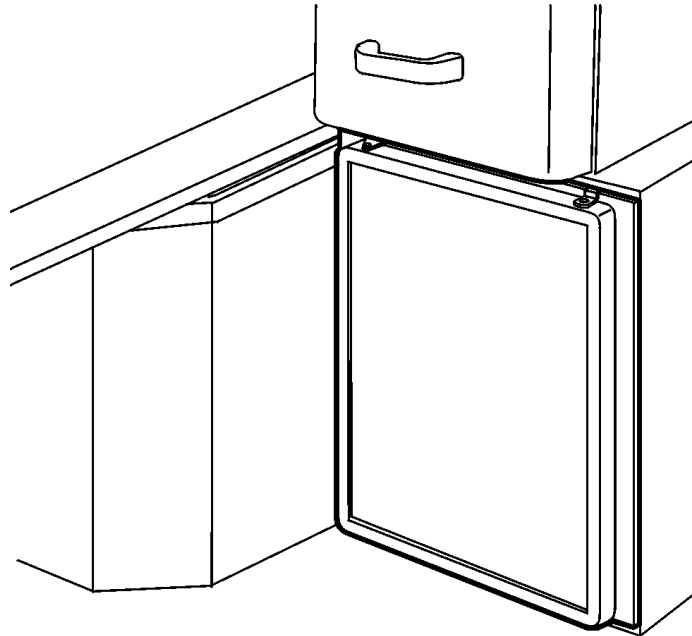


This Service Bulletin replaces Service Bulletin 889-01, "Refrigerator, Troubleshooting" (07.1999), Publication no. PV776-TSP131764.

Date	Group	No.	Page
6.2002	885	001	1(20)

Refrigerator, Troubleshooting
VN

Refrigerator, Troubleshooting



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General

Refrigerator

Thetford/Norcold

NOTE: The customer is responsible for removing all items from the refrigerator before the technician can begin repairs.

Thetford/Norcold Return Material Authorization (RMA)

Thetford/Norcold will, at its option, repair or replace a product that proves to be defective. To determine if the product will be repaired or replaced, contact the Technical Assistance Line to determine the repair (800-444-1210, Monday - Friday, 8:00 am - 6:00 pm EST). All Return Materials Authorization (RMA) must be prearranged from the Thetford/Norcold Technical Assistance Line. If the product is deemed to be non repairable, a representative will authorize and issue an RMA number.

RMA numbers are valid for thirty (30) days from the date of issue. They are valid only for the product issued. The following product information is required to issue a RMA.

- Model Number
- Serial Number
- Cooling Unit Serial Number
- Date of Purchase
- A Detailed Description of Consumer Problems Experienced

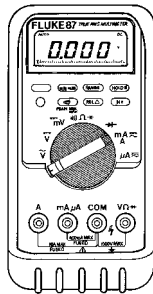
When returning the refrigerator, the RMA number must be written on the outside of the box, otherwise the product will be refused and sent back at your expense.

Tools

Special Tools

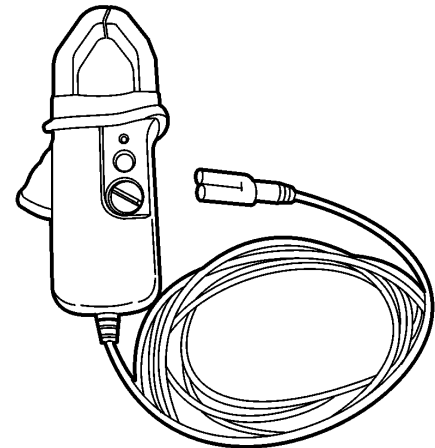
See "Refrigerator, Troubleshooting" page 1.

The following special tool may be needed when troubleshooting the refrigerator. The tools can be ordered from Kent-Moore (800-328-6657) or Volvo quoting the specified number.



J-39200

Multimeter (Kent-Moore)



Fluke Clamp Meter

Troubleshooting

Refrigerator Troubleshooting

Refrigerator Not Working, Basic Checks

See “Refrigerator, Troubleshooting” page 1.



DANGER

Before working on a vehicle, set the parking brakes, place the transmission in neutral and chock the wheels. Failure to do so can result in unexpected vehicle movement and can cause serious personal injury or death.

When the refrigerator is not working, there are some basic checks that should be performed.

Some of the procedures require removing the refrigerator from the cabinet. If so, see:

VN610 & 660 “Refrigerator, Replacement” page 17

VN770 “Refrigerator, Replacement” page 19

1. Battery Lifeguard System

The Battery Lifeguard is an optional system designed to prevent auxiliary electrical equipment from draining the batteries.

- 1 Make sure that the Battery Lifeguard System is not activated. (An alarm , in the dash, will beep if the system is activated).
If so, see Service Information in Group 30, “Battery Lifeguard System,” PV776–TSP131083.

2. Wiring Harness

- 1 Check the Maxi Fuse no. 10 (50 A).
- 2 If the Maxi Fuse is OK and there is no power to the harness connector behind the refrigerator or to the outlet in the upper cabinet, look for loose connections in the wiring harness. See "VN Electrical Schematic Group 37, PV776-370-98047/2", Connector no. 6 Power Supply LHS Lower.

