SERVICE MANUAL

Glycol Series Prep Table Service Manual

TB046, TB060,TB065, TB071, TB091 TB113, All KBP Models

This manual is applicable for all models using:

Glycol Systems, R-290 (Propane) refrigerant

2024 - PRESENT MODELS

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

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4401 Blue Mound Road Fort Worth, Texas 76106 (USA)
Phone: 800.825.8220 | E-mail: service@traulsen.com | Website: traulsen.com
Form Number: TR00427 | Revision Date: 11-2024

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

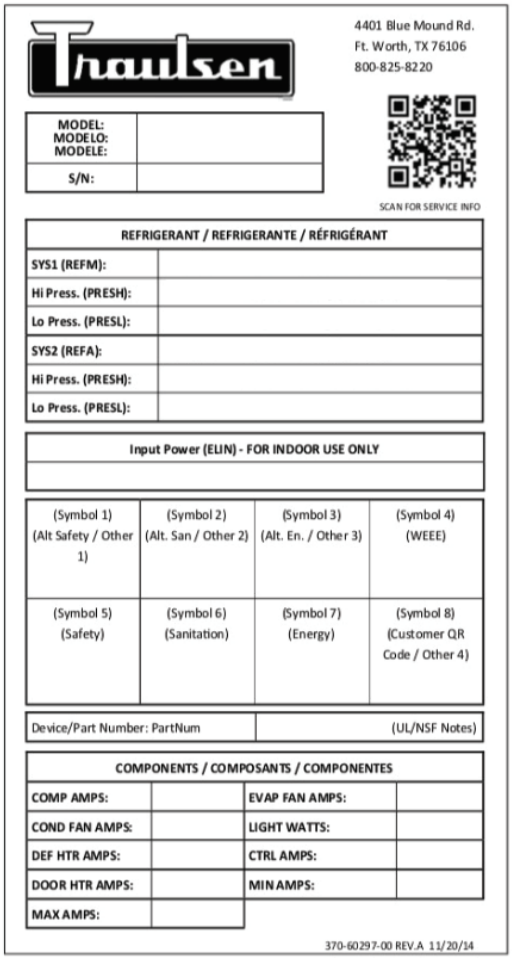

Traulsen
4401 Blue Mound Rd.
Ft. Worth, TX 76106
800-825-8220
MODEL:
MODELO:
MODELE:
S/N:
SCAN FOR SERVICE INFO
REFRIGERANT / REFRIGERANTE / RÉFRIGÉRANT
SYS1 (REFM):
Hi Press. (PRESH):
Lo Press. (PRESL):
SYS2 (REFA):
Hi Press. (PRESH):
Lo Press. (PRESL):
Input Power (ELIN) - FOR INDOOR USE ONLY
(Symbol 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 Glycol System refrigerator 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 Glycol System Model Numbers

MODEL	LENGTH	# DOORS	# PAN ROWS	# 1/6 PANS	#1/3 PANS
TB046SL2S	46"	1	2	12	6
TB046SL3S	46"	1	3	18	9
TB060SL2S	60"	2	2	16	8
TB060SL3S	60"	2	3	24	12
TB065SL2S	65"	2	2	18	9
TB065SL3S	65"	2	3	27	12+
TB071SL2S	71"	2	2	20	10
TB071SL3S	71"	2	3	30	15
TB091SL2S	91"	3	2	26	13
TB091SL3S	91"	3	3	39	18+
TB113SL2S	113"	4	2	32	16

Fig. 1.3
Glycol System Prep Table Model Numbers

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

1.4 Reading Traulsen Serial Number

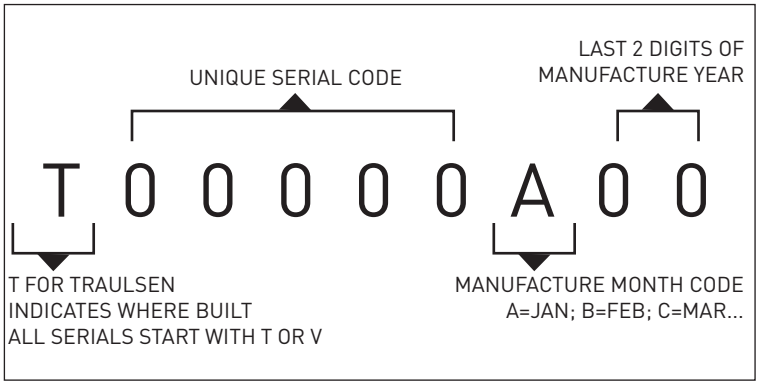


Fig. 1.4a
Format if Manufactured Before April 2021

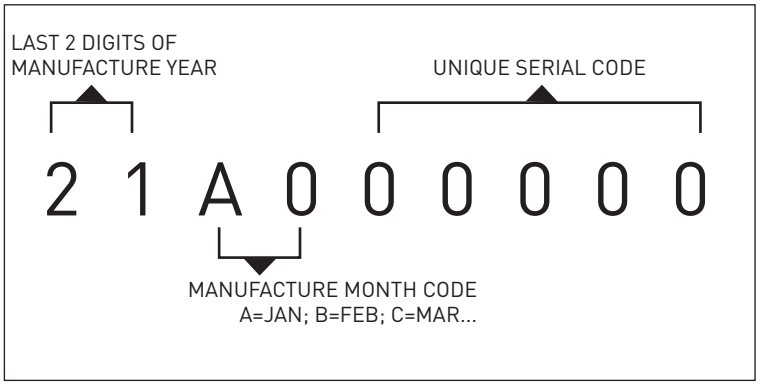


Fig. 1.4b
Format If Manufactured After April 2021

1.5 Refrigerants

1.5.1 Terminology

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.

- GWP: 3
- Refrigerant can be charged from either the liquid and vapor phase
- A-Gas refrigerant cylinders have dual port valves, making liquid off take easier
- Flammable and low toxicity with a safety classification of A3
- Compressors can be charged with a variety of oils contact the compressor manufacturer for more information
- Excellent thermodynamic properties leading to high energy efficiency
- Due to its flammable nature R290 (Propane) requires different charging, recovery procedures and equipment

Formula = R290 refrigerant has a chemical formula of C3H8, denoting its composition of three carbon atoms and eight hydrogen atoms per molecule.

Molecular Weight (g/mol) = With a molecular weight of 44.1 grams per mole, R290 is relatively lightweight, facilitating its use in refrigeration systems.

Boiling Temperature °F (°C) = R290 has a low boiling temperature of -43.8°F (-42.1°C), making it effective for cooling applications, especially in low-temperature environments.

Global Warming Potential (GWP) = With a GWP of 3, R290 is considered a low-impact refrigerant in terms of its contribution to global warming, aligning with environmentally conscious practices.

Ozone Depletion Potential (ODP) = R290 has an ozone depletion potential of 0, indicating that it does not harm the ozone layer, thus supporting efforts to preserve the Earth's atmosphere.

Appearance =This refrigerant appears as a colorless, liquefied compressed gas, allowing for easy identification and handling.

Odor = R290 is odorless, ensuring that its presence is not detectable by smell, which can be advantageous in various applications.

Solubility in Water = With a solubility of 0.0244 grams per liter, R290 exhibits limited solubility in water, which can be relevant for understanding its behavior in different environments.

Vapor Pressure = R290 operates at a vapor pressure of 109 pounds per square inch gauge (psi), influencing its performance and behavior within refrigeration systems.

Flash point = The flash point of R290 is -104°C (-155°F), indicating the temperature at which it can ignite in the presence of an ignition source, emphasizing the importance of proper handling and safety precautions.

By presenting these details in a user-friendly manner, users can better understand the characteristics and implications of utilizing R290 refrigerant in their systems.

1.5.2 R-290 (PROPANE) Refrigerant

R-290 (Propane) refrigerant is a refrigerant Traulsen uses in both low and medium temperature applications. This refrigerant is a single constituent refrigerant having no temperature glide.

Pressure (psi)	Temperature (°F)
5	-31.5
10	-21.3
15	-12.7
20	-5.1
25	1.7
30	7.9
35	13.6
40	18.9
50	28.4
60	36.9
70	44.6
80	51.6
90	58.1
100	64.2
110	69.9
130	75.2
140	80.3
150	85.2
160	89.8
170	94.2
180	98.4
190	102.4
200	106.4
210	110.1
220	113.8
230	117.3
240	120.7
250	124.0
260	127.3
270	133.4

Table 1.5.2
Pressure/ Temperature Chart For R-290 Refrigerant

NOTE: R290 Glycol System – Pressure Characteristics
During startup conditions, suction pressures may fluctuate due to the large glycol volume contained within the system (up to 10 gallons, depending on unit size). This initial load places a heavier demand on the refrigeration system until circulation stabilizes.
Once the unit approaches setpoint temperature, pressures should stabilize and reflect normal operating conditions:

Technicians should account for these fluctuations during initial pull-down and avoid misdiagnosing pressure changes as system faults. **Proper evaluation must always be performed when the unit is near setpoint, as this provides the most accurate representation of system performance.**

The refrigerant R290 (Propane) is flammable and it must be handled only by competent and responsible operators, under the conditions specified in the safety regulations in force.

R290 (Propane) is a flammable and explosive gas. Like other refrigeration systems, a unit charged with R290 is not serviceable at a consumer level. The use of special tools and proper procedures performed by licensed, trained and qualified professionals is required.

Normal Operating Pressure Range (at ~75°F Ambient)
Once the unit is nearing its setpoint and the system stabilizes, pressures should fall within these ranges:
-**Suction Pressure (Low Side): 15 – 18 PSI**
-**Discharge Pressure (High Side): 80 – 120 PSI**
These readings assume:
Ambient temperature of approximately 75°F
Glycol system has reached near setpoint
No excessive load (e.g., Long door openings, recently added warm pans)

Note: Lower ambient temperatures or systems near SP may show lower suction and discharge readings, while hotter kitchens or longer loops may cause slightly elevated values.

1.5.3 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 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 unit's 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

Transportation or Installation
Roll-thru models also include special interior wood bracing, intended to protect the cabinet during shipment. This bracing should under no circumstances be removed prior to the unit being installed in its final location.

⚠ WARNING Read and review these instructions, in their entirety, BEFORE attempting to disassemble and remove the interior bracing. If either of the diagonal or upper ceiling braces are dropped, they could cause personal injury or damage to the equipment. To disassemble the bracing, first open the doors and carefully remove the banding that holds the two diagonal braces together.

⚠ WARNING The diagonal braces will now be loose and can fall out of position and possibly permit the ceiling corner brace to fall.

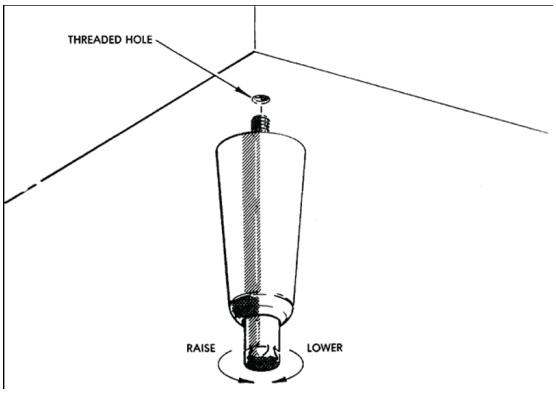
Carefully remove one diagonal brace while supporting the ceiling corner brace, so that it does not fall. Next, remove the ceiling brace, the remaining diagonal brace, and lastly the floor brace - then discard. Repeat as necessary for each section of the unit.

1.6.3 Installing Legs or Casters

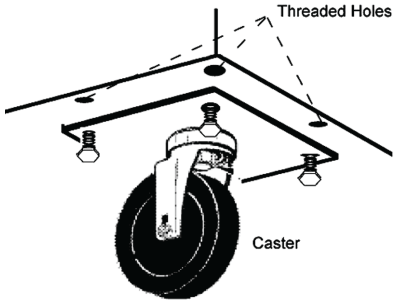
6" High stainless steel legs are supplied standard for all Traulsen reach-in and pass-thru units. Casters in lieu of legs are available as an optional accessory for the same models. These are shipped from the factory packed inside a cardboard box which is strapped to one of the shelves. Remove the nylon strap and open the box, it should contain either four ❹ legs or four ❹ casters and sixteen ⓰ 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 ❹ bolts each to secure them firmly to the cabinet bottom at each corner. The caster bolts are tightened using a 1/2" socket wrench.



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 Installing the Condensate Evaporator
A condensate evaporator is normally supplied on all self contained models (remote models require provision of either a floor drain or an optional condensate evaporator). On those models supplied with a top-mounted evaporator coil compartment, the condensate evaporator is also secured to the top of the cabinet. Check that the condensate pan is properly located underneath the drain tube.

NOTE: The use of the "P-TRAP" supplied is required. Failure to use this component may allow cold air to migrate down the drain line, resulting in condensation on the rear of the cabinet.

A remote model is normally supplied configured for condensate to be run to a floor drain unless purchased with a condensate evaporator. The installer is responsible for making the required extension to the floor drain in accordance with good practice and local regulations.

1.6.6 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.

1.6.7 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).

1.6.8 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.

1.6.9 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.

1.6.10 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).

1.6.11 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.

1.6.12 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.

1.6.13 Replacing the Light Bulb
All Traulsen 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 model.

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.

1.6.14 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

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800.825.8220

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1.6.15 Cleaning the Rail Area

Regular cleaning of the glycol rails and drain area is crucial to maintain optimal system performance, ensure hygiene, and extend the lifespan of the equipment. This process involves routine cleaning, thorough inspections, and proper handling of cleaning tools and solutions.

Start by preparing the unit for cleaning. Power off the equipment and disconnect it from the electrical supply to ensure safety. Allow the glycol rails to reach room temperature to avoid damage from sudden temperature changes. Begin by wiping down the rails with a soft, non-abrasive cloth to remove surface debris, spills, and residue.

Use a food-safe cleaning solution diluted with warm water for cleaning the rails. Apply the solution with a soft-bristle brush or non-abrasive sponge, scrubbing gently along the length of the rails. Focus on corners and edges, where buildup is more likely to occur. After cleaning, rinse the rails thoroughly with clean water using a damp cloth to remove any remaining soap residue. Leaving cleaning agents behind can interfere with the system's performance.

Attention should then be directed to the drain area beneath the rails. Inspect the drain outlet for any blockages or buildup. Carefully remove obstructions using disposable gloves and a small brush. To ensure free-flowing drainage, flush the drain with warm water. For stubborn clogs, a wet/dry vacuum may be used to clear the area effectively.

During the cleaning process, inspect the glycol rails and drain components for any signs of wear, damage, or corrosion. Identifying and addressing these issues promptly will help prevent future malfunctions or inefficiencies.

After cleaning and inspection are complete, allow all components to dry completely. Reassemble the unit, ensuring all parts are securely in place. Once the cleaning is finished and the system is reassembled, reconnect the unit to the electrical supply and restore power.

Avoid using harsh chemicals such as bleach or abrasive cleaners, as they can damage the glycol rails and compromise food safety. Ensure no water or cleaning solution enters the glycol circuit or solenoid valves to protect system integrity.

Regular cleaning prevents bacterial growth, mold, and odors, while maintaining consistent temperature regulation and reducing wear on critical components. Following these cleaning guidelines ensures reliable performance, compliance with hygiene standards, and the longevity of the system. For further maintenance recommendations, refer to the Preventative Maintenance section of this manual.

1.6.16 Service and Replacement Parts Information

Traulsen Refrigeration units are designed to provide reliable performance and long-lasting operation. In the event of a service need or when replacement parts are required, the following resources and procedures are available to ensure prompt and effective support.

Contacting Service Support or Ordering Replacement Parts
For Traulsen TB ,KBP ,Centerline Refrigeration units, our Fort Worth facility, is your primary point of contact for service support and parts replacement.

You can reach us by phone at **800.825.8220** for service assistance or parts inquiries.

Please have your model number and serial number ready when contacting our support team. These details are essential for identifying your unit and ensuring accurate assistance.

Online Resources

Additional service information, manuals, and resources are available through the Traulsen website. To access the support tools, visit **www.traulsen.com** and navigate to the resources tab. From there, you can locate authorized service providers, access service parts manuals, review parts pricing, and register for warranty coverage.

Importance of Accurate Unit Information

When contacting service support, always provide the model and serial number of your unit. This information is typically found on the data plate affixed to the unit. Having these details available ensures efficient troubleshooting, accurate parts recommendations, and faster service resolutions.

General Service Guidelines

For questions related to part compatibility, warranty coverage, or troubleshooting, the Service Finder connects you with authorized technicians. Online parts manuals are an essential resource for verifying part numbers and descriptions before placing an order to minimize delays or errors. For urgent service needs, contacting the Fort Worth facility by phone is recommended for the quickest response.

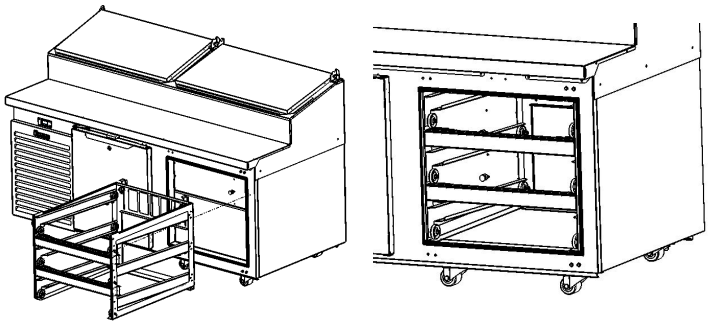
1.6.17 Installing Optional Drawers

Doors are supplied standard on all Glycol System models. However, we have engineered our refrigerator models with a drop-in feature that allows you to easily convert door(s) into two 6" deep drawers or three 4" deep drawers. The door(s) on the refrigerator models can easily be converted to drawers in the field. To begin the process, open the door to its maximum position. Support the non-hinged end of the door so minimum movement occurs. When the bolts from the lower hinge plate are removed, remove the lower hinge plate and then the door from the top hinge bracket plate and then the door from the top hinge bracket. The hinge plate pin and plastic bushing will remain in the top hinge plate.

NOTE: The lower hinge plate is under spring tension.

Once the door(s) have been removed, Insert drawer frame as shown below.

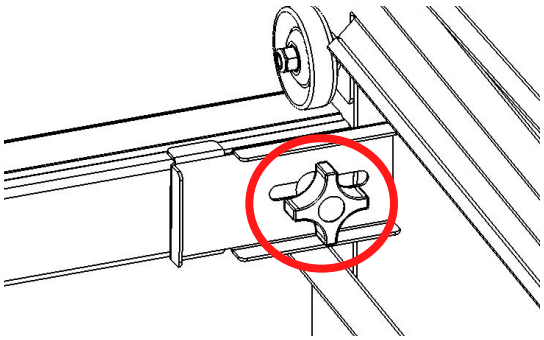
NOTE: Glycol Prep Table model drawings shown below.



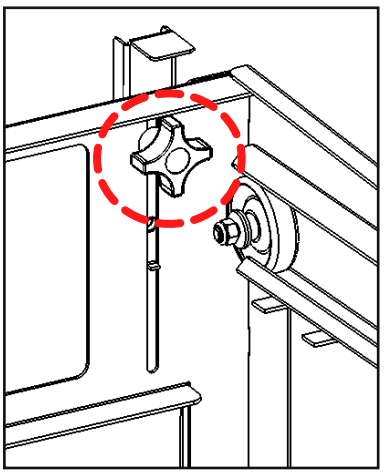
Once the drawer frame has been inserted, the drawer frame module can be installed by tightening the black front and back clamping knobs (2 of each) located on the cross rail locks and liner locks. Slide the front cross rail locks towards the center of the drawer frame module and allow the liner locks to drop down from the top of the liner. Insert the door frame module push towards the back of the unit. The entire frame assembly is now installed and ready for use.

NOTE: Repeat process for multiple drawer inserts.

Drawers	Part Number
Two Drawer 1-1/9 Pan SBS	550-10202-01
Two Drawer 1-1/9 Pan SBS	550-10202-02
Two Drawer 1-1/9 Pan SBS	550-10202-03
Three Drawer 1-1/9 Pan SB	550-10203-01
Three Drawer 1-1/9 Pan SB	550-10203-02
Three Drawer 1-1/9 Pan SB	550-10203-03



Front Clamping Knobs/ Cross Rail Locks



Back Clamping Knobs

1.6.18 Setting Up the Rail

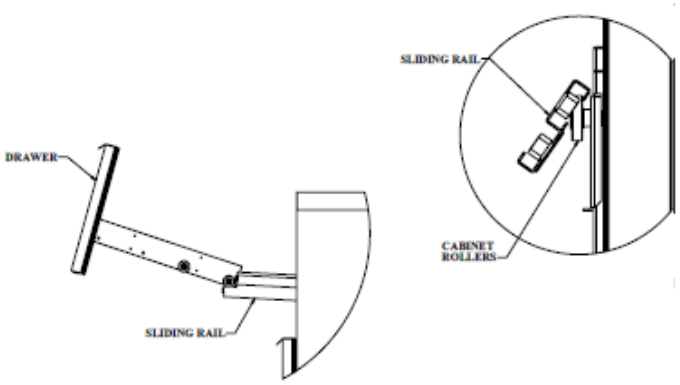
Install pans in all pan spaces in the rail. Rest each pan evenly on the front and back support ledges. The rail will cool without the use of pans. The lid should be closed when not in use.

Allow the unit to reach operating temperature before loading any food product. Load only refrigerated product at 36F or below.

All pan spaces should be filled, even if some pans are empty (even during nighttime storage).

1.6.19 Pans

Standard Glycol System models are designed to operate with Metal pans without the use of adapter bars. Other fractional size pans can be used with optional adapter bars available from Traulsen. 4" deep pans provide the best temperature performance in the rail. Both 2" & 6" deep pans will also perform to NSF7 temperature requirements.



1.6.20 System Startup and Glycol Rail Cooling Time

Upon startup, the system requires approximately 2 to 3 hours (120+ minutes) for the glycol rail to reach its setpoint temperature. During this time, the refrigeration system actively cools the circulating glycol liquid within the rail system. The cooling process ensures the glycol achieves the desired temperature necessary for consistent and efficient operation.

This gradual cooling period allows the glycol to stabilize and distribute evenly throughout the system, maintaining optimal performance once the target temperature is reached. It is important to allow this startup time to complete before loading products onto the rail to ensure proper operation.

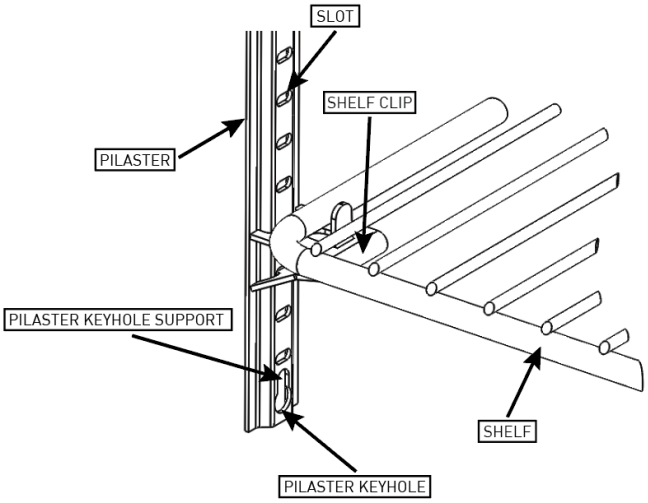
1.6.21 Shelf Clips

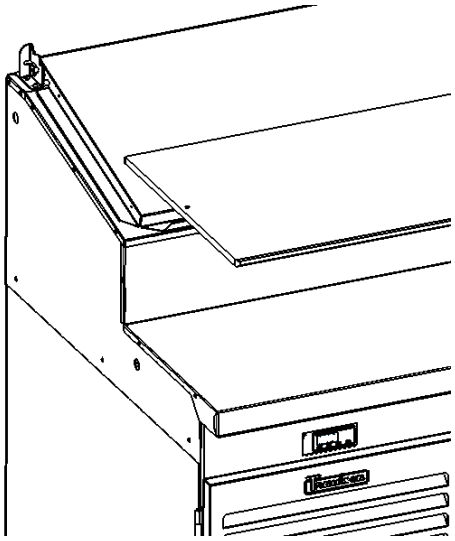
Door Models Setting up the rail Shelves and shelf clips are shipped with the unit. For each shelf, insert Four ❹ shelf clips into the pilaster slots at the same height. The shelf clips have a small projection on top which holds the shelf position and prevents it from slipping forwards. After installing shelf clips on pilasters. Place shelves on clips.

1.6.22 Cutting Board Assembly

On sandwich prep tables, the cutting board may require assembly at the site. Place cutting board on cabinet, properly align & install screws to secure in place. The cutting board is field reversible, reverse process to reverse cutting board.

Note: The lid(s)/cover(s) are installed at the factory. No assembly required.





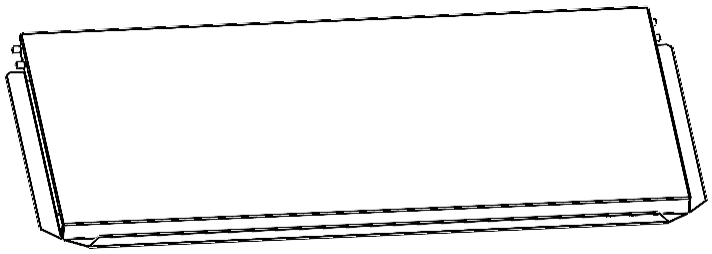
Cutting Board Install

1.6.23 Prep Lid Assembly

Installation for Traulsen Glycol Prep Table Lid Hinge Bracket Replacement.

Cutting Board	Part Number
Length vary by Model	CTBD-BK0XX-XX

Night Cover – Standard and Hinged Options
Glycol units are equipped with night covers to help retain cold air during non-operating hours and maintain energy efficiency. The type of night cover installed depends on how the unit was configured at the time of order.".



Lid Dimensions	Part Number
46" Prep Top Lid	NCVR-BK109
60" Prep Top Lid	NCVR-BK019
91" Prep Top Lid	NCVR-BK026

Bracket is loose:
The following parts would be required to repair all 4 lid hinge bracket on a TB cabinet if the screws just came loose and

"Holes are not stripped out".

Parts Required:

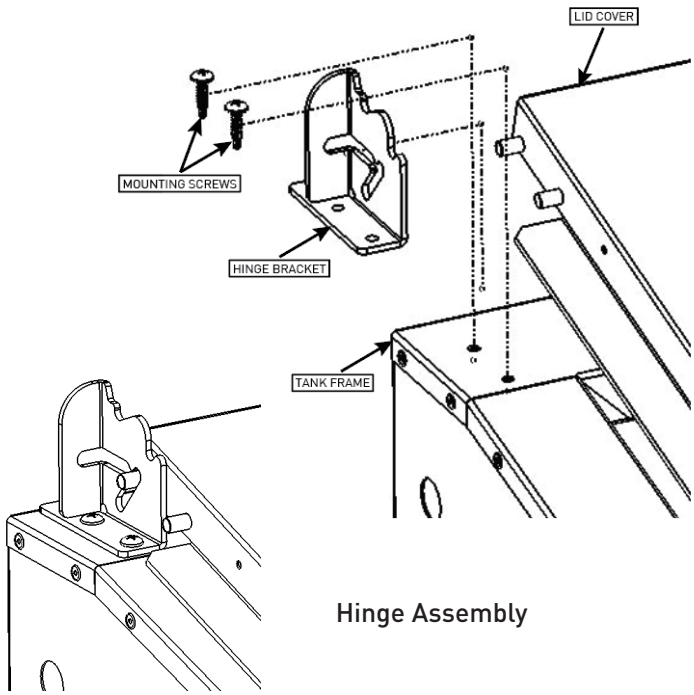
- Left Hinge Bracket P/N 510-10526-00 (2 ea.) - Included in kit
- Right Hinge Bracket P/N 510-10526-01 (2 ea.) - Included in kit
- 10-32 Button Head Screws P/N 351-12798-00 (2 per bracket, 8 total) - Included in kit
- Loc-Tite or similar thread adhesive (Not included in Kit)

Bracket Mounting Plate Stripped:
If the lid hinge bracket screw "Holes are stripped and cannot be reused", use the following procedure: (Drill, Tap, and Larger Dia. screws not included in Kit)

- Drill out the existing holes to the next screw size larger than the original 10-32 mounting screw.
- Tap the new hole for the size of the new screws that are to be used
- Install the lid brackets using the larger screws and seal with Lok-Tite adhesive.

*Another procedure is to drill out the existing holes for a 10-32 Riv-Nut insert and attach the lid hinge bracket with 10-32 screws also using Lok-Tite thread adhesive.
(Rivnuts, Drill, and Installation tools not included in kit)

Note: there is a metal backing plate already installed at the factory inside the metal outer layer of the cabinet for the lid hinge brackets .



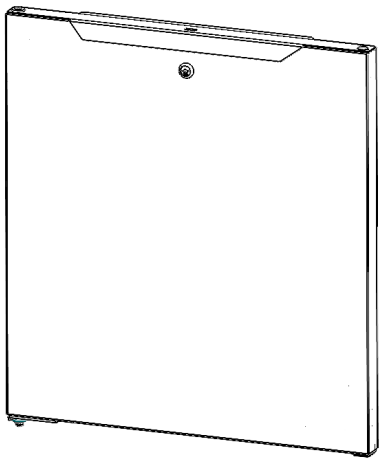
Hinge Assembly

Seal all screws with Lok-Tite tread adhesive when installing.

If additional assistance is needed, please call Traulsen Technical Service @ 1-800-825-8220

Note: The lid(s)/cover(s) are installed at the factory. No assembly required.

1.6.24 Doors
Installation for Traulsen TB046,60,65,71,91,113 models



Doors	Part Number
Door HR/HL Section	Call for part#

Half-Height Doors on Glycol Units

Half-height doors are commonly used on glycol units with multiple compartments or prep stations. These doors allow for sectional access without exposing the entire interior, helping maintain temperature control.

Key Service Considerations:
Door Gaskets:
Inspect regularly for tears, warping, or gaps. Damaged gaskets can cause warm air infiltration, leading to temperature imbalances in individual compartments.

Hinges & Alignment:
Ensure doors are properly aligned and close flush. Misaligned doors may not seal correctly, especially on the lower section where glycol flow is more sensitive to ambient intrusion.

Air Circulation:
Make sure internal airflow is not obstructed by product overloading. Half-height doors depend on steady circulation to maintain even cooling from rail to base.

Condensation or Frost Buildup:
Frequent opening of half-height doors may lead to localized condensation or minor frosting near the door edges. This can be a sign of weak gasket contact or high ambient humidity.

Regular checks of half-height doors help ensure the glycol unit maintains stable temperatures and operates efficiently across all sections.

