Operator's Manual

Vector™ 8500

Trailer and Rail Refrigeration Units

VECTOR™ 8500

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Rev D

Carrier TRANSICOLD

OPERATOR'S MANUAL

For The

VECTOR™ 8500

Single-Temp Trailer and Rail Refrigeration Units

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INTRODUCTION

This guide has been prepared for the operator of a Carrier Transicold Vector™ 8500 Trailer or Rail refrigeration unit with the APX™ Control System. It contains basic instructions for the daily operation of the refrigeration unit as well as safety information, troubleshooting tips, and other information that will help you to deliver the load in the best possible condition. Please take the time to read the information contained in this booklet and refer to it whenever you have a question about the operation of this Carrier Transicold unit.

This refrigeration unit has been engineered to provide long, trouble-free performance when it is properly operated and maintained. The checks outlined in this guide will help to minimize over-the-road problems. In addition, a comprehensive maintenance program will help to insure that the unit continues to operate reliably. Such a maintenance program will also help to control operating costs, increase the unit's working life, and improve performance.

This guide is intended as an introduction to this unit and to provide general assistance when needed. More comprehensive information can be found in the Operation and Service manual for this unit. This manual can be obtained from your Carrier Transicold dealer.

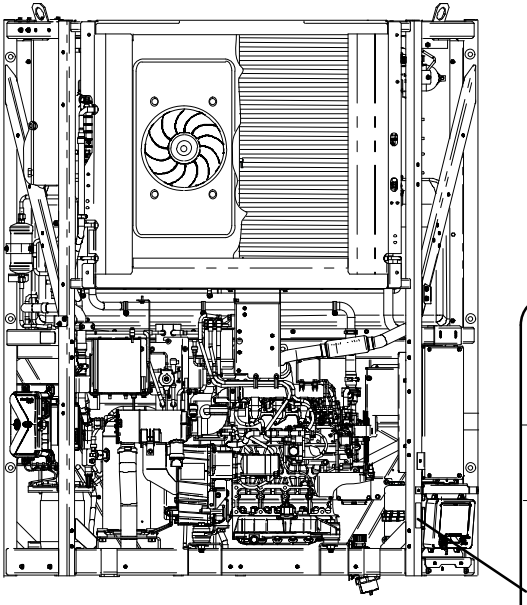
When having this unit serviced, be sure to specify genuine Carrier Transicold replacement parts for the highest quality and best reliability.

At Carrier Transicold, we are continually working to improve the products that we build for our customers. As a result, specifications may change without notice.

UNIT IDENTIFICATION

Each unit is identified by a decal attached to the frame of the unit inside the roadside side door. This decal is on the bottom vertical frame next to the display. The decal identifies the model number of the unit, the warranty ID number, the serial number, the type of refrigerant and refrigerant charge.

If a concern arises, please refer to the information on this decal, and make a note of the model and serial number before calling for assistance. This information will be needed when you contact an authorized Carrier Transicold Dealer so that they may properly assist you.



Nameplate

(Sample)

SAFETY

WARNING

Unit may start automatically at any time even if the switch is in the OFF position. Use proper lockout/tagout procedures before inspection/servicing. All unit inspection/servicing by properly trained personnel only.

WARNING

Be aware of HIGH VOLTAGE supplied at the power plug or from the generator. When performing service or maintenance procedures: ensure the START/RUN-OFF switch is in the OFF position, lockout/tagout the high voltage receptacle, and lockout/tagout the negative battery connection.

This Carrier Transicold refrigeration unit has been designed with the safety of the operator in mind. During normal operation, all moving parts are fully enclosed to help prevent injury. During any inspection or servicing with the doors open you may be exposed to moving parts; please stay clear of all moving parts when the unit is in operation.

NOTE TO TECHNICIANS

Refer to the Operation and Service manual for a complete list of safety precautions.

Auto-Start

This unit is equipped with Auto-Start in Start-Stop and Continuous Operation. The unit may start at any time. A buzzer will sound for five seconds before the unit is started. When performing any check of the refrigeration unit (e.g., visually checking the belt, oil, or coolant), place unit in Inspect mode, unplug the high voltage connector, and disconnect the starter solenoid connector.

Cooling System

The engine is equipped with a pressurized cooling system including a pressurized coolant bottle. Under normal operating conditions, the coolant in the engine and radiator is under high pressure and is very hot. Contact with hot coolant can cause severe burns. Do not remove the cap from a hot coolant system; if cap must be removed, cover it with a rag and remove very slowly in order to release the pressure without spray.

Refrigerant

The refrigerant contained in the refrigeration system of this unit can cause frostbite, severe burns, or blindness when in direct contact with the skin or eyes. For this reason (and because of legislation regarding the handling of refrigerants) we recommend that you contact your nearest Carrier Transicold authorized repair facility whenever service of the refrigerant system is required.

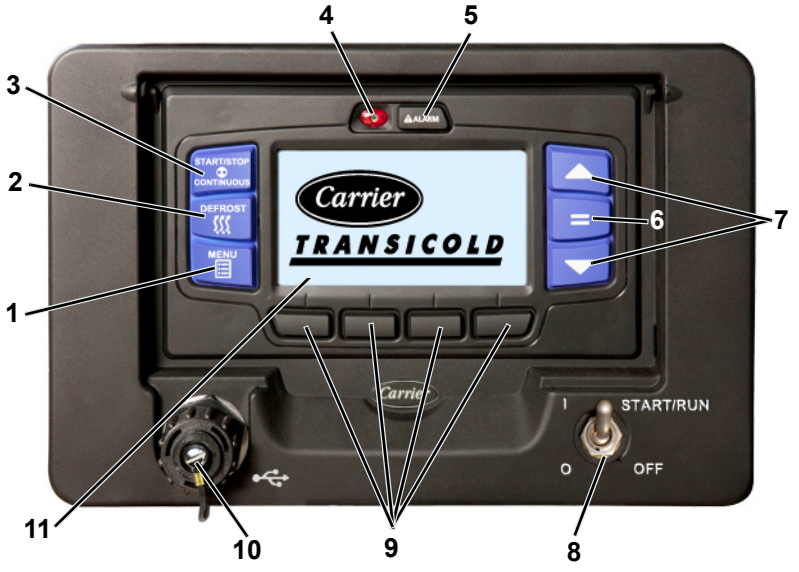
Battery

This unit may be equipped with a lead-acid type battery. The battery normally vents small amounts of flammable hydrogen gas. Do not smoke when checking the battery. A battery explosion can cause serious physical harm and/or blindness.

Standby Electric Power

Be aware of HIGH VOLTAGE supplied at the power plug. Even with the unit off, power is present from the plug to the inside of the control box. Disconnect the high voltage source when performing service or maintenance procedures and lockout/tagout the receptacle in accordance with your company procedures. The recommended lockout device (Carrier P/N 07-60129-00) is shown in the following illustration.

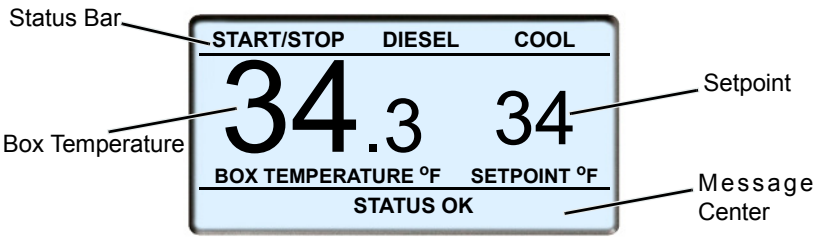
DISPLAY



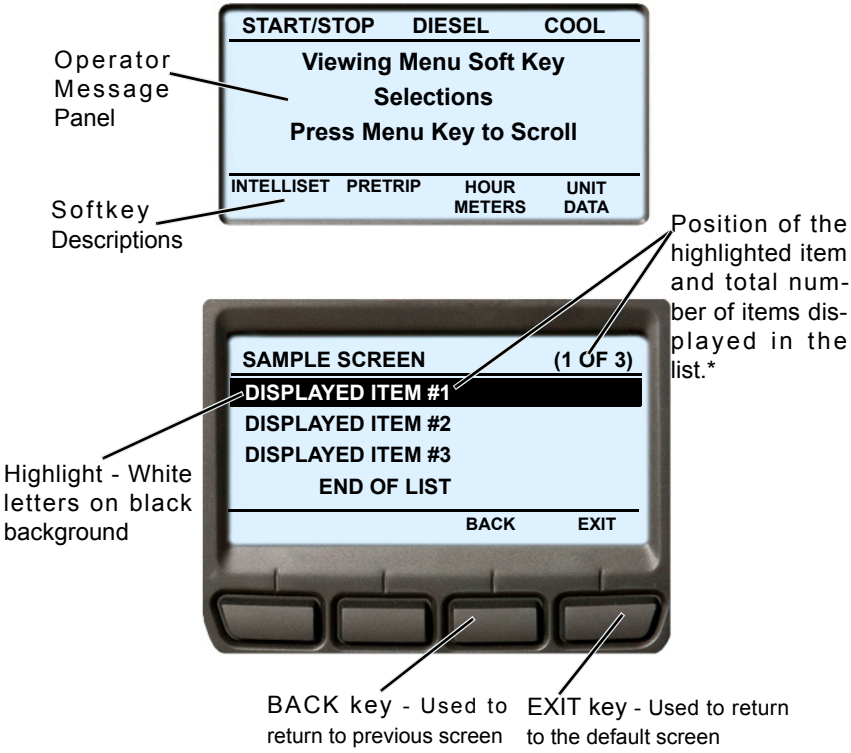
1. MENU Key
2. DEFROST Key
3. START/STOP - CONTINUOUS Key
4. Alarm LED
5. ALARM Key
6. “=” (Select) Key
7. Arrow Keys, ▲ and ▼
8. START/RUN-OFF Switch
9. Soft Keys
10. USB Interface Port (Cover)
11. Display

DISPLAY SCREENS

Default Screen



Typical Menu Screen



*Up to five items may be displayed at one time. Press the ▼ key to view additional items, or the ▲ key to scroll back up the list. “END OF LIST” will be displayed after the last item in the list.

