Undercounter Freezer Service Manual

i.Series® and Horizon Series™

Model Group	i.Series	Horizon Series
Plasma Storage	iPF105 (Version D)	HPF105 (Version D)
Laboratory	iLF105 (Version D)	HLF105 (Version D)

HELMER SCIENTIFIC
14400 Bergen Boulevard
Noblesville, IN 46060 USA

PH +1.317.773.9073
FAX +1.317.773.9082
USA and Canada 800.743.5637

CE
0086

360142-D/D

ISO 13485:2003 CERTIFIED

Document History

Revision	Date	CO	Supersession	Revision Description
A	11 DEC 2012	8187	n/a	Initial release.
B	04 DEC 2013	8953	B supersedes A	► Removed all references to mechanical Access Control. ► Added references to magnetic Access Control.
C	27 JAN 2014*	9083	C supersedes B	Corrected electrical schematics for i.Series and Horizon Series.
D	16 MAR 2015	10319	D supersedes C	► Updated instruction in **Section III**, **Items 13.1** through **13.6.3** to reflect use of monitor and control interface with new Min/Max temperature recording feature. ► Added Document Updates, to Document History page. ► Added Confidential / Proprietary Notice, **Section I**, **Item 1.4** and Disclaimer, **Section I**, **Item 1.5**.

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

Document Updates

The document is furnished for information use only, is subject to change without notice and should not be construed as a commitment by Helmer Scientific. Helmer Scientific assumes no responsibility or liability for any errors or inaccuracies that may appear in the informational content contained in this material. For the purpose of clarity, Helmer Scientific considers only the most recent revision of this document to be valid.

Contents

Section I: General Information

1 About this Manual

1.1 Intended Audience

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

1.2 Model References

Generic references are used throughout this manual to group models that contain similar features. For example, “105 models” refers to all models of that size (iPF105, HPF105, iLF105, HLF105). This manual covers all undercounter freezers, which may be identified singly, by their size, or by their respective “Series.”

1.3 Copyright and Trademark

1.4 Confidential / Proprietary Notices

1.5 Disclaimer

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

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

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

2 Safety

Includes general safety information for freezer operation.

2.1 Labels


Caution: Risk of damage to equipment or danger to operator

Caution: Unlock all casters


Caution: Hot surface


Earth / ground terminal


Caution: Shock/electrical hazard


Protective earth / ground terminal

2.2 Avoiding Injury

- ► Review safety instructions before installing, using, or maintaining the equipment.
- ► Do not open multiple, loaded drawers or baskets at the same time.
- ► Before moving unit, ensure casters are unlocked and free of debris.
- ► Never physically restrict any moving component.
- ► Avoid removing electrical service panels and access panels unless so instructed.
- ► Use manufacturer supplied power cords only.

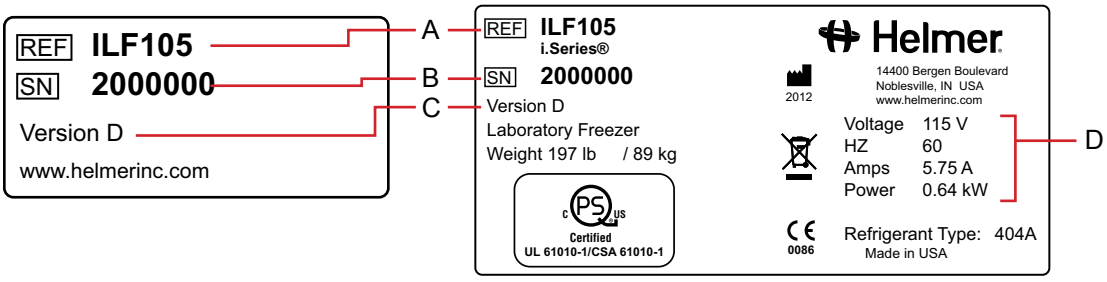
CAUTION Decontaminate parts prior to sending for service or repair. Contact Helmer or your distributor for decontamination instructions and a Return Authorization Number.

3 Configuration

3.1 Model and Input Power

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

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



Left: Chamber label. Right: Product Specification label (located on the rear at lower left).

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

3.2 Control System

NOTE Service information varies depending on the control system.

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

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.

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.

3.3 Temperature Probes

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

For each probe bottle, use:

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

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

3.3.1 Fill Temperature Probe Bottle

NOTE Temperature probes are fragile; handle with care.

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

3.3.2 Install Additional Probe Through Rear Port

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

3.4 Chart Recorder

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

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

Prior to use:

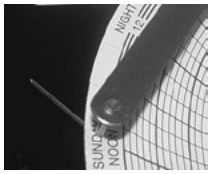
- ► Install battery.
- ► Add paper.
- ► Calibrate chart recorder to match chamber temperature.

3.4.1 Chart Recorder Access

Open door by pulling door open.

3.4.2 Install Chart Paper

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



5. Hold chart paper and reinstall chart knob.

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

6. Confirm temperature range is set to the correct value.
7. Press and hold **C** button. When stylus begins to move right, release button.
8. Confirm stylus is marking temperature correctly.

4 References and Compliance

4.1 Alarm Reference

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

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

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

4.2 Regulatory Compliance

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

CE
0086

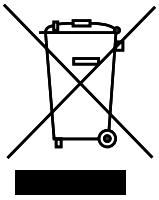
Sound level is less than 70 dB(A).

EC REP

Emergo Europe
Molenstraat 15
2513 BH
The Hague, Netherlands

RoHS COMPLIANT

4.3 WEEE Compliance



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

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

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

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

5 Warranty

5.1 Rel.i™ Product Warranty USA and Canada

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

5.1.1 Rapid Resolution

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

5.1.2 Compressor

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

- ► i.Series model compressor warranty period is five (5) years.
- ► Horizon Series model compressor warranty period is three (3) years.

5.1.3 Parts

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

5.1.4 Labor

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

5.1.5 Additional Warranty Information

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

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

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

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

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

5.2 Outside of USA and Canada

Consult your local distributor for warranty information.

Section II: i.Series® Models

6 Product Configuration

WARNING To prevent tipping:
- ensure the casters (if installed) are unlocked and the door is closed before moving the freezer.
- do not sit, lean, push or place heavy objects on upper door ledge.

6.1 Install Battery for Backup Power

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

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

Battery life varies by manufacturer as well as voltage level remaining. Providing full power is available and no battery-related alarms are active, backup power for the monitoring system is available for up to 20 hours (the Low Battery alarm will activate after approximately 18 hours of battery use). Providing full power is available, backup power for the optional Access Control system is available for up to 2.5 hours.

CAUTION
- Before installing or replacing batteries, switch the power and battery OFF. Disconnect the freezer from AC power.
- When installing a replacement battery, use only a battery which meets the manufacturer's specifications.

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

The battery is located below the chamber, behind the front cover. A cover panel must be removed to access the backup battery.

Monitoring system backup battery (supplies power to optional Access Control system).

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

6.2 Automatic Defrost Cycle

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, at even intervals. Defrost events should take place when the freezer door is opened infrequently.

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 i.C³ monitoring and control system can perform a maximum of four defrost cycles per day. For information in setting the system time and the time at which each defrost cycle occurs, refer to the i.C³ User Guide.

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.

6.3 External Monitoring Devices

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

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

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

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

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

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

- 0.5 A at 125 V (AC): 1 A at 250 V (DC)

6.3.1 Connect to Remote Alarm Interface

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

6.4 Move Drawers, Shelves, and Baskets



Storage features.

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

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

Remove a drawer or basket

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

Install a drawer or basket

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

Remove a shelf

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

Install a shelf

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

6.5 Move Slides and Brackets

Remove drawer slides

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

Install drawer slides

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

Remove shelf brackets

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

Install shelf brackets

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

6.6 Level the Freezer

NOTE

- Leveling feet are optional.
- Helmer recommends the use of leveling feet (unless casters are installed) and wall and floor brackets (PN 400472-2) for stabilization. Contact Helmer Technical Service for parts and instruction.
- A bubble level may be used to ensure the freezer is level.

Leveling feet must be adjusted to provide unit cooler drainage.

Front-to-back

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

Side-to-side

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

6.7 Optional Adapter Kits for Medication Dispensing Locks

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

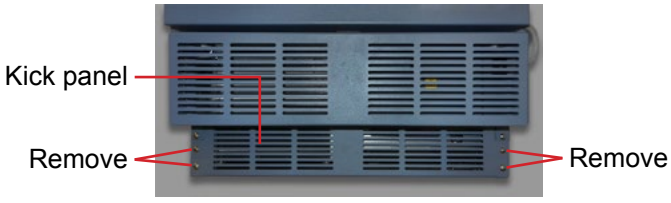
6.8 Reverse Door Hinge and Handle

NOTE

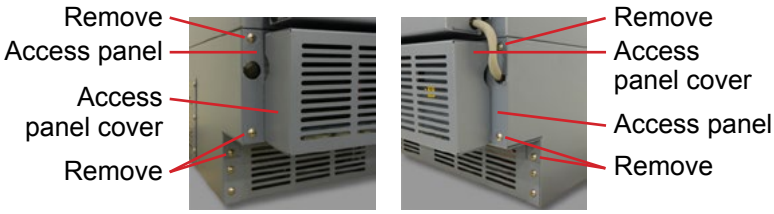
- Before reversing door hinge and handle, protect stored items in freezer from extended exposure to adverse temperature.
- Freezer must be on the floor or on an elevated work surface with enough space in front of the freezer to lay the door face-down for disassembly.
- The door hinge and handle cannot be reversed on freezers equipped with Access Control.

6.8.1 Remove the Door and Hinges

1 Open the lower front control panel. Switch AC ON/OFF switch OFF. Switch battery switch OFF.
2 Remove four screws holding the kick panel on the cabinet. Set the kick panel aside.

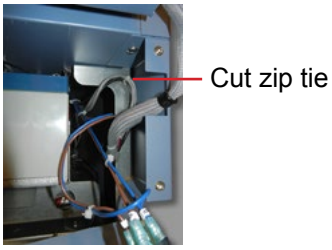


3 Remove six screws holding the access panel and cover on the cabinet. Lay the panel in front of the cabinet, ensuring there is no strain on the power switch wires.



4 Remove plug from the access panel (on the handle-side of the cabinet). Remove grommet from the hole (on the hinge-side of the cabinet). Slide the braided sleeve out of the slot (on the kick plate).

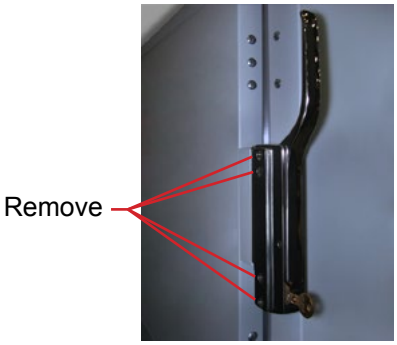
5 Cut the zip tie inside the cabinet.



6 Remove the door handle assembly.

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

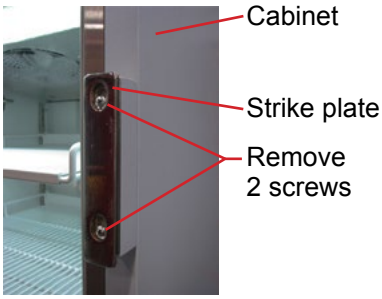
b Set the door handle assembly aside.



Door handle assembly.

7 Remove door latch / door catch.

- **a** Remove two screws holding the door latch plates and spacer bar on the cabinet
- **b** Set the latch plates and spacer bar aside.



Door latch plate.

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

9 Remove the spring assembly from the lower hinge.

- **a** Use a J-hook tool to engage the left-most hole in the spring cap and rotate the spring cap from *left to right,* and hold.
- **b** Remove the pin from the spring cap.
- **c** Allow the spring to relax.
- **d** Use a J-hook tool to engage any hole in the spring cap compress spring downward.
- **e** Remove spring assembly from the lower hinge.
- **f** Set the spring assembly aside.

NOTE

- ► A second person should assist by supporting the door while the hinges are removed.
- ► The two screws holding the hinge on the door are longer than the three screws holding the hinge on the cabinet. The screws must be installed in the same location when moving the hinge to the opposite side of the door.

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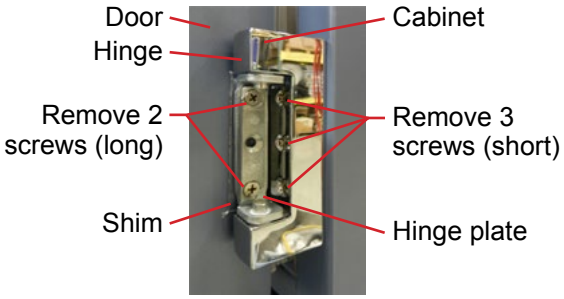
10 Remove the lower hinge.

- **a** Support the door.
- **b** Remove five screws attaching the lower hinge to the door and cabinet.
- **c** Remove the lower hinge.
- **d** Reverse the hinge manually (as if moving the hinge from a fully-closed to a fully-open position).
- **e** Set the lower hinge aside.
- **f** Continue to support the door.

11 Remove the upper hinge.

- **a** Remove five screws attaching the upper hinge to the door and cabinet.
- **b** Remove the upper hinge.
- **c** Reverse the hinge manually (as if moving the hinge from a fully-closed to a fully-open position).
- **d** Set the upper hinge aside.



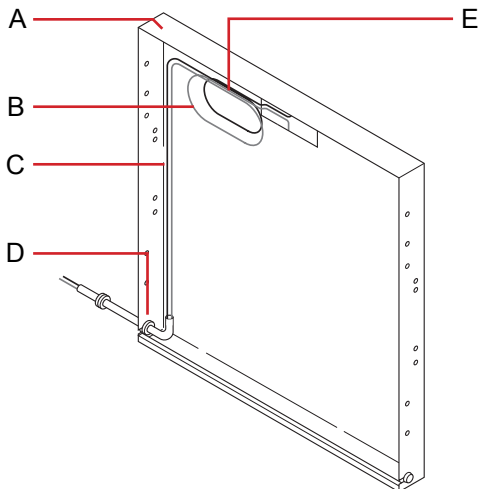
Hinge removal (lower hinge shown with spring removed).

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

6.8.2 Reverse the Cable Routing in the Door

The door consists of an inner frame and outer frame. The power cable and communication cable are connected to the display circuit board on the front of the door (behind the LCD touchscreen).

The length of the cables inside the door is approximately three feet. The cables follow a channel along the top and side of the outer frame. Additional slack has been bundled in the cables.

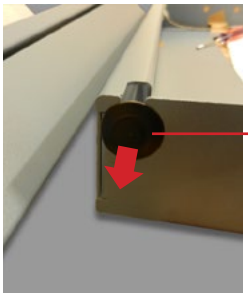


Outer door frame (right-hinged door shown), power and communication cable.

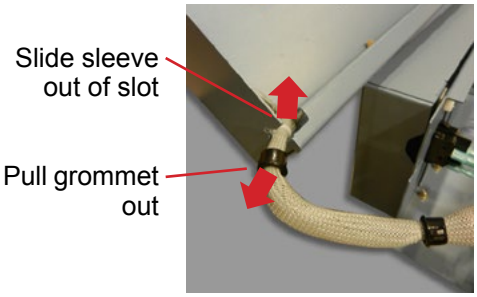
Label	Description
A	Outer door frame
B	Power cable (gray)
C	Communication cable (black)
D	Cable exit (corner of door)
E	Additional cable slack

1 Lay the door assembly face-down on a solid work surface.
2 Remove remaining screws from both sides of the door assembly.
3 Lift the inner door frame out of the outer door frame and set aside. A J-hook tool may be used along the bottom edge of the door assembly to lift the inner frame.

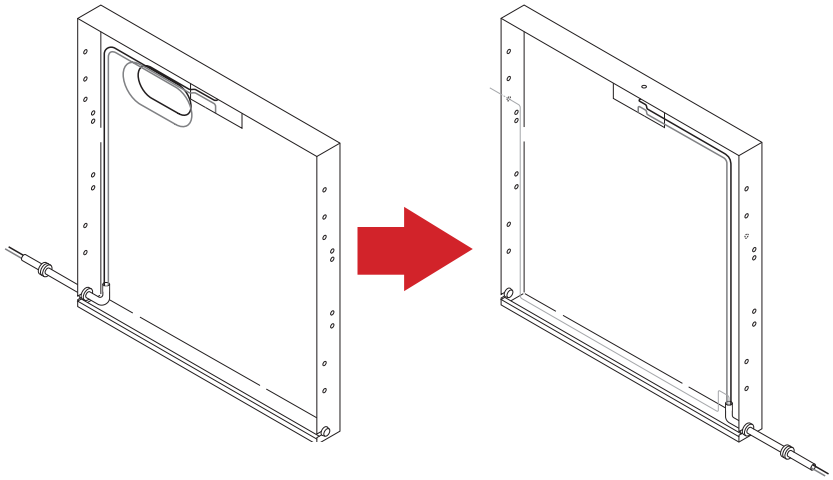
4 Remove the plug from the handle-side of the door. Set the plug aside.



5 Pull the grommet out of the hole in the door. Slide the braided sleeve out of the slot.



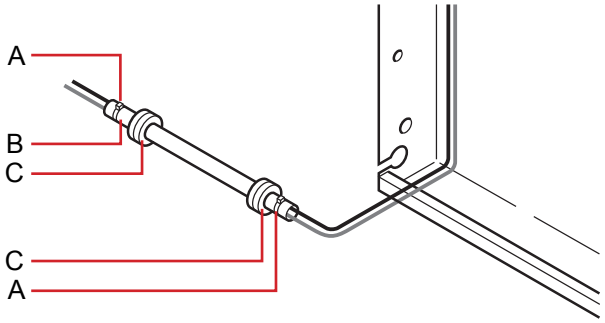
6 Re-route the power cable and communication cables.
   a Route cables inside the door; along the opposite side of the door frame; and out through the slot in the corner opposite from where the cables had previously exited the door.
   b Cables should follow the edge of the door frame, as closely as possible.
   c Tape the cables to the door frame.
   d Excess slack in the cables should be outside of the door.



