Freezer Service Manual

i.Series™ and Horizon Series™

Plasma Models

- i.Series: iPF120, iPF125 (Version C)
- Horizon Series: HPF120, HPF125 (Version C)

Laboratory Models

- i.Series: iLF120, iLF125 (Version C)
- Horizon Series: HLF120, HLF125 (Version C)

Model _____

S/N _____

CE
0086

ISO 13485:2003 CERTIFIED

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Contents

Section I: General Information

1 About this Manual

This chapter explains the symbols and conventions used in this manual, copyright information about this document, and trademark information for products supplied by Helmer.

1.1 Intended audience

This manual is intended for use by authorized end users and qualified service technicians, and is to be used in conjunction with the i.C³™ User Guide, Freezer Operation Manual, Chart Recorder Operation Manual, and the Horizon Access Control Keypad User Guide, available on the CD shipped with the freezer.

1.2 Symbols and conventions

1.2.1 Cautions

A Caution is used to call attention to a condition or possible situation that could damage or destroy the equipment or the operator's work.

CAUTION Temperature probes are fragile. Handle them with care.

1.2.2 Notes

Notes contain additional information about a topic. Notes are used to provide information about how a topic relates to another topic, or background information about a design characteristic.

NOTE Spare parts are available for purchase through Helmer.

1.2.3 Model references

Generic references are used to group freezers that contain similar features. For example, "i.Series" refers to iPF125 and iLF125 freezers, and "Horizon Series" refers to HPF125 and HLF125 freezers. This manual covers all freezers, which may be identified singly or by their respective "Series."

Model Group	i.Series	Horizon Series
Plasma	iPF120, iPF125	HPF120, HPF125
Laboratory	iLF120, iLF125	HLF120, HLF125

1.3 Copyright and trademark information

2 Safety

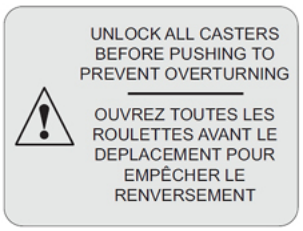
This chapter describes general safety information for servicing the freezer. The Freezer Operation Manual includes additional safety information for operating the freezer. Your organization may provide additional safety information.

2.1 Labels

Caution, risk of danger

Caution, hot surface

Caution, shock hazard



Caution, unlock all casters

Earth ground terminal

Protective earth ground terminal

2.2 Avoiding injury

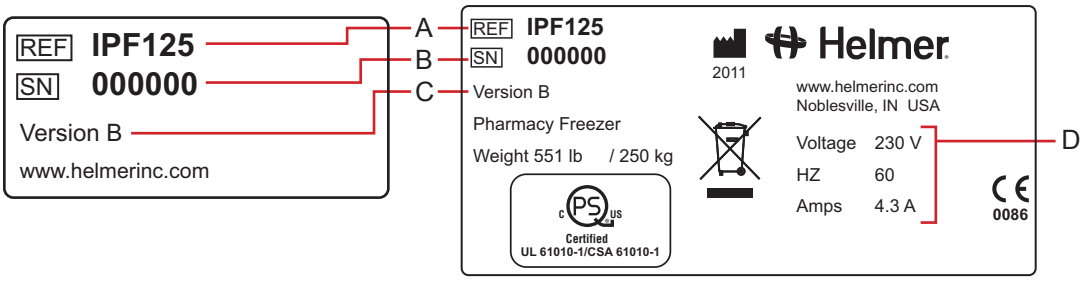
- Review safety instructions before installing, using, or maintaining the equipment.
- Before performing procedures, review any specific safety instructions.
- Do not open multiple, loaded drawers at the same time.
- Before moving unit, ensure casters are free of debris.
- Do not move a unit whose load exceeds 900 lbs (408 kg).
- Avoid removing electrical service panels and access panels unless so instructed.
- Use supplied power cords only.
- Notify appropriate safety personnel when handling or disposing of materials that are infectious, toxic, pathological, radioactive, or otherwise biologically or environmentally harmful.

CAUTION Decontaminate parts prior to sending for service or repair. Items not decontaminated appropriately will not be accepted. Documentation stating contents are not contaminated and are safe to handle must accompany returns. Contact Helmer or your distributor for decontamination instructions and a Return Authorization Number.

3 Configuration

3.1 Finding model and input power information

Service information varies depending on the model and input power requirements. This information appears on the Product Specification label, located on the rear of the freezer below the electrical box. The model also appears on a label located in the chamber on the upper side of the right wall.



Left: Chamber label. Right: Product Specification label.

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

3.2 Identifying the control system

Service information varies depending on the control system. Helmer freezers have one of two control systems installed. The type of control system varies by model.

Model group	Control system
iPF, iLF	i.C³ monitoring and control system
HPF, HLF	Horizon Series monitoring and control system

3.2.1 i.C³ control system

i.Series freezers are equipped with the i.C³ monitoring and control system. The i.C³ system combines temperature control and monitoring into a single interface, displaying multiple information logs with historical information in full color. The touchscreen monitor, located on the freezer door, displays operational information. The chamber temperature controller is integrated into the i.C³ system.

i.C³ monitoring and control system display.

3.2.2 Horizon Series control system

Horizon Series freezers feature the Horizon combined monitor and temperature controller. The Horizon Series system controls chamber temperature and monitors and displays operational information. The user interface for this system is located over the freezer door.

Horizon Series monitoring and control system display.

3.3 Preparing temperature probes

Temperature probes monitor chamber temperature. Number and location of probes varies by model.

In addition to using standard probes installed by Helmer, external probes may be introduced through existing top ports and immersed in existing probe bottles. Probes can also be inserted through a side access port (availability varies by model).

For each probe bottle, obtain:

► Approximately 4 oz (120 ml) of product simulation solution. Solution is a 1:1 ratio of water to propylene glycol (or equivalent low-temperature fluid).

Left: Probe bottle with temperature and chart recorder probes. Right: Access port on the top of the freezer. The number and location of ports varies by model.

To install an additional external probe through the top

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

To install an additional external probe through the side

1. Remove the interior and exterior plugs to expose the side access port and insert third-party probe through port into chamber.
3. Insert probe into bottle.
4. Replace plugs, ensuring a tight seal.

To fill a temperature probe bottle

CAUTION
- ► Clean bottle first, as required.
- ► Temperature probes are fragile; handle with care.

1. Remove all probes from bottle.
2. Remove bottle from bracket and fill with approximately 4 oz (120 ml) of product simulation solution.
3. Cap tightly to minimize evaporation.
4. Place bottle in bracket and replace probes, immersing at least 2 inches (50 mm) in solution.

3.4 Preparing the chart recorder

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

Complete these tasks to prepare recorder for use:

- ► Installing the backup battery
- ► Adding paper
- ► Calibrating the chart recorder to match the upper chamber temperature.

3.4.1 i.Series chart recorder access

For iPF and iLF models, open the door by pressing and releasing it.

i.Series chart recorder access.

3.4.2 Horizon Series chart recorder access

For HPF and HLF models, pull the door open.

Horizon Series chart recorder access.

3.4.3 Changing chart paper

One piece of chart paper records temperatures continuously for seven days. For additional information on changing the chart paper, see the Temperature Chart Recorder Operation and Service Manual on CD.

Section II: i.Series™ Models

4 Product Configuration

4.1 Installing batteries for backup power

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

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

Battery life varies by manufacturer as well as voltage level remaining. Providing full power is available, and no battery-related alarms are active, backup power for the i.C³ monitoring system is available for up to 20 hours (the Low Battery alarm will activate after approximately 18 hours of battery use). Backup power for the temperature chart recorder is available for up to 14 hours.

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

CAUTION
- ► Before installing or replacing batteries, disconnect power to the freezer.
- ► When installing a replacement battery for the monitoring system, use only a battery which meets the specifications outlined in chapter **6.7** (Supplies).

The battery holder is located on the top of the freezer behind the front bezel.

Monitoring system backup battery.

Models	Monitoring system	Battery requirements
iPF and iLF	Combined alarm monitoring and control system	One rechargeable 12 V lead acid sealed battery

The rechargeable backup battery that is switched off for shipping. Switch the battery ON to provide the monitoring system with backup power in the event of a main power failure.

4.2 Freezer setpoint configuration

The temperature controller adjusts chamber temperature around the freezer setpoint. The controller activates the compressor when the chamber probe registers temperature above the setpoint.

The controller also senses unit cooler temperature through a probe in the cooler. The temperature in the unit cooler typically varies from the temperature in the chamber, so an offset value is used in the control system. The unit cooler temperature combined with the offset value establishes the freezer setpoint.

NOTE The probes in the bottles are connected to the monitoring system and sense chamber temperature. These probes do not impact the refrigerator setpoint.

4.2.1 Determining current freezer setpoint

First, confirm:

- ► Freezer has run for at least 24 hours to stabilize chamber temperature.
- ► Chamber temperature is not fluctuating because of excessive door openings and closings.
- ► Freezer has been placed per location requirements. See Operation manual.
- ► Preventive maintenance has been completed. See Operation manual.
- ► Troubleshooting items associated with chamber temperature have been reviewed.

Obtain:

- ► An independent thermometer, calibrated and traceable per national standards.
- ► Tape. This is used to secure the probe to the thermometer.

1 Remove all probes from the upper probe bottle.
2 Unscrew the cap from the bottle.
3 Tape the independent thermometer to the temperature probe, and replace them in the bottle so their ends are immersed at least 2 inches (50 mm).
4 On the independent thermometer, monitor temperature for about 10 minutes to determine an approximate range.
5 From the range, calculate an approximate average temperature. This is the current setpoint.
6 Remove thermometer and probe from the bottle and remove tape.
7 Replace bottle cap, ensuring a tight fit.
8 Place probes in bottle, immersing at least 2 inches (50 mm).

4.2.2 Changing freezer setpoint

The default setpoint is either -20.0 °C or -30.0 °C, depending on use.

Change the setpoint if:

- ► Your organization requires a chamber temperature different from the default setting.
- ► The normal chamber temperature is too high or low, even after completing preventive maintenance and applicable troubleshooting tasks.

Before changing setpoint, confirm:

- ► Freezer has been placed per location requirements. See operation manual.
- ► Preventive maintenance has been completed. See operation manual.
- ► Troubleshooting items associated with chamber temperature have been reviewed.

The temperature controller is integrated into the i.C³ monitoring and control system. The temperature setpoint is configured through the i.C³ screen.

CAUTION Do not change setpoint to a value outside the temperature control range.

1. Determine the new setpoint temperature.
2. Determine the change in value to reach the desired setpoint. For example, if the desired normal temperature is -30.0 °C, but the current setpoint is -29.0 °C, then the adjustment value is -1.0 °C.
3. On the i.C³ screen, touch **i.C³ APPS**. Enter the Settings password then touch **Temperature Setpoints**.

NOTE The Settings screen may be password protected. A valid four-digit password must be entered to view settings. If viewing settings for the first time, enter the factory default password of "1234".

4. Touch plus (+) or minus (-) on the **Temperature Setpoint** spin box until the correct value appears. The button increments are ±0.1 °C.
5. The setpoint is changed. Touch **Home** to return to the home screen.

4.3 Automatic defrost cycle configuration

The freezer features an automatic defrost system. This system periodically runs to melt accumulated ice on the evaporator, which can obstruct air flow and degrade the freezer's capability to reach the temperature setpoint.

The number of programmed defrost events is dependent on environmental conditions and the frequency of usage. The recommended number of daily defrost cycles is three to four, programmed at even intervals. Defrost events should take place when the freezer door is opened infrequently. Opening the door can raise the chamber temperature above the normal defrost cycle temperature, typically 4 °C to 10 °C above the freezer setpoint.

NOTE Depending on the high temperature alarm setpoint and the actual temperature increase during the defrost cycle, frequent door openings may trigger repeated high temperature alarms.

The defrost settings are integrated into the i.C³ temperature monitoring and control system. The i.C³ can perform a maximum of four defrost cycles per day. Specify the number of defrost cycles per day and the time at which each of the defrost cycles is to occur. The timing for the defrost cycles is based on the internal time settings of the i.C³ monitoring and control system. For information in setting the system time, refer to the i.C³ User Guide.

The default defrost cycle times and on/off status are:

Defrost event	On/off	Default time
1	On	12:00 AM
2	On	8:00 AM
3	On	4:00 PM
4	Off	6:00 PM

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

For additional information in enabling or disabling each defrost cycle and setting the system time each defrost cycle occurs, refer to the i.C³ User Guide

4.4 External monitoring devices

CAUTION

- Do not connect any monitoring device that exceeds the maximum load capacity for your model.
- The interface on the remote alarm monitoring system is intended for connection to the end user's central alarm system(s) that uses normally-open or normally-closed dry contacts.
- If an external power supply exceeding 33 V r.m.s. or 70 V (DC) is connected to the remote alarm monitoring system's circuit, the remote alarm will not function properly; may be damaged; or may result in injury to the user.

The freezer provides a remote alarm interface to send information to external devices, such as the Helmer Remote Alarm Monitoring System. For more information and availability, contact Helmer or your local distributor.

The remote alarm interface is a relay switch with three terminals: Common (COM), Normally Open (NO), and Normally Closed (NC). These terminals are dry contacts and do not supply voltage. The interface circuit is either normally open or normally closed depending on which terminals are used.

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

To connect to the remote alarm interface

1. Switch the AC ON/OFF switch OFF.
2. Switch the battery backup switch OFF.
3. On the back of the freezer, locate the remote alarm interface.
4. Connect the remote alarm wires to the appropriate terminals according to the requirements for your alarm system.
5. Using a cable tie, secure the wires together for stability (as needed).
6. Switch the battery backup switch ON.
7. Switch the AC ON/OFF switch ON.

4.5 Moving drawers and shelves

Not all containers are available for all models.

Storage features (availability of shelves, drawers, and baskets varies by model).

CAUTION

- ► Before moving drawers, shelves, baskets, slides or brackets, protect stored items from extended exposure to adverse temperatures.
- ► Before moving drawers, be sure they are completely empty for safe lifting.

To remove a drawer

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

To install a drawer

1. Align the end guides on the drawer with the slides.
2. Gently push the drawer into the chamber until it stops.
3. To ensure proper installation, pull drawer back out until it stops, then push it back in again.

To remove a shelf

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

To install a shelf

1. Insert the shelf into the chamber, placing it on the brackets.
2. Gently bump the rear edge of the shelf downward to engage it with the rear brackets.
3. Test installation by pulling the shelf forward gently. The shelf should not disengage from rear brackets.

4.5.1 Drawer labels

Drawers feature a label groove (labels not provided).

Drawer with sample label.

4.5.2 Moving slides and brackets

To remove a set of slides

1. Using a screwdriver, remove the retainers for the front brackets.
2. Tap the front brackets upward to disengage them from the standard.
3. Remove the slide from the standards.

To install a set of slides

1. Insert the slides into the appropriate height in the standard.
2. Tap the front brackets downward to engage them in the standards.
3. Using a screwdriver, install the retainers for the front brackets.

To remove a set of shelf brackets

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

To install a set of shelf brackets

1. Insert the front brackets into the appropriate height in the standards.
2. Tap the front brackets downward to engage them in the standards.
3. Using a screwdriver, install the retainers for the front brackets.

4.5.3 Drawer weight

NOTE Maximum drawer load is 100 lbs (46 kg).

4.6 Leveling the freezer

After the freezer has been placed, the leveling feet must be adjusted in order to provide proper drainage of condensation from the evaporator coil, inside the unit cooler.

NOTE Helmer recommends the use of leveling feet.

Level the freezer front-to-back

1. Use a wrench to adjust the leveling feet.
2. A bubble level may be used to ensure the freezer is level.
3. When the freezer is properly leveled from front to back, the bottom of the unit cooler will slope downward from front to back (toward the condensate drain line, located in the back of the cabinet).

Level the freezer side-to-side

1. Use a wrench to adjust the leveling feet.
2. A bubble level may be used to ensure the freezer is level.
3. When the freezer is properly leveled from side to side, the bottom of the unit cooler will be horizontal (parallel to the floor).

4.7 Door characteristics

Some service information varies with respect to door characteristics. Depending on model, pads may be installed on the door handles. Single-door models may have hinges on the right or left side.

The monitoring and control system interface is located on the door.

Model group	Door type
Plasma (iPF) Laboratory (iLF)	Solid

Number of doors	Hinge location
Single-door (120, 125)	Right hinge or left hinge

4.8 Optional adapter kits for medication dispensing locks

Call Helmer or your distributor for specific system information.

5 Temperature Controller Programs

Left: Temperature Controller Programs screen. Right: Temperature Calibration screen.

Settings

The i.Series combined temperature monitor and controller is programmed at the factory with the settings that are listed in this chapter. To change the value for a setting, first enter the Settings mode for that setting. The method for accessing the Settings mode for each setting varies.

NOTE The Settings screen may be password protected. A valid four-digit password must be entered to view settings. If viewing settings for the first time, enter the factory default password of "1234".

Hysteresis

The hysteresis band (range) value is factory preset according to model and cabinet size. This value represents each side of the freezer setpoint value, for a combined total band (range). This value should not be changed.

CAUTION Changing temperature settings affects the operation of the freezer. Do not change settings unless instructed to do so in product documentation or by a Helmer Technical Services representative.

5.1 Temperature setpoint settings

NOTE When there is no interaction for two minutes, the Temperature Setpoint screen closes and returns to the home screen.

CAUTION The hysteresis setpoint is factory-preset and should not be changed unless directed by Helmer Technical Service.

1 Touch **i.C³ APPS**, **Settings**. Enter the Settings password then touch **Temperature Setpoints**.

2 Touch plus (+) or minus (-) on the **Temperature Setpoint** spin box .

► The setpoint is the temperature at which the freezer operates.

3 Touch plus (+) or minus (-) on the **Hysteresis Setpoint** spin box.

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

4 Touch plus (+) or minus (-) on the **Delay on Start-Up** spin box.

► The freezer compressor startup is delayed to allow the i.C³ monitoring and control system to start first.

5 Touch plus (+) or minus (-) on the **Duty Cycle of Control Relay during Probe Error** spin box.

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

6 Touch plus (+) or minus (-) on the **Defrost Time** spin box.

► The defrost time is the maximum allowable duration which the defrost probe will heat the evaporator. This value is set to prevent the chamber temperature from increasing excessively due to a long defrost cycle.

Setting	Setting description	Initial factory setting
Temperature Setpoint	Temperature at which the freezer operates	-30.0 °C
Hysteresis Setpoint	Allowable temperature fluctuation, relative to the temperature setpoint	Varies according to model and cabinet size
Delay on Start-Up	Time (in minutes) that a compressor start will be delayed after a power interruption	2 minutes
Duty Cycle of Control Relay during Probe Error	Percentage of time the compressor will run during a probe error	100%
Defrost Time	Maximum time (in minutes) that the defrost cycle will run, if the defrost cycle fails to defrost the evaporator	15 minutes

5.2 Temperature calibration settings

NOTE When there is no interaction for two minutes, the Temperature Calibration screen closes and returns to the home screen.