1.7 Specifications

DIMENSIONS	Height - Overall	Length	Depth	Net Capacity cu. ft
46" Models	42" (106.7cm)	46" (116.8cm)	33.5" (85.1cm)	8.41 (238.1l)
60" Models	42" (106.7cm)	60" (152.4cm)	33.5" (85.1cm)	13.52 (382.8l)
65" Models	42" (106.7cm)	64" (165.1cm)	33.5" (85.1cm)	15.30 (433.2l)
71" Models	42" (106.7cm)	71" (180.0 cm)	33.5" (85.1cm)	15.30" (433.2l)
91" Models	42" (106.7cm)	91" (231.1cm)	33.5" (85.1cm)	23.4" (662.6l)
113" Models	42" (106.7cm)	113" (287 cm)	33.5" (85.1cm)	31.5 (892l)

Table 1.7
TRAULSEN Cabinet Specifications

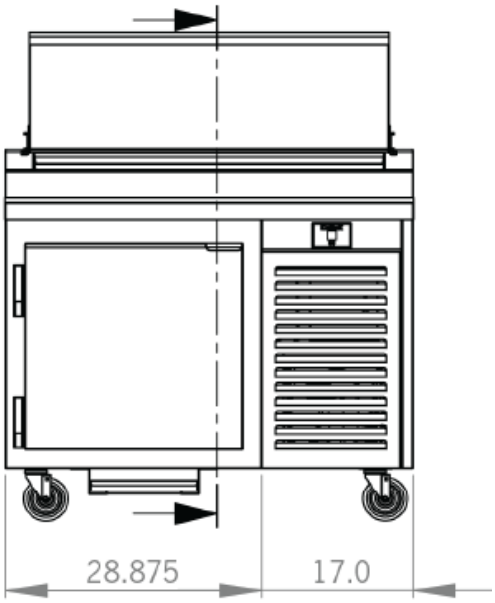


Fig. 1.7a
Front View of 46" Cabinet

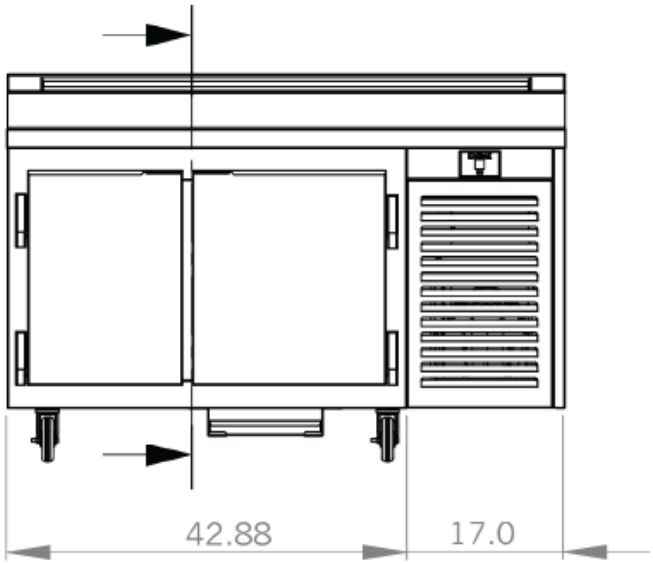


Fig. 1.7b
Front View of 61" Section Cabinet

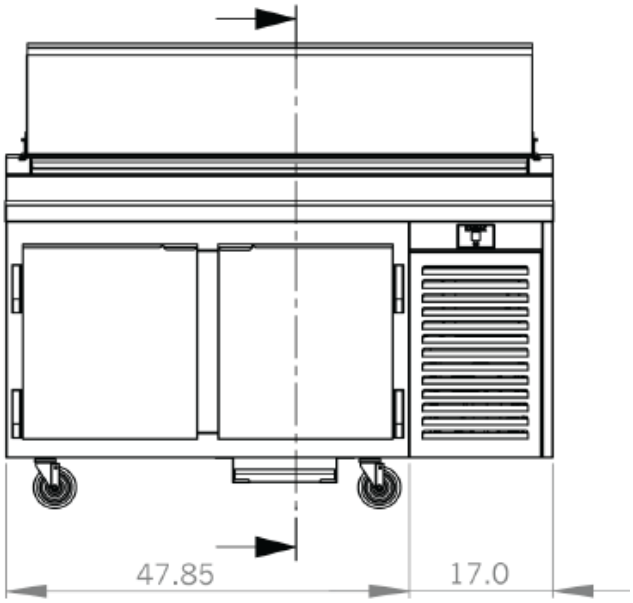


Fig. 1.7c
Front View of 65" Section Cabinet

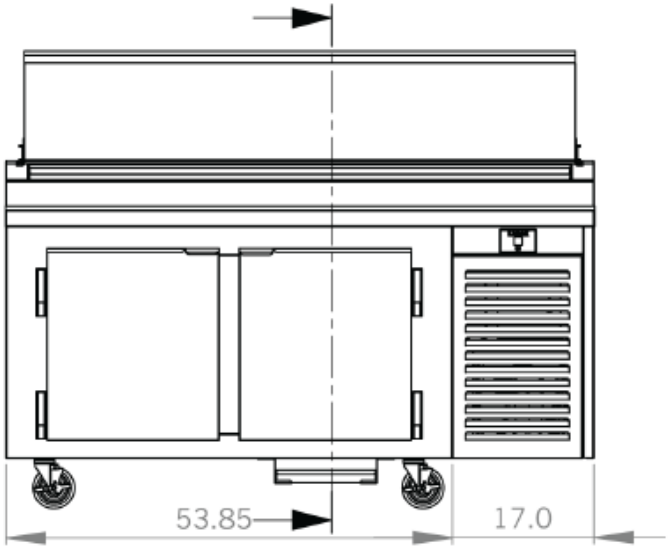


Fig. 1.7d
Front View of 71" Section Cabinet

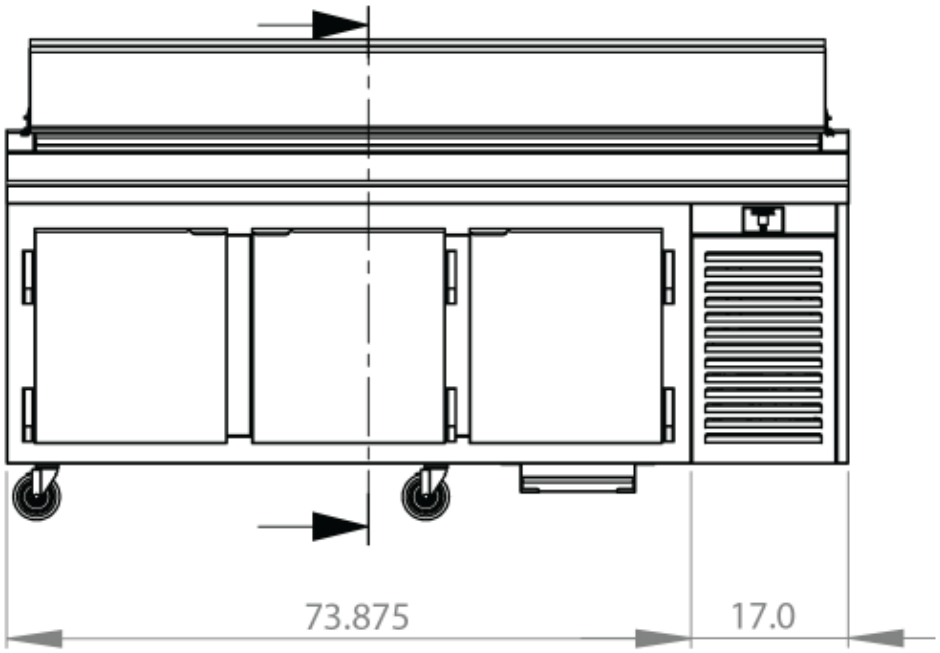


Fig. 1.7e
Front View of 91" Section Cabinet

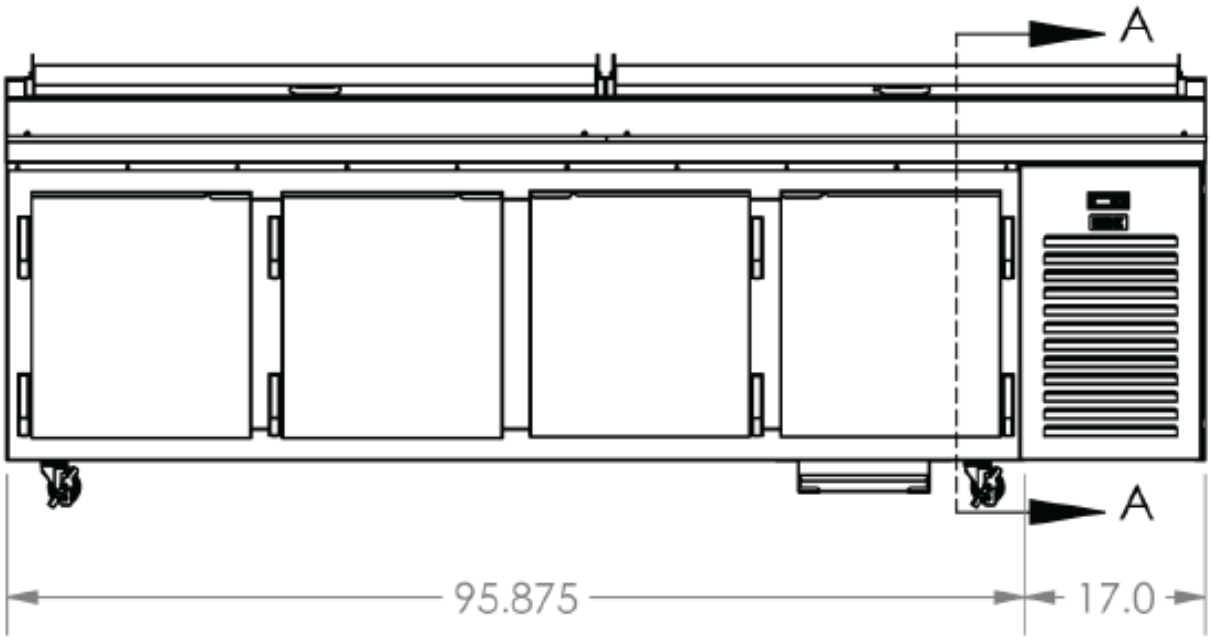


Fig. 1.7f
Front View of 113" Section Cabinet

1.7.1 Prep Table 46” Specifications

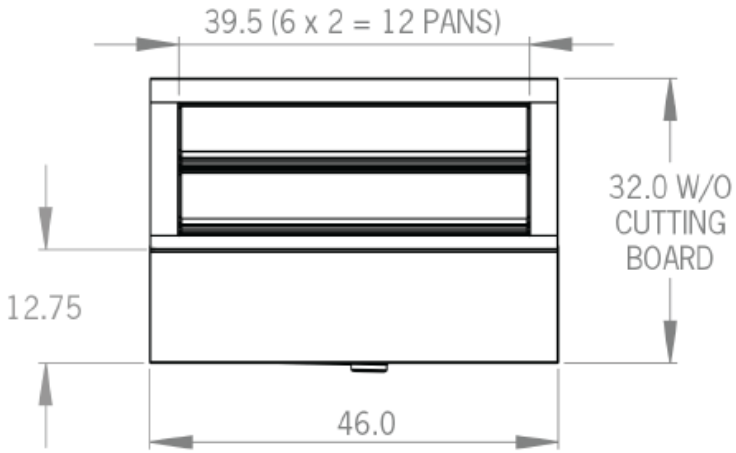


Fig. 1.7.1a
Top View of 46” Cabinets

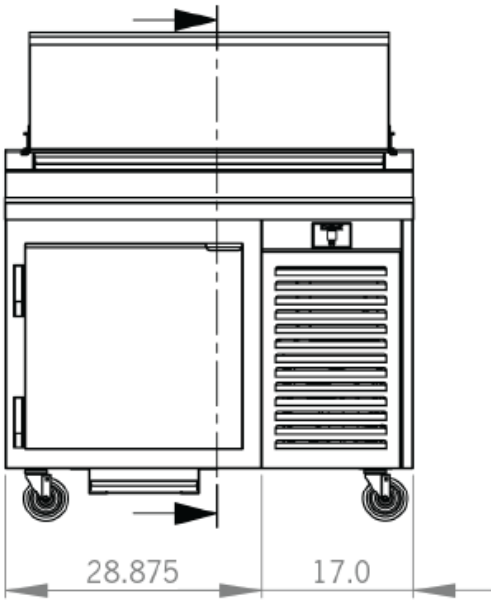


Fig. 1.7.1b
Front View of 46” Cabinets

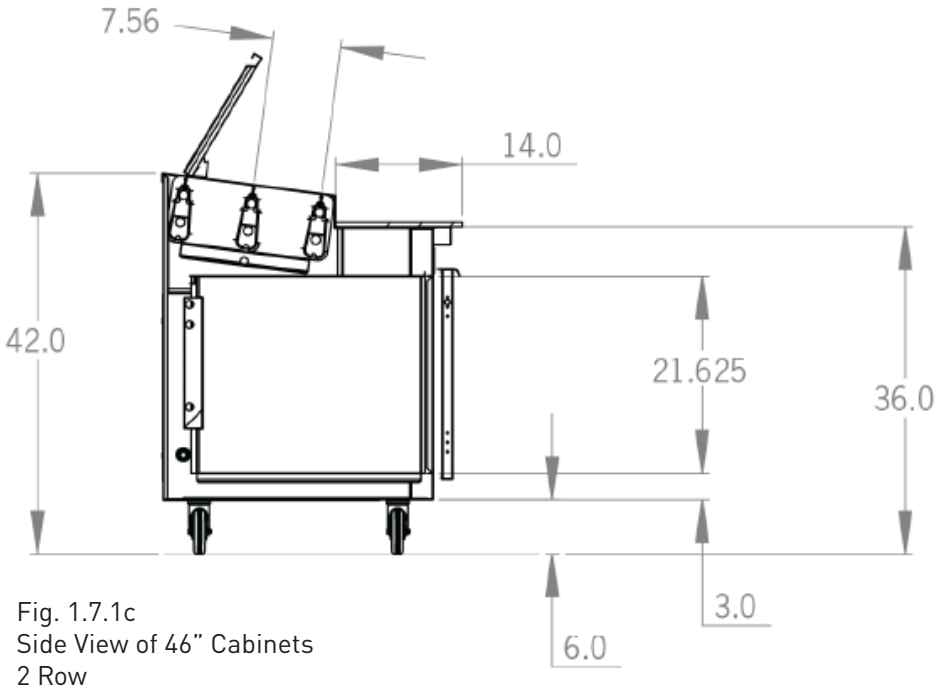


Fig. 1.7.1c
Side View of 46” Cabinets
2 Row

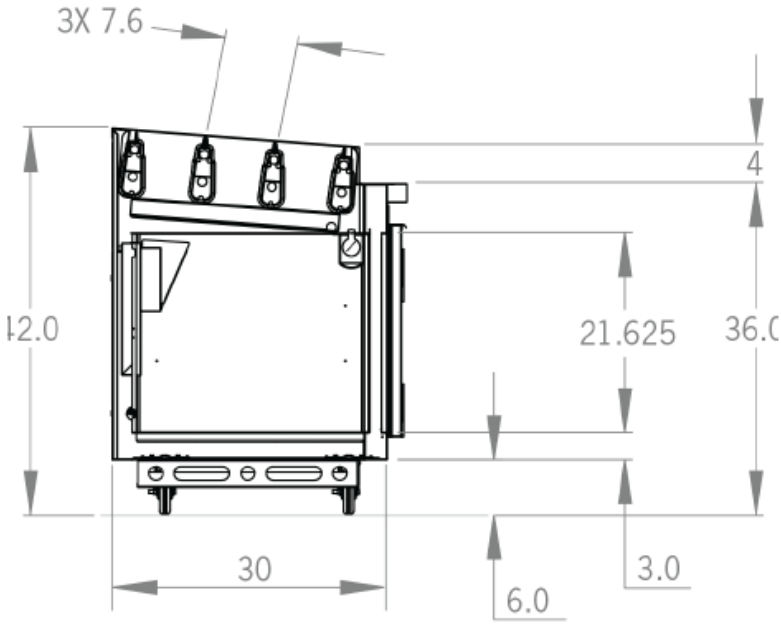


Fig. 1.7.1d
Side View of 46” Cabinets
3 Row

1.7.2 Prep Table 60” Specifications

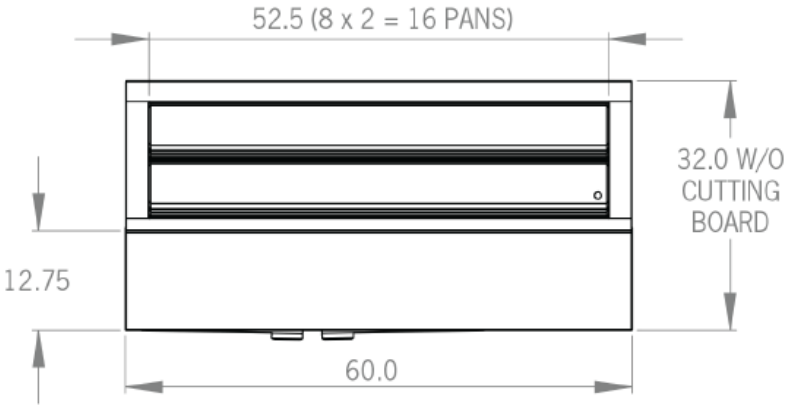


Fig. 1.7.2a
Top View of 60” Cabinets

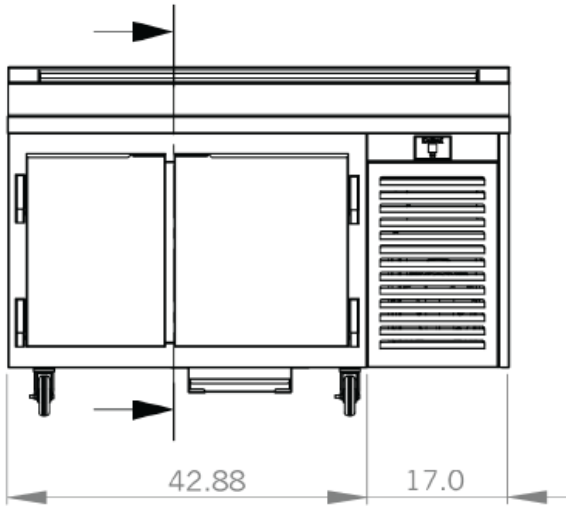


Fig. 1.7.2b
Front View of 60” Cabinets

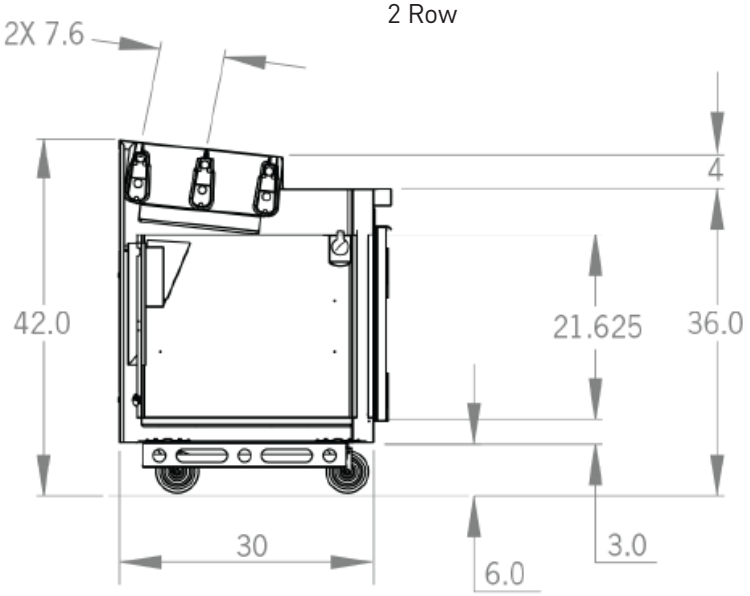


Fig. 1.7.2c
Side View of 60” Cabinets
2 Row

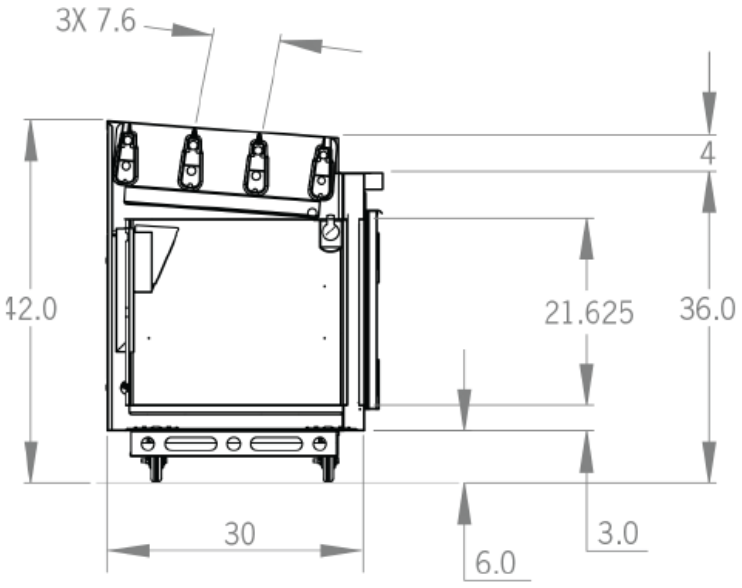


Fig. 1.7.2d
Side View of 60” Cabinets
3 Row

1.7.3 Prep Table 65” Specifications

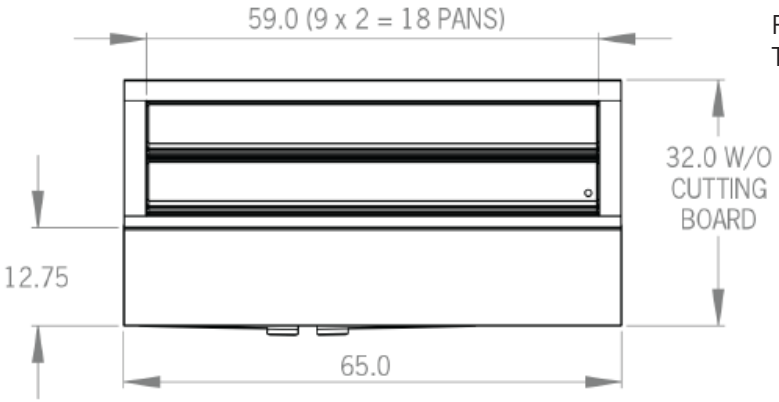


Fig. 1.7.3a
Top View of 65” Cabinets

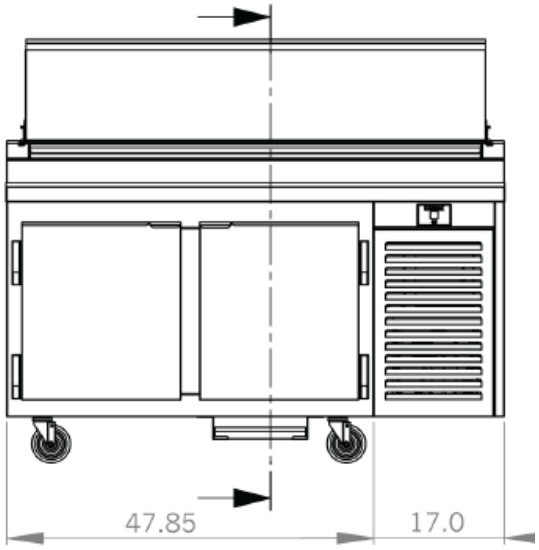


Fig. 1.7.3b
Front View of 65” Cabinets

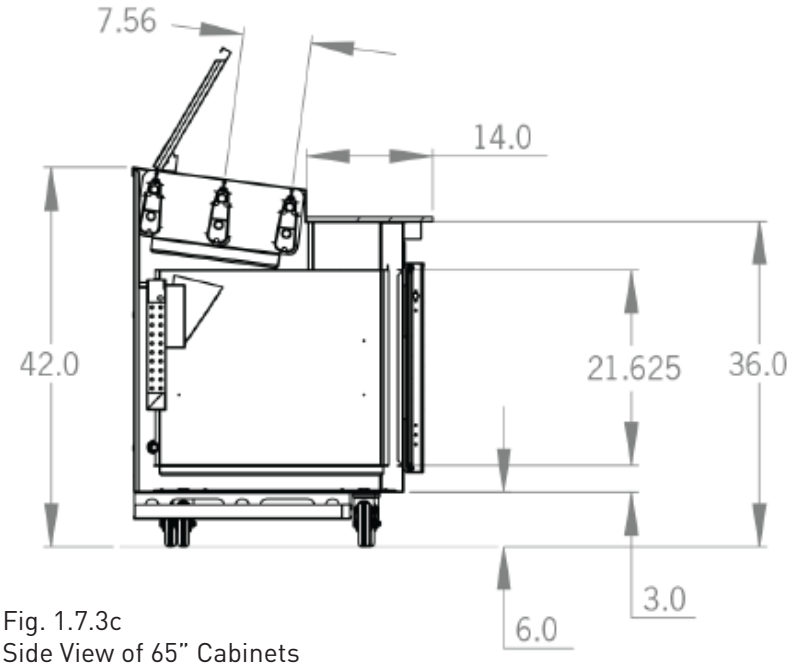


Fig. 1.7.3c
Side View of 65” Cabinets
2 Row

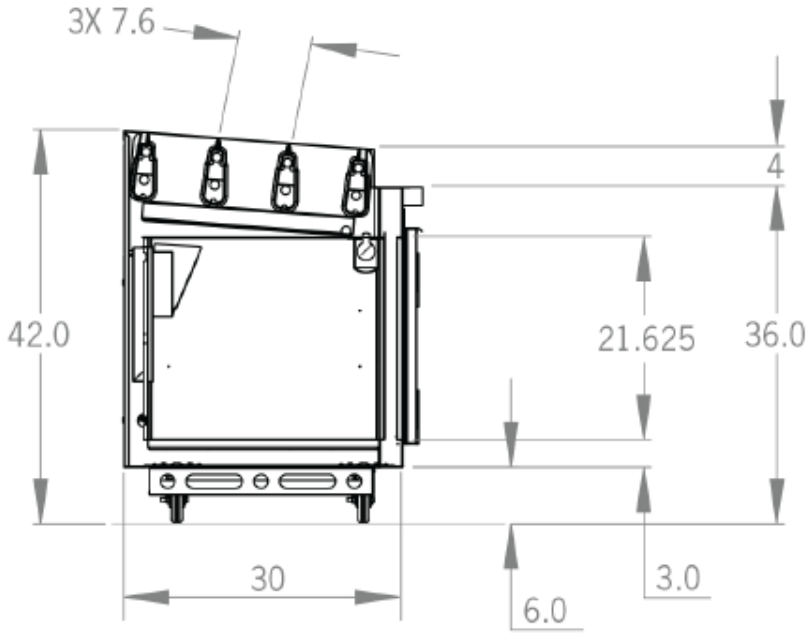


Fig. 1.7.3d
Side View of 65” Cabinets
3 Row

1.7.4 Prep Table 71" Specifications

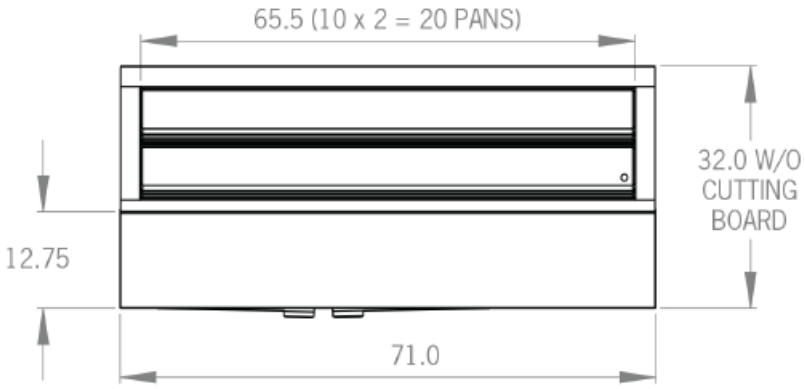


Fig. 1.7.4a
Top View of 71" Cabinets

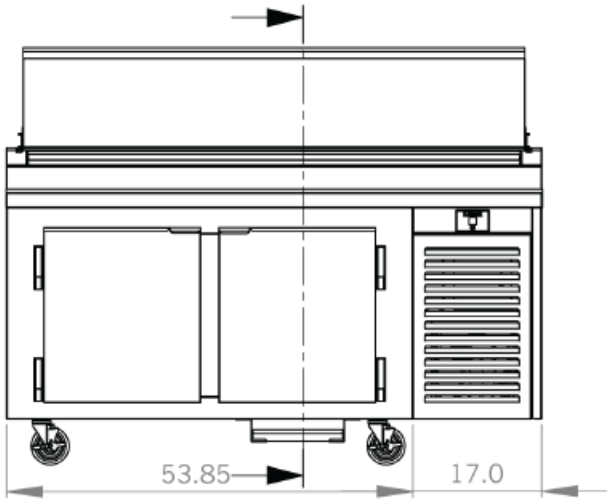


Fig. 1.7.4b
Front View of 71" Cabinets

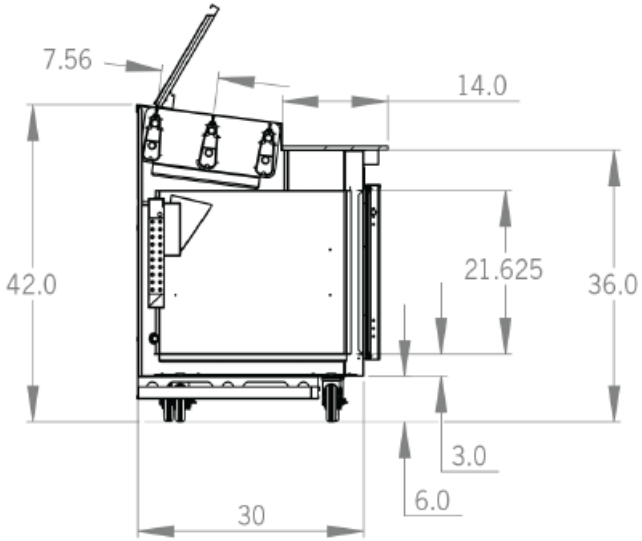


