MODEL YEAR: 2024-2025

REVISION: A

OPERATOR'S MANUAL

PLATE BANK REFRIGERATION SYSTEM WITH PLC

INCLUDING MAINTENANCE

This manual contains important safety information. Before operating the unit, read this manual thoroughly. Keep the manual with the truck body.

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1 Introduction

Congratulations on your purchase of a Johnson Truck Body with Plate Bank refrigeration. We believe that you will enjoy years of reliable service from our equipment and enjoy the benefits of accurate and efficient temperature management in your refrigerated truck. Thank you for choosing us for your refrigerated transport needs.

1.1 Plate Bank System Overview

Plate Bank refrigeration from Johnson Truck Bodies (JTB) is an all-electric refrigeration system that we have offered for decades. The refrigerated compartment is cooled to a regulated temperature with cold air from the Plate Bank fans. The air delivered by the fans is chilled by passing around Cold Plates inside the Plate Bank, which are filled with a eutectic solution which freezes and thaws at a temperature lower than the desired air temperature. When the truck is parked, the refrigeration system is plugged into AC electrical power. This powers a Condensing Unit(s), which circulates refrigerant through the Cold Plates and freezes their solution. When the truck is used for the delivery route, the frozen Cold Plates in the Plate Bank absorb heat from the refrigerated air, which slowly thaws the frozen solution. This is like using a “freezer pack” to keep a lunch box cold.

Like a “freezer pack”, the Plate Bank system does have a capacity limit. While the Cold Plates have frozen solution left to thaw, the Plate Bank maintains the designed temperature. But if the Cold Plates become completely thawed, temperature control is lost until the truck is plugged in to run the Condensing Unit and re-freeze the Cold Plates. JTB carefully sizes the Plate Bank system to provide cooling for the entire route, with more to spare, based on each truck’s design and expected usage.

1.2 Plate Bank System Advantages

The Plate Bank system is a simple and robust refrigeration system. It gives many of the advantages of Cold Plates but acts more like a forced-air evaporator. Compared to free-hanging Cold Plates, the Plate Bank’s active air circulation can provide faster temperature recovery after door openings. The Plate Bank provides more accurate medium-temperature refrigeration than free-hanging Cold Plates, lessening the risk of frozen product. Be aware that Plate Banks are still prone to freezing products which are left on the truck overnight, or longer than one route-day. This is especially true for products that are close to the Plate Bank.

Compared to a diesel-powered refrigeration system, there is no engine, no oil changes, no extra emissions, and silent operation during the delivery route. Depending upon fuel prices and electric rates, a significant savings in operating costs is usually realized.

1.3 Using The Operator's Manual

This operator's manual contains important information about your JTB Plate Bank refrigeration system and should always be kept with the truck body. The manual has been prepared to assist you in obtaining the best possible service from your Plate Bank. It is essential that this refrigeration system receive periodic inspections, maintenance, and correct service parts.

This manual includes safety checks that the operator must perform periodically. Reading your operator's manual will help you and others avoid personal injury or damage to the system. The information in this manual will provide the operator with the safest and most effective use of the refrigeration system. Knowing how to operate your refrigeration system safely and correctly will allow you to train others on the proper operation of this piece of equipment.

It is important that every Refrigerated Truck Body owner and/or operator have an organized preventative maintenance program. The United States Department of Transportation requires that the maintenance records be kept on every commercial highway vehicle. It is to your advantage to be able to show that regularly scheduled inspections and maintenance have been made on every piece of equipment operated. A regular preventative maintenance program will assure that you obtain the best possible service from your Johnson Refrigeration System.

> Read this manual carefully and become familiar with your Johnson Refrigeration System. Know its applications, its limitations and any hazards involved. Should you have any further questions, contact Johnson Truck Bodies at (800) 922-8360 and press 6 for Customer Service. This manual should always be kept with the truck body and should remain with the body when it is sold.

2 Safety

2.1 Safety Warnings and Precautions

These safety warnings and precautions draw attention to potential risks encountered in the operation and service of the refrigeration system. Please read all the information carefully to avoid injury and equipment damage. This information is meant to be thorough but is not a substitute for clear thinking and sound judgement on the part of the user.

⚠ **This is the safety alert symbol. It is used to alert you to potential hazards.**

The safety alert symbol is used with the following signal words to communicate different types of hazards. Follow safety messages to avoid or reduce the risk of injury or death.

⚠ **DANGER** indicates a hazard which, if not avoided, *will* result in death or serious injury.

⚠ **WARNING** indicates a hazard which, if not avoided, *could* result in death or serious injury.

⚠ **CAUTION** indicates a hazard which, if not avoided, *might* result in minor or moderate injury.

⚠ **NOTICE** indicates a hazard which, if not avoided, could result in equipment or property damage.

Johnson Truck Bodies recommends that all servicing be performed by a trained service technician. However, owners and operators should also learn and observe safe operation and service practices.

2.1.1 General Precautions

⚠ **WARNING:** Disconnect electrical power before inspecting or servicing any part of the system.

⚠ **DANGER:** Keep hands and loose clothing clear of fans at all times when the system is operating.

⚠ **WARNING:** Refrigeration system may start unexpectedly at any time when plugged into electrical power.

⚠ **WARNING:** Always wear safety glasses or goggles when working with or around the refrigeration system or vehicle battery. Refrigerant or battery acid can cause permanent damage if it contacts your eyes and/or skin.

⚠ **CAUTION:** Exposed coil fins can cause painful lacerations. Use caution when working on and around the condenser coil.

⚠ **CAUTION:** Do not drill or drive fasteners into refrigeration components.

2.1.2 Electrical Precautions

⚠ **WARNING:** Disconnect unit from grid power (if equipped) before servicing or inspecting any part of the unit.

⚠ **CAUTION:** If doing electric arc welding on any part of the vehicle, ensure that the welding current will not pass through any portion of the refrigeration system or its wiring. It is best to disconnect and isolate the vehicle's negative battery terminal before welding.

2.1.3 Refrigerant Precautions

Although fluorocarbon refrigerants are classified as safe, observe caution when working with refrigerants or around areas where they are being used in the servicing of your unit.

⚠ **DANGER:** In the presence of an open flame or electrical short, fluorocarbon refrigerants can produce toxic gases. These gases are severe respiratory irritants capable of causing death.

⚠ **DANGER:** Do not inhale refrigerant vapors. Use caution when working in a confined area with a limited air supply. Fluorocarbon refrigerants tend to displace air and can cause oxygen depletion which could result in death by suffocation. Provide adequate ventilation.

⚠ **WARNING:** Fluorocarbon refrigerants evaporate rapidly, freezing anything they contact if accidentally released into the atmosphere from the liquid state.

2.1.4 Refrigerant Oil Precautions

⚠ **WARNING:** Always wear safety glasses or goggles to protect eyes from contact with refrigerant oil.

⚠ **WARNING:** Protect skin and clothing from prolonged or repeated contact with refrigerant oil. Rubber gloves are recommended.

⚠ **WARNING:** Wash thoroughly immediately after handling refrigerant oil to prevent irritation.

2.2 First Aid Measures

Please familiarize yourself with the first aid measures listed below. In the event of a workplace accident, this will allow you to seek, provide, or advise first aid which is most appropriate for the listed hazards.

2.2.1 Refrigerant First Aid

Eyes: For contact with liquid or vapor, immediately flush eyes with large amounts of water. Seek medical attention immediately.

Skin: Tissues will suffer freezing injuries. Flush areas with large amounts of warm water. Do not apply heat. Wrap injured areas with dry, sterile bulky dressing to protect from infection or injury. Get prompt medical attention.

Inhalation: Move victim to fresh air and restore breathing if necessary. Seek immediate medical attention. Stay with victim until arrival of emergency personnel.

2.2.2 Refrigerant Oil First Aid

Eyes: Immediately flush eyes with large amounts of water for at least 15 minutes while holding the eyelids open. Seek medical attention immediately.