3. Voltage Input

Measure the voltage at the harness connector at the back of the refrigerator to make sure that the input voltage is correct.

Use the Multimeter J-39200.

To remove the refrigerator, see:

VN610 & 660 "Refrigerator, Replacement" page 17

VN770 "Refrigerator, Replacement" page 19

On trucks without a Battery Lifeguard System the reading should be **10.5 V DC – 32 V DC**.

Trucks with the Lifeguard system will cut the power to the refrigerator at 12.2 V DC and cut the power back on at 12.9 V.

If the electrical system goes to an overcharge condition, the refrigerator will operate up to 15.4 V.

NOTE: The truck supplies DC voltage to the refrigerator. The oscillator and the transformer then changes the power to AC voltage to the compressor.

Troubleshooting Auto Shutoff Device



CAUTION

Do not operate refrigerator with Shutoff Device disconnected. Operating the refrigerator without this device may cause compressor failure.

To determine if the Shutoff Device is functional disconnect the Shutoff Device from the Temperature Control. Connect the Temperature Control directly to the power supply. If the refrigerator operates, replace the Shutoff Device. If the refrigerator does not operate, replace the Temperature Control.

Overheating Shutoff Device Installation

1 Remove the wire (1) from the upper connection (2) of the Power Supply (3).

2 Attach the Shutoff Device to the refrigerator:



NOTE: Remove the screw from the two (2) upper holes (4) of the Power Supply. Position the Shutoff Device (5) above the Power Supply and align the mounting holes of the Shutoff Device with the upper holes of the Power Supply.

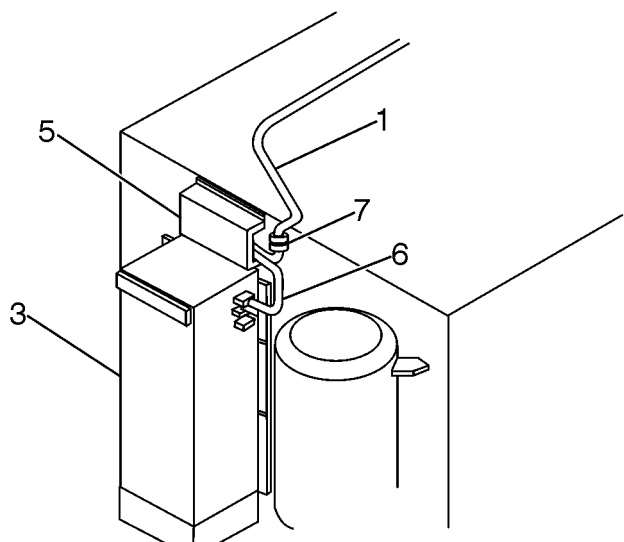
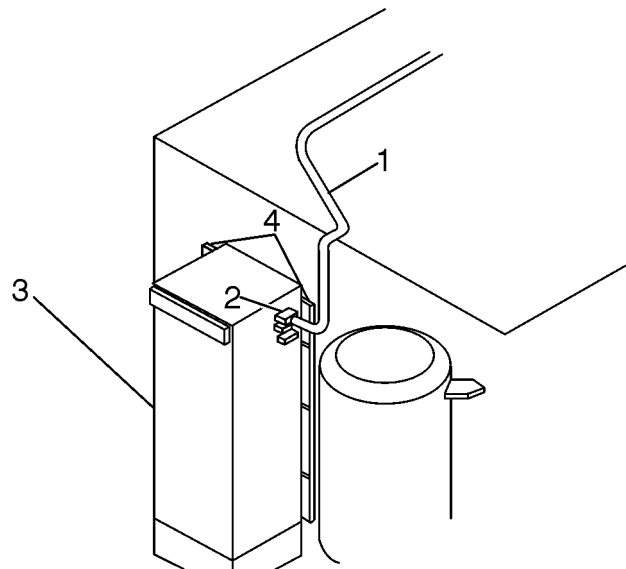
- Put a screw through each mounting hole of the Shutoff Device, through the Power Supply and into the back of the refrigerator.

- Tighten each screw.

3 Connect the Shutoff Device wires to the refrigerator.

- Push the longer wire (6) of the Shutoff Device onto the upper connection of the Power Supply.

- Push the shorter wire (7) of the Shutoff Device onto the wire (1) that you removed in step 1.



Overheating Shutoff Device Operation

The refrigerator will not restart until the refrigerator is manually turned off and the air temperature is lower than 43° C (110° F).

Operating the refrigerator in high ambient temperatures can overheat the cooling unit and cause premature failure of the compressor.

NOTE: Refer to the label inside the refrigerator.

