Operator's Manual

Neos™ 100S
Truck Refrigeration Units

Neos 100S

62-11850
Rev C

Carrier TRANSICOLD

Carrier
TRANSICOLD

OPERATOR'S MANUAL

For The

Neos™ 100S

Truck Refrigeration Units

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INTRODUCTION

This guide has been prepared for the operator of Carrier Transicold's Neos^{TM} 100S battery driven refrigeration units with Cab Command controller. It contains basic instructions for the daily operation of the refrigeration unit as well as safety information, and other information that will help 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 there is a question about the operation of this Carrier Transicold truck refrigeration unit.

This refrigeration unit has been engineered to provide long, trouble-free performance when it is properly operated and maintained. A comprehensive maintenance program will help to ensure 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 the unit and to provide general assistance when needed. More comprehensive information can be found in the Operation and Service Manual for this unit, which can be obtained from a Carrier Transicold dealer.

When having a 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.

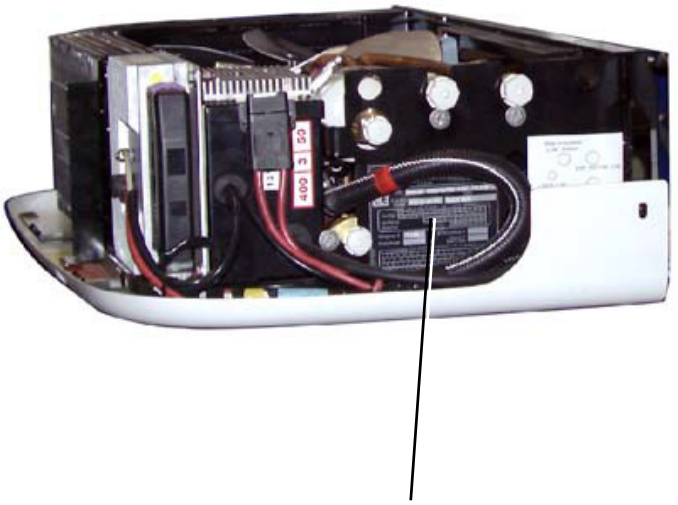
UNIT IDENTIFICATION

Each unit is identified by a nameplate attached to the frame of the unit. The nameplate identifies the complete model number of the unit, the serial number and some other information.

If a problem occurs, please refer to the information on this plate, and make a note of the model and serial number before calling for assistance. This information will be needed when contacting a technician so that they may properly assist you.

The complete nameplate is fixed on the frame and the Serial Number is fixed on the pod.

Nameplate Location



SAFETY

⚠ WARNING

Use proper Lockout/Tagout procedures before inspecting/servicing this unit. All unit inspection/servicing must be performed by properly trained personnel only.

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 all pre-trip inspections, daily inspections, and problem troubleshooting, you may be exposed to moving parts; please stay clear of all moving parts when the unit is in operation.

⚠ WARNING

Beware of unannounced starting of the fans caused by the thermostat and the start/stop cycling of the unit.

Refrigerants

The refrigerant contained in the unit refrigeration system 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 during system service, we recommend that whenever the unit requires service of the refrigeration system you contact the nearest Carrier Transicold authorized repair facility for service.

⚠ WARNING

Inspect battery cables for signs of wear, abrasion or damage at every pre trip inspection and replace if necessary. Also check battery cable routing to ensure that clamps are secure and that cables are not pinched or chafing against any components.

UNIT OPERATION

The Neos 100S is an all-electrical unit, powered by the vehicle battery (alternator).

After starting up the refrigeration unit by pressing the ON key, the microprocessor manages the unit regulation according to the box temperature needed.

The unit automatically shuts down when the engine is switched off with the ignition key.

The unit can be completely shut down manually by pressing the OFF key on the Cab Command.

Standby Mode

The Neos 100S is powered by a standby module reducing the 230 VAC into 12 Vdc. The power network connection is detected by the standby module which automatically starts up the unit in standby mode.

If the ignition key is switched ON while the unit is connected to the power network, or if the standby plug is connected while the unit is running, a buzzer alarm will sound indicating the double power supply and the unit stops.

Temperature Control

As soon as the set point temperature has been reached, temperature control is obtained by shutdown and start-up of the electro-magnetic clutch.

