

All about

Servicing

19 Cu. Ft. All
Refrigerator and
All Freezer Units
With Electronic Controls

FRIGIDAIRE™

WW White-Westinghouse

Gibson

Kelvinator 

TAPPAN

Electrolux Major Appliances
10200 David Taylor Drive
Charlotte, NC 28262

This Manual has been prepared to provide Electrolux Service Personnel with Operation and Service Information for the following models.

FPRH19D7LF All Refrigerator Professional Series

FPUH19D7LF All Freezer Professional Series

Safe Servicing Practices

Avoid personal injury and/or property damage by observing important Safe Servicing Practices.

Following are some limited examples of safe practices:

1. **DO NOT** attempt a product repair if you have any doubts as to your ability to complete the repair in a safe and satisfactory manner.
2. Always Use The Correct Replacement Parts as indicated in the parts documentation. Substitutions may defeat compliance with Safety Standards Set For Home Appliances.
3. Before servicing or moving an appliance:
 - Remove power cord from the electrical outlet, trip circuit breaker to OFF position, or remove fuse.
 - Turn off water supply if unit has an icemaker.
4. Never interfere with the proper operation of any safety device.
5. **Use ONLY REPLACEMENT PARTS CATALOGED FOR THIS APPLIANCE.** Substitutions may defeat compliance with Safety Standards Set For Home Appliances.
6. **GROUNDING:** The standard color coding for safety ground wires is **GREEN**, or **GREEN** with **YELLOW STRIPES**. Ground leads are not to be used as current carrying conductors. It is **EXTREMELY** important that the service technician reestablish all safety grounds prior to completion of service. Failure to do so will create a hazard.
7. Prior to returning the product to service, ensure that:
 - All electrical connections are correct and secure.
 - All electrical leads are properly dressed and secured away from sharp edges, high temperature components, and moving parts.
 - All non-insulated electrical terminals, connectors, heaters, etc. are adequately spaced away from all metal parts and panels.
 - All safety grounds (both internal and external) are correctly and securely connected.
 - All panels are properly and securely reassembled
 - Water supplies are turned ON if shut off prior to service.

ATTENTION!!!

This service manual is intended for use by persons having electrical and mechanical training and a level of knowledge of these subjects generally considered acceptable in the appliance repair trade. Electrolux Home Products, Inc. cannot be responsible, nor assume any liability, for injury or damage of any kind arising from the use of this manual.

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FOR YOUR SAFETY

Do not store or use gasoline, or other flammable vapors and liquids in the vicinity of this or any other appliance. Read product labels for flammability and other warnings.

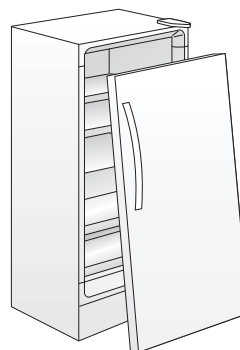
CHILD SAFETY

- Destroy carton, plastic bags, and any exterior wrapping material immediately after the freezer is unpacked. Children should never use these items to play. Cartons covered with rugs, bedspreads, plastic sheets or stretch wrap may become airtight chambers, and can quickly cause suffocation.
- Remove all staples from the carton. Staples can cause severe cuts, and destroy finishes if they come in contact with other appliances or furniture.
- An empty, discarded ice box, refrigerator, or freezer is a very dangerous attraction to children.
- Remove and discard any spacers used to secure the shelves during shipping. Small objects are a choke hazard to children.
- Remove the door(s) of any appliance that is not in use, even if it is being discarded.

RISK OF CHILD ENTRAPMENT

Child entrapment and suffocation are not problems of the past. Junked or abandoned refrigerators or freezers are still dangerous – even if they will sit for “just a few days”. If you are getting rid of your old refrigerator or freezer, please follow the instructions below to help prevent accidents:

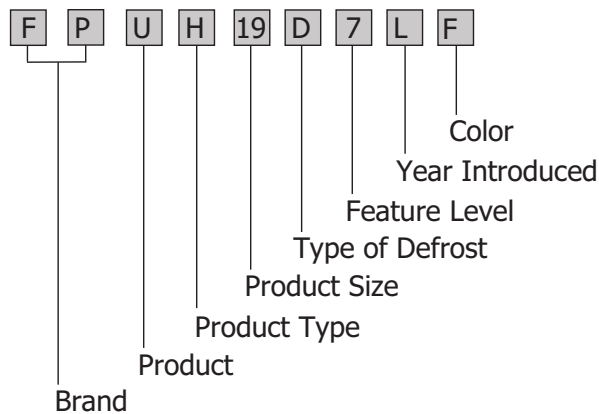
- Remove the door/lid.
- Leave shelves in place so children may not easily climb inside.
- Have the refrigerant removed by a qualified technician.



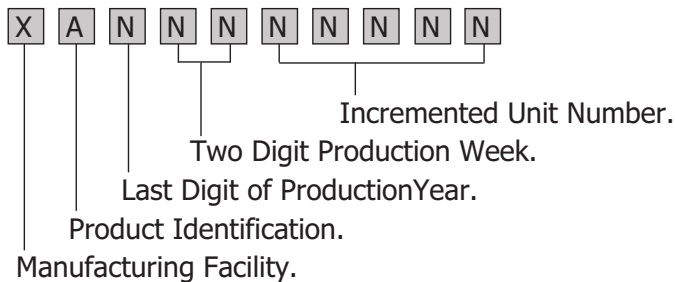
Section 1 Basic Information

Frigidaire Upright Freezer

Model Number Nomenclature



Serial Number



A=Alpha

N=Numeric

X=Either Alpha or Numeric Character

ELECTROLUX HOME PRODUCTS, INC. / AUGUSTA, GA. 30907
ELECTROLUX CANADA CORP. / NISSISSAUGA, ONT. L5V 3EA

MOD. **FPUH17D7K**
SER. **WB00000000**
MANUFACTURED/FABRIQUE 11-09
AMPS: 5.0 A VOLTS: 115 VAC HERTZ: 60 HZ
REFRIGERANT R134A 4.9 Oz. (140 Grams)
Design Pressure/ LS/PB 140 PSIG (965 KPa)
Pression de dessin: HS/PH 320 PSIG (2206 KPa)

Assembled in the USA

TYPE U17F



Energy
Performance
Rendement
Énergétique

VERIFIED
CSA
VÉRIFIÉ

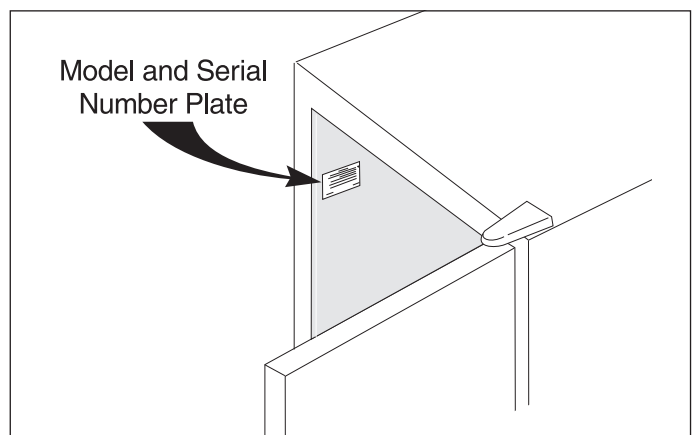
EEV99491

For questions, comments, or service please call us
TOLL FREE: 1-800-944-9044

Serial Plate

The serial plate is located inside the cabinet on the left sidewall. The technician should always refer to the serial plate to assure refrigerant type and quantity, as well as electrical ratings and operating pressures.

Model and Serial
Number Plate



All Freezer Professional Series with Mechanical Control

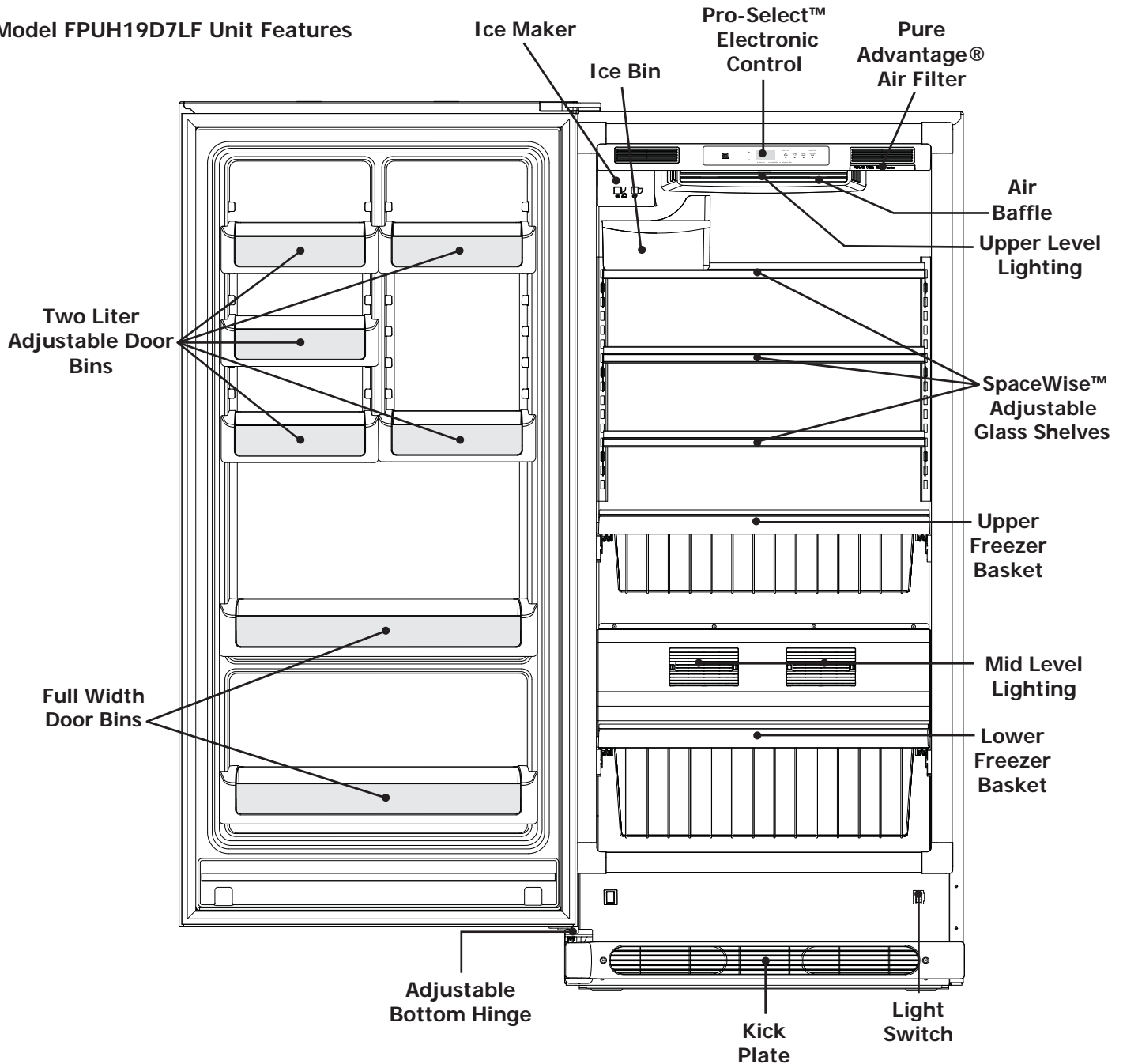
Performance

Temperature Control

7°F cut-in, -5°F cut-out @ warmest setting.

| | | |
|--|-----------|-----------|
| Room Ambient | 70°F | 90°F |
| Freezer Compartment Temperature | 5 to 12°F | 5 to 12°F |
| Percent Running Time | 30 - 40% | 45 - 55% |
| *Wattage Range (Last 1/3 of cycle) | 110 - 125 | 115 - 130 |
| Suction Pressure (Cut-in, cut-out), PSIG | 14 - 0 | 14 - 0 |
| High Side Pressure (Last 1/3 of cycle), PSIG | 100 - 125 | 150 - 165 |

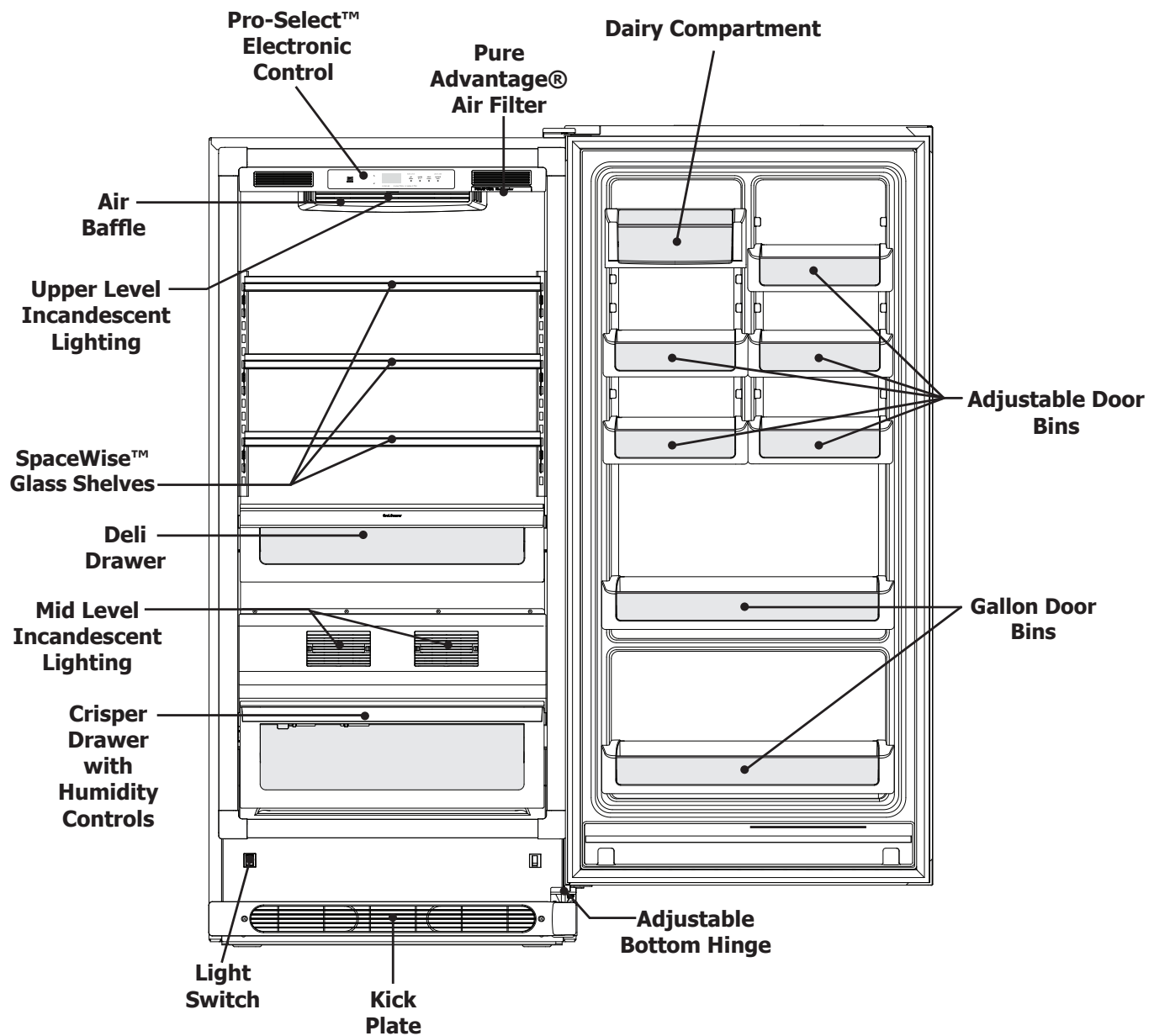
Model FPUH19D7LF Unit Features



Section 1 Basic Information

All Refrigerator Professional Series with Mechanical Control

Model FPRH19D7LF Unit Features



Section 2 Installation Information

Recognize safety symbols, words and labels:

Safety items throughout this manual are labeled with a WARNING or CAUTION based on the risk type as described below:



WARNING

This symbol alerts you to situations that may cause serious body harm, death or property damage.



CAUTION

This symbol alerts you to situations that may cause bodily injury or property damage.



WARNING

To reduce the risk of fire, electrical shock, or injury when using a freezer and/or refrigerator, follow basic safety precautions including the following:

- Read all instructions before operating the freezer and/or refrigerator.
- Before performing any type of service or installation, make sure that electric power to the freezer and/or refrigerator is disconnected.
- To avoid the possibility of explosion or fire, do not store or use combustible, flammable, or explosive liquids or vapors (such as gasoline) inside or in the vicinity of this or any other appliance.
- This appliance is equipped with a three-prong grounding plug for protection against possible electric shock hazards. Plug it only into a dedicated, grounded electrical outlet. When only a standard two-prong electrical outlet is available, the customer must have it replaced with a dedicated, properly grounded three-prong electrical outlet before using this Appliance.

Do not under any circumstances, cut or remove the third (ground) prong from the power cord.

Do not use an adapter plug.

Do not use an extension cord.

Do not use a power cord that is frayed or damaged.

The use of a ground fault interrupter (GFI) is not recommended.

- Do not install or use a damaged appliance. If you receive a damaged appliance, immediately contact your dealer or builder.
- The installer must show the customer the location of the power plug so that they know where and how to disconnect power to the freezer and/or refrigerator.
- Do not install, repair, or replace any part of the freezer and/or refrigerator unless specifically recommended in the literature accompanying it. A qualified service technician should perform all other service.



WARNING

Electrolux Home Products Inc. cannot be held responsible for damage to property or injury to persons caused by failure to comply with the installation, maintenance and safety instructions contained in this Service Manual.

Section 2 Installation Information

WARNING

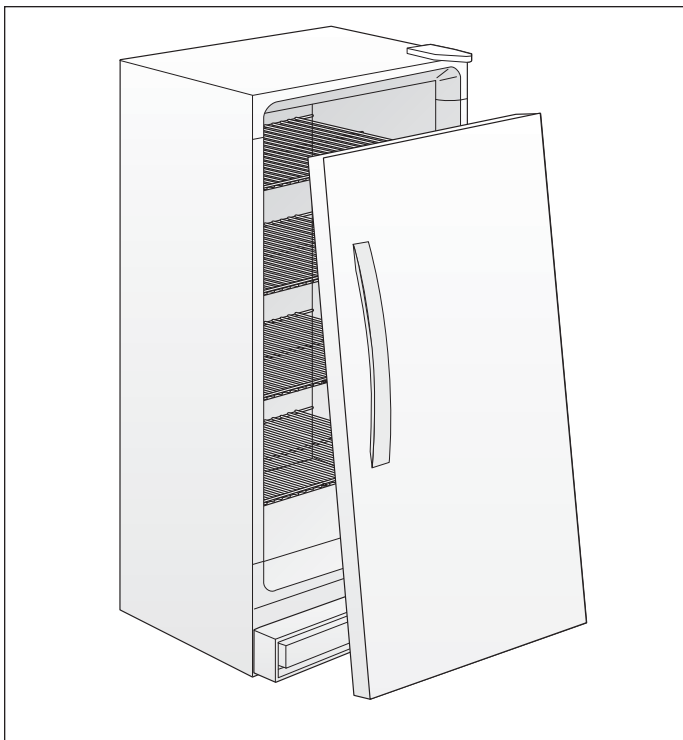
Destroy carton, plastic bags, and any exterior wrapping material immediately after the refrigerator/freezer is unpacked. Children should never use these items for play. Cartons covered with rugs, bedspreads, plastic sheets or stretch wrap may become air tight chambers and can quickly cause suffocation.

A child might suffocate if he crawls into the freezer to hide or play. Remove the door/lid of the refrigerator/freezer when not in use, even if you plan to discard the freezer. Many communities have laws requiring you to take this safety precaution.

Remove or discard any spacers used to secure the shelves during shipping. Small objects are a choke hazard to children.

Child entrapment and suffocation are not problems of the past. Junked or abandoned refrigerators or freezers are still dangerous— even if they will sit for “just a few days”. If you are getting rid of your old refrigerator or freezer, please follow the instructions below to help prevent accidents:

- Remove the door/lid.
- Leave shelves in place so children may not easily climb inside.
- Have the refrigerant removed by a qualified technician.



Installation Checklist

Doors

- ☐ Handles are secure and tight.
- ☐ Door seals completely to cabinet on all sides.
- ☐ Freezer and/or refrigerator door is level across top.

Leveling

- ☐ Freezer and/or refrigerator is level, side-to-side and tilted 1/4" (6mm) front-to-back.
- ☐ Toe grille is properly attached to freezer and/or refrigerator.
- ☐ Cabinet is setting solid on all corners.

Electrical Power

- ☐ House power turned on.
- ☐ Freezer and/or refrigerator plugged in.

Final Checks

- ☐ Shipping material removed.
- ☐ Freezer and/or refrigerator temperatures set.
- ☐ Registration card sent in.

Section 2 Installation Information

Location

1. Choose a place that is near a grounded electrical outlet. Do Not use an extension cord or an adapter plug.
2. If possible, place unit(s) out of direct sunlight and away from range, dishwasher or other heat sources.
3. The unit(s) must be installed on a floor that is level and strong enough to support a fully loaded unit(s).
4. Consider water supply availability for models equipped with an automatic ice maker.
5. The unit(s) should be located where surrounding temperature will not exceed 110°F (43°C) or drop below 40°F (5°C).
6. For ease of installation, proper air circulation and electrical connections, see Figures 2-1 and 2-2 for recommended clearances.
7. DO NOT block the toe grille on the lower front of the unit. Sufficient air circulation is essential for the proper operation of the unit(s).

NOTE

The exterior walls of the refrigerator/freezer may become quite warm as the compressor works to transfer heat from the inside. Temperatures as much as 30°F warmer than room temperatures can be expected.

NOTE

If your refrigerator and/or freezer is placed with the door hinge side against a wall, you may have to allow additional space so the door can be opened wider.

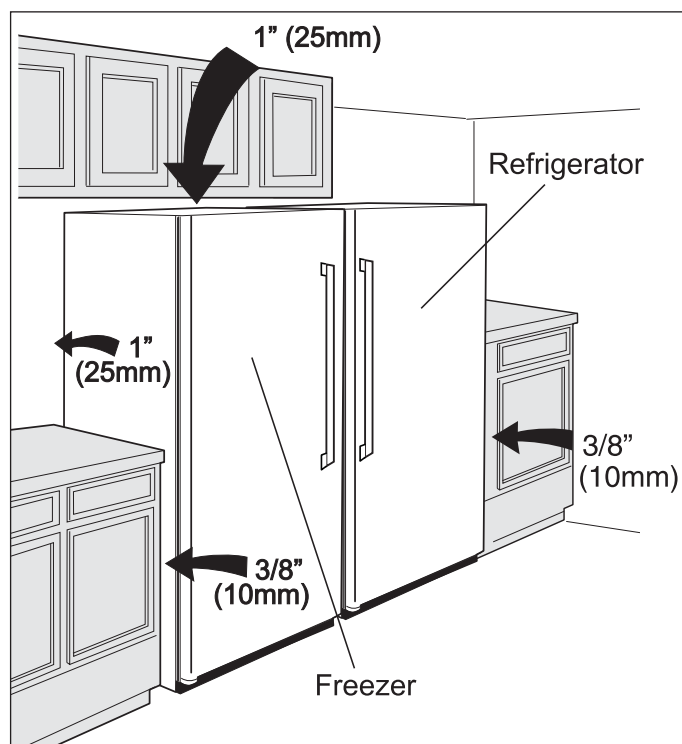


Figure 2-1. Installation Clearances

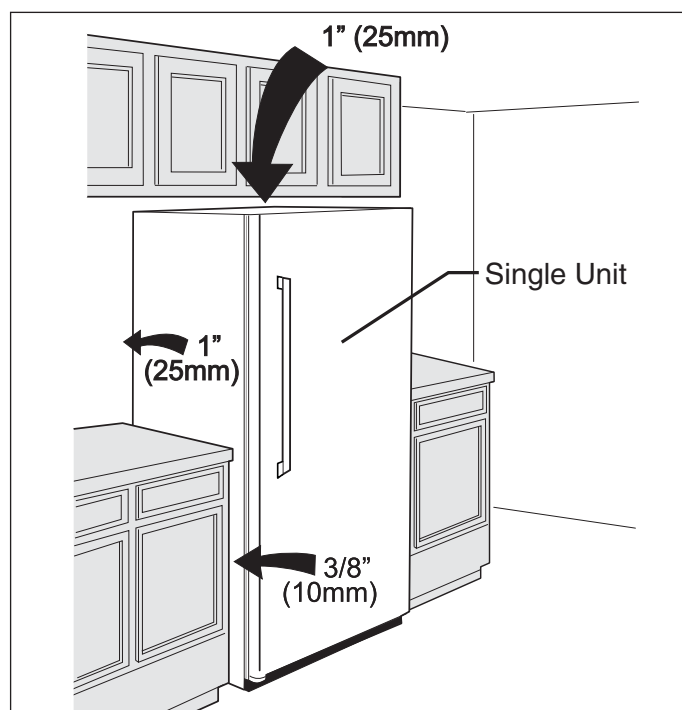


Figure 2-2. Single Unit Installation Clearances

Section 2 Installation Information

Electrical Information

These guidelines must be followed to ensure that safety mechanisms in the design of this freezer will operate properly.

Refer to the serial plate for correct electrical rating. The power cord of the unit is equipped with a three-prong grounding plug for protection against shock hazards. It must be plugged directly in to its own properly grounded three-prong receptacle, protected with a 15 amp time delay fuse or circuit breaker. The receptacle must be installed in accordance with the current edition of the National Electrical Code (NFPA 70) the local codes and ordinances. Consult a qualified electrician. Receptacles with Ground Fault Circuit Interrupters (GFCI) are NOT RECOMMENDED. DO NOT USE AN EXTENSION CORD OR AN ADAPTER PLUG.

If the voltage varies by 10% or more, freezer and/or refrigerator performance may be affected. Operating the freezer with insufficient power can damage the motor. Such damage is not covered under the warranty. If you suspect your voltage is high or low, consult your power company for testing.

To prevent the freezer from being turned off accidentally, do not plug the unit in to an outlet controlled by a wall switch or pull cord.

Do not pinch, knot, or bend the power cord in any manner.

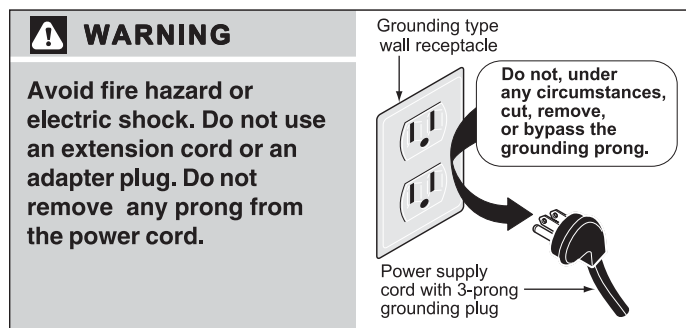


Figure 2-2. Electrical Receptacle

WARNING

Never unplug the freezer by pulling on the power cord. Always grip the plug firmly and pull straight out from the receptacle.

Turning the control to "OFF" turns off the compressor but does not disconnect power to other electrical components.

Water Supply

WARNING

To avoid electric shock, which can cause death or severe personal injury, disconnect the freezer from electrical power before connecting a water supply line to the freezer.

To Avoid Property Damage:

- Copper or Stainless Steel braided tubing is recommended for the water supply line. Water supply tubing made of ¼ inch plastic is not recommended to be used. Plastic tubing greatly increases the potential for water leaks, and the manufacturer will not be responsible for any damage if plastic tubing is used for the supply line.
- DO NOT install water supply tubing in areas where temperatures fall below freezing.
- Chemicals from a malfunctioning softener can damage the ice maker. If the ice maker is connected to soft water, ensure that the softener is maintained and working properly.

IMPORTANT

Ensure that your water supply line connections comply with all local plumbing codes.

Before Installing The Water Supply Line, You Will Need:

- Basic Tools: adjustable wrench, flat-blade screwdriver, and Phillips™ screwdriver.
- Access to a household cold water line with water pressure between 30 and 100 psi.
- A water supply line made of ¼ inch (6.4 mm) OD, copper or stainless steel tubing. To determine the length of tubing needed, measure the distance from the ice maker inlet valve at the back of the freezer to your cold water pipe. Then add approximately 7 feet (2.1 meters), so the freezer can be moved out for cleaning.
- A shutoff valve to connect the water supply line to your household water system. DO NOT use a self-piercing type shutoff valve.
- A compression nut and ferrule (sleeve) for connecting a copper water supply line to the ice maker inlet valve.

Section 2 Installation Information

NOTE

Check with your local building authority for recommendations on water lines and associated materials prior to installing your new freezer. Depending on your local/state building codes, Electrolux recommends for homes with existing valves its Smart Choice® water line kit 5305513409 (with a 6 ft. Stainless Steel Water Line) and for homes without an existing valve, Electrolux recommends its Smart Choice® water line kit 5305510264 (with a 20 ft. Copper Water Line with selftapping saddle valve). Please refer to www.frigidaire.com for more information.

To Connect Water Supply Line To Ice Maker Inlet Valve

1. Disconnect refrigerator from electric power source.
2. Place end of water supply line into sink or bucket. Turn ON water supply and flush supply line until water is clear. Turn OFF water supply at shutoff valve.
3. Remove plastic cap from water valve inlet and discard cap.
4. If you use copper tubing - Slide brass compression nut, then ferrule (sleeve) onto water supply line. Push water supply line into water valve inlet as far as it will go ($\frac{1}{4}$ inch / 6.4 mm). Slide ferrule (sleeve) into valve inlet and finger tighten compression nut onto valve. Tighten another half turn with a wrench; DO NOT over tighten. (See Figure 2-4). If you use stainless steel tubing - The nut and ferrule are already assembled on the tubing. Slide compression nut onto valve inlet and finger tighten compression nut onto valve. Tighten another half turn with a wrench; DO NOT over tighten. (See Figure 2-5).
5. With steel clamp and screw, secure water supply line (copper tubing only) to rear panel of freezer as shown.
6. Coil excess water supply line (copper tubing only), about $2\frac{1}{2}$ turns, behind freezer as shown and arrange coils so they do not vibrate or wear against any other surface.
7. Turn ON water supply at shutoff valve and tighten any connections that leak.
8. Reconnect freezer to electrical power source.
9. To turn ice maker on, lower wire signal arm (side mounted) or set the ice maker's On/Off power switch to the "I" position (rear mounted).

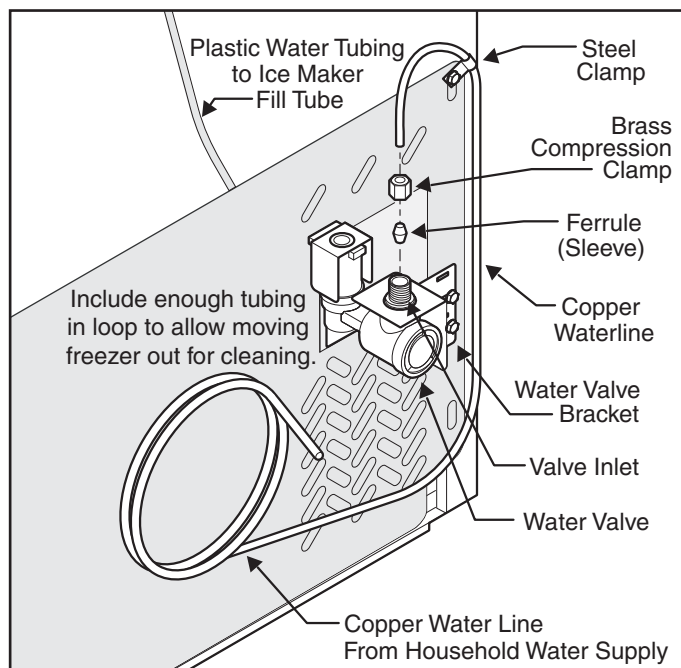


Figure 2-4. Copper Water Line Connection

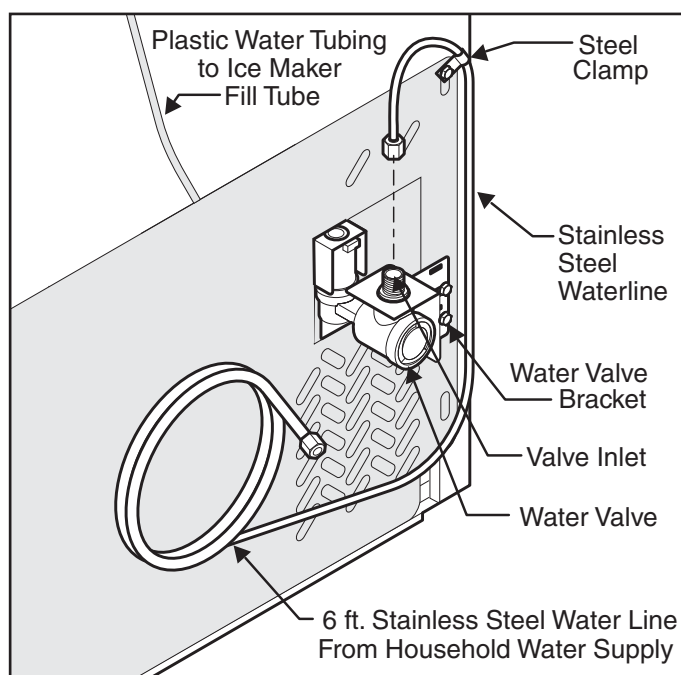


Figure 2-5. Stainless Steel Water Line Connection

Section 2 Installation Information

Connecting the Water Valve to the Ice Maker

For models Serial Number WB92254219 and greater built after June 1, 2009, the units will have a different water valve than earlier production models. The new water valves have a quick connect outlet fitting which takes a standard .255 diameter plastic tube. The old style of water valves required a flanged tube and a threaded nut to make the water connection. (See Figure 2-7b)

Water Line Kit PN 297114101 will still be used to make the water line connections between the new style water valve and ice maker, however the flanged tube will have to be modified as described in the steps below:

1. Using a box cutters or knife, cut the pointed end from the water line just below the raised point. Be sure to cut straight across the water line. Do not leave open/cut end at an angle. (See Figure 2-7c)
2. Remove the cut end and plastic nut from the water line and discard.
3. Measure 11/16" from the end of the water line and place a mark on the line with a permanent marker.
4. Insert the modified water line into the push-type fitting on the new valve, making sure that the water line is pushed in up to the mark.
5. Inspect for leaks once water supply is turned on.

