▶ Contact a qualified service technician.
All alarms are activating sporadically.	Alarm system is faulty.	▶ Confirm the circuit board and line connections are functioning correctly.
	Monitor/control board is faulty.	▶ Replace the monitor/control board.
	A component is faulty or internal connections are loose.	▶ Contact a qualified service technician.
An alarm activated, but the temperature at activation does not match the alarm setpoint.	Temperature changed slightly around the time of activation.	▶ No action needed.

18.4 Condensation Problems

Problem	Possible Cause	Action
Excessive water in the water evaporation tray inside the lower compartment in the back of the unit.	Humid air is entering the chamber	▶ Confirm the refrigerator is level, and the door is aligned, closing tightly, and sealing correctly. Correct issues as necessary.
Excessive water in the chamber.	Humid air is entering the chamber.	▶ Confirm the refrigerator is level, and the door is aligned, closing tightly, and sealing correctly. Correct issues as necessary.
	Connection between the unit cooler and the drain tube is loose.	▶ Confirm the connection is secure. Tighten the connection if necessary.
	Defrost timer bypass switch may be in the ON position.	▶ Check the defrost timer bypass switch on the circuit board. If in the **ON** position, switch to the **OFF** position. If the problem persists, replace the defrost timer.
	Drain line is plugged.	▶ Confirm the drain tube is free of debris. Remove debris if necessary.

Problem	Possible Cause	Action
Excessive moisture on the doors.	Humid air is entering the chamber.	► Confirm the refrigerator is level, and the door is aligned, closing tightly, and sealing correctly.
	Relative humidity around refrigerator is too high.	► Confirm refrigerator location meets requirements.
Water leaks from the bottom of the refrigerator.	Humid air is entering the chamber.	► Confirm the refrigerator is level, and the door is aligned, closing tightly, and sealing correctly.
	Excessive water is found in the evaporation tray inside the refrigerator.	► Contact a qualified service technician.

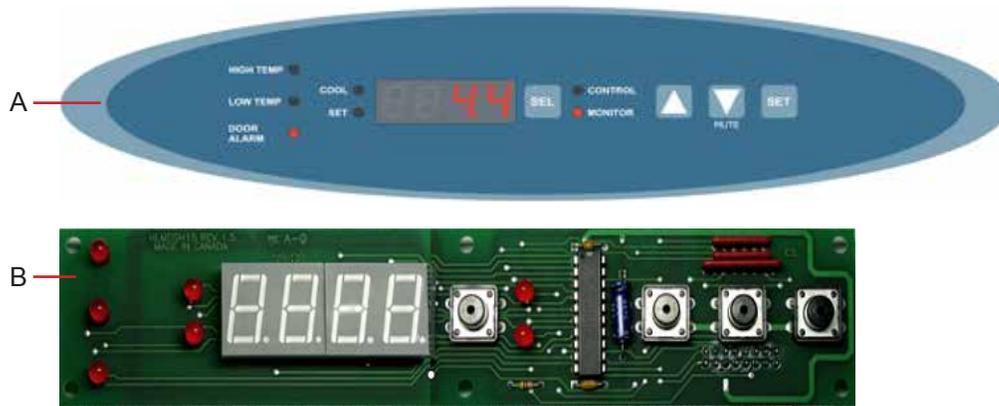## 19   Parts

⚠️   **NOTICE**   ►   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.

19.1   Front

19.1.1   Control System Display

*Top: Horizon Series combined controller and monitor. Bottom: Horizon Series display circuit board.*

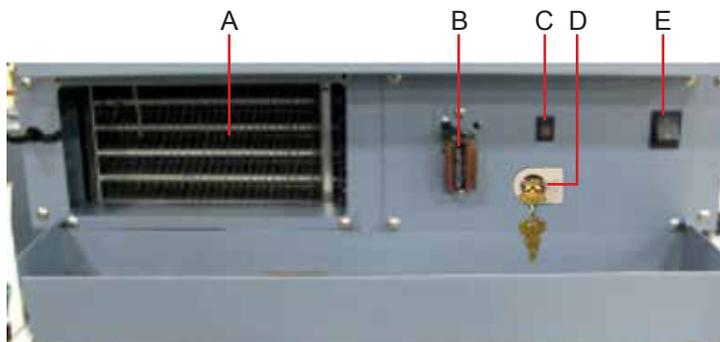| Label	Description	Part Number	Schematic Label
A	Monitor with touchpad (display)	400838-1	AZ
B	Control and monitor board kit	400837-1	L