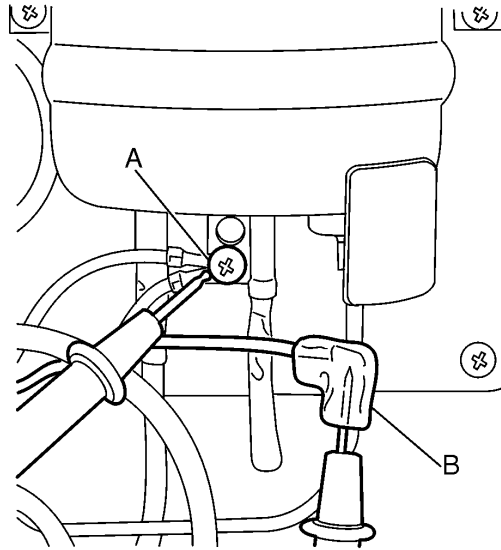
To protect the cooling unit from overheating, the refrigerator will automatically shutoff when the vehicle air temperature is higher than 43° C (110° F). If shutoff occurs, an audible alarm tone (intermittent beeping) from the refrigerator will sound.

To stop the audible alarm tone and restart the refrigerator, you must turn the thermostat knob counterclockwise to 'OFF' and then clockwise to the desired setting.

Quick Reference

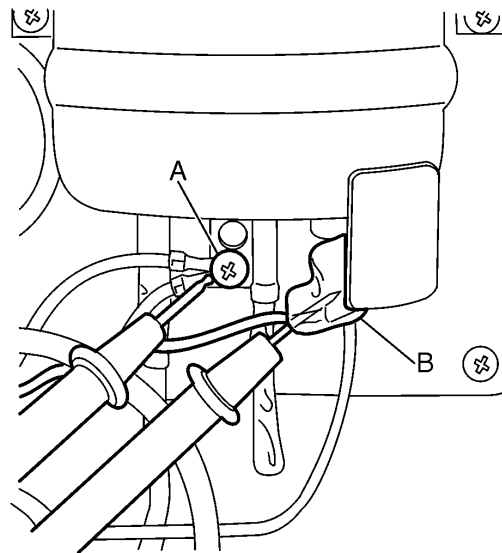
1. Check for 12 VDC (Supply Voltage) at rear of the refrigerator. Turn the refrigerator ON. The operating voltage is between 10.5 VDC to 32 VDC

2. Check for voltage (15 VAC–25 VAC) at compressor between points A and B. If the voltage is not within range refer to “Procedure C” page 10.



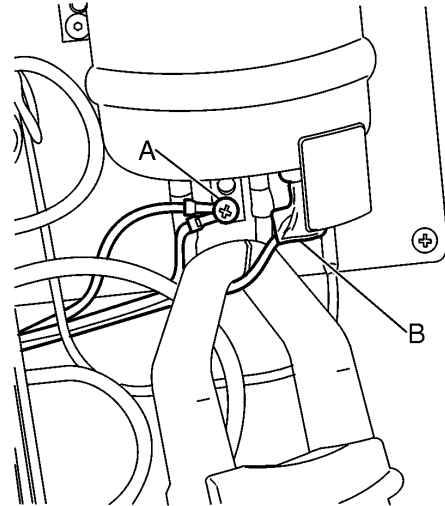
Measuring Power Supply Output Voltage

Take an Ohm (2.5–3.5 Ohms) reading at compressor between points A and B. If the resistance is not within range refer to “Procedure B” page 12.



