

Ultra-Low Freezer Operation Manual

i.Series®



i.Series
iUF118
iUF126
i.Series
iUF116
iUF124

Document History

Revision	Date	CO	Supersession	Revision Description
A	10 APR 2014*	9339	n/a	Initial release.
B	12 DEC 2014	10128	B supersedes A	Captured product changes prior to product launch
C	05 JAN 2015	11402	C supersedes B	Added instructions for removal of compressor restraints. Updated initial charge values in Specifications table.
D	17 FEB 2017	12611	D supersedes C	Reformatted for documentation consistency and ease of use. Updated and added content and screenshots to i.Series Operation as required by software platform changes.
E	15 JUL 2021	16126	E supersedes D	Added note to Placement and Leveling section regarding use of GFI/GFCI outlets. Added note regarding proper conditions for moving shelves. Updated the use of Caution and Warning symbols. Updated the Clean Filter alarm description in the Active Alarms section. Removed Preventive Maintenance Schedule as it is covered in the ULT Service Manual (360173-A) Updated Refrigerant System Specification table. Updated Compliance section

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

Document Updates

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

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

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1 About this Manual

This manual provides information on how to use the i.Series® Ultra-Low freezer. It is intended for use by end users of the freezer and authorized service technicians.

Models are indicated by a distinguishing model number that corresponds to the series, type, number of doors and capacity of the freezer. For example, “iUF124” refers to an i.Series Ultra-Low Freezer with 1 door and a capacity of 24 cu ft. This manual covers all ultra-low freezers, which may be identified singly, or by their size.

1.1 Safety Precautions and Symbols

Symbols found in this document

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



Task Indicates procedures which need to be followed.



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

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

Symbols found on the units

The following symbols may be found on the freezer or freezer packaging.



Caution: Safety hazard to operator or service technician



Caution: Electrostatic discharge (ESD) hazard



Caution: Electrocutation/shock hazard



Refer to documentation

Avoiding Injury

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

- ◆ Before moving unit, remove contents from the chamber.
- ◆ Before moving unit, ensure door is closed and latched, and casters are unlocked and free of debris.
- ◆ Before moving unit, disconnect the AC power cord and secure the cord.
- ◆ When moving unit, use assistance from a second person.
- ◆ Never physically restrict any moving component.
- ◆ Avoid removing electrical service panels and access panels unless so instructed.
- ◆ Use appropriate gloves when handling cold internal components and stored inventory.
- ◆ Keep hands away from pinch points when closing the door.
- ◆ Avoid sharp edges when working inside the electrical compartment and refrigeration compartment.
- ◆ Ensure biological materials are stored at recommended temperatures determined by standards, literature, or good laboratory practices.
- ◆ Total freezer weight (including contents) is not to exceed 1400 lbs (635 kg).
- ◆ Use manufacturer supplied power cord only.
- ◆ Using the equipment in a manner not specified by Helmer may impair the protection provided by the equipment.
- ◆ Ensure biological materials are stored safely, in accordance with all applicable organizational, regulatory, and legal requirements.
- ◆ The freezer is not considered to be a storage cabinet for flammable or hazardous materials.
- ◆ **REQUIRED:** Decontaminate parts prior to sending for service or repair. Contact Helmer or your distributor for decontamination instructions and a Return Authorization Number.

1.2 General Recommendations

Intended Use

Helmer ultra-low freezers are intended to provide a controlled temperature environment at ultra-low temperatures required for the storage of biological materials, pharmaceuticals, and reagents used in a research or clinical laboratory.

The devices referenced in this manual are intended to be operated by personnel who have procedures in place for meeting FDA, AABB, or any other applicable regulations for the processing and storage of biological materials, pharmaceuticals, and reagents.

General Use

Allow freezer to come to room temperature before switching power on.

During initial startup, the high temperature alarm may sound while the freezer reaches operating temperature.

NOTE

This unit is not a “rapid-freezing” device. Freezing large quantities of liquid, or high-water content items, will temporarily increase the chamber temperature and will cause the compressors to operate for a prolonged period of time.

Initial Loading

Allow chamber temperature to stabilize at the setpoint before storing pre-frozen product.

Product Loading Guidelines

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

- ◆ Never load freezers beyond capacity.
- ◆ Always store items within shelves.