STARTING UNIT

⚠ WARNING

Under no circumstances should ether or any other starting aids be used to start the engine.

⚠ WARNING

Be aware of HIGH VOLTAGE supplied at the power plug or from the generator. When performing service or maintenance procedures: ensure the START/RUN-OFF switch is in the OFF position, lockout/tagout the high voltage receptacle, and lockout/tagout the negative battery connection.

⚠ WARNING

Unit may start automatically at any time even if the switch is in the OFF position. Use proper lockout/tagout procedures before inspection/servicing. All unit inspection/servicing by properly trained personnel only.

STARTING UNIT - CONTINUED

1. Place the START/RUN-OFF switch in the START/RUN position.

NOTE

The unit will automatically start in the same operating state (Engine Operation or Electric Operation) it was in when last stopped.

NOTE

If required the system will initiate a “Soft Start” / “Bump Start” procedure to clear any liquid refrigerant or oil. During this procedure, the compressor will be started for one second and then shut down for 9 seconds, up to five times.

2. The system will display the Carrier Transicold logo, display the default screen, present language selection and the hour meter readings (if configured to do so) along with a test flash of the alarm light. Next the system will perform a start sequence, energize the buzzer, and then start the unit automatically.

NOTE

If the unit attempts to start in Electric Operation, and power is not available, the A00073 - “NO POWER - CHECK POWER CORD” alarm will be activated. This alarm will clear if power is restored. If this alarm condition exists for five minutes and the Functions and Configurations are set to allow a switch, the unit will switch to Engine Operation.

3. If there is an alarm present, the alarm message will be displayed in the MessageCenter and the alarm LED will flash for five seconds. If one or more shutdown alarms are present, the alarm(s) must be cleared before the unit will start.
4. If the unit is to be switched from Engine Operation to Electric Operation or from Electric Operation to Engine refer to **Switching Operating State**.

   Once the unit is operating in the desired state, observe the MessageCenter. If the word “ACTIVE” or “MODIFIED” is displayed at the right, the unit is equipped with IntelliSet™ settings; for more information refer to the **IntelliSet™** section of this book.

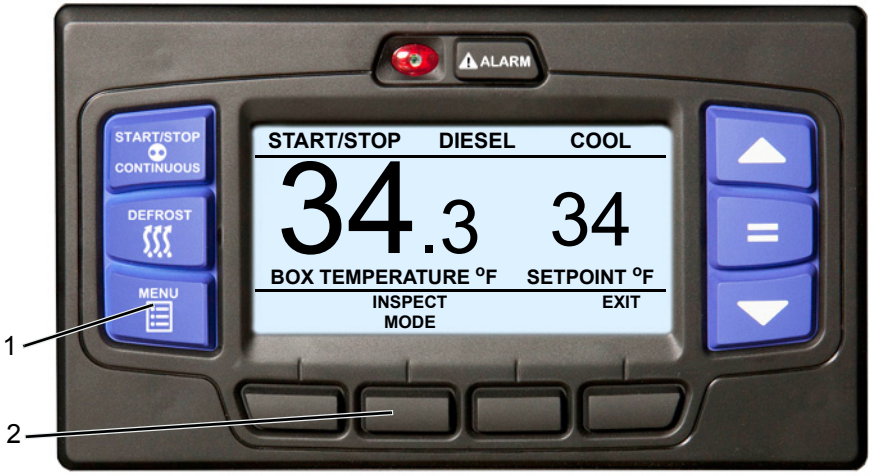
INSPECT MODE

Inspect mode provides an additional layer of safety for operators and technicians. Inspect mode should be used during all pretrip inspections of the unit.

Inspect mode is a user activated feature that forces the unit to shutdown and remain in shutdown regardless of operating state.

After unit inspection, Inspect mode must be manually disabled, at which point the unit will resume standard operation.

Inspect mode is not a substitute for proper Lockout/Tagout procedures, which are always required when servicing the unit.



Enter Inspect Mode:

1. With the system powered up (START/RUN-OFF switch in the START/RUN position) press the MENU key until INSPECT MODE is displayed.
2. Press the INSPECT MODE soft key, the unit will shut down.

INSPECT MODE - CONTINUED

While the unit is in Inspect mode the ALARM light will flash, and the display will indicate that unit operation, including temperature control, has been disabled.

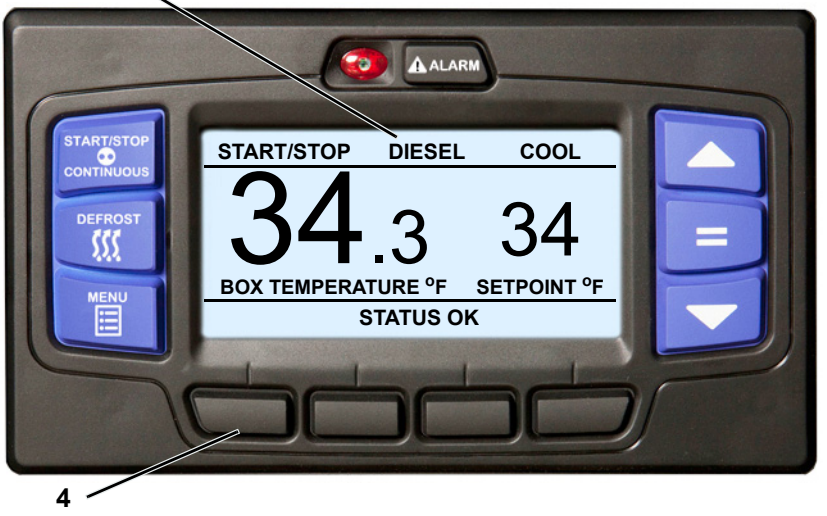
Exit Inspect Mode:

1. While the unit is in Inspect mode, the EXIT soft key will be available, all other keys and functions will be locked out.
2. Press the EXIT soft key to disable Inspect mode, the unit will resume standard operation.

SWITCHING OPERATING STATE

OPERATING STATE

If DIESEL is displayed, the unit is in Engine Operation



⚠ WARNING

Do not connect power plug to any electrical outlet without checking it meets the 460/3/60 and 30 Amp electrical requirements of the unit.

⚠ WARNING

Ensure the power plug is clean and dry before connecting to any electrical outlet/receptacle.

STANDBY ELECTRIC GUIDELINES

NOTE

The unit is equipped with automatic phase reversal which ensures that electric motors will run in the correct direction.

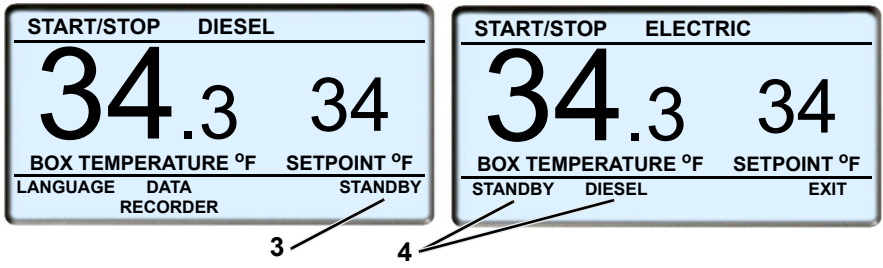
SWITCHING OPERATING STATE - CONTINUED

For safe, reliable operation in Electric Operation, it is important to consider the following guidelines:

- **NEVER** connect the unit to a high voltage power source unless the START/RUN - OFF switch is in the OFF position.
- The power supply cable and circuit breaker must comply with local electrical code and unit specifications.
- The power supply cable must be equipped with a ground connection.
- Repairs or maintenance to the supply voltage circuit should only be performed by licensed/authorized personnel.