Fig. 1.7.4c
Side View of 71" Cabinets
2 Row

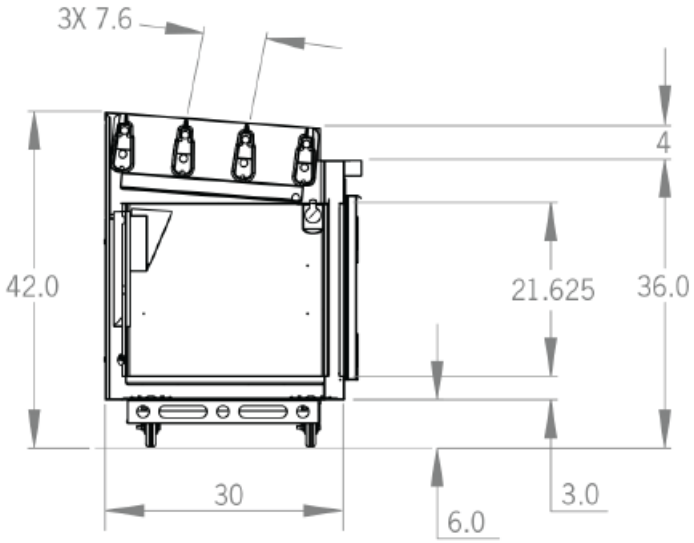


Fig. 1.7.4d
Side View of 71" Cabinets
3 Row

1.7.5 Prep Table 91” Specifications

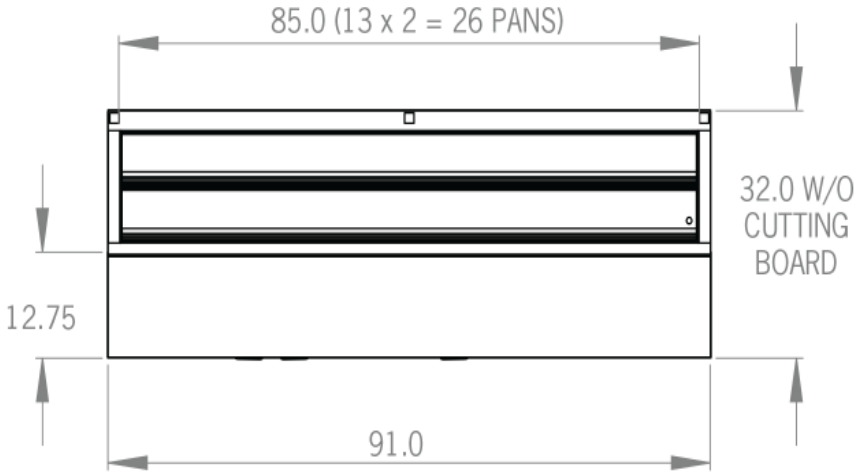


Fig. 1.7.5a
Top View of 91” Cabinets

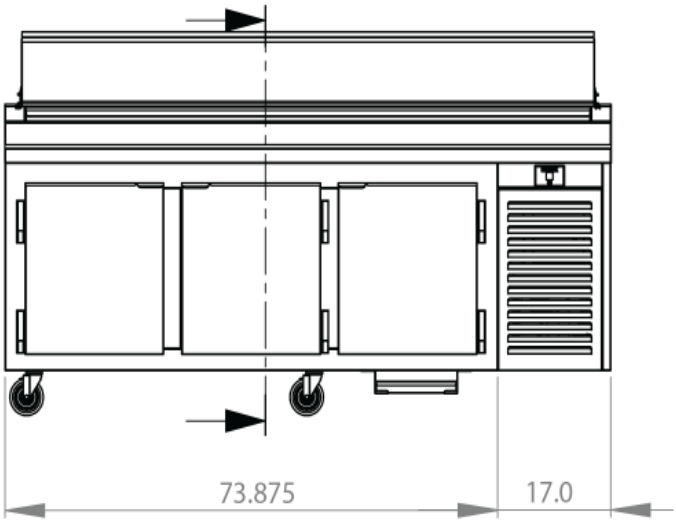


Fig. 1.7.5b
Front View of 91” Cabinets

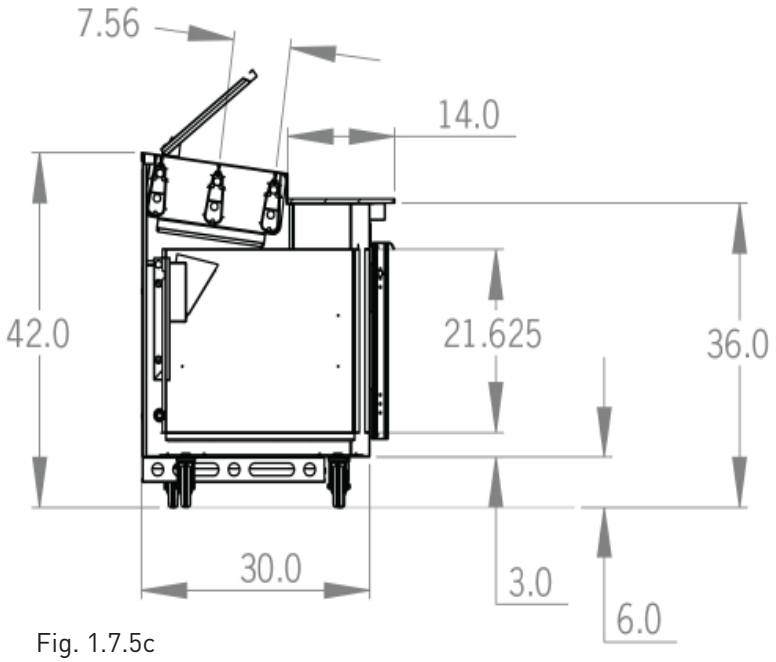


Fig. 1.7.5c
Side View of 91” Cabinets
2 Row

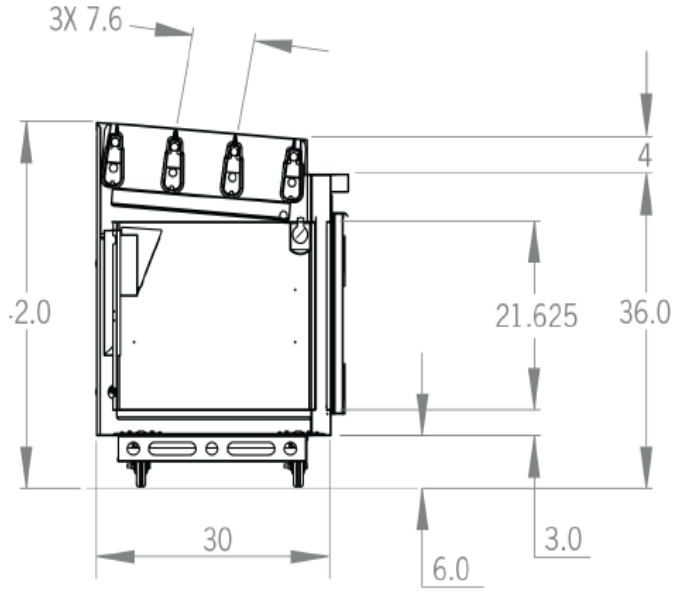


Fig. 1.7.5d
Side View of 91” Cabinets
3 Row

1.7.6 Prep Table 113” Specifications

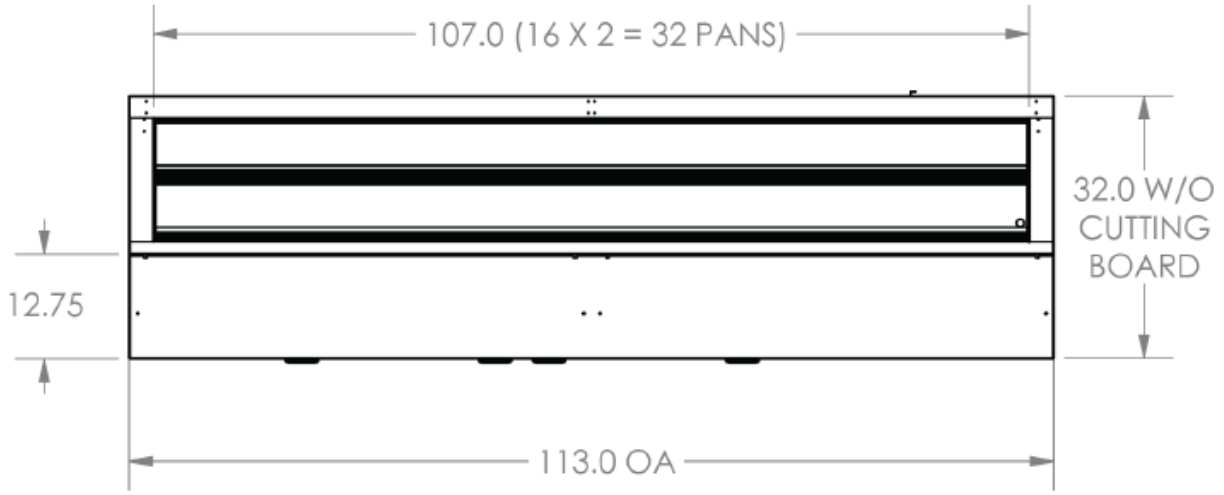


Fig. 1.7.6a
Side View of 113” Cabinets

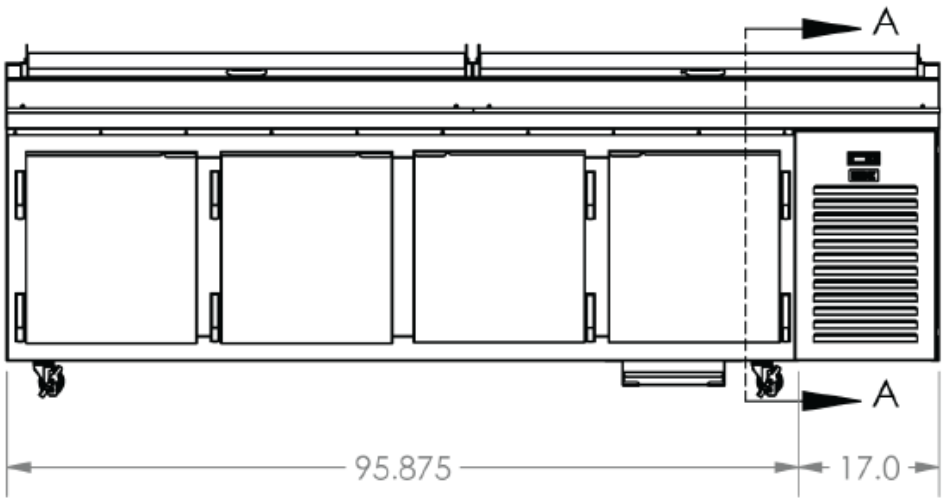


Fig. 1.7.6b
Front View of 113” Cabinets

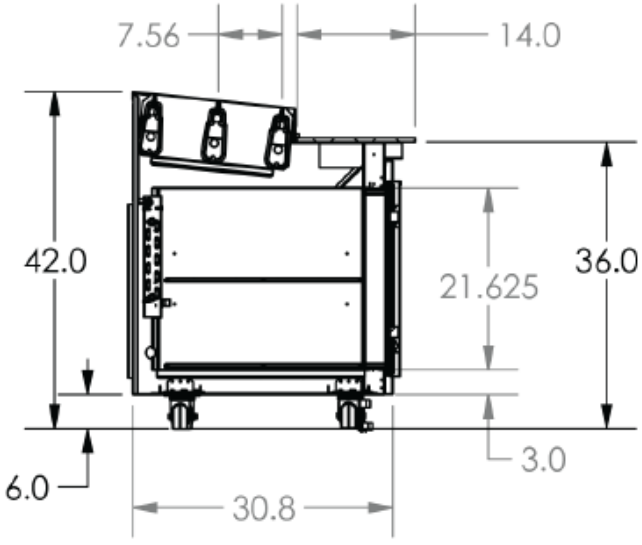


Fig. 1.7.6c
Top View of 113” Cabinets
2 Row

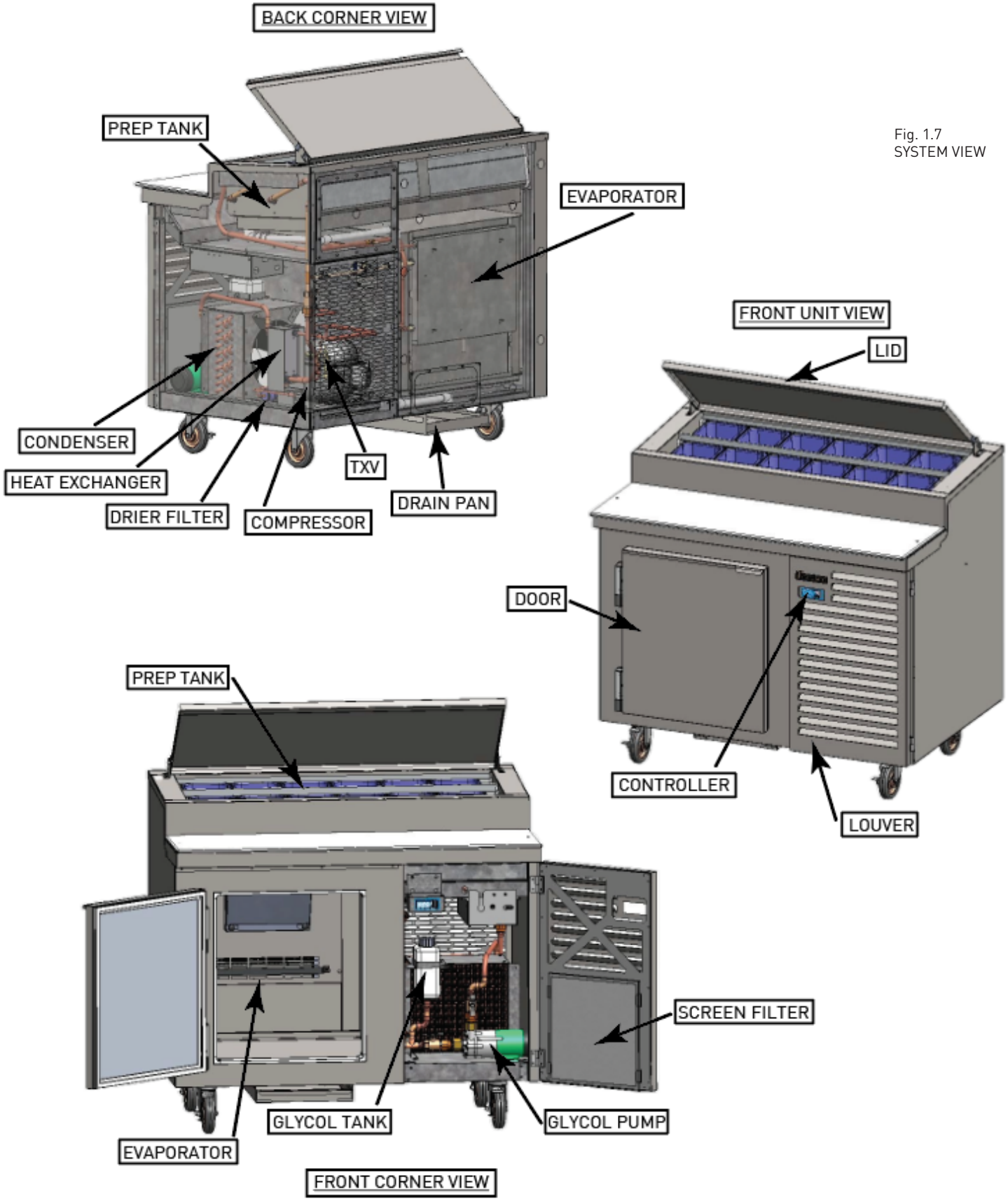


Fig. 1.7
SYSTEM VIEW

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(s)

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. 341-60197-00 - 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.

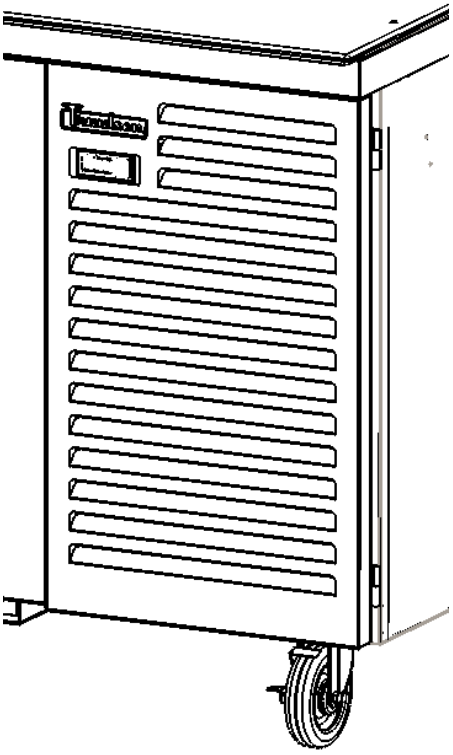
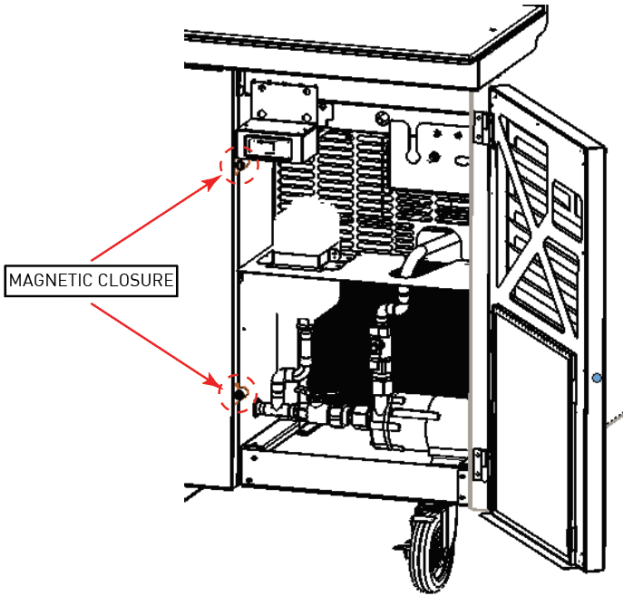
Preparation	  To clean the condenser, first disconnect electrical power to the cabinet and swing outward the front louver assembly. The louver is latched magnetically.
Cleaning	Use a soft bristle brush to remove any dirt, lint or dust from the finned condenser coil, around the compressor and other cooling 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

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. Pay special attention not to lose the door switch actuator button.

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.

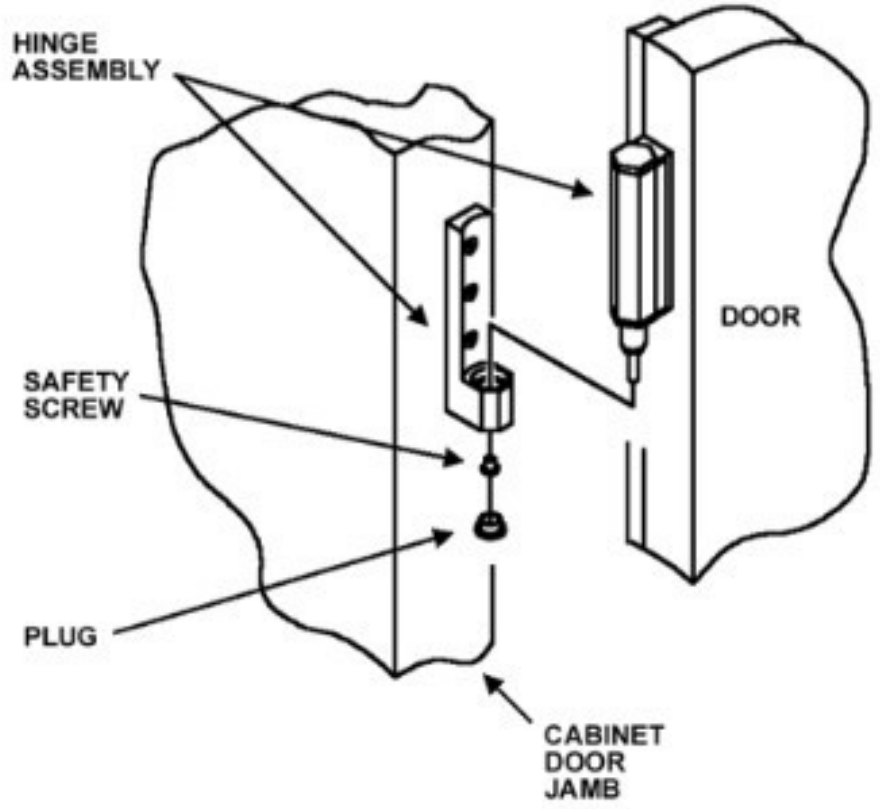
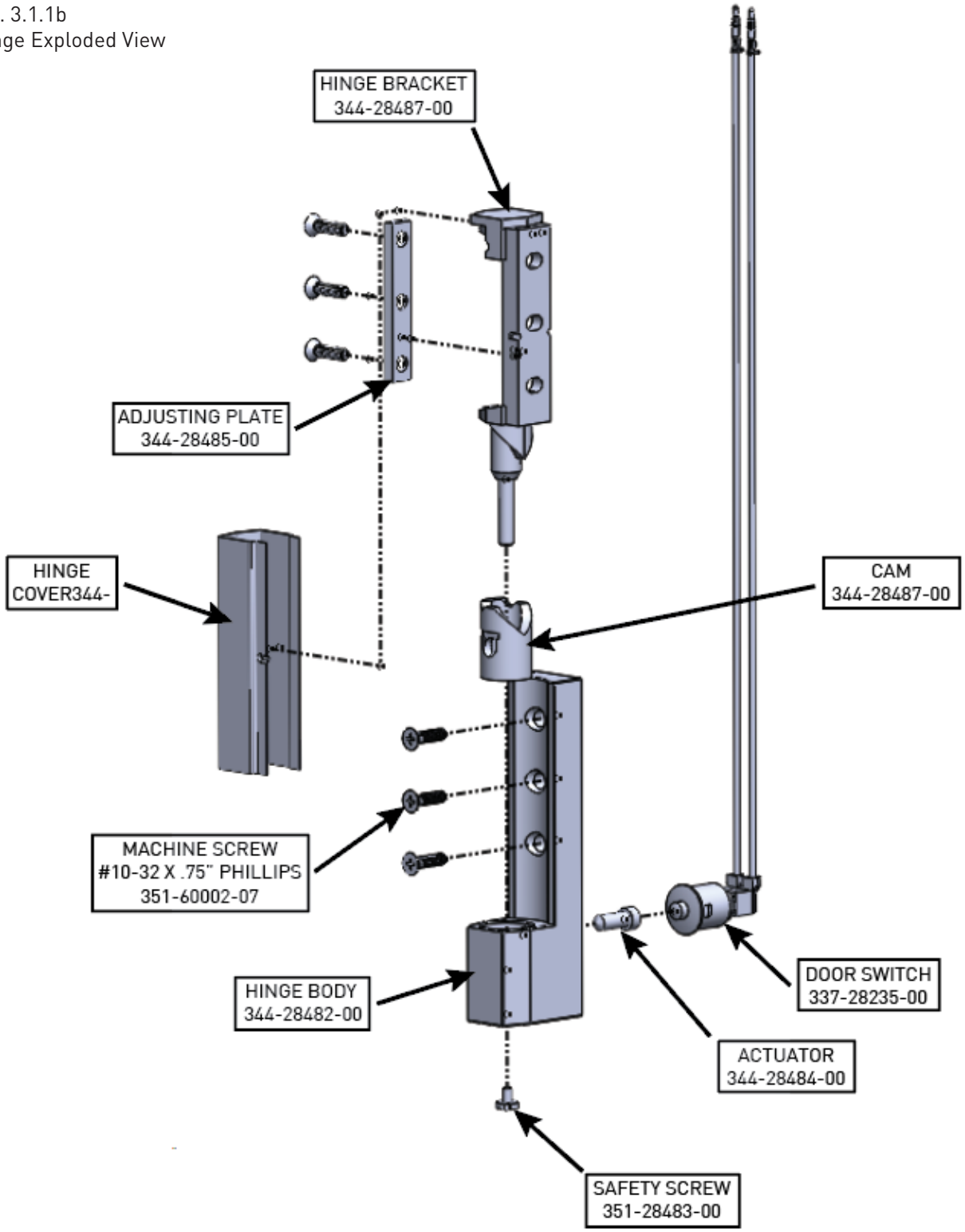


Fig. 3.1.1a
Hinge Assembly

WARNING

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

Fig. 3.1.1b
Hinge Exploded View



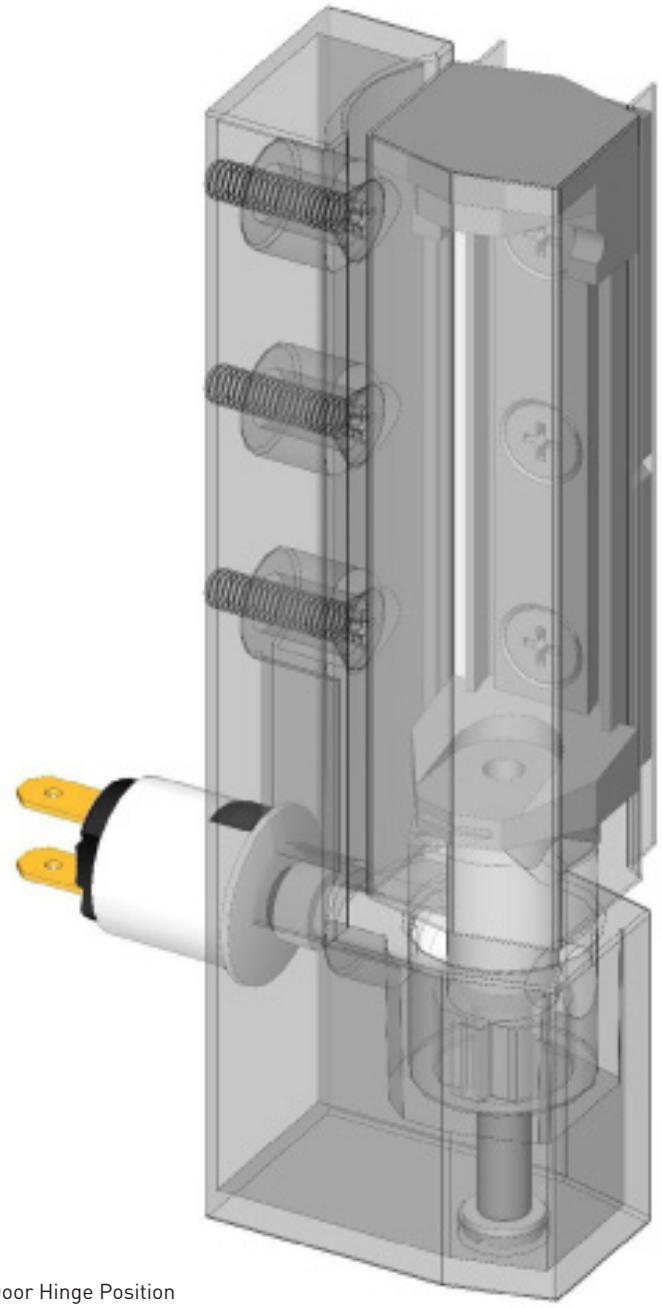


Fig. 3.1c
Closed Door Hinge Position

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

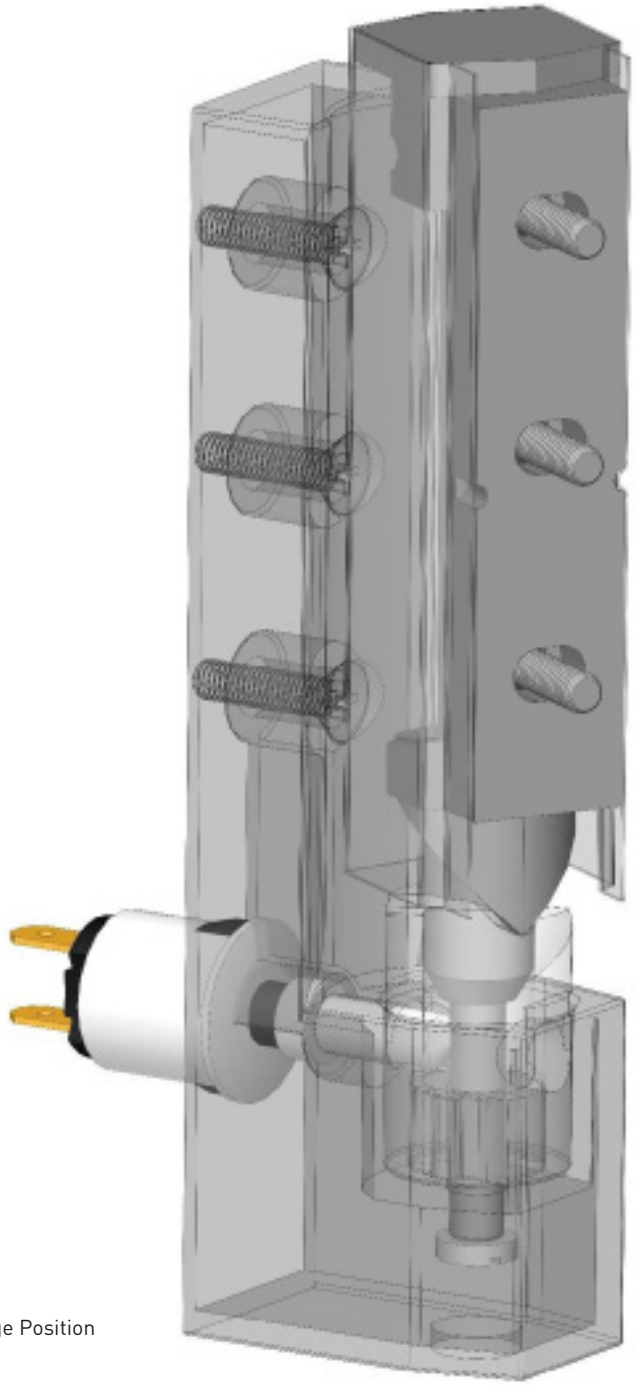


Fig. 3.1d
Open Door Hinge Position

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 situations 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.

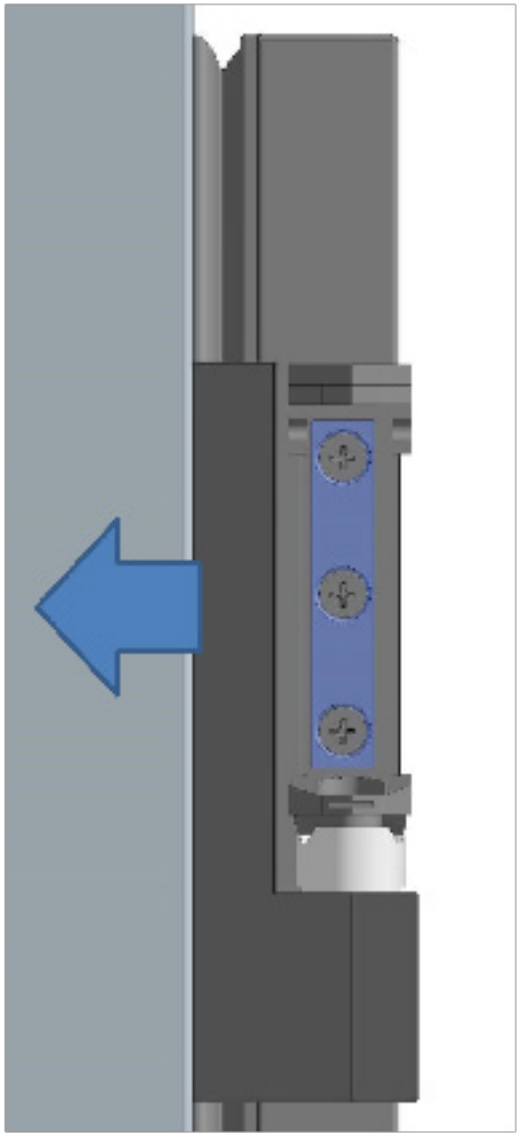


Fig. 3.2a
Door Adjustment Inward

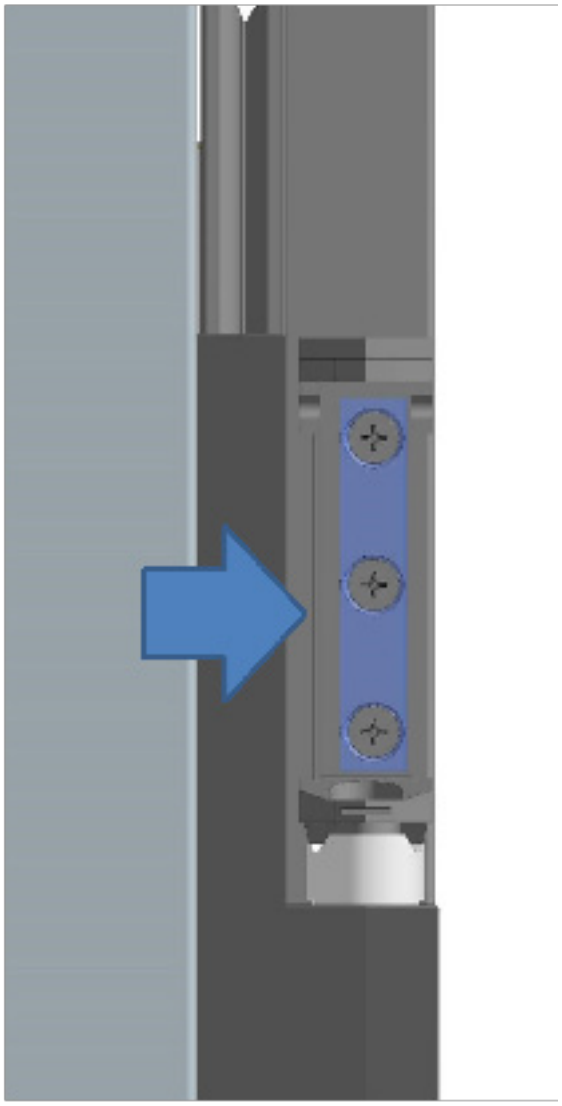


Fig. 3.2b
Door Adjustment Outward

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.