Left: Original cable routing (right-hinged door). Right: New cable routing (left-hinged door).

7 Reposition the braided sleeve.

- **a** Cut the zip ties (A) on the braided sleeve (B).
- **b** Slide the sleeve and grommets (C) along the cables, towards the door.
- **c** Slide the braided sleeve through the slot in the door and insert the door-side grommet into the hole in the door.
- **d** Install new zip ties to prevent the braided sleeve from moving along the cables.



Braided sleeve detail.

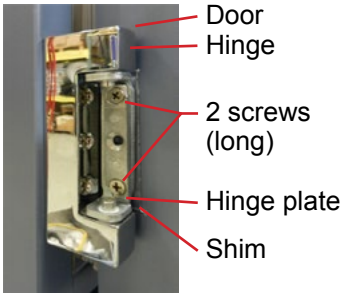
8 Reinstall the inner door frame inside the outer door frame. Install screws in the unused holes on the door where hinges were originally installed.

6.8.3 Reinstall the Door and Hinges

1 Install the hinges and hinge plates on the door.

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

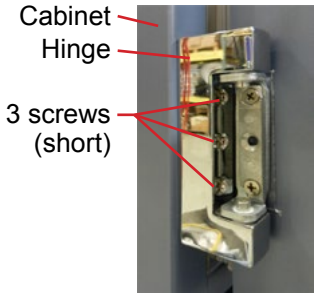
NOTE Ensure that the upper and lower hinges are not interchanged when moving the hinges to the opposite side of the door.



Attach hinge to door (lower hinge shown).

NOTE A second person should assist by supporting the door while the hinges are installed.

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

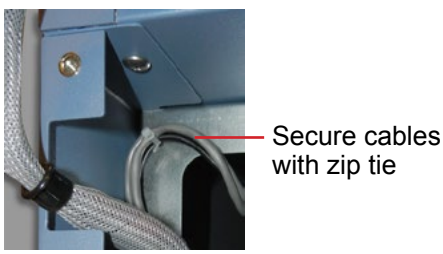


Attach hinge to cabinet (lower hinge shown).

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

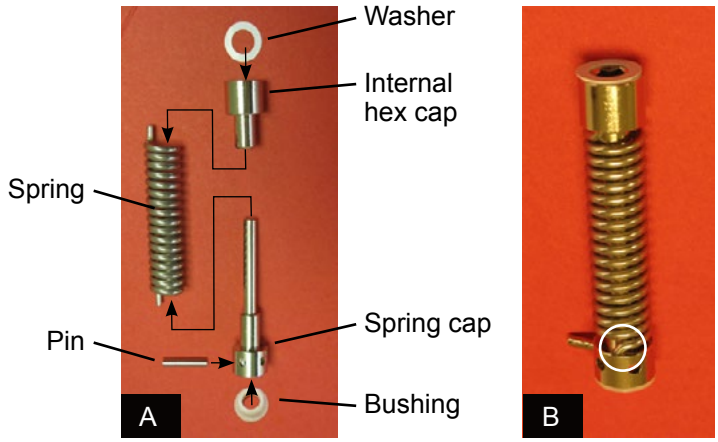
NOTE If a shim is necessary to level the door after hinge reversal, contact Helmer Technical Service to obtain a shim.

4 Route the power and communication cables across the front of the cabinet. Attach the cables to the zip tie holder under the cabinet on the hinge side.

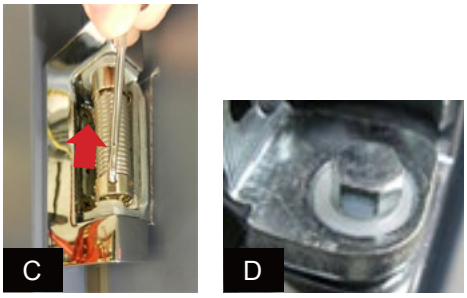


Power and communication cables secured at the hinge-side of the cabinet after hinge reversal.

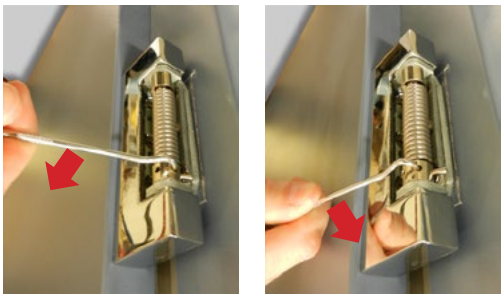
5 Install the cable in the door.
   a Slide the braided sleeve through the slot in the access panel.
   b Install the grommet in the hole.
   c Install the plug in the access panel on the opposite side.
   d Allow enough slack (approximately 3”) in the braided sleeve between the door and the cabinet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



   e Use a J-hook tool in the spring cap to compress the spring upward *(Figure C)*.
   f While compressing the spring, slide the spring cap over the lower hex bolt in the lower hinge *(Figure D)*.



   g Use a J-hook tool to engage the right-most hole in the spring cap and rotate the spring cap from *right to left,* and hold.
   h Count four holes, starting from and including the spring cap hole closest to the end of the coil.
   i Insert the pin in the fourth hole.



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

11 Switch AC ON/OFF switch ON. Switch battery switch ON. Close the lower front control panel.

12 Touch **Mute** to disable the high temperature alarm while freezer reaches operating temperature.

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

6.9 Stacked Undercounter Units

CAUTION

- For a stacked configuration, both units must have leveling feet installed.
- The back brace bars and front stabilizing brackets must be installed [PN 400821-1 (blue) or 400821-2 (stainless steel)].
- When stacking a refrigerator and freezer (104 and/or 105 models), place the heavier unit on the bottom.
- Do not open multiple, loaded drawers or baskets at the same time.

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

7 Settings

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

NOTE

- If the Settings screen is password protected or if viewing settings for the first time, enter factory default password of “1234”.
- When there is no interaction for two minutes, the Temperature Setpoint screen closes and returns to the Home screen.
- Default values for general settings, alarm settings, and display settings are available in the i.C³ User Guide.
- Changing temperature settings affects operation of the freezer. Do not change settings unless instructed in product documentation or by Helmer Technical Service.

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

7.1 Home Screen

The Home screen appears when:

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

7.1.1 Home Screen Functions

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

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

7.2 Temperature Settings

Temperature setpoint values are programmed at the factory. Setpoints can be viewed and changed through the i.C³ monitoring and control system. To view temperature setpoints, touch **Home**, **i.C³ APPS**, **Settings**. Details for each setpoint are displayed.

Temperature Controller Programs screen.

NOTE Default chamber temperature setpoint is -30.0 °C

Change the setpoint if:

► Your organization requires a chamber temperature other than -30.0 °C.

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

Perform the following:

1 Touch **i.C³ APPS**, **i.C³ Settings**.
2 Enter the Settings password.
3 Touch **Temperature Setpoints**.
4 Touch **+** or **–** on the **Temperature Setpoint** spin box.
   ► The setpoint is the temperature at which the freezer operates.
5 Touch **+** or **–** on the **Hysteresis Setpoint** spin box.
   ► The hysteresis setpoint is the allowable fluctuation in temperature, relative to the temperature setpoint.
   ► A lower hysteresis setpoint will limit the temperature variation to a smaller range.
   ► A higher setpoint will allow the temperature to vary across a larger range.

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

6 Touch **+** or **–** on the **Delay on Start-Up** spin box.
   ► Compressor startup is delayed to allow the i.C³ monitoring and control system to start first.
7 Touch **+** or **–** on the **Duty Cycle of Control Relay during Probe Failure** spin box.
   ► The duty cycle is the percentage of time the compressor will run in the event of a temperature control probe failure.

Setting	Initial Factory Value
Temperature Setpoint	-30.0 °C
Hysteresis Setpoint	2.0 °C
Delay on Start-Up	2 minutes
Duty Cycle of Control Relay during Probe Failure	100%
Defrost Time	15 minutes

7.3 Temperature Calibration

Temperature calibration values are programmed at the factory. Calibration values can be viewed and changed through the i.C³ monitoring and control system. To view calibration settings, touch **Home**, **i.C³ APPS**, **Settings**. Details for each setting are displayed.

Temperature Calibration screen.

NOTE

- If the Settings screen is password protected or if viewing settings for the first time, enter factory default password of “1234”.
- When there is no interaction for two minutes, the Temperature Setpoint screen closes and returns to the Home screen.
- The Lower Temperature calibration setting is not applicable to undercounter freezer models.
- Control Sensor and Control Sensor Offset, Evaporator Defrost and Evaporator Defrost Offset, and Compressor Probe Temperature calibration settings are factory-preset and should not be changed unless directed by Helmer Technical Service.

7.3.1 Calibrate Monitor Probe

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

NOTE

- Probe in the bottle is connected to the monitoring system and senses chamber temperature. This probe does not affect freezer setpoint.

- Default setting for monitor is -30.0 °C.
- Value is factory-preset.

Obtain:

- Calibrated reference thermometer, independent and traceable per national standards.
- Tape or wire ties to attach thermometer to monitor probe.

Calibrate probe:

1. Remove monitor probe from the probe bottle.
2. Unscrew the cap from the bottle.
3. Attach the thermometer to the monitor probe, and place them in the bottle. The probe and thermometer should be immersed at least 2” (50 mm).
4. Close the door and allow the chamber temperature to stabilize for 10 minutes.
5. Observe and note the thermometer temperature.
6. Touch, **i.C³ APPS**, **Settings**, **Temperature Calibration**.

7 Touch **+** or **–** on the **Upper Temperature** spin box to increase or decrease the value to match the measured value. The message “New Setting Saved” appears next to the spin box.

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

9 Remove thermometer from probe.
10 Replace bottle cap, ensuring a tight fit.
11 Place probe in bottle, immersing at least 2” (50 mm).

7.3.2 Control Sensor Offset

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

The temperature controller adjusts chamber temperature around the freezer setpoint by activating the compressor when the control probe registers above the setpoint.

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

1 View and record the Freezer Setpoint. (Reference **Section II**, **Item 7.2**)
2 Allow the unit to run with calibrated monitor temperature for several compressor cycles, and record the average monitor temperature .
3 View and record the current Control Offset value.
4 Subtract the Freezer Setpoint from the average monitor temperature and record the difference.
5 Add the current Control Offset value to the recorded difference determined in the previous step to establish the new Control Offset value.

EXAMPLE
1 Freezer Setpoint is 4.0
2 Average monitor temperature is 5.2
3 Current Control Offset is 0.3
4 Subtract: 5.2 - 4.0 = 1.2; difference between average temperature and setpoint
5 Add 0.3 + 1.2 = 1.5; new Control Offset value

Enter the new offset value:

1 Touch **Home**, **i.C³ APPS**, **Settings**.
2 Enter the Settings password.
3 Touch **Temperature Calibration**.
4 Touch **+** or **–** on the **Control Sensor** spin box.
- ► Value is factory-preset to match the temperature measured in the unit cooler (at the control sensor) by a calabrated reference thermometer.

5 Touch **+** or **–** on the **Control Sensor Offset** spin box.
6 Touch **Home** to return to home screen.

7.3.3 Calibrate Compressor and Evaporator Probe

The compressor and evaporator temperature probes have been factory-calibrated. Calibration settings should not be changed unless directed by Helmer Technical Service.

7.3.4 Factory Default Settings

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

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

Setting	Restored Value
Home Screen Application Icons	i.C³ APPS, Temperature Alarm Test, Temperature Graph, Information Logs, Download
Display Brightness	High (3 symbols)
Password (for Settings screen)	1234
Sounds	On
Alarm Volume	9
Alarm Tone	On
Temperature Calibration Values	Values previously entered during setup
Unit ID	Serial number entered at factory
Date Format	MM/DD/YYYY
Day	Not affected (maintained in real-time clock)
Month	
Year	
Time Format	12-hour
Minute	Not affected (maintained in real-time clock)
Hour	
AM/PM	
Language	Language previously selected during setup
Temperature Units	°C
Password Protection (for Settings screen)	On
Temperature Graph Screensaver	On
Access Control (optional) as Home Page	On
High Temperature Alarm Setpoint	-20.0 °C
High Temperature Alarm Time Delay	0 minutes
Low Temperature Alarm Setpoint *	-35.0 °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	50.0 °C
Compressor Temperature Alarm Time Delay	0 minutes
Chamber Setpoint	-30.0 °C
Chamber Hysteresis	2.0 °C
Delay on Start-Up	2 minutes

Setting	Restored Value
Control Relay Probe Failure Duty Cycle	100%
Defrost Event #1 On/Off	Off
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	Off
Defrost Event #3 Start Time	4:00 PM
Defrost Event #4 On/Off	On
Defrost Event #4 Start Time	6:00 PM
Defrost Time/Defrost Safety Operation Time	15 minutes

7.3.5 Restore Factory Default Settings

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

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

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

7.3.6 Change 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
Temperature Controller Page	Enable or disable the temperature controller screen

Factory settings may be viewed and changed. Contact Helmer Technical Service to verify if changing factory settings is necessary, and for instructions in accessing Factory Settings screen.

7.4 Test Alarms

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

7.4.1 Automatic Chamber Temperature Alarm Test

NOTE

- Test can be aborted by touching **Cancel Test**.
- Test takes less than five minutes.
- If the temperature alarm test does not automatically complete within two minutes, restart the i.C³ monitoring system.

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

Test the low alarm:

1. Identify current setting for low alarm setpoint.
2. Touch **Home**, **i.C³ APPS**, **Temperature Alarm Test**.
3. Touch **Low Alarm Test**.
4. “Peltier Test Probe Cooling” message appears.
5. When displayed temperature reaches the alarm setpoint, temperature reading turns red.
6. When completed, “Test Complete” appears.
7. Touch **Home**, **i.C³ APPS**, **Information Logs**, **Event Log**. Touch the event to view event details.
8. Observe the temperature at the time of the low temperature alarm event. Compare this to the alarm setpoint. If values do not match, refer to **Section II, Item 9** (Troubleshooting).

Test the high alarm:

1. Identify current setting for high alarm setpoint.
2. Touch **Home**, **i.C³ APPS**, **Temperature Alarm Test**.
3. Touch **High Alarm Test**.
4. “Peltier Test Probe Warming” message appears.
5. When displayed temperature reaches the alarm setpoint, the temperature reading turns red.
6. When completed, “Test Complete” appears.
7. Touch **Home**, **i.C³ APPS**, **Information Logs**, **Event Log**. Touch the event to view event details.
8. Observe the temperature at the time of the high temperature alarm event. Compare this to the alarm setpoint. If values do not match, refer to **Section II, Item 9** (Troubleshooting).

Cancel the test:

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

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

7.4.2 Manual Chamber Alarm Test

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

Obtain:

► glass with 4 oz. (120 mL) of product simulation solution (1:1 ratio of water to propylene glycol or equivalent low-temperature fluid).

NOTE Temperature probes are fragile; handle with care.

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 monitor probe from the probe bottle and insert into the product simulation solution.
5 Observe the temperature on the i.C³ 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 **Section II, Item 9** (Troubleshooting).
7 Remove probe from product simulation solution.
8 Place monitor probe in probe bottle, immersing it at least 2” (50 mm).

7.4.3 Power Failure Alarm Test

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

1 Change Power Failure delay setting to 0 minutes.
   a Touch **Home**, **Settings**, **Alarm Settings**.
   b Touch **+** or **–** on the Power Failure spin box to change the value to 0.
2 Switch AC ON/OFF switch OFF. Power failure alarm will activate immediately.
3 Switch AC ON/OFF switch ON. Power failure alarm will clear and audible alarm will cease.
4 Change Power Failure time delay to the original setting.

7.4.4 Door Open Alarm Test

1 Change Door Open (Time) delay setting to 0 minutes.
   a Touch **Home**, **Settings**, **Alarm Settings**.
   b Touch **+** or **–** on the Door Open (Time) spin box to change the value to 0.
2 Open door. Alarm will activate immediately.
3 Close door. Alarm will clear and audible alarm will cease.
4 Change the Door Open (Time) setting to the original setting.

7.5 Upgrade System Firmware

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

7.6 Calibrate the Touchscreen

The i.C³ touchscreen has been calibrated at the factory to ensure that when the screen is touched, the desired key touch is selected. If the i.C³ touchscreen or display circuit board is replaced after the 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.

Calibrate the screen:

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

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

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

NOTE

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

7.7 View Manufacturer and Product Information

View version information for contacting Helmer.

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

8 Maintenance

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

8.1 Recharge Refrigerant

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

NOTE Use only non-CFC R-404A refrigerant.

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

Model	Power Requirements	Initial Charge
105 model	115 V	11.0 oz (312 g)
	230 V	18.5 oz (524 g)

Obtain:
- ► Refrigerant
- ► Calibrated pressure gauge (0 psi to 220 psi (0 kPa to 1520 kPa))

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

NOTE Pressure varies depending on ambient air temperature.

4. Add refrigerant. Check the pressure on the high side and the low side.
   - ► Low side = 5 psi to 7 psi (34 kPa to 48 kPa)
   - ► High side = 180 psi to 220 psi (1241 kPa to 1517 kPa)
5. Remove pressure gauge.

8.2 Check Optional Access Control System Battery

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

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

8.3 Check Monitoring System Battery

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

Check the battery:

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

2 Switch AC ON/OFF switch ON.

NOTE Use a battery which meets manufacturer's specifications

8.4 Clean the Freezer

8.4.1 Condenser Grill

CAUTION Disconnect freezer from AC power when cleaning the condenser grill.

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

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

8.4.2 Exterior

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

8.4.3 Interior

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

8.4.4 Door Gaskets

Clean with soft cloth and mild soap and water solution.

