SERVICE MANUAL

R & A-Series Reach-In & Pass-Thru Refrigerator/Freezer Service Manual

This manual is applicable for all models using:

R-448A, R-450-A Refrigerants

R & A Series Reach-In & Roll-In Refrigerators*
R & A Series Pass-Thru & Roll-Thru Refrigerators*
R & A Series Reach-In & Roll-In Freezers*
R & A Series Reach-In Refrigerator/Freezers*
R & A Series Reach-In & Roll-In Hot Food Cabinets*
R & A Series Pass-Thru & Roll-Thru Hot Food Cabinets*

Please Note: This manual is intended for use with the above referenced equipment manufactured in or after 2023. To obtain a copy of the correct Service Manual to support the same products manufactured prior to this date, please contact Traulsen Service at **(800) 825-8220**.

4401 Blue Mound Road Fort Worth, Texas 76106 (USA)
Phone: 800.825.8220 | E-mail: service@traulsen.com | Website: traulsen.com
Form Number: TR00399 | Revision Date: 8-2024

Hours of Operation: Monday - Friday 7:30 a.m. - 4:30 p.m. (CST)

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1. Introduction

Traulsen provides this manual as an aid to the service technician in installation, operation, and maintenance. When used properly, this service manual can help the service technician maintain, troubleshoot, and diagnose the majority of issues that may occur. While we believe that most aspects of service are covered in this manual, should you encounter a condition not addressed, please contact:

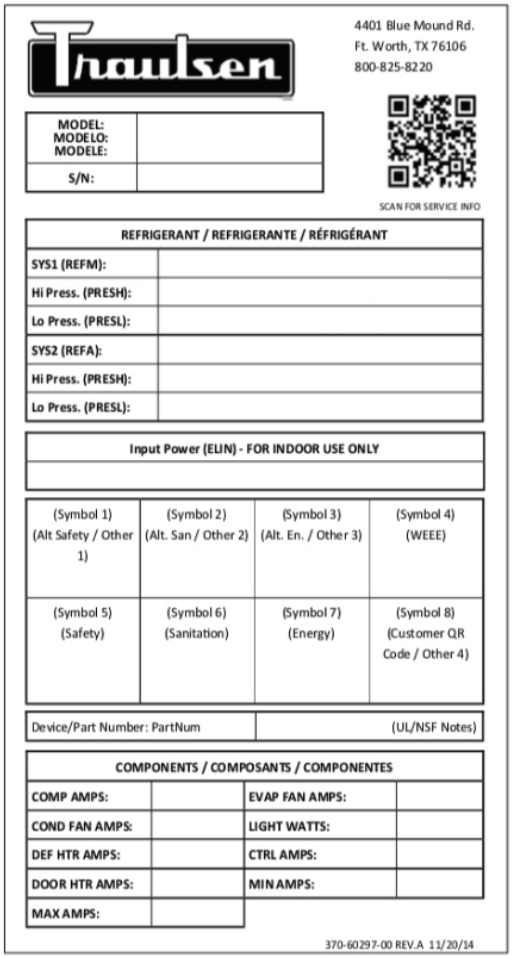
ITW Refrigeration
Traulsen
4401 Blue Mound Road
Fort Worth, Texas 76106

Attn: Service Department
Call for Technical Support:
Tel: **(800) 825-8220**
Email: **service@traulsen.com | p19parts@traulsen.com**

IMPORTANT: To improve your service communication experience, be sure to have the following available when contacting technical support:

Serial Number
Model Number
A detailed description of the issue

1.1 The Serial Tag


Traulsen
4401 Blue Mound Rd.
Ft. Worth, TX 76106
800-825-8220

MODEL: MODELO: MODELE:	
S/N:	

SCAN FOR SERVICE INFO

REFRIGERANT / REFRIGERANTE / RÉFRIGÉRANT	
SYS1 (REFM):	
Hi Press. (PRESH):	
Lo Press. (PRESL):	
SYS2 (REFA):	
Hi Press. (PRESH):	
Lo Press. (PRESL):	

Input Power (ELIN) - FOR INDOOR USE ONLY

(Symbol 1) (Alt Safety / Other 1)	(Symbol 2) (Alt. San / Other 2)	(Symbol 3) (Alt. En. / Other 3)	(Symbol 4) (WEEE)
(Symbol 5) (Safety)	(Symbol 6) (Sanitation)	(Symbol 7) (Energy)	(Symbol 8) (Customer QR Code / Other 4)

Device/Part Number: PartNum	(UL/NSF Notes)

COMPONENTS / COMPOSANTS / COMPONENTES			
COMP AMPS:		EVAP FAN AMPS:	
COND FAN AMPS:		LIGHT WATTS:	
DEF HTR AMPS:		CTRL AMPS:	
DOOR HTR AMPS:		MIN AMPS:	
MAX AMPS:			

370-60297-00 REV.A 11/20/14

Fig. 1.1 Sample Serial Tag

1.2 Serial Tag & Location

The serial tag is a permanently affixed label on which is recorded vital electrical and refrigeration data about your Traulsen product, as well as the model and serial number. This tag is in the upper left interior compartment of all R&A-Series refrigerator and freezer models.

1.2.1 Reading the Serial Tag

Model = The model number of your Traulsen unit

Serial (S/N) = The permanent ID number of your Traulsen unit

Refrigerant SYS1 = System 1 refrigerant type used and Refrigerant charge

Design Pressure = System 1 high and low pressure

Refrigerant SYS2 = System 2 refrigerant type used and Refrigerant charge

Design Pressure = System 2 high and low pressure

Volts = Voltage

Hz = Cycle

PH = Phase

Total Current = Maximum amp draw

Minimum Circuit Amps = Minimum circuit ampacity

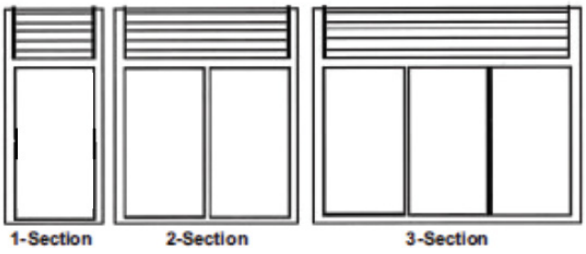
Lights = Light wattage

Agency Labels = Designates agency listings

Components = Component ratings

NOTE: Design pressure is the maximum pressure system components can handle and NOT the operating pressure.

1.3 Understand R&A-Series Model Numbers



R = Refrigerated Compartment
F = Freezer Compartment

II. b - MODEL DESIGNATIONS:
The first letter indicates the series, "R" or "A"
R = Stainless Steel Exterior & Interior
A = Stainless Steel Exterior & Anodized Aluminum Interior

*****All parts are optional, based on make/model*****
****(Part Numbers are subject to change)****

1.4 Reading Traulsen Serial Number

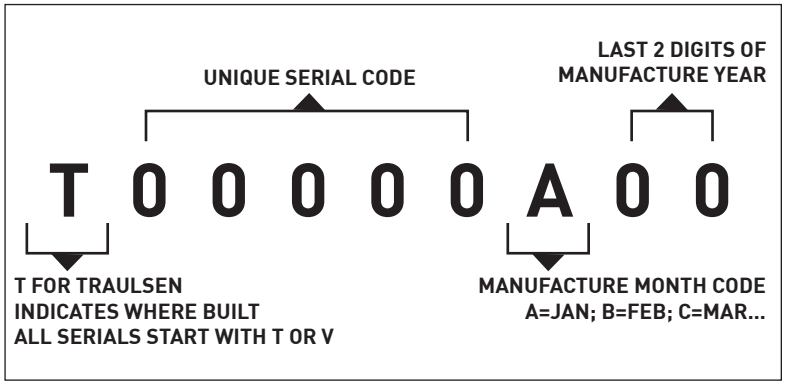


Fig. 1.4a
Format If Manufactured Before APRIL 2021

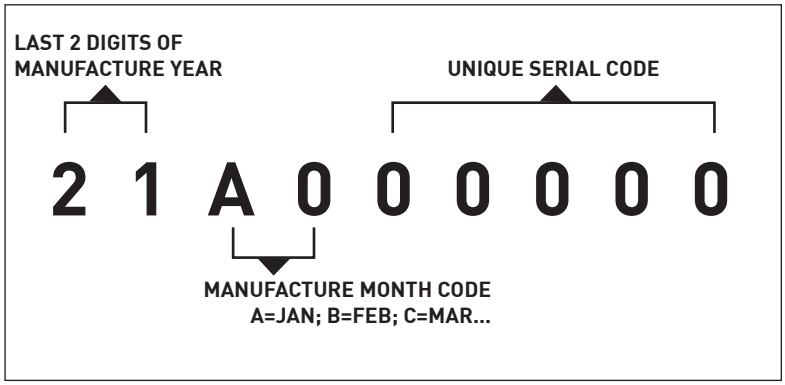


Fig. 1.4b
Format If Manufactured After APRIL 2021

1.5 Refrigerants

1.5.1 Terminology

Zeotropic Blend = A mixture of two or more refrigerants that have different boiling points that evaporate or condense together. All 400 series refrigerants are zeotropic blends.

Azeotropic Blend = A mixture of two or more refrigerants that boil at the same temperature so that they evaporate and condense together. All 500 series refrigerants are azeotropic blends.

Temperature Glide = The temperature difference between the starting and ending temperature of a refrigerant phase change within a system at a constant pressure. This can be seen on a Pressure Temperature chart as the difference between bubble and dew temperatures.

Fraction of Refrigerant = The change in composition of a blend because one or more of the components is lost or removed faster than the others.

Bubble Point = The temperature at which the liquid of a refrigerant blend starts to boil.

Dew Point = The temperature at which the vapor of a refrigerant blend starts to condense.

Superheat = The heat added to a refrigerant after its saturation point or heat added after a refrigerant boils

Subcooling = The heat removed from a refrigerant after its saturation point or heat removed after a refrigerant condenses.

1.5.2 R-450A Refrigerant

R-450 refrigerant is a refrigerant Traulsen uses in medium temperature applications. This refrigerant is technically a zeotropic blend, but has such a small temperature glide that is could be considered a near azeotropic blend.

42%	**R-134A**
58%	**R1234ze(E)**

Table 1.5.2a
R-450A Refrigerant Composition

When charging any R&A-Series refrigerator with R-450A refrigerant, care should be taken to weigh the proper amount of liquid refrigerant into the system according to the data plate. It is important to charge with refrigerant in a liquid state to avoid fractionating.

Pressure (psig)	Dew (°F)	Bubble (°F)
10	13.2	12.9
15	21.7	20.6
20	29.2	28.0
25	35.8	34.7
30	41.8	40.7
35	47.4	46.2
40	52.5	51.4
45	57.3	56.2
50	61.8	60.7
55	66.1	64.9
60	70.1	68.9
65	73.9	72.7
70	77.5	76.4
75	81.0	79.9
80	84.4	83.2
85	87.6	86.4
90	90.6	89.5
95	93.6	92.5
100	96.5	95.3
105	99.3	98.1
110	102.0	100.8
115	104.6	103.4

Table 1.5.2b
Pressure/Temperature Chart For R-450a Refrigerant

NOTE: Use the Dew temperatures when calculating superheat and bubble temperatures when calculating subcooling.

1.5.3 R-448A Refrigerant

R-448A refrigerant is a refrigerant Traulsen uses in low temperature applications. This refrigerant is a zeotropic blend with a large temperature glide.

26%	**R-32**
26%	**R-125**
21%	**R-134A**
20%	**R-1234yf**
7%	**R1324ze(E)**

Table 1.5.3a
R-448A Refrigerant Composition

When charging any R&A-Series freezer with R-448A refrigerant, care should be taken to weigh the proper amount of liquid refrigerant into the system according to the data plate. It is important to charge with refrigerant in a liquid state to avoid fractionating.

Pressure (psig)	Dew (°F)	Bubble (°F)
5	-28.8	-39.8
10	-19.7	-30.6
15	-12.0	-22.8
20	-5.2	-15.9
25	0.8	-9.8
30	6.3	-4.3
35	11.3	0.8
40	16.0	5.5
50	24.4	14.5
60	31.9	21.6
70	38.7	28.5
80	44.8	34.8
90	50.5	40.6
100	55.8	45.9
110	60.8	51.0
130	69.8	60.2
140	74.0	64.5
150	78.0	64.5
160	81.3	72.5
170	85.4	76.2
180	88.9	79.8
190	92.3	83.3
200	95.5	86.6
210	98.7	89.8
220	101.7	93.0
230	104.6	96.0
240	107.5	99.0
250	110.2	102.0
260	112.9	104.6
270	115.5	107.2

Table 1.5.3b
Pressure/ Temperature Chart for R-448A Refrigterant

1.6 Shipping and Assembly

1.6.1 Location

Select a proper location for your Traulsen unit, away from extreme heat or cold. Allow enough clearance between the unit and the side wall in order to make use of the door stay open feature at 120° (self-closing feature operates up to 90°). The door(s) must be able to open a minimum of 90° in order to make use of the maximum clear door width available.

1.6.2 Packaging

All Traulsen units are shipped from the factory bolted to a sturdy wooden pallet and packaged in a durable cardboard container. The carton is attached to the wooden skid with the use of large staples. These should first be removed to avoid scratching the unit when lifting off the crate.

Most exterior stainless steel surfaces have a protective vinyl covering to prevent scratching during manufacturing, shipping and installation. After the unit is installed in place of service, remove and discard the covering from all surfaces.

To remove the wooden pallet, first if at all possible, we suggest that the cabinet remain bolted to the pallet during all transportation to the point of final installation. The bolts can then be removed with a 3/4" socket wrench. Avoid laying the unit on its front, side or back for removal of the pallet.

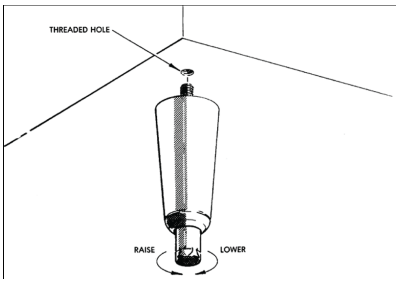
NOTE: DO NOT LAY THE UNIT ON ITS SIDE DURING

1.6.3 Installing Legs or Casters

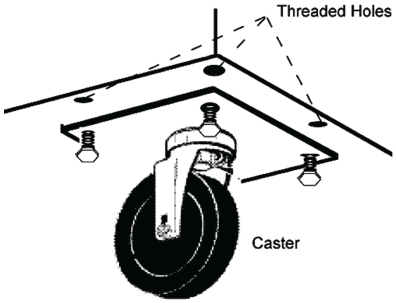
6" High stainless steel legs are supplied standard for all Traulsen reach-in and pass-thru units. Casters in lieu of legs are available as an optional accessory for the same models. These are shipped from the factory packed inside a cardboard box which is strapped to one of the shelves. Remove the nylon strap and open the box, it should contain either four (4) legs or four (4) casters and sixteen (16) bolts.

⚠ WARNING THE CABINET MUST BE BLOCKED AND STABLE BEFORE INSTALLING LEGS OR CASTERS.

To install the legs or casters, first raise and block the reachin a minimum of 7" from the floor. For installing legs, thread the legs into the threaded holes on the bottom of the cabinet. Be certain that all legs are tightly secured (legs and casters should be tightened to 300 inch/pounds, max). When the unit is set in its final position, it is important for proper operation that the unit be level. The legs are adjustable for this purpose; turn the bottom of the leg counter- clockwise to raise it, clockwise to lower it. Level the unit from front to back as well as side to side in this manner, using a level placed in the bottom of the cabinet.



Please note that Traulsen units are not designed to be moved while on legs. If the unit requires moving, a pallet jack or forklift should be used to prevent damage. For installing casters, the casters are "plate" type, and require the use of four (4) bolts each to secure them firmly to the cabinet bottom at each corner. The caster bolts are tightened using a 1/2" socket wrench.



Proper installation and use of legs and casters on upright cabinets are essential to ensure stability, mobility, and safety during usage, repositioning, and servicing. Here is an in-depth guide to the installation and usage of legs and casters

Wheel locks are an essential feature of casters that provide stability and safety when the unit is stationary. Here are the steps to properly use wheel locks

Locking the Casters:

- After Positioning: Once the cabinet is in its desired location, engage the wheel locks on all casters. This prevents the unit from moving and ensures it remains stable during use.
- Verification: Double-check that the wheel locks are fully engaged and the unit is securely in place.

Unlocking the Casters:

- Before Moving: Before attempting to move or reposition the cabinet, ensure all wheel locks are disengaged. This allows the unit to be moved freely and prevents damage to the casters or the floor.
- During Servicing: When servicing the unit, it may be necessary to move it slightly for better access. Make sure to unlock the casters before moving the cabinet.

Relocking the Casters:

- After Repositioning: Once the cabinet has been moved to its new position or after servicing is complete, re-engage the wheel locks on all casters to secure the unit.
- Safety Check: Perform a final check to confirm that all casters are locked and the cabinet is stable before resuming normal use.

Regular Inspections:

- Check Fastenings: Regularly inspect the screws and bolts securing the legs and casters. Tighten any that may have become loose over time.
- Inspect Casters: Check for any signs of wear and tear on the casters, including the wheel locks. **Replace any damaged parts immediately to ensure continued stability and safety.**

Cleaning
Remove Debris: Keep the casters free from debris that could hinder their movement or the operation of the wheel locks

Operational Checks
Test Wheel Locks: Regularly test the wheel locks to ensure they engage and disengage properly. This is crucial for maintaining the stability of the cabinet during use.

Proper installation and maintenance of legs and casters are vital for the safe and efficient operation of upright cabinets. By following the installation guidelines and ensuring the correct use of wheel locks, you can prevent accidental movement and maintain the stability of the unit. Regular inspections and maintenance will further ensure the longevity and reliability of the legs and casters, contributing to the overall performance and safety of the cabinet.

1.6.4 Shelf Pins
The unit is supplied with shelves and shelf pins installed. Check all shelf pins to assure they are tightened down as they may have come loose during shipping. Rotate the pins clockwise until they are secured against the side of the cabinet.

1.6.5 Cord & Plug
Most self-contained models are supplied with a cord & plug attached. It is shipped coiled at the top of the cabinet, secured by a nylon strip. For your safety and protection, all units supplied with a cord and plug include a special three-prong grounding plug on the service cord. Select only a dedicated electrical outlet with grounding plug for power source.

NOTE: Do not under any circumstances, cut or remove the round grounding prong from the plug, or use an extension cord.

1.6.6 Power Supply
The supply voltage should be checked prior to connection to be certain that proper voltage for the cabinet wiring is available (refer to the serial tag to determine correct unit voltage). Make connections in accordance with local electrical codes. Use qualified electricians.

Use of a separate, dedicated circuit is required. Size wiring to handle indicated load and provide necessary over current protector in circuit (see amperage requirements on the unit's serial tag).

1.6.7 Wiring Diagram
Refer to the wiring diagram for any service work performed on the unit. Should you require one, please contact Traulsen Service at **(800) 825-8220**, and provide the model and serial number of the unit involved.

1.6.8 Clearance
In order to assure optimum performance, the condensing unit of your Traulsen unit MUST have an adequate supply air for cooling purposes. Therefore, the operating location must either have a minimum of 12" clearance overhead of the condensing unit or allow for unrestricted air flow at the back of the unit. Clearance of at least 12" above is required in order to perform certain maintenance tasks.

1.6.9 Cleaning the Exterior
Exterior stainless steel should be cleaned with warm water, mild soap and a soft cloth. Apply with a dampened cloth and wipe in the direction of the metal grain.

Avoid the use of strong detergents and gritty, abrasive cleaners as they may tend to mar and scratch the surface. Do NOT use cleansers containing chlorine, this may promote corrosion of the stainless steel.

Care should also be taken to avoid splashing the unit with water, containing chlorinated cleansers, when mopping the floor around the unit.
For stubborn odor spills, use baking soda and water (mixed to a 1 TBSP baking soda to 1 pint water ratio).

1.6.10 Cleaning the Interior
For cleaning both stainless steel and anodized aluminum interiors, the use of baking soda as described in section "1.6.13" is recommended. Use on breaker strips as well as door gaskets. All interior fittings are removable without tools to facilitate cleaning.

1.6.11 Adjusting the Shelves
For shelves mounted on pins, first select the desired location and remove the white plastic covers in the interior back and sides by rotating them counter-clockwise. Remove the shelf pins by rotating them counter-clockwise. Install the pins in the desired location by rotating clockwise. Make sure the pin is securely tightened down. Do not over tighten. Slide the shelf into its new position, and replace the white plastic covers into the holes vacated by the shelf pins.

1.6.12 Replacing the light Bulb
All Traulsen R&A Series models are supplied with LED lighting with the exception of heated units. Optional tube style display lighting is available (except for sliding glass door models for which fluorescent lights are supplied standard).

The standard LED bulb is a 115 or 230 volt / 4-watt, T-6 intermediate clear refrigerator lamp. It is mounted at the top front of the cabinet at the center and is located behind a plastic light cover on refrigerator and freezer model.

Heated units (RHF/AHF/RIH/AIH/RDH/ADH/RIDH/AIDH) are equipped with a 115 or 230 volt / 25-watt, T-6 incandescent bulbs. LEDs have not evolved enough yet to take the heat. This bulb is shatterproof because these models do not include a plastic light cover.

To replace the bulb, first remove the light cover (if so equipped). This can be accomplished by squeezing it together on both sides until it comes free. Replace the light bulb, then squeeze both sides of the light cover together and replace in its original position.

1.6.13 Troubleshooting Guide

Before calling for service, please check the following:

Is the electrical cord plugged in?

Is the fuse OK or circuit breaker on?

Clean condenser coil?

Is the power switch on?

If after checking the above items and the unit is still not operating properly, please contact an authorized Traulsen service agent. A complete list of authorized service agents was provided along with your Traulsen unit. If you cannot locate this, you may also obtain the name of a service agent from the Tech Service page at traulsen.com. If service is not satisfactory, please contact our in-house service department at: Traulsen

4401 Blue Mound Road
Fort Worth, TX 76106
800.825.8220

Traulsen reserves the right to change specifications or discontinue models without notice.

1.6.14 P- Trap

The P-trap is a crucial component in refrigeration and air conditioning systems. Its primary function is to allow condensate (the water produced as a byproduct of the cooling process) to flow out of the equipment. Simultaneously, it prevents air from leaking into or out of the unit. Here's a breakdown of its purposes and functions:

Condensate Drainage

- Function: The P-trap ensures that the condensate water is effectively removed from the refrigeration unit, preventing water buildup that can lead to operational issues or damage.
- Importance: Proper drainage helps maintain the efficiency of the refrigeration system and prevents water-related damage to internal components.

Air Seal

- Function: The P-trap creates a water seal that blocks air from entering or exiting the refrigeration system through the drain line.
- Preventing air leakage is essential to maintain the system's pressure balance and operational efficiency. Air infiltration can introduce moisture and contaminants, leading to potential system failures.

Maintenance Suggestions and Simple Practices

To ensure the refrigeration system, including the P-trap, operates efficiently, follow these maintenance suggestions and practices:

Regular Cleaning

- Clean the condensate drain line and P-trap regularly to prevent clogs. Use a mixture of warm water and mild detergent, or a specialized HVAC cleaning solution.
- Frequency: Clean every three to six months, or more frequently if the system operates in a high-humidity environment.

Inspect and Clear Blockages

- Visual Inspection: Regularly inspect the P-trap and drain line for any visible blockages or buildup of debris.
- Clearing: Use a wet/dry vacuum to remove any obstructions from the drain line and P-trap.

Ensure Proper Installation

- Check Slope: Ensure the drain line has a proper slope (usually 1/4 inch per foot) to facilitate efficient water flow.
- Secure Connections: Verify that all connections are secure and there are no leaks at joints.

Monitor System Performance

- Signs of Issues: Pay attention to any **signs of poor drainage,** such as water pooling outside the refrigerator or freezer, or water freezing in the pan
- Immediate Action: Address any drainage issues immediately to prevent further complications.

Proper Usage and Regular Checks

Maintain Cleanliness:

Drain Pan: Ensure the drain pan is clean and free of debris to allow proper water flow and evaporation.

Check Seals and Gaskets

- Door Seal: Inspect door seals and gaskets for any signs of wear or damage, and replace if necessary to maintain an airtight seal.
- Proper Closure: Ensure doors close properly to prevent air leakage and maintain optimal internal temperatures.

Airflow

Unobstructed Venting : Ensure that the model has proper ventilation are not blocked allowing proper airflow, adequate space around the unit ensures proper airflow and efficient operation

Defrosting

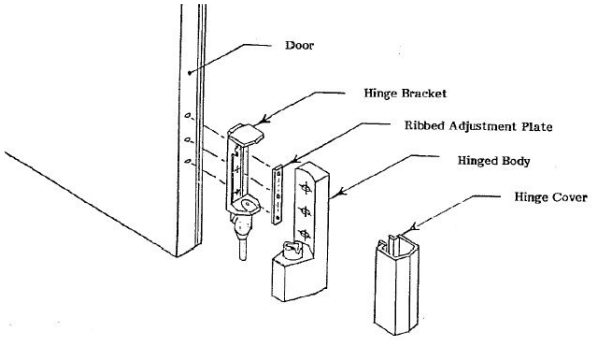
- Manual Defrost : If your unit requires manual defrosting, do so to prevent excessive ice buildup.
- Adjusting Defrost parameter : change how often the unit goes into defrost **(do not decrease below every 2 hrs)** to ensure the defrost cycle is functioning correctly.

Maintaining the P-trap and ensuring proper drainage in your unit is essential for its efficient and reliable operation. Regular cleaning, inspections, and adherence to recommended practices will help prevent issues related to condensate buildup and air leakage. By following these maintenance suggestions and simple practices, you can ensure the longevity and performance of your refrigerator and freezer.

1.6.15 Door Hinge Adjustment

Overview:

Proper adjustment of doors and hinges is essential to ensure they close correctly and maintain an airtight seal. This prevents energy loss, maintains internal temperature, and extends the lifespan of the refrigeration unit. Misaligned doors can cause air leaks, reduce efficiency, and increase energy consumption. Therefore, regular inspection and adjustment are crucial for optimal performance.



Proper adjustment of doors and hinges is crucial to ensure they close correctly and maintain an airtight seal. This prevents energy loss, maintains internal temperature, and extends the lifespan of the refrigeration unit.

Ensure the unit is powered off and all safety protocols are followed.

Gather necessary tools: screwdriver, and safety gloves.

Initial Inspection:

Check the door alignment and how it closes. does it seal?

Note any gaps or misalignment.

Removing the Door:

Locate the safety screw at the bottom of each hinge.

Use a screwdriver to remove the safety screw. Keep the screws safe for reassembly.

Carefully lift the door off the cabinet.

Adjusting the Hinges:

Identify the three screws holding the hinge bracket to the cabinet.

Loosen these three screws slightly. **Do not remove them entirely.**

Adjust the hinge bracket:

Up or Down: Move the hinge bracket vertically to align the door height.

Side to Side: Adjust horizontally to correct the door's lateral alignment.

Once aligned, tighten the three screws securely.

Reinstalling the Door:

Place the door back onto the cabinet hinges.

Replace the safety screws at the bottom of the hinges.

Test the door by opening and closing it several times to ensure it moves freely and closes properly.

The dollar bill test is a simple method used to check if a refrigerator door seal is functioning properly. To perform the test, place a dollar bill halfway into the refrigerator door and close it. Gently tug on the bill; if it slides out easily without resistance, this indicates that air may be escaping, and the door seal may need to be repaired or replaced. A good seal should hold the bill firmly in place, preventing cold air from escaping and ensuring efficient operation of the refrigerator

Lock Keeper Adjustment

Adjusting the lock keeper is vital for ensuring the door locks securely. Proper adjustment prevents unauthorized access and maintains the integrity of the unit's contents. A correctly adjusted lock keeper ensures the door remains closed, preserving the internal environment and security of the unit. Regular maintenance and adjustment help in prolonging the life and reliability of the locking mechanism..

Ensure the unit is powered off and follow all safety protocols.

Gather necessary tools: screwdriver and safety gloves.

Removing the Lock Keeper:

Locate the two screws holding the lock keeper in place.

Use a screwdriver to remove these screws and set the lock keeper aside.

Adjusting the Bracket:

Locate the two screws in the bracket mounted on the cabinet.

Loosen these screws slightly. Do not remove them entirely.

Adjust the bracket side to side:

Move the bracket to align the lock keeper with the lock bolt.

Once aligned, tighten the screws in the bracket securely.

Reinstalling the Lock Keeper:

Place the lock keeper back into position.

Secure it with the two screws previously removed.

Final Check:

Test the lock by closing the door and engaging the lock bolt.

Ensure the lock bolt catches the lock keeper and the door locks securely.

By following these detailed procedures, technicians can ensure that doors and locks are properly adjusted, maintaining the functionality and security of the refrigeration unit.

