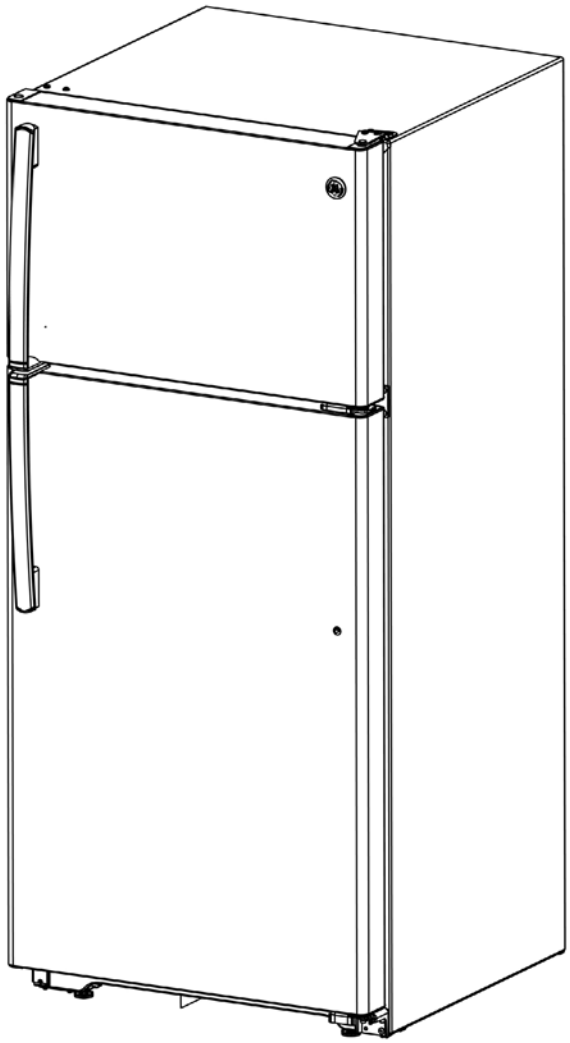
GE Appliances & Lighting

Technical Service Guide

November 2014

Top Freezer Refrigerator

HPS15BTHR
HPE15BTH
GTS15CTHR
GTE15CTHR
GPE16DTH
GIE16DGH
GTE16DTH
GTS16DTH
GTS16GTH
GTE16GTH
GTE16GSH
GTS16GSH
GIE16GSH
HPS18BTH
GIE18HGH
GIE18HSH
GIE18GCH
GIE18GSH
GTE18LGH
GTE18LSH
GTE18LMH
GTE18GSH
GTE18GMH
GTE18GTH
GTE18CTH
GTS18GSH
GTS18GTH



GE Appliances & Lighting
General Electric Company
Louisville, Kentucky 40225

IMPORTANT SAFETY NOTICE

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WARNING

To avoid personal injury, disconnect power before servicing this product. If electrical power is required for diagnosis or test purposes, disconnect the power immediately after performing the necessary checks.

RECONNECT ALL GROUNDING DEVICES

If grounding wires, screws, straps, clips, nuts, or washers used to complete a path to ground are removed for service, they must be returned to their original position and properly fastened.

GE Appliances & Lighting

Technical Service Guide

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Safety Requirements

GE Factory Service Employees are required to use safety glasses with side shields, safety gloves and steel toe shoes for all repairs.

Steel Toed Work Boot

Electrically Rated Glove and Dyneema® Cut Resistant Glove Keeper

Dyneema®Cut Resistant Glove

Cut Resistant Sleeve(s)

Plano Type Safety Glasses

Brazing Glasses

Prescription Safety Glasses
Safety Glasses must be ANSI Z87.1-2003 compliant

⚠ WARNING

Prior to disassembly of the top freezer refrigerator to access components, GE Factory Service technicians are REQUIRED to follow the Lockout / Tagout (LOTO) 6 Step Process:

Step 1 Plan and Prepare	**Step 4** Apply LOTO device and lock
Step 2 Shut down the appliance	**Step 5** Control (discharge) stored energy
Step 3 Isolate the appliance	**Step 6** "Try It" verify that the appliance is locked out

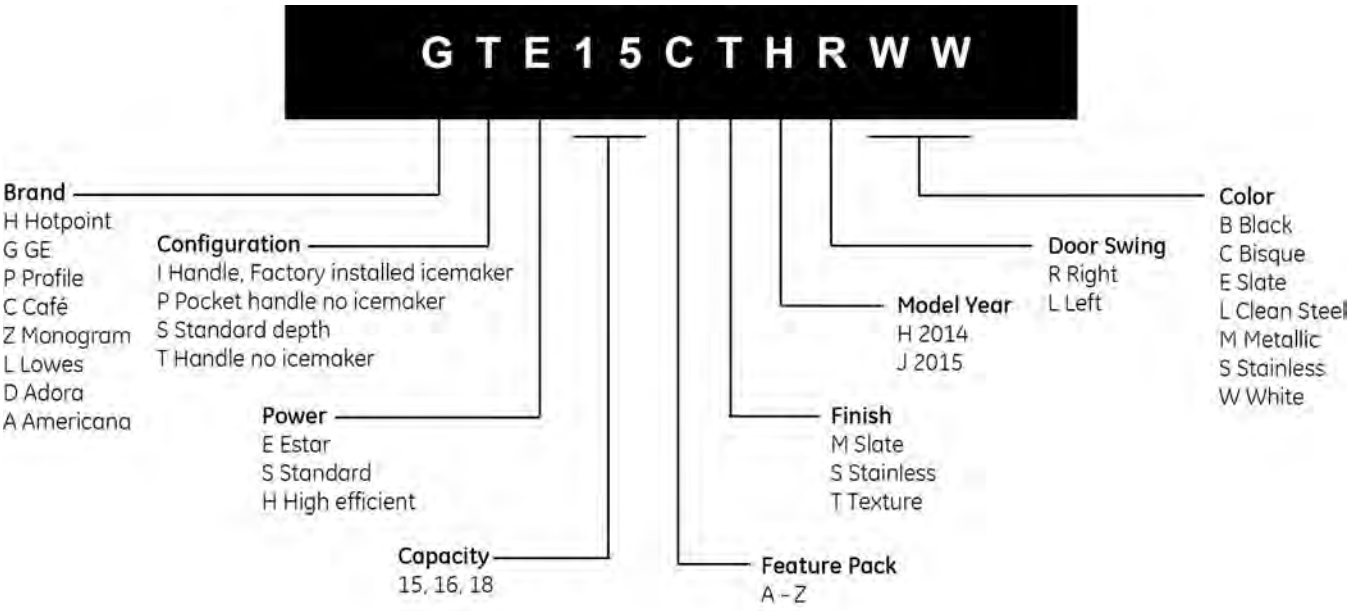
Introduction

General Electric introduces its new line of energy efficient 15', 16', and 18' cu. Ft. 28" wide top freezers. The new top freezers were designed to meet the 2014 energy regulatory requirements. Along with meeting the new energy requirements, it has new appearance features such as , new designer door handles, GE badge and round doors that create an attractive external appearance. The interior has a Redesigned control housing, Z-style fresh food shelves (on some models), 8% larger vegetable pans and a 2 position freezer shelf. A newly designs air tower improves run time and air flow. The new ice maker location and redesigned ice bucket helps to reduce ice spillage.

Key Features and Updates

- GE's simplest door reversal ever
- Newly designed condenser (moved from bottom of fridge to rear behind access cover)
- Front serviceable Cold Control, Defrost Control and Freezer components
- Omega groove door liners for ease of replacing and adjusting door gaskets
- Durable high gloss ABS liners helps prevent cracking
- Galvanized doors for improved corrosion resistance
- Heavy duty door hinge and handle system
- Improved low friction pan slides prevent binding and squeaks
- 8% larger vegetable pans take advantage of dead air space on sides and below pans
- Freezer shelf with 2 positions adding flexibility to freezer space
- New high density ice maker system makes more ice faster and takes up less space with the new efficiently designed ice bucket
- New smooth handles replace textured handles for easier cleaning
- Quick space shelf (on select models)
- Clear modular door bins (on select models)

Nomenclature



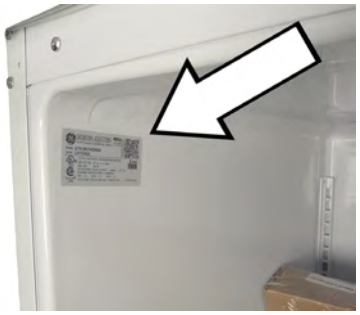
Serial Number

The nomenclature breaks down and explains what the letters and numbers mean in the model number. The first two characters of the serial number identify the month and year of manufacture. The letter designating the year repeats every 12 years

Example: LA123456S = June, 2013

A – JAN	2024 - Z
D – FEB	2023 - V
F – MAR	2022 - T
G – APR	2021 - S
H – MAY	2020 - R
L – JUN	2019 - M
M – JUL	2018 - L
R – AUG	2017 - H
S – SEP	2016 - G
T – OCT	2015 - F
V – NOV	2014 - D
Z – DEC	2013 - A

The Model Serial ID Tag is located inside the fresh food compartment in the left hand corner.



The Mini Manual is taped to the machine compartment cover.

Product Specifications

Specification for 15, 16 Cu Ft Mechanical Timer Refrigerator

DISCONNECT POWER CORD BEFORE SERVICING

IMPORTANT - RECONNECT ALL GROUNDING DEVICES

All parts of this appliance capable of conducting electrical current are grounded. If grounding wires, screws, straps, clips, nuts or washers used to complete a path to ground are removed for service, they **must** be returned to their original position and properly fastened.

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ELECTRICAL SPECIFICATIONS

Cold Control (Position 5)	28.0°F
Defrost Control @ 120 VAC ~60 Hz	15 hrs. / 33 min
Defrost Thermostat	64-23°F
Electrical Rating:	120 VAC AC 60Hz
Maximum Current Leakage	0.75 mA
Maximum Ground Path Resistance	0.14 Ohms

NO LOAD PERFORMANCE

Control Position 5/C and Ambient

Temperature of	70°F	90°F
Fresh Food, °F / °C	33-39	33-41
Frozen Food, °F / °C	(-4) -2	(-4) -4
Run Time %	23-33	37-49

REFRIGERATION SYSTEM

Refrigerant Charge (R134a)	4.6 ounces / 0.13 kg
Compressor @ 120 VAC ~60 Hz	690 BTU/hr. / 202W
Minimum Vacuum @ 2 minutes	19 inches / 48 cm
Minimum Equalized Pressure	
@70°F / 21°C	37.8 PSIG / 362 kPa (abs)
@90°F / 32°C	50.7 PSIG / 451 kPa (abs

INSTALLATION

Clearance must be provided for air circulation

TOP	1 inch / 25 mm
SIDES	3/4 inch / 19 mm
REAR	2 inch / 51 mm

REPLACEMENTPARTS

Temperature Control	WR09X21006
Defrost Control	WR09X10049
Defrost Thermostat	WR50X10071
Defrost Heater	WR09X21107
Condenser Fan Motor	WR60X20871
Evaporator Fan Motor	WR60X10346
Relay/Overload	WR08X10132
Drier	WR86X0096
Fuse Harness	WR55X21096

Pub. No. 31-51875-4

Specification for 15, 16 Cu Ft Energy Star Refrigerator

DISCONNECT POWER CORD BEFORE SERVICING

IMPORTANT - RECONNECT ALL GROUNDING DEVICES

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ELECTRICAL SPECIFICATIONS

Cold Control (Position 5)	28.0°F
Defrost Control @ 120 VAC ~60Hz	Adaptive Defrost
Defrost Thermostat	64-23°F
Electrical Rating:	120 VAC AC 60Hz
Maximum Current Leakage	0.75 mA
Maximum Ground Path Resistance	0.14 Ohms

NO LOAD PERFORMANCE

Control Position 5/C and Ambient

Temperature of	**70°F**	**90°F**
Fresh Food, °F / °C	33-39	33-41
Frozen Food, °F / °C	(-4) -2	(-4) -4)
Run Time %	23-33	37-49

REFRIGERATION SYSTEM

Refrigerant Charge (R134a)	4.5 oz
Compressor @ 120 VAC ~60Hz	615 BTU/hr. /180W
Minimum Vacuum @ 2 minutes	19 inches / 48 cm
Minimum Equalized Pressure	
@70°F / 21°C	37.8 PSIG / 362 kPa
@90°F / 32°C	50.7 PSIG / 451 kPa

INSTALLATION

Clearance must be provided for air circulation

TOP	1 inch / 25 mm
SIDES	3/4 inch / 19 mm
REAR	2 inch / 51 mm

REPLACEMENT PARTS

Temperature Control	WR09X21006
Electronic Defrost Control Board (EDC)	WR55X21128
Defrost Thermostat	WR50X10071
Defrost Heater	WR09X21107
Condenser Fan Motor	WR60X20871
Evaporator Fan Motor	WR60X10346
Relay/Overload	WR07X10133
Drier	WR86X0096
Fuse Harness	WR55X21096

Pub. No. 31-51874-5

Specification for 18 Cu Ft Mechanical Timer Refrigerator

DISCONNECT POWER CORD BEFORE SERVICING

IMPORTANT - RECONNECT ALL GROUNDING DEVICES

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ELECTRICAL SPECIFICATIONS

Temperature Control (Colder)	23.9-11.1°F / (-4.5) - (-11.6)°C
Defrost Control	15 hrs/ 33 min
Defrost Thermostat	64-23°F / 17.8 - (-5.0)°C
Electrical Rating: 110V to 127V AC 60Hz 100V AC 50 Hz	6.5 Amp
Maximum Current Leakage	0.75 mA
Maximum Ground Path Resistance	0.14 Ohms

NO LOAD PERFORMANCE

Control Position, Colder Temperature of	**70°F / 21°C**	**90°F / 32°C**
Fresh Food, °F / °C	34-40 /1.1-4.4	35-39 / 1.7-3.9
Frozen Food, °F / °C	-3 / -19.4	-3 / -19.4
Running Time %	20-30	41-53

REFRIGERATION SYSTEM

Refrigerant Charge (R134a)	Refer to Rating Plate
Compressor Capacity (@ 10°F Evap and 105°F Cond)	600 BTU/hr / 175.8W
Minimum Vacuum @ 2 minutes	19 inches / 48 cm
Minimum Equalized Pressure	
@70°F / 21°C	26 PSIG / 179 kPa
@90°F / 32°C	35 PSIG / 241 kPa

INSTALLATION

Clearance must be provided for air circulation

TOP	1 inch / 25 mm
SIDES	3/4 inch / 19 mm
REAR	2 inch / 50 mm

REPLACEMENT PARTS

Temperature Control	WR09X21005
Relay	WR08X22874
Defrost Control	WR09X10049
Defrost Thermostat	WR50X22304
Defrost Heater	WR09X21107
Condenser Fan Motor	WR17X21162
Evaporator Fan Motor	WR60X10346
Drier	WR86X0096
Harness Jumper Fuse	WR55X21096

Pub. No. 31-51904

Specification for 18 Cu Ft Energy Star Refrigerator

DISCONNECT POWER CORD BEFORE SERVICING

IMPORTANT - RECONNECT ALL GROUNDING DEVICES

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ELECTRICAL SPECIFICATIONS

Temperature Control (Colder)	34.6-13.4°F / (-10.3) - (1.4)°C
Defrost Control @ 115V ~60 Hz	Adaptive Defrost
Defrost Thermostat	64-23°F / 17.8 - (-5.0)°C
Electrical Rating: 110V to 127V AC 60Hz 100V AC 50 Hz	6.5 Amp
Maximum Current Leakage	0.75 mA
Maximum Ground Path Resistance	0.14 Ohms

NO LOAD PERFORMANCE

Control Position Colder and Ambient Temperature of	**70°F / 21°C**	**90°F / 32°C**
Fresh Food, °F / °C	33-39 /1-4	33-41 / 2-4
Frozen Food, °F / °C	(-4) -2 / (-4) -4 /(-20)-(-17)	(-20)-(-16)
Run Time %	23-33	37-49

REFRIGERATION SYSTEM

Refrigerant Charge (R134a)	Refer to Rating Plate
Compressor @ 115V ~60 Hz	600 BTU/hr / 176W
Minimum Vacuum @ 2 minutes	19 inches / 48 cm
Minimum Equalized Pressure	
@70°F / 21°C	37.8 PSIG / 362 kPa (abs)
@90°F / 32°C	50.7 PSIG / 451 kPa (abs)

INSTALLATION

Clearance must be provided for air circulation

TOP	.1 inch / 25 mm
SIDES	3/4 inch / 19 mm
REAR	2 inch / 51 mm

REPLACEMENT PARTS

Temperature Control	WR09X21005
Defrost Thermostat	WR50X22304
Defrost Heater	WR09X21107
Condenser Fan Motor	WR17X21162
Evaporator Fan Motor	WR60X10346
Relay	WR08X22874
Drier	WR86X0096
Harness Jumper Fuse	WR55X21096
Electronic Defrost Control Board (EDC)	WR55X21623

Pub. No. 31-51898

Use & Care Manuals and Mini Manuals

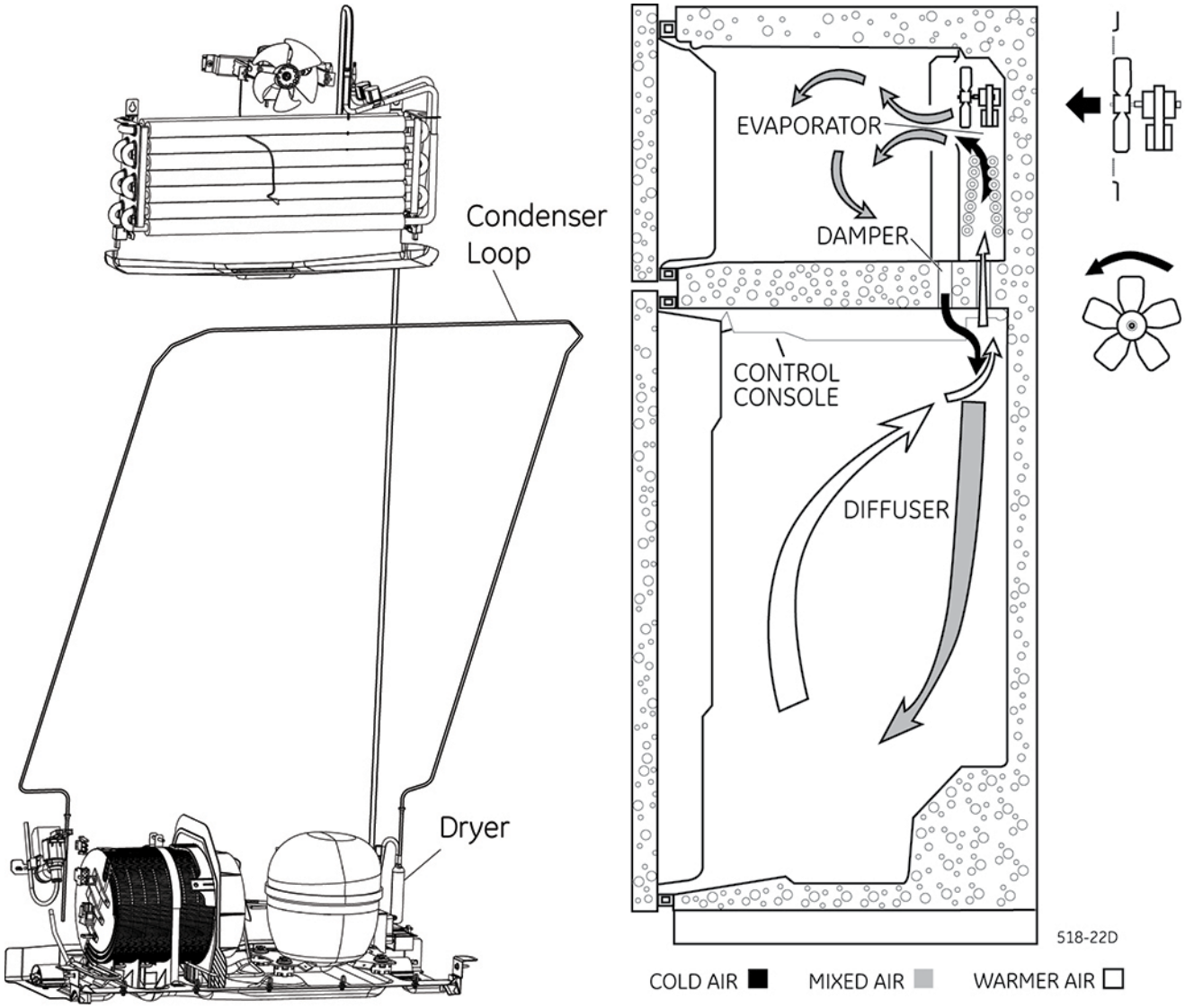
Mini Manuals (available on website):

- Pub. No. 31-51904 (245D1691P004): 18’, 28” Wide Mechanical Timer
- Pub. No. 31-51898 (245D1691P001): 18’, 28” Wide EDC
- Pub. No. 31-51875-4 1875D (245D1627P002): 15’ & 16’, 28” Wide Mechanical Timer
- Pub. No. 31-51874-5 (245D1627P001): 15’ & 16’, 28” Wide EDC

Use & Care Manuals (available on website):

- Pub. No. 49-60697-3 (245D1573P001) 15, 16, 18 Cu. Ft. and 28" Top Freezer

Refrigeration and Airflow Diagram



Installation Instructions

REVERSING THE DOOR SWING
BEFORE START

- Unplug the refrigerator from its electrical outlet.
- Empty all door shelves, including the dairy compartment.