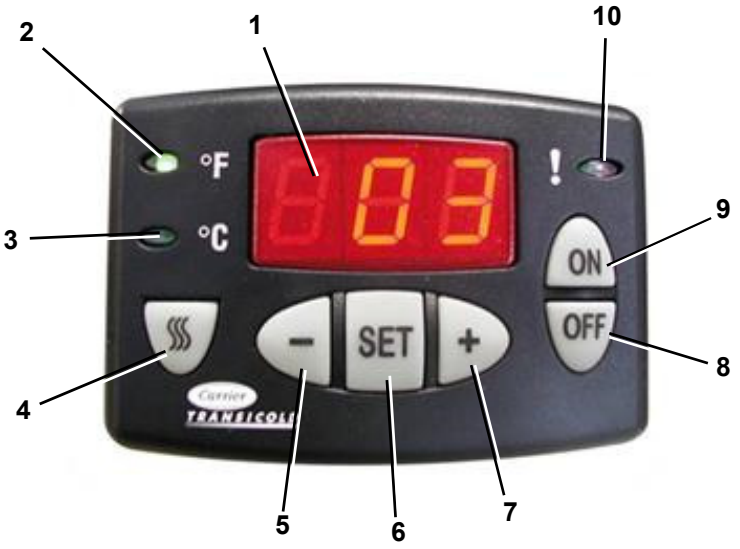
The condenser and evaporator fans cut out during regulation. When transporting fragile loads such as fresh meat, vegetables and cheese, it is possible to program the microprocessor to obtain continuous ventilation by the evaporator during regulation.

Defrost

Defrost operation is fully automatic but can be manually controlled.

- Defrost cycles are fully controlled by the integrated microprocessor.
- During the defrost cycle, the evaporator fan shuts down. The condenser fan is controlled by the microprocessor.
- Defrost cycle termination is controlled by a defrost thermostat.
- During the defrost cycle, the cab command display indicates "dF".

DISPLAY



1. Display - 3 digits
2. °F LED
3. °C LED
4. Manual Defrost key
5. - key
6. Set key
7. + key
8. OFF key
9. ON key
10. Unit operation display:
    - Green (left half):

      - Cooling, Null, and Heating modes.
    - Red (right half):

      - Malfunction

DISPLAY - CONTINUED

Display - 3 digits

- Box temperature
- "dF" message in defrost mode
- Malfunction messages
- Software version
- Hourmeter value
- Configuration parameters in the different menus

ON / OFF keys

These keys are for starting and stopping the unit.

SET key

This key is for accessing set point and unit data. This key will also allow the user to enter into the Selection menu for the functional and defrost parameters when combined with other keys.

MINUS & PLUS keys

These keys are for selecting the requested settings in different menus.

DEFROST key

This key enables manual defrost control.

°C / °F LED

This indicates that the unit is running and if temperature is displayed in Celsius or Fahrenheit degrees.

REGULATION LED - Green

This indicates the three different modes:

- COOLING mode: green light is ON.
- NULL mode (regulation): green light is OFF.
- HEATING mode: green light flashing.

ALARM LED - Red

This LED will flash in case of a malfunction.

STARTING THE UNIT

1. Start the vehicle engine.
2. Start the unit by pressing the ON key. Start-up is time-delayed for 30 seconds.
3. The digital display of the Cab Control displays the box temperature.
4. Check that the temperature set point is correct by pressing the SET key. The set point temperature is highlighted on the digital display.
5. Enter a new set point if necessary.

STOPPING THE UNIT

1. For a delivery stop: turn the unit off by the vehicle ignition key.
2. For a long stop (more than 2 hours): press the OFF key.

TEMPERATURE SETPOINT

NOTE

If, when settings are adjusted, no key is activated within five seconds, the system reverts to displaying the box tempera-ture. All changes made are recorded.

1. Press the SET key to display the setpoint temperature.
2. Press the + or - key to change the setpoint.
3. Press the SET key to return to the box temperature display.

MANUAL DEFROST

1. Check the display to verify that the box temperature is 40°F or lower.
2. Press the Defrost key to initiate manual defrost.

DEFROST INTERVAL

NOTE

If, when settings are adjusted, no key is activated within five seconds, the system reverts to displaying the box tempera-ture. All changes made are recorded.