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

19.1.2 Control and Monitoring
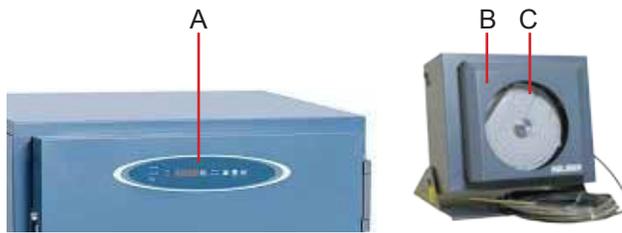
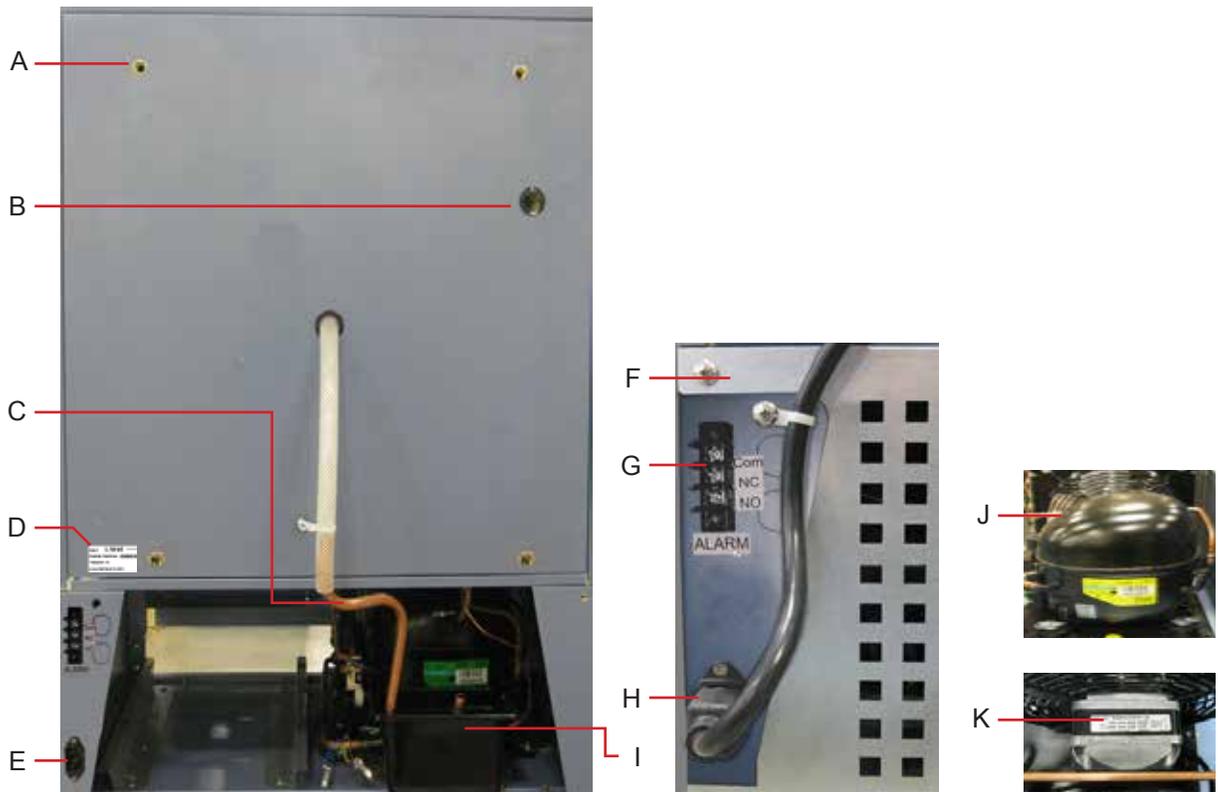| Label	Description	Part Number	Schematic Label
A	Horizon Series monitoring and control system		-
B	Temperature chart recorder (standard on blood bank model, optional on laboratory / pharmacy model)		-
C	Chart paper (52 sheets)	220366	-
Not shown	Chart recorder backup battery	120218	-

19.1.3 Lower Panel

Lower panel features.