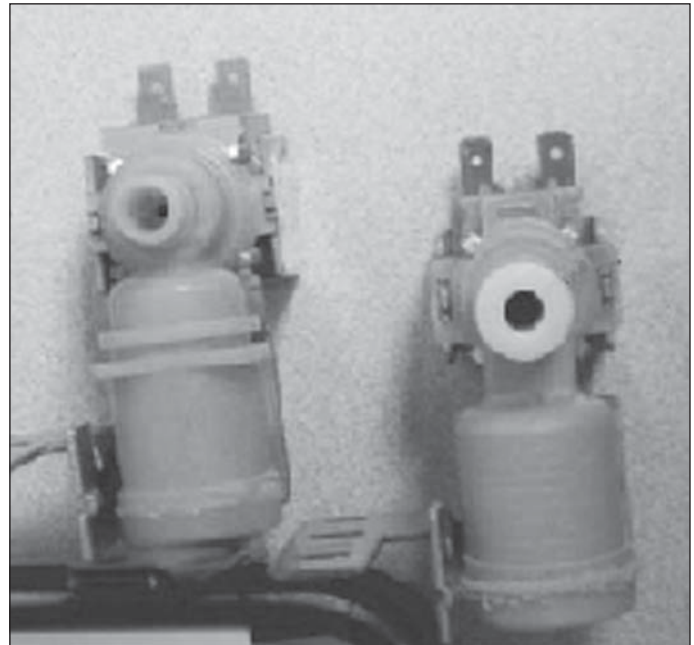


Figure 2-7b. Water Valves
The water valve on the left is the old style threaded outlet connection. The water valve on the right has the push-type outlet fitting.

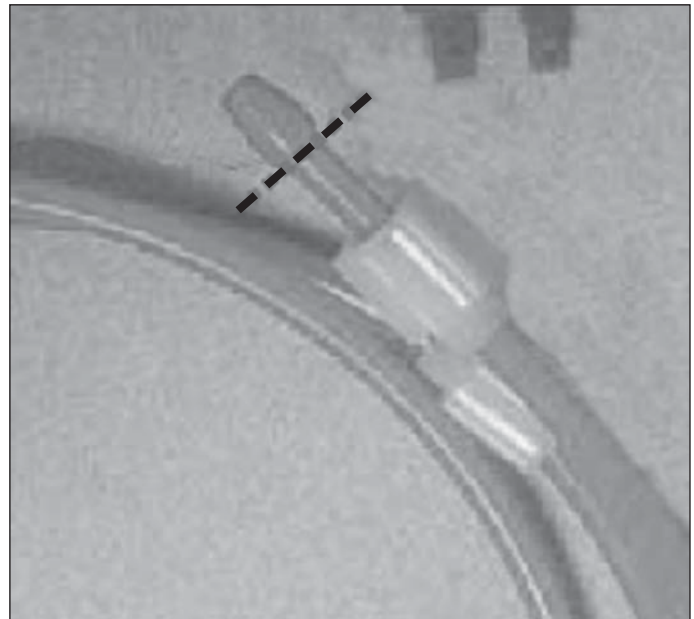


Figure 2-7c. Cut along dotted line to modify tubing.

Section 2 Installation Information

Ice Service

If your freezer has an automatic icemaker, it will provide a sufficient supply of ice for normal use. During the initial startup of your freezer, however, no ice will be produced during the first 24 hours of operation.

Automatic ice makers are also optional accessories that may be installed in some models at any time. Call your local dealer for information.

Turning Your Ice Maker On

After the plumbing connections have been completed, the water supply valve must be opened. Place the ice container under the ice maker, pushing it as far back as possible. Lower the wire signal arm to its “down” or ON position. New plumbing connections may cause the first production of ice cubes to be discolored or have an odd flavor. These first cubes should be discarded until the cubes produced are free of discoloration and taste.

Turning Your Ice Maker Off

To stop the ice maker, lift the wire signal arm until it clicks and locks in the “up” or OFF position. The ice maker also turns off automatically when the ice container is full. If your model has an adjustable freezer shelf, place the shelf in the lower position, so that the wire signal arm will hit the ice when the container is full.

Ice Maker Tips

- If the ice maker will be turned off for a long period of time, turn water supply valve to the closed position.
- Ice cubes stored too long may develop an odd flavor. Empty the ice container and ensure that the wire signal arm is in its “down” or ON position. The ice maker will then produce more ice.
- Occasionally shake the ice container to keep ice separated.
- Keep the wire signal arm in its “up” or OFF position until the freezer is connected to the water supply or whenever the water supply is turned off.
- The following sounds are normal when the ice maker is operating:
 - Motor running
 - Ice loosening from tray
 - Ice dropping into ice container
 - Running water
 - Water valve opening or closing

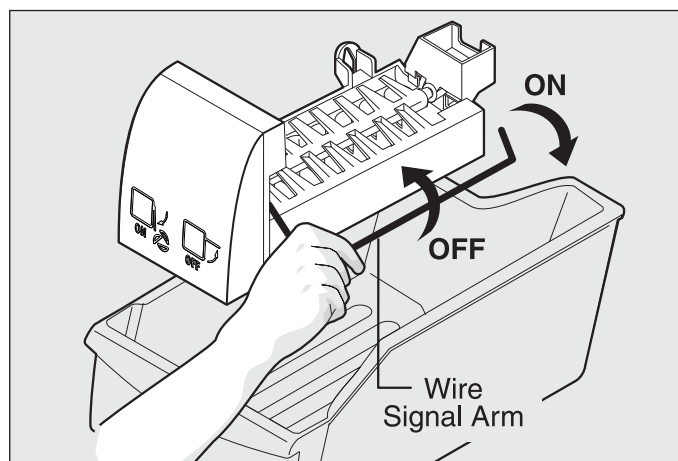


Figure 2-5. Turning Ice Maker On

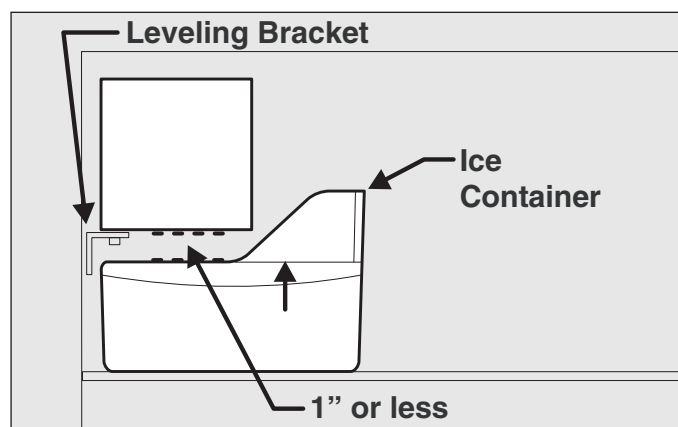


Figure 2-6. Ice Bin Location

➔ IMPORTANT

Your ice maker is shipped with the wire signal arm in the ON position. To ensure proper function of your ice maker, hook up water supply immediately or turn ice maker OFF by lifting the wire signal arm until it clicks and locks in the UP position.

Check the leveling bracket on the ice maker to ensure the ice maker is level. If the gap between the freezer wall and the ice maker is the same at top and bottom, then ice maker is level. If the ice maker is not level, loosen the screw and slide the bracket to the correct position to make it level. Retighten the screw. You will need a 1/4 inch socket wrench for this task.

⚠ CAUTION

- DO NOT place the ice container in dishwasher.
- Wash the ice container in warm water with mild detergent. Rinse well and dry.
- Stop the ice maker when cleaning the freezer and during vacations.

Section 2 Installation Information

Leveling

The freezer and/or refrigerator must have all bottom corners resting firmly on a solid floor. The floor must be strong enough to support a fully loaded freezer and/or refrigerator.

It is VERY IMPORTANT for your freezer and/or refrigerator to be level in order to function properly. If the unit is not leveled during installation, the door/lid may be misaligned and not close or seal properly, causing cooling, frost or moisture problems.

After discarding crating screws and wood base, use a carpenter's level to level the freezer and/or refrigerator from front to back and side to side.

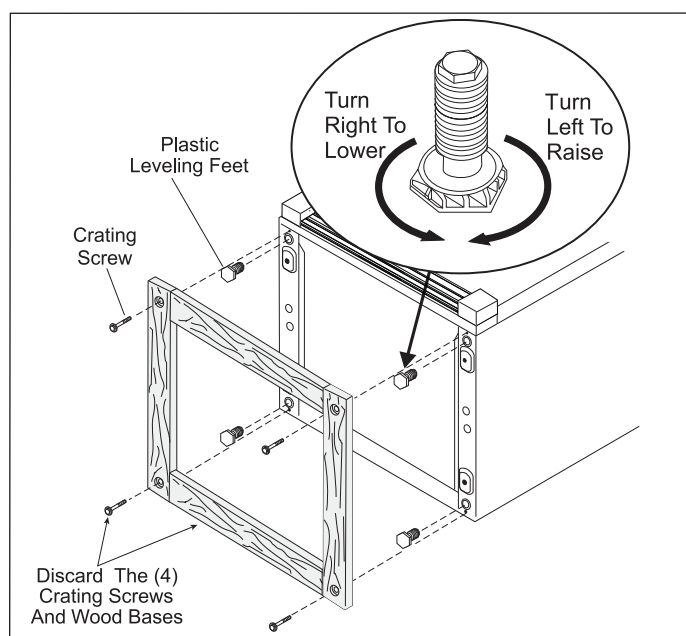


Figure 2-7. Leveling Unit

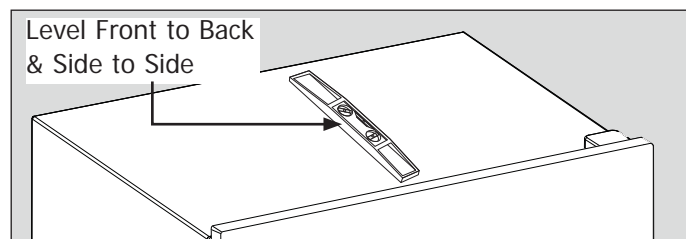


Figure 2-8. Leveling Unit

Leveling Door with Adjustable Hinge

Use the lower hinge adjustment to fine tune the door height and for final cabinet spacing. Use a 7/16 inch socket or wrench to adjust the screw at the bottom of the lower hinge. (See Figure 2-7)

Leveling Instructions For All Refrigerator/Freezer Pairs

1. Level door of first unit using all four levelers and slide unit into place. Recheck for levelness and adjust if necessary.
2. Measure distance from floor to bottom of door on first unit. Adjust and level second unit so door height matches.

Leg Leveler Adjustments:

1. One full turn of all four leg levelers raises door 5/32".
2. Slide second unit into place leaving a minimum gap of 3/16" between units for door swing clearance. This last step may require at least one extraction of the second unit to properly align units in a "built-in" application.

Adjusting Doors For Matching Refrigerator / Freezer Pair

The doors may also be adjusted side to side with the slotted hinge for aligning the doors parallel to each other. Loosen the two bolts with a 3/8" wrench and one screw with a Phillips screwdriver. Shift the doors until parallel, then retighten screws securely. (See Figure 2-9)

Lower Hinge Adjustment

To level the doors using the adjustable lower hinge:

1. If the refrigerator door is lower than the freezer door, raise the refrigerator door by turning the adjustment screw clockwise using a 7/16 inch socket wrench. (See Figure 2-9)
2. If the freezer door is lower than the refrigerator door, raise the freezer door by turning the adjustment screw clockwise using a 7/16 inch socket wrench. (See Figure 2-9)

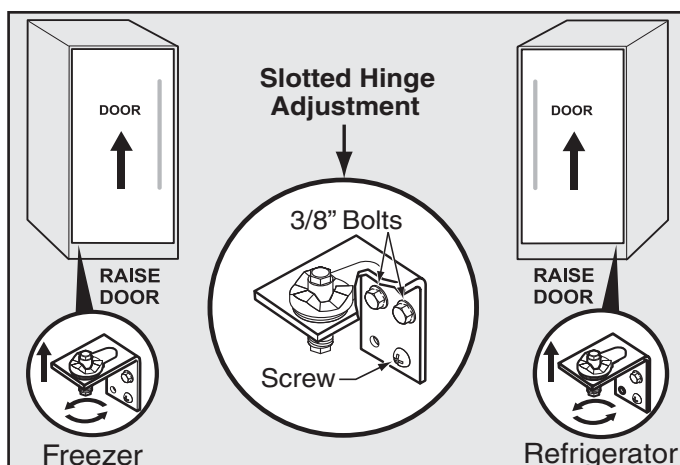


Figure 2-9. Leveling Unit Door

Section 2 Installation Information

Cut-Out Dimensions

1. Minimum opening of 75" high (79" for tall top trim) x 33" wide x 25-1/4" deep is required for a single-unit "Built-In Look" installation. 66" Wide is required for double-unit installation. (75" High to be measured from finished floor to underside of soffit or overhead cabinet.)
2. Minimum 25-1/4" depth requires recessed electrical outlet and copper water line.
3. Remove all wall / floor molding prior to built-in installation.
4. When installing a unit adjacent to wall, cabinet or other appliance that extends beyond front edge of unit, 20" minimum clearance is recommended to allow for optimum 140° door swing, providing complete crisper access and removal. (Absolute 4" minimum clearance will ONLY allow for 90° door swing which will provide limited crisper access with restricted removal.)
5. Water line for ice maker can enter opening through floor or rear wall. Copper tubing recommended between cold water line and water connection location. Water line tubing recommended is 48" minimum length by 1/4" diameter. Installation of easily accessible shutoff valve in water line required.
6. To allow for ease of moving out side-by-side units after installation, 84" minimum length of coiled copper tubing recommended.
7. If optional Single or Double Trim Kit is to be used, different cutout dimensions are required.

Trim Kits

The following trim kits are available for installation of the Frigidaire Tall All Refrigerator/Tall All Freezer units.

TRIMKITEZ1 (Part# 297333500): Single Trim Kit for a single Tall All-Refrigerator/Freezer installation. Includes louvered top grille and vented, louvered kick plate, 2-9/16" leveling system and side/top trim pieces.

TRIMKITEZ2 (Part# 297333600): Dual Trim Kit for For All-Freezer/ All-Refrigerator side-by-side installation. Includes full-width, louvered top grille and vented, louvered toe kick, two 2-9/16" leveling systems, side / top trim pieces and hardware to tie the units together.

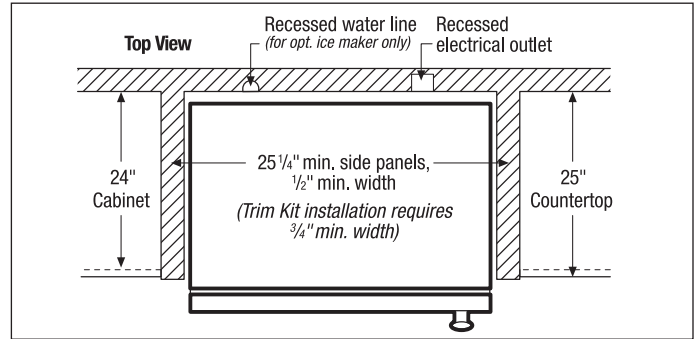


Figure 2-4. Freezer Unit Cut-out

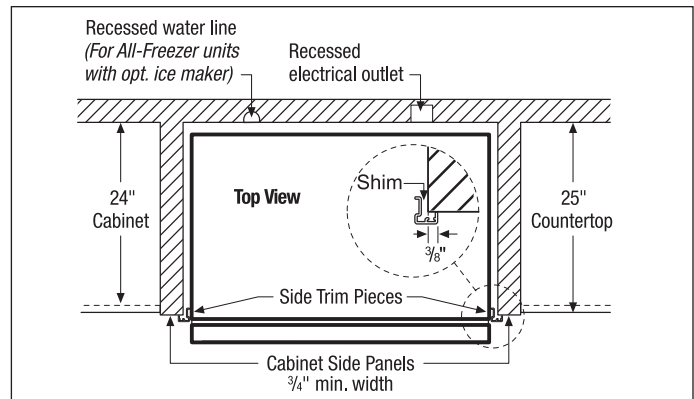


Figure 2-5. Refrigerator Unit Cut-out

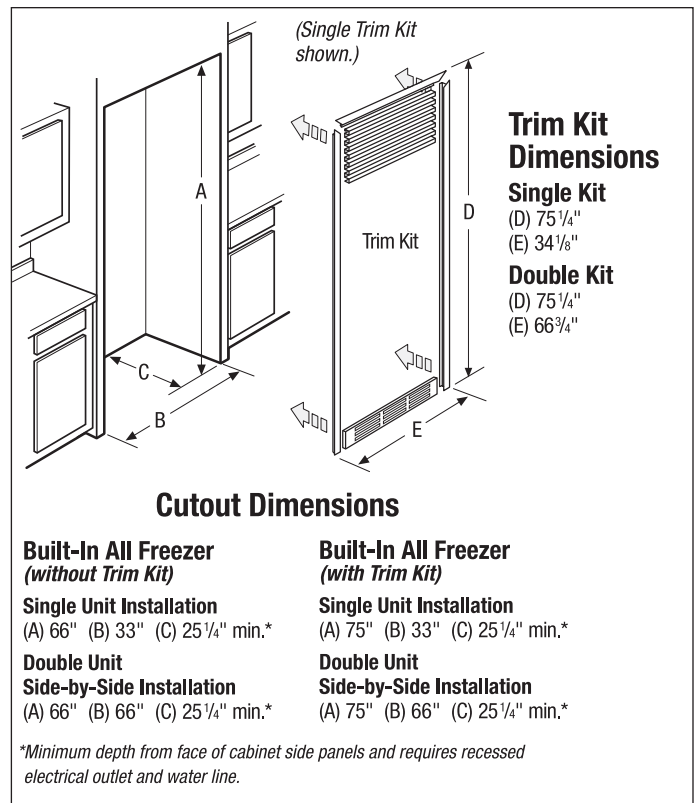
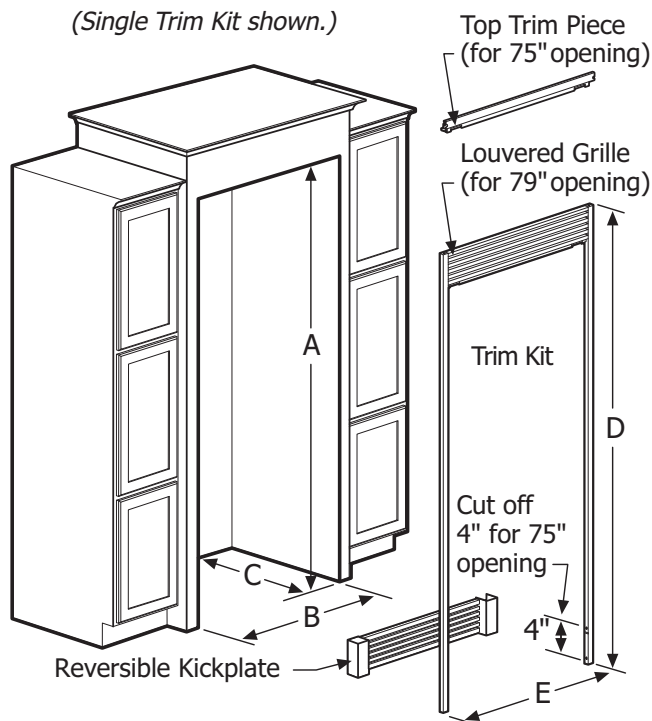


Figure 2-6. Trim Kits

Section 2 Installation Information

Cut-out Dimensions for Trim Kits



Built-In Installation (without Trim Kit)

Single Unit

(A) 72" (B) 33" (C) 25 1/4" min.*

Double Unit (Side-by-Side)

(A) 72" (B) 66" (C) 25 1/4" min.*

Single Louvered Trim Kit

PN # TRIMKITEZ1

(D) 75 1/8" or 79 1/8" (E) 34 11/16"

Built-In Installation

(with Trim Kit & Leveling System)

Single Unit

(A) 75" or 79" (B) 33" (C) 25 1/4" min.*

Double Unit (Side-by-Side)

(A) 75" or 79" (B) 66" (C) 25 1/4" min.*

Double Louvered Trim Kit

PN # TRIMKITEZ2

(Includes hardware to secure side-by-side units together.)

(D) 75 1/8" or 79 1/8" (E) 67 1/8"

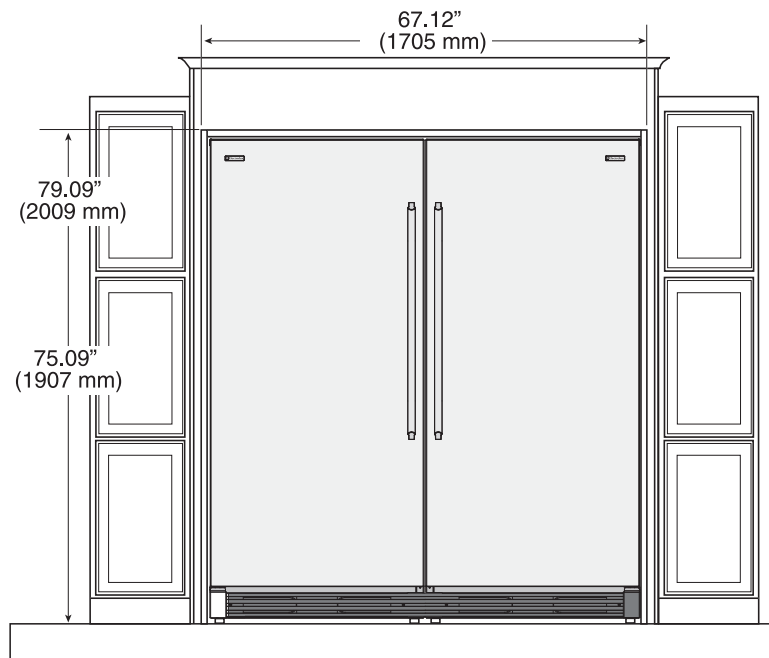
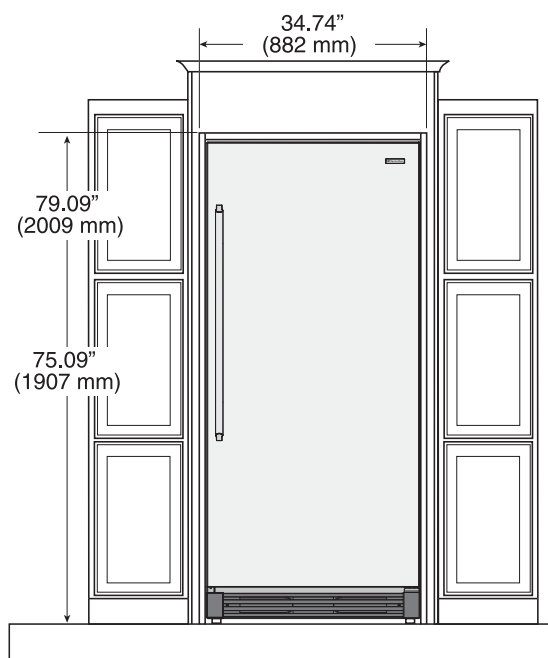
*Minimum depth from face of cabinet side panels and requires recessed electrical outlet.

Note: Both kits attach directly to cabinetry through top trim piece or louvered grille to stabilize unit(s).

Leveling System

(2) per unit raises height 2-9/16" min.

Only available with trim kits.



Section 2 Installation Information

Single Trim Kit Components

Parts Included in Kit TRIMKITEZ1

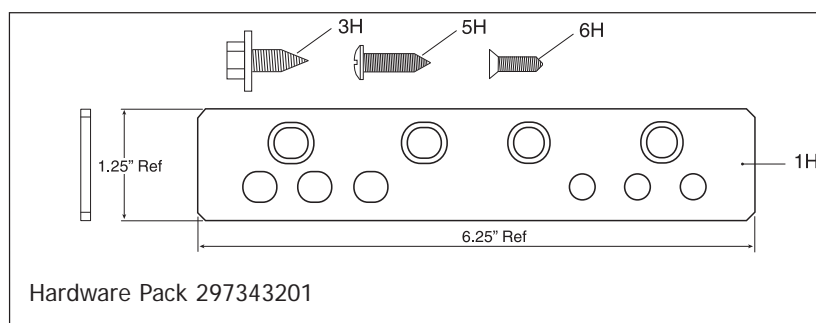
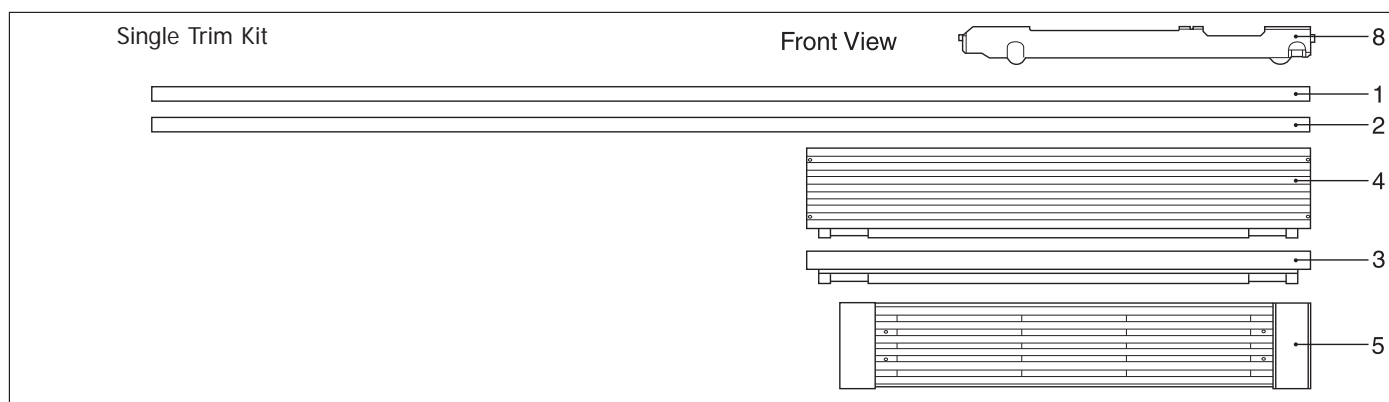
(Part# 297333510):

Kit for Models: FPRH19D7LF and FPUH19D7LF

NOTE: All Hardware Pack components mentioned throughout this section will have an "H" after the item number.

| Single Trim Kit 297333510 | | | |
|---------------------------|-------------|-------------------------------|-----|
| ITEM | PART NUMBER | DESCRIPTION | QTY |
| 1 | 297349010 | Trim Side RH U19 | 1 |
| 2 | 297349011 | Trim Side LH U19 | 1 |
| 3 | 297332711 | Trim Top Short U19 Single | 1 |
| 4 | 297332811 | Trim Top Tall U19 Single | 1 |
| 5 | 297333311 | Kick Plate U19 Sngle | 1 |
| 6 | 297337700 | Carton, Packaging | 1 |
| 7 | 297343201 | Hardware Pack Single U19 | 1 |
| 8 | 297276900 | Lever Assembly Support System | 4 |

| Hardware Pack 297343201 | | | |
|-------------------------|-------------|---------------------------|-----|
| ITEM | PART NUMBER | DESCRIPTION | QTY |
| 1H | 297333900 | Tie-Bar Hinge | 1 |
| 3H | 297236250 | Screw 1/4-20 x .63 | 6 |
| 5H | 050149 | Screw TH #8-18 x .75 AB | 6 |
| 6H | 297142600 | Screw FH #8-32 x .63 | 2 |
| 7H | 297299700 | Installation Instructions | 1 |



CAUTION

Use extreme care when handling the metal trim pieces. Corners are very sharp and easily damaged if dropped.

Section 2 Installation Information

Dual Trim Kit Components

Parts Included in Kit TRIMKITEZ2

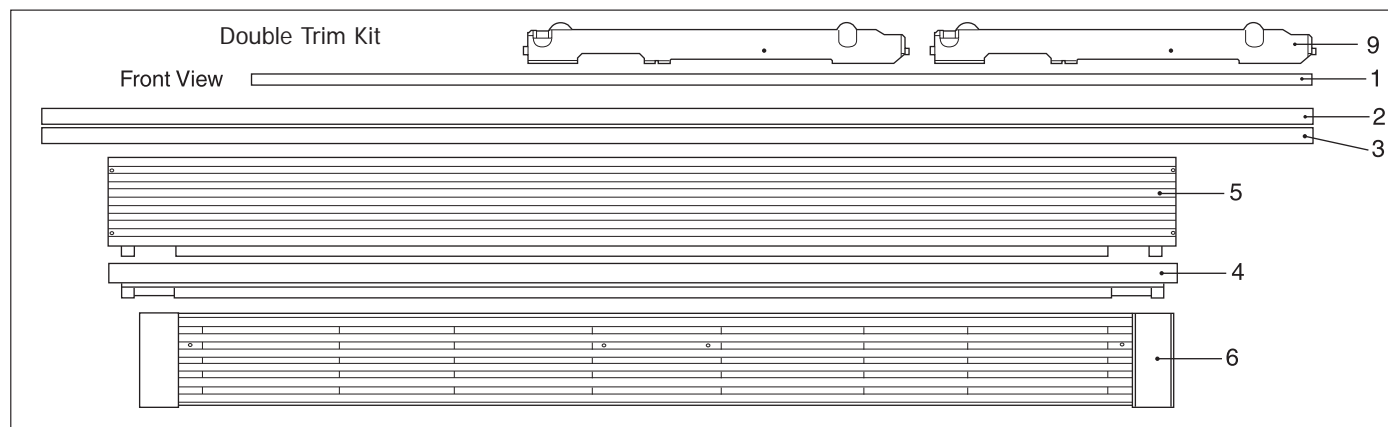
(Part# 297333600):

Kit for Models: FPRH19D7LF and FPUH19D7LF

| Double Trim Kit 297333600 | | | |
|---------------------------|-------------|-------------------------------|-----|
| ITEM | PART NUMBER | DESCRIPTION | QTY |
| 1 | 297336900 | Center Trim U19 | 1 |
| 2 | 297349010 | Trim Side RH U19 | 1 |
| 3 | 297349011 | Trim Side LH U19 | 1 |
| 4 | 297332710 | Trim Top Short U19 Dual | 1 |
| 5 | 297332810 | Trim Top Tall U19 Dual | 1 |
| 6 | 297333310 | Kick Plate U19 Dual | 1 |
| 7 | 297337700 | Carton, Packaging | 1 |
| 8 | 297343200 | Hardware Pack Dual U19 | 1 |
| 9 | 297276900 | Lever Assembly Support System | 4 |

NOTE: All Hardware Pack components mentioned throughout this section will have an "H" after the item number.

| Hardware Pack 297343200 | | | |
|-------------------------|-------------|---------------------------|-----|
| ITEM | PART NUMBER | DESCRIPTION | QTY |
| 1H | 297333900 | Tie-Bar Hinge | 2 |
| 2H | 297333901 | Tie-Bar Back | 1 |
| 3H | 297236250 | Screw 1/4-20 x .63 | 14 |
| 4H | 297337000 | Screw FH 1/4-20 x .63 | 4 |
| 5H | 050149 | Screw TH #8-18 x .75 AB | 8 |
| 6H | 297142600 | Screw FH #8-32 x .63 | 2 |
| 7H | 297299700 | Installation Instructions | 1 |



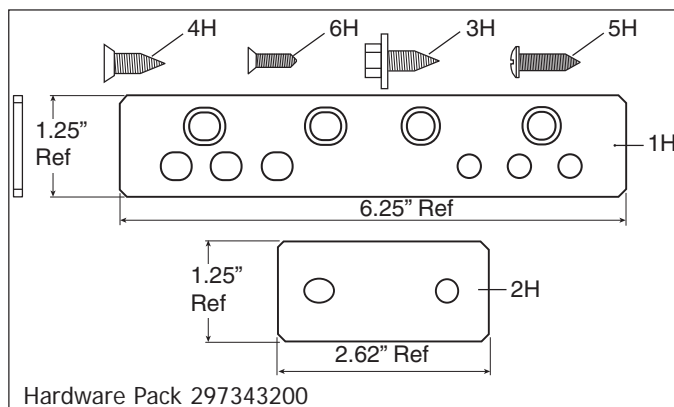
Trim Kit Installation Instructions

Before starting installation, have the following tools on hand:

- Phillips™ Screwdriver
- Flathead Screwdriver
- Adjustable Wrench to fit 1-1/4"
- Safety Glasses
- 3/8" Socket Wrench
- 7/16" Socket Wrench
- Tape Measure (min. 7" length)
- Drill & 1/8" Bit

Before You Begin

- Be careful when unpacking components. Do not use sharp objects when removing packaging material. This may scratch the surface of trim components.
- Place a drop cloth over the floor to prevent scratching of the trim kit and/or floor.