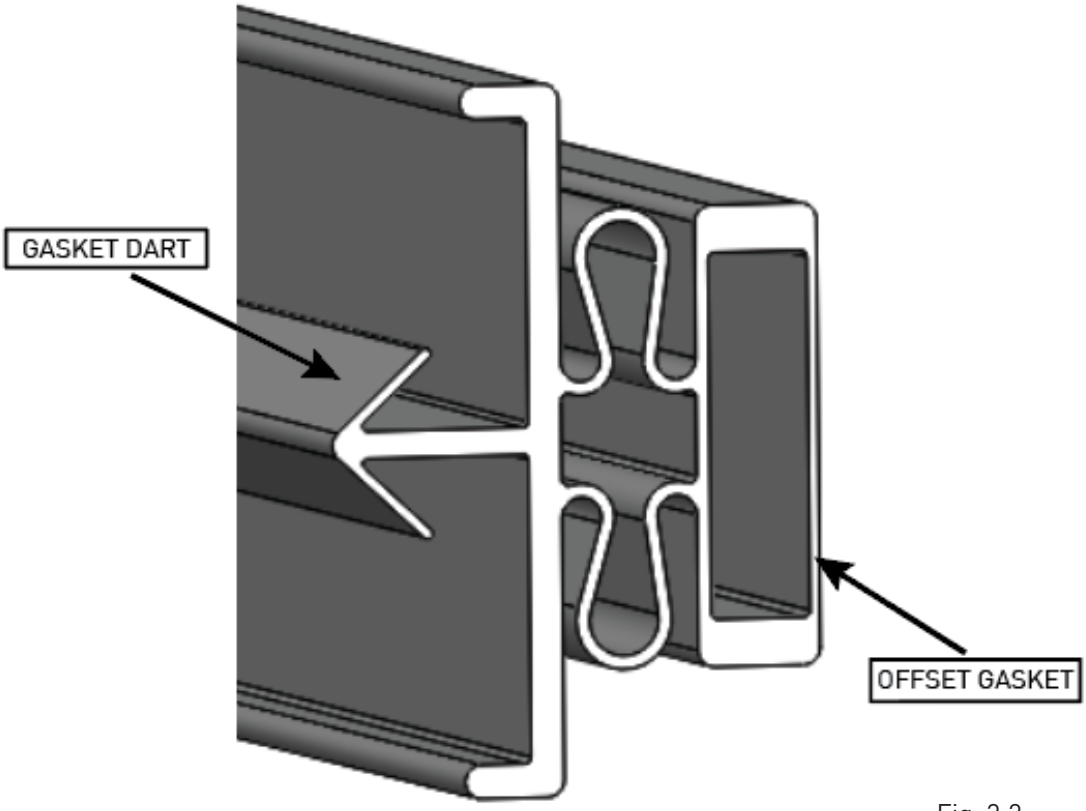


Fig. 3.2
Gasket Section View

Description	Part Number
Half-Height Door Gasket (21-7/8" x 19-1/2")	Call for part#

Table 3.3
Door Gasket Part Number

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

3.4 Traulsen Glycol System

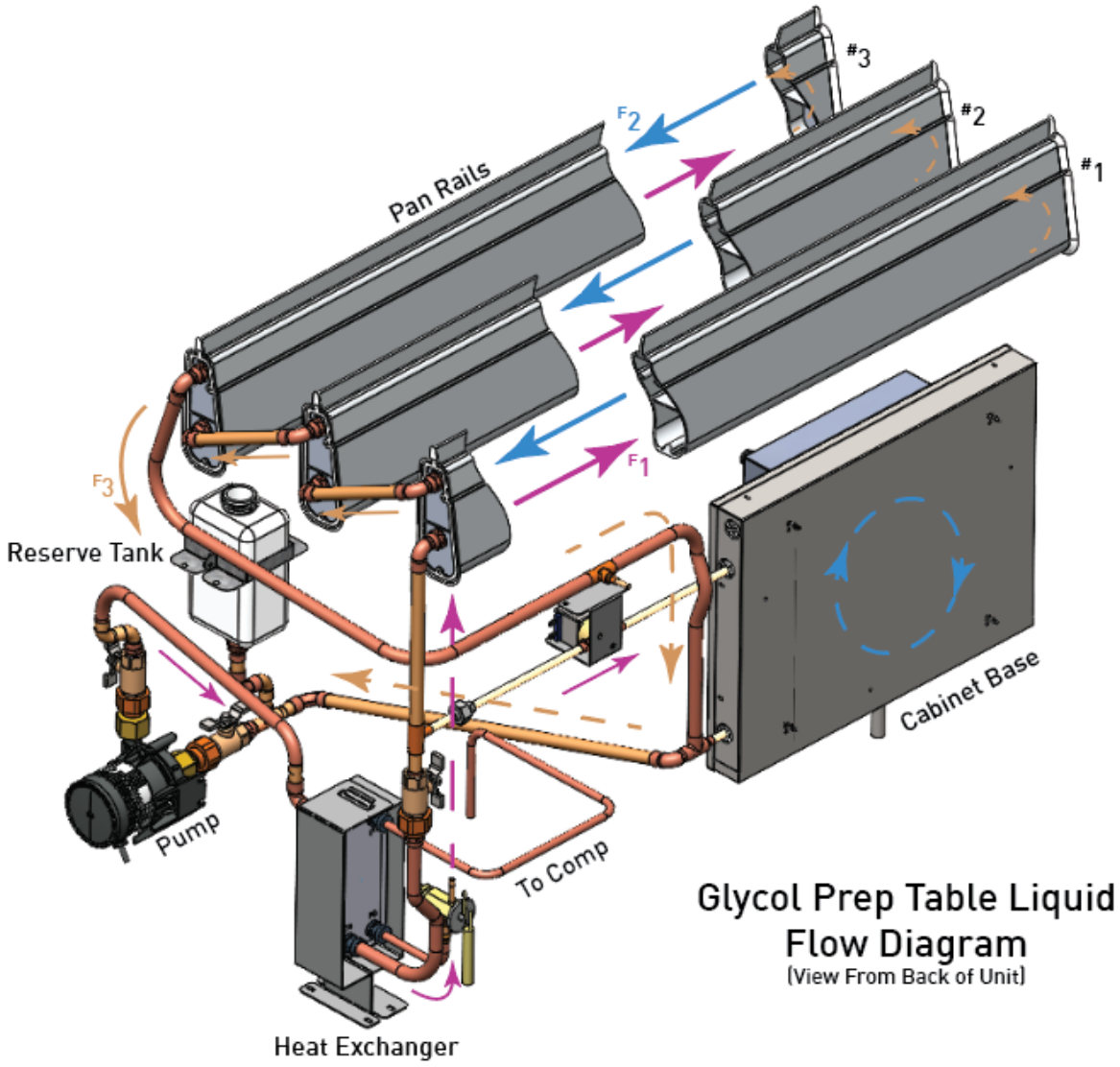
How The Traulsen Glycol KBP/TBO Series System Works

The Traulsen KBP and TB series glycol tables operate with a specialized refrigeration and glycol circulation system designed to keep food items at optimal temperatures. Here's a detailed breakdown of how this system works:

System Overview

The glycol system in the Traulsen KBP/TB series tables uses a glycol solution that continuously circulates through the cooling rail.

This solution is pumped in a closed-loop system, flowing from the reservoir through the rails and back to the heat exchanger. The system is engineered to ensure consistent temperature control across the rail, making it suitable for maintaining food safety standards in demanding environments.



Glycol Prep Table Liquid Flow Diagram
(View From Back of Unit)

3.5 Glycol System Circuits

How the Refrigeration and Glycol Circuits Work Together

Refrigeration Circuit: The refrigeration circuit is responsible for cooling the glycol solution. This circuit includes a compressor, condenser, expansion valve, and evaporator, where the heat exchange occurs between the glycol and refrigerant.

Glycol Circuit: The glycol circuit is a closed-loop system where glycol flows through the table rails. Glycol is circulated by a pump that ensures constant movement through the rail system, providing uniform cooling along the table.

Heat Exchanger Function
The refrigeration circuit and the glycol circuit meet within the heat exchanger. Here's how the cooling exchange happens:

The compressor in the refrigeration circuit compresses the refrigerant, which then travels to the heat exchanger after passing through an expansion valve.
As the refrigerant flows through the heat exchanger, it absorbs heat from the glycol, effectively cooling it down. The glycol, now cooled, circulates back into the rail system to maintain an even temperature.

Continuous Glycol Pumping Action: **The glycol solution flows in a continuous cycle, pumped through the rails to ensure a stable and even temperature throughout the system. This continuous movement is essential to prevent hot spots and maintain consistent cooling**.

Compressor Control by Green Sensor/Rail Sensor: The compressor is managed by a green temperature sensor located at the heat exchanger's outlet, insulated with thermal tape to ensure accurate temperature readings. This sensor monitors the temperature of the glycol solution as it exits the heat exchanger:

When the sensor detects that the glycol temperature has risen beyond a set threshold, it signals the compressor to turn on, initiating the cooling process in the refrigeration circuit.

Once the desired glycol temperature is reached, the sensor signals the compressor to turn off, conserving energy while maintaining the optimal cooling temperature.

This controlled cycling of the compressor, paired with the continuous glycol flow, ensures that the rail system remains within the ideal temperature range to keep food items safe and ready to serve.

Cabinet Temperature Control via the Blue Sensor
The cabinet temperature is regulated by the blue sensor, which is strategically positioned behind the evaporator panel inside the unit. This sensor is responsible for monitoring the return air temperature within the cabinet and communicating with the control system to maintain the desired setpoint.

The **blue sensor** activates the solenoid valve, allowing refrigerant to flow through the evaporator coil. As the refrigerant absorbs heat from the return air passing over the coil, the cabinet temperature is reduced to the setpoint defined by the user. Once the desired temperature is achieved, the sensor signals the control system to close the solenoid valve, stopping the refrigerant flow and preventing over-cooling.

To access the **blue sensor** for service or inspection, any shelving within the cabinet must be removed, followed by the removal of the evaporator panel. The panel is secured with four screws and must be handled carefully to avoid damage. The sensor is clipped below the evaporator coil in a plastic holder, ensuring accurate temperature readings in the return air stream.

Proper functioning of the blue sensor is critical for maintaining consistent cabinet temperatures and preventing fluctuations that could compromise product integrity.

3.6 Troubleshooting Rail System

Troubleshooting Rail Temperature Issues in Traulsen KBP/TB Series Glycol Tables
The following outlines common causes for issues with rail freezing or insufficient cooling and recommended actions for each scenario.

Causes of Rail Freezing

Sensor Failure:

- : The **Green sensor/Rail temp** sensor at the heat exchanger outlet regulates the compressor's operation based on the glycol temperature. If this sensor fails, it may cause the compressor to run continuously, resulting in excessive cooling that can freeze the glycol in the rail.

Recommended Action: Replace any faulty sensors/parts to restore accurate temperature control. **See the section "Green Sensor Relocation and Replacemen**t" for detailed instructions on sensor replacement and positioning.

Cabinet or Rail Too Cold Due to Ambient Temperature

- If the unit is operating in a particularly cold environment, or if the cabinet thermostat is set too low, this can lead to the rail reaching below temperatures. This environmental effect may freeze the glycol and prevent optimal circulation.

- Recommended Action: Adjust the thermostat to a slightly higher setting or relocate the unit to a temperature-controlled environment if feasible.

Heat Exchanger Failure (Frozen Heat Exchanger)

The heat exchanger is responsible for cooling the glycol through interaction with the refrigerant. If the copper line set within the heat exchanger freezes, it can disrupt the heat exchange process, causing the glycol to over-cool and freeze in the rail.

Pump Operation:

Check the glycol pump for proper operation. Verify that the pump is drawing between **0.5 to 1 amp.**

Glycol Solenoid Valve:

Ensure the solenoid valve is operating correctly by checking for voltage.120v

If needed, use a magnet to force the valve open and confirm proper function.

Following these steps will help identify and address any issues with the heat exchanger that could lead to freezing in the glycol rail.

Recommended Action: Inspect the refrigerant level, check for obstructions in the expansion valve, and verify that the compressor is functioning correctly. Addressing these issues can prevent freeze-ups and restore the rail to the correct temperature range.

Causes of Insufficient Cooling in the Rail

If the rail is not reaching the desired cooling levels, consider the following:

Faulty or Failed sensor- Relocate or replace sensor in sensor clip located on the heat exchanger outlet, this sensor is located under insulated taping on the heat exchanger outlet copper piping.

3.7 Relocating the Green Sensor to the Overflow Tank for Optimal Temperature Accuracy (pump in the front) - Green Sensor 334-60083-02

To improve glycol temperature accuracy, the green sensor can be repositioned from its standard location on the heat exchanger outlet to the overflow tank, where it will monitor glycol flow more effectively. For accurate readings, placing the sensor in the glycol tee allows direct contact with actively circulating glycol. This method offers better temperature control—but only if the copper line from the bottle is straight.

If the unit has a 90° copper fitting, this setup won't work, and the sensor must be reinstalled on the heat exchanger. (see pg 40 green sensor purpose)

Materials Required:

- Power drill (for straw method)

- Straw or flexible tubing or brazing rod

- Small zip tie

- Insulation tape (for re-installation if returned to the heat exchanger)

3.8 Sensor Re-Location see fig 3.8

Drill a Hole in the Overflow Tank Cap - Carefully drill a small, precise hole in the cap of the overflow tank, sized to allow the New sensor wire to pass through smoothly.

Feed the Sensor Using a Straw - Slide a straw or suitable flexible tubing over the sensor wire, ensuring the straw extends beyond the overflow tank cap.
- **Gently insert the straw through the drilled hole and guide it down into the overflow tank, positioning it so that the sensor reaches the Tee fitting where glycol liquid is circulating.**

Position and Secure the Sensor - Once the sensor is seated within the Tee fitting, carefully withdraw the straw, leaving the sensor in the optimal **position within the glycol flow**.

Install Overflow Tank Cap - Reseal the cap on the overflow tank and ensure the drilled hole is securely sealed to prevent any contaminants from entering the system....Note the hole in top will be where the sensor feeds through.

This same process can be used with a Brazing Rod - Prepare the Sensor and Brazing Rod*:
- Securely attach the green sensor to the end of a brazing rod using a small zip tie, ensuring it is stable and properly positioned on the rod.

Insert the Brazing Rod - Guide the brazing rod, with the sensor attached, down through the overflow tank until the sensor reaches the Tee fitting, where it will interact directly with the glycol flow.

Secure the Brazing Rod in Place - Leave the brazing rod in position to hold the sensor securely at the Tee. This setup maintains the sensor's alignment with the glycol flow for consistent readings.

3.8a Reinstalling the Green Sensor on the Heat Exchanger Outlet see fig 3.8e

The Green Rail Sensor **must be returned to its original mounting location beneath the factory-installed clip on the heat exchanger**. Once installed, the sensor must be fully insulated to ensure accurate temperature feedback. Proper placement and insulation are critical for maintaining precise glycol temperature monitoring and overall system performance.

Remove the Sensor from the mounting clip - unplugging also from the Board (Green Connection)

Remount the Sensor on the Heat Exchanger Outlet - Attach the sensor onto the clip on heat exchanger,using the original mounting clip to secure it.

Re-insulate the Sensor - After attaching, insulate the sensor and surrounding heat exchanger thoroughly to ensure accurate temperature readings and prevent heat interference.

These procedures ensure precise sensor placement of the Green Rail Sensor part#, providing improved temperature monitoring of the glycol system for optimal operational accuracy.

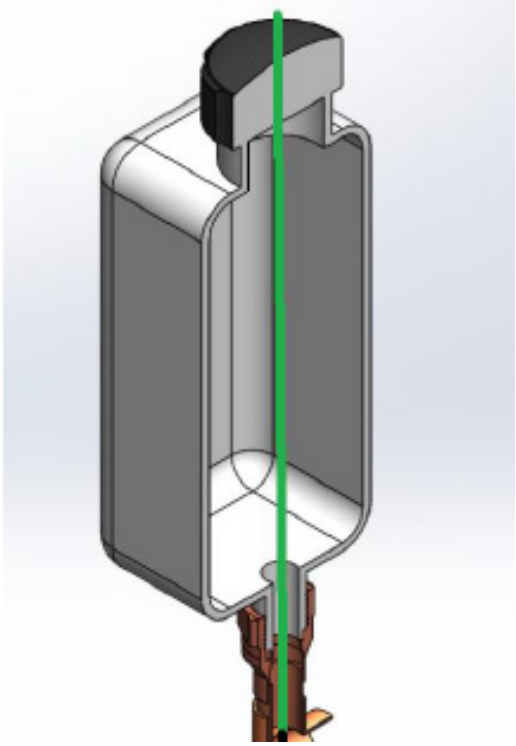


Fig 3.8 Re-locating Glycol Sensor

Multi-Functional Role of the Green Sensor in System Operation

The glycol system operates in a continuous cycle to maintain precise temperature control for both the rail and the base cabinet. The following breakdown explains each stage of operation, highlighting the role of the green probe and system functionality during defrost.

Initial Cooling Cycle

When the system starts, the condenser turns on to chill the heat exchanger using refrigerant. This cooling effect is transferred to the glycol, which is then circulated by the pump through the heat exchanger, rail system, The glycol flows consistently to ensure even temperature distribution across all components.

Glycol Temperature Range: 27°F to 29°F

As the glycol cools to 27°F, the condenser turns off, allowing the glycol to warm naturally to 29°F. At this point, the condenser activates again to lower the glycol back to 27°F. This cycle ensures the rail system and base cabinet maintain the appropriate operating temperature, preventing over-cooling or freezing.

This cooling and warming process repeats three times, controlled by the green probe, which monitors glycol temperature to ensure precision. The consistent cycling also prevents frost buildup on components during normal operation.

Defrost Cycle: Glycol Warms to 35°F

On the fourth cycle, the system allows the glycol to warm to 35°F. This temporary temperature increase facilitates defrosting by melting any frost accumulated on the rail system and evaporator coil.

During this cycle, the green probe remains active, continuously monitoring glycol temperature to confirm accurate operation. Despite the defrost process, glycol flow and circulation remain uninterrupted, ensuring the system transitions seamlessly back to normal cooling.

Base Cabinet Temperature Control see fig below

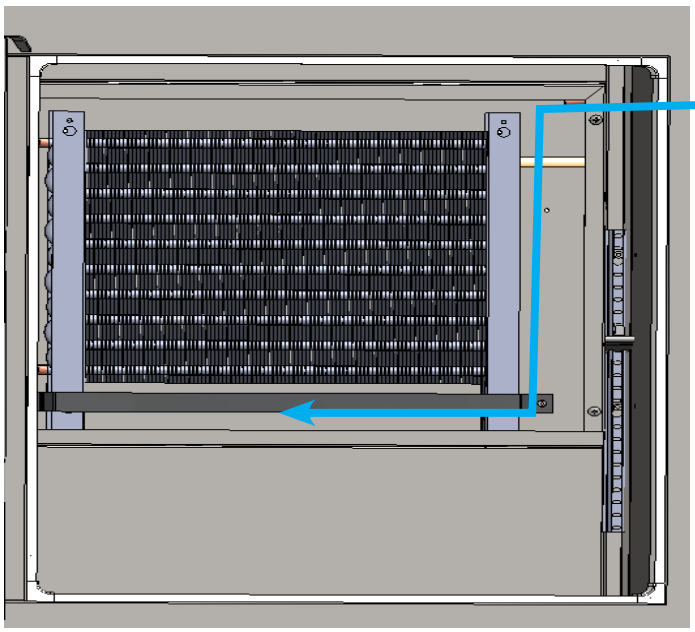
The base cabinet temperature is independently managed by the **blue probe**. The Connection from the control board is inserted through the copper tubing which the sensor bulb is located behind the evaporator panel. This probe reads the return air temperature to maintain the setpoint for cabinet cooling. While the green probe oversees glycol temperature, the blue probe ensures the cabinet environment remains stable and within the desired parameters.

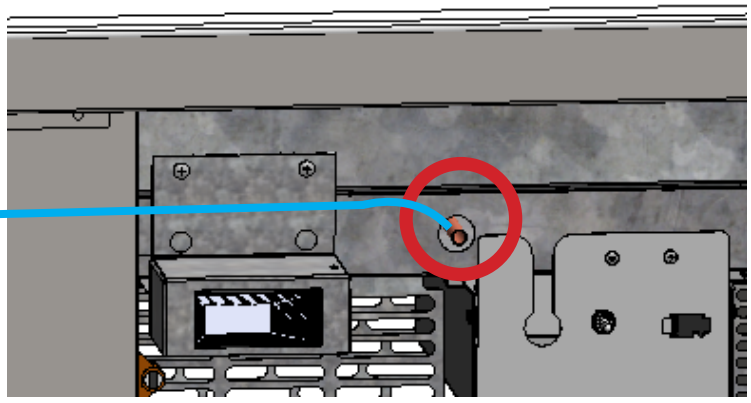
Control Display Functionality

The control display alternates between rail temperature and base cabinet temperature, providing real-time feedback for operators. This allows for easy monitoring of system performance and ensures both the rail and cabinet maintain optimal conditions.

By understanding the individual cycles and the green probe's critical role during defrost, service technicians can effectively troubleshoot and maintain the glycol system for consistent and reliable performance.

Base Cabinet Blue Probe Sensor Part# 334-60084-02





The Blue sensor is located behind the evaporator cover Panel. Its is important to note that the sensor bulb must be removed from the clip located under the evaporator **Cabinet Sensor Bracket Part #6717141.**

3.8b Glycol Tank Operation and Refill Guidelines

The glycol tank is a vital component in maintaining proper temperature control in glycol-cooled systems. It circulates a glycol-water mixture through the heat exchanger, rail, and base to ensure consistent cooling. **Depending on the size of the unit, the system contains between 3 to 10 gallons of glycol.**

Glycol Behavior During Startup

When the system starts, the glycol mixture begins to cool, causing it to thicken as the temperature drops. This change in viscosity results in a drop in the visible glycol level inside the tank, often appearing below the fill line.
This is a normal occurrence during the cooling phase and should not cause concern. As the glycol stabilizes at its operating temperature, the level may remain below the fill line. It is important not to add glycol during this phase, as overfilling the system can lead to potential operational issues.

Refilling Glycol After Service or Loss

If the system has been recently serviced or glycol has been lost due to leakage or maintenance, it is necessary to refill the system carefully. Glycol should be a 35% mix

- **Check for Leaks:** Always inspect all glycol lines, connections, and fittings before adding glycol to ensure there are no leaks in the system.

- **Filling Procedure**: Add glycol slowly to the reservoir, allowing it to circulate before reassessing the level.

Do Not Exceed the Fill Line: When refilling, ensure that the glycol level does not go above the marked fill line. Overfilling can cause glycol to overflow when the system warms up, potentially leading to spillage or imbalance in the system.

Consequences of Overfilling

Overfilling the glycol tank can lead to:

- Glycol Overflow: As glycol warms up and expands, excess glycol may spill out, creating safety hazards.
- Disrupted Circulation: Too much glycol can affect the balance and flow of the system, reducing its overall efficiency.

Key Considerations for Proper Glycol Management

A lower glycol level during initial startup is expected due to thickening as the temperature drops.
Do not panic or add glycol immediately if the level drops during startup.
After service, **always refill to the fill line only** to prevent overflow and maintain system efficiency.

By following these guidelines, the glycol system will maintain consistent cooling performance and avoid unnecessary issues during operation.

System Purging and Air Removal

Air trapped in the system can cause airlocks, restricting glycol flow and reducing cooling efficiency.

- After refilling or servicing the system, ensure the glycol loop is properly purged to eliminate any trapped air.
- Inspect for bubbles or gurgling noises, which may indicate air still present in the system.

How It Works:

Thinner Glycol: Warmer glycol flows more easily, allowing air pockets to rise and escape.

Air Bubble Elimination

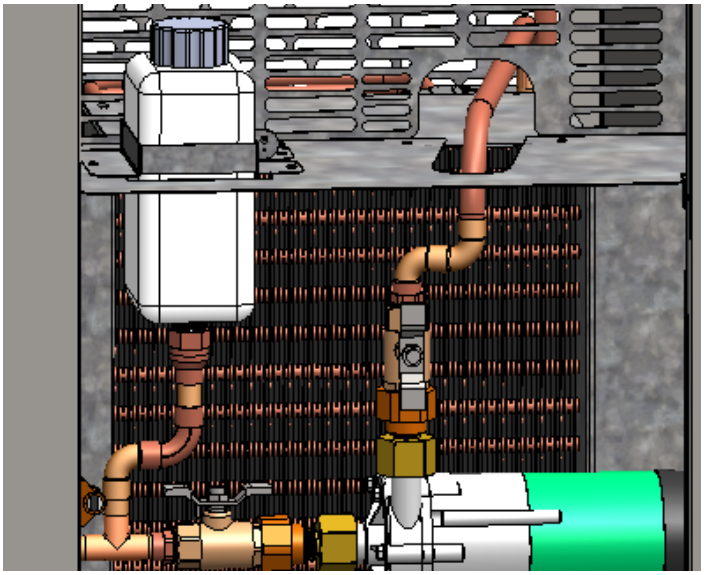
During system operation, continuous glycol pump circulation helps purge trapped air from the circuit. Air pockets can develop after maintenance, fluid replacement, or initial system start-up. As circulation increases, air is pushed through natural relief points or returned to the glycol reservoir where it dissipates.

Technicians may occasionally hear “squeaking” or “squealing” noises coming from the pump area during this process. This sound is typically caused by a mixture of air and glycol forming a temporary pocket within the pump or nearby lines. This condition is normal during system equalization and will resolve as the air is fully purged and circulation stabilizes.

- **Disconnect the refrigeration circuit but keep the glycol pump running for 60-120 min.**
- **Watch for bubbles rising in the reservoir and top off glycol if needed after air elimination.**

Benefits:

Prevents Airlocks and maintains smooth glycol flow.
This process helps maintain system efficiency and prevents potential cooling issues.



Glycol Flow Restrictions / Freeze-Up Indicators

Freeze-up occurs when cold glycol or refrigerant is not circulating properly. Identify and correct restrictions immediately to prevent rail temperature loss.

Primary Causes

- Weak or failed glycol pump
- TXV not metering (starved)
- Solenoid not opening fully
- Heat exchanger not transferring heat

Key Symptoms

- Ice forming heat exchanger
- Rail temp rising out of setpoint range
- RHI alarms triggering due to poor flow

3.8c Troubleshooting the Glycol Pump

Part#- (Black Pump 461010 Green Pump 4611015)

Checking Voltage and Amperage

- Pull back the sleeve covering the pump's wiring to expose the voltage wires. Take reading from black wire.
- Use a multimeter to check voltage to the pump (typically 120V).
- Switch your meter to amp mode and measure the current.
- A properly functioning pump should draw between 0.5 to 1 amp consistently.

If the amp reading fluctuates significantly or drops below this range, the pump may not be circulating properly.

Servicing the Glycol Pump

The glycol pump plays a critical role by circulating glycol continuously through the system to maintain proper temperature. If the pump fails or operates inconsistently, it can lead to poor cooling performance and system issues.

Troubleshooting the Glycol Pump

. Checking Voltage and Amperage

- Pull back the sleeve covering the pump's wiring to expose the voltage wires.
- Use a multimeter to check voltage to the pump (typically 120V).
- Switch your meter to amp mode and measure the current. **A properly functioning pump should draw between 0.5 to 1 amp consistently.**
- If the amp reading fluctuates significantly or drops below this range, the pump may not be circulating properly.

Signs of a Non-Functioning Pump

- Fluctuating Amperage:Erratic amp readings indicate the pump may be failing to maintain consistent flow.
- Lack of Circulation: A non-pumping or weak pump will result in poor glycol circulation, causing the heat exchanger to become **frosted or frozen due to lack of heat transfer.
- Overheating or Noise: A struggling pump may generate excessive noise or heat, indicating internal damage or blockage.

Visual Indicators of Pump Failure

- Frost on the Heat Exchanger: Lack of circulation causes the heat exchanger to freeze, as glycol is not properly transferring heat.
- Low Glycol Flow: Check for minimal or no movement in the glycol reservoir, which may indicate a stalled or under-performing pump.

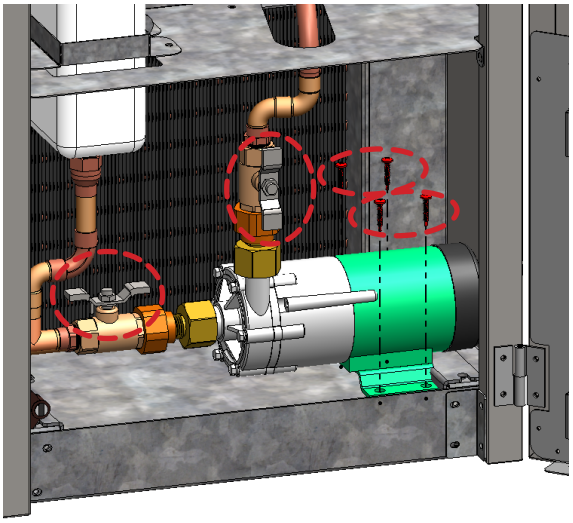
Corrective Actions

- If the pump shows fluctuating amperage or signs of failure, replace the pump to restore consistent glycol circulation.
- Always purge air from the system after replacing the pump to prevent airlocks and ensure smooth operation.

Maintaining a properly functioning glycol pump is essential to prevent freezing, protect system components, and ensure consistent cooling performance.

Pump Replacement Procedure

- Isolate the Pump
- Close the isolation valves **before and after the pump** to stop glycol flow and prevent excess fluid loss.
- Double-check that both valves are fully closed to avoid leakage when removing the pump.
- Using a wrench to loosen the bolt counter clockwise
- Screws ❹ also must be removed from the base of pump



Prepare for Fluid Drainage

Place a pan or container under the pump to catch any residual glycol that may drain from the system.
Do not reuse drained glycol—contamination or debris may affect system performance. Always replenish with fresh glycol after pump replacement.

Service Reminder-Glycol fluid Replacement

When replacing the glycol pump, it's common to experience some loss of glycol during removal and re-installation. After completing the pump swap and opening the isolation valves, any lost glycol should be replaced directly into the fill bottle, **but only up to the marked fill line.**

Do not overfill the tank.

As the unit begins cooling and temperatures drop, the system will draw a significant amount of glycol into circulation—especially as the lines, heat exchanger, rail, and base coils are refilled. This will cause the level in the fill tank to drop noticeably.

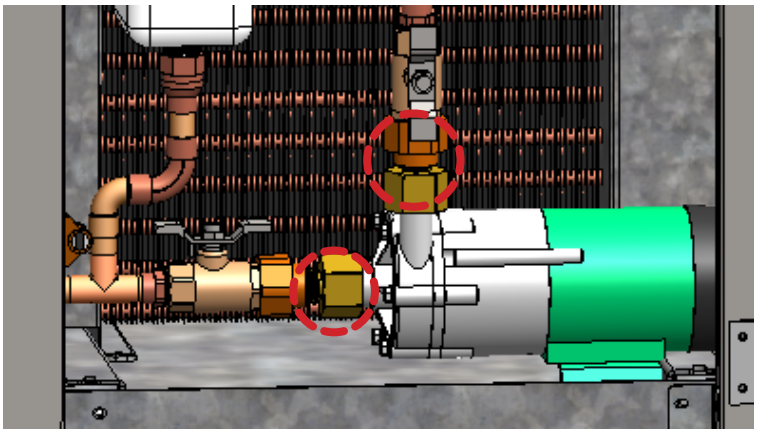
This is normal system behavior. Overfilling the tank before this process completes can result in spillover once the system stabilizes and the glycol returns to the reservoir.

Always allow the unit to run and begin pulling down to temperature before making any final adjustments to glycol level.

Remove the Pump
Using Pipe wrenches

- Support the Piping with the First Wrench
- Use one wrench to hold the stationary side of the union fitting (the side connected to the fixed piping).
- This prevents stress or twisting on the piping system when loosening the connection.
- Loosen the Union Nut with the Second Wrench
- With the second wrench, grip the union nut (the threaded ring joining the pump to the piping).
- Turn the nut counterclockwise to loosen and break the seal
- Remove all 4 screws carefully to release the pump from its mounting position.
- Disconnect the electrical wiring, ensuring power is turned off before handling the wires.

Install the New Pump Part # 4611010
-Position the new pump correctly and secure it with the 4 base screws.
-Reconnect the wiring and ensure all connections are properly secured.
-Open the isolation valves to restore glycol flow after installation.
-Run the system without compressor for 20min to purge air from the lines and ensure smooth glycol circulation.
-Check for leaks and confirm that the new pump is drawing 0.5 to 1 amp under normal operation.



3.8d Solenoid Valve – Service Manual Guidance
The solenoid valve is responsible for controlling glycol flow to the cabinet base. It operates on 120V and is connected to the orange terminal on the control board. The valve's operation is based on cabinet temperature readings from the blue sensor, opening and closing in response to the programmed setpoint (SP).

Function and Monitoring
The solenoid opens when the cabinet temperature rises above the setpoint, allowing chilled glycol to flow through the base coil. When the desired temperature is reached, the valve closes to stop circulation. This flow cycle is critical to maintaining cabinet temperature and preventing freeze-ups or warm zones.
The control board sends power to the solenoid only when required. Monitoring the board output and the sensor's input ensures proper coordination between the two.

To test a solenoid on a glycol unit, first check for electrical power using a multimeter set to voltage.