NOTE: Do not let freezer or fresh food door drop to the floor. To do so could damage the door stops.

TO REMOVE DOORS

1. Remove the top hinge.
2. Lift off the freezer door.
3. Remove the center hinge pin.
4. Lean the fresh food door forward and lift the door off of the lower hinge pin.
5. Be careful not to lose the spacer and washers.

NOTE: Plastic Handle instructions, see the next page.

STAINLESS STEEL HANDLE

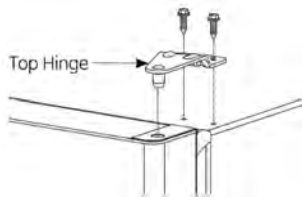
6. Remove the handle screws from the top of the fresh food door. Remove the handle screws from the bottom of the freezer door.
7. Loosen set screw on the handle with the provided 1/8 in. Allen wrench.
8. Remove the door handle.
9. Change places between the handle fastener and plug button on the door front.
10. Move the plug buttons on the top and front of the door to the opposite side of the door.
11. Transfer the door stop on the bottom of the door.
12. Attach the handle to the fresh food door with screws at top of the handle. Use 1/8 in. Allen wrench to tighten set screw at bottom of handle.
13. Attach handle to the freezer door with screws at bottom of the handle. Use the 1/8 in. Allen wrench to tighten set screw at top of handle.
14. Attach badge on freezer door opposite of the handle.

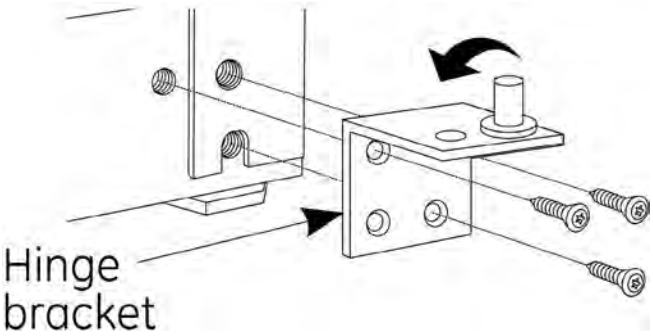
Tools needed:

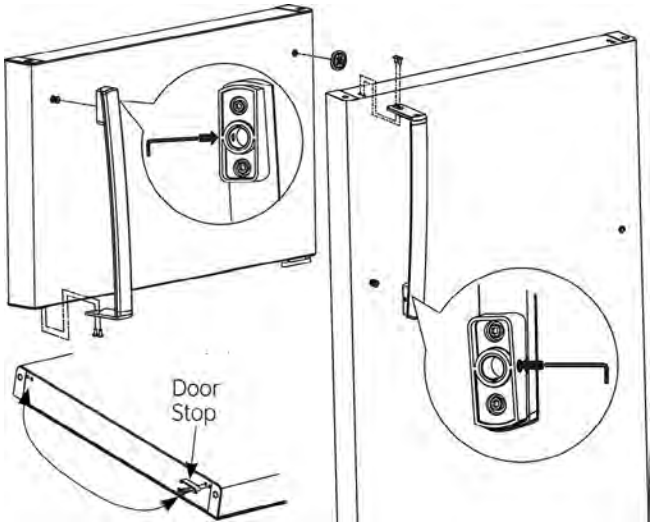
- T20 Torx bit driver
- 1/8 in. Allen wrench (provided in handle package)
- #2 Phillips screw driver (some models)

NOTE: When installing door handles, follow the instructions that pertain to the type of handles provided with the unit.

- 'a' instructions are for Stainless Steel Handles
- 'b' instructions are for Plastic Handles







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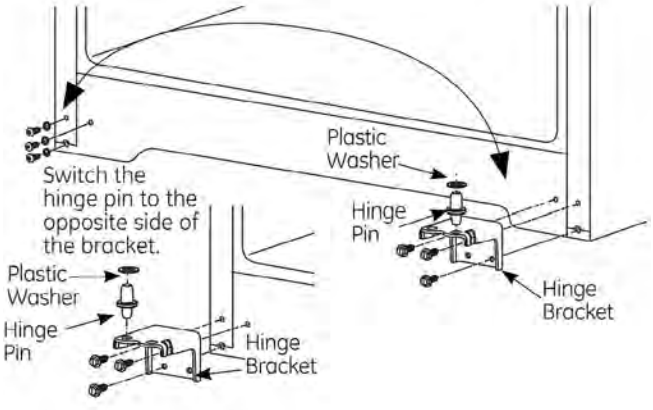
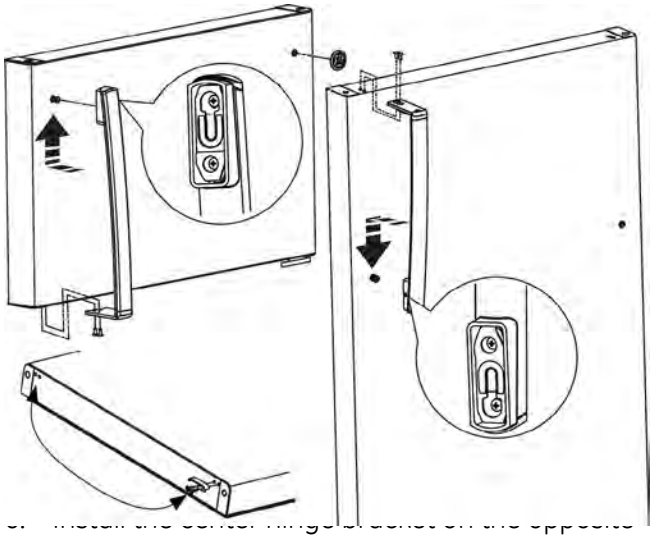
REVERSING THE DOOR SWING
PLASTIC HANDLE ASSEMBLY

6. Remove the handle screws from the top of the fresh food door. Remove the handle screws from the bottom of the freezer door.
7. Remove the door handle on the fresh food door by sliding the handle up off of the fastener. Remove the door handle on the freezer door by sliding the handle down off of the fastener.
8. Change places between the handle fastener and plug button on door front.
9. Move the plug buttons on the top and front of the door to the opposite side of the door.
10. Transfer the door stop on the bottom of the door.
11. Attach handle to the fresh food door by sliding the handle down onto the fastener and with the screws at top of handle.
12. Attach the handle to the freezer door by sliding the handle up onto the fastener and with the screws at the bottom of the handle.
13. Attach badge on freezer door opposite of the handle.

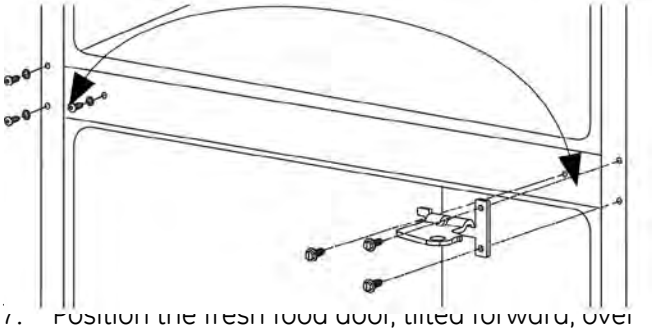
TO RE-HANG THE DOORS

1. Remove the hinge pin from the lower hinge bracket.
2. Remove the lower hinge bracket.
3. Install the bottom hinge bracket on the opposite side of the opening.
4. Install the lower hinge pin into the hinge bracket hole to the outside of the refrigerator.
5. Remove the center hinge bracket.

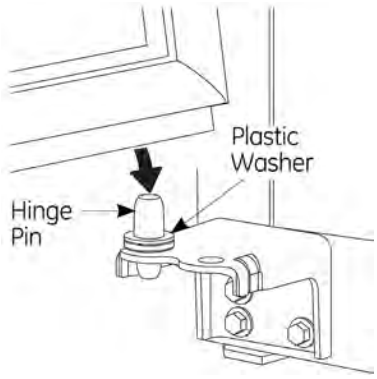




6. Install the center hinge bracket on the opposite side of the opening. (Turn the hinge over to install.)



7. Position the fresh food door, tilted forward, over the lower hinge pin and slide it into place.
8. Install the center hinge pin into the center hinge bracket and into the hole in the fresh food door. Make sure the washer is in place over the hinge pin on top of the bracket.
9. Place the freezer door on top of the center hinge pin.
10. With the freezer door in place, install the top hinge into the top of the freezer door. The holes in the hinge will align with two of the holes on top of the refrigerator. Install the two screws into the top hinge.



Product Specifications

Do you hear what I hear? These sounds are normal.

HUMMM... WHOOSH...

- The new high efficiency compressor may run faster and longer than an old refrigerator and might produce a high-pitched hum or pulsating sound while it is operating.
- There may also be a whooshing sound when the doors close. This is due to pressure equalizing within the refrigerator.

WHIR!

- There may be sounds heard associated with the fans spinning at high speeds. This happens when the refrigerator is first plugged in, when the doors are opened frequently or when a large amount of food is added to the refrigerator or freezer compartments. The fans are helping to maintain the correct temperatures.

CLICKS, POPS, CRACKS and CHIRPS

- There may be cracking or popping sounds when the refrigerator is first plugged in. This happens as the refrigerator cools to the correct temperature.
- The compressor may cause a clicking or chirping sound when attempting to restart (this could take up to 5 minutes).
- Expansion and contraction of cooling coils during and after defrost can cause a cracking or popping sound.
- On models with an ice maker, after an ice making cycle, ice cubes dropping into the ice bucket may be heard.

WATER SOUNDS

- The flow of refrigerant through the freezer cooling coils may make a gurgling noise like boiling water.
- Water dropping on the defrost heater can cause a sizzling, popping or buzzing sound during the defrost cycle.
- A water dripping noise may occur during the defrost cycle as ice melts from the evaporator and flows into the drain pan.
- Closing the door may cause a gurgling sound due to pressure equalization.

Structure

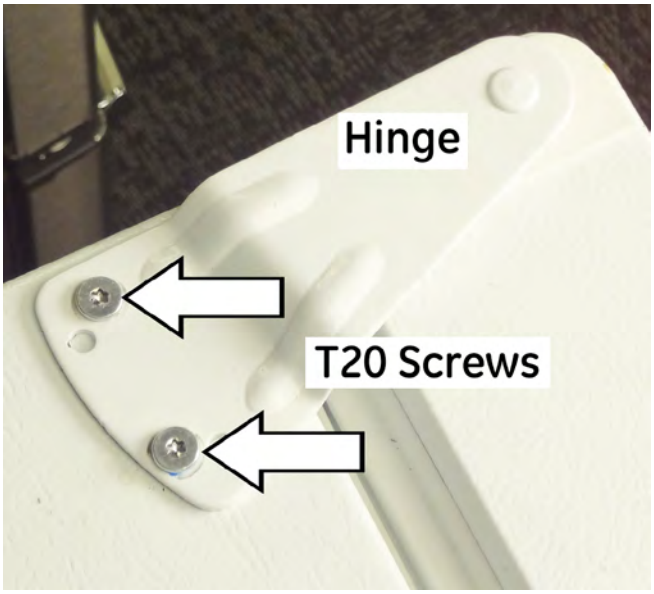
Refrigerator Doors

All refrigerator doors have a galvanized treated finish prior to painting. This treatment gives an added protection against rust, tropical environments, and is able to withstand highly corrosive conditions. The refrigerator doors are a combination of the inner liner and outer door panel held together by interior foam. This process makes both separate pieces one solid sturdy structure. Both inner and outer doors are now one assembly.

Freezer Door and Hinge

Door Removal

1. Remove all food from the inner door liner.
2. Remove two T20 Torx screws and the top hinge from the cabinet.
3. Open the door and lift it off the center hinge pin.



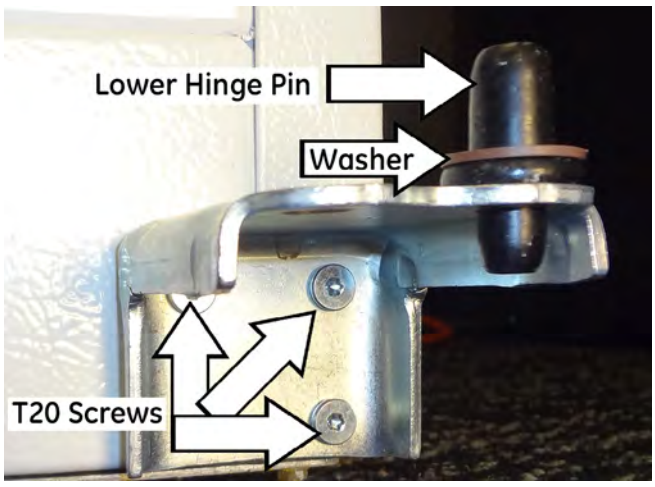
Fresh Food Door and Hinges

Door Removal

1. Remove all food items from the door(s). **Note: Do not lose washers on the center hinge pin and lower hinge pin. These washers are needed for proper door adjustment.**
2. Using a 3/8 hex head driver or a #2 Phillips screw driver, loosen and remove the center hinge pin.
3. Tilt the fresh food door away from the cabinet and lift up to clear the lower hinge.

To remove the hinge from the cabinet, remove the three T20 Torx screws.

Removing the lower hinge, then remove the three T20 Torx screws.



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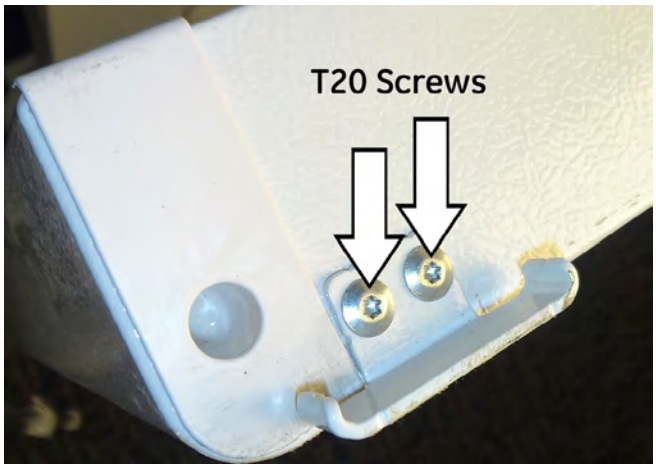
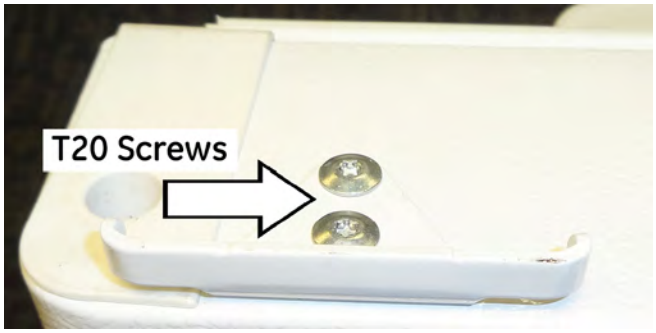
Door Stops

Fresh Food Door Stop



Freezer Door Stop



Door Handles

There are three types of handles, and they are model specific:

- Stainless
- Plastic
- Pocket

The stainless and plastic handles attach similar to both the Fresh Food and Freezer doors. They are both secured by two #2 Phillips screws on the top of the Fresh Food and bottom of the Freezer doors respectively. The stainless steel handle uses a 1/8 in. Allen wrench to fasten the handles to the doors, where the plastic handles are slotted and fastened to a stud on both doors.

NOTE: The Pocket Handles are foamed in with the doors and are not replaceable. If a handle is needed, the door would need to be replaced.

Door Gasket Removal and Replacement

Both the freezer and fresh food door gaskets are held in place by the inner door panel.

1. Pull the old gasket out of the door liner channel.
2. Soak the new gasket in warm water to make it more pliable.
3. Using the palm of a gloved hand, push the darted edge of the new gasket into the inner door retaining channel.

(*Continued next page*)

Front Mobility Wheels and Leveling Legs Removal

Warning: Disconnect power to the refrigerator prior to servicing the mobility wheel assembly. Also, before moving the refrigerator from its installation, make sure that the leveling legs are raised to prevent damage to the flooring.

1. Remove any items from the Fresh Food section.
2. Safely tilt the refrigerator back.
3. Remove the three 1/4 in. hex head screws and remove the mobility assembly.

There are two adjustable legs attached to the Mobility Wheel assembly. Turn CCW to remove, or raise the refrigerator and turn CW to re-assemble or adjust.

Base Pan

The Base Pan is the foundation for the machine compartment and adds structural strength and stability to the refrigerator cabinet. It also adds mobility, and is used for water evaporation. The base pan supports the following components:

- Compressor
- Condenser/Condenser support
- Condenser fan assembly
- Wire harness

The base pan is fastened to the refrigerator cabinet with two 3/8 in. hex head screws.

NOTE: The base pan and rear mobility wheels are not available for replacement.

For more information about machine compartment components, refer to **Machine Compartment** section of this service guide.

Control Panel

The control panel is attached to the ceiling of the fresh food section and houses the operational controls for the refrigerator. The control panel is a functional part that is designed as a conduit that supplies air to the refrigerator section, and returns the air to the freezer section. In the rear of the control panel, the water from the evaporator is drained through the control panels drain trough, which is connected to the drain outlet hose located at the rear of the fresh food section. The control panel houses the following parts:

- Cold control
- EDC board/Defrost control (model dependent)
- Light switch
- Lamp holder (socket)
- Control panel wire harness
- EPS duct transition
- Cold control knob

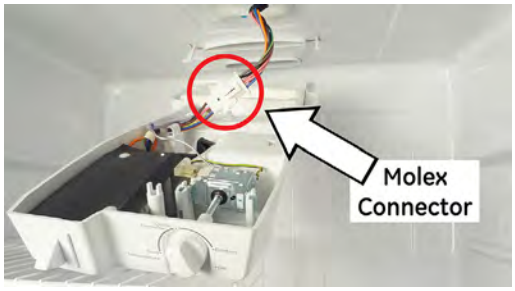
Warning: Disconnect power to the refrigerator prior to disassembling the Control Panel.