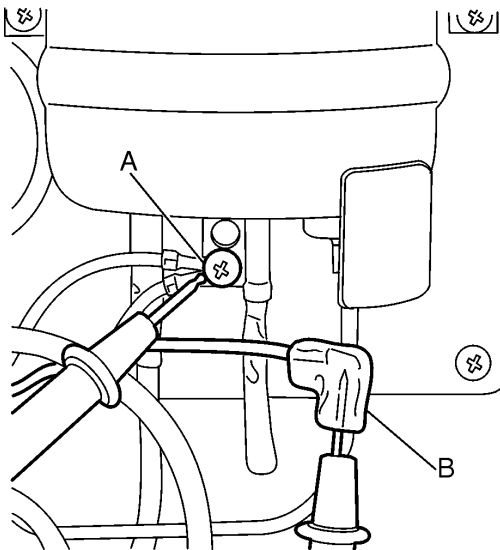
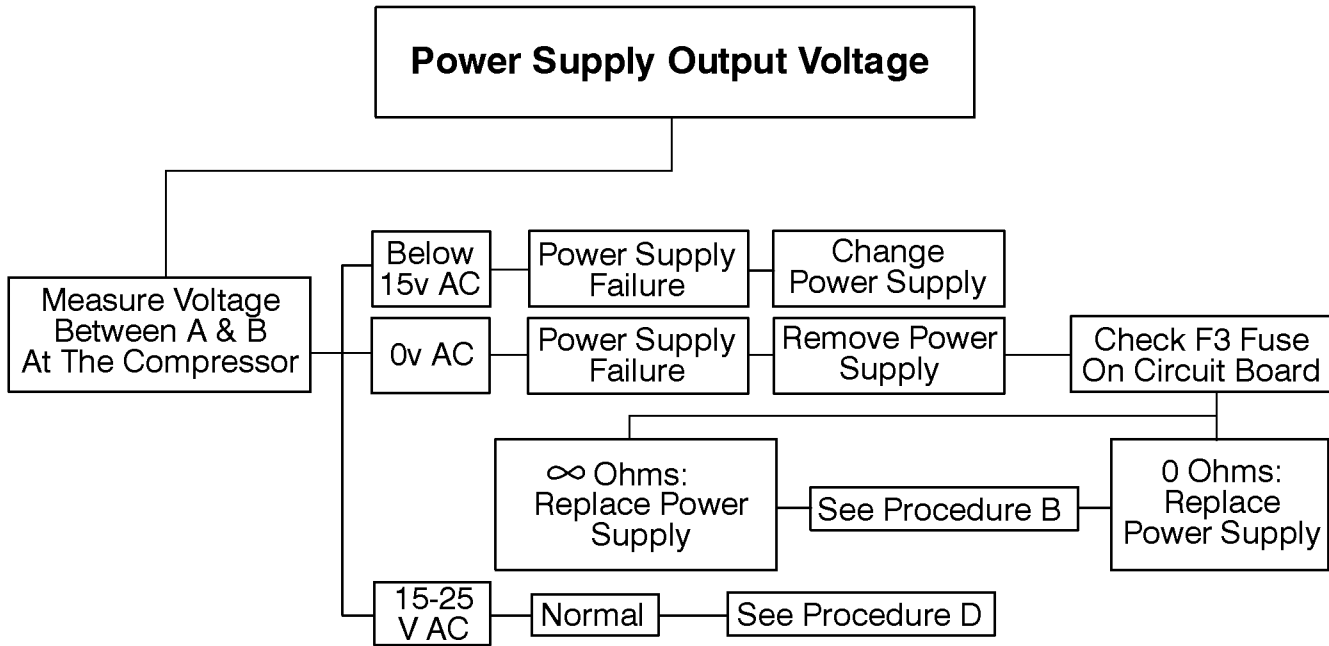
Measuring Compressor Resistance

Take an Amp (1.5–2.5 Amps) reading at the black wire (with rubber boot), between points A and B, connected to the compressor. If the Amps are not within range, refer to "Procedure D" page 13.

