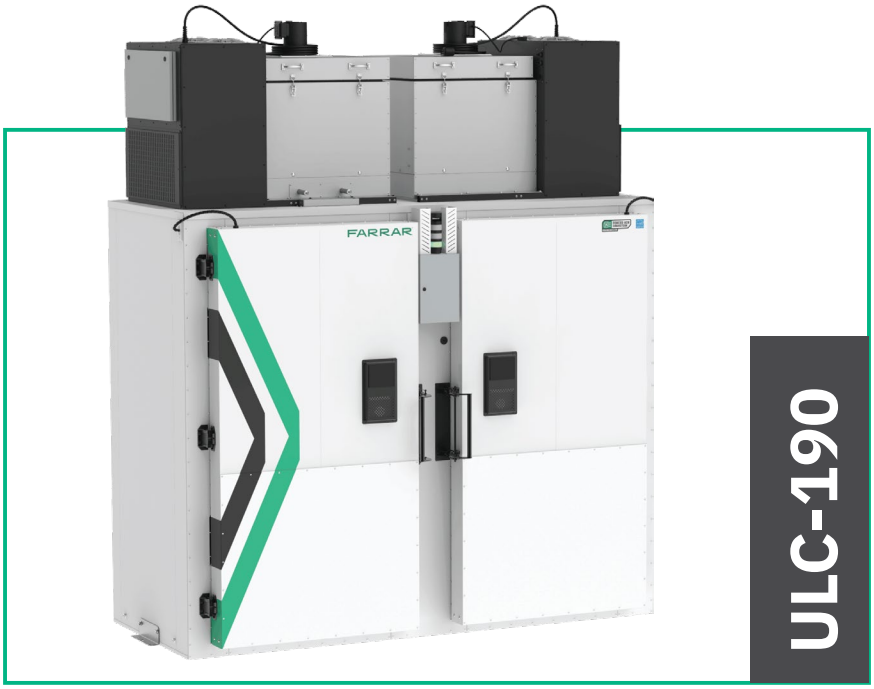
FARRAR | TRANE TECHNOLOGIES

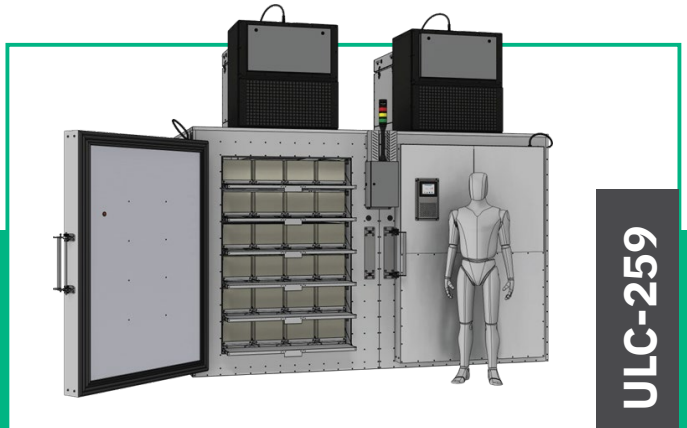
ULC SERIES

ULTRA LOW STORAGE CHAMBER

INSTALLATION, OPERATION, AND MAINTENANCE



ULC-190



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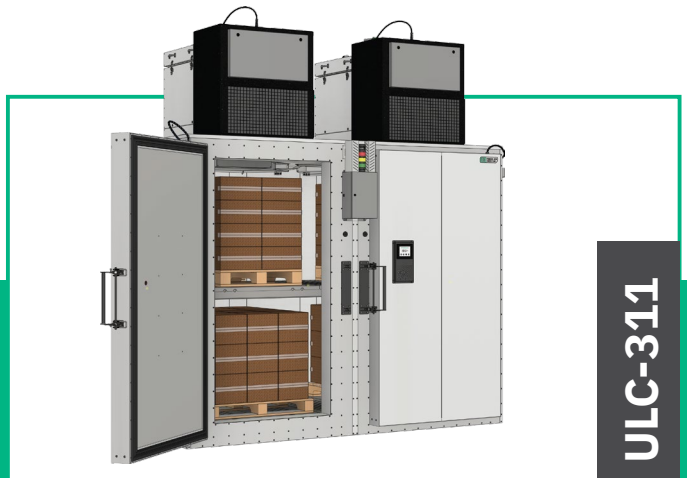


ULC-311

READ THIS INSTRUCTION MANUAL

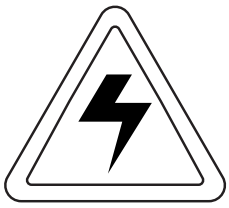
SAFETY PRECAUTIONS

User Advisory

Failure to read, understand, and follow the instructions in this manual may result in damage to the unit, injury to operating personnel, and poor equipment performance.

CAUTION! All internal adjustments and maintenance must be performed by qualified service personnel

Lock



Electrocution

When plugged in, there is high voltage present on terminals inside the machine space. Proper care must be taken if the electrical control panels are opened to perform any kind of maintenance.

The material in this manual is for information purposes only. Its contents and the product it describes are subject to change without notice. FARRAR makes no representations or warranties with respect to this manual. In no event shall FARRAR be held liable for any damages, direct or incidental, arising out of or related to the use of this manual.

Important operating and/or maintenance instructions. Read the accompanying text carefully. Maintained or serviced equipment must be turned off and locked out to prevent injury.

Do Not Touch

Always dissipate high or low temperatures, especially inside the control space before performing any maintenance on the unit.

Before performing maintenance, always do the following:

- Use the proper protective equipment (clothing, gloves, goggles, etc.).
- Dissipate extreme cold or heat and wear protective clothing.
- Follow good hygiene practices.

Each individual is responsible for their own safety.

ULC SERIES INSTRUCTION MANUAL

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INTRODUCTION

The FARRAR™ ULC (Ultra-Low Chamber) Series addresses a major shift in the biopharma industry. Manufacturers of these products want to make and distribute biological and tissue donor samples and materials as fast as possible for process intensification and high yields. FARRAR wants to limit handling steps and on-site storage, as well as streamline freezing and cold storage to avoid bottlenecks (reducing the time to reach temperature set point after opening doors). Additionally, FARRAR wants its freezers to have the flexibility to meet changing set points and be easy to maintain.

The FARRAR ULC Series meets these requirements. These units are forced-air, low-temperature, long-term storage freezers with built-in redundancy. Interior chamber temperatures are maintained between +2°C to +8°C and -20°C to -80°C. The ULC Series chamber consists of two redundant cascade refrigeration systems. There are two condensers, two evaporators, and a total of four compressors.

There are six models based on cu. ft. of storage:

- North American Markets
    - ULC-190
    - ULC-259
    - ULC-311
- International Markets
    - ULC-190i
    - ULC-259i
    - ULC-311i

The ULC Series has a wide range of storage and customizable material handling capabilities. The energy-efficient design offers improved sustainability and helps lower operating costs. The ULC-190 recently earned its ENERGY STAR® certification. It also offers best-in-class density, which reduces the amount of storage/warehouse space required. Good Manufacturing Practices (GMP) requirements are maintained across all models without sacrificing performance.

Features

FARRAR ULC Series freezers consist of:

- Dual refrigeration systems
- Blower
- Control system

The user can adjust various settings to suit their specific requirements. These are described in the Operation section of this manual.

Refrigeration System

Each refrigeration system consists of:

- Compressors (move heat)
- Evaporator (absorbs heat)
- Condenser (rejects heat)
- Interstage heat exchanger (transfers heat between stage 1 and stage 2)
- Circulating blower (produces air flow)
- Pulse width modulation (PWM) valve (controls refrigerant flow)

These components are packaged as one unit. Both systems are located on top of the chamber. Each refrigeration system has its own electrical power supply and power cord. There are also two LCD controllers (one mounted on each of the exterior doors). There are two refrigeration systems. When one runs the defrost cycle, the other maintains the freezer temperature. Both refrigeration systems work in tandem after the doors are opened to help maintain set points. Therefore, additional cooling capacity is available when needed, and energy consumption is reduced when at the steady state.

Blower

The blower produces a forced air flow of 500 cfm, with an air change every two seconds. This forced convection moves energy from the container surface to the air. The resulting air circulation moves the energy to the evaporator coil, which then moves to the evaporator and achieves equilibrium. Conventional freezers rely on natural convection, which is efficient but easily disrupted when the door is opened. In comparison, forced convection enables temperatures to reach equilibrium faster, even after the door is opened and shut.

Control System

The controller display provides access to the human-machine interface (HMI) and enables approved users to adjust the temperature control set point between -20°C to -80°C or +2°C to +8°C. All functions and set points can be accessed on either of the HMIs located on each of the exterior doors. The displays are synchronized; therefore, any adjustments or set points programmed on one display will be synchronized automatically on the other. Some parameters, such as the defrost cycle time, are independently set for each refrigeration system including:

- Defrost Cycle Time
- Defrost Maximum Time
- Defrost End Temp
- Single Sided/Double Sided selection
- Ignore Door Switch
- Calibration Interval/Maintenance Interval
- Off/Auto control selection
- Alarm Log
- Clock Set

Components

Control components include:

- Circulation Blower
- Main Controller
- RTD (resistance temperature detector) Temperature Sensors
- Solid State Relay
- Miscellaneous/Other Hardware

User Access

The ULC Series is delivered with factory default settings. FARRAR™ recommends proper access control to each user with an assigned username provided by the facility administrator or operator. If a user does not have sufficient privilege or access control, then no set points or values can be changed within each of the Liquid Crystal Display (LCD) display controllers; instead, a warning acknowledgment will display.

Each LCD display will offer a view-only mode to a non-authorized user. A username and password will be assigned and programmed by the facility administrator. The username and password should be maintained and controlled according to company protocols.

Automatic Functions

The ULC Series controllers are designed to properly maintain the temperature set point and initiate an automatic defrost of the evaporator coil for each refrigeration system. During the defrost period, the system blower will be turned off in a manner specific to the refrigeration system (system A or system B), and defrost mode will activate. The secondary refrigeration system will operate, and its blower will be energized to maintain the proper temperature set point within the chamber. Defrost cycles are factory programmed to be enabled every 24 hours. However, the defrost cycles can be modified by the end user to occur every 2 to 168 hours, depending on the following: ambient moisture, frequency of door openings, and/or warm product being placed inside the ULC Series. FARRAR's technical support team can assist users with any questions related to controller adjustments and settings.

The ULC Series internal blower will automatically turn off when either of the two exterior doors are opened. When one of the two exterior doors is opened, the LCD screen displays a warning icon, along with a yellow light indicator on the light bar located in the top middle of both doors. Should the door remain open for too long (user adjustable setting from 5 to 300 sec.), the display changes from a “Warning” to the “Alarm” condition, and the color of the light bar will change from yellow to red. There is also an audible alarm to notify the user of an alarm condition. Additional warning and alarm status items can be found in the Alarms section of this manual.

The blower circulates air flow throughout the chamber. Should the temperature deviate more than +3°C from the set point (this value is adjustable to 0 to 40°C), the controller is designed to start both refrigeration systems automatically in order to reach and maintain the control set point temperature.

Alarms

The ULC Series is supplied with remote alarm signaling dry contacts (non-powered). Connections are made to a terminal strip located on the right side of the unit near the top. Each pair of contacts is electrically isolated from the other contacts.

Figure 1: Remote Alarm

There are two sets of dry contacts, as shown in Figure 2. One set activates when either door is open, and the other activates for any alarm condition. Both sets of contacts are normally open when the chamber is powered off. More details are provided in the *Terminal Positions and Descriptions* table.

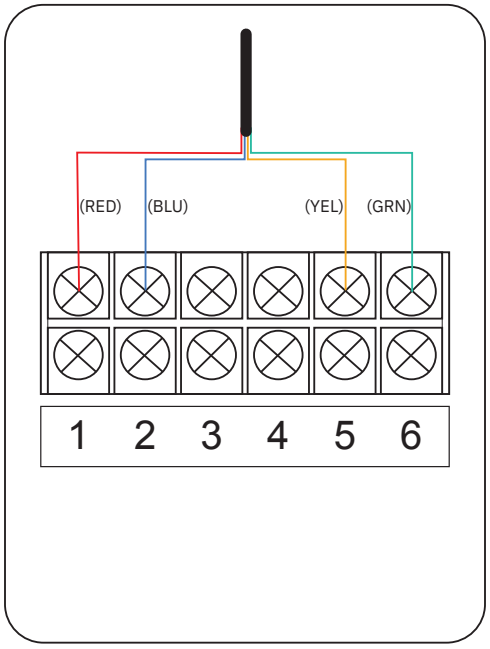


Figure 2: Dry Contacts

Terminal Positions and Descriptions

Terminals	Position	Description
1-2	Open	Doors are open
1-2	Closed	Doors are closed
5-6	Open	General alarm
5-6	Closed	No alarm conditions

Light Tower

Figure 3: Light Tower (located between the doors)

The *Alarm and Indicator Light Descriptions* table describes the conditions that trigger the alarms and indicator lights.

Alarm and Indicator Light Descriptions

Alarm/Indicator	System A	System B	Light Tower	Displays	Settable Range
Power Fail	V/C	V/C	-	-	-
Temperature High Alarm	A/V/C	A/V/C	Red	Alarm Icon	-80°C to 30°C
Temperature Low Alarm	A/V/C	A/V/C	Red	Alarm Icon	+10°C to -99°C
Door Open	V/C	V/C	Yellow	Warning Icon	Instantaneous
Door Open Too Long	A/V/C	A/V/C	Red	Alarm Icon	5-300 seconds
Refrigeration System Failure*	A/V/C	A/V/C	Red	Alarm Icon	-
Defrost in Progress	V	V	Yellow	Warning Icon	-
Refrigeration Assist System A & B	-	-	Green	-	0°C to 40°C
System Operating Normally	V	V	Green	No Alarm or Warning	-
Preventative Maintenance Reminder	V	V	Green	Service Icon	1 to 240 months
Calibration Reminder	V	V	Green	Service Icon	1 to 240 months
A = Audible Alarm V = Visual Alarm C = Dry Contacts Switch					

Note: When a refrigeration system is defrosting, the warning light on the light tower and display will illuminate. The defrosting system cannot assist in the chamber temperature recovery during that period (approximately 15 minutes).