1.6.16 EZ-Open Foot Pedal

Installation Instructions

1 Foot Pedal Installation

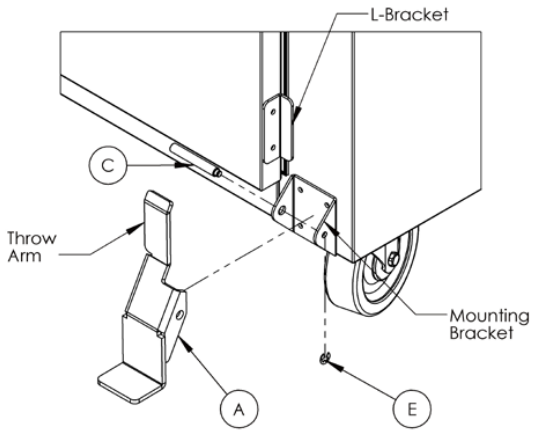
1) Install casters/legs before installing foot pedal
2) Remove ring E and pin C
3) Place foot pedal A in center of mounting bracket
4) Ensure Throw Arm is between unit and L-Bracket when door is in closed position
5) Insert pin C and attach ring E to secure

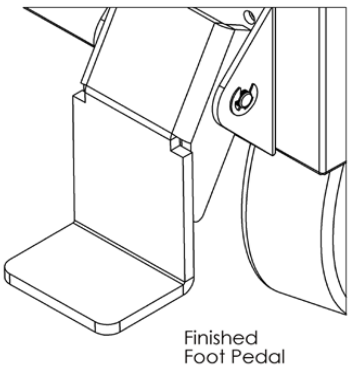
2 Foot Pedal Installation

1) Install casters/legs before installing foot pedal
2) Remove ring E and pin D
3) Place foot pedals A and B in center of mounting bracket
4) Ensure Throw Arms are between unit and L-Brackets when door is in closed position
5) Insert pin D and attach ring E to secure

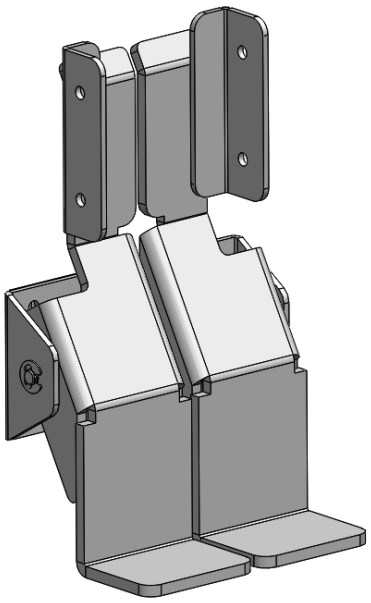
Item	Description
A	Foot Pedal Right Extended
B	Foot Pedal Left Extended
C	Pin Pivot Foot Pedal (1 foot pedal)
D	Pin Pivot Foot Pedal (2 foot pedal)
E	E-Style Retaining Ring

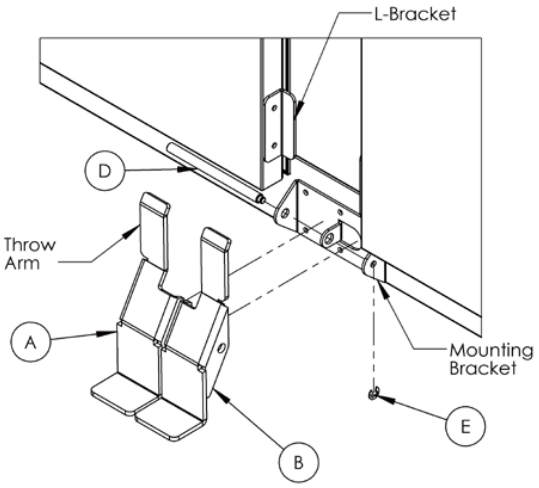
* **Brackets Factory Installed**
** **Pedal(s) Field Installed**

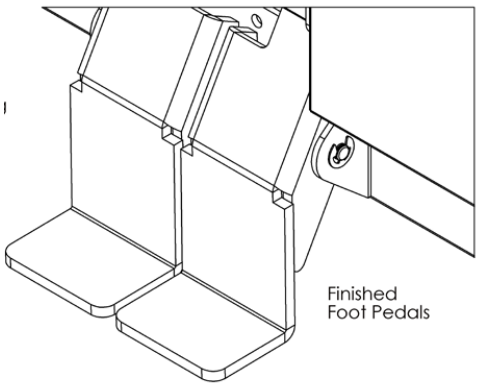




*****All parts are optional based on make/model*****



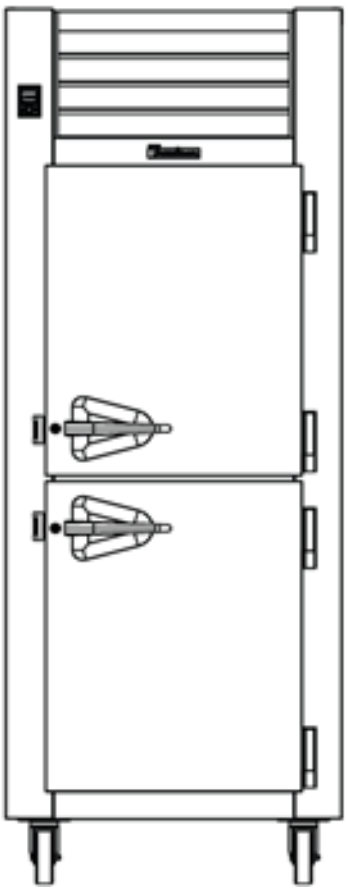




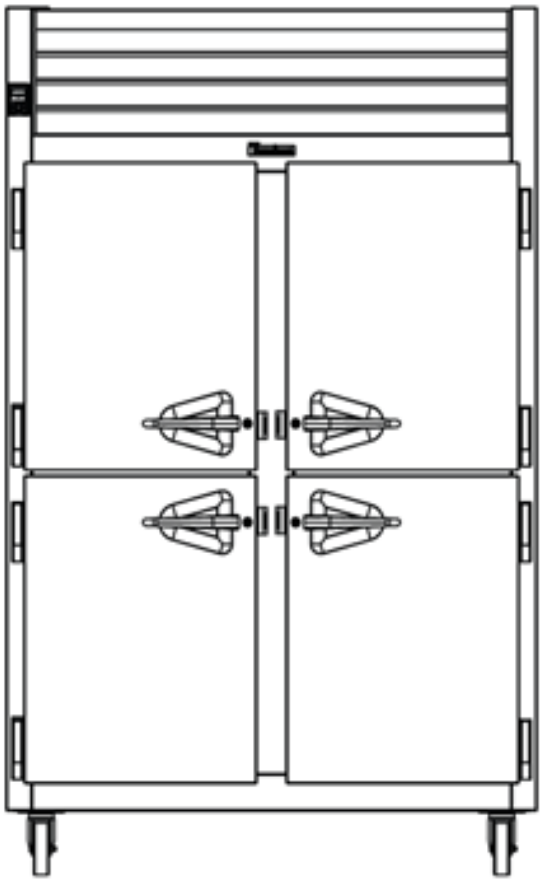
1.7 Specifications

DIMENSIONS	1 Section Cabinet	2 Section Cabinet	3 Section Cabinet
Height - Overall on 6" Casters	83-7/16" (211.9 cm)	83-7/16" (211.9 cm)	83-7/16" (211.9 cm)
Width	29-7/8" (75.9 cm)	52-1/8" (132.4 cm)	76-5/16" (193.8 cm)
Depth	35" (88.8 cm)	35" (88.8 cm)	35" (88.8 cm)
Net Capacity cu. ft.	23.37	46.5	69.1

Table 1.7
TRAULSEN Cabinet Specifications

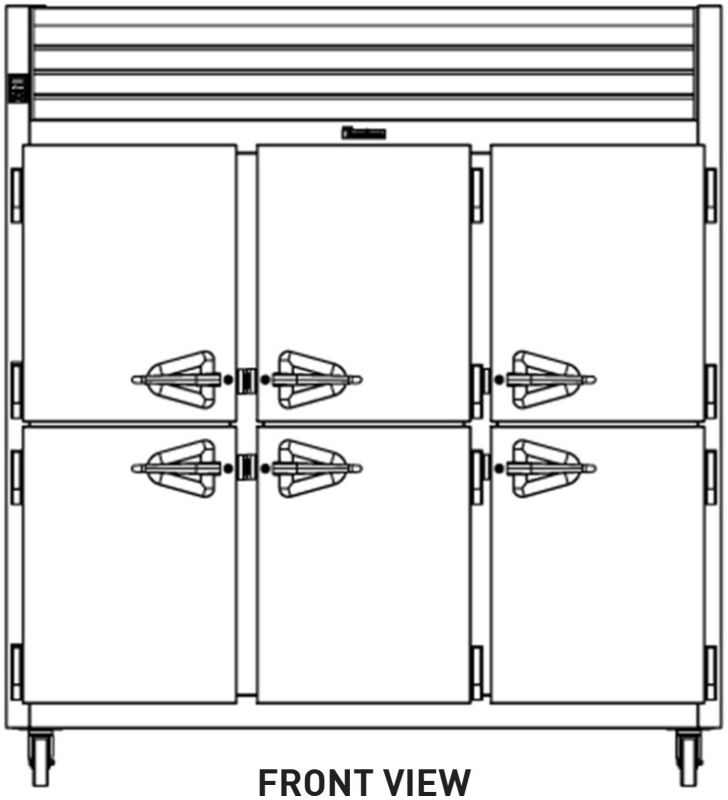


FRONT VIEW ONE SECTION CABINET



FRONT VIEW TWO SECTION CABINET

Fig. 1.7a
Front View of 1 & 2 Section Cabinets



FRONT VIEW
THREE SECTION
CABINET

Fig. 1.7b
Front View Of 3 Section Cabinet

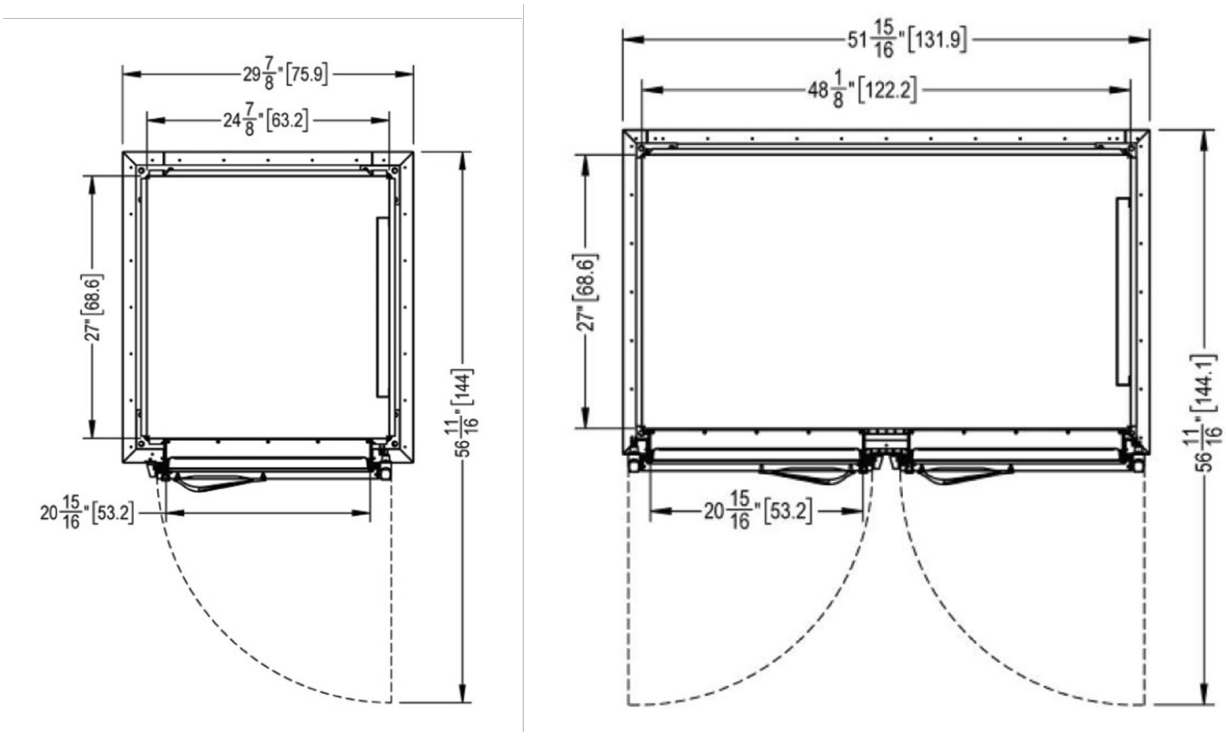


Fig. 1.7c
Top View Of 1 & 2 Section Cabinets

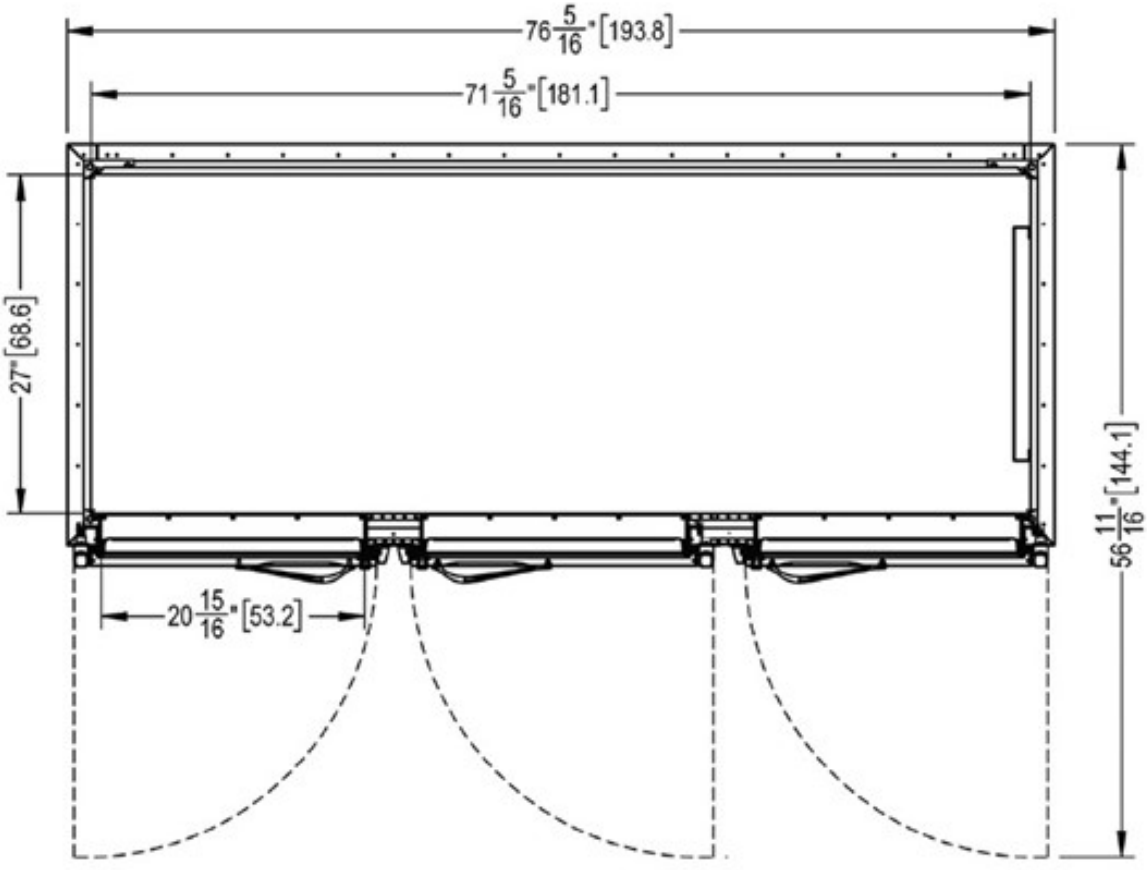


Fig. 1.7d
Top View of 3 Section Cabinets

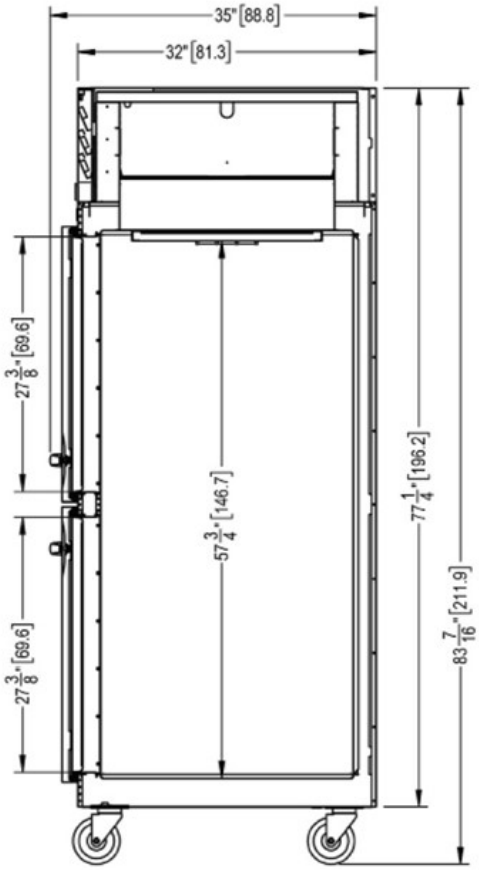


Fig. 1.7e
Side View of Reach-in Cabinets

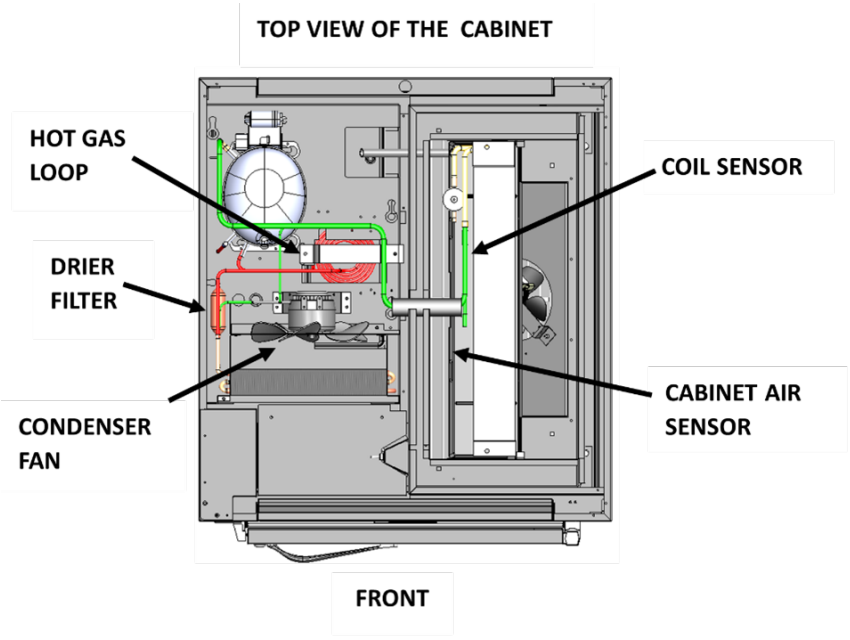
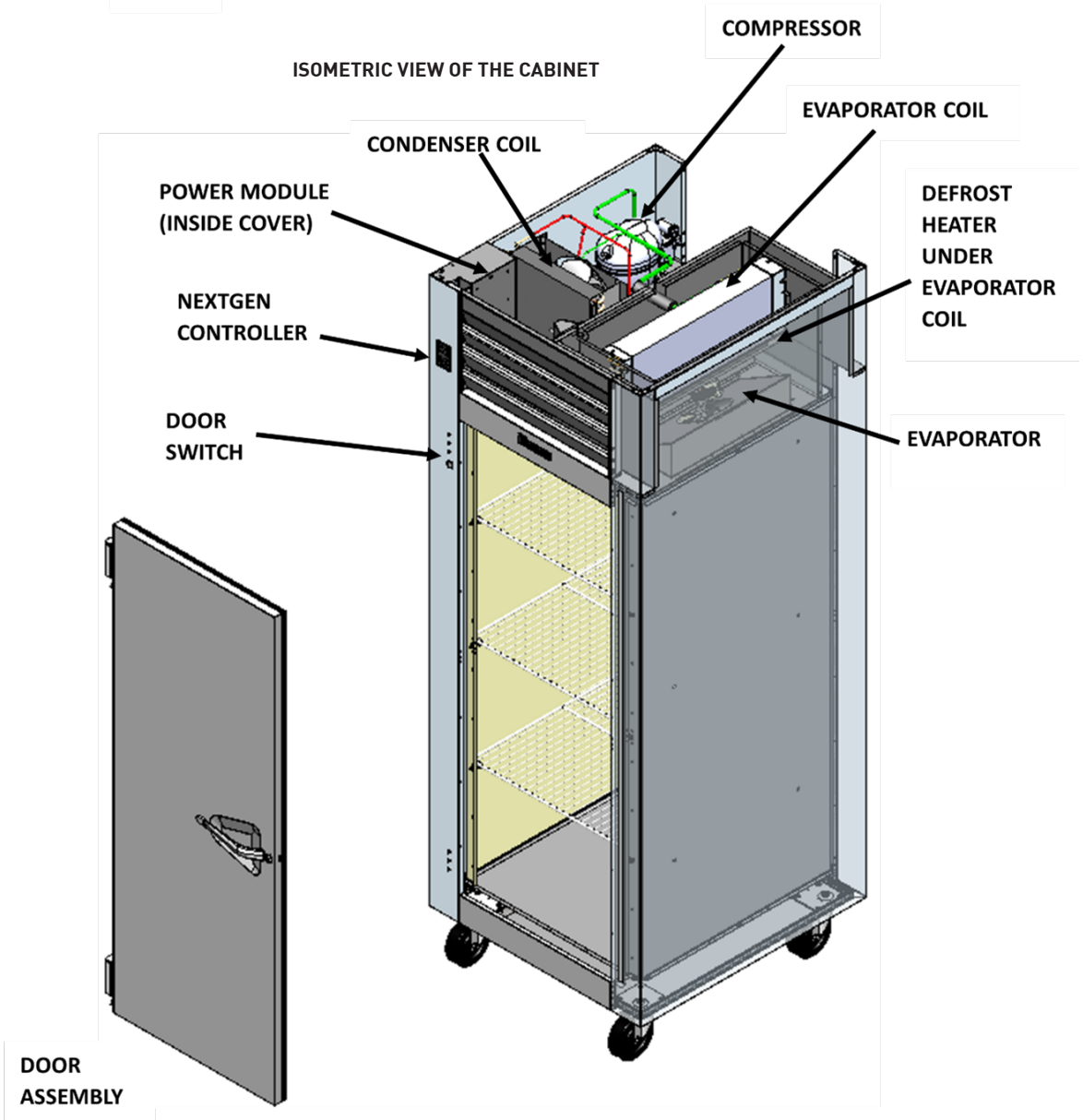


Fig. 1.6f
SYSTEM VIEW



2. Preventive Maintenance

This section is to inform the recommended preventive maintenance (PM) procedures.
Depending on application, PM schedule may vary.

2.1 Inspect & Clean Unit

Why	Sanitation & prolong cabinet life	
Frequency	Daily	
Time required	3 minutes to prepare	3 minutes to complete
Preparation	Have a soft cloth. Baking soda & water mixed to a 1 TBSP (15mL) baking soda to 1 pint (473.2mL) water ratio.	
Cleaning	Apply with a dampened cloth, wipe in the direction of the metal grain. (Avoid the use of strong detergents and gritty, abrasive cleaners as they may tend to mar and scratch the surface. Do NOT use cleansers containing chlorine; this may promote corrosion of the stainless steel.)	
Inspection	Visually inspect the unit for signs of wear that may require repair.	

Table 2.1
Cleaning PM Procedure

2.2 Inspect & Clean Door Gasket

Why	Long reliable service life
Frequency	Every 3 months
Time required	10 minutes to complete
Inspection	Open cabinet door(s) to inspect gasket. Pull gasket with hand & visually inspect gasket for tears, dirt, mold or wear. Clean with mild soap & water. **Do NOT use cleaners containing chlorine or chlorides.** Replace as needed. 341-60256-00 - Full-Height Gasket 341-60257-00 - Half-Height Gasket

Table 2.2
Door Gasket Cleaning PM Procedure

2.3 Clean Condenser Coil

⚠ WARNING **Disconnect electrical power supply before cleaning any parts of the unit.**

Why	Long reliable service life, extended compressor life	
Frequency	Every 3 months	
Time required	5 minutes to prepare	15 minutes to complete

Table 2.3a
Condenser Cleaning PM Procedure

INSPECTING EVAPORATOR COIL DRAIN PAN & DRAIN:

Clear out any debris. Spray water on coil to ensure drain pan is flowing out of the drain.

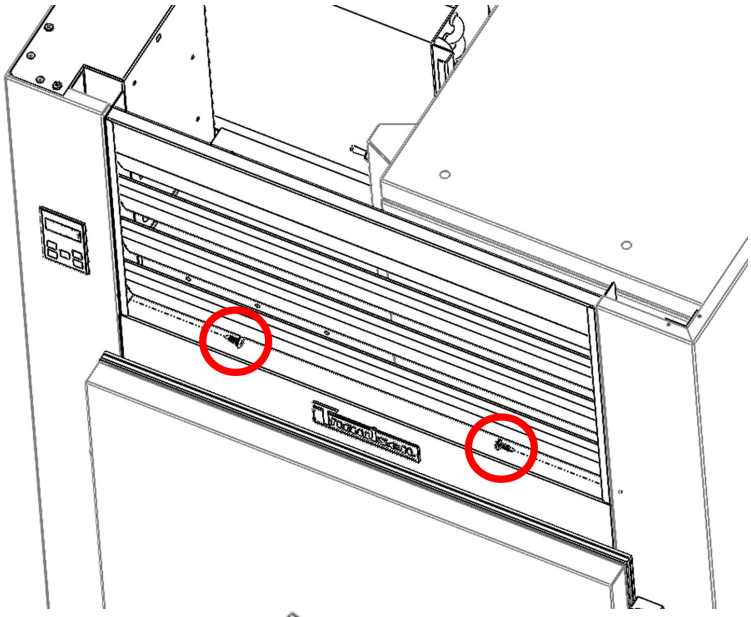
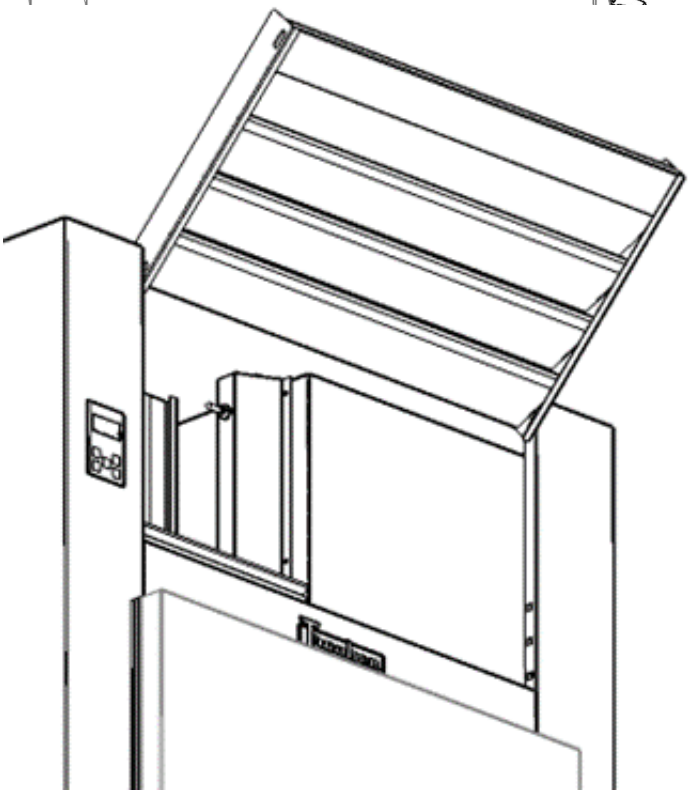
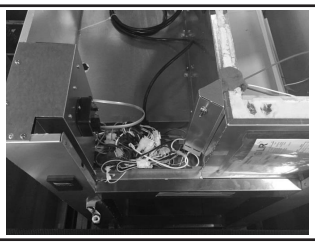
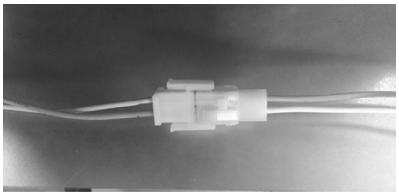
Preparation	  To clean the condenser, first disconnect electrical power to the cabinet and lift the front louver assembly. To lift this, remove the two screws located on both sides at the bottom of the louver assembly. Once the screws are removed, the panel can be pivoted upwards allowing full access to the front-facing condenser.
Cleaning	Use a soft bristle brush to remove any dirt, lint or dust from the finned condenser coil, around the compressor and other cooling system parts as indicated. Be sure to brush in the direction of the fins to prevent damage. If significant dirt is clogging the condenser fins, use compressed air to blow this clear. When finished, reverse the louver removal process as instructed above. **Compressor warranty claims will not be paid for units with dirty condensers.**

Table 2.3b
Condenser Cleaning PM Procedure

2.4 Door Frame Heater Replacement

Installation process:

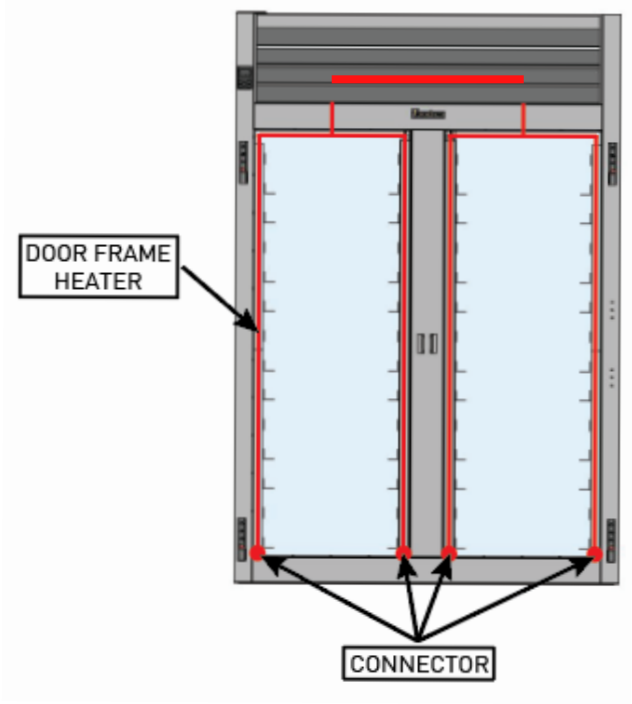
Note: The original heater wire will be abandoned in the foam.

Unplug unit.	
Remove screws and breaker strips around the perimeter of the door opening.	
Find the orange and white power supply wires to the door heaters on top of the unit in the wire chase.	
Use a long probe or screw driver to create a hole through the foam in the top center mullion area up to the wire chase hole.	
In the wire chase check for the white and orange wires coming from the control board. Connect the new heater wires to the power wires.	
Stick new foil heater wires around the perimeter of the unit to the right of the breaker strip screws closest to the outer skin of the unit like in the picture below. **Remove 1 " of foam from each corner** and tuck the element into the cavity so as not to pinch/damage the heater element when re-installing the breaker strips	
When finished reinstall breakers strips.	
Plug in unit.	

2.5 Door Frame Heaters

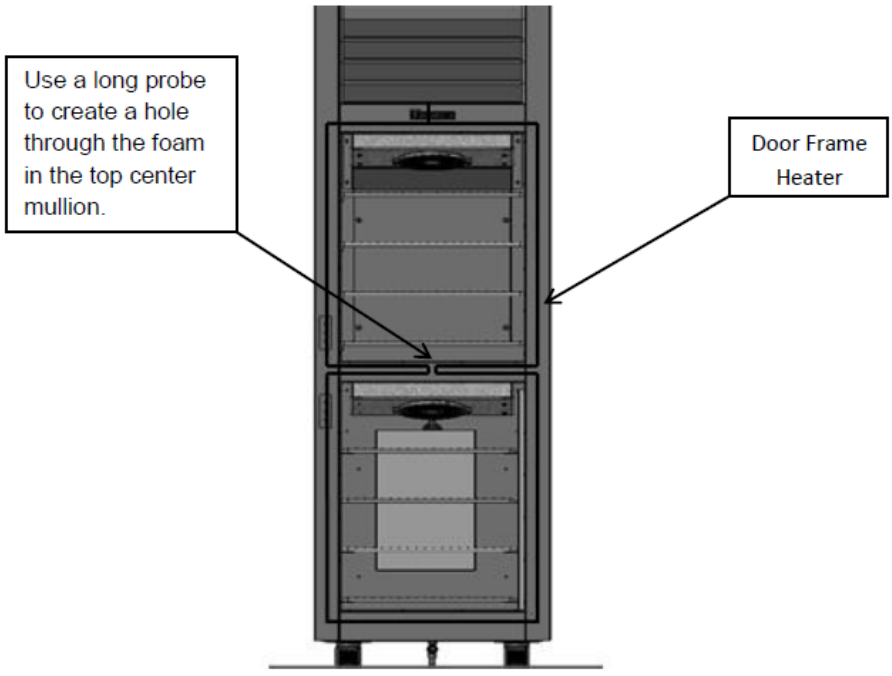
Door Frame Heaters in Roll-IN Units

2.5.1 How door frame heaters should be run in a two section Roll-in unit.



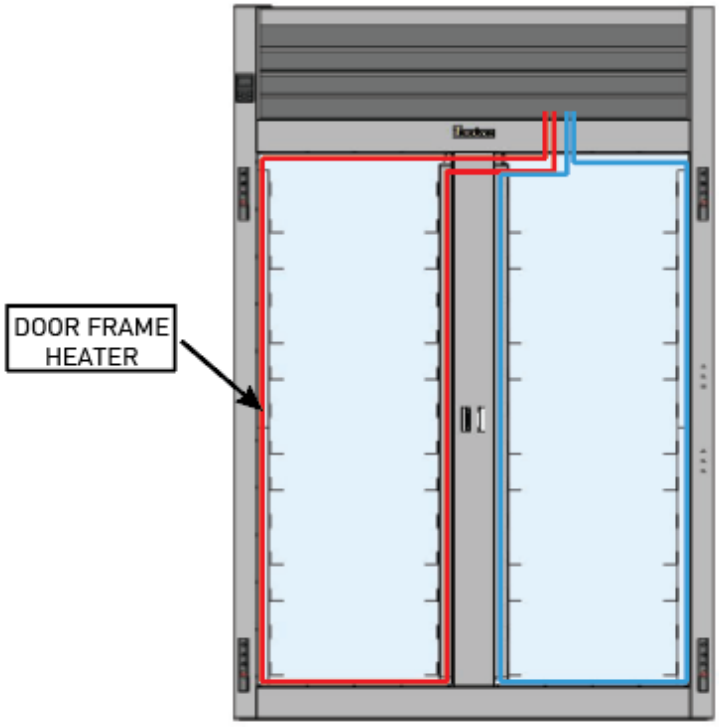
Door Frame Heaters in Half Height Units

2.5.2 How door frame heaters should be run in a Half Height unit.



Door Frame Heaters in 2 Section Units

2.5.3 How door frame heaters should be run in a 2 section unit.



3. Doors & Hardware

3.1 Hinges

3.1.1 Removing the Doors & Hardware

To fit through narrow (less than 35") doorways, it may be necessary to remove the door(s), and/or hinges. To remove any solid door, begin by removing the safety screw at the bottom of the top hinge which secures the door in place. Remove this with a #2 Phillips screwdriver and the door can then be lifted off the hinges. After removing the door, it may be necessary to remove the hinge assembly and hardware from the door itself. If it is necessary to remove the hing hardware from the cabinet, begin by removing the (3) Phillips-head screws which hold it in place. Set these components aside for later reassembly.