CAUTION The Control Sensor and Control Sensor Offset, Evaporator Defrost and Evaporator Defrost Offset, and Compressor Probe Temperature settings are factory-preset and should not be changed unless directed by Helmer Technical Service.

1. Touch **Home**, **i.C³ APPS**, **Settings**.
2. Enter the Settings password.
3. Touch **Temperature Calibration**.
4. Touch plus (+) or minus (-) on the **Control Sensor** spin box.
   - ► The value for the probe should match the temperature measured in the unit cooler (at the control sensor) by an independent thermometer, calibrated and traceable per national standards.
5. Touch plus (+) or minus (-) on the **Control Sensor Offset** spin box.
   - ► The value for the offset should be equal to the difference between the freezer setpoint and the temperature as measured by an independent thermometer (at the upper probe bottle).
   - ► Raise the offset value to lower chamber temperature; lower the offset value to raise chamber temperature.
   - ► Example: (measured temperature at the upper probe bottle) – (freezer setpoint) = (offset value)
   - ► Example: (–28) – (–30.0) = +2.0
6. Touch plus (+) or minus (-) on the **Upper Temperature** spin box.
   - ► The value for the probe should match the temperature measured in the upper probe bottle by an independent thermometer.
7. Touch plus (+) or minus (-) on the **Lower Temperature** spin box.
   - ► The value for the probe should match the temperature measured in the lower probe bottle by an independent thermometer.
8. Touch plus (+) or minus (-) on the **Evaporator Defrost** spin box.
   - ► The value should match the temperature measured in the unit cooler (at the defrost coil sensor) by an independent thermometer.
9. The Evaporator Defrost Offset value is set at the factory and should not be changed unless directed by Helmer Technical Service.

Setting	Setting description	Default value
Control Sensor	Calibrated temperature of the temperature control sensor (measured at the evaporator).	Varies (set at the factory to match independent calibrated thermometer)
Control Sensor Offset	Adjustment value used if the freezer setpoint is not equal to the temperature measured by an independent thermometer.	Varies (set at the factory; difference between setpoint and temperature measured at the control sensor)
Upper Temperature	Calibrated temperature for the upper chamber probe.	-30.0 °C
Lower Temperature	Calibrated temperature for the lower chamber probe.	-30.0 °C
Evaporator Defrost	Calibrated temperature for the evaporator defrost probe (measured at the evaporator defrost heater).	Varies (set at the factory to match independent calibrated thermometer)
Evaporator Defrost Offset	Adjustment value used by the factory to limit the maximum evaporator defrost temperature.	Varies (set at the factory)
Compressor Probe Temperature	Calibrated temperature for the compressor probe (measured at the condenser).	Varies (set at the factory to match independent calibrated thermometer)

6 Maintenance

CAUTION See operation manual for the preventive maintenance (PM) schedule.

6.1 Recharging refrigerant

CAUTION The procedures in this chapter should only be completed by trained refrigeration technicians who are familiar with the terminology and processes described here, as well as with local and organizational regulations regarding refrigerant leaks.

Use only non-CFC R-404A refrigerant.

The freezer features an expansion valve refrigeration system. The amount of the full initial charge varies by model and power requirements, which can be found on the Product Specification label.

The initial charge is:

Model	Power requirements	Initial charge
iPF120, iPF125, iLF120, and iLF125	Any	29.0 oz (822 g)

Obtain:

- ► Refrigerant of the appropriate type and quantity
- ► A calibrated pressure gauge capable of reading 0 lb/in² to 220 lb/in² (0 kPa to 1520 kPa)

1. Attach the pressure gauge to the refrigeration lines.
2. Monitor the low side (suction) pressure through a full compressor cycle.
3. At the end of the next cycle, before the compressor stops, measure the pressure. The pressure varies depending on the ambient air temperature. The low side pressure should be 4 lb/in² to 7 lb/in² (30 kPa to 50 kPa). The high side pressure should be 100 lb/in² to 220 lb/in² (690 kPa to 1520 kPa).
4. Add refrigerant so the pressure is within the acceptable range.

6.2 Checking the monitoring system backup battery

CAUTION Checking the monitoring system rechargeable backup battery requires that power be disconnected from the freezer, which may affect the chamber temperature. Before testing the alarm, take precautions to protect items in the freezer from extended exposure to adverse temperatures.

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

Regularly test whether the backup battery is functioning, and replace it if the test fails or if the battery has been in use for two years.

Test whether the backup battery is functioning

1. Disconnect the freezer from AC power by disconnecting the AC power cord from the wall outlet or by switching the AC ON/OFF switch OFF. The display should continue to display information with the screen backlight at reduced brightness. The battery icon will appear in the header bar of the screen. If the display is blank, replace the battery.
2. Re-connect the freezer to AC power.

CAUTION When installing a replacement battery for the monitoring system, use only a battery which meets the specifications outlined in chapter **6.7** (Supplies).

6.3 Cleaning the freezer

Condenser grill

CAUTION
- ► Disconnect power to the freezer to eliminate the potential of electric shock and injury from surrounding components.
- ► Cleaning the condenser grill requires power disconnection. Protect items in the freezer from extended exposure to adverse temperatures.

The condenser grill is the finned surface at the rear of the unit. It must be kept clean for proper operation. Not cleaning condenser grill regularly significantly reduces freezer life expectancy. In environments where the freezer is exposed to excessive lint or dust, condenser grill may need to be cleaned more frequently than stated on the preventive maintenance schedule.

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

Exterior

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

CAUTION The condensate evaporator and the water evaporation tray are hot.

Interior

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

Door gaskets

Clean door gaskets with a soft cloth and mild soap and water solution.

Clean and refill probe bottles

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

CAUTION Protect stored items from extended exposure to adverse temperatures.

Obtain:

- Fresh water-bleach solution (not provided) Solution is a 10% bleach solution (1 part bleach to 9 parts water, where bleach means a 5% solution of commercial sodium hypochlorite (NaOCl)). Otherwise, use an equivalent oxidizing cleaner/disinfectant approved for use by your organization.
- Approximately 4 oz (120 ml) of product simulation solution per bottle. Solution is a 1:1 ratio of water to glycerin.

CAUTION Temperature probes are fragile. Handle with care.

1. Remove all probes from bottle.
2. Remove bottle from bracket and clean with water-bleach solution.
3. Fill with approximately 4 oz (120 ml) of product simulation solution.
4. Cap tightly to minimize evaporation.
5. Place bottle in bracket and replace probes, immersing at least 2 inches (50 mm) in solution.

i.C³ touchscreen

Clean the touchscreen with a soft, dry cotton cloth.

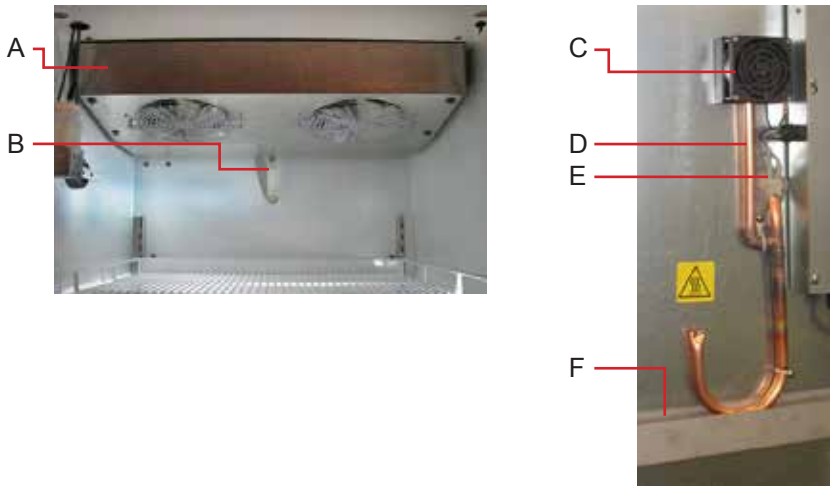
6.4 Removing and installing the unit cooler cover

The unit cooler cover has a port to drain condensation generated in the cooling process. If the unit cooler cover is not removed correctly, the drain port may be damaged. Improper drainage may result in excessive icing in the freezer and the freezer's inability to maintain the temperature setpoint.

This drain port fits into a piece of tubing that directs the condensate into the J-shaped drain line on the rear of the freezer. Before removing the unit cooler cover, first remove the tubing. This process also requires removal of the drain line heater, which is located inside the tubing.

The following is required to remove and reinstall the unit cooler cover:

- ► 5/16" socket wrench
- ► Tool to push putty away from the tubing



Left: Unit cooler (A) inside the chamber, with drain port (B). Right: drain line fan (C), drain tubing (D), and heater wires (E).

To remove the unit cooler cover

1. On the electrical box, turn the AC ON/OFF switch OFF. Disconnect the freezer from outlet power as well. Disable the power failure alarm by switching the backup battery OFF or touching the **Mute** button.
2. On the rear, remove the screws and loosen the pipe straps securing the drain line to the freezer.

CAUTION The water evaporation tray and condensate evaporator may be hot.

3. On the rear, pull the long straight copper tube downward to separate it from the drain line that protrudes from the cabinet. The tube to the external drain fan may also separate from the fan in the process.
4. Verify the drain line heating element is cool to the touch. Remove the drain line heater from the tube protruding from the cabinet by firmly pulling the heating element downward and away from the freezer. The heating element is about 9 inches (220 mm) long.
5. Inside the cabinet, separate the copper drain line from the copper extension. The extension should remain installed on the vinyl tube. Inside the cabinet, rotate and pivot the copper drain line to remove it from cabinet.
6. For iPF models, remove the top drawer and the Cold-Shield system panel from the chamber. To remove the Cold-Shield panel, loosen the three screws that secure it to the freezer (located behind the panel, one in the middle and two on the right side), then slide the panel to free it from the screws.
7. While holding the unit cooler cover in place to prevent it from dropping, use the socket wrench to remove the four screws securing the cover to the unit cooler. Gently lower the cover to avoid damaging wiring for the unit cooler fan.

To reinstall the unit cooler cover

1. In the chamber, verify the wiring for the unit cooler fan is connected and routed correctly. The wiring should be routed above the tube inside the unit cooler. If the wires have separated, reconnect them (the two wires marked with wire ties should be connected to each other).
2. Ensure the short length of clear tube is installed on the unit cooler cover. The tube should be installed 1/4" away from the unit cooler cover. Ensure the copper extension is firmly installed on the clear tube.
3. Insert the copper drain tube through the hole in the cabinet, from inside the cabinet.
4. Insert the drain line heater into the copper drain tube through the hole located in the middle of the bend in the drain tube. The drain line heater element should protrude from the drain line, inside the cabinet.
5. Lift the unit cooler cover into place, ensuring the front of the cover is behind the lip of the unit cooler. Install and tighten 4 screws to secure unit cooler cover to the unit cooler.
6. Inside the cabinet, rotate and pivot the copper drain line so the drain line is aligned with the copper extension on the unit cooler. Press the copper drain line and the copper extension together to make a tight seal.
7. On the rear, push the long straight copper tube upward and on to the drain line that protrudes from the hole in the cabinet.

CAUTION The water evaporation tray and condensate evaporator may be hot.

8. Install the remaining tubing. Insert the straight section of tubing into the hole on the bottom of the external fan. While holding that section in place, press the J-shaped tube upward into place. Fasten the tubing in place with the two wire ties.
9. Press the putty around the tube to seal the hole from the rear. Secure the heater wires to the freezer with a wire tie.
10. Return the freezer to normal operation. Connect the freezer to outlet power turn the AC ON/OFF switch ON. Switch the backup battery ON or cancel the alarm by touching the Mute button.

6.5 Defrosting the freezer

To address operational issues, it may be necessary to defrost the freezer. For all models, defrost events may be scheduled to occur at specific times.

A defrost event can occur on demand without affecting a programmed defrosting schedule.

On-demand defrost event

1. From the i.C³ home screen, touch **i.C³ APPS**, **Temperature Setpoints**.
2. Touch the **Manual Defrost: Start** button.
   - ► The Defrost icon will appear on the i.C³ home screen for the duration of the defrost cycle.
3. To cancel the manually-initiated defrost cycle, touch the **Manual Defrost: Stop** button.

6.6 Removing and replacing the Access Control cartridge

The Access Control lock cartridge is a serviceable part and may be replaced if necessary. The lock cartridge is an assembly that is installed on the outside of the freezer cabinet.

CAUTION

- ► Review all safety instructions prior to replacing the Access Control cartridge. See chapter **2** (Safety).
- ► Power the freezer off and disconnect AC power before performing service.
- ► The chamber temperature will increase above the allowable temperature range for stored inventory while performing this procedure. Take precaution to protect items in the freezer from extended exposure to adverse temperature.

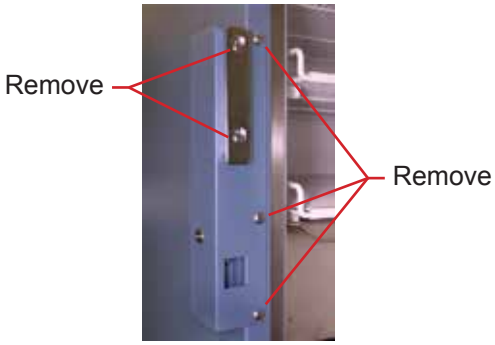
The following is required to remove and replace the Access Control cartridge:

- ► Wire cutter
- ► #2 Phillips screwdriver

To remove the Access Control cartridge

1. On the electrical box on the back of the freezer, turn the AC ON/OFF switch OFF. Disconnect the freezer from outlet power as well. Disable the power failure alarm by switching the backup battery OFF or touch the alarm **Mute** button.
2. Open the freezer door and prop the door open. If the door is in a locked state, use the manual override key to override the Access Control lock, then open the freezer door.
3. Remove the (2) screws securing the strike plate to the Access Control cartridge cover.

4 Remove the (3) screws securing the cover over the cartridge on the side of the freezer cabinet then remove the cover.



4 Cut the zip tie securing the bundled wires to the back of the cartridge. Separate the two pairs of spade connectors.

5 Remove the (2) screws securing the cartridge assembly to the side of the cabinet.

6 Remove the cartridge from the cabinet.

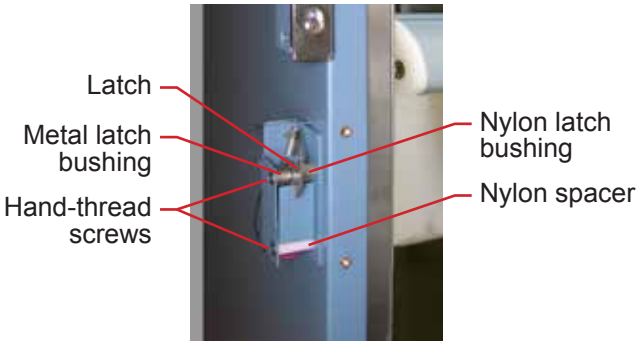
To install the replacement Access Control cartridge

1 Insert a screw through the upper hole in the cartridge body, then through the door latch, and latch bushings.

2 Insert a screw through the lower hole in the cartridge body and the nylon spacer.

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

3 Hand-thread each screw into the corresponding hole in the cabinet.



NOTE Ensure the wires will not be pinched between the cartridge body and the cabinet.

4 Tighten both screws to attach the cartridge to the cabinet.

5 Connect the electrical wires from the cabinet to the wires from the cartridge. Bundle the excess wiring and secure it to the back of the cartridge with a zip tie.

NOTE The latch must be in the unlocked position (rotated toward the back of the freezer) before installing the cartridge cover.

6 Install the cover over the Access Control cartridge. Hold the cover over the cartridge and align the (3) three screw holes with the corresponding holes in the cabinet. Install (3) three screws and tighten to secure the cover.

7 Install the strike plate on the Access Control cartridge cover. Align the (2) two screw holes with the corresponding holes in the cartridge cover. Install (2) two screws and tighten to secure the strike plate.

8 Close the freezer door and return the freezer to normal operation to provide power to the Access Control lock. Connect the freezer to outlet power then turn the AC ON/OFF switch ON. Cancel the high temperature alarm by touching the **Mute** button.

9 Once the freezer has reached operating temperature, enable the high temperature alarm by touching the **Mute** button to cancel the alarm.

CAUTION Allow the freezer temperature to stabilize at the setpoint before moving contents back into the freezer.

6.7 Supplies

Refrigerant: non-CFC R-404A

Chart paper: 220366, 52 sheets

Glycerin solution: 400922-1

Monitoring system backup battery

One 12 V, 7 Ah rechargeable sealed lead acid battery: 120628

Chart recorder backup battery

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

7 Troubleshooting

CAUTION Review all safety instructions prior to completing troubleshooting recommendations. See chapter **2** (Safety).

7.1 General operation problems

Problem	Possible Cause	Action
A drawer does not slide easily.	There is debris in the drawer slides.	► Pull the drawer out and confirm the slides are free of debris. Clean if necessary.
	The drawer slides are not lubricated.	► Using a lightweight oil, lubricate the bearings in the slides.
	There is ice buildup in the drawer slides.	► Pull the drawer out and confirm the slides are free of ice. De-ice if necessary.
	The drawer is misaligned or not level.	► Confirm both slides for the drawer are mounted at the same height.
	A drawer slide is faulty.	► Confirm the slide is operating correctly. Replace if necessary.
The door does not open easily.	There is debris in the hinges.	► Confirm the hinges are free of debris. Clean the hinges if necessary.
	The door hinges are not lubricated.	► Using a general-purpose grease, lubricate the pivots in the hinges.
	A hinge cam is faulty.	► Confirm the hinge cam is not damaged. Replace the cam if necessary.
The monitor display is hard to read (i.Series).	The screen contrast is set too low.	► Change the screen contrast.
The alarm monitor is not responding.	Digital electronics are locked because of an interruption in power.	► Reset the monitoring system.
“Probe Error” is displayed on the monitor.	The defrost probe or temperature probe wiring is an open circuit.	► Check the continuity of the probe wiring and connections. Secure the connections if necessary. ► Confirm the probe is providing resistance in the range of 1191 Ω to 2000 Ω. Replace the probe if necessary.

7.2 Chamber temperature problems

Problem	Possible Cause	Action
The chamber temperature displayed is higher or lower than the actual temperature.	The connections for the chamber temperature probe are loose.	► Test the chamber probe connections. Secure the connections if necessary.
	The temperature probe wiring is an open circuit.	► Check the continuity of the probe wiring. Replace the probe if necessary.
	The 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.
	The solution in the probe bottle is frozen.	► Refill the bottle with new solution.
	Digital electronics are locked because of an interruption in power.	► Reset the monitoring system.
	The monitor is not calibrated.	► Confirm the temperature probe is reading correctly. Calibrate the chamber probe if necessary.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
The chamber temperature meets an alarm condition, but the appropriate temperature alarm is not active.	The temperature alarm setpoint was changed.	► Check the current setpoints for the temperature alarms. Change the setpoints if necessary.
The compressor runs continuously.	The freezer setpoint is set too low.	► Confirm the setpoint is set within the operating range and change it if necessary.
	The temperature control probe in the unit cooler is faulty.	► Replace the probe if necessary.
	The temperature monitor/control board is faulty.	► Confirm the temperature controller or monitor/control board is operating correctly. Replace it if necessary.
	The compressor starting relay is faulty.	► Confirm the relay is operating correctly. Replace the relay if necessary.
	The defrost timer is faulty.	► Replace the defrost timer.