CAUTION

Use extreme care when handling the metal trim pieces. Corners are very sharp and easily damaged if dropped.

Section 2 Installation Information

Setting Up The Trim And Grill Assembly (Single and Dual Installations)

1. Lay the parts out on a cleared area face down. Be sure to place a drop cloth over the floor to prevent scratching trim kit and/or floor. (See Figure 2-12).

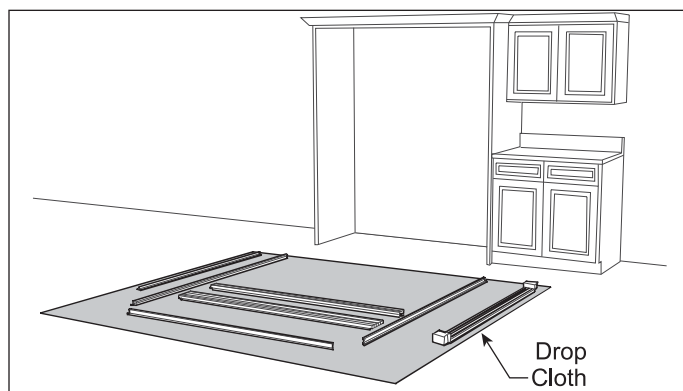


Figure 2-12.

2. Cut 4" (101.6mm) off the left and right Side Trim using the slot as a guide to make the proper size for a 75" (1905mm) cut-out. (See Figure 2-13).

NOTE: DO NOT cut the side trim if installing in a 79" (2006mm) opening.

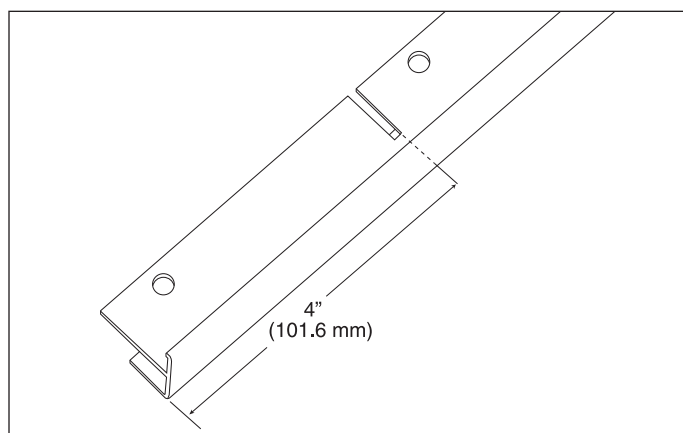


Figure 2-13.

Leveling System Install (Single and Dual Installations)

3.
 - a. Lie unit on its back on packaging material or a drop cloth to prevent damage.
 - b. Remove (3) screws from each side and discard. (See Figure 2-14)
 - c. Remove and save both plastic leg levelers to use in the next step.

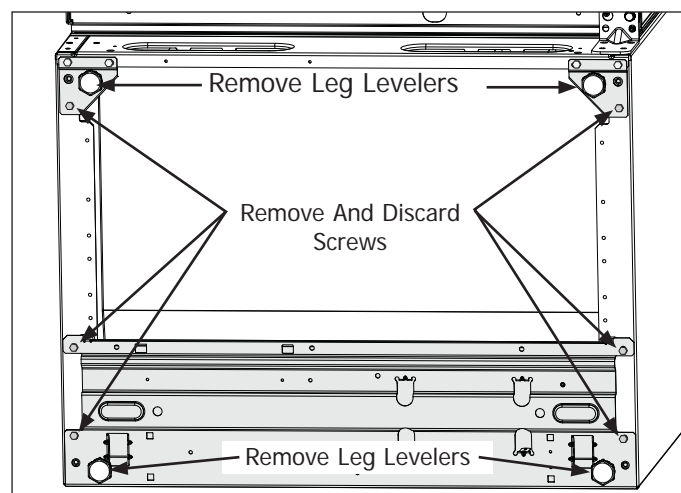


Figure 2-14.

4.
 - a. Attach the current leg leveler to leveling system. The leg leveler is a common part that will work on both bottom sides of the unit. (See Figure 2-15).
 - b. Attach leg leveler with three (3) screws per side using a 3/8 socket.
 - c. Re-install the front leg levelers.
 - d. In order to access the rear screw hole, adjust rear roller up out of the way. When finished, lower the rear roller back to its initial position.

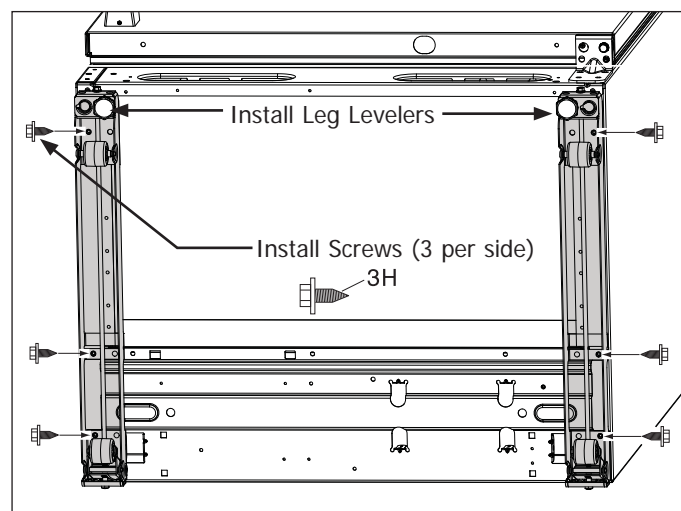


Figure 2-15.

Section 2 Installation Information

Trim Kit Installation

Installing Trim Kit Tie Bar (Dual Installation Only)

5. a. Tie units together by securing the mounting bracket at the back of the units with a 3/8" socket. (See Figure 2-16).
- b. Install center strip to insure the proper 3/8" gap is maintained between units. (See Figure 2-17).
- c. Tie units together with the common mounting bracket at the front top with two screws in the inner two screw holes by using a 3/8" socket. (See Figure 2-18)
- d. Tie units together with common mounting bracket at the bottom front using #3 Phillips driver. (See Figure 2-19)

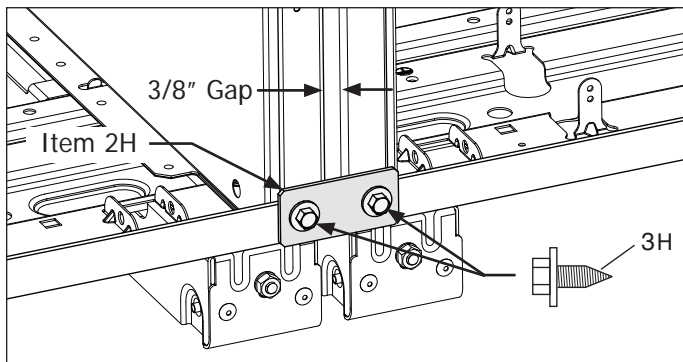


Figure 2-16.

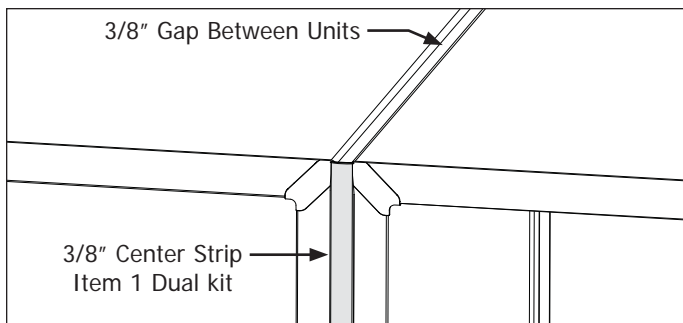


Figure 2-17.

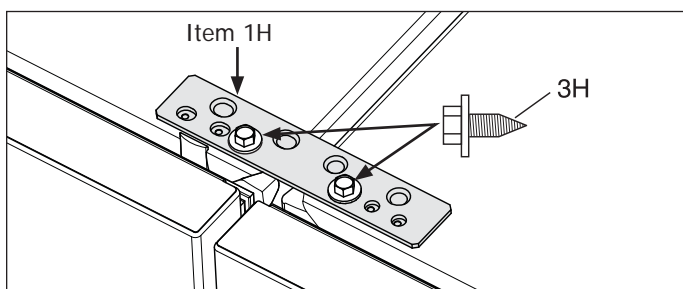


Figure 2-18.

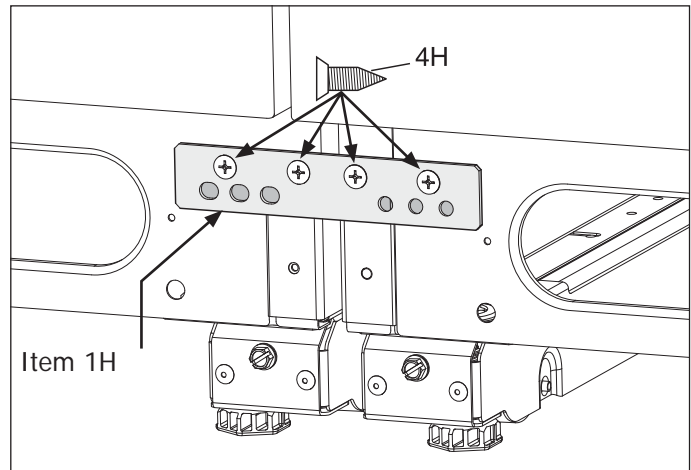


Figure 2-19.

Trim Kit Installation (Single Unit Installation)

6. Remove outer screw from top hinge using a 3/8" socket driver or wrench, and save for later use. Install mounting bracket with one screw mounted to inside hole using a 3/8" socket. (See Figure 2-20).

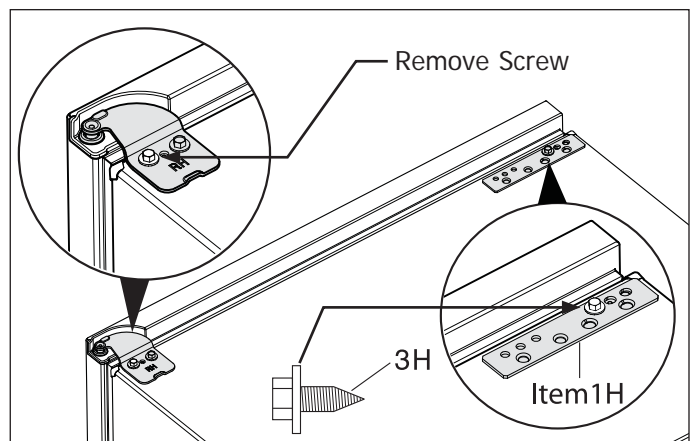


Figure 2-20.

Side Trim Installation (Single and Dual Installations)

7. a. Position left hand side trim on cabinet trim with bottom resting on the floor.
- b. Drill the 1/8" (3mm) pilot hole.
- c. Run screw in all the way and then back out. Remove side trim for later install. (See Figure 2-21).



NOTE

Some cabinet substrates may require pre-drilling holes using a 1/8" diameter drill bit.

Section 2 Installation Information

8. a. Position right hand side trim on cabinet trim with bottom resting on the floor.
- b. Drill the 1/8" (3mm) pilot hole.
- c. Run screw in all the way and then back out. Remove side trim for later install. (See Figure 2-21).

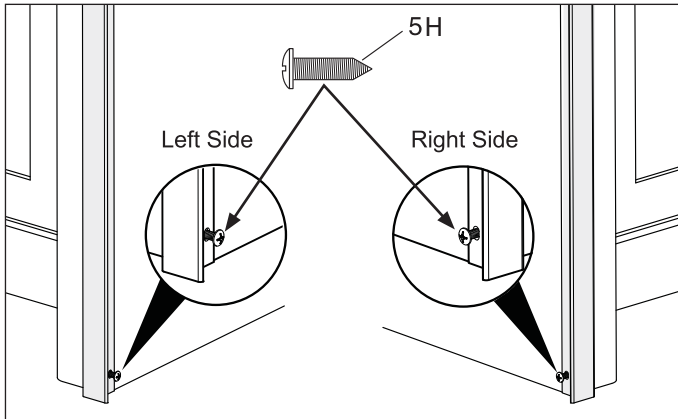


Figure 2-21.

Top Trim Install (Single and Dual Installations)

9. a. Remove outer hinge screw common on both sides for a dual installation, (for a single installation this screw is removed in Step 6. Align the top trim and attach with a 3/8" socket. Repeat for opposite side. (See Figure 2-22).
- b. (Dual installation only) Install outer screws on common mounting bracket, align top trim and attach with 3/8" socket. (See Figure 2-23).

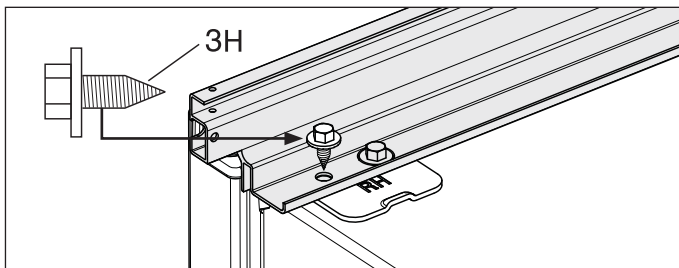


Figure 2-22.

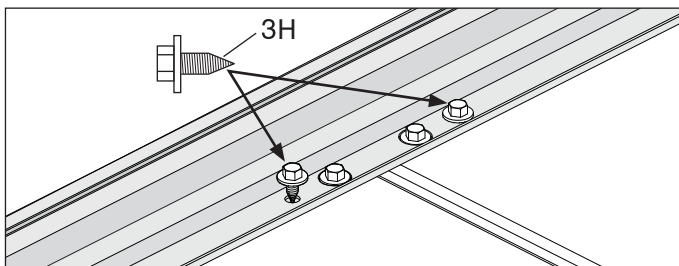


Figure 2-23.

10. 75" (1905mm) High Opening With Top Trim (Single and Dual Installations)

- a. Slide units into place. Adjust height so top trim height reaches 75.09" (1907mm). Center units in opening and level. (See Step 12 for leveling instructions)(See Figures 2-24 and 2-25)
- b. Drill 1/8" (3mm) pilot holes and fasten screws with a phillips driver to kitchen cabinets.

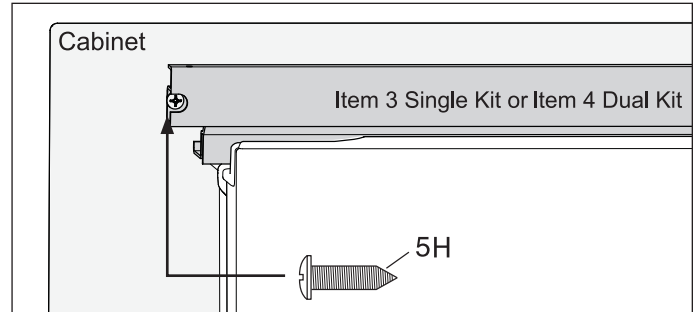


Figure 2-24.

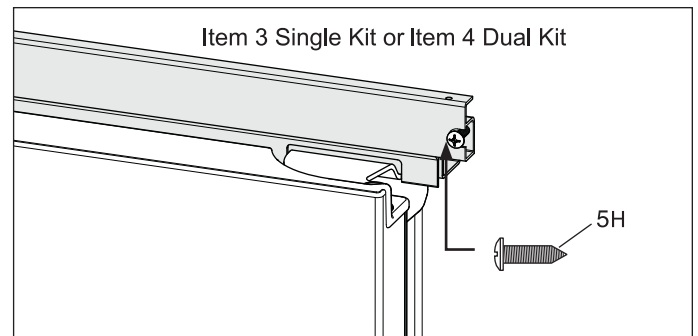


Figure 2-25.

11. 79" (2006mm) High Opening With Louvered Top Trim (Single and Dual Installations)

- a. Slide units into place. Adjust height so top trim height reaches 79.09" (2009mm). Center units in opening and level. (See Figure 2-26)
- b. Drill 1/8" pilot holes and fasten two (2) screws per side with a phillips driver to kitchen cabinets.

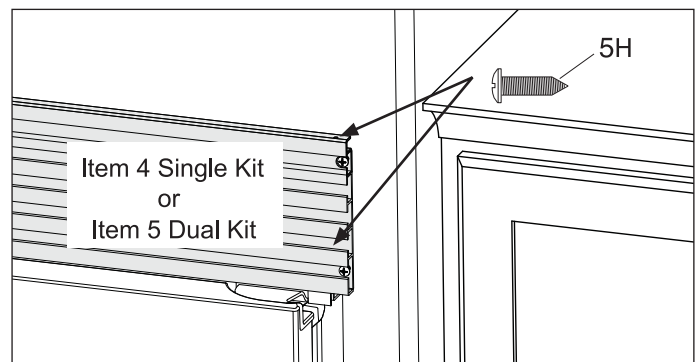


Figure 2-26.

Section 2 Installation Information

12. Trim Kit Leveling (See Figure 2-27) (Single and Dual Installations)

- To raise front of unit, turn leg leveler to left with adjustable wrench to fit 1-1/4" hex.
- To raise back of unit, adjust bolt clockwise with 3/8" socket or flat head screwdriver

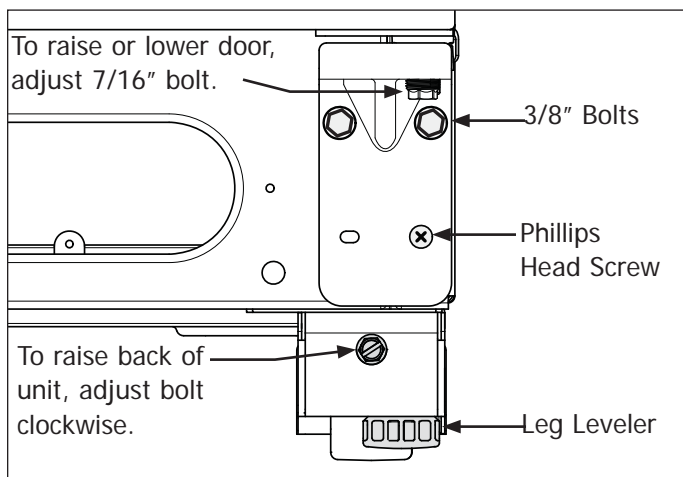


Figure 2-27.

13. Hinge Adjustment (See Figure 2-27) (Single and Dual Installations)

- The bottom hinge is designed to make final minor adjustments for door to door and door to cabinet alignment.
- Hinge will move side to side 3/32" and raise up 1/8".

Use a 7/16" socket or open end wrench to raise or lower the door.

Use a 3/8" socket and a Phillips screwdriver to loosen bottom hinge. Shift door left or right, then retighten screw and bolts.

14. Side Trim Attachment to Kitchen Cabinets (Single and Dual Installations)

- Fasten bottom of side trim with screw. (See Figure 2-28)
- Fasten screws to top trim. (See Figure 2-29)

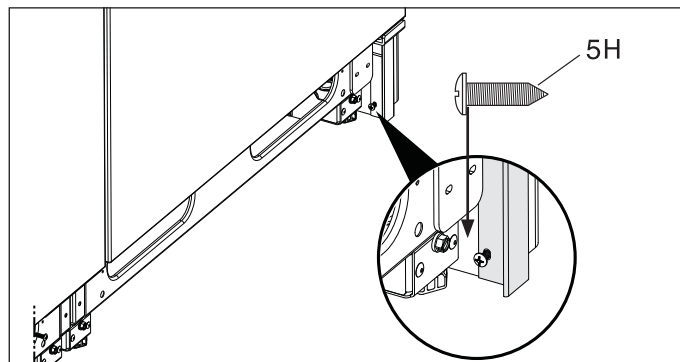


Figure 2-28.

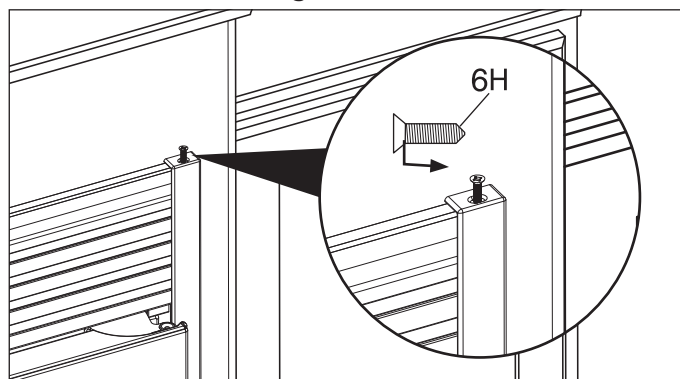


Figure 2-29.

15. Kick Plate Attachment

(Single Unit) Attach the kick plate to the cabinet with two (2) screws. (See Figure 2-30)

(Dual Unit) Attach the kick plate to the cabinet with four (4) screws. (See Figure 2-31)

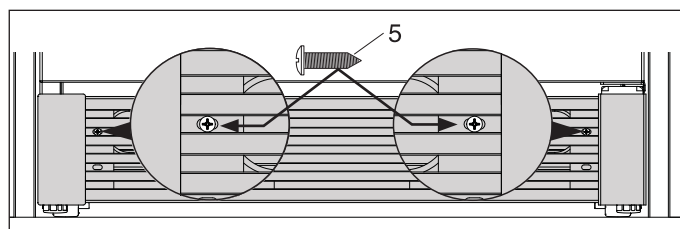


Figure 2-30.

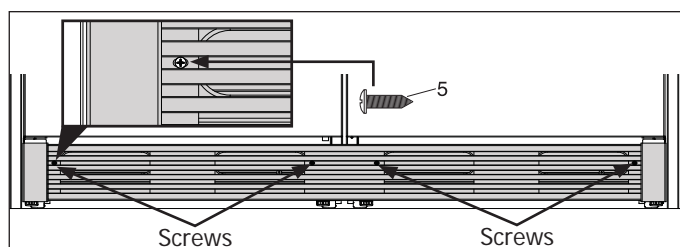


Figure 2-31.

Section 2 Installation Information

Care & Cleaning Of Your Trim Kit

The trim and grill kit surfaces are best cleaned with a cotton cloth dampened with a mixture of water and mild detergent. Avoid using abrasive cleaners as they will mar the surface of the metal components.

Door Removal

For some installations it may be necessary to remove the door to fit through the entrance of the installation site.

To remove the door, follow the steps below.

1. Make sure electrical plug is disconnected from the wall outlet.
2. Gently lay freezer on its back on a soft clean surface.
3. Lift plastic cover off upper hinge assembly. (See Figure 2-28)
4. Using a 3/8" socket or wrench, extract the two bolts securing the upper hinge to the unit frame.
5. Remove kickplate.
6. Using a 3/8" socket or wrench, extract the two bolts securing the lower hinge to the unit frame. Use a phillips head screwdriver to extract the remaining screw from the lower hinge assembly. (See Figure 2-29).
7. Lift the door assembly off of the unit frame.

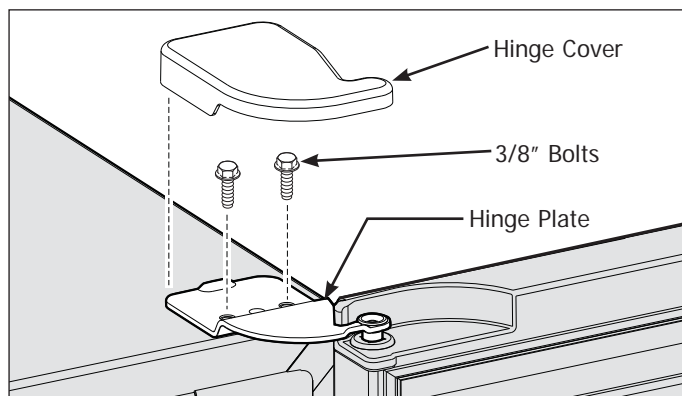


Figure 2-28. Top Hinge Removal

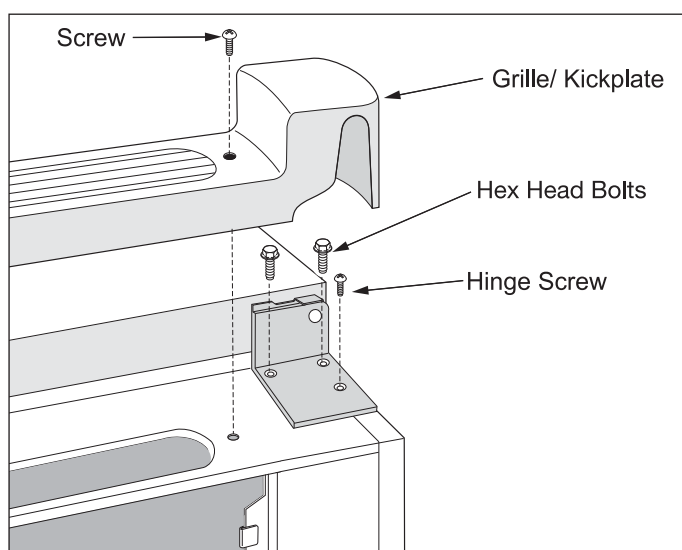


Figure 2-29. Bottom Hinge Removal

Door Handle Mounting Instructions

For some installations the door handle may need to be removed. (See Figure 2-30)

To remove the door handle:

1. Remove screw cover plates by pushing in and sliding the screw cover plate off of the door handle.
2. Using a phillips head screwdriver, extract the screws securing the door handle to the door assembly.
3. Push upwards until the screw button assembly is free of the dovetail inside the handle assembly.

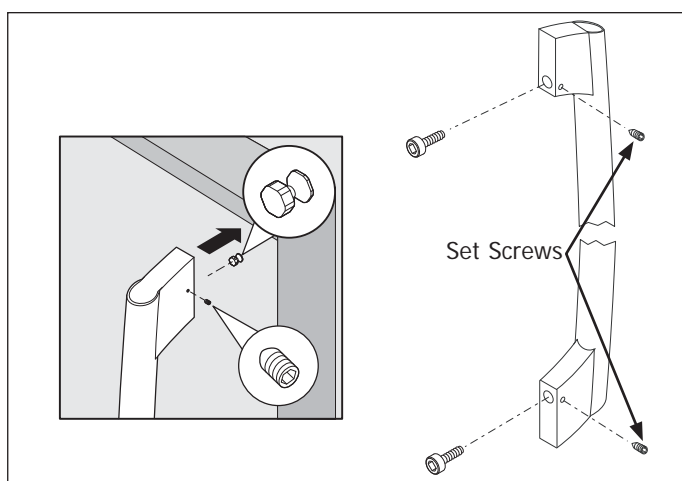


Figure 2-30. Handle Removal

Section 2 Installation Information

Notes

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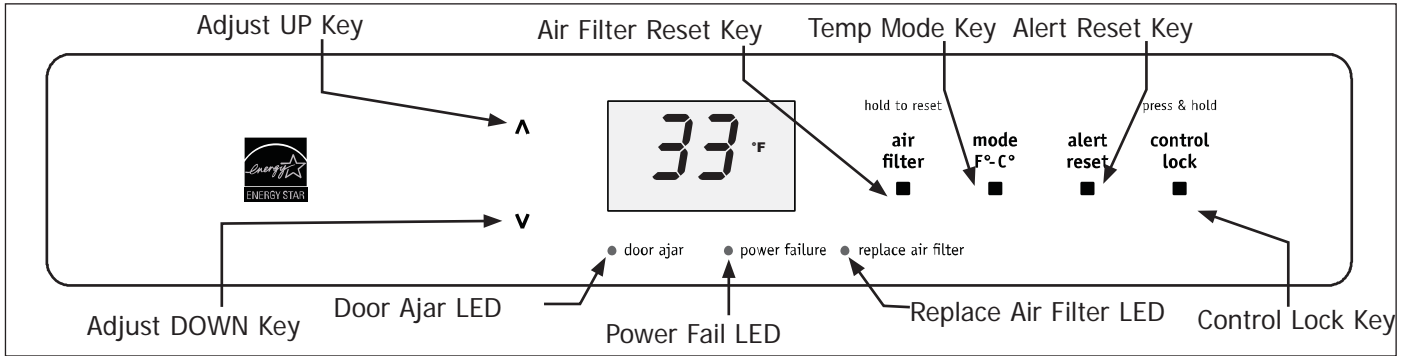


Figure 3-1.

Electronic Control

The electronic temperature control is located at the top center of the refrigerated compartment. Temperature is factory preset to provide satisfactory food storage temperatures. However, the temperature control is adjustable to provide a range of temperatures for personal satisfaction.

Power On Reset (POR)

When applying power to the unit, the following sequence will be followed:

1. Power up tone sounds.
2. Model ID is displayed for five seconds.
3. **Refrigerator:** If the cabinet is above 55°F (13°C), the HI TEMP LED illuminates and the current cabinet temperature (updated every 10 seconds) is displayed until the temperature falls below 55°F (13°C). If cabinet is below 55°F (13°C), the set temperature default (38°F (3.3°C)) is displayed.
Freezer: If the cabinet is above 23°F (-5°C), the HI TEMP LED illuminates and the current cabinet temperature (updated every 10 sec.) is displayed until the temperature falls below 23°F (-5°C). If cabinet is below 23°F (-5°C), the set temperature default (0°F (-18°C)) is displayed.

Adjusting Temperature

To adjust the temperature setting, press the UP (^) key for warmer temperature and DOWN (v) key for colder temperature on the control panel. Allow several hours for the temperature to stabilize between adjustments.

The refrigerator can be adjusted between 33°F (1°C) and 46°F (8°C). The freezer can be adjusted between -10°F (-23°C) and 10°F (-12°C).

Switching Between Fahrenheit & Celsius

By pressing the TEMP MODE key, the temperature display will toggle between Fahrenheit (°F) to Celsius (°C).

Turning The Control OFF

Refrigerator:

To turn the refrigerator OFF, press the UP (^) key until the warmest temperature setting of 46°F (8°C) shows in the display. Then press the UP (^) key three (3) times within three (3) seconds to turn the refrigerator OFF. The display will then show "OF". To turn the unit back ON, press the DOWN key three (3) times within three (3) seconds. The control will then display "46°F (8°C)" and may be adjusted to the desired temperature.

Freezer:

To turn the freezer OFF, press the UP (^) key until the warmest temperature setting of 10°F (-12°C) shows in the display. Then press the UP (^) key three (3) times within three (3) seconds to turn the freezer OFF. The display will then show "OF". To turn the unit back ON, press the DOWN key three (3) times within three (3) seconds. The control will then display "10°F (-12°C)" and may be adjusted to the desired temperature.

Section 3 Electronic Control

Electronic Control Features

Replace Air Filter

When the “REPLACE AIR FILTER” LED is illuminated yellow, the air filter needs to be replaced. The control will signal for air filter replacement after 3600 hours of refrigerator operation. After replacing the air filter, reset the air filter timer by pressing the AIR FILTER key for three (3) seconds. The “REPLACE AIR FILTER” LED will be illuminated green for three (3) seconds, confirming a timer reset.

Control Lock

To disable the keypads on the control, begin by pressing the CONTROL LOCK key for three seconds until “LO” is displayed for 1 second. With the control locked, when keys are pressed on the control panel, “LO” will be displayed and the Key Press click tone will sound three times in succession. To unlock the control, press the CONTROL LOCK key for three seconds. The display will show “UL” and the key press click tone will sound 3 times in succession.

Power Fail

The Power Fail indicator light informs you that due to a power failure lasting more than one hour, the cabinet temperature exceeded the set point temperature by 10°F. The display alternates between showing the power failure duration (Hours and DURATION LED illuminate in the display) and the cabinet temperature (°F or °C illuminates) every ½ second. This safety feature will aid in determining what food spoilage action to take.

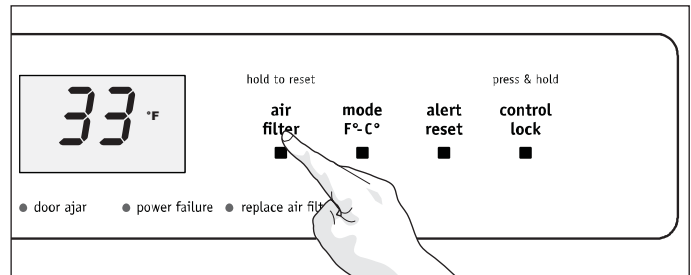


Figure 3-2. Resetting Air Filter Alarm

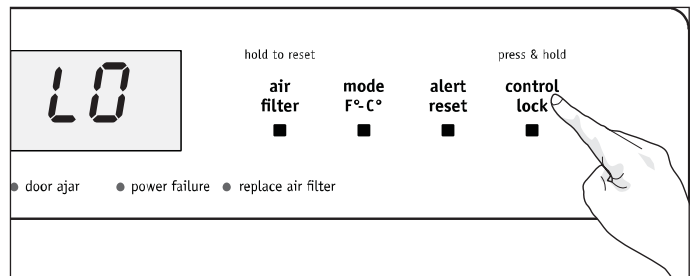


Figure 3-3. Setting Control Lock

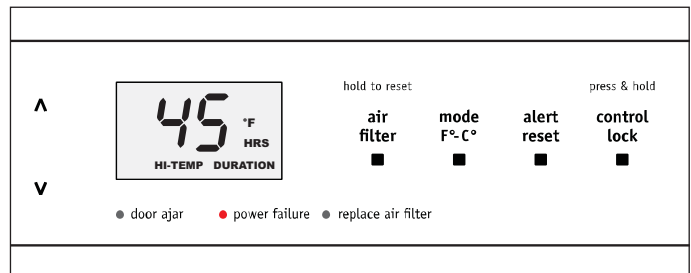


Figure 3-4. Power Fail Indicator

Alarms

There are four possible conditions that will cause the alarm tone to sound.

