FARRAR®

FARRAR® CYCLONE™ SERIES

ULTRA LOW TEMPERATURE FREEZER

SERVICE AND MAINTENANCE MANUAL

Document History

Revision	Date	CO	Supersession	Revision Description
A	*APR 10 2025	27489	n/a	Initial release.
B	*OCT 21 2025	30063	B supersedes A	• Corrected typos • Updated Set Point screenshot in Section 3.3 • Updated temperature alarm testing instructions Section 4.1 Alarm Tests • Updated refrigerant charge table in Section 5.1 • Added Adaptive Defrost instruction in Section 5.2

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

Document Updates

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The images appearing in this guide are provided for illustrative purposes only, and may vary slightly from the actual product components.

Contents

1 About this Manual

1.1 Intended Audience

This manual provides information on how to use the CYCLONE™ SERIES freezer. It is intended for use by end users of the freezer and authorized service technicians.

1.2 Model Reference

The FARRAR CYCLONE 900 series have over 900 liters of storage space. A distinguishing model number that corresponds to the type, volume in cu. ft. For example, FCF-133 refers to a FARRAR CYCLONE Freezer with one door and a total volume of 33 cu. ft.

1.3 Intended Use

The FARRAR® CYLCONE™ is intended for life science applications and addresses the needs and requirements of biopharmaceutical, biorepository, and research industries. This unit provides manufacturers and companies charged with housing drug products and reagents a solution that meets their -20°C to -80°C pre-clinical to production scale needs.

1.4 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 FARRAR products.

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

Symbols found on the units

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


Caution: Risk of damage to equipment or danger to operator


Caution: Shock / electrical hazard


Caution: Hot surface


Warning: Low temperature / freezing conditions, frostbite


Warning: Flammable material


Refer to documentation


Earth / ground terminal

1.5 Avoiding Injury

- Do not use mechanical devices or other means to accelerate the defrosting process, other than those recommended by the manufacturer.
- Do not damage the refrigerant circuit.
- Ensure unit is powered off and unplugged prior to performing service or maintenance to prevent an electrocution hazard.

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 risk of ignition by using only manufacturer supplied components and authorized personnel when servicing the unit.
- Avoid removing 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 refrigeration compartment.
- Proceed with caution when adding and removing product from the freezer.
- Always dissipate extreme temperatures, especially inside the control space before performing any maintenance on the unit.
- Use only manufacturer supplied power cord.
- Using the equipment in a manner not specified by FARRAR may impair the protection provided by the equipment.
- Ensure product is 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 FARRAR or your distributor for decontamination instructions and a Return Authorization Number.

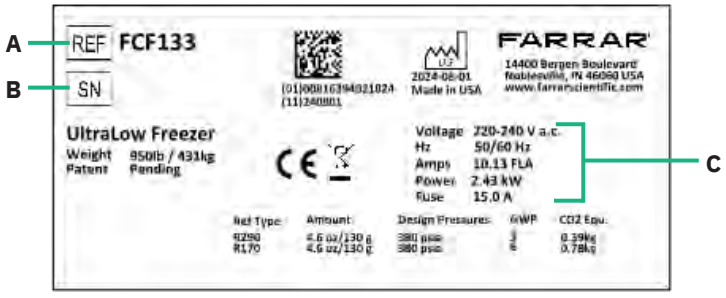
1.6 Model and Input Power

Model and Input Power

Model	Voltage	Frequency	Current Draw
133	220-240V	50/60 Hz	10.13 A

1.7 Product Labels

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



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

Sample Product Specification label
(For illustration only: regulatory information and other content shown here may differ from that on the equipment label)

2 Temperature Monitoring

2.1 Prepare for Monitoring

The FARRAR® CYCLONE™ Series freezer is equipped with a rechargeable 12V sealed lead acid battery providing backup power to the HMI monitoring and control system. The battery is located in the right side of the refrigeration system at the top of the freezer and is switched off for shipping. Switch the battery on to provide the HMI with backup power in the event of an AC power failure.

Temperature Sensor

The HMI monitoring and control system has an independent control/display sensor (100 OHM 3 wire stainless steel RTD, +/- 0.15°C). The sensor is located in the duct panel at the top of the cabinet.

Temperature Sensor

Additional Sensors

Three top-mounted access ports on the refrigeration system and cabinet allow for usage of a building management system (BMS) or supervisory control and data acquisition (SCADA) temperature monitoring probe. Each port is 1.0 in. (2.54 cm) in diameter. The interior and exterior access ports are sealed and insulated to reduce moisture infiltration. After installing an additional sensor in an external port, replace the insulation and reseal the port both inside and outside of the cabinet to help prevent moisture infiltration and reduce the risk of ice buildup.

Access Ports

NOTICE

Failure to properly seal the access port on both the interior and exterior may result in moisture infiltration leading to ice buildup on evaporator coils and impacting the performance of the unit.

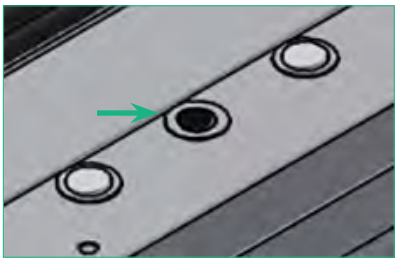
Notes

- Installation of an optional third party probe should be completed prior to powering the unit on.
- Temperature probes are fragile; handle with care.

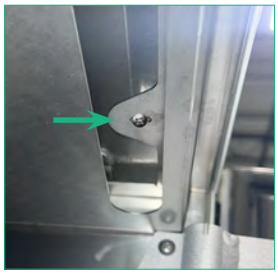
Install Additional Sensor

1. Switch the main power switch to OFF. Disconnect the AC power cord from the power receptacle.
2. Lift up on the front facia panel on both ends until the shoulder bolts clear the key slots. Pull the panel away from the freezer and set aside.

3. Turn the backup battery switch OFF.
4. Use a slotted screwdriver to unlock the front panel locks by turning the locks a quarter turn. Rotate the panel upward to disengage the hinge tabs from the slots on top to remove the panel and set it aside.



Pass Thru Access Ports (inside refrigeration system)



Duct Panel Screw

Control/Monitor Sensor

5. At the front of the refrigeration system module, remove the cap from a pass thru access port for the 3rd party probe.
6. Inside the freezer, use a Phillips screwdriver to remove the two screws that secure the duct panel to the top of the chamber and set aside.
7. Pull the duct panel out slowly until you see the control/monitor sensor. Slide the control/monitor sensor out to remove it from the holder.
8. Remove the duct panel from the freezer and set it aside.

Access Port Cap

Routing 3rd Party Probe

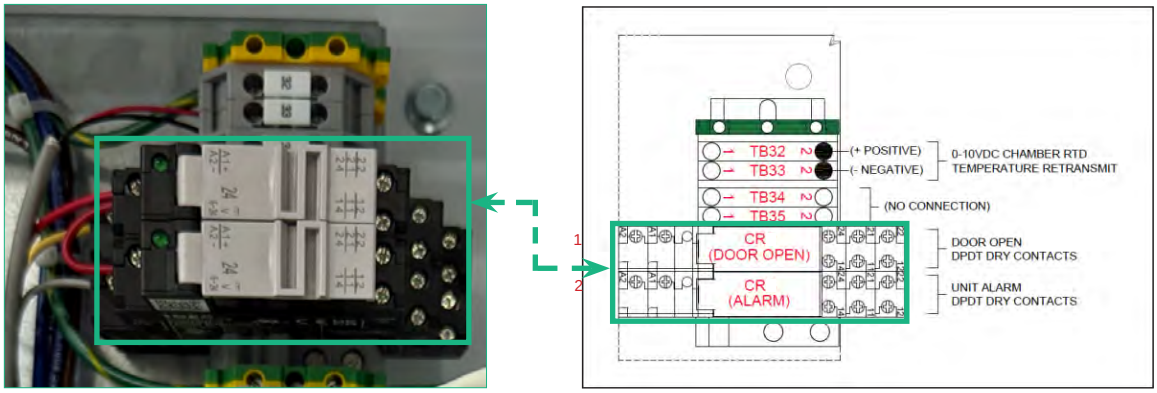
9. Inside the freezer chamber, remove the cap from the pass-thru access port and remove the insulation from the port.
10. Route the 3rd party probe through the access port at the top of the freezer, through the pass thru port in the refrigeration system module and down into the chamber.
11. Inside the freezer chamber, reinstall the insulation and seal the pass thru access port with Permagum putty ensuring a tight seal.
12. At the front of the refrigeration system module, install Permagum putty at the pass thru access port ensuring a tight seal.
13. Align the duct panel with the rails at the top of the chamber and slide the panel leaving clearance to reinstall the control/monitor sensor into the holder.
14. Reinstall the control/monitor sensor and the 3rd party probe into the holder.

15. Complete the installation of the duct panel and ensure the panel is flush with the front of the chamber and not bowed in the middle. Secure the duct panel with the two screws using a Phillips screwdriver.
16. Reinstall the front panel to the refrigeration system module. Angle the panel so the hinge tabs slide under the top cover panels. Rotate the panel down so the lock arms seat into the clearance slots. Use a slotted screwdriver to lock the panel in place, turning each lock a quarter turn in the opposite direction as when removed.
17. Turn the battery backup power switch ON.
18. Reinstall the front facia panel by inserting the shoulder bolts into the key slots and seating them in the bottom of the slots.
19. Reconnect the AC power cord. Switch the main power switch to ON.

2.2 External Monitoring Devices

A remote alarm interface is a relay switch with three terminals. Terminals are dry contacts and do not supply voltage. Two terminals exist as shown in the diagram below. One terminal activates when the door is open, and the other activates for any alarm condition. Connections are made to a terminal strip located inside the control panel. Each set of contacts is electrically isolated from the other contacts. The interface circuit is either normally open or normally closed, depending on terminals used. Both sets of contacts are normally open when the chamber is powered off. A temperature retransmit with a 0-10V output is provided at terminal blocks TB32(+) and TB33(-) in the electrical panel.

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

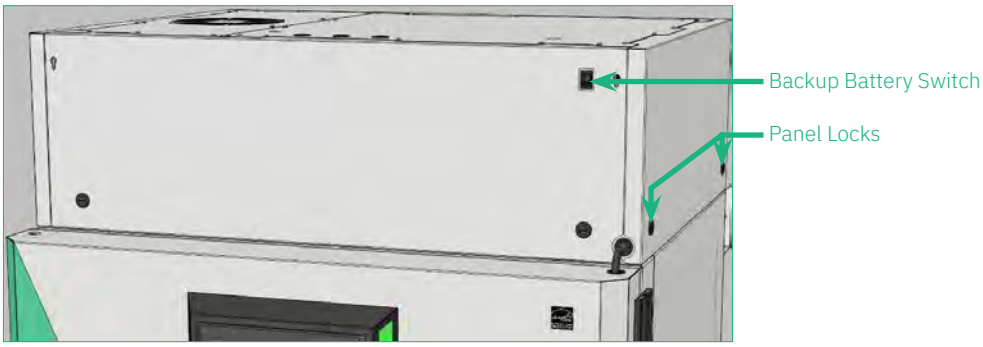


Remote Alarm Interface

Terminals	Position	Description	Function	Rating
CR1	11 | 21	Common	Relay coil is energized when the unit door is opened	Minimum: 5VDC, 10mA Maximum: 250VAC, 6A
	14 | 24	Normally Open		
	12 | 22	Normally Closed		
CR2	11 | 21	Common	Relay coil is energized when unit alarm is triggered	Minimum: 5VDC, 10mA Maximum: 250VAC, 6A
	14 | 24	Normally Open		
	12 | 22	Normally Closed		

Connect to Remote Alarm Interface

1. Switch the main power switch to OFF. Disconnect the AC power cord from the power receptacle.
2. Lift up on the front facia panel on both ends until the shoulder bolts clear the key slots. Pull the panel away from the freezer and set aside.