Skin: Remove contaminated clothing. Wash thoroughly with soap and water. Get medical attention if irritation persists.

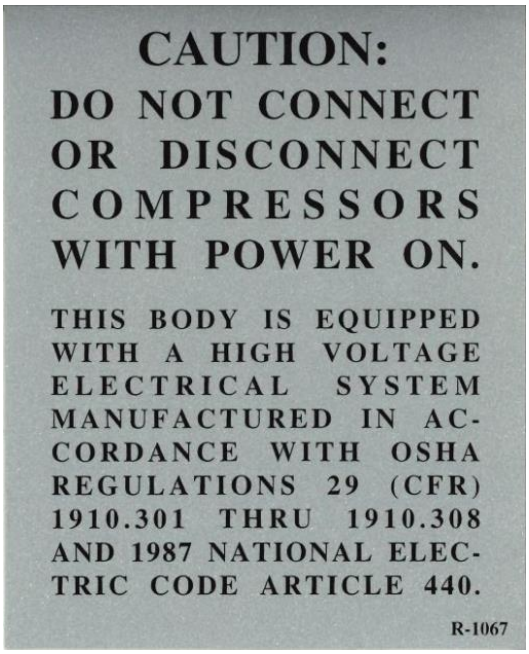
Inhalation: Move victim to fresh air and restore breathing if necessary. Seek immediate medical attention. Stay with victim until arrival of emergency personnel.

Ingestion: Do not induce vomiting. Contact poison control center or physician immediately.

2.3 Safety Labels and Locations

These safety warnings and labels shown below are placed on the truck body and Plate Bank refrigeration system to draw attention to potential safety concerns, avoid system damage, and to provide operation instructions and service information. Please read all the information carefully to avoid injury and system damage. Familiarize yourself with the locations of these labels. If labels become damaged or missing, contact Johnson Truck Bodies for replacements.

Table 1: Refrigeration System safety labels and locations

Label	Location
Caution: Do Not Connect With Power On 	Located at the electrical system inlet. Other versions of this decal may list the voltage and phase of the electrical system.
Vacuum Relief Port Label 	Low temperature bodies only. Located next to vacuum relief port, typically at the curbside front corner. Keep port free from obstruction to prevent blockage. Prevents doors being stuck shut due to shrinkage of cold air.

3 Basic Operation Instructions

Before operating the system, please read the Operator's Manual completely and retain it for future reference. Carefully observe all warnings, precautions, and instructions on the refrigeration system and adhere to them. This section presents the system components and instructions for pre-cooling, proper loading, operation on route, returning from the route, and defrosting.

3.1 Refrigeration System Diagram

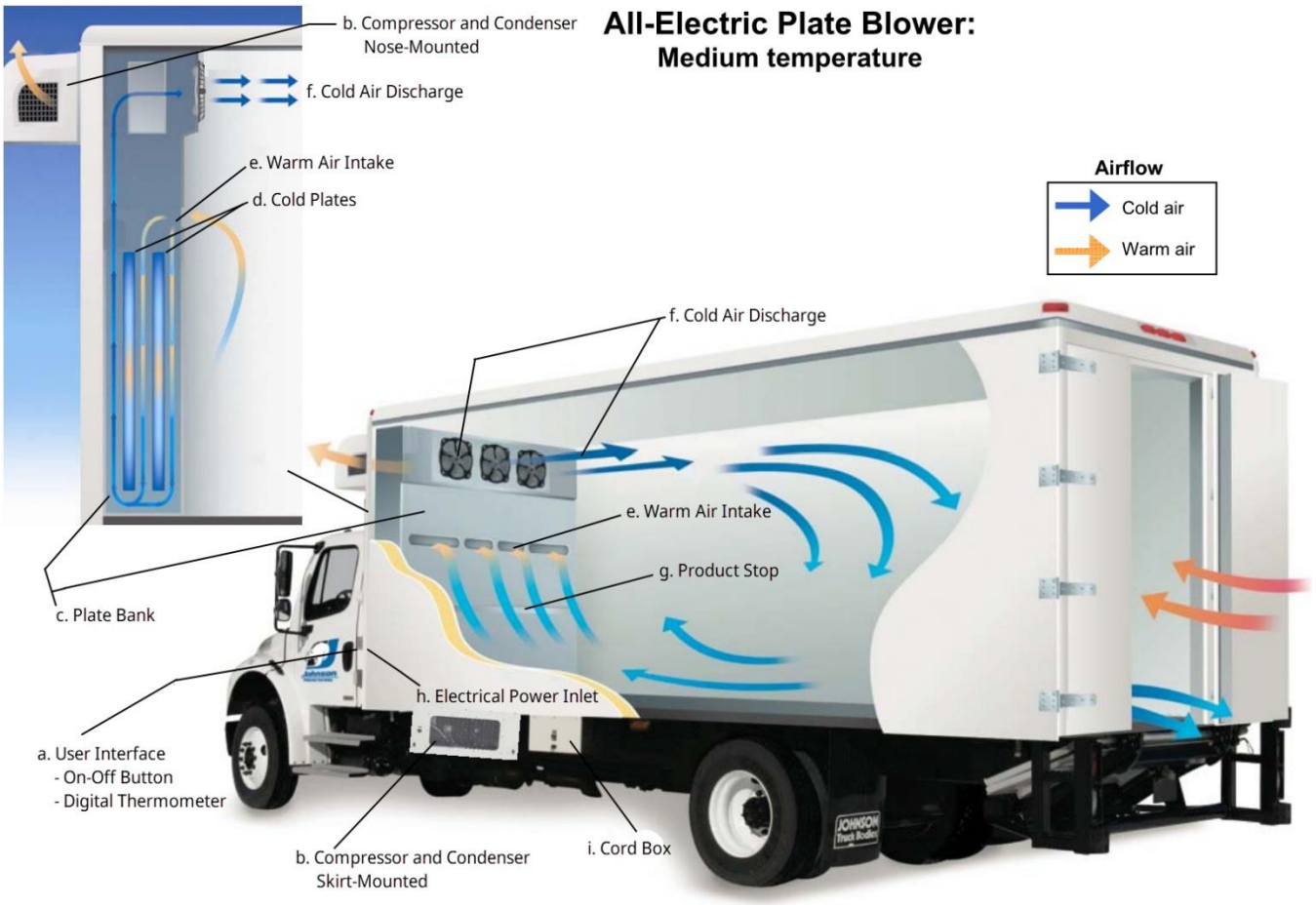


Figure 1: Plate Bank Refrigeration System Diagram

a. **User Interface:** Located on the driver-side front corner of the body; allows access and display of refrigeration system information
   - A button on the User Interface allows the refrigeration system to be switched on or off; must be turned OFF before disconnecting the power cord; switch defaults to ON when system powers on.
   - The User Interface includes a Digital Thermometer, displaying the refrigerated compartment air temperature.

b. **Compressor and Condenser:** Moves refrigerant through the system and removes heat from the refrigerant. Powered by electricity to operate when plugged into grid power. Can be nose mounted or skirt mounted.

c. **Plate Bank:** Large housing at interior front of refrigerated compartment. Contains the Cold Plates, blower fans, and defrost equipment.
d. **Cold Plates:** Mounted within the Plate Bank. Contain a special liquid solution with a freezing point somewhat colder than the desired temperature of the refrigerated compartment. Refrigerant is used to freeze the solution solid during plug-in operation. Cold Plates act as large ice packs during delivery routes, absorbing heat from the air circulated by the blower fans.
e. **Warm air intake:** Where air is drawn into the Plate Bank to be cooled.
f. **Cold air discharge:** Blower fans exhaust cold air into the refrigerated compartment, after cooling the air by drawing it through the Plate Bank.
g. **Product Stop:** A barrier to protect the Plate Bank from accidental damage while loading cargo.
h. **Electrical power inlet:** 250V inlet to plug the refrigeration system into 208-240-volt single-phase or three-phase AC electrical power; located either on the driver-side front corner or in the cord box.
i. **Cord Box (Optional):** for storage of plug-in cord for refrigeration system. Typically includes a safety interlock switch; the cord box cover must be closed to allow the engine to start or transmission to shift.