ENGINE TO ELECTRIC

1. If the standby electric cable is not already in place, ensure the unit is powered OFF and the external power circuit breaker is OFF, and then connect the standby electric cable to the unit receptacle.
2. Turn the external power circuit breaker ON.
3. Turn the START/RUN-OFF switch to the START/RUN position.
4. Press and release the MENU key until the STANDBY soft key is displayed.

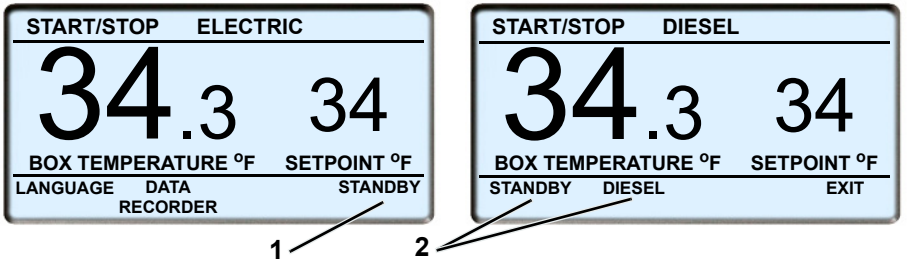


5. Press the STANDBY soft key, the STANDBY and DIESEL soft keys will display.
6. Press the STANDBY soft key to place the unit in Electric operation. The unit will stop, the status bar will change to ELECTRIC and the unit will restart in Electric Operation.

SWITCHING OPERATING STATE - CONTINUED

ELECTRIC TO ENGINE

1. Press and release the MENU key until the STANDBY soft key is displayed.



2. Press the STANDBY soft key, the STANDBY and DIESEL soft keys will display.

⚠ WARNING

Under no circumstances should ether or any other starting aids be used to start the engine.

3. Press the DIESEL soft key to place the unit in Engine Operation. The unit will stop, the status bar will change to DIESEL and the unit will restart in Engine Operation.

4. If the standby electric cable is in place, and will not be needed, ensure the external power circuit breaker is OFF, disconnect the cable from the unit receptacle and hang up off the ground.

INTELLISET™

Products carried or stored in a refrigerated compartment require a multitude of refrigerant unit settings that must be checked and, if required, reset each time a new product is loaded. The APX Control System offers the settings necessary to meet these requirements. IntelliSet is a feature that allows pre-selection and naming of the necessary settings for over 40 different products. The operator may then call up the settings by simply selecting the assigned IntelliSet name.

For example: a load of apples may require continuous operation at 35°F (1.7°C) with a defrost every 3 hours while a load of cheese may require the same operation with setpoints ranging from 35°F to 42°F (1.7°C to 5.6°C) and a load of ice cream requires start-stop operation at -22°F (-30°C) with defrost at 12 hour intervals. The settings required for each product may be entered into the system and locked so that they cannot be changed, and they can be given an appropriate name. In the case of cheese, the range of setpoints may be locked, leaving the operator the ability to change the setpoint within the locked range.

When a load of apples is going to be picked up, the operator simply selects “APPLES” from the IntelliSet menu; for cheese, “CHEESE” is selected and the setpoint reset as required; for ice cream, “ICE CREAM” is selected. With each selection, the system automatically re-programs the settings to provide the best temperature control, fuel economy, and performance for that particular product.

NOTE

The above settings are examples of possible settings. Units leave the factory with default IntelliSets. However, most customers develop their own set.

An IntelliSet may be pre-programmed as “IntelliSleep” which allows Sleep mode to be entered by simply changing to that IntelliSet. Range Protect may be applied to any IntelliSet. Range Protect offers increased fuel savings over normal Start-Stop Operation for commodities that can use less restrictive temperature control.

INTELLISET - CONTINUED

1. With the system powered up (START/RUN-OFF switch in the START/RUN position) and the default screen displayed, press the “=” key.

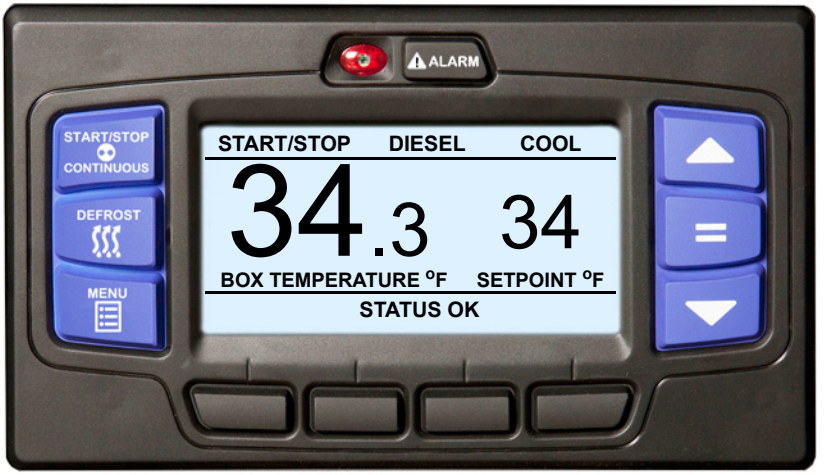
2. Press the MENU key until INTELLISET is displayed. Then, press the INTELLISET soft key to display the IntelliSet screen.

3. The IntelliSet screen will display with a 15 second timeout and five of the available IntelliSets listed. There may be more than five IntelliSets available. This information is provided, in parenthesis, on the first line. For example, in the preceding illustration there are seven IntelliSets available and the second IntelliSet is highlighted. Press the ▲ or ▼ key to scroll through the list of available IntelliSets. The IntelliSet that is currently selected will have the word “ACTIVE” or “MODIFIED” to the right.
4. To change to another IntelliSet, press the ▲ or ▼ key to scroll through the list and highlight the IntelliSet desired. Press the “=” key. The highlighted IntelliSet will become active and an “INTELLISET CHANGED” message will display.
5. Press the EXIT soft key to return to the default display.

NOTE

If setpoint change is allowed, refer to **Changing Setpoint** section for setpoint change instruction.

OPERATOR MESSAGES



"STATUS OK" - This message or other user-defined message will be displayed in the MessageCenter at most times.

If a problem develops or the operation has been changed, one of the following messages may be displayed:

"CHECK AT NEXT SERVICE INTERVAL" is displayed when there is an active non-shutdown alarm present (the alarm condition is present but is not serious enough to shut down the unit). These alarms may be viewed by pressing the ALARM key. The message will clear itself when the condition is corrected.

"DOOR OPEN" will be displayed if an optional door switch is installed and configured to notify you when the door is open or not closed tightly.

"LOSS OF COMMUNICATIONS" is displayed when there is a problem between one or more modules and the display module.

"CHECK FUEL LEVEL" is displayed if an optional fuel level sensor is installed in the tank, the level is low, and fuel needs to be added.

DOOR OPEN - LOW SPEED" or "REMOTE SWITCH OPEN - LOW SPEED is displayed if an optional door or remote switch is installed and configured to operate the engine in low speed when the refrigerated compartment door is opened or remote switch is activated.

SLEEP MODE, OFF / ON TO WAKE will display when the unit is in Sleep mode, and the engine has cycled off.

SLEEP WARNING NO TEMP CONTROL will display when the unit is running while in Sleep mode.

TECHNICIAN RESET REQUIRED is displayed if the Low Engine Oil Pressure or High Coolant Temperature alarm has been activated three times in the last two hours and the unit has been locked out. The unit must be brought to a Carrier Transicold Dealer for service.

BATTERY VOLTAGE TOO LOW will display when the unit battery voltage is too low to allow the unit to start and run.

UNIT SHUTDOWN - DOOR OPEN or REMOTE SWITCH is displayed if an optional door or remote switch is installed and configured to shut the unit down when the compartment door is opened or a remote switch is activated.

UNIT SHUTDOWN is displayed when there is a safety shutdown. Pressing the Alarm key will bring any Active Alarms into the MessageCenter.

WARNING: NO TEMP CONTROL will display:

- When system is not performing up to capacity and there is an active temperature control alarm.

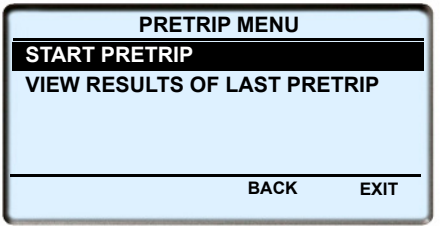
  OR

- the refrigerated compartment temperature control sensors (return air and supply air) have failed, the compartment has a frozen set-point and the compartment is only operating in cool mode.