2 Installation

2.1 Location

- ◆ Has a dedicated 15 A grounded circuit with dedicated single point receptacle meeting the electrical requirements listed on the product specification label.
- ◆ Is clear of direct sunlight, high temperature sources, and heating and air conditioning vents.
- ◆ Minimum 8" (203 mm) above, and minimum 4" (102 mm) behind.
- ◆ Meets limits specified for ambient temperature and relative humidity.

2.2 Remove Compressor Restraints

1. Using ½" socket and ½" open-end wrench, remove the hex bolt securing the compressor restraint under the high-stage compressor. Set hex bolt, washer and hex nut aside for use in installing rubber compressor foot (Qty.: 1 per compressor).
2. Lift compressor mounting plate slightly and slide restraint out.
3. Remove rubber compressor foot and metal spacer from accessories box.
4. Slide the compressor foot under the compressor mounting plate and align hole in the foot with opening in the bottom of the freezer and mounting plate.
5. Insert metal spacer in the center of rubber compressor foot.
6. Insert hex bolt through bottom of freezer and up through compressor foot and mounting plate.
7. Place washer and hex nut over the protruding hex bolt. Hand-thread hex nut.
8. Secure using torque wrench, and tighten to 78.8 in-lbs.
9. Repeat steps 1 – 8 for low-stage compressor.

Note

When removing the compressor restraint from the low-stage compressor, approach from the left side of the compressor to avoid damage to the copper tubing mounted to the floor of the refrigeration compartment.

10. Place rear panel over refrigeration compartment and align holes in panel with threaded holes in freezer.
11. Hand thread screws and tighten using #2 Phillips screwdriver .



Compressor restraint



Rubber foot with spacer



Rubber foot installed



Rear panel

2.3 Placement and Leveling

NOTICE

- To prevent tipping, ensure door is closed and latched, and casters are unlocked and free of debris before moving freezer.
- The freezer is extremely heavy. Helmer recommends two people work together to move the freezer.
- Helmer does not recommend operating this unit on a GFI/GFCI outlet.

1. Ensure all casters are unlocked and door is closed and latched.
2. Roll freezer into place and lock casters.
3. Adjust leveling feet (if installed) to ensure freezer is level.

2.4 Rear Stand-Offs

NOTICE

The rear stand-offs include a hole to accept a threaded fastener for anchoring the freezer to a wall. The rear stand-offs do not provide a secure means to anchor the freezer to the wall that can be considered resistant to seismic events.

Notes

- Installation of the rear stand-offs is optional.
- Anchoring the freezer to the wall is optional.
- Hardware to anchor the freezer to the wall is not provided with the freezer. The end user is responsible for determining the best method to anchor the freezer to the wall.

Install Rear Stand-Offs



Rear Stand-off

1. Align the holes in the stand-offs with the corresponding threaded holes on the back of the freezer.
2. Insert the 3/8" hex head cap screws through the holes in the stand-offs.
3. Hand-thread the cap screws into the threaded holes.
4. Using a 9/16" open-ended wrench, tighten the cap screws.

2.5 AC Power Cord Retainer

NOTICE

- Do not position the freezer where it will prevent access to the power cord disconnect at the wall receptacle.
- Use only manufacturer supplied power cord.

Install Power Cord Retainer

1. Insert the power cord into the receptacle on rear of the cabinet.
2. Slide the retainer upward, engaging the groove in the power plug with the slot in the retainer.
3. Align the holes in the retainer with the corresponding holes on the cabinet.
4. Insert the screws with lock washers through the retainer and into the holes in the cabinet.
5. Using a #2 Phillips screwdriver, tighten the screws.



Power Cord Retainer

2.6 Storage Shelves

Note

- Shelf clips must be installed so the horizontal section is oriented upward.
- Helmer recommends moving storage racks before the unit reaches the setpoint temperature.

Install Shelves with Shelf Clips

1. Open the chamber door and all inner doors.
2. Install shelf clips on the shelf standards at the marked locations.
3. Beginning with the bottom shelf, insert the shelf into the chamber at an angle.
4. Rotate the shelf so it sits flat on the shelf clips.
5. Working from the bottom to the top, install the remaining shelves as described in steps 3 and 4.
6. Close the inner doors and the chamber door.