The lock keeper may also require removal to reduce the overall cabinet depth to 32".

First remove the lock keeper strike plate by removing the (2) Phillips-head screws which secure it in place- exposing the adjustment screws. Then remove both adjustment screws from the mounting plate. To reinstall the door and/or hinges, please reverse the appropriate sections of the preceding procedure.

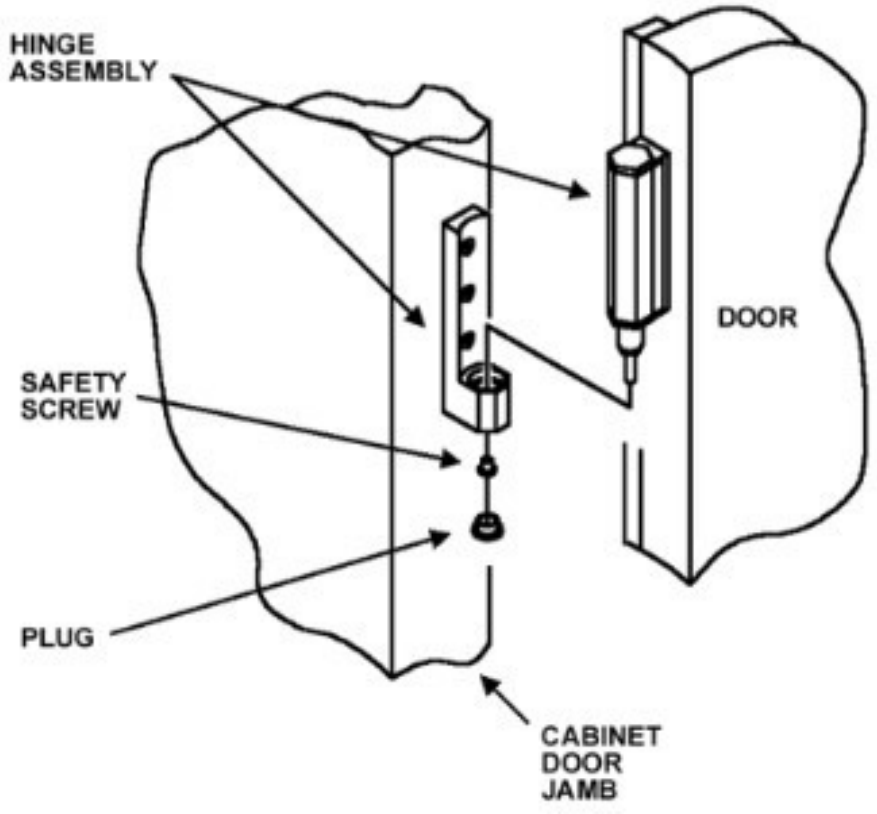


Fig. 3.1a
Hinge Assembly

WARNING

WHEN REMOVING DOORS ENSURE THEY ARE SET ASIDE IN A SECURE POSITION TO PREVENT FALL/SLIP THAT MAY CAUSE PERSONAL INJURY.

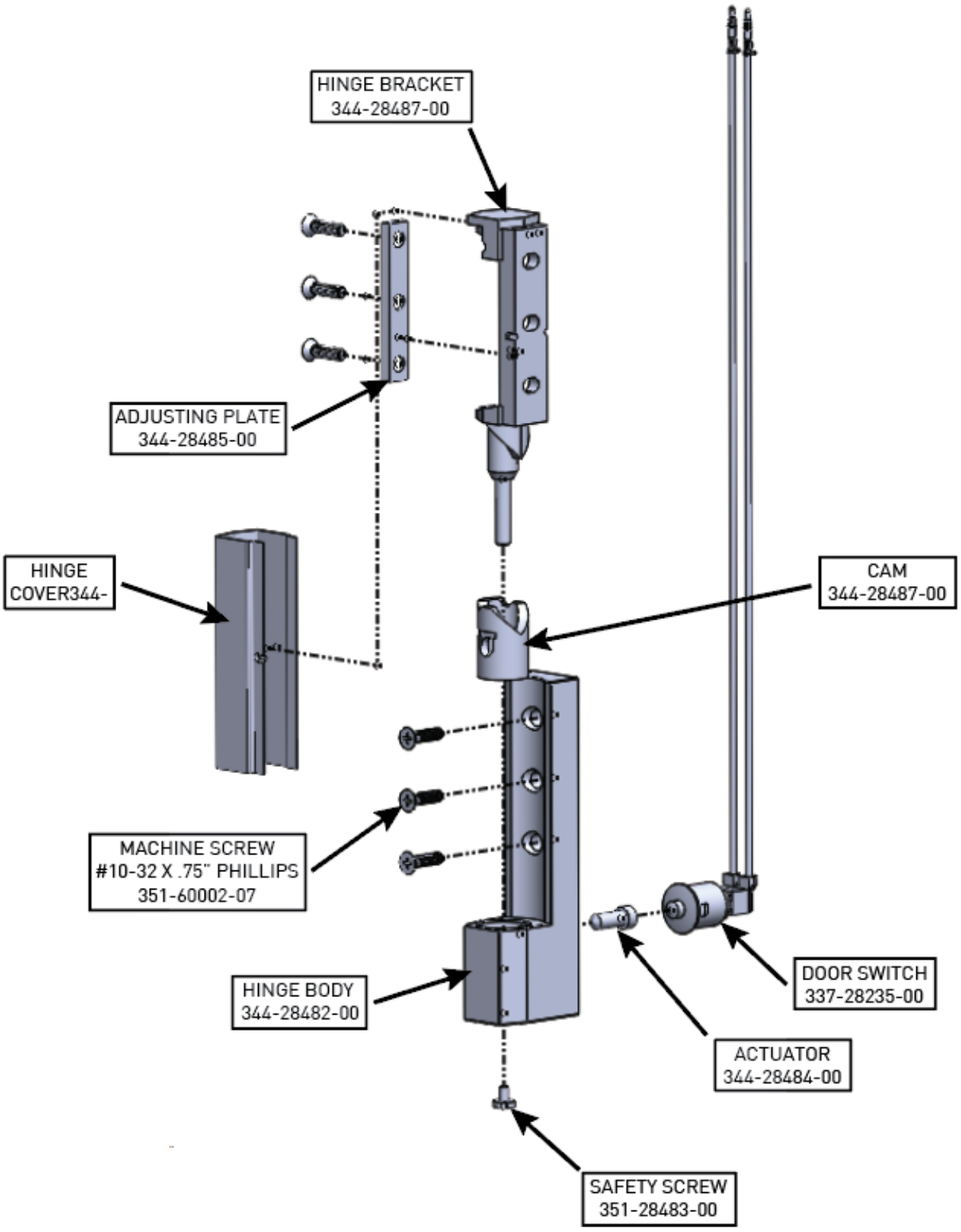


Fig. 3.1b
Hinge Exploded View

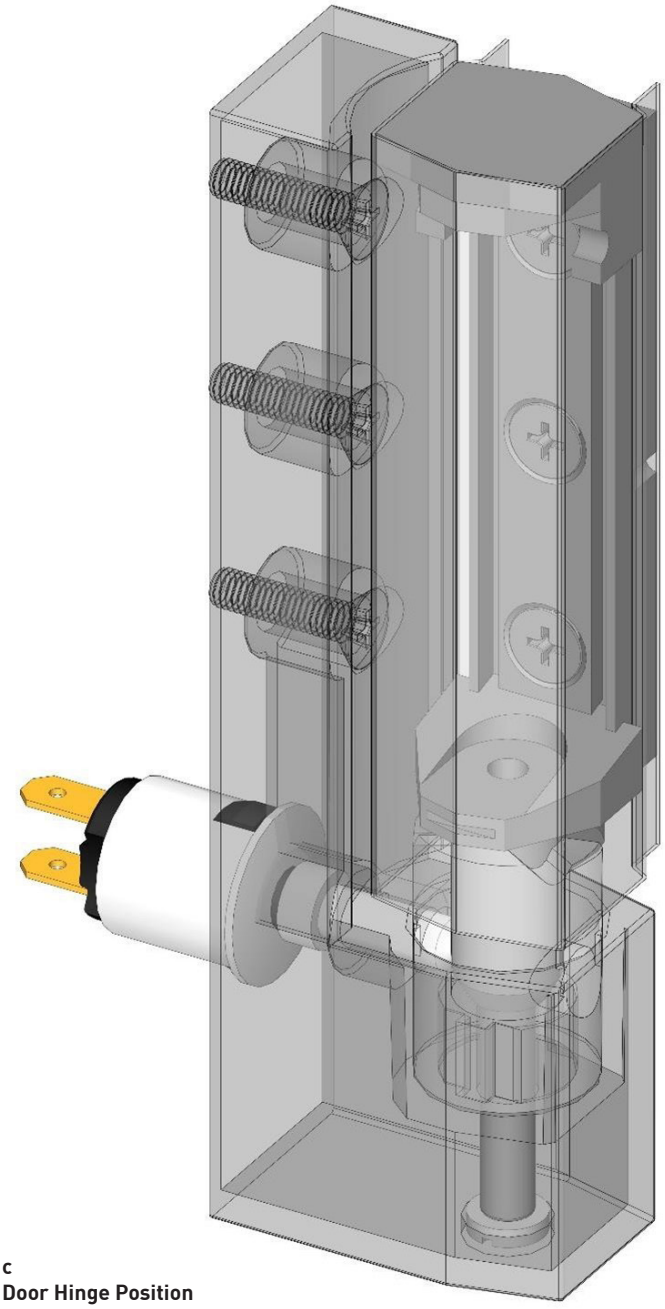


Fig. 3.1c
Closed Door Hinge Position

***** "Scan for Door Switch Troubleshooting & Service Videos!" *****

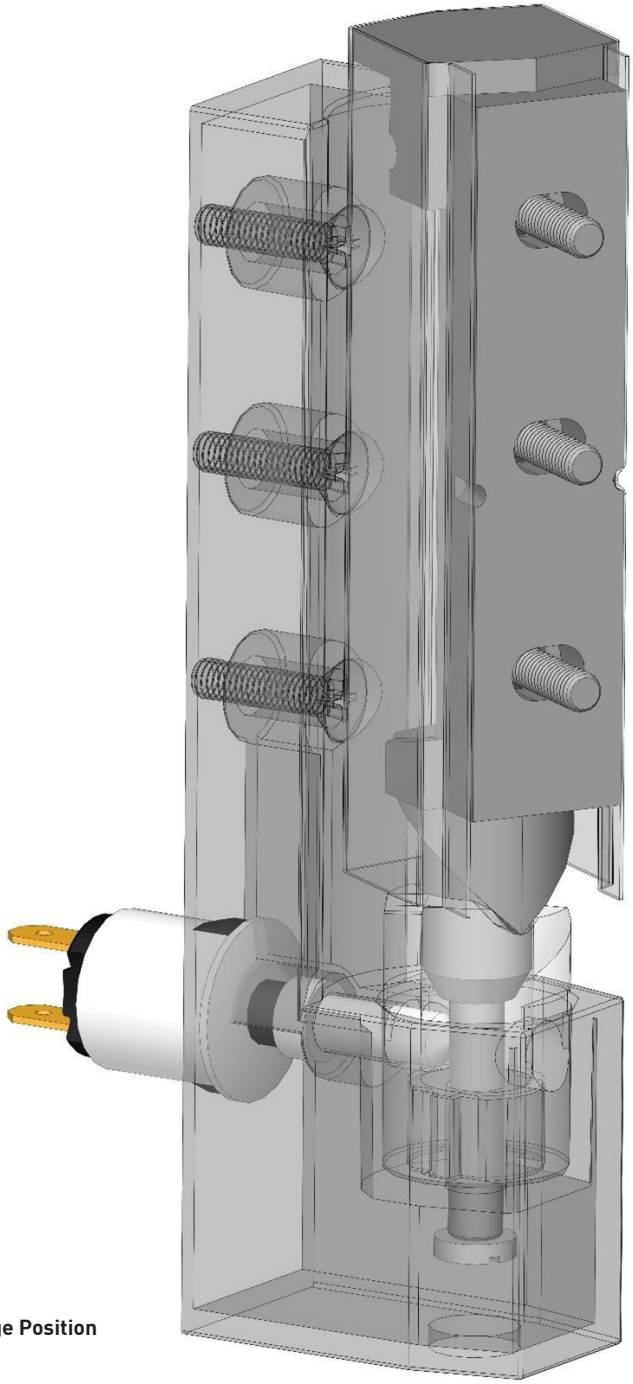


Fig. 3.1d
Open Door Hinge Position

Closing the Door:

The hinge bracket travels along the cam & the thicker portion of the hinge bracket stem **pushes the actuator** into the door switch, opening the circuit.

- Light turns off
- Fans come back on (if board is calling for fans)

Opening the Door:

The hinge bracket travels along the cam- exposing the thinner hinge bracket stem and the door switch pushes the actuator out, closing the circuit.

- Light turns on
- Fans turn off (this helps prevent ice buildup on evaporator coil from ambient air moisture)

3.2 Adjustments

Performing a Door Adjustment

These instructions are intended to aid the technician in the field perform hinge adjustments and may not cover all situatuations that could arise. Final diagnosis of field-based equipment is the sole responsibility of the technician performing any work required.

1. Remove the hinge safety screw.
2. Remove the door and gently lay it on the floor to slide the hinge cover off of the hinge bracket.
3. Loosen the (3) bolts securing the hinge bracket to the door.
4. Install the door without hinge covers.
5. Position the adjusting plate to the desired fit, tighten the screws and replace the hinge covers.

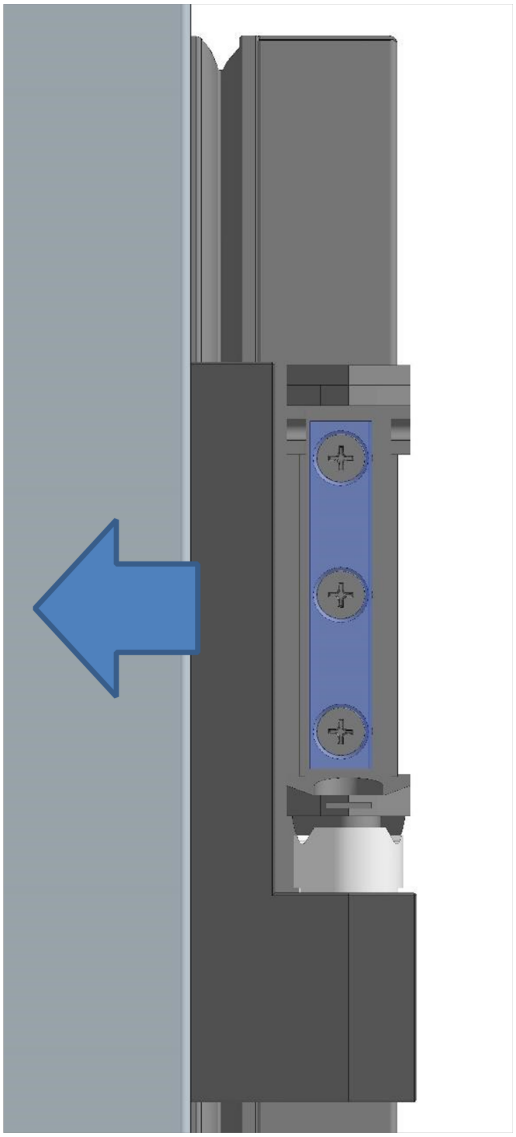


Fig. 3.2a
Door Adjustment Inward

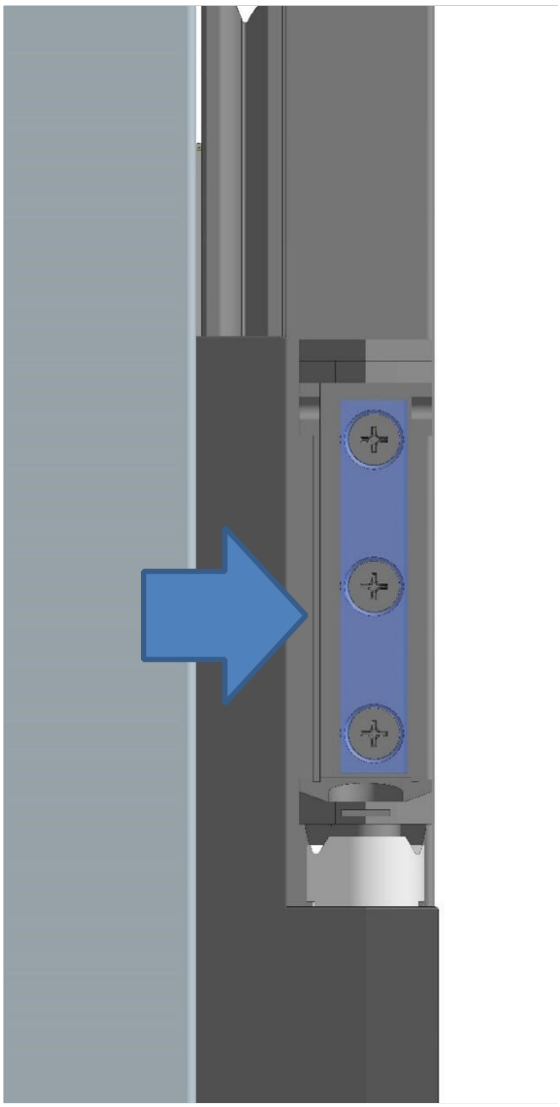


Fig. 3.2b
Door Adjustment Outward

3.3 EZ-Clean Gaskets

Door Gasket Replacement

Remove an old gasket by grasping it firmly by one corner and pull it out. Install the new gasket by inserting all (4) corners first. After the corners are properly inserted, work your way towards the center from both ends- pushing the dart into the retainer until the gasket is completely seated in place. Check for a proper seal all the way around the door.

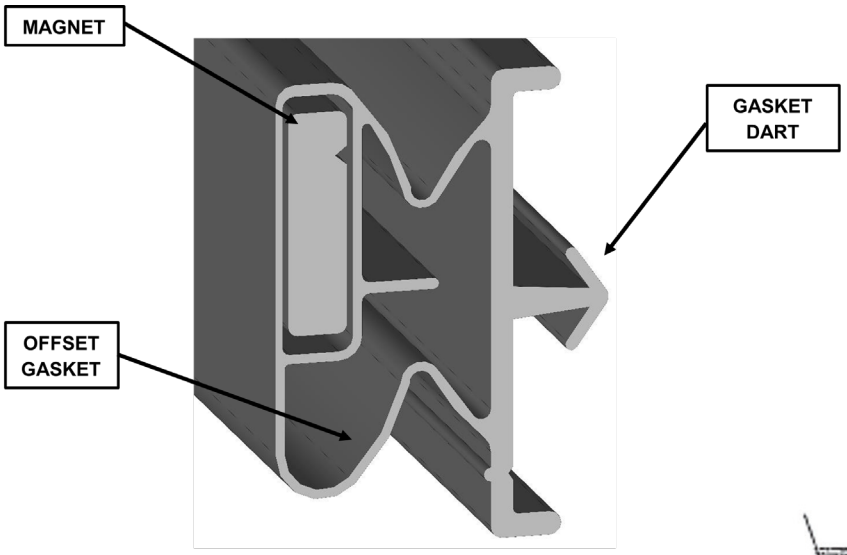
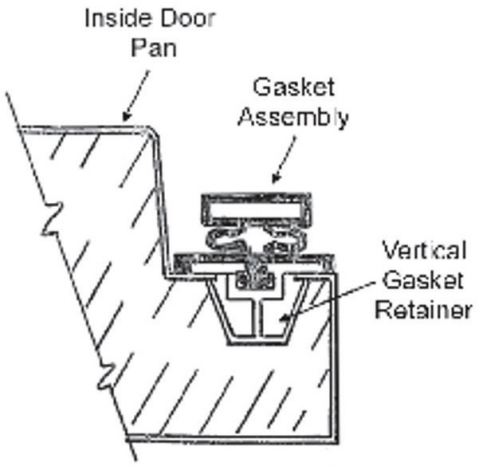


Fig. 3.3
Gasket Section View



Description	Part Number
Half-Height Door Gasket (22.814" x 29.5")	SVC-60257-00
Full-Height Door Gasket (22.814" x 59.75")	SVC-60256-00

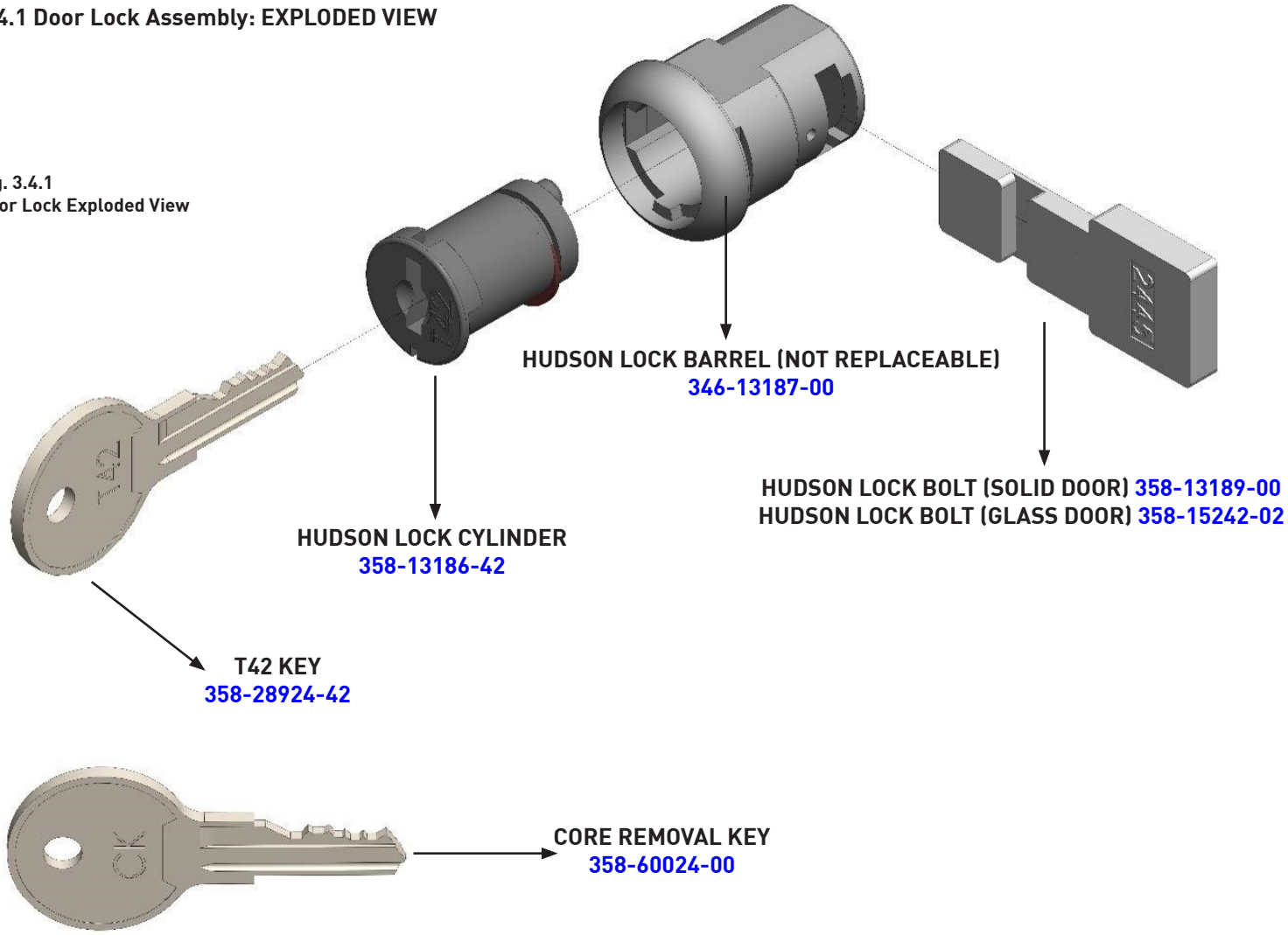
Table 3.3
Door Gasket Part Numbers

*** "Scan for Gasket Installation & Service Videos!" ***

3.4 Locks

3.4.1 Door Lock Assembly: EXPLODED VIEW

Fig. 3.4.1
Door Lock Exploded View



NOTE: Core removal key should only be used to remove door lock assembly. A damaged Hudson lock barrel requires door replacement.

Service Kit Numbers:

Solid Door Lock Kit	SER-13186-42
Glass Door Lock Kit	358-13186-02

Table 3.4
Door Lock Service Kit Part Numbers

3.4.2 Door Lock Replacement Instructions:

Disassembly of Lock

To remove the lock cylinder for replacement, insert the core removal key into the lock- causing the spline to lower so the lock cylinder can be removed. Move the key up & down, then pull backwards; the core key will pull the lock cylinder along with it. The lock bolt is now free to slide out of the lock barrel for replacement (if applicable).

Assembly of Lock

Insert the lock bolt into the lock barrel until the groove in the bolt is approximately in the locked position. Insert the core removal key into the lock cylinder (causing the spline to lower) and insert the lock cylinder into the lock barrel **(NOTE: Lock stud must be lined up with lock bolt groove)**. Use one hand to firmly hold the lock cylinder in place, then remove the core key with the other (causing spline to rise & securing lock cylinder).

NOTE: Lock barrel is assembled to the door during production at the factory. A damaged lock barrel requires door replacement. Core removal key should only be used for lock replacement. Use of core removal key to lock & unlock the door will cause the lock cylinder to fall out.