PRETRIP

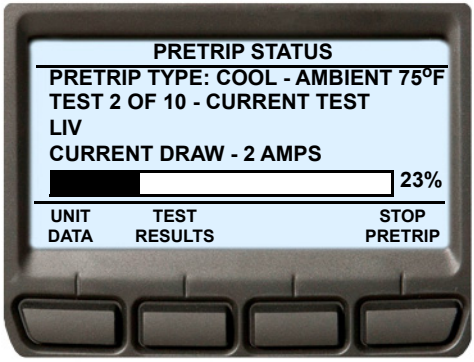
Pretrip is a set of tests run by the system to check unit operation. It is recommended that a Pretrip is run prior to loading the refrigerated compartment. It will indicate a failure if one is detected.

1. With the system powered up (START/RUN-OFF switch in the START/RUN position) press the MENU key until PRETRIP is displayed.
2. Press the PRETRIP soft key to display the PRETRIP MENU screen; which will display with a 15 second timeout.
3. Use the ▲ or ▼ key to select START PRETRIP, then press the “=” key.



PRETRIP - CONTINUED

4. If START PRETRIP is selected, Pretrip will begin and the PRETRIP STATUS screen will be displayed. Immediately following Pretrip *OR* if "View Results of Last Pretrip" is selected the PRETRIP SUMMARY SCREEN will be displayed.



NOTE

At any time during Pretrip, the UNIT DATA soft key may be pressed to allow the user to view the unit data screen, refer to **Unit Data**. To return to Pretrip, press the BACK soft key.

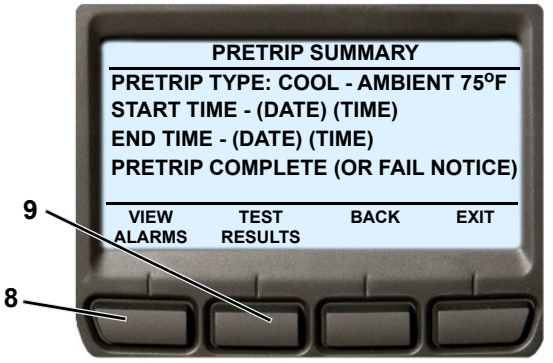
NOTE

During Pretrip the ALARM light will illuminate to indicate there is no temperature control.

5. During Pretrip Test 1, verify that the buzzer is energized and the amber light on the light bar is illuminated (if equipped).
6. The remainder of the Pretrip tests will run automatically and take 7 to 25 minutes. The percent of Pretrip that has been completed is displayed in the status bar under the test description information.
7. "PRETRIP PASS", "PRETRIP FAIL IN TEST ##" or "PRETRIP FAILED AND COMPLETE" will be displayed at the end of the testing. The "PASS" message will display until a key is pressed. The Pretrip test "FAIL" results message will display until the alarms are cleared.

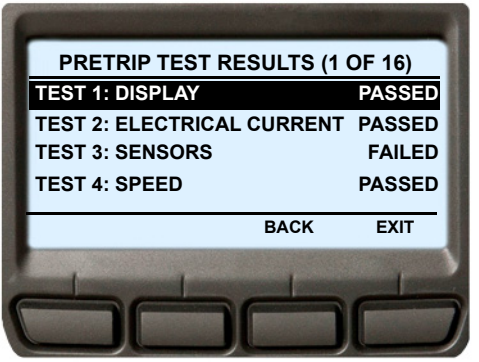
TIP

To end Pretrip at any time, press STOP PRETRIP soft key.

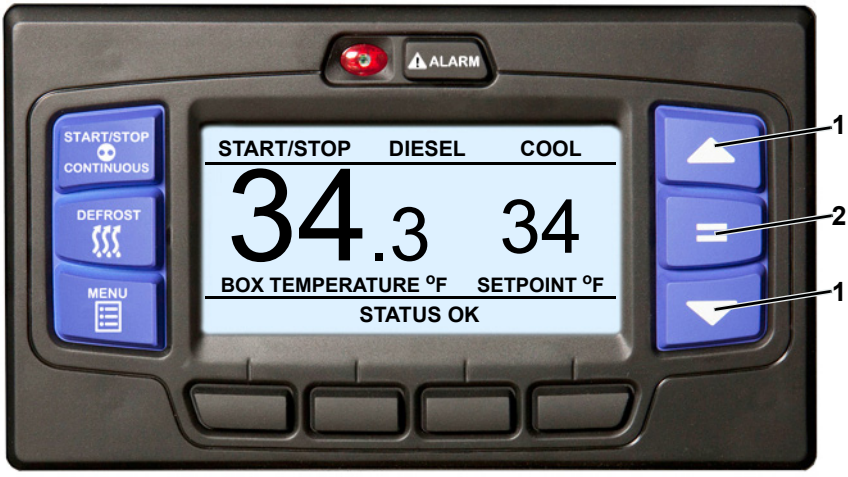


8. Press the VIEW ALARMS soft key to move to the Alarm screen (refer **Alarm List** section) and review any alarms activated during the test.

9. Press the TEST RESULTS soft key to view details of the test results. Press the ▼or ▲ key to scroll through the results.



CHANGING SETPOINT



1. With the system powered up (START/RUN-OFF switch in the START/RUN position) and the default screen displayed (press the BACK or EXIT soft key if required), press the ▲ or ▼ key to bring the displayed setpoint to the desired value.

TIP

The setpoint will change one degree (or 0.1 degree if configured to do so) with each press and release of an arrow key or the setpoint will scroll if the key is pressed and held.

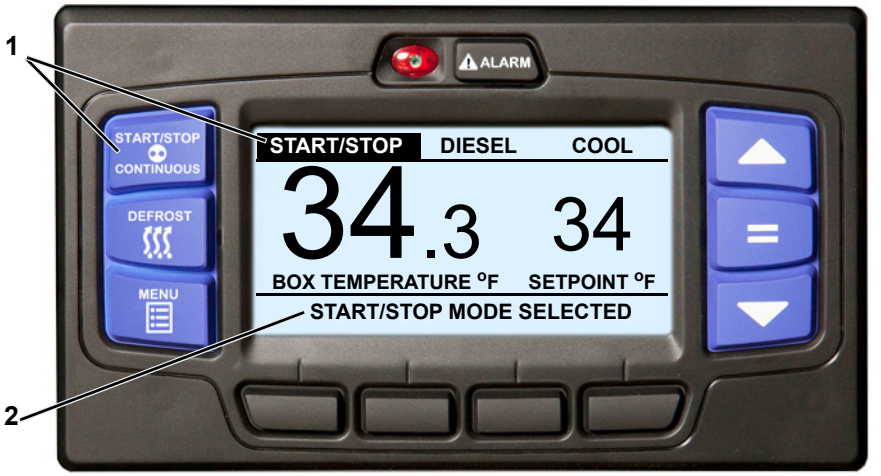
2. Press the "=" key to save the new setpoint. The MessageCenter will display "SETPOINT CHANGED" for 10 seconds.
3. If the "=" key is not pressed the setpoint screen will flash, the MessageCenter will display "SETPOINT NOT CHANGED" and then return to original setpoint. Alarm 04004 "NO SETPOINT CHANGE" will be activated.

NOTE

The setpoint range is from -22°F to +90°F (-30°C to +32°C). This range may not be fully accessible, depending on the settings for this system. If the message "MAX SETPOINT HAS BEEN REACHED" or "MIN SETPOINT HAS BEEN REACHED" is displayed, the setpoint range has been locked and can not be changed outside the range.

START-STOP / CONTINUOUS OPERATION

Start-Stop is provided to reduce fuel or power consumption by allowing full automatic control of unit shut down and restart by monitoring compartment temperature, battery charge and, when in Engine operation, coolant temperature. The main function of Start-Stop operation is to turn off the refrigeration system near setpoint to provide an efficient temperature control system and to initiate a restart sequence after certain conditions are met.



1. With the system powered up (START/RUN-OFF switch in the START/RUN position) press the START-STOP/CONTINUOUS key until the desired operation (Start/Stop or Continuous) is highlighted.
2. "START/STOP MODE SELECTED" or "CONTINUOUS RUN MODE SELECTED" will be displayed in the MessageCenter for 10 seconds.
3. The operation indication in the status bar will no longer be highlighted. The unit is now running in the displayed mode.

NOTE

If "CONTINUOUS LOCKED" or "START/STOP LOCKED" is displayed, the system is currently locked into the displayed mode of operation and cannot be changed using the "START/STOP - CONTINUOUS" key.

Whenever the unit starts in Start-Stop, it will run until:

- The selected minimum run time has expired
- The compartment temperature is at setpoint

START-STOP / CONTINUOUS OPERATION - CONTINUED

- The battery is fully charged (as indicated in the MessageCenter by “OK” after the voltage value) AND charging amps are less than the Configuration setting. In Electric Operation, if battery condition is the only reason the unit needs to restart, only the battery charger will be energized.
- And, when in Engine operation, the engine coolant temperature rises above 122°F (50°C).