8.4.5 Clean and Refill Probe Bottle

Obtain:

- ► Fresh water-bleach solution (not provided)
  - ► 1:9 ratio of bleach to water
  - ► Bleach is 5% solution of commercial sodium hypochlorite (NaOCl)
  - ► Equivalent oxidizing cleaner/disinfectant approved by your organization may be substituted
- ► 4 oz (120 mL) of product simulation solution per bottle
  - ► Solution is a 1:1 ratio of water to propylene glycol (or equivalent low-temperature fluid)

Clean and refill bottle:

1 Remove probe from bottle.
2 Remove bottle from bracket.
3 Clean bottle with water-bleach solution.
4 Fill bottle with 4 oz (120 mL) of product simulation solution.

5 Cap bottle tightly to minimize evaporation.
6 Place bottle in bracket.
7 Replace probe, immersing at least 2” (50 mm).

8.4.6 i.C³® Touchscreen

Clean touchscreen with a soft, dry cotton cloth.

8.5 Defrost the Unit Cooler

Defrost events may be scheduled to occur at specific times. A defrost event can be triggered on demand without affecting a programmed defrosting schedule.

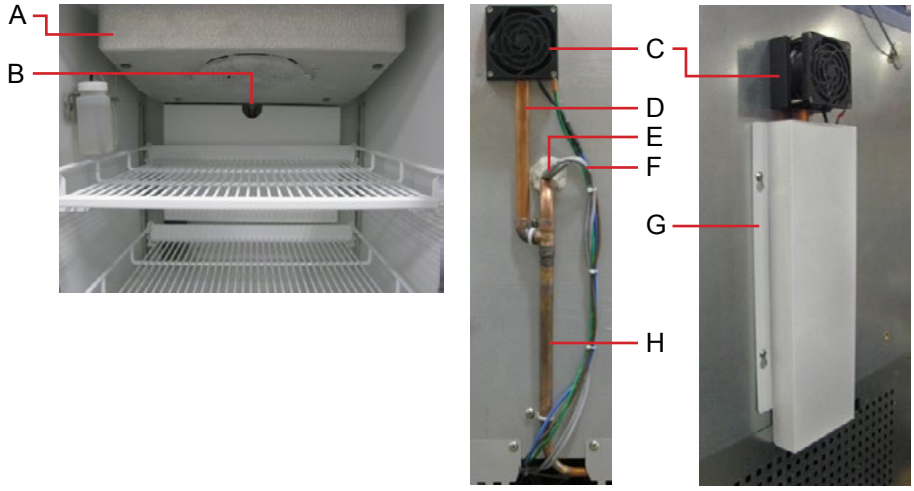
1 Touch **i.C³ APPS**, **Temperature Setpoints**.
2 Touch the **Manual Defrost: Start** button.
► The Defrost icon will appear for the duration of the defrost cycle.
3 To cancel, touch the **Manual Defrost: Stop** button.

8.6 Unit Cooler Cover Removal and Installation

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

Required tools:

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



Drain line, fan, and heater components.

Label	Description
A	Unit cooler cover
B	Drain port
C	Drain fan
D	Fan tube
E	Heating element
F	Heater wires
G	Protective cover
H	Drain tube

8.6.1 Remove the Unit Cooler Cover

1. Switch AC ON/OFF switch OFF. Switch battery switch OFF.
2. Remove the rear protective cover (G) on the rear of the cabinet.
   - **a** Loosen four screws
   - **b** Slide the cover up and remove
   - **c** Cut the wire ties securing the drain line to the cabinet
3. On the back of the cabinet, peel the putty back to expose the drain tube (H) and drain heater (E).

CAUTION The condensate evaporator and water evaporation tray are hot.

4. Inside the cabinet, remove the putty around the drain tube.
5. Remove the wire ties securing the heater wires (F) to the cabinet. Verify the heating element is cool.
6. Remove the drain heater from the drain tube.
7. Remove the drain tube (H) by pulling it downward. The drain tube should separate from the fan tube (D) at the 90° elbow, leaving the fan tube (D) attached to the fan (C).
   - **a** The section of the drain tube inside the cabinet should separate from unit cooler drain port (B).
   - **b** Gently twist the drain tube from left to right to separate it from the unit cooler drain port.
   - **c** Pivot the drain tube upward then remove it from the cabinet.
8. Remove top drawer, basket, or shelf from the chamber.
9. Remove the unit cooler cover (A).
   - **a** Hold unit cooler cover in place to prevent it from dropping.
   - **b** Use the socket wrench to remove four screws securing the unit cooler cover.
   - **c** Carefully lower unit cooler cover to avoid damage to the fan wiring.

8.6.2 Install the Unit Cooler Cover

1. Verify unit cooler wiring is connected and routed correctly.
   - **a** Wiring should be routed above copper tube inside the unit cooler.
   - **b** Reconnect wires if they have separated.
2. Attach unit cooler cover.
   - **a** Lift unit cooler cover into place.
   - **b** Front edge of the cover should be behind the unit cooler case.
   - **c** Use the socket wrench to install four screws to secure the unit cooler cover.
3. Insert the drain tube through hole in the cabinet.
   - **a** Push drain tube upward at an angle, toward the unit cooler drain port.
   - **b** Picot the drain tube downward then push the tube upward.
   - **c** In the chamber, push the drain tube onto unit cooler drain port.
4. Attach the drain tube to the fan tube.
5. Insert the drain line heater in the drain tube.
   - **a** Insert the heater at an upward angle.
   - **b** The black heating element should no longer be visible.
6. Reinstall top drawer, basket, or shelf if previously removed.
7. Reattach the drain line heater wires to the cabinet.
8. On the back of the cabinet, press putty around the drain hose and partially into the hole.
9. Install the protective cover on the rear of the cabinet.
10. Switch AC ON/OFF switch ON. Switch battery switch ON.
11. Touch **Mute** to disable the high temperature alarm while freezer reaches operating temperature.

9 Troubleshooting

CAUTION Review all safety instructions prior to troubleshooting. Refer to **Section I, Item 2** (Safety).

9.1 General Operation Problems

Problem	Possible Cause	Action
A drawer or basket does not slide easily.	Debris in the drawer slides.	► Pull the drawer or basket out and confirm the slides are free of debris. Clean if necessary.
	Drawer or basket slides are not lubricated.	► Using a multi-purpose grease, lubricate the bearings in the slides.
	Ice buildup in the drawer slides.	► Pull the drawer or basket out and confirm the slides are free of ice. De-ice if necessary.
	Drawer or basket is misaligned or not level.	► Confirm both slides for the drawer or basket are mounted at the same height.
	A drawer or basket slide is faulty.	► Confirm the slide is operating correctly. Replace if necessary.
The door does not open easily.	Debris in the hinges.	► Confirm the hinges are free of debris. Clean the hinges if necessary.
	Hinge is faulty.	► Confirm the hinge spring or pin is not damaged. Replace entire hinge (lower hinge only), if necessary.
	Door hinges are not lubricated.	► Using a general-purpose grease, lubricate the pivots in the hinges.
	Lower hinge spring and/or pin may be bent or faulty.	► Replace the entire lower hinge spring and pin assembly.
The monitor display is hard to read.	Screen brightness is set too low.	► Change the screen brightness.
The alarm monitor is not responding.	Digital electronics are locked because of an interruption in power.	► Reset the monitoring system.
“Probe Failure” is displayed on the monitor.	Defrost probe or monitor probe wiring is an open circuit.	► Check the continuity of the probe wiring and connections. Secure the connections if necessary. ► Confirm the probe is providing resistance in the range of 86 Ω to 110 Ω. Replace the probe if necessary.

9.2 Chamber Temperature Problems

Problem	Possible Cause	Action
The chamber temperature displayed is higher or lower than the actual temperature.	Monitor probe is not calibrated.	► Check the chamber temperature calibration. Change the calibration if necessary.
	Connections for the monitor probe are loose.	► Test the monitor probe connections. Secure the connections if necessary.
	Monitor probe wiring is an open circuit.	► Check the continuity of the probe wiring. Replace the probe if necessary.
	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.
	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.
	Monitor is not calibrated.	► Confirm the monitor probe is reading correctly. Calibrate the monitor probe if necessary.
The chamber temperature meets an alarm condition, but the appropriate temperature alarm is not active.	Temperature alarm setpoint was changed.	► Check the current setpoints for the temperature alarms. Change the setpoints if necessary.
The compressor runs continuously.	Freezer setpoint is set too low.	► Confirm the setpoint is set within the operating range and change it if necessary.
	Temperature monitor/ control board is faulty.	► Confirm the temperature controller or monitor/ control board is operating correctly. Replace it if necessary.
	Compressor starting relay is faulty.	► Confirm the relay is operating correctly. Replace the relay if necessary.

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

9.3 Alarm Activation Problems

Problem	Possible Cause	Action
The freezer is in an alarm condition, but alarms are not audible.	Alarm system is faulty.	► Confirm the circuit board and line connections are functioning correctly.
	Monitor/control board is faulty.	► Replace parts with those included in the control board kit, or replace the monitor/control board.
	Alarm buzzer is faulty.	► Replace the alarm buzzer.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
	Audible alarms are muted.	► Verify that audible alarms are not muted. If time remaining is greater than five minutes, change MUTE timer value to five minutes and wait until timer resets.
The freezer meets an alarm condition, but the appropriate alarm is not active.	Monitor/control board is faulty.	► Replace parts with those included in the control board kit, or replace the monitor/control board.
	Alarm setpoint was changed.	► Check the current setpoints for the alarms.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.

Problem	Possible Cause	Action
The High Temperature alarm activates when the door is opened, then clears shortly after the door is closed.	Connections for the monitor probe are loose.	► Check the monitor probe connections. Secure the connections if necessary.
	Monitor 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 necessary.
	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.
	ON/OFF AC power switch located inside the front lower panel is faulty.	► Replace the ON/OFF AC power switch.
	ON/OFF AC power switch is OFF.	► Turn the ON/OFF AC power switch to the ON position.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
	Circuit breaker is tripped.	► Reset or replace the circuit breaker.

Problem	Possible Cause	Action
The Door Open alarm is activating sporadically.	Door is not closing completely.	► Clean hinges if debris is present. ► Confirm door is aligned. ► Confirm hinge spring and/or pin are not damaged. Replace hinge (lower only) if necessary.
	Door is closing but not sealing completely.	► Confirm the door gasket seals completely. Replace the door gasket if necessary.
	Connections for the door switch are faulty.	► Test the switch connections. Secure the connections if necessary.
	Door switch is faulty.	► Replace the door switch.
	Monitor/control board is faulty.	► Replace parts with those included in the control board kit, or replace the monitor/control board.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
	Door Ajar Timeout is set to zero, causing the alarm to activate immediately when the door is opened.	► Check the current setpoint for the Door Ajar alarm. Change the setpoint if necessary.
All alarms are activating sporadically.	Alarm system is faulty.	► Confirm the circuit board and line connections are functioning correctly.
	Monitor/control board is faulty.	► Replace parts with those included in the control board kit, or replace the monitor/control board.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
	Compressor is overheating due to lack of airflow.	► Check the condenser grill. Clean if necessary. ► Confirm freezer location meets requirements.
	Condenser alarm setpoint is too low.	► Confirm the alarm setpoint is set at the expected or correct value.
	Refrigerant level is too low.	► Check refrigeration lines for leaks and repair if necessary. Check the refrigerant level. Recharge refrigerant if necessary.

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

9.4 Testing Problems

Problem	Possible Cause	Action
The automatic temperature tests do not work.	Connections for the monitor probe are loose.	► Test the monitor probe connections. Secure the connections if necessary.
	Monitor probe is faulty.	► Test the monitor probe. Replace the probe if necessary.
	Monitor/control board is faulty.	► Replace parts with those included in the control board kit, or replace the monitor/control board.
	High Alarm setpoint is set significantly higher than the default value, or the Low Alarm setpoint is set significantly lower than the default value.	► Confirm the alarm setpoints are set at the expected or correct values. ► Test the temperature alarms manually.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.

9.5 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.
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.
	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.
	Drain line is plugged.	► Confirm the drain tube is free of debris. Remove debris if necessary.
	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.
There is excessive moisture on the doors.	Humid air is entering the chamber.	► Confirm the freezer is level, and the door is aligned, closing tightly, and sealing correctly.
	Relative humidity around freezer is too high.	► Confirm freezer location meets requirements.

Problem	Possible Cause	Action
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.
	Drain line is plugged.	► Confirm the drain tube is free of debris. Remove debris if necessary.
	Drain line heater is faulty.	► Confirm the drain line heater is warm to the touch. Contact Helmer Technical Service to resolve issues as necessary.
	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.

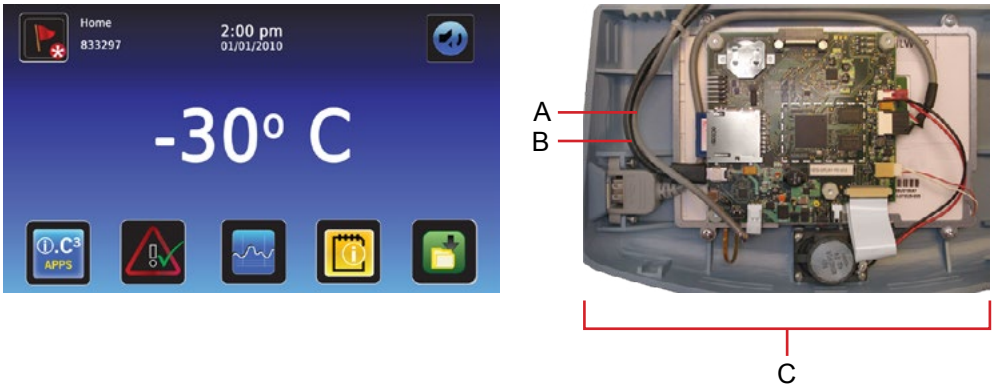
10 Parts

NOTE

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

10.1 Front

10.1.1 Control System Display



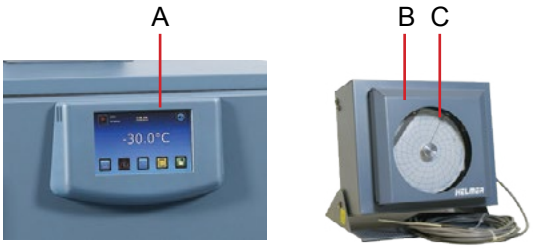
Left: Front view, LCD touchscreen. Right: Rear view showing display board.

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

NOTE

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

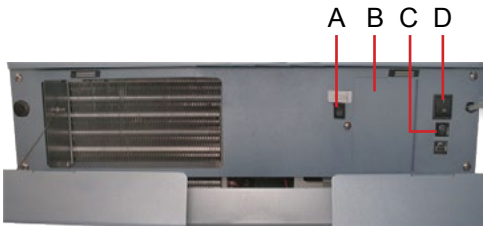
10.1.2 Control and Monitoring



Control and monitoring features.

Label	Description	Part Number	Schematic Label
A	i.C³ monitoring and control system	-	-
B	Temperature chart recorder (standard on plasma freezer model, optional on laboratory model)	500613-1	-
C	Chart paper (52 sheets)	220419	-
Not shown	Chart recorder backup battery	120218	-

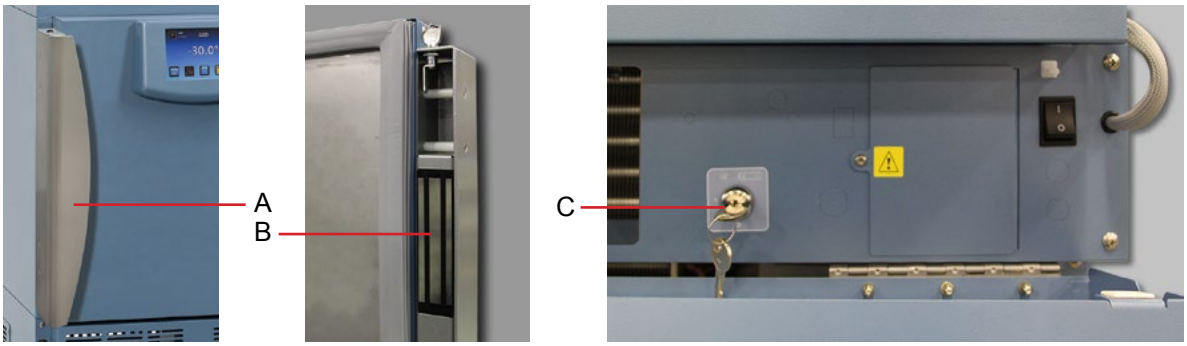
10.1.3 Lower Panel



Lower panel features.

Label	Description	Part Number	Schematic Label
A	Battery backup switch	120202	IC
B	Battery access door	-	-
C	Circuit breakers (230 V models only)	120288	C
D	ON/OFF AC power switch	120478	D
Not shown	Monitoring system backup battery	120628	IB

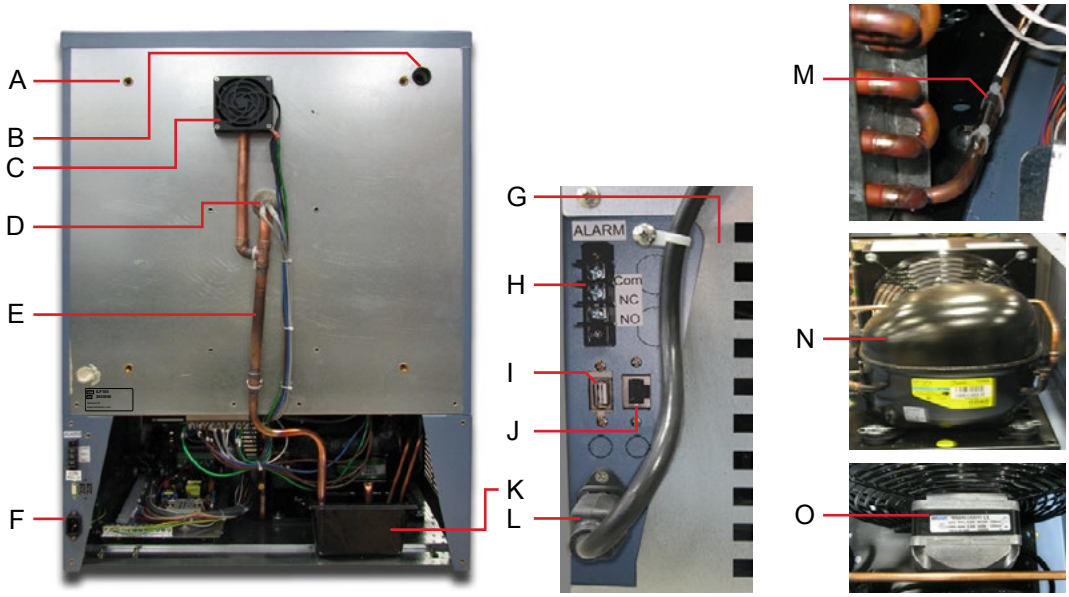
10.1.4 Access Control Option



Access Control features (iPF105 model shown).