Problem	Possible Cause	Action
The chamber temperature does not stabilize at the freezer setpoint.	The temperature monitor/control board is faulty.	► Confirm the temperature controller or monitor/control board is operating correctly. Replace it if necessary.
	The condensing unit fan is not running.	► Check the condensing unit fan connections. Replace the fan motor if necessary.
	The 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.
	The compressor motor has seized.	► Replace the compressor.
	The temperature control probe is faulty.	► Replace the probe if necessary.
	The refrigerant level is too low.	► Check the refrigeration lines for leaks and repair them if necessary. Check the refrigerant level. Recharge the refrigerant if necessary.
	The compressor starting relay is faulty.	► Confirm the relay is operating correctly. Replace the relay if necessary.
	The condenser grill is dirty.	► Check the condenser grill. Clean it if necessary.
	The circulation in the chamber is not adequate.	► Check if there are any items that may obstruct air flow and remove them if necessary.
	The ambient air temperature around the freezer is too high.	► Confirm freezer location meets requirements. See operation manual.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
	The evaporator is covered with ice and is not exchanging heat.	► Initiate a freezer defrost cycle.

7.3 Alarm activation problems

Problem	Possible Cause	Action
The freezer is in an alarm condition, but alarms are not audible.	The alarm system is faulty.	► Confirm the circuit board and line connections are functioning correctly.
	The monitor/control board is faulty.	► Replace control parts with those included in the control and display board kit, or replace the monitor/control board.
	The speaker is faulty.	► Replace the speaker.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
	Audible alarms are muted.	► Verify that audible alarms are not muted. For i.Series, if time remaining is greater than 5 minutes, change MUTE timer value to 5 minutes and wait until timer resets.

Problem	Possible Cause	Action
The freezer meets an alarm condition, but the appropriate alarm is not active.	The monitor/control board is faulty.	► Replace control parts with those included in the control and display board kit, or replace the monitor/control board.
	The alarm setpoint was changed.	► Check the current setpoints for the alarms.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
The High Temperature alarm activates when the door is opened, then clears shortly after the door is closed.	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.
	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.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
The freezer is connected to power, but the AC Power Failure alarm is active.	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 power supply board is faulty.	► Replace the power supply board.
	The ON/OFF AC power switch located inside the front lower panel is faulty.	► Replace the ON/OFF AC power switch.
	The ON/OFF AC power switch is OFF.	► Turn the ON/OFF AC power switch to the ON position.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
	The circuit breaker was tripped.	► Confirm the circuit breaker switch is seated. Push the circuit breaker switch to reset the circuit breaker.

Problem	Possible Cause	Action
The 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 monitor/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 Helmer Technical Service.
	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.	The alarm system is faulty.	► Confirm the circuit board and line connections are functioning correctly.
	The monitor/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 Helmer Technical Service.
	The compressor is overheating due to lack of airflow.	► Check the condenser grill. Clean if needed. ► Confirm freezer location meets requirements.
	The condenser alarm setpoint is too low.	► Confirm the alarm setpoint is set at the expected or correct value.
	The refrigerant level is too low.	► Check refrigeration lines for leaks and repair if necessary. Check the refrigerant level. Recharge refrigerant if necessary.
	The condenser probe is not calibrated.	► Contact Helmer Technical Service to confirm the condenser probe is reading correctly and to calibrate the probe if necessary.

Problem	Possible Cause	Action
The condenser alarm is active.	Refrigerant level is too low.	► Check refrigeration lines for leaks and repair if needed. Check refrigerant level. Recharge if low.
	Connections for the condenser temperature probe are loose.	► Test the probe connections. Secure the connections if necessary.
	Condenser temperature probe is faulty.	► Test the probe. Replace the probe if necessary.
	Condenser fins are dirty.	► Clean as necessary, or order new ones from Helmer or your distributor.
	The compressor is overheating due to a lack of air flow.	► Check the condenser grill and clean if necessary. ► Confirm the freezer is correctly located. Refer to the Operation Manual.
	Condenser probe is not calibrated.	► Confirm the condenser probe is reading correctly. Calibrate the probe if necessary.
	The condenser alarm setpoint is too low.	► Confirm the alarm setpoint is at the appropriate value.
	The condenser fan motor is faulty.	► Replace the condenser fan motor.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
An alarm activated, but the temperature recorded at activation does not match the alarm setpoint.	The monitor settings are not calibrated.	► Confirm the temperature probe is reading correctly. Calibrate the probe if necessary.
	The temperature changed slightly around the time of activation.	► No action needed.
The No Battery alarm is activating sporadically.	The battery voltage level on the backup batteries for the monitoring system is low.	► Replace the backup batteries for the monitoring system.
The High Temperature alarm is activating sporadically.	The upper chamber temperature probe is not immersed in the product simulation solution.	► Confirm the probe bottle is full of solution, and the probe is placed in the bottle correctly.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
	The upper chamber temperature probe is not calibrated.	► Confirm the upper temperature probe is reading correctly. Calibrate the probe if necessary.

7.4 Testing problems

Problem	Possible Cause	Action
The automatic temperature tests do not work.	The connections for the chamber temperature probe are loose.	► Test the chamber temperature probe connections. Secure the connections if necessary.
	The chamber temperature probe is faulty.	► Test the chamber temperature probe. Replace the probe if necessary.
	The monitor/control board is faulty.	► Replace parts with those included in the control and display board kit.
	The 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 Helmer Technical Service.

7.5 Condensation and icing problems

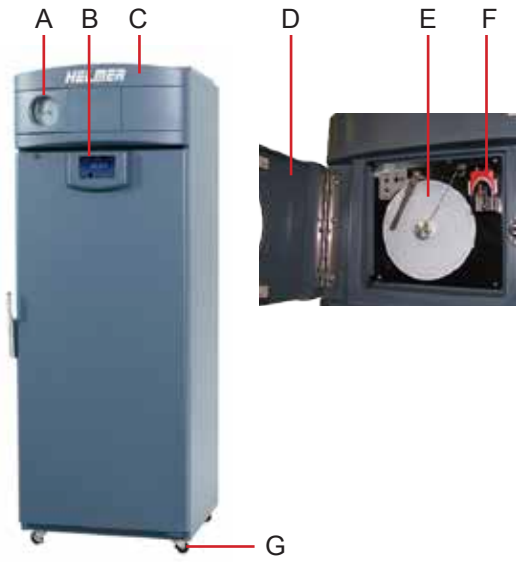
Problem	Possible Cause	Action
There is excessive water in the water evaporation tray inside the lower compartment in the back of the unit.	Humid air is entering the chamber	► Confirm the freezer is level, and the door is aligned, closing tightly, and sealing correctly. Correct issues as necessary.
	The heater in the water evaporation tray is faulty.	► Confirm the heater is hot and is drawing the correct current (approximately 0.21 A to 0.35 A). Replace the heater if necessary.
There is excessive ice in the chamber.	Humid air is entering the chamber.	► Confirm the freezer is level, and the door is aligned, closing tightly, and sealing correctly. Correct issues as necessary.
	The unit cooler drain line is damaged or restricted.	► Confirm the unit cooler drain line is free of debris and is not restricted. Remove debris if necessary.
	The drain line is plugged.	► Confirm the drain tube is free of debris. Remove debris if necessary.
	The external drain fan is faulty.	► Confirm the external drain fan is running. Hold a piece of paper in front of the fan and confirm that the paper is being drawn toward the freezer. ► Confirm the connections are secure. Tighten connections if necessary. ► Replace the drain line fan if necessary.
	The connection between the unit cooler and the drain line is loose.	► Confirm the connection is secure. Tighten the connection if necessary.
There is excessive moisture on the door.	Humid air is entering the chamber.	► Confirm the freezer is level, and the door is aligned, closing tightly, and sealing correctly.
	The relative humidity around freezer is too high.	► Confirm freezer location meets requirements.
After a defrost cycle, no water flows into the water evaporation tray.	Not enough time has elapsed since the end of the defrost cycle.	► Allow approximately 20 minutes after the end of the defrost cycle to check for water in the evaporation tray.
	The drain line is plugged.	► Confirm the drain tube is free of debris. Remove debris if necessary.
	The drain line heater is faulty.	► Confirm the drain line heater is warm to the touch. Contact Helmer Technical Service to resolve issues as necessary.
	The defrost heater on the evaporator in the unit cooler is not working.	► Check for ice buildup on the evaporator by looking through the fan grill with a flashlight. If there is significant ice buildup inside or behind the unit cooler, initiate a defrost cycle of the freezer.
	The defrost heater on the evaporator in the unit cooler is faulty.	► Confirm the drain line heater is hot and is drawing the appropriate current during a defrost event (approximately 3.3 A to 5.5 A). ► Replace the defrost heater if necessary.

8 Parts

This chapter concerns replaceable parts and part numbers. It also includes references to schematics, as appropriate. See chapter **9** (Schematics).

CAUTION Before replacing parts that affect chamber temperature, take precautions to protect items in the freezer from extended exposure to adverse temperatures.

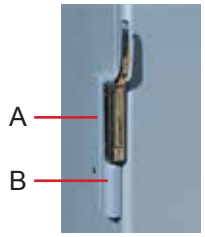
8.1 Front



Front features. Left: iPF120 freezer. Right: Chart recorder and door.

Label	Description	Replacement part numbers	Label on schematic
A	Temperature chart recorder (standard on plasma freezer model, optional on laboratory model)	800084-1	CA
B	i.C³ monitoring and control system	See subsequent section(s) for part numbers	IQ
C	Bezel with chart recorder door	800069-2	-
	Bezel without chart recorder door	400998-2	-
D	Chart recorder door assembly	800070-1	-
E	Chart paper (52 sheets)	220366	-
F	Chart recorder backup battery	120218	CC
G	Caster (swivel with brake)	220467	-

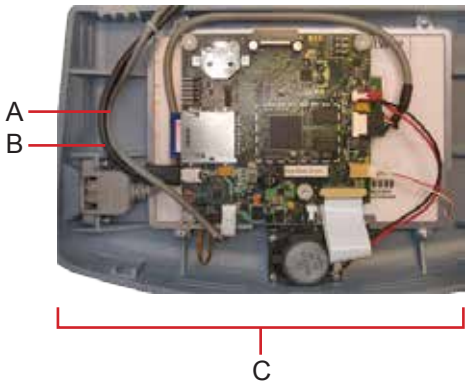
8.1.1 Access Control option



Optional Access Control door lock.

Label	Description	Replacement part number	Label on schematic
A	Access Control cartridge cover	-	-
B	Access Control door catch (door side)	-	-
Not shown	Access Control cartridge assembly (includes manual override key)	Left-hinged door: 800020-1 Right-hinged door: 800020-2	N

8.1.2 Control system display parts

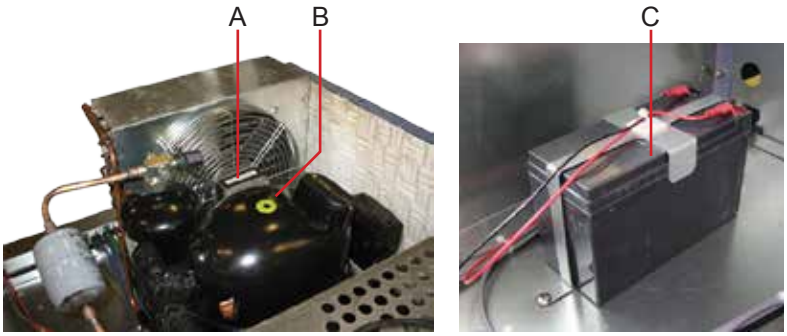


Left: Front view, LCD touchscreen. Right: Rear view of display, showing display board.

Label	Description	Replacement part numbers	Label on schematic
A	Interface cable	800010-1	IG
B	Power cable	800010-1	IH
C	Display assembly (includes touchscreen, display board, interface cable, speaker)	800041-1	IQ

NOTE Although the touchscreen and display board may be replaced independently of the i.C³ display assembly, Helmer recommends replacing the complete assembly.

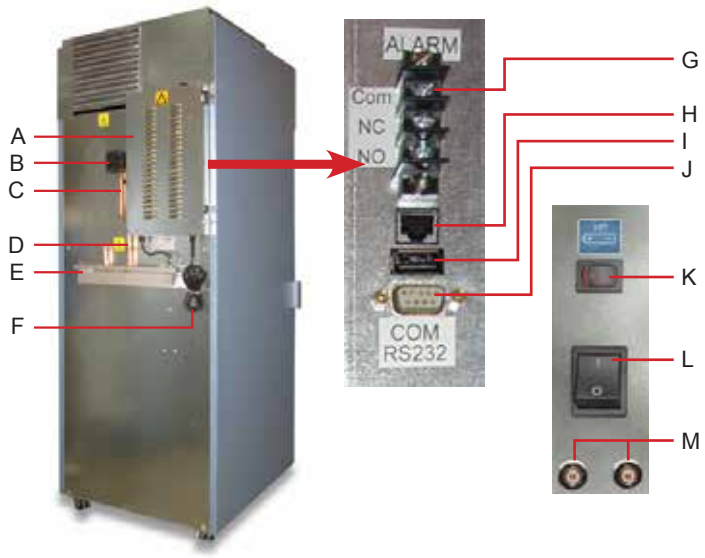
8.2 Top



Top features.

Label	Description	Replacement part numbers	Label on schematic
A	Condenser fan motor	230 V, 50 Hz: 120515 230 V, 60 Hz: 120493	K
B	Compressor	230 V, 50 Hz: 400672-3 230 V, 60 Hz: 400672-4	J
C	Monitoring system backup battery	120628	IB
Not shown	Condenser probe	800039-1	IL
Not shown	Solenoid valve	220547	W
Not shown	Solenoid coil	800096-1	V

8.3 Rear

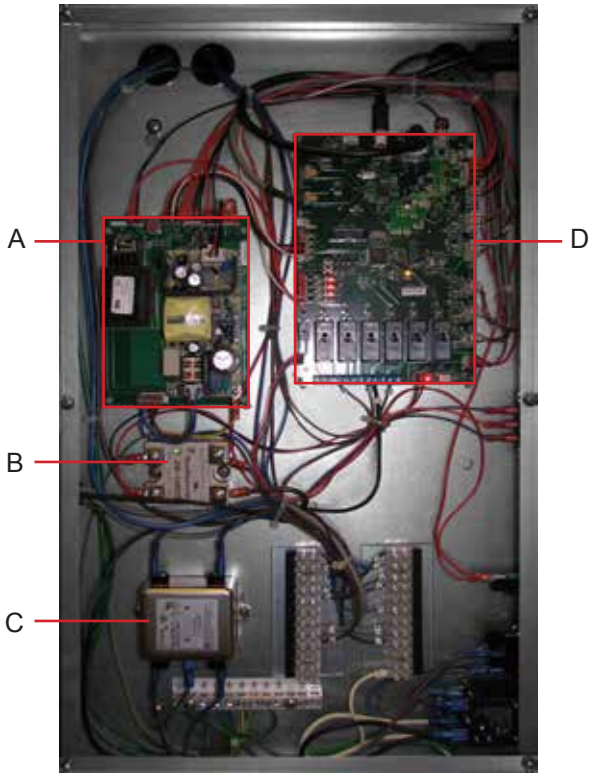


Rear features (iPF120 model shown).

Label	Description	Replacement part numbers	Label on schematic
A	Electrical box	See subsequent section(s) for part numbers.	-
B	Drain line fan	120511	Q
C	Drain line heater	120485	T
D	Drain line	-	-
E	Condensate evaporator assembly (includes condensate evaporator, tray, and cover)	400790-2	J
F	Power cable	North American models: 800002-1 European models: 800003-1	A
G	Remote alarm contacts	-	-
H	RJ-45 Ethernet port	800008-1	IF
I	USB port	120633	IE
J	RS-232 serial port (optional)	-	-
K	Battery backup switch	120202	IC
L	Main power switch	120478	C
M	Circuit breaker, 12 A	120220	B

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

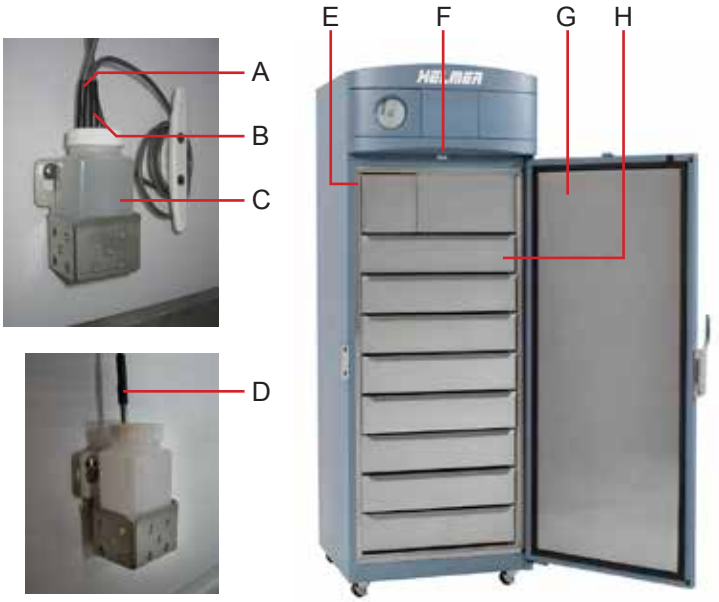
8.3.1 Electrical box parts



Electrical box features (iPF120 model shown).

Label	Description	Replacement part numbers	Label on schematic
A	Power supply board	800035-1	ID
B	Compressor relay	120426	L
C	Power line filter	120400	D
D	Monitor/control board	800034-1	IA

8.4 Interior

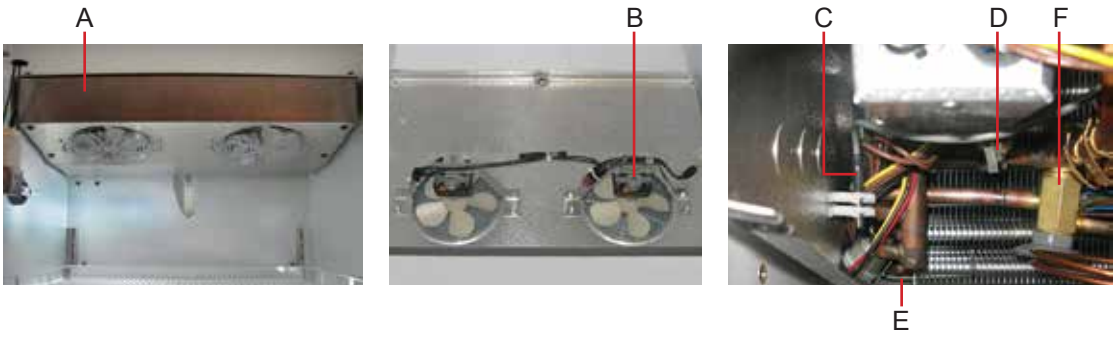


Interior features (iPF125 model shown).