Shelf Clip



Installed shelves

2.7 Chart Recorder (optional)



Chart Recorder with paper installed

Install / Replace Chart Paper

Note

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



Chart recorder stylus and time line groove

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

3 i.Series Operation

3.1 Initial Start Up

1. Plug the power cord into a 15 A grounded circuit with a dedicated single point receptacle.
2. Switch battery ON/OFF switch **ON**.
3. Switch AC ON/OFF switch **ON**.

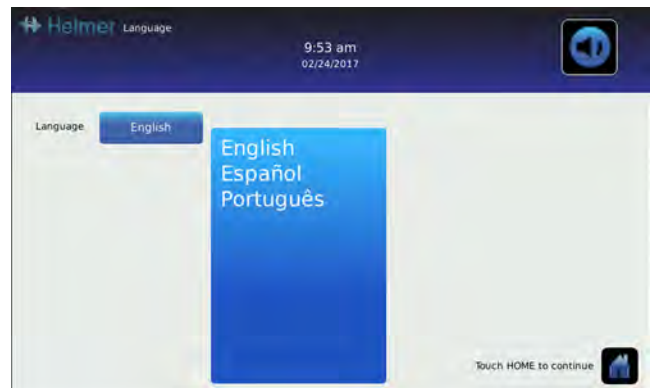
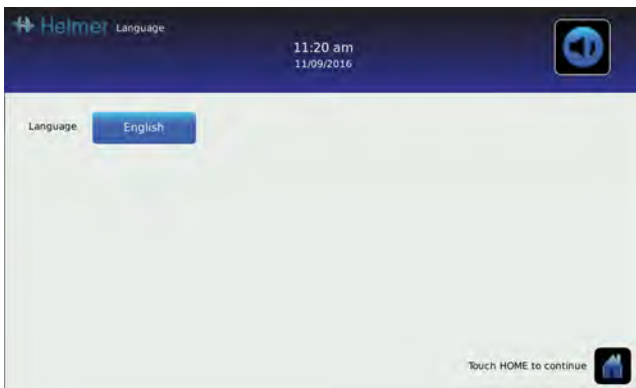
Note

The Start screen is displayed when the i.C³ is powered on. The i.C³ monitoring and control system will take approximately three minutes to boot up.



Start screen

The language screen is displayed after the i.C³ is powered on. Use the Language screen to select the i.C³ display language.



Language screens

Note

English is the default language.

If an alarm sounds, temporarily mute the alarm by touching the Mute icon.



Home screen - alarm muted



Muted icon

Note

Active alarms are displayed on the Home screen. If an alarm condition other than High Temperature occurs, refer to the service manual for troubleshooting.

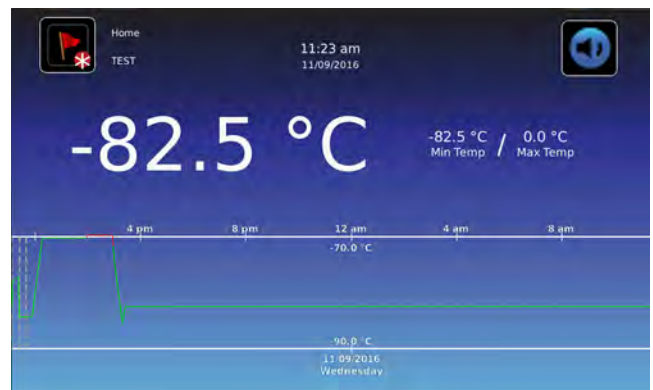
3.2 Operation

Notes

- Refer to the i.C³ User Guide for Ultra-Low Freezers for complete information regarding the i.C³ User Interface.
- The i.C³ Home screen displays temperature and alarm information, and provides icons to gain access to other functions of the i.C³.
- After two minutes of inactivity, the screensaver will be displayed. To return to the Home screen, touch the screensaver.