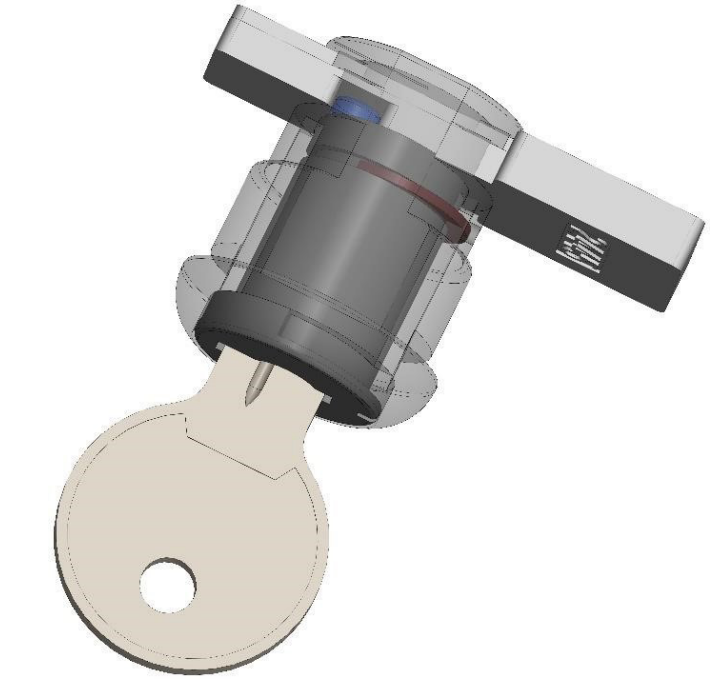


Fig. 3.4.2a
Unlock Position

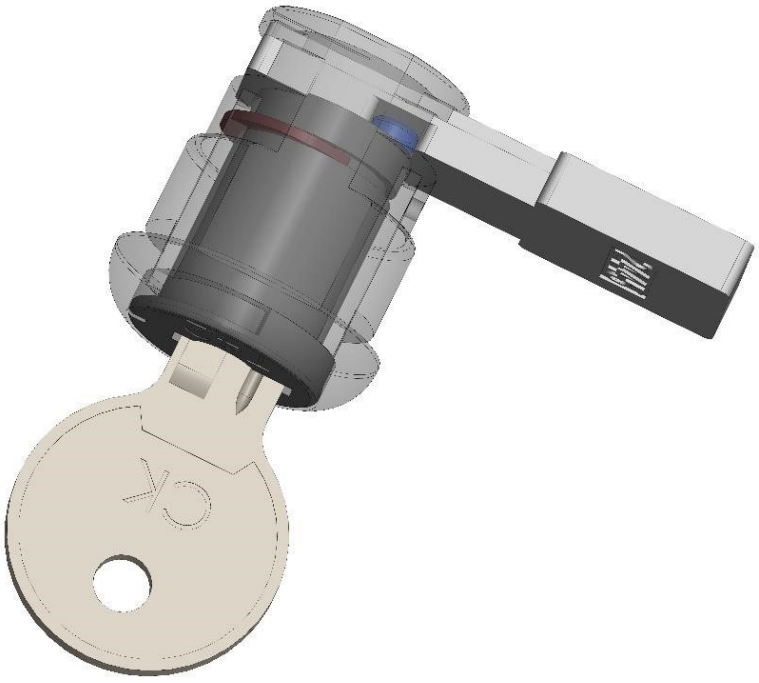
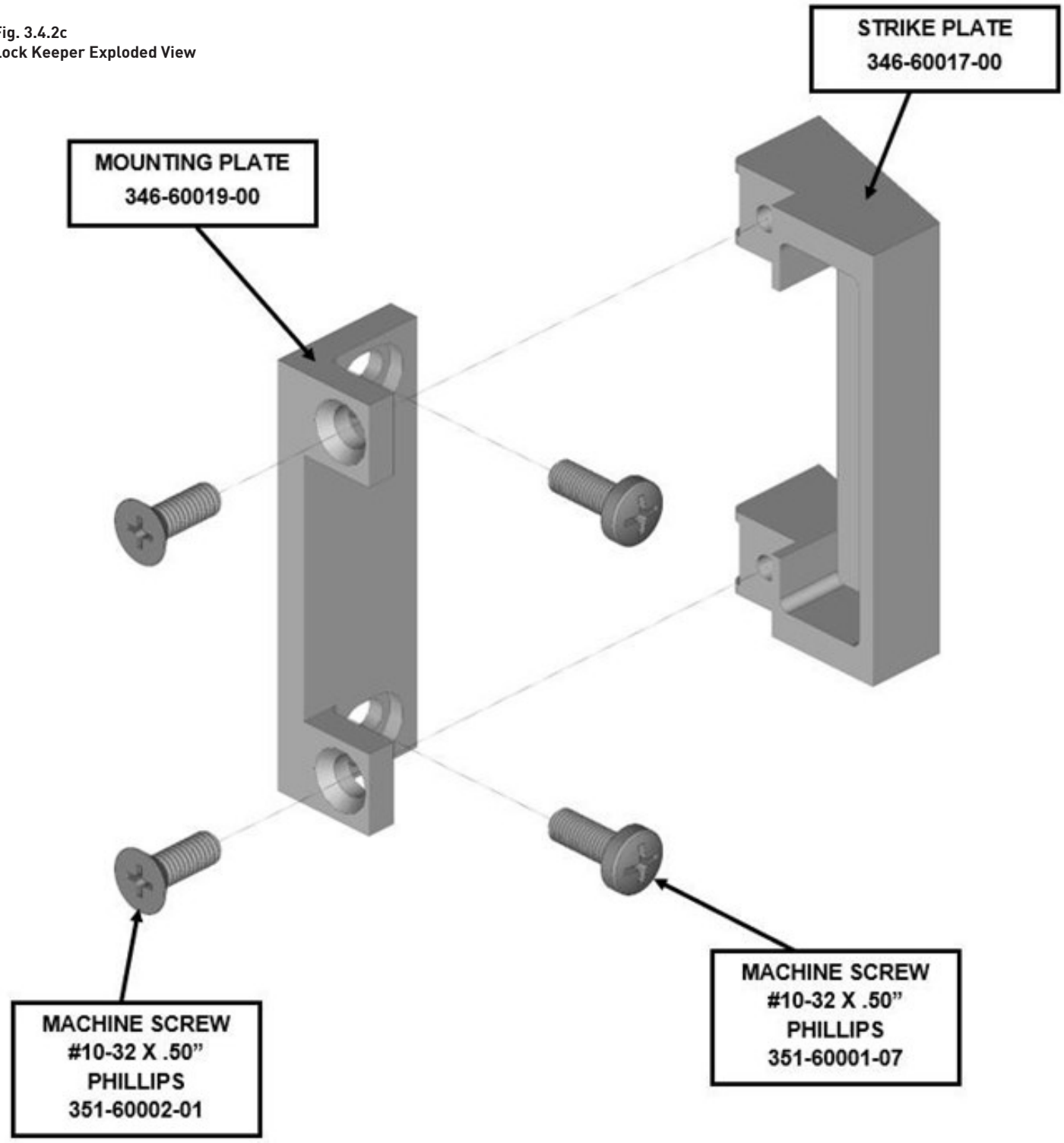


Fig. 3.4.2b
Lock Position

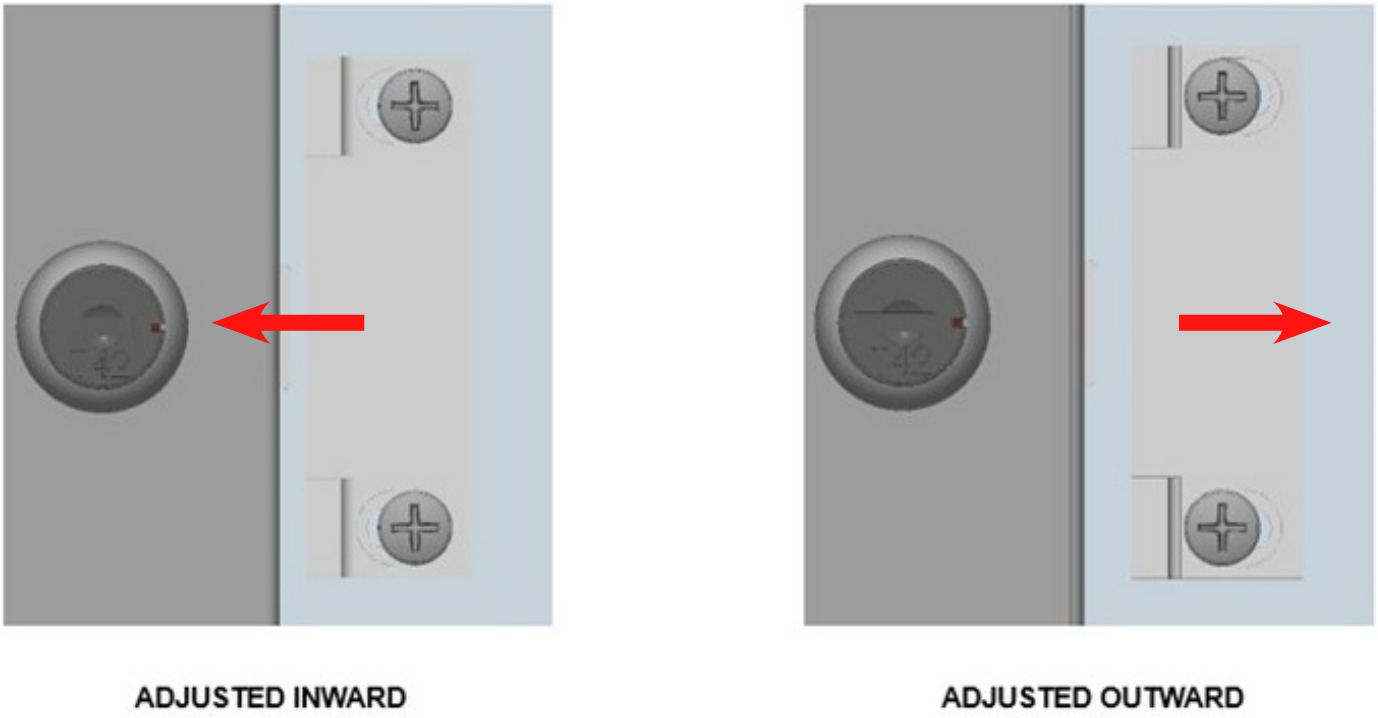
Fig. 3.4.2c
Lock Keeper Exploded View



Adjusting the Lock Keeper

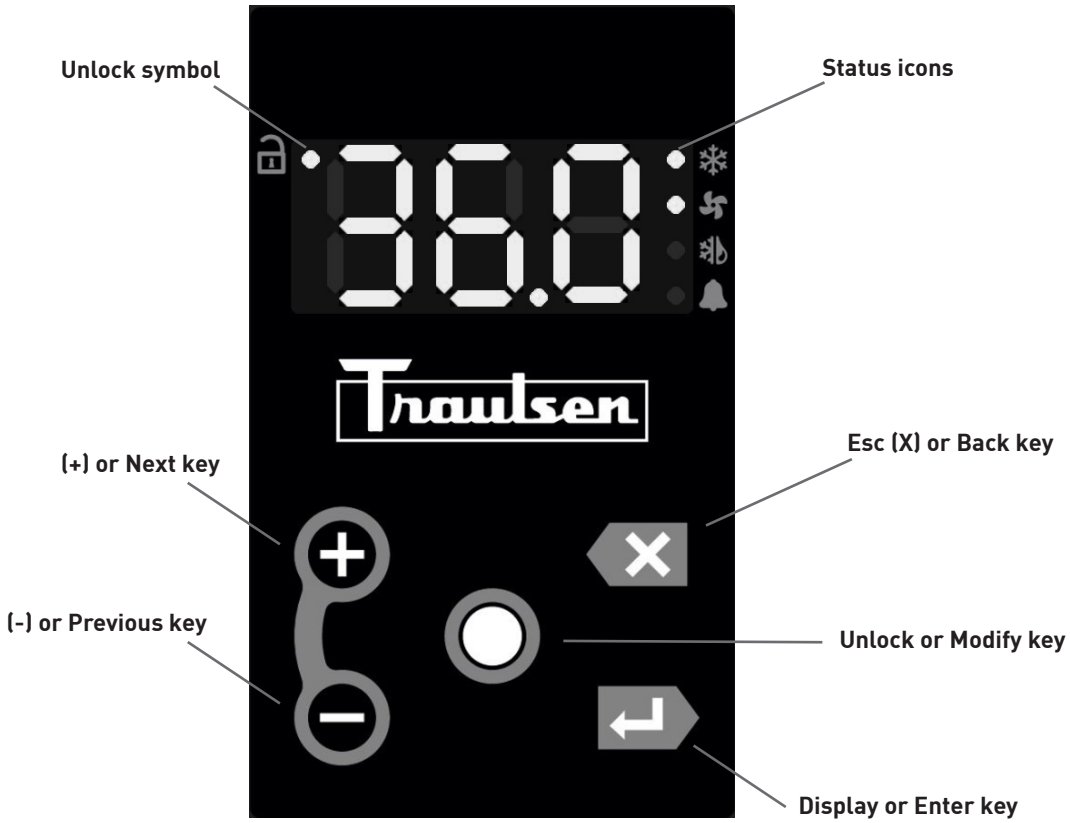
1. Remove the (2) machine screws holding the strike plate to the mounting plate using a #2 Phillips screwdriver.
2. Remove the strike plate.
3. Loosen the (2) machine screws holding the mounting plate to the cabinet.
4. Adjust the mounting plate (left or right) until:
    A. The lock keeper does not interfere with the door opening or closing.
    B. The lock bolt extends far enough in the locked position to be stopped by the strike plate, locking the door.

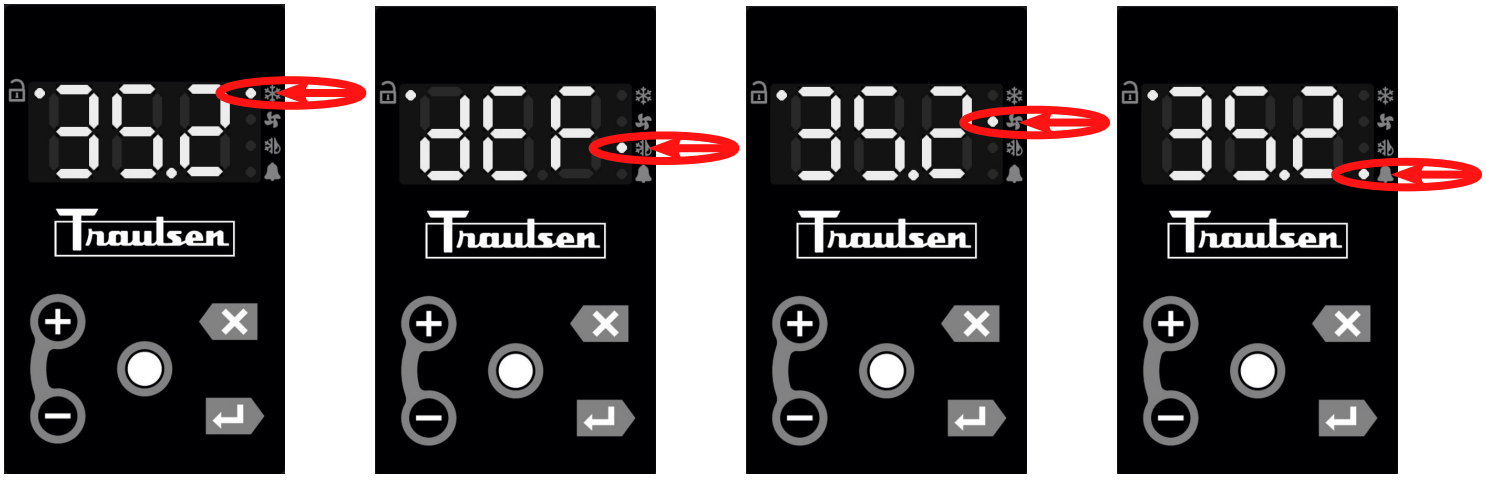
Fig. 3.4.2d
Lock Keeper Adjustment



4. Controls

4.1 Understanding the Display



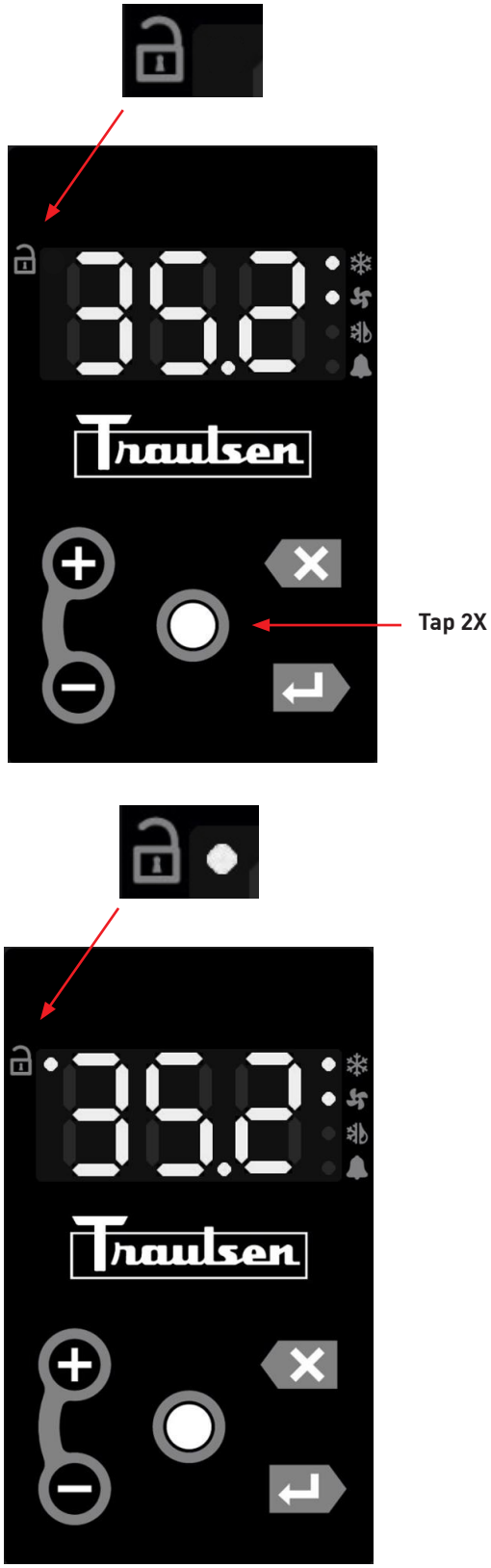


Compressor On | Defrosting | Evap Fan On | Alarm

Displays Status Icons

4.2 Unlocking the Display

The **Unlock Key** is a white dot in the bottom middle of the display, centered between the other four control keys. Press the Unlock Key twice within a second to unlock the keypad (think "tap-tap"). The **Keypad Unlocked LED** will turn on to indicate the keypad is now live. The keypad will stay unlocked until 3 minutes of inactivity have passed- at which time it will automatically lock the keypad.



Unlocking the Display

There are (2) operations the user can perform without having to enter a password: 1. Change the temperature setpoint & 2. Indicate a defrost operation.

4.3 Changing the Setpoint

The setpoint to the unit can be changed simply by pressing the **Plus or Minus Key**. There will be a slight delay at first to prevent an accidental change, so it will be necessary to hold the key for (3-4) seconds until the value starts to flash. The flashing value indicates the setting is being modified. To raise the setpoint, press the **Plus Key** to increment to the setpoint you want. Similarly, press the **Minus Key** to lower the setpoint. When the desired value is reached, press the **Enter/Display Key** to lock in the value. Pressing the **Esc Key** will abort the process and keep the original set point. The keypad must be unlocked to change the setpoint using the shortcut method.

4.4 Initiating a Defrost

To initiate a manual defrost for troubleshooting purposes, press the **Minus Key** and the **Esc Key** simultaneously and hold for (5) seconds.

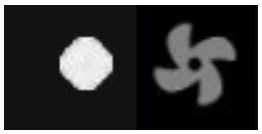
Fig. 4.4a
Defrost Icon Illuminates In Electric Defrost ONLY

Fig. 4.4b
ONLY Fan Icon Illuminates With Off-Cycle Defrost

Electric Defrost	Off-Cycle Defrost
Compressor Icon OFF	Compressor Icon OFF
Fan Icon OFF	Fan Icon ON
Defrost Icon ON	Defrost Icon OFF

Table 4.4
Electric Defrost Vs. Off-Cycle Defrost

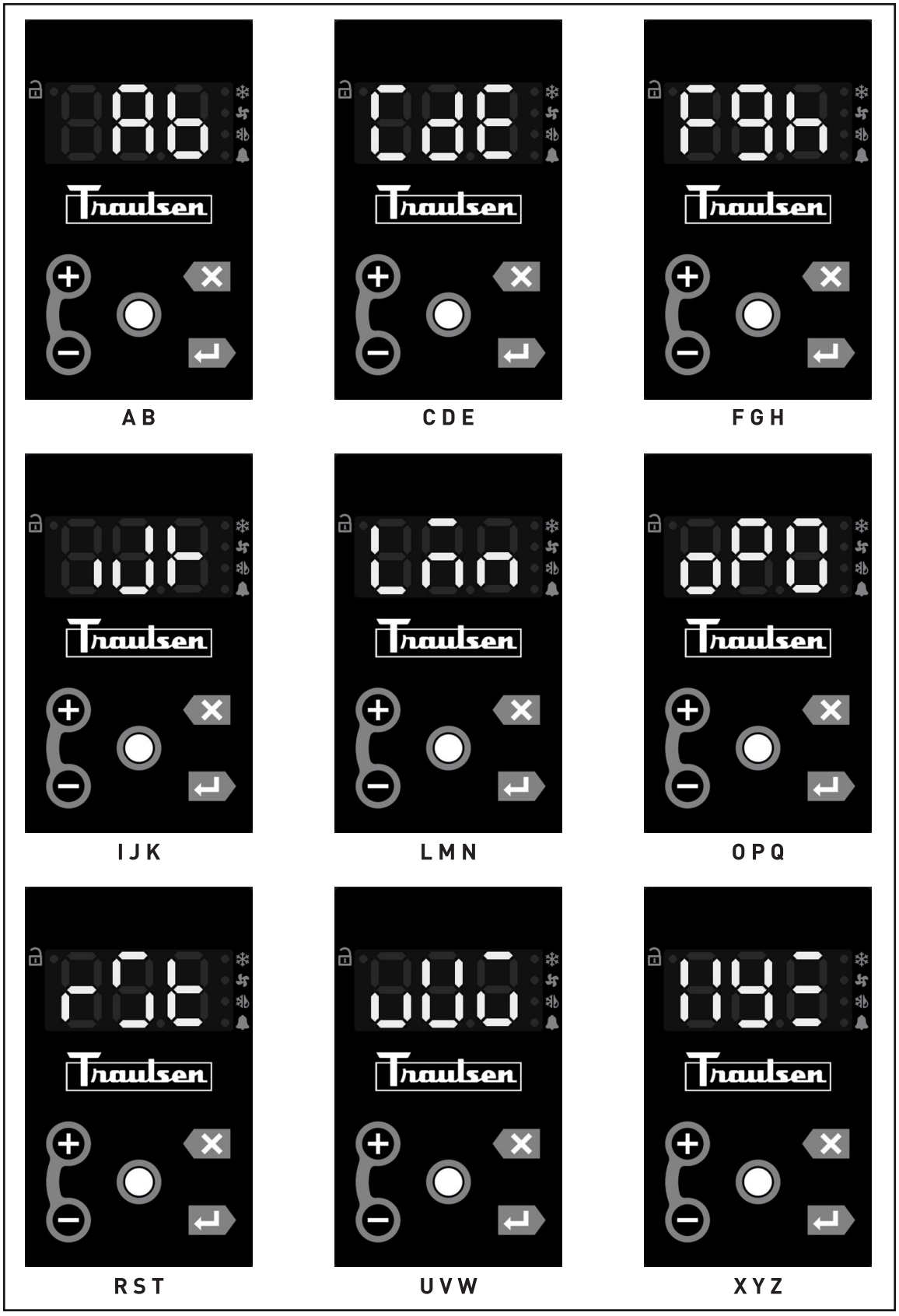
Compressor



Evaporator Fan

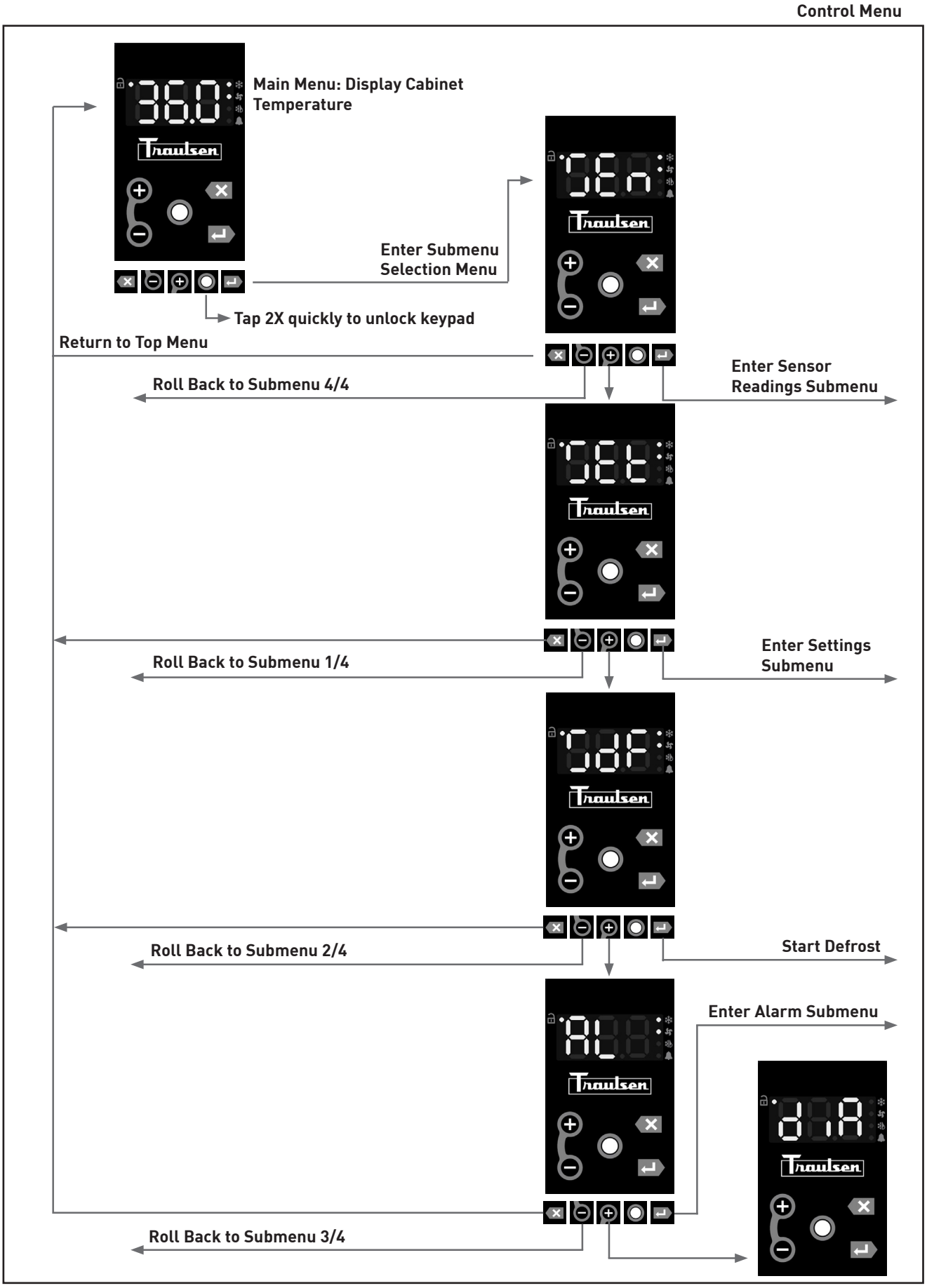
Defrost Heat Icon

4.5 Decode Alphabet

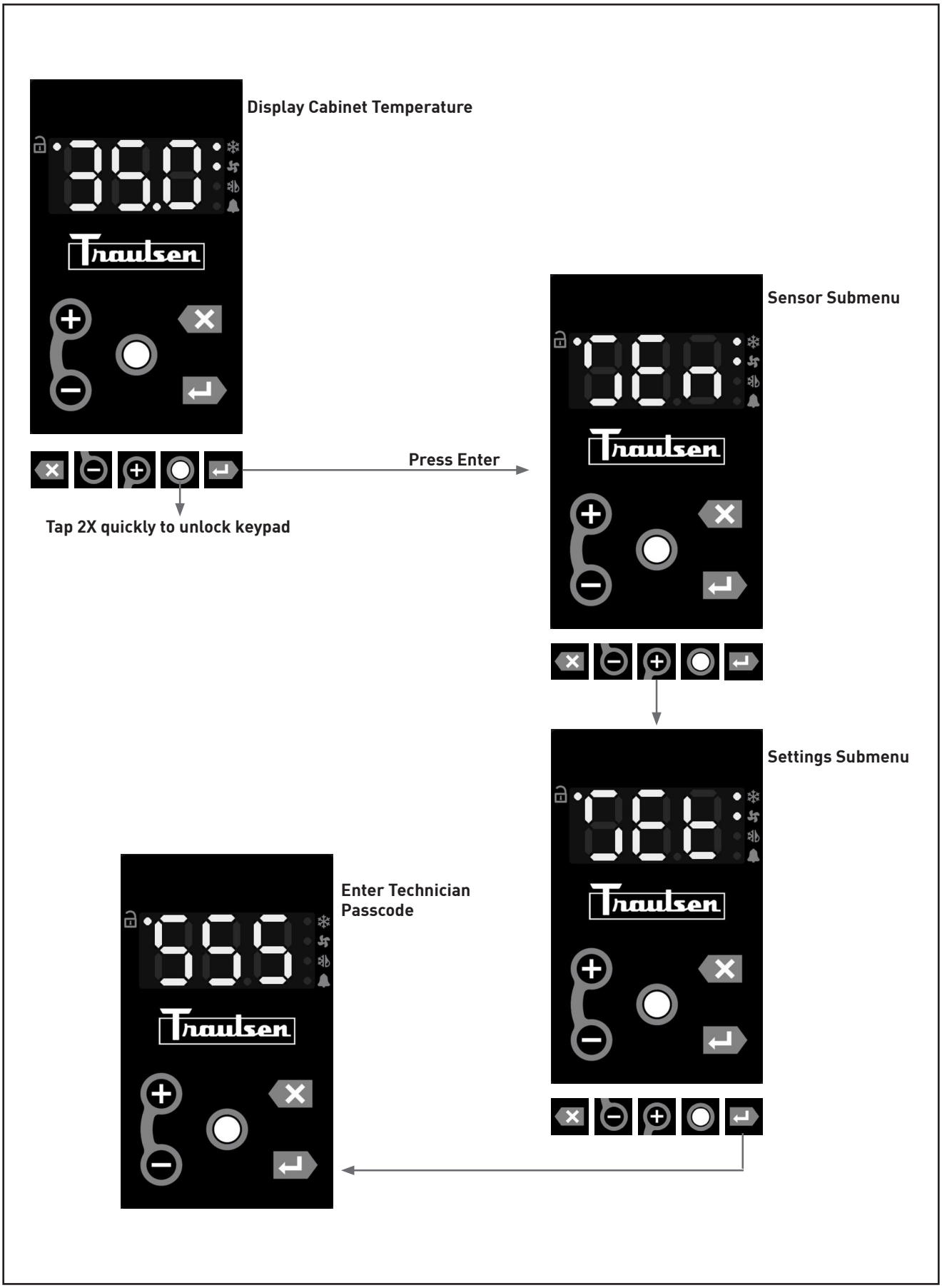


Decoding the display
ALPHABET

4.6 Understanding the Menu System



4.7 Defrost Settings



4.8 Defrost Setpoint

Defrost Setpoint - Evaporator Coil Temperature at Defrost Heat Termination

Press enter to view setting

Defrost Setpoint

Freezer Setting

Refrigerator Setting

4.9 Defrost Mode

1) Defrost Mode - Determines how defrost is initiated

2) Optimize - Control is set to 'Optimize' at the factory. This mode takes into consideration the dewpoint, door openings, and Defrost Interval Setting when deciding when to start a defrost.

3) Time - When defrost mode is set to 'Time' defrost is initiated based strictly on the Defrost Interval setting.