Label	Description	Replacement part numbers	Label on schematic
A	Chart recorder probe	800024-1	CB
B	Upper chamber probe	800038-1	IK
C	Probe bottle and glycerin kit	400922-1	-
D	Lower chamber probe	800037-1	IJ
E	Mullion heater (behind strike plates)	800082-1	U
F	Door switch	120380	M
G	Door	See subsequent section(s) for part numbers	-
H	Storage parts	See subsequent section(s) for part numbers	-
Not shown	Strike plate replacement kit (includes strike plates (2 vertical, 2 horizontal), with pre-applied foam tape, foil tape, and instructions)	400687-1	-
Not shown	Unit cooler	See subsequent section(s) for part numbers	F

8.4.1 Unit cooler parts

CAUTION To remove the unit cooler cover, follow the instructions in chapter **6.4** (Removing and installing the unit cooler cover) for removing and installing the unit cooler cover. Not following these instructions could result in damage to the drain port on the unit cooler, which may cause operational problems such as excessive icing in the chamber and the inability to maintain the freezer setpoint.



Left: Unit cooler. Center and right: Unit cooler parts.

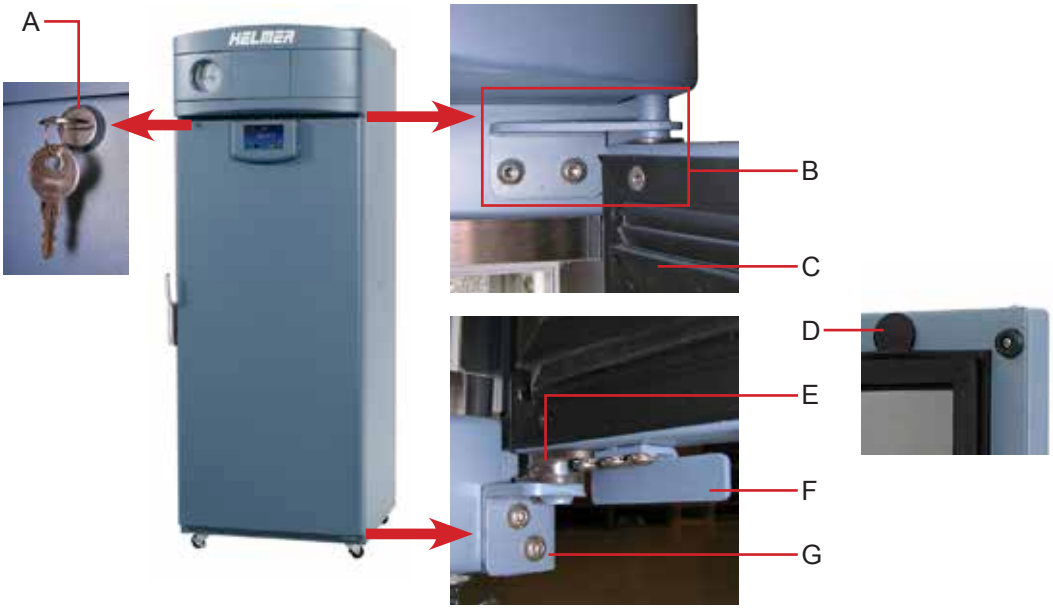
Label	Description	Replacement part numbers	Label on schematic
A	Unit cooler assembly	120476	F
B	Unit cooler fan motor	120548	E
C	Temperature control probe	800048-1	IT
D	Defrost heater limit thermostat	800014-1	S
E	Defrost heater	120567	R
F	Expansion valve	320495	-
Not shown	Defrost temperature probe	800039-1	IL

8.4.2 Storage parts

Storage features (left: iLF125 model shown; right: iPF125 model shown).

Label	Description	Replacement part numbers
A	Full shelf (includes hardware)	120 model: 400414-1 125 model: 400414-2
B	Drawer assembly (includes drawer, 2 slides, hardware)	120 model: 400584-2 125 model: 400584-1
Not shown	Drawer slide assembly (right side)	120 model: 400541-3 125 model: 400541-1
Not shown	Drawer slide assembly (left side)	120 model: 400541-4 125 model: 400541-2
Not shown	Roll-out basket assembly (optional, includes basket, 2 slides, hardware)	120 model: 400890-1 125 model: 400890-2
Not shown	Roll-out basket slide assembly (right side)	120 model: 400541-3 125 model: 400541-1
Not shown	Roll-out basket slide assembly (left side)	120 model: 400541-4 125 model: 400541-2
Not shown	Drawer slide wheel	320815-1
Not shown	Half shelf (includes hardware)	400413-1

8.4.3 Door and hinge parts

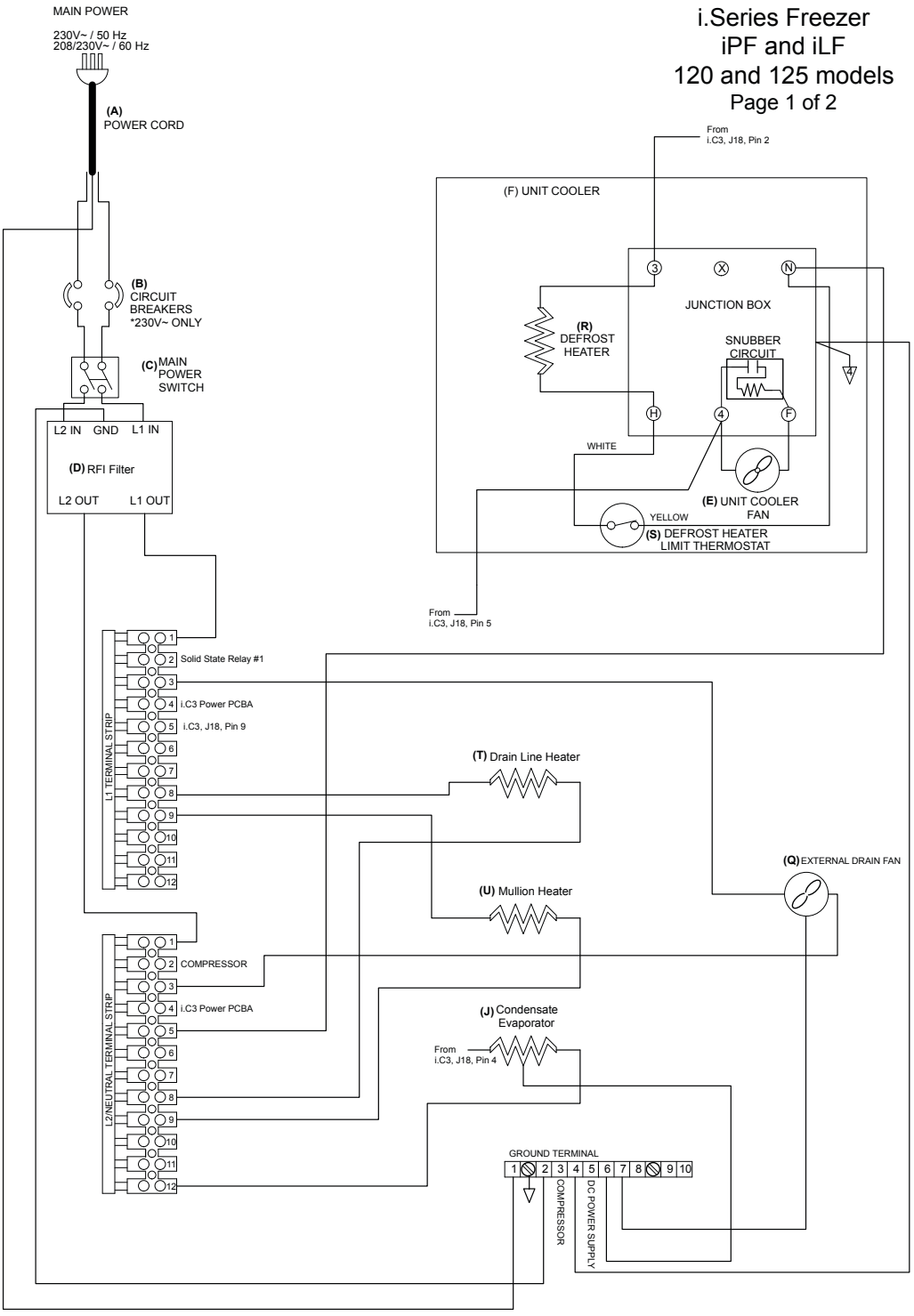


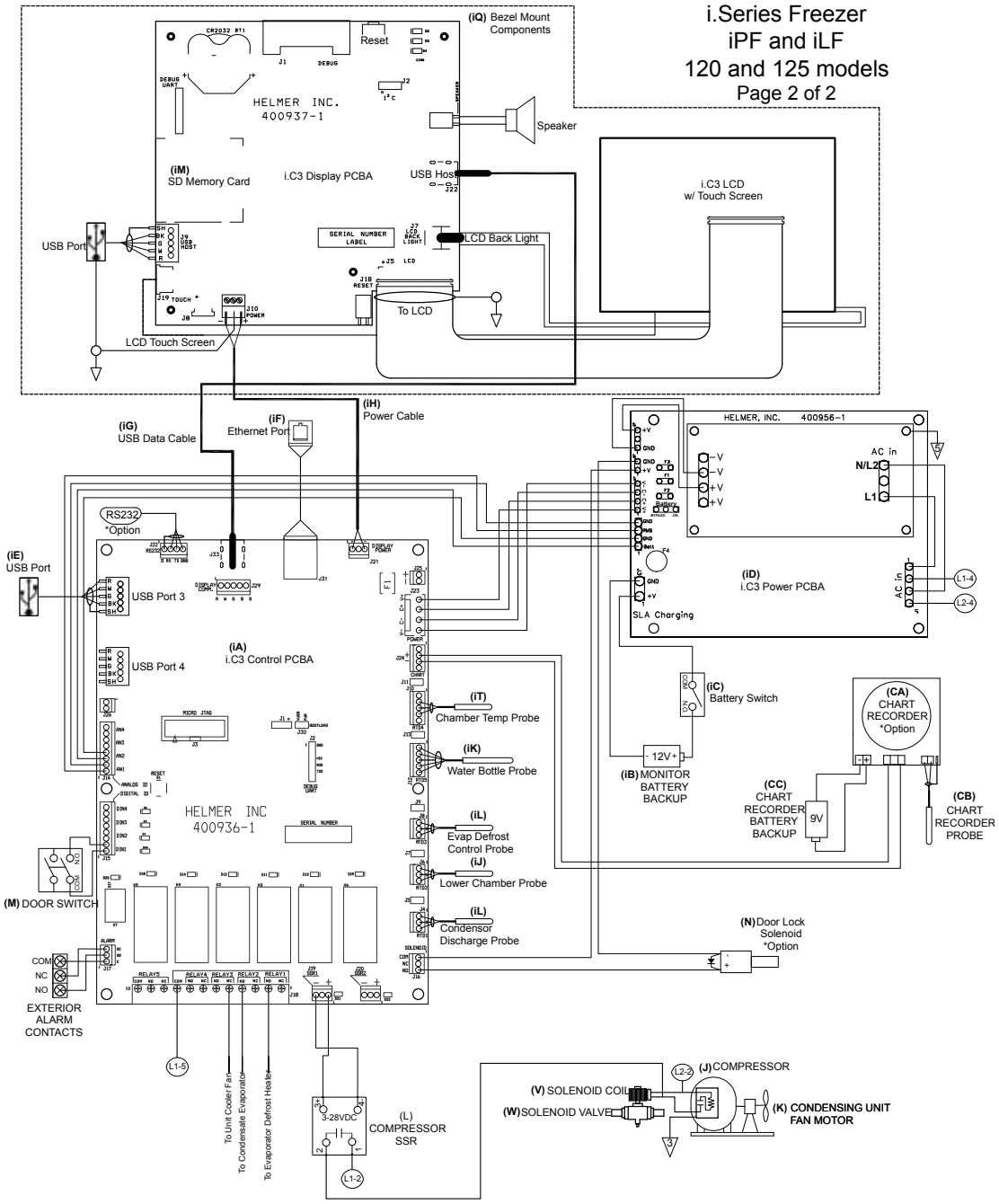
Door and hinge features (iPF125 model shown).

Label	Description	Replacement part numbers	Label on schematic
A	Door lock (functions as Access Control manual override lock on models equipped with Access Control option)	220540	-
B	Upper hinge assembly (includes hinge bearing, hinge pin, and upper hinge bracket)	Left hinge: 400960-2 Right hinge: 400960-1	-
C	Door gasket	320726-1	-
D	Door bumper	220441	-
E	Lower hinge cam	320742-1	-
F	Door stop	320763-1	
G	Lower hinge bracket	Right hinge: 400377-1 Left hinge: 400377-2	-
Not shown	Access Control lock cartridge assembly (cabinet side, included with Access Control option)	Left hinge: 800020-1 Right hinge: 800020-2	N

9 Schematics

9.1 iPF and iLF models; 120 and 125 configurations




i.Series Freezer
iPF and iLF
120 and 125 models
Page 2 of 2
(iQ) Bezel Mount Components
Reset
HELMER INC.
400937-1
Speaker
(iM) SD Memory Card
i.C3 Display PCBA
USB Host
i.C3 LCD w/ Touch Screen
USB Port
SERIAL NUMBER LABEL
LCD Back Light
To LCD
LCD Touch Screen
(iG) USB Data Cable
(iF) Ethernet Port
(iH) Power Cable
HELMER, INC. 400956-1
AC in
N/L2
L1
RS232 *Option
(iE) USB Port
USB Port 3
USB Port 4
(iA) i.C3 Control PCBA
(iD) i.C3 Power PCBA
SLA Charging
(iC) Battery Switch
(iB) MONITOR BATTERY BACKUP
12V+
(CA) CHART RECORDER *Option
(CC) CHART RECORDER BATTERY BACKUP
9V
(CB) CHART RECORDER PROBE
(iT) Chamber Temp Probe
(iK) Water Bottle Probe
(iL) Evap Defrost Control Probe
(iJ) Lower Chamber Probe
(iL) Condensor Discharge Probe
HELMER INC
400936-1
(M) DOOR SWITCH
(N) Door Lock Solenoid *Option
COM
NC
NO
EXTERIOR ALARM CONTACTS
L1-8
To Unit Cooler Fan
To Condensate Evaporator
To Evaporator Defrost Heater
3-28VDC
(L) COMPRESSOR SSR
L1-2
(V) SOLENOID COIL
(W) SOLENOID VALVE
L2-2
(J) COMPRESSOR
(K) CONDENSING UNIT FAN MOTOR

10 Settings

NOTE Information regarding descriptions and default values for general settings, alarm settings, and display settings is available in the i.C³ User Guide.

10.1 Navigating the Home screen

The Home screen displays current information and is the starting screen for all interaction with the monitoring system.

The Home screen appears when:

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

Home screen on the monitoring system.

Label	Description	Function
A	Information header	► Allows access to information logs ► Indicates new logged alarm events ► Provides date, time, and unit ID information ► Turn chamber light on or off ► Mute active audible alarms
B	Display zone	► Identifies active alarm conditions ► Displays upper and lower probe temperature ► Indicates freezer operational status
C	Application icons	► Displays customizable i.C³ application button icons

10.1.1 Understanding functions available from the Home screen

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

From the Home screen:

- View current readings from the temperature probe
- View the current time and date for the system
- Access any of the five customizable applications (touch **i.C³ APPS** for additional applications)
- View detailed information about current or previous alarm events or door open data
- View whether the monitoring system is running on backup battery power
- Mute audible alarms
- Turn the chamber light on and off
- View a graph of the chamber temperature for the past 24 hours or past 7 days of operation

10.2 Viewing and changing settings

Through the i.C³ monitoring system, the current settings may be viewed and changed. To view settings, touch **Home**, **i.C³ APPS**, **Settings**. Details for each setting are displayed. Use a touch-drag motion to scroll up or down to display additional settings. The settings can be changed through the same screen that they are viewed in. Refer to the i.C³ User Guide for instructions in changing settings, as well as descriptions and default values for each setting.

NOTE The Settings screen may be password protected. A valid four-digit password must be entered to view settings. If viewing settings for the first time, enter the factory default password of "1234".

10.2.1 Calibrating the settings for the chamber temperature probe

To ensure the high and low temperature alarms are activated properly, the chamber temperature that is read by the temperature probe must be accurate. Verify the probe is reading correctly by comparing the readings to those from an independent thermometer. After determining the appropriate temperature, change the value displayed on the monitor for the temperature probe.

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

The default setting for the chamber temperature probe is -30.0 °C. The value can be changed to a value from -50.0 °C to +50.0 °C.

Obtain:

- ► An independent thermometer, calibrated and traceable per national standards.
- ► Tape. This is used to secure the probe to the thermometer.

1 Measure the temperature of the upper probe bottle contents.

- **a** Remove all probes and the cap from the bottle.
- **b** Tape the independent thermometer to the temperature probe, and replace them in the bottle so their ends are immersed at least 2 inches (50 mm) in the solution.
- **c** Allow the chamber temperature to stabilize for approximately 10 minutes.
- **d** Obtain the reading from the independent thermometer.

2 Enter and save the reading from the independent thermometer into the i.C³ system.

- **a** From the Home screen, touch, **i.C³ APPS**, **Settings**, **Temperature Calibration**. The Temperature Calibration screen appears.
- **b** Touch plus (+) or minus (-) on the **Upper Temperature** spin box to increase or decrease the value to match the measured value.
- **c** The message "New Setting Saved" appears next to the spin box, indicating that the new temperature calibration setting is saved.

NOTE Shortly after saving the new temperature value, the displayed temperature may change so it no longer matches the new value. This is normal.

3 Replace the probes in the probe bottle.

- **a** Remove the thermometer and probe from the bottle and remove the tape from them.
- **b** Screw the cap on the bottle, ensuring it fits tightly to minimize evaporation.
- **c** Place the probes in the bottle, immersing them at least 2 inches (50 mm) in the solution.

10.2.2 Calibrating the compressor and evaporator probe

To ensure the freezer maintains the correct temperature, the compressor and evaporator temperature probes have been calibrated at the factory. Changing the calibration settings for the compressor or evaporator probe is not typically necessary, and should not be performed unless directed to do so by Helmer Technical Service.