Home screen



Home screensaver

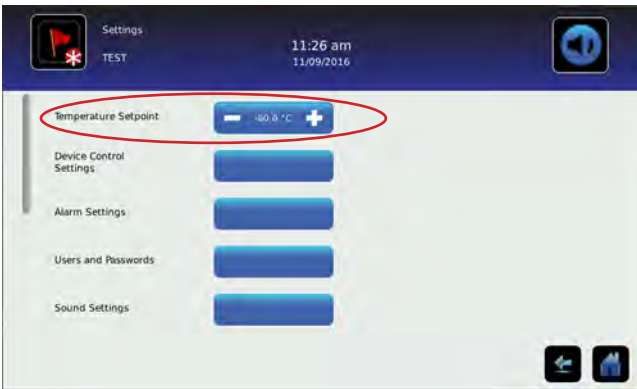
3.3 Change Temperature Setpoint

Note

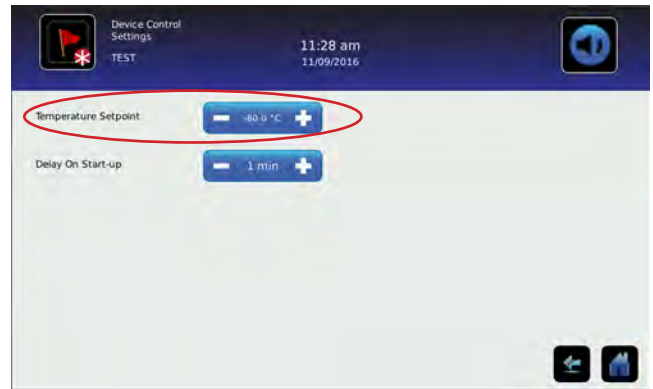
The Temperature Setpoint toggle button can be accessed from either the initial Settings screen or the Device Control Settings screen.



> Enter the Settings password. Select Temperature Setpoints. Touch minus (-) or plus (+) on spin box to change value.



Settings screen



Device Control Settings screen

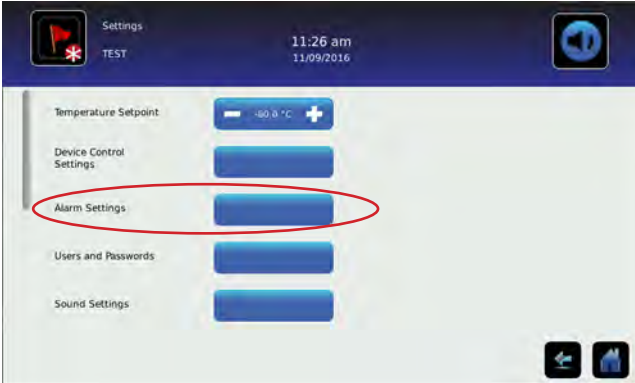
Notes

- Default Settings password is 1234.
- Default setpoint is -80.0 °C.

3.4 Set Alarm Parameters



> Enter the Settings password. Scroll down to select Alarm Settings. Touch minus (-) or plus (+) on spin box to set each alarm parameter.



Settings screen



Alarm Settings screens

Alarm settings control the circumstances and timing of alarm condition indicators displayed on the i.C³ Home screen.

3.5 Active Alarms



Home screen with active alarm

Table 1. i.Series Active Alarms

Alarm	Description
Primary Monitor Probe High Temp	Primary monitor probe reading is above high temperature alarm setpoint
Primary Monitor Probe Low Temp	Primary monitor probe temperature reading is below low temperature alarm setpoint
Probe Failure	Probe not functioning properly
Ambient Probe High Temp	Ambient temperature reading is above high temperature alarm setpoint
Ambient Probe Low Temp	Ambient temperature reading is below low temperature alarm setpoint
Clean Filter	Air filter is dirty, clean or replace filter
CO ₂ / LN ₂ Active	CO ₂ / LN ₂ back-up refrigeration system is active
Refrigeration System	Refrigerant pressure is too high High stage compressor temperature is too high Low stage compressor temperature is too high High stage compressor has failed Low stage compressor has failed
Power Failure	Power to unit has been disrupted
Door Open	Door is open beyond user-specified duration
Low Battery	Rechargeable battery voltage is low
No Battery	Battery is not connected
Communication Failure Messages 1, 2, 3	1 Communication lost between i.C ³ display board and control board 2 Communication lost between i.C ³ display board and internal system memory 3 Corrupt database
Emergency Mode	Control probe temperature sensor failed or is failing intermittently and refrigeration system is operating at 100% duty cycle (<i>alarm is only displayed on Home Screen</i>)

3.6 Mute and Disable Active Alarms

Audible alarms may be muted by touching the Mute icon to set delay. Touching the Mute icon repeatedly will increase the Mute timer incrementally.