3.2 User Interface

In 2024 we have introduced a new User Interface. The User Interface is installed on the front left corner of the truck body. It has a digital color display of refrigeration system information and keypad to access information and adjust system settings. The User Interface requires almost no interaction from the operator. If troubleshooting or servicing is ever needed, technicians will appreciate the easy access to complete system information.

The User Interface is rated for IP67 / IP65 protection from dust and jets of water. We have tested that it is unharmed by a pressure washer, but it is a good idea to avoid excessive pressure washing at close range.

In this guide, we refer to the User Interface buttons as labeled in the picture below. Button functions are generally unique to each screen. Screens have labels to show what each button does.

Figure 2: Keypad layout of User Interface

Table 2: Status LED and its meanings. Located to the right of the OK button.

LED Color	Pattern	Description
Orange	Blink 1x when turning on	Normal
Green	Blinking 2x per second Steady On	
Green	Blinking 5x per second	Abnormal Contact JTB Customer Service, 800.922.8360 Extension 6
Red	Blinking 5x per second Steady On	

The User Interface saves any settings or changes and remembers them each time it turns on. Some features are password protected to prevent accidental or unauthorized settings changes.

3.3 Operating Instructions

The refrigerated compartment must be pre-cooled before loading cargo. The same operating instructions are used for pre-cooling a warm truck, or re-cooling a truck that has returned from a delivery route. Follow these steps:

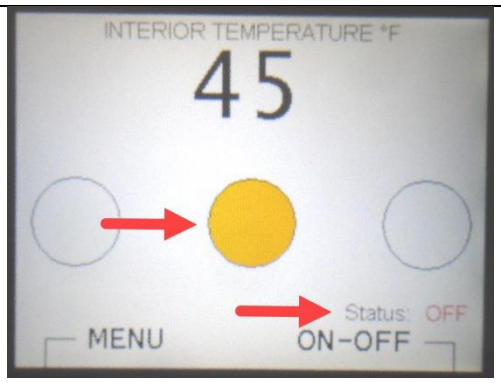
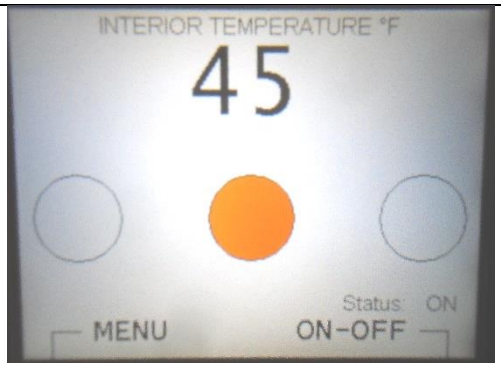
<table>
<tr><td rowspan="3">Connect AC Power</td><td>Retrieve Cord.

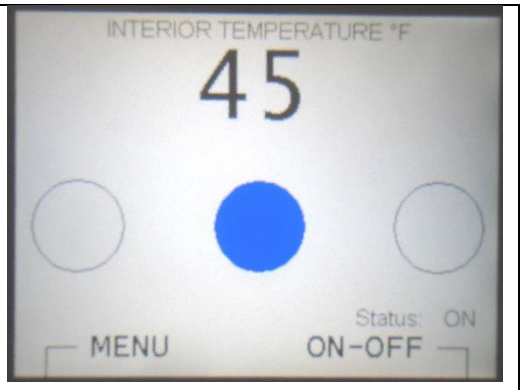
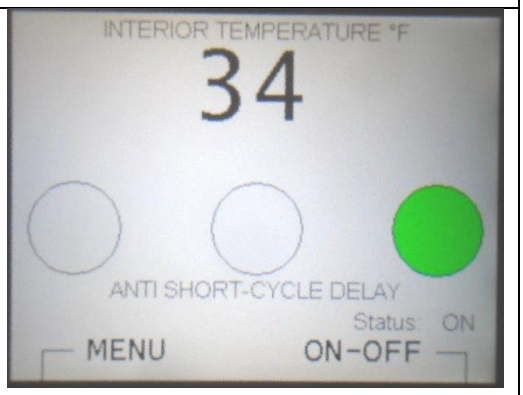
Typically stored in cab or cord box.

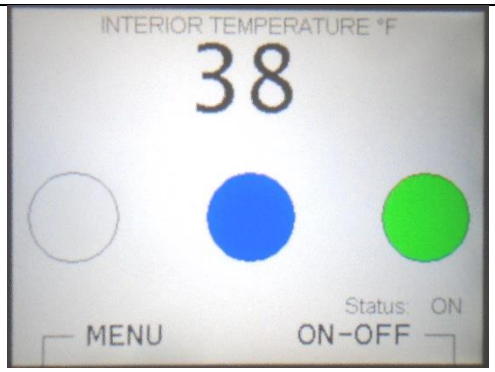
Plug male cord end into matching AC electrical outlet.

Building receptacle’s disconnect switch may be turned on; cord may be energized when plugging in to truck.</td><td>  </td></tr>
<tr><td>Plug female cord end into electrical inlet on truck.

Ignore this step if cord box is hard-wired.</td><td>  </td></tr>
<tr><td>Upon connection to AC power, the refrigeration system controller starts up. Start-up takes about 10 seconds.</td><td> 
</td></tr>
</table>

Turn On System	At the HOME screen, the F4 button is the ON-OFF SWITCH. If Switch Status is OFF, press F4 to turn ON the cooling system. When Switch Status is OFF, the blinking yellow indicator is a reminder that the system is not cooling. **Turn the Switch OFF before unplugging from AC power.**	
Auto Defrost	When AC power is plugged in and the Switch Status is ON, the Plate Bank system will operate automatically. In some situations, a Defrost Cycle will be the first thing to happen. The system is programmed to automatically defrost the plates at appropriate times. The controller monitors duration of door openings and time spent on route. Defrost will normally occur when the truck is first plugged in after returning from a route. A steady orange indicator shows that the system is defrosting. Defrosting ends automatically. Default termination is 10 minutes after the defrosting heater reaches 50°F, or after a 90-minute timer expires. Cooling commences after defrosting is completed.	

Pull-Down	When Switch Status is ON and AC power is plugged in: If defrosting is completed and the Plates are not frozen, the refrigeration compressor runs to freeze the solution in the Plates. The blower fans run to circulate air and cool the body. The blue indicator shows that the compressor is operating. *In the event of a power outage, the Switch remains at its previous setting. If it was ON, it will still be ON when power is restored.	
Pre-Cooling Completed	Once the Plates are frozen, the refrigeration compressor turns off. The blue indicator goes away, because the compressor is not running. Blower fans will still run intermittently to circulate air and maintain the INTERIOR TEMPERATURE. The green indicator shows that the Plates are fully frozen, and the INTERIOR TEMPERATURE is in the desired range. *ANTI SHORT-CYCLE DELAY is a temporary message that the compressor will not immediately re-start for a short time (usually 30 seconds) even if conditions call for additional cooling. **The green indicator shows that the Cold Plates are fully frozen, and the Interior Temperature is in the desired range.**	

	Any time the Plates begin to thaw due to heat load, the system runs the refrigeration compressor again. The blue indicator shows that the system is actively cooling. The green indicator indicates that the Plates are still fully frozen, and the INTERIOR TEMPERATURE is still in the desired range.	
Prepare for Departure	Use Button F4 to turn System Switch OFF. ⚠ **NOTICE: Do not unplug while the system is running.** Unplug and stow power cord. If equipped with Cord Box option, the Cord Box cover must be fully closed and latched; an interlock switch is included to prevent the truck from being driven while plugged in.	

Indicator Color	Description
Blue	Refrigeration is currently running.
Green	Pull-Down is complete. Truck is ready for a delivery route.
Orange	Defrost cycle active.
Yellow	ON-OFF Switch is off. Refrigeration will not run.
Red	Fault.