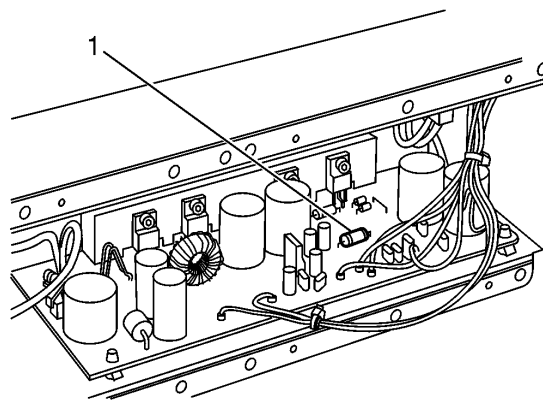


Measuring Amp Draw of Compressor

Procedure C

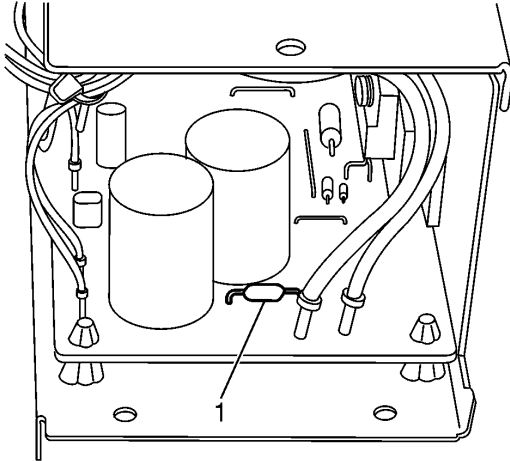


Measuring Power Supply Output Voltage



DE Model-F3 Fuse Location

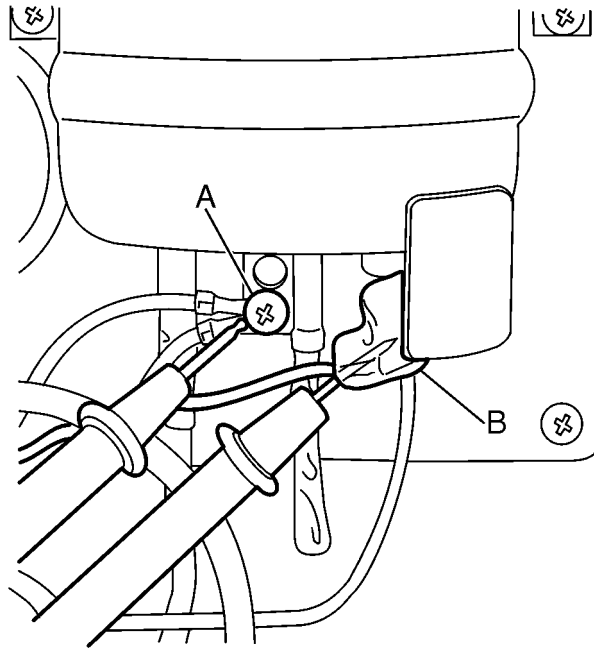
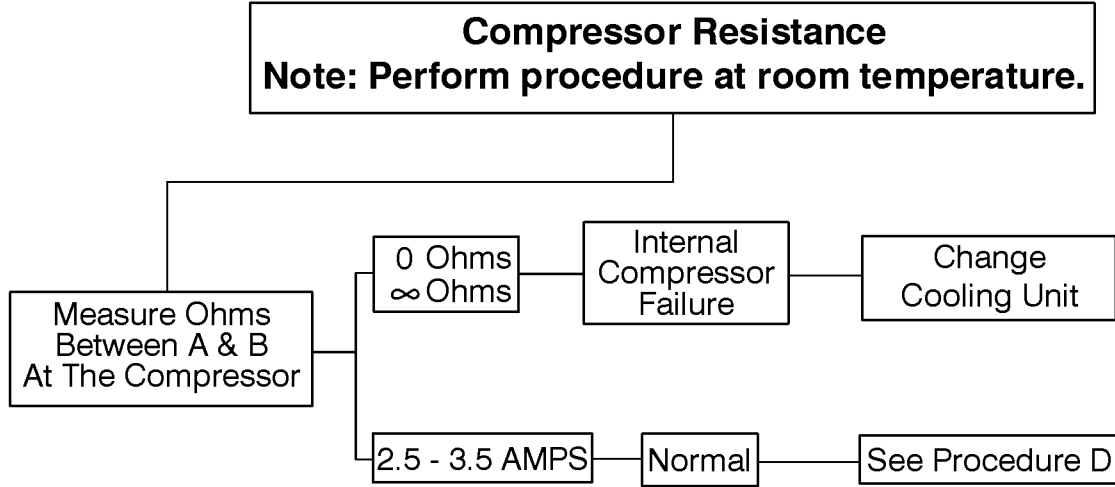
1 Fuse



DC Model-F3 Fuse Location

- 1 Fuse

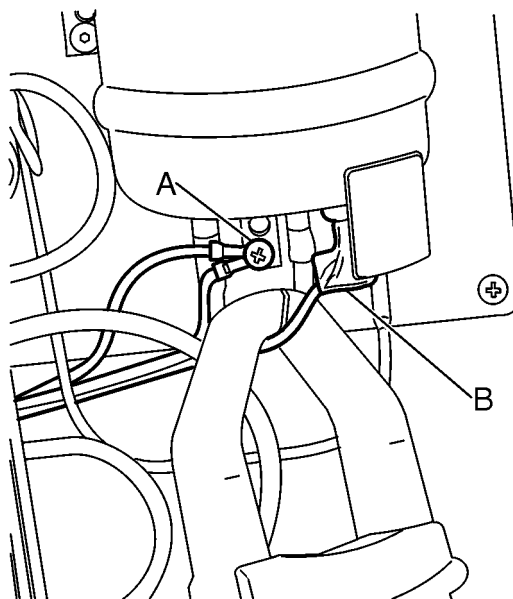
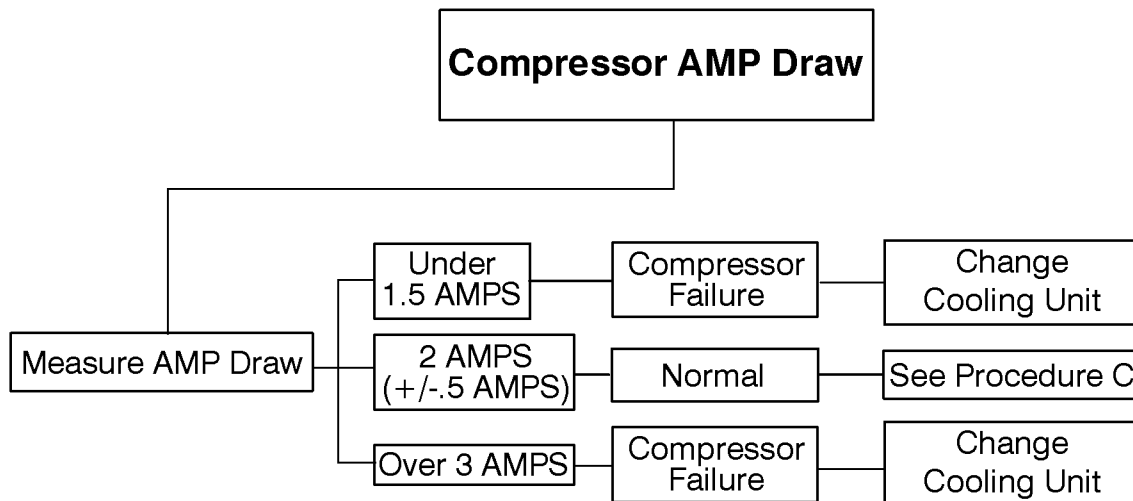
Procedure B



Measuring Compressor Resistance

NOTE: Remove the black wire to the compressor. Measure the resistance of the compressor between points A and B.