1)

2)

3)

4.10 Defrost Interval

1) Defrost Interval - Determines how many hours between each defrost

2) Refrigerator Off-Cycle Defrost - Defrost Interval set to h02 for refrigerators utilizing Electric Defrost

3) Freezer Electric Defrost - Defrost Interval set to h04 for freezers utilizing Electric Defrost

4) **Refrigerator Electric Defrost -** Defrost Interval set to h08 for refrigerators utilizing Electric Defrost

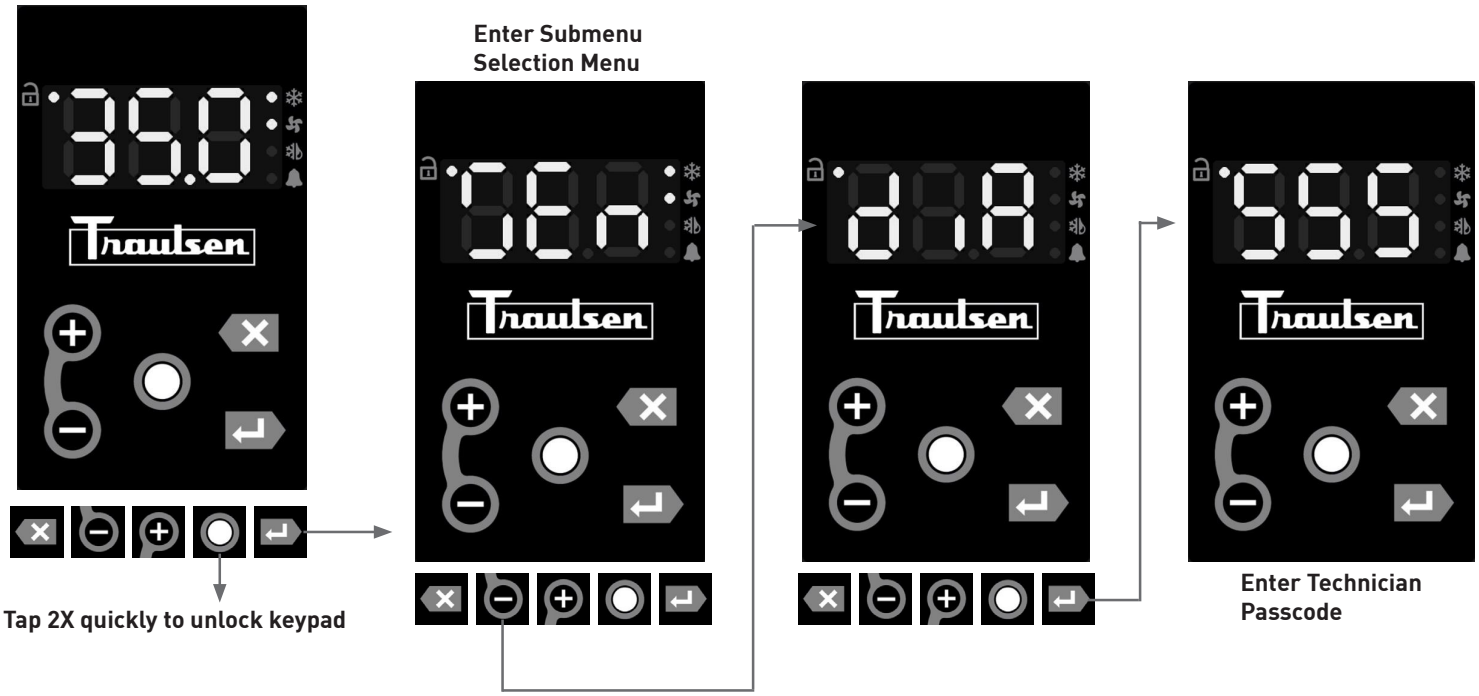
1)

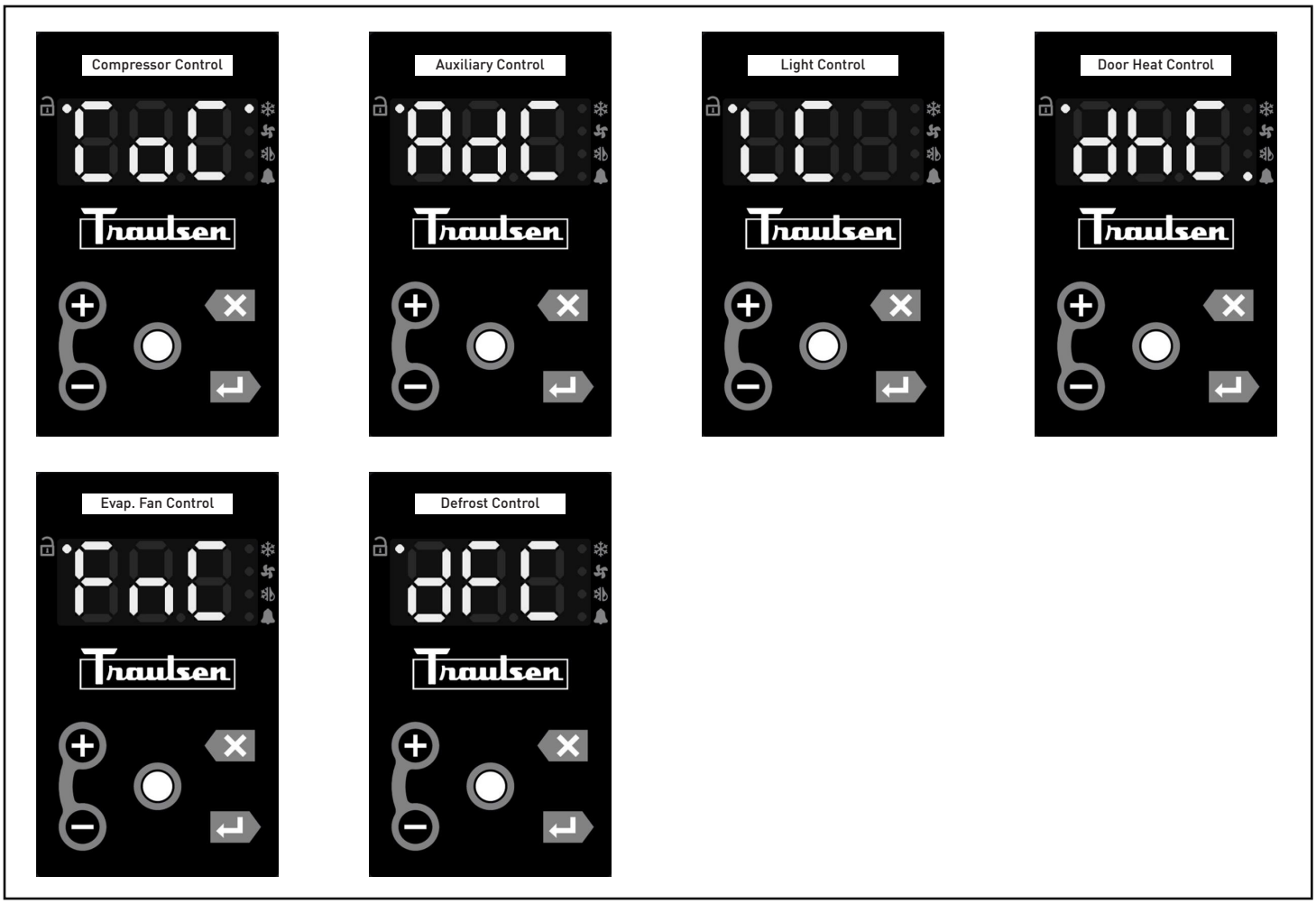
2)

3)

4)

4.11 Diagnostic Menu

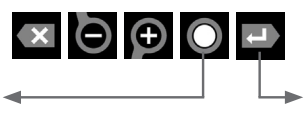




Tap & hold the Modify key for 2 seconds

ACt will begin to flash

Press enter to Activate (energize the compressor & condenser fan motor)



Tap & hold the Modify key for 2 seconds

Press enter to Deactivate (de-energize the compressor & condenser fan motor)

4.12 Control Cover Removal & Components

4.12.1 Removing the Display

Remove bottom louver screws & rotate louver up out of the way. Disconnect cable from the back of the controller. Lastly, squeeze the (4) tabs holding on the back side of the display & push outward to remove the display. See figure 4.12.1.

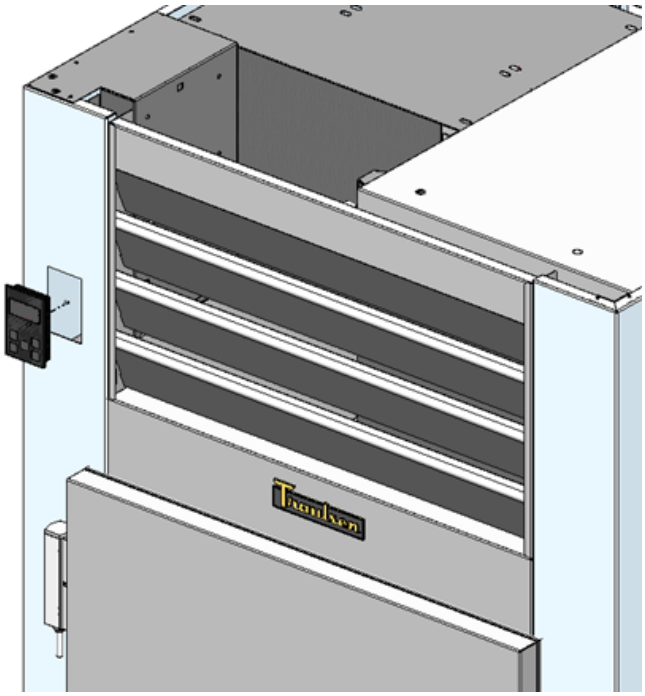


Fig. 4.12.1 Display Removal
PART # 950-60510-00

4.12.2 Installing the Display

Line up the display with the cutout on the cabinet. Firmly press the (4) outside corners (do not press the center) of the controller into the cabinet until the (4) tabs click into place. Make sure to reconnect the cable to the display.
NOTE: Do not press on the center of the display during installation to avoid causing damage.

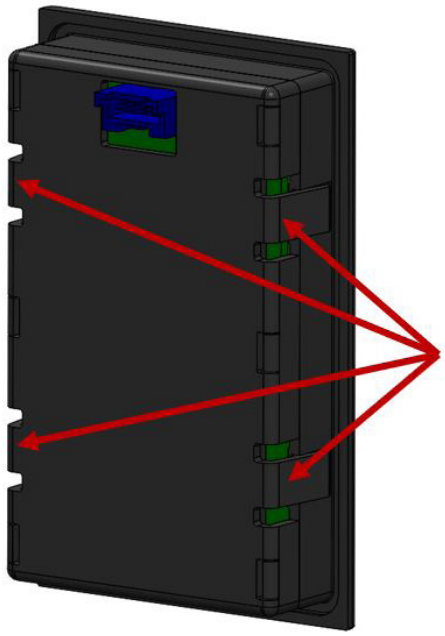


Fig. 4.12.2 Display Install

4.12.3 Accessing the Power Module (Control Board)
Use a #2 Phillips screwdriver to remove (3) screws (see figure 4.12.3) and lift on bracket.

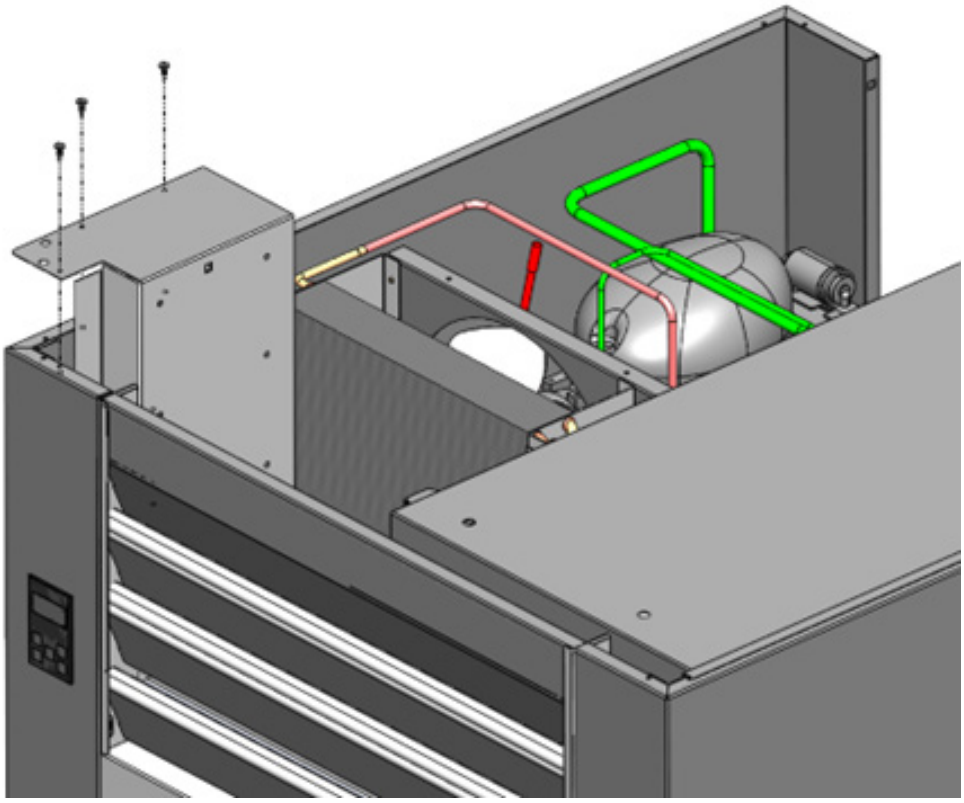


Fig. 4.12.3 Power Module Access (Control Board)

The **Power Module (Control board)** is located at the top of the unit, making it easily accessible for maintenance and troubleshooting. To gain access, you'll need to remove the securing screws using a #2 Phillips screwdriver, which allows the bracket to be lifted and the control board exposed.

This design also ensures that all critical components, including the display and associated wiring, are centralized and accessible from the top. This not only facilitates easy inspection and servicing but also minimizes the risk of damage to internal components during maintenance. The placement of the control board at the top of the unit streamlines the repair process, reducing downtime and ensuring that technicians can efficiently address any issues that arise.

4.13 Power Module Connections Overview

Part Number: 950-60509-02 **Blue factory installed ,**950-60509-01 **Green Replacement board** pictured below (**NOTE:** Serial & Model #'s necessary for power module replacement due to programming)
Picture below illustrates inout/output connection points

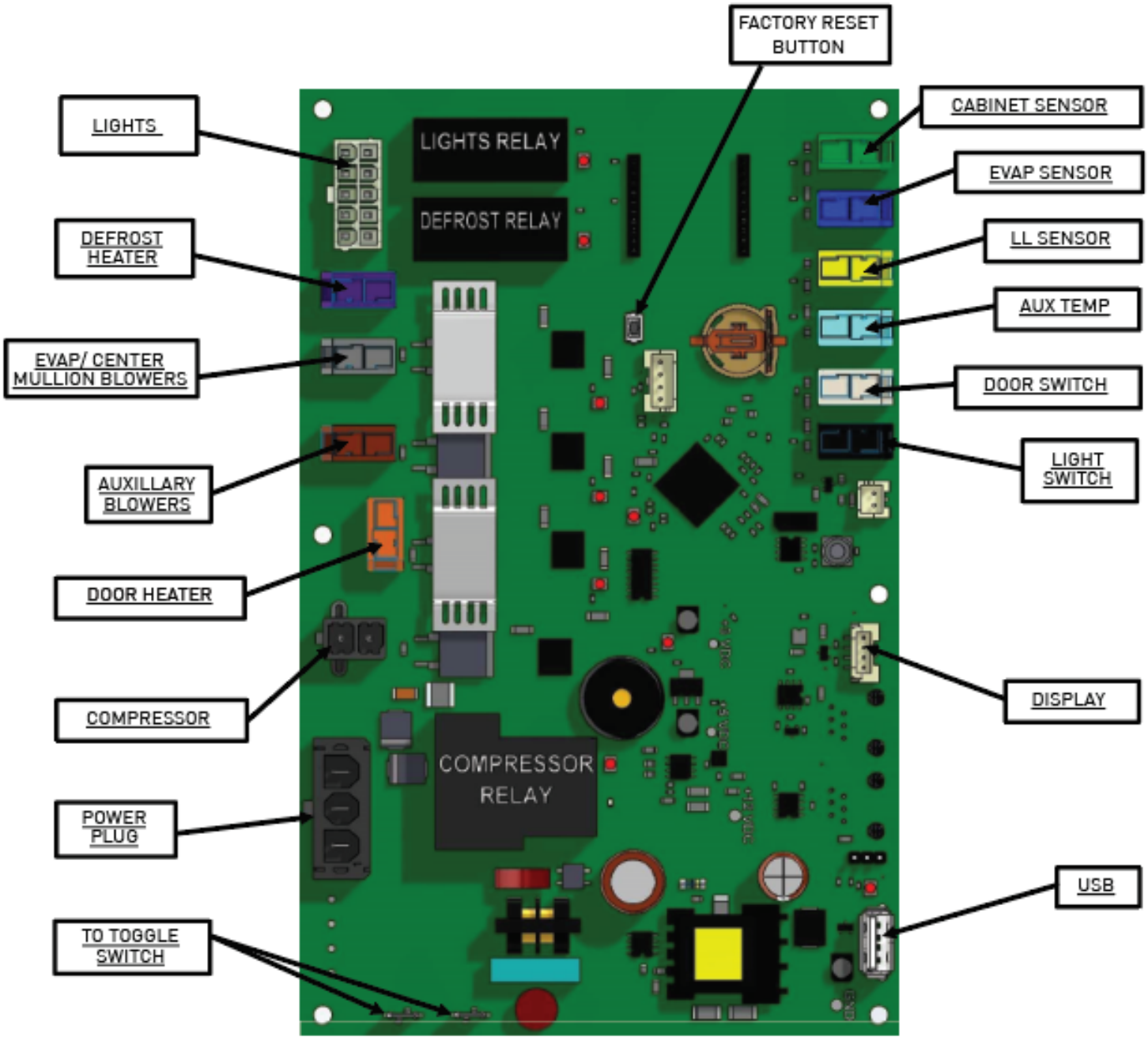


Fig. 4.13 Power Module Access (Control Board)

4.14 Power Module LED's & Reset Button Overview

NOTE: To reboot the board press the reset button (see figure 4.14) for 1 second or until all LED lights flash, shut off, and then come back on again.

The reset button does not restore programming back to factory settings.

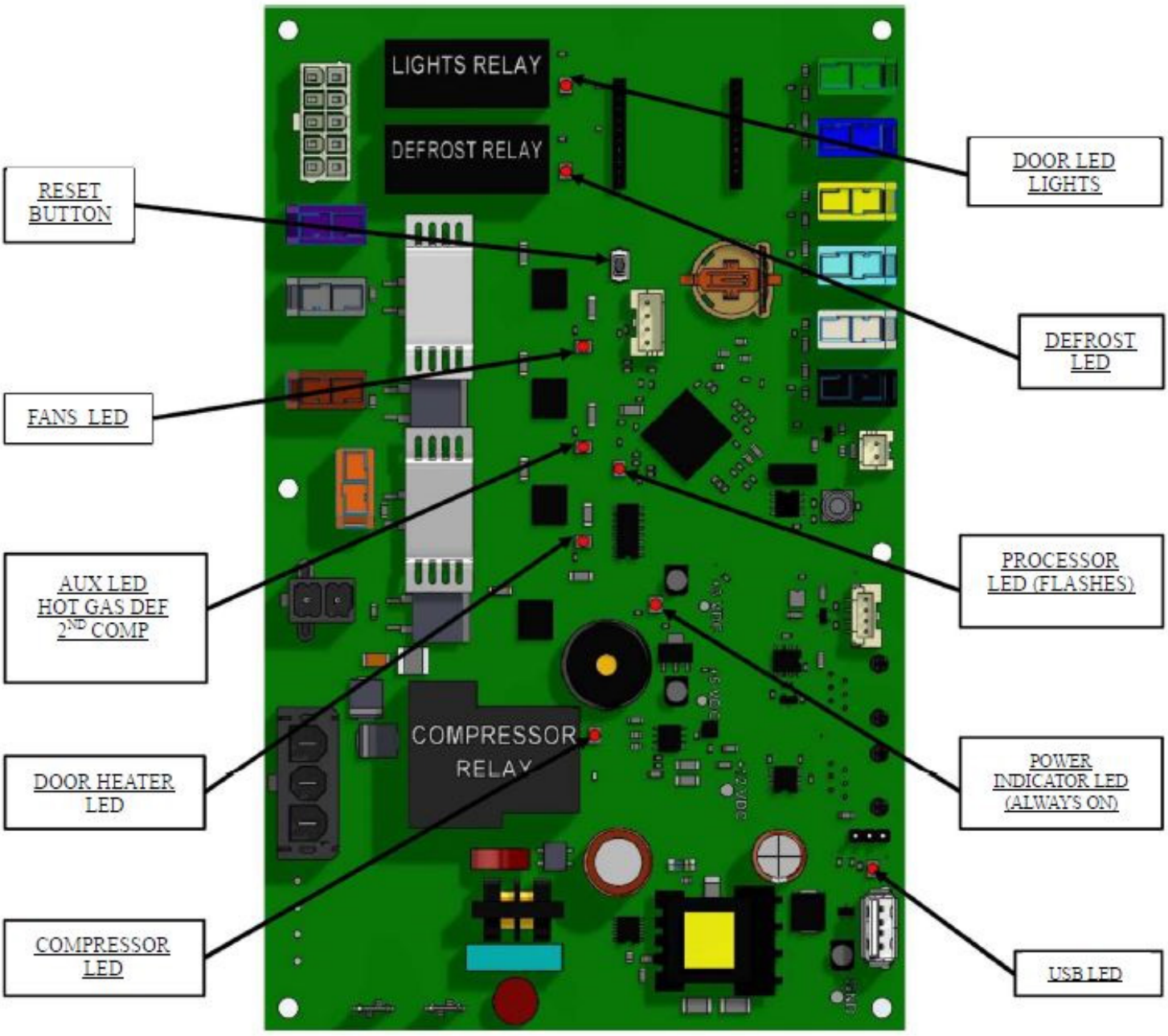
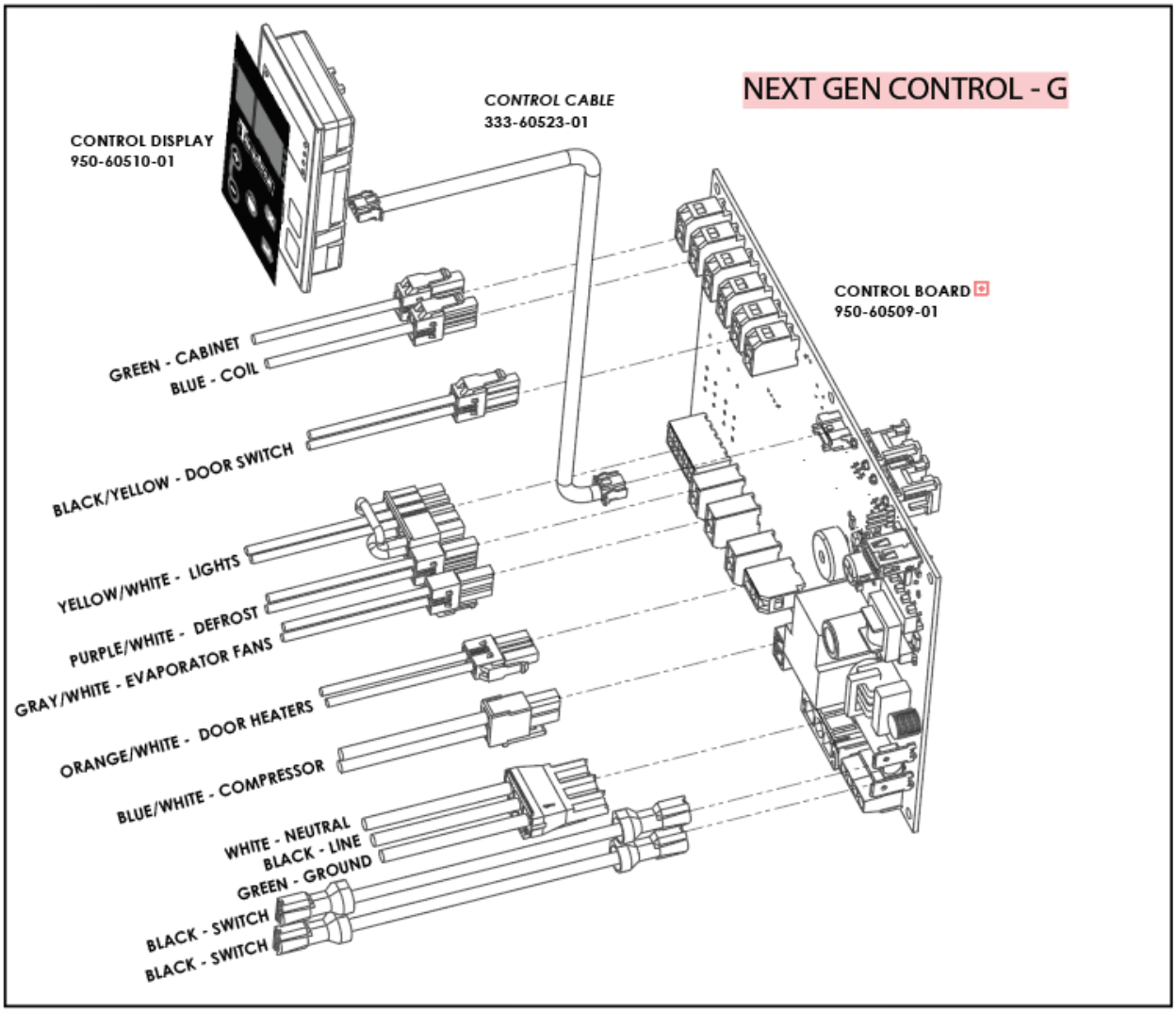


Fig. 4.14a Power Module LED & Reset Button Overview

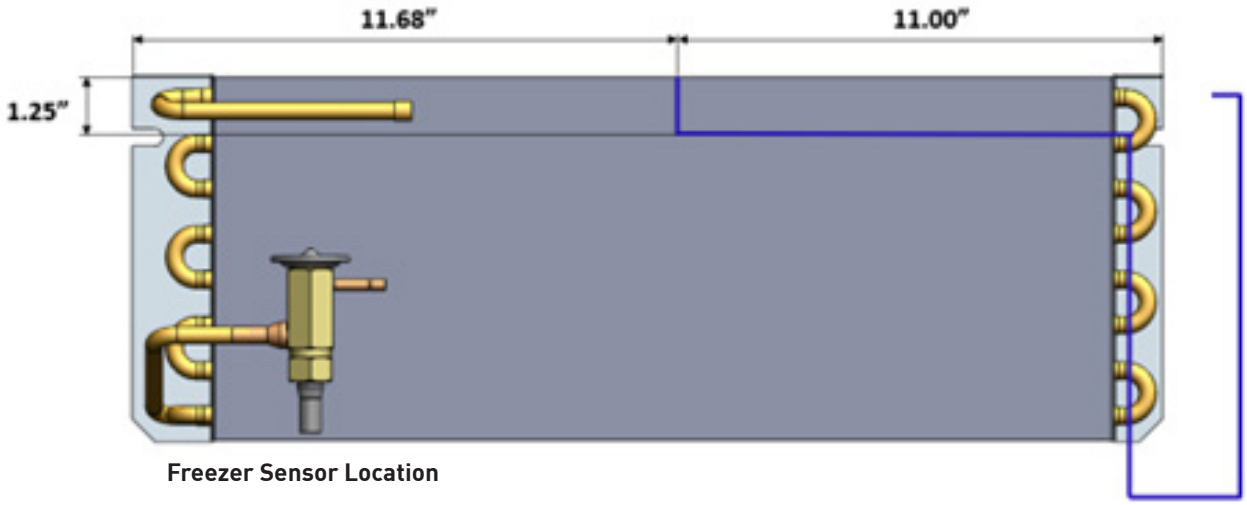
Reset	To reboot the board press the reset button (See Figure 2) for 5 seconds or until all the LED lights flash, shut off and then come back on again.
Toggle Switch	Toggle switch disconnects power to all controls and components. When you turn on toggle switch there is a 5 second time delay before start up.
Door Switch	12VDC to Door Switch. When you open door there is a 1 second delay before the light comes on.
Data Logging	8 GB SanDisk USB drive logs data every 10 secs for up to 10 years
High Voltage Outputs	All high voltage component outputs can be isolated from the rest of the circuit by disconnecting their respective 2 pin connector form the board. All components may be tested with direct power ONLY when disconnected from the board. DO NOT jumper power at the board.

Fig. 4.14b Power Module & Display Schematics

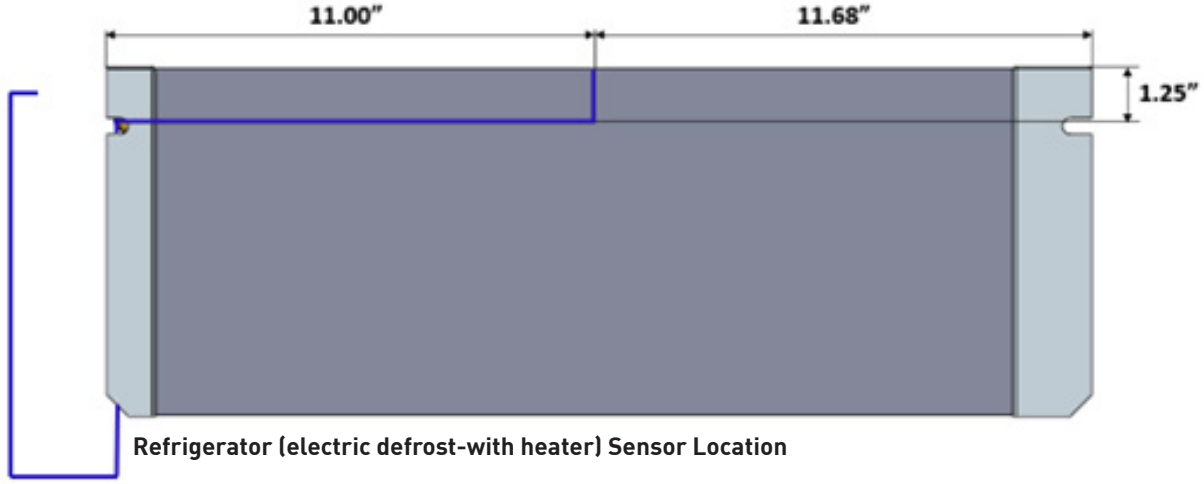


5. Sensor Location

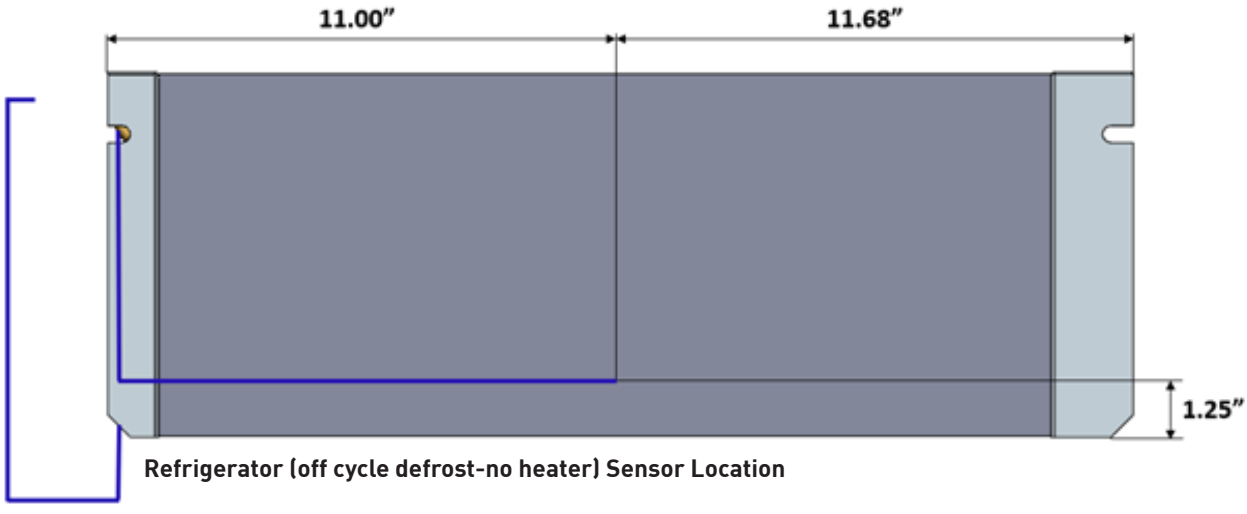
This section is an overview of the various sensors located throughout the cabinet.



Freezer Sensor Location



Refrigerator (electric defrost-with heater) Sensor Location



Refrigerator (off cycle defrost-no heater) Sensor Location

5.1 Sensor Control Value Test

1. Submerge sensor bulb into a 32° F ice bath.
2. Follow steps below to view control value.

Press Enter

Press 2X quickly to unlock keypad

Enter Technician Passcode

Good Sensor Reading

tC = Cabinet Return Air Temperature

tE = Evaporator Coil Temperature

tLi = Liquid Line Temperature

5.2 Sensor Resistance Test

To check if the sensor is reading accurately:

- Place sensor bulb in a glass of ice with a little bit of water in it (32° F)
- Use Ohm meter to test resistance. At 32° F resistance should be 32.7KΩ.

Resistance Curve:

Temp C	Resistance K Ohms	Resistance Ohms	Temp F
-40.0	OL	OL	-40.0
-20.5	99.900	99000.0	-5.0
-17.7	85.200	85200.0	0.0
-15.0	72.900	72900.0	5.0
-12.2	62.400	62400.0	10.0
-9.4	53.700	53700.0	15.0
-6.7	46.200	46200.0	20.0
-3.9	39.900	39900.0	25.0
-1.1	34.600	34600.0	30.0
0.0	32.700	32700.0	32.0
1.7	30.100	30100.0	35.0
4.4	26.100	26100.0	40.0
7.2	22.800	22800.0	45.0
10.0	19.900	19900.0	50.0
12.8	17.400	17400.0	55.0
15.6	15.300	15300.0	60.0
18.3	13.500	13500.0	65.0
21.1	11.900	11900.0	70.0
23.9	10.500	10500.0	75.0
26.7	9.3100	93100.0	80.0
29.4	8.2500	82500.0	85.0
32.2	7.3400	73400.0	90.0
35.0	6.5300	65300.0	95.0
37.8	5.8200	58200.0	100.0
100.0	0.6790	679.0	212.0

Table 5.2 Resistance Test Curve

5.3 Troubleshooting Traulsen Refrigeration System

Compressor will not run, compressor has no current draw.	1. Main circuit breaker open. 2. Compressor overload tripped. 3. Cabinet temperature satisfied. 4. Wired wrong or faulty connection. 5. Control malfunction 6. Start component malfunction. 7. Compressor motor windings open.
Compressor will not run, current draw and trips overload.	1. Low voltage. 2. Start component malfunction. 3. Compressor windings shorted. 4. Locked rotor.
Compressor short cycles on overload.	1. Low voltage. 2. Low refrigerant charge. 3. Dirty condenser coil. 4. Wired wrong or faulty connection. 5. Condenser fan inoperative. 6. Start component malfunction. 7. Control malfunction
Compressor short cycles.	1. Non Condensables. 2. Low ambient conditions. 3. Control malfunction 4. Bad sensors.
Continuous unit operation.	1. Sensor Failure 2. Excessive door openings. 3. Control malfunction1. 4.. Very dirty condenser.
Low suction pressure.	1. Expansion valve restricted. 2. Drier plugged. 3. Loss of refrigerant. 4. Poor air flow. 5. Iced evaporator coil.
High head pressure.	1. Dirty condenser. 2. High ambient conditions. 3. Overcharge of refrigerant.
Will not defrost or inadequate defrost.	1. Defrost heater malfunction. 2. Wired wrong or faulty connection. 3. Cabinet air leak. 4. Coil sensor failure. 5. Control malfunction
Coil icing.	1. Number of defrost cycles too few. 2. Defrost duration too short. check sensors, heating element 3. Cabinet air leak. 4..Defrost heater not working. 5. Coil sensor failure.