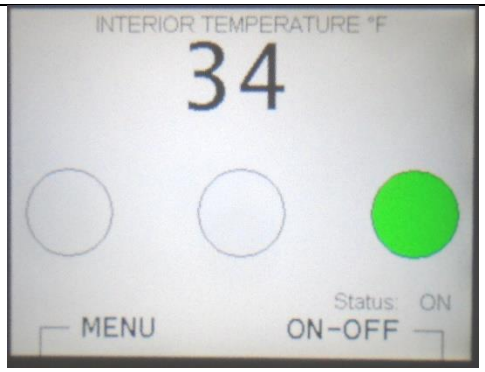
3.4 Loading Instructions

Refer to the General Body Care and Maintenance Operator's Manual. Proper loading practices will help ensure the appropriate environment for temperature-controlled products and will optimize the refrigeration performance to ensure delivery of the highest quality products.

3.5 Route Instructions

When the truck is unplugged from AC power and the truck is running, the Plate Bank system is in route operation. The system maintains the INTERIOR TEMPERATURE by running the blower fans with 12VDC power, circulating air over the frozen cold plates.

Blower fans are permitted to run for a limited time on battery power after the truck engine is turned off. This helps to maintain body temperature during route stops. The default 30-minute POWER-OFF FAN RUNTIME limit is meant to protect the truck battery from excessive discharge.



Best practices during the route focus on minimizing the heat load entering the refrigerated compartment.

Be aware that the Plate Bank system has a limited total refrigeration capacity. If an excessive amount of heat enters the body during the route, the Cold Plates in the Plate Bank will thaw completely. If the solution in the Cold Plates become completely thawed, temperature control is lost until the truck is plugged in to run the Condensing Unit and re-freeze the Cold Plates.

To achieve best performance from the Plate Bank system:

- Product must be properly pre-cooled.
- Maintain door gaskets and door hardware for good sealing.
- Minimize the duration (time) when doors are opened.
- Minimize the number of times the doors are opened.
- Install and maintain strip curtains in the doorways.
- If using a loading dock, position the truck to achieve a good seal.

When the doors are opened, the air temperature in the refrigerated compartment will rise, sometimes a lot. Once the doors are closed, the Plate Bank needs time to cool the air back to the design temperature. If the Plate Bank system is specified, designed, and used correctly, during the route:

- Air temperature in the refrigerated compartment recovers to the design temperature between route stops.
- Air temperature in the refrigerated compartment continues to recover to the design temperature, even at the end of the route.

If the Plate Bank system is not meeting these performance indicators, it may be close to or exceeding its refrigeration capacity. If so, first consider the best practices listed above. Also refer to the troubleshooting guide at the end of this manual.

4 Advanced Operation Instructions

This section includes information about advanced features of the User Interface, and an introduction to the display of system faults. This information should not be necessary for ordinary daily operation.

4.1 Advanced User Interface Features

This section is intended for the advanced user and service technician. There is no need for ordinary users to understand the full capabilities of the User Interface. Some screens or features may be password-protected to prevent unauthorized adjustment. If you need to access or edit password-protected areas of the controller, contact Customer Service.

⚠ **CAUTION:** Unauthorized adjustments to the password-protected areas of the controller can result in improper or unsafe operation, refrigeration system failure, possible injury to the operator, and lead to warranty revocation.

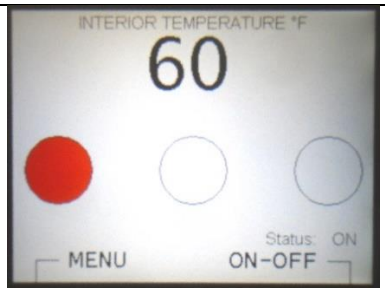
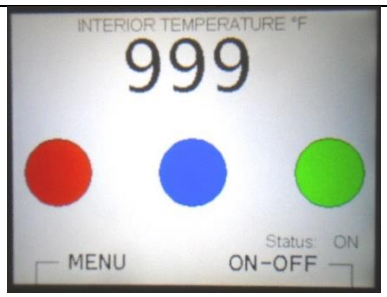
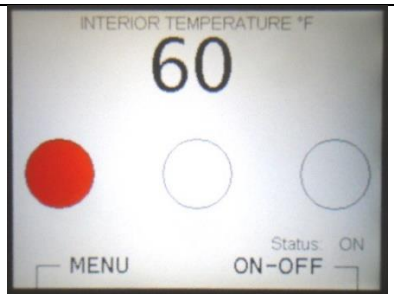
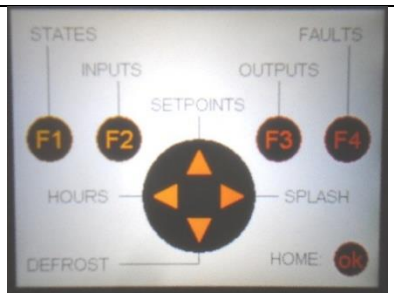
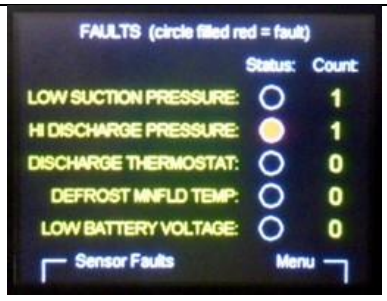
Screen	Description
HOME	Default screen. Intended for viewing during operation. Information Provided: INTERIOR TEMPERATURE, ON-OFF Switch Status, System Indicators
MENU	Accessed from the HOME screen by pressing F1 Button. Lists all available screens.
SPLASH	Includes software version ID. Displayed during system boot.
SETPOINTS	View and edit the: CUT-IN and CUT-OUT pressures. INTERIOR TEMPERATURE for blower fan cut-in and cut-out. Low- and High-Pressure Fault limits and reset pressures (when the respective fault will clear itself). ANTI SHORT-CYCLE DELAY timer POWER-OFF FAN RUNTIME
STATES	List of various operation states, some of which occur simultaneously. Indicators on the HOME screen are an abbreviated summary of the operation state(s). Page 2 of the STATES section also provides access to PUMP-DOWN functions shown below.
INPUTS	View all the sensor readings that the controller is receiving. Useful for troubleshooting.
OUTPUTS	View all the system components that the controller is controlling. View the status (on/off) of all system components. Manually command system components on/off, overriding program. System damage could result from inappropriate over-rides. Over-rides are saved after exiting screen. Useful for function-testing system components.

Screen	Description
FAULTS	View any active system faults. COUNTERS – Number of times each fault has occurred. SENSORS – View any active sensor faults and their counters
HOURS	Hour meter to track refrigeration system operation.
DEFROST	The plate bank features an automatic defrost system to remove frost & ice accumulation from the cold plates. For medium-temperature units (non-frozen "fresh" cargo temperatures around 35°F) a defrost cycle will occur after returning from route and plugging into AC power and will last up to 90 minutes (default setting). Blower fans run continuously to circulate above-freezing air for a faster defrost completion. The defrost cycle terminates itself and the system will enter cooling mode automatically. These screens display related settings, conditions, triggers, and progress, as well as control over certain functions and settings.
PUMP-DOWN	Special operation modes, generally used by the service technician. This screen is accessed via page 2 of the STATES & MODES section. Closes the liquid line solenoid while the compressor is running. This traps the condensed refrigerant in the receiver tank while the compressor draws most of the remaining refrigerant out of the cold plates. Once the compressor turns off, a check-valve keeps most of the refrigerant isolated in the receiver and condenser coil. PUMP DOWN TO SETPOINT: This pump-down cycle terminates at the Setpoint for Low Pressure CUT-OUT. PUMP DOWN TO 2 PSI: This pump-down cycle terminates at 2 psig, which is the lowest safe pressure for the system. CANCEL PUMP-DOWN: Used to stop an active pump-down cycle before its automatic termination. OPEN VALVE FOR 20 SECONDS: Opens the liquid line solenoid to release refrigerant out of the receiver and into the expansion valves and cold plates. Used when resuming normal operation of the system. **If this step is not executed after Pump-Down, the suction pressure may never rise to the CUT-IN, causing the system to not run, despite the Cold Plates being warm.**

4.2 Fault Conditions

This section introduces what the user will see if a system fault occurs.