3. Turn the backup battery switch OFF.
4. Use a slotted screwdriver to unlock the right side panel locks turning each lock a quarter turn. Rotate the panel upward to expose the electrical compartment and disengage the hinge tabs from the slots on top to remove the panel and set aside.
5. Locate the remote alarm terminals on the far right side of the electrical compartment.
6. Route the alarm wires through the access port located on the back of the unit above the Ethernet port and into the electrical compartment.
7. Connect the remote alarm wires to the appropriate terminals, according to requirements for your alarm system.
8. Use a cable tie to relieve strain on alarm wires (as necessary).
9. Reinstall the right side panel to the refrigeration system module. Angle the panel so the hinge tabs slide under the top cover panel. Rotate the panel down so the lock arms seat into the clearance slots. Use a slotted screwdriver to lock the panel in place, turning each lock a quarter turn in the opposite direction as when removed.
10. Turn the battery backup power switch ON.
11. Reinstall the front facia panel by inserting the shoulder bolts into the key slots and seating them in the bottom of the slots.
12. Reconnect the AC power cord. Switch the main power switch to ON.

3 Controls

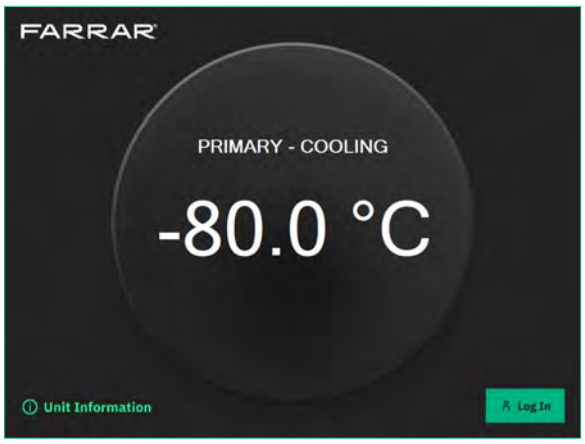
CYCLONE freezers are equipped with a human-machine interface (HMI) allowing users to monitor and manage performance. All functions and set points can be accessed on the HMI located on the exterior of the door.

3.1 Home Screen

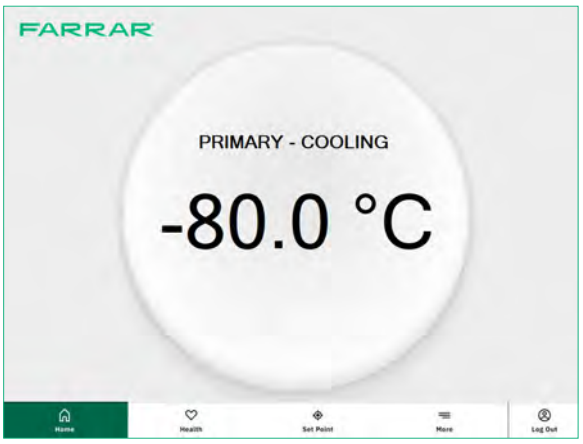
Note

The IDLE screen appears when:

- The unit is first powered on.
- The controller is left unattended for more than five (5) minutes.
- The Log Out icon is selected.



IDLE Screen



Home Screen (after login)

3.2 Home Screen Functions

Note

Refer to the HMI User Guide for options available on all HMI screens.

- View current interior cabinet temperature reading.
- View mode of operation (PRIMARY – COOLING, PRIMARY – CYCLED OFF, DEFROST, or OFF).
- View current alarm events.
- Mute audible alarms.
- Access additional functions (touch the **More** button for additional applications and information).

3.3 Alarm and Warning Conditions

Alarms and warnings activate for a number of circumstances indicating the unit needs attention. Alarms are visual, audible and sent through the remote alarm interface. Alarm occurrences also appear on the Alarm Log. Warnings provide a visual indication on the display and do not appear in the alarm log. Light bar indicators on each side of the HMI display may change colors or flash to signify the condition of the unit. Alarms and Warnings along with their light indications are listed in the tables below.

Note

The Refrigeration System Failure warning will appear when one or more of the Alarms listed below occur. The Refrigeration System Failure warning can only be cleared by viewing the alarm log screen.

- Control and Evaporator Coil Probe Failure occurs simultaneously
- Evaporator Coil Low Temperature (> 2 minutes)
- ISHX High Temp
- ISHX Low Temp
- ISHX Probe Failure
- 1st Stage Compressor High Pressure
- 2nd Stage Compressor High Pressure

Alarm Reference

Alarm	Light	Flashing/ Solid
High Temperature	Red	Flashing
Low Temperature	Red	Flashing
Control Probe Failure	Red	Flashing
Extended Door Opening *(> 1 minute)*	Red	Flashing
1st Stage Compressor High Pressure	Red	Flashing
2nd Stage Compressor High Pressure	Red	Flashing
ISHX Probe Failure	Red	Flashing
ISHX High Temperature	Red	Flashing
ISHX Low Temperature	Red	Flashing
Evaporator Coil Low Temp *(Alarm activates after two (2) minutes. Occurrence appears on the Alarm Log immediately.)*	Red	Flashing
Evaporator Coil Probe Failure	Red	Flashing
Drain Pan Probe Failure	Red	Flashing
Refrigeration System Failure	Red	Flashing
Internal System Communication Failure	Red	Flashing
AC Mains Power Failure	Red	Flashing

Warning Reference

Warnings	Light	Flashing/ Solid
Door Open Warning *(< 1 minute)*	Yellow	Flashing
Door Switch Disabled Warning	Green	Solid
Low Backup Battery Warning	Green	Solid
Battery Inputs Disabled Warning	Green	Solid
Low PLC Backup Battery Warning	Green	Solid
Defrost Event Warning	Yellow	Solid
Defrost Timeout Warning	Green	Solid
Maintenance Warning	Green	Solid
Calibration Warning	Green	Solid

3.4 System Settings

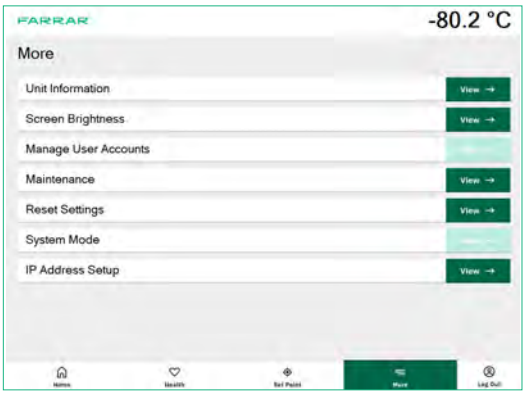
The HMI controller is programmed at the factory. Current settings may be viewed and changed through the HMI. Some features may be hidden or not selectable based on privileges assigned to the user type. Operator privileges or above are required to change any controller settings. Supervisor or Service level access is required to modify set points.

Notes

- Password protected user access levels define the privileges provided to individual users. FARRAR recommends creating the Administrator account with a unique user name and password upon first login.
- Only a user with the Administrator access can assign user access levels.
- Only a user account with Supervisor or Service level access may change set point settings.
- Default chamber temperature set point is -80°C. The lowest set point that can be set is -80°C.
- Default values for general settings, alarm settings, and display settings are available in the HMI User Guide.
- Changing temperature settings affects the operation of the freezer. Do not change settings unless instructed in product documentation or by FARRAR Technical Service.

More Screen

The More screen provides a menu of options for monitoring and maintaining the system. Buttons across the bottom of the screen and access to View options for each line will vary based on assigned user access. Actionable View buttons appear darker in color.



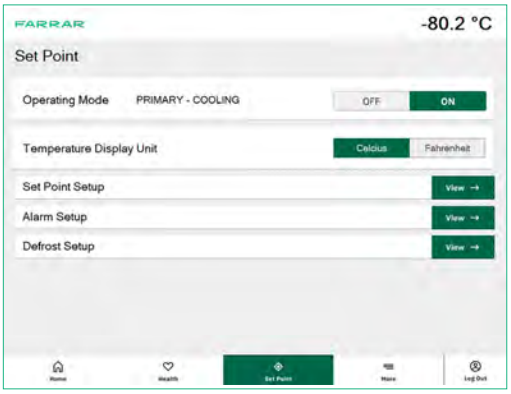
More screen

Set Points

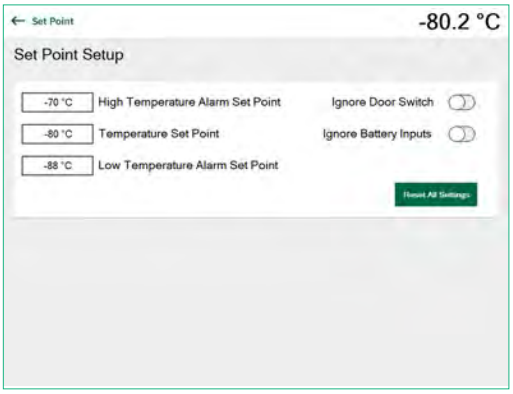
Current settings can be viewed and changed by touching the Set Points button at the bottom of the display to open the Set Points screen. The unit Operating Mode appears at the top of the Set Point screen indicating the current status of the system and allows the user to cycle the unit ON or OFF.

Notes

- Only users with Supervisor or Service level privileges can make changes to the set point settings.
- Users with Maintenance, Supervisor or Service level privileges can change the Operating Mode.
- FARRAR does not recommend changing the Operating Mode unless performing a manual defrost.



Set Point screen



Set Point Setup screen

Note

The available Temperature Set Point range is -20°C to -80°C.

Change Temperature Set Points

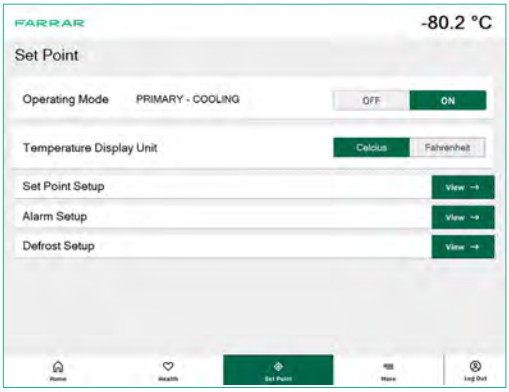
1. Select **View** button on the Set Point Setup line. The Settings screen appears.
2. Touch the **Temperature Set Point**, **High Temperature Alarm Set Point** or **Low Temperature Alarm Set Point** box. A numeric keypad appears.
3. Enter the desired set point and press **Enter** to save or **X** to exit without saving.
4. Select the Set Point screen return arrow ← Set Point to return to the Set Point Screen followed by the **Home** button to return to the Home screen.

User Configurable Alarm Settings

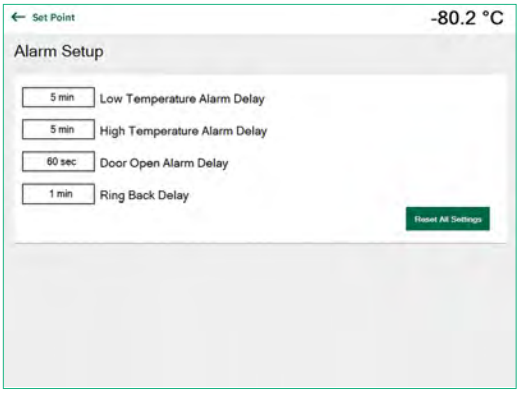
The following alarm settings may be changed by a Supervisor or Service level user. The set point for temperature alarms may be changed, as well as the time delay between when the alarm condition begins and when the visual and audible alarms are initiated.

User Configurable Alarms

Setting	Description	Settable Range	Default Set point	Default Time Delay
High Temperature	High temperature at which alarm condition occurs	-80°C to 30°C	-70.0 °C	5 minutes
Low Temperature	Low temperature at which alarm condition occurs	-99°C to -40°C	-88.0 °C	5 minutes
Door Open (Time)	Time door remains open until alarm sounds	5-300 seconds	n/a	30 seconds



Set Point screen



Alarm Setup screen

Note

The Ring Back Delay indicates the duration an audible alarm is muted. The settable range for the delay is 1 to 3000 minutes.

Change Alarm Delay Time

1. Select **View** button on the Alarm Setup line. The Alarm Setup screen appears.
2. Touch the desired **Alarm Delay** box. A numeric keyboard appears.
3. Enter the desired delay setting and press **Enter** to save or **X** to exit without saving.
4. Select the Set Point screen return arrow ← Set Point to return to the Set Point screen followed by the **Home** button to return to the Home screen.