Next, with the power off, test the coil's resistance by setting the multimeter to ohms and measuring the resistance across the coil terminals; an "OL" or an open circuit reading indicates a faulty coil.
Finally, for a functional check, temporarily energize the coil and use a screwdriver near the armature to confirm it becomes magnetized and moves if the valve does not open under normal operating conditions, this indicates either:

- A faulty solenoid coil,
- A wiring or board output issue, or
- Sensor misreadings that fail to trigger the cooling call.

Using Eyes and Hands – Physical Inspection
A technician should rely on both visual cues and tactile feedback when assessing solenoid operation.

Visual Signs:
A improper functioning solenoid valve will result in a noticeable frost buildup on the copper line leading into the valve, as chilled glycol is present.
The line after the valve (toward the cabinet coil) should either show a light sweat or no frost when the valve is closed.

Touch Test:
Carefully touch the copper lines before and after the valve. A working valve under call for cooling will show:
A cold-to-the-touch line before the valve (supply side).
A similar temperature after the valve if glycol is flowing.
If the line after the valve is warm, or significantly different from the inlet side, the valve may be stuck closed or not energized.

Service Tips

- Always verify 120V at the orange terminal when a cooling call is active.
- Confirm proper blue sensor placement and readings using the control display (SET=555).
- Use a multimeter to check coil resistance, and compare with manufacturer specs if no function is observed.
- After magnet testing, remove the magnet and confirm if the valve resets properly.

Proper operation of the solenoid valve is essential to cabinet performance. A combination of control diagnostics, manual testing, and physical inspection ensures accurate troubleshooting and effective repairs.

3.8e Critical Service Information
Glycol-Cooled Units

This section highlights essential service-related knowledge specific to glycol systems. Technicians must understand these principles to accurately diagnose, service, and maintain the performance and reliability of glycol-cooled equipment. The following points provide key considerations that can be applied in field service, troubleshooting, and technical support.

Pump Operation is Continuous
The glycol pump is designed to run nonstop, regardless of cooling call.

- A constant 120V supply should be present at the pump terminals.
- If pump amperage fluctuates below 0.5A or drops in and out, this may indicate a failing pump or a blockage in the system.
- Use visual cues and temperature checks across glycol lines to verify proper flow. Inconsistent temperatures or frost buildup in isolated areas may signal flow restrictions or pump failure.

Green Sensor (TR) Placement — Critical to Rail Temperature & Defrost Control see fig 3.8b
The **Green Temperature Sensor (TR)** is factory-installed beneath insulated foam tape and secured under a mounting clip on the heat exchanger.(**353-60050-00- heat exchanger clip)**
The foam tape must be carefully cut to access the sensor, but should remain intact and reused during reassembly to ensure the heat exchanger remains properly insulated.
When servicing or replacing the TR sensor, the mounting clip must be released to remove the sensor. Upon new sensor installation the sensor is returned under the clip, then original foam insulation must be restored to fully cover the sensor and surrounding tubing.
Correct placement is essential. This sensor regulates rail temperature setpoint and also functions as the defrost termination sensor. If installed incorrectly or left exposed without insulation, inaccurate temperature readings may occur, resulting in poor rail temperature performance and improper defrost cycling.

Green Pump vs. Black Pump — Sensor Relocation Considerations
Two glycol pump configurations may be present in the field:
• Green Pump – Part No. 4611010
• Black Pump – Part No. 4611015
Both pumps operate the same and should exhibit similar amp draw values when running. However, they differ in physical size and piping geometry, which directly affects where the Green Rail Temperature Sensor (TR) can be properly installed**.**
When relocating the TR sensor:
• Black Pump Installed
The TR sensor may be relocated to the glycol bottle tee located in the main glycol flow path. The straight-through design on this configuration allows full sensing contact with flowing glycol.
• Green Pump Installed
The TR sensor must remain in its factory-installed location on the heat exchanger. The glycol bottle tee associated with this pump utilizes a 45° angled copper connection. This angle restricts the TR sensor from fully entering the glycol stream, preventing accurate rail temperature and defrost termination sensing.
Incorrect relocation of the TR sensor will result in inaccurate temperature readings, rail instability, and potential defrost cycle faults.

- The **blue sensor (TC)** monitors cabinet/base temperature and controls the solenoid valve. It must be installed in its original position within the evaporator section.
- Sensor drift, misplacement, or disconnection can cause false temperature readings and erratic system behavior.

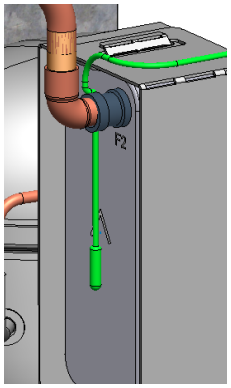


Figure 3.8e Green sensor heat exchanger location (clip Mounted)

Solenoid Valve Operation
The cabinet solenoid is powered via the orange wire from the control board and opens when the cabinet temperature exceeds the setpoint.

- use a screwdriver near the armature to confirm it becomes magnetized
- Confirm solenoid operation by checking for frost before the valve and a temperature drop after. If no change is observed, the valve may be stuck closed or the board may not be sending voltage.

Glycol Level Management
The system draws down glycol volume during startup as chilled fluid is pulled into the rails and base coils.

- **It is normal for the glycol level to drop below the fill line during cooldown—do not panic or top off prematurely.**
- After servicing or pump replacement, always refill to the fill line only. Overfilling may result in spillover or expansion overflow once the system reaches full circulation.

Off-Cycle Defrost Function (green Sensor)
Defrost is handled by stopping the refrigeration cycle **every fourth cycle,** while the pump continues to circulate warm glycol.

- No heaters or hot gas are used—glycol circulation alone performs the defrost.
- Frost buildup on the base coil may indicate poor pump performance or air in the lines.

System Purging and Airlocks
Air in the glycol system can prevent flow, reduce cooling efficiency, and cause pump cavitation.

- Run the system without refrigeration to warm and thin the glycol mixture, allowing trapped air to rise and purge through the reservoir.
- Visual bubbling in the tank may indicate ongoing air removal. Allow the system to stabilize before rechecking fluid level.

Heat exchanger

Traulsen Heat Exchanger – Operation and Troubleshooting

The heat exchanger plays a central role in Traulsen glycol-cooled systems, especially on R290 refrigerant models. It **serves as the point where refrigeration and glycol circulation interac**t to maintain proper rail temperatures.

On R290 glycol units, the green sensor (TR) is typically mounted on the copper line at the heat exchanger. This placement allows the control system to monitor the rail temperature accurately and make the necessary adjustments during operation.

Purpose

-Provides direct thermal exchange between the refrigeration circuit and the glycol loop.

-Ensures glycol is chilled to maintain consistent rail and cabinet performance.

-Supports accurate feedback to the control system via the **Green sensor**.

The **Green Sensor** is located on the heat exchanger, heat shrinked wrapped and **clipped part#353-60050-00** this must be placed back in its original position- this controls the rail temp as well as defrost.

Common Failures

While the heat exchanger is a durable component, several issues may present during service:

Refrigerant Leaks within the exchanger can result in reduced cooling performance and loss of rail temperature control.

Clogging or Restriction: Though uncommon, foreign material or oil logging can reduce flow within the exchanger and impair efficiency.

TXV Metering Failure: If the TXV (thermostatic expansion valve) fails to meter refrigerant properly, the exchanger may not receive the correct flow. This condition often appears as a frozen heat exchanger due to liquid refrigerant flooding or starvation.

Service Notes

Always inspect the heat exchanger for signs of frost or ice buildup. Persistent freezing can indicate TXV or refrigerant charge problems.

-Verify green sensor placement and readings; misplacement or poor contact can lead to false rail temperature feedback.

-If leaks are suspected, remove the insulated foam to verify any glycol loss or evidence of liquid (blue)

-Heat Exchanger Replacement – **Part #SER-60702-XX**

In the event of a confirmed leak or other failure, the heat exchanger must be replaced as a complete assembly. This ensures the integrity of the glycol and refrigeration circuits.

Preparation

-Verify the correct replacement part number: SER-60702-XX.

-Ensure all safety procedures are followed. Disconnect electrical power and recover refrigerant in compliance with EPA guidelines.

****Reference pump replacement procedures as a guide for valve isolation and system preparation.****

Valve Isolation

-Close the isolation valves (unions) located before and after the heat exchanger. This will prevent glycol loss during service.

-Confirm valves are fully seated to minimize spillage. There will be a significant amount of glycol in the heat exchanger this amount will need to be replaced on start up.

Component Removal

-Remove any insulation tape and protective wrap around the heat exchanger and adjacent copper connections.

-Identify the brazed or "sweat-out" joints where the exchanger connects into the refrigeration circuit.

-Carefully heat the brazed joints with appropriate torch equipment until the existing solder softens.

-Use proper extraction tools to disconnect the exchanger without damaging surrounding tubing.

Installation of New Heat Exchanger

-Position the new heat exchanger assembly in place.

-Clean and prep all copper connection points to ensure a secure braze.

-Braze the new joints using industry-approved materials and techniques. Ensure complete penetration without overheating the exchanger body.

-Allow all joints to cool before re-insulating. Replace insulation tape and covers to restore factory conditions.

Heat Exchanger Replacement Overview

When replacement of the heat exchanger is required due to a leak or performance failure, the procedure must be carried out with caution to prevent damage to surrounding components and to maintain proper system function. **This service requires isolating the glycol circuit, disconnecting the refrigeration connections, and transferring the temperature sensor for reuse.**

The heat exchanger is surrounded by foam insulation that must be removed during disassembly. Once exposed, the green rail sensor (TR) will be visible, clipped to the copper tubing. This sensor is critical for control operation and must be carefully removed and set aside. The same sensor will be installed back onto the new heat exchanger assembly after replacement is complete.

The following instructions outline the steps for safely isolating, removing, and **replacing the heat exchanger assembly (Part #SER-60702-XX).**

Heat Exchanger Removal and Replacement

-Isolate glycol flow by closing the valves before and after the heat exchanger (see arrows).

-Disconnect the copper lines at the threaded unions by turning counterclockwise. **Be aware!! Glycol is present in these lines.**

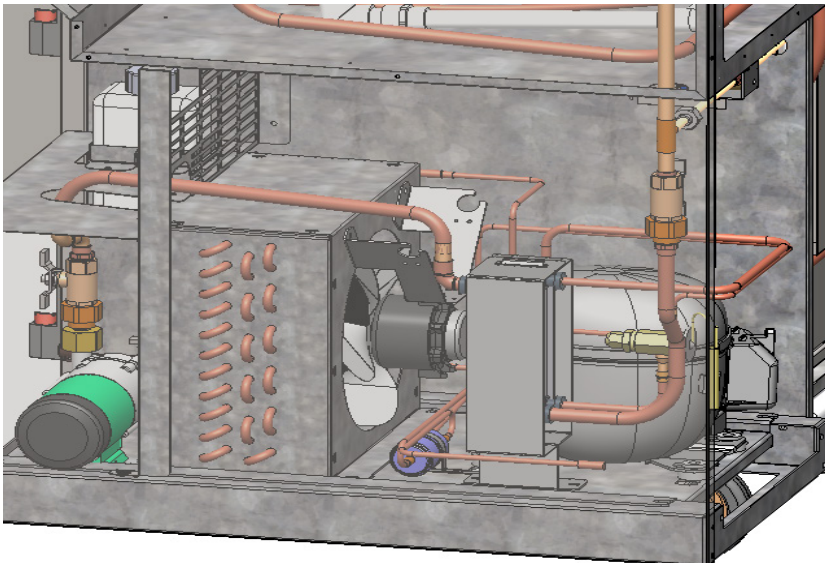
-Remove surrounding foam insulation from the heat exchanger. This will expose the green sensor (TR), clipped to the copper tubing.

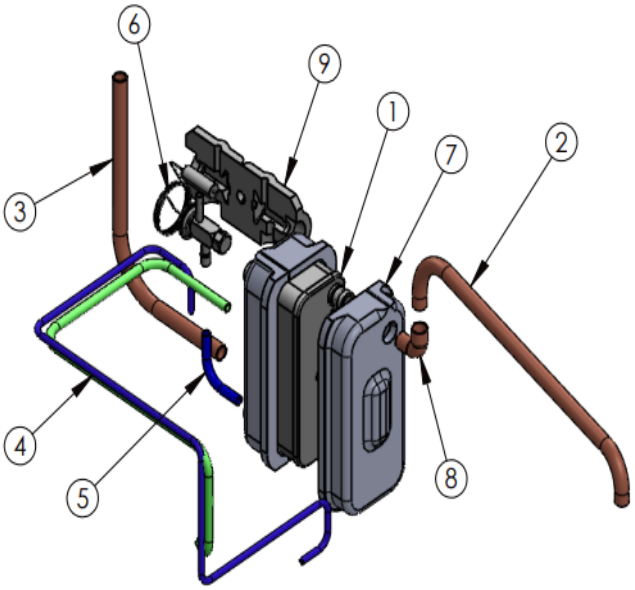
-Carefully remove the clip and set the sensor aside. The green sensor will be re-used with the new heat exchanger assembly.

-Align the new heat exchanger assembly (**Part #SER-60702-XX)** with the existing copper line set.

-Cut only the glycol /refrigerant lines that match the new exchanger connections.This will require a system pumpdown. Do not cut additional lines.

-Open the latch on the heat exchanger's metal cover to remove the old assembly and install the replacement.





4. Controls

4.1 Understanding the Display

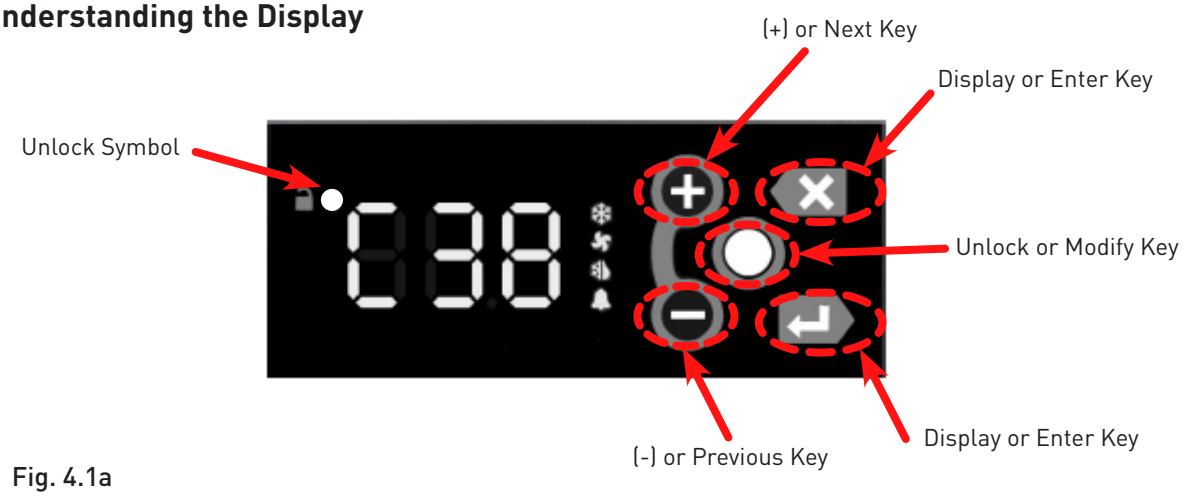


Fig. 4.1a
Display Status Icons
Display P/N: 950-60510-00

Display Character & Status Descriptions

- **C — Cabinet Temperature**
  Indicates the current interior cabinet temperature.
- **R — Glycol / Rail Temperature**
  Indicates the current rail (glycol) temperature.
  Automatically alternates (flashes) between C and R during normal operation.
- **DEF — Defrost Mode**
  Indicates an off-cycle defrost is in progress.
  No status icons are illuminated during defrost.
  Occurs every 4th refrigeration cycle and terminates when the rail (glycol) reaches 37°F.

Compressor On

Defrosting

Displays Status Icons

Alarm

4.2 Control Cover Removal & Components

Open bottom louver & rotate louver out of the way. Remove 3) screws of screen cover placing cover to the side. Remove 2) screws attaching faceplate to control box. 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**

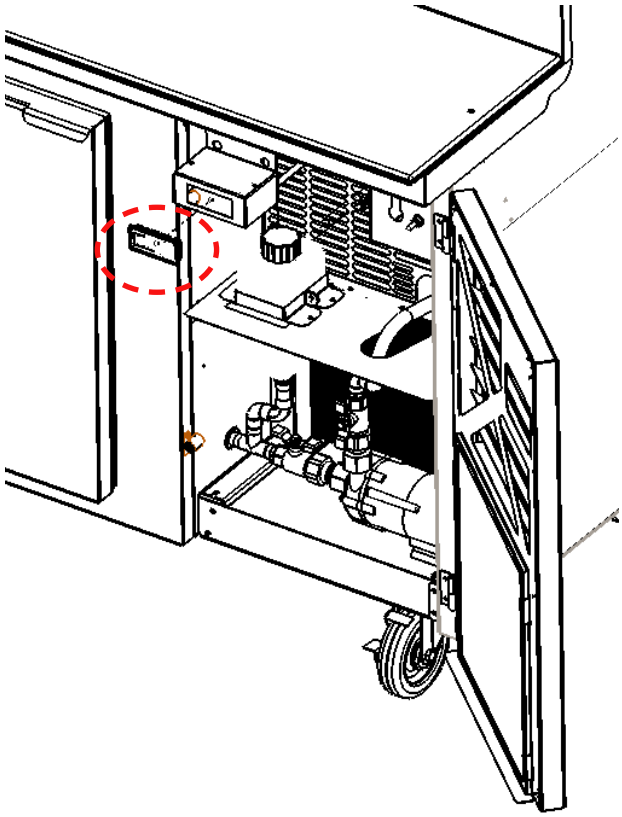


Fig. 4.2 **Display P/N: 950-60510-00**

4.2.1 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.

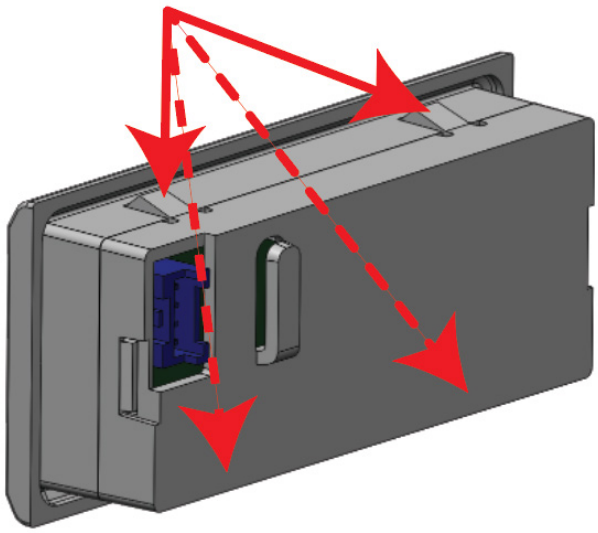


Fig. 4.2.1 Display Install

4.3 Controller Display Descriptions

Cabinet Temperature

Cabinet Temperature

Rail Temperature

Liquid Line Temperature

Light Switch

Rail Temperature

Door Switch

Evaporator Coil Temperature

Sensor Reading Submenu

Status and Button Symbols:

	Compressor Status
	Fan Status
	Defrost Status
	Alarm / Door Open
	Unlock Symbol
	+ or Next Key
	- or Previous Key
	Unlock or Modify Key
	Esc or Back Key
	Display or Enter Key

4.3.1 Basic Controller Instructions

Unlocking the Keypad:

Press		Display	Press
Tap two times			

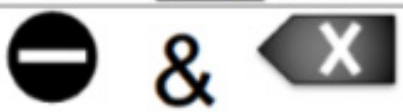
Turning the display on and off:

Press		Display	Display State
Hold 5 sec			NO DISPLAY
			NORMAL DISPLAY

Adjusting temperature set point:

1. Unlock Keypad
2. Use  or  to adjust Set Point
3. Press 

Initiate manual defrost:

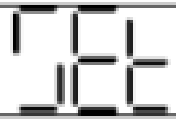
Press	Display
	
Hold for 5 Seconds	

****** the display will not show DEF icon this is a off cycle defrost******

4.3.2 Controller Index

rC JCn		
1. To view Parameter press ↵ 2. Press ✖ to return to Parameter list		
Mnemonic	**Parameter**	**Description**
tI	Time Set	Local Time Set
tC	Temp Cab Average	Average Cabinet Temperature
tE	Evap Coil Temp	Evaporator Line Temperature
tLI	Liquid Line Temperature	Liquid Line Temperature
tAu	Aux Temp	Auxiliary Temp
tr	Temp Rail	Rail Temp
db	Dry Bulb/Rm Temp	Dry Bulb
rh	Relative Humidity	Relative Humidity
dP	Dew Point	Dew Point
rhS	RH Sensor	RH Sensor Status
tuC	Total Amps	Total Amps
CoI	Compressor Command	Compressor On Status
Co8	Compressor Run Count	Number of Compressor Cycles since last defrost
FnC	Cabinet Fan Command	Cabinet Fan Status
CFC	Condenser Fan Control	Condenser Fan Status
uLC	Cabinet Solenoid	Cabinet Solenoid Status
tdF	Temp Cab Defrost	Temp Cab at time of defrost
dHC	Defrost Command	Defrost Device status
dC9	DH Duty Cycle	Door Heater Duty Cycle
doC	Door Switch	Door Switch
doL	Door Open Count	# times door opened since defrost
LI	Light Switch	Light Switch
AdC	Aux Device Command	Aux Device Status
LC	Light Command	Light Status
PuC	Pump Command	Pump Status

4.3.2 Controller Index (Cont'd)



1. To view Parameter press ↵
2. Use ✚ or ▬ to adjust Parameter
3. Press ↵ to save settings
4. Press ✖ to return to Parameter list

Mnemonic	Parameter	Description
	Temp Cab SP	Cabinet Temp Setpoint
	Temp Cab SPDiff	Cabinet Temp Set Point Differential
	Temp Rail SP	Rail Temp Set Point
	Temp Rail SPDiff	Temp Rail Set Point Differential
	Temp Aux SP	Auxiliary Temp Set Point
	Temp Aux SPDiff	Auxiliary Temp Set Point
	Cabinet Fan Mode	Fan Mode
	Cabinet Fan Door Action	Cabinet Fan Action When Door Open
	Defrost Set Point	Defrost Set Point
	Defrost Mode	Defrost Mode
	Defrost Intervals	Intervals Between Defrost
	Temp Unit	Temperature Units
	Time Zone	Time Zone
	DSTFlag	Daylight Savings Time
	Sabbath On	Sabbath start time on Friday
	Sabbath Off	Sabbath end time on Saturday
	Serial Number	Serial Number
	Software Version	Software Version

4.3.2 Controller Index (Cont'd)

ParameterName	Mnemonic	Description	Value
TempCabSP	SP	Temp Setpoint	35
TempCabSPDiff	SPD	Cabinet Temp Differential	3
TempRailSP	RSP	Rail Temp Setpoint	27.5
TempRailSPDiff	RSD	Rail Temp Differential	2
TempUnits	TUN	Temperature Units	DegF
SerialNumber	SER	EOL: Serial Number	
TempCab	TC	EOL: Cabinet Temp	
TempEvap	TE	EOL: Evaporator Coil Temp	
TempLiqLine	TLI	EOL: Liquid Line Temp	
TempRail	TR	Rail Temp	
DewpointRoom	DP	EOL: Dewpoint	
CompCmd	COC	Compressor status	
CabFanCmd	FNC	Cabinet Fan status	
CondFanCmd	CFC	Condenser Fan status	
CabSolndCmd	SLC	CabSolnd status	
DefrostCmd	DFC	Defrost Device status	
DoorSwitch	DOR	EOL: Door Switch	N/A
LightSwitch	LS	Light Switch	N/A
AuxDeviceCmd	ADC	AuxDevice status	N/A
LightCmd	LC	Light status	N/A
PumpCmd	PUC	Pump status	
DoorAlarm	DOS	Door Switch Alarm	N/A
TempCabAtPowerUp	TCU	Cabinet Temp at power up	
TimeOfPowerDown	TPD	Time of power down	
TimeOfPowerUp	TPU	Time of power up	
PFDuration	PFD	Duration of Power Failure	
PowerFailAlarm	PFA	Power Fail Alarm	
TempCabAlarm	TCA	Cabinet Temp Alarm Status	
TempLiqLineAlarm	TLA	Liq Line Temp Alarm Status	
LiqLineSDAlarm	LLA	Liq Line Shutdown Status	
EvapSDAlarm	EVS	Evap Shutdown Status	

4.4 Power Module Connections Overview

Part Number: 950-60509-02 **Blue factory installed pictured below,**950-60509-01 **Green Replacement board not pictured** (NOTE: Serial & Model #'s necessary for power module replacement due to programming)
Picture below illustrates in out/output connection points

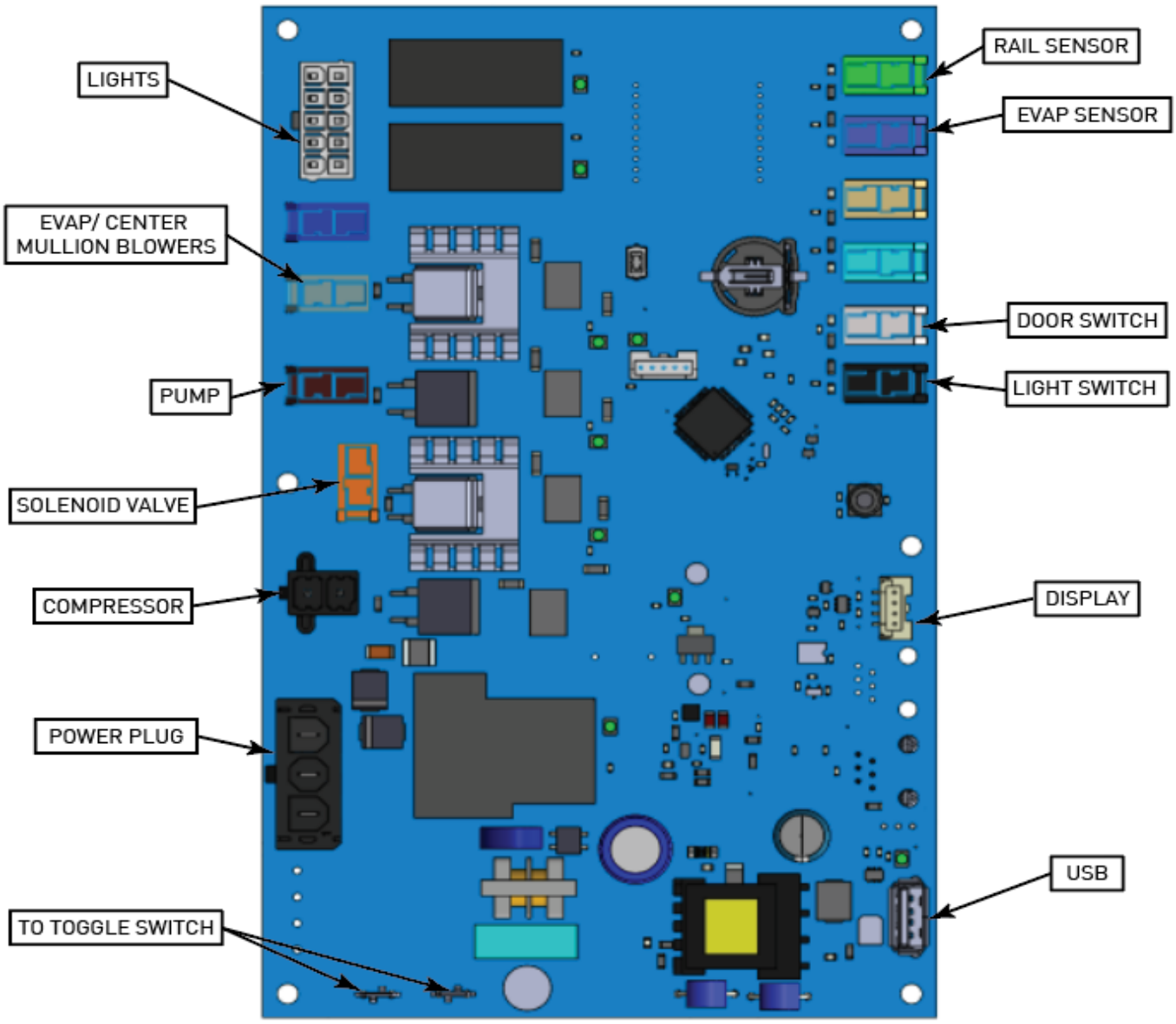


Fig. 4.13 POWER MODULE ACCESS (CONTROL BOARD)

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.

4.4.1 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.

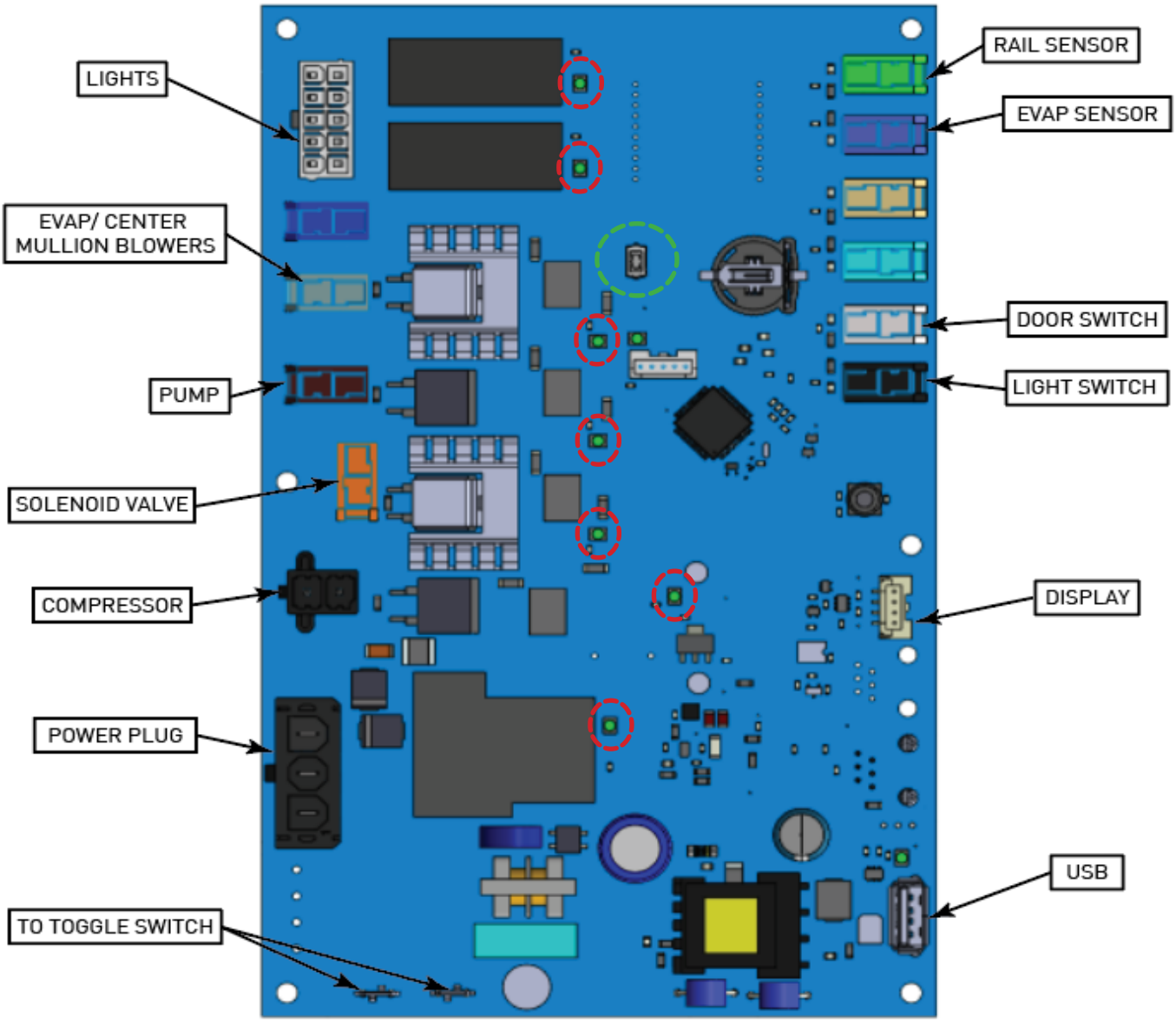


Fig. 4.14a POWER MODULE LED & RESET BUTTON OVERVIEW

LED & Reset Button Identification:

In the diagram above**, the LED indicators are identified by a red circle** and represent the status lights for system operation and diagnostics**. The reset button is indicated by a green circle** and is used to manually reset the control system after a fault, alarm, or maintenance service.