4 Min/Max Temperature Monitoring

The Min/Max temperature display provides the highest and lowest Primary Monitor probe temperature reading since the last system reset (power-on event) or manually-initiated reset. Touch the Reset icon to the right of the display to manually reset.



Notes

- The Min/Max temperature display can be turned on or off through Display Settings.
- Once the time reaches the maximum display of 999 hours and 60 minutes, the message will display ">999:60", but minimum and maximum temperatures will continue to be tracked.

5 Access Control

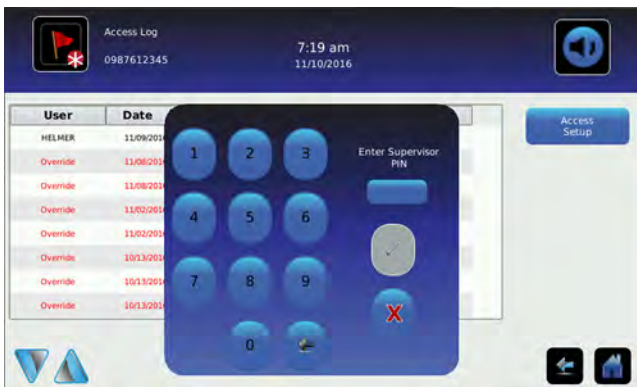
Allows user-specific secure access to the freezer.

Notes

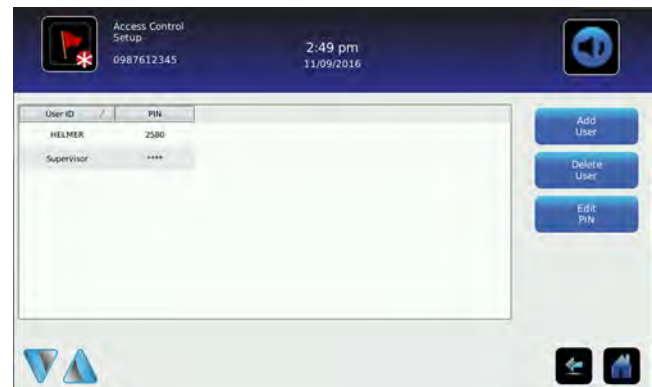
- The Supervisor PIN must be used to set up user profiles.
- The Supervisor PIN does not allow access to the unit. At least one user ID must be set up to gain access to the unit.
- The Supervisor PIN should be changed to prevent unauthorized user ID setup. The Supervisor PIN can not be deleted.
- In the event the Supervisor PIN is unavailable, contact Helmer Technical Service to reset the Supervisor PIN.
- When setting up Access Control user IDs, ensure the key lock is in the locked position to prevent unauthorized access to the freezer.
- The keys provided with the freezer may be used to lock or unlock the exterior door.
- Refer to the i.C³ User Guide for i.Series Ultra-Low Freezers for complete information regarding Access Control.

5.1 Setup

Configure and manage multiple user-specific accounts to allow controlled access to the freezer.



Access Control Setup screen with password keypad overlay




Access Control Setup screen



Note

The **Access Setup** button can be found on the *Users and Passwords* screen or the *Access Log* screen.

Entry into Access Control Setup

1. Touch the **Access Setup** button. A numeric keypad is displayed.
2. Enter the supervisor PIN (*if entering for the first time, use the factory supervisor PIN = 5625*).
3. Touch  to confirm. The keypad closes and the Access Control Setup screen is displayed.

Add a user profile

1. Touch the **Add User** button. An alphanumeric keyboard is displayed.
2. Enter the User ID for the new user profile.
3. Touch the  to store the user ID. The numeric keyboard is displayed.
4. Enter a 4-digit PIN for the new user profile.
5. Touch the  to store the user PIN. The User ID and PIN for the new user profile are displayed in the table.

5.2 Open Freezer with Access Control



Access Control Keypad

Using Access Control to unlock the door

1. Enter unique 4-digit PIN.
2. If a valid PIN is entered, the Padlock indicator appears open and the door is unlocked.

6 Product Specifications

6.1 Operating Standards

- ◆ Indoor use only
- ◆ Altitude (maximum): 2000 m
- ◆ Ambient temperature range: 15 °C to 32 °C
- ◆ Relative humidity (maximum for ambient temperature): 80% for temperatures up to 25 °C, decreasing linearly to 53% at 32 °C
- ◆ Temperature control range: -50 °C to -86 °C
- ◆ Overvoltage Category II
- ◆ Pollution Degree 2
- ◆ RF Emissions: Group 1 - Class A
- ◆ EMC Environment: Basic
- ◆ Sound level is less than 70 dB(A).