*When the **Refrigeration System Failed** alarm occurs, the affected system switches from **AUTO** to **OFF**. Refer to the *Troubleshooting section* of this manual for further information on system failures.

External Access Ports

Two front access ports on the cabinet allow for usage of a building management system (BMS) or supervisory control and data acquisition (SCADA) temperature monitoring probe. Each port is 0.875-in. (2.22 cm) in diameter and is located between the exterior doors of the ULC Series. The access ports are plugged with rubber stoppers on the exterior and interior and are insulated to reduce moisture infiltration. After installing a sensor in an external port, replace the insulation and seal the port both inside and outside of the cabinet to reduce moisture infiltration.

Note: Customer BMS probe/sensor should be routed from the top of the ULC chamber, next to each refrigeration system probe. The front ports are to be used when performing temperature mapping only.

Failure to properly seal the access port on both the interior and exterior will result in moisture infiltration, degrading the performance of the unit. Moisture leads to ice buildup on metal surfaces, including the evaporator coil. If the moisture is uncontrolled, the ice buildup on the coil will begin to limit refrigeration capacity (i.e., a reduced surface area for heat transfer).

Figure 4: Exterior Sensor Access Port

Sensor Validation

The ULC Series has an independent control/display sensor (100 OHM 3 wire Platinum RTD, +/- 0.15°C). Calibration is conducted by accessing the HMI through the LCD displays. Refer to the *Calibration and Maintenance* section of this manual for further information on unit calibration.

Specifications

The following tables outline the specifications for the ULC Series.

Storage Capacity and Dimensions

ULC Series Model	259	190	311
Exterior Dimensions (Does not include refrigeration sections)			
Width	133.125 (in.) 3,381 (mm)	122 (in.) 3,098 (mm)	128 (in.) 3,251 (mm)
Depth	76.25 (in.) 1,935 (mm)	60.25 (in.) 1,528 (mm)	76.25 (in.) 1,926 (mm)
Height	84.625 (in.) 2,151 (mm)	102 (in.) 2,592 (mm)	102 (in.) 2,592 (mm)
Exterior Dimensions (Includes refrigeration sections)			
Width	133.125 (in.) 3,381 (mm)	122 (in.) 3,098 (mm)	128 (in.) 3,251 (mm)
Depth	76.25 (in.) 1,935 (mm)	60.25 (in.) 1,528 (mm)	76.25 (in.) 1,926 (mm)
Height	127.25 (in.) 3.234 (mm)	147 (in.) 3,738 (mm)	147 (in.) 3,738 (mm)
Interior			
Width	121 (in.) 3,073 (mm)	110 (in.) 2,794 (mm)	116 (in.) 2,946 (mm)
Depth	54 (in.) 1,741 (mm)	38 (in.) 864 (mm)	54 (in.) 1,371 (mm)
Height	68.625 (in.) 1,741 (mm)	86.25 (in.) 2,193 (mm)	84.75 (in.) 2,151 (mm)
Unit Weight			
lbs.	3,500	3,150	3,900
kg	1,588	1,492	1,769
Shipping Weight			
lbs.	4,100	3,900	4,500
kg	1,860	1,769	2,132
Area Footprint			
sq. ft.	55.6	47	67.5
mm^2	5.17	5.17	6.28
Total Volume			
cu. ft.	259	190	311
Liter	7,334	5,380	8,806

Storage Capacity and Dimensions (cont.)

ULC Series Model	259	190	311
Chamber Floor Space			
sq. ft.	70.5	51.0	67.8
m^2	6.5	4.7	6.3
Door Opening	46 W x 67 H (in.) / 1,168 W x 1,702 H (mm) x 2 doors	41 W x 87 H (in.) / 1,041 W x 2,210 H (mm) x 2 doors	44 W x 87 H (in.) / 1,118 W x 2,210 H (mm) x 2 doors
Chamber Wall Thickness	6 (in.) 152.4 (mm)	6 (in.) 152.4 (mm)	6 (in.) 152.4 (mm)
Ambient Conditions	18°C to 30°C 70% RH Max NOTE: FOR INDOOR USE ONLY Pollution Degree 2	18°C to 30°C 70% RH Max NOTE: FOR INDOOR USE ONLY Pollution Degree 2	18°C to 30°C 70% RH Max NOTE: FOR INDOOR USE ONLY Pollution Degree 2
Box Capacity			
2 in. Freezer Boxes	3,920	3,430	4,900
3 in. Freezer Boxes	2,520	2,058	2,940
Vial Capacity			
81 Vials in 2 in. box	317,250	277,830	396,900
81 Vials in 3 in. box	204,120	166,698	238,140
Inventory Racks for 2 in. boxes (not included)	112	70	140
Inventory Racks for 3 in. boxes (not included)	168	98	196

Application and Electrical Requirements

Application	Pharmaceutical, Biopharmaceutical, Biorepository, Bio-Logistics
Electrical ULC/ULCi	208-230 VAC, 1 Ø, 60 Hz / 2 230 VAC, 1 Ø, 50 Hz / 2 Mains Supply Fluctuation +/- 10% Overvoltage Category II
Electrical Requirements	
North America	208-230VAC, 1 Ø, Single Phase, 60 Hz
International	230VAC, Single Phase, 50 Hz
Circuit Breaker	2 x 30 amp
Electrical Breaker	30A, 60 Hz. (32A, 50 Hz)/ 2 Circuits
Temperature Control Range	-20°C to -80°C +2°C to +8°C
Ambient Operating Temperature	+18°C to +30°C
Noise level	65 dB(A)

ULC Series Material Handling Solution

ULC Model	259	190	311
Shelves			
Type	Sliding (individually)	Stainless Steel (1 in.) Weight Capacity: 300 lbs./ 136 kg.	Pallet (capacity)
Size (in.)	55 ⅛ x 40 ½	54 x 36	40 W x 48 D x 36 H
Size (mm)	1,400 x 1,029	1,372 x 914	1,016 W x 1,219 D x 914 H
Positioning	4 across by 6 high @ 10 (in.) increments	Adjustable @ 1 (in.) increments	
Product Cart			
Qty/Type	6 shelves, 10 (in.) / 254 (mm)	4 shelves, 8 (in.) / 457 (mm)	4 shelves, 18 (in.) / 457 (mm)
Size (in.)	49 ⅜ D x 20 ⅜ W x 51 ¼ H	36 ¾ D x 33 W x 61 ½ H	51 ½ D x 21 W x 61 ½ H
Size (mm)	1,229 x 517 x 1,302	934 D x 838 W x 1,562 H	1,308 D x 534 W x 1,562 H
Transfer Cart			
Size (in.)	41 ⅛ D x 39 W x 45 ⅛ H	27 W x 56 D x 45 ⅛	41 ⅛ D x 39 W x 45 ⅛ H
Size (mm)	1,043 D x 991 W x 1,146 H	686 W x 1,423 D x 1,146 H	1,043 D x 0991 W x 1,146 H

Refrigeration Systems

Refrigeration Systems	Qty 2
Scroll Compressors	Qty 4
Blower Motor	Qty 2 500 cfm 14,158 l/min
Evaporator/QTY=2	Forced-Air
Condenser/QTY=2	Forced-Air-Cooled or Water
Metering Device	Electronic
Refrigerant: High Stage	R449
Refrigerant: Low Stage	R-290 & R508B (HFC)
Noise level	65 dB(A)
Requirements	***Tower water:** Water temperature ≤30°C Maximum flow rate = 7 gpm (27 LPM) Average flow rate = 4.5 gpm (17 LPM) ***Chilled water:** Water temperature ≤10°C Maximum flow rate = 3.5 gpm (14 LOM) Average flow rate = 2.0 gpm (8 LPM)

Order Information

ULC Series	ULC-259 Models				ULC-190 Models				ULC-311 Models			
	259-AC	259-WC	259i-AC	259i-WC	190-AC	190-WC	190i-AC	190i-WC	311-AC	311-WC	311i-AC	311i-WC
Description												
Air-Cooled	✓		✓		✓		✓		✓		✓	
Water-Cooled		✓		✓		✓		✓		✓		✓
R508B and Oil Additive												
208-230VAC – 1 Phase – 60 Hz	✓	✓			✓	✓			✓	✓		
230VAC – 1 Phase – 50 Hz			✓	✓			✓	✓			✓	✓
Amps (FLA) / Breaker												
2 x 24 FLA / 30A	✓	✓			✓	✓			✓	✓		
2 x 24 FLA / 32A			✓	✓			✓	✓			✓	✓

Performance Data

ULC Model	259	190	311
Uniformity Air Temperature	+/- 3°C (empty chamber)		
Temperature Control	+/- 1.0°C		
Warranty, North America (U.S. and Canada)	1-year parts and labor		
Warranty, International	1-year parts only		
Temperature Control Range	-20°C to -80°C @ 1°C increments +2°C to +8°C		
Temperature Minimum Set Point	-80°C		
Temperature Pull Down Time	From +20°C to -80°C within 4 hrs. - 25 min.		
Temperature Air Stability at -80°C	+/- 3°C Uniformity		
Temperature Air Stability at -20°C	+/- 5°C Uniformity		
Cooling Assist Mode	If Air Temperature is > 3°C from set point / Both System A & System B Operational (User Adjustable)		
Power Failure Warm Up from -80°C to -50°C	6 Hours		
Temperature Recovery to -80°C from 30 sec. Door Opening	25 Minutes *(empty chamber)*		
Temperature Recovery to -80°C from 60 sec. Door Opening	35 Minutes *(empty chamber)*		
Power Consumption			
Energy Consumption per cu. ft.	Awaiting Energy Star® Test Result	E-Star certified at 0.3 kWh/cu. ft.	0.33 kWh/cu. ft.
During Power Off	All ULC operations and displays are Off		
Dry Alarm Contacts	Screw Terminals - C / NO 1st set of contacts will change state from closed to open when either or both chamber doors are open. The contacts will close when both chamber doors are closed. 2nd set of contacts will change state from closed to open when a "General Alarm Signal" is generated by the ULC (High temperature, door open too long failed refrigeration system, etc.).		
Power Receptacle Location	At least 3 ft. (1 m) clearance in front of receptacle, with a 30 in. (75 cm) wide working space and headroom at least the height of the equipment. Electrical cord supplied with unit is 12' (3.7M).		
Digital Connectivity	Modbus TCP/IP Protocol. If the optional FARRAR Remote Predictive Monitoring Analytic Solution or Monitoring Hardware Solution is purchased, then each refrigeration unit will require a hardwired RJ45 internet connection.		

Construction

Chamber Exterior Material	Painted Aluminum - White Embossed Finish
Chamber Interior Material	Painted Aluminum - White Embossed Finish
Load Capacity per Chamber Side	2,000 / 907 (4,000 / 1,814 total)

Controller

Temperature Controller/QTY	Microprocessor (2)
Displays	5.7 (in.) LCD (2)
Modbus TCP/IP	Communication Protocol
Alarms	Refrigeration system failure, high-low temperature, door ajar, power failure, remote alarm contacts
Dry Contacts	Standard (C, NO, NC)

Water-Cooler Condenser

Temperature Controller/QTY	4 x 0.5 (in.) FPT connections (2 per refrigeration system Pressure differential = approximately 20 PSI (1.4 bar) **Tower water:*** Water temperature 85°F. Maximum flow rate = 7 GPM (26.5 LPM) Average flow rate = 4.5 GPM (17 LPM) **Chilled water:*** Water temperature ≤10°C Maximum flow rate = 3.5 GPM (14 LPM) Average flow rate = 2.0 GPM (8 LPM) *Total for both refrigeration systems **Heat Rejection @ -80°C Maximum:** = 28,000 Btu/hr. (8.2 kW/hr.) to water = 1,800 Btu/hr. (0.52 kW/hr.) to ambient **Minimum Normal Operation, 1 system @ 75-80%:** = 12,000 Btu/hr. (3.5 kW/hr.) to water > 900 Btu/hr. (0.26 kW/hr.) to ambient **Average - Normal Operation, 1-2 Door opening/hr.,1 System Defrost:** = 14,000 Btu/hr. (4.1 kW/hr.) to water = 1,000 Btu/hr. (0.29 kW/hr.) to ambient
Thermal Room Load: Water-Cooled	<1,550 Btu/hr. 0.44 kW/hr. Maximum
Air-Cooled Condenser	**Heat Rejection @ -80°C:** **Maximum*** = 28,000 Btu/hr. (8.2 kW/hr.) **Minimum** = 12,000 Btu/hr. (3.5 kW/hr.) **Average** = 14,000 Btu/hr. (4.1 kW/hr.) *When both machine sections are running

INSTALLATION

Unpacking and Setup

Confirm that this item was thoroughly inspected and carefully packed prior to shipment, and that all necessary precautions were taken to ensure safe arrival. Immediately upon receipt, and before the unit is moved from the receiving area, carefully examine the shipment for loss or damage. Unpack the shipment and inspect both interior and exterior for any in-transit damage.

If any loss or damage is discovered, note any discrepancies in the delivery receipt and call the delivering carrier to request their representative perform an inspection. Do not discard any of the packing material and do not move the shipment from the receiving area prior to its inspection. Document any problems in writing with photos.

For products shipped Free Carrier (FCA) to Marietta, Ohio, the responsibility of FARRAR™ ends when the merchandise is loaded onto the carrier's vehicle. For Free on Board (FOB) Destination shipments, the responsibility of FARRAR and the carrier ends when the receiving department personnel sign a free and clear delivery receipt.

Location and Placement

Before placing the unit, install the FARRAR lifts on the side or ends of the chamber. Use the FARRAR hydraulic lifts to raise, move, and rotate the unit into place.