4.5 Temperature Reading Accuracy

This service manual provides instructions for accurately testing temperature sensors within an Traulsen Glycol Prep Table refrigeration system by immersing them in an ice bath at precisely 32°F.

Procedure:

Ice Bath Preparation:
Fill a suitable container with an 80% ice to 20% water ratio to create an ice bath with a consistent temperature of 32°F.
Dipping the Sensor Bulb:

Locate the bulb of the temperature sensor that requires testing.
Submerge the sensor bulb fully into the ice bath, ensuring complete immersion.

Viewing Control Value:
Monitor the control value displayed on the testing equipment. If the temperature does not read 32°F, proceed to the next step.

Measuring Resistance:
If the control value deviates from 32°F, measure the resistance of the sensor using appropriate equipment.
The expected resistance at 32°F should be 32.7 Kilo ohms.
Sensor Identification:

Tr – Green Sensor (Rail Sensor):
The green sensor (Tr) is installed beneath the heated air plenum, near the heat exchange tubing, and is encased in heat shrink wrapping for protection. This sensor monitors the air temperature along the return airflow path, specifically near the rail or prep area where product exposure is highest. It plays a critical role in maintaining proper holding temperatures at the rail surface to ensure food safety and temperature compliance.

Tc – Blue Sensor (Cabinet Sensor):
The blue sensor (Tc) is located on the interior wall of the cabinet, typically near the evaporator or circulation zone. This sensor measures the core cabinet air temperature and communicates directly with the control module to modulate the heater relay. Accurate readings from this sensor are essential for consistent cabinet performance and overall heat distribution.

Sensor Testing & Calibration
To verify sensor accuracy, both sensors (Tr and Tc) can be tested using an ice water bath. A properly functioning sensor should stabilize at 32°F (0°C) when fully submerged in slush ice and water. Resistance values should be measured using a multimeter and compared against factory specifications **(typically ~32kΩ at 32°F)** for Traulsen thermistors. .
Sensor inaccuracies or drift can lead to:
Overheating or under heating of the cabinet or rail.

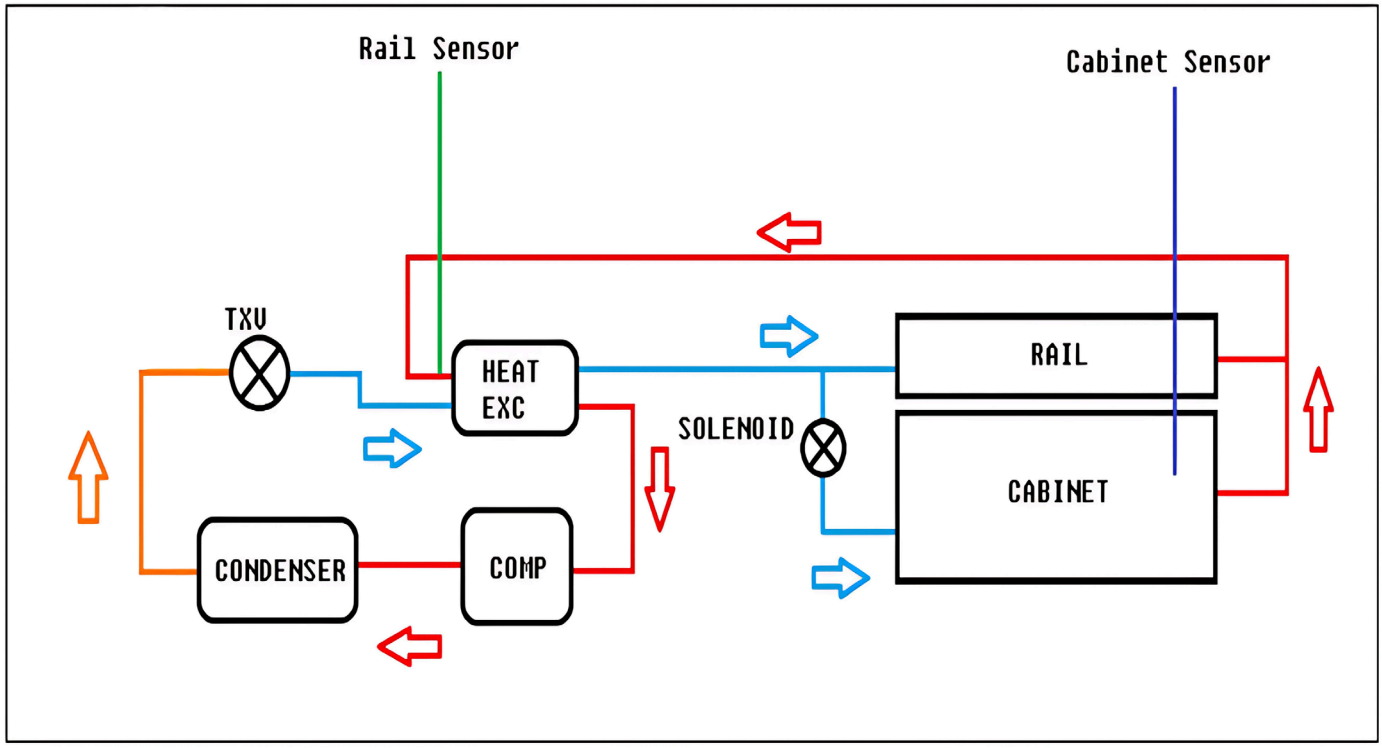
Verifying Cabinet and Rail Temperatures in the Field
When verifying the actual cabinet and rail temperatures, use both the control display and external thermometers to confirm accuracy.
Start by checking the control display for the **TR parameter**, which shows the current r**ail temperature** as measured by the green sensor (located near the heat exchanger and covered in heat-shrink tubing). Make note of this temperature.
Use an infrared thermometer to scan the surface of the rail. Aim directly and ensure the surface is clean for a proper reading. This provides a real-time comparison to the TR value on the display.

Next, measure the **TC parameter, cabinet temperature** using a probe thermometer placed inside the unit near the airflow path. Compare this to the temperature reading shown for the **Tc sensor (the blue sensor mounted inside the cabinet).**
Keep in mind that a 3–5°F difference is common. This is due to sensor placement and environmental factors. If the readings are consistently off beyond that range, it may indicate a sensor is the failing component.

Service Tip:
When diagnosing uneven heat zones, always confirm that both sensors are securely mounted, free from moisture intrusion, and reading within tolerance. If one sensor consistently deviates from the setpoint by more than 5°F, it may require replacement or recalibration.

5. Sensor Location

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



#	Sensors	Sensor Location	Description
1	Rail Sensor	Heat Exchanger	Controls the compressor based on SP and SPd, Terminates Defrost
2	Cabinet Sensor	Return air	Controls the Solenoid Valve

Sensor Data	Part Number
Blue Sensor Coil	334-60084-02
Green Sensor Rail	334-60083-02

Sensor Placement Diagram

The accompanying diagram illustrates the placement of key sensors within the system, ensuring precise temperature monitoring and control.

Blue Sensor: Located behind the evaporator panel inside the cabinet, this sensor monitors return air temperature. It is clipped below the evaporator coil to accurately measure air returning to the coil for consistent cabinet temperature regulation.

Green Sensor: Positioned on the heat exchanger outlet copper tubing, this sensor monitors the glycol temperature as it exits the heat exchanger. It ensures the refrigeration system maintains the glycol at the proper operating temperature for the rail.

Understanding the locations of these sensors is essential for diagnostics, maintenance, and ensuring optimal performance of the system. The diagram provides a visual reference for accessing and servicing these components.

5.1 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 5.1 Resistance Test Curve

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 HEAT PUMPS 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.

Minimum Ventilation Area $7.1m^2$

Minimum Floor Area Requirements:

Regulatory Basis:
- Safety standards for flammable refrigerants dictate that to avoid creating hazardous concentrations of gas in case of a leak, the refrigerant must be diluted in a sufficiently large room.
- The minimum floor area of 7.1 square meters ensures that in the event of a leak, the concentration of R290 does not reach flammable levels.

Specific Requirements:

Ventilation:
- The room where the unit is installed must be well-ventilated to prevent the accumulation of flammable gas.
- Proper ventilation helps disperse any leaked refrigerant, reducing the risk of reaching a flammable concentration.

Location Restrictions:
- The unit must not be installed in lobbies or corridors. These areas typically have higher foot traffic, and placing flammable refrigerants there could pose a greater risk to public safety.
- Restricting installation to less trafficked areas reduces potential ignition sources and the number of people exposed to risk.

Practical Implications:

For Installers and Users:
- When installing units with R290 refrigerant, professionals must ensure that the room meets the minimum floor area requirement of 7.1 square meters.
- Additionally, they must verify that the space has adequate ventilation and is not a high-traffic area like a lobby or corridor.

Compliance with Standards:
- Adhering to these regulations helps ensure compliance with international safety standards, which is crucial for legal and insurance purposes.
- It also enhances safety for end-users by minimizing the risk of accidents associated with refrigerant leaks.

By understanding and following these requirements, stakeholders can ensure the safe and effective use of R290 refrigerant in refrigeration systems, balancing environmental benefits with necessary safety precautions.

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 refrigeration 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, 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.

General precautions when working on an R-290 (propane) refrigeration system:

- Notify all persons in the immediate area that your are working with a flammable refrigerant.
- Insure the work area is well ventilated.
- Use a combustible gas monitor to measure propane concentration in the air.
- Beware of flammable materials present in the work area.
- Extinguish ignition sources within 10 feet of the work area if possible.
- Have a Class B dry powder type fire extinguisher available.
- Use spark-resistant tools.
- Use extra care while servicing the unit to avoid damage to refrigerant tubing, condenser, and evaporator coils.
- Always use appropriate PPE (Personal Protection Equipment).

Examples of ignition sources:

- A spark from an electrical source such as:

  - Contactor
  - Relay
  - Defrost heaters
  - Condensate pan heaters
  - Door switches
  - Light bulbs
  - Electrical outlets
  - Switches
  - Electrical drill
  - Static electricity

- Open flame ignition sources such as:

  - Fryers
  - Cigarettes/lighters
  - Gas appliances
  - Griddles

- Tools:

  - Non-spark resistant tools
  - Heat guns
  - Torches

6B. Troubleshooting

⚠ WARNING Certain procedures in this section require electrical tests or measurements while power is applied to the machine. Exercise extreme caution at all times. If test points are not easily accessible, disconnect power and follow lockout/tagout procedures, attach test equipment and reapply power to test.

6B.1 Additional Requirements & Precautions for Servicing R-290 (Propane) Systems

Key Terms:

Lower Explosive Limit (LEL) - The lowest concentration of a gas or vapor in the air capable of producing a flash fire in the presence of an ignition source (arc, flame, heat). A concentration lower than the LEL is not rich enough to burn. The LEL of R-290 (propane) is 2.1% concentration by volume of air.

Upper Explosive Limit (UEL) - The highest concentration of a gas or vapor in the air capable of producing a flash of fire in the presence of an ignition source (arc, flame, heat). Concentration higher than the UEL is too rich to burn. The UEL for R-290 (propane) is 9.5% concentration by volume of air.

EPA/SNAP - Environmental Protection Agency/Significant New Alternative Policy. The EPA approved the conditional use of R-290 (propane) refrigerant in new equipment in 2011.

Global Warming Potential (GWP) - A measure of the greenhouse gases' ability to trap radiant energy, with carbon dioxide assigned a value of 1. R-448A and R-450A have values of 1273 and 546 respectively. R-290 (propane) has only a value of 3.

Hydrocarbon Refrigerants (HC) - Hydrocarbon refrigerants are a select group of hydrocarbons that are non-toxic, non-ozone depleting substances that are being used to replace more traditional refrigerants.

Ozone Depletion Potential (ODP) - A measure of the refrigerant's ability to destroy stratospheric ozone. Modern HFC refrigerants such as R448-A and R-450A have an ODP of zero. Hydrocarbon refrigerants such as R-290 (propane) also have an ODP of zero.

Flash Point - Flash point is the minimum temperature at which a substance will burn with an ignition source. The flash point of R-290 (propane) is -150°F.

Auto Ignition Temperature - The auto ignition temperature is the temperature at which a fuel will ignite without the need for a spark or flame. The auto ignition temperature of R-290 (propane) is 896°F.

Well Ventilated - Any area or space where air flow can enter and exit freely.

Confined Space - Per OSHA, a confined space is defined as:

- Large enough for an employee to enter fully and perform assigned work.
- Not designed for continuous occupancy by the employee.
- Has a limited or restricted means of entry or exit.

Personal Protection Equipment (PPE) - This list is not meant to be all encompassing, but should include: safety glasses, knee protection or kneeling aid, first aid kit, fire extinguisher, insulated screwdriver set, LOTO kit, ear plugs, slip resistant black leather safety toe shoes, electrical glove kit (rubber glove and "goatskin protector"), cut resistant gloves, cut resistant sleeves, heat resistant sleeves, GFCI cord set, fall prevention kit, nitrite gloves, chemical goggles, ARC flash barrier tape, hard hat with ARC flash rated face shield, and ARC flash rated balaclava.

For models contained R-290 (propane) as a refrigerant, all instructions labeled on the unit must be closely followed. Service and repair must be performed by qualified refrigeration technicians familiar with applicable safety standards for flammable refrigerants. Technician must use appropriate personal protective precautions to avoid risk of fire or explosion.

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.

For R-290 (propane) systems, make sure the electronic leak detector being used is designed to detect R-290 (propane). A combustible gas monitor may also be used to indicate the presence of a leak.

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.

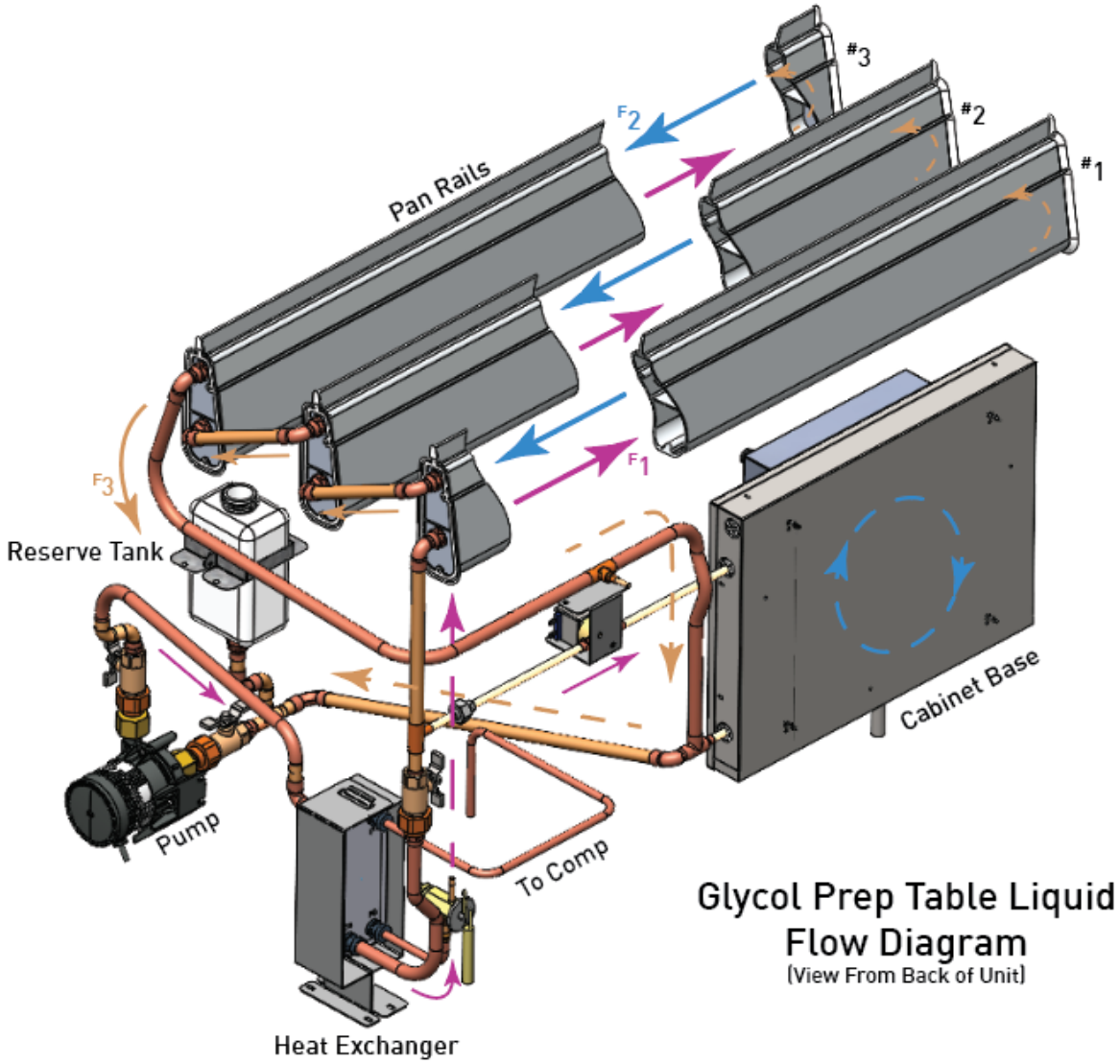
- Pinch line off just before the temporary access port three times using a crimper tool.
- Verify that there are no leaks.
- Remove the piercing valve/temporary access port.
- Cut off the copper tubing between the location of the temporary access port removed in step 3 and the crimps made in step 1.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

6B.4 Refrigerant Recovery

For refrigeration systems using R-290 (propane), the U.S. EPA has allowed venting to the atmosphere due to its low environmental impact. Use the following process. This process requires the use of a combustible gas monitor.

1. If the refrigeration system is located in a confined area, consider using the refrigerant recovery process noted above. The R-290 (propane) can then be vented later in a safe location.
2. Venting must not be to a public area with people present that are unaware of the procedure.
3. The technician responsible for venting R-290 (propane) must make all persons in the immediate area aware a flammable gas is being released to the atmosphere.
4. Ensure there are no ignition sources within 10 ft of the area you are venting R-290 (propane).
5. Ensure that all local legislation addressing safety of hazardous or flammable substances are satisfied.
6. Like most other refrigerants, R-290 (propane) is heavier than air. Ensure you are not venting it into a low-lying area.

Point of Failure	Cause	Solution
Control System - Solenoid not energized	- Hybrid relay not energized - Solenoid is not energized	- Check voltage from relay module - Check wiring to coil
Pressure control - Compressor not pumping down - Compressor short cycling	- Pressure control stuck closed - Pressure control opening at random intervals	- Replace pressure control
Glycol Pump - Amp Draw lower than 5	- Failed Glycol pump	- Replace glycol Pump
Refrigerant - Low suction/head pressure	- Low on charge	- Leak check, recharge
TXV - Not feeding	- Moisture in system - Non-condensible in valve - Failed TXV	- Pull deep vacuum, change drier - Open value to see if debris clears, Readjust - Replace TXV



Glycol Prep Table Liquid Flow Diagram
(View From Back of Unit)

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.
- Always run low pressure nitrogen through the system when brazing as this reduces the risk of oxidation. For R-290 (propane) systems, this also reduces the risk of combustible gas ignition.
- It is absolutely not acceptable to leave line tap valves or piercing valves attached to the system.

6B.6 System Evacuation

After the system has been sealed and leak checked, it is necessary to evacuate it in order to remove air, moisture, and unwanted residual refrigerant.

- With R-290 (propane) systems, first purge the system with nitrogen. This will prevent flammable mixtures from occurring.
- When connecting the hoses between the system, gauge manifolds, and vacuum pump, ensure that the connections are secure. For R-290 (propane) systems, ensure that there are no potential ignition sources nearby.
- For R-290 (propane) systems, ensure that the pump discharge is in an area free of potential ignition sources.
- Ensure that a micron gauge is used since conventional manifold gauges may not provide proper readings.
- The system should be evacuated to the desired pressure (typically 250 microns or less) and then left to stand for 15 minutes to ensure that the entire refrigerant charge has been removed from the oil and any residual moisture has been evaporated from the system.
- Ensure that the vacuum pump is of good quality and of appropriate capacity for the system, and the oil level is correct.

6B.7 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.8 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.
5. Braze open end shut.
6. Leak check the system following the LEAK CHECKING SYSTEM section in this document.

6B.9 Compressor Troubleshooting

6B.9.1 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.

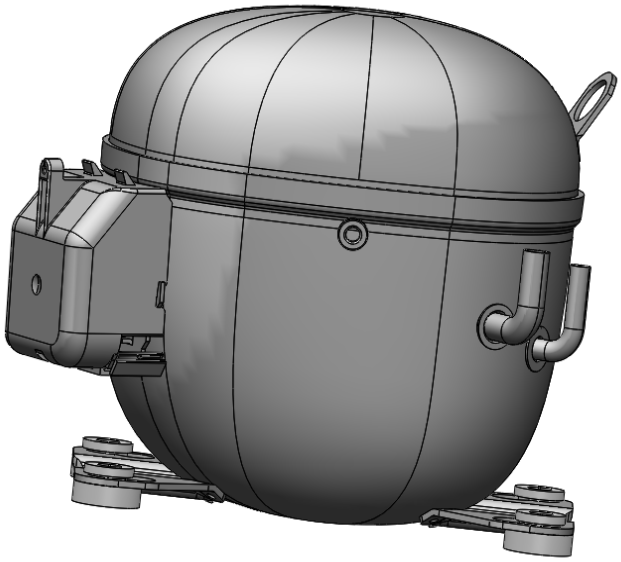


Fig. 6B.9 Compressor

6B.9.2 Accessing The Compressor

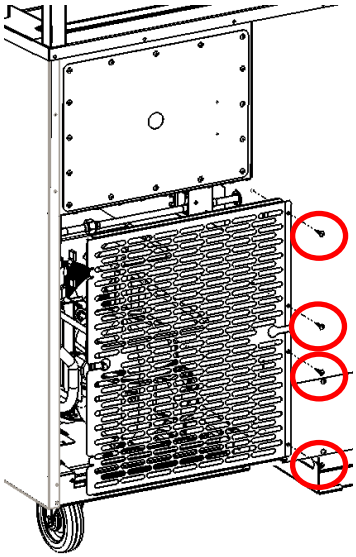


Fig. 6B.9.2a Remove ❹ Screws

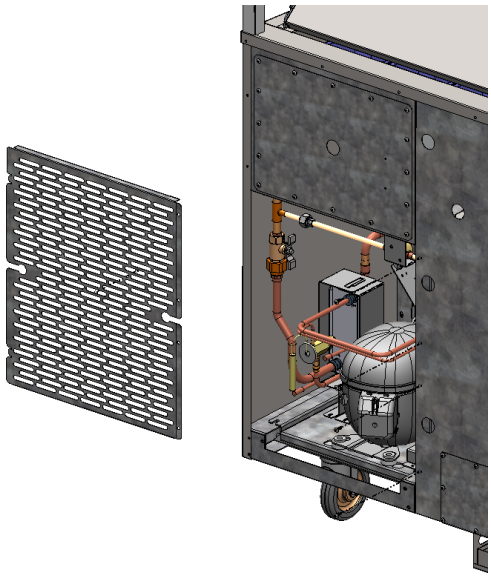


Fig. 6B.9.2b Remove Condenser Housing

6B.9.3 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.9.4 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.9.5 Resistance and AMP Values of Glycol System Compressors (Compressor part#/Model may vary)

Compressor Information		INPUT VOLTAGE		Current	
Traulsen Part Number	Embraco Model	INVERTER	FROM INVERTER	RLA	LRA
321-60306-xx	VSC FMTFT415U	337-50508-00 1000W	120/220V	3.4A	7.0A

Table 6B.9.5 Resistance and AMP Values

6B.9.6 Troubleshooting Compressor Failure

Verify Incoming Voltage

Before diagnosing the inverter or compressor, confirm that the unit is receiving the proper voltage.

- Using a multimeter, measure the voltage at the main power terminals.
- Ensure the voltage matches the specifications listed on the unit's data plate.
- If voltage is out of range, check the power supply, circuit breakers, and wiring connections.

6B.9.7 Check Inverter Power and Functionality

- Locate the inverter module and inspect its status lights.
- The green heartbeat LED indicates normal operation.
- If solid green, the inverter is powered but not running the compressor.
- If blinking green, the inverter is functioning normally.
- If no light, the inverter may not be receiving power or may be faulty.
- If red LED is on, this indicates a fault condition; refer to the inverter fault code chart.

Measure incoming voltage at the inverter:

Verify correct voltage between L1 and L2 terminals.

If voltage is incorrect, trace wiring back to the power source.

6B.9.8 Variable Speed Inverter and Compressor Wiring

In modern refrigeration systems, a variable speed inverter is often integrated into the system to control the compressor's operation more efficiently. This setup can eliminate the need for traditional start capacitors and run capacitors, which are typically used in single-speed compressors to manage motor startup and running conditions.

Wiring and Operation:

Variable Speed Inverter Integration

The variable speed inverter is wired in series with the compressor. Instead of using traditional capacitors to regulate the compressor's motor, the inverter adjusts the electrical power supplied to the compressor. The inverter converts the incoming AC (alternating current) to DC (direct current), and then, through a series of complex algorithms, it converts the DC back to AC with a variable frequency and voltage that controls the motor's speed.

Compressor Control

By adjusting the frequency and voltage sent to the compressor, the variable speed inverter enables the compressor to run at varying speeds, based on the system's cooling demands. The inverter provides smoother startup and operation of the compressor, removing the need for a start capacitor, which typically provides a boost of power during compressor startup.

Eliminating the Start and Run Capacitors

Traditionally, a start capacitor is used to provide extra torque to the compressor motor at startup, and a run capacitor helps maintain the motor's energy efficiency during continuous operation. With a variable speed inverter, these components are no longer necessary. The inverter modulates the electrical supply to the compressor, delivering the required startup and operational power, thereby improving energy efficiency and reducing wear on the motor.

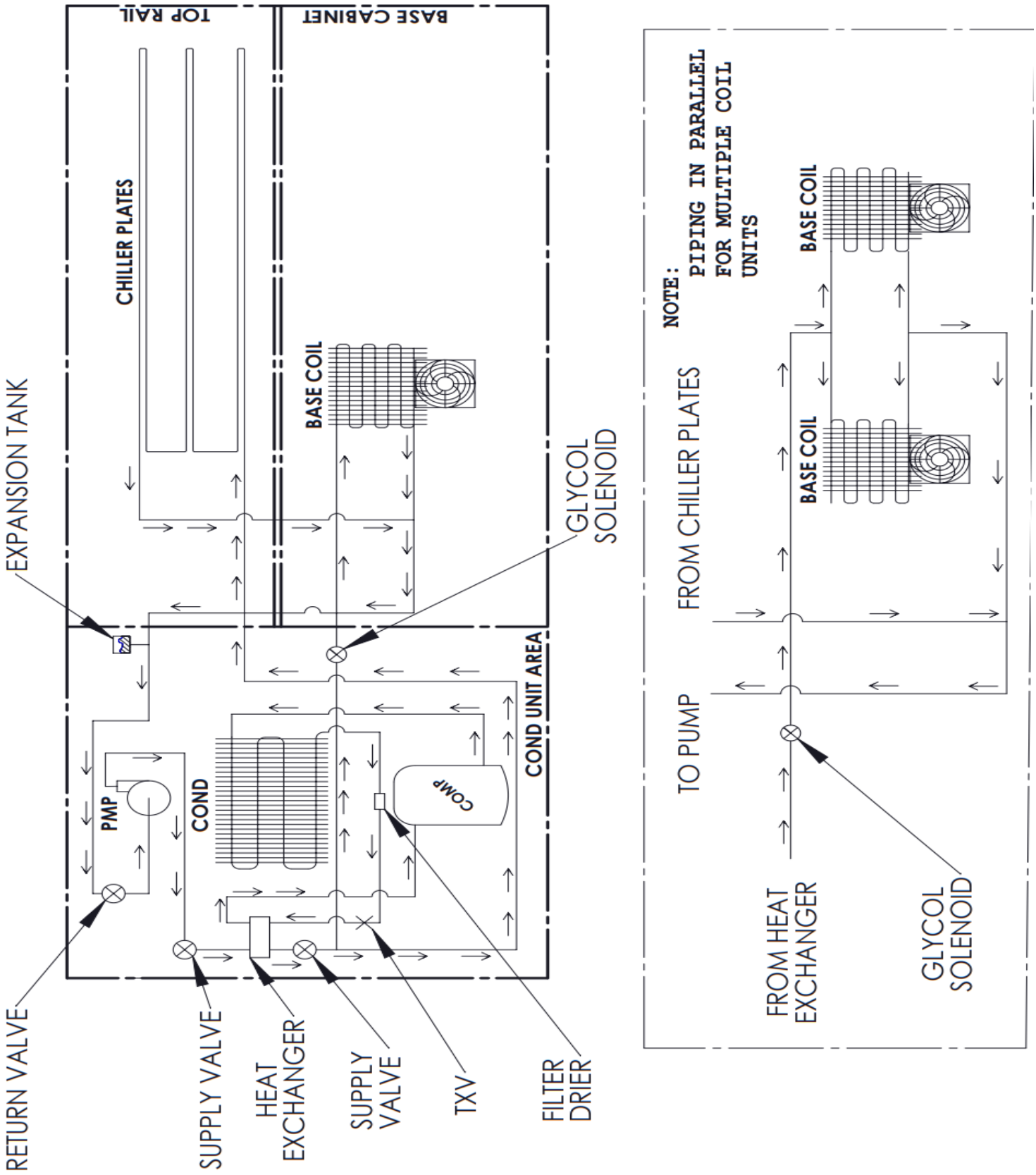
System Efficiency and Reliability

The use of a variable speed inverter increases overall system efficiency by allowing the compressor to operate at a range of speeds instead of a fixed speed. This adaptive operation helps the system maintain the desired temperature with minimal energy consumption, as the compressor only runs as fast as necessary based on load conditions. Additionally, the elimination of start and run capacitors reduces the complexity of the system and the risk of component failure.

Benefits:

- **Energy Efficiency: The inverter adjusts the compressor speed based on the cooling load, reducing energy consumption.**
- **Improved Reliability: Fewer components like capacitors lead to fewer points of failure, improving system longevity.**
- **Smooth Operation: The inverter provides smoother startup and operation, reducing mechanical stress on the compressor.**
- **Reduced Maintenance: Eliminating start and run capacitors minimizes the need for maintenance and parts replacement.**
- **In conclusion, the integration of a variable speed inverter in series with the compressor simplifies the electrical system by removing start and run capacitors. It enhances energy efficiency, reduces mechanical stress, and improves system reliability**.

6B.9.9 Refrigeration diagram



6B.9.10 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. See Table 6B.10.5 for Traulsen part number and OEM model number.

6B.9.11 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.9.12 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 325-60452-00)**. 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.