Non-Configurable Alarms

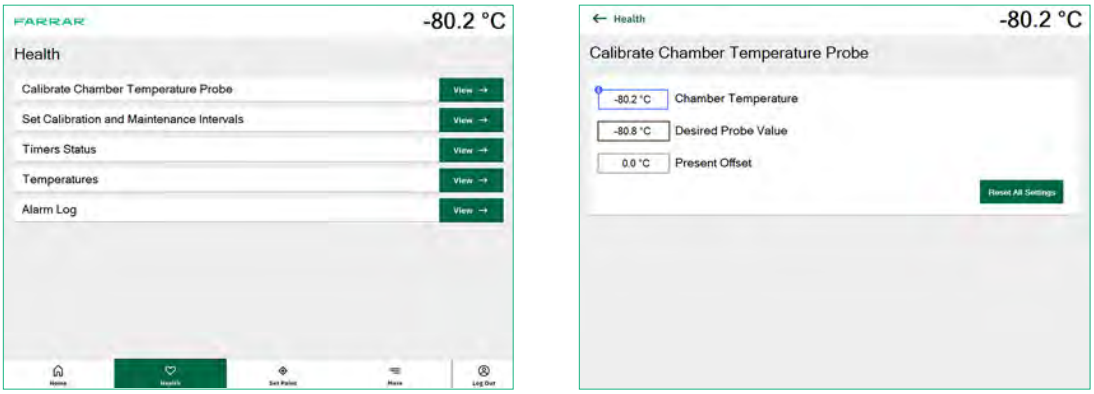
The following alarms indicate operational conditions which require the attention of the operator or a qualified service technician.

Non-Configurable Alarms

Alarm	Description
Control Probe Failure	No temperature reading detected for more than 5 seconds
AC Mains Power Failure	AC line voltage has failed
Refrigeration System Failure	One of the key components of the refrigeration system is operating outside allowable limits
1st Stage Compressor High Pressure	1st stage compressor high pressure cuts off
2nd Stage Compressor High Pressure	2nd stage compressor high pressure cuts off
ISHX High Temperature	Interstage heat exchanger is warmer than set limit
ISHX Low Temperature	Interstage heat exchanger is colder than set limit
ISHX Probe Failure	No temperature reading detected for more than 5 seconds
Evaporator Coil Low Temp	Evaporator coil is colder than set limit
Evaporator Coil Probe Failure	No temperature reading detected for more than 5 seconds
Internal System Communication Failure	Communication is lost between HMI and PLC *(programmable logic controller)*
Battery Inputs Disabled	Backup battery is disconnected or voltage is depleted

3.5 Sensor Calibration

Sensor calibration values are programmed at the factory. Calibration values can be viewed and changed through the HMI. To view calibration settings, touch the **Health** button at the bottom of the screen, followed by the Calibrate Chamber Temperature Probe **View** button.



Sensor Calibration screens

NOTICE

Changing calibration settings affects operation of the freezer. Do not change settings unless instructed in product documentation or by FARRAR Technical Service.

Chamber Temperature Probe

Verify the chamber temperature probe is reading the chamber temperature correctly by comparing the probe reading on the HMI display to the temperature measured by a calibrated reference thermometer. If the probe is not reading correctly, change the value displayed on the monitor.

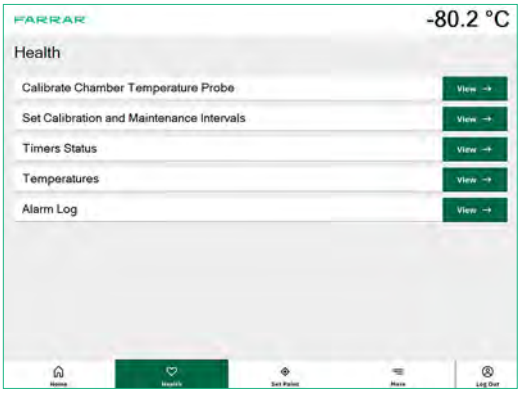
Use appropriate gloves when handling cold interior components and stored inventory.

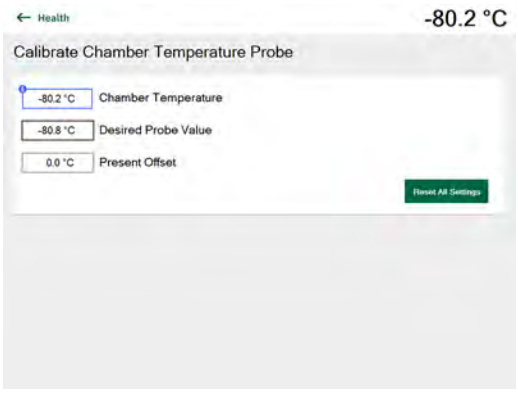
Notes

- Only Maintenance, Supervisor or Service level users may perform temperature probe calibration.
- The chamber temperature probe is factory-calibrated and should be verified on an annual basis. Calibrate when required or as dictated by facility standard operating procedures.
- Before performing calibration, protect items in the freezer from extended exposure to adverse temperature.
- Regular calibration intervals can be scheduled through the Set Calibration and Maintenance Intervals screen. Refer to instructions for setting intervals provided in the HMI User Guide.
- The chamber temperature probe is 100 Ω stainless steel RTD.
- Calibration must be done with an independent thermometer that is calibrated and traceable per national standards.
- Initial factory calibration settings vary.
- If the PRESENT OFFSET value is more than ±5 °C, a message will appear warning of an excessive calibration offset.
- Typical offset values should not exceed ±1 °C under most conditions.

Calibrate chamber temperature/control probe

1. Refer to the ***Install Additional Sensor*** instructions found in ***Section 2.1*** of this manual to install an independent reference thermometer calibrated and traceable to national standards next to the chamber temperature probe.
2. Once installed, ensure that pass thru ports are tightly sealed, close the door and reassemble the unit.
3. Allow the chamber temperature to stabilize, then read the temperature on the reference thermometer.
4. Log into the HMI using a Maintenance, Supervisor or Service level password.
5. Select the **Health** button at the bottom of the HMI display. The Health screen appears.



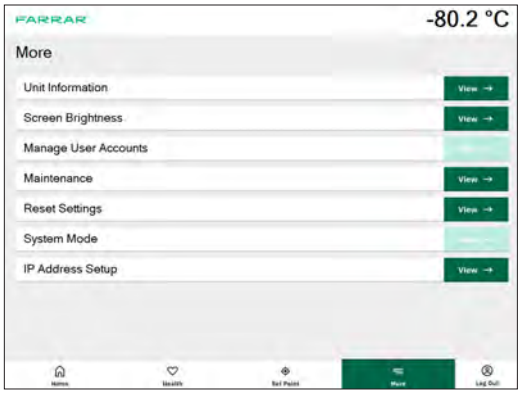


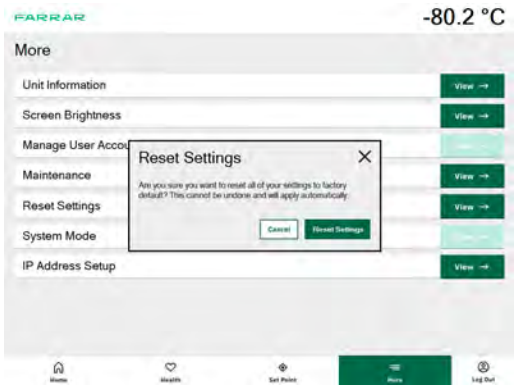
6. Select the **View** button for Calibrate Chamber Temperature Probe. The Calibrate Chamber Temperature screen appears.
7. Touch the **Desired Probe Value** box. A numeric keyboard will appear.
8. Enter the temperature reading from the reference thermometer and press **Enter**. The new Chamber Temperature and Present Offset readings will update automatically to reflect the calibrated values.
9. Follow the ***Install Additional Sensor*** instructions to access and remove the calibrated reference thermometer.
10. Reassemble the freezer as outlined in ***Install Additional Sensor*** instructions and return power to the unit.
11. Select the **Health** arrow ← Health to go back to the Health screen, then select the **Home** button to return to the Home screen.

Factory Default Settings

Restored Settings

Setting	Restored Value
Chamber Set Point	-80°C
High Temperature Alarm Set Point	-70°C
High Temperature Alarm Delay	5 minutes
Low Temperature Alarm Set Point	-88°C
Low Temperature Alarm Delay	5 minutes
Door Open Alarm Delay	30 seconds
Ring Back Delay	1 minutes
Defrost Termination Temperature	10°C
Defrost Cycle Time	24 hours
Defrost Max Time	30 minutes
Calibration Interval	12 months
Maintenance Interval	12 months





Note

- The factory default settings may not be the same as the settings that were factory-calibrated before the freezer was shipped.
- Only users with a Service Level password may restore factory settings.

Restore Settings

1. Touch the **More** button. The More screen appears
2. Touch the Reset Settings **View** button. The Reset Settings confirmation box appears.
3. Touch the **Reset Settings** button to confirm, or **Cancel** button to cancel.

4 Maintenance

Maintenance tasks should be completed according to the schedule below.

Ensure unit is powered off and unplugged prior to performing service or maintenance to prevent an electrocution hazard.

NOTICE

- Maintenance should only be performed by trained refrigeration technicians.
- Review all safety instructions prior to performing maintenance.

Notes

- It is important to ensure that all scientific equipment is maintained regularly for optimum performance.
- These are recommended minimum requirements. Regulations for your organization or physical conditions at your facility may require maintenance items to be performed more frequently, or only by designated service personnel.
- Allow the freezer temperature to stabilize at the set point after performing service.

Preventive Maintenance Schedule

Task	Frequency			
	Quarterly	Annually	2 years	As Needed
Verify the monitor/chamber temperature sensor accuracy. Calibrate the sensor if necessary.		✓		
Test the High and Low chamber alarms.	✓			
Test the Power Failure alarm (as required by your organization's protocols).				✓
Test the Door Open alarm.		✓		
Inspect electrical components and wiring terminals in the electrical box for discoloration. Contact FARRAR Technical Service if any discoloration is found.		✓		✓
Inspect and replace the condenser filter.				✓
Replace the system backup battery			✓	
Inspect and clean the vacuum relief port				✓
Defrost and clean the chamber, exterior door gasket, and inner doors.				✓

4.1 Alarm Tests

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

Use appropriate gloves when handling cold interior components and stored inventory.

NOTICE

Avoid sharp edges when working inside the refrigeration compartment.

Notes

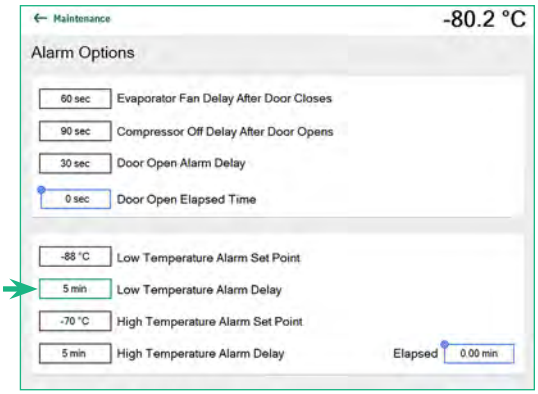
- Before testing alarms, protect items in freezer from extended exposure to adverse temperature.
- If the HMI did not display the appropriate alarm during the alarm test, contact FARRAR Technical Service.
- Temperature sensors are fragile; handle with care.
- Only users with a Supervisor or Service Level password may perform alarm testing.

Change temperature alarm delay

Notes

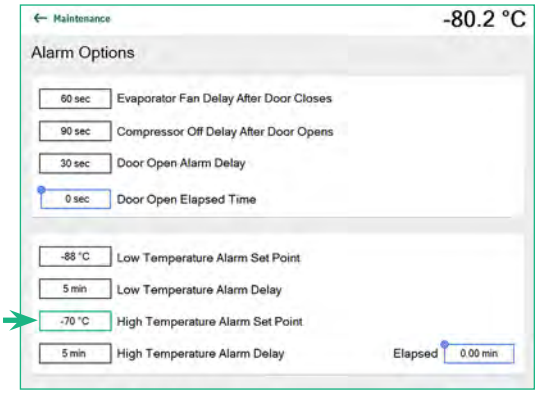
- FARRAR recommends changing the Temperature Alarm Delay setting to the lowest possible value prior to performing the High Temp and Low Temp alarm tests.
- The High and Low Temp alarm delay range is 0 - 120 min

1. Log in using a Service level password.
2. Select the **More** button at the bottom of the screen. The More screen appears.
3. Select the **View** button on the Maintenance line. The Maintenance screen appears.
4. Use the scroll arrows at the right of the screen to scroll to the second page.
5. Select the **View** button on the Alarm Options line. The Alarm Options screen appears.
6. Touch the desired **Alarm Delay** box. The selected box turns green and a numeric keypad appears.
7. Enter the desired time delay then touch the **Enter** button to save.
8. Touch the Maintenance back arrow to return to the Maintenance screen.
9. Touch the More back arrow to return to the More screen.
10. Touch the **Home** button to return to the Home screen or the **Logout** button to log out of the HMI.