The image below reflects the new look Control Panel for 15' - 16' and 18' - 28" wide product.

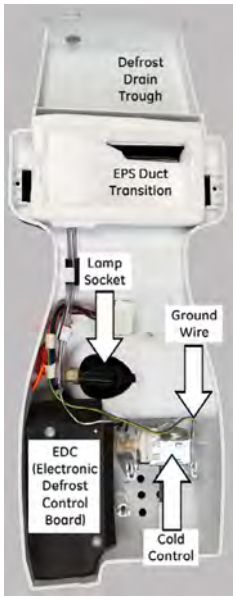
Control Panel Removal

1. Remove both Quadrex screws (a #2 Phillips screwdriver can be used to remove Quadrex screws).
2. Press in on the retainers to release the control housing assembly.

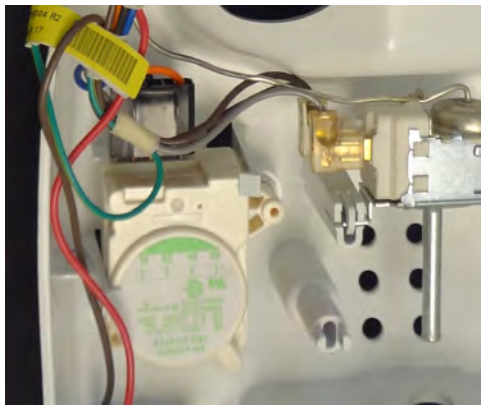
3. Release the Molex connector. Care should be taken when disconnecting the harness so that the Control Panel does not fall.



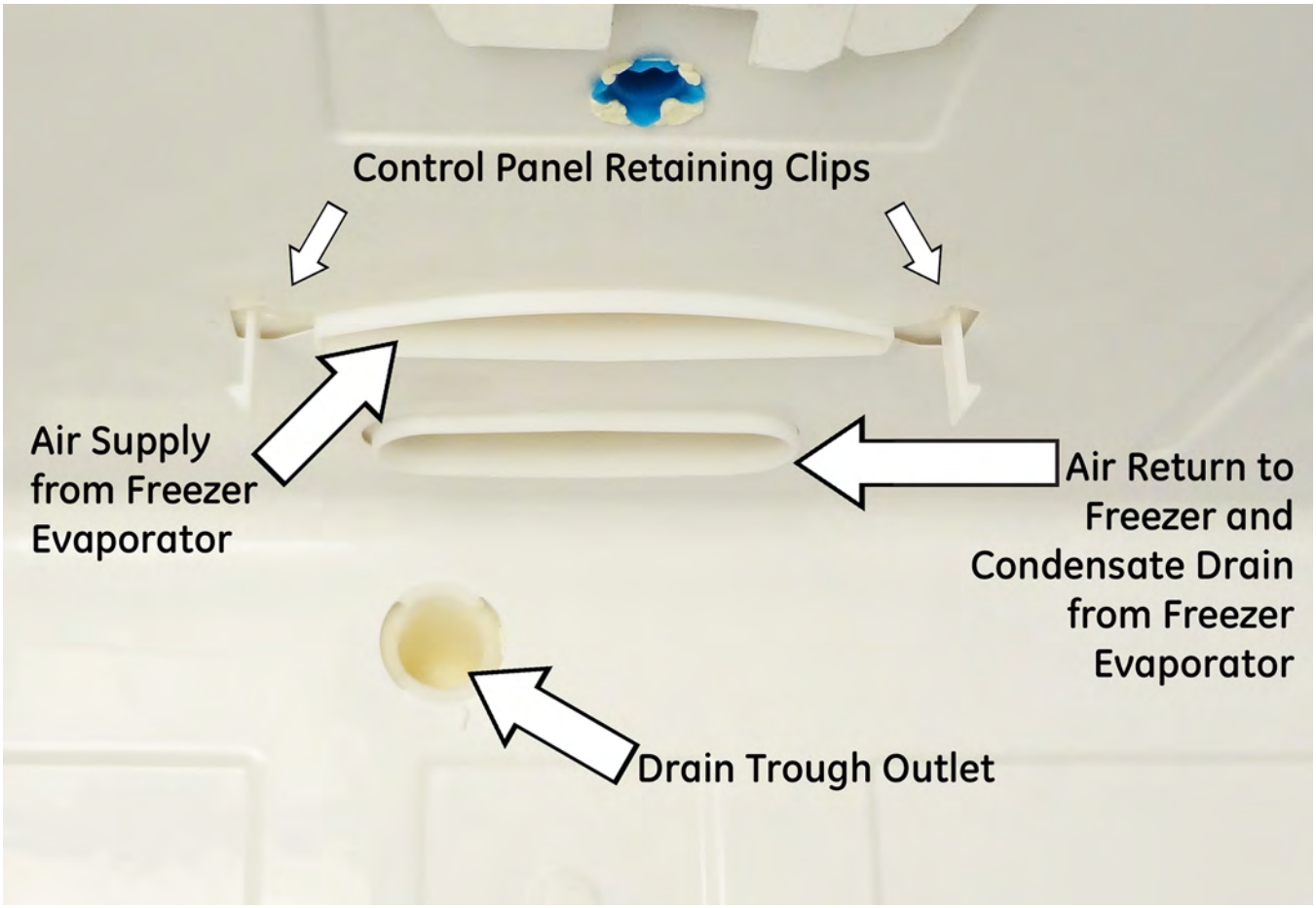
Control Panel Components



Control Panel with Electro-Mechanical Defrost Control



Fresh Food Compartment Air Ducts and Drain Tube



The air supply, freezer return, and control panel retainers are a single piece foamed in transition that connects the freezer to the fresh food section. This transition allows forced air to be directed from the freezer to the fresh food section and back to the freezer through the return. The return also is used for removing water after a defrost cycle, which drains into the control panel drain trough and out of the drain tube outlet. The retaining clips also help secure the control panel to the ceiling of the fresh food section.

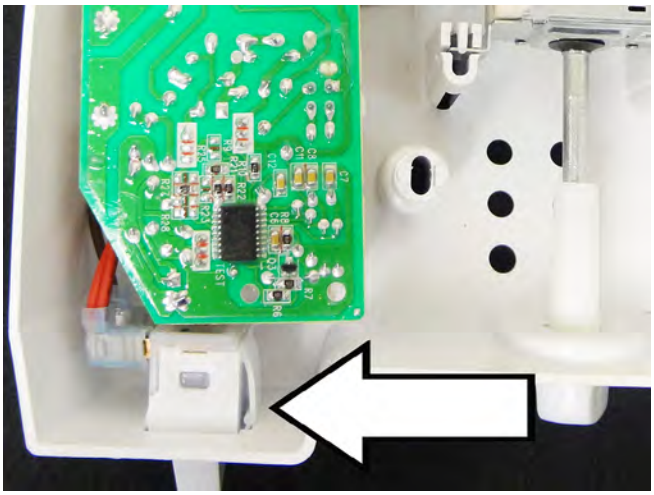
Control Panel

Light Switch

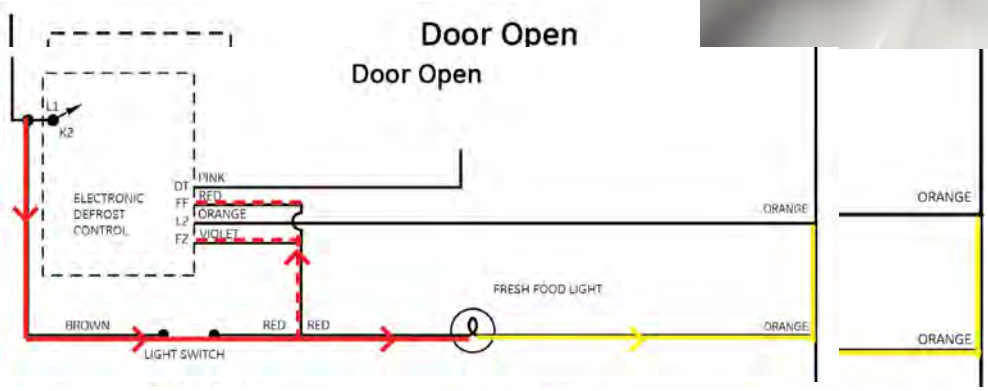
Warning: Disconnect power to the refrigerator prior to servicing.

Door Switch Removal

1. Remove the control panel (see the **Control Panel Removal** section in this Guide).
2. Remove the EDC board cover (if the model has an EDC board) to access the Door Switch.
3. Push in on the Door Switch tab, and remove the switch from the Control Housing and unplug.



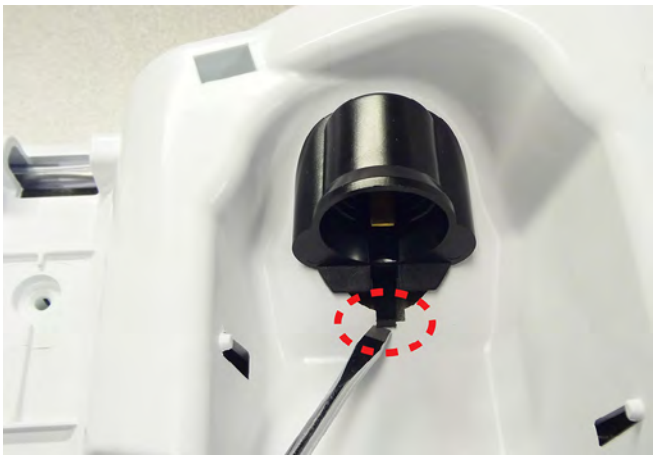
The door switch receives 120 VAC from the line voltage through the **brown** wire. When the Fresh Food door is open, the Door Switch closes and sends 120 VAC through the **red** wire to the Fresh Food 40W Lamp. The Door Switch operation is the same in the EDC models as it is in the Timer models with one difference: the EDC model the Door Switch provides door opening feedback to the control. See the **Adaptive Defrost** section in this Guide for more information.



Light Socket

Light Socket Removal

1. Unscrew the light bulb and remove.
2. Use a small flat blade screwdriver and lift up on the light socket tab. The light socket can be serviced without removing the control panel.



3. Disconnect the wire leads from the light socket.

Cold Control

A Cold Control is used to regulate the operation of the compressor and thus maintain desired food temperatures. The Cold Control consists primarily of a capillary tube and bellows assembly, a set of normally closed contacts, and a mechanical linkage.

The Cold Control is adjustable by means of a shaft, which rotates a cam to apply bias pressure against the bellows. With a knob on the shaft, the user can adjust the temperature setting as desired. Numbers on the knob indicate relative control settings that vary the temperature.

Pressure within the gas-charged capillary tube and bellows assembly respond to temperature sensed at the coldest point along the length of the capillary tube. Rising temperature causes the pressure to increase and expand the accordion-type bellows. The expanded bellows actuates the linkage, which allows the contacts to close. When the temperature drops, the bellows contract due to a decrease in pressure and the snap-action of the linkage opens the contacts. When the control shaft is rotated to the "off" setting, the cam manually presses the linkage against the contacts and holds them open.

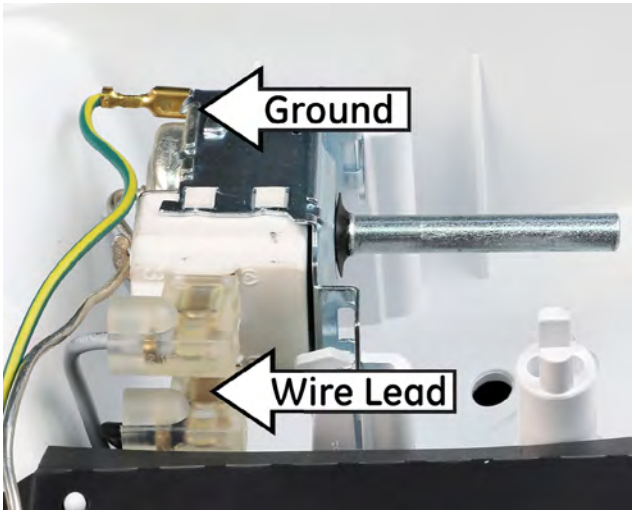
The temperature control is connected electrically in series with the compressor. While the control contacts remain closed, the compressor is energized until the pre-selected temperature is reached. The control contacts then open the circuit to the compressor. The compressor will remain off until the temperature increases sufficiently to cause the control contacts to close.

The difference between the off and on temperatures is called the temperature differential. On most controls, the differential is fixed and, remains constant at all settings. For example, where the temperature limits of a control at the warm setting are: 30°F - 21°F; at mid: 20°F - 11°F, and at cold: 10°F - 1°F, the control has a constant 9°F differential.

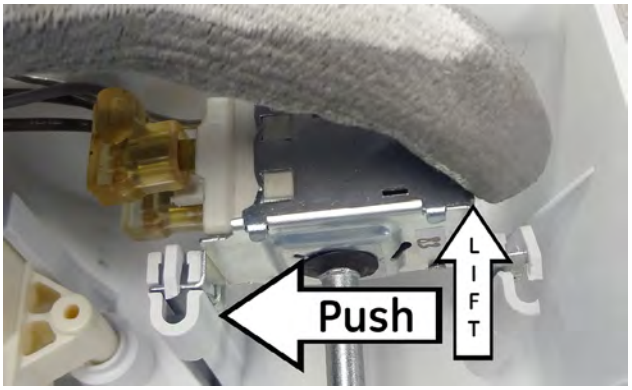
(*Continued next page*)

Cold Control Removal

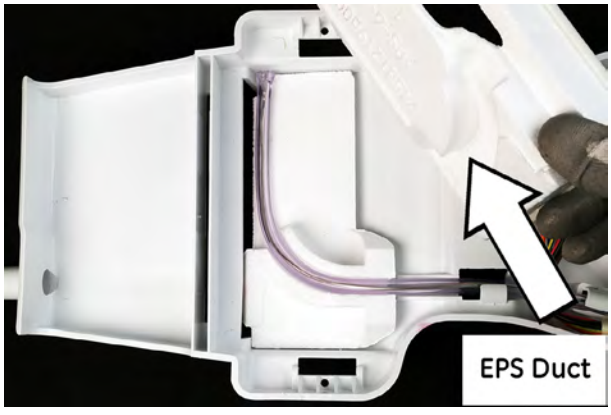
1. Remove the control console (see the **Control Panel Removal** section in this Guide).
2. Remove the temperature adjustment knob.
3. Disconnect the wire leads and ground wire from the Cold Control.



4. Push Cold Control either to the left or right to clear the retaining tabs. Lift up on the side that has cleared from the tab and remove.



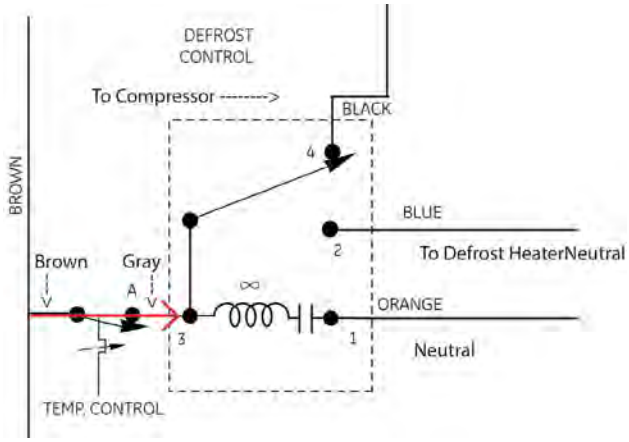
5. Remove (do not discard) the EPS Duct transition to access the Cold Control capillary.
6. Remove the capillary from the sleeve.



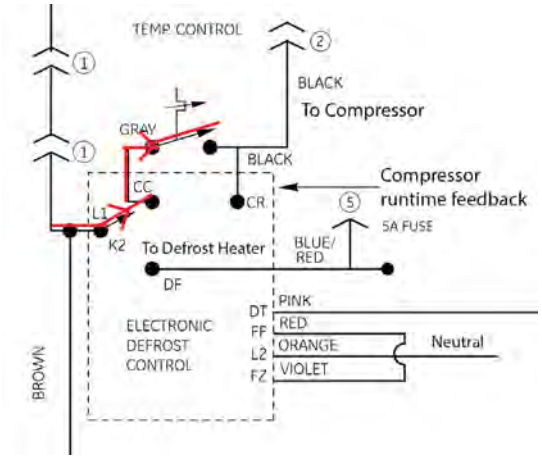
NOTE: When reinstalling the Cold Control, reconnect the ground wire and fully insert the Cold Control capillary into the sleeve.

The Cold Control switches 120 VAC from the **brown** wire to the **grey** to the Defrost Control.

120 VAC is supplied to the Cold Control from L1 to CC terminal when the K2 relay, located on the EDC board, is in the compressor run position.



On electromechanical models, the Cold Control switches 120 VAC from the **brown** wire to the **gray** to the Defrost Control.



On models with an EDC board, 120 VAC is supplied to the L1 terminal of the EDC. When the K2 relay is closed, 120 VAC is supplied to the cold control.

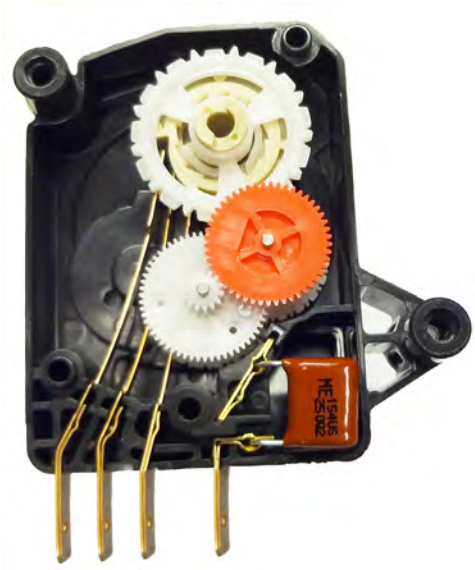
Electro-Mechanical Defrost Control

A defrost circuit is used on all models having the automatic defrost feature. This feature is often called **NO FROST** or **FROST FREE**, which simply means that frost is conveniently and automatically removed without any action required by the consumer. (Frost always accumulates where refrigeration takes place.)

The electrical components which comprise the defrost circuit are:

- the Heater (or heaters)
- the Control (often called the “defrost timer")
- the Defrost Thermostat (sometimes called the “Bi-Metal")

The defrost control used on most models is a simple electro-mechanical timer. It consists of a clock motor, attached to an insulated housing that contains a cam, and a single pole, double throw switch. The terminals are clustered together at one end of the control housing.



The purpose of the defrost control is to regulate the frequency of the defrost cycles and the duration of each cycle. This is accomplished by energizing the clock motor to drive a set of gears that, in turn, rotate the cam which operates the switch. The defrost cycle begins when the cam has rotated to the position where a mark on the cam aligns with a mark on the control housing. At this position, terminal 4 switch blade drops off the edge of the cam. This opens the first set of contacts (terminals 3 and 4) and closes the second set of contacts (terminals 3 and 2). As the cam continues to rotate, terminal 3 switch blade will drop off the edge of the cam. This opens the second set of contacts (terminals 3 and 2) and closes the first set of contacts (terminals 3 and 4) thus, ending the defrost cycle. An audible "SNAP" can be heard each time a switch blade drops off the edge of the cam (at the beginning and ending of the defrost cycle).