Procedure D



Measuring Amp Draw of Compressor

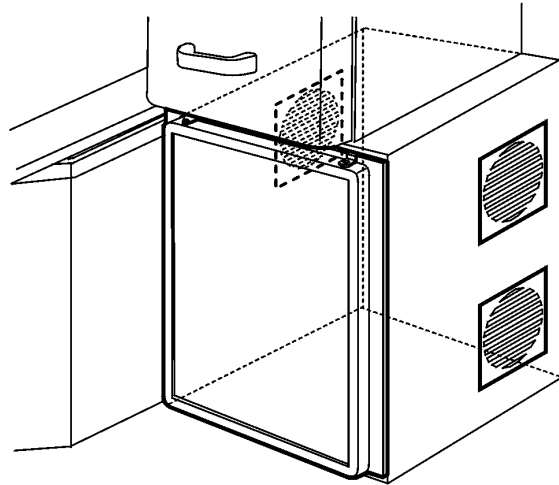
Ventilation

Good ventilation is required to assure efficient operation of the refrigerator.

Ventilation allows fresh air to flow through the living area of the vehicle by means of an inlet and an exhaust vent. These vents must be unobstructed and provide an open path to the rear of the refrigerator.

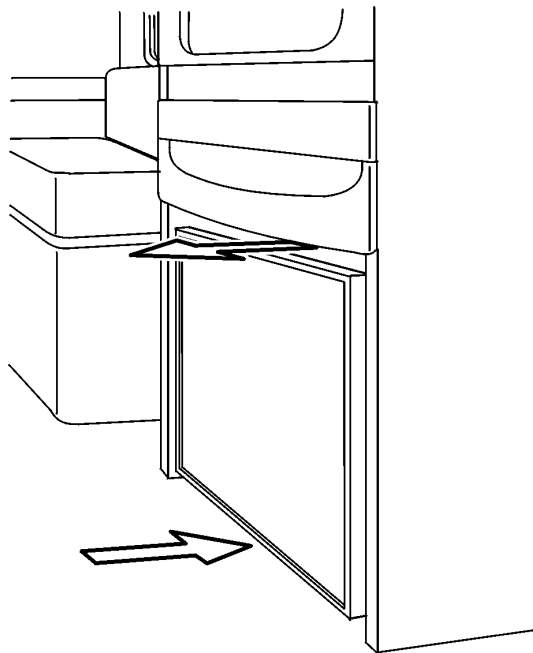
In the **VN610 and 660** trucks there are 2 air vents in the cabinet facing the drivers seat and one air vent on the other side of the cabinet.

Make sure the curtain, or anything else, has not been pushed behind the drivers seat so it could block the air vent.



In the **VN770** truck there is an inlet vent just above the floor and an exhaust vent above the refrigerator.

Make sure nothing is placed on top of the refrigerator, or on the floor, that can block the ventilation.



Refrigerator Door, Door Seal and Hinges, Checking

See "Refrigerator, Troubleshooting" page 1.

If a customer complains of frost forming around the outer edges of the door, do the following troubleshooting procedures.

1. Door Seal

Open the door and do a visual check of the condition of the door seal. Look for cuts, etc.

If the door seal is bad, the door must be replaced. The seal is not replaceable.

If the seal looks good, continue with "Check for Leaks" below.

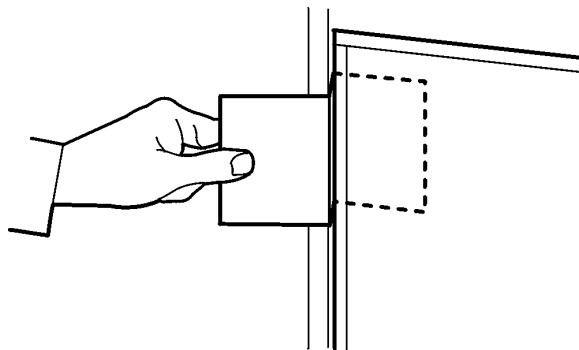
2. Check for Leaks

Use a piece of paper the size of a dollar bill.

Close the door on the paper and gently pull the paper. There should be a slight drag between the door gasket and the refrigerator cabinet.

Do this check on all four sides of the door.

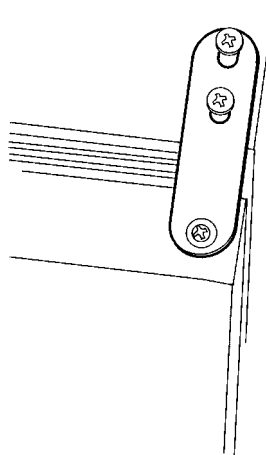
If there is not a slight drag on the paper, continue with "Door Hinges" below.



3. Door Hinges Adjustment

Check the door hinge adjustment.

The holes in the hinge mounting brackets are slotted. Move the brackets in or out according to which way the door needs to be adjusted.