10.2.3 Restoring factory defaults

The settings listed below may be simultaneously changed to the factory default value.

This setting	Is restored to this value
Home Screen Application Icons	i.C³ APPS, Temperature Alarm Test, Temperature Graph, Information Logs, Download
Display Brightness	High (3 symbols)
Password (for Settings screen)	1234
Sounds	On
Alarm Volume	9
Alarm Tone	On
Temperature Calibration Values	Values previously entered during setup
Unit ID	Serial number entered at factory
Date Format	MM/DD/YYYY
Day	Not affected (maintained in real-time clock)
Month	
Year	
Time Format	12-hour
Minute	Not affected (maintained in real-time clock)
Hour	
AM/PM	
Language	Language previously selected during setup
Temperature Units	°C
Password Protection (for Settings screen)	On
Temperature Graph Screensaver	On
Access Control as Home Page	On
Light Off Delay (on/off)	On
Light Off Delay	5 minutes
High Temperature Alarm Setpoint	-20.0 °C
High Temperature Alarm Time Delay	0 minutes
Low Temperature Alarm Setpoint	-32.0 °C
Low Temperature Alarm Time Delay	0 minutes
Power Failure Alarm Time Delay	1 minute
Probe Failure Alarm Time Delay	0 minutes
Door Open (Time) Alarm Time Delay	3 minutes
Compressor Temperature Alarm Setpoint	50 °C
Compressor Temperature Alarm Time Delay	0 minutes
Chamber Setpoint	-30.0 °C
Chamber Hysteresis	Varies according to model and cabinet size
Delay on Start-Up	2 minutes

This setting	Is restored to this value
Duty Cycle of Control Relay during Probe Error	100%
Defrost Event #1 On/Off	On
Defrost Event #1 Start Time	12:00 AM
Defrost Event #2 On/Off	On
Defrost Event #2 Start Time	8:00 AM
Defrost Event #3 On/Off	On
Defrost Event #3 Start Time	4:00 PM
Defrost Event #4 On/Off	Off
Defrost Event #4 Start Time	6:00 PM
Defrost Time/Defrost Safety Operation Time	15 minutes

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

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

- ► To restore the factory default settings, touch the **Yes** button. The message screen closes and the settings are saved.
- ► To cancel restoring factory default settings touch the **No** button. The message screen closes and the settings are not saved.

10.2.4 Changing factory settings

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

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

Through the i.C³ monitoring system, the current settings may be viewed and changed. The factory settings can be changed through the same screen that they are viewed in. Contact Helmer Technical Service to verify if changing factory settings is necessary, and for instructions in accessing the factory settings page.

10.3 Testing alarms

Test the alarms to ensure they are working correctly. The freezer has alarms that indicate if the chamber temperature becomes too high or too low.

Test these alarms using the built-in Peltier device. The Peltier device physically heats or cools the upper temperature probe; it is unnecessary to insert the probe in chilled or warm water. This automatic method does not affect the chamber temperature.

The alarms may also be tested by placing the upper temperature probe in chilled or warm water and noting the displayed temperature at which the alarm activates.

10.3.1 Testing temperature alarms automatically

Alarm test screen on the monitoring system.

NOTE The automatic test can be aborted at any time by touching the **Cancel Test** button.

When performing an automatic low alarm test, the Peltier device cools the probe until the low alarm setpoint is reached. An event is added to the Event Log indicating the low temperature alarm was initiated. The Alarm Test icon is displayed on the Temperature Graph, indicating the change in temperature was test-induced. When completed, the message "Test Complete" appears at the right side of the screen. The test process takes less than five minutes.

When performing an automatic high alarm test, the Peltier device heats the probe until the high alarm setpoint is reached. An event is added to the Event Log indicating the low temperature alarm was initiated. The Alarm Test icon is displayed on the Temperature Graph, indicating the change in temperature was test-induced. When completed, the message "Test Complete" appears at the right side of the screen. The test process takes less than five minutes.

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.

To automatically test the low temperature alarm

1. Identify the current setting for the low alarm setpoint.
2. Touch **Home**, **i.C³ APPS**, **Temperature Alarm Test**. The Temperature Alarm Test screen is displayed.
3. Touch the **Low Alarm Test** button to start the low alarm test. The button begins to flash.
4. In the Alarm Condition area, a "Peltier Test Probe Cooling" message appears.
5. When the displayed temperature reaches the alarm setpoint, the temperature reading turns red and an event is added to the Event Log, indicating the low temperature alarm was initiated.
6. When completed, the message "Test Complete" appears at the right side of the screen.
7. View the Event Log by touching **Home**, **i.C³ APPS**, **Information Logs**, **Event Log**. Touch the event to view the Event Log Detail screen.
8. Observe the temperature at the time of the low temperature alarm event. Compare this value to the alarm setpoint. If the values do not match, refer to chapter **7** (Troubleshooting) for information on how to proceed.

NOTE If the temperature alarm test does not automatically complete within two minutes, restart the i.C³ monitoring system.

To automatically test the high temperature alarm

1. Identify the current setting for the high alarm setpoint.
2. Touch **Home**, **i.C³ APPS**, **Temperature Alarm Test**. The Temperature Alarm Test screen is displayed.
3. Touch the **High Alarm Test** button to start the high alarm test. The button begins to flash.
4. In the Alarm Condition area, a "Peltier Test Probe Warming" message appears.
5. When the displayed temperature reaches the alarm setpoint, the temperature reading turns red and an event is added to the Event Log, indicating the high temperature alarm was initiated.
6. When completed, the message "Test Complete" appears at the right side of the screen.
7. View the Event Log by touching **Home**, **i.C³ APPS**, **Information Logs**, **Event Log**. Touch the event to view the Event Log Detail screen.
8. Observe the temperature at the time of the high temperature alarm event. Compare this value to the alarm setpoint. If the values do not match, refer to chapter **7** (Troubleshooting) for information on how to proceed.

NOTE If the temperature alarm test does not automatically complete within two minutes, restart the i.C³ monitoring system.

To cancel an automatic test in progress

1. Touch **Home**, **i.C³ APPS**, **Temperature Alarm Test**.
2. Touch the **Cancel Test** button. The test is cancelled.

10.3.2 Testing temperature alarms manually

CAUTION The door must be left open during testing, which may affect the chamber temperature. Before testing the alarms manually, take precautions to protect items in the freezer from extended exposure to adverse temperatures.

Complete the low alarm test before the high alarm test in order to control the temperature more easily and complete the testing more quickly.

Obtain:

- ► An independent thermometer, calibrated and traceable per national standards.
- ► Tape. This is used to secure the probe to the thermometer.
- ► One 8 oz (250 ml) glass half full of chilled water. This holds the water used to measure the temperature.
- ► One glass filled with crushed ice. This is used to cool the water.
- ► One 8 oz (250 ml) glass half full of warm water. This is used to heat the water.

CAUTION Temperature probes are fragile. Handle them with care.

1. Identify the current settings for the low alarm setpoint and high alarm setpoint.
2. Remove the upper chamber temperature probe from the probe bottle.
3. Tape the temperature probe to the thermometer, and immerse them in the glass of chilled water so their ends are toward the bottom of the glass.
4. Activate the Low Temperature Alarm with this method: While constantly stirring the thermometer and probe in the chilled water and watching the temperature on the monitor, slowly add ice so the temperature decreases 0.5 °C per minute. This is approximately 1 teaspoon (5 ml) of ice every 15 to 25 seconds. Be sure to keep the end of the thermometer and probe in the lower liquid and not in the upper ice. When the temperature reaches the low alarm setpoint, an alarm sounds and the temperature reading turns red. An event is added to the event log indicating the low temperature alarm was started.
5. Note the temperature on the independent thermometer when the alarm was triggered.

6 Activate the High Temperature Alarm with this method: While constantly stirring the thermometer and probe in the chilled water and watching the temperature on the monitor, slowly add warm water so the temperature increases 0.5 °C per minute. When the temperature reaches the high alarm setpoint, an alarm sounds and the temperature reading turns red. An event is added to the event log indicating the high temperature alarm was started. The test is complete.
7 Note the temperature on the independent thermometer when the alarm was triggered.
8 Remove the thermometer and probe from the water and remove the tape from them.
9 Place the probe in the bottle, immersing it at least 2 inches (50 mm) in the solution.
10 Compare each recorded thermometer value to its corresponding setpoint. If the values do not match, see chapter **7** (Troubleshooting) for information on how to proceed.

10.3.3 Testing the power failure alarm

CAUTION Testing the power failure alarm requires that power be disconnected from the freezer, which may affect the chamber temperature. Before testing the alarm, take precautions to protect items in the freezer from extended exposure to adverse temperatures.

Test the power failure alarm to ensure it activates at the appropriate time.

During a power failure, the backup battery continues to provide power to the monitoring system.

1 Identify the current setting for the Power Failure Time Delay.
2 Change the setting to zero minutes. For instructions, refer to the i.C³ User Guide.
3 Disconnect the freezer from power by moving the main power switch on the electrical box to the OFF position. The power failure alarm should activate immediately, causing the audible alarm to sound and the Power Failure alarm message to appear on the Home screen. An event is added to the event log indicating a power failure alarm condition.
4 Power the freezer on by moving the main power switch on the electrical box to the ON position. The power failure alarm will clear, causing the audible alarm to clear and the Power Failure alarm message to clear from the Home screen. An event is added to the event log indicating the power failure alarm condition reset.
5 Change the Power Failure Time Delay setting back to the original value.

10.3.4 Testing the door open alarm

CAUTION Testing the door open alarm requires the freezer door to be left open for an extended period of time, which may affect the chamber temperature. Before testing the alarm, take precautions to protect items in the freezer from extended exposure to adverse temperatures.

1. Identify the current setting for the Door Open Time delay.
2. Change the setting to zero minutes. For instructions, refer to the i.C³ User Guide.
3. Open the freezer door. The door open alarm should activate immediately, causing the audible alarm to sound and the Door Open alarm message to appear on the Home screen. An event is added to the event log indicating the door open alarm condition started.
4. Close the freezer door. The door open alarm should clear, causing the audible alarm to clear and the Door Open alarm message to clear from the Home screen. An event is added to the event log indicating the door open alarm condition reset.
5. Change the Door Open Time setting back to the original value.

10.4 Upgrading the system firmware

Helmer may occasionally issue updates for the i.C³ firmware. In the case of updated firmware, follow the upgrade instructions included with the firmware update.

10.5 Calibrating the touchscreen

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

Perform the following procedure to calibrate the touchscreen:

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

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

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

NOTE If the screen was unintentionally touched outside of any of the crosshair icons during calibration, the screen may be recalibrated using the process outlined above.

10.6 Viewing manufacturer and product information

View version information for contacting Helmer.

1. From the Home screen, touch **i.C³ APPS**, **Contact Helmer**.
2. The manufacturer contact information appears.
3. The software version appears.

11 Warranty

11.1 Rel.i™ Product Warranty USA and Canada

For technical service needs, please contact Helmer at 800-743-5637 or www.helmerinc.com. Be sure to have the model and serial number available.

11.1.1 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.

11.1.2 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.

11.1.3 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.

11.1.4 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.

11.1.5 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.

11.2 Outside of USA and Canada

Consult your local distributor for warranty information.

12 References and Compliance

12.1 Alarm reference

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

The table below indicates if an alarm for a particular model is audible (A), visual (V), or sent through the remote alarm interface (R). Messages for visual alarms, if applicable, appear in the table as well.

Alarm	Alarm type
High Temperature	A, V (“High Temperature”), R
Low Temperature	A, V, (“Low Temperature”) R
Compressor Temperature	A, V (“Compressor Temperature”), R
Door Open (Time)	A, V (“Door Open”), R
Power Failure	A, V (“Power Failure”), R
Low Battery	V, R
Probe Failure	A, V (“Probe Failure”), R
No Cellular Service	A, V (“No Cell Service”), R

12.2 Energy conservation and regulatory compliance

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

CE
0086

This product is certified to applicable UL and CSA standards by a NRTL.

Insulation Type: 2

Pollution Degree: 2 (for use in USA and Canada only)

Sound level is less than 70 dB(A).

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 the 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 the collection and return systems available locally.

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

Section III: Horizon Series™ Models

13 Product Configuration

13.1 Installing batteries for backup power

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

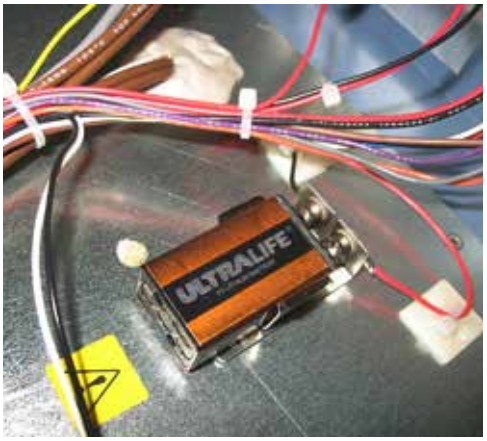
NOTE The monitoring systems will start on battery power alone. If the freezer was previously not connected to AC power and the backup battery is connected or switched on, the monitoring system will begin running on battery power.

Battery life varies by manufacturer as well as voltage level remaining. Providing full power is available, and no battery-related alarms are active, backup power is available for up to two hours. Backup power for the temperature chart recorder is available for up to 14 hours.

CAUTION

- ► Before installing or replacing batteries, disconnect power to the freezer.
- ► When installing a replacement battery for the monitoring system, use only a battery which meets the specifications outlined in chapter **15.7** (Supplies).

The battery holder is located on the top of the freezer behind the front bezel.



Monitoring system backup battery.

The type of battery for the monitoring system varies by model:

Models	Monitoring system	Battery requirements
HPF and HLF	Combined alarm monitoring and control system	One non-rechargeable 9 V lithium (or equivalent) battery

Monitoring system battery is included in the literature box. Install and connect the battery to provide monitoring system with backup power in the event of AC power failure.

13.2 Freezer setpoint configuration

The temperature controller adjusts chamber temperature around the freezer setpoint. The controller activates the compressor when the chamber probe registers temperature above the setpoint.

The controller also senses unit cooler temperature through a probe in the cooler. The temperature in the unit cooler typically varies from the temperature in the chamber, so an offset value is used in the control system. The unit cooler temperature combined with the offset value establishes the freezer setpoint.

NOTE The probes in the bottles are connected to the monitoring system and sense chamber temperature. These probes do not impact the freezer setpoint.

13.3.1 Determining current freezer setpoint

First, confirm:

- ► Freezer has run for at least 24 hours to stabilize chamber temperature.
- ► Chamber temperature is not fluctuating because of excessive door openings and closings.
- ► Freezer has been placed per location requirements. See Operation manual.
- ► Preventive maintenance has been completed. See Operation manual.
- ► Troubleshooting items associated with chamber temperature have been reviewed.

Obtain:

- ► An independent thermometer, calibrated and traceable per national standards.
- ► Tape. This is used to secure the probe to the thermometer.

1 Remove all probes from the upper probe bottle.
2 Unscrew the cap from the bottle.
3 Tape the independent thermometer to the temperature probe, and replace them in the bottle so their ends are immersed at least 2 inches (50 mm).
4 On the independent thermometer, monitor temperature for about 10 minutes to determine an approximate range.
5 From the range, calculate an approximate average temperature. This is the current setpoint.
6 Remove thermometer and probe from the bottle and remove tape.
7 Replace bottle cap, ensuring a tight fit.
8 Place probes in bottle, immersing at least 2 inches (50 mm).

13.3.2 Changing freezer setpoint

The default setpoint is either -20.0 °C or -30.0 °C, depending on use.

Change the setpoint if:

- ► Your organization requires a chamber temperature different from the default setting.
- ► The normal chamber temperature is too high or low, even after completing preventive maintenance and applicable troubleshooting tasks.

Before changing setpoint, confirm:

- ► Freezer has been placed per location requirements. See operation manual.
- ► Preventive maintenance has been completed. See operation manual.
- ► Troubleshooting items associated with chamber temperature have been reviewed.

CAUTION Do not change setpoint to a value outside the temperature control range.

1. Determine the new setpoint temperature.
2. Determine the change in value to reach the desired setpoint. The adjustment will be the difference. For example, if the desired normal temperature is -25.0 °C, but the current setpoint is -30.0 °C, then the difference is -5.0 °C. The setpoint adjustment value is therefore -2.5 °C.
3. On the monitoring system, change to Control mode by pressing and releasing the SEL button until the CONTROL lamp is lit.

13.4 Automatic defrost cycle configuration

The freezer features an automatic defrost system. This system periodically runs to melt accumulated ice on the evaporator, which can obstruct air flow and degrade the freezer's capability to reach the temperature setpoint.

The number of programmed defrost events is dependent on environmental conditions and the frequency of usage. The recommended number of daily defrost cycles is three to four, programmed at even intervals. Defrost events should take place when the freezer door is opened infrequently. Opening the door can raise the chamber temperature above the normal defrost cycle temperature, typically 4 °C to 10 °C above the freezer setpoint.

NOTE Depending on the high temperature alarm setpoint and the actual temperature increase during the defrost cycle, frequent door openings may trigger repeated high temperature alarms.

CAUTION

- ► Disconnect power to the freezer to eliminate the potential of electric shock and injury.
- ► Before disconnecting AC power, protect stored items from extended exposure to adverse temperatures.

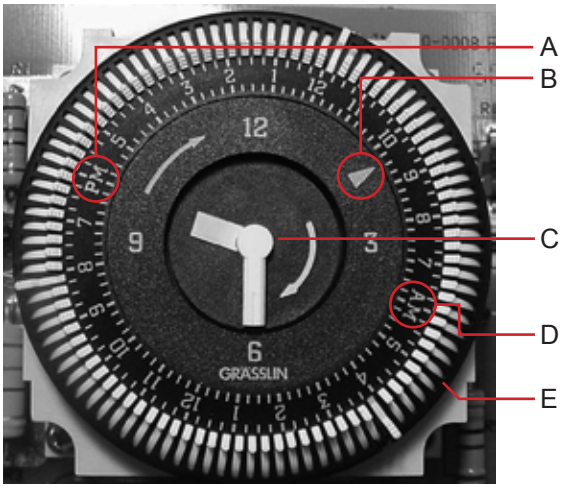
13.4.1 Accessing the Horizon defrost controller

The defrost controller is located inside the electrical box on the back of the freezer. Using a screwdriver, loosen the six screws attaching the electrical box cover to the electrical box. Slide the cover up and remove the cover.

13.4.2 Defrost controller

Specify the number of defrost events to execute per day, as well as the time at which to initiate each defrost cycle. The cycles are based on the current time settings on the defrost controller.

The defrost controller features two time indicators and a time adjustment ring. The hour and minute hands in the center of the dial show the current time in hours and minutes, but do not indicate AM or PM. The outer ring shows the current time including AM or PM, but only to the nearest 15-minute interval.



Horizon Series defrost controller with current time set to approximately 9:30 PM.