Defrost Controls

Defrost Control

Mechanical Defrost Control Removal

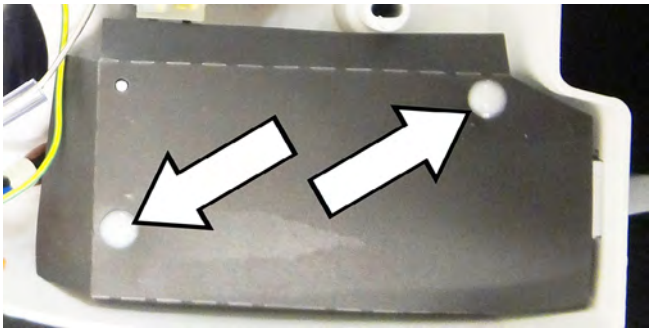
1. Remove the control panel (see the **Control Panel Removal** section in this Guide).
2. Disconnect the control panel wire harness.
3. Disconnect the wiring harness connector from the defrost control.
4. Press the locking tabs back and slide the defrost control out of the control panel.

The defrost control switches 120 VAC from the cold control (**grey**) wire at terminal 3. The purpose of the defrost control is to regulate the frequency of defrost cycles and the duration of each cycle. Defrost time is 15 hours of accumulated compressor run time. The defrost control stays in defrost for approximately 33 minutes. The defrost control provides power to the following:

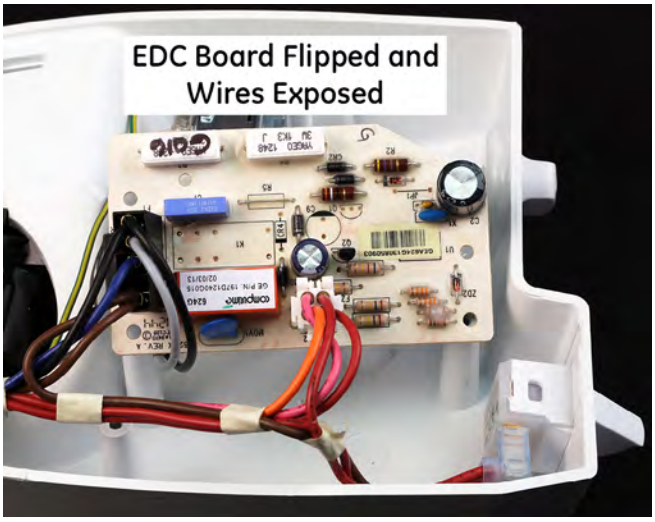
- Terminal 1 (**orange**) is neutral for the timer motor.
- Terminal 2 (**blue**) 120 VAC to defrost cycle.
- Terminal 3 (**brown**) 120 VAC to timer (from cold control)
- Terminal 4 (**black**) 120 VAC cooling cycle operation

Electronic Defrost Control (EDC) Board Removal

1. Remove the control panel (see the **Control Panel Removal** section in this Guide).
2. Disconnect the control panel wire harness.
3. Remove the two push pins.



4. Remove the cover and flip the control over.
5. Disconnect the EDC wiring and remove EDC board from the control panel.



The EDC board receives 120 VAC through **brown** at L1. The EDC controls the following:

1. 120 VAC Line voltage to the cold control through the K2 relay, L1 (**brown**) to CC (**gray**).
2. Defrost heater operation through the K2 relay, L1 (**brown**) to DF (**blue**).

The EDC receives input from the following:

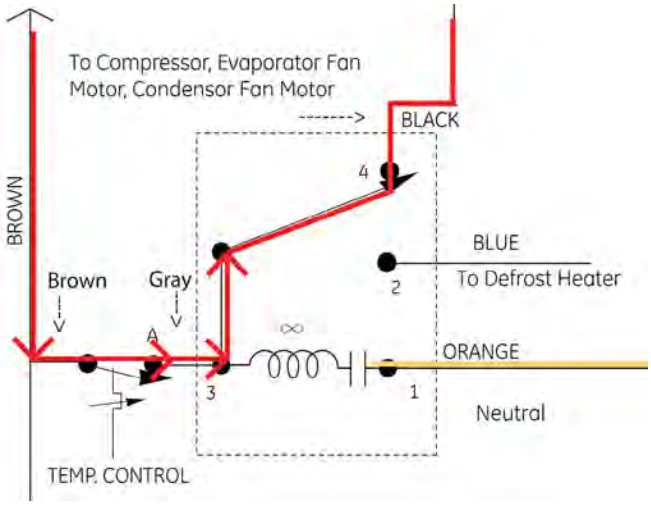
1. Compressor run time through CR (**black**)
2. Fresh Food door openings through FF (**red**)
3. Defrost Heater time through DT (**pink**)

NOTE: Freezer is not monitored, as there is no freezer door switch on top mount freezers at this time.

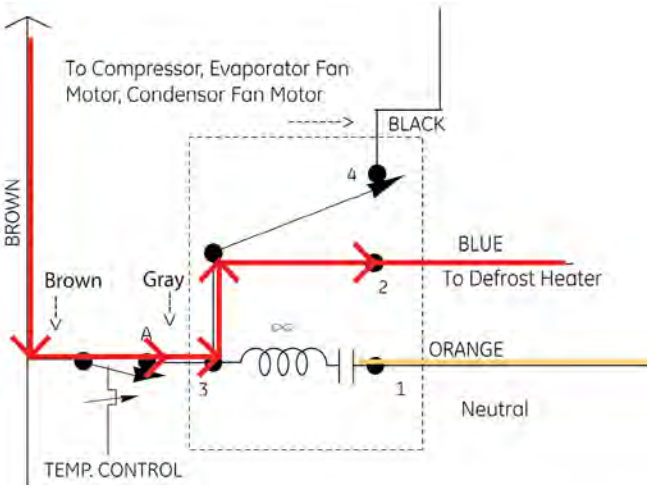
Defrost Control Operations

Defrost Control and EDC Board Operations

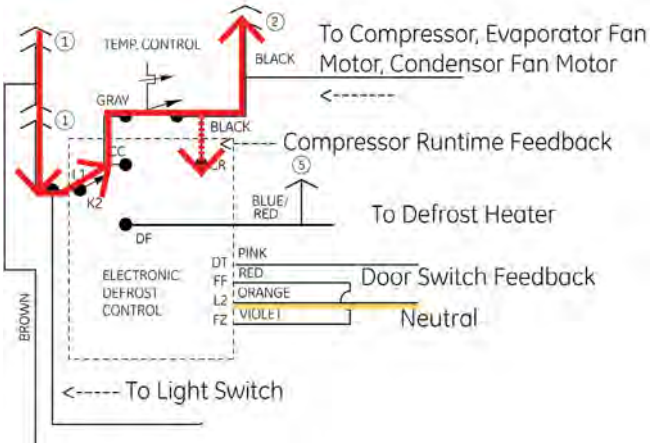
Electro-mechanical defrost control function during the cooling mode.



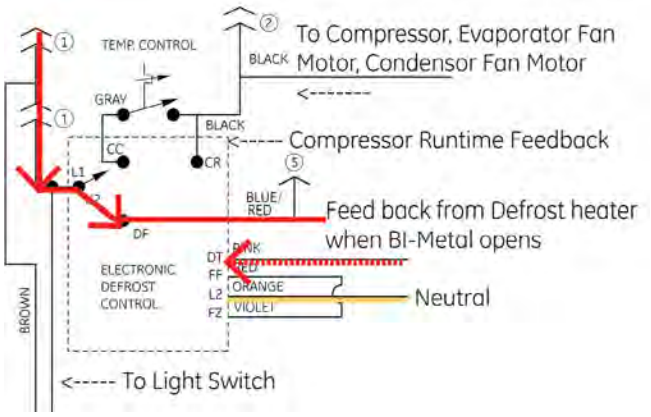
Electro-mechanical defrost control during defrost mode.



EDC board function during cooling mode.



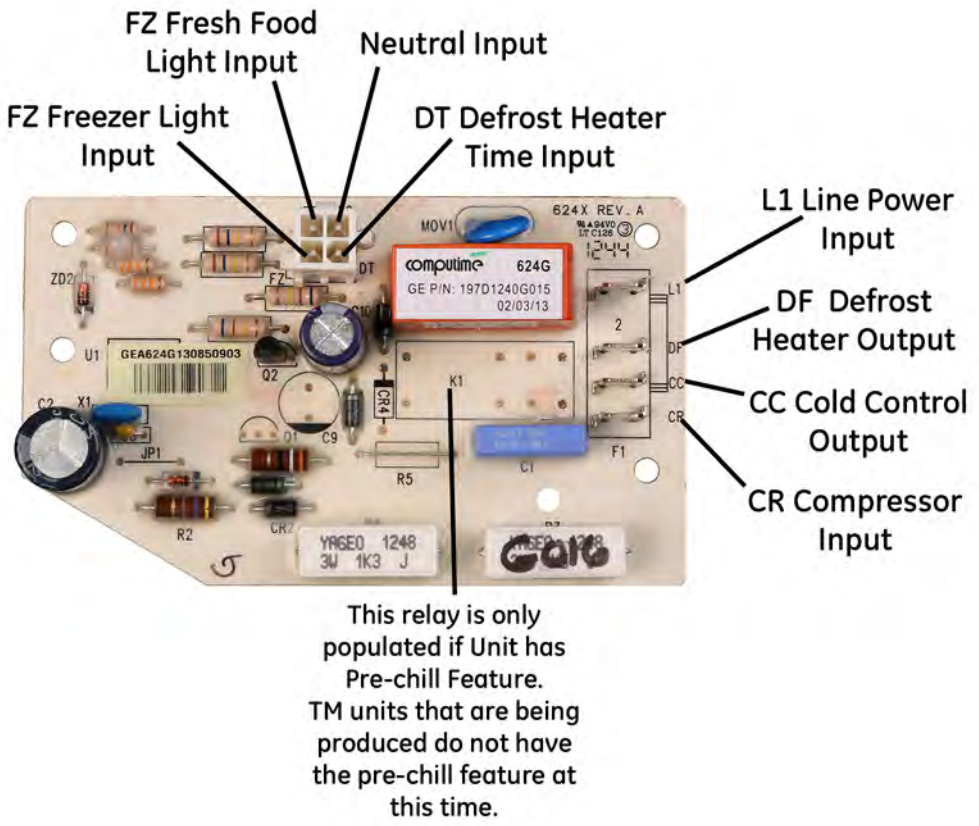
EDC board function during defrost mode.



Adaptive Defrost

Introduction

Adaptive defrost control for top mount, no-frost (TMNF) models was introduced in GE manufactured refrigerators in 2005. With the push for more energy efficient appliances, this type of defrost control is becoming more widespread on TMNF model refrigerators. The conventional defrost timer has been replaced by an electronic control defrost board. These refrigerators use less electricity by more precisely controlling the defrost cycle. The adaptive defrost interval will vary from 12 to 60 hours depending on the compressor run time and door openings. These models still incorporate a conventional cold control for compressor operation.



Adaptive defrost means defrosting based on the compressor run time, along with door open times instead of defrosting after a set time (which is what mechanical timer models do). This provides energy benefits.

In normal operating condition, the board simply provides power to the cold control. The cold control turns the compressor on/off based off of the temperature set point and corresponding cabinet temperature. The board knows when the compressor is on via the CR input. The CR input is tied to the compressor (cold control), so when the compressor turns on, the CR input has feedback voltage.

Electronic Defrost Control (EDC)

The EDC processes:

1. The amount of time the compressor has run.
2. The number of times the fresh food door was open.
3. The length of time the defrost heater was on.

During the defrost mode, the electronic control monitors the defrost heater operation (heater ON time). Once the heater operation is terminated by the Defrost Thermostat, the electronic control will allow a DWELL TIME before initiating the next cooling cycle. Dwell time is the elapsed time from the heater termination until the cooling operation is resumed (approximately 15 minutes). If the Defrost Heater remains on more than 25 minutes (or a maximum of 40 minutes), the EDC board will go directly into the cooling mode and bypass the DWELL TIME MODE. This cycle would be considered an Abnormal Defrost.

During the cooling operation, the electronic control monitors door opening times and compressor run times. These times are measured in seconds (1 second of door opening = 286 seconds) and are accumulated until they add up to 80 hours of total equivalent compressor run time. One door opening at 1 second X 286, is equivalent to 4 minutes 46 seconds of compressor run time.

Once 80 hours (4600 minutes) of total equivalent compressor run time is reached, the refrigerator will enter the Defrost Mode. The total equivalent compressor run time is calculated by multiplying the accumulated amount of time the Fresh Food door was open since the last defrost cycle by a multiplication factor, then adding to that number the actual amount of time the compressor has been running since the last defrost cycle.

The MULTIPLICATION FACTOR of 286 seconds is used to compute an equivalent compressor run time for each time the refrigerator (Fresh Food door) door is open. For example, with a multiplication factor of 286 and a door open 10 times for one second each time, 2860 seconds of equivalent compressor run time is noted, (286 X 10). **NOTE**: To get door opening seconds to minutes, divide the total number of door opening seconds by 60 (60 seconds = 1 minute). Example: 10 x 286 = 2860 seconds, 2860 / 60 = 47 minutes.

(Accumulated door open time (door openings) X Multiplication factor of 286 seconds) + Accumulated compressor run time (minutes) = Total equivalent compressor run time (minutes)

EDC Board Diagnostics

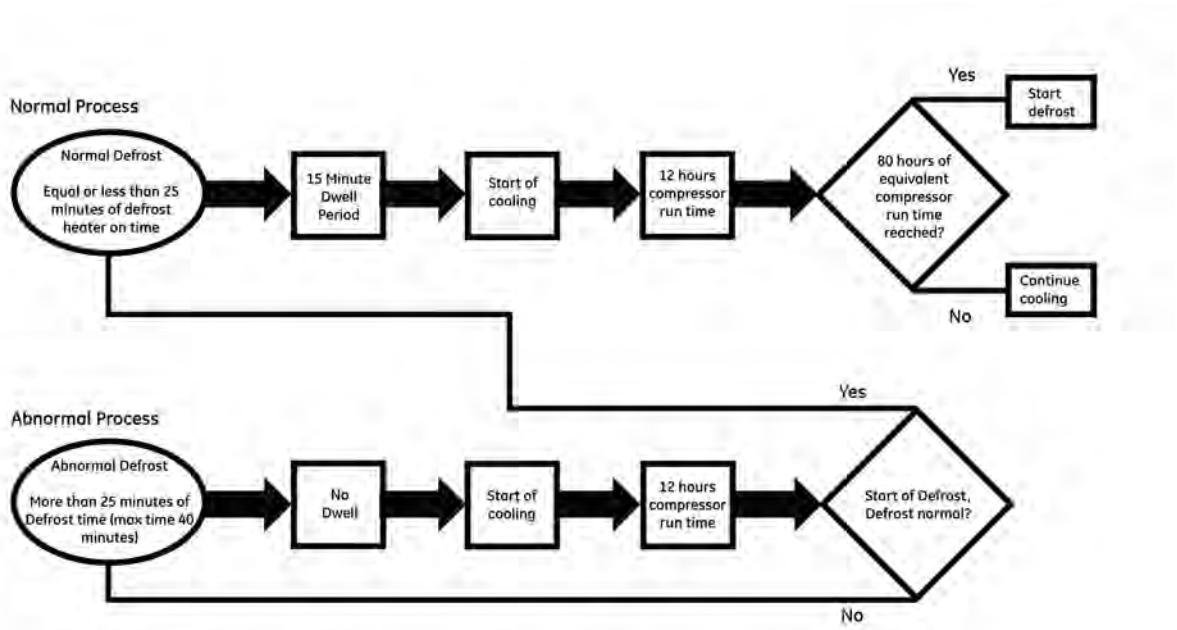
Initiating Diagnostic Defrost

To initiate manual defrost, open the fresh food door, then press the door switch located on the control panel three (3) times within five (5) seconds and close the fresh food door. Pressing this switch in this way will initiate an immediate defrost unless the control is already in the Defrost or Dwell states. After defrost is initiated, the normal defrost sequence will follow and the normal rules will determine the start of the next defrost. **NOTE**: If the refrigerator has been unplugged, wait 45 seconds before initiating the defrost diagnostic.

Terminate Diagnostic Defrost

To terminate defrost, with the fresh food door open press the door switch three (3) times within five (5) seconds when the control is in either the Defrost or Dwell states. Pressing this switch in this way will terminate the defrost and initiate a first cycle state (time starts at 0).

EDC Process Flow Chart



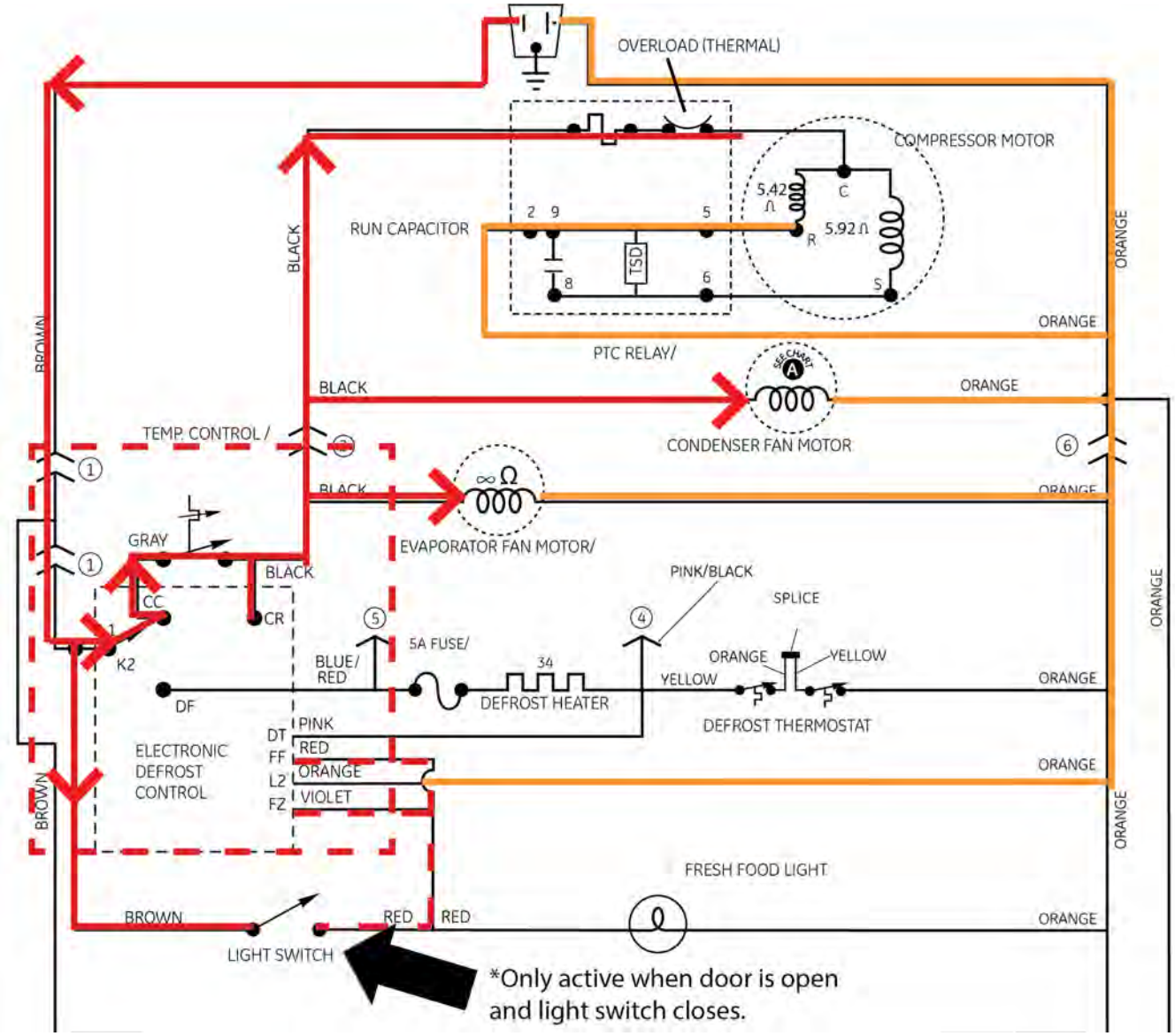
At the end of an abnormal defrost, the electronic control will return the refrigerator to cooling operation. However, due to an abnormal amount of heater ON time that occurs during the defrost cycle, the control will initiate the next defrost operation after a fixed 12 hours of accumulated compressor run time (non-adaptive defrost operation). The intent of this cycle is to attempt to clear any ice that may be remaining on the evaporator.