Hinge on a refrigerator in a VN770

Check for bent brackets

Look at the brackets to see if they are bent.

If the brackets are bent they need to be replaced. Replace both brackets even if only one of them is bent.

If the brackets are straight and look good, continue with "Check if Door is Bent" below.

Check the hinge pin holes

If the door is lower on one end, you may have to check the hinge pin holes (top and bottom) to see if the holes have an excessive play. If so, the door may need to be replaced. The hinge pins should also be replaced when the door is replaced.

4. Check for bent door

To check if the door is warped or bent, it has to be removed from the refrigerator cabinet.

- 1 Use a Phillips Head screwdriver to remove the top and bottom hinge pins.
- 2 Remove the door and lay it down on a flat surface.
- 3 Check that all four corners have contact with the surface to see if the door is bent.

If the door is bent it must be replaced.

When replacing the door, you should also replace the hinge pins.

8851-03-02-01 Refrigerator, Replacement

VN610 & 660

See "Refrigerator, Troubleshooting" page 1.

NOTE: This procedure applies only to the factory-installed refrigerator. To report technical problems with the factory-installed refrigerator, contact Norcold at 1-800-444-1210.

NOTE: If the refrigerator is not operating correctly, before replacing see "Refrigerator Not Working, Basic Checks" page 4.

DANGER

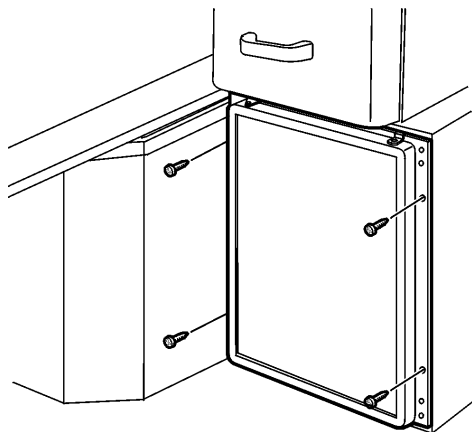
Before working on a vehicle, set the parking brakes, place the transmission in neutral and chock the wheels. Failure to do so can result in unexpected vehicle movement and can cause serious personal injury or death.

Removal

1
Turn off the refrigerator power switch.

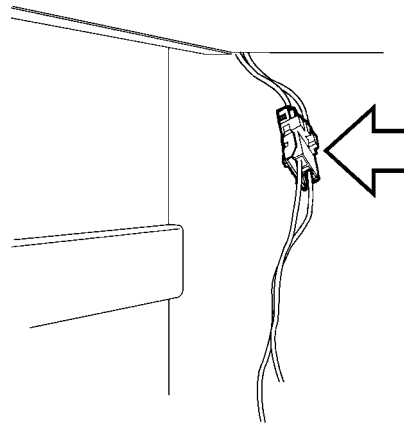
2
Remove the top drawer from the cabinet. You must push up the drawer stop to be able to pull out the drawer.

3



Remove the four cover plugs and remove the four mounting screws that hold the refrigerator in place. T25 socket

4



Pull the refrigerator out of the cabinet, and disconnect the wiring harness.

5

WARNING

The refrigerator weighs 62 lbs. At least two people should lift the unit when removing it from the truck. Failure to do so can result in personal injury.

Remove the refrigerator from the truck.

6

(Do the last 2 steps only if you need to replace the cabinet.) T30, T40 sockets
Remove the eight mounting screws that hold the cabinet in place.

7

Remove the cabinet from the truck.

Installation

1

(Do the first 2 steps only if you need to replace the cabinet.)

Install the cabinet in cab and place it in position.

2

Install all eight mounting screws that hold the cabinet in place.

Torque the M8 screws to 24 ± 4 Nm (18 ± 3 ft-lb) and the T6 screws to 10 ± 1.5 Nm (7.5 ± 1 ft-lb).

M8 = 24 ± 4 Nm

(18 ± 3 ft-lb)

T6 = 10 ± 1.5 Nm

(7.5 ± 1 ft-lb)

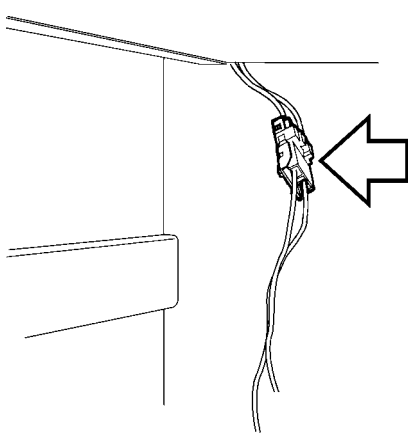
T30, T40

sockets

3

Place the refrigerator on the floor just in front of the cabinet.