1. Press the OFF key to shut down the unit.
2. Press simultaneously the Defrost and ON keys and hold for five seconds to display the last selected defrost interval.
3. Press the + or - key to change the defrost interval.
   - 00: Inhibit Defrost Function.
   - AUT (coefficient 1): microprocessor-optimized automatic defrost according to type of cargo transported (variable intervals).
   - 1H, 2H,.....6H: Fixed defrost interval in hours.
4. Press the SET key to return to the box temperature display.

MINIMUM SETPOINT LOCK

To limit the temperature pull-down, it is possible to program the minimum set point lock:

1. Press consecutively the +, - and Defrost keys to access the functional parameters.
2. The display will show the previous Minimum Setpoint Lock value.
   - Available values are: 32°F / -4°F / -20°F
   - Factory setting by default: 32°F
3. Press the + or - key to modify the displayed value.
4. Press the SET key to validate the new selected value.
5. The display will show the Differential Parameter value.
   - Available values are: 32°F / -4°F / -20°F
   - Factory setting by default: 32°F
6. Press + or - key to modify the displayed value.
7. Press the SET key to validate the new selected value.

MINIMUM SETPOINT LOCK - CONTINUED

8. The display will show the EFM (Evaporator Fan Motor) status in “Null” Mode.
   - Available values are: ON or OFF
   - Factory setting by default: OFF
9. Press the + or - key to modify the displayed value.
10. Press the SET key to validate the new selected value and return to the box temperature display.

DISPLAYING UNIT DATA

1. Press the SET key for five seconds to enable access to malfunction codes.
2. Press the + or - key to display active or passive alarms.
3. Press the SET key to display the software version.
4. Press the SET key to display the hourmeter.
5. Press the SET key to return to the box temperature display.

PRODUCT LOADING

Before Loading

- Pre-cool the inside of the insulated body by lowering the temperature for about 15 minutes.
- Evacuate the humidity existing inside the box by carrying out a manual defrost. This can only take place when enabled by the defrost thermostat (box temperature lower than 37°F during pull down and 46°F during heating).
- Evaporator fans are protected by safety grills. In the event of heavy duty use of the unit, ice can accumulate on the grills. It is therefore recommended to clean them regularly by means of a small brush. The operation MUST be done when the unit has been SHUT DOWN.

When Loading

- Turn the unit off!
- It is recommended to open doors as little as possible to avoid the intake of hot air and humidity.
- Select the temperature by means of the thermostat, according to the transported goods.
- Check the internal temperature of the goods being loaded (using a probe thermometer).
- Take care not to obstruct the air intakes on the evaporator section and the ventilation ducts.
- Leave a free space of about 2 to 3 inches between the load and the front wall.
- Leave a free space of about 8 inches between the top of the load and the roof.
- Leave a free space of about 8 inches between the floor and the load (gratings, pallets).
- Do not forget to close the doors.
- Before closing the doors, check your load once more and see that nobody is shut inside the box.

NOTE

For stationary utilization, we recommend to place the vehicle in the shade.

⚠ CAUTION

Never leave your unit more than a month without running.

PRODUCT LOADING - CONTINUED

Proper air circulation in the insulated box refers to air that can move around and through the load. This 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, when loaded so air can flow freely through the pallets to return to the evaporator, help protect the product from heat passing through the floor of the truck. When using pallets, it is important to refrain from stacking extra boxes on the floor at the rear of the truck, as this will cut off the airflow.

Product stacking is another important factor in protecting the product. Products that generate heat, such as fruits and vegetables, should be stacked so that the air can flow through the product to remove the heat. This is called "air stacking" the product. Products that do not create heat, such as meats and frozen products, should be stacked tightly in the center of the box.

All products should be kept away from the sidewalls and ceiling of the cargo area to allow air to flow between the body and the load. This will prevent heat from filtering through the walls and 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 a warm product.

RECOMMENDED TRANSPORT TEMPERATURES

Below are some general recommendations on product transport temperatures and operating modes for the unit. These are included for reference only. The shipper or receiver may require different set points than those listed.