Label	Description
A	PM indicator
B	Current time indicator (includes AM/PM and shows nearest 15-minute interval)
C	Current time indicator (hour and minutes only)
D	AM indicator
E	Time adjustment ring

View and change current time

1. Switch the AC ON/OFF switch OFF.
2. Use a screwdriver to remove the kick plate. Pull out the slide tray to expose the defrost controller.
3. On the timer dial, turn the time adjustment ring clockwise until the current time indicators show the correct (current) time.
4. To resume normal operation, replace the kick plate and switch the AC ON/OFF switch ON. Allow the freezer adequate time to come to normal temperature.

Scheduling defrost times

The default settings for the Horizon Series controller are three defrost events per day, occurring at 12:00 AM (midnight), 8:00 AM, and 4:00 PM. Defrost events may be added or removed, and the time(s) of the events may be changed. The fan delay/defrost termination thermostat (located inside the unit cooler) controls the duration of each defrost event, which can last from 15 to 30 minutes. However, the defrost controller must be set appropriately to allow the defrost event to complete correctly.

Each switch that is set to the ON position (toward the outer ring) schedules a 15-minute defrost event to occur at that time.

1. Switch the AC ON/OFF switch OFF.
2. Use a screwdriver to remove the kick plate. Pull out the slide tray to expose the defrost controller.
3. (Optional) Add an event by doing the following:
   - ► On the defrost controller, at the appropriate time marking, flip one switch to ON.
4. (Optional) Remove an event by doing the following:
   - ► On the defrost controller, at the appropriate time marking, flip one switch to OFF.
5. To resume normal operation, replace the kick plate and switch the AC ON/OFF switch ON. Allow the freezer adequate time to come to normal temperature.

Horizon Series defrost controller with defrost times set to On position at 12:00 AM, 8:00 AM, and 4:00 PM.

13.5 External monitoring devices

CAUTION

- Do not connect any monitoring device that exceeds the maximum load capacity for your model.
- The interface on the remote alarm monitoring system is intended for connection to the end user's central alarm system(s) that uses normally-open or normally-closed dry contacts.
- If an external power supply exceeding 33 V r.m.s. or 70 V (DC) is connected to the remote alarm monitoring system's circuit, the remote alarm will not function properly; may be damaged; or may result in injury to the user.

The Helmer freezer provides a remote alarm interface to send information to external devices, such as the Helmer Remote Alarm Monitoring System. For more information and availability, contact Helmer or your local distributor.

The remote alarm interface is a relay switch with three terminals: Common (COM), Normally Open (NO), and Normally Closed (NC). These terminals are dry contacts and do not supply voltage. The interface circuit is either normally open or normally closed depending on which terminals are used.

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

To connect to the remote alarm interface

1. Switch the AC ON/OFF switch OFF.
2. Disconnect the backup power to the monitoring system by removing the battery.
3. On the back of the freezer, locate the remote alarm interface.
4. Connect the remote alarm wires to the appropriate terminals according to the requirements for your alarm system.
5. Using a cable tie, secure the wires together for stability (as needed).
6. Reconnect the backup power to the monitoring system by reinstalling the battery.
7. Switch the AC ON/OFF switch ON.

13.6 Moving drawers and shelves

Not all containers are available for all models.

Storage features (availability of shelves, drawers, and baskets varies by model).

CAUTION

- ► Before moving drawers, shelves, baskets, slides or brackets, protect stored items from extended exposure to adverse temperatures.
- ► Before moving drawers, be sure they are completely empty for safe lifting.

To remove a drawer

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

To install a drawer

1. Align the end guides on the drawer with the slides.
2. Gently push the drawer into the chamber until it stops.
3. To ensure proper installation, pull drawer back out until it stops, then push it back in again.

To remove a shelf

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

To install a shelf

1. Insert the shelf into the chamber, placing it on the brackets.
2. Gently bump the rear edge of the shelf downward to engage it with the rear brackets.
3. Test installation by pulling the shelf forward gently. The shelf should not disengage from rear brackets.

13.6.1 Moving slides and brackets

To remove a set of slides

1. Using a screwdriver, remove the retainers for the front brackets.
2. Tap the front brackets upward to disengage them from the standard.
3. Remove the slide from the standards.

To install a set of slides

1. Insert the slides into the appropriate height in the standard.
2. Tap the front brackets downward to engage them in the standards.
3. Using a screwdriver, install the retainers for the front brackets.

To remove a set of shelf brackets

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

To install a set of shelf brackets

1. Insert the front brackets into the appropriate height in the standards.
2. Tap the front brackets downward to engage them in the standards.
3. Using a screwdriver, install the retainers for the front brackets.

13.6.2 Drawer weight

NOTE Maximum drawer load is 100 lbs (46 kg).

13.7 Leveling the freezer

After the freezer has been placed, the leveling feet must be adjusted in order to provide proper drainage of condensation from the evaporator coil, inside the unit cooler.

NOTE Helmer recommends the use of leveling feet.

Level the freezer front-to-back

1. Use a wrench to adjust the leveling feet.
2. A bubble level may be used to ensure the freezer is level.
3. When the freezer is properly leveled from front to back, the bottom of the unit cooler will slope downward from front to back (toward the condensate drain line, located in the back of the cabinet).

Level the freezer side-to-side

1. Use a wrench to adjust the leveling feet.
2. A bubble level may be used to ensure the freezer is level.
3. When the freezer is properly leveled from side to side, the bottom of the unit cooler will be horizontal (parallel to the floor).

13.8 Door characteristics

Some service information varies with respect to door characteristics. Depending on model, pads may be installed on the door handles. Single-door models may have hinges on the right or left side.

The Horizon monitoring and control system is located above the door.

Model group	Door type
Plasma (HPF) Laboratory (HLF)	Solid

Number of doors	Hinge location
Single-door (120, 125)	Right hinge or left hinge

13.9 Optional adapter kits for medication dispensing locks

Call Helmer or your distributor for specific system information.

14 Temperature Controller Programs

The freezer is shipped from the factory with preset temperature setpoints. These setpoints are specific to the freezer's intended use. These setpoints may be changed depending on organizational requirements.

NOTE The Control Offset and Control Hysteresis are factory preset and should not be changed.

14.1 Hysteresis

The hysteresis band (range) value for Horizon Series freezer models is factory preset at 2.0. This value represents each side of the freezer setpoint value, for a combined total band (range) value of 4.0. This value should not be changed.

14.2 High alarm setpoint

The High Alarm setpoint specifies the activation point of the high temperature alarm. The default setting is -20.0 °C. The setpoint may be changed to a value from -40.0 °C to +40.0 °C.

14.3 Low alarm setpoint

The Low Temp alarm setpoint specifies the activation point of the Low Temperature Alarm. The default setting is -35.0 °C.

14.4 Control temperature offset value

The Control Offset is used to control chamber temperature. This value is factory preset and should not be changed.

14.5 Monitor temperature offset value

If the temperature displayed on the monitor does not match the actual chamber temperature, the setting for the Monitor Offset can be changed so they match. The monitor offset can be changed to a value from -10.0 °C to +10.0 °C.

15 Maintenance

CAUTION See Operation Manual for the preventive maintenance (PM) schedule.

15.1 Recharging refrigerant

CAUTION The procedures in this chapter should only be completed by trained refrigeration technicians who are familiar with the terminology and processes described here, as well as with local and organizational regulations regarding refrigerant leaks.

Use only non-CFC R-404A refrigerant.

The freezer features an expansion valve refrigeration system. The amount of the full initial charge varies by model and power requirements, which can be found on the Product Specification label.

The initial charge is:

Model	Power requirements	Initial charge
HPF120, HPF125, HLF120, and HLF125	Any	29.0 oz (822 g)

Obtain:

- ► Refrigerant of the appropriate type and quantity
- ► A calibrated pressure gauge capable of reading 0 lb/in² to 220 lb/in² (0 kPa to 1520 kPa)

1. Attach the pressure gauge to the refrigeration lines.
2. Monitor the low side (suction) pressure through a full compressor cycle.
3. At the end of the next cycle, before the compressor stops, measure the pressure. The pressure varies depending on the ambient air temperature. The low side pressure should be 4 lb/in² to 7 lb/in² (30 kPa to 50 kPa). The high side pressure should be 100 lb/in² to 220 lb/in² (690 kPa to 1520 kPa).
4. Add refrigerant so the pressure is within the acceptable range.

15.2 Checking the monitoring system backup battery

CAUTION Checking the monitoring system backup battery requires that power be disconnected from the freezer, which may affect the chamber temperature. Before testing the alarm, take precautions to protect items in the freezer from extended exposure to adverse temperatures.

The monitoring system does not have visual indicators for the status of the backup battery. Regularly test whether the backup battery is functioning, and replace it if the test fails or if the battery has been in use for one year.

Test whether the backup battery is functioning

1. Disconnect the freezer from AC power by disconnecting the AC power cord from the wall outlet or by switching the AC ON/OFF switch OFF. The display should continue to display information. If the display is blank, replace the battery.
2. Re-connect the freezer to AC power.

CAUTION When installing a replacement battery for the monitoring system, use only a battery which meets the specifications outlined in chapter **15.7** (Supplies).

15.3 Cleaning the freezer

Condenser grill

CAUTION
- ► Disconnect power to the freezer to eliminate the potential of electric shock and injury from surrounding components.
- ► Cleaning the condenser grill requires power disconnection. Protect items in the freezer from extended exposure to adverse temperatures.

The condenser grill is the finned surface at the rear of the unit. It must be kept clean for proper operation. Not cleaning condenser grill regularly significantly reduces freezer life expectancy. In environments where the freezer is exposed to excessive lint or dust, condenser grill may need to be cleaned more frequently than stated on the preventive maintenance schedule.

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

Exterior

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

CAUTION The condensate evaporator and the water evaporation tray are hot.

Interior

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

Door gaskets

Clean door gaskets with a soft cloth and mild soap and water solution.

Clean and refill probe bottles

NOTE A replacement kit that includes a probe bottle and propylene glycol is also available from Helmer.

CAUTION
- ► Removing the temperature probe from the bottle may cause the chamber temperature to fluctuate.
- ► Protect stored items from extended exposure to adverse temperatures.

Obtain:

- ► Fresh water-bleach solution (not provided) Solution is a 10% bleach solution (1 part bleach to 9 parts water, where bleach means a 5% solution of commercial sodium hypochlorite (NaOCl)). Otherwise, use an equivalent oxidizing cleaner/disinfectant approved for use by your organization.
- ► Approximately 4 oz (120 ml) of product simulation solution per bottle. Solution is a 1:1 ratio of water to propylene glycol (or equivalent low-temperature fluid).

CAUTION Temperature probes are fragile. Handle with care.

1. Remove all probes from bottle.
2. Remove bottle from bracket and clean with water-bleach solution.
3. Fill with approximately 4 oz (120 ml) of product simulation solution.
4. Cap tightly to minimize evaporation.
5. Place bottle in bracket and replace probes, immersing at least 2 inches (50 mm) in solution.

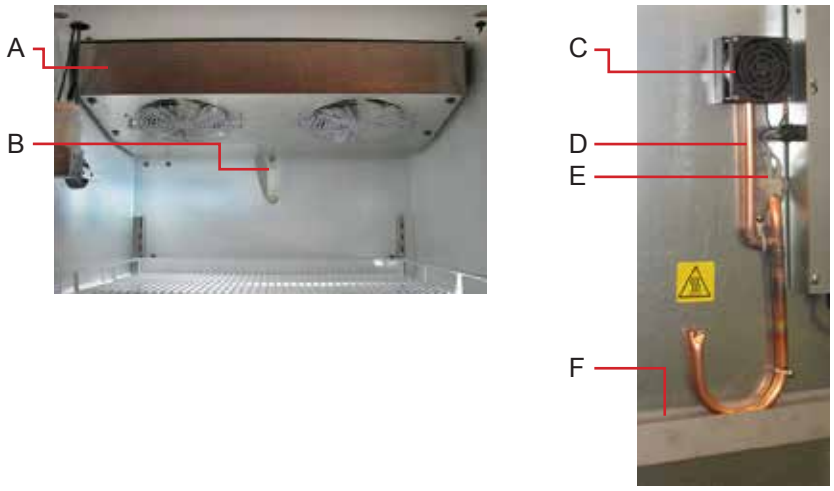
15.4 Removing and installing the unit cooler cover

The unit cooler cover has a port to drain condensation generated in the cooling process. If the unit cooler cover is not removed correctly, the drain port may be damaged. Improper drainage may result in excessive icing in the freezer and the freezer's inability to maintain the temperature setpoint.

This drain port fits into a piece of copper tubing that directs the condensate into the J-shaped drain line on the rear of the freezer. Before removing the unit cooler cover, first remove the copper tubing. This process also requires removal of the drain line heater, which is located inside the tubing.

The following is required to remove and reinstall the unit cooler cover:

- 5/16" socket wrench
- Tool to push putty away from the tubing



Left: Unit cooler (A) inside the chamber, with drain port (B). Right: drain line fan (C), drain tubing (D), and heater wires (E).

To remove the unit cooler cover

1. On the electrical box, turn the AC ON/OFF switch OFF. Disconnect the freezer from outlet power as well. Disable the power failure alarm by disconnecting the backup battery or turning the Alarm Disable key switch OFF.
2. On the rear, remove the wire ties securing the drain line to the freezer.

CAUTION The water evaporation tray and condensate evaporator may be hot.

3. Remove the J-shaped tube by pulling it downward to separate it from the other tubing. The tube to the external drain fan may also separate from the fan in the process.
4. Peel the putty away to expose the angled copper tube and the drain line heater that is inserted into the hole in the tube.
5. Remove wire tie securing the heater wires to freezer. Verify black heating element is cool to the touch.
6. Remove the drain line heater from the tube by firmly pulling the heating element downward and away from the freezer. The heating element is about 9 inches (220 mm) long.
7. For HPF models, remove the top drawer and the Cold-Shield system panel from the chamber. To remove the Cold-Shield panel, loosen the three screws that secure it to the freezer (located behind the panel, one in the middle and two on the right side), then slide the panel to free it from the screws.

8 While holding the unit cooler cover in place to prevent it from dropping, use the socket wrench to remove the four screws securing the cover to the unit cooler. Gently lower the cover to avoid damaging wiring for the unit cooler fan.

To reinstall the unit cooler cover

1 In the chamber, verify the wiring for the unit cooler fan is connected and routed correctly. The wiring should be routed above the tube inside the unit cooler. If the wires have separated, reconnect them (the two wires marked with wire ties should be connected to each other).
2 Ensure the short length of clear tube is installed on the unit cooler cover. The tube should be installed 1/4" away from the unit cooler cover. Ensure the copper extension is firmly installed on the clear tube.
3 Insert the copper drain tube through the hole in the cabinet, from inside the cabinet.
4 Insert the drain line heater into the copper drain tube through the hole located in the middle of the bend in the drain tube. The drain line heater element should protrude from the drain line, inside the cabinet.
5 Lift the unit cooler cover into place, ensuring the front of the cover is behind the lip of the unit cooler. Install and tighten 4 screws to secure unit cooler cover to the unit cooler.
6 Inside the cabinet, rotate and pivot the copper drain line so the drain line is aligned with the copper extension on the unit cooler. Press the copper drain line and the copper extension together to make a tight seal.
7 On the rear, push the long straight copper tube upward and on to the drain line that protrudes from the hole in the cabinet.

CAUTION The water evaporation tray and condensate evaporator may be hot.

8 Install the remaining tubing. Insert the straight section of tubing into the hole on the bottom of the external fan. While holding that section in place, press the J-shaped tube upward into place. Fasten the tubing in place with the two wire ties.
9 Press the putty around the tube to seal the hole from the rear. Secure the heater wires to the freezer with a wire tie.
10 Return the freezer to normal operation. Connect the freezer to outlet power and switch the AC ON/OFF switch ON. Reconnect the backup battery or turn the Alarm Disable key switch ON.

15.5 Defrosting the freezer

To address operational issues, it may be necessary to defrost the freezer. Defrost events may be scheduled to occur at specific times.

15.6 Removing and replacing the Access Control cartridge

The Access Control lock cartridge is a serviceable part and may be replaced if necessary. The lock cartridge is an assembly that is installed on the outside of the freezer cabinet.

CAUTION

- ► Review all safety instructions prior to replacing the Access Control cartridge. See chapter **2** (Safety).
- ► Power the freezer off and disconnect AC power before performing service.
- ► The chamber temperature will increase above the allowable temperature range for stored inventory while performing this procedure. Take precaution to protect items in the freezer from extended exposure to adverse temperature.

The following is required to remove and replace the Access Control cartridge:

- ► Wire cutter
- ► #2 Phillips screwdriver

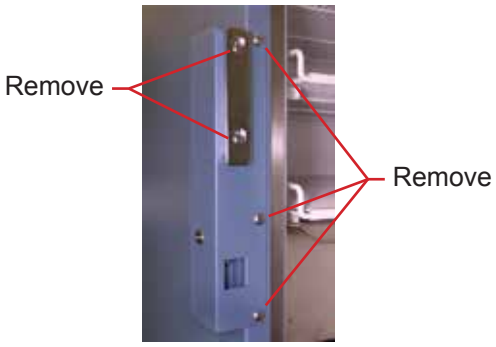
To remove the Access Control cartridge

1 On the electrical box on the back of the freezer, turn the AC ON/OFF switch OFF. Disconnect the freezer from outlet power as well. Disable the power failure alarm by disconnecting the backup battery or turning the Alarm Disable key switch OFF.

2 Open the freezer door and prop the door open. If the door is in a locked state, use the manual override key to override the Access Control lock, then open the freezer door.

3 Remove the (2) screws securing the strike plate to the Access Control cartridge cover.

4 Remove the (3) screws securing the cover over the cartridge on the side of the freezer cabinet then remove the cover.



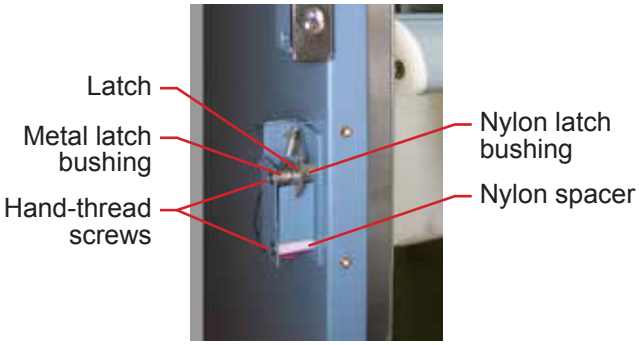
4 Cut the zip tie securing the bundled wires to the back of the cartridge. Separate the two pairs of spade connectors.

5 Remove the (2) screws securing the cartridge assembly to the side of the cabinet.

6 Remove the cartridge from the cabinet.

To install the replacement Access Control cartridge

1 Insert a screw through the upper hole in the cartridge body, then through the door latch, and latch bushings.
2 Insert a screw through the lower hole in the cartridge body and the nylon spacer.
3 Hold the cartridge against the freezer cabinet and align the screws with the holes in the cabinet.
3 Hand-thread each screw into the corresponding hole in the cabinet.