4

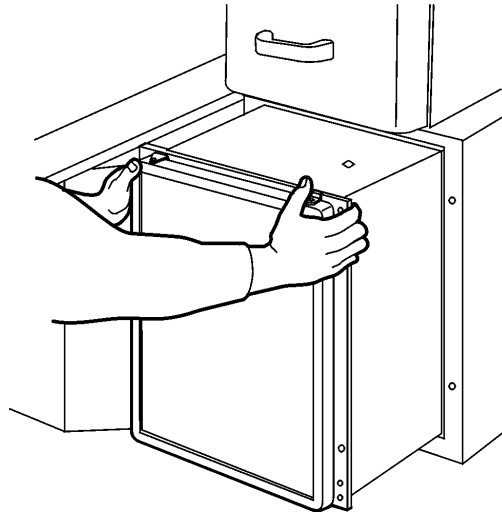


Connect the 12V power supply, using the locking connector.

5

Turn on the refrigerator power switch to check for operation.

6



Slide the refrigerator back into the cabinet as far as possible, until the front edges are touching.

7

Install the four mounting screws that hold the refrigerator in the cabinet. Torque the screws to 13 ± 2 Nm (9.5 ± 1.5 ft-lb).

13 ± 2 Nm
(9.5 ± 1.5 ft-lb)

Pop in the four plastic plugs that cover the holes.

T25 socket

8

Put the top drawer back into the cabinet. Pull down the drawer stop.

8851-03-02-01 Refrigerator, Replacement

VN770

See "Refrigerator, Troubleshooting" page 1.

NOTE: This procedure applies only to the factory-installed refrigerator. To report technical problems with the factory-installed refrigerator, contact Norcold at 1-800-444-1210.

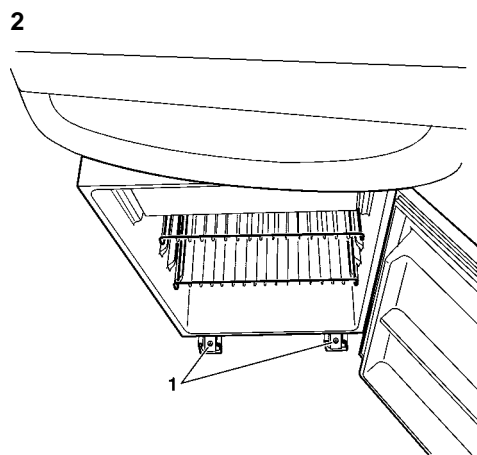
NOTE: If the refrigerator is not operating correctly, before replacing see "Refrigerator Not Working, Basic Checks" page 4.

DANGER

Before working on a vehicle, set the parking brakes, place the transmission in neutral and chock the wheels. Failure to do so can result in unexpected vehicle movement and can cause serious personal injury or death.

Removal

1
Turn off the refrigerator power switch.

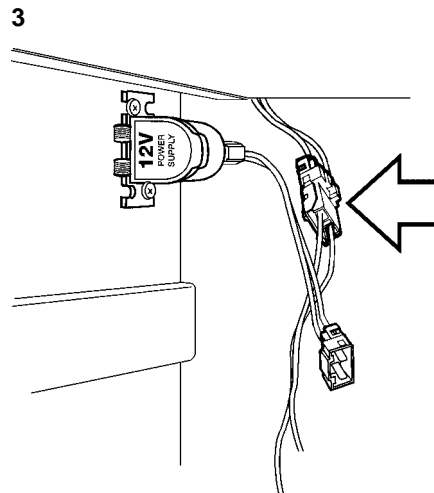


1 Mounting Bolts

Open the refrigerator door. Remove the bolt from the mounting strip on each side of the front of the refrigerator.

Torx 30

Remove both mounting strips. (The mounting strips will be used for reinstallation.) Slide the refrigerator forward until it comes away from the stationary tracks.



Unplug the locking 12V connector.

4
Check the terminals for power and ground.

5
Remove the refrigerator from the truck.

WARNING

The refrigerator weighs 62 lbs. At least 2 people should lift the unit when removing it from the truck. Failure to do so can result in personal injury.

Installation

1

Place the refrigerator on the floor just in front of the cabinet.

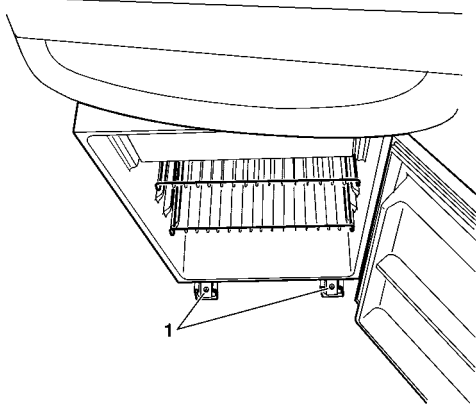
2

Connect the 12 V power supply, using the locking connector.
Turn on the refrigerator power switch to check for operation.

3

Align the refrigerator mounting brackets with the floor tracks.

4



1 Mounting Bolts

Slide the refrigerator as far back on the tracks as possible. Open the refrigerator door and install a mounting strip on each side of the tracks. Torque the two mounting bolts to 13 ± 2 Nm (9.58 ± 1.5 ft-lb).

13 ± 2 Nm
(10 ± 1.5 ft-lb)
Torx 30