Label	Description	Part Number	Schematic Label
A	Condenser	-	-
B	Monitoring system backup battery	120399	AE
C	Light switch (optional)	120202	AX
D	Alarm disable key switch	-	M
E	Main power switch	120478	Q
Not shown	Circuit breakers (230 V models only)	230 V / 50 Hz 120272 230 V / 60 Hz 120288	P

19.2   Rear

Rear features.

Label	Description	Part Number	Schematic Label
A	Nut flanges for brace bars used in stacking undercounter units (four shown)	-	-
B	Rear access port	-	-
C	Drain line (copper tube segment)	321190-1	-
D	Product specification label	-	-
E	Power cord connector	120299	-
F	Compressor/component rear compartment door	321184-1	-
G	Remote alarm contacts	-	-
H	Power cord	-	-
I	Condensate evaporator tray	-	-
J	Compressor	Contact Helmer	A
K	Condensing unit fan motor	Contact Helmer	U
Not shown	Compressor solid state relay	400842-1	AA
	Defrost timer	800120-1	F
	Caster (optional, swivel with brake)	220380	-

19.2.1   Electrical Tray

Kick plate (removed). Pull-out electrical components tray (open).

⚠️ **WARNING**   Disconnect the refrigerator from AC power before accessing the electrical tray.

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


19.3   **Interior**

Interior features.

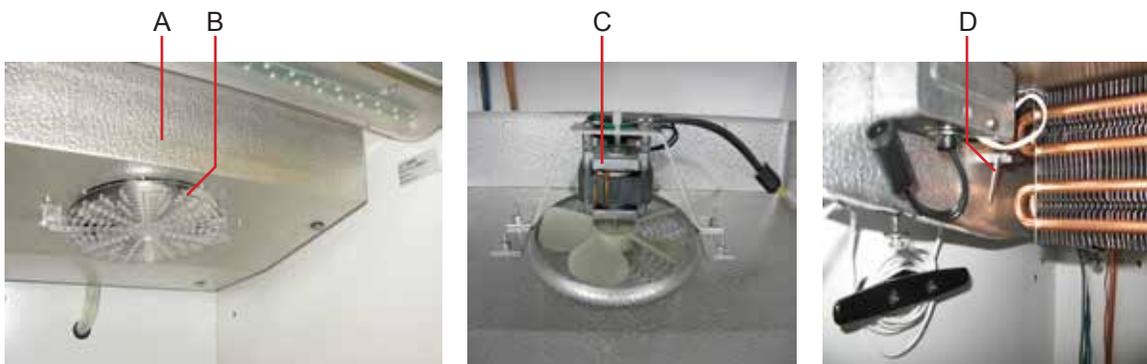| Label	Description	Part Number	Schematic Label
A	Door	**Solid door** Stainless steel: 400918-1 Powder coated: 400918-2 **Glass door (optional)** Stainless steel: 400919-1 Powder coated: 400919-2	-
B	Drawer (blood bank model)	400752-4	-
C	Door switch	120380	M
D	Roll-out basket (optional)	400815-1	-
E	Standard for shelf, drawer, or roll out basket	321173-1	-
F	Chamber temperature probe	400512-1	AB
G	Drawer slide for drawer or roll out basket	400753-2	-
H	Probe bottle and glycerin kit	400922-1	-
I	Shelf (laboratory / pharmacy model)	400814-1	-

19.3.1   **Lighting (Optional)**
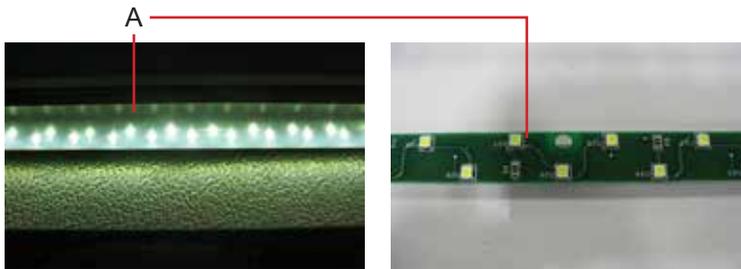
Light features (partial views).