High Temp Alarm

If the temperature inside the cabinet has exceeded 55°F (13°C) for 1 hour or more, the HIGH TEMP LED will illuminate, the HIGH TEMP Alert will sound with 4 short beeps every ½ second, and the cabinet temperature is shown in the display. The LED and temperature alarm will remain active until the cabinet temperature is below 55°F (13°C).

The audible alarm can be turned off by pressing ALERT RESET key

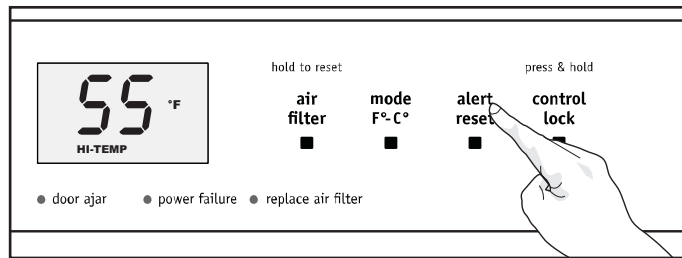


Figure 3-5. Alert Reset

Door Ajar Alarm

This alarm will sound to alert you that the door has been open for 5 minutes or more. The DOOR AJAR LED will illuminate and the audible alarm will sound until the door is closed.

The audible alarm can be turned off by pressing the ALERT RESET key or by closing the door. If the door is ajar for 15 minutes, the interior light will turn off.

Stuck Key Alarm

The stuck key alarm will sound if the control reads a keypress for longer than 30 seconds. The audible alarm will sound and will be limited to one minute and will stop automatically. The display will alternate between "E7" and the lowest setpoint temperature (Refrigerator= "33° F (1°C)" Freezer= "-10°F (-23°C))" at ½ second intervals until the condition is resolved.

The audible alarm can be turned off by pressing the ALERT RESET key.

Error Code Descriptions

Thermistor Error (Temp Error Alarm)

The thermistor alarm signals that a problem exists with a temperature sensor. The audible alarm will sound and the display will alternate between "E8" or "E9" and the lowest setpoint temperature at ½ second intervals. The control will then enter a Thermistor Error Mode that runs the compressor in a manner that maintains the factory set cabinet temperature.

The audible alarm can be turned off by pressing the ALERT RESET key.

Thermistor Error Mode

If the thermistor is open or shorted, the compressor will run with a cycle of 6 minutes compressor on, 32 minutes compressor off for refrigerator units, and will run continuously for freezer units. The automatic defrost cycle will still occur normally after 12 hours of compressor run time.

A shorted thermistor is defined as a temperature exceeding 90-95°F (32-35°C) for greater than 20 minutes of compressor run time. Thermistor Error Mode takes precedence over Fail Safe Mode.

If an "Open Thermistor" condition is present, the display will alternately display an "E9" for 0.5 seconds and the lowest selectable temperature (Refrigerator= "33°F (1°C)" Freezer= "-10°F (-23°C))" for 0.5 seconds.

If a "Shorted Thermistor" condition is present the display will alternately display an "E8" for 0.5 seconds and the lowest selectable temperature (Refrigerator= "33°F (1°C)" Freezer= "-10°F (-23°C))" for 0.5 seconds.

Fail Safe Mode

Upon entering the Fail Safe Mode for any reason, the display will continuously alternate between "E7" for 0.5 seconds and the lowest selectable temperature (Refrigerator= "33°F (1°C)" Freezer= "-10°F (-23°C))" for 0.5 second intervals.

The refrigerator units will cycle the compressor on and off with a cycle of 6 minutes on and 32 minutes off, and will run continuously for freezer units. Automatic Defrost Mode will occur normally. Audible alarms will be limited to one (1) minute and will cancel automatically. In case of a thermistor error "Thermistor Error Mode" will be initiated instead of Fail Safe Mode.

Section 3 Electronic Control

Initiate Diagnostics Mode

To initiate Diagnostics Mode, begin by pressing the CONTROL LOCK key for three seconds until "LO" is displayed for 1 second. With the control locked, enter diagnostics mode by press and holding both the UP (^) and DOWN (v) keys simultaneously for 5 seconds.

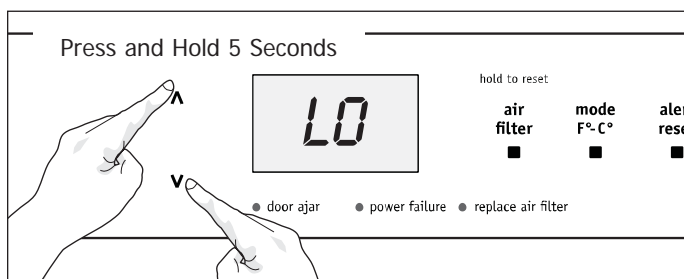


Figure 3-6. Entering Diagnostics Mode

Diagnostics Indicator

The control will display the following in 2-second intervals. The system will then wait for load testing for 10 seconds. If load testing is performed, a 10 second wait cycle is re-established after each key press. This is followed by Defrost Cycle Time adjust mode. After exiting Diagnostic Mode the control will also exit Control Lock Mode.

- Three (3) short confirmation tones sound.
- Left digit displays "8", right digit is blank.
- Left digit blanks and right digit displays "8".
- The following LEDs are illuminated: (-), (°C), (°F), (HRS), (Door Ajar), (Power Fail). Blanked after 2 seconds.
- The following LEDs are illuminated: (Hi Temp), (Duration), (Replace Air Filter), (Control Lock) Blanked after 2 seconds.
- Displays "Id" (model ID) with tone.
- Displays Model ID.
- Displays "5F", (Software Version) with tone.
- Displays Software Version Number.
- Door Switch Status with tone ("dO" or "dC").
- Thermistor Status with tone ("tO" for open, "tC" for closed or "--" for good thermistor).
- Tone and enters Load Test Mode for 10 seconds.
 1. Press DOWN (v) key. Displays "HE" and turns on heater.
 2. Press UP (^) key. Displays "CP" and turns on compressor.
 3. Press TEMP MODE key. Displays "LA" and illuminates cabinet lamp.

- Enters Defrost Cycle Time adjust mode. Default is 12 Hours. Time can be adjusted for 8, 10, or 12 hours by using Up (^) / Down (v) Keys. The Compressor Run Time will also be adjusted.
- Diagnostics Mode exits at end of 10 second Load Test mode.

Change Model ID

Press and hold UP (^), ALERT RESET and CONTROL LOCK keys and apply AC power, then release the keys.

NOTE: This task requires two people.

The display will flash the current model number at 0.5 second intervals. Press UP (^) or DOWN (v) key to select the model number. Press ALERT RESET key to save the setting.

After the model ID has been stored it will remain on the display and the only function the control will perform is the operation of the door lamp. A POR must be performed to enter into normal operation.

NOTE: Restore the original model number for the remainder of the tests.

Automatic Defrost Timing

The length of the defrost cycle is 30 minutes, this includes the heater "ON" time and dwell time.

Refrigerator:

Defrost will occur after every 8 hours of compressor run time.

Freezer:

Defrost will occur after every 12 hours of compressor run time.

Manual Defrost Mode

In the event that a manual defrost is desired, begin by pressing the AIR FILTER and ALERT RESET keys for five seconds. The display will show "dE" and the audible confirmation tone will be heard. The "dE" will be displayed for the duration of the manual defrost cycle. The defrost cycle terminates automatically after thirty minutes and then the display will show the set temperature. The HIGH TEMP alarm will be inhibited for 1 hour beginning at the start of the cycle. Manual defrost may be cancelled at any time by pressing the AIR FILTER and ALERT RESET keys for five seconds.

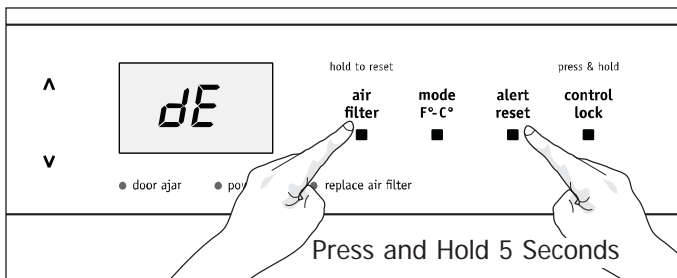


Figure 3-7. Entering Manual Defrost Mode

Showroom Mode

Showroom mode allows a sales person to demonstrate the units features without turning the compressor on or going through defrost cycles. All keys will operate normally, but no visual or audible alarms will occur during showroom mode. The display will indicate the set temperature, not the actual thermistor temperature. The cabinet light will operate as otherwise specified during showroom mode, but the compressor fan and defrost heater will remain off. Entering Sabbath Mode while in Showroom Mode will additionally disable cabinet lighting.

To initiate or exit Showroom Mode, press and hold the UP (^) and DOWN (v) keys simultaneously and apply AC power. The display will show "E5" (Enter Showroom) for 3 seconds.

NOTE: This task requires two people.

If power is removed and restored, the display will again show "E5" to indicate it remains in Showroom Mode. To cancel showroom mode, repeat the initiate procedure.

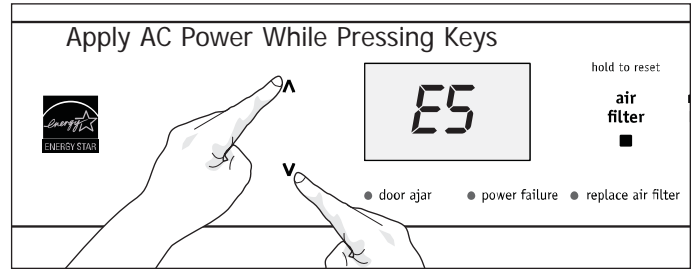


Figure 3-8. Entering Showroom Mode

Sabbath Mode

The Sabbath Mode is a feature that disables portions of the unit and its controls in accordance with the observance of the weekly Sabbath and religious holidays within the Orthodox Jewish community.

To initiate or cancel Sabbath Mode, press the CONTROL LOCK and TEMP MODE keys at the same time and hold for three (3) seconds. The display will now show "Sb" and the confirmation tone will sound. When AC power is cycled while the control is in Sabbath mode, the control enters into Sabbath mode automatically. "Sb" will again be displayed. While in Sabbath Mode, the display will show "Sb".

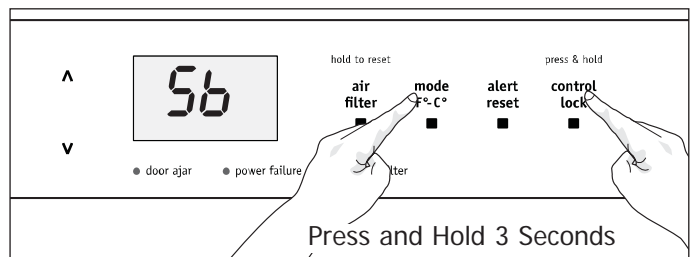


Figure 3-9. Entering Sabbath Mode

In the interest of food safety, only the HIGH TEMP Alarm remains active and takes precedence over other Sabbath Mode features.

Section 3 Electronic Control

Compressor Delay Start

When the compressor is turned off, it will not start again for 13 minutes if a freezer, and 4 minutes if a refrigerator.

Memory Retention

Whenever power is restored to the control after a power loss, the control resumes normal operation under the setting in which it was in before power was lost. The compressor run time, air filter time, temperature setting, temperature mode status, sabbath mode status, showroom mode status and defrost cycle time will be stored. However, if the setting is changed during fail safe, then the new setting will not be saved, and the control will resume operations under the last setting it was on before the failure occurred.

Voltage Range

The control operates normally down to a line voltage of 98 volts and up to 132 volts. Below this voltage, the compressor is turned off and an "E" will flash on the display at one-second intervals. Once the voltage rises above 98 volts, the control resumes normal operation

Notes

This image shows a full page of blank, lined paper. It features approximately 20 evenly spaced horizontal grey lines across the entire width of the page, typical of notebook or legal stationery. There are no margins, text, or other markings present.

IMPORTANT

The purpose of this section is to give the service technician an understanding of refrigerants and sealed system service. Persons attempting to use this service manual to make repairs to sealed system refrigeration systems should have electrical training as well as training in sealed system repairs. The person making the repairs must know and understand all laws (Local and International) governing handling of all refrigerants. The technician must be trained in the use of recovery and recycling equipment and an EPA certification for servicing refrigeration systems. Electrolux Home Products, Inc. cannot be responsible, nor assume any liability, for injury or damage of any kind arising from the use of this manual.

IMPORTANT

Effective July 1, 1992, the United States clean air act governs the disposal of refrigerants such as R-134a. Therefore, when discharging or purging the sealed system use an EPA approved refrigerant recovery system as outlined in the final rule on the protection of stratospheric ozone and refrigerant recycling, which was published in the Federal Register May 14, 1993.

NOTE

Electrolux does not permit the use of recovered refrigerant in the servicing of our products for in-warranty and out-of-warranty repairs or for products covered by service contracts. Therefore, only new refrigerant or refrigerant that has been reclaimed back to new specifications by a refrigerant manufacturer is to be used.

Soldering

WARNING

WEAR APPROVED SAFETY GLASSES WHEN WORKING WITH OR ON ANY PRESSURIZED SYSTEM OR EQUIPMENT. HAVE AN APPROVED DRY TYPE FIRE EXTINGUISHER HANDY WHEN USING ANY TYPE OF GAS OPERATED TORCH.

1. All joints to be soldered must have a proper fit. Clearance between tubes to be soldered should be from .001" to .006". It is not practical to actually measure this; however, you do not want a dry fit or loose fit. Tubing joints should overlap about the distance of their diameter except for restrictor tubes, which should be inserted 1.25".
2. Clean all joint areas with fine steel wool or preferably an abrasive cloth, such as grit cloth No. 23 or Scotch-Brite.
3. Apply a thin film of liquid flux recommended for silver soldering to surfaces to be joined, and to surfaces immediately adjacent to joint.

4. Align tubing so no stress is on joint. Do not move tubing while solder is solidifying or leaks will result.
5. Use a torch of adequate capacity so joint can be quickly heated with a minimum of heat travel to other points. Use a good grade of silver solder.

CAUTION

During application of heat, use wet cloths to prevent heat from conducting to areas other than the soldered joint. Use a sheet of metal or torch guard pad as a heat deflector to keep flame away from inflammable materials and painted surfaces.

6. Solder connections. If tubing is properly cleaned and fluxed, solder will flow readily. Use only enough solder to make a good bond.
7. Allow joint to cool, then wash exterior with water to remove flux.

Section 4 Refrigeration

Introduction

This Service manual is intended as a guide for introducing the service technician to R-134a refrigerant, and the equipment needed to service R-134a systems. The replacement of R-12 refrigerant involves changes in materials, choice of lubricant, and processing procedures, with an overall requirement of continuous high quality system performance and reliability. The following information provides a good practical foundation for service needed to maintain long product life.

Compressor Oils

In a refrigerating system designed for R-134a refrigerant, only R-134a refrigerant is to be used. The current design of hermetic compressors lead to the situation that some oil (a small percentage) will follow with the refrigerant through the whole system. R-134a compressors require a new lubricant. At this time, only synthetic ester oil is to be used. The R-12 compressors used mineral oil. Mineral oil is not compatible with R-134a and is not to be used in R-134a systems. Ester oil must not be mixed nor replaced with any other lubricant. Compressors used with R-134a systems charged with oil, cannot have any tube fittings exposed to ambient air for more than 15 minutes. Ester oil is more hygroscopic (it will absorb water at a much faster rate) than the mineral oil used with R-12 systems.



CAUTION

Ester oil can be an irritant to eyes and skin. Refer to manufacture safety data sheets from lubricant supplier for handling specifications. As with all current refrigerants, you must have an adequately ventilated work area at all times for sealed system service and repairs.

Refrigeration Systems

The sealed refrigeration system will consist of the same basic components being utilized in the R-12 systems.

There is a 10% to 15% discharge pressure increase using R-134a, with a 5% to 10% decrease in suction pressure when compared to the same product with an R-12 system operating at 90°F (32°C) ambient temperature conditions. Lower suction pressures result from the lower density of R-134a refrigerant which effects refrigerant flow rate. R-134a systems commonly operate in a 1"-2" vacuum on the suction side.

Products using R-134a refrigerant will have a different heat exchanger than an R-12 product. The difference is in the capillary tube, it will be longer to maintain a similar flow rate. On some models, a larger condenser will be used to reduce the discharge pressures and lower start-up sound transmission. A different filter-drier will be used on refrigerating systems with R-134a. The molecules of R-134a are smaller than those of R-12, therefore, a dryer with smaller pores is necessary. Otherwise, R-134a could be trapped inside the filter-drier along with the water. On some products you will see some changes to the evaporator and suction line. Ester oil and R-134a mix satisfactorily within the compressor. Lower gas speed increases the risk of oil accumulation in the evaporator. Some changes will be required to ensure good oil returnability.

Sealed System Repair

To prevent any form of cross contamination of R-134a, and R-12 refrigerant, or a cross contamination of ester oil and mineral oil, you must have dedicated equipment. The equipment consists of one set of gauges, manifold, hoses, vacuum pump, charging cylinder, and reprocessing or transfer pump. This means you must have one complete set for CFC, (R-11, R-12) and HCFC, (R-22) systems, and one complete set for HFC, (R-134a) systems. You can not share the use of any of the same equipment on both systems.

Since the R-134a molecule is smaller than the R-12 molecule, R-134a could pass through more minor leaks than R-12, and the flow through a certain leak would be larger for R-134a than for R-12. As a consequence, it is critical to maintain very good brazing processes and leak tests.

Make sure you do not mix refrigeration oil or refrigerant in your bulk storage area. Because moisture infiltration is much higher in ester oil, you must keep it stored in sealed containers and only allow exposure to room air for a very short period of time when changing or adding oil to a system. You must not mix refrigerant in your storage containers for used refrigerant removed from products for service. You must have dedicated cylinders for each refrigerant R-12, R-22, and R-134a.

Service Diagnostic Tips

A prime requisite on the initial contact is: Always allow the customer to explain the problem. Many times the trouble can be diagnosed more quickly, based on the customer's explanation. Most of all, do not jump to conclusions until you have heard the full story and have evaluated the information obtained from the customer. Then proceed with your diagnosis.

Before starting a test procedure, connect the product service cord to the power source, through a wattmeter, combined with a voltmeter. Then make a visual inspection and operational check of the refrigerator to determine the following:

1. Is the product properly leveled?
2. Is the product located for proper dissipation of heat from the condenser? Check recommended spacing from walls.
3. Feel condenser. With compressor in operation, condenser should be hot, with gradual reduction in temperature from entry to exit of condenser.
4. Are door gaskets sealing properly? (Refrigerators and freezers)
5. Does the door actuate the light switch? (Refrigerators and freezers)
6. Is evaporator fan properly located on motor shaft?
7. Is the thermostat sensing element properly positioned?
8. Observe frost pattern on evaporator.
9. Check thermostat knob setting.
10. Inscribe bracket opposite slotted shaft of defrost timer to determine if timer advances (Refrigerators and freezers - auto defrost models only).

The service technician should inquire as to the number of people in the family to determine the service load and daily door openings. In addition, he should know the room temperature for refrigerator and freezers.

After this phase of diagnosis is completed, a thorough operational check should be made of the refrigeration system.

Refrigerator and Freezer Air Temperatures

Temperatures are affected by improper door seal, frost accumulation on the evaporator, service load, ambient temperature, percent of relative humidity, thermostat calibration (cut-in and cut-out), location of evaporator fan blade on motor shaft, and by compressor efficiency.

Line Voltage

It is essential to know the line voltage at the product. A voltage reading should be taken at the instant the compressor starts, and also while the compressor is running. Line voltage fluctuation should not exceed 10% plus or minus, from nominal rating. Low voltage will cause overheating of the compressor motor windings, resulting in compressor cycling on thermal overload, or the compressor may fail to start. Inadequate line wire size and overloaded lines are common reasons for low voltage at the product.

IMPORTANT

Your Country may have regulations or restrictions governing the discharging of chlorofluorocarbons (CFC's) such as R-12 and R-22 to the atmosphere. Therefore, when discharging or purging the sealed system, use an approved refrigerant recovery system.

Section 4 Refrigeration

Basic Components

The basic components of a refrigerated unit are a compressor, condenser, evaporator, heat exchanger (capillary tube and suction line), drier and perimeter hot tube.

Condensing Configuration

The freezer has a dynamic coil condenser located in the machine compartment. This coil is connected in series with a serpentine "hot wall" condenser on the sides and top of the exterior cabinet. The drier is connected in series to the "hot wall" condenser exit. The serpentine condenser is located close enough to the front cabinet flange to prevent sweating at the door gasket in humid environments.

The refrigerator has a dynamic coil condenser located in the machine compartment. This coil is connected directly to the drier by means of a jumper. This jumper is foamed in at the bottom of the shell bottom. There is no need for heat at the door gasket area.

Refrigerant Cycle

The refrigerant cycle is a continuous cycle that occurs whenever the compressor is in operation. Liquid refrigerant is evaporated in the evaporator by the heat that enters the cabinet through the insulated walls, and by the heat from product load and door openings. The refrigerant vapor is then drawn from the evaporator, through the suction line, to the compressor.

Compression raises the pressure and temperature of the vapor in the compressor and the vapor is then forced through the discharge valve into the discharge line and into the condenser. Air passing over the condenser surface removes heat from the high pressure vapor which then condenses to a liquid. The liquid refrigerant then flows from the condenser to the evaporator through the small diameter liquid line (capillary tube).

Before it enters the evaporator, the liquid refrigerant is sub-cooled in the heat exchanger by the low temperature suction vapor in the suction line. When refrigerant is added, the frost pattern will improve, the suction and discharge pressures will rise, the condenser will become hot and the wattage will increase.

Testing for Refrigerant Leaks

NOTE

The line piercing valve (clamp-on type) should be used for test purposes only. It must be removed from system after it has served its purpose.

If the sealed system is diagnosed as short of refrigerant and the system has not been recently opened, there is probably a leak in the system. Adding refrigerant without first locating and repairing the leak or replacing the component will not permanently correct the difficulty.

The leak must be found!

Sufficient refrigerant may have escaped to make it impossible to leak test effectively. In such cases, add a 1/4" line piercing valve to the compressor process tube. Add sufficient refrigerant vapor to increase the pressure to 75 lbs. per sq. in. Through this procedure, leaks are more easily detected before discharging the system into reprocess/recapture equipment. Check the low side for leaks. Run the compressor 2 or 3 minutes and check the high side for leaks. Recover refrigerant using an EPA approved recovery system.

Checking For Internal Leaks

Before checking for internal leaks, check all accessible system components and joints for leaks.

If an internal leak is suspected, it must be confirmed. Use the following procedure:

1. Discharge the system by using refrigerant recovery equipment.
2. Disconnect the condenser and the drier from the hot tube on refrigerators. On food freezers, separate the high and low pressure sides of the system. Pinch off and solder closed one end of the part of the system to be tested.
3. Solder a 1/4" charging hose fitting to the open end of the part of the system to be tested.
4. Connect a pressure gauge and access valve to the open end of the part of the system to be tested. Pressurize to 250 lbs. using dry nitrogen or carbon dioxide.
5. Leave the pressure on the hot tube for 24 hours. Any drop in pressure is an indication of a leak.

Definitions

Recovery:

To remove refrigerant in any condition from a system and store it in an external container without necessarily testing or processing it in any way.

Recycling:

To clean refrigerant for reuse by oil separation and single or multiple passes through devices, such as replaceable core filter-driers, which reduce moisture, acidity and particulate matter. This term usually applies to procedures implemented at the field job site or at a local service shop.

Reclaim:

To reprocess refrigerant to new product specifications by means which may include distillation, will require chemical analysis of the refrigerant to determine that appropriate product specifications are met. This term usually implies the use of processes or procedures available only at a reprocessing or manufacturing facility.

Equipment Needed for Evacuation & Recharging

1. 1 - Heated Dial-A-Charge charging cylinders.
2. 1 - Recovery/Recycling equipment.
3. 1- Tank for each type of refrigerant you use in service. (Do not mix refrigerants in the same tank)
4. 1 - External vacuum pumps.
5. Process tube adapter kit (Robinair No.12458)
6. Tubing cutter.
7. Pinch-off tool capable of making leak proof seal.
8. Leak detector.
9. Complete brazing torch set.
10. Small 3-corner file.
11. Grit cloth or Scotch-Brite.
12. 45% silver solder and flux.
13. 1 -Gauge and Manifold set. (See Figure 5-1)
14. 2 - Tube piercing valves.
15. Oil test kits.
16. Heat Gun.
17. Swag Tool. (See Figure 5-2)

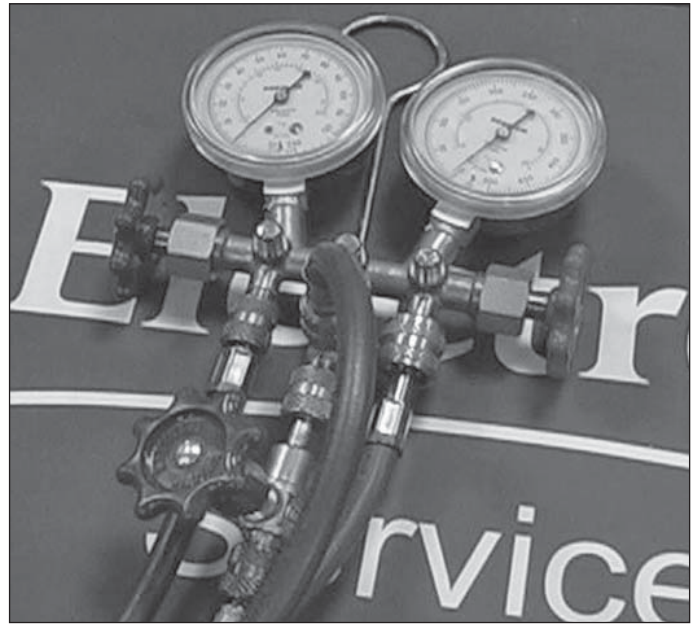


Figure 4-1.



Figure 4-2.

Section 4 Refrigeration

Low/High Side Leak or Undercharge

A loss of refrigerant can result in any of the following:

1. Excessive or continuous compressor operation.
2. Above normal freezer compartment temperature.
3. A partially frosted evaporator (depending on amount of refrigerant loss).
4. Below normal freezer compartment temperature.
5. Low suction pressure (vacuum).
6. Low wattage.

The condenser will be "warm to cool", depending on the amount of refrigerant lost.

In the case of a low side refrigerant leak resulting in complete loss of refrigerant, the compressor will run but will not refrigerate. Suction pressure will drop below atmospheric pressure and air and moisture will be drawn into the system, saturating the filter drier. A system with R-134a refrigerant and ester oil will become saturated with moisture much faster than a system with R-12 and mineral oil. Therefore, you must obtain a sample of the oil and check with an oil test kit to determine the amount of contamination. You will find that the oil in an R-134a system will have to be replaced after most low side leaks.

If there is reason to believe the system has operated for a considerable length of time with no refrigerant and the leak occurred in the low side of the system, excessive amounts of moisture may have entered the system. In such cases, the two stage service Dryer Filter part number 5303918288 and vacuum procedure listed under Refrigerant Leaks, need to be followed to prevent repetitive service.

If a slight undercharge of refrigerant is indicated and no leak can be found after a thorough leak test, the charge can be corrected without changing the compressor.

If a high side leak is located and some refrigerant remains in the system it is not necessary to change the compressor.

Precautions For Charging Sealed Systems

Overcharging a refrigeration system with refrigerant can be dangerous. If the overcharge is sufficient to immerse the major parts of the motor and compressor in liquid refrigerant, a situation has been created which, when followed by a sequence of circumstances, can lead to the compressor shell seam separating.

When a hydraulic block occurs, the compressor is prevented from starting. This condition is known as locked rotor. Electric current continues to flow through the compressor motor windings which become, in effect, electric resistance heaters. The heat produced begins to vaporize the excess refrigerant liquid, causing a rapid increase in system pressure. If the compressor protective devices fail, pressure within the system may rise to extremes far in excess of the design limits. Under these conditions, the weld seam around the compressor shell can separate with explosive force, spewing oil and refrigerant vapor, which could ignite.

To eliminate this exceedingly rare but potential hazard, never add refrigerant to a sealed system. If refrigerant is required, evacuate the existing charge and recharge with the correct measured amount of the refrigerant specified for the system.

Always make sure your equipment is in good condition and all manufacturer's instructions are followed to prevent the accidental rupture of a hose, connection fitting, or a tank which could cause a serious injury. Run equipment until system has reached 13 inches of vacuum. Shut system down and allow to set for two minutes, if pressure remains below (0) pounds per square inch, disconnect equipment and proceed. If pressure does not stay below (0) pounds per square inch, repeat above procedure until all refrigerant is removed and system remains in a vacuum.

Flushing The System With Nitrogen

It is recommended that system be flushed with dry Nitrogen. However, if refrigerant is used to flush the system you must look at the serial plate to see what type of refrigerant is used in the system. This is the only refrigerant that can be used to flush the system and it must be recovered.

CAUTION

Use extreme care when using Dry Nitrogen to flush systems. Pressure in nitrogen cylinder could be as high as 2000 psi. Nitrogen cylinder must be equipped with approved pressure regulator and pressure relief valve. Ensure that your hoses have adequate ratings for pressure involved and that all of your equipment is in good condition. The end of the flushing hose on this tank regulator must be equipped with a hand shut-off valve (Robinair No. 40380). Close hand shut-off valve and adjust nitrogen regulator to correct pressure before proceeding with flushing procedure.

1. Remove compressor and filter-drier. Connect process coupling to outlet tube of condenser.
2. Fasten cloth over other end of coil to prevent old oil from spraying over room.
3. Connect hand shut-off valve on flushing hose to process coupling.
4. Slowly open hand shut-off valve and allow nitrogen to flow through condenser until discharge is clear.

CAUTION

DO NOT exceed 300 Psi.

5. Disconnect cap tube from evaporator. Flush evaporator in same manner as condenser.

CAUTION

DO NOT exceed 150 Psi.

6. Flush cap tube. This is only possible if you have a proper service valve adapter.

CAUTION

DO NOT exceed 300 Psi.

7. Reassemble system.

WARNING

NEVER PRESSURIZE WITH OXYGEN. NEVER OPEN A HIGH PRESSURE TANK UNLESS IT IS EQUIPPED WITH A PRESSURE REGULATOR. NEVER PUT HIGH PRESSURE ON THE DOME OF THE COMPRESSOR - IT MIGHT EXPLODE. MAKE SURE GAUGE FITTINGS ARE IN GOOD CONDITION AND DO NOT LEAK.

If dry nitrogen or carbon dioxide is not available. Follow instructions 1 through 3, then use 4 and 5 listed below as an alternative method.

4. Connect gauges to charging hose fittings. Pull a vacuum on each side of the system.
5. Leave the vacuum on each side of the system for 24 hours. Any loss of vacuum is an indication of a leak.

Compressor Oil Contamination

Before installing new compressor, check for possible system contamination by obtaining an oil sample from the old compressor. On R-134a systems use an oil test kit to check for contamination. If oil has a burned odor or shows contamination (dark color), the system should be flushed to remove as much of the contamination as possible before installing a new compressor and filter-drier. If this contamination is allowed to remain in the system it will mix with the new oil causing it to become contaminated and damage the new compressor, or cause a restriction in the filter-drier or cap tube.

NOTE

NEVER install a new compressor without first checking for possible system contamination.

Section 4 Refrigeration

Recovering Refrigerant

Recovering refrigerant is the first step in preventive maintenance or repair of equipment. Simply put, recovery means transferring the systems' refrigerant into a refillable refrigerant cylinder.

The first step is to have on hand, clean, safe, refillable cylinders evacuated to 25 microns, and labeled for each different type of refrigerant you will be working with. Example; for repairing Electrolux Home Products Inc. built products you will need one cylinder for R-12, one for R-22, one for R-134a, and one for R-500 if you work on dehumidifiers.

Second step is you must have dedicated equipment for HFC (R-134a) refrigerant. Because of the difference in the oil and the refrigerant, you can not use the same equipment on HFC based refrigerants as you use on CFC based refrigerants.



CAUTION

Always make sure equipment is in good condition and all manufacture instructions are followed to prevent accidental rupture of a hose, connection fitting, or a tank, that could cause a serious injury. Always sit tank on a scale when transferring refrigerant into the tank. Always check the weight to see when tank is full, do not over fill the tank.

To recover the refrigerant:

1. Disconnect unit from source of power.
2. Attach an approved self tapping line tap valve to the process tube. Connect refrigerant recovery system to tap valve. Turn on recovery system, open the line tap valve, and allow refrigerant to flow into an approved tank. (See Figure 5-3)
3. Allow the recovery pump to run until the system has reached 13 inches of vacuum.
4. Shut system down and allow to set for two minutes. If pressure is below (0) pounds per square inch, disconnect equipment and proceed with repair.
5. If pressure does not stay bellow (0) pounds per square inch, repeat steps 3 and 4 until all refrigerant is removed and system remains in a vacuum.