6. UL/IEC/CE

6A.1 Electrical outputs for refrigerant detection system

The device shall have an output to indicate the presence of a refrigerant concentration exceeding the set point.

The REFRIGERANT SENSORS and controls shall be configured such that a failure of the controls or sensor turns on the indoor fan to deliver Qmin or greater as defined in Annexes GG and 101.DVG. For ADD-ON HEATPUMPS a failure of the REFRIGERANT SENSOR or controls shall turn on the indoor fan at the highest available speed or to not less than Qmin as determined in Annex GG.

Vibration requirements of IEC 60079-29-1 for fixed gas detection sensors need not apply to the entire appliance.

6A.2 Refrigerant detection system self-test routine

The refrigerant detection system shall include a means for self-testing to determine if a REFRIGERANT SENSOR or sensing element malfunction has occurred. The self-test shall include missing REFRIGERANT SENSOR (open circuit), by-passed REFRIGERANT SENSOR (shorted circuit), and REFRIGERANT SENSOR output out of range.

The test shall be run at least every hour, and if a failure is detected, the device shall take the actions in accordance with Clause 6.1

If the REFRIGERANT SENSOR is a LIMITED LIFE REFRIGERANT SENSOR and requires replacement after a given period, then the device shall take the actions prescribed in Clause 6.1 at the end of the specified life and shall provide indication that replacement is required. Compliance is checked by inspection.

6A.3 Serviceability

REFRIGERANT SENSORS shall be accessible for inspection, and replacement. REFRIGERANT SENSORS for replacement shall be specified by the appliance manufacturer.

6A.4 Refrigerant Sensor identification

The REFRIGERANT SENSORS shall be marked or tagged with

A) name, trademark, or identification mark of the manufacturer or responsible vendor;

B) reference number or other means for identifying the refrigerant sensor; and

C) “This refrigerant sensor shall only be replaced with manufacturer approved sensor”. If the SENSOR is only replaceable as part of an assembly of parts, then the assembly shall be marked.

6A.5 Qualification of workers

To minimize the risk of possible ignition due to improper service or incorrect parts. Servicing shall only be carried out by factory authorized service personnel certified to work on refrigeration systems containing flammable refrigerants.

EPA Section 608

Certified Refrigeration Service Technician (CRST)

6A.6 Information on servicing

6A.6.1 Checks to the area

This appliance is marked with thew ISO 7010-W021 warning label to indicate the presence of FLAMMABLE REFRIGERANTS. Prior to beginning work on systems containing FLAMMABLE REFRIGERANTS, safety checks are necessary to ensure the risk of ignition is minimized. For repair to the REFRIGERATING SYSTEM, follow the instructions outlined in sections 6A.6.2 to 6A.6.5 prior to conducting work on the system.

Verifying refrigerant is important for the safe and efficient operation of HVAC systems. Refrigerant testing can help identify contaminants like moisture, acid, and particulate matter, which can damage equipment and compromise performance. It can also help identify leaks, which can lead to refrigerant loss and environmental damage.

6A.6.2 Work procedure

Work shall be undertaken under a controlled procedure so as to minimize the risk of a flammable gas or vapor being present while the work is being performed.

6A.6.3 General work area

All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out. Work in confined spaces shall be avoided.

6A.6.4 Checking for presence of refrigerant

The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially toxic or flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with all applicable refrigerants, i.e., non-sparking, adequately sealed, or intrinsically safe.

6A.6.5 Presence of fire extinguisher

If any hot work is to be conducted on the refrigerating equipment or any associated parts, appropriate fire extinguishing equipment shall be available on hand. A dry chemical or CO2 fire extinguisher should be adjacent to the charging area.

6A.6.6 No ignition sources

No person carrying out work in relation to a REFRIGERATING SYSTEM which involves exposing any pipe work shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which refrigerant can possibly be released to the surrounding space. Prior to work taking place, the area around the equipment shall be surveyed to make sure that there are no flammable hazards or ignition risks. "No Smoking" signs shall be displayed.

6A.6.7 Ventilated area

Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

6A.6.8 Checks to the refrigerating equipment

Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times, the manufacturer's maintenance and service guidelines shall be followed. If in doubt, consult the manufacturer's technical department for assistance.

The following checks shall be applied to installations using FLAMMABLE REFRIGERANTS:

A) the actual REFRIGERANT CHARGE is in accordance with the room size within which the refrigerant containing parts are installed;

B) the ventilation machinery and outlets are operating adequately and are not obstructed;

C) if an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant;

D) marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected;

E) refrigerating pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

6A.6.9 Checks to electrical devices

Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment, so all parties are advised.

Initial safety checks shall include:

A) that capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking;

B) that no live electrical components and wiring are exposed while charging, recovering or purging the system;

C) that there is continuity of earth bonding.

6A.7 Repairs to sealed components

During repairs to sealed components, all electrical supplies shall be disconnected from the equipment being worked upon prior to any removal of sealed covers, etc. If it is absolutely necessary to have an electrical supply to equipment during servicing, then a permanently operating form of leak detection shall be located at the most critical point to warn of a potentially hazardous situation.

Particular attention shall be paid to the following to ensure that by working on electrical components, the casing is not altered in such a way that the level of protection is affected. This shall include damage to cables, excessive number of connections, terminals not made to original specification, damage to seals, incorrect fitting of glands, etc.

Ensure that the apparatus is mounted securely.

Ensure that seals or sealing materials have not degraded to the point that they no longer serve the purpose of preventing the ingress of flammable atmospheres. Replacement parts shall be in accordance with the manufacturer's specifications.

6A.8 Repair to intrinsically safe components

Do not apply any permanent inductive or capacitive loads to the circuit without ensuring that this will not exceed the permissible voltage and current permitted for the equipment in use.

Intrinsically safe components are the only types that can be worked on while live in the presence of a flammable atmosphere. The test apparatus shall be at the correct rating.

Replace components only with parts specified by the manufacturer. Other parts can result in the ignition of refrigerant in the atmosphere from a leak.

NOTE The use of silicon sealant can inhibit the effectiveness of some types of leak detection equipment. Intrinsically safe components do not have to be isolated prior to working on them.

6A.9 Cabling

Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges, or any other adverse environmental effects. The check shall also take into account the effects of aging or continual vibration from sources such as compressors or fans.

6A.10 Detection of flammable refrigerants

Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used.

The following leak detection methods are deemed acceptable for all refrigerant systems. Electronic leak detectors may be used to detect refrigerant leaks but, in the case of FLAMMABLE REFRIGERANTS, the sensitivity might not be adequate, or might need recalibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed, and the appropriate percentage of gas (25 % maximum) is confirmed.

Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine can react with the refrigerant and corrode the copper pipe-work.

NOTE Examples of leak detection fluids are

- Bubble method,
- Fluorescent method agents.

If a leak is suspected, all naked flames shall be removed/extinguished.

If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak. Removal of refrigerant shall be according to.

6A.11 Removal and evacuation

When breaking into the refrigerant circuit to make repairs - or for any other purpose - conventional procedures shall be used. However, for flammable refrigerants it is important that best practice be followed, since flammability is a consideration. The following procedure shall be adhered to:

A) safely remove refrigerant following local and national regulations;

B) purge the circuit with inert gas;

C) evacuate;

D) purge with inert gas;

E) open the circuit by cutting or brazing.

The refrigerant charge shall be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. For appliances containing flammable refrigerants,the system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants. This process might need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems.

For appliances containing flammable refrigerants, refrigerants purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum. This process shall be repeated until no refrigerant is within the system (optional for A2L). When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place.

Ensure that the outlet for the vacuum pump is not close to any potential ignition sources and that ventilation is available.

6A.12 Charging procedures

In addition to conventional charging procedures, the following requirements shall be followed.

A) Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimize the amount of refrigerant contained in them.

B) Cylinders shall be kept in an appropriate position according to the instructions.

C) Ensure that the REFRIGERATING SYSTEM is earthed prior to charging the system with refrigerant.

D) Label the system when charging is complete (if not already).

E) Extreme care shall be taken not to overfill the REFRIGERATING SYSTEM.

Prior to recharging the system, it shall be pressure-tested with the appropriate purging gas. The system shall be leak-tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

6A.13 Decommissioning

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended good practice that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of recovered refrigerant. It is essential that electrical power is available before the task is commenced.

A) Become familiar with the equipment and its operation.

B) Isolate the system electrically.

C) Before attempting the procedure, ensure that:

I) mechanical handling equipment is available, if required, for handling refrigerant cylinders;

II) all personal protective equipment is available and being used correctly;

III) the recovery process is supervised at all times by a competent person;

IV) recovery equipment and cylinders conform to the appropriate standards.

D) Pump down refrigerant system, if possible.

E) If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.

F) Make sure that cylinder is situated on the scales before recovery takes place.

G) Start the recovery machine and operate in accordance with instructions.

H) Do not overfill cylinders (no more than 80 % volume liquid charge).

I) Do not exceed the maximum working pressure of the cylinder, even temporarily.

J) When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment is removed from site promptly and all isolation valves on the equipment are closed off.

K) Recovered refrigerant shall not be charged into another REFRIGERATING SYSTEM unless it has been cleaned and checked.

6A.14 Labeling

Equipment shall be labeled stating that it has been de-commissioned and emptied of refrigerant. The label shall be dated and signed. For appliances containing FLAMMABLE REFRIGERANTS, ensure that there are labels on the equipment stating the equipment contains FLAMMABLE REFRIGERANT.

6A.15 Recovery

When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely.

When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available. All cylinders to be used are designated for the recovered refrigerant and labeled for that refrigerant (i.e., special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.

The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of all appropriate refrigerants including, when applicable, FLAMMABLE REFRIGERANTS. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition. Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release. Consult manufacturer if in doubt.

The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.

If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that FLAMMABLE REFRIGERANT does not remain within the lubricant. The evacuation process shall be carried out prior to returning the compressor to the suppliers. Only electric heating to the compressor body shall be employed to accelerate this process. When oil is drained from a system, it shall be carried out safely.

6A.16 Warning Notices

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.

WARNING Children should be supervised to ensure that they do not play with the appliance.

This appliance is rated for use in Climatic Class 5. This appliance can operate in an environment with maximum ambient temperatures of 104° F (40° C) and 40% RH.

Product is suitable for use up to 6500 ft (2000m).

WARNING Power cord should only be replaced with a Traulsen-specified part.

WARNING Appliances that use a flammable refrigerant shall indicate that component parts shall be replaced with like components so as to minimize the risk of possible ignition due to incorrect parts.

Maximum loading per shelf is 200 lbs (91 kg)

WARNING Do not store explosive substances such as aerosol cans with a flammable propellant in this appliance.

Review all flammable refrigerant cautions for completeness.

WARNING Keep clear of any obstructions for all ventilation openings of the appliance enclosure.

WARNING Do not use mechanical devices or other means to accelerate the defrosting process, other than those recommended by the manufacturer.

WARNING Do not damage the refrigerating circuit. Do not pierce or burn.

WARNING Do not use electrical appliances inside the food/ice storage compartments unless they are of the type recommended by the manufacturer.

Taking care to avoid causing a fire by igniting flammable material.

Install in accordance with the Safety Standard for Refrigeration Systems, ANSI/ASHRAE 15.

WARNING Do not use means to accelerate the defrosting process or to clean, other than those reco0mended by the manufacturer.

WARNING The appliance shall be stored in a room with out continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater.

WARNING Be aware that refrigerants may not contain an odor.

6B. Troubleshooting

6B.1 Condensate Overflow Troubleshoot

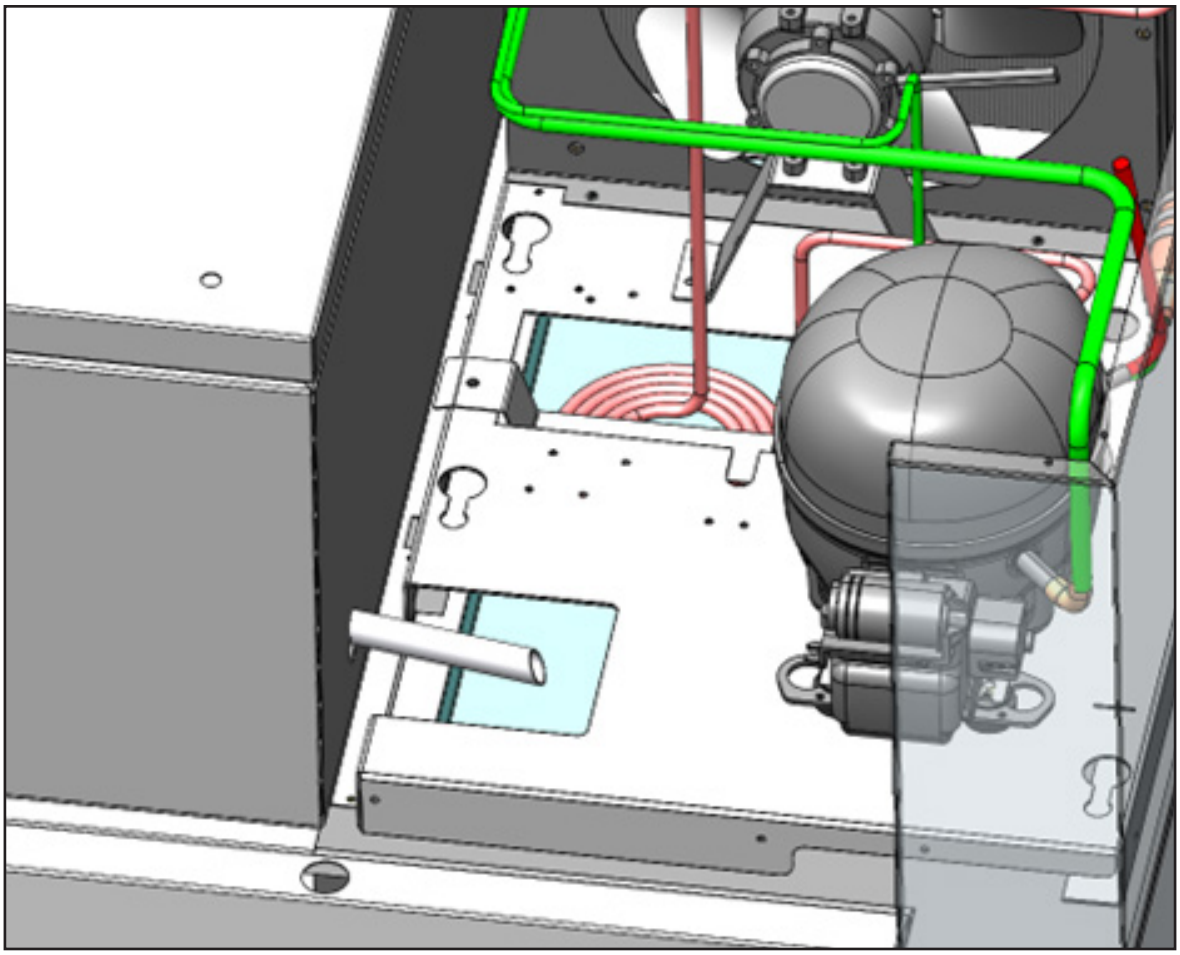


Fig. 6B.1 Troubleshooting Condensate Pan Overflow

The condensate pan generally does not overflow unless there is an excess of ambient air infiltrating the cabinet.

- Hump Cover not sealed properly (i.e. torn or missing Foam Tape).
- The door is not sealed properly.
- Door not self-closing (see door section).
- Putty not fully sealing refrigeration lines penetrating evaporator compartment.
- Units with electric defrost- shorting the time between defrost may help to reduce the amount of water (see control section).

6B.2 Leak Checking System

A number of means for leak detection may be considered:

- Bubble test
- Holding pressure test (refer to serial tag for maximum system pressure)
- Electronic leak detector

Never use any dyes or other contaminants when working with Traulsen refrigeration systems.

6B.3 Accessing the Refrigeration System

Piercing valves can be used to access the refrigeration system. Access ports should be temporarily placed on the process tube (suction and/or liquid line) as close to the end of the process tube as possible.

Do **NOT** leave piercing valves on this system. If you cannot finish the repair you will need to use Lock/Out-Tag/Out procedures.

- Pinch line off just before the temporary access port three times using a crimper tool.
- Verify that there are no leaks.
- Remove the piercing valve/temporary access port.
- Cut off the copper tubing between the location of the temporary access port removed in step 3 and the crimps made in step 1.
- Braze open end shut.
- Leak check the system.

6B.4 Refrigerant Recovery

For refrigeration systems using R-448A and R-450A, the U.S. EPA requires the refrigerant to be recovered whenever the refrigerant must be removed from the system for service. It is **ILLEGAL** to vent these refrigerants to the atmosphere. Use the following process with the se of a recovery machine.

1. Evacuate the empty recovery cylinder into a vacuum.
2. Using an accurate refrigerant scale, zero out the refrigerant scale and weigh the empty recovery cylinder prior to adding refrigerant gauges or hoses, notate this weight.
3. Securely connect the evacuated cylinder to the refrigeration system using refrigerant gauges and hoses.
4. Open the refrigerant gauges to allow refrigerant to flow through the gauges to the recovery cylinder.
5. Once the pressures have equalized, valve off the refrigerant gauges and the recovery cylinder securely.
6. Carefully remove the refrigerant hose from the recovery cylinder.
7. Zero out the refrigerant scale and weigh the recovery cylinder, notate this weight. Subtract the weight notated from line 2 from line 7. This is the amount of refrigerant recovered into the cylinder.
8. If necessary, repeat this process with another empty recovery cylinder until the system refrigerant charge is removed. Note trace amounts of refrigerant will remain trapped in the compressor oil.

6B.5 Repair of Leaks

It is of utmost importance to properly repair refrigerant leaks as soon as they are discovered. If they cannot be repaired immediately, the refrigerant charge should be removed from the system until the point at which the leak can be repaired. A number of considerations are relevant when attempting to repair a leak:

- Repair the leak properly - this means removing the refrigerant, examining the leak source, determining the reason for the leak and carrying out the proper course of action.
- Before repairing the leak, ensure that the refrigerant has been removed and the system flushed with nitrogen if brazing is to take place.
- It is **absolutely not acceptable** to leave line tap valves or piercing valves attached to the system.

6B.6 Charging the System

After the proper evacuation of the system, the following process should be followed:

1. Process Tube needs to be extended.
   - Remove the crimped tubing and piercing or saddle valve from the process tube.
   - Extend the process tube a minimum of 12".
   - Crimp and braze the process tube extension.
   - Install piercing or saddle valve just after the last crimp.
2. Evacuate the system following the SYSTEM EVACUATION section in this document.
3. Charge the system.
   - **DO NOT OVERCHARGE THE SYSTEM.** You must weigh in the exact charge.
   - Prior to charging, ensure the system has been leak checked.
   - Hoses or lines should be as short as possible to minimize the amount of refrigerant contained in them.
   - Evacuate the hoses and manifold prior to charging to avoid contamination of the refrigerant.
   - Upon completion of charging, a further leak check must be carried out prior to leaving the site.
   - After charging, carefully disconnect the hoses, attempting to minimize the release of refrigerant.
   - After charging, all access ports must be removed following the **REMOVE ACCESS PORTS** section in this document.

6B.7 Remove Access Ports

Do **NOT** leave piercing valves on this system. If you cannot finish the repair you will need to use Lock/Out-Tag/Out procedures.

1. Pinch line off just before the temporary access port three times using a crimper tool.
2. Verify that there are no leaks.
3. Remove the piercing valve/temporary access port.
4. Cut off the copper tubing between the location of the temporary access port removed in step 3 and the crimps made in step 1.
5. Braze open end shut.
6. Leak check the system following the **LEAK CHECKING SYSTEM** section in this document.

6B.8 Compressor Troubleshooting

6B.8.1 Terminology

OEM - Original Equipment Manufacturer, refers to the manufacturer of a piece of equipment or component.

RLA - Rated Load Amps, the OEM test conditions amperage rating (does not necessarily indicate the normal running amperage as conditions and applications can vary from OEM test conditions).

LRA - Locked Rotor Amps, the OEM test condition lock rotor amperage rating indicating the expected amperage at which a motor does not turn when power is applied.

Microfarad - This is a unit of measure for capacitance; the symbol for **Microfarad** is **µF.**

Current - The flow of electrons in an electrical circuit measured in Amps with an Amp Meter.

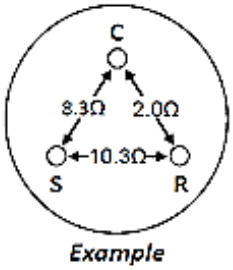
Resistance - The opposition to the flow of electrical current measured in Ohms with an Ohm Meter; the symbol for Ohms is **Ω**.

Back EMF - The voltage generated by the start winding once the compressor runs which is higher than line voltage.

Pick-up Voltage - The back EMF value at which the normally closed contacts of a potential relay open.

First verify that the Call for Cooling LED on this display is illuminated. See Control Section.

Ω= OHM= Unit Resistance
R= Run
S= Start
C= Common
Figure 6 shows the readings of the resistance through the compressor motor windings. (C-S C-R). If the windings are good the start winding resistance (C-S) will always be higher than the run winding resistance (C-R).



Example

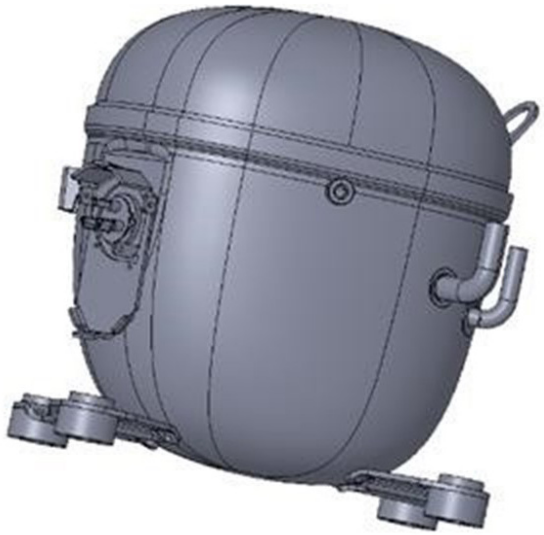


Fig. 6B.8.1 Compressor

6B.8.2 Accessing the Compressor

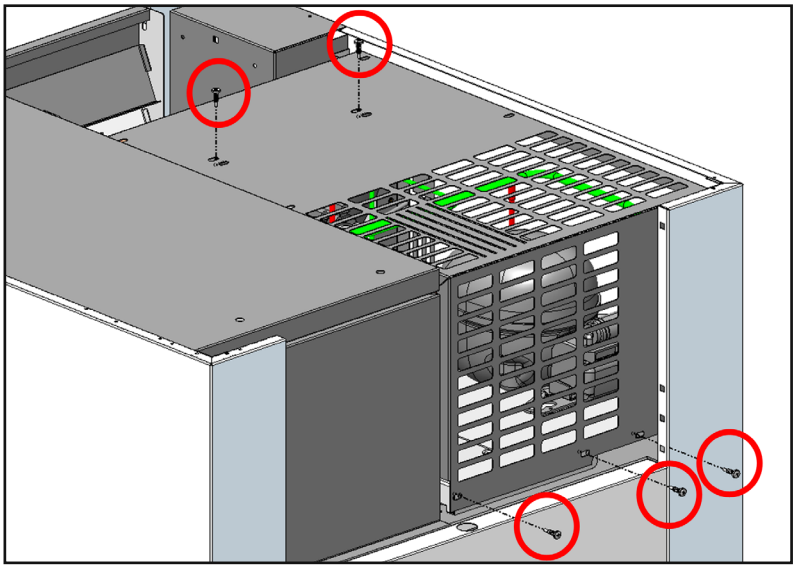


Fig. 6B.8.2a Remove (5) Screws

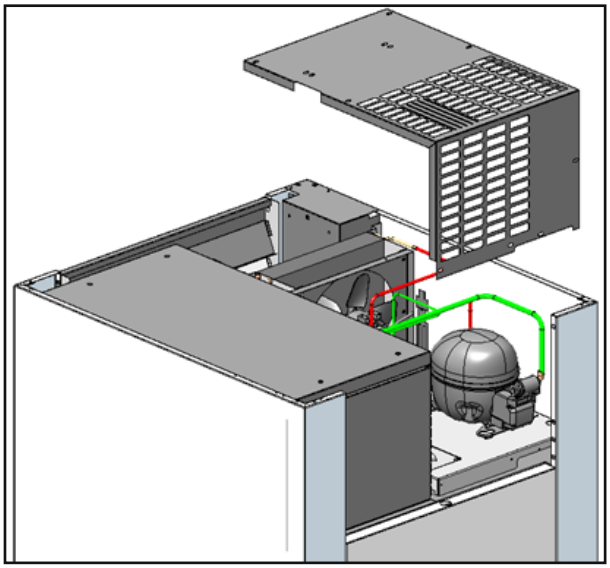


Fig. 6B.8.2b Remove Condenser Housing

Basic Troubleshooting

- What is my amp draw and voltage when the compressor is starting?
- What is the resistance of the windings?
- What is the RLA (Rated Load Amps) of the compressor?
- What is the LRA (Locked Rotor Amps) of the compressor?
- Check the start components?
- Very High amps but not a high LRA cause "Start Components"?

Symptom	Reason	Possible Resolution
0 amps	Check for voltage between C & R terminals.	No: Check external overload & find where power loss is. Yes: open winding or the internal overload is open
Amps lower then RLA	Lower head & high suction.	Weak valves, busted crankshaft or connecting rod.
Slightly higher amps then RLA	Overload opens after compressor runs for a time.	Bad run capacitor, tight bearings, or winding issues.
Very high amps but not LRA	Start Components/ Potential Relay	Change Start Componernts
Reading LRA	Compressor not starting, reading 5 to 6 times RLA	Check start capacitor, start relay &wires for burning, try 3 in 1. Check voltage drop (+/-10%) and for resistance.

6B.8.3 Compressor Not Running

If the condenser fan motor is running but not the compressor, the compressor may be overheated. Carefully place your hand on the dome of the compressor. If the compressor is very hot, the external overload protector may be open. Disconnect power to the unit and give the compressor ample time to cool.

6B.8.4 Testing the Windings of the Compressor

After the compressor has been sufficiently cooled, remove all the start components from the compressor. Now use an Ohms Meter to measure the resistance of the windings, comparing the resistance values measured with the values given in **Table 5.2**. Be careful when measuring resistance to make a good connection to each terminal with your meter lead. Take several measurements to ensure you are consistently getting the same values. If the resistance values are consistent but do not match the values given below, replace the compressor with OEM replacement.

6B.8.5 Resistance and AMP Values of R/A-Series Compressors

Compressor Part Variations:
The R&A series encompasses a diverse array of compressor configurations to accommodate the specific needs of different systems. These variations necessitate the availability of multiple compressor part numbers to ensure compatibility with various system setups.

Importance of Confirming Capacitors and Relays:
During maintenance or repair tasks involving compressors, it is crucial to verify the compatibility of compressor start and run capacitors, as well as relays, with the factory. This confirmation ensures that the replacement components are suitable for the specific compressor and system requirements, preventing potential operational issues or damage.

Procedure for Compressor Replacement:
When the need arises to replace a compressor, careful attention must be given to ensure a seamless transition and optimal performance. The first step in this process is to verify the model number of the existing compressor. This information serves as a critical reference point for selecting the appropriate replacement unit.

Exact OEM Part Replacement:
It is essential to replace the compressor with the exact OEM part specified for the system. Using compatible components ensures compatibility with existing system components and maintains the integrity of system operations. Deviating from OEM specifications may lead to compatibility issues, diminished performance, or even system damage.

Accessing Part Numbers:
Detailed information regarding part numbers for compressors and related components can be obtained from Traulsen's service department. Service personnel can access part numbers by contacting **service@traulsen.com** or reaching out to the customer service hotline at 800-825-8220. This resource facilitates accurate identification and procurement of the required components for maintenance or repair tasks.

By adhering to these guidelines and procedures, service technicians can ensure the effective replacement of compressors and related components in the R/A series, promoting optimal system performance and reliability.

6B.8.6 Troubleshooting External Overload Protector

If the windings of the compressor match the values given above, the overload can be tested with an Ohms Meter for continuity. A closed switch should have continuity indicative of a complete circuit. If the external overload will not close after cooling, replace the overload protector. If the compressor starts and runs while the current is at or below the RLA, but the overload still opens, replace the external overload protector with OEM replacement.

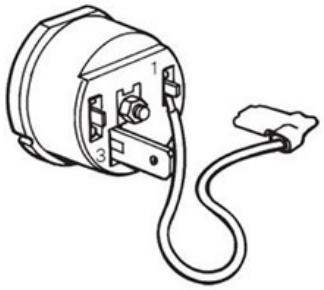


Fig. 6B.10.6 Overload

6B.8.7 Measuring for Excessive Voltage Drop

Now that the compressor has cooled down, measure the voltage supplied to the cabinet while the compressor is trying to start. If the voltage drops below 104 volts, you may have a problem with the power supply, try a different circuit.

6B.8.8 Troubleshooting Potential Relay

Disconnect the power supply, remove wires and measure for continuity between pins 1 & 2 (normally closed contacts) of Potential Relay. If continuity is not detected replace the Potential Relay.

Clamp amp probe onto blue wire connected to pin number 1 of the Potential Relay. Apply power and measure the current. If the current does not drop out after the compressor starts, then the contacts between pins 1 & 2 are stuck in the closed position. In this case, the Potential Relay must be replaced.