A restart will be initiated when one of the following conditions occurs:

- During the Minimum Off Time compartment temperature has moved away from setpoint by 3.6° to 18°F (2° to 10°C) depending on the Functional Parameter settings.
- The Minimum Off Time has expired and the compartment temperature has moved away from setpoint by more than the Restart Functional Parameter setting (0.5° to 18°F, 2° to 10°C).
- Maximum Off Time has expired. The Maximum off time setting ensures that the entire load stays within safe temperature range. The unit will start after a pre-selected maximum off time-regardless of any change in compartment temperature.
- Battery voltage falls below the configured setting (12.0 to 12.8 V). In Electric Operation, if battery condition is the only reason the unit needs to restart, only the battery charger will be energized.
- Or, when in Engine Operation, coolant temperature drops below the configured setting (10° to 32°F, -12.2° to 0°C).

If the engine fails to start after three attempts, alarm 00031 - “FAILED TO START-AUTO MODE” will be activated. While running, if the unit shuts down on a safety, or fails to run for the minimum run time, three consecutive times, alarm 00030 - “FAILED TO RUN MINIMUM TIME” will be activated. The shutdown counter is cleared when the engine has run for 15 minutes, or when the unit cycles off normally. In Electric operation, the unit will stop for a minimum of 5 minutes instead of 15 minutes.

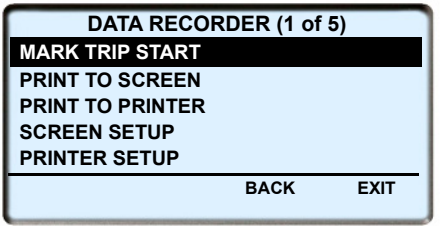
In Continuous Operation the unit will not shut down, except in response to a shut down alarm. Continuous Operation provides constant evaporator air flow and temperature control for the product.

Refer to **Recommended Transport Temperatures** for suggested Start-Stop and Continuous Operation settings.

DATA RECORDER / TRIP START

The Data Recorder records data while the START/RUN - OFF switch is in the START/RUN position.

1. With the system powered up (START/RUN-OFF switch in the START/RUN position) press the MENU key until DATA RECORDER is displayed.
2. Press the DATA RECORDER soft key to display the sub menus.



Choices vary based on software revision and model type.

3. The Data Recorder screen will display with a 15 second timeout. Press the ▲ or ▼ key to scroll through the available sub menus. With the desired sub-menu highlighted, press the "=" key to enter the menu.

MARK TRIP START

Trip Start places the present time and date as a stamp in the data recorder memory to allow easy review of the data from the last trip, and to allow downloading data from a specific trip. A trip begins at a Trip Start and ends at the next Trip Start.

DATA RECORDER / TRIP START - CONTINUED

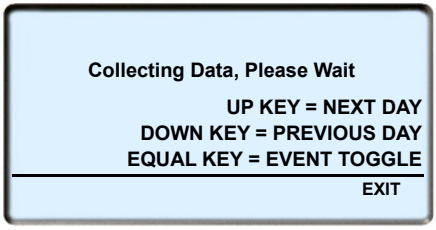
To Enter a Trip Start: with MARK TRIP START highlighted, press the "=" key. If trip start is acknowledged by the data recorder, "TRIP START ENTERED" will be displayed for 15 seconds and then the display will return to the Data Recorder screen. In the unlikely situation that the data recorder is not functioning properly "CANNOT ENTER TRIP START" will flash and then the display will revert back to the Data Recorder menu.

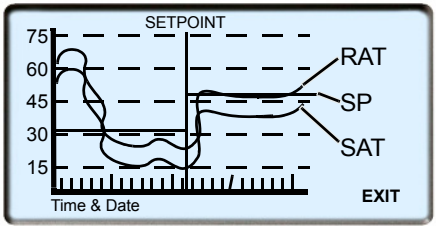
NOTE

If configured to do so, the System will prompt for entry of a customer specific data protect PIN code before any data recorder print functions can be used. If this code is not entered, all print functions are locked out.

PRINT TO SCREEN

PRINT TO SCREEN displays a graphical representation of the recorded data. To display the data, highlight PRINT TO SCREEN, and press the "=" key.





Once the graphical display is presented, press the ▲ or ▼ key to move through the recorded data, day by day. The data is presented with the left horizontal axis as 00:00 (midnight) with 24 dividing lines representing the hours of the day.

Press the "=" key to toggle the event codes on or off. When viewing events with the event codes ON, the following acronyms will be displayed:

c = Door Close	o = Door open
d = Defrost start	p = Power up
e = Defrost end	r = Real time clock change
f = Power down	t = Trip Start

MANUAL DEFROST

1. With the system powered up (START/RUN-OFF switch in the START/RUN position) press the MANUAL DEFROST key.
2. If the conditions for defrost are met, the status bar and the Box Temperature display will change to the word “DEFROST”. The MessageCenter will display “DEFROST CYCLE STARTED” for 10 seconds. At the completion of any defrost cycle, the MessageCenter will return to the default display.
3. If the conditions for defrost are not met, the MessageCenter will display “CANNOT START DEFROST CYCLE” for five seconds. This message will be activated when:

   - The box temperature is too warm. Defrost may be entered when the defrost termination temperature sensor is below 40°F (4.4°C) or the supply air temperature sensor is below 45°F (7.2°C), **OR**
   - The engine has not run at least 15 seconds after starting, **OR**
   - The unit is in Pretrip, **OR**
   - There is an active shutdown alarm.

MANUAL DEFROST - CONTINUED

Defrost may also be initiated automatically at preset intervals by the system defrost timer or by the defrost air switch.

The defrost mode terminates when the defrost termination temperature sensor and the supply air temperature sensor both rise higher than 55°F (12.8°C). If the defrost cycle does not end after a maximum of 45 minutes, the defrost cycle is terminated automatically. “DEFROST NOT COMPLETE” will be displayed in the MessageCenter.

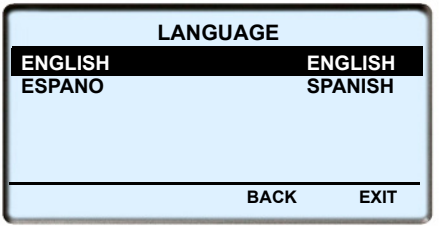
If defrost terminates on the 45 minute termination timer, the system will wait 1.5 hours of compressor running time before attempting another automatic defrost cycle. Pressing the manual defrost key will override this mode and start a defrost cycle.

LANGUAGE SELECTION

NOTE

Language selection may not be available on early software revisions.

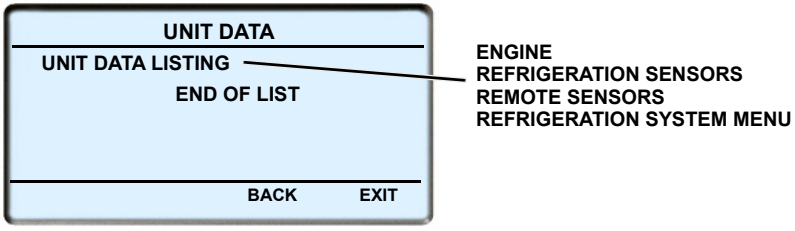
1. With the system powered up (START/RUN-OFF switch in the START/RUN position) press the MENU key until LANGUAGE is displayed.
2. Press the LANGUAGE soft key to display the LANGUAGE screen.



3. The LANGUAGE screen will display with a 10 second timeout. Press the ▲ or ▼ key to scroll through the available selections.
4. With the desired language highlighted, press the “=” key. The highlighted language will become active and “LANGUAGE CHANGED” will be displayed.

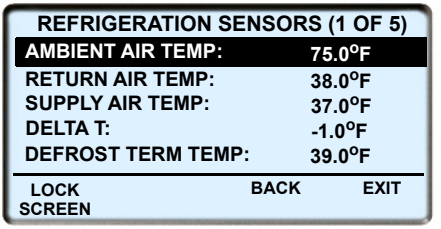
UNIT DATA

1. With the system powered up (START/RUN-OFF switch in the START/RUN position), press the MENU key until UNIT DATA is displayed.
2. Press the UNIT DATA soft key to display the UNIT DATA screen.



3. The UNIT DATA screen will display with a 15 second timeout. Press the ▲ or ▼ key to scroll through the available unit data sub menus. With the desired sub-menu highlighted, press the “=” key to view the data.

4. The selected sub-menu data will be displayed. For example, the REFRIGERATION SENSORS display may include:



5. Press the ▲ or ▼ key to scroll through the sub-menu data list.
6. To lock the present display press the LOCK SCREEN soft key. The screen will highlight (white lettering on a black background) to indicate it is locked and the soft key will change to UNLOCK SCREEN.
7. Press the UNLOCK SCREEN soft key to unlock the screen or press the ▲ or ▼ key to unlock the screen and scroll through the sub-menu data selections. Press the BACK soft key to return to the sub-menu selection screen or the EXIT soft key to return to the default screen.