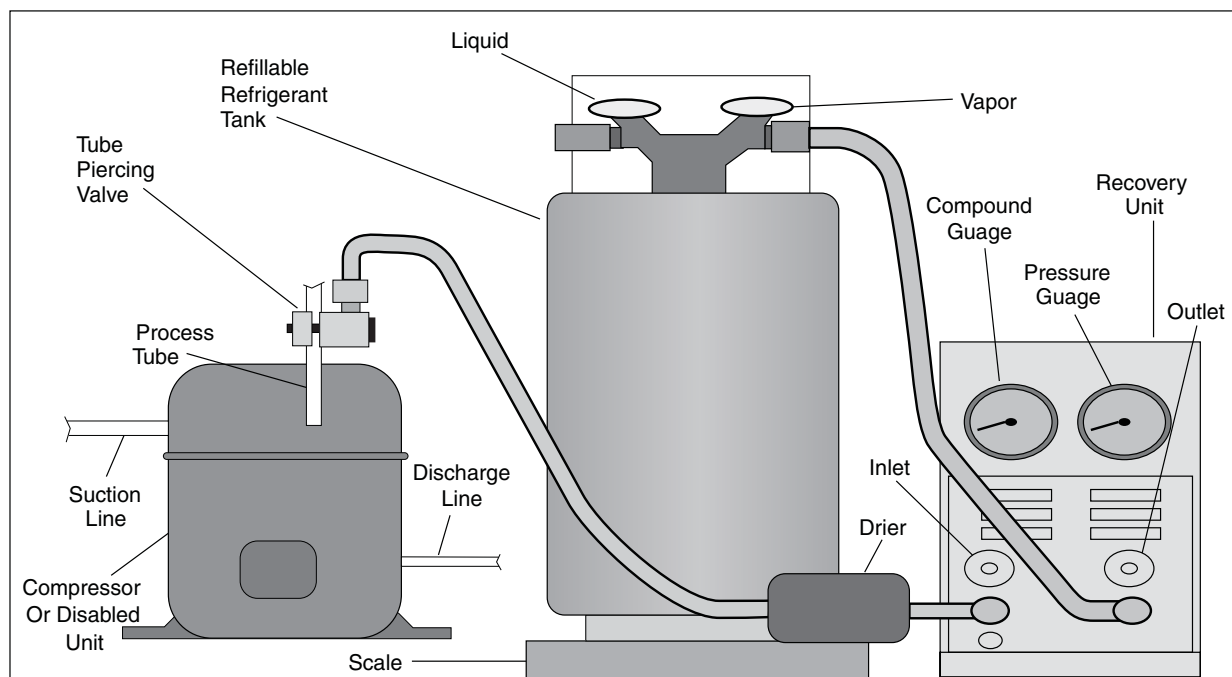


Figure 4-3. Installation of Recovery Equipment

Installing a New Compressor

NOTE

Entirely new compressors have been developed for use with R-134a and Ester oil refrigeration systems. Both compressor and electric motor have been modified. Old compressors intended for R-12 refrigerant must not be used for new systems charged with R-134a.

Replacement of compressor and installation of filter-drier must be done in a continuous sequence so the system is exposed to atmosphere no longer than necessary.

All replacement compressors are shipped with rubber plugs in the suction, discharge and process tubes, and contain the correct oil charge and a holding charge of inert gas. Compressors have a low-side process tube attached to the compressor shell. A high-side process tube is attached to the filter-drier.

Replacement compressors for some units may have an oil cooler even if the original compressor did not. If the product is not equipped for an oil cooler, leave the plastic caps in place and install the compressor, connecting only to the suction and discharge lines of the new compressor.

Before installing the replacement compressor, remove the discharge plug and check for the pop sound of the inert gas leaving the compressor.

CAUTION

DO NOT use compressor if you do not hear this sound.

If the compressor checks OK, reinstall the plug. Do not remove any of the plugs again until the compressor is in position and you are ready to braze the lines.

A new compressor which is cold (e.g. after having been kept in a cold service van) should be left to warm to the surrounding temperature before the plugs on the compressor connections are removed. This will help prevent condensation from forming in the oil and the compressor. Also, avoid opening the system when any of the components or lines are cold.

A process tube is connected onto the high-side process tube of the filter drier. This tube is located at the top of the filter-drier.

WARNING

DO NOT OPERATE RECIPROCATING COMPRESSORS WHEN CHARGING LIQUID REFRIGERANT INTO SYSTEM THROUGH ITS PROCESS TUBE.

To replace the compressor:

1. Pull unit from its installation position and unplug from wall outlet.
2. Extract the screws securing the compressor shield to the unit frame and remove from unit.
3. Attach an approved self tapping line tap valve to the process tube. Connect refrigerant recovery system to tap valve. Turn on recovery system, open the line tap valve, and allow refrigerant to flow into an approved tank.
4. Using a 7/16" socket, remove the (4) bolts, one in each corner, holding the compressor to the base.
5. Disconnect electrical leads from compressor.
6. After refrigerant is completely recovered, cut suction and discharge lines as close to compressor as possible. Leave only enough tubing to pinch off and seal defective compressor. Plug or tape any open system tubing to avoid entrance of moisture and air into system. Remove inoperable compressor and transfer mounting parts to new compressor.
7. Release holding charge (release slowly to avoid oil discharge) on new compressor to ensure there is no leak in seam or tubing. Reinstall rubber plug.
8. Install new compressor in exact same manner as original compressor.

NOTE

If low-side process tube is too short, silver solder four inch piece of tubing onto process tube at this time.

9. Reform both suction and discharge lines to align with new compressor. If they are too short, use additional lengths of tubing. Joints should overlap 0.5" to provide sufficient area for good solder joints. Clean and mark area where tubing should be cut. Cut tubing with tubing cutter. Work quickly to avoid letting moisture and air into system.

CAUTION

Compressor must NOT be left open to atmosphere for more than 10 minutes to prevent moisture contamination of oil.

Section 4 Refrigeration

10. Solder all connections according to soldering procedure.
11. Remove original filter-drier.

CAUTION

DO NOT unbrazed old filter-drier from system. This will vaporize and drive moisture from desiccant back into system. The old filter-drier should be cut out of system.

12. Install new filter-drier at condenser outlet.
13. Evacuate and charge system using recommended procedure described under Evacuating and Recharging.
14. Reconnect compressor terminal leads in accordance with unit wiring diagram.
15. Reassemble unit.

Condenser Replacement

1. Disconnect electrical supply to refrigerator/freezer.
2. Remove compressor access panel.
3. Recover refrigerant by using EPA approved recovery system.
4. Remove condenser fan mounting screws.
5. Unplug fan motor harness located in back of fan motor.
6. Remove fan motor and fan blade.
7. After refrigerant is completely recovered, disconnect inlet and discharge lines from condenser.
8. Lift front of condenser and pull out of retainers mounted to the drain pan.
9. Remove old condenser out the back of cabinet.
10. Install replacement condenser.
11. Remove original filter-drier.
12. Install new filter-drier at condenser outlet.

CAUTION

DO NOT unbrazed old filter-drier from system. This will vaporize and drive moisture from desiccant back into system. The old filter-drier should be cut out of system.

13. Evacuate and charge the system using recommended procedure described under Evacuating and Recharging.
14. Reassemble unit.

Filter-Drier Installation

Any time the sealed system is opened and the refrigerant charge is removed, the liquid line filter-drier must be replaced and the system thoroughly evacuated before replacing refrigerant.

CAUTION

DO NOT unbrazed old filter-drier from system. This will vaporize and drive moisture from desiccant back into system. The old filter-drier should be cut out of system.

1. Disconnect electrical supply to refrigerator/freezer.
2. Recover refrigerant by using EPA approved recovery system.
3. Using a 3 cornered file, score a groove around capillary tube as close to old filter-drier as possible. Break capillary tube along score mark from filter-drier.
4. Cut condenser outlet tube at filter-drier. Discard filter-drier.
5. Thoroughly clean condenser outlet tube and capillary tube.
6. Place inlet connection of filter-drier over condenser tube approximately 1/4" and solder.
7. Insert capillary tube input end into filter-drier outlet. Do not allow tube to bottom against screen. Solder carefully so that solder does not plug capillary tube.
8. Install process tube adapter to filter-drier.
9. Evacuate and charge system using the recommended procedure described under Evacuating and Recharging.
10. Reassemble unit.

Evaporator and Suction Line Replacement

1. Disconnect electrical supply to refrigerator/freezer.
2. Recover refrigerant by using EPA approved recovery system.
3. Remove shelving.
4. Remove evaporator cover.
5. Remove evaporator from its installation position.
6. Cut or remove suction line from compressor.

7. Cut filter-drier from condensing unit.
8. Remove sealant from cabinet where suction line enters.
9. Remove evaporator and suction line as one piece.
10. Install new evaporator with attached suction line.
11. Seal cabinet.
12. Install new filter drier at condenser outlet.
13. Evacuate and charge system using the recommended procedure described under Evacuating and Recharging.

CAUTION

DO NOT unbrazed old filter-drier from system. This will vaporize and drive moisture from desiccant back into system. The old filter-drier should be cut out of system.

Installing Evacuation and Recharging Equipment

1. Disconnect refrigerator/freezer from electrical supply.
2. If compressor was replaced, install correct sized process tube adapter on process tube.
If compressor was not replaced, cut process tube with tubing cutter leaving as much tube as possible and install correct size process tube adapter.
3. Install correct sized process tube adapter on high-side process tube.
4. Attach refrigeration service gauge manifold to system in following order: (See Figure 5-4)
 - Low-side (compound gauge) hose to suction side process tube adapter.
 - High-side (pressure gauge) hose to high-side process tube adapter.
 - Center port manifold hose before hand shut-off valve to charging cylinder.
 - Center port manifold hose after hand shut-off valve to vacuum pump.

WARNING

R-134A SYSTEMS ARE PARTICULARLY SUSCEPTIBLE TO MOISTURE CONTAMINATION WHICH CAN ONLY BE PREVENTED BY EVACUATING THE SYSTEM FOR A MINIMUM OF 30 MINUTES TO ATTAIN A MINIMUM 29.9 INCH (500 MICRON OR LOWER) VACUUM.

Evacuating System

To achieve the required levels of evacuation, a properly maintained two stage vacuum pump in good condition is required. It is absolutely essential to maintain your vacuum pump according to the manufacturer's instructions including required oil changes at the recommended intervals. Vacuum pump oil should always be changed after evacuating a contaminated system.

Vacuum pump performance should be checked periodically with a micron gauge.

1. Make certain that charging cylinder valve, hand shut-off valve, and manifold gauge valves are all closed.
2. Start vacuum pump.
3. Open hand shut-off valve and slowly open both manifold valves, turning counterclockwise, for two full rotations.

CAUTION

If high vacuum equipment is used, just crack both manifold valves for a few minutes and then open slowly for the two full turns counterclockwise. This will prevent the compressor oil from foaming and being drawn into vacuum pump.

4. Operate vacuum pump for a minimum of 30 minutes to a minimum of 29.9" (500 micron) vacuum.
5. Close hand shut-off valve to vacuum pump. Watch compound gauge for several minutes. If reading rises, there is a leak in the system, go to step 6. If no leak is indicated, stop vacuum pump. System is now ready for charging.
6. If a leak is indicated, stop vacuum pump and introduce a small charge of refrigerant into system by cracking valve on bottom of charging cylinder until system is pressurized to 40 or 50 lbs psi.
7. Leak test low-side. Close compound gauge. Run compressor for a few minutes and leak test high-side. When leak is found, recapture refrigerant using EPA approved recovery system. Repair and go back to step 1.

Section 4 Refrigeration

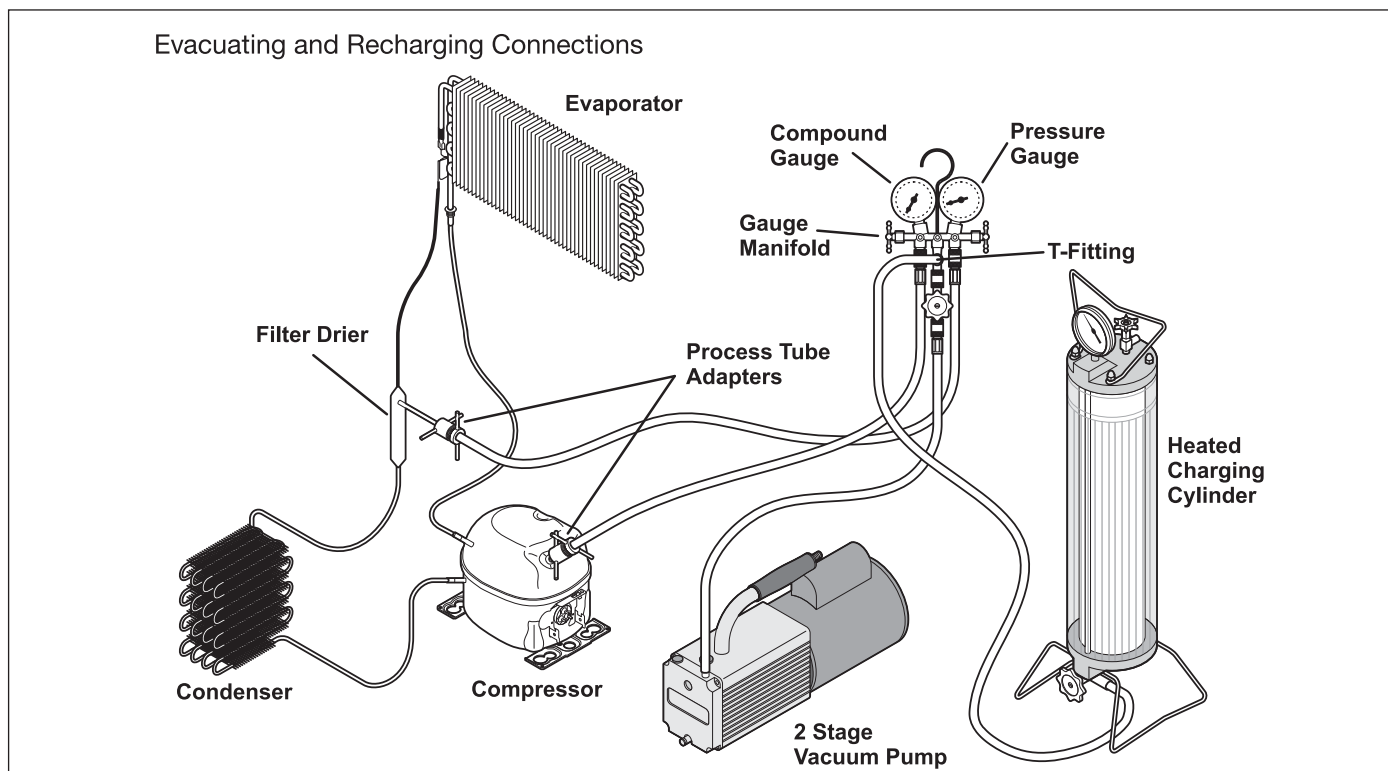


Figure 4-4. Installation of Recovery Equipment

Charging The System

⚠ CAUTION

Check the serial plate for the correct refrigerant type. It is extremely important to verify the type of refrigerant in the system before starting any sealed system repairs. After charging the system with liquid be certain to wait at least 5 minutes before starting the compressor to give the refrigerant a chance to disperse throughout the system. Otherwise the compressor could be damaged by attempting to pump excessive quantities of liquid.

Preparing The Charging Cylinder:

1. Make certain that hand shut-off valve to vacuum pump is closed.
2. Close high-side manifold gauge valve.
3. Set charging cylinder scale to pressure indicated on cylinder pressure gauge.
4. Observe refrigerant level in sight glass. Subtract amount to be charged into system and note shut off point.
5. Open charging cylinder valve slowly and allow proper charge to enter system.

6. As soon as refrigerant in sight glass has gone down to predetermined level, close charging cylinder valve.

⚠ WARNING

DISCONNECT THE CHARGING CYLINDER HEATER AT THIS TIME TO PREVENT THE CYLINDER PRESSURE FROM EXCEEDING ITS MAXIMUM LIMITS.

7. Allow system to sit for five minutes.
8. Turn on refrigerator compressor. Run compressor for a few minutes and monitor system pressures.
9. When satisfied that the unit is operating correctly, clamp the high-side process tube with the pinch-off tool while the unit is still running.

Final Leak Test

1. With the refrigerator turned OFF leak test all low-side system components.
2. Turn the unit ON and run until the condenser is warm. Leak test the high-side system components.

Dedicated Equipment

R-134a must not be mixed with other types of refrigerants. R-134a must be recovered in dedicated and properly identified recovery bags and tanks.

It will be necessary to check with the manufacturer of your recovery equipment to determine R-134a compatibility. Some recovery equipment manufacturers have changeover instructions for switching between refrigerant types. Protect yourself and your equipment by following all manufacturer guidelines.

Also, ensure that your refrigeration hoses are specified for use with R-134a refrigerant. Research has shown that compounds in standard refrigeration hoses may enter sealed systems and ultimately restrict the cap tube in an R-134a system.

For example, hoses that were used for a refrigeration system operating on R-12 may contain small quantities of mineral oil which can block the capillary tube in a system operating on R-134a. As little as one milligram may be sufficient to cause a blockage. In addition, sealed system components that have been used with CFC systems must not be used with R-134a systems. These components may contain residual amounts of refrigerant and oil which could damage an R-134a system.

At the earliest stage of development work on R-134a, tests were carried out on a different type of synthetic oil known as Poly-Alkaline Glycol (PAG). This oil is also used in certain air conditioning systems for cars. PAG and Ester oil DO NOT mix with one another. Service equipment used for R-134a / Ester oil must not come into contact with PAG.

Vacuum Pump Maintenance

It is absolutely essential to maintain your vacuum pump according to the manufacturer's instructions, including required oil changes at the recommended intervals. Vacuum pump oil should always be changed after evacuating a contaminated system. Vacuum pump performance should be checked periodically with a micron gauge.

Vacuum pump suppliers may or may not recommend changing the vacuum pump oil to the same type that's in the system being evacuated. Some manufacturers may recommend a vacuum pump that's dedicated to R-134a systems.

Robinair has stated that their current and discontinued vacuum pump models, using mineral oil currently specified for use in their vacuum pumps, can be used to evacuate R-134a/Ester oil systems. Robinair also states that it is acceptable to alternate between evacuating R-12/mineral oil and R-134a/Ester oil systems without adversely affecting the vacuum pump's performance.

For other brands of vacuum pumps, check with the manufacturer for restrictions and guidelines when using with R-134a.



CAUTION

Check the serial plate for the correct refrigerant type. It is extremely important to verify the type of refrigerant in the system before starting any sealed system repairs.

With the possible exception of the vacuum pump, all service equipment that comes in contact with R-134a during evacuation and recharging must be dedicated. Accordingly, R-134a will require a dedicated charging cylinder, manifold gauge set, process tube adapters, and hoses. Any residual mineral oil on other tools (tubing cutter, etc.) must be thoroughly cleaned off before using on R-134a/ Ester oil systems. It will be necessary to check with the manufacturer of your vacuum pump for refrigerant and oil compatibility issues.

If you use a vacuum pump with mineral oil to evacuate an R-134a system, it is ABSOLUTELY ESSENTIAL to have a shut-off valve between the pump and your manifold gauge set as shown on page 5-12. The hand valve must be closed during all times when the vacuum pump is not operating. This will prevent the migration of mineral oil vapor into the R134a/Ester oil system. If the vacuum pump should stop during evacuation for any reason, the hand pump shut-off valve must be closed immediately.

Insure that your refrigeration hoses are specified for use with R-134a refrigerant. Research has shown that compounds in standard refrigeration hoses may enter sealed systems and ultimately restrict the cap tube in an R-134a system.

Section 4 Refrigeration

| VACUUM CHART | | |
|-------------------|---------|---------------------------|
| Vacuum Inches Hg. | Microns | Boiling Point of Water °F |
| 28.940 | 25000 | 77.9 |
| 29.530 | 10000 | 52.0 |
| 29.832 | 4600 | 32.0 |
| 29.882 | 1000 | 1.0 |
| 29.901 | 500 | -11.2 |
| 29.915 | 150 | -32.8 |
| 29.917 | 100 | -38.2 |
| 29.919 | 50 | -49.0 |

To achieve the required 29.9 inch (500 micron) vacuum, a properly maintained two-stage vacuum pump in good condition is required. A two stage pump can reach a deeper vacuum than a single stage because the exhaust from the first pumping stage is discharged into the second pumping stage. This means the second stage begins pumping at a lower pressure so a lower ultimate vacuum can be achieved.

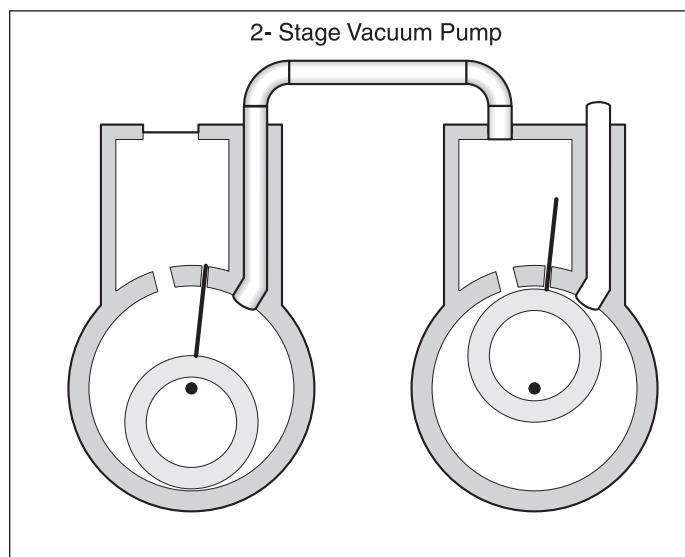


Figure 4-5. Two Stage Vacuum Pump

Spills or Leaks

If a large release of vapor occurs, such as from a large spill or leak, the vapors may concentrate near the floor or low spots and displace the oxygen available for breathing, causing suffocation.

Evacuate everyone until the area has been ventilated. Use blowers or fans to circulate the air at floor level. DO NOT re-enter the affected area unless you are equipped with a self-contained breathing apparatus or unless an area monitor indicates that the concentration of HFC-134a vapors in the area is below the AEL.

Always use self-contained breathing apparatus or an air-line mask when entering tanks or other areas where vapors might exist. Use the buddy system and a lifeline. Refer to the Material Safety Data Sheet (MSDS) for HFC-134a information.

HFC-134a vapors have a slightly sweet odor that can be difficult to detect. Therefore, frequent leak checks and the installation of permanent area monitors may be necessary in enclosed spaces. Refer to ASHRAE Standards 15 and 34 for refrigeration machinery rooms.

To ensure safety when working with HFC-134a in enclosed areas:

1. Route relief and purge vent piping (if present) outdoors, away from air intakes.
2. Make certain area is well ventilated, using auxiliary ventilation if needed to move vapors.
3. Make sure area is clear of vapors prior to beginning work.
4. Install air monitoring equipment to detect leaks.

HFC-134a, CFC-12 Pressure Temperature Chart

| °F | °C | HFC-134a | CFC-12 | | °F | °C | HFC-134a | CFC-12 |
|-----|-------|----------|--------|--|-----|------|----------|--------|
| -60 | -51.1 | 21.8* | 19.0* | | 55 | 12.8 | 51.1 | 52.0 |
| -55 | -48.3 | 20.4* | 17.3* | | 60 | 15.6 | 57.3 | 57.7 |
| -50 | -45.6 | 18.7* | 15.4* | | 65 | 18.3 | 63.9 | 63.8 |
| -45 | -42.8 | 16.9* | 13.3* | | 70 | 21.1 | 70.9 | 70.2 |
| -40 | -40.0 | 14.8* | 11.0* | | 75 | 23.9 | 78.4 | 77.0 |
| -35 | -37.2 | 12.5* | 8.4* | | 80 | 26.7 | 86.4 | 84.2 |
| -30 | -34.4 | 9.8* | 5.5* | | 85 | 29.4 | 94.9 | 91.8 |
| -25 | -31.7 | 6.9* | 2.3* | | 90 | 32.2 | 103.9 | 99.8 |
| -20 | -28.9 | 3.7* | 0.6 | | 95 | 35.0 | 113.5 | 108.3 |
| -15 | -26.1 | 0.0 | 2.4 | | 100 | 37.8 | 123.6 | 117.2 |
| -10 | -23.3 | 1.9 | 4.5 | | 105 | 40.6 | 134.3 | 126.6 |
| -5 | -20.6 | 4.1 | 6.7 | | 110 | 43.3 | 145.6 | 136.4 |
| 0 | -17.8 | 6.5 | 9.2 | | 115 | 46.1 | 157.6 | 146.8 |
| 5 | -15.0 | 9.1 | 11.8 | | 120 | 48.9 | 170.3 | 157.7 |
| 10 | -12.2 | 12.0 | 14.6 | | 125 | 51.7 | 183.6 | 169.1 |
| 15 | -9.4 | 15.0 | 17.7 | | 130 | 54.4 | 197.6 | 181.0 |
| 20 | -6.7 | 18.4 | 21.0 | | 135 | 57.2 | 212.4 | 193.5 |
| 25 | -3.9 | 22.1 | 24.6 | | 140 | 60.0 | 227.9 | 206.6 |
| 30 | -1.1 | 26.1 | 28.5 | | 145 | 62.8 | 244.3 | 220.3 |
| 35 | 1.7 | 30.4 | 32.6 | | 150 | 65.6 | 261.4 | 234.6 |
| 40 | 4.4 | 35.0 | 37.0 | | 155 | 68.3 | 279.5 | 249.5 |
| 45 | 7.2 | 40.0 | 41.7 | | 160 | 71.1 | 298.4 | 265.1 |
| 50 | 10.0 | 45.3 | 46.7 | | 165 | 73.9 | 318.3 | 281.4 |

Section 4 Refrigeration

HFC 134a COMPARISON WITH CFC 12

HFC-134a (1,1,1,2-tetrafluoroethane) is being studied as part of the PAFT I programme sector, which began in December 1987. It is a prime candidate for the replacement of CFC-12 (dichlorodifluoromethane) in refrigeration and air conditioning systems, medical aerosols, and in certain foam blowing applications. HFC-134a is similar to CFC-12 in that it has a low chemical reactivity and a high degree of stability. Both chemicals are gases.

Inhalation Toxicity

(Short-term exposures to high concentrations, such as accidental leakages)

Both HFC-134a and CFC-12, are very low in toxicity by the inhalation route. The 4-hour LC₅₀ for HFC-134a is greater than 500,000 ppm, and for CFC 12 it is 760,000 ppm. As with other halogenated hydrocarbons, CFC-12 and HFC-134a can, at high dose levels, sensitize the heart to adrenaline. For CFC-12, the threshold level for cardiac sensitization is 50,000 ppm, while for HFC-134a it is 75,000 ppm.

HFC-134a poses no acute or chronic hazard when it is handled in accordance with DuPont recommendations and when exposures are maintained at or below the DuPont Acceptable Exposure Limit (AEL) of 1,000 ppm (8 and 12 hour Time-Weighted Average or TWA).

An AEL is an airborne exposure limit established by DuPont scientists that specifies time-weighted average (TWA) airborne concentrations to which nearly all workers may be repeatedly exposed without adverse effects. The AEL for HFC-134a has the same value as the Threshold Limit Values (TLVs) established for CFC-12 and HCFC-22. TLVs are established by the American Conference of Governmental and Industrial Hygienists (ACGIH).

However, inhaling high concentrations of HFC-134a vapor may cause temporary central nervous system depression with narcosis, lethargy and anesthetic effects. Other effects that may occur include dizziness, a feeling of intoxication and a loss of coordination. Continued breathing of high concentrations of HFC-134a vapors may produce cardiac irregularities (cardiac sensitization), unconsciousness, and with gross overexposure, death. Intentional misuse or deliberate inhalation of HFC-134a may cause death without warning. This practice is extremely dangerous.

If you experience any of the initial symptoms, move to fresh air and seek medical attention.

Cardiac Sensitization

If vapors are inhaled at a concentration of 75,000 ppm, which is well above the AEL, the heart may become sensitized to adrenaline, leading to cardiac irregularities and, possibly, to cardiac arrest. The likelihood of these cardiac problems increases if you are under physical or emotional stress.

Medical attention must be given immediately if exposed to high concentrations of HFC-134a. DO NOT treat with adrenaline (epinephrine) or similar drugs. These drugs may increase the risk of cardiac arrhythmia and cardiac arrest. If the person is having difficulty breathing, administer oxygen. If breathing has stopped, give artificial respiration.

Skin and Eye Contact

At room temperature, HFC-134a vapors have little or no effect on the skin or eyes. However, in liquid form, HFC-134a can freeze skin or eyes on contact, causing frostbite. Following contact, soak the exposed area in lukewarm water, not cold or hot. If medical treatment cannot begin immediately, apply a light coat of a nonmedicated ointment, such as petroleum jelly. If the exposed area is in a location where the presence of the ointment would be awkward, such as on the eye, apply a light bandage. In all cases of frostbite, seek medical attention as soon as

possible. Always wear protective clothing when there is a risk of exposure to liquid HFC-134a. Where splashing is possible, always wear eye protection and a face shield.

Combustibility of HFC-134a

HFC-134a is nonflammable at ambient temperatures and atmospheric pressure. However, tests have shown HFC-134a to be combustible at pressures as low as 5.5 psi (139.3 kPa absolute) at 177°C (350°F) when mixed with air at concentrations generally greater than 60% volume air. At lower temperatures, higher pressures are required for combustibility. (HCFC-22 is also combustible at pressures above atmospheric in the presence of high air concentrations). Test results and calculations have shown:

- At ambient temperature, all concentrations of HFC-134a in air are nonflammable at pressures below 15 psi (205 kPa absolute).
- Combustible mixtures of air and HFC-134a will not form when liquid HFC-134a is pumped into closed vessel if initial air pressure in vessel is limited to one atmosphere absolute and final pressure is limited to 300 psi (2,170 kPa absolute). If initial air pressure is greater than one atmosphere, combustible mixtures may form as tank is filled.

Based on above information, the following operating practices are recommended:

Bulk Delivery and Storage

- Tanks should normally be evacuated at start of filling, and should never be filled while under positive air pressure.
- Tank pressure should never be allowed to exceed 300 psi (2,170 kPa) when filling with HFC-134a. Relief devices on either tanks or HFC-134a supply system usually prevent this.
- Tank pressures should be monitored routinely.
- Air lines should never be connected to storage tanks.

Filling and Charging Operations

- Before evacuating cylinders or refrigeration equipment, any remaining refrigerant should be removed by recovery system.
- Vacuum pump discharge lines should be free of restrictions that could increase discharge pressures above 15 psi (205 kPa) and result in formation of combustible mixtures.
- Cylinders or refrigeration equipment should normally be evacuated at start of filling, and should never be filled while under positive air pressure.
- Final pressures should not exceed 300 psi (2,170 kPa).
- Filled cylinders should periodically be analyzed for air (nonabsorbable gas or NAG).

Refrigerant Recovery Systems

Efficient recovery of refrigerant from equipment or containers requires evacuation at the end of the recovery cycle. Suction lines to a recovery compressor should be periodically checked for leaks to prevent compressing air into the recovery cylinder during evacuation. In addition, the recovery cylinder pressure should be monitored, and evacuation stopped in the event of a rapid pressure rise indicating the presence of noncondensable air. The recovery cylinder contents should then be analyzed for NAG, and the recovery system leak checked if air is present. **DO NOT** continue to evacuate a refrigeration system that has a major leak.

Thermal Decomposition

HFC-134a vapors will decompose when exposed to high temperatures from flames or electric resistance heaters. Decomposition may produce toxic and irritating compounds, such as hydrogen fluoride. The pungent odors released will irritate the nose and throat and generally force people to evacuate the area. Therefore, it is important to prevent decomposition by avoiding exposure to high temperatures.

Section 4 Refrigeration

R-134a Physical Properties:

R-134a - Tetrafluoroethane

Refrigerant of choice in automotive industry. Genetron134a replaces CFC12 for air conditioning and refrigeration systems in commercial residential and industrial applications.

R-12 - Dichlorodifluoromethane

A versatile and widely used refrigerant. Common in reciprocating and rotary type equipment. For all types of applications, household to industrial. Also employed in some centrifugal designs and in several special applications.

| | |
|---|-----------------------------------|
| Chemical formula | CF ₃ CH ₂ F |
| Molecular weight..... | 102.03 |
| Boiling point at 1 atm..... | -15.1°F (-26.2°C) |
| Critical temperature..... | 214.0°F (101.1°C) |
| Critical pressure, psia. | 589.9 |
| Critical density. lb./cu. ft. | 31.97 |
| Liquid density at 80°F (26.7°C). lb./cu. ft..... | 75.0 |
| Heat of vaporization at boiling point, Btu/lb.°F..... | 92.4 |
| Specific heat of liquid at 80°F (26.7°C). Btu/lb.°F..... | 0.341 |
| Specific heat of vapor at constant pressure (1 atm.) and 80°F (26.7°C), (Btu/lb.°F)..... | 0.204 |
| *Flammable range, %volume in air. | None |
| Ozone depletion potential | 0 |
| Greenhouse warming potential (estimate)..... | 0.285 |

* Flame limits measured using ASTM E681 with electrically activated kitchen match ignition source per ASHRAE Standard 34.