During this non-adaptive defrost period, only the compressor run time will be monitored. The door open times will have no bearing on when the next defrost cycle will occur. The refrigerator will operate just like a conventional defrost system, for a fixed 12 hour period.

If the next defrost is a normal defrost (heaters off in less than 25 minutes), the electronic control will allow the refrigerator to return to normal adaptive defrost operation. The next defrost will occur after 80 hours of total equivalent compressor run time. However, if the next defrost is abnormal, the refrigerator will once again revert to a fixed 12 hour accumulated compressor run time and then enter the defrost cycle (non-adaptive defrost operation).

EDC Cooling

The compressor operation is controlled by the cold control, which is external to the EDC board. The EDC board is summing the compressor run time by monitoring the compressor voltage at pin CR.



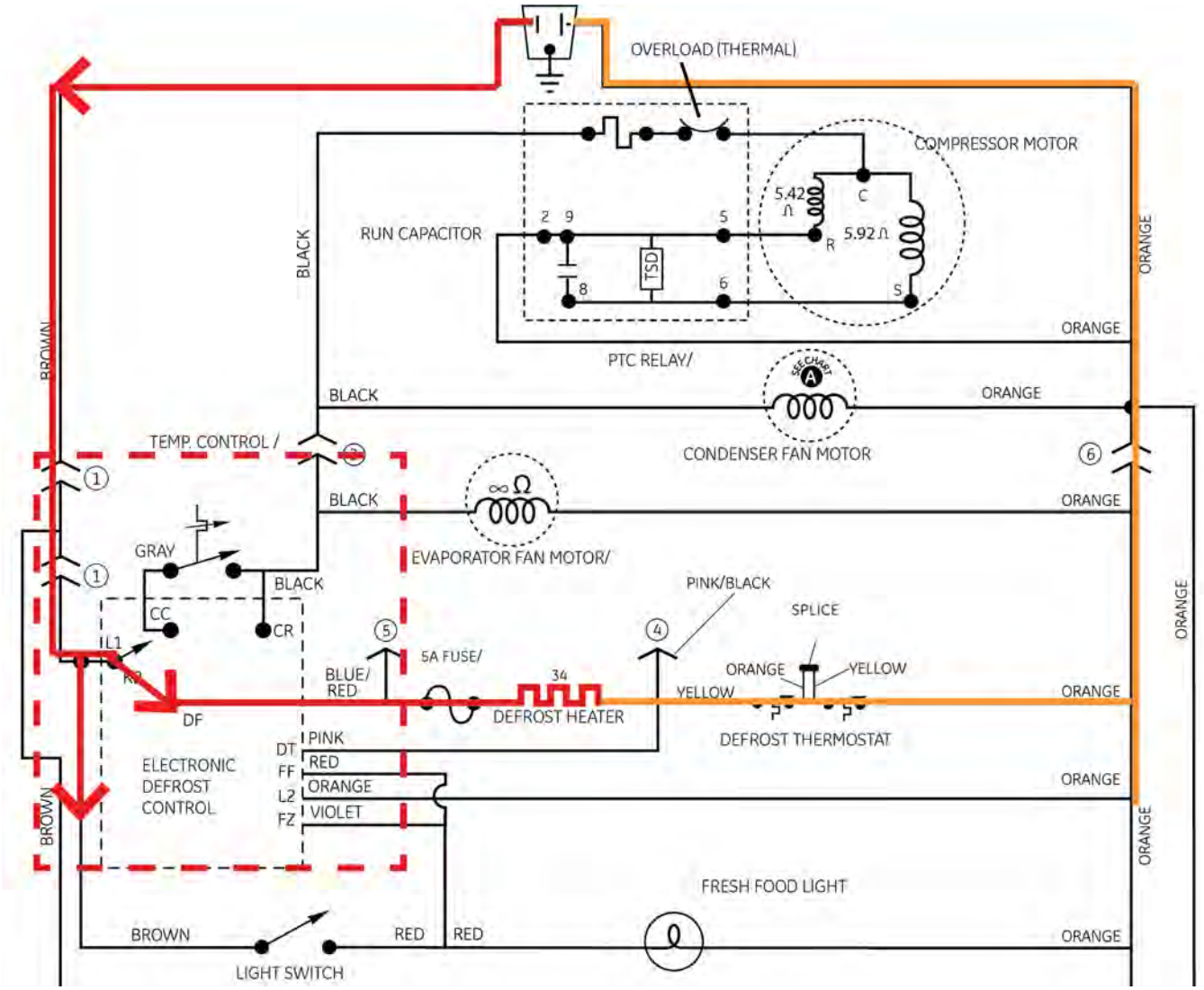
Freezer door monitoring is not used on these models since there are no lights in the freezer.

NOTE: The 286 seconds of accumulated time per fresh food door opening takes in account for the lack of a freezer door switch.

EDC Defrost

Defrost

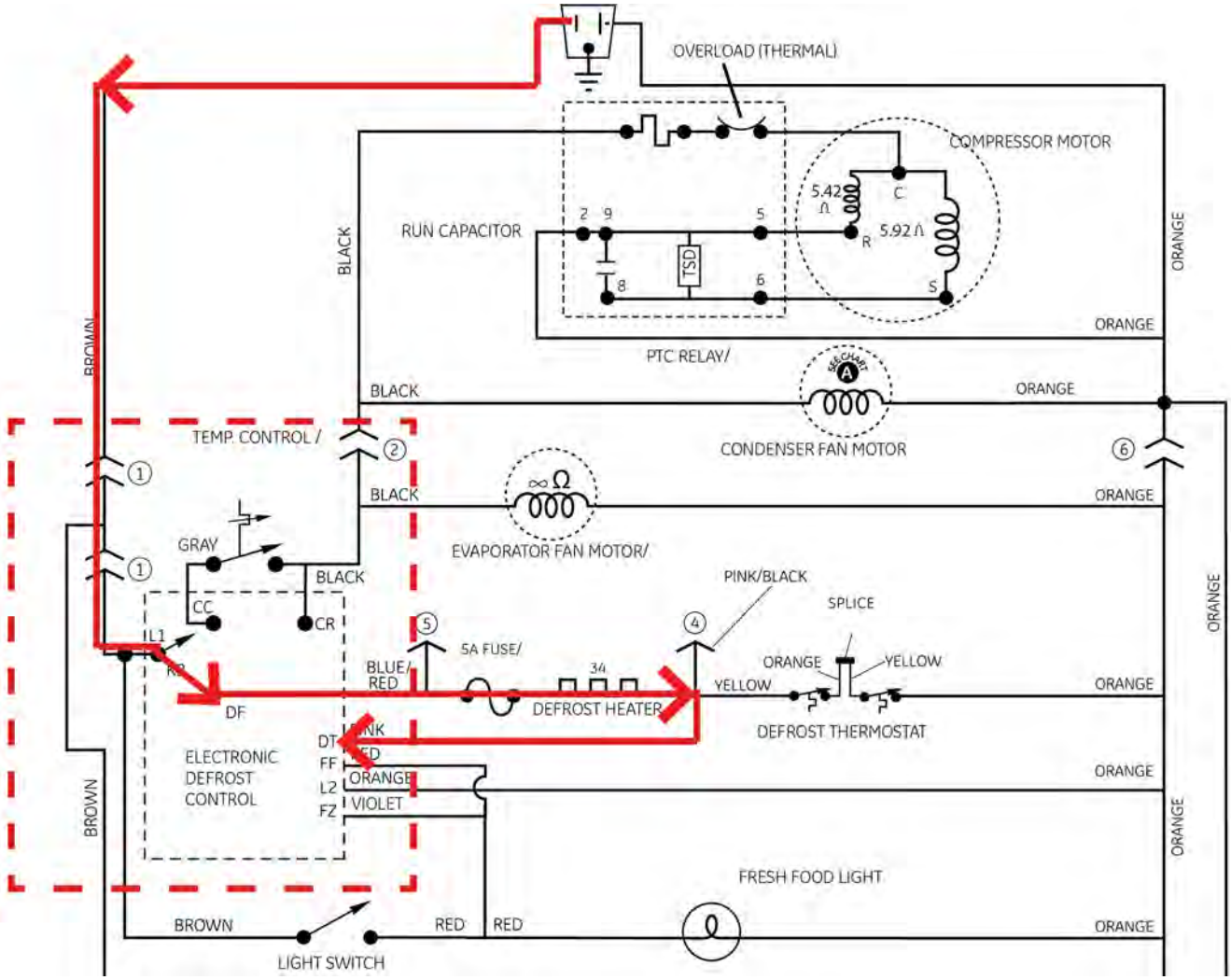
The compressor is turned off and the defrost heaters are turned on by energizing the K2 relay and sending 120 VAC through the DF terminal. During this time, the defrost termination is monitored through the DT terminal to determine when the defrost thermostat opens. If less than 25 minutes of defrost heater run time the control will immediately enter the dwell state. If the defrost thermostat does not open during the prescribed 25 minutes or less, defrost will be terminated by time (max 40 minutes) and the dwell state will be bypassed.



EDC Dwell

Dwell

During the 15 minute dwell time, the K2 relay continues to keep the compressor off.



When the defrost thermostat opens, the dwell time timer is activated. Except when the defrost heater on time exceeds 25 minutes.

Ice Maker

Some 15'-18' refrigerators have factory installed ice makers, but all are ice maker ready.

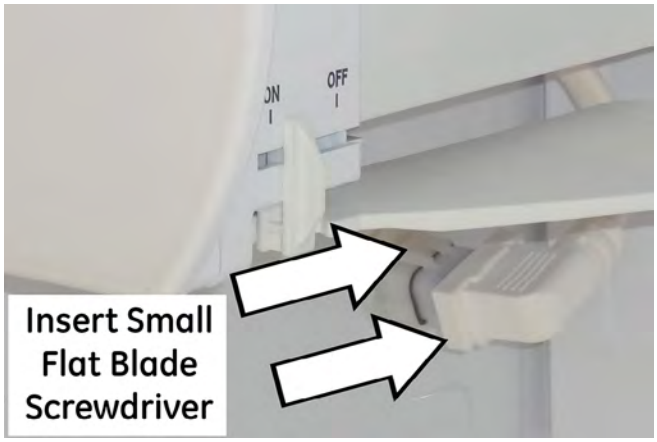
There are two types of ice makers that may be encountered in the field:

- Electro-Mechanical
- Electronic

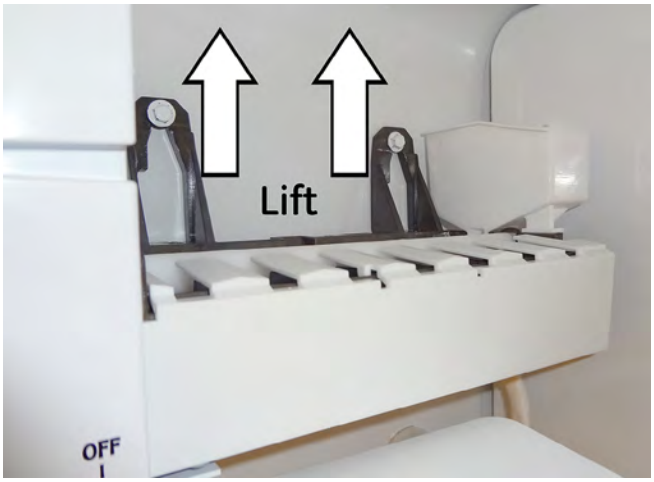
Electro-Mechanical ice makers have an on/off slide switch, and the electronic ice makers have a toggle on/off switch on the side of the ice maker control housing.

Ice Maker Removal (Ice Makers are optional)

1. Unplug the ice maker. Use a small flat blade screwdriver to release the tabs.



2. Loosen the two 1/4 in. hex head screws.
3. Lift the ice maker up to clear the screws and remove the ice maker.



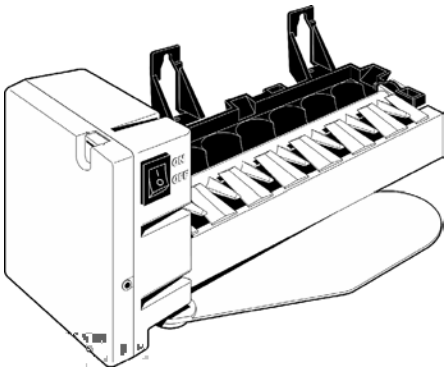
Electro-Mechanical Ice Maker

To manually cycle the ice maker the switch needs to be in the on position and the rake must be in the home position. Safely pull the ice maker rake in a CW direction until a click is heard, then release and remove hand and the ice maker will cycle.

The Electro-Mechanical Ice Maker is a single fill ice maker and is cycled at approximately 15°F by a thermostat attached to the mold body. The ice maker will harvest 7 cubes at an average cycle time between 75 - 90 minutes.

If the ice maker does not cycle, verify that the ice maker plug is securely plugged in, and that 120 VAC is present.

Electronic Ice Maker



The Electronic Ice Maker is an adaptive fill ice maker that has onboard diagnostics.

The adaptive fill allows the ice maker to compensate for low water pressure conditions by way of monitoring the mold thermistor.

Water entering the ice maker will cause the mold temperature to change, effecting the resistance of the thermistor. There are three possible water fill times.

(*Continued next page*)

Ice Maker continued

After the ice cubes harvest, the mold is pre-chilled to 35°F before starting the fill process. When the mold temperature reaches 36°F, the ice maker will fill for 5.1 seconds. If the mold rises above 42°F, water reaches the front of the mold and no further fills are needed. If there is no change in the temperature then a 2.5 second fill will occur. If temperature does not rise a third and final time, a fill of 2.4 seconds will be initiated.

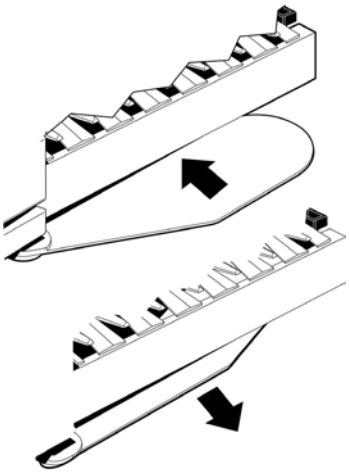
First Fill	5.1 sec.
Second Fill	2.5 sec.
Third Fill	2.4 sec.

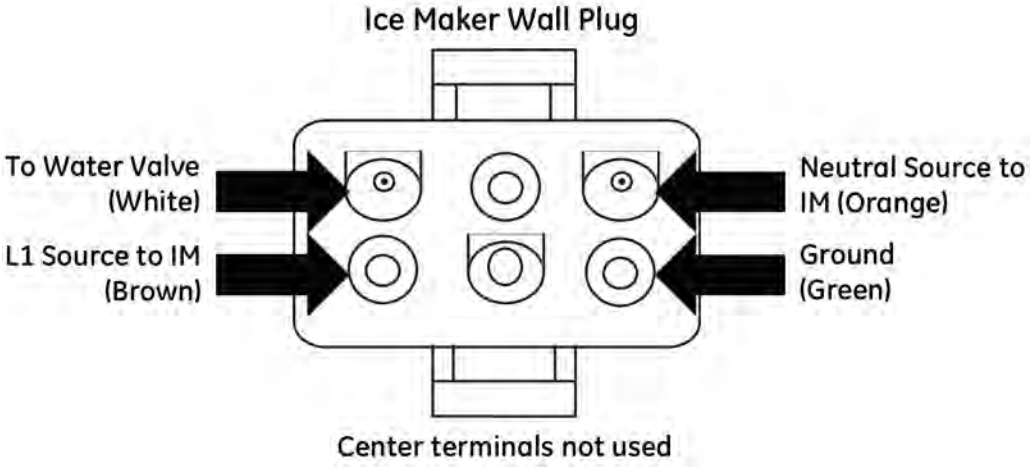
Average cycle time, 75 - 90 minutes.

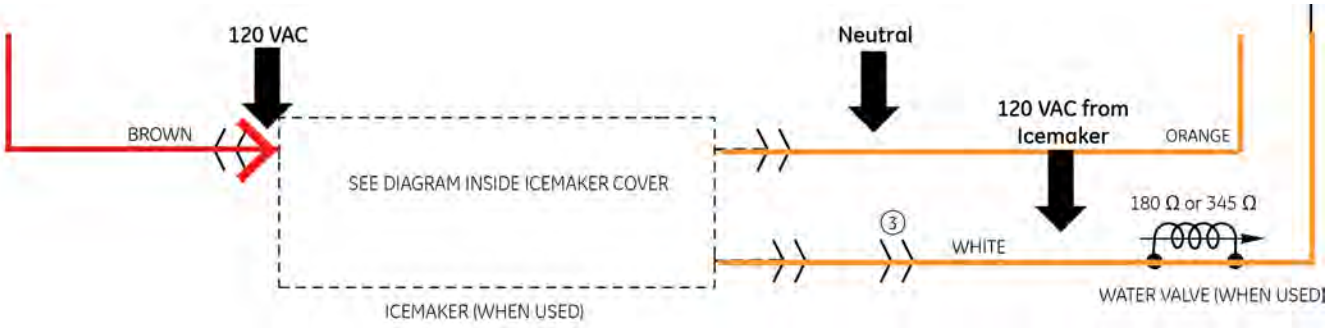
For more information about the Electronic Ice Maker, refer to Technical Service Guide 31-9063.

Service Diagnostics for Electronic Ice Maker

During the first 15 seconds that power is first applied to the icemaker, the Service Diagnostic Test mode may be entered. The service mode is entered by pushing the feeler arm from the "out" position to the "in" position and back again 3 times (and only 3 times) within 15 seconds.

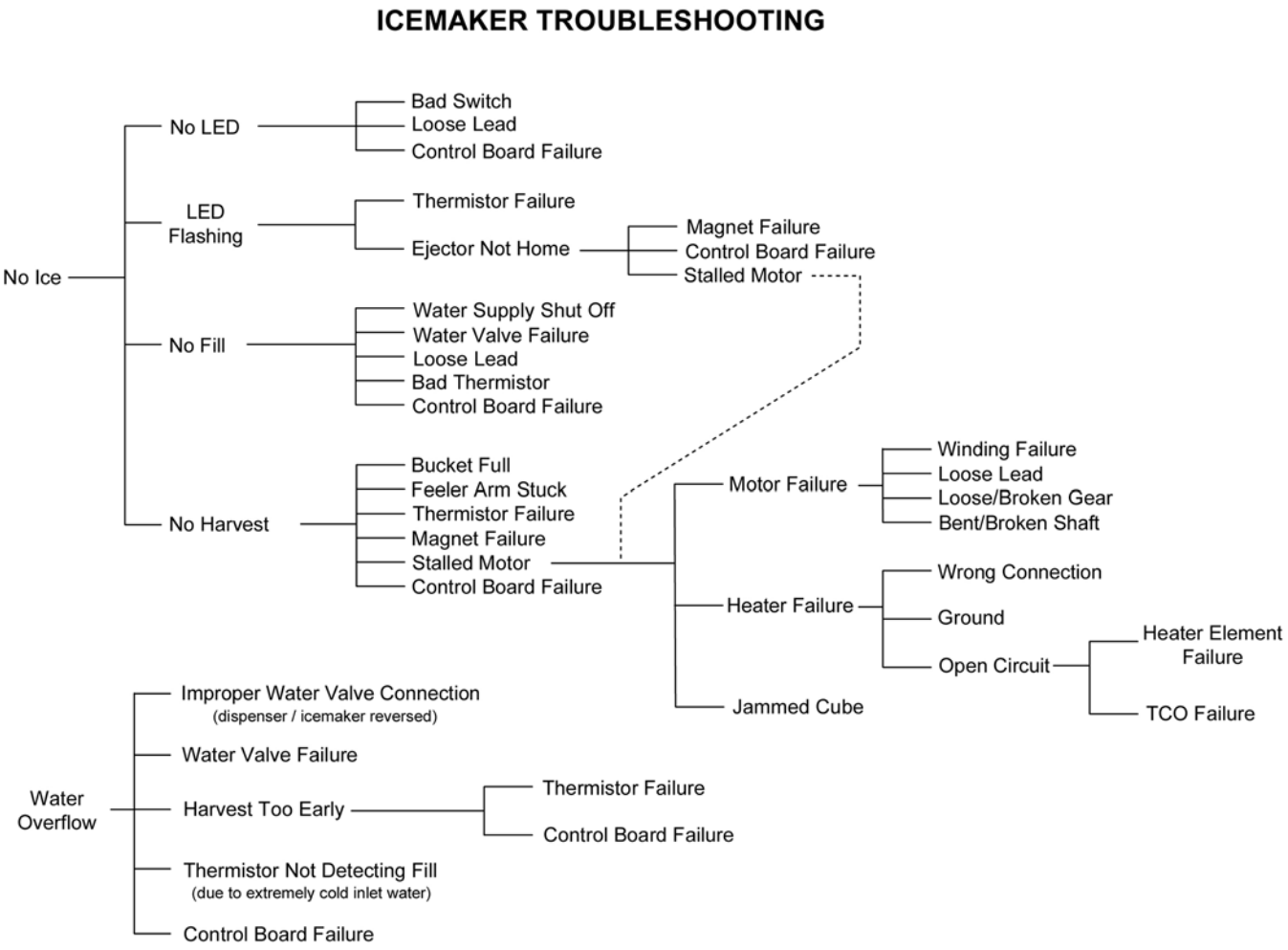






Ice Maker Troubleshooting Chart

For more information about the Electronic Icemaker, refer to Technical Service Guide 31-9063.