Table 3: Instructions for fault conditions

Fault Conditions	User Interface
A flashing red indicator shows that a fault is present. Most faults prevent the compressor from running and cooling the truck. This protects the system from serious damage or hazards due to dangerous pressures or temperatures.	
Some faults still permit cooling, because there is no immediate hazard. In the pictured example, the Interior Temperature sensor or its cable has been damaged. The compressor is primarily controlled based on refrigerant pressures, so only the temperature display is affected. The compressor is still running.	
Information about the fault can be accessed with the User Interface. Begin by navigating to the MENU. The HOME screen shows that the MENU is reached by pressing the F1 Button	
At the MENU Screen, the F4 button navigates to the FAULTS screen.	
The FAULTS screen shows which fault(s) is currently occurring, and the number of times that each fault has occurred. In this case, high discharge pressure could be due to a combination of dirty/blocked condenser coil and very hot weather. See the troubleshooting guide for more help with faults.	

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5 Maintenance

It is important that every refrigerated truck body owner and/or operator have an organized preventative maintenance program. Preventative maintenance will help to keep your Johnson Refrigeration System in top operating condition. The maintenance schedule below is suggested to ensure that all items receive the proper frequency of attention. Use the Section Reference to locate instructions for the maintenance task.

Table 4: Maintenance Schedule

Maintenance Task	Section Reference	Daily	1-Month	3-Month
Truck Body Inspection	Truck Body General Manual	X		
Check Line Cord	5.1	X		
Check Condenser Coil	5.2	X		
Plate Bank Inspection	5.3		X	
Condensing Unit Inspection	5.4			X
Clean and Wax Fiberglass	5.5	At least annually		

5.1 Check Line Cord

This maintenance task can be part of the driver's daily responsibilities.

- Before every use, check the line cord for any damage to the outer jacket.
    - Minor chafing or abrasion is acceptable.
    - If the jacket is cut or cracked, or if the inner wires are visible, the line cord is unsafe. It must be replaced and immediately removed from service.
- Check the plug at each end of the line cord and the shore power inlet for signs of arcing. Look for charred or sooty areas around the electrical contacts. If the male plug prongs have become burned, pitted, eroded, or otherwise damaged, remove from use. Have an electrician check the affected connectors; it is likely that both male and female components will need replacement.

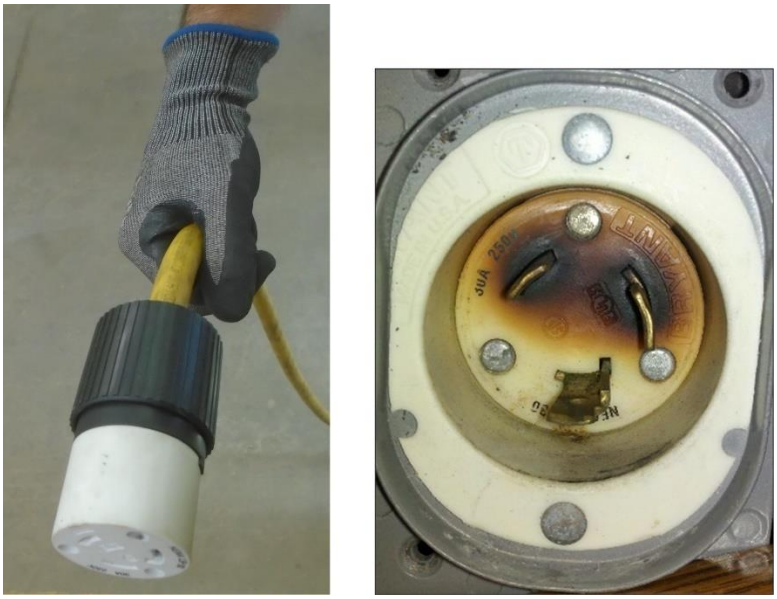

Figure 3: On left, typical line cord. On right, example of severe arcing damage on inlet.

- When unplugging the cord, take note if the plug body feels unusually warm. This may indicate that a connection is becoming loose. If you notice unusual heat, remove the cord from use and have it checked by an electrician.

⚠ **WARNING**: Though very rare, it is possible for a failed plug to become hot enough to cause burns. If any electrical device is emitting smoke, has a burning odor, or has plastic parts which are melted or distorted, do not touch it. Turn off the switch or circuit breaker if safe to do so. Call 911 in case of fire.

5.2 Check Condenser Coil

The condenser coil is located with the compressor, either nose-mounted or skirt-mounted. The condenser coil is like a radiator, using airflow to cool the hot refrigerant. It is a good idea to routinely check if airflow is restricted by unusual debris like leaves, wrappers, bags, etc.

⚠ **CAUTION:** Exposed coil fins can cause painful lacerations. Use caution when working near the condenser coil.

Figure 4: Condenser Coil location on a nose-mounted condensing unit.

Figure 5: Condenser Coil location on a skirt-mounted condensing unit.

5.3 Plate Bank Inspection

These checks keep the Plate Bank operating in its best condition. Begin by ensuring that the system is unplugged. It is not necessary to defrost the Plate Bank before this inspection.

⚠ **WARNING:** Disconnect electrical power before inspecting or servicing any part of the system.

⚠ **WARNING:** Refrigeration system may start unexpectedly at any time when plugged into electrical power.

- Check that blower fans are securely mounted.
- Check that blower fan housings and blades are not cracked or damaged.
    - Later, when system is operating, verify that both fans are working. The compartment door should need to be closed for the door switch to permit fan operation.
- Check that Cold Plates are not leaking solution.
    - Look for surface stains on the floor that appear “salty”.
- Check that Auto-Defrost reservoir is about half-filled with coolant.
- Check that there are not leaks of Auto-Defrost coolant on the floor.
    - Medium-Temperature Plate Banks use an orange-colored propylene glycol coolant, “Generally Recognized as Safe” for incidental contact with food.
    - Low-Temperature Plate Banks use a yellow-green colored 50/50 automotive ethylene glycol coolant to ensure freeze-free operation at the colder temperatures.

If this inspection reveals any issues, seek assistance from a Refrigeration Service Technician. Upon passing this inspection, close and latch the cowling. The system may be returned to use.

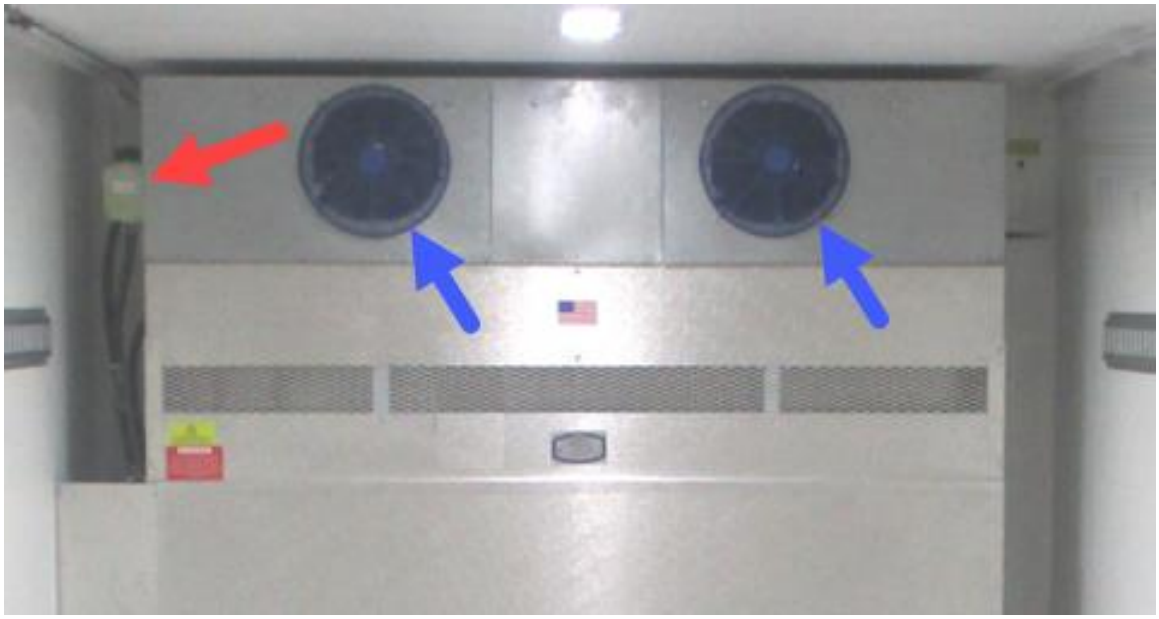

Figure 6: Red arrow points to coolant reservoir. Blue arrows point to blower fans.