Comparative Cycle Performance:

Evaporator temperature = 20°F

Condenser temperature = 110°F

Suction superheat = 30°F

sub-cooling = 10°F

Compressor isentropic efficiency = 65%

| | Refrigerant | | |
|---|-------------|-------|-------|
| | 12 | 22 | 134a |
| Evaporator pressure, psi..... | 21.0 | 43.0 | 18.5 |
| Condenser pressure, psi | 136.4 | 226.3 | 146.4 |
| Compression ratio | 4.23 | 4.17 | 4.86 |
| Compressor discharge temperature, °F..... | 188.1 | 227.0 | 178.3 |
| Coefficient of performance..... | 2.90 | 2.79 | 2.83 |
| Refrigerant circulation per ton, lb./min..... | 3.80 | 2.78 | 3.00 |
| Compressor displacement per ton, cfm..... | 4.51 | 2.82 | 4.55 |
| Liquid flow per ton, cu. in. /min. | 83.2 | 67.4 | 71.7 |
| Latent heat at evaporator temp., Btu/lb | 66.5 | 90.6 | 86.9 |
| Net refrigeration effect. Btu/lb | 52.7 | 72.0 | 66.7 |

CFCs

Chlorofluorocarbons (CFCs) are compounds consisting of chlorine, fluorine, and carbon atoms which are very stable in the troposphere. They are degraded only in the stratosphere by the sun's radiation where released chlorine may contribute to ozone depletion. They can persist in the troposphere for a hundred years or longer.

Fluorocarbons

These chemical compounds include CFCs, hydrochlorofluorocarbons (HCFCs), and hydrofluorocarbons (HFCs). For many years, CFCs have served vital functions in society. They are used in a variety of applications including refrigeration, air conditioning, energy efficient insulation, medical products, and cleaning of electronic and precision engineering components. HCFCs and HFCs retain many of the desirable properties of CFCs but because they exist for a shorter time in the atmosphere, ozone depletion and global warming concerns are significantly reduced.

Global Warming

Global warming, which is an increase in the natural greenhouse effect, refers to the physical phenomenon that may lead to heating of the earth. Most of the sun's energy reaches the earth as visible light. After passing through the atmosphere, part of this energy is absorbed by the earth's surface and in the process is converted into heat energy. The earth, now warmed by the sun, radiates heat energy back into the atmosphere toward space.

Naturally occurring gases, such as carbon dioxide, water vapor, and ozone, absorb and thus retain some of the outgoing heat energy. This process slows the heat loss, making the earth's surface warmer than it would be if this heat energy had passed unobstructed through the atmosphere into space. The warmer earth's surface, in turn, radiates more heat until a balance is established between incoming and outgoing energy. This warming process, caused by the atmosphere's absorption of the heat energy radiated from the earth's surface, is called the greenhouse effect.

Increasing concentrations of gases from man-made sources (e.g., carbon dioxide, methane, and CFCs) that absorb the heat radiation could lead to a slow warming of the earth. This phenomenon is commonly referred to as global warming.

Global Warming Potential (GWP)

An index developed to provide a simplified means of describing the relative ability of each greenhouse gas emission to affect radiative forcing and thereby the global climate. GWPs are defined on a mass basis, relative to either CFC-11 (the Halocarbon GWP or HGWp) or carbon dioxide. Because CFC-11 has a finite lifetime in the atmosphere, the HGWp can be calculated explicitly and is a single number. Because carbon dioxide does not have a finite lifetime in the atmosphere, GWPs relative to it have to be calculated up to a particular time horizon, for example, 20, 100, or 500 years.

Greenhouse Gases

Gases present in relatively small quantities in the atmosphere that strongly absorb infrared radiation or "heat" emitted by the earth. The primary greenhouse gases are water vapor, carbon dioxide, methane, nitrous oxide, ozone, and some of the chlorofluorocarbons. Concentrations of several greenhouse gases are increasing, primarily as a result of human activities.

Section 4 Refrigeration

HCFCs

Hydrochlorofluorocarbons (HCFCs) are compounds comprised of hydrogen, chlorine, fluorine, and carbon atoms. These compounds have many of the useful properties of CFCs, but are destroyed naturally in the lower atmosphere and do not persist to the same extent as CFCs. Only a fraction of HCFCs emitted can be transported to the ozone layer in the stratosphere where their chlorine could deplete ozone. HCFCs typically have an ozone depletion potential 2 to 10 percent that of CFCs.

HFCs

Hydrofluorocarbons (HFCs) are compounds consisting of hydrogen, fluorine, and carbon atoms which, like the HCFCs, are destroyed naturally in the lower atmosphere. They have many of the useful properties of the CFCs. Because they do not contain chlorine, they are not involved in ozone depletion.

NOT-IN-KIND (NIK) Technologies

Technologies that do not rely on the use of fluorocarbons.

Ozone

Ozone, formed in the stratosphere by the action of sunlight on oxygen, is also an airborne pollutant near ground level. Low altitude (tropospheric) ozone is formed by reactions between hydrocarbons and oxides of nitrogen in sunlight.

Ozone Depletion

Ozone is continually being formed and destroyed by chemical reactions occurring in the stratosphere. There are large natural changes in ozone concentration in the stratosphere; for example, between summer and winter there is a change of about 25 percent at mid-latitudes. Ozone depletion occurs if the rate of ozone destruction is increased due to human activities.

Notes

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Component Teardown

This section explains how to access and remove components from an All Refrigerator Pro and/or an All Freezer Pro unit, and has been arranged in such a way as to simulate which components would need to be removed first in order to gain access to other components. When following a component removal procedure, it may be necessary to reference another component removal procedure listed earlier in this section.

IMPORTANT

Before continuing, please take note of the **WARNINGS** and **CAUTIONS** below.

WARNING

- If it is necessary to remove an All Refrigerator Pro and/or an All Freezer Pro unit from its installation, use proper lifting techniques as units are heavy and could fall resulting in serious injury or death. Pulling a unit from its installation should only be performed by a trained authorized service technician or installer.
- To avoid electric shock, power to an All Refrigerator Pro and/or an All Freezer Pro unit must be disconnected whenever accessing/ removing components powered by electricity or components near other electrical components.
- After service is completed, be sure all safety-grounding circuits are complete, all electrical connections are secure, and all access panels are in place.
- If unit was used prior to service, the compressor assembly will be hot. Wear protective gloves and the appropriate safety gear when working with compressors.
- If removing a door from a unit, remember that the doors are heavy. If a door were to fall, it could cause serious personal injury.

CAUTION

- Metal edges may be sharp. Use caution and wear appropriate safety equipment when servicing evaporators and condensers to avoid personal injury.
- If working in the compressor area, remember that compressor and tubing may be hot.

Exterior Components

Door Handle Removal

The door handle is secured with set screws to the handle mounting shoulder screws that are fastened into the front of the door assembly.

To remove the handle, use a 3/32" allen wrench and extract the setscrew located in each handle standoff. Pull handle assembly from door assembly.

(See Figure 5-1)

Use a 5/32" allen wrench to extract the screw located inside the handle standoff, that secures the handle standoff to the handle.

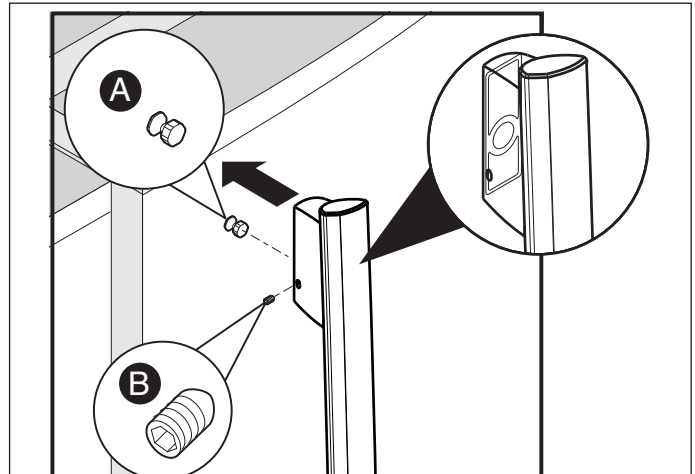


Figure 5-1. Handle Removal

Kickplate Removal

The kickplate is secured with two screws to the lower front of the unit.

To remove the kickplate, extract the screw from each end of the kickplate with a phillips head screwdriver.

(See Figure 5-2)

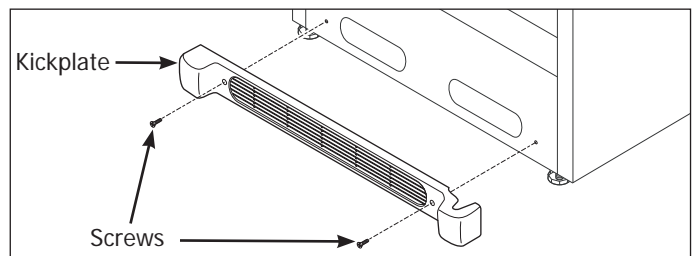


Figure 5-2. Kickplate Removal

Door Hinge and Door Assembly Removal

The door assembly is secured to the unit frame by an upper and lower hinge assembly.

To remove the door assembly:

1. Gently lay freezer on its back on a soft clean surface.
2. Lift plastic cover off upper hinge assembly.
(See Figure 5-3)
3. Using a 3/8" socket or wrench, extract the two bolts securing the upper hinge to the unit frame.
4. Remove kickplate.
5. Using a 3/8" socket or wrench, extract the two bolts securing the lower hinge to the unit frame. Use a phillips head screwdriver to extract the remaining screw from the lower hinge assembly.
7. Lift the door assembly off of the unit frame.

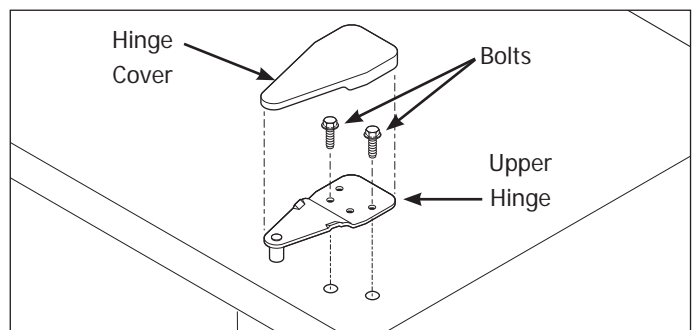


Figure 5-3. Upper Hinge Removal

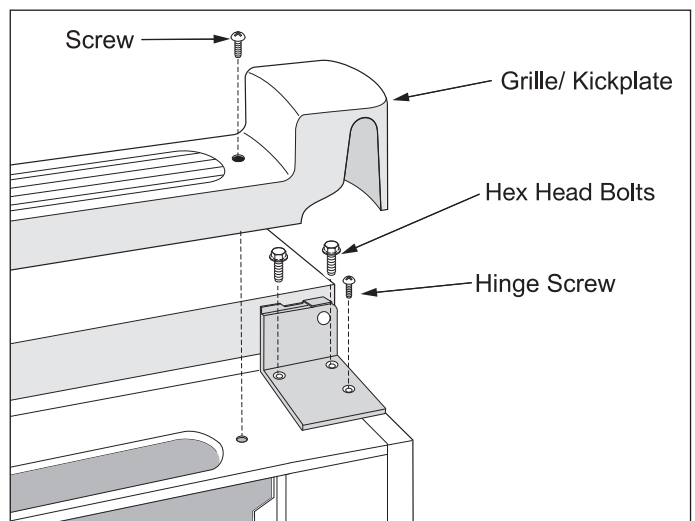


Figure 5-4. Lower Hinge Removal

Door Stop Assembly Removal

The door stop is secured to with two screws the underside of the door assembly.

To remove the door stop:

1. Remove door from unit.
2. Extract the two screws securing the door stop to the bottom of the door assembly. (See Figure 5-5)

Door Gasket and Inner Panel Removal

The inner panel of the door assembly is secured with screws that pass through the inner panel and fasten into the door assembly. The door gasket has an inner lip that is pressed between the inner panel and the door assembly and is secured in position when the inner panel screws are fastened to the door assembly. The inner panel does not have to be completely removed to extract the door gasket from the door assembly.

To remove the door gasket:

1. Lift the inside edge of the door gasket to access the inner panel screws.
2. Loosen the inner panel screws until the door gasket can be pulled out from under the inner panel. (See Figure 5-6)
3. Continue loosening screws around door assembly until door gasket is free.
4. To remove the inner panel, extract all screws from the outside edge of the inner panel and remove from unit.
5. The secondary gasket is secured with two retaining clips that snap into the inner door panel. Pry out the two retaining clips with a small putty knife, using caution not to damage the inner door panel. The secondary gasket is now free.

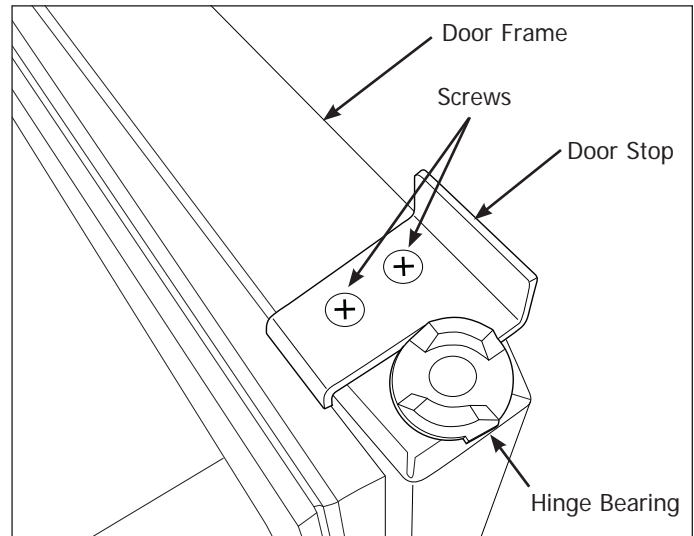


Figure 5-5. Door Stop Removal

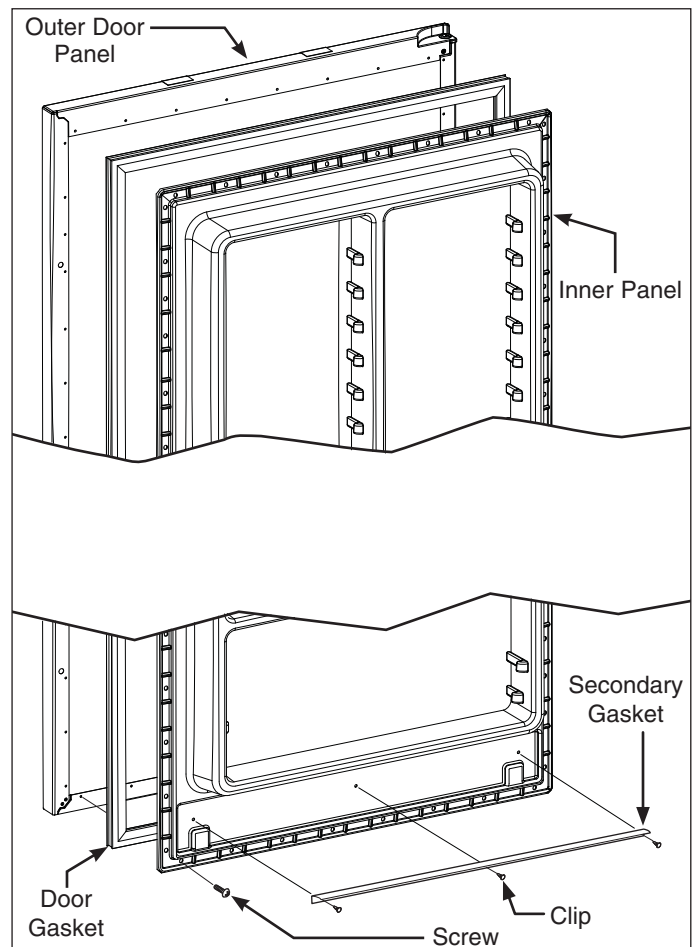


Figure 5-6. Inner Panel and Door Gasket Removal

Door Storage Components

Adjustable Door Bins Removal

There are four two liter door bins that can be arranged as needed by the user.

To remove a two liter door bin, lift the bin straight up until it is free of the supports molded into the door liner, then pull from unit. (See Figure 5-7)

Dairy Door Removal

The dairy door has a hole on each side that fits over molded pins in the door liner.

To remove the dairy door:

1. Open dairy door.
2. Grab the dairy door on each side and flex the outer edge inwards until the door is free of the pins in the door liner, then pull from door. (See Figure 5-8)

Gallon Door Bin Removal

The gallon door bin has slots on each end that fit over molded slots in the door liner.

To remove the gallon door bin, bend the inside lip of the gallon door bin away from the supports molded into the door liner while pulling out of the door. (See Figure 5-9)

Door Switch Removal

The door switch is mounted inside a hole in the cabinet base along the lower left hand side. (See Figure 5-10)

To remove the door switch:

1. Disconnect unit from power supply.
2. Remove kickplate.
3. Reach into the access hole next to the door switch and disconnect the electrical leads from the door switch terminals.
4. Press in on the retaining latch on the switch body and push switch through hole in cabinet base.

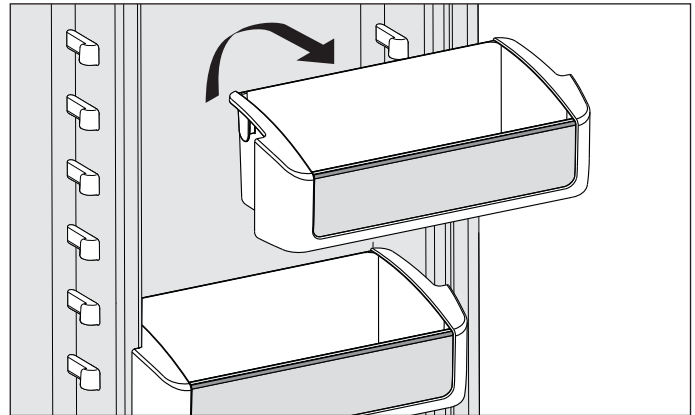


Figure 5-7. Adjustable Door Bin Removal

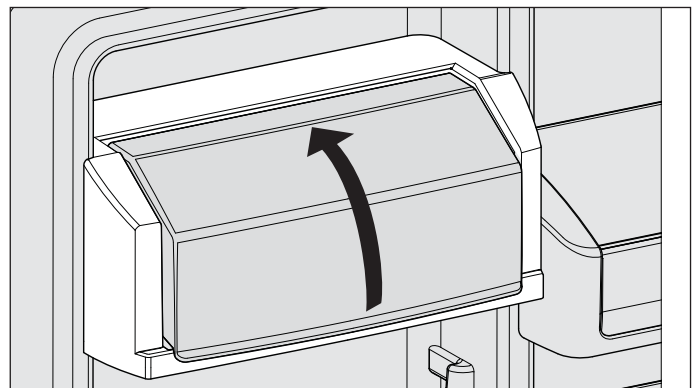


Figure 5-8. Dairy Door Removal

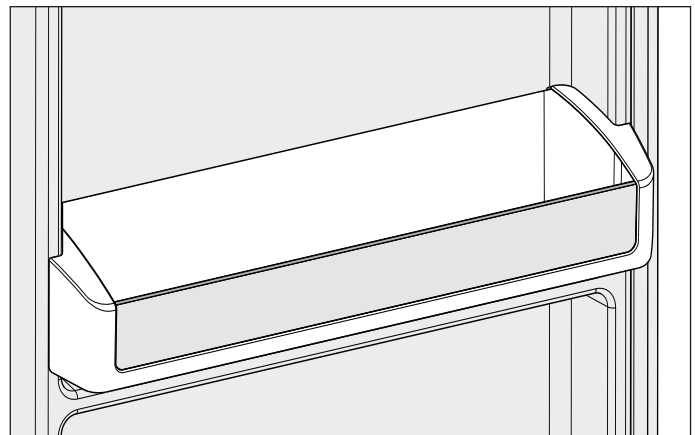


Figure 5-9. Gallon Door Bin Removal

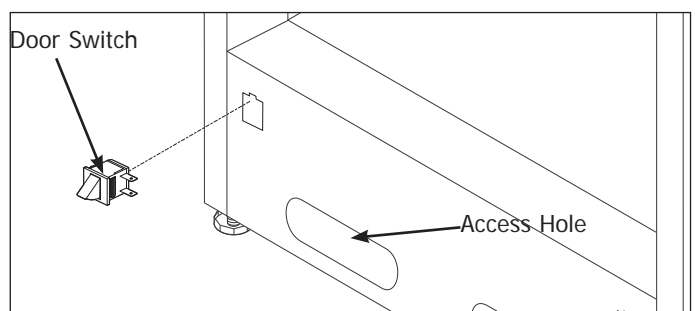


Figure 5-10. Door Switch Removal

Interior Components

Adjustable Interior Shelving Removal

The glass shelves can be moved to any position for larger or smaller packages. The shelves are supported at the back of the refrigerator. (See Figure 5-11) Replace the shelf by inserting the hooks at rear of the shelf into the wall bracket. Lower the shelf into the desired slots and lock into position.

To remove the shelf assemblies:

1. Lift front edge up.
2. Pull shelf out.

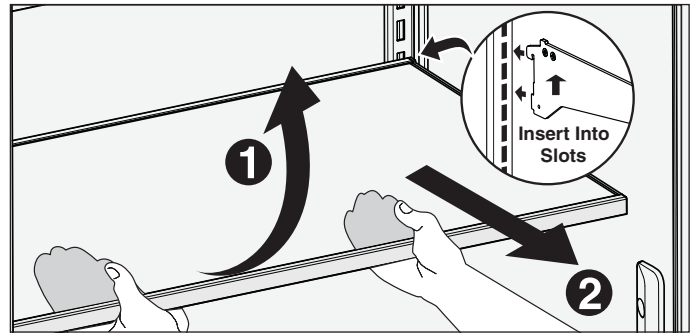


Figure 5-11. Interior Glass Shelving Removal

Crisper Assembly Removal

The crisper drawers can be lifted off of the supports and then pulled from the refrigerated compartment. The drawer may then be removed from the drawer slides. (See Figure 5-12)

To remove the crisper drawers:

1. Remove the lowest adjustable interior shelf.
2. Remove the glass from the drawer to be removed from the unit.
3. Lift up on the front of the drawer assembly and lift upwards until the bracket releases from the supports mounted to the liner sidewalls. Then pull assembly out of the cabinet interior.
4. Remove crisper drawer from slides by using a flat bladed screwdriver just behind the clip between the drawer and rail, then gently twisting up. The clip will release and the drawer will be free.
5. The drawer slides are secured with two tabs that lock into the drawer frame brackets. Push drawer slide upwards until the front tab releases, then pull drawer slide forward until rear tab disengages. Drawer slide is now free.
6. The bracket is secured with two screws to the drawer frame. Extract the two screws to separate the bracket and drawer frame.
7. The supports are secured with two screws to the compartment sidewall. Extract the screws and remove the supports.

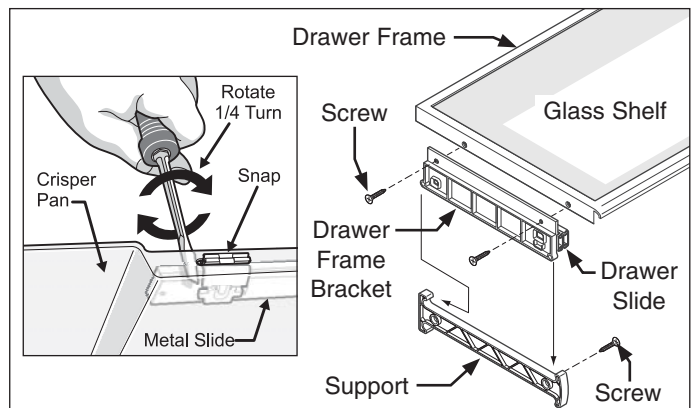


Figure 5-12. Refrigerator Drawer Assembly Removal

Upper Level Lighting

The upper level lighting comes on automatically when the door is opened.

To replace the light bulbs:

IMPORTANT

To disconnect power to the unit, unplug the unit or switch the breaker that supplies power to the unit to the off position. Replace the old bulb with a bulb of the same wattage.

1. To replace the light bulb, turn the temperature control to OFF and unplug the electrical cord.
2. Remove the light shield by pushing in on the sides where the two tabs are located in the back, then rotate the light shield down and out.
3. Replace the old bulb with a bulb of the same type and wattage.
4. When replacing the light shield, insert the three tabs in the front of the light shield into the slots in the control box and then rotate the rear upward until the two retaining latches lock into place.

Baffle Plate Removal

To remove the baffle plate, with one hand grab the baffle plate from the center and pull back while with the other hand, reach behind to disengage the retaining latches. (See Figure 5-14)

Evaporator Cover Removal

The evaporator cover is secured with screws to the back wall and bottom of the freezer compartment. The evaporator cover has a gasket on each side to create proper airflow in the compartment. (See Figure 5-15)

To remove the evaporator cover:

1. Disconnect unit from power supply.
2. Remove the cantilever shelves.
3. Remove the crispers and crisper supports.
4. Using a phillips head screwdriver, extract the ten (10) screws securing the evaporator cover to the refrigerator compartment.
5. Pull the thermostat knob from thermostat shaft.
6. Carefully pull the evaporator cover away from the back wall enough to access the wire harness connections to the light fixtures and thermostat. Use caution not to damage the gaskets on both sides of the evaporator cover.

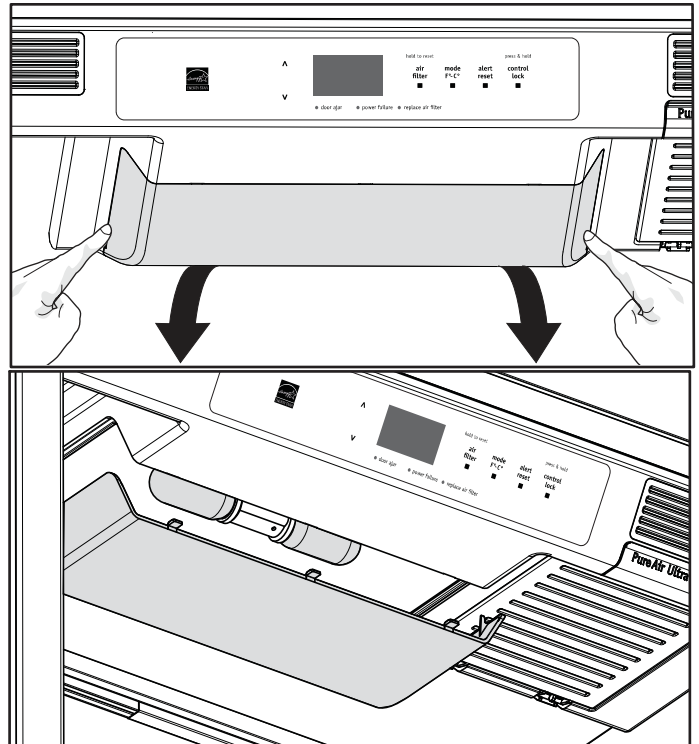


Figure 5-13. Light Shield and Fixture Removal

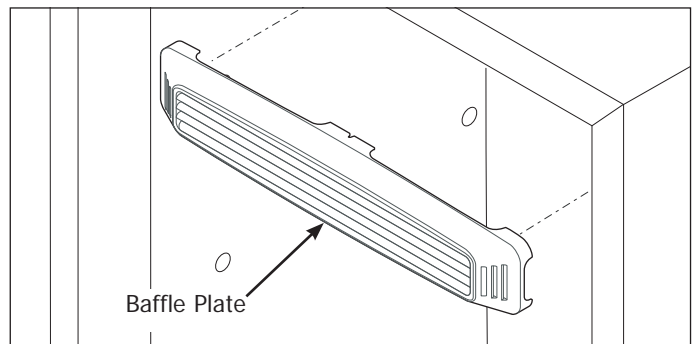


Figure 5-14. Baffle Plate Removal

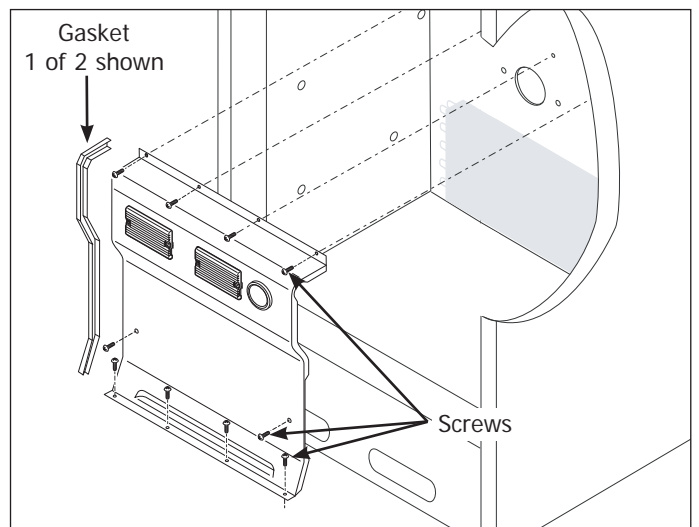


Figure 5-15. Evaporator Cover Removal

7. From behind the evaporator cover, disconnect the wire leads from the light fixture terminals.
8. Compress the thermostat spring clip then pull the thermostat from the back of the evaporator cover. Evaporator cover may now be removed from unit.

Thermostat Control Removal

The evaporator cover does not need to be completely removed to access the thermostat control or the wire harness connections, however, removing the evaporator cover from the unit will make the task easier.

To remove the thermostat control:

1. Follow steps 1-8 from the previous page on removing the evaporator cover.
2. Extract the screw securing the sensor tube to the back wall of the cabinet interior. (See Figure 5-17)
3. Disconnect the 2 wire leads from the top of the thermostat control.
4. Disconnect the ground wire lead from the thermostat control. Thermostat control is now free.

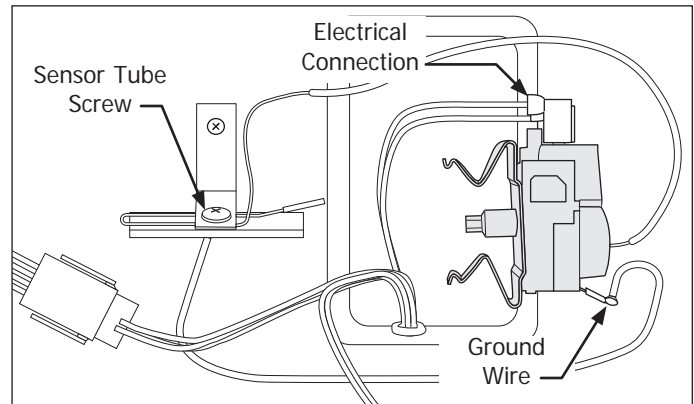


Figure 5-17. Thermostat Control Removal

Evaporator Fan Assembly Removal

The evaporator fan assembly consists of the fan motor mount bracket, fan motor and fan blade. Two screws secure the fan motor to the fan motor mount bracket. The evaporator fan assembly is then secured with two screws to the back wall of the freezer compartment. (See Figure 5-18)

To remove the evaporator fan assembly:

1. Disconnect unit from power supply.
2. Remove the cantilever shelves.
3. Remove the crispers and crisper supports.
4. Remove the evaporator cover.
5. Remove wires from retaining clips mounted on the fan motor mounting bracket. Disconnect the electrical leads of fan motor at quick disconnect.
6. Using a 5/16" socket or nut driver, extract the two hex head screws securing the fan motor mounting bracket to the back wall of the unit.
7. Separate the fan motor from the mounting bracket by extracting the two hex head screws securing the fan motor to mounting bracket.
8. Pull fan blade from fan motor shaft.

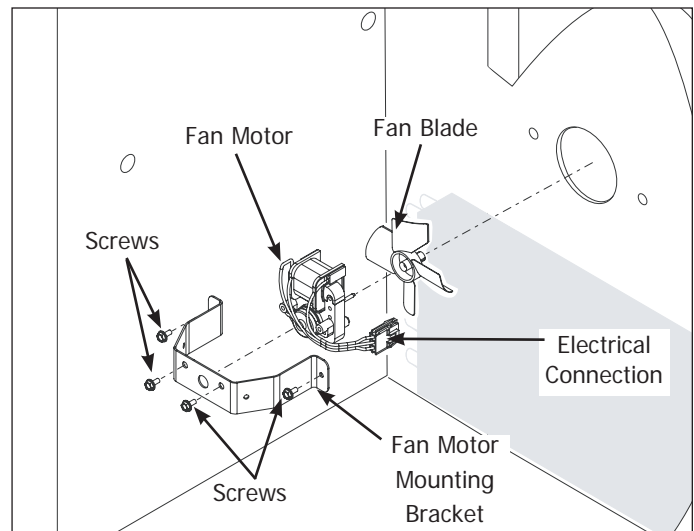


Figure 5-18. Evaporator Fan Assembly Removal

Defrost Thermostat Removal

The defrost thermostat is secured with a retaining clip to the upper left corner of the evaporator assembly. The defrost thermostat and wire harness connections may be accessed without completely removing the evaporator cover. The top of the evaporator cover may be pulled away from the rear of the cabinet interior enough to remove the defrost terminator and disconnect the wire harness connections. (See Figure 5-19)

To remove the defrost thermostat:

1. Disconnect unit from power supply.
2. Remove the cantilever shelves.
3. Remove the crispers and crisper supports.
4. Remove the evaporator cover.
5. Disconnect the defrost thermostat wire leads from the wire harness. (See Figure 5-19)
6. Pull the defrost thermostat off of the evaporator inlet tubing.