NOTE: Only the feeler arm, stripper and fill cup are servicable on the ice maker.

Freezer Components

Air Tower Removal

1. Remove shelving.

2. Place a small flat blade screwdriver in the air tower slot and gently push up.

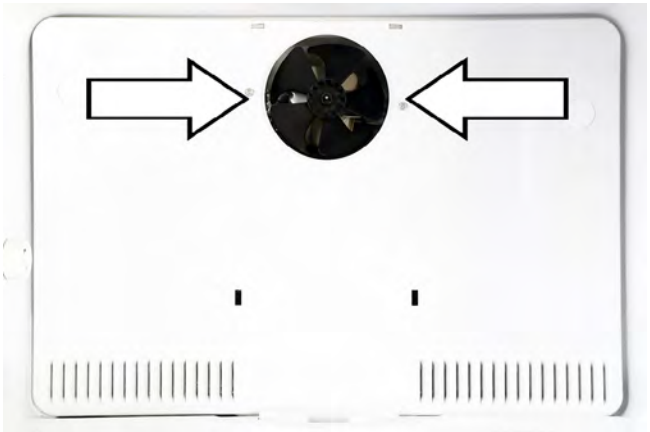
3. Gently push in on either side and lift up. Swing the bottom outward and slightly pull down for the air tower tabs to clear the evaporator cover.

4. Remove the air baffle from the air duct.

The air baffle controls air distribution to the fresh food section. The air baffle is non-adjustable and must be placed back in the supply duct or cooling issues will occur.

Evaporator Cover Removal

1. Remove the two 1/4 in. hex head screws.
2. From the fan orifice, pull the evaporator cover outward to remove.



Evaporator Fan Motor

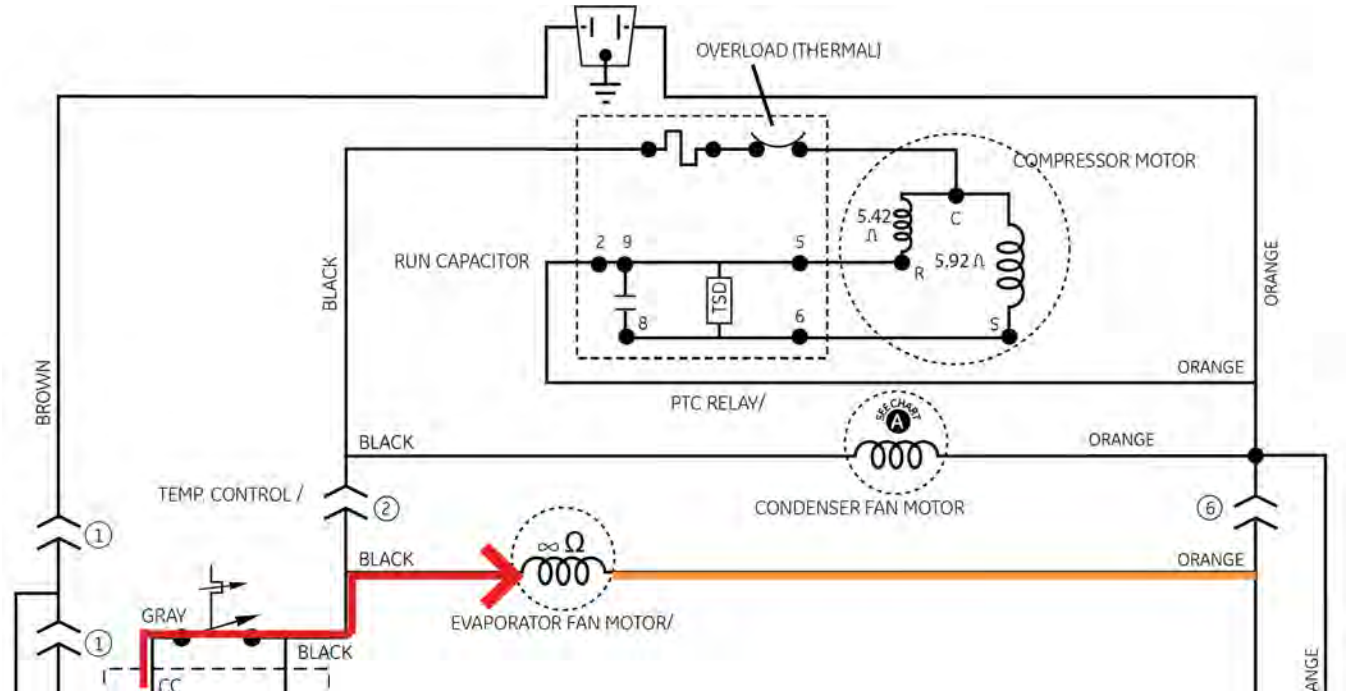
The evaporator fan motor is connected electrically in parallel with the compressor and condenser fan motor. When the cold control contacts are closed, the compressor and evaporator fan motor are energized simultaneously.

The evaporator fan motor is a AC/DC motor, the motor converts AC voltage to DC voltage. The purpose of using this motor is for energy efficiency.

To check the evaporator AC/DC fan motor, carefully check for 120 VAC at the fan motor connector. If 120 VAC is present at the connector and the fan is not operating, replace the fan motor.

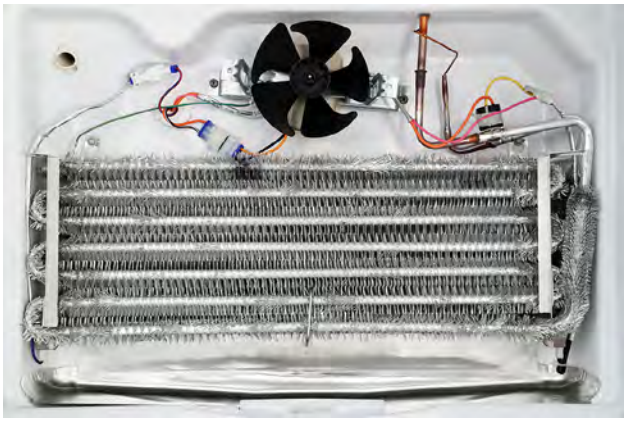
Rubber grommets or isolators that are used to mount the fan motor must be in position not only to insure quiet motor operation, but also to properly center the blade in the orifice. Likewise, the mounting screws must be tight to properly secure the motor. All wiring should be carefully dressed to avoid obstructing the fan blade.

NOTE: Motor resistance and VDC cannot be checked due to the motor design.



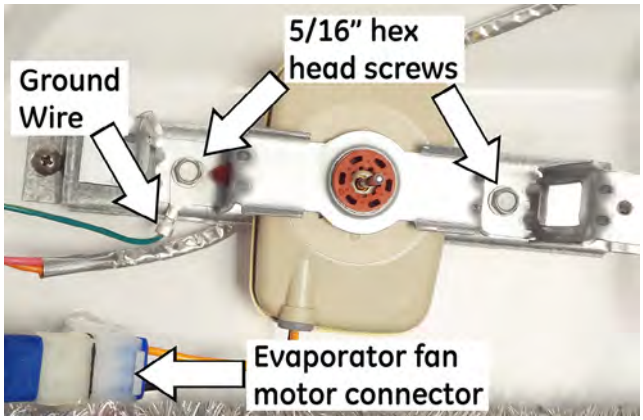
Evaporator Fan Removal

1. Remove freezer shelving.
2. Remove the ice maker, if one is installed (see **Ice Maker Removal** section in this Guide).
3. Remove the air tower (see **Air Tower Removal** section in this Guide).
4. Remove the evaporator cover (see **Evaporator Cover Removal** section in this Guide).



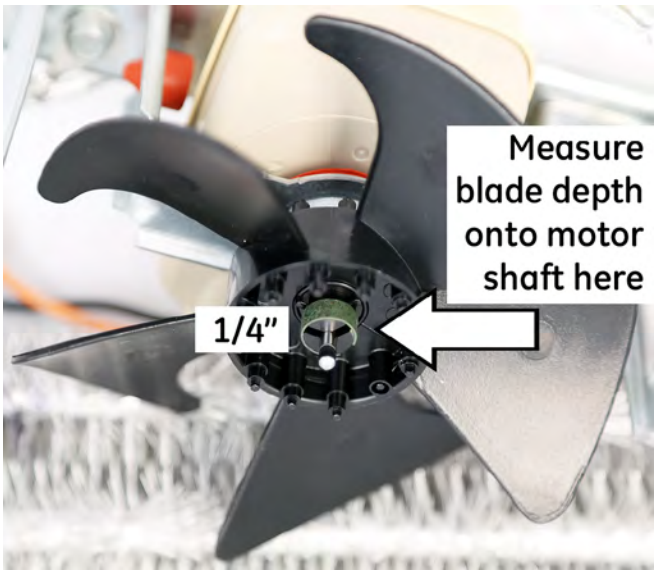
5. Carefully pull the fan off of the motor shaft.

6. Remove the two 5/16 in. hex head screws.
7. Unplug the evaporator fan connector.



NOTE: When reinstalling the evaporator fan motor and fan blade. make sure the ground wire, fan grommets, and evaporator fan motor connector are back in place and firmly connected.

It is **extremely important** to place the evaporator fan blade at the prescribed depth. Failure to do so could cause increased noise, affect air flow and result in a repeat service call. Set the evaporator fan blade depth at 1/4 in. (see the image below). Note the position of the evaporator fan blade when removing from the motor.



Freezer Section Defrost System

Defrost Thermostat

The defrost thermostat consists of a single pole switch, a bimetal disc, and a transfer pin within a metal and plastic case that is sealed with epoxy. Lead wires, welded to the internal terminals, extend through the case.

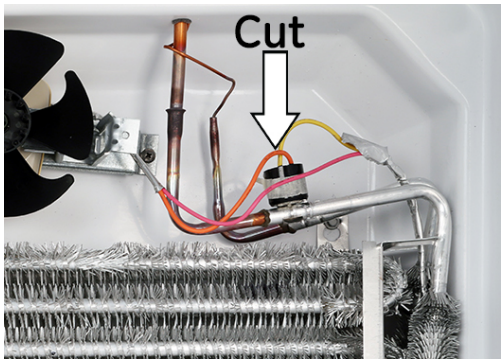
The purpose of the defrost thermostat, located on the evaporator, is to de-energize the heater during the defrost cycle. The defrost thermostat closes at 23°F and opens at 64°F. After all frost has been completely removed from the evaporator, the temperature of the evaporator begins to rise rapidly. When the limit temperature of the thermostat is sensed, the bimetal disc warps and pushes the transfer pin against a switch blade which opens the switch contacts. Conversely, when the temperature of the evaporator has cooled sufficiently, the bimetal disc warps in the opposite direction. Then the spring-loaded switch blade pushes the transfer pin out of the way and closes the contacts.

Defrost Thermostat Removal

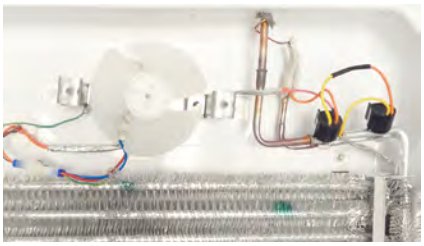
1. Disconnect power to the refrigerator.
2. Remove freezer shelving.
3. Remove the ice maker if one is installed (see **Ice Maker Removal** section in this Guide).
4. Remove the air tower (see **Air Tower Removal** section in this Guide).
5. Remove the evaporator cover (see **Evaporator Cover Removal** section in this Guide).
6. Cut the wires at the defrost thermostat (since the defrost thermostat is being discarded, cut about 1 in. from the top of the thermostat).
7. Remove the defrost thermostat from the evaporator.

The defrost thermostat has a metal clip that fastens it to the evaporator suction line.

The image below represents a electro-mechanical defrost control which has one defrost thermostat.



EDC control defrost systems have two defrost thermostats that are ran in series with each other.



It is recommended to replace both defrost thermostats if an open defrost thermostat is discovered.

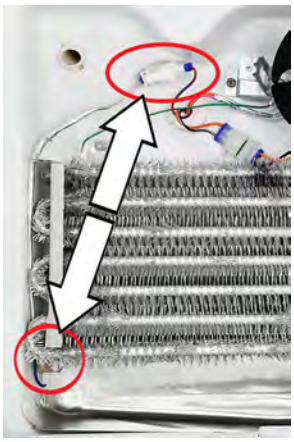
IMPORTANT: When replacing defrost thermostats, use only approved splicing techniques.

5 Amp Inline Fuse

The 5 Amp Fuse opens the line (120 VAC) side of the defrost circuit and protects the refrigerator from a shorted/grounded heater. The inline fuse can be diagnosed by unplugging the connectors at the defrost heater and the fuse connector. Use an ohm meter to check continuity.

5 Amp Inline Fuse Removal

1. Disconnect power to the refrigerator.
2. Access the evaporator section.
3. Disconnect the fuse from the defrost heater and connector located above the evaporator.



If an open fuse is discovered, observe and check the defrost heater, wire connections at the defrost heater, and at the defrost control (EDC board/ electro-mechanical defrost control). If faults are found, replace or repair the components. If no component or wiring issues are found, only replace the fuse.

Defrost Heater

Defrost heaters are resistive loads and should be tested for proper resistance as indicated on the schematic wiring diagram, using a volt/ohm meter. However, a visual inspection should also be made and the heater replaced if any of the following conditions are observed:

- Element is open
- Glass tube is broken
- Glass tube is opaque with green or black coating inside
- Element coils are bunched together
- End caps or terminals are deteriorated, burnt or corroded

When replacing a defrost heater, avoid handling the glass tube with bare hands. Even small quantities of salt, or other contaminants from the hands deposited on the surface of the glass will increase the brittleness, which could result in premature failure of the heater. Handle the heater by the end caps. If it should be necessary to grasp the glass tube, clean it afterward with a damp paper towel or approved glass cleaner.

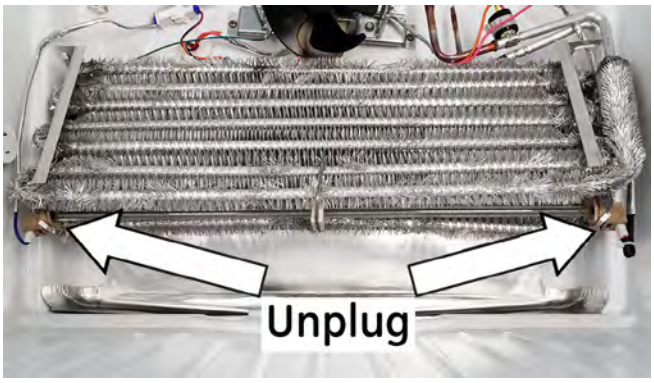
The defrost heater can be checked with a volt/ohm meter at the EDC board or electro-mechanical defrost control, depending on the model. If an open circuit is detected, isolation of the defrost heater will be needed to verify that the defrost heater is faulty. Use the schematic for proper check points and component values.

(*Continued next page*)

Defrost Heater Removal

1. Disconnect power to the refrigerator.
2. Remove freezer shelving.
3. Remove the ice maker if one is installed (see **Ice Maker Removal** section in this Guide).
4. Remove the air tower (see **Air Tower Removal** section in this Guide).
5. Remove the evaporator cover (see **Evaporator Cover Removal** section in this Guide).
6. Unplug the Defrost Heater.

NOTE: Evaporator pulled away from the rear wall is for demonstration purposes. Evaporator does not need to be pulled out to remove the defrost heater.



7. Remove the defrost heater holder.

After the defrost heater is reinstalled, make sure the defrost heater holder is back in place.

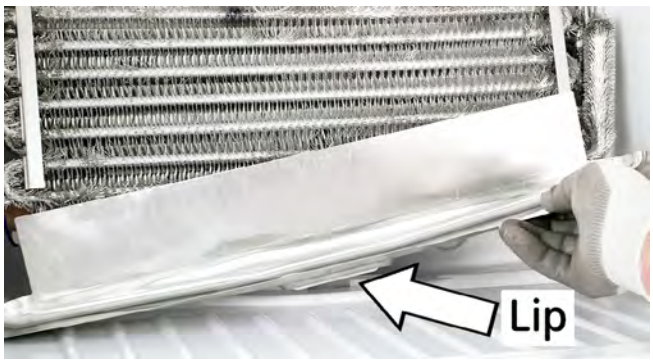
8. Carefully bend the aluminum tabs back (located at each end of the of the defrost heater) and lower the heater out of the evaporator.

Defrost Drain Pan

The defrost drain pan collects melting ice during the defrost cycle and funnels water to the drain trough in the fresh food section, where it is sent to the condenser drain pan where the water is evaporated.

Evaporator Drain Pan Removal

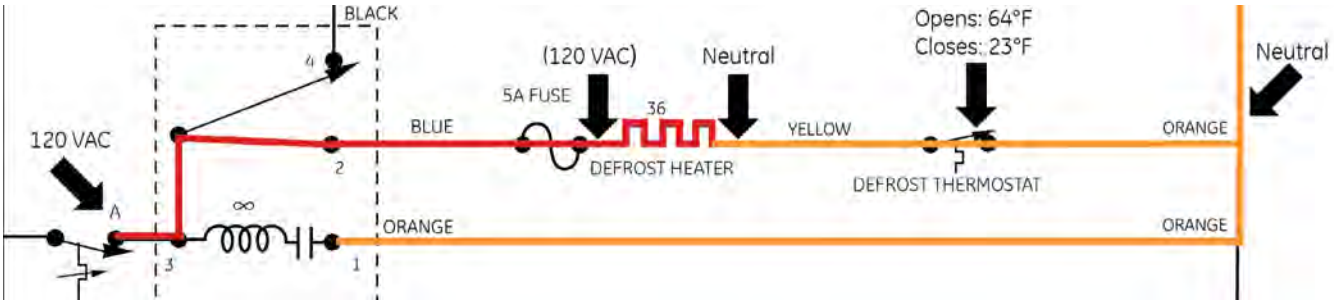
To remove, carefully pull the bottom of the evaporator forward and lift the drain pan until the pan lip clears the return duct.