Unit clearance requirements are as follows:

Unit Clearance Requirements

ULC Model	259	190	311
Sides of all units	14 in. (36 cm)	14 in. (36 cm)	14 in. (36 cm)
Top of all units	12 in. (30 cm)	12 in. (30 cm)	12 in. (30 cm)
Back of unit per model	2 in. (5 cm)	14 in. (36 cm)	2 in. (5 cm)
Overall minimum height of location, floor to ceiling, per model	11 ft. 7.25 in. (3.53 m)	13 ft. 4 in. (4 m)	13 ft. 4 in. (4 m)

Mechanical

The inlet and outlet water connections for the water-cooled system are located on the top of each refrigeration system as shown in Figure 5. The connections are 0.5 in. FPT.

To allow for movement of the equipment during servicing, FARRAR recommends using 0.5 in. industrial grade flexible hose, 8 ft. (2.5 m) in length. An adapter from imperial to metric is included for each fitting.

FARRAR strongly recommends installing a 0.5-in. ball valve at the water inlet, along with a strainer and pressure gauge, as shown in Figure 6. These will facilitate any servicing or testing requirements.

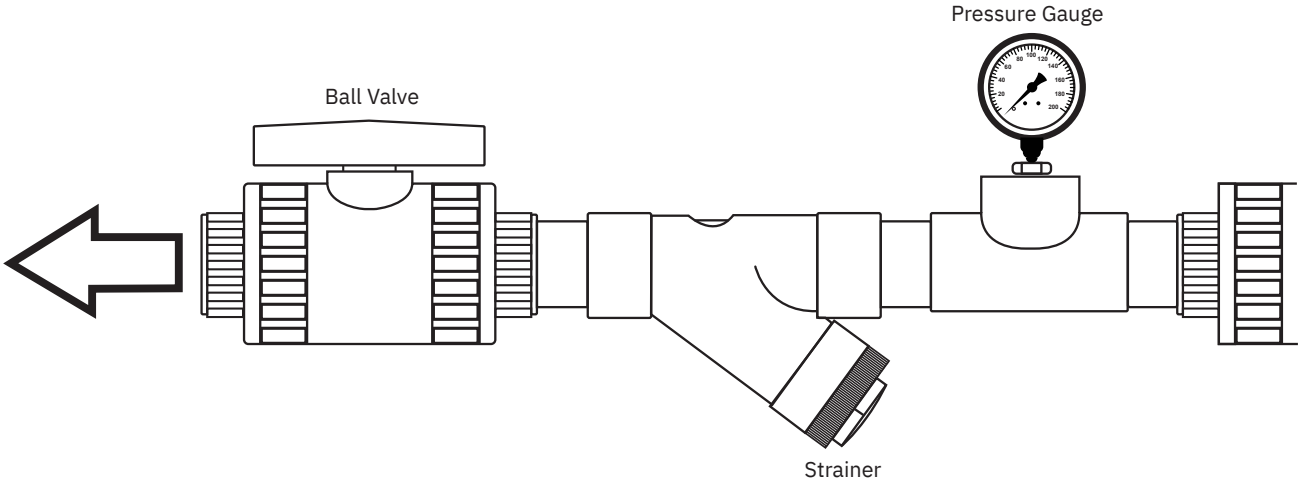
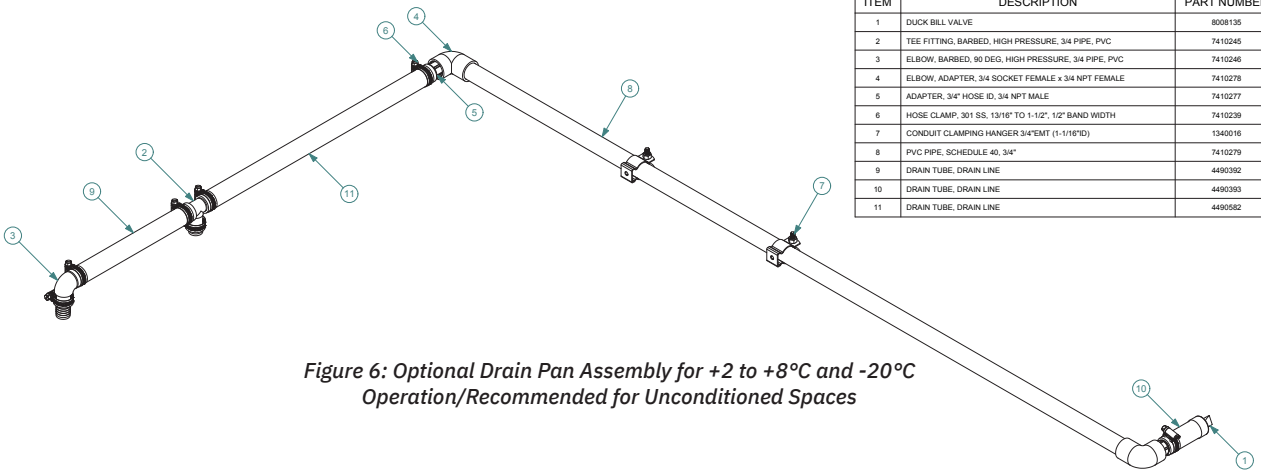


Figure 5: Ball Valve, Strainer, Pressure Gauge

Check all connections for leaks. Verify that the water differential pressure is adequate along with nominal flow and temperature requirements (see *Specifications* in this manual).

Optional drain pan assembly for +2°C to +8°C operation and -20°C operation.

For units that operate in unconditioned facilities, it is recommended that the drain line be piped to a facility drain for proper operation of the unit.



PARTS LIST

ITEM	DESCRIPTION	PART NUMBER	QTY
1	DUCK BILL VALVE	8008135	1
2	TEE FITTING, BARBED, HIGH PRESSURE, 3/4 PIPE, PVC	7410245	1
3	ELBOW, BARBED, 90 DEG, HIGH PRESSURE, 3/4 PIPE, PVC	7410246	1
4	ELBOW, ADAPTER, 3/4 SOCKET FEMALE x 3/4 NPT FEMALE	7410278	2
5	ADAPTER, 3/4" HOSE ID, 3/4 NPT MALE	7410277	2
6	HOSE CLAMP, 301 SS, 13/16" TO 1-1/2", 1/2" BAND WIDTH	7410239	7
7	CONDUIT CLAMPING HANGER 3/4"EMT (1-1/16"ID)	1340016	2
8	PVC PIPE, SCHEDULE 40, 3/4"	7410279	1
9	DRAIN TUBE, DRAIN LINE	4490392	1
10	DRAIN TUBE, DRAIN LINE	4490393	1
11	DRAIN TUBE, DRAIN LINE	4490582	1

Figure 6: Optional Drain Pan Assembly for +2 to +8°C and -20°C Operation/Recommended for Unconditioned Spaces

REVISION HISTORY

REV	DESCRIPTION	BY	DATE	APPROVED
A	PROTOTYPE RELEASE	CJN	8/14/2023	BTI

TOLERANCES
x ±.1
xx ±.03
xxx ±.015
xxxx ±.0005
ANGLE ±1°
FRACTIONAL ±1/16
DIMENSIONS ARE IN **INCHES** UNLESS OTHERWISE SPECIFIED

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FARRAR | TRANE TECHNOLOGIES

30765 OH-7 | MARIETTA, OH | 45750 | ph. 740.374.8300 | fx. 740.374.8310

DRAIN KIT, ULC-259

SIZE	DWG NO	REV
B	4490590	A

DRAWN BY	DRAWN DATE
C. NEUHART	8/14/2023
APPROVED BY	APPROVAL DATE
B. IRWIN	8/14/2023
REFERENCE	SCALE
N/A	1 / 5

SHEET 1 OF 1

Electrical

Connect each refrigeration system to a separate receptacle's 30 Amp (32 Amp, 50 Hz) 208-230 VAC 2 pole, 2 wires + GND (3-wire receptacle).

Note: The ULC Series must be powered by two separate single-phase circuits.

Figure 7 and Figure 8 show the plugs used on all ULC Series units (depending on purchase location).

Figure 7: NEMA L6-30P, Locking Plus (North America)

Figure 8: IEC 60309 Plug (International)

OPERATION

Powering the Unit

Electrical power is provided via a power cord. Internally, power passes through a 2-pole main circuit breaker, which is accessible inside the main control enclosure.

To turn off power to the unit, unplug the power cord from the wall receptacle.

System Setup

All system operation is performed using the door-mounted touch screen displays. A list of icons is available in *Appendix A:* Icons.

1. Once the system is set up, plug the power cord(s) into the properly sized receptacles.
2. The door mounted displays will turn on and display the **HOME** screen, as shown in Figure 9. The current interior chamber temperature will display.
3. To initiate system setup, press the **SETUP** icon in the bottom-left corner of the **HOME** screen.

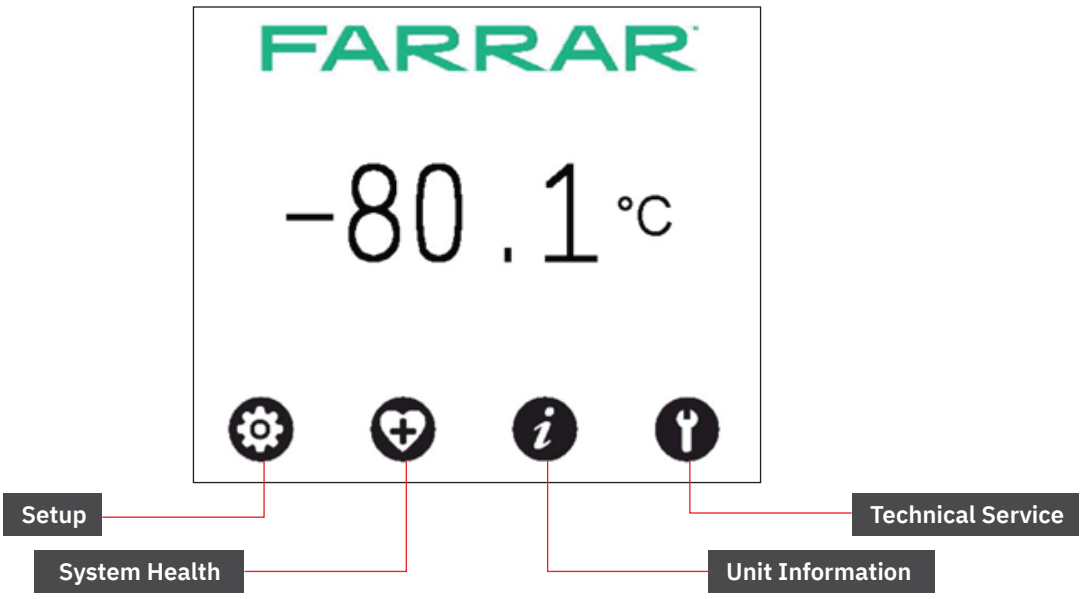


Figure 9: Home Screen

Note: All settings may be returned to factory default settings.

Note: Operator privileges or above will be required to make changes to any of the controller settings. User access will return to **View Only** if the controller is left unattended for more than 5 minutes.

Set Point Setup

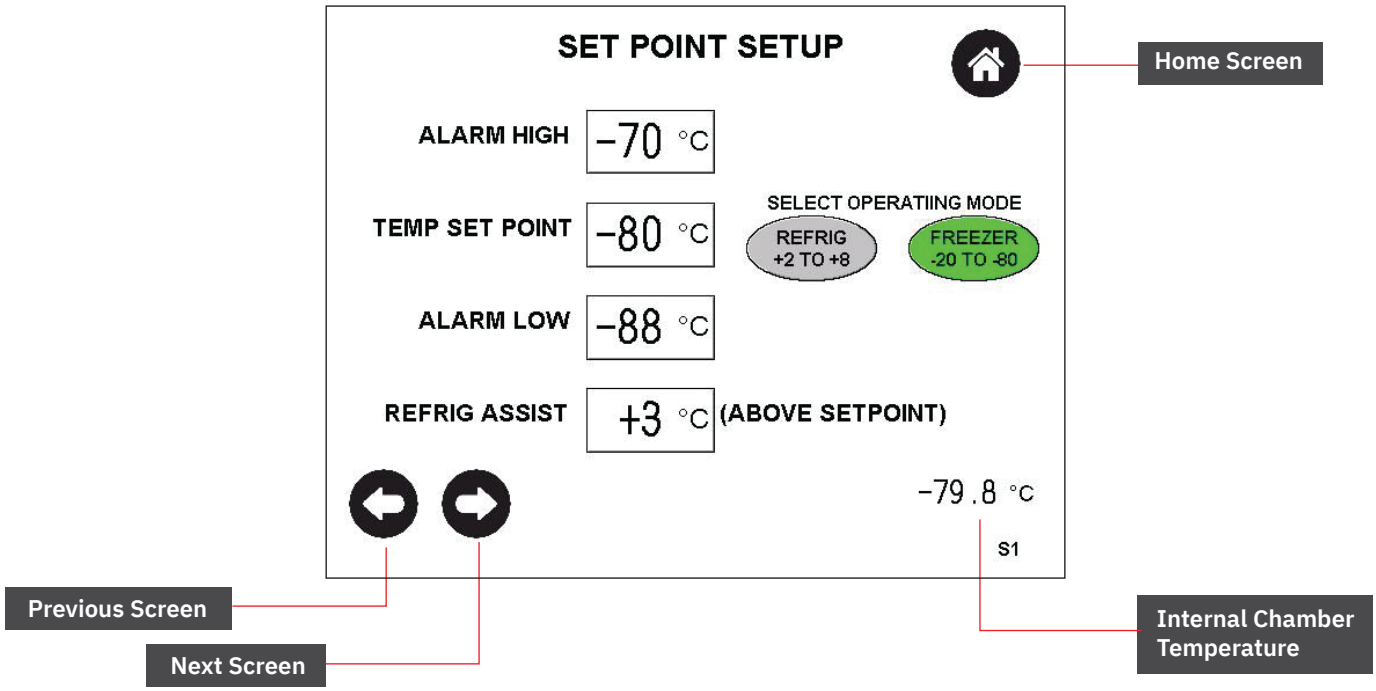


Figure 10: Set Point Setup Screen

Complete the following steps to input temperature values:

1. Touch the **ALARM HIGH** display to enter the high temperature alarm set point using the numerical keypad. Press **ENT** to save.
   Note: The available range is +30°C to -80°C. The Factory Default value is 30°C.