NOTE Ensure the wires will not be pinched between the cartridge body and the cabinet.

4 Tighten both screws to attach the cartridge to the cabinet.
5 Connect the electrical wires from the cabinet to the wires from the cartridge. Bundle the excess wiring and secure it to the back of the cartridge with a zip tie.

NOTE The latch must be in the unlocked position (rotated toward the back of the freezer) before installing the cartridge cover.

6 Install the cover over the Access Control cartridge. Hold the cover over the cartridge and align the (3) three screw holes with the corresponding holes in the cabinet. Install (3) three screws and tighten to secure the cover.
7 Install the strike plate on the Access Control cartridge cover. Align the (2) two screw holes with the corresponding holes in the cartridge cover. Install (2) two screws and tighten to secure the strike plate.
8 Close the freezer door and return the freezer to normal operation to provide power to the Access Control lock. Connect the freezer to outlet power then turn the AC ON/OFF switch ON. Cancel the high temperature alarm by turning the Alarm Disable key switch OFF.
9 Once the freezer has reached operating temperature, enable the high temperature alarm by turning the Alarm Disable key switch ON.

CAUTION Allow the freezer temperature to stabilize at the setpoint before moving contents back into the freezer.

15.7 Supplies

Refrigerant: non-CFC R-404A

Chart paper: 220366, 52 sheets

Glycerin solution: 400922-1

Monitoring system backup battery

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

Chart recorder backup battery

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

16 Troubleshooting

CAUTION Review all safety instructions prior to completing troubleshooting recommendations. See chapter **2** (Safety).

16.1 General operation problems

Problem	Possible Cause	Action
A drawer does not slide easily.	There is debris in the drawer slides.	► Pull the drawer out and confirm the slides are free of debris. Clean if necessary.
	The drawer slides are not lubricated.	► Using a lightweight oil, lubricate the bearings in the slides.
	There is ice buildup in the drawer slides.	► Pull the drawer out and confirm the slides are free of ice. De-ice if necessary.
	The drawer is misaligned or not level.	► Confirm both slides for the drawer are mounted at the same height.
	A drawer slide is faulty.	► Confirm the slide is operating correctly. Replace if necessary.
The door does not open easily.	There is debris in the hinges.	► Confirm the hinges are free of debris. Clean the hinges if necessary.
	The door hinges are not lubricated.	► Using a general-purpose grease, lubricate the pivots in the hinges.
	A hinge cam is faulty.	► Confirm the hinge cam is not damaged. Replace the cam if necessary.

16.2 Chamber temperature problems

Problem	Possible Cause	Action
The chamber temperature displayed is higher or lower than the actual temperature.	The connections for the chamber temperature probe are loose.	► Test the chamber probe connections. Secure the connections if necessary.
	The temperature probe wiring is an open circuit.	► Check the continuity of the probe wiring. Replace the probe if necessary.
	The 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.
	The solution in the probe bottle is frozen.	► Refill the bottle with new solution.
	Digital electronics are locked because of an interruption in power.	► Reset the monitoring system.
	The monitor is not calibrated.	► Confirm the temperature probe is reading correctly. Calibrate the chamber probe if necessary.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.

Problem	Possible Cause	Action
Prob appears on the display, but chamber temperature is set correctly.	The connections for the chamber temperature probe are loose.	► Test the chamber probe connections. Secure the connections if necessary. ► Calibrate the probe if necessary.
	The 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.
An error code displays on the monitor.	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
The chamber temperature meets an alarm condition, but the appropriate temperature alarm is not active.	The temperature alarm setpoint was changed.	► Check the current setpoints for the temperature alarms. Change the setpoints if necessary.
The compressor runs continuously.	The freezer setpoint is set too low.	► Confirm the setpoint is set within the operating range and change it if necessary.
	The 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.
	The temperature monitor/control board is faulty.	► Confirm the temperature controller or monitor/control board is operating correctly. Replace it if necessary.
	The compressor starting relay is faulty.	► Confirm the relay is operating correctly. Replace the relay if necessary.

Problem	Possible Cause	Action
The chamber temperature does not stabilize at the freezer setpoint.	The temperature monitor/control board is faulty.	► Confirm the temperature controller or monitor/control board is operating correctly. Replace it if necessary.
	The condensing unit fan is not running.	► Check the condensing unit fan connections. Replace the fan motor if necessary.
	The 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.
	The compressor motor has seized.	► Replace the compressor.
	The 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.
	The refrigerant level is too low.	► Check the refrigeration lines for leaks and repair them if necessary. Check the refrigerant level. Recharge the refrigerant if necessary.
	The compressor starting relay is faulty.	► Confirm the relay is operating correctly. Replace the relay if necessary.
	The condenser grill is dirty.	► Check the condenser grill. Clean it if necessary.
	The circulation in the chamber is not adequate.	► Check if there are any items that may obstruct air flow and remove them if necessary.
	The ambient air temperature around the freezer is too high.	► Confirm freezer location meets requirements. See operation manual.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
	The evaporator is covered with ice and is not exchanging heat.	► Initiate a freezer defrost cycle.

16.3 Alarm activation problems

Problem	Possible Cause	Action
The freezer is in an alarm condition, but alarms are not audible.	The alarm system is faulty.	► Confirm the circuit board and line connections are functioning correctly.
	The monitor/control board is faulty.	► Replace control parts with those included in the control and display board kit, or replace the monitor/control board.
	The alarm buzzer is faulty.	► Replace the alarm buzzer or speaker.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
	Alarm Disable key is in the OFF position.	► Turn the Alarm Disable key to the ON position.

Problem	Possible Cause	Action
The freezer meets an alarm condition, but the appropriate alarm is not active.	The monitor/control board is faulty.	► Replace control parts with those included in the control and display board kit, or replace the monitor/control board.
	The alarm setpoint was changed.	► Check the current setpoints for the alarms.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
The High Temperature alarm activates when the door is opened, then clears shortly after the door is closed.	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.
	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.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
The freezer is connected to power, but the AC Power Failure alarm is active.	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 ON/OFF AC power switch.
	The ON/OFF AC power switch is OFF.	► Turn the ON/OFF AC power switch to the ON position.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
	The circuit breaker was tripped.	► Confirm the circuit breaker switch is seated. Push the circuit breaker switch to reset the circuit breaker.

Problem	Possible Cause	Action
The 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 monitor/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 Helmer Technical Service.
All alarms are activating sporadically.	The alarm system is faulty.	► Confirm the circuit board and line connections are functioning correctly.
	The monitor/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 Helmer Technical Service.
	The compressor is overheating due to lack of airflow.	► Check the condenser grill. Clean if needed. ► Confirm freezer location meets requirements.
	The refrigerant level is too low.	► Check refrigeration lines for leaks and repair if necessary. Check the refrigerant level. Recharge refrigerant if necessary.
	The condenser probe is not calibrated.	► Contact Helmer Technical Service to confirm the condenser probe is reading correctly and to calibrate the probe if necessary.
An alarm activated, but the temperature recorded at activation does not match the alarm setpoint.	The temperature changed slightly around the time of activation.	► No action needed.
The High Temperature alarm is activating sporadically.	The upper chamber temperature probe is not immersed in the product simulation solution.	► Confirm the probe bottle is full of solution, and the probe is placed in the bottle correctly.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
	The upper chamber temperature probe is not calibrated.	► Confirm the upper temperature probe is reading correctly. Calibrate the probe if necessary.

16.4 Condensation and icing problems

Problem	Possible Cause	Action
There is 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 freezer is level, and the door is aligned, closing tightly, and sealing correctly. Correct issues as necessary.
	The heater in the water evaporation tray is faulty.	► Confirm the heater is hot and is drawing the correct current (approximately 0.21 A to 0.35 A). Replace the heater if necessary.
There is excessive ice in the chamber.	Humid air is entering the chamber.	► Confirm the freezer is level, and the door is aligned, closing tightly, and sealing correctly. Correct issues as necessary.
	The unit cooler drain line is damaged or restricted.	► Confirm the unit cooler drain line is free of debris and is not restricted. Remove debris if necessary.
	The drain line is plugged.	► Confirm the drain tube is free of debris. Remove debris if necessary.
	The external drain fan is faulty.	► Confirm the external drain fan is running. Hold a piece of paper in front of the fan and confirm that the paper is being drawn toward the freezer. ► Confirm the connections are secure. Tighten connections if necessary. ► Replace the drain line fan if necessary.
	The connection between the unit cooler and the drain line is loose.	► Confirm the connection is secure. Tighten the connection if necessary.
There is excessive moisture on the door.	Humid air is entering the chamber.	► Confirm the freezer is level, and the door is aligned, closing tightly, and sealing correctly.
	The relative humidity around freezer is too high.	► Confirm freezer location meets requirements.
After a defrost cycle, no water flows into the water evaporation tray.	Not enough time has elapsed since the end of the defrost cycle.	► Allow approximately 20 minutes after the end of the defrost cycle to check for water in the evaporation tray.
	The drain line is plugged.	► Confirm the drain tube is free of debris. Remove debris if necessary.
	The drain line heater is faulty.	► Confirm the drain line heater is warm to the touch. Contact Helmer Technical Service to resolve issues as necessary.
	The defrost heater on the evaporator in the unit cooler is not working.	► Check for ice buildup on the evaporator by looking through the fan grill with a flashlight. If there is significant ice buildup inside or behind the unit cooler, initiate a defrost cycle of the freezer.
	The defrost heater on the evaporator in the unit cooler is faulty.	► Confirm the drain line heater is hot and is drawing the appropriate current during a defrost event (approximately 3.3 A to 5.5 A). ► Replace the defrost heater if necessary.

17 Parts

This chapter concerns replaceable parts and part numbers. It also includes references to schematics, as appropriate. See chapter **18** (Schematics).

CAUTION Before replacing parts that affect chamber temperature, take precautions to protect items in the freezer from extended exposure to adverse temperatures.

17.1 Front

Front features (HLF125 model shown).

Label	Description	Replacement part numbers	Label on schematic
A	Temperature chart recorder (standard on plasma freezer models, optional on laboratory models)	800083-1	CA
B	Horizon Series monitoring and control system	See subsequent section(s) for part numbers	HA
C	Bezel (with chart recorder door)	800093-1	-
	Bezel (without chart recorder door)	800092-1	-
Not shown	Chart paper (52 sheets)	220366	-
Not shown	Chart recorder backup battery	120218	CC
D	Alarm disable key switch	120227	HE
E	Caster (swivel with brake)	220467	-

17.1.1 Access Control option

Optional Access Control door lock and keypad.

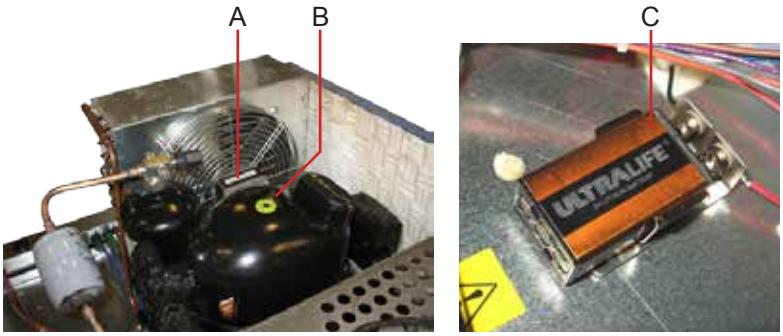
Label	Description	Replacement part number	Label on schematic
A	Access Control cartridge cover	-	-
B	Access Control door catch (door side)	-	-
Not shown	Access Control cartridge assembly (includes manual override key)	Left-hinged door: 800020-1 Right-hinged door: 800020-2	N
C	Bezel	With chart recorder: 800074-1 Without chart recorder: 800057-1	-
D	Access control keypad	800007-1	HM

17.1.2 Control system display parts

Left: Horizon display with touchpad. Right: Rear view of display showing monitor/control board.

Label	Description	Replacement part numbers	Label on schematic
A	Touchpad / board assembly	800006-1	HA

17.2 Top



Top features.

Label	Description	Replacement part numbers	Label on schematic
A	Condenser fan motor	230 V, 50 Hz: 120515 230 V, 60 Hz: 120493	K
B	Compressor	230 V, 50 Hz: 400672-3 230 V, 60 Hz: 400672-4	J
C	Monitoring system backup battery	120399	HH
Not shown	Solenoid valve	220547	W
Not shown	Solenoid coil	800096-1	V

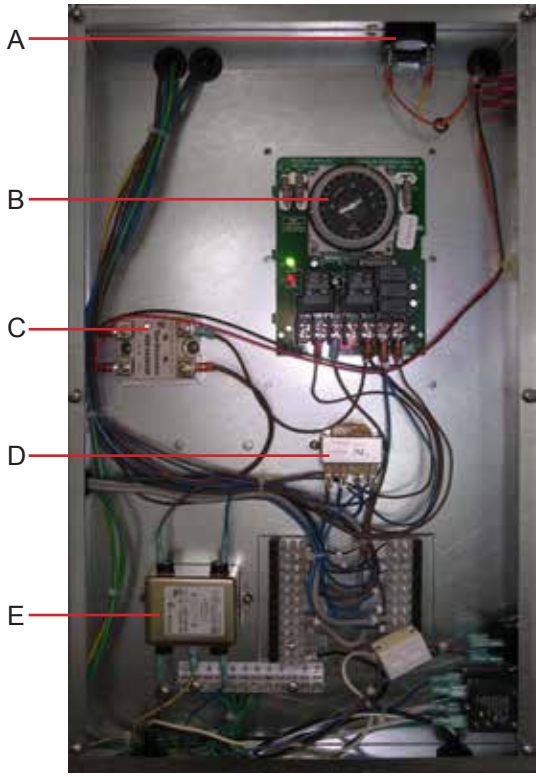
17.3 Rear

Rear features (HPF125 model shown).

Label	Description	Replacement part numbers	Label on schematic
A	Electrical box	See subsequent section(s) for part numbers.	-
B	Drain line fan	120511	Q
C	Drain line heater	120485	T
D	Drain line	-	-
E	Condensate evaporator assembly (includes condensate evaporator, tray, and cover)	400790-2	J
F	Power cable	North American models: 800002-1 European models: 800003-1	A
G	Remote alarm contacts	-	-
H	RS-232 serial port	-	-
I	Main power switch	120478	C
J	Circuit breaker, 12 A	120220	B

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

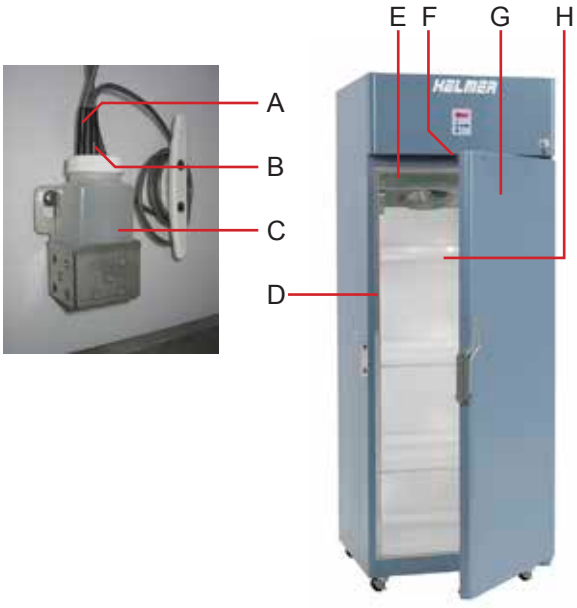
17.3.1 Electrical box parts



Electrical box features (HPF111 model shown).

Label	Description	Replacement part numbers	Label on schematic
A	Alarm buzzer	120227	HD
B	Defrost timer	800015-2	HF
C	Compressor relay	120426	L
D	Temperature control transformer	800086-1	HO
E	Power line filter	120400	D
Not shown	12 V DC power supply for Access Control (optional)	120505	HN

17.4 Interior

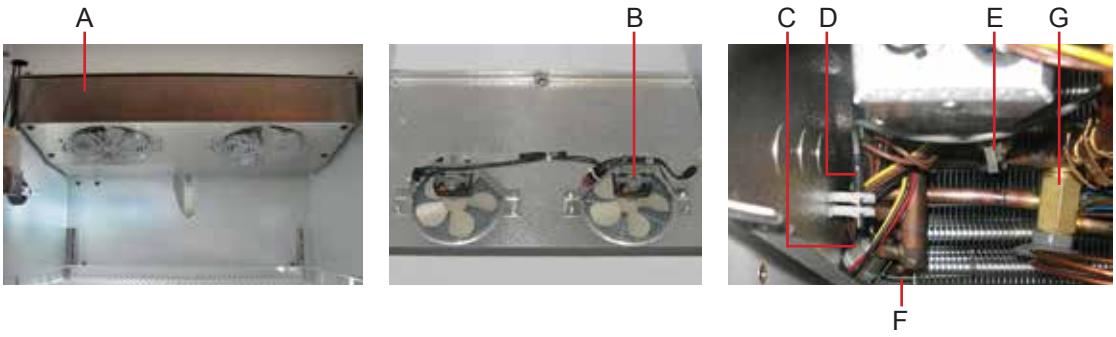


Interior parts (iLF125 model shown).

Label	Description	Replacement part numbers	Label on schematic
A	Chart recorder probe	800024-1	CB
B	Upper chamber probe	800029-1	HC
C	Probe bottle and glycerin kit	400922-1	-
D	Mullion heater (behind strike plates)	800082-1	U
E	Unit cooler	See subsequent section(s) for part numbers	F
F	Door switch	120380	M
G	Door	See subsequent section(s) for part numbers	-
H	Storage parts	See subsequent section(s) for part numbers	
Not shown	Strike plate replacement kit (includes strike plates (2 vertical, 2 horizontal), with pre-applied foam tape, foil tape, and instructions)	400687-1	-
Not shown	Unit cooler		F

17.4.1 Unit cooler parts

CAUTION To remove the unit cooler cover, follow the instructions in chapter **15.4** (Removing and installing the unit cooler cover). Not following these instructions could result in damage to the drain port on the unit cooler, which may cause operational problems such as excessive icing in the chamber and the inability to maintain the freezer setpoint.



Left: Unit cooler. Center and right: Unit cooler parts.