Label	Description	Part Number	Schematic Label
A	Door handle (includes manual keyed lock)	322000-1	-
B	Magnetic lock assembly (includes magnet and door handle)	800139-1	AXb
C	Backup battery key switch	401220-1	AXa

10.2 Rear

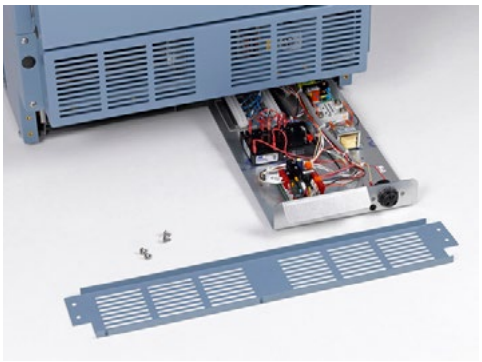


Rear features.

Label	Description	Part Number	Schematic Label
A	Nut flanges for brace bars used in stacking undercounter units	-	-
B	Rear access port	-	-
C	Drain line fan	115 V: 400909-1 230 V: 400909-2	Q
D	Drain line heater	115 V: 120590 230 V: 120485	T

Label	Description	Part Number	Schematic Label
E	Drain line assembly	400910-1	-
F	Power connector	-	-
Not shown	Cover for communication ports and remote alarm contacts	-	-
G	Rear cover	321184-1	-
H	Remote alarm contacts	-	-
I	USB port	120638	IE
J	RJ-45 Ethernet port	800008-2	IF
Not shown	RS-232 COM port (optional)	-	-
K	Condensate evaporator tray	-	-
L	Power cable (with connector)	North American models 120 V: 120630 230 V: 120631 European models 230 V: 120156 Chinese models 203 V: 120547 Saudi Arabian models 230 V: 120641	A
M	Condenser probe	800039-1	IL
N	Compressor	115 V: 800012-1 230 V 50 Hz: 800104-1 230 V 60 Hz: 800105-1	J
O	Condenser fan motor	115 V: 120608 230 V 50 Hz: 120660 230 V 60 Hz: 120661	K
Not shown	Caster (optional, swivel with brake)	220467	-

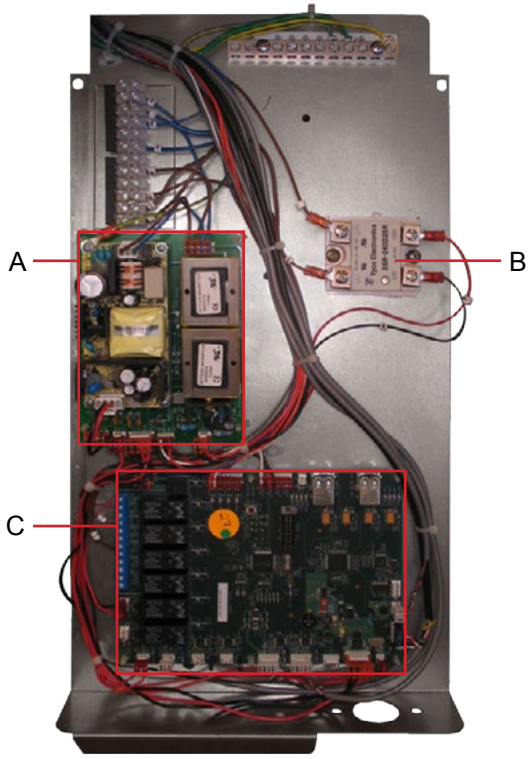
10.3 Electrical Tray



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

CAUTION Disconnect the freezer from AC power before accessing the electrical tray.

10.3.1 Electrical Tray Components

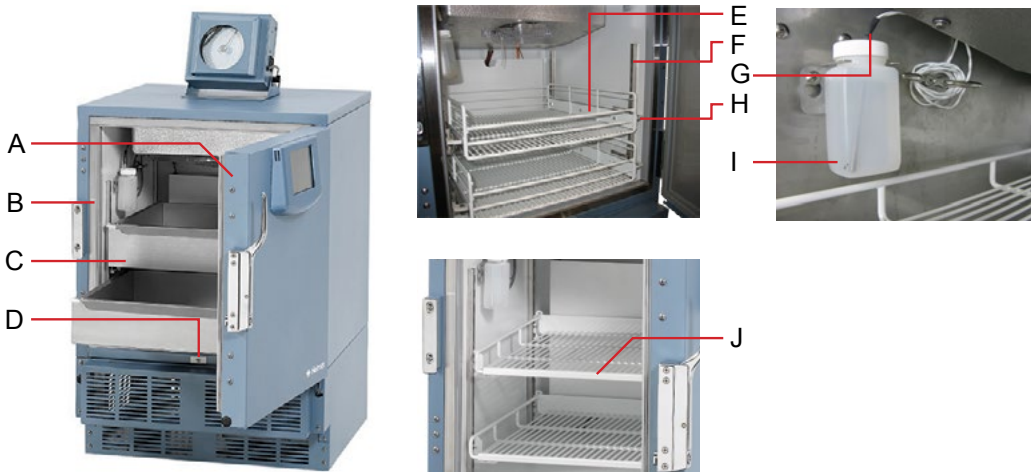


Electrical tray features.

Label	Description	Part Number	Schematic Label
A	Power supply board	800035-1	ID
B	Compressor relay	115 V: 120426 230 V 50 Hz: 120669 230 V 60 Hz: 120671	L
C	i.C³ control board	800034-1	IA
Not shown	Power line filter	115 V: 120299 230 V: 120677	B
Not shown	Compressor power line filter	120706	V

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

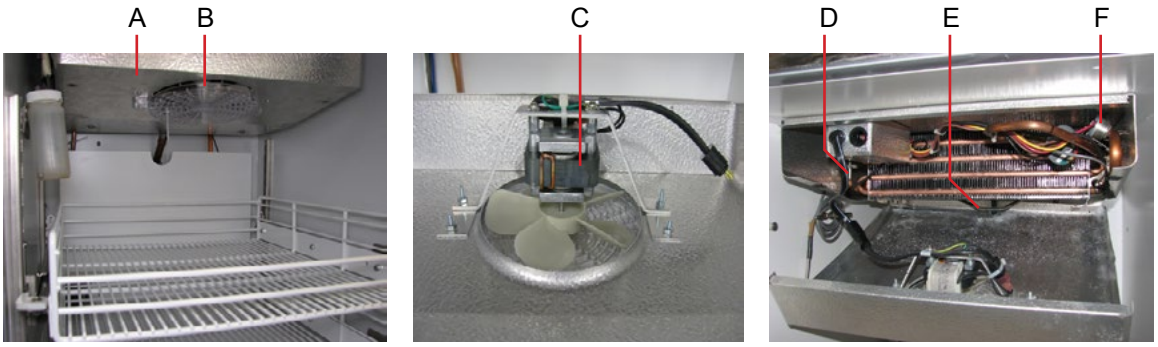
10.4 Interior



Storage features.

Label	Description	Part Number	Schematic Label
A	Door	Stainless steel: 800063-2 Powder coated without Access Control: 800063-1 Powder coated with Access Control: 800144-1	-
B	Mullion heater (behind strike plates)	115 V: 800081-1 230 V: 800106-1	U
C	Drawer (blood bank model)	400854-3	-
D	Door switch	120380	M
E	Roll-out basket (optional)	400890-3	-
F	Standard for shelf, drawer, or roll out basket	321173-1	-
G	Monitor probe	800038-1	IK
H	Drawer slide for drawer or roll out basket	400753-2	-
I	Probe bottle and propylene glycol kit	400922-2	-
J	Shelf	400814-1	-
Not shown	Optional adapter kit for medication dispensing lock	Call Helmer or your distributor for specific information	-

10.4.1 Unit Cooler



Unit cooler interior features.

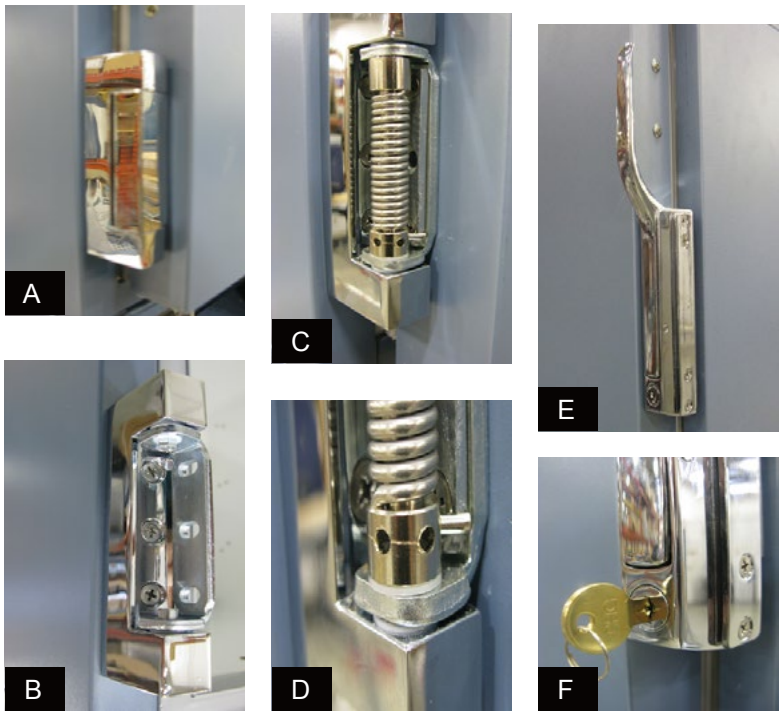
Label	Description	Part Number	Schematic Label
A	Unit cooler assembly	115 V: 120592 230 V: 120657	F
B	Fan guard	-	-
C	Unit cooler fan motor	115 V: 120540 230 V: 120658	E
D	Control probe	800048-1	IT
E	Defrost heater	115 V: 120633 230 V: 120659	R
F	Defrost heater limit thermostat	800014-1	S
Not shown	Defrost temperature probe	-	IL

10.5 Side Access Panel

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

Side access panel.

10.6 Door and Hinge



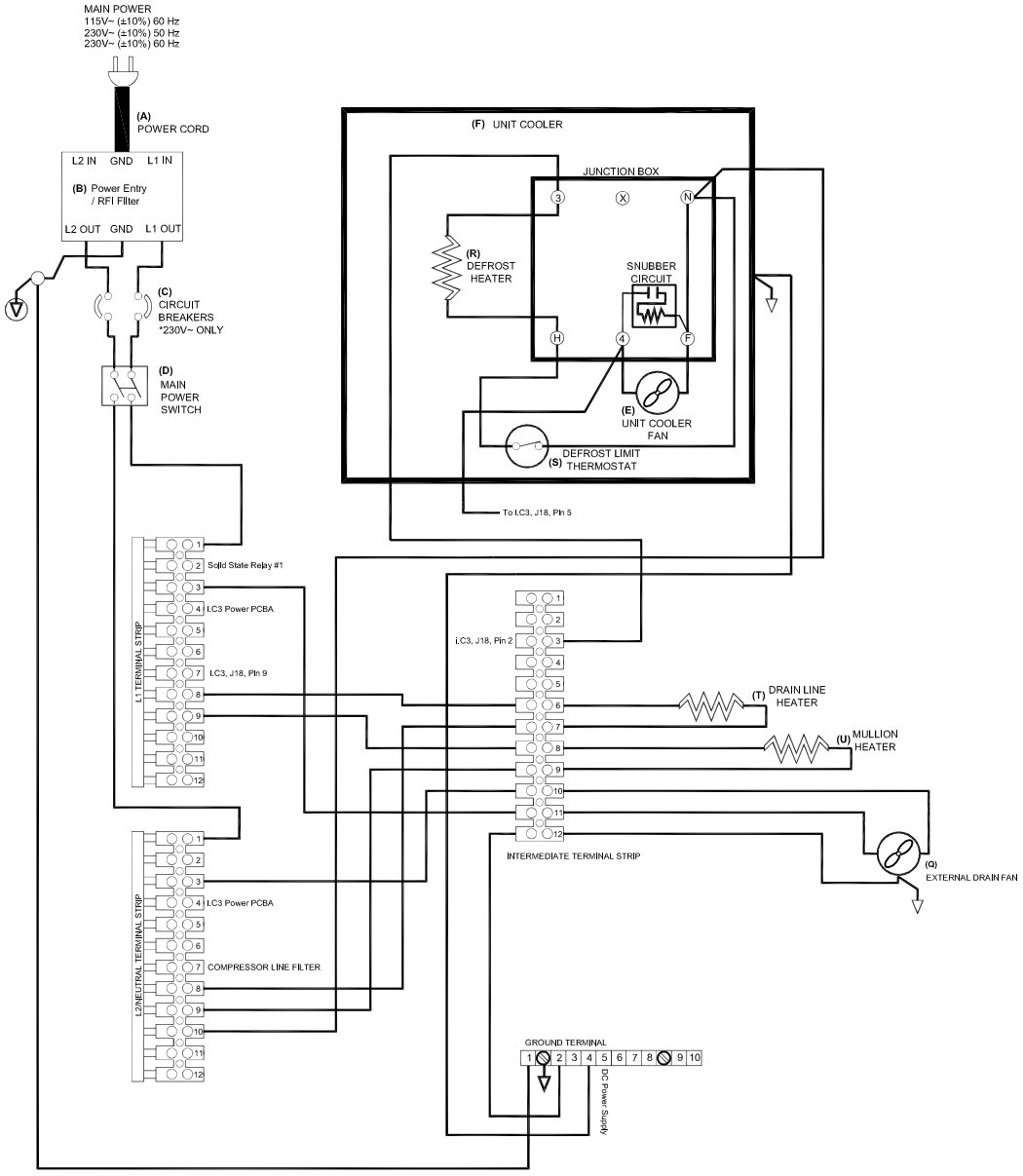
Hinge, hinge spring and pin assembly, and door handle with key lock.

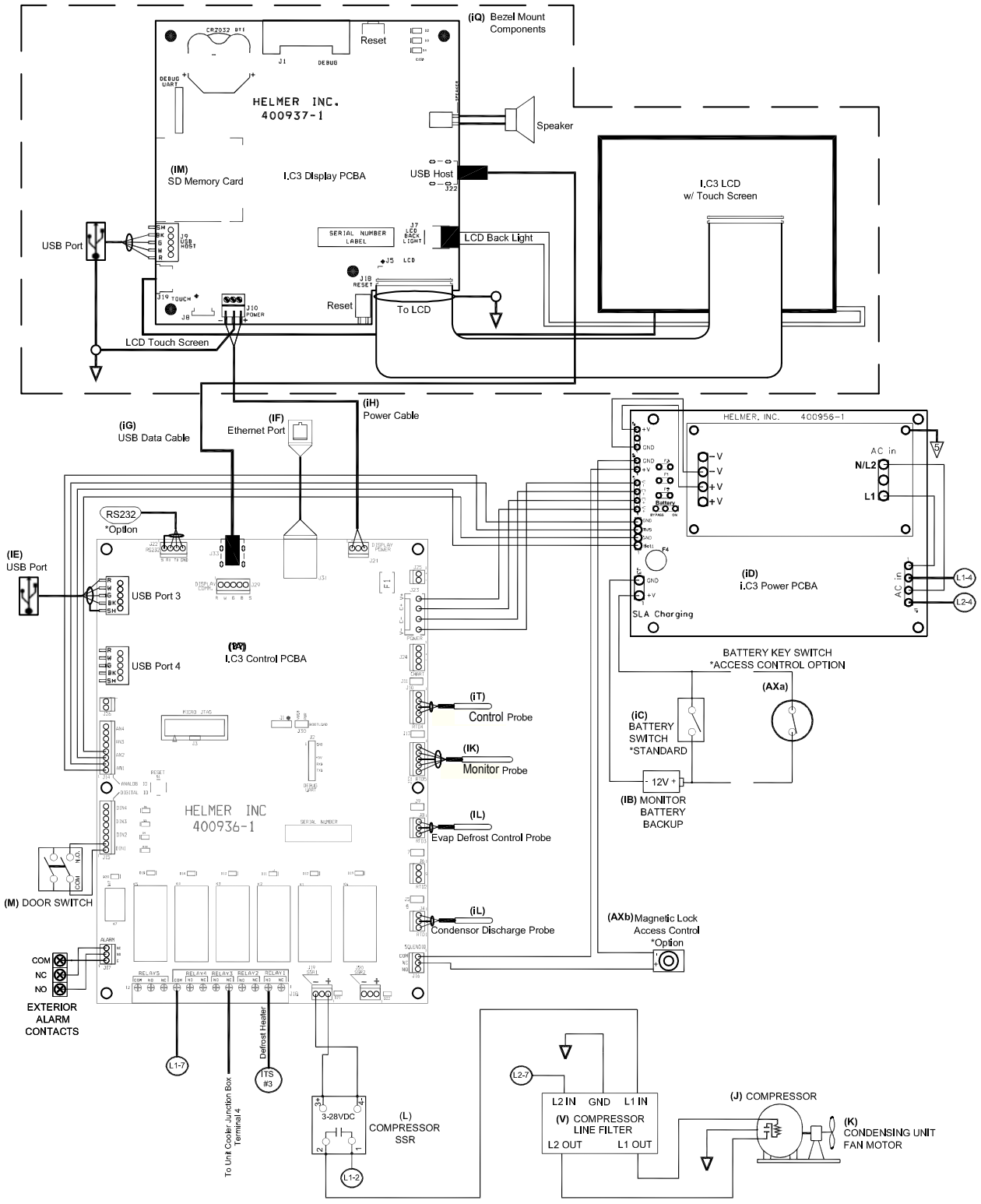
NOTE Spring tension is controlled at the point where the pin is stopped by the side plate (C, D).