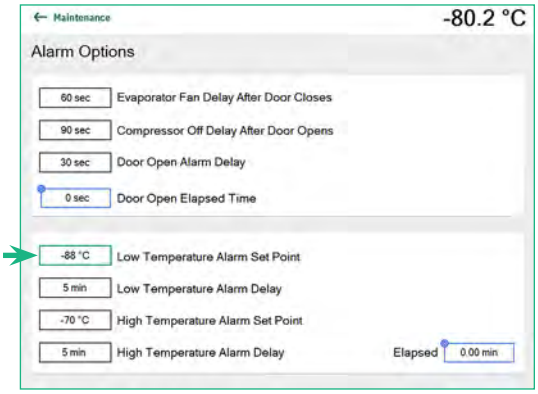
Test the high temperature alarm

1. Log in using a Service level password.
2. Select the **More** button at the bottom of the screen. The More screen appears.
3. Select the **View** button on the Maintenance line. The Maintenance screen appears.
4. Use the scroll arrows at the right of the screen to scroll to the second page.
5. Select the **View** button on the Alarm Options line. The Alarm Options screen appears.
6. Touch the **High Temperature Alarm Set Point** field. The selected box turns green and a numeric keypad appears.
7. Enter a set point below the current Temperature set point and press **Enter** to save. The alarm should activate within the new time delay setting.
8. Return the High Temperature Alarm Set Point to its original setting. The High Temp alarm will clear, the audible alarm will cease and the indicator lights will return to green.



Test the low temperature alarm

1. Log in using a Service level password.
2. Select the **More** button at the bottom of the screen. The More screen appears.
3. Select the **View** button on the Maintenance line. The Maintenance screen appears.
4. Use the scroll arrows at the right of the screen to scroll to the second page.
5. Select the **View** button on the Alarm Options line. The Alarm Options screen appears.
6. Touch the **Low Temperature Alarm Set Point** field. The selected box turns green and a numeric keypad appears.
7. Enter a set point above the current Temperature set point and press **Enter** to save. The alarm should activate within the new time delay setting.
8. Return the Low Temperature Alarm Set Point to its original setting. The Low Temp alarm will clear, the audible alarm will cease and the indicator lights will return to green.



Power Failure Alarm Test

Note

Do not switch the backup battery switch OFF during a power failure test.

1. Switch the AC ON/OFF switch **OFF**. The power failure alarm will activate immediately.
2. Switch the AC ON/OFF switch **ON**. The power failure alarm will clear, the audible alarm will cease and the indicator lights will return to green.

Test the (extended) Door Open Alarm

Note

The Door Open Elapsed Time value cannot be changed.

1. Open the freezer door and keep open until the alarm delay time has passed *(30 seconds)*. The warning message will change to an alarm banner, an audible alarm will sound and the indicator lights will change from flashing yellow to flashing red.
2. Close the freezer door. The Door Open Alarm will clear, the audible alarm will cease and the indicator lights will return to green.

4.2 Test and Replace Backup Battery

When power is lost, the HMI controls will remain powered if the backup battery switch is turned on and the battery has power. Warning indications appear on the HMI when power is lost.

Notes

- During a power failure, the backup battery provides power to the control system and power failure alarm. If the backup battery is not functioning, the power failure alarm will not be activated.
- If the backup battery does not provide power to the control system during the power failure alarm test, replace the battery.

Test the Backup Battery

1. Switch AC power switch OFF.
2. The HMI screen should continue to display information. If the screen is blank, replace the battery.
3. Once verified, switch the AC power switch ON.

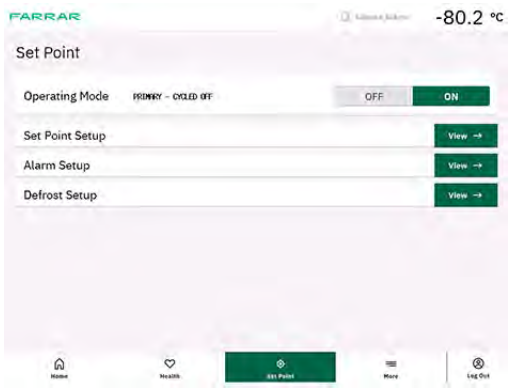
Replace Backup Battery

Contact FARRAR Technical Service to order a Backup Battery service kit. Follow instructions for replacement included with the service kit.

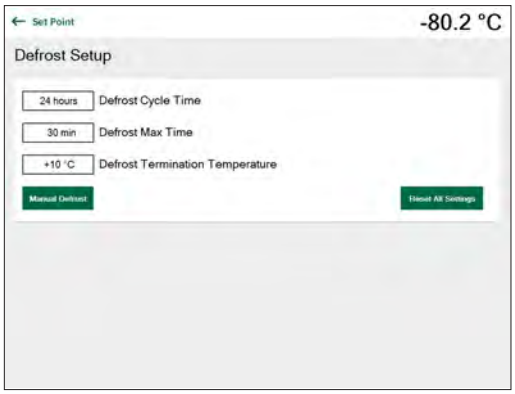
4.3 Automated Evaporator Defrost

The CYCLONE Series controller is designed to properly maintain the temperature set point and initiate an automatic defrost of the evaporator coil. A preprogrammed automatic defrost system keeps the evaporator coil clear allowing the freezer to maintain airflow through the chamber. During the defrost period, the system blower will be turned off and the defrost mode will activate. The unit will complete the defrost cycle quickly to maintain uniformity within the chamber. After a defrost cycle has ended, the refrigeration system will recondition the system to match the set point.

A manual defrost may be initiated between scheduled defrost cycles by selecting the Manual Defrost button. The Operating Mode must be ON and defrost setup parameters can not be changed when initiating a manual defrost. Manual Defrost may be used when a temporary change in operating conditions results in ice build up on the evaporator coil.



Set Point screen



Defrost Setup screen

Notes

- Consult FARRAR Technical Service before changing any defrost setting.
- Only users with a Supervisor or Service Level password may change defrost settings.

Set Defrost Parameters

1. Select the **Set Point** button at the bottom of the screen. The Set Point screen appears.
2. Select the **View** button next to Defrost Setup. The Defrost Setup screen appears.
3. Select the defrost parameter(s) you wish to set. A numeric keypad appears.
4. Enter the desired time and/or temperature and press **Enter** to save or **X** to exit without saving.
5. Select the Set Point screen return arrow ← Set Point to return to the Set Point screen followed by the **Home** button to return to the Home screen.

4.4 Upgrade System Firmware

FARRAR may occasionally issue updates for the HMI firmware. Follow upgrade instructions included with the firmware update.

4.5 Clean CYCLONE Freezer

Use appropriate gloves when handling cold interior components or stored inventory.

NOTICE

- Avoid sharp edges when cleaning and installing the condenser grill and filter.
- Protect items in freezer from extended exposure to adverse temperature.
- Allow chamber temperature to stabilize at set point before moving product back into the freezer.

Clean Vacuum Relief Port

For optimal performance, the vacuum relief port located on the inside of the exterior door must be checked and cleaned periodically. The port must be kept clear of ice and snow to prevent a longer wait time before the door can be re-opened. Use a soft dry cloth to wipe the vacuum relief port and remove any residue.

Defrost and Clean Interior

Frost accumulation is normal. The freezer chamber and interior doors must be periodically defrosted to prevent excessive frost from interfering with door operation and storage of product, or the freezer's ability to maintain temperature.

Defrost the chamber if the freezer door or interior doors do not operate correctly, or if the freezer cannot maintain the chamber set point temperature.

- Do not use a secondary heat source to defrost the freezer chamber. The use of an electrical heat source (such as a heat gun) could create an electrocution hazard if the user comes into contact with water from the defrosted chamber.
- Use appropriate gloves when handling cold interior components and stored inventory.

NOTICE

- Keep hands away from pinch points when closing the door.
- Defrosting the freezer will create excessive water in the work area. Take necessary precautions to prevent slip hazards.
- Before defrosting the chamber, protect items in the freezer from extended exposure to adverse temperatures.
- Do not use a secondary heat source to defrost the freezer. The use of a secondary heat source (such as a heat gun) may create additional pressure within the refrigeration system and may damage system components.
- Allow chamber temperature to stabilize at set point before moving product back into the freezer.

Notes

- FARRAR® recommends vacuuming out the frost that has accumulated in the chamber to reduce water pooling inside the chamber.
- All moisture must be removed before powering the freezer on. Any remaining moisture will refreeze in the chamber and may require more frequent defrosting.

Defrost and Clean Chamber

1. Turn the freezer OFF and disconnect the power cord from the power receptacle.
2. Lift up on the front facia panel on both ends until the shoulder bolts clears the key slots. Pull the panel away from the freezer and set aside to reveal the backup battery switch on the front cover panel.

3. Switch the backup battery switch OFF.
4. Open the chamber door and all interior doors a minimum of 6" (152 mm).
5. Place towels on the chamber floor.
6. Allow the freezer to set letting accumulated frost melt.

Note

FARRAR recommends supplementing the drying process by returning power to the unit and turning the evaporator blower motor ON or placing blowers in front of the chamber for eight (8) hours or until the interior is stabilized at ambient temperature. Power must be shut off and disconnected before proceeding to **Step 7**.

7. Once defrost is complete, wipe the interior surfaces, doors and door gaskets with a dry cotton cloth to remove all moisture.
8. Clean the interior surfaces and door gasket with a soft cotton cloth and non-abrasive, non-chlorine liquid cleaner.
9. Rinse with clean water and dry all surfaces again with a dry cotton cloth.
10. Close the interior doors and chamber door.
11. Remove any accumulated moisture from the floor around the unit.
12. Reconnect the power cord and power the unit ON.
13. Switch the backup battery switch ON.
14. Reinstall the front facia panel, by inserting the shoulder bolts into the key slots and seat in the bottom of the slot.
15. Allow the temperature to stabilize before moving inventory back in the unit.

Defrost and Clean Exterior Door Gasket

FARRAR recommends defrosting the entire chamber if excessive frost or ice build-up appear on the exterior door gasket. After the defrost is complete, carefully inspect the door gasket for tears or damage, and ensure proper adhesion to the exterior door.

Condenser

Use appropriate gloves when handling cold interior components and stored inventory.

NOTICE

Protect items in the freezer from extended exposure to adverse temperatures.

Replace Condenser Filter

Contact FARRAR Technical Service to order a Condenser Filter service kit. Follow instructions for replacement included with the service kit.

Exterior

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

HMI Touchscreen

Note

Do not use solvent or alcohol-based cleaners to clean the HMI touchscreen.

Clean the HMI touchscreen with a soft, dry cotton cloth.

5 Service

Ensure unit is powered off and unplugged prior to performing service or maintenance to prevent an electrocution hazard.

5.1 Refrigerant

Risk of fire or explosion. Flammable refrigerant used. To be repaired only by trained service personnel. DO NOT puncture refrigerant tubing.

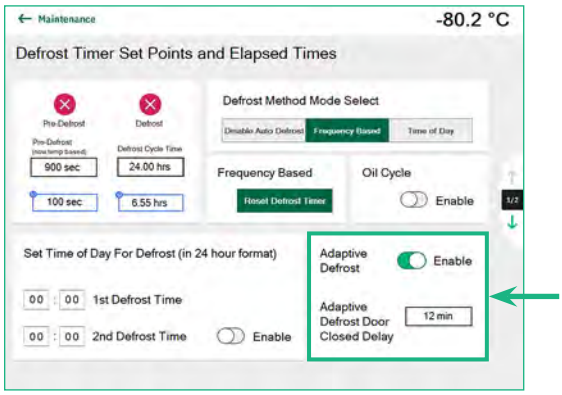
NOTICE

- Review all safety instructions prior to recharging refrigerant.
- Maintenance should only be performed by trained refrigeration technicians.
- Avoid sharp edges when working inside the refrigeration compartment.
- Avoid sharp edges when working inside the refrigeration compartment.
- The refrigeration systems are sealed at the factory. Do not connect gauge manifolds or add refrigerant to either system unless directed by FARRAR Technical Service.