2. Touch the **TEMP SET POINT** display to enter the chamber control temperature using the numerical keypad. Press **ENT** to save.
   Note: User has two available ranges: -20°C to -80°C and +2 to +8. The Factory Default setting is -80°C.

3. Touch the **ALARM LOW** display to enter the low temperature alarm set point using the keypad. Press **ENT** to save.
   Note: The available range is +10°C to -99°C. The Factory Default is -88°C.

4. Touch the **REFRIG ASSIST** display to enter the temperature warmup above **TEMP SET POINT** that will cause the standby system to turn on. Press **ENT** to save.
   Note: The available range is 0°C to +40°C. The Factory Default is 3°C and should not be changed without consulting FARRAR.
   Note: When the chamber warms up to the programmed REFRIG ASSIST temperature, the Standby system will run to assist the Primary system with returning the chamber to the temperature set point.

5. Press the right arrow to go to the next screen.

Alarm Setup

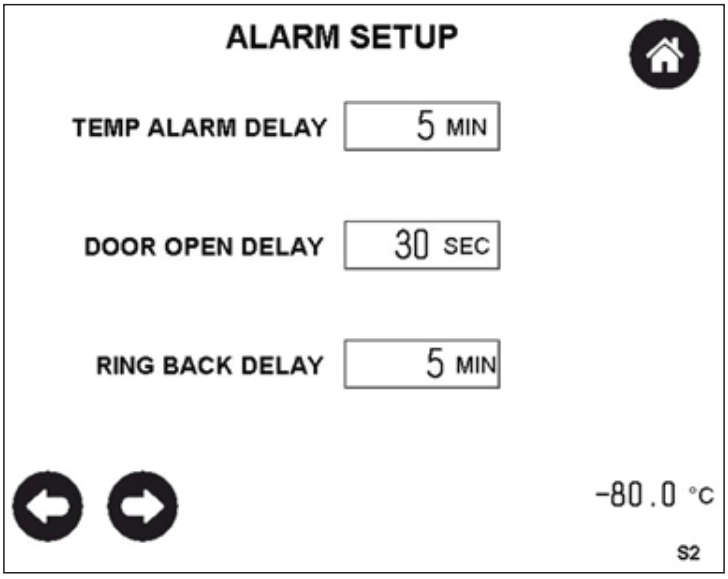


Figure 11: Alarm Setup Screen

Complete the following steps to set up alarms:

1. Touch the **TEMP ALARM DELAY** display to enter the time permitted before the High Temperature alarm condition causes the audible and visual alarms to activate.
   Note: The available range is 0 to 9999 minutes. The Factory Default is 5 minutes.

2. Touch the **DOOR OPEN DELAY** to enter the time permitted before an open chamber door causes the Door Open Too Long alarm to activate.
   Note: The available range is 5 to 300 seconds. The Factory Default is 30 seconds.

3. Touch the **RING BACK DELAY** display to enter the amount of time before the unit re-enables the audible alarm after it is silenced by a user.
   Note: The available range is 1 to 3,000 minutes. The Factory Default is 1 minute.

4. Press **ENT** to save all alarms.

5. Press the right arrow to go to the next screen.

Defrost Setup

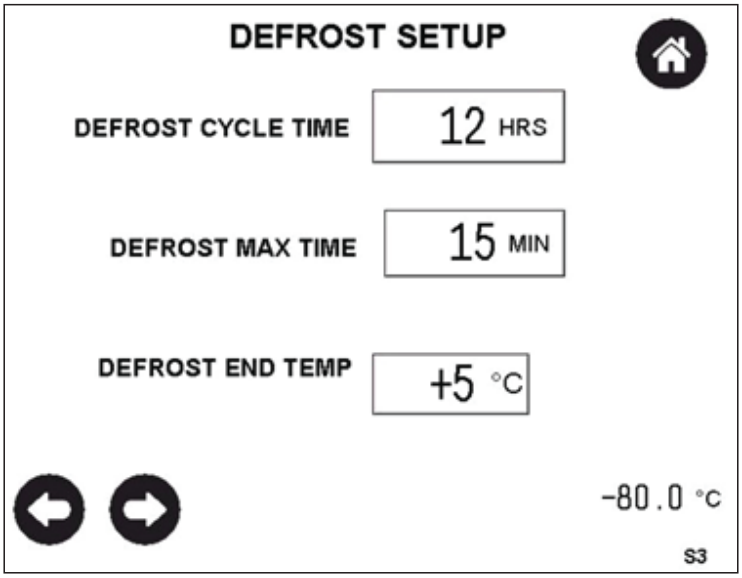


Figure 12: Defrost Setup Screen

Complete the following steps to set up defrosting settings:

1. Touch the **DEFROST CYCLE TIME** display to enter the length of time between automatic defrosts.
   Note: The available range is 2 to 168 hours. The Factory Default and recommended setting is 24 hours and should not be changed without consulting FARRAR.

2. Touch the **DEFROST MAX TIME** display to enter the length of the defrost cycle.
   Note: The available range is 5 to 60 minutes. The Factory Default and recommended setting is 30 minutes, and it should not be changed without consulting FARRAR.
   Note: When the coil temperatures warm to the designated defrost levels, defrosting is (typically) terminated automatically.

3. Touch the **DEFROST END TEMP** display to enter the defrost automatic termination temperature.
   Note: The available range is 0°C to +40°C. The Factory Default and recommended setting is 5°C and should not be changed without consulting FARRAR.

4. Press the right arrow to go to the next screen.

Note: Only the cooling coils (evaporators) are defrosted by the automatic defrost system. This keeps the coils clear in order to maintain air flow through the chamber. Over time, the chamber walls, shelves, doors, etc., will be covered with ice/snow that must be removed manually. See the *General Maintenance* section of this manual for chamber defrosting instructions.

System Configuration

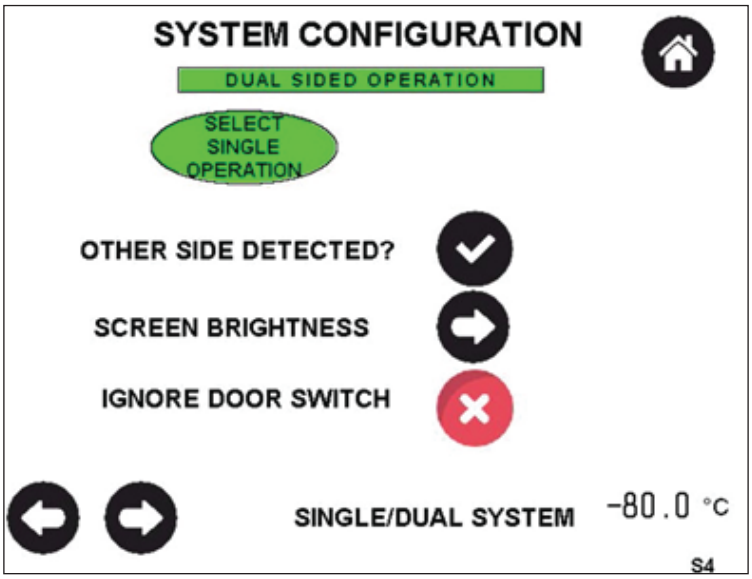


Figure 13: System Configuration Screen

Complete the following steps to change system configuration settings:

1. The user has the option to select between **SINGLE SIDED OPERATION** and **DUAL SIDED OPERATION** for the machine. **If SINGLE SIDED OPERATION** is selected the **SELECT DUAL OPERATION** button will be displayed on the screen. If **DUAL SIDED OPERATION** is selected the **SELECT SINGLE OPERATION** button will be displayed on the screen. The user has the ability to switch operation modes from this screen by selecting the button that is displayed on the screen.

2. Confirm whether one or two refrigeration systems are operational by looking at the **OTHER SIDE DETECTED**? icon that is displayed.

   An X means the opposite side system is not detected.

   A checkmark means the opposite side system is detected.

3. Touch the **SCREEN BRIGHTNESS** (right arrow) icon, and the adjustment screen will open. Adjust the display bright ness to the desired level. Touch the **X** in the upper right corner of the screen to return to the System Configuration screen.

4. Touch the **IGNORE DOOR SWITCH** icon to disable the door switch input. This will allow the refrigeration system to remain powered on when the door is open. One of two icons will display:

   The door switches will be monitored. Both refrigeration systems will turn off as long as the door remains open.

   The door switches will be ignored. The refrigeration system will continue to run under temperature control, regardless of whether the doors are open or closed.

5. Press the right arrow to go to the next screen.

Note: When **IGNORE DOOR SWITCH** mode is activated, a message on the **HOME** screen will appear:

WARNING: DOOR SWITCH DISABLED

This is intended to remind the operator that the door switch is being ignored. No alarms or lights related to door openings will be activated.

Note: Normally, opening either door will cause the refrigeration system to power off and remain off as long as the door is open. This is the recommended mode of operation. It is recommended that **IGNORE DOOR SWITCH** mode only be used if a door switch fails. Once the door switch is repaired, **IGNORE DOOR SWITCH** mode should be deactivated.

Calibration and Maintenance

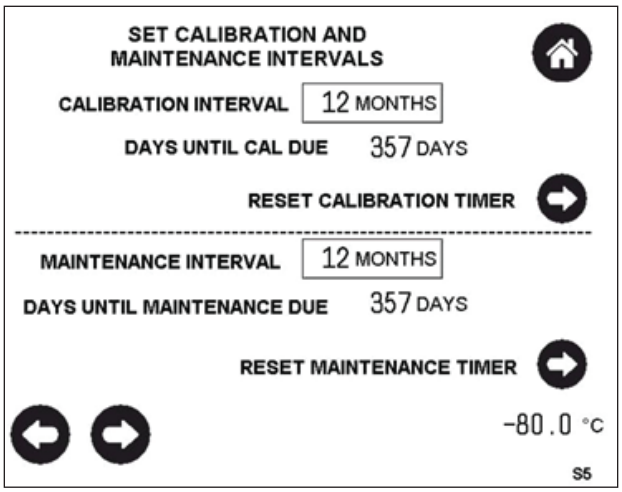


Figure 14: Calibration and Maintenance Screen

Complete the following steps to set calibration and maintenance intervals:

1. Touch the **CALIBRATION INTERVAL** display to enter the time interval between calibration notification messages.
   Note: The available range is 1 to 240 months. The Factory Default is 12 months.
   The **SERVICE** Icon ⚠ will display 30 days before the end of the interval to allow for scheduling.

2. Touch the right arrow icon next to **RESET CALIBRATION TIMER** to restart the countdown from the set calibration interval. A message will display to confirm that the timer was reset.

3. Touch the **MAINTENANCE INTERVAL** display to enter the time interval between preventative maintenance notification messages.
   Note: The available range is 1 to 240 months. The Factory Default is 12 months.
   The **SERVICE** icon ⚠ will display 30 days before the end of the interval to allow for scheduling.

4. Touch the right arrow icon next to **RESET MAINTENANCE TIMER** to restart the countdown from the set maintenance interval. A message will display to confirm that the timer was reset.

Restore Factory Settings

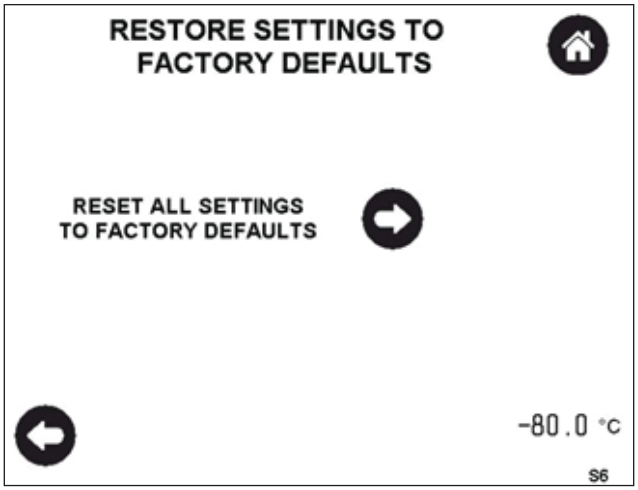


Figure 15: Restore Factory Default Settings

Complete the following steps to restore factory default settings:

1. Navigate to the **SET CALIBRATION AND MAINTANENCE INTERVALS** menu and press the right arrow .
2. Touch the right arrow next to **RESET ALL SETTINGS TO FACTORY DEFAULTS** to reset all control settings to factory default values.
3. A second screen will display to confirm that the reset is complete.
4. A green checkmark will appear. Touch the green check mark to reset all settings to factory default values.
5. Press the house icon to return to the **HOME** screen.

System Health

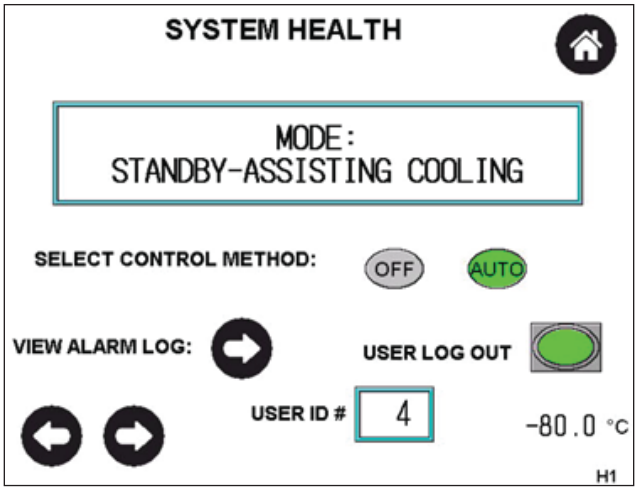


Figure 16: System Health Screen

Complete the following steps to check the operating status of the system:

1. Press the **SYSTEM HEALTH** icon at the bottom of the **HOME** screen.
2. The MODE will indicate the status of the system. The ULC Series has four modes:
    - PRIMARY – COOLING or PRIMARY – CYCLED OFF
    - STANDBY – OFF or STANDBY – ASSISTING COOLING
    - DEFROST
    - OFF
3. Use **SELECT CONTROL METHOD** to activate or deactivate key features of the system. The ULC Series has two control methods:
    - Touch the **OFF** icon to turn off the operation of the system. This disables the refrigeration system as well as all alarms.
    - Touch the **AUTO** icon to initiate the system's **AUTO** mode. This allows the system to automatically alternate between PRIMARY mode and **STANDBY** mode. **AUTO** also activates all programmed alarms and the automatic evaporator defrost.
4. Touch the arrow next to **VIEW ALARM LOG** to view a list of all the alarms that have occurred on the system. See the Alarm Log section of this manual for more information.
5. Press the right arrow to go to the next **SYSTEM HEALTH** screen.