Label	Description	Part Number
A	Hinge, covered, edge mount	220506
B	Hinge, uncovered, without spring assembly	-
C	Hinge, uncovered, spring and pin assembly	-
D	Close up, hinge spring and pin assembly	-
E	Door handle - Magnetic offset latch with key lock	220426
F	Door key lock with key, close-up	-
Not shown	Door gasket (magnetic)	-
Not shown	Door lock replacement kit	220439

11 Schematics

11.1 iPF and iLF Models; 105 Configuration




(iQ) Bezel Mount Components
HELMER INC.
400937-1
Reset
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
Reset
To LCD
LCD Touch Screen
(iG)
USB Data Cable
(IF)
Ethernet Port
(iH)
Power Cable
HELMER, INC. 400956-1
AC in
N/L2
L1
(iD)
i.C3 Power PCBA
SLA Charging
AC in
L1-4
L2-4
RS232
*Option
(IE)
USB Port
USB Port 3
USB Port 4
(IY)
I.C3 Control PCBA
BATTERY KEY SWITCH
*ACCESS CONTROL OPTION
(AXa)
(iT)
Control Probe
(iC)
BATTERY
SWITCH
*STANDARD
(IK)
Monitor Probe
12V
(IB) MONITOR
BATTERY
BACKUP
HELMER INC
400936-1
(IL)
Evap Defrost Control Probe
(M) DOOR SWITCH
(iL)
Condensor Discharge Probe
(AXb) Magnetic Lock
Access Control
*Option
COM
NC
NO
EXTERIOR
ALARM
CONTACTS
L1-7
To Unit Cooler Junction Box
Terminal 4
Defrost Heater
ITS
#3
3-28VDC
(L)
COMPRESSOR
SSR
L1-2
L2-7
L2 IN
GND
L1 IN
(V) COMPRESSOR
LINE FILTER
L2 OUT
L1 OUT
(J) COMPRESSOR
(K)
CONDENSING UNIT
FAN MOTOR

Section III: Horizon Series™ Models

12 Product Configuration

WARNING To prevent tipping:
- ensure the casters (if installed) are unlocked and the door is closed before moving the freezer.
- do not sit, lean, push or place heavy objects on upper door ledge.

12.1 Install Battery for Backup Power

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

NOTE
- The optional Access Control system uses an independent battery for backup power, in the event of a power failure.
- The monitoring system will start on battery power alone. If the freezer was previously not connected to AC power and the battery is connected, the monitoring system will begin running on battery power.

Battery life varies by manufacturer as well as voltage level remaining. Providing full power is available, and no battery-related alarms are active, backup power for the monitoring system is available for up to two hours. Providing full power is available, backup power for the optional Access Control system is available for up to 2.5 hours.

CAUTION
- Before installing or replacing batteries, switch the power OFF. Disconnect the freezer from AC power.
- When installing a replacement battery, use only a battery which meets the manufacturer's specifications.

The the battery is located below the chamber, behind the front cover. The battery holder is located behind an access panel.

Monitoring system backup battery.

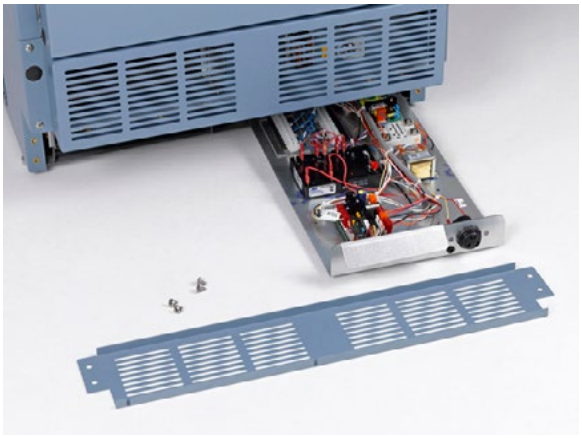
Optional Access Control backup battery (behind panel).

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

12.2 Schedule Defrost Events

Defrost events may be scheduled to occur at specific times.

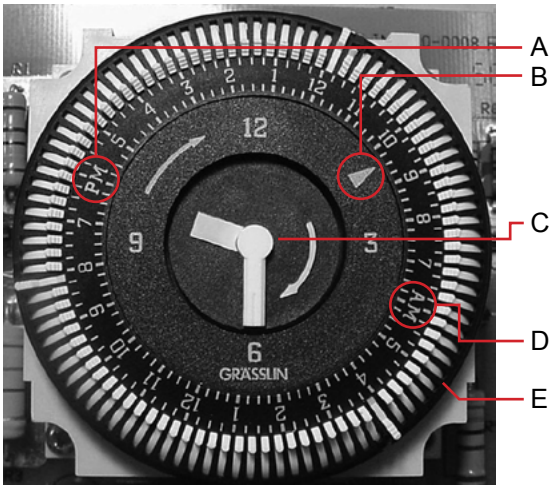
Access to the defrost controller is available from the front of the freezer, in the pull-out components tray.



Kick plate (removed), and pull-out components tray (open).

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 show the current time in hours and minutes. The outer ring shows the current time including AM or PM, to the nearest 15-minute interval.



Defrost controller with current time set to approximately 9:30 PM.

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

12.2.1 Set Current Time

1. Switch the AC ON/OFF switch OFF. Turn the Alarm Disable key switch OFF.
2. Remove the kick plate and pull out the electrical tray.
3. Rotate the time adjustment ring clockwise until the current time indicators show the current time.
4. Push the electrical tray in and replace the kick plate.
5. Switch the AC ON/OFF switch ON. Turn the Alarm Disable key switch ON.
6. Press the **Mute** button to disable the high temperature alarm while freezer reaches operating temperature.

12.2.2 Set Defrost Time

- ► Default setting of three defrost events per day
- ► Default times are 12:00 AM, 8:00 AM, 4:00 PM
- ► Defrost events can be added or removed
- ► Defrost events can be scheduled for any time of day (in 15-minute intervals)
- ► Defrost cycle lasts 15 to 30 minutes
- ► Defrost events must be at least one hour apart

NOTE Three defrost cycles are recommended for consistent freezer operation.

12.2.3 Schedule a Defrost Event

- ► Switch defrost event switch(es) to the ON position (outside) to initiate a defrost event at that time.
- ► Switch defrost event switch(es) to the OFF position (inside) to cancel a defrost event at that time.

1. Switch the AC ON/OFF switch OFF. Turn the Alarm Disable key switch OFF.
2. Remove the kick plate and pull out the electrical tray.
3. Add a defrost event:
   - ► At the appropriate time mark, position the switch ON (toward the outer ring).
4. Remove a defrost event:
   - ► At the appropriate time mark, position the switch OFF (toward the inside ring).
5. Push the electrical tray in and replace the kick plate.
6. Switch the AC ON/OFF switch ON. Turn the Alarm Disable key switch ON.
7. Press the **Mute** button to disable the high temperature alarm while freezer reaches operating temperature.

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

12.3 External Monitoring Devices

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

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

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

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

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

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

- ► 0.5 A at 125 V (AC): 1 A at 250 V (DC)

12.3.1 Connect to Remote Alarm Interface

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

12.4 Move Drawers, Shelves, and Baskets

Storage features.

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

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

Remove a drawer or basket

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

Install a drawer or basket

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

Remove a shelf

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

Install a shelf

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

12.5 Move slides and brackets

Remove Drawer Slides

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

Install drawer slides

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

Remove shelf brackets

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

Install shelf brackets

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

12.6 Level the Freezer

NOTE

- Leveling feet are optional.
- Helmer recommends the use of leveling feet (unless casters are installed) and wall and floor brackets (PN 400472-2) for stabilization. Contact Helmer Technical Service for parts and instruction.
- A bubble level may be used to ensure the freezer is level.

Leveling feet must be adjusted to provide unit cooler drainage.

Front-to-back

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

Side-to-side

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

12.7 Optional Adapter Kits for Medication Dispensing Locks

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

12.8 Reverse Door Hinge and Handle

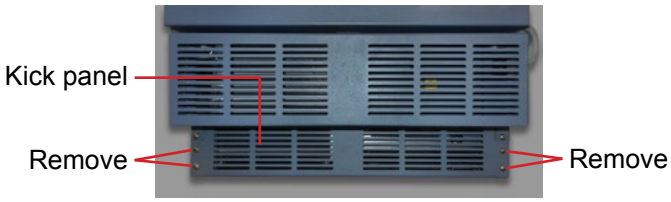
NOTE

- ► Before reversing door hinge and handle, protect stored items in freezer from extended exposure to adverse temperature.
- ► Freezer must be on the floor or on an elevated work surface with enough space in front of the freezer to lay the door face-down for disassembly.
- ► The door hinge and handle cannot be reversed on freezers equipped with Access Control.

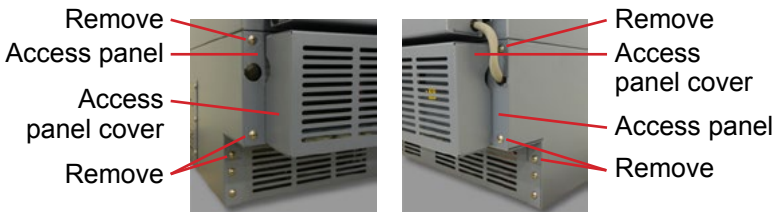
12.8.1 Remove the Door and Hinges

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

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

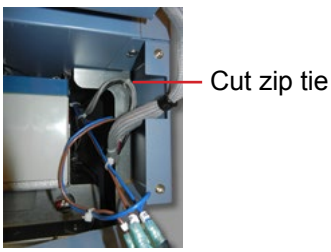


3 Remove six screws holding the access panel and cover on the cabinet. Lay the panel in front of the cabinet, ensuring there is no strain on the power switch wires.



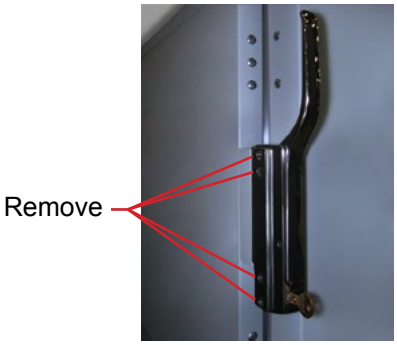
4 Remove plug from the access panel (on the handle-side of the freezer). Remove grommet from the hole (on the hinge-side of the freezer). Slide the braided sleeve out of the slot (on the kick plate).

5 Cut the zip tie inside the cabinet.



6 Remove the door handle assembly.

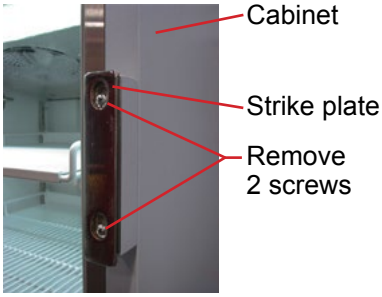
- **a** Remove four screws holding the door handle assembly on the door.
- **b** Set the door handle assembly aside.



Door handle assembly.

7 Remove door latch / door catch.

- **a** Remove two screws holding the door latch plates and spacer bar on the cabinet
- **b** Set the latch plates and spacer bar aside.



Door latch plate.

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

9 Remove the spring assembly from the lower hinge.

- **a** Use a J-hook tool to engage the left-most hole in the spring cap and rotate the spring cap from *left to right,* and hold.
- **b** Remove the pin from the spring cap.
- **c** Allow the spring to relax.
- **d** Use a J-hook tool to engage any hole in the spring cap compress spring downward.
- **e** Remove spring assembly from the lower hinge.
- **f** Set the spring assembly aside.

NOTE

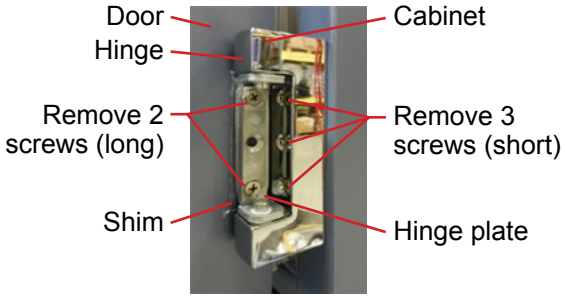
- ► A second person should assist by supporting the door while the hinges are removed.
- ► The two screws holding the hinge on the door are longer than the three screws holding the hinge on the cabinet. The screws must be installed in the same location when moving the hinge to the opposite side of the door.

10 Remove the lower hinge.

- **a** Support the door.
- **b** Remove five screws attaching the lower hinge to the door and cabinet.
- **c** Remove the lower hinge.
- **d** Reverse the hinge manually (as if moving the hinge from a fully-closed to a fully-open position).
- **e** Set the lower hinge aside.
- **f** Continue to support the door.

11 Remove the upper hinge.

- **a** Remove five screws attaching the upper hinge to the door and cabinet.
- **b** Remove the upper hinge.
- **c** Reverse the hinge manually (as if moving the hinge from a fully-closed to a fully-open position).
- **d** Set the upper hinge aside.



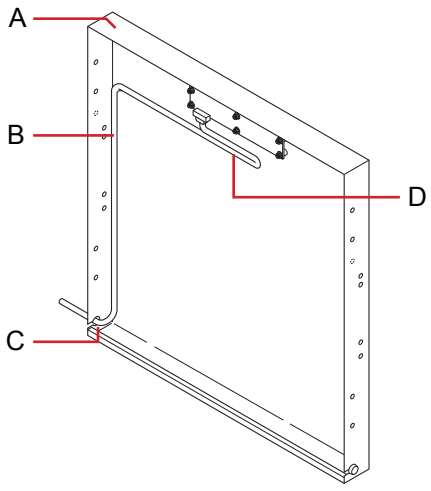
Hinge removal (lower hinge shown with spring removed).

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

12.8.2 Reverse the Cable Routing in the Door

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

The length of the cable inside the door is approximately three feet. The cable follows a channel along the top and side of the outer frame. Additional slack has been bundled in the cable.

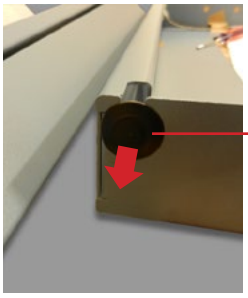


Outer door frame (right-hinged solid door shown) and data cable.

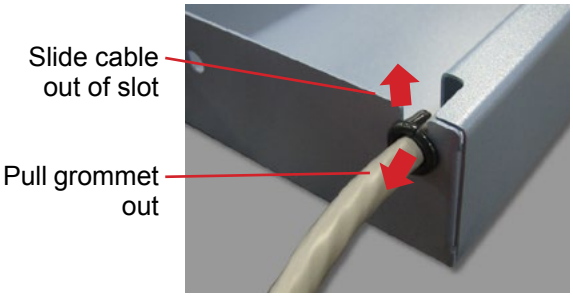
Label	Description
A	Outer door frame
B	Data cable (gray)
C	Cable exit (corner of door)
D	Additional cable slack

1 Lay the door assembly face-down on a solid work surface.
2 Remove remaining screws from both sides of the door assembly.
3 Lift the inner door frame out of the outer door frame and set aside. A J-hook tool may be used along the bottom edge of the door assembly to lift the inner frame.

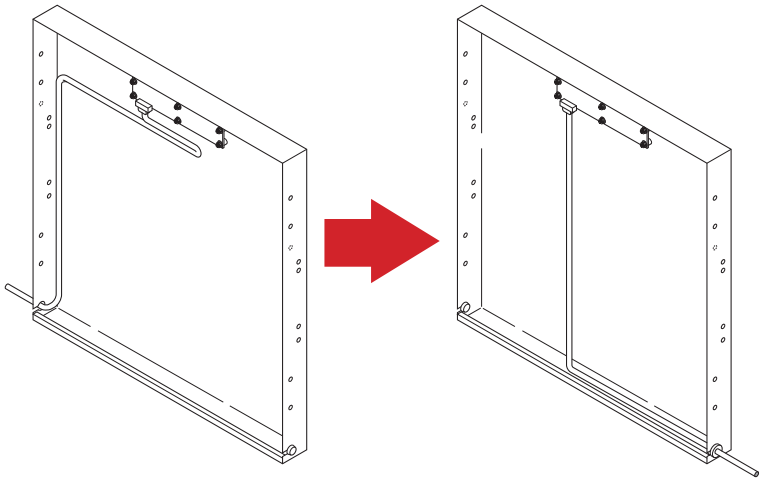
4 Remove the plug from the handle-side of the door. Set the plug aside.



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



6 Re-route the data cable.
   a Route the data cable inside the door and out through the slot in the corner opposite from where the cable had previously exited the door.
   b Cable should follow the bottom edge of the door frame, as closely as possible.
   c Tape the cable to the door frame.
   d Excess slack in the cable should be outside of the door.



Left: Original cable routing (right-hinged door). Right: New cable routing (left-hinged door).

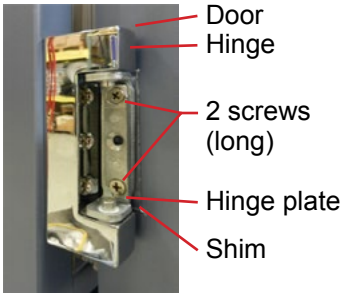
7 Route the data cable out of the door.
   a Slide the data cable through the slot in the door.
   b Insert the door-side grommet into the hole in the door.