Note

Power conditioning (voltage boost) is an optional feature. If facility voltage is consistently at or below 195 V, voltage boost must be installed in order to protect the compressors.

Table 2. Electrical Specifications

Model	116	118	124	126
Input Voltage and Frequency	208/230 V, 60 Hz			
Voltage Tolerance	±10%			
Circuit Breakers	12.0 A (quantity 2)			
Current Draw	11.0 A			
Energy Consumption	18.5 kWh/day	18.5 kWh/day	19 kWh/day	19 kWh/day
Power Source	15 A dedicated circuit			
Boost Cut-in Voltage	195 V			
Monitoring System Battery / Chart Recorder Battery	12 V, 7 Ah rechargeable sealed lead acid battery			
Remote Alarm Capacity	0.5 A at 30 V (RMS); 1.0 A at 60 V (DC)			

NOTICE

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

Note

Overall exterior dimensions include casters, handle, i.C³ bezel, and door hinges

Table 3. Ultra-Low Freezer Specifications

Model	Voltage Code	Amps	Capacity Cu. Ft (Liters)	Dimensions Interior W x H x D in. (mm)	Dimensions W x H x D in. (mm)		Net Wt. lbs (kg)
					Exterior	Overall Exterior	
iUF116	208/230 V 60 Hz	11.0	16 (453)	23.1 x 49.5 x 23.3 (587 x 1257 x 592)	33.8 x 78.2 x 34.8 (859 x 1986 x 884)	37.1 x 78.2 x 37.5 (942 x 1986 x 953)	607 (275)
iUF118	208/230 V 60 Hz	11.0	18 (510)	23.1 x 54.1 x 23.3 (587 x 1374 x 592)	28.9 x 78.2 x 34.8 (734 x 1986 x 884)	32.5 x 78.2 x 37.5 (826 x 1986 x 953)	622 (282)
iUF124	208/230 V 60 Hz	11.0	24 (680)	34.4 x 49.5 x 23.3 (874 x 1257 x 592)	45.1 x 78.2 x 34.8 (1146 x 1986 x 884)	48.4 x 78.2 x 37.5 (1229 x 1986 x 953)	704 (319)
iUF126	208/230 V 60 Hz	11.0	26 (736)	34.4 x 54.1 x 23.3 (874 x 1374 x 592)	40.2 x 78.2 x 34.8 (1021 x 1986 x 884)	43.8 x 78.2 x 37.5 (1113 x 1986 x 953)	725 (328)

Note

Vacuum-insulated panels are included in cabinet walls on indicated models. All models feature vacuum-insulated panels in the exterior door.

Table 4. Interior/Exterior Cabinet Specifications

Model	116	118	124	126
Insulation	Ecomate® insulating foam (non-ODP, non-GWP, and VOC-exempt blowing agent foam)			
Vacuum-Insulated Panels	-	✓	-	✓
Wall Thickness	5.0" (127 mm)	2.7" (69 mm)	5.0" (127 mm)	2.7" (69 mm)
Door Thickness	2.7" (69 mm)			
Internal Compartments	4	5	4	5
Shelves	3 Stainless steel	4 Stainless steel	3 Stainless steel	4 Stainless steel
Maximum Shelf Load	160 lbs (73 kg)			
Internal Material	Galvannealed steel with bacteria-resistant powder-coated finish			
External Material	Galvannealed steel with bacteria-resistant powder-coated finish			
External Port	2, standard (top-left corner, rear of cabinet; bottom-left corner, rear of cabinet)			
Vacuum Break Port	Standard (heated)			
Temperature Chart Recorder	Optional, 4" (102 mm), 7-day inkless, pressure-sensitive chart paper, backup battery; ±0.5 °C (0.9 °F) accuracy			
i.C³ Monitor	±0.5 °C (0.9 °F) at setpoint accuracy			