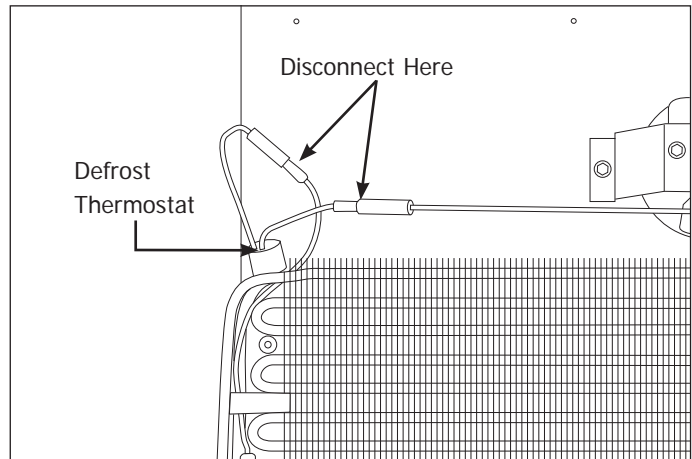


Figure 5-19. Defrost Thermostat Removal

NOTE

Refrigerator defrost thermostat must be installed on the evaporator inlet tube.

Defrost Heater Removal

The defrost heater is secured with two aluminum straps to the bottom tube of the evaporator assembly.

To remove the defrost heater:

1. Disconnect unit from power supply.
2. Remove the cantilever shelves.
3. Remove the crispers and crisper supports.
4. Remove the evaporator cover.
5. Disconnect the defrost heater wire leads from the wire harness. (See Figure 5-20)
6. Release the aluminum straps securing the defrost heater to the bottom of the evaporator assembly.
7. Remove the styrofoam insulators from both sides of the evaporator.
8. Pull defrost heater from evaporator assembly.

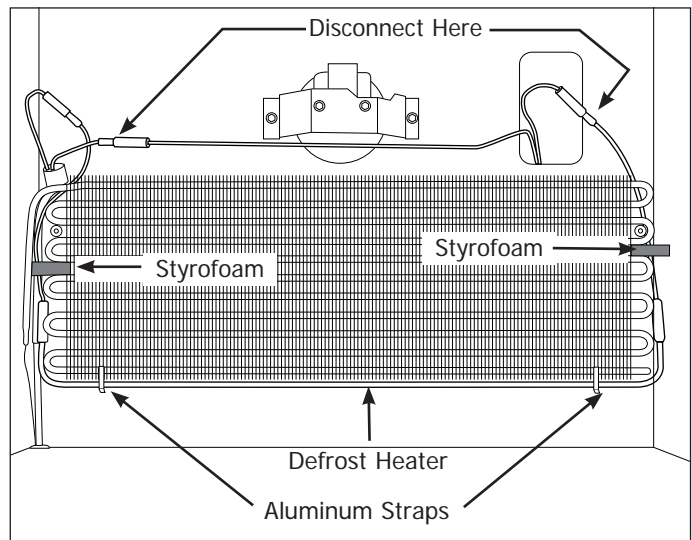


Figure 5-20. Defrost Heater Removal

Evaporator Removal

The evaporator sets upon the two screw standoffs mounted to the back wall of the freezer compartment. Two pieces of styrofoam are pressed between the evaporator assembly and the sidewalls of the unit, securing the assembly in position. (See Figure 5-21)

To remove the evaporator:

1. Disconnect unit from power supply.
2. Remove the cantilever shelves.
3. Remove the crispers and crisper supports.
4. Remove the evaporator cover.
5. Remove the styrofoam insulators from both sides of the evaporator.
6. Remove the defrost thermostat and defrost heater.
7. Recover refrigerant by using EPA approved recovery system.



NOTE

Whenever the sealed system is opened the filter-drier must be replaced.

8. Remove the filter-drier.
9. Cut suction line about 1" from compressor.
10. Straighten the tubing, remove the foam sleeve, and carefully feed the heat exchanger through the cabinet while pulling up on the evaporator.

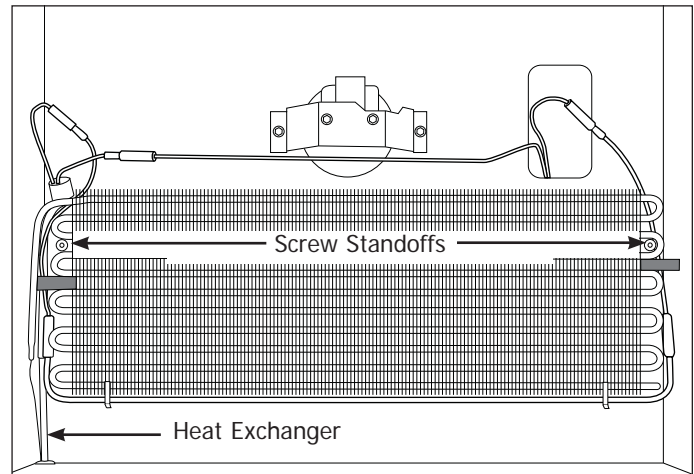


Figure 5-21. Evaporator Removal

Compressor Area Components

All Refrigerator and All Freezer-Pro Models

The compressor area components for the All Refrigerator and All Freezer-Pro Units are similar in layout and have the same access and removal steps. However, the part numbers for items in the compressor area may differ between the all refrigerator and all freezer models.

Power Cord Removal

The power cord enters the compressor area on the lower left side and is secured to the compressor mounting plate with a P-clamp and screw.

To remove the power cord:

1. Pull unit from its installation position to access the rear compressor area. Disconnect power from unit.
2. Using a phillips head screwdriver, extract the four screws securing the compressor area shield to the rear of the unit. Remove shield.
3. Using a 1/4" socket or wrench, extract the screw securing the P-clamp to the compressor mounting plate. (See Figure 5-22)
4. Using a 1/4" socket or wrench, extract the screw securing the ground wires to the compressor mounting plate.
5. Disconnect power cord from the wire harness at the quick disconnect. Remove power cord from unit.

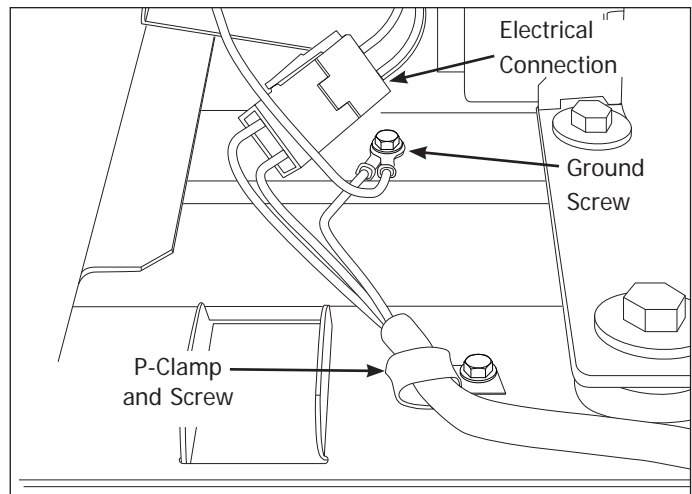


Figure 5-22. Power Cord Removal

Water Valve Removal (if equipped)

The water valve is secured with two screws to the right hand side of the unit behind the compressor area shield.

To remove the water valve:

1. Pull unit from its installation position to access the rear compressor area.
2. Using a phillips head screwdriver, extract the four screws securing the compressor area shield to the rear of the unit. Remove shield.
3. Disconnect water valve from household water supply. (See Figure 5-23)
4. Using fingers, disconnect the icemaker water line from water valve.
5. Using a 1/4" socket or wrench, extract screws securing water valve to unit frame.
6. Disconnect electrical connections from terminals of water valve.

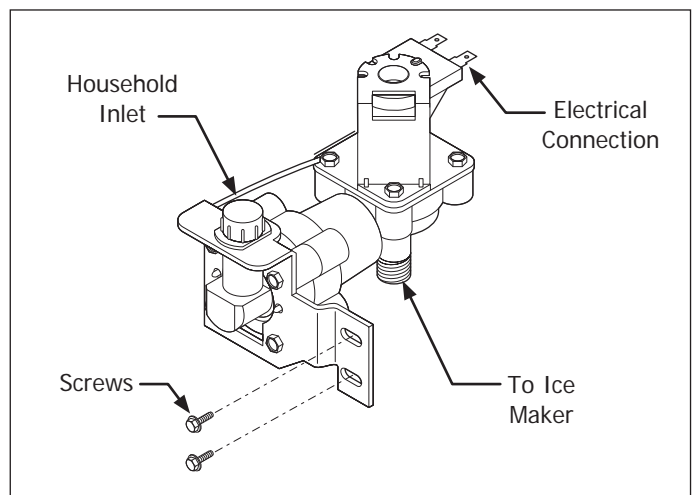


Figure 5-23. Water Valve Removal

Defrost Timer Removal

The defrost timer is mounted to a bracket which is secured to the bottom of the base tray with two 1/4" bolts. (See Figure 5-24)

To remove the defrost timer:

1. Pull unit from its installation position to access the rear compressor area. Disconnect power from unit.
2. Extract the screws securing the fiber board cover to the unit frame and remove from unit.
3. Extract the upper screw first securing the defrost timer cover to the mounting bracket. Remove cover.
4. Extract lower screw. Pull defrost timer from mounting bracket.
5. Disconnect wire harness connector from defrost timer.
6. Extract the two bolts with a 1/4" socket or wrench to remove the mounting bracket to the base tray.

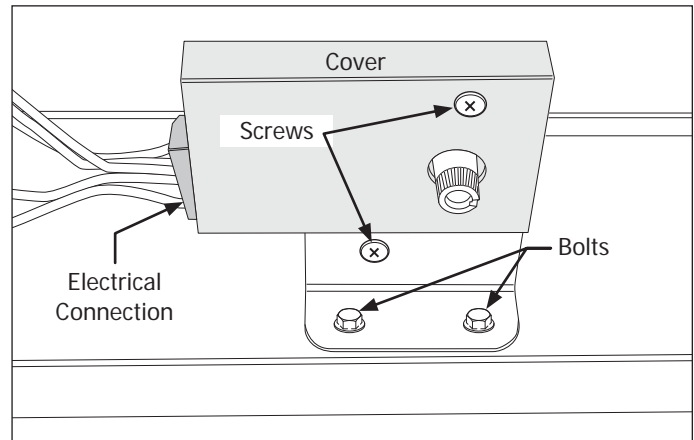


Figure 5-24. Defrost Timer Removal

Filter-Drier Removal

The filter-drier is located in the compressor area on the left side of the compressor. (See Figure 5-25)

To remove the filter-drier:

1. Pull unit from its installation position to access the rear compressor area. Disconnect power from unit.
2. Extract the screws securing the fiber board cover to the unit frame and remove from unit.
3. Recover refrigerant by using EPA approved recovery system.
4. Using a 3 cornered file, score a groove around capillary tube as close to old filter-drier as possible. Break capillary tube along score mark from filter-drier.
5. Cut condenser outlet tube at filter-drier. Discard filter-drier.
6. Thoroughly clean condenser outlet tube and capillary tube.
7. Place inlet connection of filter-drier over condenser tube approximately 1/4" and solder.
8. Insert capillary tube input end into filter-drier outlet. Do not allow tube to bottom against screen. Solder carefully so that solder does not plug capillary tube.
9. Install process tube adapter to filter-drier.
10. Evacuate and charge system using the recommended procedure described under Evacuating and Recharging in the Refrigeration section.
11. Reassemble unit.

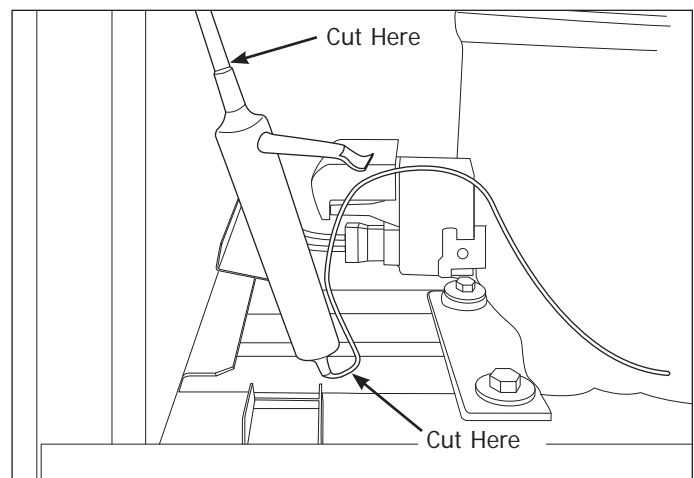


Figure 5-25. Filter-Drier Removal



CAUTION

On R-134a systems, the system must NOT be left open to the atmosphere for more than 10 minutes to prevent moisture contamination of compressor oil.

Compressor Removal

The compressor sits on four grommets and is secured with four screws to the compressor mounting plate. (See Figure 5-26)

To remove the compressor:

1. Pull unit from its installation position to access the rear compressor area. Disconnect power from unit.
2. Extract the screws securing the compressor shield to the unit frame and remove from unit.
3. Using a small flat bladed screwdriver, release the locking tab from the wire harness connection and disconnect from compressor controller.
4. Using a needlenose pliers, remove spring wire holding the controller to the compressor.
5. Recover refrigerant by using EPA approved recovery system.
6. Using a 7/16" socket, remove the (4) bolts, one in each corner, holding the compressor to the base. (See Figure 5-26)
7. After refrigerant is completely recovered, cut suction and discharge lines as close to compressor as possible. Leave only enough tubing to pinch off and seal defective compressor. Plug or tape any open system tubing to avoid entrance of moisture and air into system. Remove inoperable compressor and transfer mounting parts to new compressor.
8. Install new compressor inexact same manner as original compressor.
9. Reform both suction and discharge lines to align with new compressor. If they are too short, use additional lengths of tubing. Joints should overlap 0.5" to provide sufficient area for good solder joint. Clean and mark area where tubing should be cut.
10. Cut tubing with tubing cutter. Work quickly to avoid letting moisture and air into system.
11. Reassemble unit.

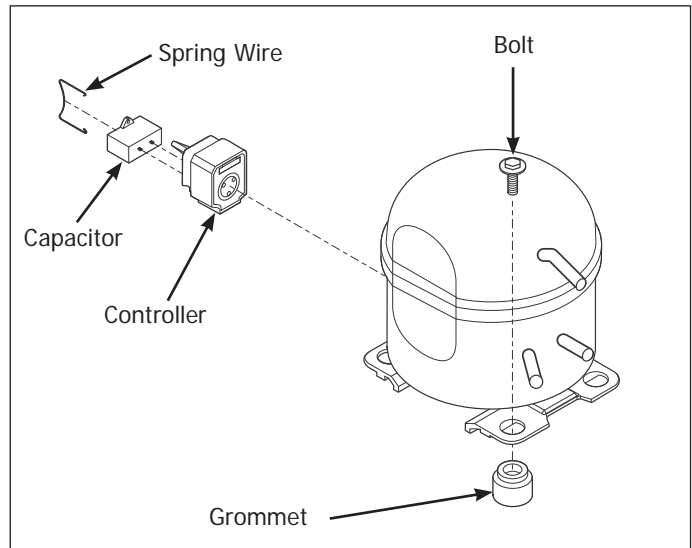


Figure 5-26. Compressor Components

Drain Pan Removal

The drain pan is secured with four screws to the bottom of the unit frame.

To remove the drain pan:

1. Pull unit from its installation position to access the rear compressor area. Disconnect power from unit.
2. Extract the screws securing the compressor shield to the unit frame and remove from unit.
3. The rear of the unit may need to be raised to access the drain pan screws.

CAUTION

Use caution when tilting a freezer unit. Use sturdy blocking materials that will not allow the freezer to rock or tip over when servicing unit.

4. Using a short phillips head screwdriver, extract the two screws securing the drain pan to the bottom of the unit frame. (See Figure 5-27)
5. Position unit to access the front of the unit. Remove kickplate.
6. The front of the unit may need to be raised to access the drain pan screws.
7. Using a short phillips head screwdriver, extract the two screws securing the drain pan to the bottom of the unit frame. (See Figure 5-27)
8. Allow the drain pan to drop down. Pull drain tube from drain pan.
9. Pull condenser tubes out of the retainers mounted to the drain pan. Drain pan may now be removed from the unit.

Condenser Fan Motor Removal

The condenser fan motor is secured with three screws to the condenser fan motor bracket. Two hooks and two screws at the base of the condenser fan motor bracket secure the assembly to the unit base. (See Figure 5-28)

To remove the condenser fan motor:

1. Pull unit from its installation position to access the rear compressor area. Disconnect power from unit.
2. Extract the screws securing the compressor shield to the unit frame and remove from unit.
3. Disconnect wire harness from the wire leads of condenser fan at quick disconnect.
4. Remove the four drain pan screws. Allow the drain pan to drop from its installation position.

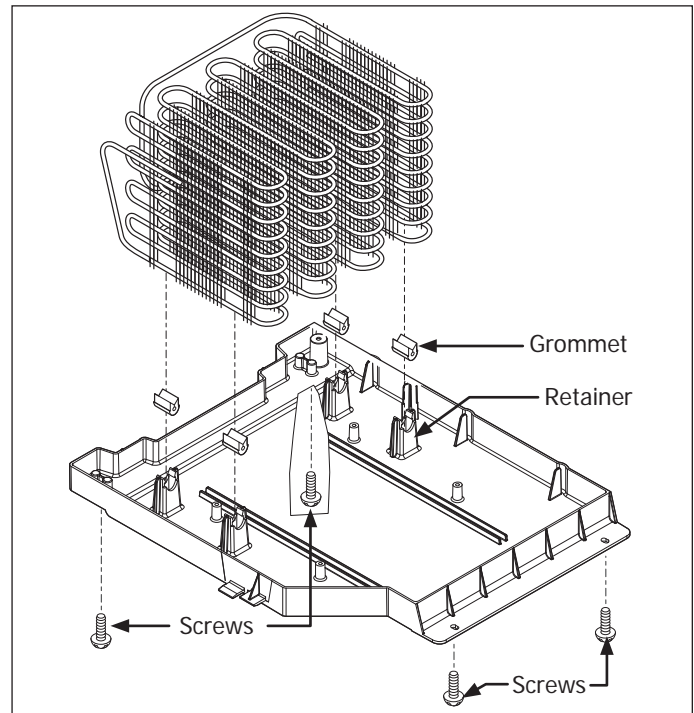


Figure 5-27. Condenser Drain Pan Removal

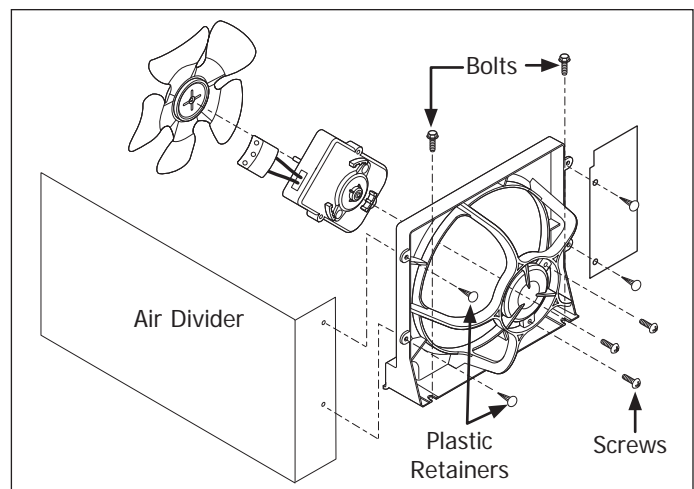


Figure 5-28. Condenser Fan Motor Removal

5. With a needle nose pliers, reach behind air dividers and compress the plastic retainers while pushing them out of the condenser fan mounting bracket. Remove air dividers.
6. Using a 1/4" socket or wrench, extract the two bolts securing fan mounting bracket to unit frame.
7. Using a phillips head screwdriver, extract the three screws securing the fan motor to the fan mounting bracket.
8. Pull fan motor and fan blade out from behind the mounting bracket. Remove fan blade by pulling the fan blade from the motor shaft.

Condenser Coil Removal

The condenser coil is mounted to the drain pan by four retaining clips.

To remove the drain pan:

1. Pull unit from its installation position to access the rear compressor area. Disconnect power from unit.
2. Extract the screws securing the compressor shield to the unit frame and remove from unit.
3. Recover refrigerant by using EPA approved recovery system.
4. Remove condenser fan assembly from unit.
5. Disconnect inlet and outlet lines from condenser coil. (See Figure 5-29)
6. The front of the unit will need to be raised to access the drain pan screws.
7. Using a short phillips head screwdriver, extract the four screws securing the drain pan to the bottom of the unit frame.
8. Allow the drain pan to drop down. Pull drain tube from drain pan.
9. Pull condenser tubes out of the retainers mounted to the drain pan. Remove condenser from unit.
10. Replace old filter-drier after installing the new condenser coil.

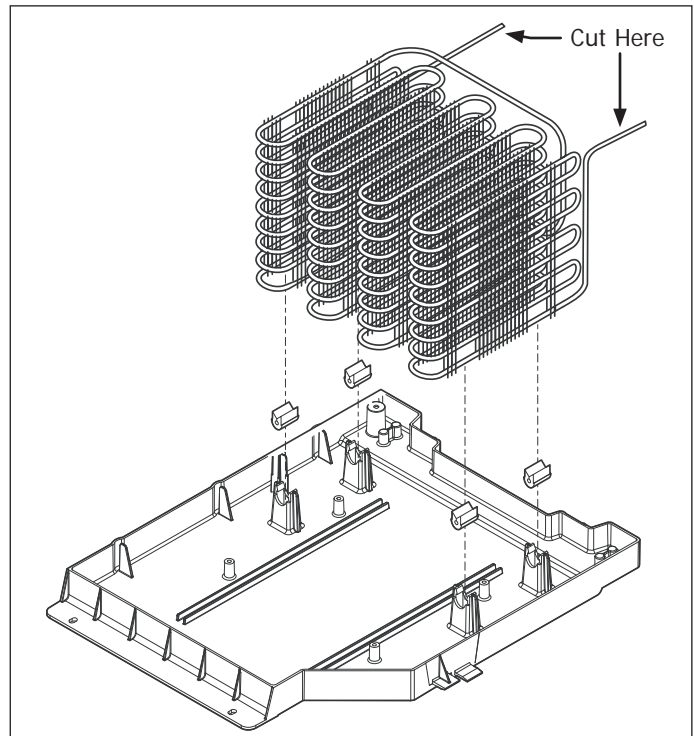


Figure 5-29. Condenser Coil Removal

Freezer Exterior Components

Door Handle Removal

The door handle is secured with setscrews to the handle mounting shoulder screws that are fastened into the front of the door assembly.

To remove the handle, use a 3/32" allen wrench and extract the setscrew located in each handle standoff. Pull handle assembly from door assembly.

(See Figure 5-30)

Use a 5/32" allen wrench to extract the screw located inside the handle standoff, that secures the handle standoff to the handle.

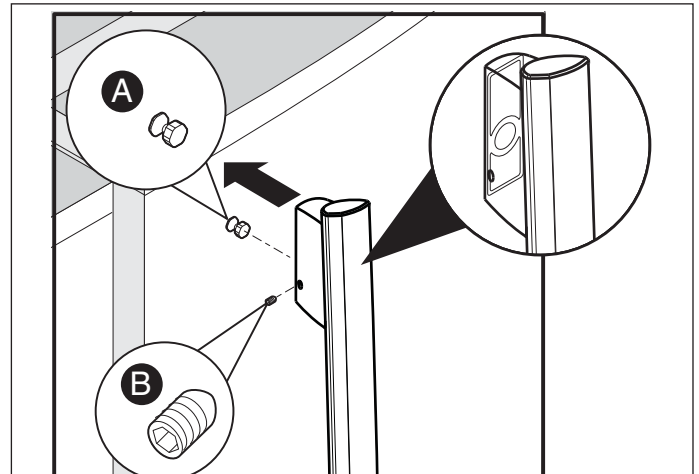


Figure 5-30. Handle Removal

Kickplate Removal

The kickplate is secured with two screws to the lower front of the unit.

To remove the kickplate, extract the screw from each end of the kickplate with a phillips head screwdriver.

(See Figure 5-31)

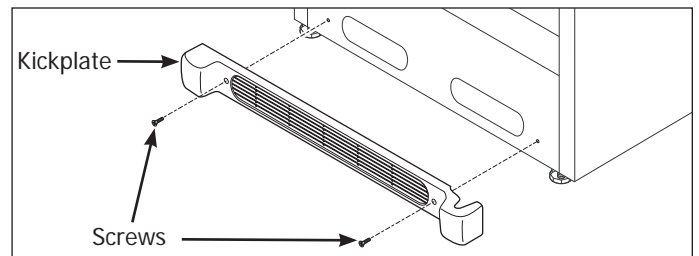


Figure 5-31. Kickplate Removal

Door Hinge and Door Assembly Removal

The door assembly is secured to the unit frame by an upper and lower hinge assembly.

To remove the door assembly:

1. Gently lay freezer on its back on a soft clean surface.
2. Lift plastic cover off upper hinge assembly. (See Figure 5-32)
3. Using a 3/8" socket or wrench, extract the two bolts securing the upper hinge to the unit frame. (See Figure 5-33)
4. Remove kickplate.
5. Using a 3/8" socket or wrench, extract the two bolts securing the lower hinge to the unit frame. Use a phillips head screwdriver to extract the remaining screw from the lower hinge assembly.
6. Lift the door assembly off of the unit frame.

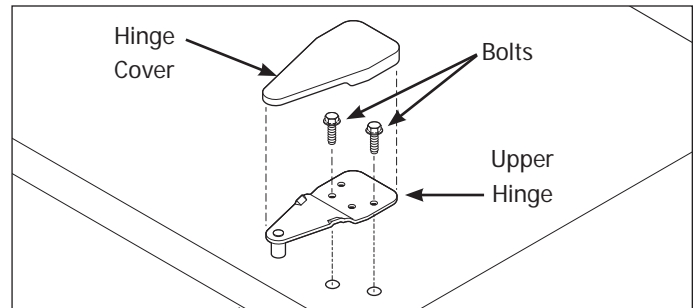


Figure 5-32. Upper Hinge Removal

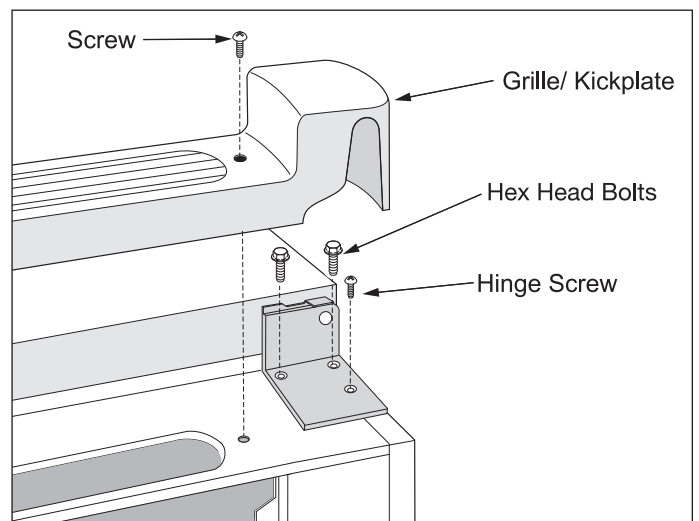


Figure 5-33. Lower Hinge Removal

Door Stop Assembly Removal

The door stop is secured to with two screws the underside of the door assembly.

To remove the door stop:

1. Remove door from unit.
2. Extract the two screws securing the door stop to the bottom of the door assembly. (See Figure 5-34)

Door Gasket and Inner Panel Removal

The inner panel of the door assembly is secured with screws that pass through the inner panel and fasten into the door assembly. The door gasket has an inner lip that is pressed between the inner panel and the door assembly and is secured in position when the inner panel screws are fastened to the door assembly. The inner panel does not have to be completely removed to extract the door gasket from the door assembly.

To remove the door gasket:

1. Lift the inside edge of the door gasket to access the inner panel screws.
2. Loosen the inner panel screws until the door gasket can be pulled out from under the inner panel. (See Figure 5-35)
3. Continue loosening screws around door assembly until door gasket is free.
4. To remove the inner panel, extract all screws from the outside edge of the inner panel and remove from unit.
5. The secondary gasket is secured with two retaining clips that snap into the inner door panel. Pry out the two retaining clips with a small putty knife, using caution not to damage the inner door panel. The secondary gasket is now free.

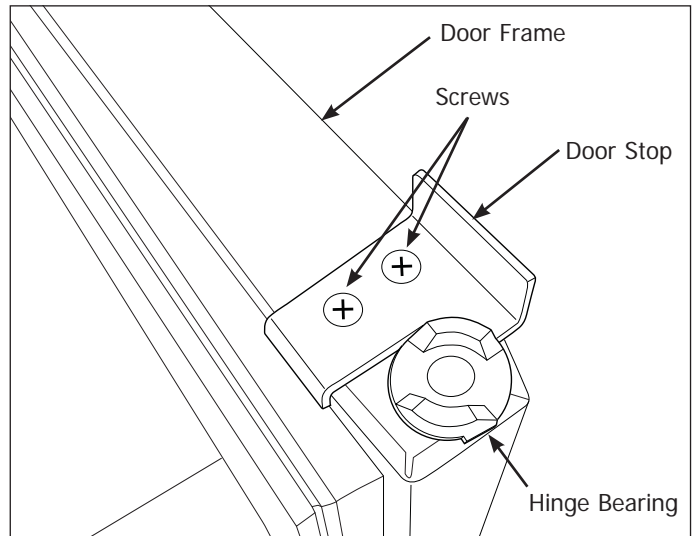


Figure 5-34. Door Stop Removal

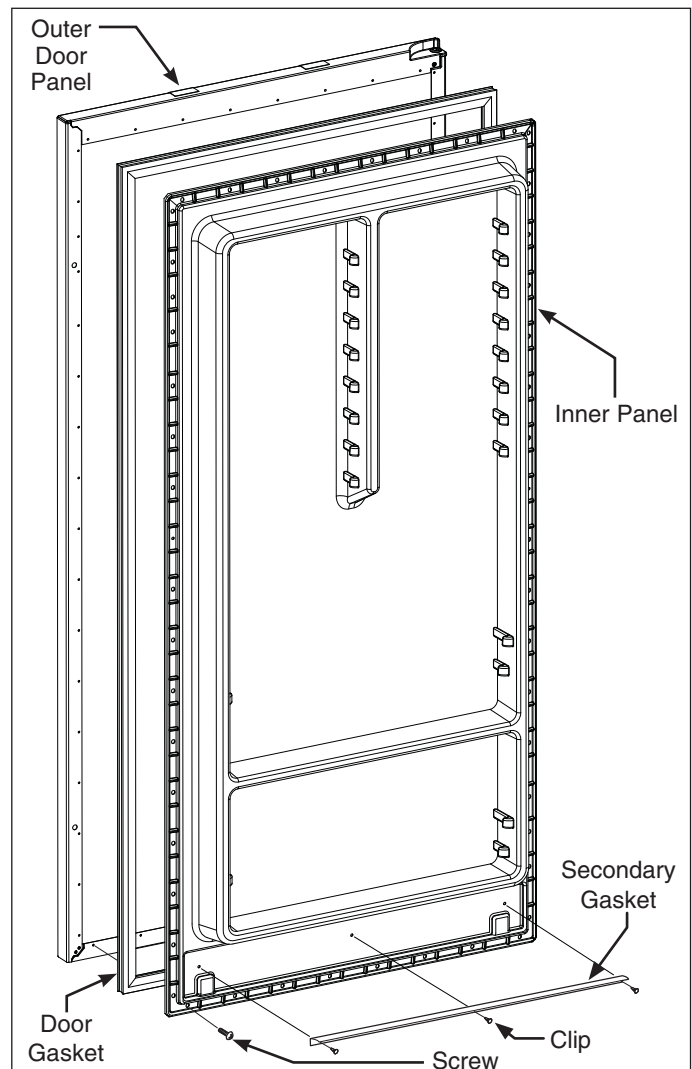


Figure 5-35. Inner Panel and Door Gasket Removal

Adjustable Two Liter Door Bins

This model is equipped with adjustable door bins that can be moved to suit individual needs.

To Move Door Bins:

- Lift the bin straight up.
- Remove the bin.
- Place the bin in desired position.
- Lower the bin onto supports until locked in place.

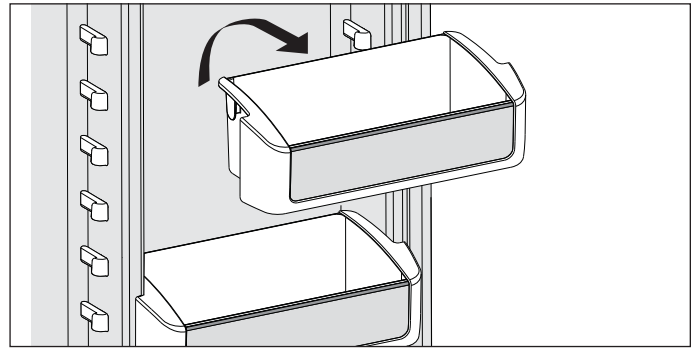


Figure 5-36. Door Bin Removal

Full Width Door Bins

The full width door bin is especially designed to hold large containers or freezer bags. The full width bins are removed in the same manner as the adjustable two liter door bins.