5.4 Condensing Unit Inspection

These checks keep the condensing unit operating in its best condition. Begin by ensuring that the system is unplugged. It is not necessary to defrost the Plate Bank before this inspection.

⚠ **WARNING:** Disconnect electrical power before inspecting or servicing any part of the system.

⚠ **WARNING:** Refrigeration system may start unexpectedly at any time when plugged into electrical power.

- Open the cowling. Check that cowling hardware is secure and in good condition.
- Remove any foreign debris from inside of condensing unit compartment.
    - Leaves, animal nests, branches, dirt, ice, snow, etc.
- Check frame and components for excessive corrosion, cracks, loose or missing bolts/fasteners.
- Check that there are no oil stains/leaks on condensing unit frame, refrigerant tubing, or other components around the condensing unit. Oil leaks can be evidence of a small refrigerant leak.
- Check refrigerant tubing and any hoses, that there is no chafing, rubbing, loose clamps, etc.
- Check that condenser fan is in good condition, with no cracked or bent blades.
- Check that discharge line thermostat is secure on the copper tubing near the compressor. (See Figure 7)
- Wash condenser coil with a garden hose sprayer. (See Figure 4 and Figure 5)
    - Take care not to damage the aluminum fins.
    - Clean condenser coils prolong compressor life.
    - Clean condenser coils allow more efficient operation.

Figure 7: Discharge line thermostat.

After completing these power-off checks, remove any tools or service equipment from the condensing unit, and ensure all personnel are clear of the condensing unit.

Re-connect power to the refrigeration system and turn it on (see Section 3.3)

For the following steps, keep all body parts outside of the condensing unit frame. The unguarded condenser fan can start at any time and might not be running initially. The compressor should run for several minutes before these checks and must continue running during them.

- View oil level sight glass on Compressor. Sight glass should be 1/3 to 1/2 full.
- View liquid line sight glass on Condensing Unit. There should be a protective plastic cap over it.
    - Sight glass should be filled with liquid refrigerant.
    - Sight glass should not show any bubbles.
    - Refrigerant should be clear / colorless.
    - Moisture indicator should be green.

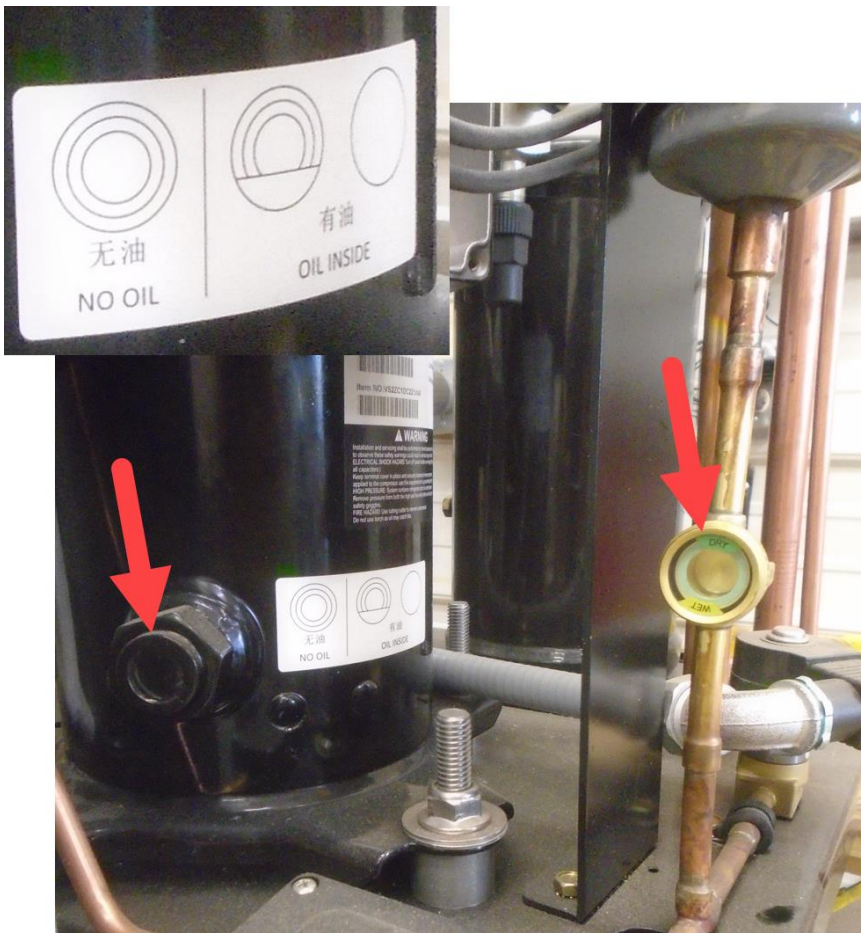

Figure 8: Arrow at left pointing to oil level sight glass. At top left is a close-up of the decal showing how to read the oil level sight glass. Arrow at right pointing to liquid line sight glass, which should be protected by a black plastic cap.

If this inspection reveals any issues, seek assistance from a Refrigeration Service Technician. Upon passing this inspection, close and latch the cowling. The system may be returned to use.

5.5 Clean and Wax Fiberglass

The Plate Bank system condensing unit has a durable fiberglass (FRP) cover, or cowl. All exterior surfaces of the Johnson Truck Body are of similar construction. Their beautiful, natural gloss gel-coat finish will stay attractive for many years if the following steps are taken:

1. Wash periodically with ordinary car-washing soap and water.

   (NOTE: Do not clean regularly with acetone or lacquer thinner)

   High caustic soaps and solutions will cause premature color fade and panel surface deterioration.

   Hot Water Pressure Washing is normally acceptable for fiberglass parts, though an improperly aggressive spray nozzle can damage the finish. It is best to use the White 40° washing nozzle. However, pressure washing it is not recommended for the refrigeration cowl due to the risk of damaging the fins of the condenser coil with too much water force. If pressure washing the truck, do not direct the nozzle into the condenser coil. (See Figure 4 and Figure 5 for reference)

2. For best finish protection, we recommend applying a coat of wax one or two times a year. Waxing helps protect against everyday elements and ultraviolet rays which cause surface oxidation of the gelcoat. Many automotive, RV, or fiberglass boat waxes can be used. Look for a product formulated to protect against gelcoat oxidation and follow the instructions on its label.

5.6 Prohibited Adjustments

The following tasks should never be conducted unless directed to do so by Johnson Truck Bodies. Failure to obtain authorization and directions for refrigeration adjustments could result in warranty revocation, refrigeration system failure, and possible injury to the operator.

1. Tampering with expansion valve settings.
2. Adjusting the high and low pressure cut in and cut out settings.
3. Other adjustments to the condensing unit.
4. Adjustments to the defrost heater thermostat.
5. Adjustments or modifications to electrical components and wiring inside the control box covers.