UNIT DATA LIST

ENGINE
- Fuel level
- Battery
- Amp Draw
- Engine Coolant Temperature
- Unit AC Current #1

REFRIGERATION SENSORS
- Ambient Air Temp
- Return Air Temp
- Supply Air Temp
- Delta T
- Defrost Term Temp

REMOTE SENSORS (Optional)
- Remote Sensor 1
- Remote Sensor 2
- Remote Sensor 3

REFRIGERATION SYSTEM
- Compressor Suction Pressure

UNIT DATA - CONTINUED

Refer to the following table for additional information on Unit Data.

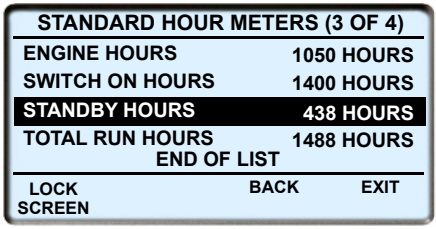
DATA	DEFINITION
FUEL LEVEL	% of fuel in tank. (This is only displayed when an optional fuel level sensor is installed and Configured ON)
BATTERY	Battery voltage. If “OK” is displayed, this indicates battery voltage is sufficient to allow a Start-Stop Off Cycle
AMP DRAW	Battery charging or discharging amps
ENGINE COOLANT TEMP	Engine coolant temperature
AMBIENT AIR TEMP	Ambient (air entering condenser) air temperature
RETURN AIR TEMP	Return (air entering evaporator) temperature
SUPPLY AIR TEMP	Supply (air leaving evaporator) temperature
DELTA-T	Supply air temperature minus return air temperature (a negative value indicates cooling and a positive value indicates heating)
DEFROST TERM TEMP	Defrost termination temperature
REMOTE SENSOR 1 (or 2 or 3)	This is the temperature at the indicated remote Temperature Sensor. (These sensors are optional, and may not be applicable to this unit.)
SUCTION PRESSURE	Compressor suction pressure
UNIT AC CURRENT #1	A/C voltage current draw on circuit #1

ALARM LIST

1. With the system powered up (START/RUN-OFF switch in the START/RUN position) press the ALARM key.
2. If there are active alarms, the alarm number will be displayed preceded by the letter “A” (active alarm). The system may also be configured to display an alarm description, following the alarm number. The last alarm that occurred will be the first alarm displayed and so on.
3. Next to the ACTIVE ALARMS screen name in the status bar, information on the total number of alarms and the position in the list of the highlighted alarm is provided. (In the illustration above there are three alarms, the second alarm is highlighted.)
4. Press the ▲ or ▼ key to scroll through the list of alarms.
5. To clear the alarms, press the CLEAR ALARMS soft key. The display will provide an “ACTIVE ALARMS CLEARED” message and then return to the default display after 10 seconds.
6. If there are no active alarms, the display will provide a “NO ACTIVE ALARMS” message and then return to the default display after five seconds.

VIEW HOUR METERS

1. With the system powered up (START/RUN-OFF switch in the START/RUN position) or in PC mode, press the MENU key until HOUR METERS is displayed.
2. Press the HOUR METERS soft key to display the hour meters screen.



3. The hour meters screen will display with a 15 second timeout. Press the EXIT soft key to return to the default screen.

STOPPING UNIT

To stop the unit, place the START/RUN-OFF switch in the OFF position. The refrigeration system and engine will shut down immediately while the control system completes a shut down sequence, and then the display will go blank.

NOTE

The system will close the compressor suction modulation valve (CSMV) and evaporator expansion valve (EVXV) before turning off.

Due to internal processing, turning the START/RUN - OFF switch OFF then back to the START/RUN position will result in a 4 to 50 second delay between the display going off and coming back on again.

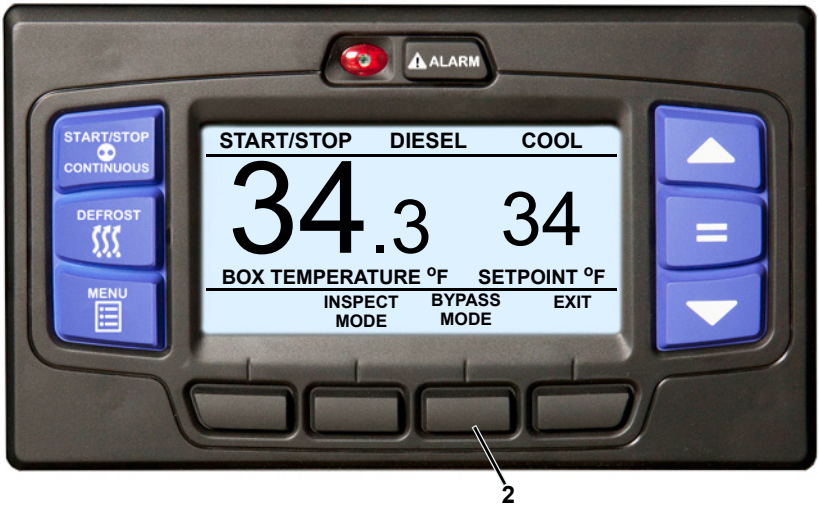
⚠ WARNING

Unit may start automatically at any time even if the switch is in the OFF position. Use proper lockout/tagout procedures before inspection/servicing. All unit inspection/servicing by properly trained personnel only.

EMERGENCY BYPASS MODE

In the event of an alarm caused by a failure of the display module, the unit will go into shutdown. In order to temporarily bypass this shutdown state, Emergency Bypass mode can be activated.

Once Emergency Bypass mode has been activated, the unit will operate normally for 24 hours, a countdown timer will be shown on the display. This 24 hour window of operation will keep the load safe, and provide enough time to contact the nearest Carrier Transicold Service Center for repair of the unit.



Enter Emergency Bypass Mode:

1. When the unit is in a shutdown state due to the display module alarm, press the MENU key until BYPASS MODE is displayed.
2. Press the BYPASS MODE soft key, the unit will resume operation until Emergency Bypass mode is disabled, or after 24 hours of unit operation in Emergency Bypass mode.

Exit Emergency Bypass Mode:

1. Press the MENU key until the EXIT BYPASS soft key is displayed.
2. Press the EXIT BYPASS soft key, the unit will shut down. Once Emergency Bypass mode is turned off, it cannot be restarted and the unit will remain in shutdown until it is repaired.

After repairs have been made and the display module alarm has been cleared, the unit will operate normally and Emergency Bypass mode will no longer be available.

PRETRIP INSPECTION

The Pretrip Inspection should be performed before picking up any load. This inspection is essential to ensure reliable operation of this unit. These checks take only a few minutes.

⚠ WARNING

Unit may start automatically at any time even if the switch is in the OFF position. Use proper lockout/tagout procedures before inspection/servicing. All unit inspection/servicing by properly trained personnel only.

BEFORE STARTING UNIT
Place unit in Inspect mode, unplug the high voltage connector and disconnect starter solenoid connector
Drain water from bottom of fuel tank
Drain water from water separator on fuel filter (if applicable)
Check radiator coolant level
Check air cleaner indicator
Check engine oil level
Visually check condition of belt
Check door latches and hinges
Check battery cables for rubbing or chafing
Check battery terminals for cleanliness
Check Engine Wiring Harness for chafing, rub spots and corrosion
Check channels or “T” bar floor as well as return air bulkhead for cleanliness and obstruction. Channels and return air bulkhead must be free of debris for proper air circulation.
Check air chute
Exit Inspect mode and reconnect starter solenoid connector
Start unit and place in engine / continuous operation

PRETRIP INSPECTION - CONTINUED

IMMEDIATELY AFTER STARTING ENGINE
Visually check fuel lines and filters for leaks
Visually check oil lines and filters for leaks
Visually check coolant hoses for leaks
Visually check exhaust system for leaks
Verify correct air flow of condenser fan*
* Place a small rag in front of the condenser coil, the rag should hold. If the rag blows away it means that the fan is rotating in reverse.
AFTER 15 MINUTES OF OPERATION
Initiate defrost and allow to terminate automatically, refer to **Manual Defrost**.
Check defrost drain line for blockage and proper water flow
PRETRIP
Initiate Pretrip, refer to **Pretrip** section.
List any Pretrip alarms
FINAL
Enter trip start in micro, refer to **Data Recorder / Trip Start** section.
COMMENTS / NOTES

PRODUCT LOADING

BEFORE LOADING:

- Pre-cool the compartment. This will remove much of the heat from the inside of the compartment (including the walls and insulation) and give the product better protection when it is loaded.
- If possible, place unit in a defrost cycle immediately before loading. This will remove moisture accumulated on the evaporator coil.