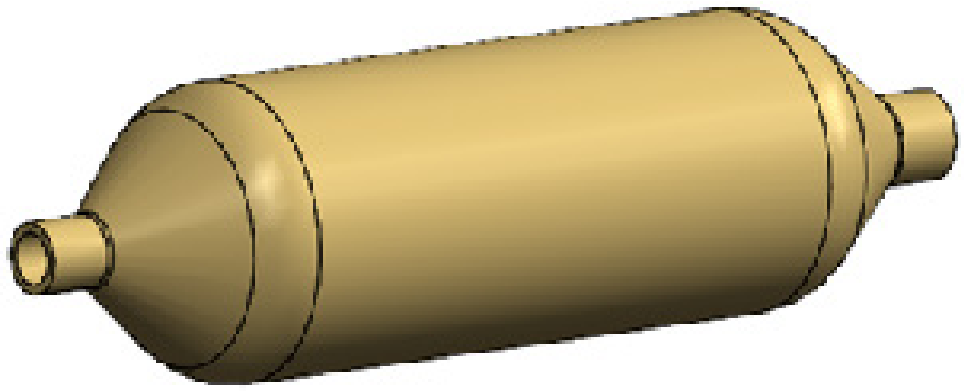
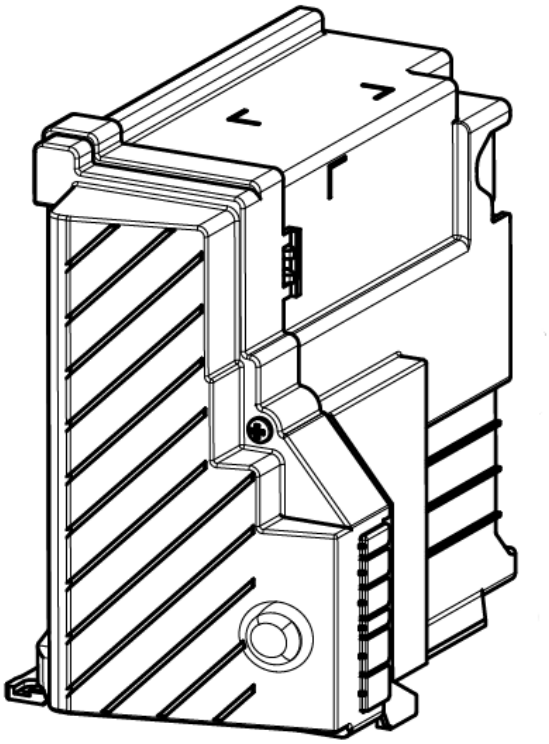


Fig. 6B.9.12 Filter Drier 325-60452-00

6B.10 Electric Inverter

Part# 337-60508-00

6B.10.1 General Product Specifications



CF10B Embraco Electric Inverter

General Specifications	
Input rated voltage range [i]	120 V or 240 V
Input operating voltage range [ii, iii, iv]	70 V-140 V or 160 V-264 V
Maximum input voltage [v, vi]	176 V or 300 V
Input frequency range	50-60 Hz
Input rated current	15.5 A
Input rated power	1000 W
Control mode	Frequency, Drop-in and Serial
Fan driver maximum current	1 A
Operating humidity	< 85%
Environmental humidity [vii]	10% to 85%
Operating ambient temperature [viii]	-20º C to 55º C
Storage temperature	-40° C to 85° C
Air forced ventilation (min) [ix]	2 m/s

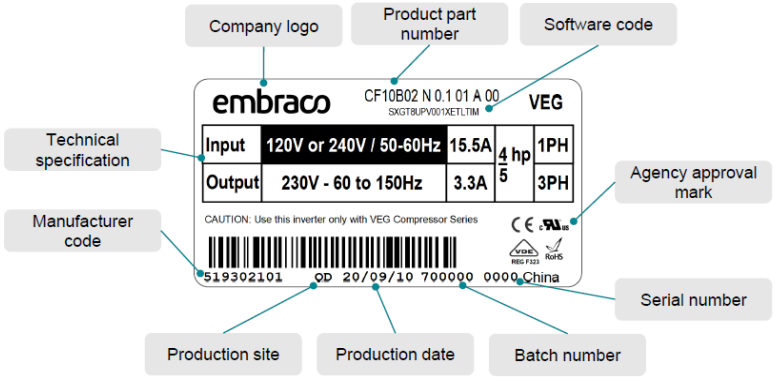
6B.10.2 Technical Specifications

WARNING

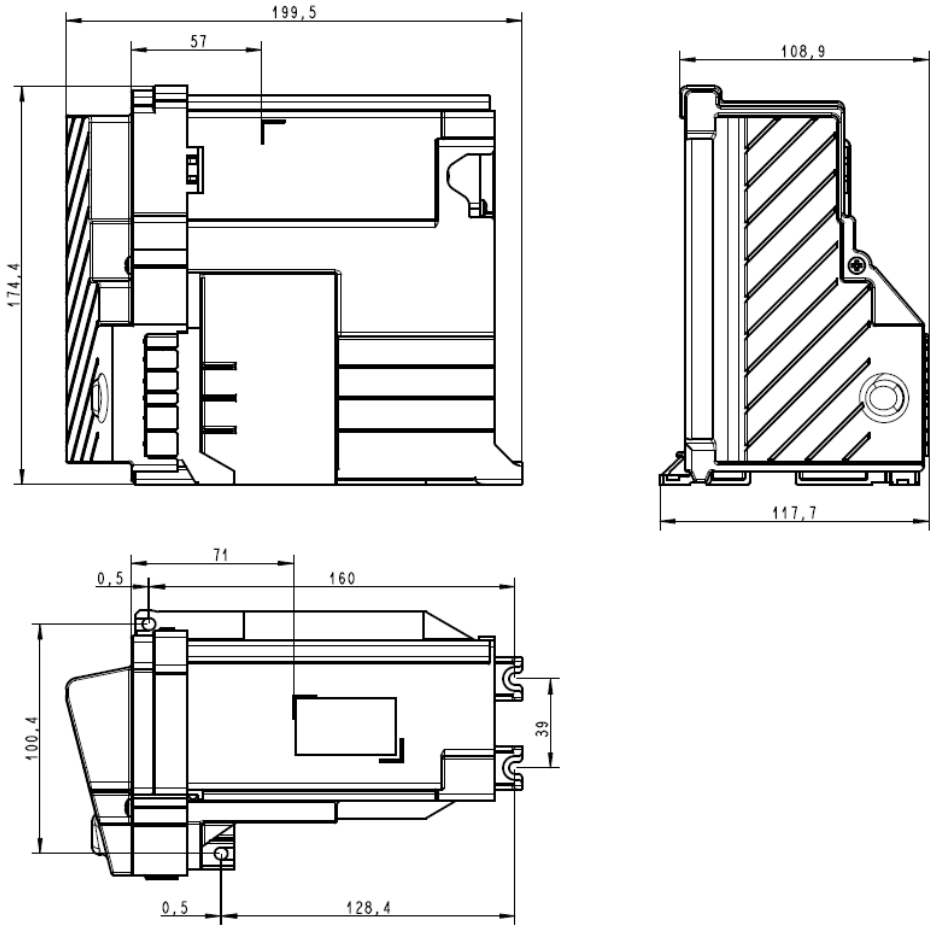
- Do not connect the CF10B Inverter to a power supply above declared Maximum voltage.

CAUTION

- This inverter is for use only with the Embraco VCC compressors.
- Operating the product at voltages out of declared Input operating voltage range may reduce its reliability and significantly impair product performance.
- Make sure to apply the proper Inverter - VCC match. The use of incorrect Inverter - VCC may degrades product overall performance.
- In order to avoid loss of performance, make sure to operate the inverter inside the temperature range of -20 °C to 55 °C.
- Ambient operation temperature above 55 °C or inappropriate positioning of the inverter related to forced ventilation air flow may activate inverter thermal protection.

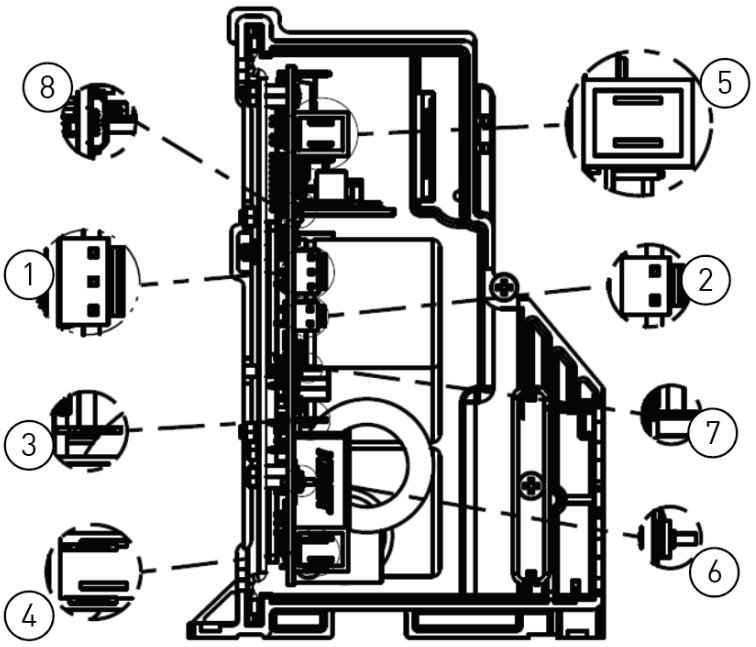


Label Identification



CF10B Product Dimensions
Stand Alone Dimensions (mm)

6B.10.3 Connectors



*Mates with 1/4" fasten receptacle. Fan connector assemble is optional.

Connector Diagram

Connectors Part Numbers			
Indicator	Description	Part Number	Insulation
1	Serial Communication	S3P-VH (LF) (SN)	Reinforced
2	Frequency input	S2P-VH (LF) (SN)	Reinforced
3	Drop in	1217754-1	Non-insulated
4	AC input (L+N)	1217754-1	Non-insulated
5	AC Fan*	MSLO 9402 - 002 - 00A - 960 - 000 - 00	Non-insulated
6	EMI Earth	Cable supplied by embraco	
7	Defrost input	1217754-1	Non-insulated
8	"You Control" input	Micro-USB B	Non-insulated

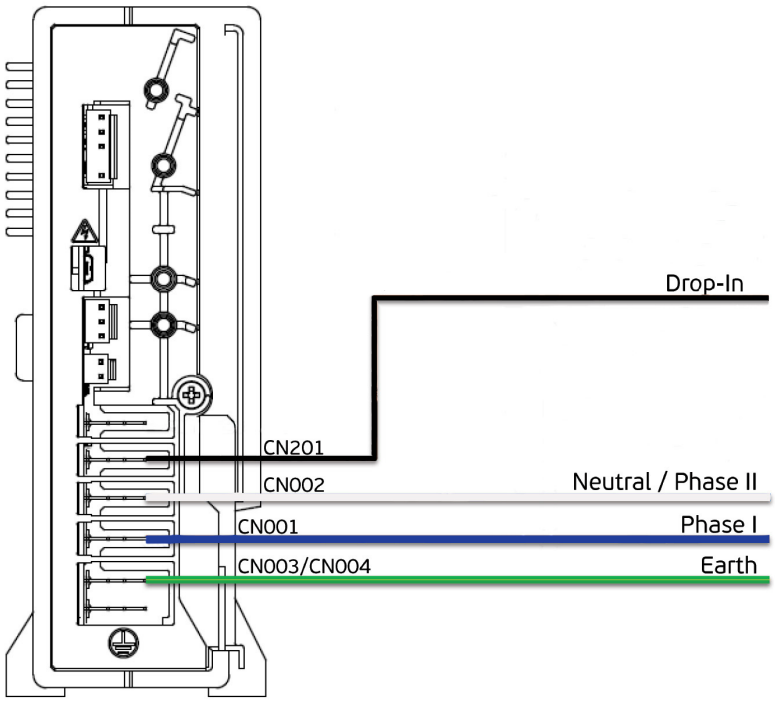
WARNING

- The 'You Control' customization input (micro USB port) does not have electrical insulation. Use the provided communication modules defined by Embraco to guarantee electrical insulation. Check Subsection 4.2.2 for information regarding the indicated communication modules and product customization.

NOTICE

- CF10B inverter series standard configuration is approved to be used only in built in appliances, with not accessible machine compartment. If the intended appliance is an open machine compartment type, please contact Embraco's technical support to ensure the proper configuration of your product.

6B.10.4 Connection



Energized Contact Drop-in Connection

6B.10.5 LED Indication

The LED diagnostics function helps services technicians to diagnose possible fault components by blinking a LED inside the box in different patterns. Basically, it indicates if there is a problem with Compressor, CF10B Inverter or Thermostat. The table below describes the failure modes.

Led Status	Period	Color	Description
1 Flash	30 Seconds	Green	Normal Operation
2 Flashes	5 Seconds	Green	Communication Problem
3 Flashes	5 Seconds	Red	Inverter Problem
4 Flashes	5 Seconds	Red	Compressor Problem
No Flashes	-	-	No Input Power / Damaged Inverter

6B.10.6 Troubleshooting

The following tables shows some possible problems and the best action to deal with them.

Compressor Does Not Start	
Problem	Action
Compressor disconnected from the inverter.	Verify compressor cable connection
No AC power supply; or wrong voltage/terminals connected.	Verify AC input cable connection and measure AC input voltage.
No control signal input or bad connection.	Verify control input cable connection and measure the signal from the thermostat.
Blown fuse (due to previous major failure).	Return the unit to manufacturer, replacing it by new one.
Open compressor motor winding.	Measure winding for open circuit between all pair of pins on the hermetic terminal. If any winding is open, return compressor to manufacturer.
Compressor with locked rotor (due to mechanical damage).	Replace compressor by new one and test for confirmation. Return damaged unit to manufacturer.
Dropped, damaged, burnt inverter.	Replace by new one and test for confirmation. Return damaged unit to manufacturer.
Inverter on waiting time after failed start.	Wait the necessary time or reset the inverter disconnecting it from the AC power supply. The reset time is about 50s.
Demagnetized rotor (only if compressor was previously connected directly to the AC power supply).	Replace compressor by a new one and test for confirmation. Return damaged unit to manufacturer.
Unequaled pressures between discharge and suction pressures in the refrigerating system.	Allow the Inverter to equalize pressure between suction and discharge sides.
Low input voltage supplied to the inverter.	Measure AC voltage to confirm.

Conditions Affecting Compressor Start

Compressor startup issues can be caused by electrical interruptions, inverter faults, motor windings, or pressure imbalances within the sealed system. Key items to verify before suspecting component failure include:

AC Line Power: Confirm that proper input voltage (e.g., 208-230V or 115V) is present at the inverter terminals. A voltage drop under load may prevent startup.

Control Signal: The relay main control (e.g., NexGen board) must deliver the correct ON/OFF logic. Moisture, poor crimps, loose connections, or corrosion at terminals can cause erratic behavior.

Fuse Status: Some inverters may contain internal non-resettable fuses. If a major failure has occurred (e.g., short winding or severe over current), replacement of the module is required.

Compressor Winding Integrity: Open windings or imbalanced resistance across motor terminals will prevent inverter engagement. Resistance checks should be taken phase-to-phase on the hermetic terminals.

Compressor does not run at the selected speed	
Problem	Action
High compression load, with compressor being subjected to a stall condition.	Review system design,refrigerant gas load or compressor capacity is not suitable for the application. If system is appropriated designed, speed will reach set value when load condition is stabilized.
Compressor always on pull down cycle for Drop-In Mode.	In Drop-In mode, check if the inverter AC input is connected to thermostat output. Inverter AC input should be directly connected to AC power supply (see Drop-In mode schematic).
No or incorrect control signal.	Check if the appropriate control signal is being correctly applied to the Control Input Connection.

Summary – Unit Not Cooling

After completing the full troubleshooting chart, confirm these critical checkpoints:

Parameters Verification

TR = Rail temperature

TC = Cabinet temperature

Cross-check readings with a multimeter or independent probe (allow for 3–5°F variance due to sensor placement).

Pump Operation

Confirm vibration and fluid circulation.

Steady amp draw between 0.5–1.0A required.

Fluctuation or zero draw = pump fault.

Compressor & Condenser

Compressor must be running.

Suction/discharge pressures within range.

Condenser fan is wired in series with compressor and must run whenever compressor is energized. Verify voltage communication lights on inverter, if lights aren't present verify incoming voltage to inverter/compressor etc

Additional Verification

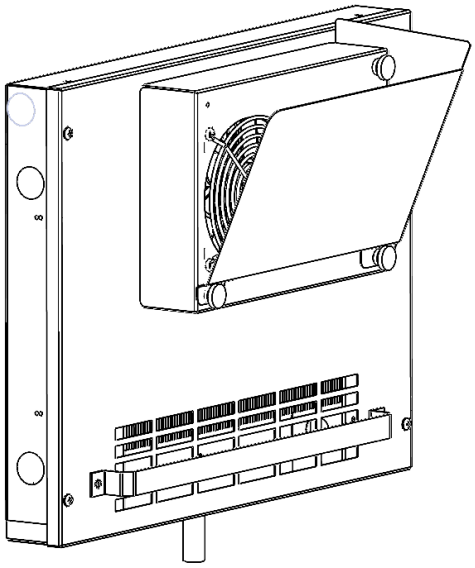
-Solenoid valve powered at 120V; test with magnet and observe frost/temp difference before vs after valve.
-Evaporator fans must run when commanded (verify icon on display and Gray wire voltage).
-Condenser coil clean and airflow unobstructed.

6B.11 Evaporator Fan Troubleshooting

6B.11.1 Steps for Troubleshooting Glycol System Evaporator Fan.

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 (**if door switches and inside lights present),** 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.11.1a Evaporator Fan Icon On
Display PN: 900-60510-00



. Next use an amp meter to prove the evaporator fan motor is running.

. 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

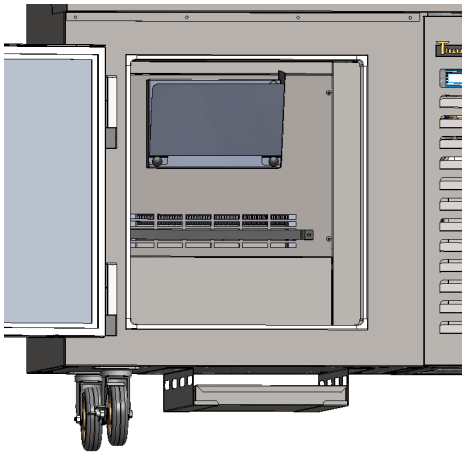


Fig. 6B.11.1b Duct Removal

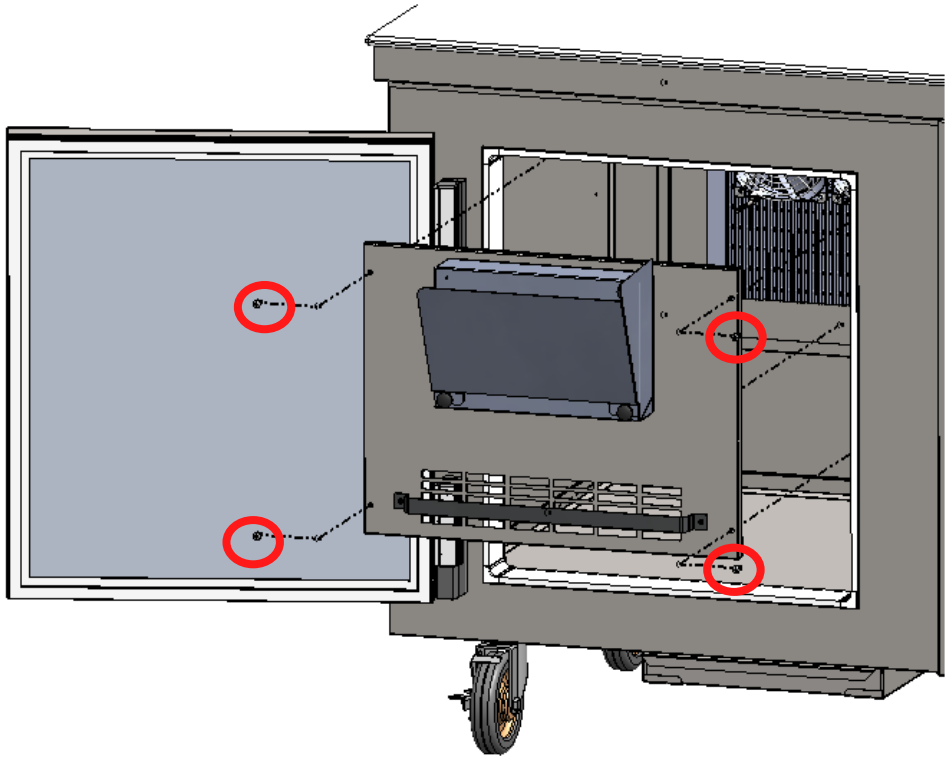
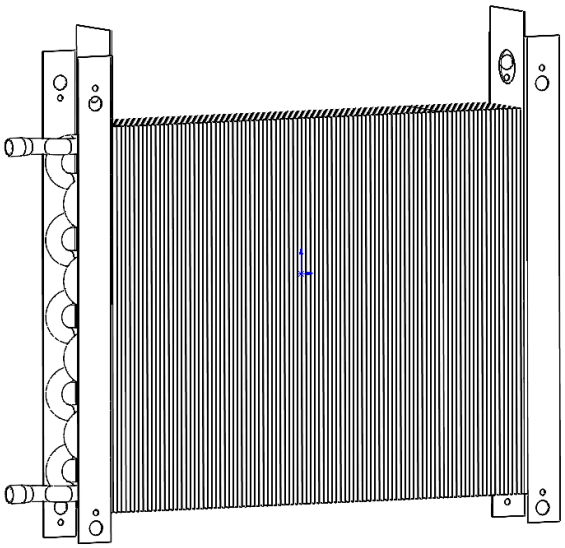


Fig. 6B.11.1c Evaporator Fan Assembly Removal
338-60062-10

6B.11.2 Evaporator Unit



Sensor Data	Part Number
Evaporator coil 10 x12	2100306

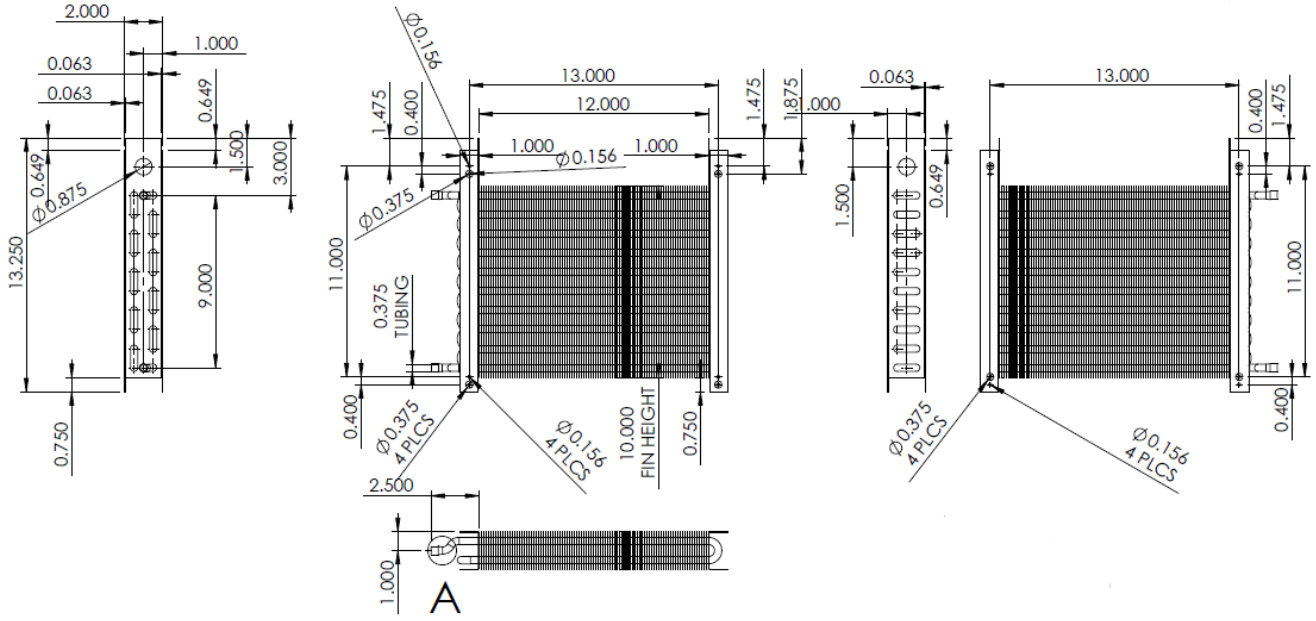


Fig. 6B.11.2 Evaporator Unit
Traulsen P/N: 2100306

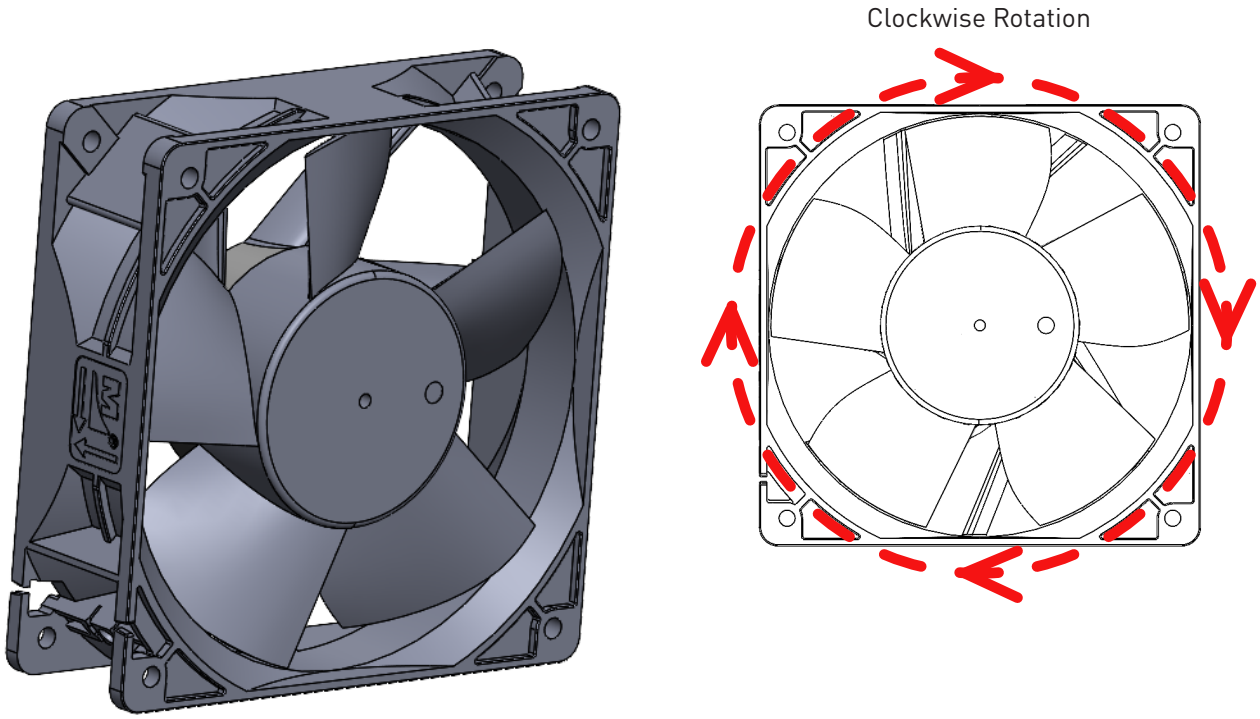


Fig. 6B.11.3 EC Axial Evaporator 5 blade Motor
TRAULSEN P/N 338-60062-10

DESCRIPTION/ SPECIFICATION	MANUFACTURER
	FASCO INDUSTRIES, INC.
Part Number	EC12038B00UL-S5-X4-A02
Amps	51.5 A
Voltage	110-120/220-240v
Frequency	50/60 Hz
Speed	3,500 RPM
Rotation	CW

Table 6B.11.3a EC Axial Fan Motor Specs

6B. 11.3 EC Axial Fan Replacement Procedure

Fans are mounted with multiple screws—each screw must be fully removed to release the motor and fan assembly.

- Disconnect voltage connections from the motor before removing.
- EC motors are typically connected via Gray wires/terminals which must be unplugged carefully.
- After replacing the motor, reconnect terminals and secure all mounting screws. Ensure the fan spins freely with no obstruction or wire contact.

Fan Troubleshooting Guidelines
When the cabinet is not cooling evenly or airflow is weak, verify fan operation using the following steps:
Fan Call Status:
Check the controller or display for a fan call icon or status indicator. If the fan icon is inactive, the unit is not currently calling for fan operation—wait for a cooling cycle or force fan mode via the control (if applicable).

Voltage Verification:
Use a multimeter to check for voltage output at the control board when fans should be running.
Confirm voltage at the fan connection (**typically 120V on Gray Terminal/Wiring Connection**).
If voltage is present at the board but not at the fan, inspect wiring for damage or loose connections.
Motor Response:
If voltage is present at the motor but the fan does not operate, the motor may be seized or internally shorted and should be replaced.
Also check for obstructions or buildup on the fan blade that could restrict movement.

6B.12 Condenser Fan Troubleshooting

6B.12.1 Troubleshooting the Condenser Fan Motor

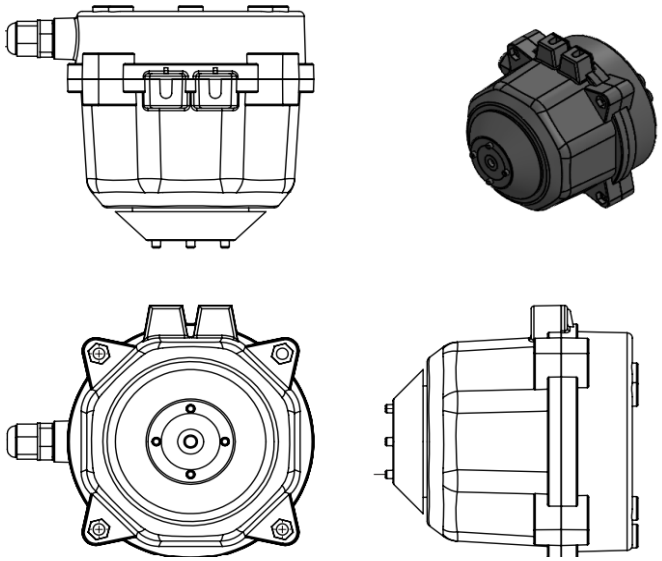


Fig. 6B.12.1a CFM Assembly View

FAN MOTOR ASSY CONDENSER PN: 325-60124-03

Fig. 6B.12.1b LED Display

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.12.2 ECN Motor failure

Condenser fan motors are wired in series with traulsen compressors, If the compressor icon is illuminated the condenser fan should be running/supplied power as well.

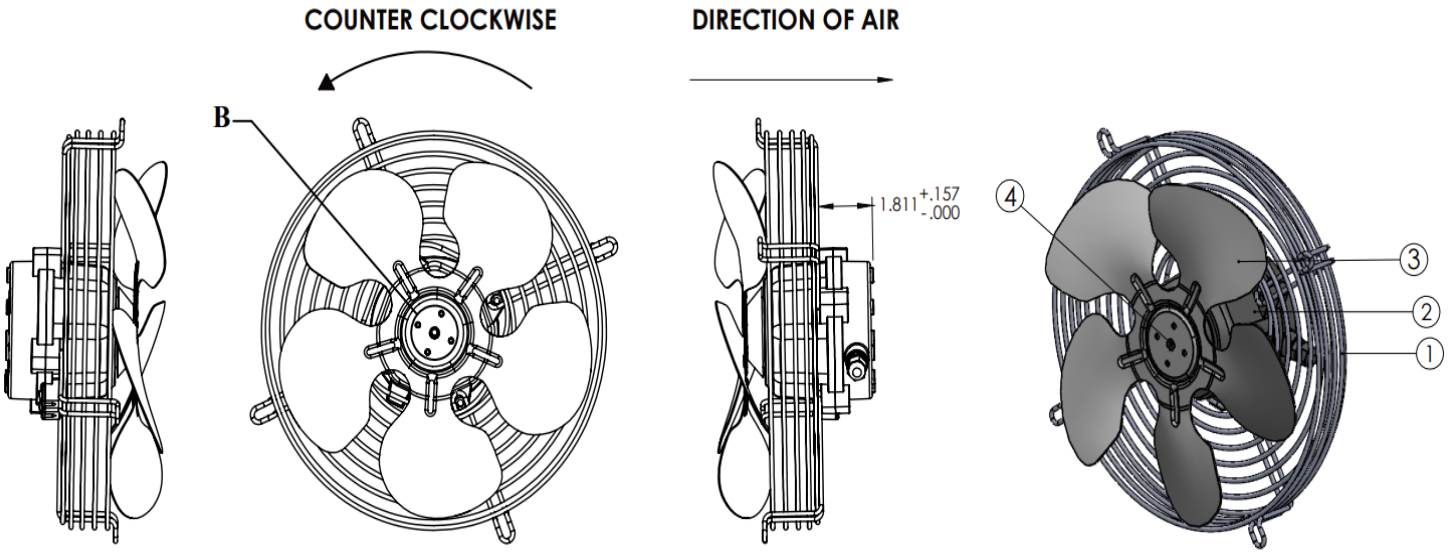
When diagnosing, always inspect for obstructions such as ice buildup or debris that may stop the fan blade from turning. Spin the blade by hand to confirm it rotates freely. Verify voltage supply at the motor terminals with a meter. If proper voltage is present and the motor fails to run, or cuts out repeatedly, the motor should be replaced.