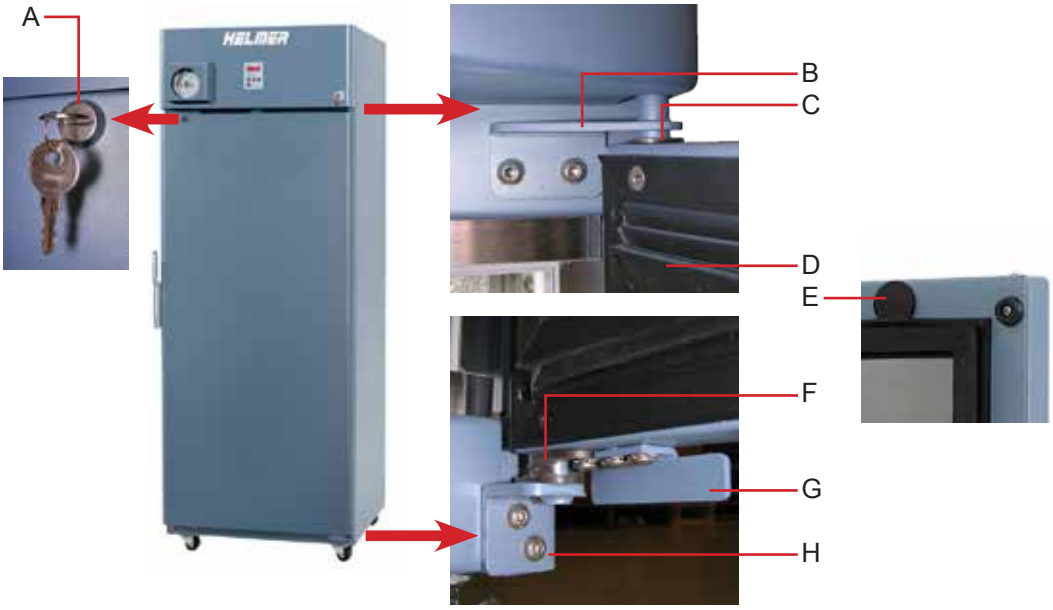
Label	Description	Replacement part numbers	Label on schematic
A	Unit cooler assembly	120476	F
B	Unit cooler fan motor	120548	E
C	Fan delay/defrost termination thermostat	800085-1	HJ
D	Temperature control probe	800028-1	HB
E	Defrost heater limit thermostat	800014-1	S
F	Defrost heater	120567	R
G	Expansion valve	320495	-

17.4.2 Storage parts

Storage parts (left: HLF125 model shown, right: HPF125 model shown).

Label	Description	Replacement part numbers
A	Full shelf (includes hardware)	120 model: 400414-1 125 model: 400414-2
B	Drawer assembly (includes drawer, 2 slides, hardware)	120 model: 400584-2 125 model: 400584-1
Not shown	Drawer slide assembly (right side)	120 model: 400541-3 125 model: 400541-1
Not shown	Drawer slide assembly (left side)	120 model: 400541-4 125 model: 400541-2
Not shown	Roll-out basket assembly (optional, includes basket, 2 slides, hardware)	120 model: 400890-1 125 model: 400890-2
Not shown	Roll-out basket slide assembly (right side)	120 model: 400541-3 125 model: 400541-1
Not shown	Roll-out basket slide assembly (left side)	120 model: 400541-4 125 model: 400541-2
Not shown	Drawer slide wheel	320815-1
Not shown	Half shelf (includes hardware)	400413-1

17.4.3 Door and hinge parts

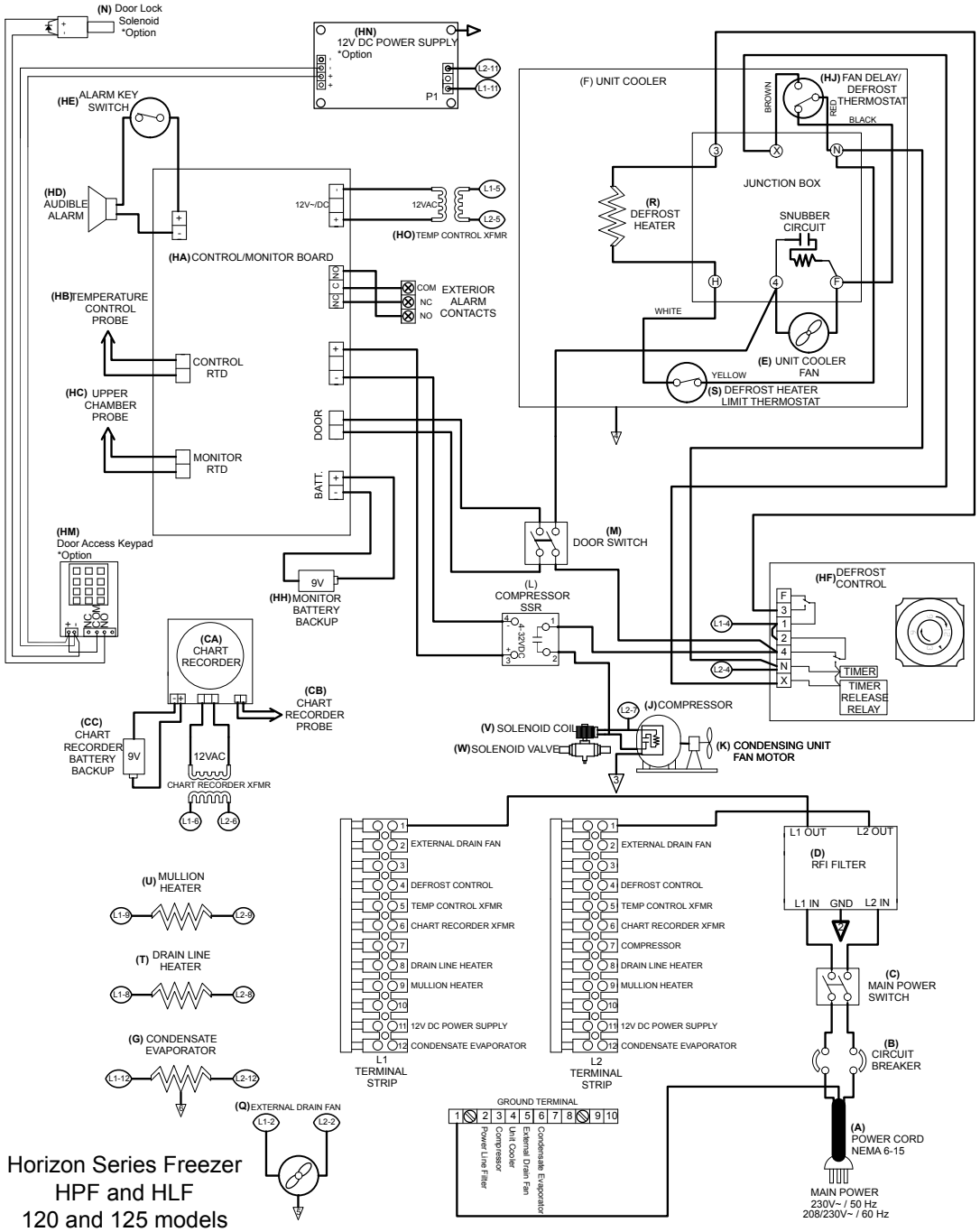


Door and hinge features (HPF120 model shown).

Label	Description	Replacement part numbers	Label on schematic
A	Door lock (functions as Access Control manual override lock on models equipped with Access Control option)	220540	-
B	Upper hinge bracket	Left hinge: 400376-2 Right hinge: 400376-1	
C	Upper hinge bearing	220375	-
D	Door gasket	320726-1	-
E	Door bumper	220441	-
F	Lower hinge cam	320742-1	-
G	Door stop	320763-1	
G	Lower hinge bracket	Right hinge: 400377-1 Left hinge: 400377-2	-
Not shown	Access Control 12 V power supply (included with Access Control option)	120505	HN
Not shown	Access Control lock cartridge assembly (cabinet side, included with Access Control option)	Left hinge: 800020-1 Right hinge: 800020-2	N

18 Schematics

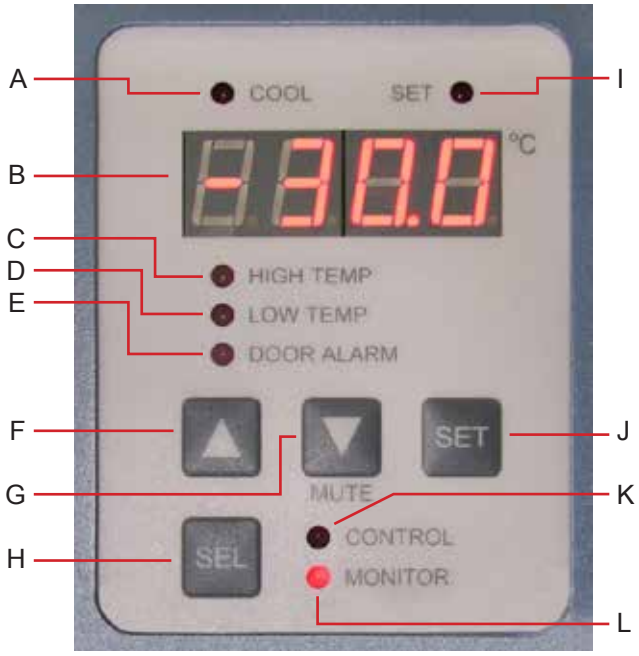
18.1 HPF and HLF models; 120 and 125 configurations



Horizon Series Freezer
HPF and HLF
120 and 125 models

19 Settings

19.1 Touring the monitoring and control system



Combined monitoring and control system.

Label	Description	Function
A	COOL lamp	Indicates the compressor is running
B	Display	Displays real-time temperature information, setpoints, and alarms
C	HIGH TEMP lamp	Indicates when the freezer is in a high temperature alarm condition. Also indicates the high alarm temperature setpoint is being changed
D	LOW TEMP lamp	Indicates when the freezer is in a low temperature alarm condition. Also indicates the low alarm temperature setpoint is being changed
E	DOOR ALARM lamp	Indicates when the door is open for greater than three minutes
F	UP ARROW button	Increases a temperature setting
G	DOWN ARROW button	Decreases a temperature setting. Also mutes the audible alarm for five minutes.
H	SEL button	Toggles between alarm monitor and control modes
I	SET lamp	Indicates a control or alarm setpoint is being changed
J	SET button	Accesses Configuration mode
K	CONTROL lamp	Indicates when the display is showing the freezer setpoint
L	MONITOR lamp	Indicates when the display is showing temperature readings from the monitor probe. Also indicates when alarm setpoints are being changed.

NOTE There is an Alarm Disable key switch located on the front bezel. This switch disables all audible alarms. This switch does not affect alarm lamps or signals sent through the remote alarm interface.

19.2 Viewing current settings

The monitoring and control system has alarms which activate if the temperature is too high or too low. The High Temp alarm setpoint specifies the temperature at which the High Temperature Alarm should activate. If the temperature detected by the chamber probe is greater than or equal to this value, the alarm activates. The factory default setpoint is -20.0 °C.

The Low Temp alarm setpoint specifies the temperature at which the Low Temperature Alarm should activate. If the temperature that is detected by the chamber probe is less than or equal to this value, the alarm activates. The default Low Alarm setpoint is set by the factory at -35.0 °C.

The Monitor Offset is used to calibrate the displayed temperature with the measured temperature. If the temperature displayed on the monitor does not match the actual chamber temperature, the setting for the Monitor Offset may be changed to calibrate them. The default value varies for each freezer.

NOTE Control Offset and Control Hysteresis control the temperature of the chamber during operation. These values are factory preset and should not be changed.

If this lamp is flashing	Then this setting is selected
HIGH TEMP and MONITOR	High Temp alarm setpoint
LOW TEMP and MONITOR	Low Temp alarm setpoint
MONITOR only	Monitor Offset
CONTROL only	Control Offset
CONTROL only	Control Hysteresis

1. To enter program mode: press and hold both the **Up Arrow** and **Down Arrow** buttons for three seconds. The MONITOR and HIGH TEMP lamps flash to indicate program mode enable.
2. Press and release **SEL** button to select the setting of interest.
3. (Optional) To view the value for another setting, repeat step 2.
4. To exit program mode: press and hold both the **Up Arrow** and **Down Arrow** buttons for three seconds. The MONITOR and HIGH TEMP lamps stop flashing to indicate program mode exit.

19.3 Changing settings

19.3.1 Changing setpoints for chamber temperature alarms

The monitoring and control system has alarms which activate if the temperature is too high or too low. The setpoints for both High and Low Alarms can be changed to a value from -50.0 °C to +50.0 °C.

The High Alarm setpoint specifies the temperature at which the High Temperature Alarm should activate. If the temperature detected by the chamber probe is greater than or equal to this value, the alarm activates. The default High setpoint is set by the factory at -20.0 °C.

The Low Alarm setpoint specifies the temperature at which the Low Temperature Alarm should activate. If the temperature detected by the chamber probe is less than or equal to this value, the alarm activates. The default Low Alarm setpoint is set by the factory at -35.0 °C.

1. To enter program mode: press and hold both the **Up Arrow** and **Down Arrow** buttons for three seconds. The MONITOR lamp flashes to indicate program mode enable.
2. Press and release the **SEL** button to select the setting to view.
3. While pressing and holding the **SET** button, press and release the up arrow or down arrow button to change the value for the parameter.
4. When changes are complete, release the **SET** button.
5. (Optional) To change the value for another setting, repeat steps 2-4.
6. To exit program mode: press and hold both the **Up Arrow** and **Down Arrow** buttons for three seconds. The MONITOR lamp stops flashing to indicate program mode exit. The new settings are saved.

19.3.2 Calibrating the monitor readout

To ensure the high and low temperature alarms activate properly, the chamber temperature read by the chamber probe must be accurate. Verify the probe readings by comparing its values to those from an independent thermometer. After determining the actual chamber temperature, enter this value to calibrate the chamber temperature probe.

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

The monitor offset can be changed to a value from -10.0 °C to +10.0 °C. The factory default value for the chamber temperature probe is -30.0 °C.

Obtain:

- ► An independent thermometer, calibrated and traceable per national standards.
- ► Tape, used to secure the chamber probe to the thermometer.

1. Measure the temperature of the probe bottle solution:
   - **a** Remove all probes as well as the cap from the bottle.
   - **b** Tape the independent thermometer to the temperature probe, and place both in the bottle. Immerse the ends at least 2 inches (50 mm) in the solution.
   - **c** Allow the chamber temperature to stabilize for approximately 10 minutes.
   - **d** Obtain and record the reading from the independent thermometer.
2. Determine how to adjust the offset value:
   - **a** Compare the reading from the thermometer to that on the monitor.
   - **b** Determine how much to increase or decrease the offset value to make the monitor reading match the thermometer reading.
3. Enter and save the offset value:

a To enter program mode: press and hold both the **up arrow and down arrow** buttons for three seconds. The MONITOR lamp flashes to indicate program mode enable.

b Press and release the **SEL** button until only the MONITOR lamp flashes. The monitor offset parameter is selected.

c While pressing and holding the **SET** button, press and release the **Up Arrow** or **Down Arrow** buttons to change the offset value.

d When the changes are complete, release the **SET** button.

e To exit program mode: press and hold both the **Up Arrow** and **Down Arrow** buttons for three seconds. The MONITOR lamp stops flashing to indicate program mode exit.
The new setting is saved.

4 To return the temperature probe to its normal location:

a Remove the thermometer and probe from the bottle and remove the tape.

b Re-cap the bottle, ensuring it fits tightly to minimize evaporation.

c Place the temperature probe into the bottle and immerse at least 2 inches (50 mm) in the solution.

19.3.3 Calibrating the evaporator probe

To ensure the freezer maintains the correct temperature, the evaporator temperature probe has been calibrated at the factory. Changing the calibration setting for the evaporator probe is not typically necessary, and should not be performed unless directed to do so by Helmer Technical Service.

19.4 Testing alarms

19.4.1 Testing high chamber temperature alarm

The freezer has alarms that activate when the chamber temperature becomes too high or too low. Test the high temperature alarm by placing the temperature probe in product simulation solution which is allowed to warm above the high temperature setpoint and noting the temperatures at which the alarm activates.

CAUTION Testing alarms requires power disconnection. Protect items from extended exposure to adverse temperatures.

Obtain:

► (1) 4 oz (125 ml) glass of product simulation solution (propylene glycol or equivalent low-temperature fluid).

Test the high alarm:

1 Identify setting for high alarm setpoint.

2 Place the glass of product simulation solution in the freezer.

3 When the product simulation solution has stabilized at the chamber temperature, remove the solution from the freezer.

4 Remove the chamber temperature probe from the probe bottle and insert into the product simulation solution.

5 While stirring probe in the product simulation solution, observe the temperature on the monitoring system display at which the high temperature alarm sounds.

6 Compare the temperature at which the alarm sounds to the high alarm setpoint. If values do not match, refer to chapter **16** (Troubleshooting).

7 Remove probe from product simulation solution.

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

19.4.2 Testing the power failure alarm

CAUTION Testing the power failure alarm requires power disconnection. Protect items from extended exposure to adverse temperatures.

NOTE During a power failure, the backup battery should continue to provide power to the monitoring system.

Test the power failure alarm to ensure it activates when AC power is lost.

1. Disconnect the freezer from power, either at the wall, or using the AC ON/OFF switch located on the electrical box on the back of the freezer. The power failure alarm should activate, causing the audible alarm to sound and PoFF to appear on the display.
2. Reconnect the freezer to power. The power failure alarm should clear, causing PoFF to clear from the display.

19.4.3 Testing the door open alarm

CAUTION Testing the door open alarm requires the door to be left open for an extended period of time. Protect items from extended exposure to adverse temperatures.

Test the door open alarm to ensure that it activates at the expected interval.

The timer value is set by the factory at 3 minutes and cannot be changed.

1. Open the freezer door and note the time. When the timer value is reached (at 3 minutes), the door open alarm should activate, causing the audible alarm to sound and the DOOR ALARM lamp to flash.
2. Close the freezer door. The door open alarm should clear, causing the audible alarm to clear and the DOOR ALARM lamp to stop flashing.

20 Warranty

20.1 Rel.i™ Product Warranty USA and Canada

For technical service needs, please contact Helmer at 800-743-5637 or www.helmerinc.com. Be sure to have the model and serial number available.

20.1.1 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.

20.1.2 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.

► Horizon Series model compressor warranty period is five (5) years.

20.1.3 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.

20.1.4 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.

20.1.5 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.

20.2 Outside of USA and Canada

Consult your local distributor for warranty information.

21 References and Compliance

21.1 Alarm reference

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

The table below indicates if an alarm for a particular model is audible (A), visual (V), or sent through the remote alarm interface (R). Messages for visual alarms, if applicable, appear in the table as well.

Alarm	Alarm type
High Temperature	A, V, R
Low Temperature	A, V, R
Compressor Temperature	-
Door Open (Time)	A, V, R
Power Failure	A, V, R
Low Battery	-
Probe Failure	A, V, R
No Cellular Service	-

21.2 Energy conservation and regulatory compliance

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

CE
0086

This product is certified to applicable UL and CSA standards by a NRTL.

Insulation Type: 2

Pollution Degree: 2 (for use in USA and Canada only)

Sound level is less than 70 dB(A).

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 the 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 the collection and return systems available locally.

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

END OF MANUAL

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