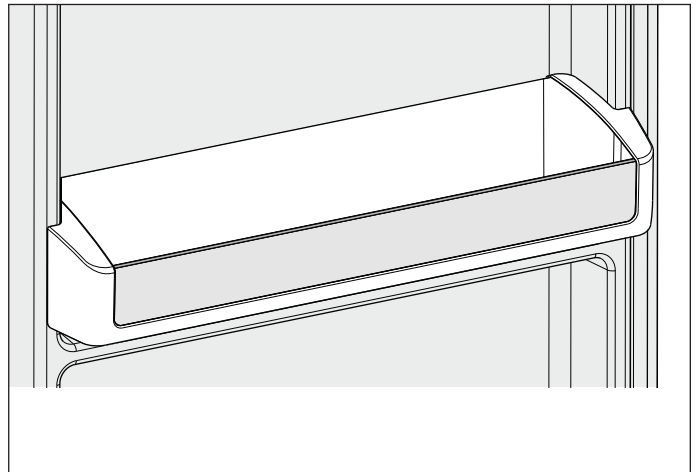


Figure 5-37. Full Width Door Bin

Door Switch Removal

The door switch is mounted inside a hole in the cabinet base along the lower left hand side. (See Figure 5-38)

To remove the door switch:

1. Remove kickplate.
2. Reach into the access hole next to the door switch and disconnect the electrical leads from the door switch terminals.
3. Press in on the retaining latch on the switch body and push switch through hole in cabinet base.

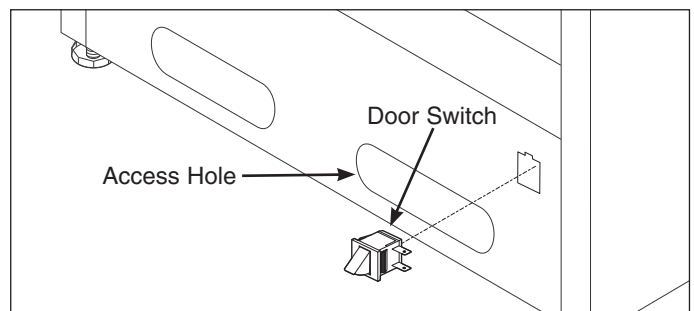


Figure 5-38. Door Switch Removal

Interior Components

Adjustable Interior Shelves

The glass shelves can be moved to any position for larger or smaller packages. The shelves are supported at the back of the freezer. (See Figure 6-45) Replace the shelf by inserting the hooks at rear of the shelf into the wall bracket. Lower the shelf into the desired slots and lock into position.

To remove the shelf assemblies:

1. Lift front edge up.
2. Pull shelf out.

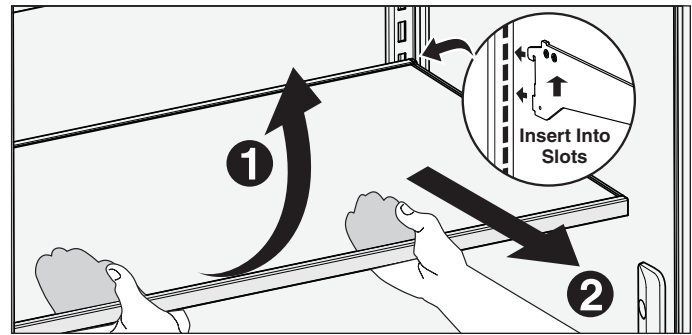


Figure 6-45. Interior Glass Shelving Removal

Freezer Basket Assembly Removal

The freezer basket assemblies can be lifted off of the supports and pulled from the freezer compartment. The basket may now be removed from the basket slides. (See Figure 6-46)

To remove the freezer baskets:

1. Remove the lowest adjustable interior shelf.
2. Lift up on the front of the drawer assembly and lift upwards until the bracket releases from the supports mounted to the liner sidewalls. Then pull assembly out of the cabinet interior.
3. Remove the glass shelf.
4. Remove freezer basket from slides by pulling the basket upwards to release the retaining clips securing the basket slides to the wire basket.
5. The drawer slides are secured with two tabs that lock into the basket frame brackets. Push drawer slide upwards until the front tab releases, then pull basket slide forward until rear tab disengages. Basket slide is now free.
6. The bracket is secured with two screws to the freezer basket frame. Extract the two screws to separate the bracket and basket frame.
7. The supports are secured with two screws to the compartment sidewall. Extract the screws and remove the supports.

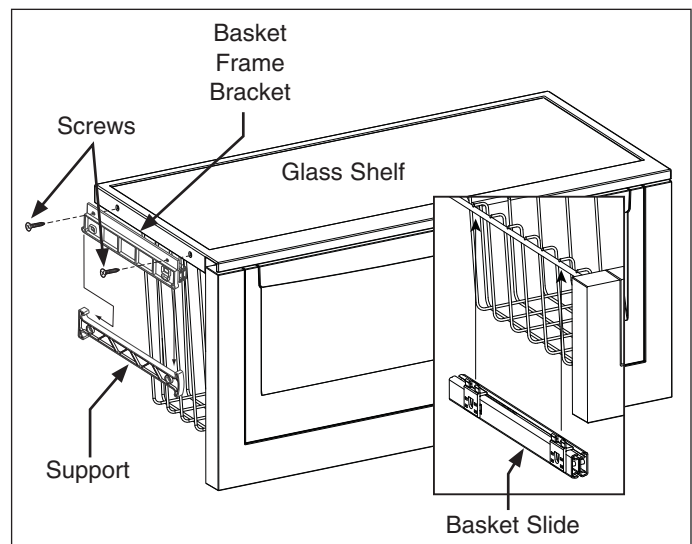


Figure 6-46. Glass Shelf and Freezer Basket Assembly Breakdown

Upper Level Lighting

The upper level lighting comes on automatically when the door is opened.

To replace the light bulbs:

➔ IMPORTANT

To disconnect power to the unit, unplug the unit or switch the breaker that supplies power to the unit to the off position. Replace the old bulb with a bulb of the same wattage.

1. To replace the light bulb, turn the temperature control to OFF and unplug the electrical cord.
2. Remove the light shield by pushing in on the sides where the two tabs are located in the back, then rotate the light shield down and out.
3. Replace the old bulb with a bulb of the same type and wattage.
4. When replacing the light shield, insert the three tabs in the front of the light shield into the slots in the control box and then rotate the rear upward until the two retaining latches lock into place.

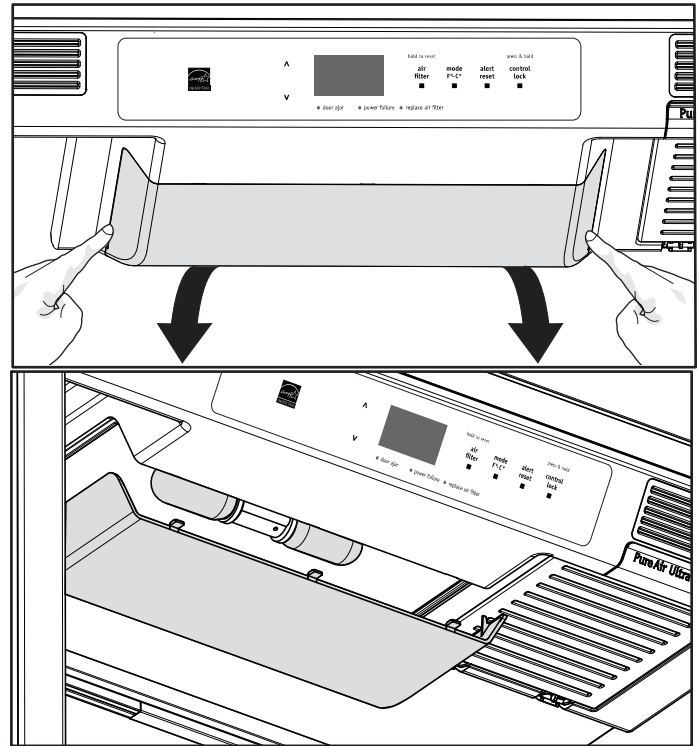


Figure 5-41. Light Shield and Fixture Removal

Baffle Plate Removal

To remove the baffle plate, with one hand grab the baffle plate from the center and pull back while with the other hand, reach behind to disengage the retaining latches. (See Figure 5-42)

Ice Maker Removal

The icemaker is mounted with two 1/4" hex head screws to the upper left hand corner of the freezer compartment. (See Figure 5-43)

To remove the ice maker:

1. Remove uppermost glass shelf and ice bucket.
2. Using a 1/4" extended socket or nut driver, extract the two screws securing the icemaker to the left sidewall of the unit.
3. Disconnect wire leads from icemaker at the quick disconnect mounted in the upper left corner of the freezer compartment.

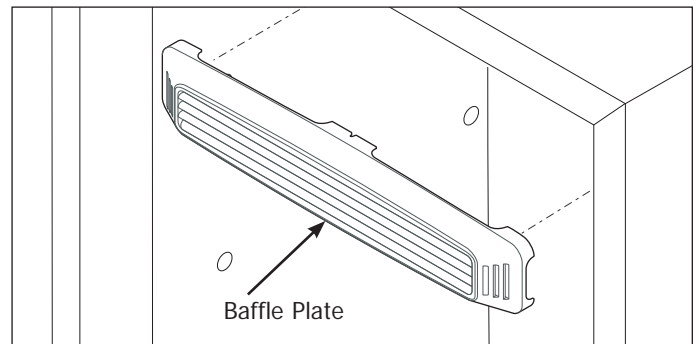


Figure 5-42. Baffle Plate Removal

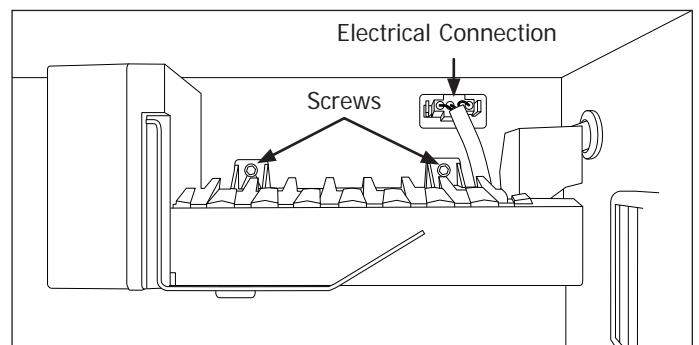


Figure 5-43. Ice Maker Removal

Evaporator Cover Removal

The evaporator cover is secured with screws to the back wall and bottom of the freezer compartment. The evaporator cover has a gasket on each side to create proper airflow in the compartment. (See Figure 5-44)

To remove the evaporator cover:

1. Remove the cantilever shelves.
2. Remove the glass shelf and side rails.
3. Remove wire baskets and slides.
4. Using a phillips head screwdriver, extract the ten (10) screws securing the evaporator cover to the freezer compartment.
5. Pull the thermostat knob from thermostat shaft.
6. Carefully pull the evaporator cover away from the back wall enough to access the wire harness connections to the light fixtures and thermostat. Use caution not to damage the gaskets on both sides of the evaporator cover.
7. From behind the evaporator cover, disconnect the wire leads from the light fixture terminals.
8. Compress the thermostat spring clip then pull the thermostat from the back of the evaporator cover. Evaporator cover may now be removed from the unit.

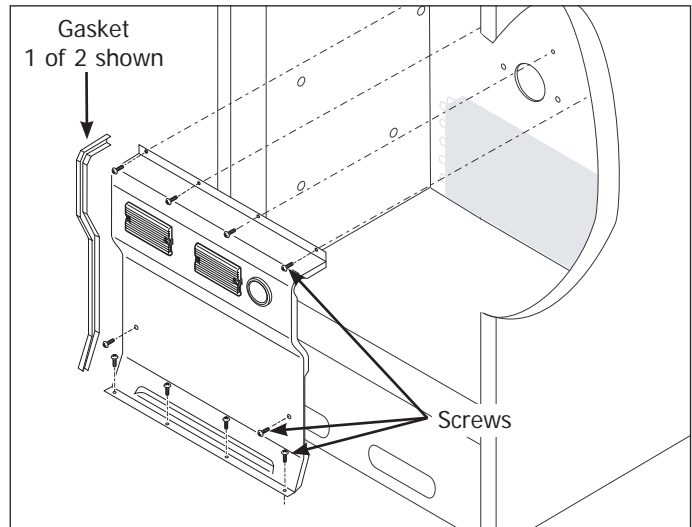


Figure 5-44. Evaporator Cover Removal

Thermostat Control Removal

The evaporator cover does not need to be completely removed to access the thermostat control or the wire harness connections, however, removing the evaporator cover from the unit will make the task easier.

To remove the thermostat control:

1. Follow steps 1-8 above for removing the evaporator cover.
2. Extract the screw securing the sensor tube to the back wall of the cabinet interior. (See Figure 5-45)
3. Disconnect the 2 wire leads from the top of the thermostat control.
4. Disconnect the ground wire lead from the thermostat control. Thermostat control is now free.

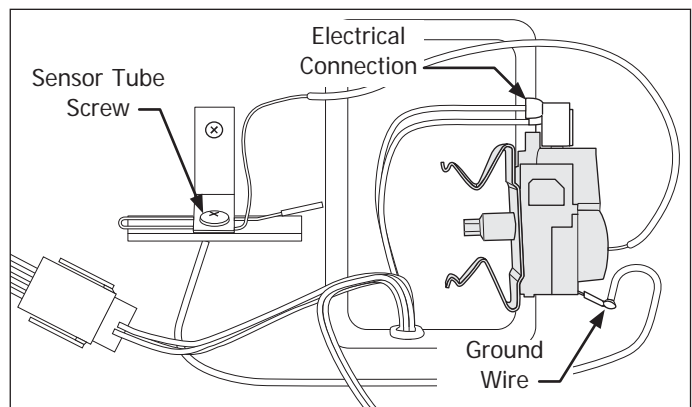


Figure 5-45. Thermostat Control Removal

Evaporator Fan Assembly Removal

The evaporator fan assembly consists of the fan motor mount bracket, fan motor and fan blade. Two screws secure the fan motor to the fan motor mount bracket. The evaporator fan assembly is then secured with two screws to the back wall of the freezer compartment. (See Figure 5-46)

To remove the evaporator fan assembly:

1. Remove the cantilever shelves.
2. Remove the glass shelf and side rails.
3. Remove wire baskets and slides.
4. Remove the evaporator cover.
5. Remove wires from retaining clips mounted on the fan motor mounting bracket. Disconnect the electrical leads of fan motor at quick disconnect.
6. Using a 5/16" socket or nut driver, extract the two hex head screws securing the fan motor mounting bracket to the back wall of the unit.
7. Separate the fan motor from the mounting bracket by extracting the two hex head screws securing the fan motor to mounting bracket.
8. Pull fan blade from fan motor shaft.

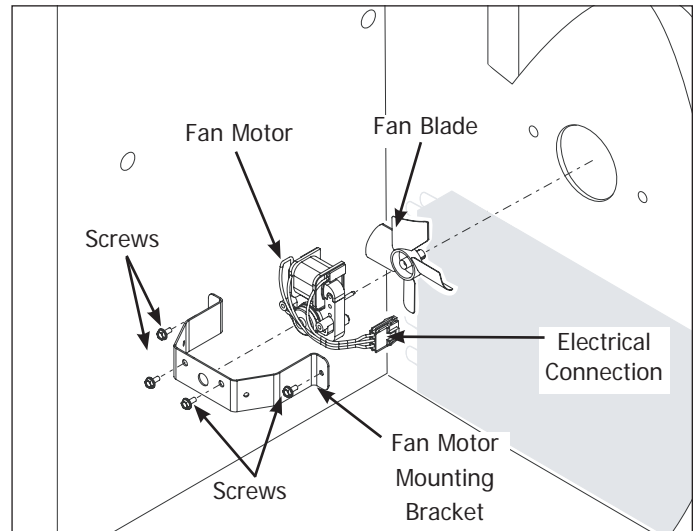


Figure 5-46. Evaporator Fan Assembly Removal

Defrost Thermostat Removal

The defrost thermostat is secured with a retaining clip to the upper left corner of the evaporator assembly. The defrost thermostat and wire harness connections may be accessed without completely removing the evaporator cover. The top of the evaporator cover may be pulled away from the rear of the cabinet interior enough to remove the defrost terminator and disconnect the wire harness connections. (See Figure 5-48)

To remove the defrost thermostat:

1. Remove the cantilever shelves.
2. Remove the glass shelf and side rails.
3. Remove wire baskets and slides.
4. Remove the evaporator cover.
5. Disconnect the defrost thermostat wire leads from the wire harness. (See Figure 5-47)
6. Pull the defrost thermostat off of the evaporator outlet tubing.

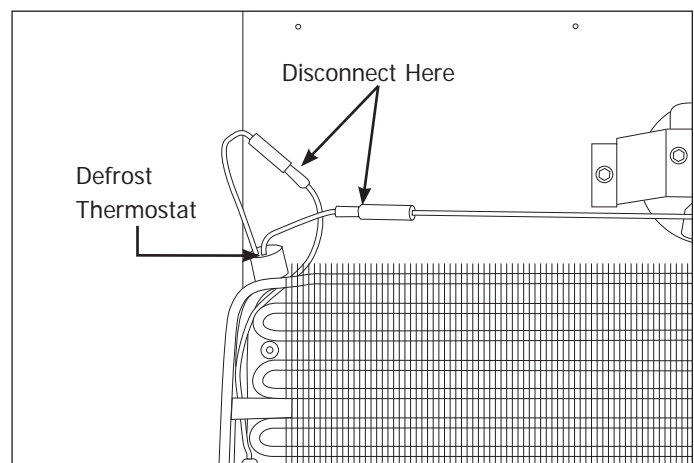


Figure 5-47. Defrost Thermostat Removal

NOTE

Freezer defrost thermostat must be installed on the evaporator outlet tube.

Defrost Heater Removal

The defrost heater is secured with two aluminum straps to the bottom tube of the evaporator assembly. (See Figure 5-48)

To remove the defrost heater:

1. Remove the cantilever shelves.
2. Remove the glass shelf and side rails.
3. Remove wire baskets and slides.
4. Remove the evaporator cover.
5. Disconnect the defrost heater wire leads from the wire harness. (See Figure 5-48)
6. Release the aluminum straps securing the defrost heater to the bottom of the evaporator assembly.
7. Remove the styrofoam insulators from both sides of the evaporator.
8. Pull defrost heater from evaporator assembly.

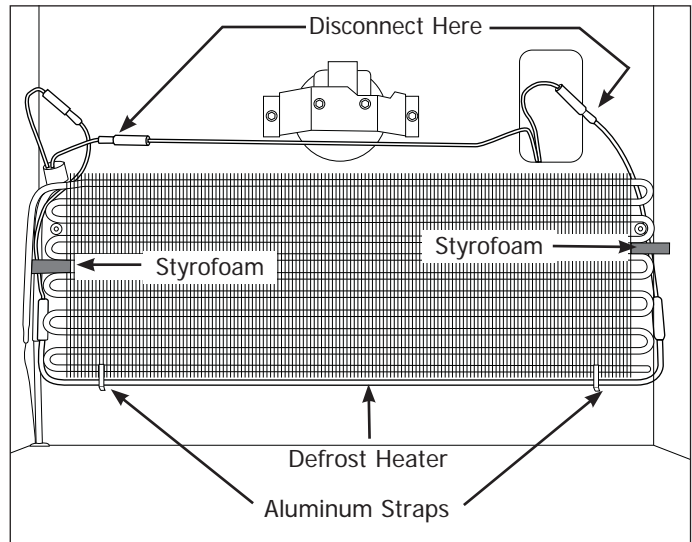


Figure 5-48. Defrost Heater Removal

Evaporator Removal

The evaporator sets upon the two screw standoffs mounted to the back wall of the freezer compartment. Two pieces of styrofoam are pressed between the evaporator assembly and the sidewalls of the unit, securing the assembly in position. (See Figure 5-49)

To remove the evaporator:

1. Remove the cantilever shelves.
2. Remove the glass shelf and side rails.
3. Remove wire baskets and slides.
4. Remove the evaporator cover.
5. Remove the styrofoam insulators from both sides of the evaporator.
6. Remove the defrost thermostat and defrost heater.
7. Recover refrigerant by using EPA approved recovery system.

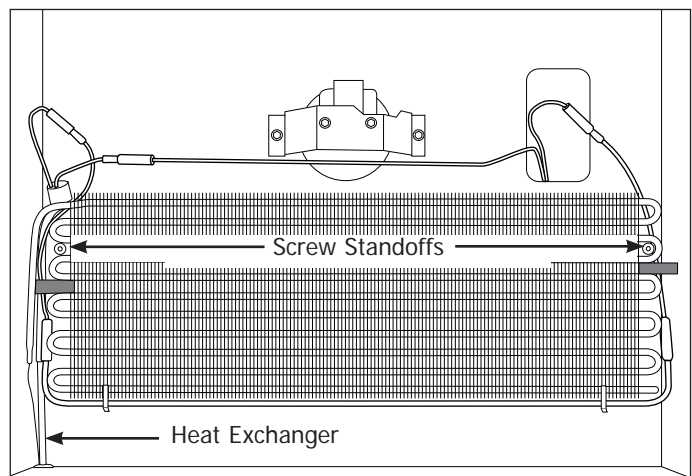


Figure 5-49. Evaporator Removal

NOTE

Whenever the sealed system is opened the filter-drier must be replaced.

8. Remove the filter-drier.
9. Cut suction line about 1" from compressor.
10. Straighten the tubing, remove the foam sleeve, and carefully feed the heat exchanger through the cabinet while pulling up on the evaporator.

Section 6 Troubleshooting

| Problem | Cause | Correction |
|---|---|--|
| Freezer/refrigerator compressor does not run. | Unit is plugged into a circuit that has a ground fault interrupt. | Use another circuit. Check circuit for proper voltage. |
| | Temperature control is in the "OFF" position. | Set control to a temperature setting. Instruct customer. |
| | Unit may not be plugged in, or plug may be loose. | Ensure plug is tightly pushed into outlet. |
| | House fuse blown or tripped circuit breaker. | Check/replace fuse with a 15 amp time delay fuse. Reset circuit breaker. |
| | Power outage. | Check house lights. Call local Electric Company. |
| Freezer/refrigerator runs too much or too long. | Room or outside weather is hot. | It's normal for the freezer/refrigerator to work harder under these conditions. |
| | Unit has recently been disconnected for a period of time. | It takes 4 hours for the unit to cool down completely. |
| | Large amount of warm or hot food have been stored recently. | Warm food will cause unit to run more until the desired temperature is reached. |
| | Door is opened too frequently or kept open too long. | Warm air entering the unit causes it to run more. Open the door less often. |
| | Unit door may be slightly open. | See Problem section "Door will not close". |
| | Temperature control is set too low. | Set control to a warmer setting. Allow several hours for the temperature to stabilize. |
| | Freezer/refrigerator gaskets are dirty, worn, cracked or poorly fitted. | Clean or change gasket. Leaks in the door seal will cause unit to run longer in order to maintain desired temperature. |
| Interior freezer/refrigerator temperature is too cold. | Temperature control is set too low. | Set control to a warmer setting. Allow several hours for the temperature to stabilize. |
| Interior freezer/refrigerator temperature is too warm. | Temperature control is set too warm. | Set control to a colder setting. Allow several hours for the temperature to stabilize. |
| | Door is opened too frequently or kept open too long. | Warm air entering the unit causes it to run more. Open the door less often. |
| | Unit door may be slightly open. | See Problem section "Door will not close". |
| | Large amount of warm or hot food have been stored recently. | Wait until the unit has had a chance to reach its selected temperature. |
| | Unit has recently been disconnected for a period of time. | Unit requires 24 hours to cool down completely. |
| Freezer external surface temperature is warm. | The external freezer walls can be as much as 30°F warmer than room temperature. | This is normal while the compressor works to transfer heat from inside the unit cabinet. |

Section 6 Troubleshooting

| Problem | Cause | Correction |
|---|--|--|
| Louder sound levels whenever Freezer/refrigerator is on. | Modern Freezers have increased storage capacity and more stable temperatures. They require heavy duty compressors. | This is normal. When the surrounding noise level is low, you might hear the compressor running while it cools the interior. |
| Louder sound levels when compressor comes on. | Freezer/refrigerator operates at higher pressures during the start of the ON cycle. | This is normal. Sound will level off or disappear as freezer/refrigerator continues to run. |
| Popping or cracking sound when compressor comes on. | Metal parts undergo expansion and contraction, as in hot water pipes. | This is normal. Sound will level off or disappear as freezer/refrigerator continues to run. |
| Bubbling or gurgling sound. | Refrigerant used to cool the unit is circulating throughout system. | This is normal. |
| Vibrating or rattling noise. | Freezer/refrigerator is not level. It rocks on the floor when it is moved slightly. | Level the freezer/refrigerator. |
| | Floor is uneven or weak. | Ensure floor can adequately support unit. Level the unit by putting wood or metal shims under part of the unit |
| | Freezer/refrigerator is touching the wall. | Re-level freezer/refrigerator or move slightly. |
| Moisture forms on inside Freezer/refrigerator walls. | Weather is hot and humid, which increases internal rate of frost build-up. | This is normal. |
| | Door is slightly open. | See Problem section "Door will not close". |
| | Door is opened too frequently or kept open too long. | Open the door less often. |
| Odors in Freezer/refrigerator. | Interior needs to be cleaned. | Clean interior with sponge, warm water, and baking soda. Replace air filter. |
| | Foods with strong odors are in the Freezer. | Cover the food tightly. |
| Door will not close. | Freezer/refrigerator is not level. It rocks on the floor when it is moved slightly. | This condition can force the cabinet out of square and misalign the door. Level unit. |
| | Floor is uneven or weak. | Ensure floor can adequately support unit. Level the unit by putting wood or metal shims under part of the unit. |
| One of the lights does not illuminate. | The light bulb is burned out. | Replace light bulb. See Section 4 |
| Automatic ice maker not working. (Some freezer models) | No electric current is reaching the freezer. | See Problem section "Freezer/refrigerator compressor does not run" on previous page. |
| | Ice maker system is not working | <ol style="list-style-type: none"> 1. Ensure the wire signal arm is not in the UP position. 2. Ensure Water supply is turned off. 3. Ensure Water pressure is sufficient. 4. The freezer is not cold enough. |

Section 6 Troubleshooting

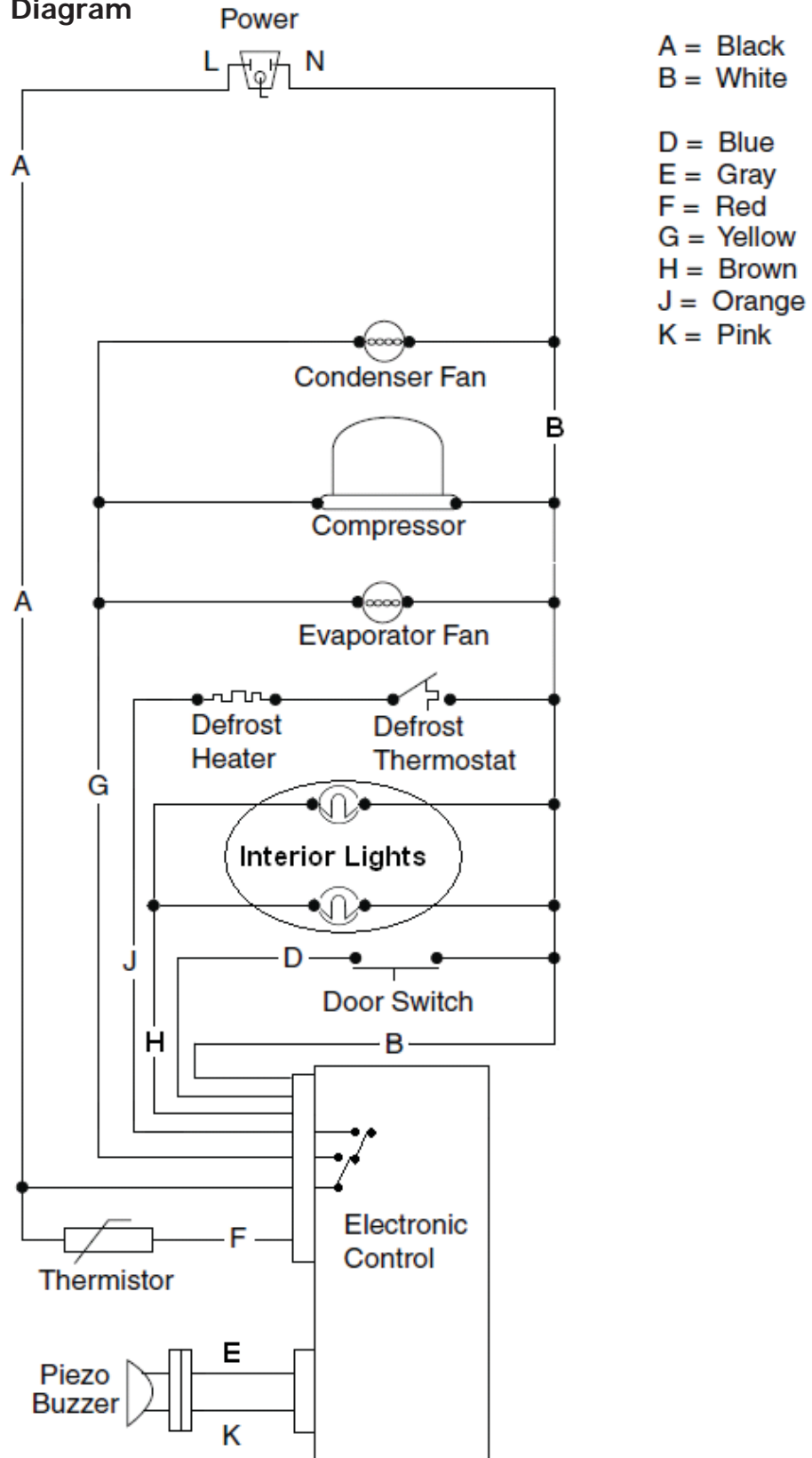
The following table relates to troubleshooting the thermostat, electronic components and compressor with its associated components.

| Problem | Cause | Correction |
|---|--|--|
| Compressor and evaporator fan motor does not run. | <ol style="list-style-type: none"> 1. Is the temperature control set to off? 2. Measure the input voltage to the electronic control. Is line to neutral voltage being applied? 3. Disconnect the wiring harness from the compressor controller and measure the voltage drop between the two wires in the harness. Does meter read line to neutral voltage? | <ol style="list-style-type: none"> 1.Yes. Set control from 1 to 7 1.No. Go to step 3. 2.Yes. Replace defective electronic control. 2.No. Defective wire harness. 3.Yes. Replace defective compressor controller or compressor and evaporator fan motor. 3.No. Replace defective electronic control. |
| Compressor does not run, but the evaporator fan motor does. | <ol style="list-style-type: none"> 1. Defective compressor or compressor controller. 2. No power to compressor. Poor connection at main connector. | <ol style="list-style-type: none"> 1. Replace compressor controller. If problem is not corrected replace compressor. 2. Ensure good electrical connection from power to compressor. |
| Evaporator fan motor does not run, but the compressor operates. | <ol style="list-style-type: none"> 1. Is there something blocking the fan blade? | <ol style="list-style-type: none"> Yes. Remove restriction from fan blade. No. Replace defective fan motor. |
| Interior lighting does not illuminate when door is opened. | <ol style="list-style-type: none"> 1. Check the door switch with an ohm meter. Is switch NC, and properly connected. 2. With power on and door open, check for DC voltage across terminals located diagonal from each other at 4 socket connector coming from the Power Supply Box. Is there a voltage greater than 20 Vdc across each diagonal? 3. Check for continuity across the terminals located diagonal from each other at the 4 pin connector coming from the cabinet. Is there continuity in both circuits? 4. With power on and door open, check for line voltage across 2 pin connector from cabinet to Power Supply Box. | <ol style="list-style-type: none"> 1. No, Yes. Replace defective door switch. 1. Yes, No. Connect door switch. 1. Yes, yes. Go to step 2. 2. Yes, go to step 3. 2. No, go to step 4. 3. Yes. Poor connection exists between 4 pin connectors. Ensure they are properly connected. 3. No. Faulty connection or light bulb exists in light bulb circuit. Check light bulb for proper connection and for failure. 4. Yes, Replace Power Supply 4. No, replace electronic control |
| Compressor runs continuously, but freezer is not cold. | <ol style="list-style-type: none"> 1. Connect a low side gauge to the processing tube on the compressor. Is the pressure in a vacuum or lower than normal? | <ol style="list-style-type: none"> Yes. System low on refrigerant, check for leak in system before adding refrigerant. No. Replace defective compressor. |
| Compressor runs continuously and the freezer/refrigerator is colder than set temp. Or Freezer/refrigerator temperatures do not correspond with temperature control settings, but compressor operation is normal. | <p>Check resistance of the thermistor. Determine the corresponding temperature using the "Thermistor Resistance chart".</p> <ol style="list-style-type: none"> 1. Is the temp from the chart within a few degrees of the actual temperature of the thermistor? 2. Is the temp from the chart within a few degrees of the displayed temp on the control? Defective thermostat. | <ol style="list-style-type: none"> 1. Yes, go to step 2. 1. No, replace defective thermistor 2. Yes, check for error codes on the control 2. No, replace defective control |

Notes

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and extend across the width of the page. There are no margins, text, or other markings on the paper.

All Refrigerator Wiring Diagram



Section 7 Wiring Diagram

All Freezer Wiring Diagram