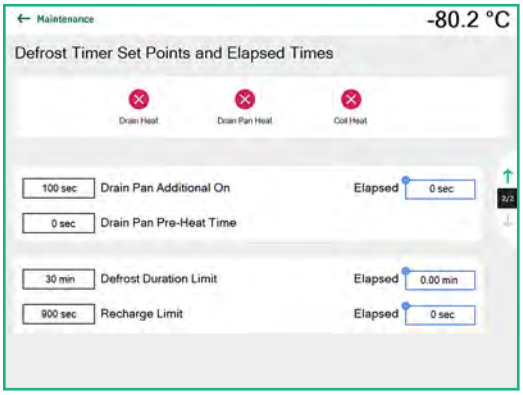
Refrigerant Charge

Model	FCF 133
High Stage Refrigerant	R290 (99.5% purity or higher)
Low Stage Refrigerant	R170 (99.5% purity or higher)
High Stage Initial Charge	4.6 oz. (130 g +/- 1 g)
Low Stage Initial Charge (R170)	4.6 oz. (130 g +/- 1 g)

5.2 Adaptive Defrost



Defrost Timer Set Points and Elapsed Times/Adaptive Defrost - pg 1



Defrost Timer Set Points and Elapsed Times- pg 2

Notes

- Adaptive Defrost is Enabled by default.
- Contact FARRAR Technical Service before changing Adaptive Defrost settings.
- Pre-defrost functions do not occur when an Adaptive Defrost is initiated.
- The Defrost Duration Limit and Recharge Limit timers will start once the defrost becomes active.

The Adaptive Defrost function helps maintain optimal performance by preventing excessive frosting on evaporator coils or ductwork. The Adaptive Defrost is initiated under specific conditions to ensure efficient operation.

5.3 Casters

If a caster is bent or broken, it can be replaced. Contact FARRAR Technical Service to order a Caster service kit. Follow instructions for replacement included with the service kit.

6 Troubleshooting

Ensure unit is powered off and unplugged prior to performing service or maintenance to prevent an electrocution hazard.

NOTICE

- Review all safety instructions prior to troubleshooting.
- Troubleshooting should only be performed by trained refrigeration technicians.

NOTE

To order Replacement Parts, contact FARRAR Technical Service (800-242-7197 or 740-374-8300).

6.1 General Operation Problems

Problem	Possible Cause	Action
The exterior door does not open easily.	Exterior door handle bushings are worn.	Confirm the exterior door handle is firmly attached to the freezer door. Replace the door handle bushings if the handle is loose.
	Exterior door handle alignment has moved during use.	Examine door catch and adjust on cabinet if necessary.
	Excessive frost or ice build-up on mullion because cleaned or defrosted gasket and closed while still wet.	Defrost the interior and verify it is dry before closing door.
An interior door does not open easily.	Frost accumulation around the interior door.	Defrost the interior door.
	Interior door hinge is bent.	Replace the interior door hinge.
The control system is not responding.	Digital electronics are locked because of an interruption in power.	Reset the control system by turning backup battery and AC power off and back ON.
"Refrigeration System Failure" alarm is displayed on the monitor.	Refrigerant pressure or temperature is too high due to improper airflow.	Ensure that freezer has been installed with proper clearances.
		Check that ambient temperature is in the acceptable range.
		Check the condenser filter and condenser coil, and clean or replace filter as needed.
		Check the operation of the condenser fan, and repair or replace as needed.
	Refrigerant pressure or temperature is too high because the 2nd stage compressor is not operating when it should be.	Check the 2nd stage compressor inverter.
	Refrigerant pressure or temperature is too high because the 1st stage compressor is not operating when it should be.	Check the condenser filter and condenser face, and clean or replace as needed.
		Check the operation of the condenser fan, and repair or replace as needed.
	One or more system components has failed.	Contact FARRAR Technical Service.
A sensor failure alarm is displayed on the monitor.	One or more of the temperature sensors has failed, or sensor wiring is an open circuit.	Check the sensor wire connection to the CARD 1 and secure the connection if necessary.
		Confirm the sensor is providing resistance in the range of 73 Ω to 110 Ω. Replace the sensor if resistance is outside of specified range.

6.2 Chamber Temperature Problems

Problem	Possible Cause	Action
The “Maintenance Warning” is activated.	Maintenance Warning has elapsed.	Acknowledge and reset Maintenance Interval Timer. Replace the condenser filter if necessary.
The chamber temperature displayed is higher or lower than the actual temperature.	Chamber temperature sensor is not calibrated.	Check the chamber temperature offset. Calibrate temperature probe..
	Connections for the chamber temperature sensor are loose.	Check the sensor wire connection to CARD 1 in the electronics panel and secure the connection if necessary.
		Check the continuity of the sensor wiring. Replace the sensor if necessary.
		Confirm the sensor is providing resistance in the range of 73 Ω to 110 Ω. Replace the sensor if resistance is outside of specified range.
	Digital electronics are locked because of an interruption in power.	Reset the control system by turning backup battery and AC power off and back ON.
	Compressor inverter is faulty.	Contact FARRAR Technical Service.
	A component is faulty or internal connections are loose.	Contact FARRAR Technical Service.
The chamber temperature meets an alarm condition, but the appropriate temperature alarm is not active.	Temperature alarm set point was changed.	Check the current set points for the temperature alarms. Change the set points if necessary.
The chamber temperature does not reach or stabilize at set point.	Ambient air temperature is too high.	Confirm freezer location meets requirements.
	Excessive frost has accumulated in the chamber.	Defrost chamber.
	Temperature control sensor is faulty.	Check accuracy of temperature probe.
		Confirm the sensor is providing resistance in the range of 73 Ω to 110 Ω. Replace the sensor if resistance is outside specified range.
	Condenser filter is dirty.	Check condenser filter, replace as needed.
	Condenser fan running slowly or not at all.	Check voltage and wiring to fan motor at connector.
		Replace condenser fan assembly.
	Compressor not running	Check power to the compressor.
		Check compressor inverter connections. Replace inverter if necessary.
		Amperage check and OHM windings of the compressor. Contact FARRAR Technical Support.

6.3 Alarm Activation Problems

Problem	Possible Cause	Action
The freezer is in an alarm condition, but alarms are not audible.	Audible alarms are muted.	Verify that audible alarms are not muted. If time remaining is greater than five minutes, change MUTE timer value to five minutes and wait until timer resets.
	HMI control board is faulty.	Replace display assembly.
	Speaker is faulty.	Replace display assembly.
	A component is faulty or internal connections are loose.	Contact FARRAR Technical Service.
The freezer meets an alarm condition, but the appropriate alarm is not active.	Alarm set point was changed.	Check the current set points for the alarms.
	A component is faulty or internal connections are loose.	Contact FARRAR Technical Service.
The High Temperature alarm activates when the door is opened, then clears shortly after the door is closed.	High temperature alarm set point is set too low.	Check the set point and change it if necessary.
	Connections for the chamber temperature sensor are loose.	Check the sensor wire connection to the CARD 1 in the electronics panel and secure the connection if necessary.
	A component is faulty or internal connections are loose.	Contact FARRAR Technical Service.

Problem	Possible Cause	Action
The freezer is connected to power, but the AC Power Failure alarm is active.	Outlet connection is faulty.	Verify power at the outlet. Repair the original outlet or connect to a different outlet if necessary.
	Power cord is faulty.	Confirm the power cord is connected securely. Secure the power cord if necessary.
	Plugged into GFI/GFCI outlet.	Move to standard outlet. FARRAR does not recommend operating this unit on a GFI outlet.
	ON/OFF AC power switch is faulty.	Replace the ON/OFF AC power switch.
	ON/OFF AC power switch is OFF.	Switch the ON/OFF AC power switch ON.
	A component is faulty or internal connections are loose.	Contact FARRAR Technical Service.
	Circuit breaker is tripped.	Reset the circuit breaker.
	Circuit breaker is faulty.	Replace the circuit breaker.
	Battery control module is faulty.	Replace the battery control module.
The Door Open alarm is activating sporadically.	Exterior door is not closing completely.	Confirm the hinges are not damaged. Replace the hinges if necessary.
	Exterior door is closing but not sealing completely.	Defrost the exterior door gasket.
	Connection for the exterior door switch is loose.	Test the switch wiring connection and secure the connection if necessary.
	Exterior door switch is faulty.	Replace the reed switch and magnet.
	HMI control board is faulty.	Confirm the control board is operating correctly. Replace if necessary.
	Door Open Time out is set to zero, causing the alarm to activate immediately when the door is opened.	Check the time delay for the Door Open alarm. Change the time delay if necessary.
The ISHX High Temp alarm is active .	Condenser filter is dirty.	Check the condenser filter. Clean or replace if necessary.
	Alarm setting is incorrectly set.	Check ISHX High Temp alarm setting.
	Condenser fan is not running.	Check the condenser fan wiring connection. Secure the connection if necessary.
		Check power to the fan and electrical connections. If power to the fan, replace fan. If no power to the fan, call FARRAR Technical Support.
	1st stage compressor is not operating.	Check 1st stage compressor inverter operation.
		Check voltage to compressor and Ohm out windings.
ISHX Low Temp alarm is active	Evaporator Fan Motor is not running.	Ensure product is not up against or blocking ducting.
		Check for ice in the evaporator fan motor ducting. Defrost ice if needed.
		Remove suction duct, dump snow and reinstall
		Check power going to the evaporator fan motor. Replace motor if no power is present.
	2nd stage compressor isn't operating.	Check operation of the compressor inverter, replace if needed.
		Check power going to the compressor and ohm out windings.
The No Battery alarm is activating sporadically.	Control system backup battery voltage is low.	Replace the control system backup battery.
	Power supply board voltage is incorrect.	Contact FARRAR Technical Service.
The High Temperature alarm is activating sporadically.	Chamber temperature sensor is not calibrated.	Check the chamber temperature sensor calibration. Change the calibration if necessary.
	A component is faulty or internal connections are loose.	Contact FARRAR Technical Service.

6.4 Icing Problems

Problem	Possible Cause	Action
There is excessive ice in the chamber, on the interior doors, or on the exterior door gasket.	Humid air is entering the chamber.	Verify the door is aligned, gap is within spec, closing tightly, and sealing correctly. Correct issues as necessary.
		Verify all ports in the cabinet ceiling are sealed.
		Verify the LN2 rear access port is sealed.
		Check for tears, loose door gasket, or damaged door gasket. Replace if necessary.
		Defrost the chamber, exterior door gasket, and interior doors if necessary.
	Exterior door is not closing completely.	Defrost the exterior door gasket if necessary
		Confirm the hinges are not damaged. Replace the hinges if necessary.
		Confirm door gaps and alignment are appropriate.
		Check door latch to ensure it is securing and remains secure.
	Relative humidity around freezer is too high.	Confirm freezer location meets requirements.