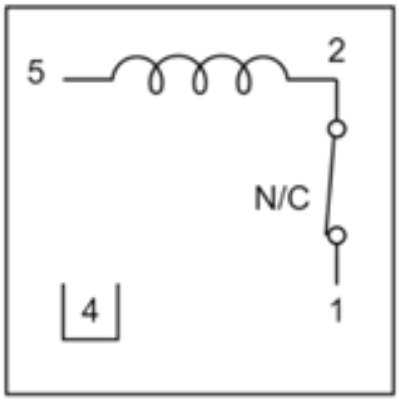


Fig. 6B.8.8 Potential Relay Schematic

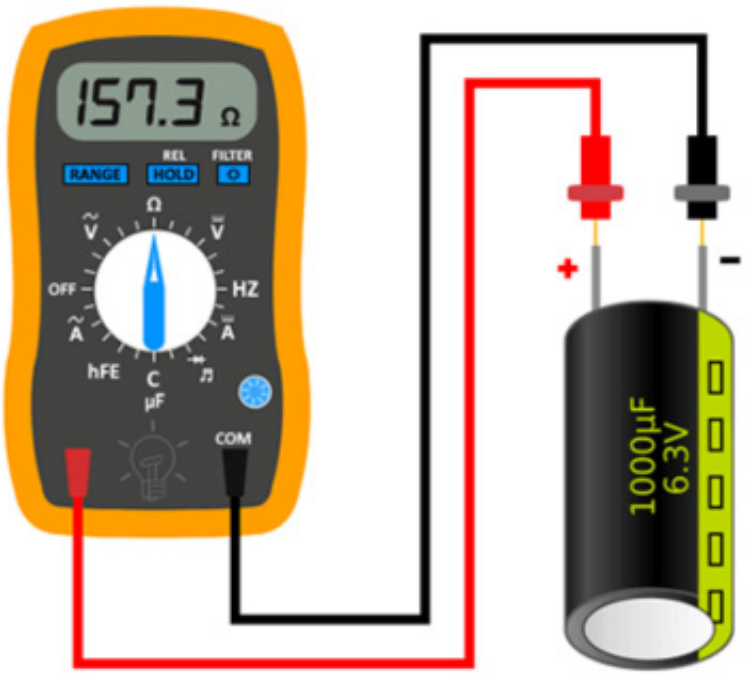
6B.8.9 Troubleshooting Start Capacitor (BLACK PLASTIC CASING)

If the voltage measures 115 volts +/- 10% but the compressor doesn't start, measure the current with your amp meter at the common terminal of the compressor. If the current spikes very high but the compressor doesn't start, disconnect the power so that you can remove all the start components for testing. Start capacitors can be tested with a microfarad tester. For the most accurate measurement, remove the resistor from the start capacitor. **The start capacitor should never be used without the resistor as this will damage the start relay.** If microfarads measured do not match the values in the table below, replace the start capacitor.

6B.8.10 Troubleshooting Run Capacitor (METAL CASING)

If the compressor starts and runs with an amp draw higher than the RLA and the compressor is a capacitance run compressor (which means it requires a run capacitor), disconnect the power so that you can remove the run capacitor from the circuit for testing with a microfarad tester. Connect the microfarad tester across both terminals of the run capacitor. If the microfarads measured do not match the specs given, replace the run capacitor.

Note: If the run capacitor is swollen or leaking fluid, it must be replaced.



6B.8.11 Locked Up Compressor

After all start components have been properly tested and determined to be good and the proper voltage has been verified, the compressor does not start while the current spikes up to the LRA, this could be indicative of an internal mechanical problem within the compressor. If so, replace the compressor with OEM replacement.

6B.8.12 Current Climbs Above RLA

See section on Troubleshooting Run Capacitor first. If the amps start out at RLA but climb higher until the external overload protector opens, this could be an indication of poor air circulation through the condenser coil resulting in higher head pressure. The solution could be as simple as cleaning the condenser coil or a problem with the condenser fan motor, such as tight bearings or a fan blade that has been installed backwards. If none of the above, this could also be a symptom of an internal mechanical problem within the compressor. If so, replace the compressor with OEM replacement.

Note: When a system is overcharged, the compressor current may be above RLA.

6B.8.13 Replacing the Compressor

If you have taken all the proper steps outlined above to troubleshoot the compressor, and therefore have determined the compressor has failed, **be sure to replace the liquid line filter drier along with the compressor (Traulsen Part Number 325-60103-00).** Traulsen recommends that you use a nitrogen flow regulator to purge with low pressure nitrogen as you braze all connections. After you have brazed all connections and have checked thoroughly for leaks, change the oil in your vacuum pump before connecting to system with a micron gauge. Pull a deep vacuum of 200 microns to remove moisture from the system.

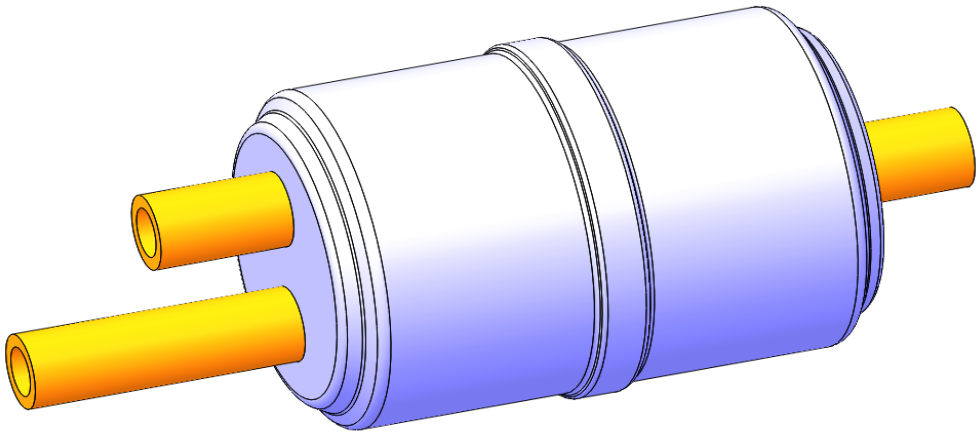


Fig. 6.8.13 R-448 R-450 Filter Drier
P/N: 325-60103-00

6B.8.14 Compressor Wiring Schematics

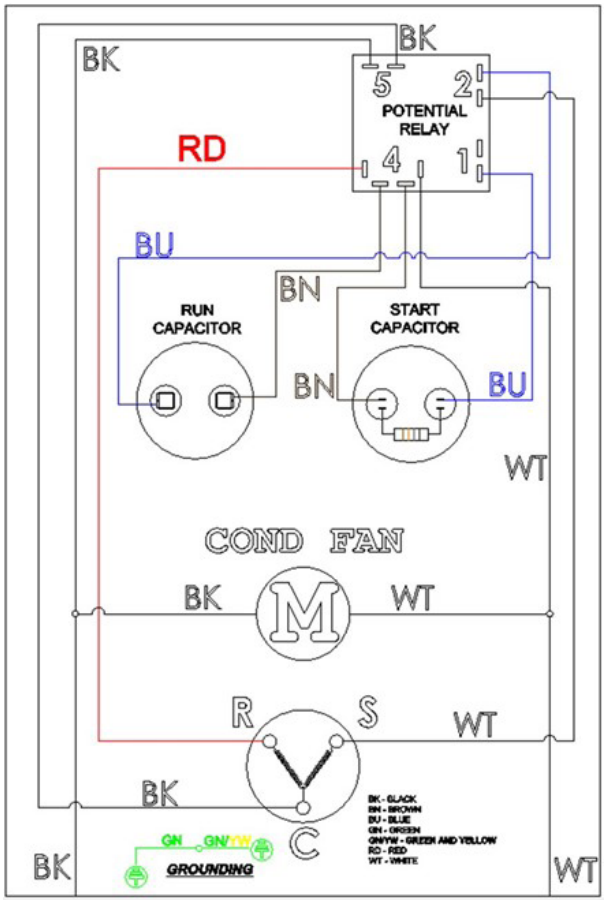


Fig. 6B.8.14a Capacitor Run/ Capacitor Start Compressors

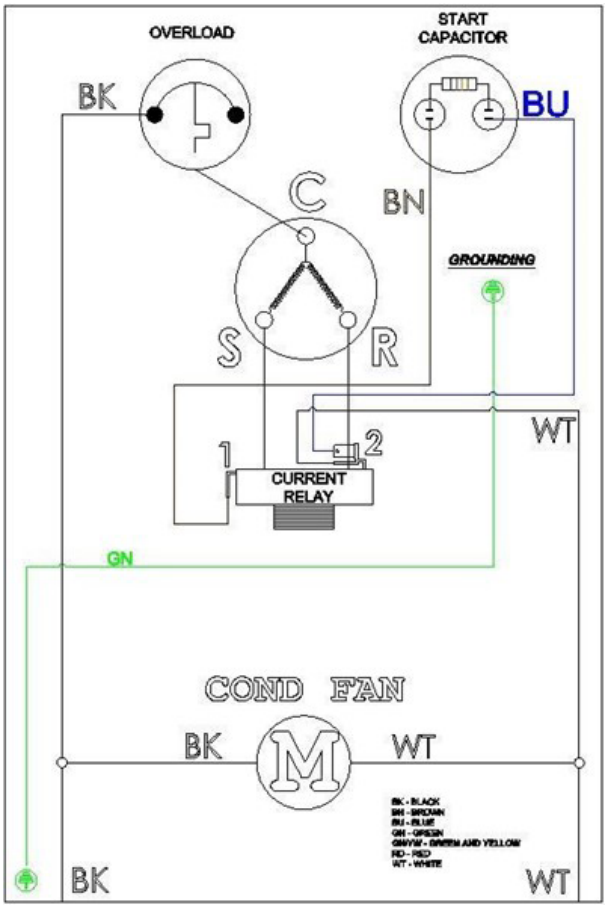
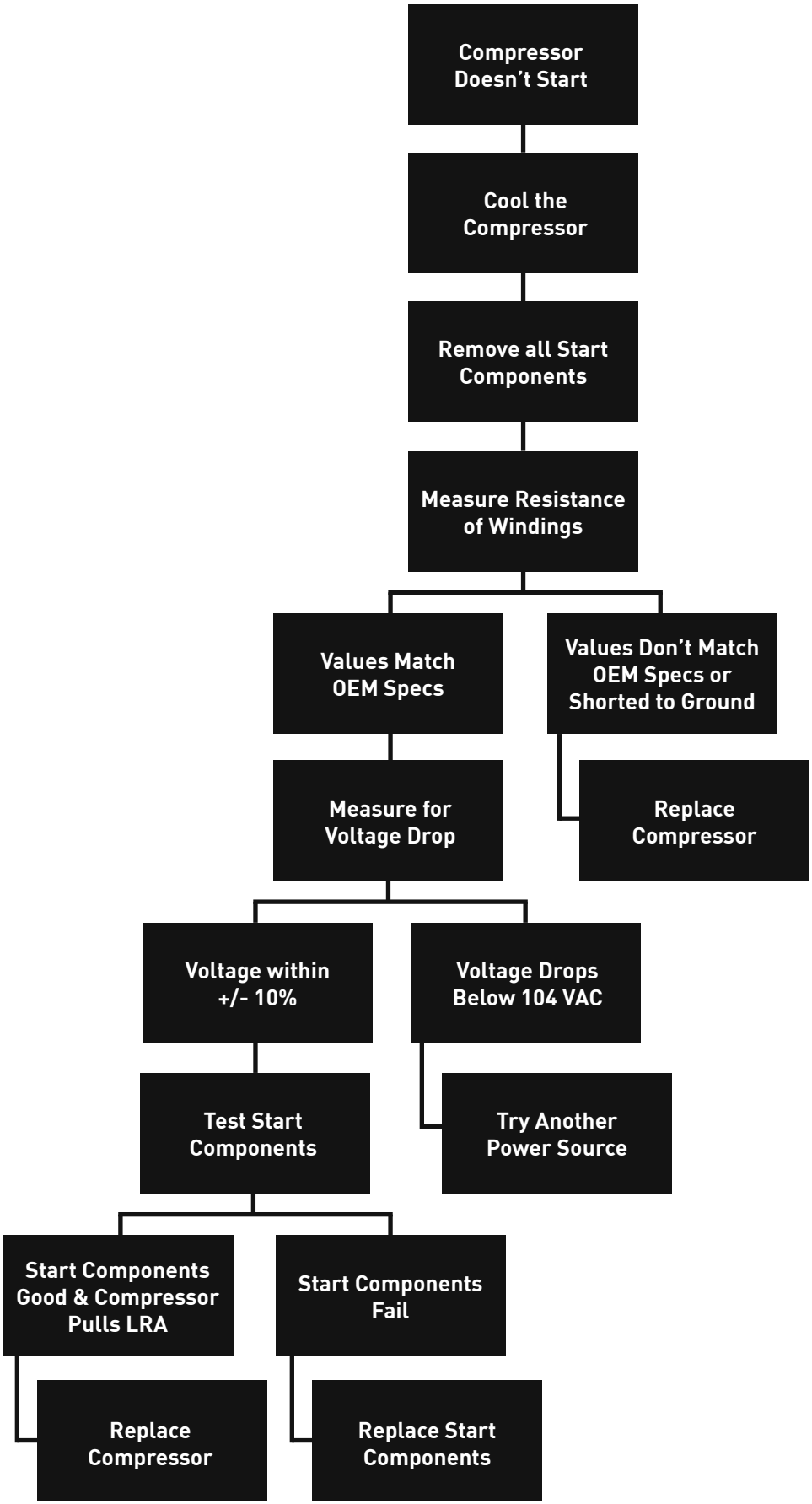
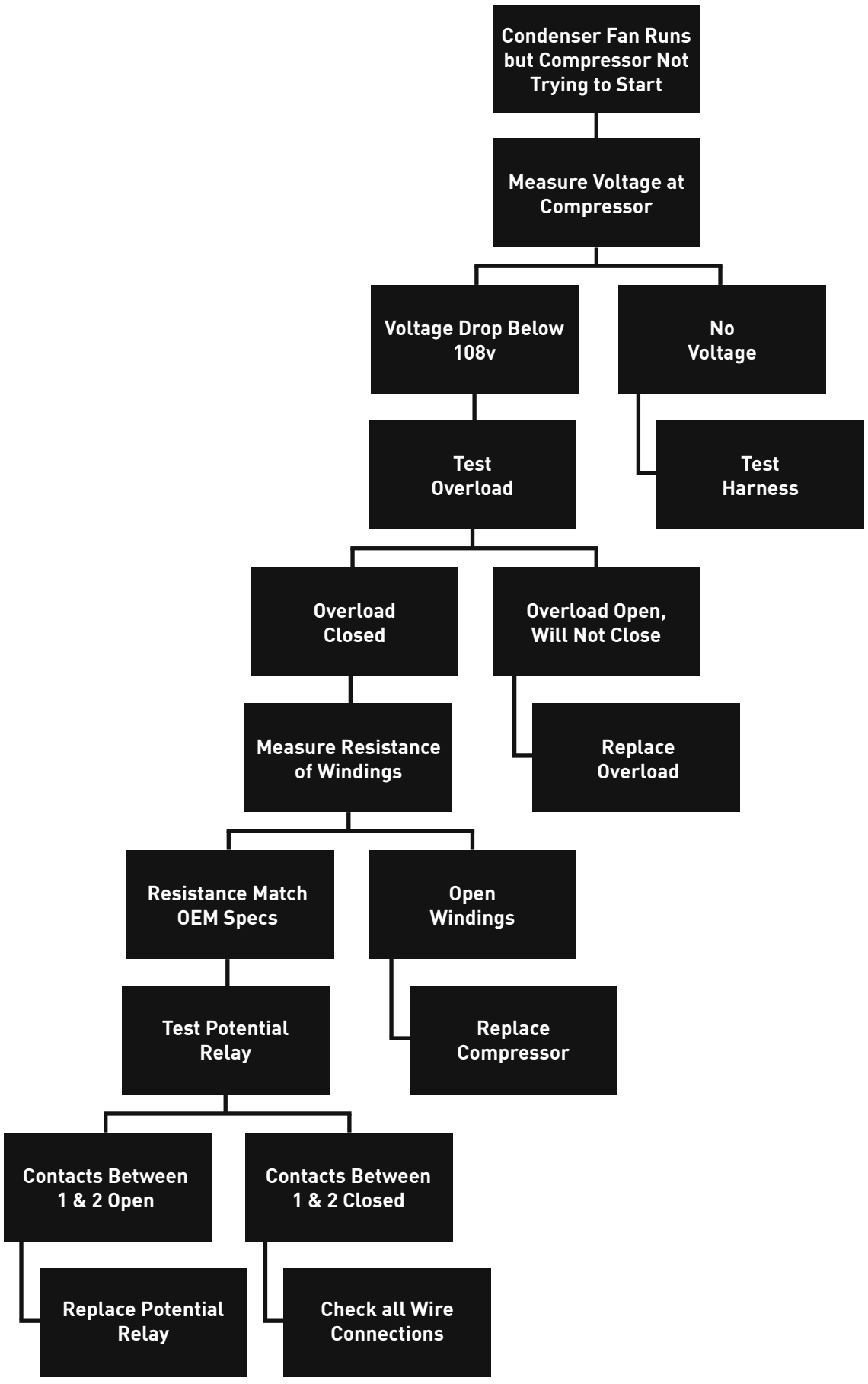


Fig. 6B.8.14b Induction Run Capacitor Start Compressors

6B.8.15 Compressor Short Cycles on Overload Protection



6B.8.16 Compressor Not Trying to Start



6B.9 Evaporator Fan Troubleshooting

6B.9.1 Steps for Troubleshooting R&A-SERIES Evaporator Fan

1. First verify fan icon is illuminated on the display indicating a call for the evaporator fan. Remember- the fan will shut off when door is open, so if you open door to physically check if fan is running you will need to disconnect white door switch connector from control board.

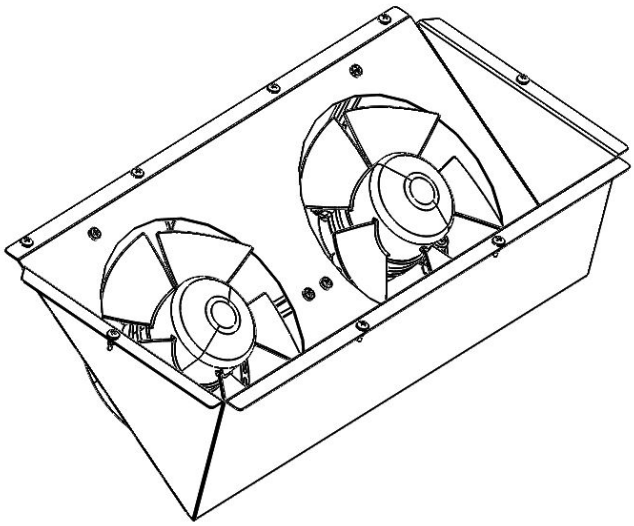


Fig. 6B.9.1a Evaporator Fan

Fig. 6B.9.1b Evaporator Fan Icon On Display

2. Next use an amp meter to prove the evaporator fan motor is running.
3. If fan motor is not running use voltage meter to measure the voltage at fan motor if measurement within +/- 10% of rated voltage replace the fan motor.

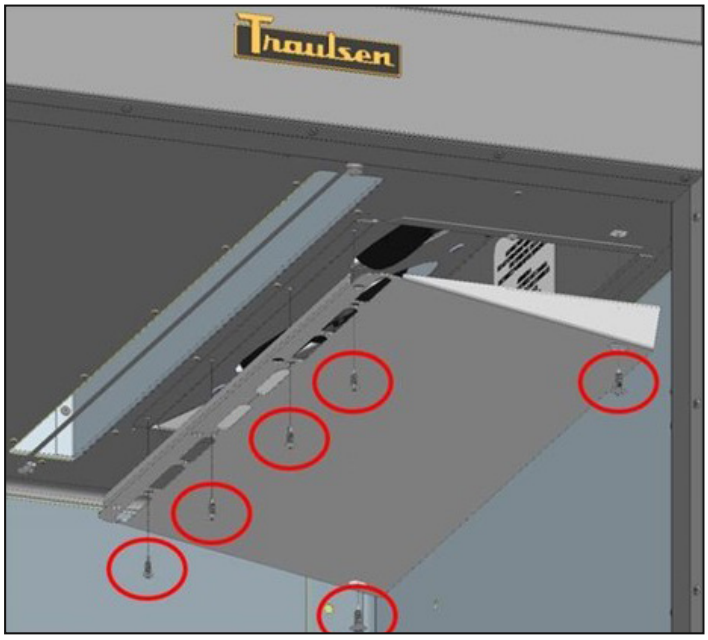


Fig. 6B.9.1c Duct Removal

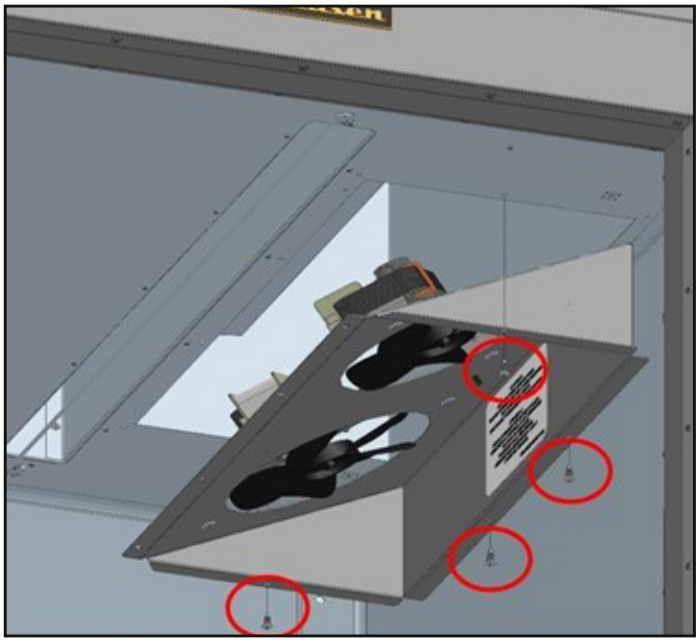


Fig. 6B.9.1d Evaporator Fan Assembly Removal

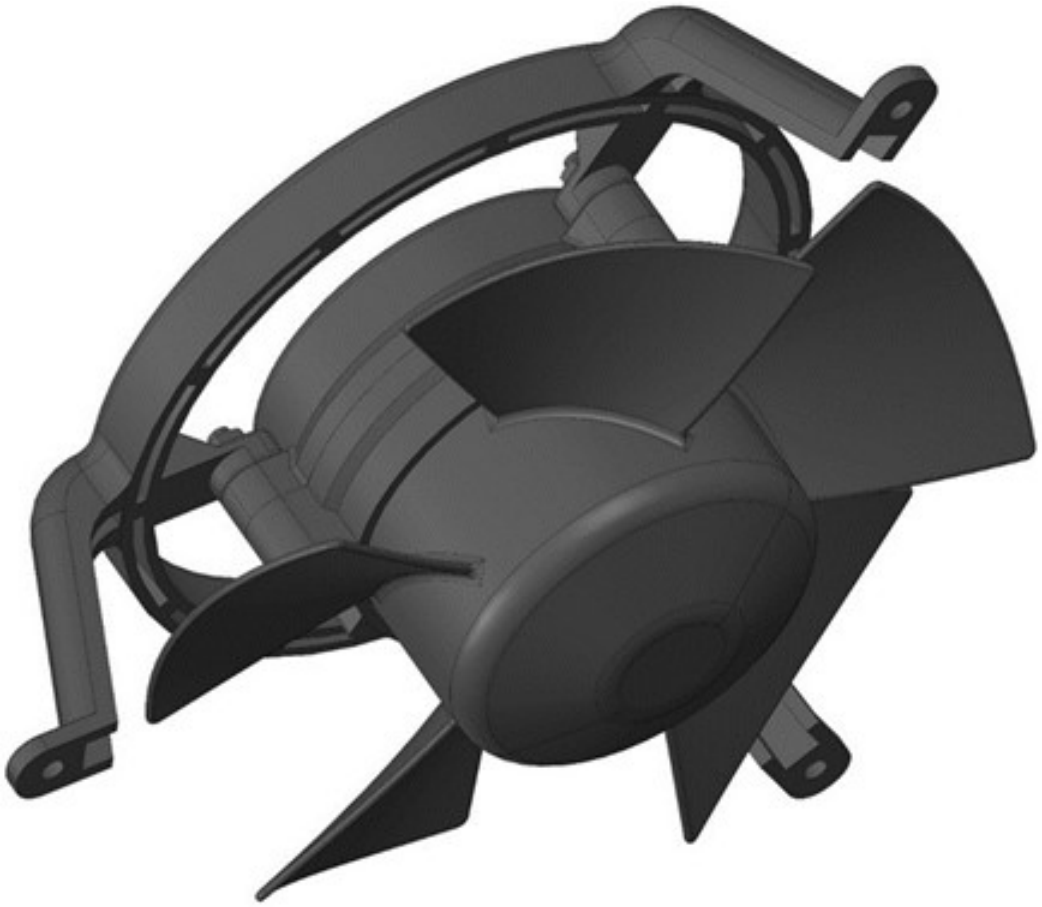


Fig. 6B.9.1e Evaporator Fan Motor Cw From Lead End
TRAULSEN P/N 338-60066-00 115v

DESCRIPTION/ SPECIFICATION	MANUFACTURER
	N/A
PART NUMBER	EXRi50-154F-B-2400-M01-C
OUTPUT	8 WATTS
AMPS	0.07 A
VOLTAGE	120/230 VAC
FREQUENCY	50/60 Hz
SPEED	2,400 RPM
ROTATION	CW
AIR FLOW	168 CFM

Table 6B.9.1f ECM Fan Motor Specs

6B.10 Condenser Fan Troubleshooting

6B.10.1 Troubleshooting the Condenser Fan Motor on R&A-SERIES

325-60124-03

First verify that the Call for Cooling LED on the display is illuminated. If the compressor is running but not the condenser fan motor, you should measure voltage at the condenser fan motor. If you measure +/- 10% of rated voltage but the motor doesn't run, replace the fan motor.

6B.10.2 Motor Bearing Failure

Problems with motor bearings can be easily overlooked- as the motor will run while the cabinet drops in temperature until the motor overheats. Once the motor overheats it will shut off on the internal overload until the motor cools sufficiently. If the condenser fan motor is making a loud grinding noise, leaking oil from the bearings, and pulling excessive current to the motor, the bearings have failed. If the condenser fan motor exhibits these motor bearing failure symptoms, replace the fan motor.

TRAULSEN CAST IRON 9 WATT CONDENSER MOTOR P/N: 338-60050-00

DESCRIPTION/ SPECIFICATION	
MODEL	SP-B16LE12
PART NUMBER	338-60050-00
OUTPUT	16 WATT
AMPS	.80A
VOLTAGE	115VAC
FREQUENCY	50/60 Hz
SPEED	1,550 RPM
ROTATION	CW

Table 6B.10.2 Condenser Fan Motor

6B.10.3 Access and Removal of Condenser Fan Motor: FULL ASSEMBLY P/N: 325-60144-00

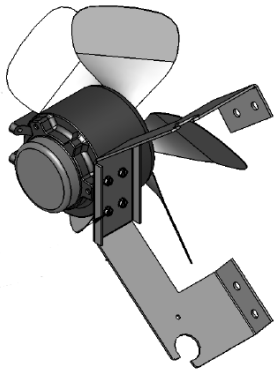


Fig. 6B.10.3a Remove Fan Mounting Bolts

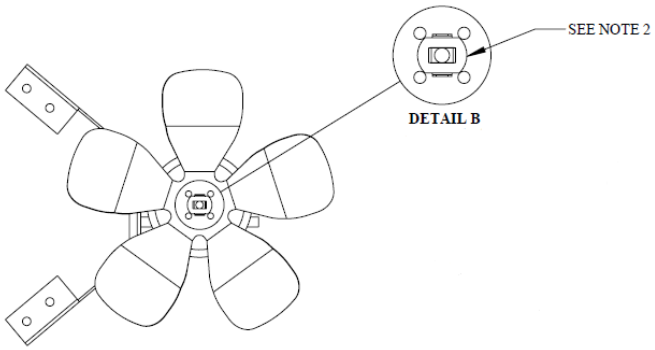


Fig. 6B.10.3b Evaporator Fan Blade Ø8.75"
TRAULSEN P/N 325-60135-00

Notes:

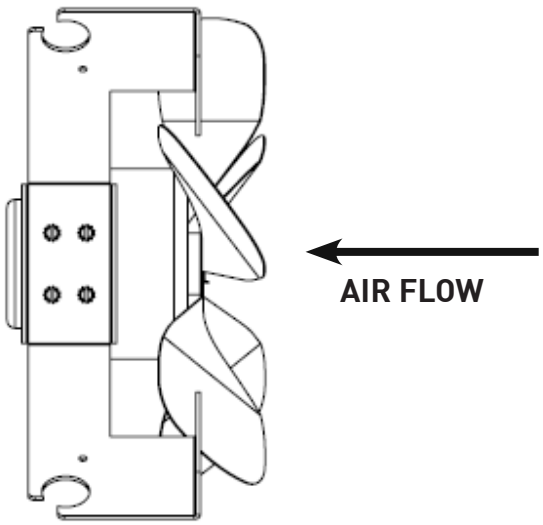
1. Use vibration washer (supplied with motor) or our Part No. 265182 between motor and fan blade.
2. Assemble fan blade with concave toward motor using speed nut (Supplied with motor).
3. Assemble (510-10305-00) to motor using (4) fasteners (supplied with motor)

6B.10.4 Replacing the Condenser Fan Motor

DESCRIPTION	TRAULSEN PART NUMBER
BLADE, FAN 8.75	325-60135-00
FAN MOTOR, 1550 RPM	338-60050-00
BRACKET COND FAN MOTOR BREAKING TABLE	510-10305-00

Table 6B.10.4 CONDENSER FAN MOTOR TRAULSEN P/N

When replacing the motor, be sure to note the direction of air flow as well as the position of the fan blade. The motor is designed to pull air through the condenser coil. The fan blade should be installed with the concave toward the motor using speed nut included with the motor. The vibration washer, which is supplied with the motor, must be installed between the motor and fan blade. Torque speed nut to 10 IN-LB.



CONDENSER FAN MOTOR	
338-60050-00	16W 115V
338-60050-01	16W 220V
338-60050-03	16W 230V
338-60049-02	16W 115V

Fig. 6B.10.4 Fan Blade Orientation

Refer to the figure above to confirm the fan blade orientation when mounted on the bracket.

6B.11 Troubleshooting Thermostatic Expansion Valve

All Traulsen R&A-Series refrigerators and freezers are equipped with Thermostatic Expansion Valve (TXV). The TXV is a type of metering device that meters liquid refrigerant into the evaporator coil. A TXV is superior to a capillary tube metering device, as it can respond to load changes. The TXV is designed to control the superheat value of the refrigerant leaving the evaporator coil. This control of superheat is accomplished by a sensing bulb that is secured to the outlet of the evaporator coil at the suction line. When the temperature of the suction line increases at the sensing bulb (which is charged with refrigerant), the pressure in the sensing bulb increases- opening the valve. This is the only opening force upon the valve, so if the refrigerant charge is lost in the sensing bulb (powerhead) the TXV will close- starving the evaporator coil. If the sensing bulb is not attached to the suction line properly, the valve will likely open too much- flooding the evaporator.