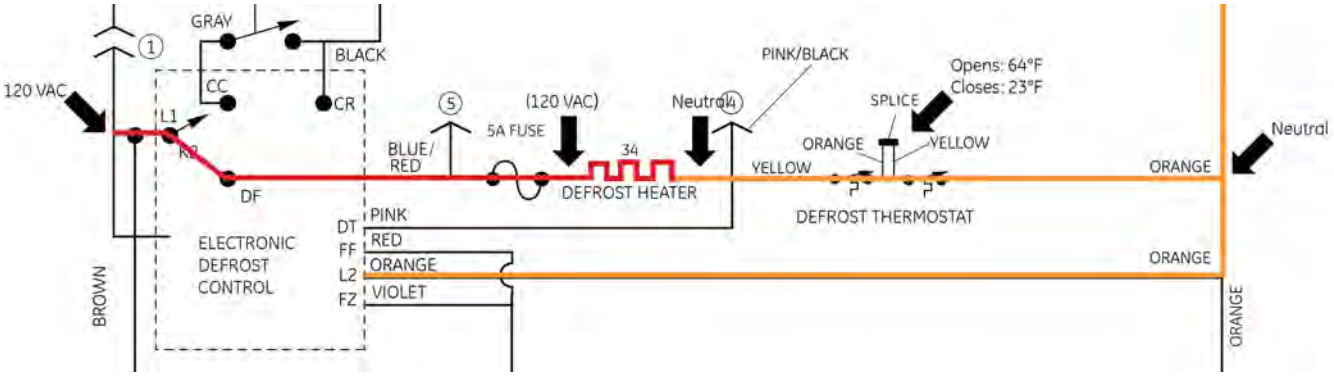
NOTE: Do not operate defrost heaters with the drain pan removed, as damage to the liner can occur.

Defrost Circuit

Defrost Circuit Timer Models

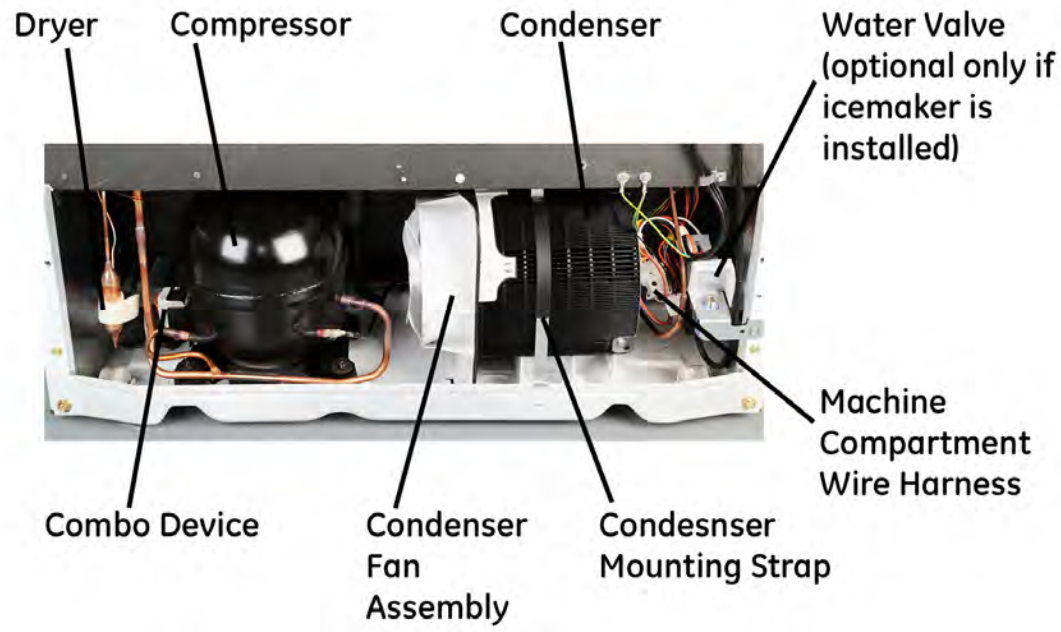


Defrost Circuit EDC Models



Machine Compartment

Machine Compartment Components



Condensor Fan

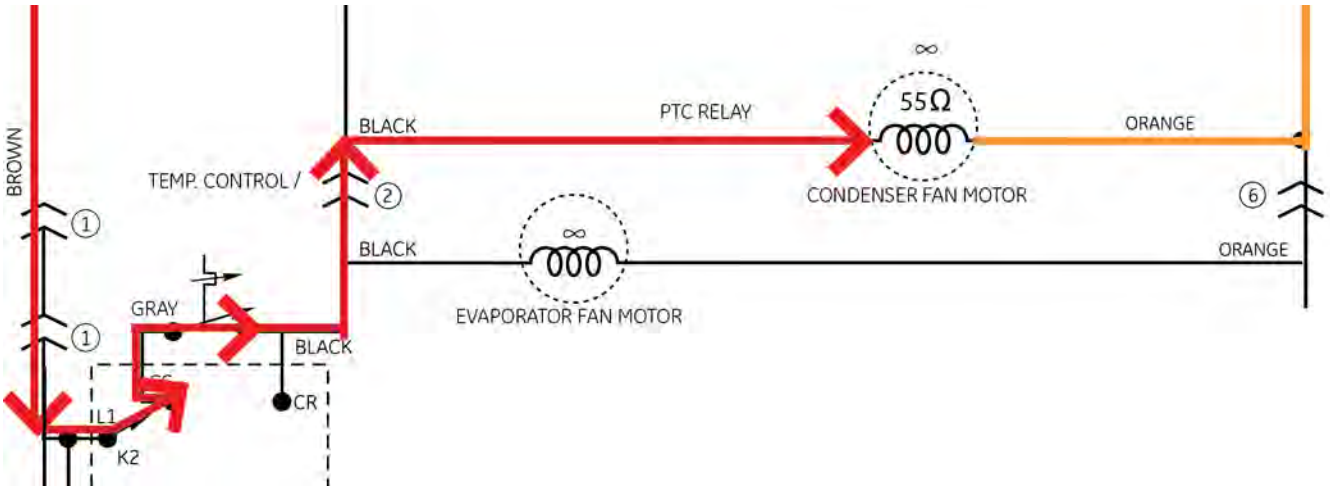
The purpose of the condenser fan is to efficiently remove heat from the condenser and compressor.

The condenser fan motor is connected electrically in parallel with the compressor. When the cold control contacts are closed, the compressor and condenser fan motor are energized simultaneously.

The condenser fan motor is a AC/DC motor; the motor converts AC voltage to DC voltage. The purpose of using this motor is for energy efficiency.

To check the condenser fan motor, safely check for 120 VAC at the fan motor connector BK-OR. If 120 VAC is present at connector BK-OR and the fan is not operating, replace the fan motor.

Resistance cannot be checked on this device, due to motor design.

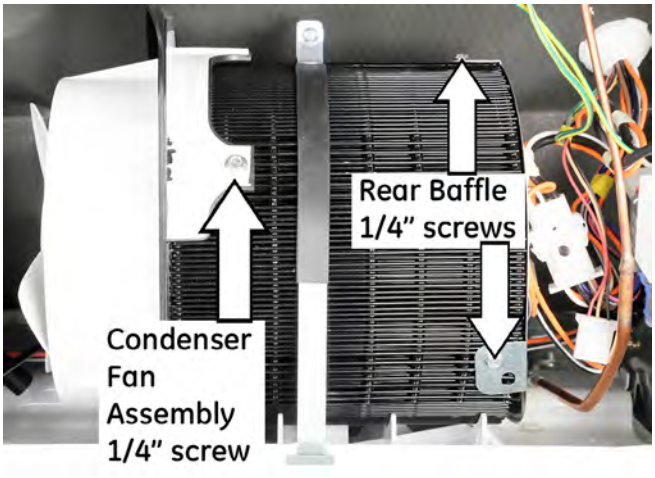


*Refer to the model mini manual for the condensor fan motor resistance. (55 Ω / ∞)

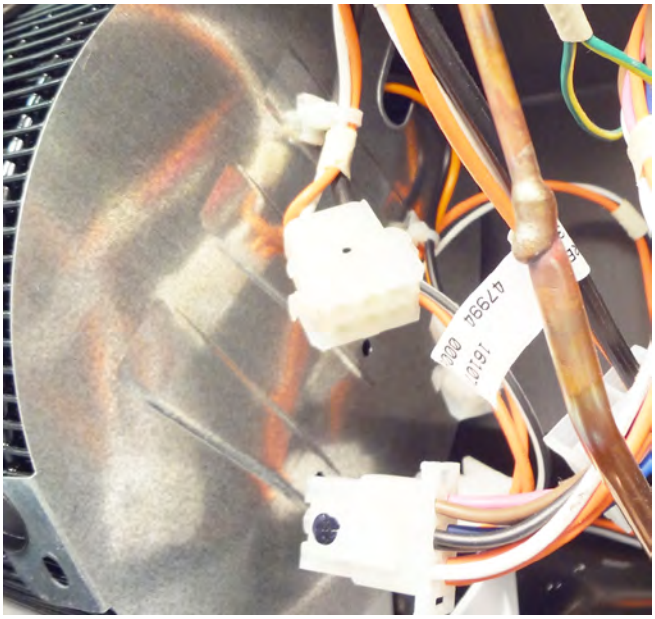
Machine Compartment Components

Condenser Fan Assembly Removal

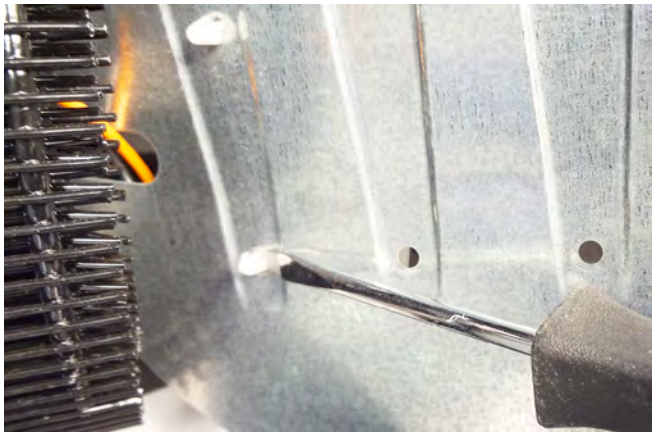
1. Disconnect power to the refrigerator.
2. Remove the four 1/4 in. hex head screws from the rear access cover.
3. Move the water valve out of the way (if applicable).
4. Remove the one 1/4 in. hex head screw from the condenser fan assembly.
5. Remove the two 1/4 in. hex head screws from the rear baffle.



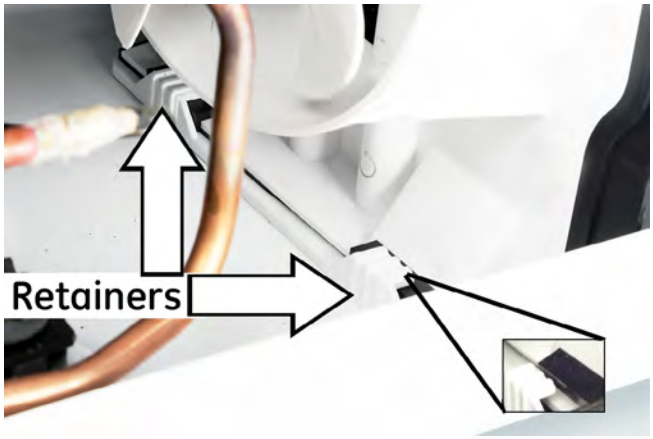
6. Unplug the machine compartment connector.



7. Release the plastic fastener from the baffle (condenser fan motor wire).



8. Remove the fan blade.
9. Unplug the condenser fan motor connector.
10. Grasp the upper corner of the condenser fan assembly and move toward the compressor to allow the assembly to disengage from the condenser support retainers.



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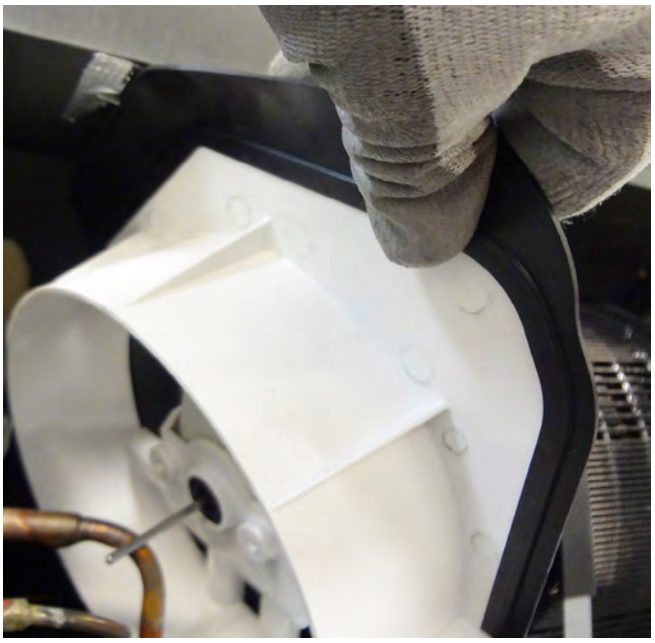
Condenser Fan Assembly Removal continued

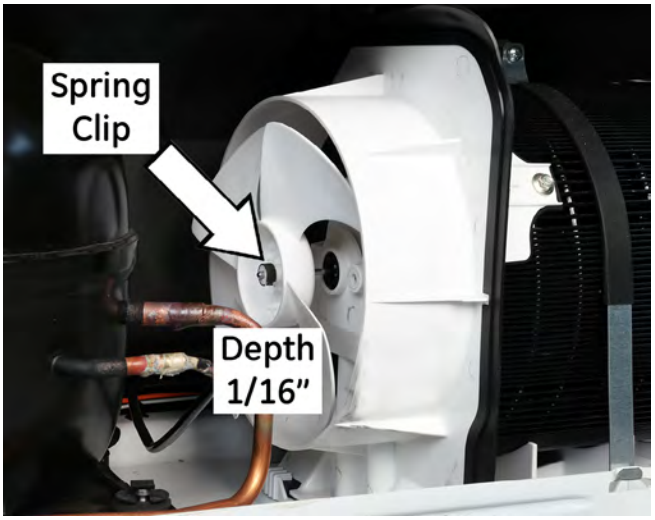
11. Remove the condenser fan assembly from the machine compartment by grasping the upper exterior corner and pulling the assembly out on an angle, making sure to clear the refrigerant tubing and condenser.



NOTE: After installing the condenser fan assembly, the fan blade must be installed in the proper direction and the fan depth set at 2 mm, or approximately 1/16 inches.

The image below shows the direction of the fan blade and fan depth on the motor shaft. Use the blade spring clip as a reference to the direction.

If any part of the condenser fan assembly needs replacing, it is replaced as a whole assembly. The only exception is the condenser fan blade. The condenser fan blade can be ordered separately.



Compressor Combo Device

The combo device is a combination relay/overload device. These combo devices are simply a PTC (relay) and an overload made together and contained in one housing.

NOTE: The capacitor is plugged to the combo device but is a separate part and must be ordered separately if needed. The capacitor will be covered in this section.

Solid State Relay

Most refrigerators use a PTC. A PTC is a Positive Temperature Coefficient Resistor (Relay). This means that as temperature increases, the resistance decreases. It is simply a set of contacts pressed against a solid state, ceramic disc.

The disc is fused with silicon and other elements that change alignment as electricity passes through it. The result is that as the current flows through the PTC and heats it, the resistance of the disc instantly changes. It goes from 4 ohms, to over 10,000 ohms in less than a second. When the line voltage sees this large resistance, all current flows to the run windings, and the start windings are essentially taken out of the electrical circuit.

Benefits over mechanical relay:

- No moving parts
- No contacts that "make and break"
- Insect resistant

Overload

The overload provides protection to the compressor motor by responding to both temperature and current. The overload consists primarily of a bimetal element and a set of normally closed contacts. The auxiliary heater is for a faster response.

The overload is connected in series with both windings of the motor. If the motor fails to start for any reason, the "high" locked rotor current will cause the bimetal element to heat, snapping the contacts open and interrupting current flow through the motor.

The motor will continue to cycle on the overload so long as the original reason for tripping persists.

Run Capacitor

The run capacitor plugs into the combo device and the same disassembly and safety procedures apply (**ALWAYS DISCONECT POWER**).

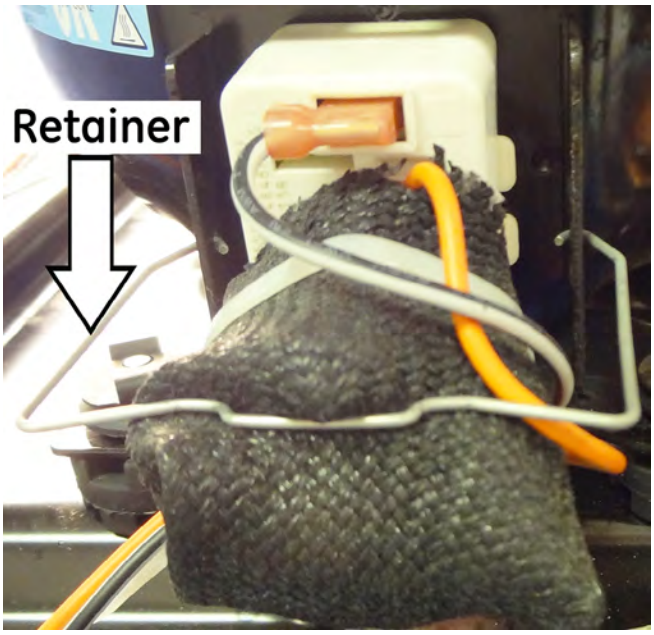
Run Capacitor

Combo device with Run Capacitor connected

Run capacitors are used with single-phase compressor motors to increase the running efficiency. The run capacitor is connected in parallel with the PTC, and is shunted while the PTC cycling control closes for starting, but is utilized along with the start winding after the relay contacts open and so long as the motor operation continues.

Combo Device Removal

1. Disconnect power to the refrigerator.
2. Remove the four 1/4 in. hex head screws from the rear access cover.
3. Remove the combo device retainer (needle nose pliers work well in removing retainer).
4. Remove the protective sleeve off of the capacitor.
5. Disconnect the wiring.
6. Disconnect the capacitor from the device.

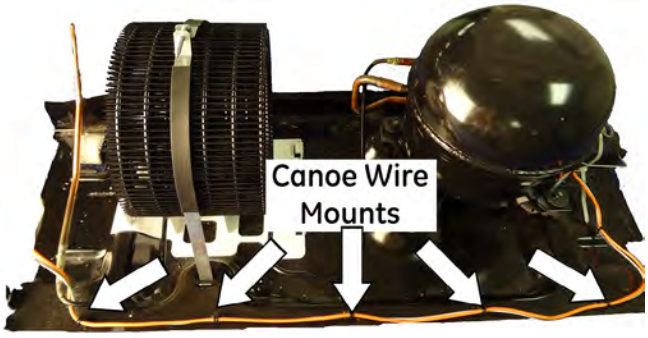


Machine Compartment Wire Harness

The machine compartment wire harness assembly comes with the power cord and wiring to the following machine compartment components:

- Compressor combo device (**black/white**)
- Condenser fan motor (**black/white**)
- Water valve (**white**)
- Case ground (**gray**)
- Unit neutral (**orange**)

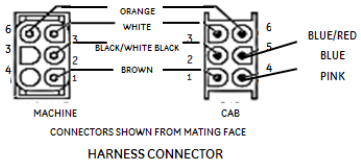
The harness supplies power to the refrigerator through a Molex connector, located at the right rear section of the machine compartment.