WARNING: Unauthorized maintenance, adjustments, or replacement of electrical components within the electrical control box could cause major failure to the refrigeration system as well as electrical hazards.

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6 Troubleshooting

This chart has been prepared to help the user to efficiently resolve the most common problems encountered in operating a Plate Bank System with IFM Controls. Due to the variations in options, equipment, and installation, some information may not apply to your system. If you experience a problem that is not listed, or are unable correct the problem, please contact Customer Service at Johnson Truck Bodies. We are dedicated to helping you enjoy trouble-free service from our products.

If experiencing a fault, look for it in the "Problem" column.

Problem	Possible Causes	Correction
User Interface does not turn on	No AC power to body.	Check electrical supply and connections.
	Blown 5A ATO fuse for PLC VBBS or VBB1 (in condensing unit control panel)	Check for damaged wiring, replace fuse.
	12V power supply not functioning.	Check if power supply is overheated. Check if power supply has short-circuit fault.
	Loose cable on User Interface.	Check that locking nut is tight.
System on, but not Running	System Switch is OFF, Status is STANDBY	Press button F4 at HOME screen to turn System Switch to ON.
	Status is PLTS FROZE. (Suction pressure is below CUT-IN setpoint)	Verify that compressor starts after temperature rise in the refrigerated compartment. Solenoid valve was not opened after Pump-Down cycle.
	Suction pressure is below CUT-IN setpoint due to pump-down. Suction pressure is below CUT-IN due to running compressor with manual contactor over-ride.	In the PUMP-DOWN menu, select the command OPEN VALVE FOR 20 SECONDS
	Status is FAULT.	Check FAULTS screen to see more information. Contact JTB for assistance.
	Component Failure	Contact JTB for assistance or contact refrigeration technician.
PLATES FROZEN but TEMPERATURE NOT REACHED	Plates froze quickly, need more time for INTERIOR TEMPERAURE to be reduced	Check for INTERIOR TEMPERATURE being satisfied within 1-2 hours.
	Plate Bank needs defrosting, excessive ice accumulation. Possibly due to unusual usage profile not triggering auto defrost cycle.	Run manual defrost cycle. Contact JTB for assistance with defrost settings.
	Blower fan(s) are not operating	See "Blower fan(s) are not operating"
	Excessive heat load.	Check for poor door seals. Check for product loaded warm. Check for other sources of air leakage.

Problem	Possible Causes	Correction
System is on or running, but blower fans are not operating	INTERIOR TEMPERATURE is at or near setpoint.	No issue. Fans only operate to cool the INTERIOR TEMPERATURE when it is more than 4°F above the setpoint.
	Blower fan fuse(s) blown.	Check for damaged wiring or fan with locked rotor. Replace 15A ATO fuse in condensing unit control box.
	BODY DOOR OPEN = TRUE	Close doors to refrigerated compartment. The fans only operate to cool the INTERIOR TEMPERATURE when the doors are shut, to minimize plate frost accumulation and conserve holdover. If doors are shut, check for misaligned or damaged door switch and magnet. Controller requires +12V signal at Input 11 for BODY DOOR OPEN = FALSE.
System Running, not reaching normal operating temperature	Insufficient run time.	Plate Bank system can require up to 16 hours to reach desired temperature if the truck has been out of service. See Section 3.3. System may be in Auto-Defrost, or just completed Auto-Defrost.
	Excess heat load due to warm product loaded.	Product must be at proper temperature prior to loading. System will require extra time to pull down if product is warm.
	Excessive frost accumulation on Cold Plates	See “Auto Defrost not Functioning”
	Excess heat load due to poor door seals	See door seal information in Body Care and Maintenance Manual.
	One or more Cold Plates not functioning (still warm while others are cold) Affected plates may accumulate less frost than other plates in the system.	Contact JTB for assistance or contact refrigeration technician.
	Partial loss of refrigerant.	
Refrigerated compartment temperature not adequately maintained during route.	Excessive frost accumulation on Cold Plates	See “Auto Defrost not Functioning”
	Excessive time with doors open.	Reduce duration of door openings or number of door openings.
	Door strip curtains damaged or missing	Maintain strip curtains in good condition.
	Excess heat load due to warm product.	Product must be at proper temperature prior to loading. Be aware that warm product can rapidly exhaust the cooling capacity Cold Plates during the route.
	Excess heat load due to poor door seals	See door seal information in Body Care and Maintenance Manual.
FAULT **Low Suction Pressure**	Refrigerant loss.	Contact JTB for assistance or contact refrigeration technician.
	Failed pressure sensor.	

Problem	Possible Causes	Correction
FAULT **High Discharge Pressure**	Ambient temperature exceeds the system capabilities.	Move truck away from sources of excessive heat.
	Airflow is restricted through condenser coil.	Inspect condenser coil and condensing unit for obstructions. Clean condenser coil.
	Condenser fan not functioning	Wiring issue – correct wiring. Failed fan relay – replace relay. Failed fan motor – replace motor.
	Failed pressure sensor.	Contact JTB for assistance or contact refrigeration technician.
FAULT **Discharge Thermostat**	Compressor is excessively hot	Check for restricted airflow. Check for low compressor oil level. Contact JTB for assistance or contact refrigeration technician.
	Faulty Discharge Thermostat	Contact JTB for assistance or contact refrigeration technician.
FAULT **Defrost Manifold Temp** (sensor reading above 100°F)	Defrost system is airlocked. Pump unable to prime, no coolant circulation.	Check coolant level at reservoir. Check for air at bleeder screw or other fittings.
	Circulation pump not operating	Check for power at pump. Check for pump failure.
FAULT **Suction Sensor** **Discharge Sensor** **Body Temp Sensor** **Defrost Temp Sensor**	Loose wiring connection	Check termination in control panel on Condensing Unit
	Damaged sensor or wiring	Replace sensor (cable is integral with sensor) Contact JTB for assistance or contact refrigeration technician.
FAULT **Low Battery Voltage**	12V Truck electrical system has low battery voltage	Plug in AC shore power – maintains battery. Start engine to charge with alternator, or charge batteries with other AC charger. Reduce “Power-Off Fan Runtime” setting. Reduce standby accessory load power.
	Loose or corroded 12V power connections	Inspect and correct any poor connections.
Truck batteries are dead after system has been plugged in overnight	12V Power Supply not functioning	Verify 12V Power supply (in blower housing) outputting 12 to 14VDC when system is plugged in to AC power. Verify AC power is present to Power Supply. Verify sound wiring between Power Supply and Control Box.
Line cord ends are hot to the touch when condensing unit is running	Arcing caused by routinely unplugging unit from grid power while the system is running.	Look for burnt spots on plug and socket. Have damaged components replaced before operating equipment. NOTE: Always turn off power when unplugging unit from Shore Power.
	Contact-to-Wire connections loose in plug body.	Have cord assembly serviced by a qualified electrician.
	Line cord wires worn or damaged.	If the jacket is cut or cracked, or if the inner wires are visible, the line cord is unsafe. It must be replaced and immediately removed from service.

