ALL-ELECTRIC PLATE BANK SYSTEM

QUICK-START MANUAL FOR IFM CONTROLS

Please refer to the Operator's Manual for complete information on use and maintenance of the refrigeration system. Keep the manual with the truck body.

1 Introduction

Johnson Truck Bodies has proudly produced refrigerated truck bodies with Plate Bank refrigeration systems for decades. As part of our commitment to continuous improvement, we have introduced a new control system for the All-Electric Plate Bank product line. This Quick-Start Manual is written to help an experienced operator to quickly understand how to operate the improved controller. Please refer to the full Operator Manual for complete instructions on the use and care of the Plate Bank refrigeration system.

2 Quick Start Guide

Compared to previous systems, the most noticeable change is the 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.

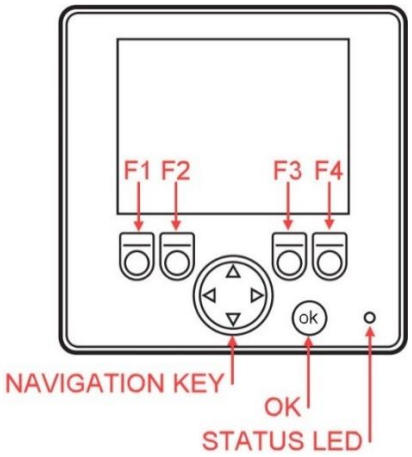


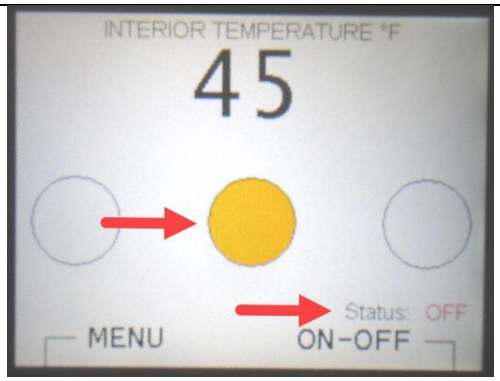
Figure 1: Keypad layout of User Interface

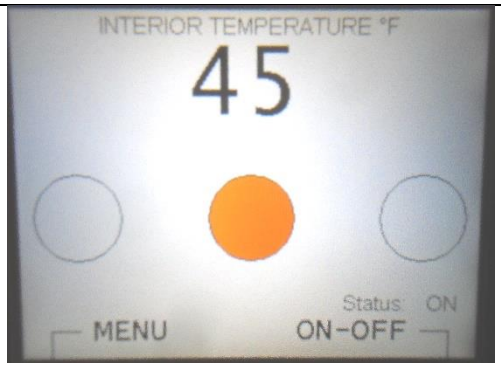
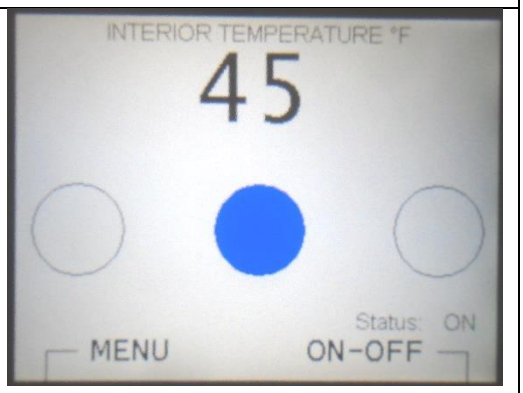
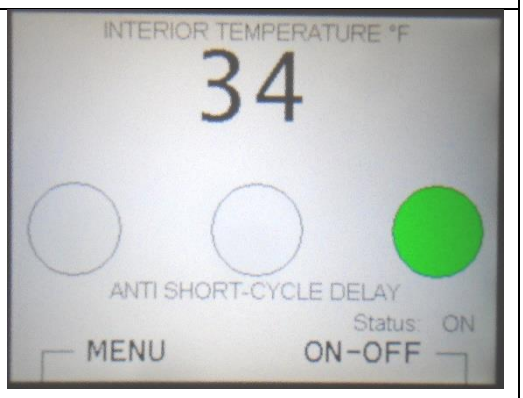
Table 1: Status LED and its meanings. Located to the right of the OK button.

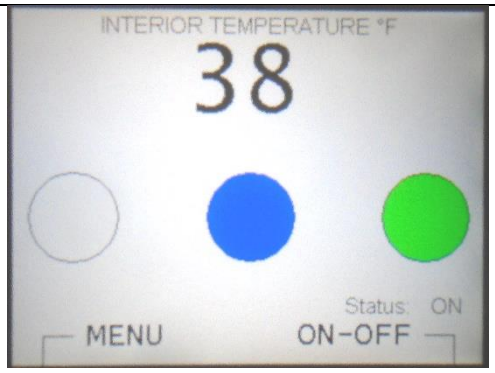
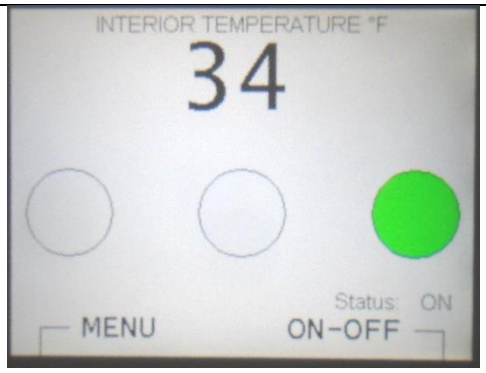
LED Color	Pattern	Description
Orange	Blink 1x when turning on	Normal
Green	Blinking 2x per second Steady On	
Green	Blinking 5x per second	Abnormal Contact JTB Customer Service, 800.922.8360 Extension 6
Red	Blinking 5x per second Steady On	

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.