DURING LOADING:

- Stop the unit (place START/RUN-OFF switch in the OFF position)
- Check product temperature during loading
- Ensure the air returns and supply openings remain unobstructed
- Leave approximately 4 to 5 inches (100 to 125 mm) between the load and compartment front wall for air return to the unit
- Leave at least 10 to 12 inches (250 to 300 mm) between the top of load and the ceiling to ensure there is nothing to prevent airflow
- Load product on pallets to provide free air return to unit and improve product protection

Proper air circulation in the compartment, air that can move around and through the load, is a critical element in maintaining product quality during transport. If air cannot circulate completely around the load, hot spots or top-freeze can occur.

The use of pallets is highly recommended. Pallets help protect the product from heat passing through the floor of the trailer when loaded so air can flow freely through them to return to the evaporator. When using pallets, it is important to refrain from stacking extra boxes on the floor at the rear of the compartment as this will cut off the airflow.

Product stacking is another important factor in protecting the product. Products that generate heat - fruits and vegetables, for example - should be stacked so the air can flow through the product to remove the heat; this is called “air stacking” the product. Products that do not create heat - meats and frozen products - should be stacked tightly in the center of the trailer. All products should be kept away from the side-walls of the body, to allow air flow between the body and the load; this prevents heat filtering through the walls from affecting the product.

It is important to check the temperature of the product being loaded to ensure that it is at the correct temperature for transport. The refrigeration unit is designed to maintain the temperature of the product at the temperature at which it was loaded; it was not designed to cool warm product.

RECOMMENDED TRANSPORT TEMPERATURES

Some general recommendations on product transport temperatures and operating modes for the unit are listed in the following chart. These are included for reference only and should not be considered preemptive of the setpoint required by the shipper or receiver.

More detailed information can be obtained from your Carrier Transicold dealer.

Product	Setpoint Range		Operation[1]
	°F	°C	
Bananas	56 to 58	13 to 14	Continuous
Fresh fruits and vegetables	33 to 38	0.5 to 3	Continuous
Fresh meats and seafood	28 to 32	-2 to 0	Start/Stop or Continuous
Dairy products	33 to 38	0.5 to 3	Start/Stop or Continuous
Ice	15 to 20	-10 to -7	Start/Stop[2]
Frozen fruits and vegetables	-10 to 0	-23 to -18	Start/Stop[2]
Frozen meats and seafood	-10 to 0	-23 to -18	Start/Stop[2]
Ice cream	-20 to -15	-29 to -26	Start/Stop[2]

[1] During delivery cycles that include frequent stops and door openings, the unit should always be operated in Continuous Operation to help insure product quality. If it is possible, the unit should be turned off during the time the trailer doors are open to help conserve the product temperature.

[2] Variations may be necessary for very high or very low ambient temperatures.

GENERAL TROUBLESHOOTING

⚠ WARNING

Unit may start automatically at any time even if the switch is in the OFF position. Use proper lockout/tagout procedures before inspection/servicing. All unit inspection/servicing by properly trained personnel only.

⚠ WARNING

Be aware of HIGH VOLTAGE supplied at the power plug or from the generator. When performing service or maintenance procedures: ensure the START/RUN-OFF switch is in the OFF position, lockout/tagout the high voltage receptacle, and lockout/tagout the negative battery connection.

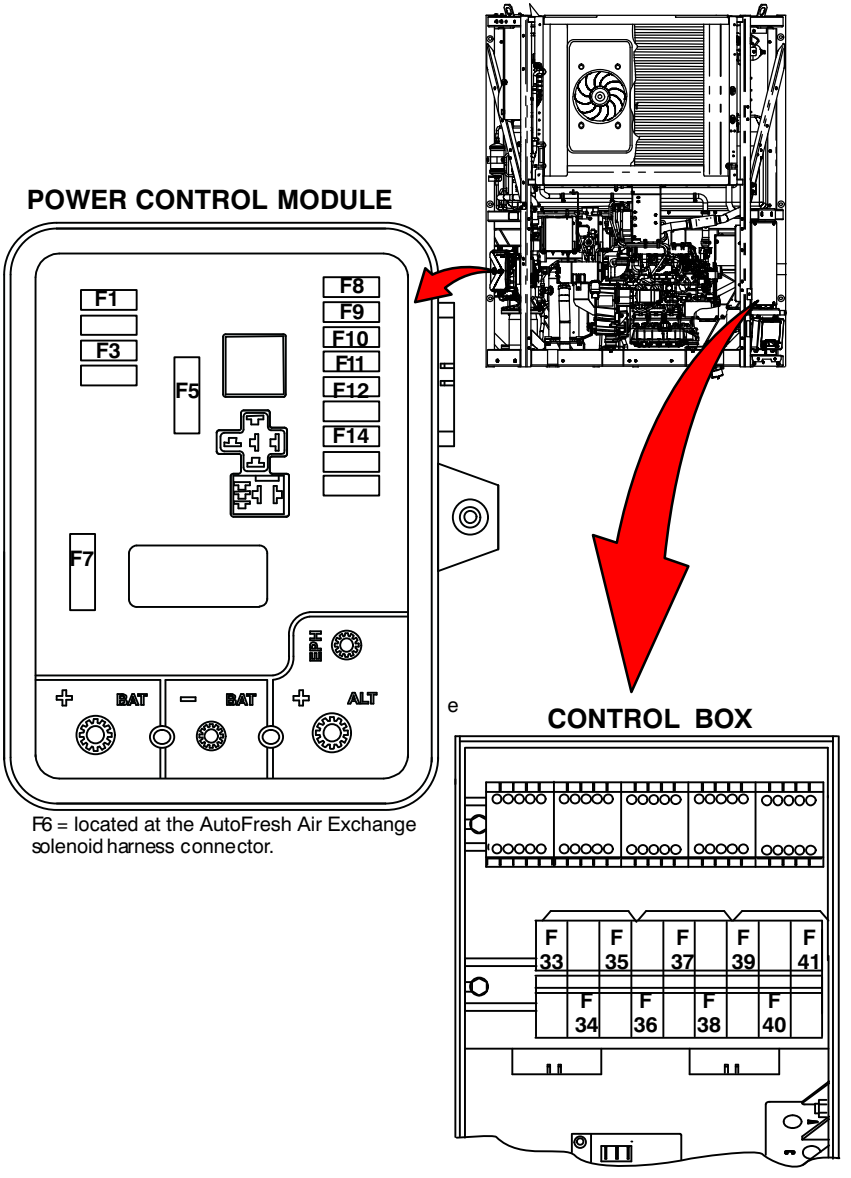
Everything possible has been done to ensure that this unit is the most reliable, trouble-free equipment available today. If, however you are having an issue, the following section may be of assistance.

If you do not find the trouble that you have experienced listed, please call your Carrier Transicold dealer for assistance.

Engine Operation	
Unit won't crank	Check alarm list Visually check battery condition Visually check battery connections Check all fuses
Unit won't start	Check alarm list Check fuel level Check all fuses
Unit won't run	Check alarm list Check fuel level Check engine oil level Check all fuses
Unit stops operating	Check alarm list Visually check belt Check engine oil level Visually check coolant level Check fuel level Check all fuses
Unit not cooling/ heating properly	Check alarm list Initiate Manual Defrost, refer to **Manual Defrost** Check for proper air circulation in the refrigerated compartment Check condenser for airflow restriction Check refrigerated compartment for damage or air leaks
Electric Operation	
Unit won't run	Check all fuses Check power cable connections Check power supply circuit breaker Visually check battery condition Visually check battery connections
Unit not cooling properly	Initiate Manual Defrost, refer to **Manual Defrost** section Check for proper air circulation in refrigerated compartment Check condenser for airflow restriction Check refrigerated compartment for damage or air leaks

FUSES

Fuses are located in the Power Control Module (PCM) (curbside of the unit) and in the Control Box (roadside of the unit).



F6 = located at the AutoFresh Air Exchange solenoid harness connector.

FUSES - CONTINUED

⚠ WARNING

When replacing fuses, lockout/tagout the power plug and the negative battery cable.

Fuse	Purpose	Amps	Volts
F1	Module Logic Circuit and Buzzer Power	5A	12VDC
F3	Stepper Valve Module Component Actuation and Engine Control Unit Power	5A	12VDC
F5	Power Enable Relay Contact Power	30A	12VDC
F6	AutoFresh Air Exchange Solenoid Power	10A	12VDC
F7	Main Power	80A	12VDC
F8*	Fuel Level Sensor Power	5A	12VDC
F9	Contactor Control Board Component Actuation Power	5A	12VDC
F10	Main Microprocessor Module Component Actuation Power	20A	12VDC
F11	Light Bar Power	5A	12VDC
F12	Satellite Communications Power	5A	12VDC
F14	Fuel Heater Power	15A	12VDC
F33, 34, 35	Battery Charger	5A (timed)	600VAC
F36, 37, 38	Condenser and Evaporator Fan Motors	12A	600VAC
F39, 40, 41	Coil/Drain Pan Heaters	12A (timed)	600VAC

*With EES installed F8 = 10 amp for FLS and EES

MAINTENANCE SCHEDULE

For the most reliable operation and for maximum life, this unit requires regular maintenance. This includes oil and filter changes, fuel filter and air cleaner replacement and coolant replacement. Maintenance should be performed by properly trained personnel on the following schedule:

⚠ WARNING

Unit may start automatically at any time even if the switch is in the OFF position. Use proper lockout/tagout procedures before inspection/servicing. All unit inspection/servicing by properly trained personnel only.