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

12.8.3 Reinstall the Door and Hinges

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

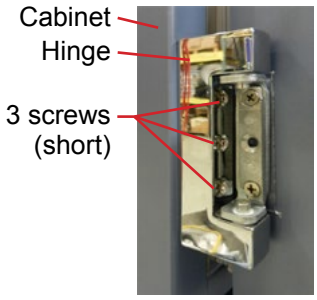
NOTE Ensure that the upper and lower hinges are not interchanged when moving the hinges to the opposite side of the door.



Attach hinge to door (lower hinge shown).

NOTE A second person should assist by supporting the door while the hinges are installed.

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



Attach hinge to cabinet (lower hinge shown).

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

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

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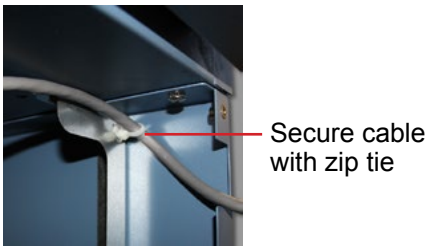
4 Route the data cable across the front of the cabinet. Attach the cable to the zip tie holder under the cabinet on the hinge side.



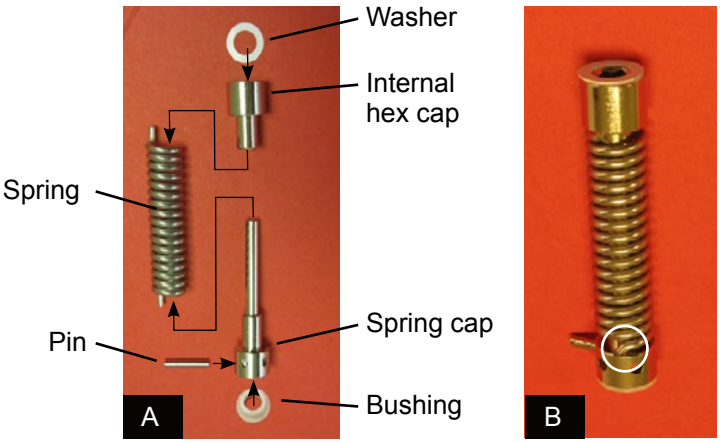
Data cable secured at the hinge-side of the cabinet after hinge reversal.

5 Install the data cable in the door.
- **a** Slide the data cable through the slot in the access panel.
- **b** Install the grommet in the hole.
- **c** Install the plug in the access panel on the opposite side.
- **d** Allow enough slack (approximately 3”) in the data cable between the door and the cabinet so the door can pivot open and closed without straining the cable.

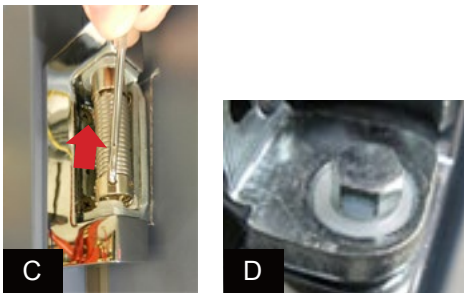
6 Install the access panel and cover.
7 Install the kick panel.
8 Install the door handle on the opposite side of the door.
9 Install the latch plates and spacer bar on the opposite side of the cabinet.

10 Install the hinge spring and pin assembly.

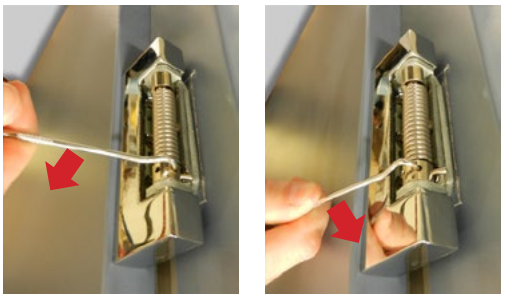
- **a** Close the door.
- **b** Assemble the hinge spring assembly for the left side of the door *(Figure A)*.
- **c** Orient the bend in the coil toward the front of the freezer *(Figure B)*.
- **d** Slide the internal hex cap (with washer) on to the upper hex bolt in the lower hinge.



- **e** Use a J-hook tool in the spring cap to compress the spring upward *(Figure C)*.
- **f** While compressing the spring, slide the spring cap over the lower hex bolt in the lower hinge *(Figure D)*.



- **g** Use a J-hook tool to engage the right-most hole in the spring cap and rotate the spring cap from *right to left,* and hold.
- **h** Count four holes, starting from and including the spring cap hole closest to the end of the coil.
- **i** Insert the pin in the fourth hole.



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

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

12 Close the lower front control panel.

13 Press the **Mute** button to disable the high temperature alarm while freezer reaches operating temperature.

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

12.9 Stacked Undercounter Units

CAUTION

- For a stacked configuration, both units must have leveling feet installed.
- The back brace bars and front stabilizing brackets must be installed [PN 400821-1 (blue) or 400821-2 (stainless steel)].
- When stacking a refrigerator and freezer (104 and/or 105 models), place the heavier unit on the bottom.
- Do not open multiple, loaded drawers or baskets at the same time.

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

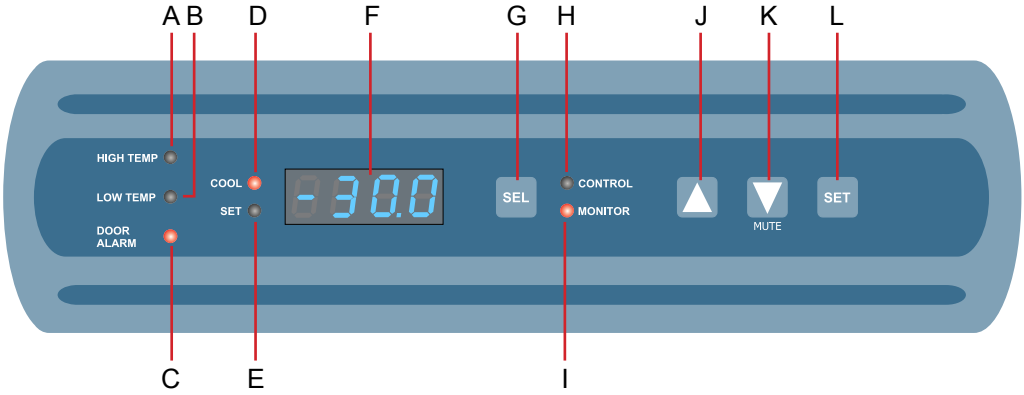
13 Settings

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

NOTE

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

13.1 Monitor and Controller Interface



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

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

13.2 Display Minimum and Maximum Monitor Temperature Recordings

NOTE

- ► This feature is standard on Horizon Series™ models with serial numbers of 2015494 or higher. Some exceptions may exist. For confirmation on your unit, please contact Helmer Technical Service.
- ► Units that do not include the minimum and maximum recording feature will not display .C or .F when entering the program mode.

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

NOTE The following steps apply only to the monitor probe.

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

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

3 View recorded temperature timer.

NOTE

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

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

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

NOTE The minimum and maximum temperature and timer will reset when:
- ► the unit is powered off and battery backup is not engaged, or
- ► after 99 hours and 59 minutes have elapsed.

13.3 Freezer Setpoint

NOTE Default setpoint is -30.0 °C

Change the setpoint if:

► Your organization requires a chamber temperature other than -30.0 °C.

Change setpoint.

1 On the monitoring system, press and release **SEL** to change to Control mode. The CONTROL lamp will illuminate.

3 Press and hold **SET** to display the current temperature setpoint.

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

4 Hold **SET** and press **Up Arrow** or **Down Arrow** to set the adjustment value.

5 Release **SET** button; the setpoint is changed.

6 Press and release **SEL** to return to Monitor mode. The MONITOR lamp will illuminate.

13.4 Table of Parameters

Parameter	Visual Indicator	Range	Default
Celsius or Fahrenheit	None	.C, .F	.C
High Temperature	MONITOR Lamp & HIGH Lamp	-40.0 to 40.0 (°C) -40 to 104 (°F)	-20.0°C
Low Temperature	MONITOR Lamp & LOW Lamp	-40.0 to 40.0 (°C) -40 to 104 (°F)	-40.0°C
Monitor Offset	MONITOR Lamp	-10.0 to 10.0 (°C) -18 to 18 (°F)	Varies
Control Offset	CONTROL Lamp	-10.0 to 10.0 (°C) -18 to 18 (°F)	Varies
Hysteresis	CONTROL Lamp	0.5 to 2.5 (°C) 1 to 5 (°F)	2.0°C

13.4.1 View Alarm Setpoints and Offset Values

1 Press and hold the **Up** and **Down Arrows** simultaneously for 3 seconds to enter program mode.

2 The LED Display will show .C or .F to indicate Celsius or Fahrenheit.

3 Press and release **SEL** to scroll through the parameters and view settings.

4 Hold **Up** and **Down Arrows** simultaneously for 3 seconds to exit program mode.

5 The LED Display will show current monitor temperature.

13.4.2 Temperature Units

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

1 Press and hold the **Up** and **Down Arrows** simultaneously for 3 seconds to enter program mode.

2 The LED Display will show .C or .F to indicate Celsius or Fahrenheit.

3 Press and hold the **SET** button while pressing the **Up** or **Down Arrow** to select the desired temperature unit parameter.

4 Release **SET** button. The new setting is saved.

5 Press and hold **Up** and **Down Arrows** simultaneously for 3 seconds to exit program mode.

13.5 Temperature Alarm Setpoints

Temperature alarm setpoints specify the temperature at which an alarm activates.

13.5.1 High Temperature Alarm Setpoint

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

13.5.2 Low Temperature Alarm Setpoint

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

13.6 Temperature Calibration Setpoints

Temperature calibration setpoints indicate an acceptable margin of error between the actual temperature value and the desired temperature value.

13.6.1 Monitor Offset

► Value is factory-set to match a calibrated reference thermometer.

NOTE

► Ensure the product simulation bottle is full of solution.
► Probes in the bottle are connected to the monitoring system and sense chamber temperature. These probes do not affect freezer setpoint.

Obtain:

► Calibrated reference thermometer; independent and traceable per national standards.
► Tape or wire ties to attach thermometer to monitor probe.

Measure the chamber temperature:

1. Remove the monitor probe from the probe bottle and unscrew the cap.
2. Attach the thermometer to the probe, and immerse at least 2” (50 mm) in bottle.
3. Close the door and allow the chamber temperature to stabilize for 10 minutes.
4. Note the temperature on the calibrated reference thermometer and compare to the chamber temperature displayed on the monitor.
5. Adjust the monitor offset value higher or lower to reflect the difference between the chamber temperature displayed on the monitor and the temperature reading from the calibrated reference thermometer.
6. Remove thermometer from the probe.
7. Replace bottle cap, ensuring a tight fit.
8. Place probe in bottle, immersing at least 2” (50 mm).

Enter the new offset value:

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

13.6.2 Control Sensor Offset

► Factory-preset. Varies for each freezer.

Determine control sensor offset:

NOTE

► Control Sensor Offset is factory-preset and should not be changed. Contact Helmer Technical Service for instructions regarding changing the Control Sensor Offset.
► Steps in Item 13.6.1 must be performed to ensure the monitor display is calibrated and accurate prior to adjusting the Control Sensor Offset.

1. View and record the Freezer Setpoint. (Reference **Section III**, **Item 13.3**)
2. Allow the unit to run with calibrated monitor temperature for several compressor cycles, and record the average monitor temperature .
3. View and record the current Control Offset value.
4. Subtract the Freezer Setpoint from the average monitor temperature and record the difference.
5. Add the current Control Offset value to the recorded difference determined in the previous step to establish the new Control Offset value.

EXAMPLE

1. Freezer Setpoint is -30.0
2. Average monitor temperature is -31.2
3. Current Control Offset is 0.3
4. Subtract: -31.2 - (-30.0) = -1.2; difference between average temperature and setpoint
5. Add 0.3 + (-1.2) = -0.9; new Control Offset value

Enter the new offset value:

1. Press and hold the **Up** and **Down Arrows** simultaneously for 3 seconds to enter program mode.
2. The Display will show .C or .F to indicate Celsius or Fahrenheit.
3. Press **SEL** until only the CONTROL lamp flashes.

NOTE

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

4. Hold **SET**, then press **Up** or **Down Arrow** to change the setpoint.
5. Release **SET** button. The new setting is saved.
6. Press and hold **Up** and **Down Arrows** simultaneously for 3 seconds to exit program mode.

13.6.3 Hysteresis

► Allowable temperature variance on each side of the freezer setpoint.

NOTE Hysteresis is factory-preset and should not be changed. Contact Helmer Technical Service for instructions regarding changing the Hysteresis value.

13.7 Test Alarms

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

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

13.7.1 Chamber Temperature Alarm

Obtain:

► glass with 4 oz. (120 mL) of product simulation solution (1:1 ratio of water to propylene glycol or equivalent low-temperature fluid).

NOTE Temperature probes are fragile; handle with care.

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 monitor probe from the probe bottle.
5. Place the 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 **Section III, Item 15** (Troubleshooting).
7. Remove probe from product simulation solution.
8. Place monitor probe in probe bottle, immersing it at least 2” (50 mm).

13.7.2 Power Failure Alarm

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

1. Switch AC ON/OFF switch OFF. Audible power failure alarm will activate immediately and “PoFF” (power off) will appear on the display.
2. Switch AC ON/OFF switch ON. Audible power failure alarm will cease and “PoFF” will clear from the display.

13.7.3 Door Open Alarm

► Factory-set to three minutes.

► Value can not be changed.

Test the alarm:

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

14 Maintenance

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

14.1 Recharge Refrigerant

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

NOTE Use only non-CFC R-404A refrigerant.

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

Model	Power Requirements	Initial Charge
105 model	115 V	11.0 oz (312 g)
	230 V	18.5 oz (524 g)

Obtain:
- ► Refrigerant
- ► Calibrated pressure gauge (0 psi to 220 psi (0 kPa to 1520 kPa))

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

NOTE Pressure varies depending on ambient air temperature.

4. Add refrigerant. Check the pressure on the high side and the low side.
   - ► Low side = 5 psi to 7 psi (34 kPa to 48 kPa)
   - ► High side = 180 psi to 220 psi (1241 kPa to 1517 kPa)
5. Remove pressure gauge.

14.2 Check Monitoring System Battery

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

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

NOTE Use a battery which meets manufacturer's specifications.

14.3 Check Optional Access Control System Battery

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

Check the battery:

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

14.4 Clean the Freezer

14.4.1 Condenser Grill

CAUTION Disconnect freezer from AC power when cleaning condenser grill.

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

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

14.4.2 Exterior

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

14.4.3 Interior

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

14.4.4 Clean and Refill Probe Bottle

Obtain:

► Fresh water-bleach solution (not provided)
   ► 1:9 ratio of bleach to water
   ► Bleach is 5% solution of commercial sodium hypochlorite (NaOCl)
   ► Equivalent oxidizing cleaner/disinfectant approved by your organization may be substituted
► 4 oz (120 mL) of product simulation solution per bottle
   ► Solution is a 1:1 ratio of water to propylene glycol (or equivalent low-temperature fluid)

Clean and refill bottle:

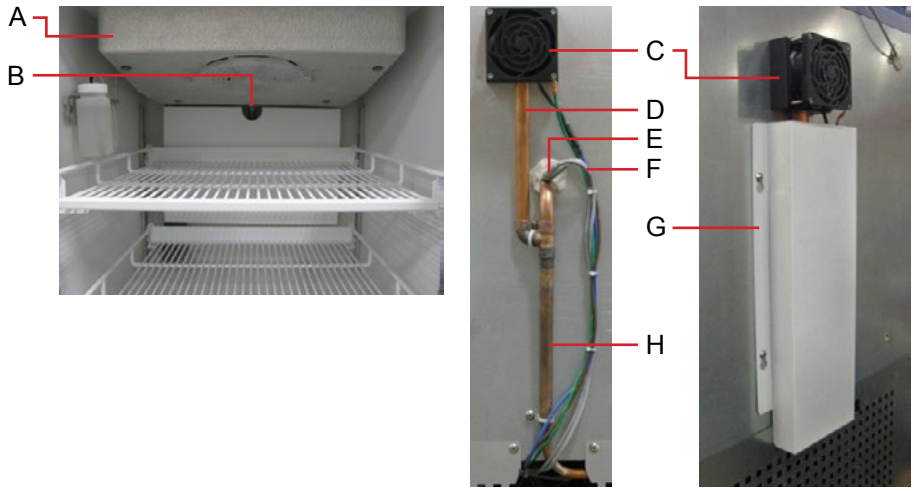
1 Remove probe from bottle.
2 Remove bottle from bracket.
3 Clean bottle with water-bleach solution.
4 Fill bottle with 4 oz (120 mL) of product simulation solution.
5 Cap bottle tightly to minimize evaporation.
6 Place bottle in bracket.
7 Replace probe, immersing at least 2” (50 mm).

14.5 Unit Cooler Cover Removal and Installation

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

Required tools:

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



Drain line, fan, and heater components.

Label	Description
A	Unit cooler cover
B	Drain port
C	Drain fan
D	Fan tube
E	Heating element
F	Heater wires
G	Protective cover
H	Drain tube

14.5.1 Remove the Unit Cooler Cover

1. Switch AC ON/OFF switch OFF. Disconnect the battery.
2. Remove the rear protective cover (G) on the rear of the cabinet.
   - **a** Loosen four screws
   - **b** Slide the cover up and remove
   - **c** Cut the wire ties securing the drain line to the cabinet
3. On the back of the cabinet, peel the putty back to expose the drain tube (H) and drain heater (E).

CAUTION The condensate evaporator and water evaporation tray are hot.

4. Inside the cabinet, remove the putty around the drain tube.
5. Remove the wire ties securing the heater wires (F) to the cabinet. Verify the heating element is cool.
6. Remove the drain heater from the drain tube.