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

Product	Set Point Range	
	°F	°C
Bananas	56 to 58	13 to 14
Fresh fruits and vegetables	33 to 38	0.5 to 3
Fresh meats and seafood	28 to 32	-2 to 0
Dairy products	33 to 38	0.5 to 3
Ice	15 to 20	-10 to -7
Frozen fruits and vegetables	-10 to 0	-23 to -18
Frozen meats and seafood	-10 to 0	-23 to -18
Ice cream	-20 to -15	-29 to -26

NOTE

It is essential to shut down the compartment during the periods when the doors are opened, in order to maintain the temperature of the cargo in the other compartments and keep the unit operating correctly.

GENERAL TROUBLESHOOTING

⚠ WARNING

Use proper Lockout/Tagout procedures before inspecting/servicing this unit. All unit inspection/servicing must be performed by properly trained personnel only.

Everything possible has been done to ensure that this unit is the most reliable, trouble-free equipment available today. If, however you run into problems 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.

Cooling Mode	
Unit will not cool	Compressor drive belt broken. Compressor defective. Defrost cycle has not terminated. Abnormal pressure. Hot gas (two-way) solenoid malfunction.
Insufficient cooling	No or restricted evaporator airflow. Compressor valve(s) worn or broken. Abnormal pressure. Expansion valve malfunction.
Long or continuous cooling	Box hot load. Defective box insulation or air leak. Abnormal pressure. Temperature controller malfunction. Compressor defective.
High discharge pressure	Condenser coil dirty. Non-condensibles or refrigerant overcharge. Condenser fan inoperative.
Low discharge pressure	Compressor valve(s) worn or broken. Hot gas (two-way) solenoid malfunction.
High suction pressure	Compressor valve(s) worn or broken. Hot gas (two-way) solenoid malfunction.

Low suction pressure	No evaporator air flow or restricted air flow. Excessive frost on coil. Suction service valve partially closed. Filter-drier partially plugged. Low refrigerant charge. Expansion valve malfunction.
Suction and discharge pressure tend to equalize when unit is operating.	Compressor valves defective. Hot gas (two-way) solenoid malfunction.
Heating Mode	
Unit will not heat or insufficient heating	Abnormal pressure. Temperature controller malfunction. Hot gas (two-way) solenoid malfunction. Compressor drive belt broken. Compressor defective.
High discharge pressure	Overcharged system. Condenser fan of HP2 pressure switch defective. Non-condensibles in system. Condenser fan defective or no air flow through Condenser.
Low discharge pressure	Compressor valve(s) worn or broken. Hot gas (two-way) valve malfunction.
Low suction pressure	Refrigerant shortage. Compressor pressure regulating valve malfunction.
Defrost Mode	
Automatic defrost will not initiate	Defrost thermostats (DTT) open or defective. Hot gas valve. Electronic card malfunction.
Manual defrost will not initiate	Microprocessor defective. Defrost thermostat (DTT) open or defective.
Defrost cycle initiates but does not defrost	Hot gas (two-way) solenoid malfunction.
Frequent defrost	Wet load.
Does not terminate or cycles on defrost	Defrost thermostat (DTT) shorted closed.

ALARM DESCRIPTION

There are three types of alarms:

AXX: Active alarms that cannot be cleared until the malfunction has been corrected. The red LED is flashing rapidly.

PXX: Passive alarms that stay in memory until the technician clears them. The red LED is flashing slowly.

Direct Display: These alarm messages are displayed instead of temperature read-out as soon as the malfunction is detected, and remain displayed as long as malfunction persists. The unit does not run until the malfunction has disappeared or been corrected.

Fault Alarm Display

1. When an alarm is activated, the ! light flashes red. The light flashes green when the unit is operating correctly.
2. Press the SET key for five seconds to display alarms.
3. Press the + or - keys to view additional alarms.
4. Press the SET key to return to the box display temperature.

ALARM LIST AND ALARM RESET

ALARM	ALARM / ERROR DESCRIPTION
A00	No malfunction. Unit is in operation.
A01/A02/A03	Low pressure switch open / High pressure switch open / DC electrical motor over heated (displayed alternatively).
A04	Clutch compressor fault.
A06	Condenser fault.
A07	Evaporator fan fault.
A09	Defrost valve (HGS1) fault.
A11	Main heat valve (HGS2) fault.
A12	High temperature alarm.
A13	Low temperature alarm.
A14	Defrost alarm > 45 minutes.
A15	Setpoint adjusted out of the range -20°F / +86°F.
E E	Evaporator temperature probe (open circuit).
b A t	Battery low voltage alarm.
S E	Maintenance needed. This is a maintenance alarm that occurs every 1000 hours. To reset this alarm, refer to procedure to **Reset Passive Alarms and Clear the Maintenance Interval Message SE**.