7 Parts

7.1 Exterior and Interior Cabinet

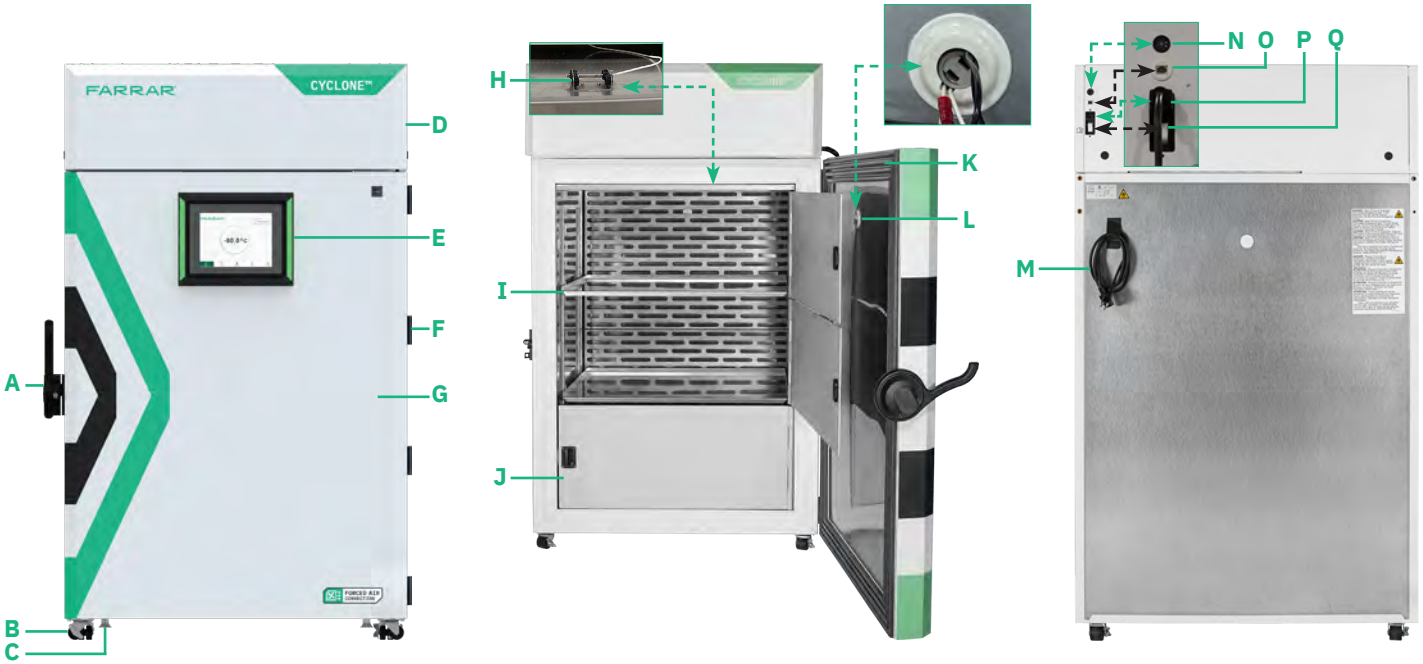
Use appropriate gloves when handling cold interior components and stored inventory.

NOTICE

To avoid damage to the interior door hinges, do not apply upward or downward force to the interior doors.

NOTE

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



Label	Description	Part #
A	Door handle	801299-1
B	Caster (swivel with brake)	801294-1
C	Leveling legs	-
D	Front fascia	801318-1
E	Display bezel	801300-1
Not Shown	Firmware update	801321-1
F	Door hinge	801296-1
G	Door	801293-1
H	Chamber temperature probe	801301-1

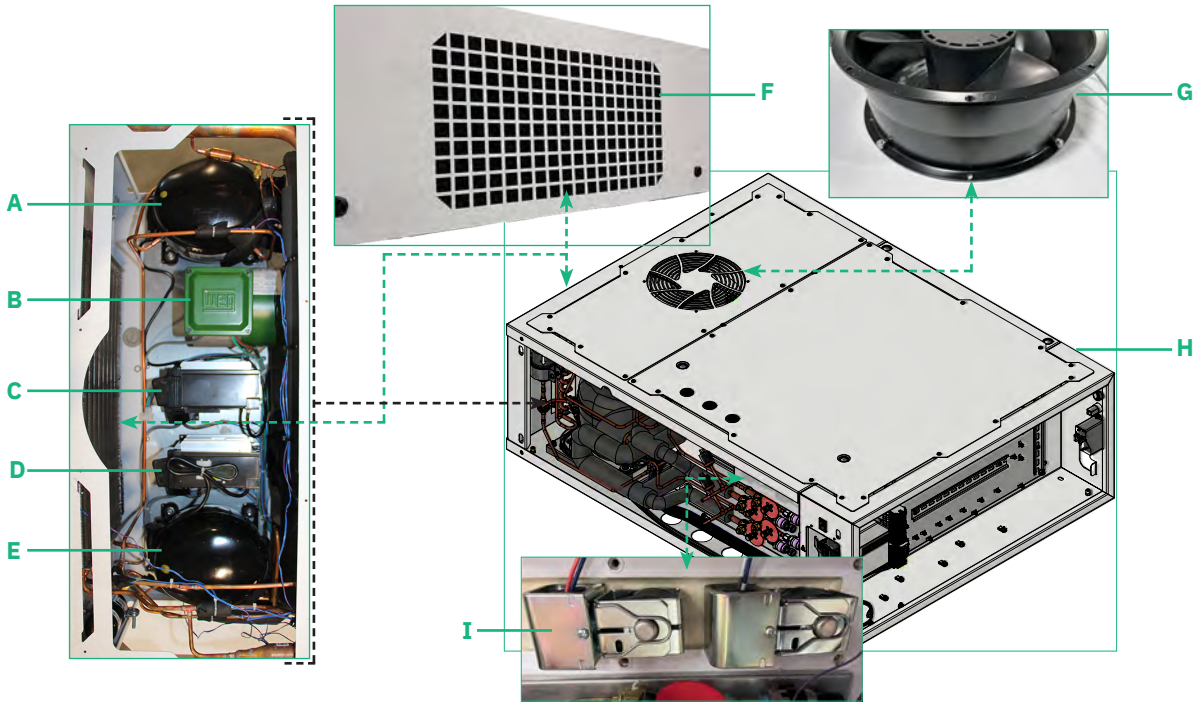
Label	Description	Part #
I	Shelf	801319-1
J	Inner door	801297-1
K	Door gasket	801295-1
L	Vacuum port	801298-1
M	Power cord	-
O	Ethernet port	-
P	Power receptacle	-
Q	Power switch	121247
Not Shown	Rear standoffs *(qty 2)*	322024-1

7.2 Refrigeration System

- Ensure unit is powered off and unplugged prior to performing service or maintenance to prevent an electrocution hazard.
- Risk of fire or explosion. Flammable refrigerant used. To be repaired only by trained service personnel. DO NOT puncture refrigerant tubing.

NOTICE

Avoid sharp edges when working inside the refrigeration system module.



Label	Description	Part #
A	2nd Stage compressor	801322-1
B	Evaporator motor	801302-1
C	2nd Stage inverter	801305-1
D	1st Stage inverter	801303-1
E	1st Stage compressor	801304-1

Label	Description	Part #
F	Condenser air filter	801316-1
G	Condenser fan	801315-1
H	Refrigeration system module	801292-1
I	Solenoid Coils *(1st and 2nd stage included)*	801317-1

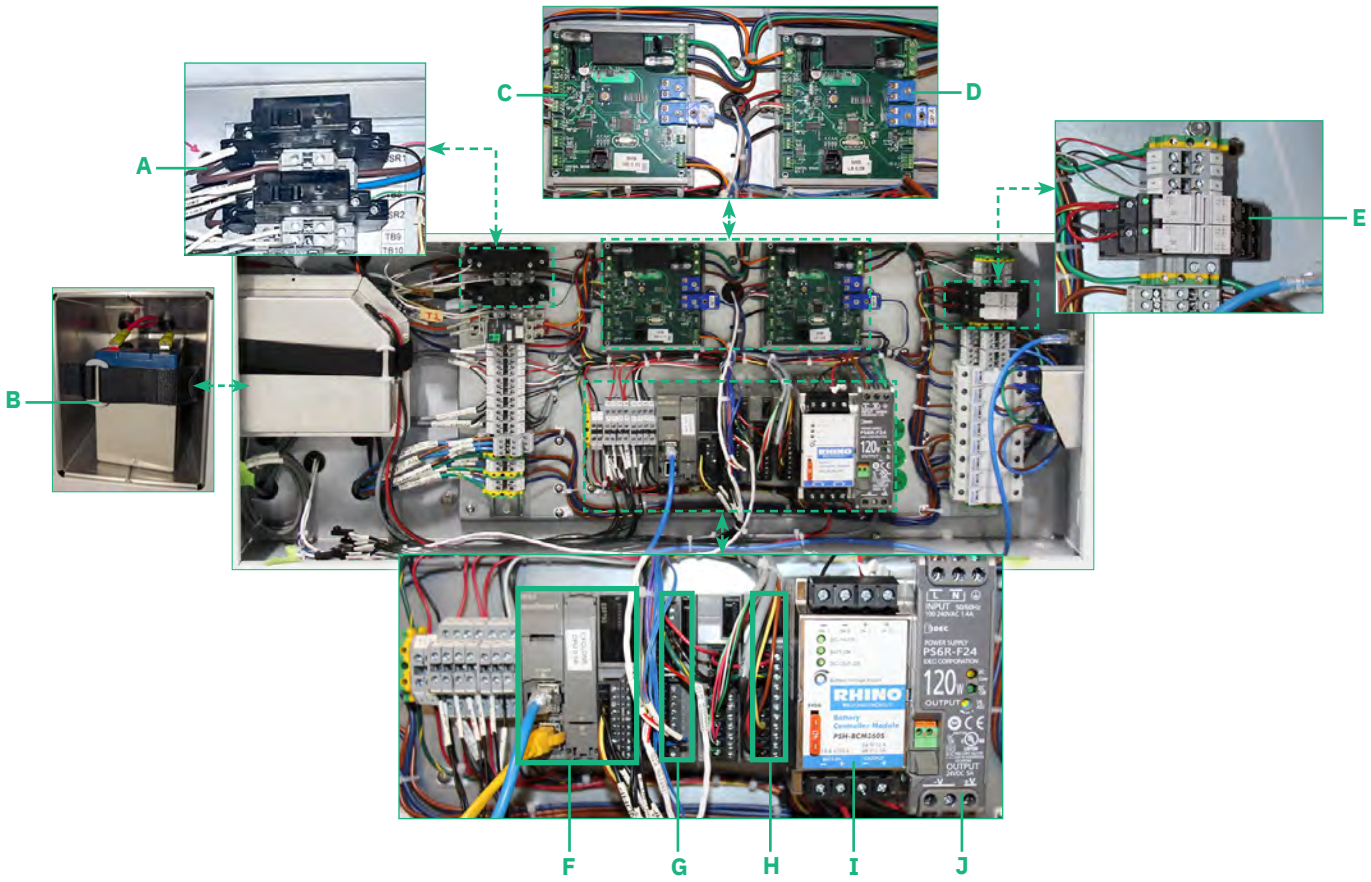
7.3 Electrical Compartment

⚠

Disconnect the freezer from AC power before removing the access panel.

NOTICE

Avoid sharp edges when working inside the refrigeration system module.