7 Remove the drain tube (H) by pulling it downward. The drain tube should separate from the fan tube (D) at the 90° elbow, leaving the fan tube (D) attached to the fan (C).
   a The section of the drain tube inside the cabinet should separate from unit cooler drain port (B).
   b Gently twist the drain tube from left to right to separate it from the unit cooler drain port.
   c Pivot the drain tube upward then remove it from the cabinet.
8 Remove top drawer, basket, or shelf from the chamber.
9 Remove the unit cooler cover (A).
   a Hold unit cooler cover in place to prevent it from dropping.
   b Use the socket wrench to remove four screws securing the unit cooler cover.
   c Carefully lower unit cooler cover to avoid damage to the fan wiring.

14.5.2 Install the Unit Cooler Cover

1 Verify unit cooler wiring is connected and routed correctly.
   a Wiring should be routed above copper tube inside the unit cooler.
   b Reconnect wires if they have separated.
2 Attach unit cooler cover.
   a Lift unit cooler cover into place.
   b Front edge of the cover should be behind the unit cooler case.
   c Use the socket wrench to install four screws to secure the unit cooler cover.
3 Insert the drain tube through hole in the cabinet.
   a Push drain tube upward at an angle, toward the unit cooler drain port.
   b Picot the drain tube downward then push the tube upward.
   c In the chamber, push the drain tube onto unit cooler drain port.
4 Attach the drain tube to the fan tube.
5 Insert the drain line heater in the drain tube.
   a Insert the heater at an upward angle.
   b The black heating element should no longer be visible.
8 Reinstall top drawer, basket, or shelf if previously removed.
9 Reattach the drain line heater wires to the cabinet.
10 On the back of the cabinet, press putty around the drain hose and partially into the hole.
11 Install the protective cover on the rear of the cabinet.
12 Switch AC ON/OFF switch ON. Reconnect the battery.
13 Press the **Mute** button to disable the high temperature alarm while freezer reaches operating temperature.

15 Troubleshooting

CAUTION Review all safety instructions prior to troubleshooting. Refer to **Section I, Item 2** (Safety).

15.1 General Operation Problems

Problem	Possible Cause	Action
A drawer or basket does not slide easily.	Debris in the drawer slides.	► Pull the drawer or basket out and confirm the slides are free of debris. Clean if necessary.
	Drawer or basket slides are not lubricated.	► Using a multi-purpose grease, lubricate the bearings in the slides.
	Ice buildup in the drawer slides.	► Pull the drawer or basket out and confirm the slides are free of ice. De-ice if necessary.
	Drawer or basket is misaligned or not level.	► Confirm both slides for the drawer or basket are mounted at the same height.
	Drawer or basket slide is faulty.	► Confirm the slide is operating correctly. Replace if necessary.
The door does not open easily.	Debris in the hinges.	► Confirm the hinges are free of debris. Clean the hinges if necessary.
	Hinge is faulty.	► Confirm the hinge spring or pin is not damaged. Replace entire hinge (lower hinge only), if necessary.
	Door hinges are not lubricated.	► Using a general-purpose grease, lubricate the pivots in the hinges.
	Lower hinge spring and/or pin may be bent or faulty.	► Replace the entire lower hinge spring and pin assembly.

15.2 Chamber Temperature Problems

Problem	Possible Cause	Action
"Prob" appears on the display, but the chamber temperature is set correctly.	Connections for the monitor probe are loose.	► Check the probe connections. Secure the connections if necessary.
	Monitor probe wiring is an open circuit.	► Check the continuity of the probe wiring and connections. Secure the connections or replace the probe if necessary.
	A component is faulty.	► Contact Helmer Technical Service.
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.	Temperature alarm setpoint was changed.	► Check the current setpoints for the temperature alarms. Change the setpoints if necessary.
The compressor runs continuously.	Freezer setpoint is set too low.	► Confirm the setpoint is set within the operating range and change it if necessary.
	Control probe in the unit cooler is faulty.	► Confirm the control probe is providing resistance in the range of 98 Ω to 110 Ω. Replace the probe if necessary.
	Temperature monitor/ control board is faulty.	► Confirm the temperature controller or monitor/ control board is operating correctly. Replace it if necessary.
	Compressor starting relay is faulty.	► Confirm the relay is operating correctly. Replace the relay if necessary.
	Defrost timer is faulty.	► Replace the defrost timer.

Problem	Possible Cause	Action
The chamber temperature does not stabilize at the freezer setpoint.	Monitor/control board is faulty.	► Confirm the temperature controller or monitor/control board is operating correctly. Replace it if necessary.
	Compressor starting relay is faulty.	► Confirm the relay is operating correctly. Replace the relay if necessary.
	Temperature monitor/controller board is faulty.	► Confirm the temperature monitor/controller board is operating correctly. Replace the board if necessary.
	Condensing unit fan is not running.	► Check the condensing unit fan connections. Replace the fan motor if necessary.
	Unit cooler fan is not running.	► Check the voltage to the fan when door switch is activated. Replace the fan motor or door switch if necessary.
	Compressor motor has seized.	► Replace the compressor.
	Control probe is out of calibration.	► Confirm the probe is providing accurate temperature readings.
	Control probe is faulty.	► Confirm the probe is providing resistance in the range of 98 Ω to 110 Ω. Replace the probe if necessary.
	Refrigerant level is too low.	► Check the refrigeration lines for leaks and repair them if necessary. Check the refrigerant level. Recharge the refrigerant if necessary.
	Probe bottle is empty.	► Refill the probe bottle.
	Condenser grill is dirty.	► Check the condenser grill. Clean the grill if necessary.
	Air circulation at the top of the chamber is not adequate.	► Check if there are any items that may obstruct air flow and remove them if necessary.
	Ambient air temperature around the freezer is too high.	► Confirm the freezer is placed appropriately.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.

15.3 Alarm Activation Problems

Problem	Possible Cause	Action
The freezer is in an alarm condition, but the appropriate alarm is not audible or active.	Alarm system is faulty.	► Confirm the circuit board and line connections are functioning correctly.
	Monitor/control board is faulty.	► Replace parts with those included in the control board kit, or replace the monitor/control board.
	Alarm buzzer is faulty.	► Replace the alarm buzzer.
	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.
	Audible alarms are muted.	► Verify that audible alarms are not muted.
	Alarm setpoint was changed.	► Check the current setpoints for the alarms.
The High Temperature alarm activates when the door is opened, then clears shortly after the door is closed.	Connections for the monitor probe are loose.	► Check the monitor probe connections. Secure the connections if necessary.
	Monitor probe is faulty.	► Test the probe. Replace the probe if necessary.
	Unit cooler fan continues to run while the door is open.	► Test the door switch and unit cooler fan connections. Secure the connections if necessary. Replace the door switch or fan motor if necessary.
	Probe bottle is empty.	► Check the level of product simulation solution in the bottle. Clean and refill bottle if necessary.
	High temperature alarm setpoint is set too low.	► Check the setpoint. Change the setpoint if necessary.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
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.
	ON/OFF AC power switch located inside the front lower panel is faulty.	► Replace the ON/OFF AC power switch.
	ON/OFF AC power switch is OFF.	► Turn the ON/OFF AC power switch to the ON position.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
	Circuit breaker is tripped.	► Reset or replace the circuit breaker.

Problem	Possible Cause	Action
The Door Open alarm is activating sporadically.	Door is not closing completely.	► Clean hinges if debris is present. ► Confirm door is aligned. ► Confirm hinge spring and/or pin are not damaged. Replace hinge (lower only) if necessary.
	Door is closing but not sealing completely.	► Confirm the door gasket seals completely. Replace the door gasket if necessary.
	Connections for the door switch are faulty.	► Test the switch connections. Secure the connections if necessary.
	Door switch is faulty.	► Replace the door switch.
	Monitor/control board is faulty.	► Replace parts with those included in the control board kit, or replace the monitor/control board.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
All alarms are activating sporadically.	Alarm system is faulty.	► Confirm the circuit board and line connections are functioning correctly.
	Monitor/control board is faulty.	► Replace parts with those included in the control board kit, or replace the monitor/control board.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
	Compressor is overheating due to lack of airflow.	► Check the condenser grill. Clean if necessary. ► Confirm freezer location meets requirements.
	Refrigerant level is too low.	► Check refrigeration lines for leaks and repair if necessary. Check the refrigerant level. Recharge refrigerant if necessary.
	Condenser probe is not calibrated.	► Contact a qualified service technician 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.	Monitor settings are not calibrated.	► Confirm the monitor probe is reading correctly. Calibrate the probe if necessary.
	Temperature changed slightly around the time of activation.	► No action necessary.

15.4 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.
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.
	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.
	Drain line is plugged.	► Confirm the drain tube is free of debris. Remove debris if necessary.
	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.
There is excessive moisture on the doors.	Humid air is entering the chamber.	► Confirm the freezer is level, and the door is aligned, closing tightly, and sealing correctly.
	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.
	Drain line is plugged.	► Confirm the drain tube is free of debris. Remove debris if necessary.
	Drain line heater is faulty.	► Confirm the drain line heater is warm to the touch. Contact Helmer Technical Service to resolve issues as necessary.
	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.

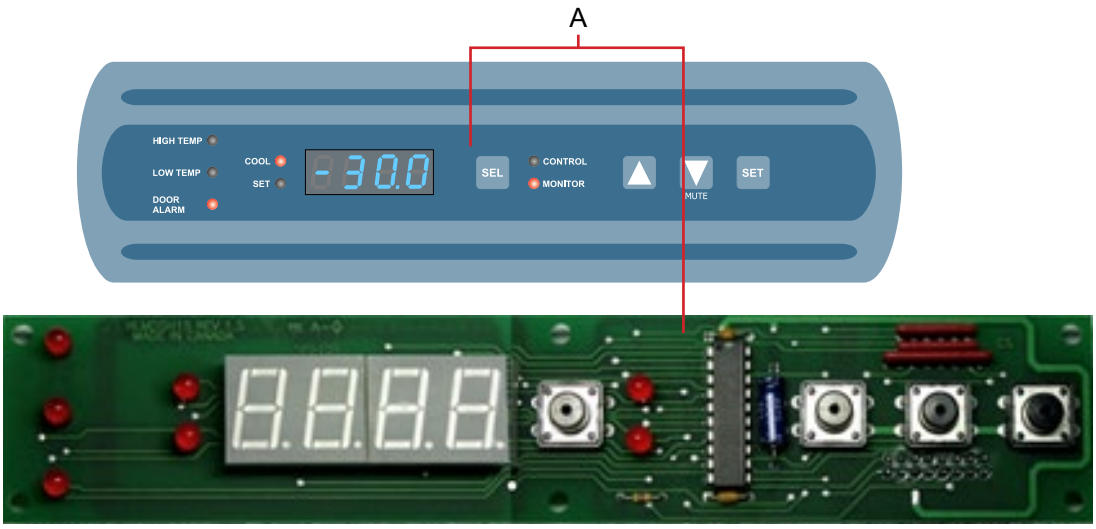
16 Parts

NOTE

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

16.1 Front

16.1.1 Control System Display

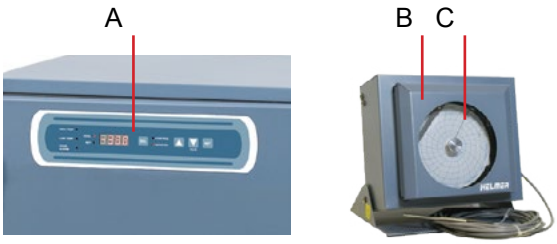


Top: Display with touchpad. Bottom: Display board.

Label	Description	Part Number	Schematic Label
A	Touchpad / display board assembly	400838-1	HI
Not shown	Interface cable	Without Access Control: 800032-1	HL

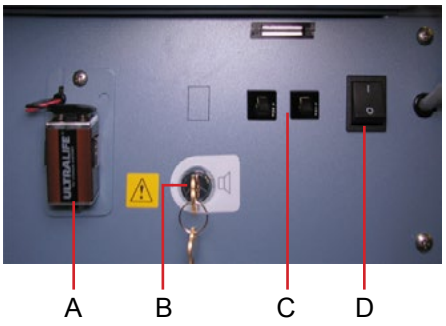
NOTE The display board is sensitive to static electricity and can be damaged by electrostatic discharge. Use proper ESD precautions when handling the board.

16.1.2 Control and Monitoring



Label	Description	Part Number	Schematic Label
A	Horizon Series monitoring and control system	-	-
B	Temperature chart recorder (standard on plasma freezer model, optional on laboratory model)	500613-1	-
C	Chart paper (52 sheets)	220419	-
Not shown	Chart recorder backup battery	120218	-

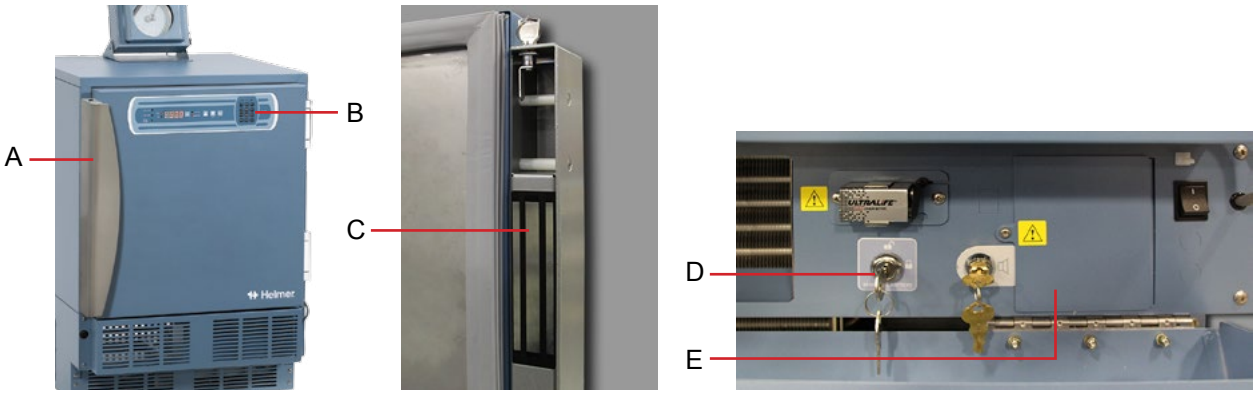
16.1.3 Lower Panel



Lower panel features.

Label	Description	Part Number	Schematic Label
A	Monitoring system backup battery	120399	HH
B	Alarm disable key switch	120227	HD
C	Circuit breakers (230 V models only)	120288	B
D	ON/OFF AC power switch	120478	C

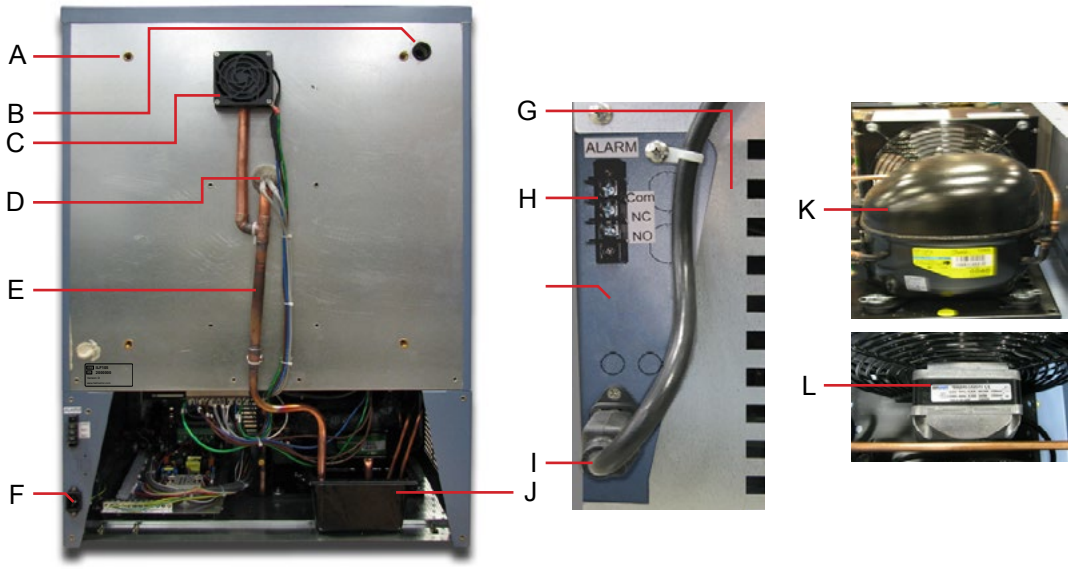
16.1.4 Access Control Option



Access Control features (HPF105 model shown).

Label	Description	Part Number	Schematic Label
A	Door handle (includes manual keyed lock)	322000-1	-
B	Keypad	800007-1	HM
C	Magnetic lock assembly (includes magnet and handle)	800139-1	AXb
D	Backup battery key switch	401220-1	AXa
E	Backup battery (behind battery cover)	120628	AXe

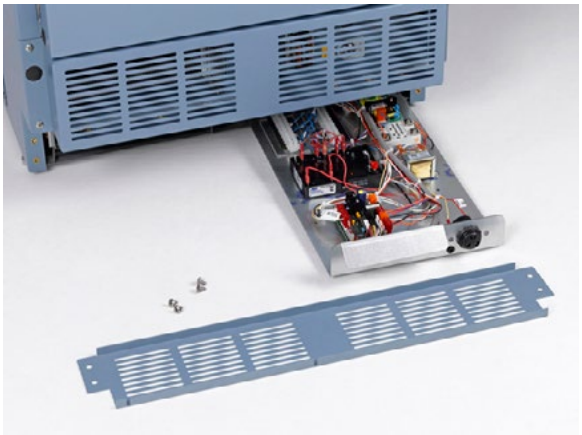
16.2 Rear



Rear features.