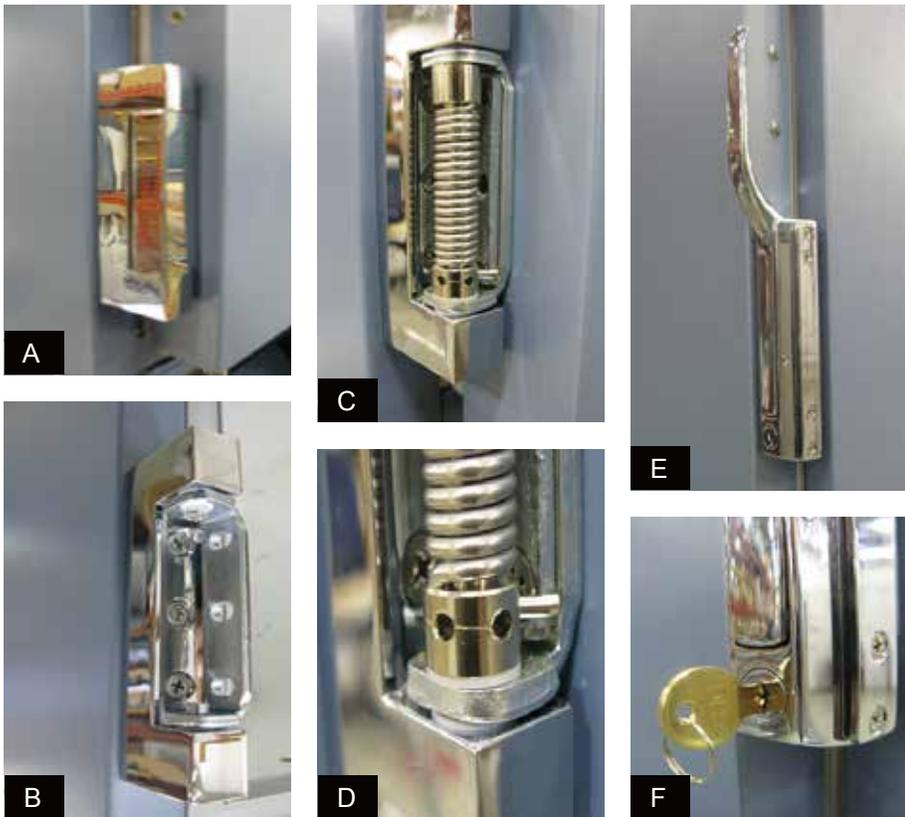| Label	Description	Part Number	Schematic Label
A	Light assembly (includes circuit board and cover)	800023-1	P
Not shown	Light cover	-	-

19.3.2   **Unit Cooler**

Left: Unit cooler with fan guard. Middle: Unit cooler fan. Right: Temperature control probe.

Label	Description	Part Number	Schematic Label
A	Unit cooler	-	-
B	Fan guard	-	-
C	Unit cooler fan	115 V: 120540 230 V: 120560	H
D	Temperature control probe	400511-2	G

19.4 **Door Hinges**

Hinge, hinge spring and pin assembly, and door handle with key lock.

| NOTE | Spring tension is controlled at the point where the pin is stopped by the side plate (C, D). |