Alarm Log

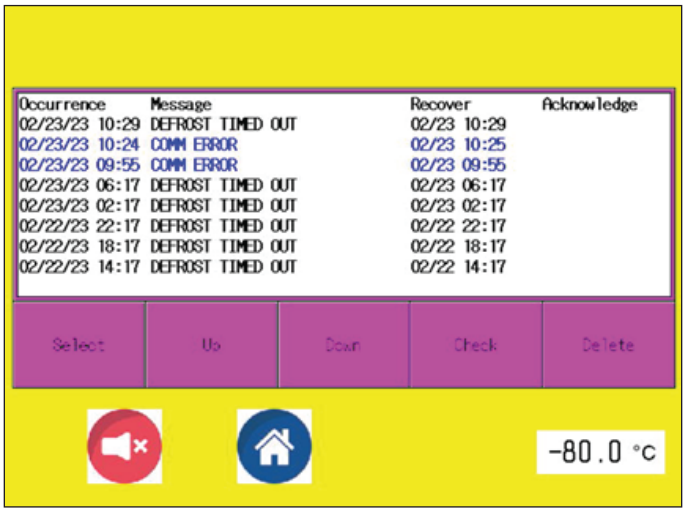


Figure 17: Alarm Log Screen

The **ALARM LOG** screen shows all current and previous alarm conditions detected by the control system. Information logged with each alarm includes:

- **Occurrence:** Shows the date and time when the alarm occurred.
- **Message:** Lists the specific alarm that occurred.
- **Recover:** Shows the date and time that the alarm stopped.
- **Acknowledge:** Shows the date and time that the alarm was acknowledged by an operator.

The icons below the alarm list allow the operator to manage the alarm log as follows:

- **Select:** Touch this icon to begin the selection of a specific alarm item.
- **Up:** Touch this icon to scroll up the list of alarms.
- **Down:** Touch this icon to scroll down the list of alarms.
- **Check:** Touch this icon to acknowledge a specific alarm. **The Acknowledge** column will populate with the current date and time.
- **Delete:** Touch this icon to delete the specific alarm item that is selected.

The remaining two buttons on this screen have the following functions:

Silence Audible Alarm. Silences any current audible alarm. This is subject to the **RING BACK DELAY** described in the Alarm Setup section of this manual.

Home Screen. Closes the **ALARM LOG** screen and returns to the **HOME** screen.

System Health (cont.)

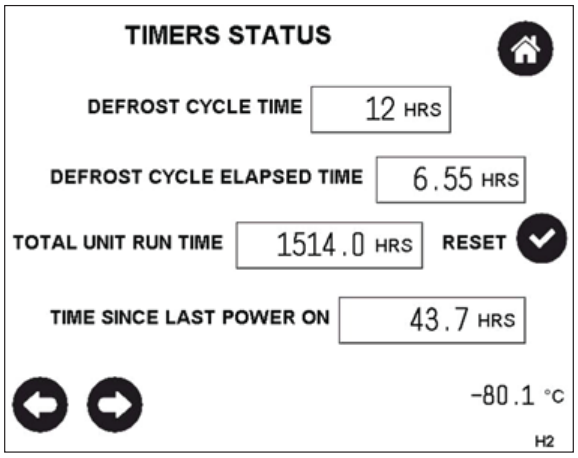


Figure 18: Defrost Timers Status Screen

- **DEFROST CYCLE TIME** displays the time interval between evaporator defrosts when the system is running as **PRIMARY**.
  Note: This value cannot be changed on this screen. Refer to the Defrost Setup section of this manual for instructions on changing this value.
- **DEFROST CYCLE ELAPSED TIME** displays the cumulative length of time that the system has been running as **PRIMARY** since its last defrost cycle. When this value matches the **DEFROST CYCLE TIME**, the side running as **PRIMARY** will begin a **DEFROST** cycle.
- **TOTAL UNIT RUN TIME** displays the cumulative length of time that the system has been powered. Press the checkmark icon to reset this value to zero.
- **TIME SINCE LAST POWER ON** displays the length of time since the system was last powered on.

1. Press the right arrow to go to the next **SYSTEM HEALTH** screen.

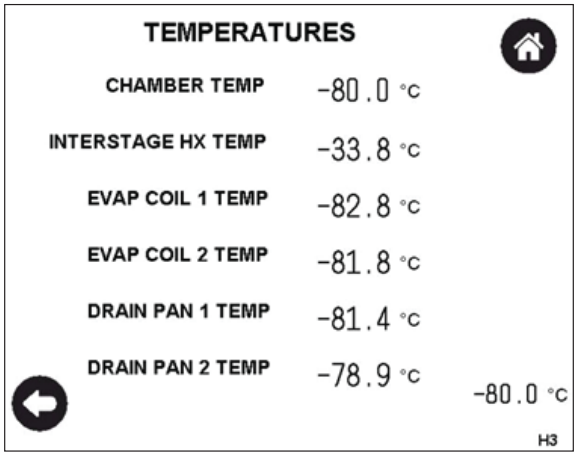


Figure 19: Temperatures Screen

The **TEMPERATURES** screen displays the current value of various key temperatures in the refrigeration system. These values, which are not adjustable from this screen, are useful to technical and maintenance personnel.

1. Press the house icon to return to the **HOME** screen.

Unit Information

Unit information, such as the electrical requirements, serial number, and operating pressure, is typically available on the serial tag label. However, it can also be accessed within the system.

Complete the following steps to view unit information:

1. Press the **UNIT INFORMATION** icon on the bottom of the **HOME** screen.

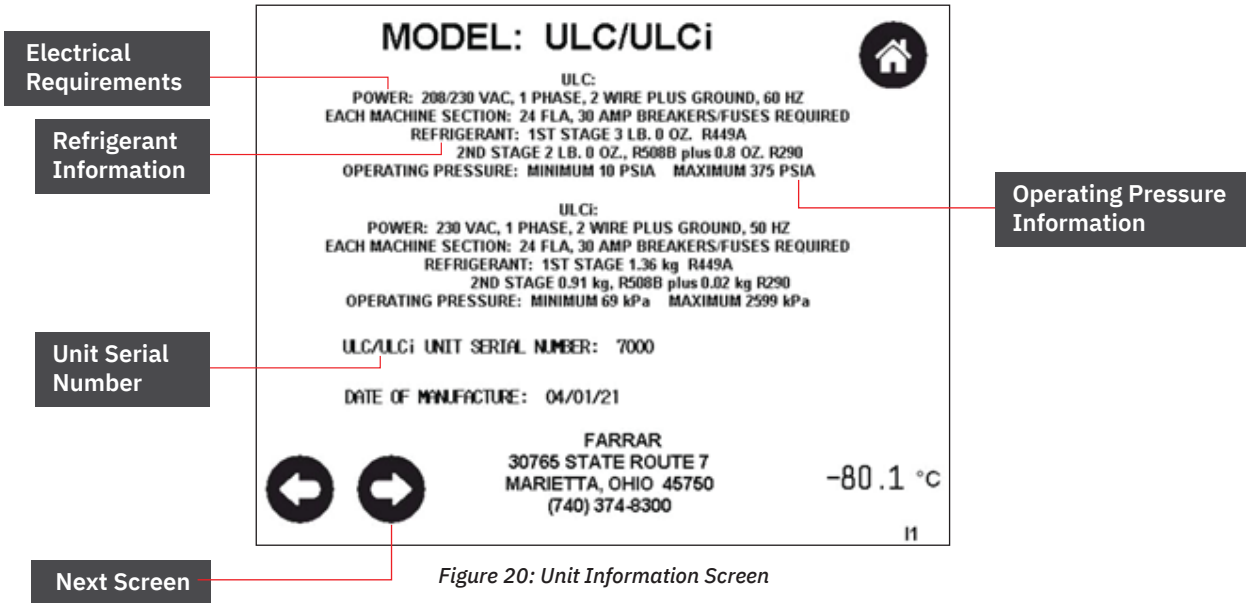


Figure 20: Unit Information Screen

2. Press the right arrow to go to the next **UNIT INFORMATION** screen. This indicates the display and PLC software versions, as well as the machine section and ULC unit serial numbers.

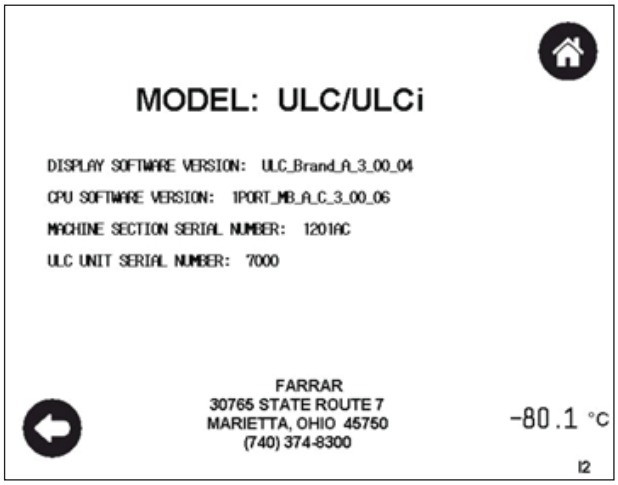


Figure 21: Next Unit Information Screen

3. Press the house icon to return to the **HOME** screen.

Technical Service

Access to the following Technical Service screens and functions requires administrative privileges. These screens and functions may only be accessed by qualified service personnel.

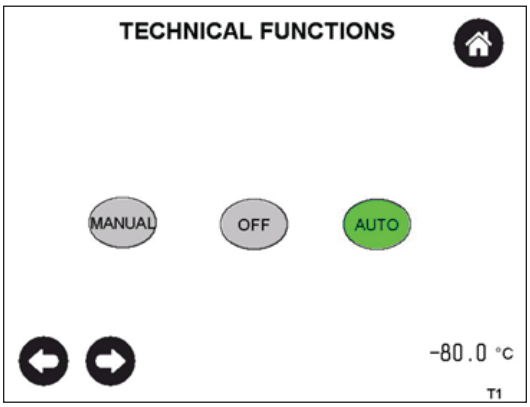


Figure 22 Technical Functions Screen

Complete the following steps to access technical functions of the unit:

1. Press the **TECHNICAL SERVICE** (wrench) icon on the bottom of the **HOME** screen.

2. Use the following **TECHNICAL FUNCTIONS** to alter the major operations of the system:
   - Touch the **MANUAL** onscreen button to enter MANUAL mode. This mode allows the operator to turn individual components within the system on or off. MANUAL mode may only be used by qualified service personnel.
   - Touch the **OFF** onscreen button to turn off the operation of the system. All functions, including cooling, will stop.
   - Touch the **AUTO** onscreen button to place the system into **AUTO** mode. This allows the system to automati cally alternate between **PRIMARY** mode and STANDBY mode. **AUTO** also activates all programmed alarms and the automatic evaporator defrost.

Note: Note: **OFF**, and **AUTO** modes require Maintenance privileges or above to access. **MANUAL** mode requires Engineering privileges or above to access.

3. Press the right arrow to go to the **TECHNICAL MENU** screen.

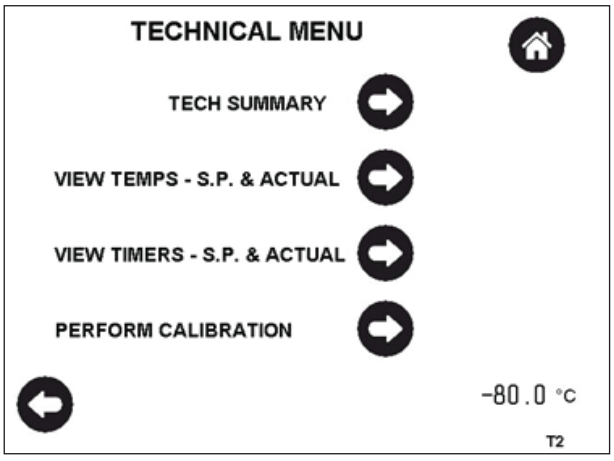


Figure 23: Technical Menu Screen

4. Use the following **TECHNICAL FUNCTIONS** to alter additional, major operations of the system:

    - **TECH SUMMARY:** Touch the right arrow to enter the detailed technical screens.
    - **VIEW TEMPS – S.P. & ACTUAL:** Touch the right arrow to enter the detailed temperature technical screens.
    - **VIEW TIMERS – S.P. & ACTUAL:** Touch the right arrow to enter the detailed timer technical screens.
    - **PERFORM CALIBRATION:** Touch the right arrow to enter calibration of the control probe for this system.

Note: **TECH SUMMARY**, **VIEW TEMPS** – **S.P. & ACTUAL**, **VIEW TIMERS** – **S.P. & ACTUAL**, and **PERFORM CALIBRATION** requires Operator privileges or above to access. Operator privileges to access. Refer to the Update Existing User Account section of this manual for more information.