Label	Description	Part Number	Schematic Label
A	Nut flanges for brace bars used in stacking undercounter units	-	-
B	Rear access port	-	-
C	Drain line fan	115 V: 400909-1 230 V: 400909-2	Q
D	Drain line heater	115 V: 120590 230 V: 120485	T
E	Drain line assembly	400910-1	-
F	Power connector	-	-
G	Rear cover	321184-1	-
H	Remote alarm contacts	-	-
I	Power cable (with connector)	North American models 120 V: 120630 230 V: 120631 European models 230 V: 120156 Chinese models 203 V: 120547 Saudi Arabian models 230 V: 120641	A
J	Condensate evaporator tray	-	-
K	Compressor	115 V: 800012-1 230 V 50 Hz: 800104-1 230 V 60 Hz: 800105-1	J
L	Condenser fan motor	115 V: 120608 230 V 50 Hz: 120660 230 V 60 Hz: 120661	K
Not shown	Cover for communication ports and remote alarm contacts	-	-

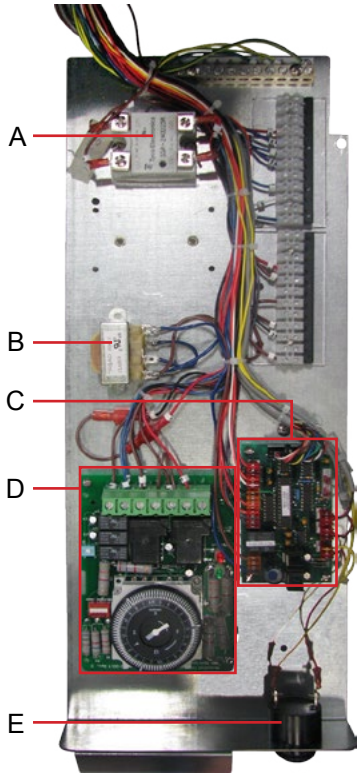
16.3 Electrical Tray



Kick plate (removed), and pull-out components tray (open).

CAUTION Disconnect the freezer from AC power before accessing the electrical tray.

16.3.1 Electrical Tray Components

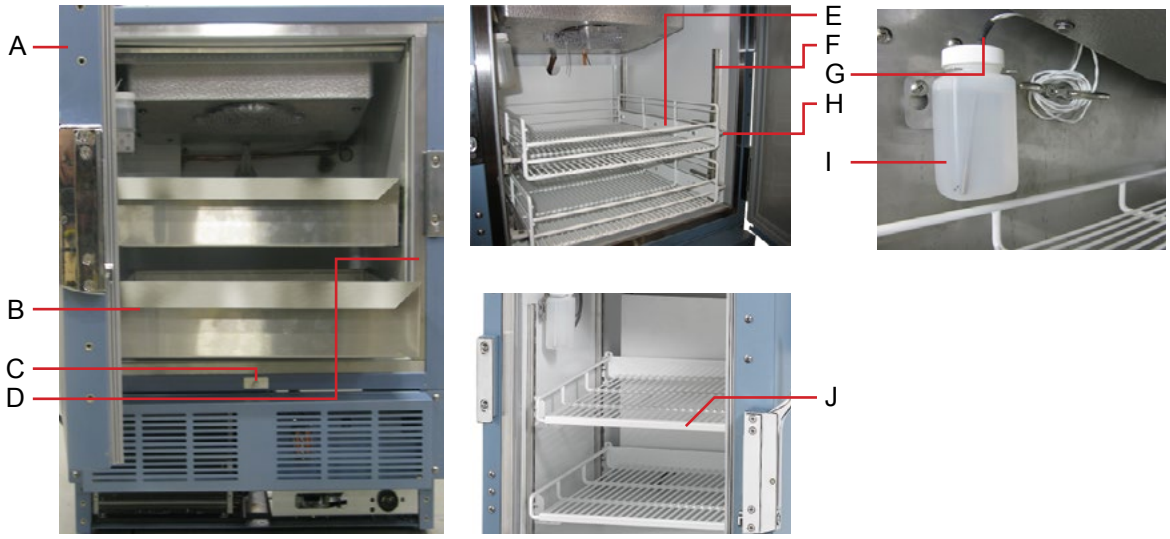


Electrical tray features.

Label	Description	Part Number	Schematic Label
A	Compressor relay	115 V: 120426 230 V 50 Hz: 120669 230 V 60 Hz: 120671	L
B	Temperature control transformer	115 V: 401097-1 230 V: 401098-1	HO
C	Control/monitor board	800006-1	HA
D	Defrost timer	800015-1	HF
E	Alarm buzzer	120160	HE
Not shown	12 V DC power supply for Access Control (optional)	800035-1	HN
Not shown	Power line filter	115 V: 120299 230 V: 120677	D

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

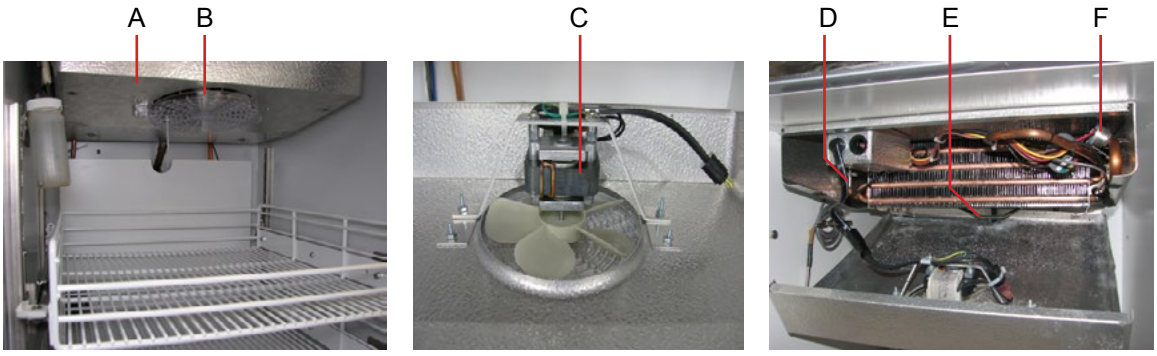
16.4 Interior



Interior features.

Label	Description	Part Number	Schematic Label
A	Door	Stainless steel without Access Control: 800064-2 Powder coated with Access Control: 800062-1 Powder coated without Access Control: 800064-1	-
B	Drawer (plasma freezer model)	400584-3	-
C	Door switch	120380	M
D	Mullion heater (behind strike plates)	115 V: 800081-1 230 V: 800106-1	
E	Roll-out basket (optional)	400890-3	-
F	Standard for shelf, drawer, or roll out basket	321173-1	-
G	Monitor probe	800029-1	HC
H	Drawer slide for drawer or roll out basket	400753-2	-
I	Probe bottle and propylene glycol kit	400922-1	-
J	Shelf (laboratory / pharmacy model)	400814-1	-
Not shown	Optional adapter kit for medication dispensing lock	Call Helmer or your distributor for specific information	-

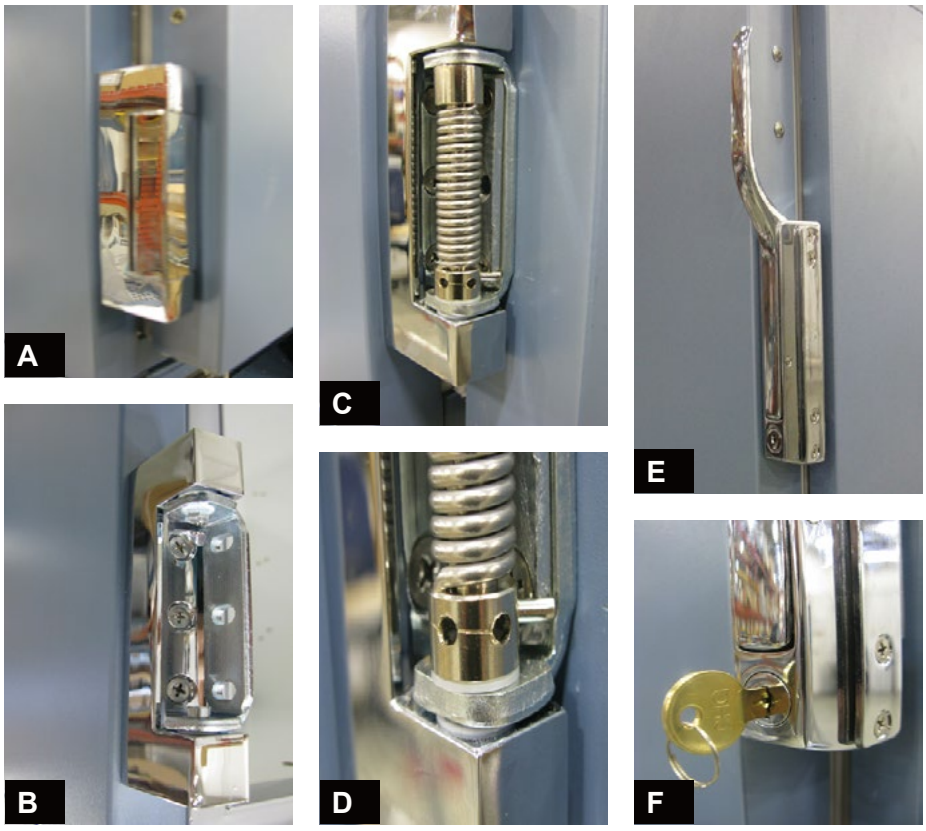
16.4.1 Unit Cooler



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

Label	Description	Part Number	Schematic Label
A	Unit cooler assembly	115 V: 120592 230 V: 120657	F
B	Fan guard	-	-
C	Unit cooler fan motor	115 V: 120540 230 V: 120658	E
D	Control probe	800028-1	HB
E	Defrost heater	115 V: 120633 230 V: 120659	R
F	Defrost heater limit thermostat	800014-1	S
Not shown	Fan delay/defrost termination thermostat	800085-1	HJ

16.5 Door and Hinge



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

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

Label	Description	Part Number
A	Hinge, covered, edge mount	220506
B	Hinge, uncovered, without spring assembly	-
C	Hinge, uncovered, spring and pin assembly	-
D	Close up, hinge spring and pin assembly	-
E	Door handle - Magnetic offset latch with key lock	220426
F	Door key lock with key, close-up	-
Not shown	Door gasket (magnetic)	-
Not shown	Door lock replacement kit	220439

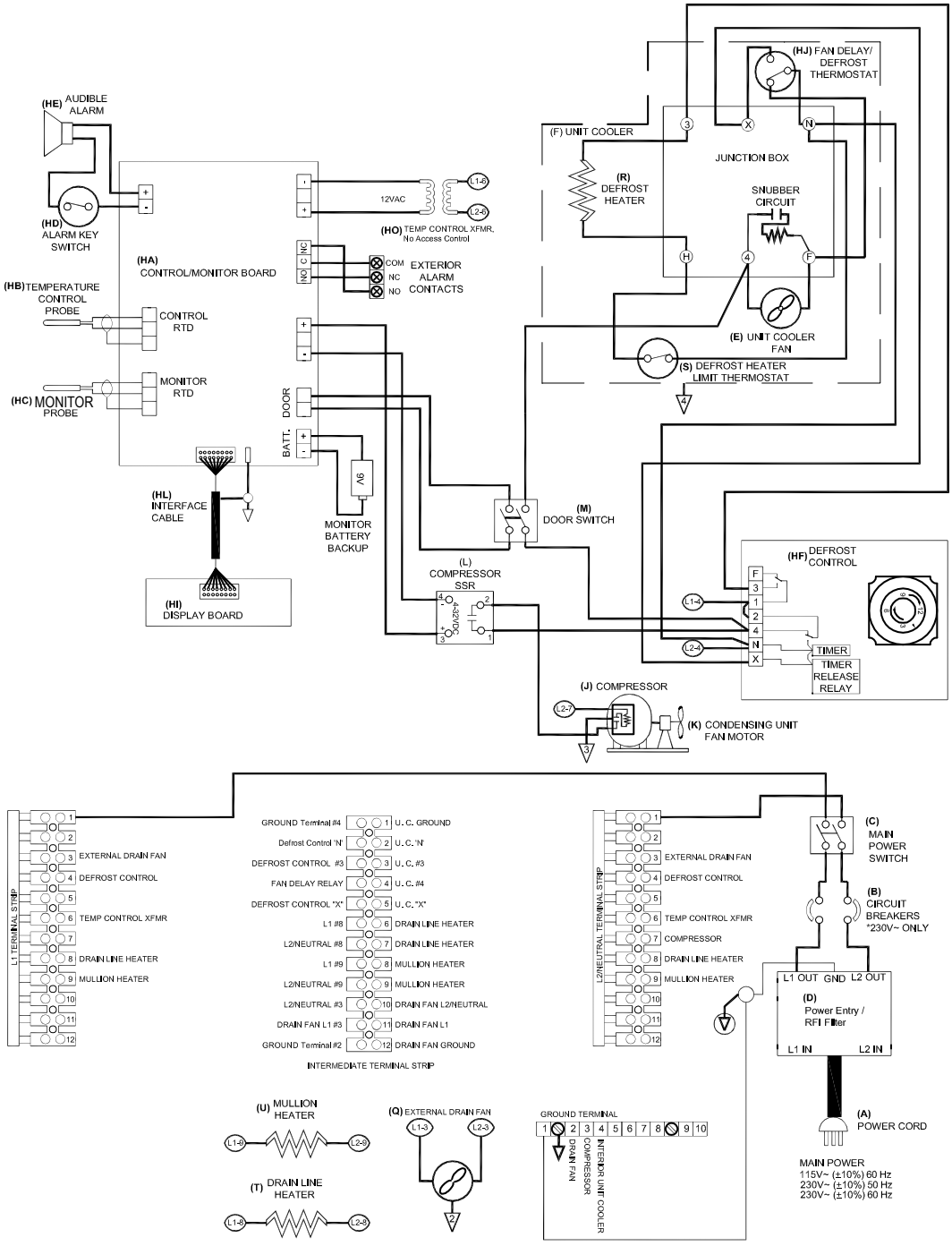
16.6 Side Access Panel

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

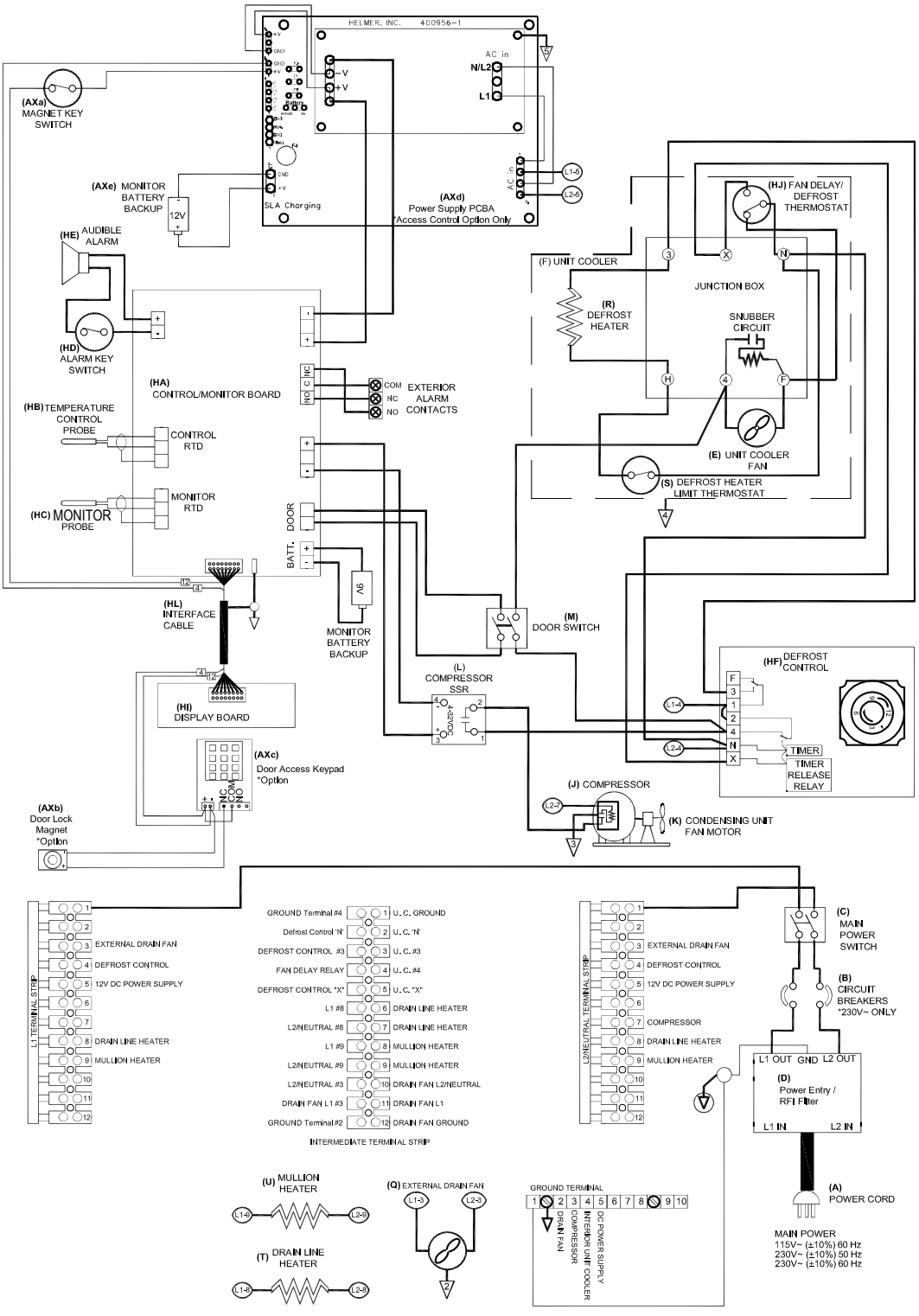
Side access panel.

17 Schematics

17.1 HPF and HLF Models; 105 Configuration (Without Access Control)



17.1 HPF and HLF Models; 105 Configuration (With Access Control)



END OF MANUAL

HELMER SCIENTIFIC
14395 Bergen Boulevard
Noblesville, IN 46060 USA
Phone +1 (317) 773-9073
Fax +1 (317) 773-9082
www.helmerinc.com

Helmer SCIENTIFIC