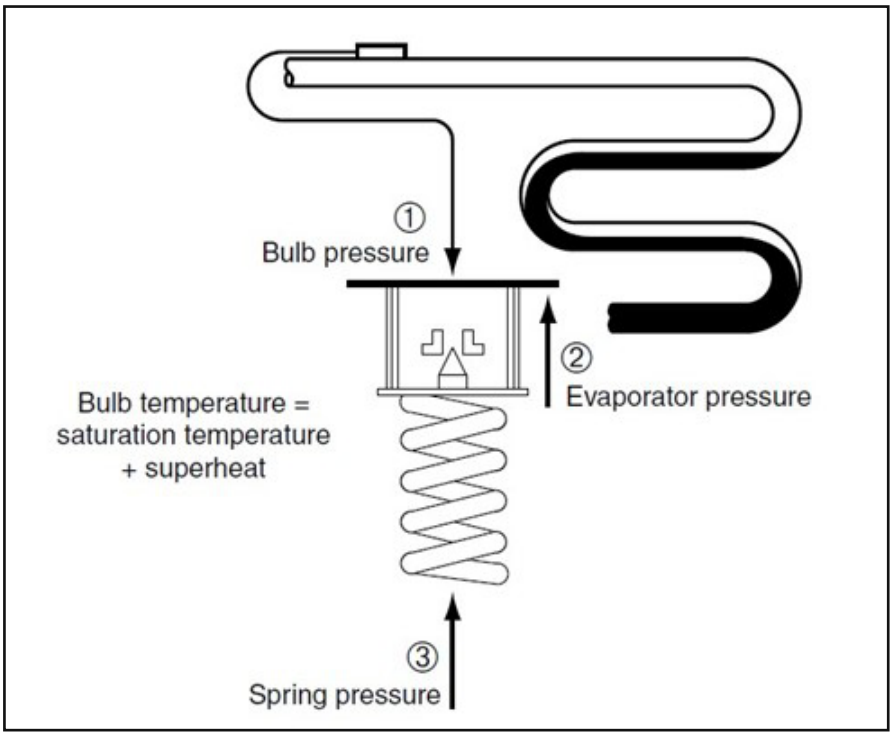


Fig. 6B.11 TXV 3 Pressures

TXV PART NUMBER USED ON ALL PRE - 2024 R/A MODELS
325-60080-43
325-60080-102
325-60080-103
325-60080-104
325-60080-105

6B.11.1 Three Pressures

There are three pressures at work on a TXV:

(1) The bulb pressure which is the only opening force.
(2) The evaporator pressure which is a closing force.
(3) The spring pressure which is a closing force.

All the TXV's used in Traulsen R&A-Series models are internally equalized, which means that the evaporator pressure closing force is applied internally from the inlet evaporator. The spring pressure is technically adjustable, but it should not be necessary to adjust any TXV on Traulsen equipment- as the superheat will be properly adjusted by Traulsen.

6B.11.2 Non-Bleed Type

The TXV used in Traulsen R&A-Series equipment is a non-bleed (hard shut-off) type of TXV, which means that the pressures do not equalize during the off-cycle.

6B.11.3 Maximum Operating Pressure

The TXV used in a Traulsen R&A-Series equipment is a MOP valve with Maximum Operating Pressure. The MOP valve is designed to limit the suction pressure from rising above the MOP value. Therefore, you will never see the suction pressure rise above the MOP value- not even during a hot pull down or after a defrost cycle.

6B.11.4 Troubleshooting Thermostatic Expansion Valve

Superheat	Subcooling	Diagnosis
Above 7F	Below 4F	Refrigerant Charge is Low
Below 5F	Above 12F	System Overcharged
Above 7F	Above 12F	Restriction in High Side or Metering Device

Moisture Contamination : When moisture infiltrates the system, it can lead to various issues, including obstruction and freezing within the TXV.

Obstruction Thawing: Moisture within the TXV can cause a blockage, which impedes the flow of refrigerant. However, when the temperature rises, the moisture thaws, temporarily alleviating the obstruction.

Temporary Restoration of Function: With the thawing of the obstruction, the system can briefly resume proper functioning as refrigerant flow improves.

Moisture Recurrence: Despite the temporary restoration, the moisture is not eliminated from the system. It may gradually find its way back to the TXV due to the cyclic nature of refrigerant flow.

Freezing at Orifice: As the moisture returns to the TXV, it can refreeze at the orifice due to the low temperatures within the valve, reinstating the obstruction and leading to recurrent malfunctions.

Cycle of Malfunction: This process can create a cyclical pattern where the system experiences intermittent periods of proper function followed by malfunctions when moisture re-obstructs the TXV.

6B.11.5 Measuring Superheat

When troubleshooting a TXV, it may become necessary to measure superheat- this can be done without connecting pressure gauges. All Traulsen R&A-Series refrigeration systems are sealed without access for pressure test. Installing pressure test access valves should be the last resort. Superheat can be measured with two thermometers securely attached to refrigerant lines.

(T1) Measure the temperature at the inlet of the evaporator coil after the TXV valve body.
(T2) Measure the temperature at the outlet of the evaporator coil after the TXV sensing bulb.

Subtracting (T1) from (T2) will equal the superheat. The superheat should measure somewhere between 4° to 12° F.

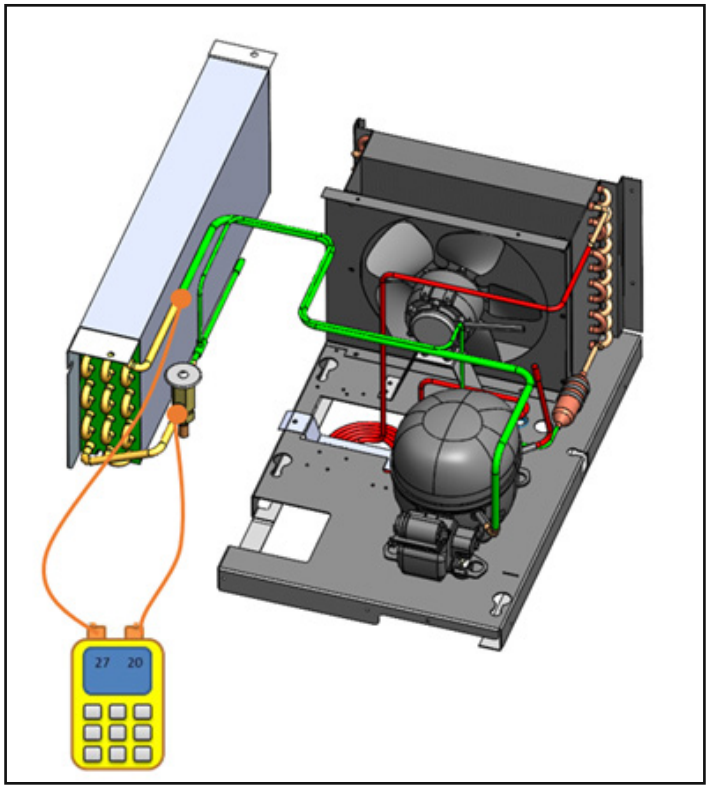


Fig. 6B.11.5 Measuring Superheat

6B.11.6 Restrictions

If the flow of refrigerant becomes restricted at the TXV, the valve will be very cold to the point of freezing, but the evaporator coil will be warm with high superheat and subcooling. Both low side and high side pressures will drop. Although, if refrigerant is added to the system, the high side pressure will rise but the low side will not.

6B.11.7 Replacing the TXV

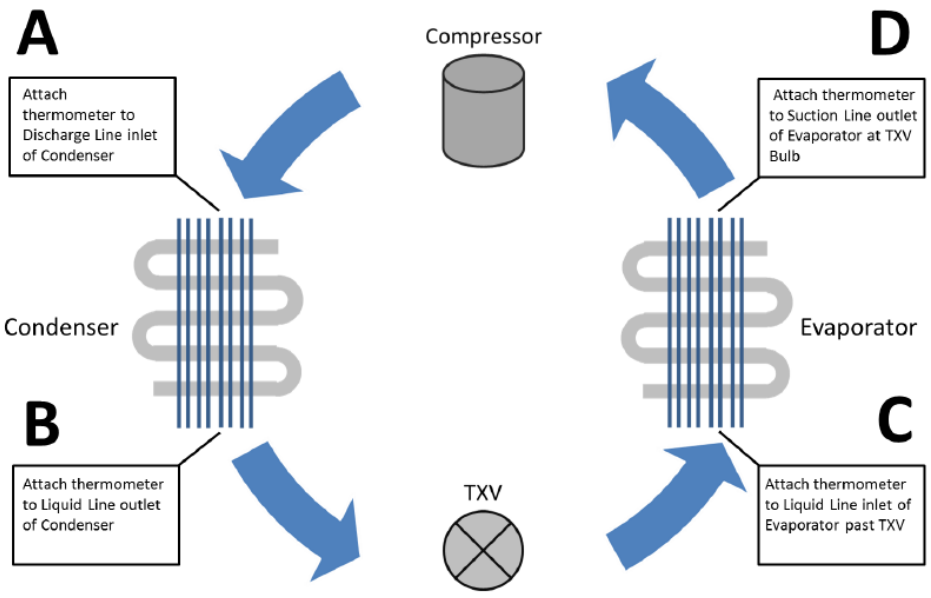
If it becomes necessary to replace the TXV, care should be taken to replace it with the exact OEM part. When brazing the TXV into the system, care should be taken not to overheat the valve. This is best accomplished by wrapping the valve with a cold wet rag. A dry nitrogen purge of 10 SCFH should be used to displace the oxygen to prevent the creation of an oxidized film inside the piping- which could lead to system contamination or a restriction. Too much nitrogen pressure will blow back through the joint and cause pinholes. After replacing the TXV, be sure to pull a deep vacuum of 200 microns.

6B.11.8 Troubleshooting Traulsen Refrigeration System

Introduction:
This is to inform the field how to trouble shoots the refrigeration system with the use of a thermometer. Trouble Shooting Refrigeration System by Temperature:
Use Table 10 and corresponding chart to aid in troubleshooting a Traulsen refrigeration system with the use of thermometers.

ITEM	FORMULA	TRAULSEN SPEC
Condenser Split	(A + B)/2-Ambient Temperature	30°F (-1.1°C)
Sub-cooling	(A + B)/2-B	4°F to12°F (-15.5°C -11.1°C)
Evaporator Superheat	D-C	5°F to 7°F (-15°C to 13.9°C)

Note: Unit must be running for at least 5-10 minutes before checking temperatures and insulate sensing bulb of thermometer for most accurate readings.



6B.12 Removing the Refrigeration System

6B.12.1 Condenser Assembly

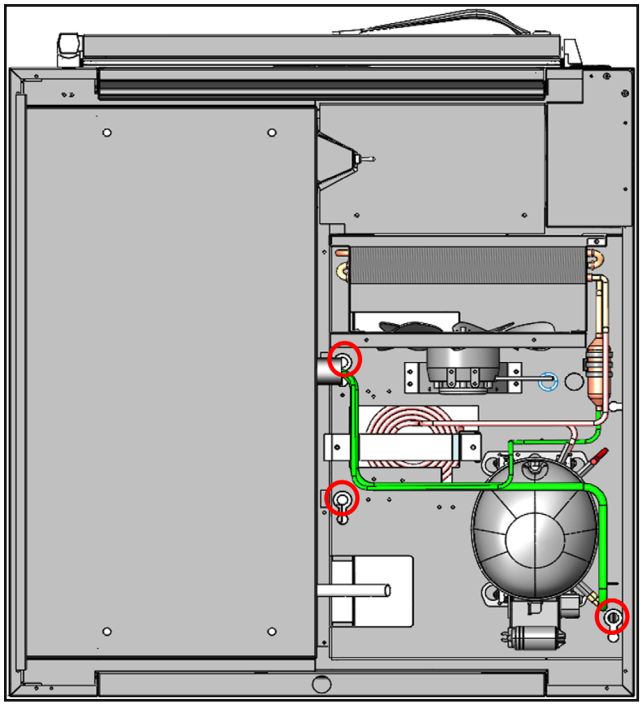


Fig. 6B.12.1a Fastener Locations

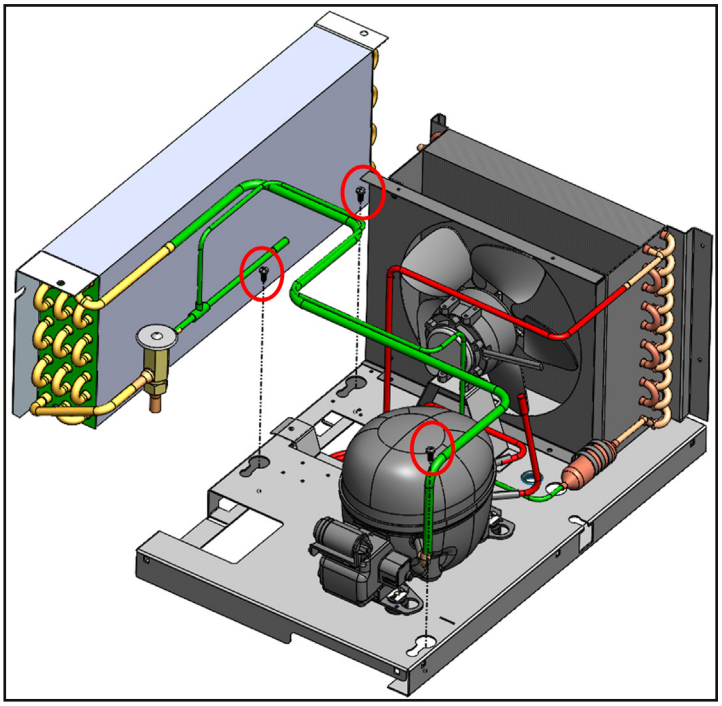


Fig. 6B.12.1b Remove Fastener Locations

6B.12.2 Defrost Troubleshooting

Traulsen uses two different types of defrost on the R&A-Series refrigerators. The last cabinet temperature before the defrost started will be displayed throughout the entire defrost cycle.

1. Off-Cycle Defrost (1 Section Refrigeration reach-in Solid Door)

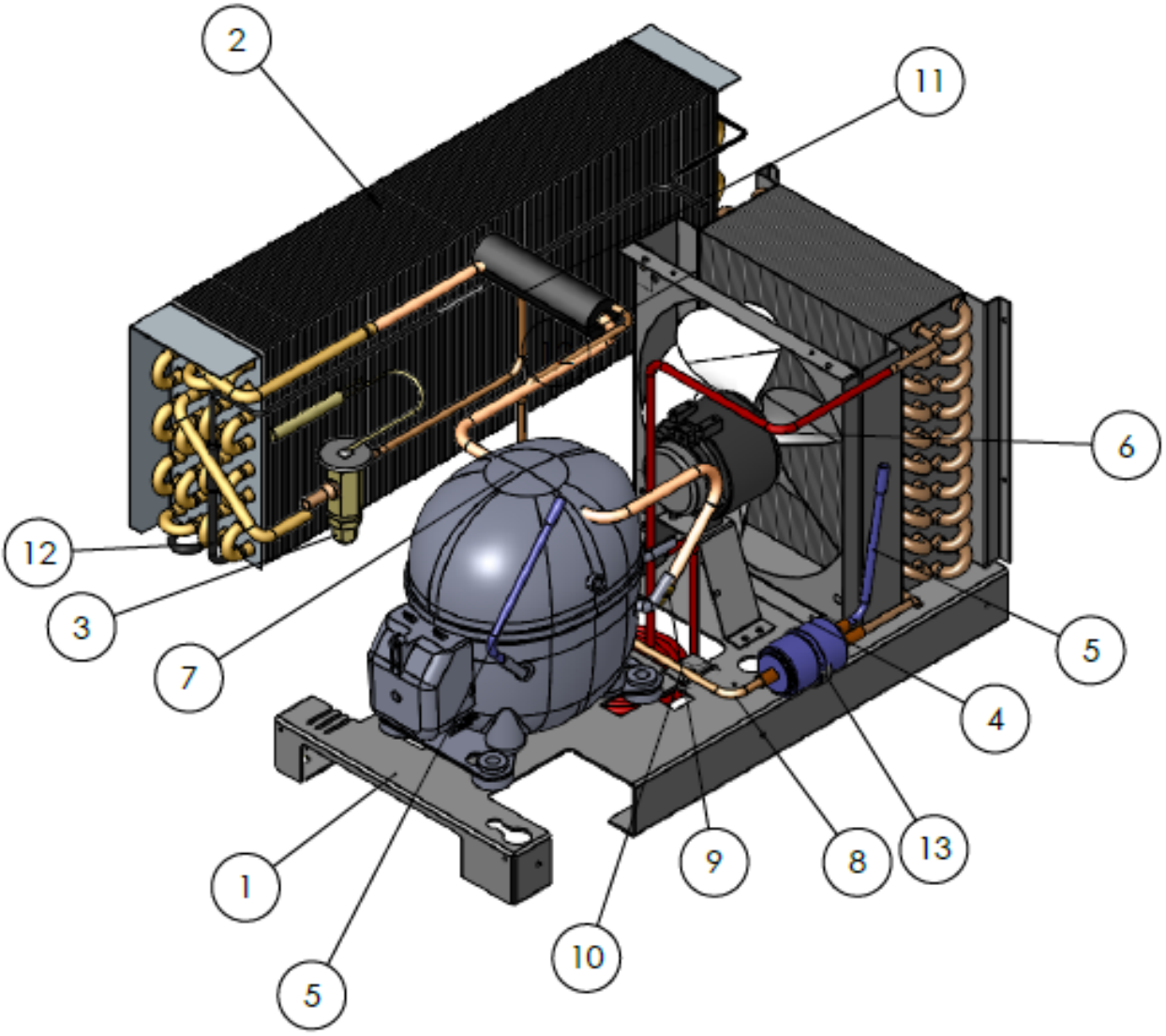
   The off-cycle defrost is really an air over defrost. In other words, we shut off the compressor but continue to run the evaporator fan motor. During an off-cycle defrost the melting snowflake does not illuminate, but instead the fan icon. This type of defrost is time initiated every two hours, but then temperature terminated when the evaporator coil reaches 40°F or a maximum of 30 minutes. After the coil reaches the defrost termination temperature, two minutes of drip time will begin before the compressor is energized.

Fig. 6B.12.2a Display During Off-Cycle Defrost

2. Electric Defrost (1 Section Glass door, Passthrough, 2&3 Section Units)

During an electric defrost we shut off the compressor and the evaporator fan motor but energize an electric heating element- at which time the melting snowflake is illuminated on the display. The electric defrost is initiated by time every four hours on R&A-Series freezers, but then terminated when the evaporator coil temperature reaches 45°F or a maximum of 30 minutes. After the defrost heat is terminated, a drip time begins. During the drip time, the coil temperature will continue to rise until the four minutes of drip time is completed- at which time the compressor is energized. Once the evaporator coil temperature drops to 35°F the evaporator fan motor will be energized.

Fig. 6B.12.2b Display During Freezer Electric Defrost



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	319-10050-26	COND, UNIT, ASSY 132N FRZ 115/60	1
2	322-60003-00	COIL: EVAPORATOR	1
3	325-60080-112	TXV, RFGB08-0.35-302 (R-448A) SANHUA	1
4	325-60103-00	LIQUID LINE FILTER DRIER	1
5	315-10040-00	6" PROCESS TUBE,1/4" O.D.	2
6	315-10041-00	TUBING, HOT GAS LOOP 132N REF/FRZ	1
7	315-10042-00	TUBING, SUCTION LINE, 132N REF/FRZ	1
8	315-10043-00	TUBING, LIQUID LINE	1
9	358-60420-00	REDUCING COUPLING	1
10	601-70008-00	BRACKET,DISCHARGE LOOP	1
11	327-60003-01	INSULATION TUBING (PARTIALLY SHOWN)	3.3 FT
12	329-60022-01	DEFROST HEATER, 500W 115V, 3-PASS W/THERMAL DISK	1
13	701-60796-01	FILTER DRIER BRACKET (SMALL)	1

UNIT/EVAPORATOR A/RLT132N 115/60 R-448A

6B.13 PTC Heater

Positive-Temperature-Coefficient (PTC) Heater Part # 329-60101-00

A positive-temperature-coefficient (PTC) heating element, also known as a self-regulating heater, is an advanced type of electrical resistance heater characterized by its ability to adjust its resistance in response to temperature changes. This unique property makes PTC heaters highly efficient and safe for various applications.

How PTC Heaters Work.

A PTC heating element is composed of a ceramic material that exhibits a positive temperature coefficient. As the temperature of the heater increases, its electrical resistance also increases significantly. This behavior contrasts with traditional resistance heaters, whose resistance remains relatively constant regardless of temperature changes.

Initial Heating When the PTC heater is powered on, (Aux/BrownCtrl Board) it initially has a low resistance, allowing a high current to flow through the element. This results in rapid heating.

Self-Regulation As the temperature rises, the resistance of the PTC element increases sharply. This increased resistance reduces the current flow, thus reducing the power output and preventing overheating.

Positive-Temperature-Coefficient (PTC) Heater in Drain Pans

In refrigeration and air conditioning systems, excess water can accumulate in the drain pan due to condensation. Managing this water is crucial to prevent overflow, mold growth, and potential damage to the system. A positive-temperature-coefficient (PTC) heating element is often strategically placed in the drain pan to help eliminate this excess water efficiently.

Role of PTC Heater in Drain Pans

The PTC heater, with its self-regulating properties, is ideal for maintaining optimal conditions within the drain pan. Here's how it functions in this specific application:

Water Evaporation The primary role of the PTC heater in the drain pan is to promote the evaporation of accumulated water. When the heater is activated, it generates heat, which raises the temperature of the water in the pan. As the temperature increases, the water begins to evaporate, effectively reducing the water level in the drain pan.

Prevention of Freezing In environments where temperatures can drop significantly, the PTC heater also prevents the water in the drain pan from freezing. By maintaining a temperature above the freezing point, it ensures that the drain pan remains functional and free of ice blockages, which could otherwise impede proper drainage.

Minimizing Mold and Bacteria Growth By efficiently evaporating the excess water, the PTC heater helps maintain a dry environment within the drain pan. This dryness is crucial for minimizing the growth of mold, mildew, and bacteria, which thrive in moist conditions. A dry drain pan contributes to better air quality and overall system hygiene.

PTC Heater 120V 2555W 2.125Amps P/N: 329-60101-01B

**** Parts are optional, based on make/model**

Advantages of Using a PTC Heater in Drain Pans

Energy Efficiency The PTC heater's ability to self-regulate its power consumption based on temperature changes leads to significant energy savings. It only uses the necessary amount of energy to maintain the desired temperature, avoiding unnecessary power consumption.

Enhanced Safety The inherent safety of PTC heaters, due to their self-limiting temperature feature, ensures that there is no risk of overheating. This safety aspect is particularly important in preventing potential fire hazards or damage to the system components.

Reliability PTC heaters are known for their durability and consistent performance. In the drain pan application, they provide reliable heating over extended periods, ensuring that excess water is continuously managed without frequent maintenance or replacement.

Integrating a positive-temperature-coefficient heating element into the drain pan of a refrigeration system is a highly effective method for managing excess water. The PTC heater not only promotes efficient water evaporation but also prevents freezing and inhibits the growth of mold and bacteria. Its self-regulating properties ensure energy efficiency and safety, making it an indispensable component in maintaining the optimal functioning of the drain pan and the overall system.

7. General Wiring Diagrams

7.1 Refrigerator (Off-Cycle Defrost) 115 Volt

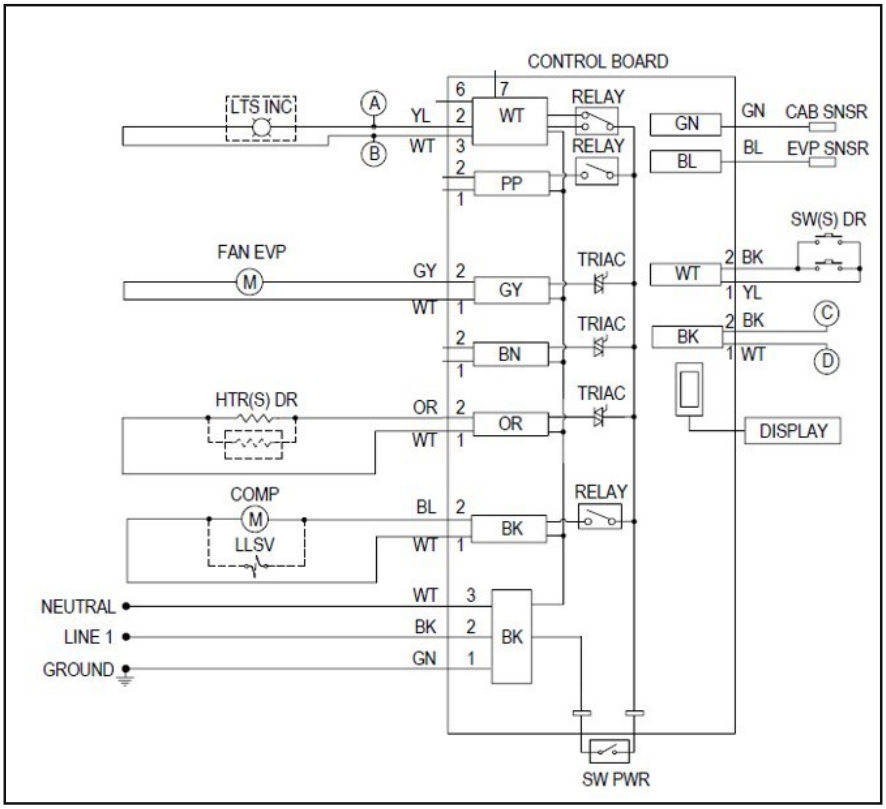


Fig. 7.1 Refrigerator Off-Cycle Defrost 115v

7.2 Refrigerator Electric Defrost/Freezer 115 Volt

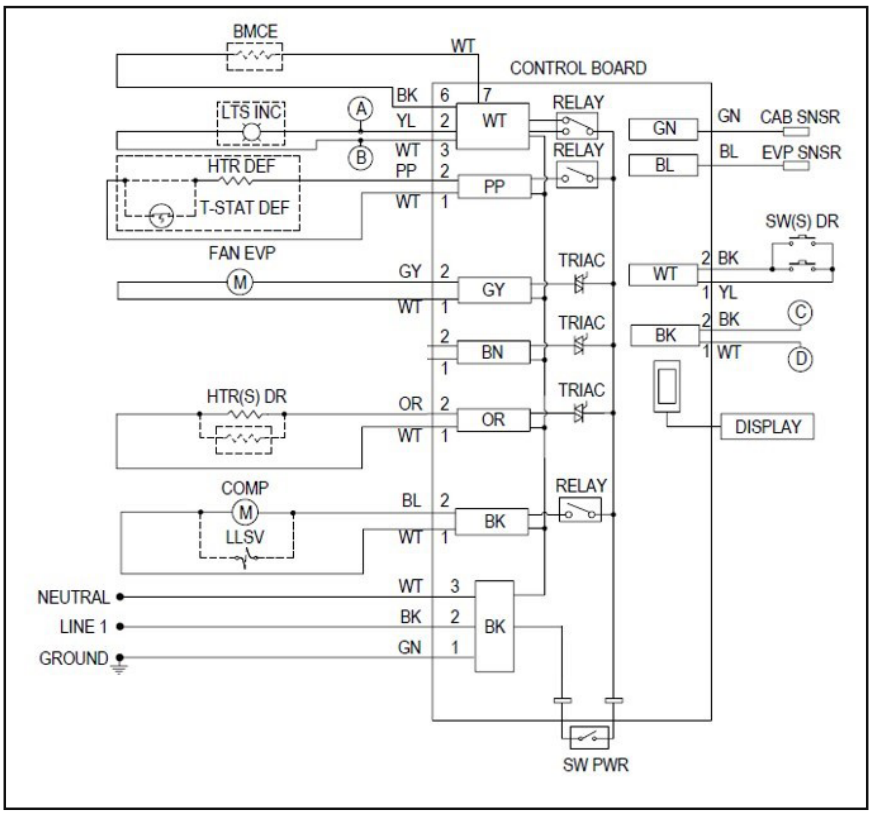


Fig. 7.2 Refrigerator Electric Defrost/Freezer 115v

7.3 Lighting Circuits

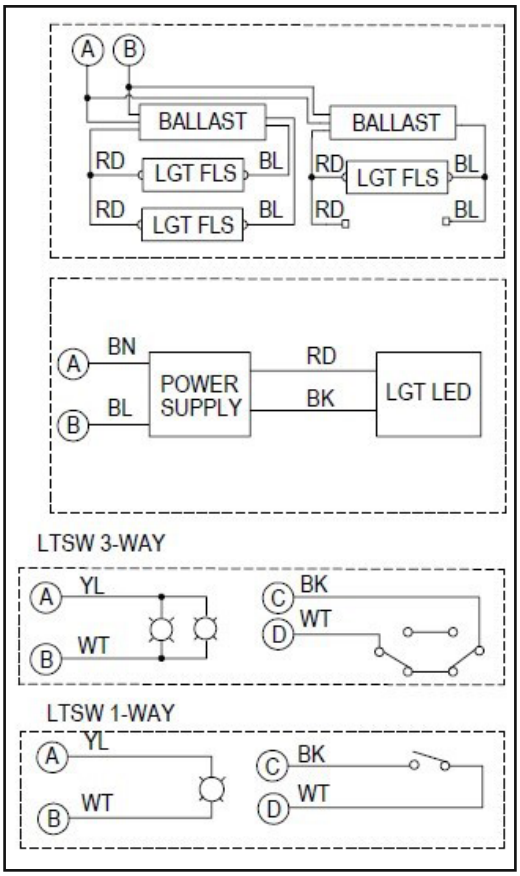


Fig. 7.3 Lighting Circuits

7.4 3-Section Freezer 208-230/115 Volt

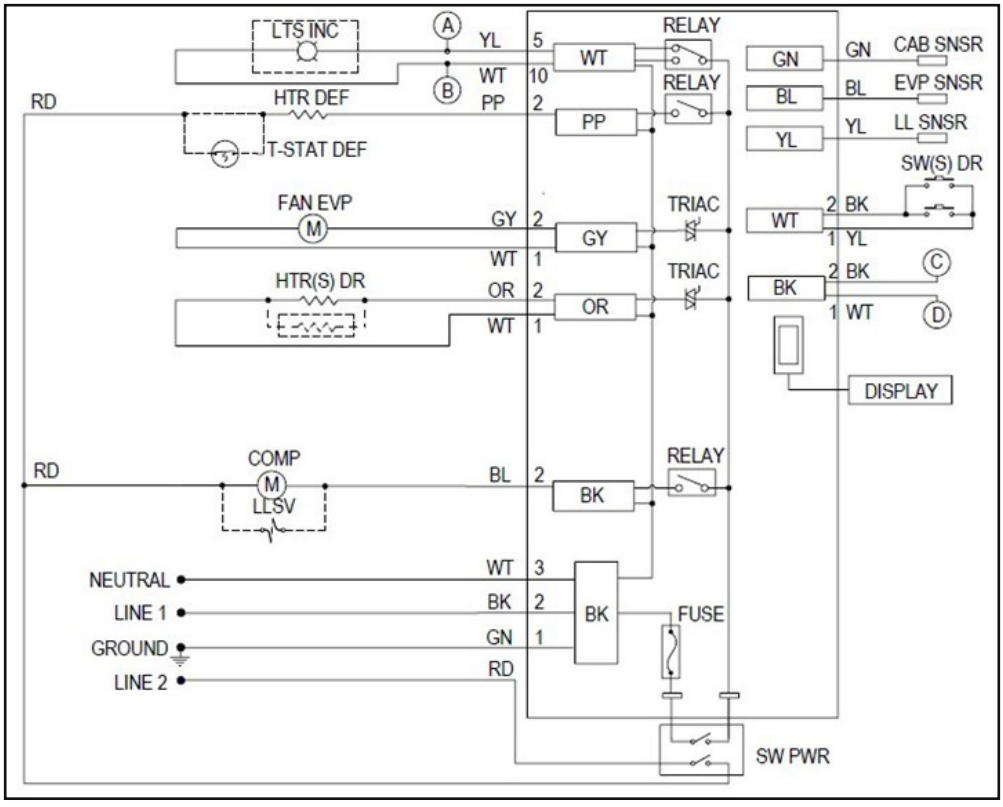


Fig. 7.4 2&3-Section Freezer 208-230/115V

NOTES:

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Form Number: TR00399 | Revision Date: 8-2024

Hours of Operation: Monday - Friday 7:30 a.m. - 4:30 p.m. (CST)