Condenser Fan Motor P/N: 338-60069-00

DESCRIPTION/ SPECIFICATION	MANUFACTURER
	MORRILL MOTORS, INC.
MODEL	GEC7124H
MOTOR TYPE	BRUSHLESS EC
OUTPUT	16 WATT
AMPS	.80 A
VOLTAGE	100-240V
FREQUENCY	50/60 Hz
SPEED	1,550/1880 (+/-50) RPM
ROTATION	CCW

Table 6B.12.2 Condenser Fan Motor

6B.12.3 Replacing The Condenser Fan Motor

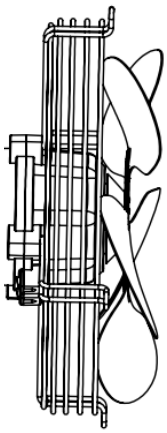


1. ASSEMBLE FAN BLADE WITH CONCAVE TOWARD MOTOR USING SPEED NUT INCLUDED WITH MOTOR.
A. USE PROPER TORQUE EQUIPMENT WHEN INSTALLING SPEED NUT.
B. TORQUE TO 10 IN-LB TO 18IN-LB.
2. USE VIBRATION WASHER SUPPLIED WITH MOTOR

DESCRIPTION	TRAULSEN PART NUMBER
Condenser fan motor assembly	325-60124-03

Table 6B.12.3 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.



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

Fig. 6B.12.3 Fan Blade Orientation

6B.13 Troubleshooting Thermostatic Expansion Valve

All Traulsen Glycol System refrigerators 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 (power head) 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.

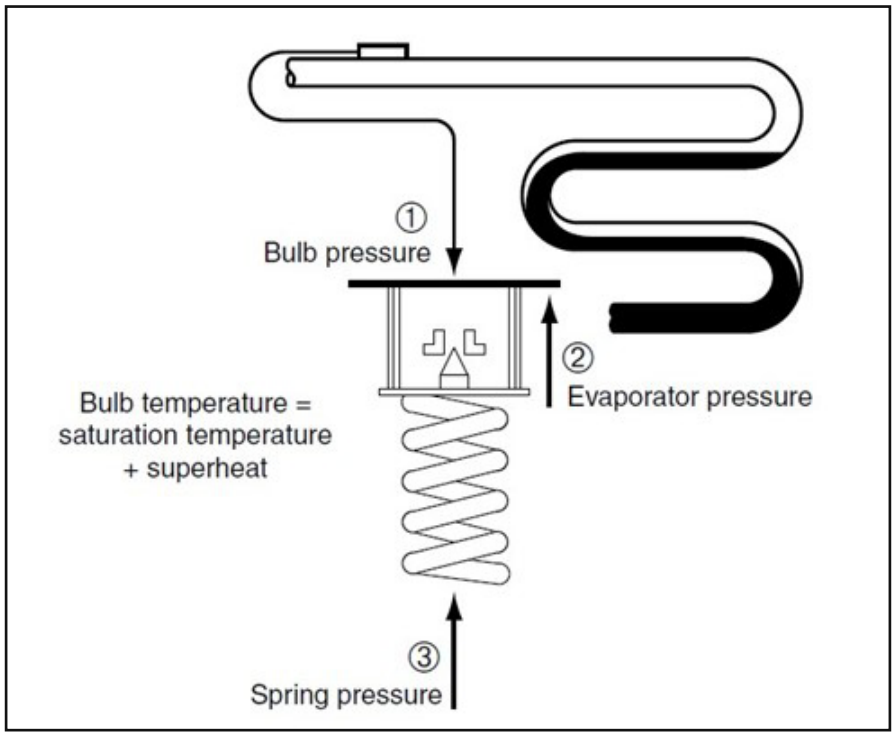


Fig. 6B.13 TXV 3 Pressures

6B.13.1 Three Pressures

There are three pressures at work on a TXV:

- The bulb pressure which is the only opening force.
- The evaporator pressure which is a closing force.
- The spring pressure which is a closing force.

All the TXV's used in Traulsen Glycol System 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.13.2 Non-Bleed Type

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

6B.13.3 Maximum Operating Pressure

The TXV used in a Traulsen Glycol System 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.13.4 Measuring Superheat

When troubleshooting a TXV, it may become necessary to measure superheat- this can be done without connecting pressure gauges. All Traulsen Glycol System 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.

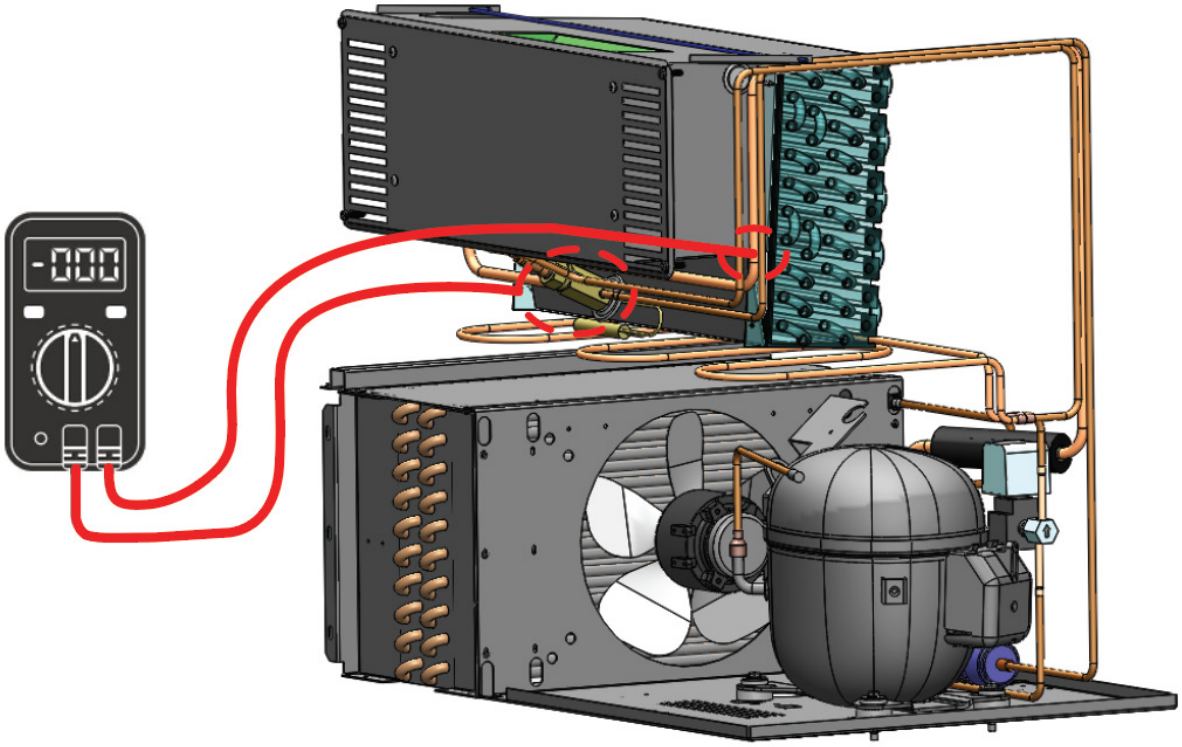


Fig. 6B.13.4 Measuring Superheat

6B.13.5 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.13.6 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.14 Servicing the Refrigeration System

6B.14.1 Condenser Assembly

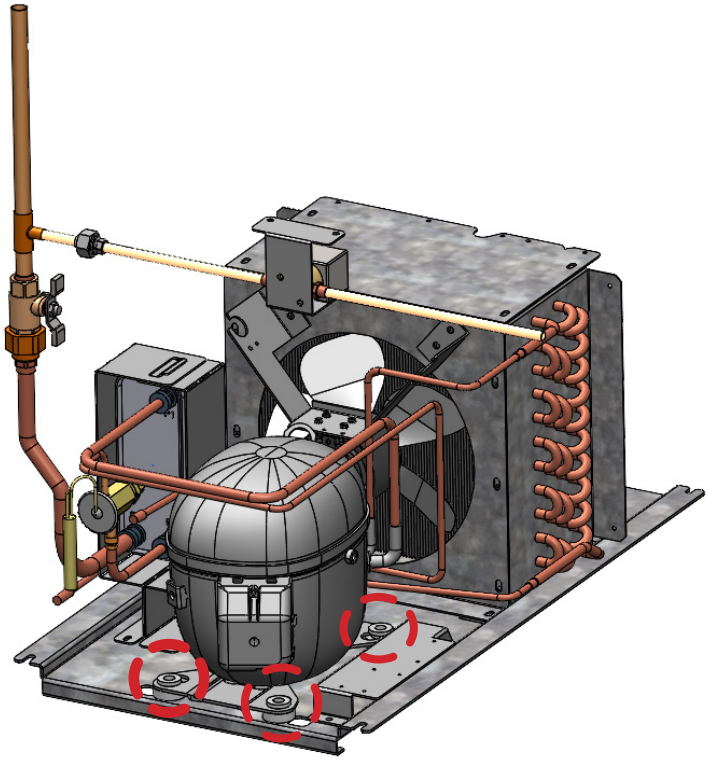


Fig. 6B.14.1a Fastener Locations

Servicing the Refrigeration System – Glycol Units

Glycol refrigeration systems are engineered for performance and service accessibility. Depending on the issue, repairs may involve replacing specific components such as the heat exchanger or compressor, or in some cases, replacing the entire refrigeration skid assembly. The appropriate method depends on the extent of the repair, warranty status, and technician access in the field.

Component-Level Service (Compressor or Heat Exchanger Only)

For targeted repairs or when access is not restricted, technicians may choose to service only the failed component. Both the heat exchanger and compressor can be accessed and replaced without removing the entire skid.

Heat Exchanger Service:

Accessible from the side or rear depending on unit layout.

Disconnect glycol lines and insulation as needed.

Confirm proper re-installation and leak-free operation during reassembly.

Compressor Replacement:

The compressor is mounted using quick-release clips rather than traditional bolt-and-nut fasteners.

These clips must be carefully removed and reinstalled to secure the compressor firmly and maintain vibration control.

Follow standard procedures for refrigerant recovery, braze joint disconnection, and system evacuation during compressor swap.

Service Note:

When replacing components individually, always inspect surrounding parts for signs of wear or contamination (e.g., Oil stains, corrosion, or refrigerant leaks). Even if only the compressor is being replaced, it's critical to confirm the heat exchanger and solenoid valves are operating properly to avoid repeated service calls.

Summary for Technicians

- **Skid replacement is ideal for full warranty repairs or multiple failures.**
- **Compressor and heat exchanger service offers efficient options for isolated issues.**
- **Compressor uses clip-style mounts—no traditional bolts or brackets.**
- **Always follow refrigerant handling procedures and verify system balance after service.**
- **Selecting the right service approach ensures faster repairs, better long-term performance, and compliance with factory standards**

6B.14.2 Defrost Troubleshooting

Traulsen uses a off cycle defrost on the Glycol System refrigerators. The last cabinet temperature before the defrost started will be displayed throughout the entire defrost cycle.

Glycol System Off-Cycle Defrost

The glycol system utilizes a passive off-cycle defrost method that activates automatically every fourth compressor cycle. This defrost strategy is designed to remove light frost accumulation from the rail and heat exchanger surfaces without the use of electric or hot gas defrost.

Defrost Cycle Overview

- On every 4th compressor cycle, the refrigeration system shuts off, initiating the defrost process.
- The glycol pump continues to operate, allowing circulated glycol (now slightly warmer due to compressor shutoff) to absorb residual frost from the system.
- During this time, the evaporator fan remains off to prevent airflow over melting frost and to help contain any condensation.
- The solenoid valve continues to cycle normally, responding to the cabinet's setpoint (SP) temperature.

Defrost Termination Control

- The green sensor, located on the copper line leading to the heat exchanger, monitors temperature during defrost.
- Defrost is automatically terminated when the sensor reads between 34°F to 35°F, ensuring that frost has cleared and glycol is ready to re-enter cooling mode.
- This ensures the system does not re-enter cooling prematurely or extend defrost unnecessarily, preserving energy efficiency and maintaining temperature stability.

Drip Time and Transition

- After defrost ends, a drip time delay of up to 2 minutes allows any remaining condensate to drain from the heat exchanger before active cooling resumes.
- During this period, the system remains idle while the pump continues circulation.

Pre-Cool Phase

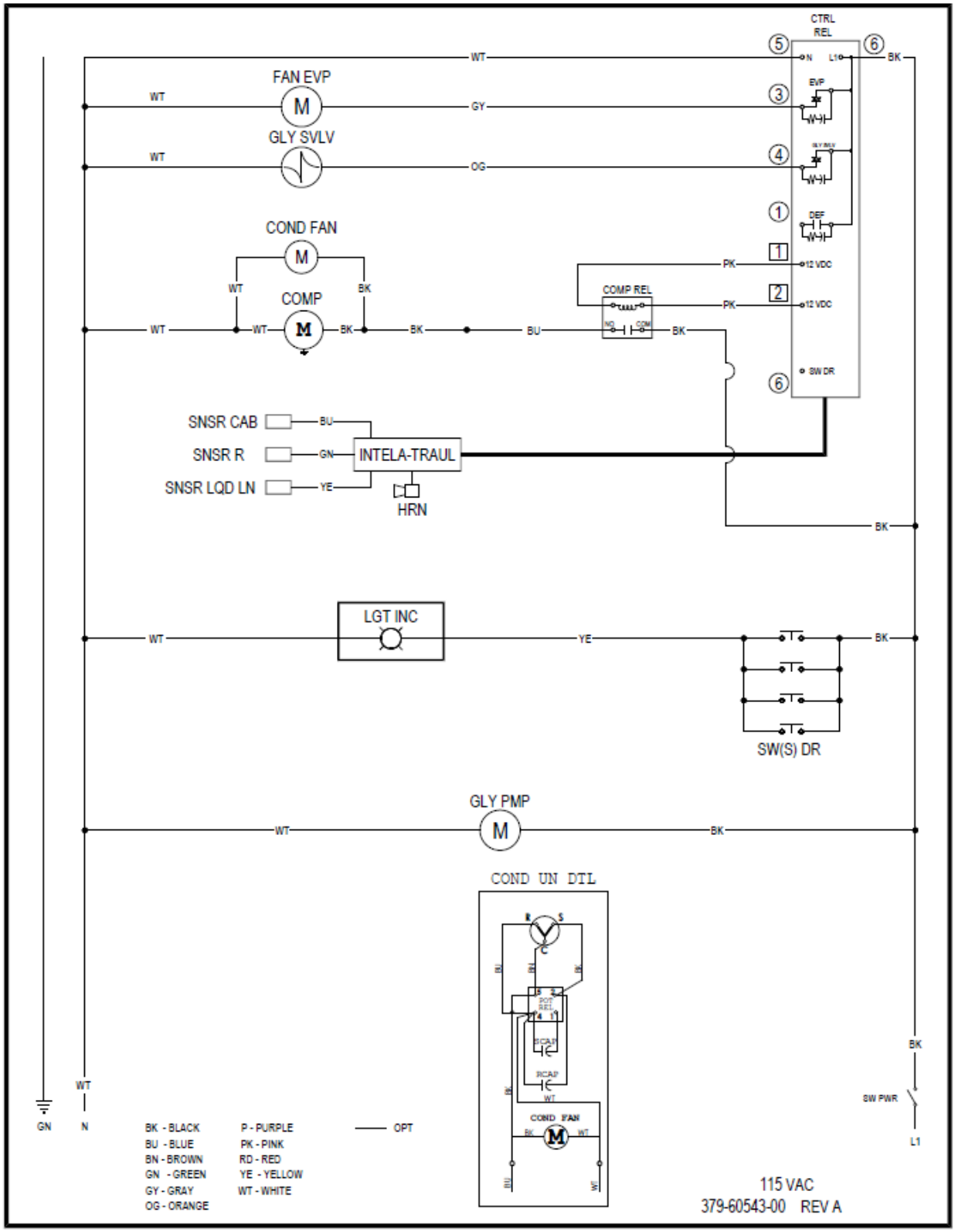
Following drip time, the system enters pre-cool mode.

- The compressor starts and the solenoid valve opens, initiating active cooling.
- The system prioritizes the rail section, quickly lowering its temperature.
- Evaporator fans are re-enabled and the system resumes standard cooling operation, maintaining the cabinet at the programmed setpoint.

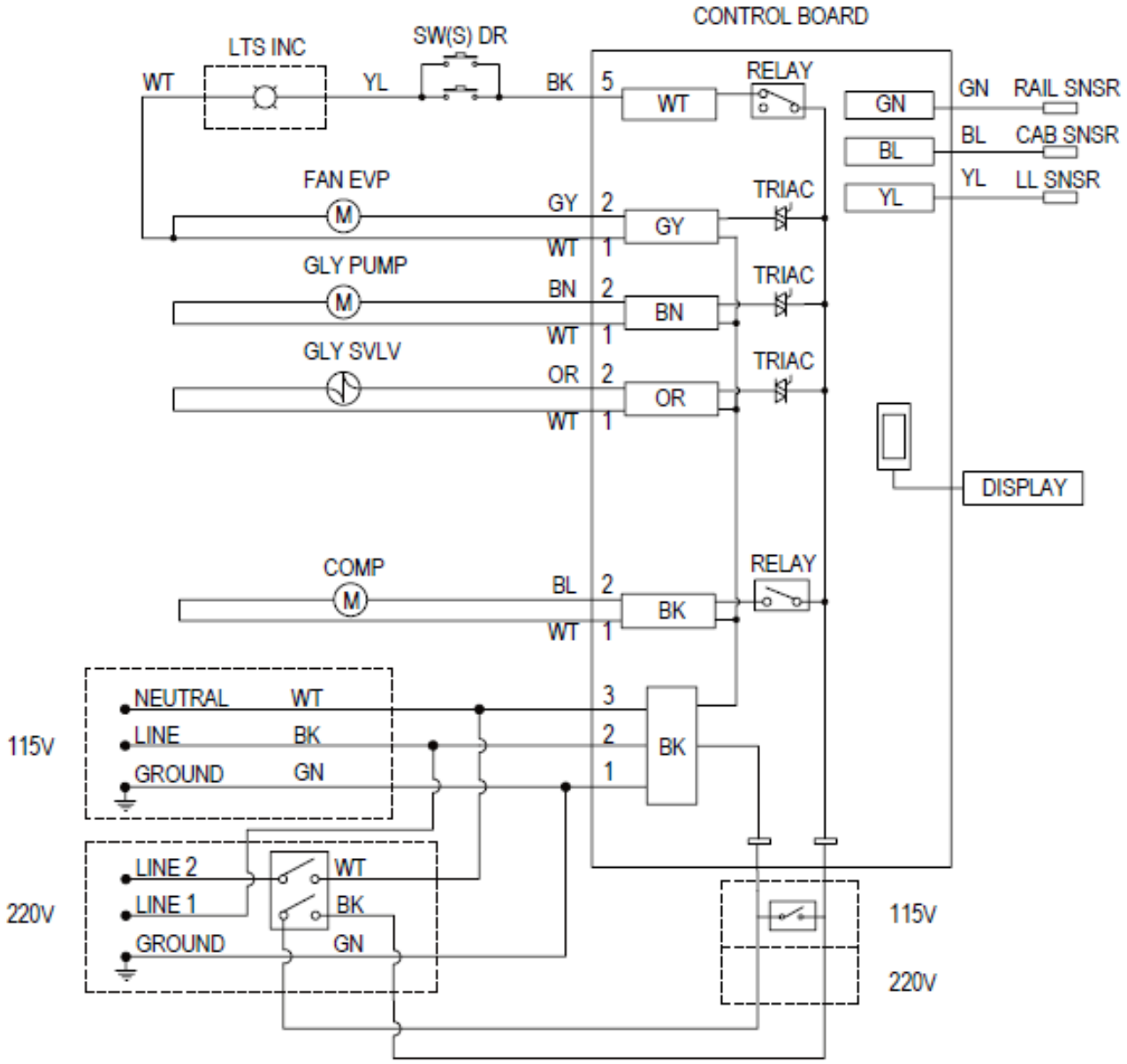
This defrost method is energy-efficient, non-intrusive, and designed to maintain precise temperature control while minimizing system downtime. Proper operation of the green sensor, pump, solenoid valve, and fan timing is critical for effective defrost performance.

7. General Wiring Diagrams

7.1 Pre R290 Intelatrol Control Models

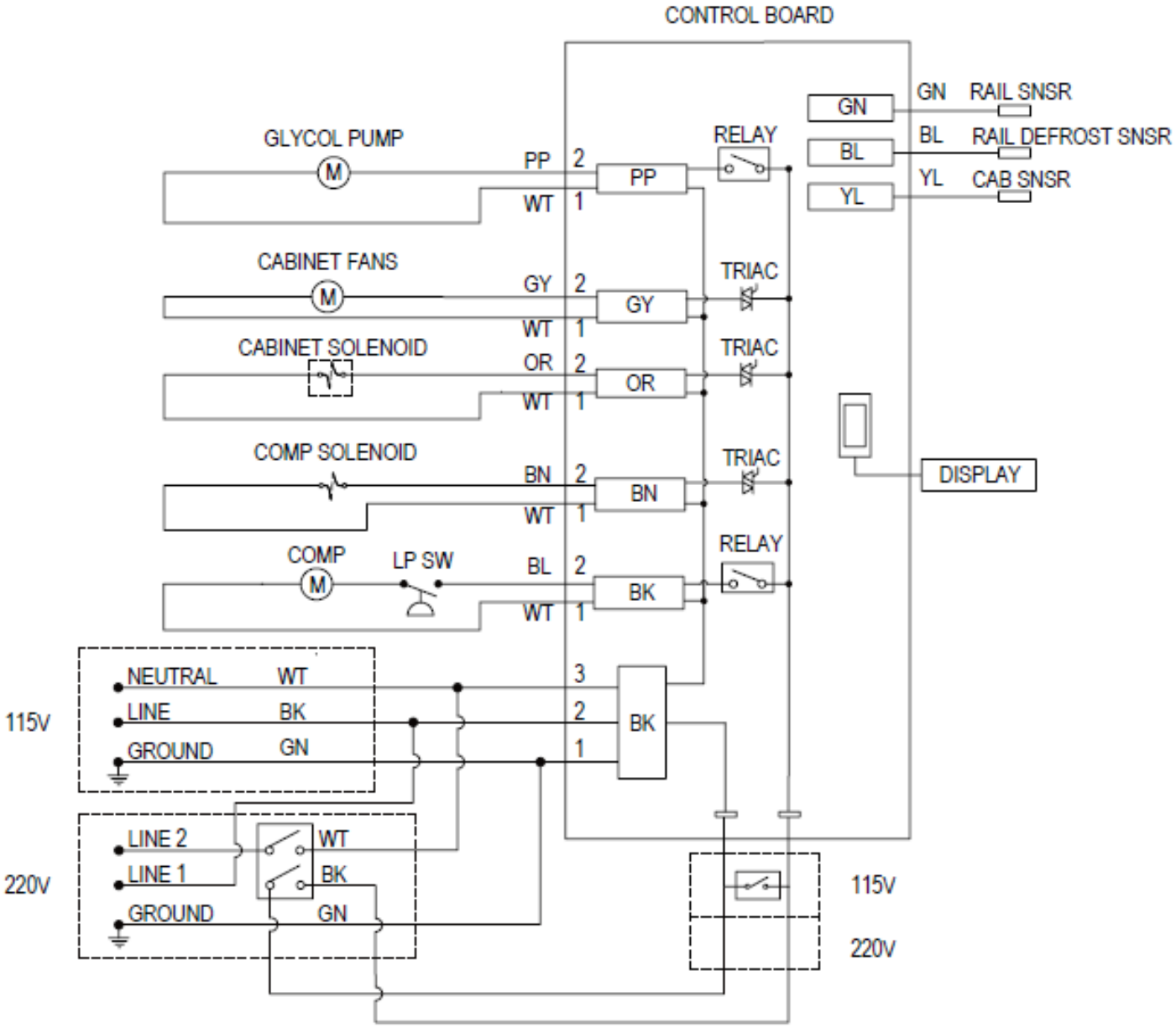


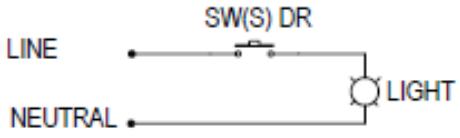
7.2 NEW R290 Next Gen Diagram 115V or 220V



BK	BLACK
BL	BLUE
BN	BROWN
GN	GREEN
GY	GREY
OR	ORANGE
PP	PURPLE
RD	RED
WT	WHITE
YL	YELLOW
- - -	OPTION

7.3 Cont. Next Gen Diagram 115V or 220V





NOTES:
1. BICU DOES NOT HAVE CABINET FANS

BK	BLACK
BL	BLUE
BN	BROWN
GN	GREEN
GY	GREY
OR	ORANGE
PP	PURPLE
RD	RED
WT	WHITE
YL	YELLOW
- - -	OPTION

8. Warranty Information

NOTES STANDARD DOMESTIC WARRANTY

TRAULSEN & CO., INC. Warrants new equipment to the original purchaser, when installed within the United States against defective material and workmanship for one 1) year from the date of original installation. Under this warranty, TRAULSEN & CO., INC. Will repair or replace, at its option, including service and labor, all parts found to be defective and subject to this warranty. The compressor part is warranted for an additional four 4) years. During this period TRAULSEN & CO., INC. Will supply replacement compressor(s) if deemed defective, however, all installation, recharging and repair costs will remain the responsibility of the owner.

This warranty does not apply to damage resulting from fire, water, burglary, accident, abuse, misuse, transit, acts of God, attempted repairs, improper installation by unauthorized persons, and will not apply to food loss.

THERE ARE NO ORAL, STATUTORY OR IMPLIED WARRANTIES APPLICABLE TO TRAULSEN, INCLUDING BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF. TRAULSEN SHALL HAVE NO OBLIGATION OR LIABILITY FOR CONSEQUENTIAL OR SPECIAL DAMAGES, GROWING OUT OF OR WITH RESPECT TO THE EQUIPMENT OR ITS SALE, OPERATION OR USE, AND TRAULSEN NEITHER ASSUMES NOR AUTHORIZES ANYONE ELSE TO ASSUME FOR IT ANY OBLIGATION OR LIABILITY IN CONNECTION WITH THE EQUIPMENT OR ITS SALE, OPERATION OR USE OTHER THAN AS STATED HEREIN.

INTERNATIONAL COMMERCIAL WARRANTY

(for Canadian warranties see domestic US warranty)

TRAULSEN & CO., INC. Warrants to the original purchaser the Refrigeration Equipment manufactured and sold by it to be free from defects in material and workmanship under normal use and service for a period of one 1) year from date of shipment. Under this warranty, TRAULSEN & CO., INC. Will reimburse the purchaser for the replacement of any part of said equipment (excluding dryers & refrigerant gas) which then proves to be defective. This warranty is void if said equipment or any part thereof has been subject to misuse, damage in transit, accident, negligence or alteration.

TRAULSEN'S standard warranty does not apply to Export Sales. Rather, for a period of one 1) year from date of original installation not to exceed Fifteen 15) months from date of shipment from factory, TRAULSEN:

will replace, F.O.B. factory, any defective parts normally subject to warranty.

will not cover the cost of packing, freight or labor such costs being the sole responsibility of the dealer.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EITHER EXPRESSED OR IMPLIED AND CONSTITUTES TRAULSEN'S FULL OBLIGATION AND LIABILITY. WARRANTIES NOT AVAILABLE ON REMOTE MODELS.

Tech Tip

8.1 Optimizing Glycol Prep Table lower storage cabinet Settings for High-Volume Environments (these settings are for the Nextgen controller only)

To ensure your Glycol prep table lower storage cabinet performs optimally, especially in high-traffic environments, adjusting certain settings can significantly impact cooling efficiency.
Two key settings**—"FNO"** and **"Dfr"—**can be tailored to meet your needs.

1. **FNO (Fan Control Setting)**
Factory Default: "cyc" (cycle)
By default, the fans are programmed to cycle on and off,
Adjustment: "FNO" (Fan On)

- In high-volume settings with frequent door openings, it's recommended to set the fans to "On." This ensures that the fans are continuously circulating air, maintaining a consistent internal temperature and preventing rapid temperature fluctuations caused by repeated door openings on the lower storage cabinet.

- By doing so:It provides quicker temperature recovery and helps maintain the temperature in the lower storage cabinet, keeping your prep table cabinet within the ideal cooling range.

- It enhances overall cooling performance, particularly when the standard "cyc" setting may not meet the demands of high-volume operations.

2. Dfr (Evaporator Fan Defrost Setting)
What It Does: This setting controls whether the evaporator fans run during defrost cycles. In an off-cycle defrost (which does not use heat to melt frost), enabling the fans allows for continuous airflow across the evaporator coils, aiding in the defrosting process.

Why It's Important: For operations with minimal downtime, like restaurants running long shifts, this setting helps the unit defrost more efficiently without introducing excess heat. By keeping air moving over the coils:
- It reduces the accumulation of frost more efficiently.
- It maintains stable temperatures inside of the lower storage cabinet throughout the defrost process.
- It prevents unnecessary interruptions to the cooling system, ensuring the prep table remains ready for use

By understanding and adjusting these settings, you can fine-tune your Glycol prep table's performance to better handle the demands of high-volume environments.

Why These Setting Changes Are Important in High-Volume Operations

In high-volume kitchens, frequent door openings and continuous product loading introduce warm air into the lower storage cabinet, causing rapid temperature swings and extended recovery times. By enabling continuous fan operation and airflow during defrost, the system maintains more consistent temperatures and clears frost more efficiently. These adjustments reduce thermal stress on the refrigeration system, improve pull-down performance, and help ensure product remains within safe holding temperatures during peak demand.

Service Technician Note:

Before making these adjustments, technicians should evaluate how the unit is being used. Consider factors such as door frequency, customer traffic flow, ambient temperature, and the unit's placement in the kitchen. Not all applications require these changes—units in low-traffic or temperature-stable environments may perform best using factory default settings. Adjust only when operational patterns indicate a need for improved temperature recovery or frost control.

Control Adjustment for Cabinet Optimization

8.1A Controller Unlock and NexGen Setting Adjustments (FNO / dFr)

Follow the steps below to unlock the controller and adjust airflow settings for optimal lower cabinet performance in high-volume environments.

Controller Unlock and DFR / Fan Settings Adjustment:
Unlock the Controller:
Tap the **white circle** button twice. **(Tap,Tap)**
Look for a **solid blue dot in the upper left corner, which means the controller is unlocked.**
Press the bottom right **return key**.
The display should show **SEN.**
Press the + button to navigate to SET (note: the "T" will look like an upside-down "F").
Press the bottom right return key.

Change the Password:
You should see **000**.
Change the three zeros to **999** by using the **+/-** buttons to adjust the numbers.
Press the bottom right return key after each change to advance to the next digit.

Adjust FNO Setting:
(FNO-evap fans to ON so they run all the time)
Once you see **SP,** press the **+** button to navigate to **FNO**.
Press the bottom right **return key.**
Press the **white circle** button (the value will start flashing).
Use the **+** button to change the value to On.
Press the bottom right **return key** to store the change.

Set DFR to Air:
(DFR- change to AIR so the evap fans run during defrost.)
Press the top right **X button** to go back to **FNO**.
Press the **+ button** until you see **DFR**.
Press the bottom right **return key**.
Press the **white circle** button (the value will flash).
Use the **+ button** to **change the value to Air**.
Press the bottom right **return key** to store the change.

Return to Main Display:
Press the top right **X button** 4 times to return to the main display.

Controller Auto-Lock Function

After exiting the settings menu, the controller will remain unlocked for approximately two minutes. During this time, no button presses are required to maintain access. Once this period expires, the controller will automatically re-lock and the blue dot indicator will disappear.

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Form Number: TR00427 | Revision Date: 11-2024

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