Table 2: Instructions and steps for typical operation.

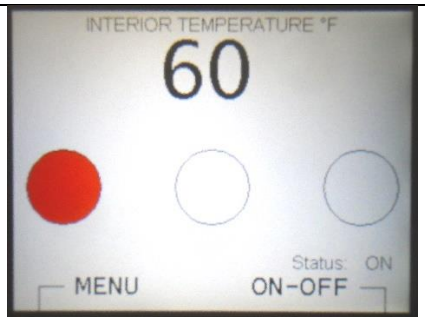
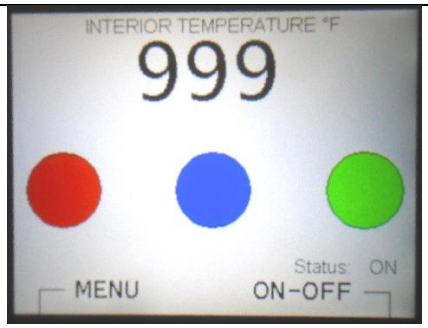
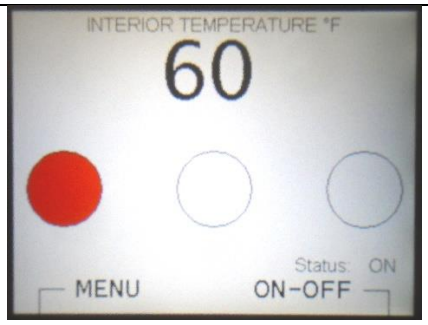
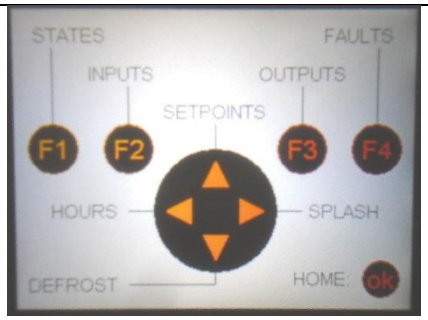
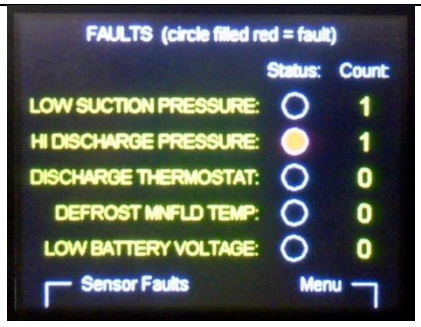
Typical Operation Sequence	User Interface
The operator controls and monitors the refrigeration system with the User Interface (indicated by red arrow) The User Interface is installed on the front left corner of the truck body as shown. On this truck, the AC power inlet is installed just below it. The User Interface is connected to the truck batteries and is therefore always ON. The compressor & cold plate system requires an AC power cord to be plugged in for operation. *Trucks with the optional Cord Box feature no longer have an On-Off switch in or on the cord box; On-Off function is at the User Interface.	
If power to the User Interface has been interrupted it will require about 10 seconds to boot up, during which a splash screen will display as shown to the right.	
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. **It is recommended to turn the Switch OFF before unplugging from AC power.** *After a power-off event, the Switch remains at its previous setting.	

When AC power is plugged in and the Switch Status is ON, the Plate Bank system will operate automatically. In many 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.	
When Switch Status is ON and AC power is plugged in: If defrosting is completed or the Plates are not frozen, the refrigeration compressor runs to freeze the solution in the Plates. The blower fans will run to circulate air and cool the body. The blue indicator shows that the compressor is operating. *After a power-off event, the Switch remains at its previous setting.	
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.	

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.	
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, circulating air over the frozen cold plates. Blower fans are permitted to run for a limited time on battery standby alone, after AC power is unplugged or the truck engine is turned off. This helps to maintain body temperature. The default 30-minute POWER-OFF FAN RUNTIME limit is meant to protect the truck battery from excessive discharge.	

Indicator Color	**Description**
Blue	Refrigeration compressor is currently running.
Green	Pull-Down is complete. Truck is ready for a delivery route.
Yellow - Flashing	ON-OFF Switch is off. Refrigeration will not run. Or Plates are frozen, but INTERIOR TEMPERATURE is not satsified.
Orange	Defrost cycle active.
Red - Flashing	Fault.

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.	
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 the pictured example, 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.	

3 Advanced 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.
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 Troubleshooting

This chart has been prepared to help the user to efficiently resolve the most common problems encountered in operating the AE100 System with IFM Controls. Due to the variations in options, equipment, and installation, some information may not apply to your AE100 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 rise in suction pressure (may take several hours). If Solenoid valve was not opened after Pump-Down cycle, do so using the PUMP-DOWN screen.
	Status is FAULT.	Check FAULTS screen to see more information. Contact JTB for assistance.
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.
FAULT **Low Suction Pressure**	Refrigerant loss.	Contact JTB for assistance or contact refrigeration technician.
	Failed pressure sensor.	
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.
	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. Reduce standby accessory load power.
	Loose or corroded 12V power connections	Inspect and correct any poor connections.

Problem	Possible Causes	Correction
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.
Compressor starts but shuts off immediately (Short Cycling)	Low Refrigerant.	Contact JTB for assistance or contact refrigeration technician.
	Faulty pressure sensor.	
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. Try switching two legs of the compressor motor wiring. Check phase-rotation correction system for miswiring or failure. Unit is designed to detect phase rotation and uses two contactors to ensure forward rotation.
	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.

5 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.

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