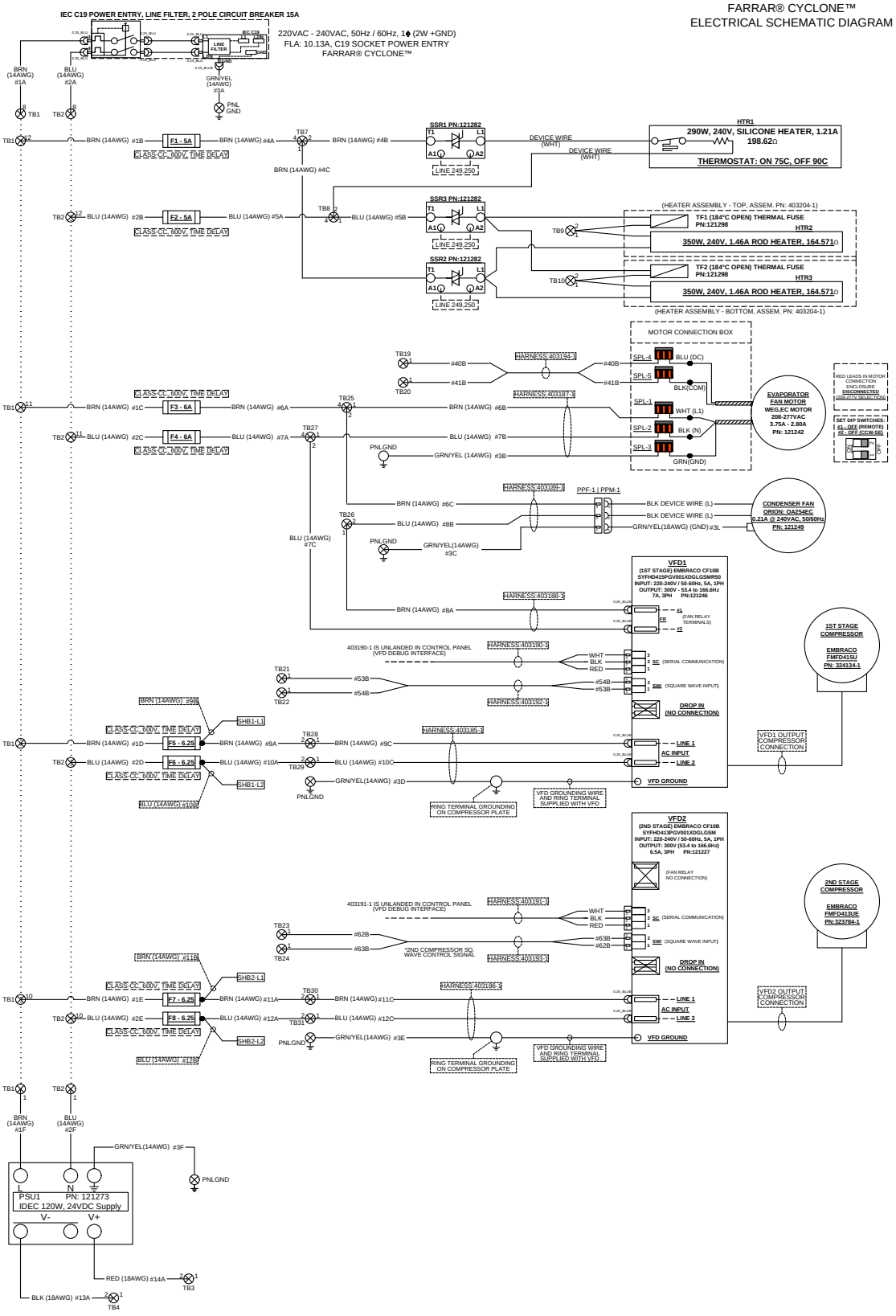


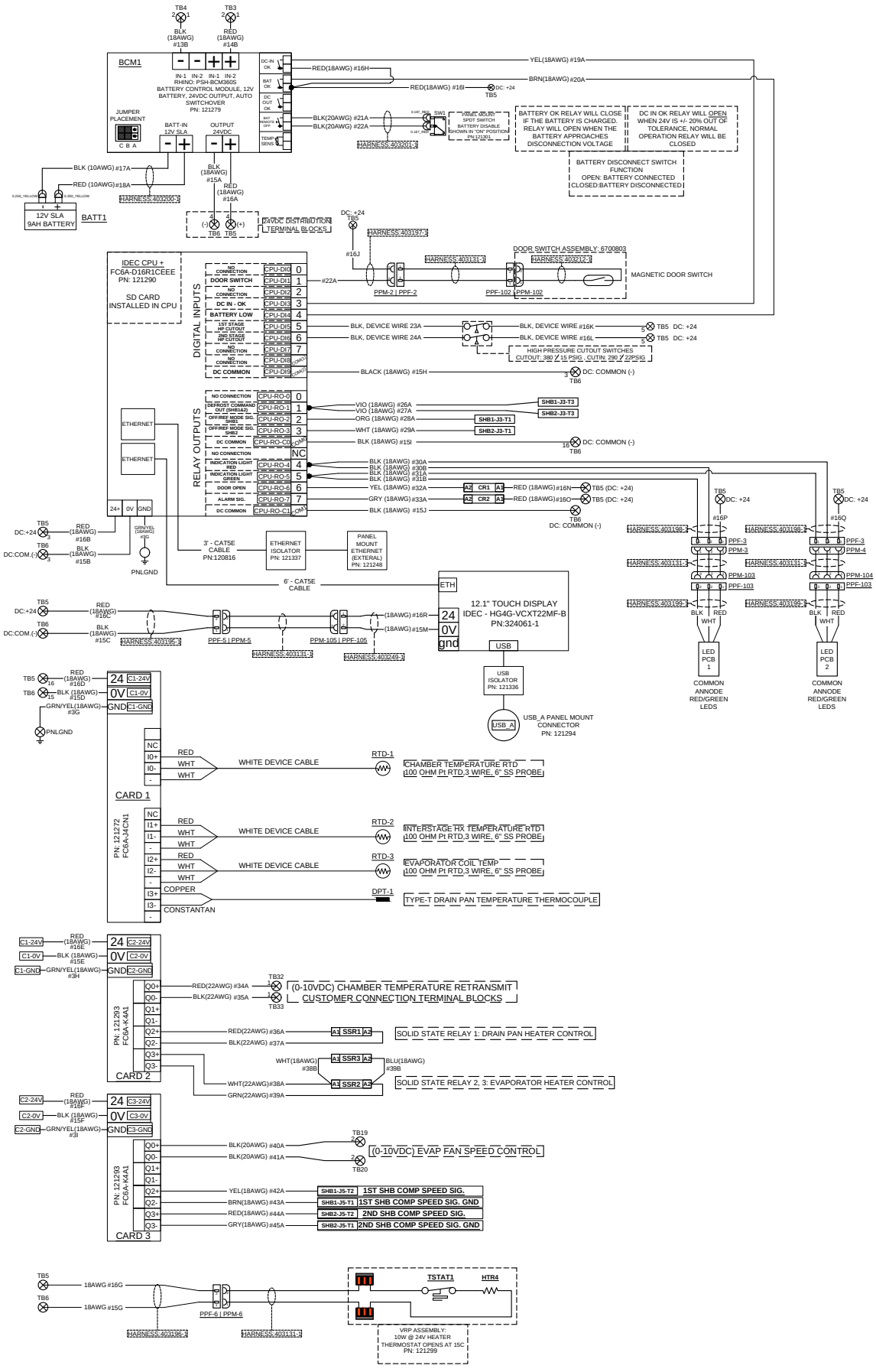
Label	Description	Part #
A	Solid state relays	801312-1
B	12V battery	801320-1
C	1st Stage superheat board	801306-1
D	2nd Stage superheat board	801307-1
E	24VDC Relay	801313-1

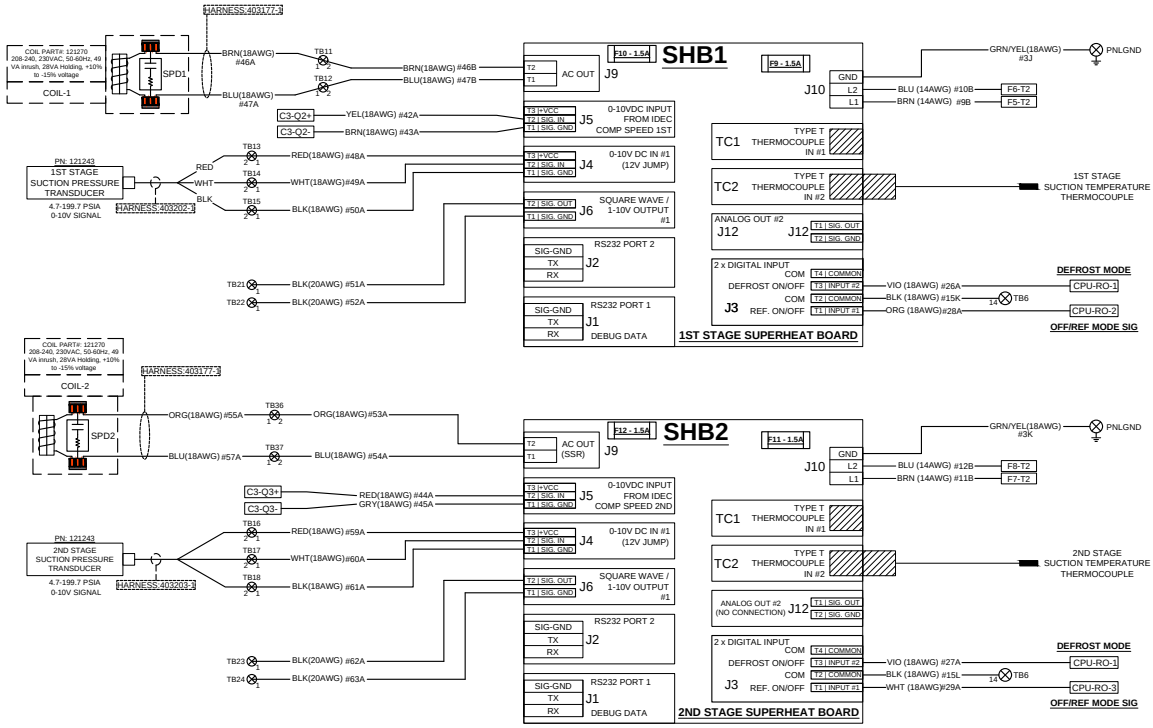
Label	Description	Part #
F	PLC controller	801314-1
G	4 Channel analog input module	801308-1
H	PLC analog 4 output VDC/MA module	801310-1
I	Battery controller module	801311-1
J	24V Power supply	801309-1