SYSTEM	OPERATION
a. Pretrip Inspections	
	1. Pretrip Inspection - See **Pretrip Inspection** 2. Run Microprocessor Pretrip - Before loading, see **Pretrip** 3. Check Engine Hours
b. Every Service Interval or Yearly	
Engine	1. Check engine oil and filter change interval 2. Check low oil pressure switch 3. Clean crankcase breather 4. Check fuel injectors every 1,500 hours* 5. Check injection pump every 3,000 hours* 6. Check and adjust engine valves every 4,000 hours
Fuel System	1. Clean mechanical and electric (if equipped) fuel pump screens 2. Change fuel filter 3. Check fuel heater (if equipped)
Cooling System	1. Check coolant change interval. If replacement is not required, check antifreeze concentration using a refractometer (Carrier Transicold P/N 07-00435-00) 2. Clean condenser/radiator surfaces 3. Check water pump 4. Check water temperature sensor
Exhaust System	1. Check mounting hardware 2. Check muffler and exhaust pipes
Air Intake System	1. Change air cleaner element 2. Check and reset air cleaner indicator

Starting Circuit	1. Clean battery connections and check cables for chafing, rub spots and corrosion added 2. Check battery hold down clamps 3. Check battery condition 4. Check starter operation
*Based on EPA 40 CFR Part 89	
b. Every Service Interval or Yearly (Continued)	
Charging Circuit	1. Check battery charger output voltage 2. Check battery charger amperage
Unit	1. Check unit mounting bolts 2. Check engine and compressor mounting bolts 3. Check door latches and hinges 4. Check condition of water pump belt
Refrigeration System	1. Check defrost air switch and calibrate as necessary 2. Remove bulkhead (if equipped); check and clean the evaporator coil and all defrost drain hoses 3. Install manifold gauge set and check refrigerant pressure 4. Check calibration of suction pressure transducer 5. Run APX Control System Pretrip, see **Pretrip** 6. Check manual defrost operation
Electrical System	1. Check unit switches and electrical connections 2. Check all ground connections for corrosion and tightness 3. Check stand-by plug for signs of wear or damage 4. Check condenser fan amperage 5. Check evaporator fan amperage 6. Check compressor amperage 7. Check heater amperage
c. 5 year or 12,000 Hour Maintenance	
Coolant System	1. Drain and flush cooling system 2. Refill with Extended Life Coolant
d. Oil Change Intervals	
Oil Type	**Oil Change / ESI Filter Change**
Petroleum	3000 hours or 2 years (Maximum oil drain interval is 2 years)
Mobile Delvac 1*	4000 hours or 2 years (Maximum oil drain interval is 2 years)
*Mobil Delvac 1 is the only approved synthetic oil	

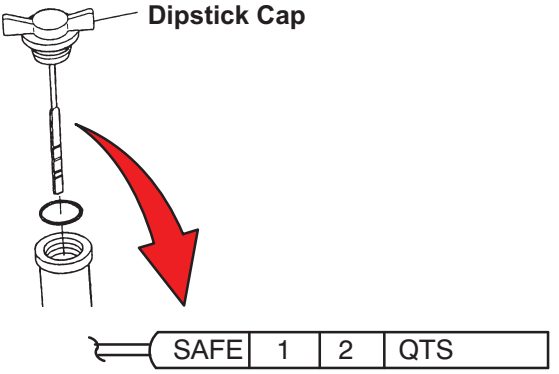
These maintenance schedules are based on the use of approved oils and regular pretrip inspections of the unit. Failure to follow the recommended maintenance schedule may affect the life and reliability of the refrigeration unit.

MAINTENANCE

Engine oil - the petroleum oils recommended for use in this refrigeration unit must comply with the American Petroleum Institute's (API) Class CG or better rating. The only recommended synthetic oil is Mobil Delvac 1. The use of any oil that does not meet this rating may affect the warranty on the engine. The use of oil of the proper weight (viscosity) is also essential. The following chart indicates the SAE weight rating of the oil to be used in various climates:

SAE Weights		
Outdoor Temperature		SAE
Fahrenheit	Centigrade	
Below 32°	Below 0°	10W 30 or Mobil Delvac 1 (5W 40)
Above 32°	Above 0°	10W 30 or Mobil Delvac 1 (5W 40) or 15W 40

To check the engine oil level: Run the unit to bring the engine up to operating temperature, shut the unit off, and remove the cap/dipstick. Wipe the dipstick clean and insert it into the oil fill tube without threading it all the way back into the tube. Remove the dipstick again and check oil level. DO NOT add oil if the level is in the “safe” range. If needed, add oil as indicated by markings on dipstick until level is in the “safe” range.



PRIMING FUEL SYSTEM

The mechanical fuel lift pump is mounted on the engine next to the injection pump. This pump has a manual plunger for priming the fuel system when the fuel tank has been run dry.

⚠ WARNING

Keep clear of rotating belt and pulleys.

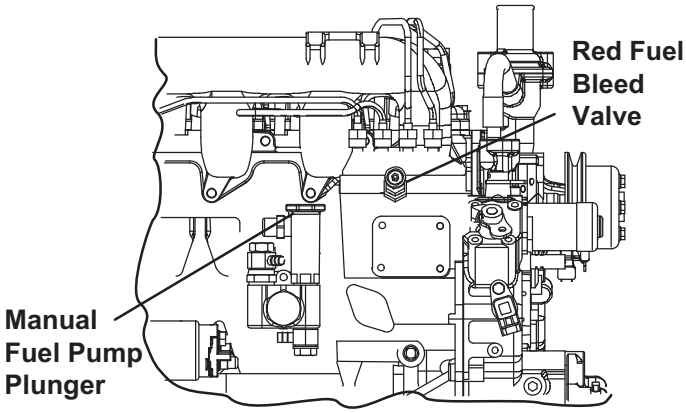
To prime the fuel system, use the following steps:

1. Turn the bleed valve (red) counter-clockwise until fully opened.
2. Turn the top of the manual fuel pump plunger counter-clockwise to unlock it. S-L-O-W-L-Y (up/down once per second) pump the manual plunger until positive pressure (resistance) is felt. This may take up to 200 strokes. Positive pressure indicates fuel flow.
3. Continue to pump S-L-O-W-L-Y (up/down once per second) approximately 100 more strokes to fill the filter and bleed the air out of the lines.
4. Start engine. It may be necessary to continue to pump until the engine starts.

NOTE

Running the engine for an extended period of time with the manual plunger up can cause a priming pump failure.

5. Depress and turn the top of the manual plunger clockwise to lock in place.
6. When the engine is running smoothly, turn bleed valve clockwise until fully closed.



EMERGENCY ROAD SERVICE

At Carrier Transicold we're working hard to give you complete service when and where you need it. That means a worldwide network of dealers that offer 24-hour emergency service. These service centers are manned by factory trained service personnel and backed by extensive parts inventories that will assure you of prompt repair.

Should you experience a problem with your unit during transit, follow your company's emergency procedure or contact the nearest Carrier Transicold service center. Consult the Shortstop Service Centers directory or visit www.trucktrailer.carrier.com and click on "Dealer Locator" to locate the service center nearest you. The Shortstop directory may be obtained from your Carrier Transicold dealer.

You can also download the Carrier Transicold North America Truck/Trailer Dealer Locator App to your smart phone. The Dealer Locator App provides:

- Location information for every Carrier Transicold dealer in North America
- The nearest dealer from your present location
- Dealer look-up capability
- Dealer services (Trailer, Truck, APU, Mobile Support, etc.)
- Addresses
- Maps to easily find dealers
- Directions and navigation to the dealerships
- Phone number and 24-hour emergency hot lines, where available
- Auto dialing
- Hours of operation
- Link to dealer website
- Ability to add dealers to Contacts

To download the Carrier Transicold North America Truck/Trailer Dealer Locator App, scan this QR code, or go directly to your App store.

If you are unable to reach a service center, call our 24-hour Action Line: (800) 448-1661.

We will do everything we can to get your problem taken care of by an authorized CTD dealer and get you back on the road.

⚠ **WARNING:** Breathing diesel engine exhaust exposes you to chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

- Always start and operate engine in a well-ventilated area.
- If in an enclosed area, vent the exhaust to the outside.
- Do not modify or tamper with the exhaust system.
- Do not idle the engine except as necessary.

For more information, go to www.P65warnings.ca.gov/diesel

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