Table 5. Refrigeration System Specifications

Model	116	118	124	126
High Stage Refrigerant	R-404A, CFC/HCFC-free			
Low Stage Refrigerant	R-508B, CFC/HCFC-free and R601 natural refrigerant			
High Stage Compressor	1.5 HP, air-cooled			
Low Stage Compressor	1.5 HP, air-cooled			
High Stage Initial Charge	29 oz. (822 g +/- 14.2 g)			
Low Stage Initial Charge (R508B)	13.5 oz. (383 g +/- 2.8 g)		15.3 oz. (434 g +/- 2.8 g)	
Low Stage Initial Charge (R601)	0.77 oz. (22 g +/- 1 g)		0.89 oz. (25 g +/- 1 g)	

7 Compliance

7.1 Regulatory Compliance

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

7.2 Electromagnetic Compliance























This device complies with FCC Radiated and Conducted Emissions Approval to CFR47, Part 15; Class A levels



Helmer Scientific Ultra Low Freezers meet the applicable requirements of IEC61326 and EN55011 and are intended for use in the electromagnetic environment specified in the Operating Standards section of this manual. The customer or the user of these devices should assure they are used in such environment.

Appendix A

Application Icons

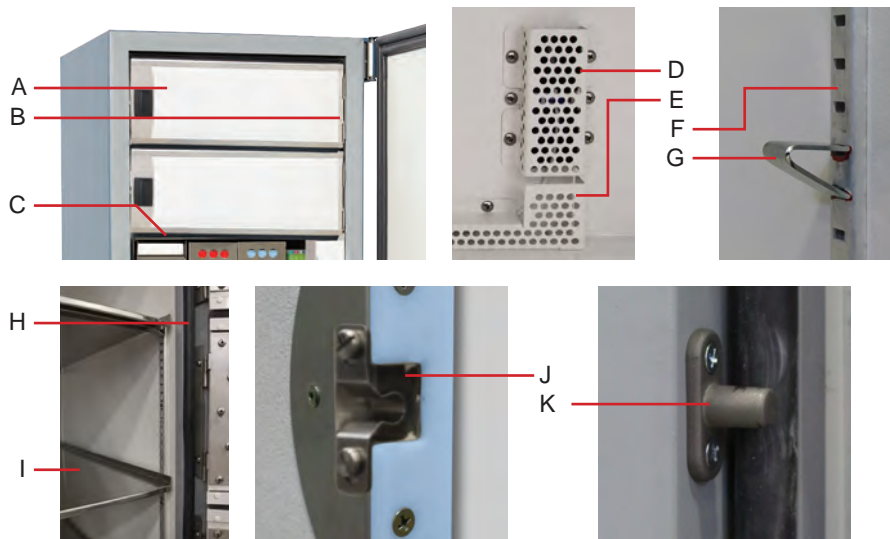
Icon	Description	Icon	Description	Icon	Description	Icon	Description
	Home		i.C³ Applications		Icon Transfer		Save
	Event Log		Settings		Download		Cancel
	Mute		Temperature Graph		Upload		Back Arrow
	Reset		Information Log		Access Control		Scroll Arrows
	Zoom Information		Contact Helmer		Access Log		Temperature Graph Forward/Back Arrows
	Zoom Out		Display Brightness		Alarm Conditions		Battery Power

Appendix B Exterior Components



Label	Description	Label	Description
A	i.C ³ user interface	J	Monitoring system backup battery ON/OFF switch
B	USB port	K	Condenser discharge grill
C	Door handle with key lock, electronic lock, and padlock hasp	L	RJ-45 Ethernet port
D	Condenser grill and filter media	M	USB port
E	Side panel (refer to side panel detail)	N	RS-232 serial port
F	Temperature Chart recorder (optional)	O	Remote alarm interface
G	Caster	P	LN ₂ / CO ₂ backup system interface
H	AC ON/OFF power switch	Q	Power connector
I	Circuit breakers	Not shown	Leveling feet

Interior Components



NOTICE

- Do not allow the storage rack to set on the top edge of a partially-open interior door when removing or replacing racks.
- To avoid damage to the interior door hinges, do not apply upward or downward force to the interior doors.

Label	Description	Label	Description
A	Inner door	F	Shelf standard
B	Inner door hinge	G	Shelf clip
C	Inner door gasket	H	Inner door mullion gasket
D	Chamber temperature sensor cover	I	Shelf
E	Chamber temperature sensor wire cover	J	Inner door retaining clip
Not shown	Chamber / chart recorder temperature sensor (behind cover)	K	Inner door catch

END OF MANUAL