8 Schematics

8.1 Electrical Schematic




BCM1
IN-1 IN-2 IN-1 IN-2
RHINO PSH-BCM360S
BATTERY CONTROL MODULE, 12V
BATTERY, 24VDC OUTPUT, AUTO
SWITCHOVER
PN: 121279
JUMPER PLACEMENT
BATT-IN 12V SLA
OUTPUT 24VDC
DC-IN OK
BAT V OK
DC OUT OK
BAT WAKEUP OFF
TEMP SENS
TB4
TB3
BLK (18AWG) #13B
RED (18AWG) #14B
RED(18AWG) #16H
RED(18AWG) #16I
YEL(18AWG) #19A
BRN(18AWG) #20A
DC: +24 TB5
BLK(20AWG) #21A
BLK(20AWG) #22A
HARNESS:4032201-3
SW1
VOLT. ADJ TO SPOT SWITCH BATTERY DISABLE SHOWN IN "ON" POSITION PN:121391
BATTERY OK RELAY WILL CLOSE IF THE BATTERY IS CHARGED. RELAY WILL OPEN WHEN THE BATTERY APPROACHES DISCONNECTION VOLTAGE
DC IN OK RELAY WILL OPEN WHEN 24V IS +/- 20% OUT OF TOLERANCE, NORMAL OPERATION RELAY WILL BE CLOSED
BATTERY DISCONNECT SWITCH FUNCTION
OPEN: BATTERY CONNECTED
CLOSED:BATTERY DISCONNECTED
BLK (10AWG) #17A
RED (10AWG)#18A
HARNESS:4032202-3
BLK (18AWG) #15A
RED (18AWG) #16A
12V SLA 9AH BATTERY
BATT1
TB6 TB5
24VDC DISTRIBUTION TERMINAL BLOCKS
DC: +24 TB5
HARNESS:4032197-3
#16J
IDEC CPU + FC6A-D16R1CEEE PN: 121290
SD CARD INSTALLED IN CPU
DIGITAL INPUTS
CPU-DI0 0
CPU-DI1 1
CPU-DI2 2
CPU-DI3 3
CPU-DI4 4
CPU-DI5 5
CPU-DI6 6
CPU-DI7 7
CPU-DI8 COM0
CPU-DI9 COM1
#22A
HARNESS:4032131-3
HARNESS:4032212-3
PPM-2 | PPF-2
PPF-102 | PPM-102
DOOR SWITCH ASSEMBLY: 6700803
MAGNETIC DOOR SWITCH
BLK, DEVICE WIRE 23A
BLK, DEVICE WIRE 24A
BLK, DEVICE WIRE #16K
BLK, DEVICE WIRE #16L
HIGH PRESSURE CUTOUT SWITCHES CUTOUT: 380 Y 15 PSIG , CUTIN: 290 Y 22PSIG
BLACK (18AWG) #15H
DC: COMMON (-) TB6
RELAY OUTPUTS
CPU-RO-0 0
CPU-RO-1 1
CPU-RO-2 2
CPU-RO-3 3
CPU-RO-C0 COM
CPU-RO-4 4
CPU-RO-5 5
CPU-RO-6 6
CPU-RO-7 7
CPU-RO-C1 COM
VIO (18AWG) #26A
VIO (18AWG) #27A
ORG (18AWG) #28A
WHT (18AWG) #29A
BLK (18AWG) #15I
BLK (18AWG) #30A
BLK (18AWG) #30B
BLK (18AWG) #31A
BLK (18AWG) #31B
YEL (18AWG) #32A
GRY (18AWG) #33A
BLK (18AWG) #15J
SHB1-J3-T3
SHB2-J3-T3
SHB1-J3-T1
SHB2-J3-T1
CR1
CR2
RED (18AWG)#16N
RED (18AWG)#16O
TB5 (DC: +24)
DC: COMMON (-)
ETHERNET
ETHERNET
24+ 0V GND
RED (18AWG) #16B
BLK (18AWG) #15B
GRN/YEL (18AWG) #3G
PNLGND
3' - CAT5E CABLE PN:120816
ETHERNET ISOLATOR PN: 121337
PANEL MOUNT ETHERNET (EXTERAL) PN: 121248
6' - CAT5E CABLE
ETH
12.1" TOUCH DISPLAY
IDEC - HG4G-VCXT22MF-B
PN:324061-1
USB
USB ISOLATOR PN: 121336
USB_A
USB_A PANEL MOUNT CONNECTOR PN: 121294
#16P
#16Q
HARNESS:4031198-3
HARNESS:4031131-3
HARNESS:4031199-3
PPF-3
PPM-3
PPM-103
PPF-103
PPM-4
PPM-104
BLK
WHT
RED
LED PCB 1
LED PCB 2
COMMON ANNODE RED/GREEN LEDS
#16R
#15M
HARNESS:4031196-3
PPF-5 | PPM-5
HARNESS:4031131-1
PPM-105 | PPF-105
HARNESS:4032249-3
#16D
#15D
C1-24V
C1-0V
C1-GND
#3G
CARD 1
NC
I0+
I0-
RED
WHT
WHT
WHITE DEVICE CABLE
RTD-1
CHAMBER TEMPERATURE RTD 100 OHM Pt RTD,3 WIRE, 6" SS PROBE
PN: 121272 FC6A-J4CN1
I1+
I1-
I2+
I2-
I3+
I3-
RTD-2
INTERSTAGE HX TEMPERATURE RTD 100 OHM Pt RTD,3 WIRE, 6" SS PROBE
RTD-3
EVAPORATOR COIL TEMP 100 OHM Pt RTD,3 WIRE, 6" SS PROBE
COPPER
CONSTANTAN
DPT-1
TYPE-T DRAIN PAN TEMPERATURE THERMOCOUPLE
#16E
#15E
#3H
C2-24V
C2-0V
C2-GND
CARD 2
TB32
TB33
(0-10VDC) CHAMBER TEMPERATURE RETRANSMIT
CUSTOMER CONNECTION TERMINAL BLOCKS
RED(22AWG) #34A
BLK(22AWG) #35A
Q0+
Q0-
Q1+
Q1-
Q2+
Q2-
Q3+
Q3-
RED(22AWG) #36A
BLK(22AWG) #37A
SSR1
SOLID STATE RELAY 1: DRAIN PAN HEATER CONTROL
WHT(18AWG) #38B
BLU(18AWG) #39B
SSR3
WHT(22AWG)#38A
GRN(22AWG)#39A
SSR2
SOLID STATE RELAY 2, 3: EVAPORATOR HEATER CONTROL
#16F
#15F
#3I
C3-24V
C3-0V
C3-GND
CARD 3
TB19
TB20
(0-10VDC) EVAP FAN SPEED CONTROL
BLK(20AWG) #40A
BLK(20AWG) #41A
YEL(18AWG) #42A
BRN(18AWG) #43A
RED(18AWG) #44A
GRY(18AWG) #45A
SHB1-J5-T2
1ST SHB COMP SPEED SIG.
SHB1-J5-T1
1ST SHB COMP SPEED SIG. GND
SHB2-J5-T2
2ND SHB COMP SPEED SIG.
SHB2-J5-T1
2ND SHB COMP SPEED SIG. GND
18AWG #16G
18AWG #15G
PPF-6 | PPM-6
HARNESS:4031196-3
HARNESS:4031131-1
TSTAT1
HTR4
VRP ASSEMBLY:
10W @ 24V HEATER
THERMOSTAT OPENS AT 15C
PN: 121299



SCHEMATIC SYMBOLS

TB#	TERMINAL BLOCK, DIN RAIL MOUNT
	GROUNDING TERMINAL BLOCK, DIN RAIL MOUNT
A1 SSRX A2 / T1 L1 SSR-1	SOLID STATE RELAY A1 - POSITIVE CONTROL VOLTAGE A2 - CONTROL VOLTAGE GROUND T1 - LINE CONNECTION L1 - LOAD CONNECTION
	2 POSITION SHORTING JUMPER (SHB1 & SHB2)
	THERMOSTAT, NORMALLY CLOSED
	PRESSURE SWITCH, NORMALLY CLOSED
	REED SWITCH / MAGNETIC SWITCH, NO
USB_A	USB PORT, FEMALE, TYPE A
	THERMAL FUSE
	RTD - RESISTANCE TEMPERATURE DETECTOR
	THERMOCOUPLE, TYPE T

F# - X	FUSE
0.187" Red	0.187", FEMALE QD TERMINAL, RED
0.250" YELLOW	0.250", FEMALE QD TERMINAL, YELLOW
0.25_Blue	0.250", FEMALE QD TERMINAL, BLU
	LEVER NUT, 3 WAY PARALLEL CONNECTION
	PPF - POINT TO POINT FEMALE CONNECTOR MALE PIN CONTACTS
	PPM - POINT TO POINT MALE CONNECTOR FEMALE SOCKET CONTACTS
	SOLENOID COIL
	RESISTOR CAPACITOR SURGE SUPRESSOR
	HEATER
	WIRE JUMP, NO CONNECTION

COMPONENT ABBREVIATIONS

BATT1	12V, 9AH, SLA BACKUPBATTERY
BCM1	BATTERY CONTROL MODULE
CARD1	IDEC CARD IN FIRST STACK POSITION
CARD2	IDEC CARD IN 2ND STACK POSITION
CARD3	IDEC I/O CARD IN 3RD STACK POSITION
COIL-1	1ST STAGE SOLENOID COIL
COIL-2	2ND STAGE SOLENOID COIL
CR#	CONTROL RELAY
HTR#	HEATER
IDEC CPU	IDEC CENTRAL PROCESSING UNIT MODULE
MTR#	MOTOR
PPF#	POINT TO POINT FEMALE CONNECTOR
PPM#	POINT TO POINT MALE CONNECTOR
PSU-1	POWER SUPPLY (24VDC OUTPUT)
RTD	RESISTANCE TEMPERATURE DETECTOR
SHB1	SUPER HEAT CONTROL BOARD 1ST STAGE
SHB2	SUPER HEAT CONTROL BOARD 2ND STAGE
SPD-X	SURGE PROTECTION DEVICE
SSR#	SOLID STATE RELAY
TB#	DIN MOUNT TRERMINAL BLOCK CONNECTION
TF#	THERMAL FUSE
TSTAT	THERMOSTAT
VFD#	VARIABLE FREQUENCY DRIVE

DRY CONTACT SIGNAL RELAYS (DPDT)

UNIT SIGNAL	RELAY	RELAY CONTACT		FUNCTION	CONTACT RATINGS
DOOR OPEN	CR1	11 | 21	COMMON	RELAY COIL IS ENERGIZED WHEN THE UNIT DOOR IS OPENED	RESISTIVE MINIMUM: 5VDC, 10mA MAXIMUM: 250V AC, 6A INDUCTIVE B300(PILOT DUTY)
		14 | 24	NORMALLY OPEN		
		12 | 22	NORMALLY CLOSED		
GENERAL ALARM	CR2	11 | 21	COMMON	RELAY COIL IS ENERGIZED WHEN UNIT ALARM IS TRIGGERED	
		14 | 24	NORMALLY OPEN		
		12 | 22	NORMALLY CLOSED		

CHAMBER TEMPERATURE RETRANSMIT SIGNAL

TERMINAL	POLARITY	FUNCTION
TB32-2	(+) POSITIVE	0-10VDC, -100C to 100C
TB33-2	(-) NEGATIVE	

FUSE GUIDE

ID	TYPE	CURRENT RATING	PROTECTED DEVICE
F1	CLASS CC - TIME DELAY	5A	HEATERS - DRAIN PAN & EVAPORATOR
F2	CLASS CC - SLOW BLOW	5A	
F3	CLASS CC - SLOW BLOW	6A	MOTORS - EVAPORATOR FAN & CONDENSER FAN
F4	CLASS CC - SLOW BLOW	6A	
F5	CLASS CC - SLOW BLOW	6.25A	VFD1
F6	CLASS CC - SLOW BLOW	6.25A	
F7	CLASS CC - SLOW BLOW	6.25A	VFD2
F8	CLASS CC - SLOW BLOW	6.25A	
F9	2AG GLASS CARTRIDGE FUSE - TIME DELAY	1.5A	SHB1 - (PCB FUSE CLIPS)
F10			
F11			SHB2 - (PCB FUSE CLIPS)
F12			

WIRE COLOR ABBREVIATION CODES

BLK	BLACK
BLU	BLUE
BRN	BROWN
GRN/YEL	GREEN + YELLOW TRACE
GRY	GRAY
ORG	ORANGE
RED	RED
VIO	VIOLET
WHT	WHITE

Appendix A: Product Warranty

FARRAR® CYCLONE™ Model Numbers:

- FCF-133-115
- FCF-133-230

FARRAR, a brand of Trane Technologies Life Science Solutions, LLC, designs, engineers, and manufactures high-quality products. FARRAR offers the initial owner this warranty for the FARRAR® CYCLONE™ series ultra-low temperature freezer models listed above (”Covered Equipment”). This warranty is valid for two (2) years from the purchase date (“Warranty Period”).

- **OUTSIDE THE UNITED STATES** (Direct Sale/Distribution) - FARRAR assumes responsibility for the replacement of any defective part(s) identified during the Warranty Period. FARRAR is not responsible for any costs associated with the repair of the Covered Equipment, including the cost of installing any replacement parts.

- **UNITED STATES** (Direct Sale/Distribution) - FARRAR assumes responsibility for the repair costs and/or replacement costs of any defective part(s) identified during the Warranty Period.

This warranty is outlined in its entirety and may not be changed or altered by any person, agency, distributor, dealer, or company without prior written permission from FARRAR. FARRAR does not recognize or authorize any third-party assumptions of liability.

Per this warranty, customers are afforded specific legal rights. Customers may have other legal rights if mandated by local law. FARRAR does not assume liability or responsibility for any event resulting in indirect or consequential damages including damages to lost profits or loss of inventory or other products stored within the Covered Equipment. FARRAR does not assume any liability for any delay in warranty performance due to events beyond our control. If serial numbers on the Covered Equipment are altered or deemed illegible, this warranty is null and void.

THIS WARRANTY IS EXCLUSIVE. NO OTHER WARRANTIES, WRITTEN, ORAL, OR IMPLIED ARE RECOGNIZED. NO WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE SHALL APPLY.

Warranty Exclusions

Routine or basic maintenance, as well as replacement of consumable items, including, but not limited to, batteries, filters, etc. are excluded from this warranty. Normal maintenance functions not covered include, but are not limited to, filter cleaning or replacement, removal of chamber and door ice build-up, and door adjustment, including hinges, handles, and latches. Consult the product manual for the timing of routine or basic maintenance recommendations.

Services/Items NOT Covered:

Accident	Customer adjustments not scoped in the Service Manual	Incorrect line voltages
Acts of God	Damage resulting from improper installation	Installation
Broken or defaced cabinet	Damage resulting from fire	Torn or damaged gaskets or seals
Calibration	Damage resulting from flood	Uses outside of manual instructions
Chamber/shelf corrosion from unauthorized use of cleaning chemicals/solvents.	Failure resulting from improper maintenance	Validation
Consumables (batteries, filters, gaskets, seals, etc.)	Improper repair, unauthorized repair, and repair performed by an unauthorized service provider	

Owner Responsibilities

Per this warranty, the customer is responsible for using, maintaining, and operating the Covered Equipment as instructed in the FARRAR® CYCLONE™ Service and Maintenance Manual. Any warranty repair must be conducted by an authorized FARRAR service provider. Reach out to FARRAR for a list of approved service providers. The purchaser (customer, dealer, or distributor) must provide the original purchase receipt as proof of purchase to the approved service provider before initiating a warranty repair/replacement. Should the customer need repair or assistance, contact FARRAR.

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