5. Press the right arrow to go to the **CALIBRATION** screen.

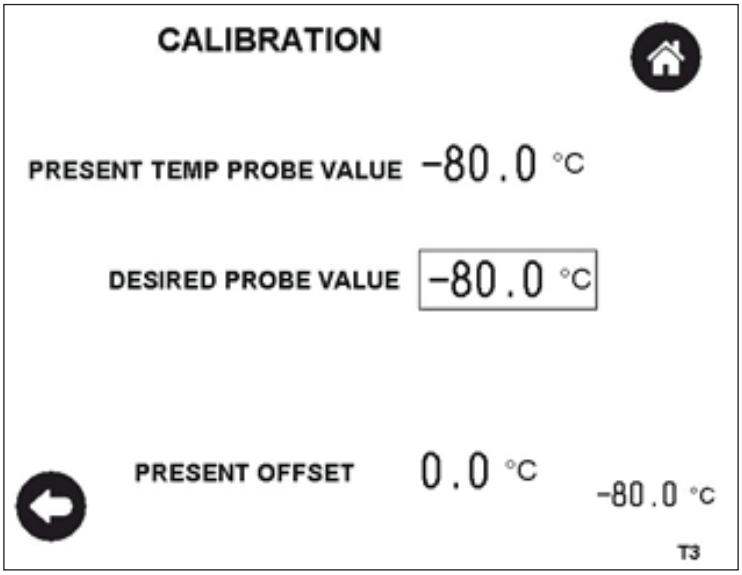


Figure 24: Calibration Screen

6. **PRESENT TEMP PROBE VALUE** displays the current reading from the temperature control probe.

7. Touch the display next to the **DESIRED PROBE VALUE** and use the keypad to enter the control probe value based on an independent temperature sensor.

8. The **PRESENT OFFSET** displays the current value of the offset to the raw temperature probe value due to calibration. **Note:** If the **PRESENT OFFSET** value is more than +/- 5°C, a message will appear warning of this excessive calibration offset. However, the software will still accept the calibration value.

9. Press the house icon to return to the **HOME** screen.

Starting the Cooling Process

Note: Operator privileges or above are required to access the AUTO button and change the temperature set point.

1. Press **SYSTEM HEALTH** on the Home screen.
2. Press **AUTO**, enter the access code, and press **ENT**.
3. After a short delay, the compressors will turn on and the unit will begin to cool down to the set point.
   Note: It is not necessary to remain on this screen while waiting for the compressors to start.
4. To set the chamber temperature, press the **SETUP** icon (see Set Point Setup in this manual).
5. Touch the **TEMP SET POINT** display, enter the access code, and press **ENT**.
6. Input the desired temperature set point and press **ENT**.

Managing User Accounts

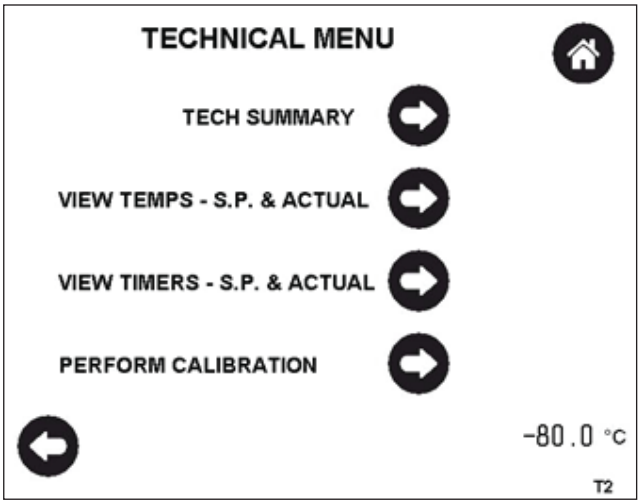


Figure 25: Technical Menu Screen

1. To reach the **USER ACCOUNT** screens, go to the **TECHNICAL MENU** screen (see *Technical Service* in this manual).
2. Press the right arrow to view the **TECH SUMMARY**. The **PASSWORD** keypad will display, as shown in Figure 26.

Note: To manage user accounts, the user must have Administrator access privileges. The Factory Administrator account username is “Tom1”, and the password is “1mot”. The administrator should set up their own account with username and password at the first log in. If the factory account is deleted and the password lost, the HMI will need to be factory reprogrammed to restore use.

Password						
Tom1						
A	B	C	D	E	F	CAN
G	H	I	J	K	L	
M	N	O	P	Q	R	CLR
S	T	U	V	W	X	
Y	Z	0	1	2	3	ENT
4	5	6	7	8	9	

Figure 26: Password Keypad

Set Up User Accounts

1. To set up the new user accounts and passwords for the first time, enter the Factory Administrator account information and press ENT. The display will return to the **TECHNICAL MENU** screen, as shown in Figure 25.
2. Press the right arrow again to view the **TECH SUMMARY** screen. Once the user has their own Administrator account, scroll using the up and down arrows to find their username.
3. Enter the password and press **ENT**.

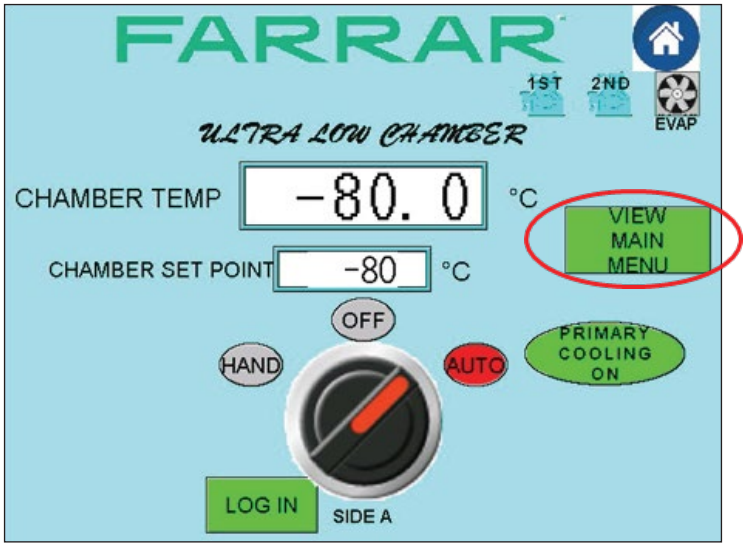


Figure 27: Tech Summary Screen

4. On the TECH SUMMARY screen, press **VIEW MAIN MENU**.

5. From the **MAIN MENU** screen, press **VIEW OPTIONS SCREEN**.

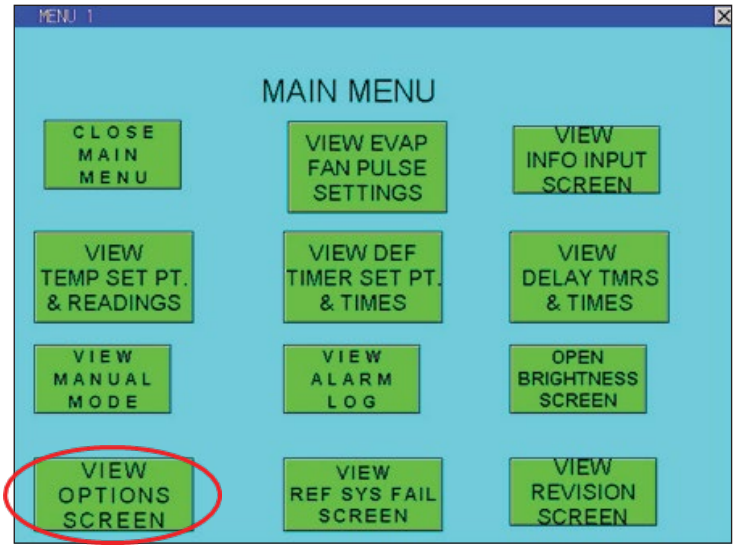


Figure 28: Main Menu Screen

6. From the **OPTIONS** screen, press **OPEN USER ACCOUNTS**.

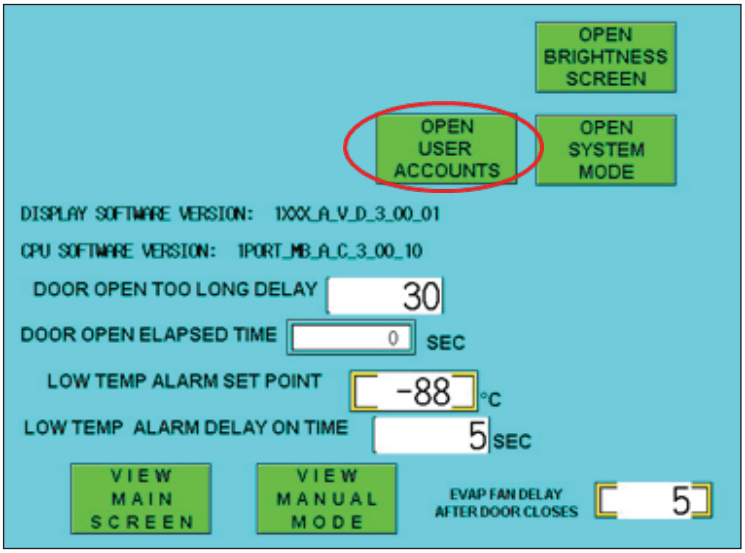


Figure 29: Options Screen

Update Existing User Account

1. To edit the profile of an existing account, press the up or down arrow to scroll to that account's profile and press **Edit**.

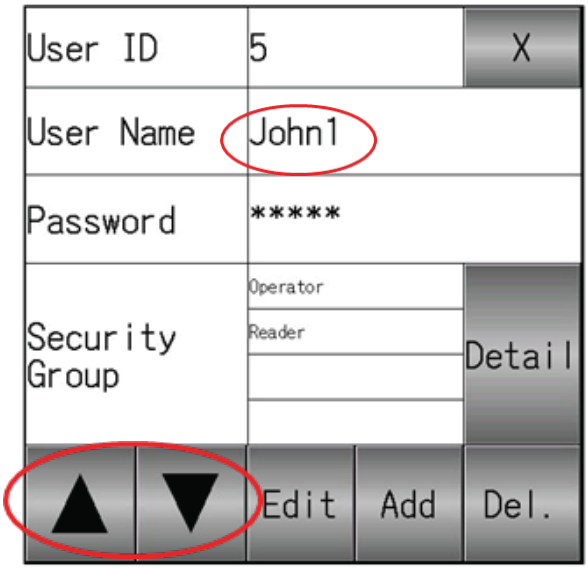


Figure 30: User Account Screen

2. After opening a specific account screen, make changes to the account as required. For example, to change the account's **Security Group**, press **Change**.

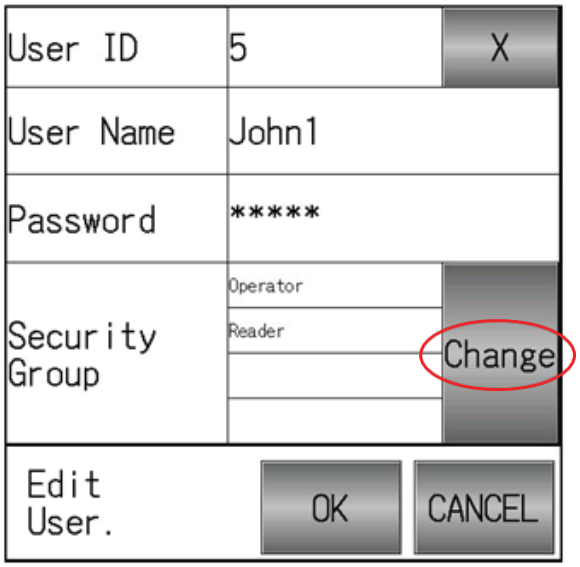


Figure 31: User Account Screen, Security Group Change

3. The Security Groups screen will display. Select the security groups required for the account and press **Close**.

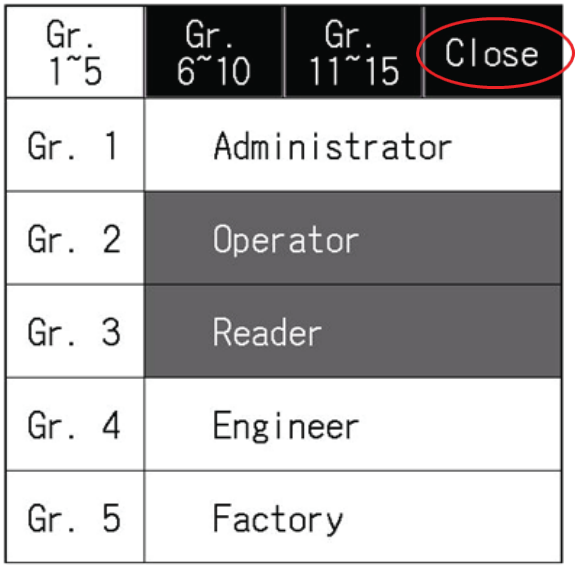


Figure 32: Security Groups Screen

The security group descriptions are as follows:

- **Administrator**. This is the highest level of security. Accounts in this security group have access to all screens and functions of the equipment, including user setup and technical screens. A limited number of people should be granted Administrator access.
- **Operator**. This is the intermediate level of security. Accounts in this security group may make changes to all settings, including set points, alarms, and the alarm log. Operator access should be granted to senior-level equipment users.
- **Reader**. This is the lowest level of security. Accounts with Reader access can view system settings and alarms but cannot change settings or the alarm log.
- **Engineer** and **Factory**. These security levels are for factory use only. Accounts with Engineer or Factory access have access to all screens (including engineering-level screens) except the **USER ACCOUNT** screen.
- **Maintenance**. This security level has access to System Health screens. Accounts with Maintenance access can activate **OFF** and **AUTO** modes for maintenance purposes.

4. After selecting the appropriate security group, press **OK**.

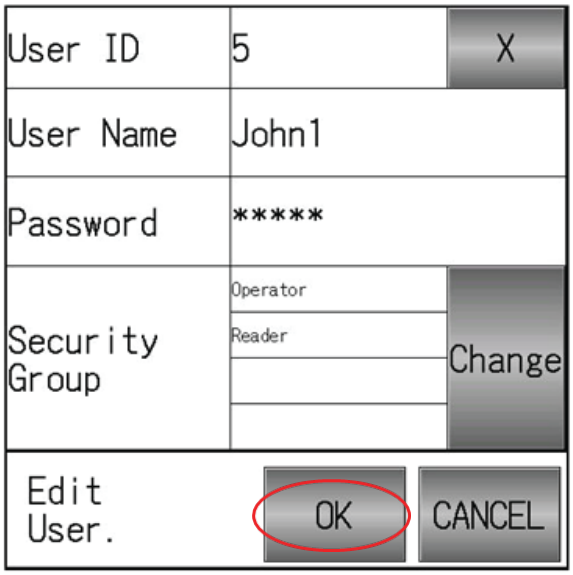


Figure 33: User Account Screen, Security Group Change

5. After pressing **OK** on the Account Edit screen, the message screen will indicate that the changes have been saved. Press **OK** to return to the Accounts screen.