Reset Passive Alarms and Clear the Maintenance Interval Message SE

1. While displaying either the P** alarm code or the SE alarm, press simultaneously the +, -, and SET keys. This will cancel all passive alarms or the service hourmeter will reset.

FUSES

⚠ WARNING

When replacing fuses, Lockout/Tagout the Negative Battery Cable and the High Voltage Power Supply.

1	F1	1A	Ignition fuse (fuse box of the vehicle)
2	FEFMM	15A	Evaporator fan motors protection
3	FMC	80A	DC motor protection (closed to condenser)
4	FR1	125A	Main road fuse (near vehicle battery)
5	FRPM	2A	+ Micro protection (near vehicle battery)
6		25A	Micro protection

UNIT MAINTENANCE

⚠ WARNING

Use proper Lockout/Tagout procedures before inspecting/servicing this unit. All unit inspection/servicing must be performed by properly trained personnel only.

⚠ WARNING

Before any operation requiring an intervention on the unit, check that the unit (Cab Command) is off. Verify that it is impossible for the unit to automatically start-up during maintenance.

A comprehensive maintenance program will help to ensure 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.

Regular servicing is required in order to optimize the service life and reliability of the unit. Service operations are to be carried out according to the maintenance schedule. A service message will appear on the cab command display (the running hours of the unit can be inside the data menu: 1 on the display = 10 HRS):

Hours displayed	Running hours	Initial service	Service A	Service B
10	100	X		
100	1000		X	
200	2000		X	X
300	3000		X	
400	4000		X	X
500	5000		X	
600	6000		X	X
700	7000		X	

Initial Service	Check the tightness of bolts and screws and verify that the unit is correctly fastened onto the box. Check the fixation of the roof-top skin. Check the gasket pod for air leaks.
Service A	Clean up the battery and battery clamps. Check compressor belt tension. Replace the compressor belt every 3000 hours. Check for refrigerant leaks. Check all electrical connections. Check the cooling mode. Check the defrost operation. Check the operation of the cab control. Check and replace the pod gasket if necessary. Clean up the condenser coil. Clean up the pod (inside). Check the insulation gasket at the condenser opening. Check the insulation gasket at the condenser fan motor opening.
Service B	Replace the electrical motor brushes.
Every Year	Replace the filter drier. Clean up the expansion orifice filter.
Every Two Years	Replace the compressor oil - only use Polyolester oil (POE) approved by Carrier Transicold. Replace the refrigerant. Replace the orifice expansion valve.

NOTE

Compressor oil: The compressors are supplied with CARRIER POLYOLESTER (POE) oil. The presence of a sticker indicates that the oil change has been correctly carried out in our CARRIER TRANSICOLD plant. Oils of PAG type are strictly incompatible with the operation of our units. Never use an oil other than those approved by CARRIER.

STANDBY OPERATION GUIDELINES

For safe, reliable operation in Standby mode, it is important to follow a few guidelines:

- ALWAYS check that the unit is OFF (Cab command) before connecting or disconnecting it from the power source.
- The extension cable and fuse used for network connection must comply with the legislation currently applicable on the site of use and with the unit specifications as described in the table below:

Maximum Amperage for Operation Equipment	
Operating voltage	
230 / 1 / 50 Hz	8 A (1.5 mm^2)
230 / 1 / 60 Hz	6, 8 A (1.5 mm^2)

- The unit connection cable must be fitted with a ground connection. The cable must be connected to earth (ground).
- On the 230 V supply, the unit should be connected to a Ground Fault Protection Device.
- Operations on the 230 V supply for the unit must only be carried out by authorized personnel.
- The user is liable for ensuring that the above measures are taken.

EMERGENCY ROAD SERVICE

At Carrier Transicold we are 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 hotlines 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.

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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

Carrier TRANSICOLD

North America
Carrier Transicold
700 Olympic Drive
Athens, GA 30601 USA

Central America and Mexico
Carrier Transicold
Ejercito Nacional 253-A Piso 5
Colonia Anahuac 11320 Mexico D.F.