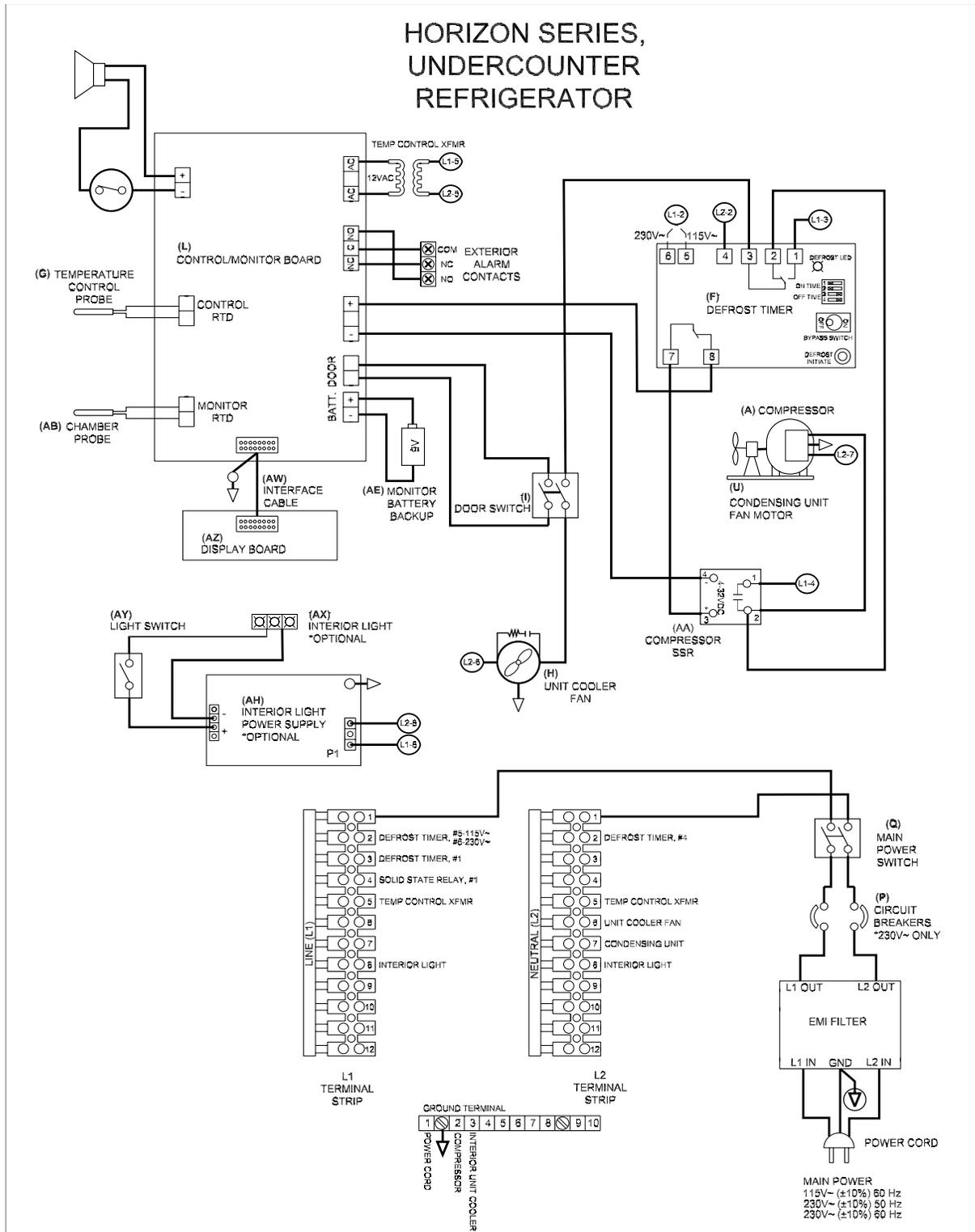| Label	Description	Part Number
A	Hinge, covered, edge mount	220506
B	Hinge, uncovered, without spring assembly	-
C	Hinge, uncovered, spring and pin assembly	-
D	Close up, hinge spring and pin assembly	-
E	Door handle - Magnetic offset latch with key lock	220426
F	Door key lock with key, close-up	-

19.5   **Side Access Panel**

Undercounter refrigerators feature easy access for servicing, removal, and replacement of the compressor and condenser. The compressor is accessible from the rear and the side.

Side access panel.

20 Schematics

20.1 Horizon Series Schematic

HORIZON SERIES,
UNDERCOUNTER
REFRIGERATOR

END OF MANUAL