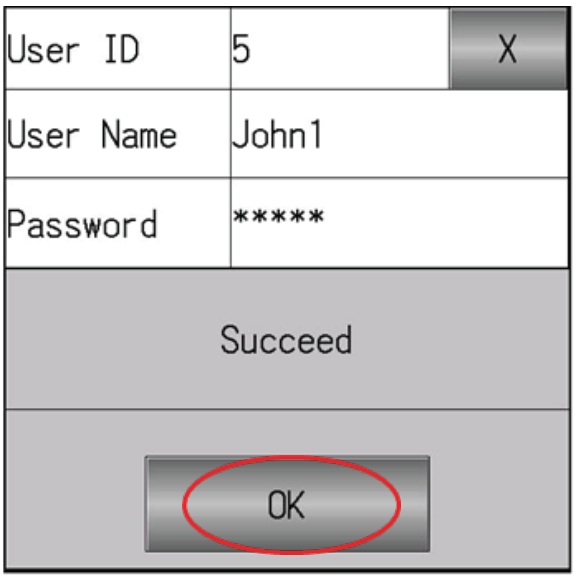


Figure 34: User Account Screen, Successful Security Group Change

Add New User Account

1. To add a new user account, press **ADD** on the **USER ACCOUNT** screen. A blank user account profile screen will appear.

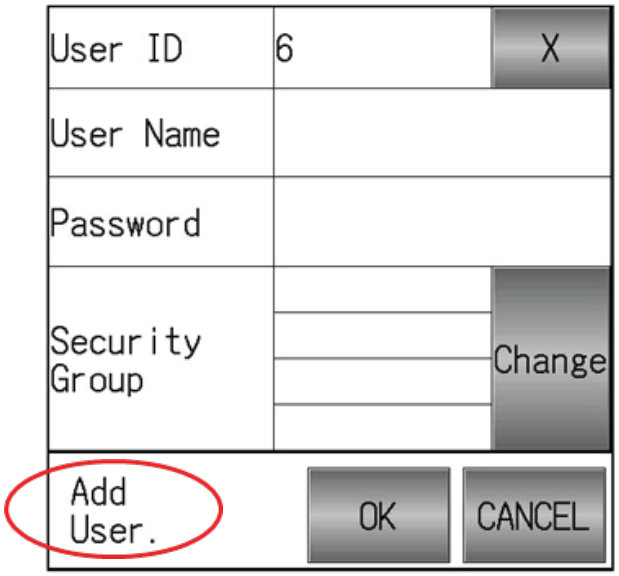


Figure 35: User Account Screen, Add User

2. To create a username, press the **USERNAME** field.

3. A keypad will display. Enter the new account username and press **ENT** to return to the account profile screen.
Note: Selection buttons are located on the left side of the keypad for lowercase letters, numbers, and symbols.

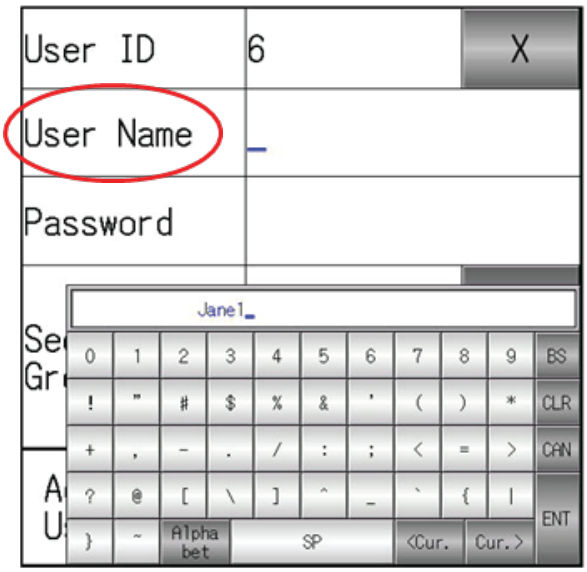


Figure 36: User Account Screen, Add Username

4. To create a password, press the PASSWORD field. A keypad will display. Enter the password and press ENT to return to the Account Profile screen.

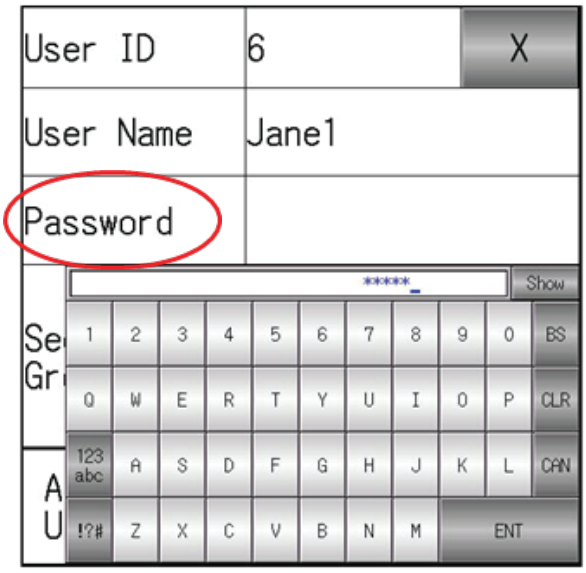


Figure 37: User Account Screen, Add Password

5. To assign security levels to the account, press the Change field. The Security Groups screen will display.

6. Select the Security level for the user as previously described. After selecting the security group, press Close to return to the Accounts screen.

7. After all the account profile information has been entered, press OK.

8. A “Succeed” message will display, confirming that the account profile has been saved. Press OK to return to the Accounts screen.

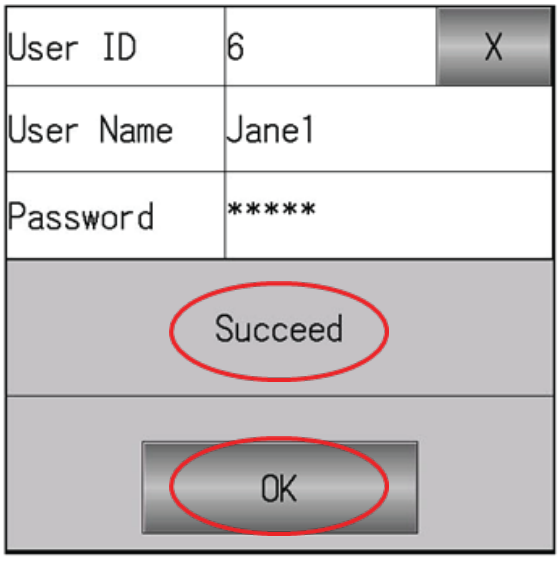


Figure 38: User Account Screen, User Successfully Added, Exit

9. To exit the **ACCOUNTS** screen entirely, press the **X** button at the top of any account screen. This will return the user to the **VIEW OPTIONS** screen.
10. From the **VIEW OPTIONS** screen, press **VIEW MAIN SCREEN**. This will return the user to the **TECH SUMMARY** screen.
11. From the **TECH SUMMARY** screen, press the **HOME** icon.

System Setup

Note: Administrator privileges are required to set the system date and time.

To access the system clock, press the upper left corner of the display screen for a few seconds. This will display the hidden **MAINTENANCE** screen.

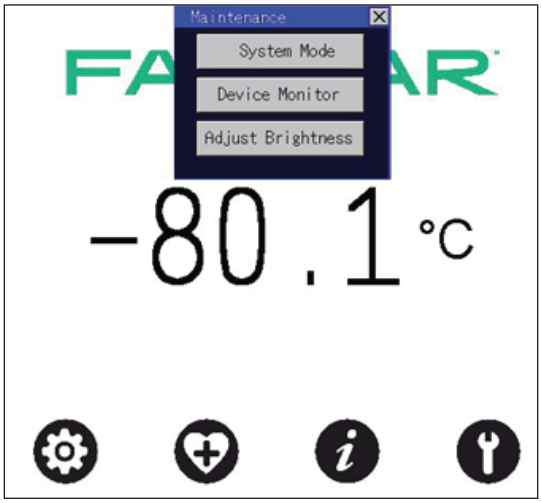
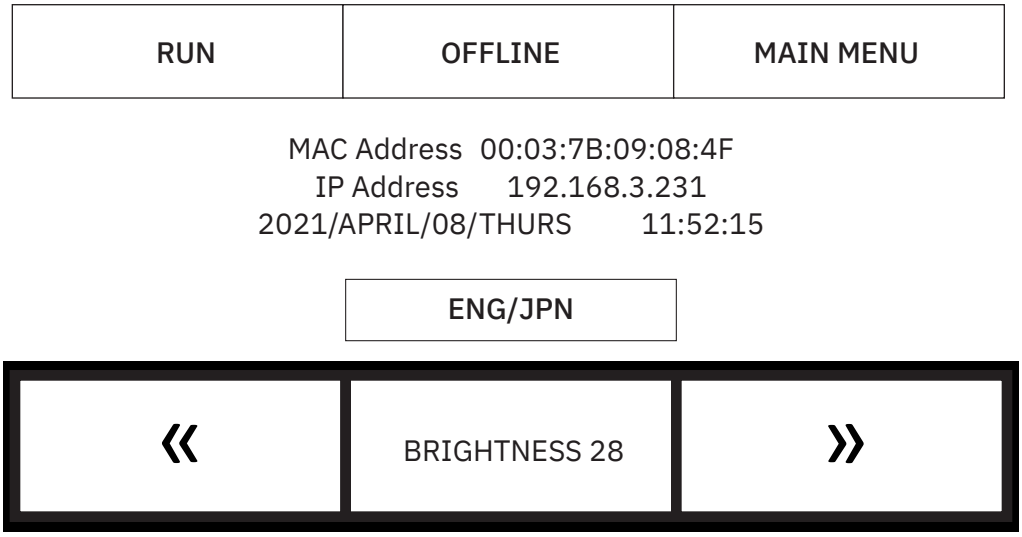


Figure 39: Setting Time Clock

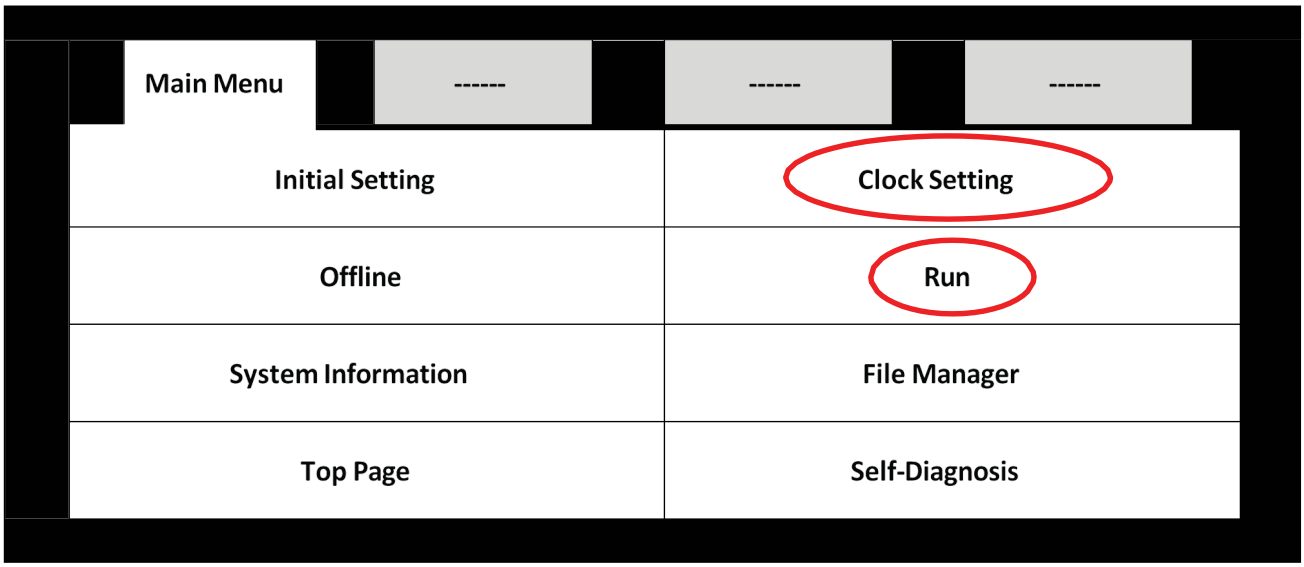
Complete the following steps to change the system clock:

1. Touch the **SYSTEM MODE** icon.
2. From the **SYSTEM MODE** screen, press the **MAIN MENU** icon.

SYSTEM MODE TOP PAGE



3. From the **MAIN MENU** screen, press **CLOCK SETTING**.



4. Use the keypad and left and right arrow keys to enter the desired date and time.
5. Press **SAVE** to return to the **MAIN MENU** screen.
6. Press **RUN** to return to the **HOME** screen.

GENERAL MAINTENANCE

The unit must be **turned off and unplugged** during any and all maintenance/service to avoid the following hazards:


Electrical Hazard


Extreme Cold Temp


Hot Touch


Hand Injury


Sharp Object

Periodic Cleaning

Beginning with the initial installation, the exterior surfaces of the ULC should be periodically wiped down using isopropyl alcohol or commercial-grade glass cleaner. Please refer to the site standard operating procedures (SOPs) for further periodic cleaning instructions.

All surfaces (internal and external) should be cleaned using isopropyl alcohol. Cleaners containing acetone can damage and remove the paint and powder coat finish on the exterior of the cabinet and should be avoided.

Note: All moving parts have been permanently lubricated and will require no maintenance.