Problem	Possible Causes	Correction
Compressor starts but shuts off in less than 5 minutes. Restarts in less than 15 minutes. (Short Cycling)	Low Refrigerant.	Contact JTB for assistance or contact refrigeration technician.
	Faulty pressure sensor.	
	Faulty check valve.	
	Faulty solenoid valve.	
Noisy Compressor: Loud, metallic rattle	Noise lasts less than 10 seconds. Only happens at initial start-up. Unit was not operated for several days or more.	No issue. It can take several seconds for the compressor to get fully oiled.
	Noise lasts longer than 10 seconds. Oil level in sight glass is normal. Three-Phase electrical system.	Compressor may be rotating backwards. Running backwards can cause severe damage. Usually caused by miswiring when replacing a contactor. Otherwise, due to failure of phase-rotation correction system. The system is designed to detect phase rotation and uses one of two contactors to ensure forward rotation. **Contact JTB for assistance.**
	Noise lasts longer than 10 seconds. Rotation is correct. Oil level is low.	Low oil level can cause noisy operation and severe damage. Add POE oil – seek assistance.
Auto Defrost not functioning	Unusual usage profile not triggering auto defrost cycle	Run manual defrost cycle. Contact JTB for assistance with defrost settings.
	Low coolant level.	See “Auto Defrost Coolant Reservoir is empty”
	Defrost system is airlocked.	See “Auto Defrost system is air-locked”
	No power to defrost heater or pump.	Defrost relay failure. Replace relay.
	Circulation pump failure. 220V present at pump wires, but no pump operation.	Replace pump.
	Defrost heater failure. 220V present at heater wires, but no amperage draw. Temperature is below 80°F.	Replace heater.
Auto Defrost system is air-locked. Pump is unable to circulate fluid, because it has lost prime due to air in system.	Coolant reservoir became empty, and air was drawn into the system.	Check coolant level at reservoir. Keep full throughout following steps. Open bleeder at pump outlet until coolant flows out. Close bleeder. Operate pump in manual defrost cycle. Check for fluid flow by squeezing hoses. Listen for changes in pump noise due to air cavitation. If pump loses prime, turn off and repeat bleeding. Then restart defrost cycle. Monitor the system periodically throughout the defrost cycle. Air separator device should remove remaining small air bubbles.

Problem	Possible Causes	Correction
Auto Defrost Coolant Reservoir is empty	Leaking hose or connection	Inspect manifolds and hoses, located on left side of Plate Bank. Inspect hoses and fittings in top of Plate Bank cabinet.
	Coolant overflowed out of reservoir due to boil-over. Can be caused by defrost pump being air-locked, resulting in coolant stagnating in the defrost heater.	See “Auto Defrost system is air-locked”
Bulged or inflated Cold Plate	Internal refrigerant leak. Refrigerant is above atmospheric pressure, so it inflates the Cold Plate like a balloon.	Use caution, distortion can cause the Cold Plate to break free from its mounts or damage other components in the plate bank. Do not pump-down the system. Be aware that Cold Plate solution (a trade secret, but likely containing water, dissolved salts, and glycols) could migrate back into the refrigerant tubing if the suction pressure decreases (due to running the compressor or using a recovery machine or vacuum pump on the system). May want to use (additional) filter-dryer on inlet of refrigerant recovery machine. After replacing defective Cold Plate, do a dry nitrogen and/or solvent flush to clean any potential contaminants out of the system. Replace the filter-dryer on the condensing unit. Consider adding a suction side filter-dryer.

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7 Warranty

We believe that our customers can expect their new truck body and Plate Bank refrigeration system to be without manufacturing defects. We back that up with warranty coverage. Terms of the Johnson Truck Bodies warranty are available on request.

If you have any questions regarding your warranty, please contact the Johnson Truck Bodies Customer Service Department toll-free at 800.922.8360, Extension 6.

Johnson Truck Bodies may deny warranty coverage in cases of the following:

- Repairs done without prior approval from Johnson Truck Bodies, by calling Customer Service Department toll-free at 800.922.8360, Extension 6.
- Equipment abuse.
- Neglected or improper maintenance.
- Unapproved modifications.

The refrigerated truck body owner is responsible for the preventative maintenance specified in this Operator's Manual.

If you believe that a repair is eligible for warranty coverage, you must contact Johnson Truck Bodies prior to any warranty work being done. Please have the body serial number ready. Johnson Truck Bodies must provide prior approval for warranty work before a qualified service technician performs any repairs.

Figure 9: Truck body serial number badge. This serial number is 44253. The -21 year code indicates a 2021 manufacture date. This badge is typically located on the front left corner of the truck body.

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8 Service and Support

From pre-sale to post-sale, we are here for you from the initial sales inquiry to service support through the life of your Johnson equipment.

At Johnson Truck Bodies, we are positioned to provide you with the most efficient and convenient local and field support available through our in-house experts and service repair locations nationwide.

Headquarters and Manufacturing Plant

215 E Allen Street
Rice Lake, WI 54868
Toll Free: 800.922.8360
Local: 715.537.7400
Fax: 715.537.7495
Web: greatdane.com/refrigerated/johnson/

Sales and New Body Inquiries

Toll Free: 800.922.8360 Extension 2
Local: 715.537.7400 Extension 2
Email: jtbsales@greatdane.com

Parts Orders

Genuine Johnson Truck Bodies Parts Orders
Toll Free: 800.922.8360 Extension 3
Email: jtbparts@greatdane.com
Online Parts Catalog: parts123.com/parts123/yb.dll?parta~partsort~50~cadffgja
If what you need isn't in the catalog, please call! We can probably get you what you need.

Customer Service

Toll-Free: 800.922.8360 Extension 6
Email: jtbcustomerservice@greatdane.com

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9 Glossary

This glossary helps to explain terms used in the manual. Terms are defined in the context of truck refrigeration with Plate Banks. Some terms have other meanings when used elsewhere.

Air Temperature vs. Product Temperature – The air temperature in the refrigerated compartment may fluctuate greatly due to door openings and/or other factors. The product temperature generally changes very slowly due to its mass. Air temperature being "too high", even for several minutes, usually has little effect on the product temperature.

Ambient Air Temperature – Temperature of the outdoor air surrounding the truck body.

Amp – Abbreviation for ampere, the basic measuring unit of electrical current.

Arcing – Electrical current passing through air, producing a bright "spark". In Plate Bank systems, arcing can happen if AC power is unplugged without first turning the system OFF. Arcing can damage system components due to voltage spikes and burning/pitting of plug contacts.

Auto Defrost – Heater system which thaws frost accumulation from the Cold Plates in the Plate Bank. Uses programmed logic to automatically operate at pre-determined intervals.

BTU (British Thermal Unit) - Unit of measure for heat. Defined as the amount of heat energy required to heat one pound of water one degree Fahrenheit. One BTU would cause one pound of water at 40°F to increase to 41°F. Used to quantify the capacity of refrigeration systems.

Capacity – Refrigeration system capacity is the **BTUs** per hour of heat energy that can be removed from the cargo area. This must be more than the **BTUs** entering the truck body as heat.

Coil - Like a radiator, using airflow to cool the hot refrigerant. Refrigerant flows through tubing, transferring heat into thin metal fins, which transfer heat into the air blowing through them.

Cold Plate – A rectangular steel shell filled with a **eutectic** solution. Internal refrigerant tubing passes through the solution. Refrigerant freezes the solution. The cold plate absorbs heat from the refrigerated compartment as the solution slowly thaws. Works like an ice pack.

Compressor – A sealed device, including the motor, with a vapor compression pump. Moves the refrigerant through the system. Receives low-pressure vapor from the outlet of the **cold plates**, sending it at high pressure to the condenser coil.

Condensing Unit – The assembly containing the **compressor**, condenser coil, electrical controls, and other related devices of the refrigeration system. Either nose-mounted or skirt-mounted.

Defrost – Thawing frost from Cold Plates. Frost forms when humidity in the air passes over the cold surface, freezing directly from water vapor into ice. Thick frost makes the Plate Bank not work well.

Eutectic – A mixture of substances which has a freezing/melting point lower than any of the substances on their own. An example is water and salt. Cold Plates are filled with a eutectic solution proprietary to their manufacturer.

FRP (Fiberglass Reinforced Plastic) – A composite material made of a plastic matrix containing and reinforced by fine glass fibers.

Low Temperature – Refrigerating frozen products, usually between -5 and 10°F.

Medium Temperature – Refrigerating non-frozen products, usually between 34 and 46°F.

Refrigerant – The working fluid circulated by the condensing unit. A substance which, depending upon its pressure, can exist as a liquid at the desired ambient temperature and can be vaporized at the desired refrigerated temperature. Carries heat energy within the system.

Refrigerant Oil – A special oil used to lubricate compressors in refrigerant systems.

Volt – The basic measuring unit of electrical potential.

Watt – The basic measuring unit of electrical power.