Cleaning the Air-Cooled Condenser

It is recommended that the condenser located on the outside end of each refrigeration section be cleaned monthly. Regular cleanings will aid the heat transfer characteristics of the refrigeration system and increase its efficiency. Dust, dirt, and lint tend to accumulate on the fins of the condensing unit, obstructing the flow of air through the condenser and lowering the efficiency of the system. Use a brush with stiff bristles to loosen particles that are attached to the fins, then remove them with a vacuum cleaner.

Note: Failure to keep the condenser coil clean and free of obstructions could result in temperature loss and damage to the compressor.


Sharp Object

Cleaning and Flushing the Water-Cooled Condenser


Hand Injury


Hot Touch


Electrical Hazard

The water-regulating valve should be inspected every six months. Complete the following steps:

1. Deactivate power to the freezer.
2. Remove the side panel cover of each refrigeration section to access the compressor area.
3. Manually flush the valve and piping before and after installing, repairing, or replacing a valve to remove filings, chips, or other foreign matter.
    - Manual flushing does not affect valve adjustment. To flush the valve, insert screwdrivers under both sides of the valve spring guide and lift upward, as shown in the following diagram.

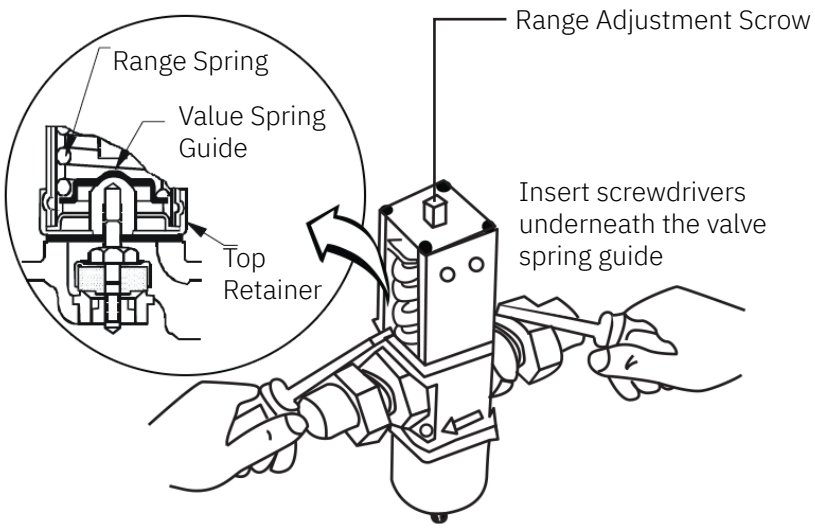


Figure 1: Manual Flushing

Gasket Maintenance

Extreme Cold Temp

Periodically check the gaskets around the door for punctures or tears. Leaks are indicated by a streak of frost forming at the point of gasket failure. Keep the door gaskets clean and free of frost by wiping with a microfiber cloth.

Defrosting the Chamber

Each machine section will perform a defrost cycle for the evaporator automatically at regular time intervals set by the user.

Depending on how often the door is opened, it may be necessary to manually defrost the chamber interior periodically. More frequent door openings create a greater need to defrost the chamber. To manually defrost the chamber:

1. Remove all product from the freezer.
2. Turn the freezer off and disconnect power from both refrigeration systems.
3. Open the doors and place towels on the chamber floor.
4. Allow the frost and/or ice to melt and become loose. Place blowers in front of the chamber to speed up the process if necessary.
5. Remove all ice and water.
6. Dry the chamber.
7. Clean the interior with a non-abrasive, non-chlorine detergent.
8. Rinse with clean water.
9. Dry the chamber again.
10. Connect the refrigeration systems to power and set the displays to AUTO.
11. Allow the freezer to run overnight before reloading the product.

Vacuum Relief Ports

Extreme Cold Temp

Periodically check each vacuum relief port located on the inside of each exterior door. Keep the vacuum relief ports clean and free of frost by wiping them with a soft cloth. The vacuum relief ports must be kept clear of ice and snow. Failure to do so will result in a longer wait time before the door can be re-opened due to the vacuum created inside the chamber.

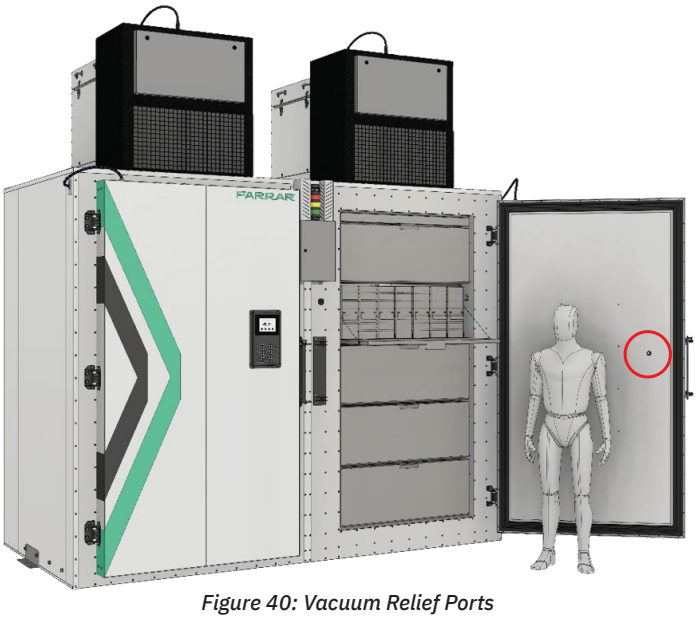


Figure 40: Vacuum Relief Ports

Evaporator Inspection

Extreme Cold Temp

The evaporator should be inspected every 12 months. To inspect the evaporator:

1. Turn off the freezer.
2. Unplug the evaporator blower power cable.
3. Remove the top of the evaporator cover by unlatching the four clamps holding the evaporator cover in place.
4. Using the handles installed, lift the evaporator cover from the machine section.
5. Visually inspect the blower wheel and check its balance by turning the blower wheel manually and checking for proper balance of the blower wheel.
6. Inspect the evaporator coil. Use a vacuum cleaner to remove any particles that are attached to the fins.
7. Look in the evaporator box and inspect the A-Coil for debris or damage.
8. Re-install the evaporator cover, ensuring that all ductwork is aligned with its mating piece.
9. Securely engage and close all four clamps.

TROUBLESHOOTING

Unit connected to power source, display not on:

1. On initial startup, qualified service personnel should verify the input voltage at the receptacle.
2. Verify input voltage on the incoming line side of the main breaker before checking if the breaker is tripped.
3. Confirm that the main circuit breaker (located in the upper-left corner of the control enclosure) is not tripped.

Electrical Hazard

Reaching inside the machine section while the unit is energized can be dangerous. Always unplug the unit and lock out the power supply before performing maintenance inside the unit.

Unit not cooling:

1. Verify that at least one of the redundant refrigeration systems is set to **AUTO** mode.
2. Verify that the temperature control set point is set to the desired level.
3. Verify that the unit door is closed. The door switch turns off the internal circulation blower and refrigeration.
4. Confirm that the access port is sealed and that there is no moisture infiltration.
5. Confirm that circuit breakers inside of the control enclosure are not tripped.

Electrical Hazard

Reaching inside the machine section while the unit is energized can be dangerous. Always unplug the unit and lock out the power supply before performing maintenance inside the unit.

Refrigeration System Failure

Problems that cause refrigeration system failure are:

- Compressor
  - Fail low amps (<2 amps)
  - Fail high amps (>20 amps)

Refer to the System Failures section of this manual for further information on system failures.

WARRANTY

FARRAR's warranty does not cover damage or misuse. Repair costs resulting from negligence, or costs associated with equipment damage, theft, loss, and/or misuse will be the responsibility of the customer. Non-warranty-related costs are to be paid by the customer.

The warranty protection extends to any subsequent owner during the warranty period. Installation and calibration are not covered by this warranty agreement.

The FARRAR Technical Services Department must be contacted for warranty determination and directions prior to any work being performed. Expendable items, i.e., glass, filters, pilot lights, light bulbs, and door gaskets are excluded from this warranty.

Replacement or repair of component parts or equipment under these warranties shall not extend the warranty to either the equipment or to the component part beyond the original two years' warranty period. The Technical Services Department must give prior approval for the return of any components or equipment.

THIS WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, WHETHER WRITTEN, ORAL, OR IMPLIED. NO WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE SHALL APPLY.

FARRAR shall not be liable for any indirect or consequential damages including, without limitation, damages relating to lost profits or loss of products.

The following sections outline the differences between North America and International warranties. All other terms and conditions follow the above.

North America

Every FARRAR ULC freezer is backed by a comprehensive 1-year parts and labor warranty that grants coverage on all controls, refrigeration components, electrical components, and ULC wall panels. An extended 3-year parts and labor warranty is also available for purchase. Please contact FARRAR or your local FARRAR distributor for more information.

International

Every FARRAR ULC freezer is backed by a 1-year parts warranty that grants coverage on all controls, refrigeration components, electrical components, and ULC wall panels. An extended 3-year parts warranty is also available for purchase. Please contact FARRAR or your local FARRAR distributor for more information.

CONTACTING FARRAR™

When contacting FARRAR or local FARRAR distributors, please have the following information readily available if service is required:

Model Number:	
Serial Number:	
Date of Purchase:	
Purchase Order:	

FOR CUSTOMER ASSISTANCE:

The FARRAR products support team is ready to answer any questions. In addition to technical support, FARRAR offers various accessories, extended warranty programs, and validation services. Please contact FARRAR at:

Corporate HQ
800-B Beaty Street, Davidson, NC 28036

Manufacturing HQ
30765 State Route 7, Marietta, OH 45750

Europe HQ
Lenneke Marelaan 6, 1932 Sint-Stevens-Woluwe Belgium

800-242-7197 | 740-374-8300 | sales@FARRARscientific.com | www.FARRARscientific.com

DOCUMENT REVISION TABLE

Revision	Description	Approval	Date
A	Original release	JL	24 Apr 2020
B	Updated water connection size	JL	16 Jul 2020
09022020_a	Updated with additional specs per NRTL inspection requests	TS	02 Sep 2020
09032020_b	Added a maximum RH value to the spec	TS	03 Sep 2020
09032020_c	Revised warranty	JL	03 Sep 2020
12042020_d	Added 32 amp mains breakers for 50 Hz models	JL	04 Dec 2020
02172021_e	Corrected shelving specifications	JL	17 Feb 2021
03192021_f	Corrected Exterior Dimensions	JL	19 Mar 2021
04162021_g	Enhanced chamber defrost. Section 11	JL	16 Apr 2021
06012021_h	Changed pictures to illustrations. Various sections	JL	01 Jun 2021
07292021_i	Add Maintenance security level to User Accounts	JL	29 Jun 2021
	Branding update and changed refrigeration operation temperature range to +2°C to +8°C	JL	21 Jun 2023
ECR-475	Revised low alarm delay and settable range for temperature low alarm	MD	17 Sep 2023
ECR-487	ULC-311 pallet size to accurately reflect W x D x H	MD	22 Nov 2023

APPENDIX A: ICONS

The following is a list of the icon symbols used throughout this manual.

Icon	Description*	Additional Information, if applicable
	Home Screen*	Takes you back to Home Screen.
	Previous Screen*	Takes you back to the prior screen.
	Next Screen*	Advances you to the next screen.
	System Setup*	Displays the system setup screens for alarms, alarm delays, defrost cycles, screen settings, service intervals and factory defaults in sequential order.
	System Health	Displays the general system health screens for primary cooling, defrost status, and system critical temperatures in sequential order.
	System Information	Displays the general information concerning the system, such as typical serial label information, software revisions, and support contact information.
	Technical Service	Allows access to the technical and service functions of the unit. These functions will typically be under log-in security protection and should only be accessed by qualified service personnel.
	Acknowledgment	Accepts the action.
	Cancel Action	This cancels the action.
	Alarm Silence	Displays during an active alarm. Touching this icon will silence the audible alarm for a period of time set up by the user. Should the alarm condition remain active, the audible will sound again at the end of the delay period.
	Warning	Displays during an active warning and is visible when a warning message is active. Touching this button displays the active warning message(s). A warning informs users that an Alarm Condition may occur if the warning conditions are not resolved within the programmed delay period. Warning example: System in defrost mode.
	Alarm	Displays during an active alarm and is visible when an alarm condition is active. Touching this button will display the active alarm condition(s). Action is required by the end user to resolve the alarm condition. Alarm examples: Door open, system failure.
	Service	Displays to indicate the system is due for maintenance or calibration.

APPENDIX B: HAZARD SYMBOLS

 Important Alert	This symbol alerts the user to important operating and/or maintenance instructions. It may be used alone or with other safety symbols. Read the accompanying text carefully.
 Electrocution	Potential electrical hazards. Only qualified service personnel should perform the instructions and procedures associated with this symbol.
 Electrical Hazard	Potential electrical hazards. Only qualified service personnel should perform the instructions and procedures associated with this symbol.
 Lock	Potentially hazardous energy. Equipment being maintained or serviced must be turned off and locked out to prevent possible injury. Reference OSHA Regulation 1910-147.
 Do Not Touch	Extreme temperature hazards, hot or cold. Instructions associated with this symbol should only be carried out when using special handling equipment or when wearing special, protective clothing.
 Hot Touch	Extreme hot temperature hazards. Instructions associated with this symbol should only be carried out when using special handling equipment or when wearing special, protective clothing.
 Extreme Hot Temp	Extreme hot temperature hazards. Instructions associated with this symbol should only be carried out when using special handling equipment or when wearing special protective clothing.
 Extreme Cold Temp	Extreme cold temperature hazards. Instructions associated with this symbol should only be carried out when using special handling equipment or when wearing special protective clothing.
 Pinch Point	Potential hazard “Pinch Point.” Keep hands clear during operation.
 Sharp Object	Potential hand injuries from sharp objects. Instructions associated with this symbol should only be carried out when wearing special protective clothing.
 Hand Injury	Potential hand injury. Instructions associated with this symbol should only be carried out when wearing special protective clothing.

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