Replacing Machine Compartment Wire Harness

1. Disconnect power to the refrigerator.
2. Remove the four 1/4 in. hex head screws from the rear access cover.
3. Disconnect the wiring from the machine compartment (See **Machine Compartment** section in this Guide).
4. Disconnect the ground wires from the case.
5. Remove the condenser fan assembly (see **Condenser Fan Removal** section in this Guide).
6. Remove the combo device.
7. Remove the water valve.
8. Use needle nose pliers or side cutters to remove the connectors.

The new machine compartment wire harness will come with canoe fasteners attached to harness.



IMPORTANT: When reinstalling the wire harness back to the refrigerator, make sure that all of the ground wires, protective sleeve, and electrical components are securely fastened.

Checking Combo Device and Compressor

Carefully check the **orange** and **black** wires for 120 VAC at the compressor combo device. If power is present at **black** and **orange** at the combo device perform the following checks:

- Checking Overload
- Checking PTC Relay
- Checking Run Capacitor
- Checking Compressor Electrically

Checking Overload

1. Disconnect power to the refrigerator.
2. Remove the combo device from the compressor.
3. Place the multi-meter on ohm's scale.
4. Check overload for approximately 1Ω (**NOTE**: If overload is warm, allow a few minutes for it to cool down before checking).
5. If overload is open, replace the combo device.

IMPORTANT: The overload is a safety device. If the overload is open, look for these possible reasons:

- Dirty condenser
- Condenser fan motor not running
- Low voltage, less than 105 VAC
- Refrigerator on an unapproved extension cord
- Shorted, stalled or grounded compressor

(*Continued next page*)

Checking PTC Relay

1. Disconnect power to the refrigerator.
2. Remove the combo device from compressor.
3. Place meter on ohm's scale.
4. Check PTC relay at pins 5 and 6 on back side of the relay (the portion that plugs into compressor. (Resistance should be approximately 6Ω - 11Ω).
5. If the PTC relay is open, replace the combo device.

Things to check if faulty PTC Relay is found:

- Dirty condenser
- Condenser fan motor not running
- Low voltage, less than 105 VAC
- Refrigerator on an unapproved extension cord
- Shorted, stalled or grounded compressor

Checking Run Capacitor

1. Disconnect power to the refrigerator.
2. Remove the combo device from the compressor.
3. Place meter to capacitance (set meter to **CAP**) and place meter leads to the capacitor. The meter should display approximately 12 µF.
4. Replace the run capacitor if open or shorted.

The compressor will start and run without the run capacitor being in the circuit, but will not run as efficiently.

Checking Compressor Electrically

1. Disconnect power to the refrigerator.
2. Remove combo device from the compressor.
3. Place meter on the ohm's scale.
4. Take the following three readings (see wiring diagram for compressor resistance values).
    - Between Run and Start
    - Between Common and Start
    - Between Common and Run

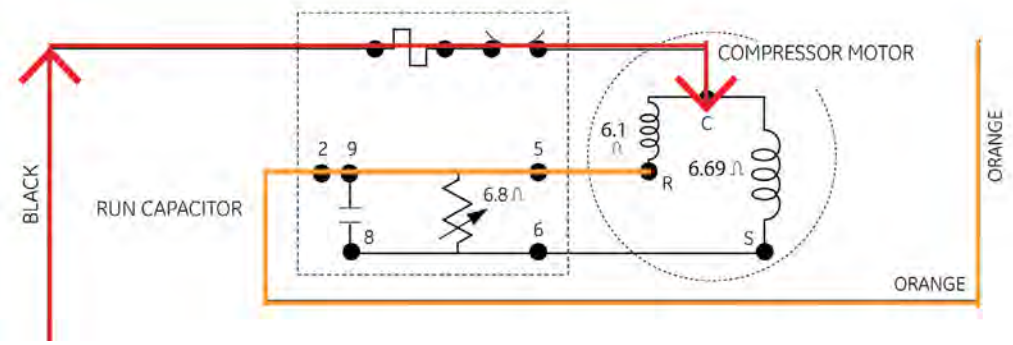
Refer to the refrigerator schematic for compressor resistance values.

5. Place one meter lead to case ground and the other to any of the three compressor terminals alternating between the R, C, and S, to check for a grounded compressor.
6. If the compressor is stalled, shorted, opened, or internally grounded, the replace the compressor.

Things to check if faulty compressor is found:

- Dirty condenser
- Condenser fan motor not running
- Low voltage, less than 105 VAC
- Refrigerator on an unapproved extension cord

Refer to the mini manual for correct electrical resistances



Sealed System

WARNING

- Be careful when using a torch inside the plastic cabinet. Use approved safety equipment and protect the liner from damage with the heat shield kit (part #WX5X8926), which includes the heat shield and thermal paste. The thermal paste is available separately (part #WX5X8927).
- Before cutting or using a torch on refrigerant tubes, recover the refrigerant from the system, using approved recovery equipment.
- Never charge new refrigerant through the purge valve. This valve is always located on the high-pressure side of the system.
- Never apply heat from any source to a container of refrigerant. Such action will cause excessive pressure in the container.
- Always wear goggles when working with refrigerants and nitrogen holding charge in some replacement parts. Contact with these gases may cause injury.

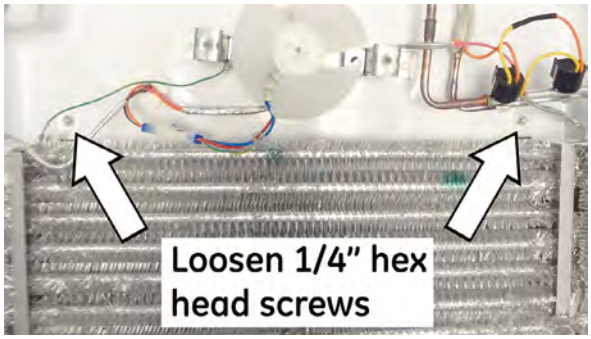
Evacuation and Charging Procedure

1. Attach the hose from the R-134a charging cylinder to the process tube port on the compressor.
2. Evacuate the system to a minimum 20 in. vacuum using the refrigerator compressor and recovery pump, which is attached to the new drier assembly.
3. Turn off the recovery pump. Close the ball valve on the hose connected to the high-pressure side port connection. Add 3 ounces of R-134a refrigerant to the system. Let the refrigerator operate and circulate the refrigerant for 5 minutes.
4. Open the ball valve. Recover the purge/sweep charge using the recovery pump and the refrigerator compressor until a 20 in. vacuum is attained. Close the ball valve and remove the recovery hose.
5. Charge the system with the exact amount of R-134a refrigerant specified.
6. Disconnect the power cord to the refrigerator. This allows the pressure to equalize. After 3 to 5 minutes, the low-pressure side will be positive and then, the hose-to-charging port can be disconnected.
7. Using an electronic leak detector, check all brazed joints and both schrader ports. Reinstall caps to schrader ports.

Sealed System - Evaporator

Evaporator Removal

1. Disconnect power to the refrigerator.
2. Recover refrigerant.
3. Remove freezer shelving (if applicable).
4. Remove ice maker if installed (see **Ice Maker Removal** section in this Guide).
5. Remove the air tower (see **Air Tower Removal** section in this Guide).
6. Remove evaporator cover (see **Evaporator Cover Removal** section in this Guide).
7. Remove evaporator fan (see **Evaporator Fan Removal** section in this Guide).
8. Remove defrost thermostat from the evaporator (see **Defrost Thermostat** section in this Guide).
9. Remove the defrost heater (see **Defrost Heater** section in this Guide).
10. Disconnect the ground wire from evaporator and position all wiring to allow for evaporator removal.
11. Loosen the two 1/4 in. hex head screws from the evaporator support.

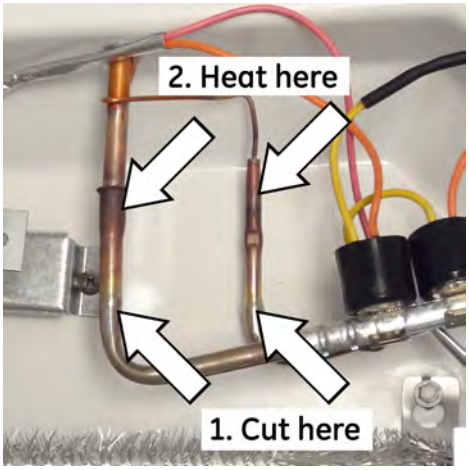


Evaporator (Brazing Method)

Caution:

- If unbrazing the evaporator, HEAT SHIELD P/N WR49X10025 must be used to prevent damage to freezer liner.
- Add thermal paste (WX5X8927) to the exposed Liner or any item that heat from a torch may come in contact with.
- Protect wiring from heat during unbrazing and re-brazing.

12. Cut the suction line off of the evaporator (see image below).
13. Cut the capillary tube section off (see image below).
14. Unbraze the capillary tube.
15. Unbraze the suction line.



16. Remove the evaporator.
17. Using a file, or cap tube cutter (WX05X10050) score the capillary tube just above the old braze and break the braze-covered section off. This will help prevent the capillary tube from becoming plugged when re-brazing.
18. Position the new evaporator in the cabinet. Insert the suction line and the capillary tube into the evaporator.
19. Braze the suction line to the evaporator.
20. Braze the capillary tube to the evaporator.
21. Install a replacement drier.
22. Evacuate and recharge the system using currently accepted procedures.

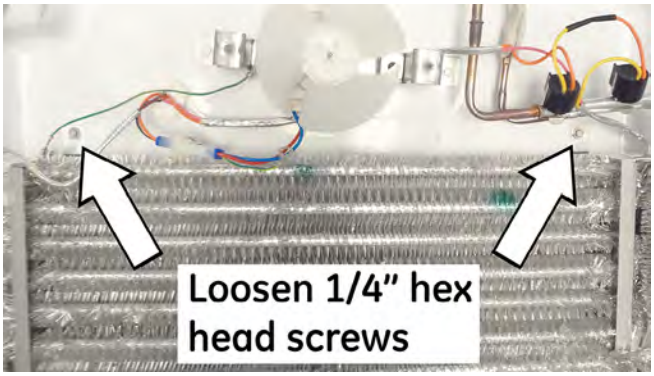
(*Continued next page*)

Sealed System - Evaporator

Evaporator (LOKRING Method)

Removing Evaporator:

1. Disconnect power to the refrigerator.
2. Recover refrigerant.
3. Remove freezer shelving (if applicable).
4. Remove ice maker if installed (see **Ice Maker Removal** section in this Guide).
5. Remove the air tower (see **Air Tower Removal** section in this Guide).
6. Remove the evaporator cover (see **Evaporator Cover Removal** section in this Guide).
7. Remove evaporator fan (see **Evaporator Fan Removal** section in this Guide).
8. Remove the defrost thermostat from the evaporator (see **Defrost Thermostat Removal** section in this Guide).
9. Remove the defrost heater (see **Defrost Heater Removal** section in this Guide).
10. Disconnect the ground wire from the evaporator and position all wiring to allow for evaporator removal.
11. Loosen the two 1/4 in. hex head screws from the evaporator support.



CAUTION: Tubing must be clean and free from burrs when using LOKRING.

NOTE: LOKRING connector P/N WR97X10021 must be used. Two LOKRING connectors are required.

12. Replace the evaporator using the LOKRING method (see Pub # 31-9067).
    - Cut the copper lines of the old evaporator as close as possible to the aluminum evaporator tubes.
    - Cut the copper lines of the new evaporator 1-1/8 inch from the edge of the aluminum evaporator tubes.
    - Defrost thermostat can be moved from the horizontal part of the copper line, to the vertical part just above the bend.
13. Install a replacement drier.
14. Evacuate and recharge the system using currently accepted procedures.

DPO Evaporator / LokRing Installation

IMPORTANT SAFETY INFORMATION

Before cutting or using a torch on refrigerant tubes, recover the refrigerant from the system using approved recovery equipment.

Never charge new refrigerant through the purge valve. This valve is always located on the high pressure side of the system.

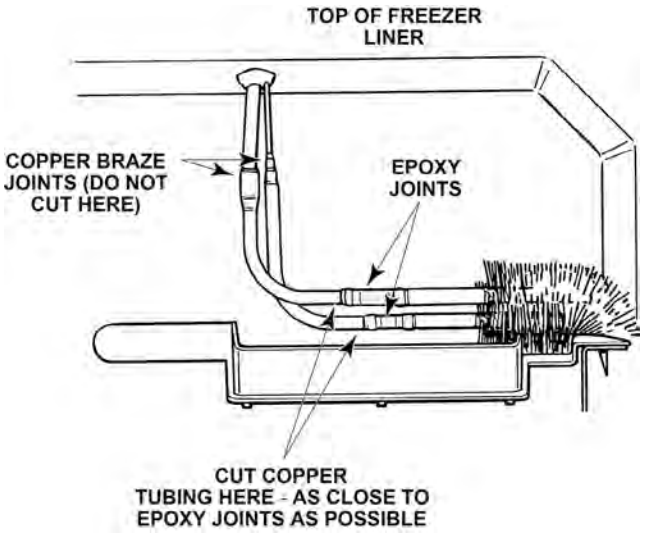
Never appy heat from any source to a container of refrigerant. Such action will cause excessive pressure in the container.

Always wear approved safety goggles when working with refrigerants and nitrogen holding charge in replacement compressor. Contact with these gases may cause injury.

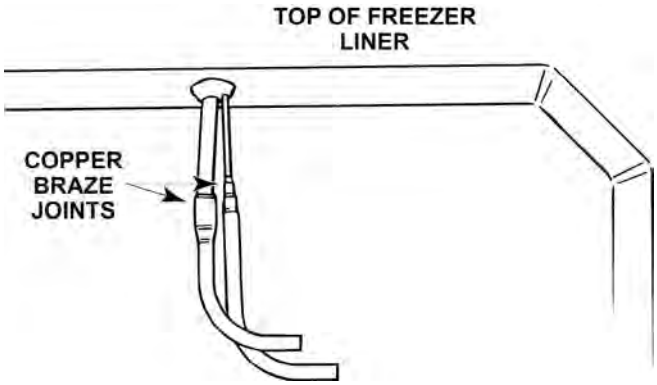
Part Numbers:

- **WR97X10014**: 3/8" LokRing Union
- **WR88X16**: LokPrep sealant/cleaner
- **WX5X1**: LokRing Tool with 3/8" Jaw

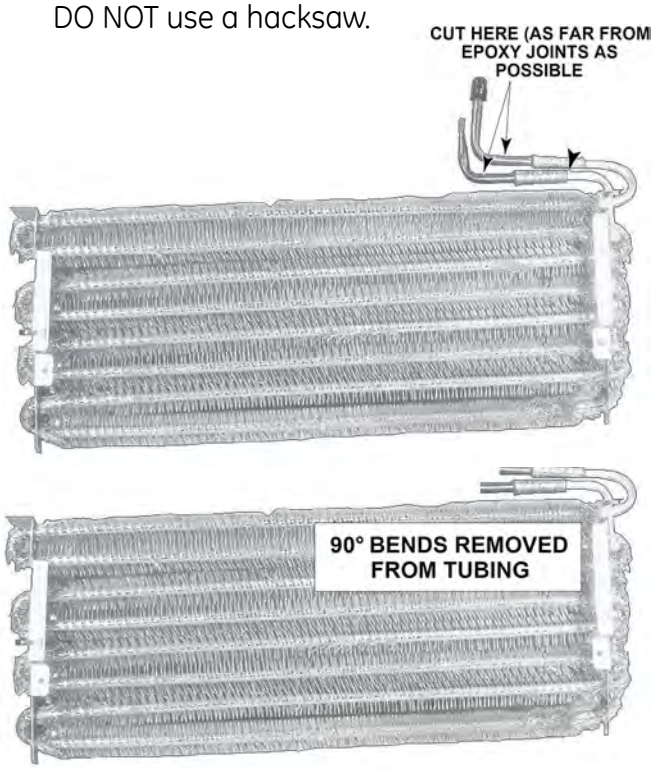
1. Disconnect power to the refrigerator.
2. Remove the rear access cover in order to gain access to the machine compartment.
3. Recover the refrigerant from the inoperative sealed system using approved recovery equipment.
4. Remove the shelves and ice trays, or icemaker (if used), from the freezer compartment, while the refrigerant is being recovered.
5. Remove the evaporator cover. Remove the screws from the base of the air tower, remove the air tower and foam nozzle. Remove screws from the upper left and right of evaporator cover and screws attached to the evaporator fan bracket.
6. Remove the evaporator cover and freezer floor.
7. Disconnect the power cord.
8. Remove the evaporator fan assembly by taking out both screws and disconnecting the orange, black and green wire leads.
9. Disengage the defrost thermostat from the evaporator. Disconnect both wire leads to the defrost heater.
10. Cut the copper jumper tubes as close to the epoxy joints as possible (see illustration below). Use a tubing cutter to make this cut. DO NOT use a hacksaw.



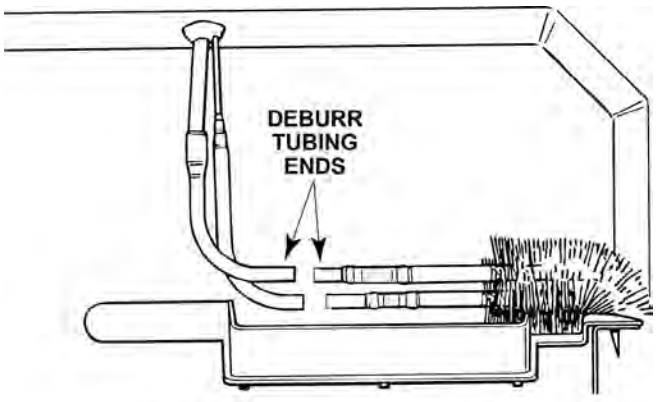
11. Loosen (2) mounting screws that fasten the evaporator to the rear wall of the freezer. Remove the defective evaporator.



12. Cut the copper evaporator tubing as far from the epoxy joints as possible. Do not remove the epoxy joint. See illustration below. Use a tubing cutter to make this cut. DO NOT use a hacksaw.



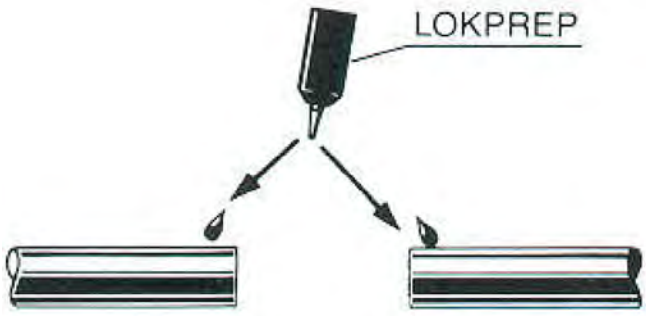
13. Install the replacement evaporator by hanging it on the left mounting screws. Install the evaporator over the right mounting screw. Tighten (2) screws to hold the evaporator in place. Care should be taken to prevent any foreign matter from entering the evaporator and aluminum tubes.



COPPER TO COPPER CONNECTIONS

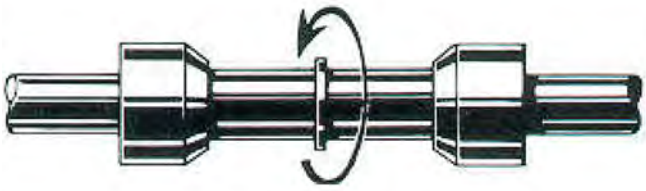
14. Deburr the tubing ends (see previous illustration) to remove any residue left from the tubing cutters, using ScotchBrite or fine emery cloth. Care should be taken to prevent residue from entering the cut tubing ends, which could contaminate the system.

15. Apply a few drops of LokPrep, a specially formulated anaerobic sealant that fills in any surface scratches. This is extremely important to a successful, leak free joint.



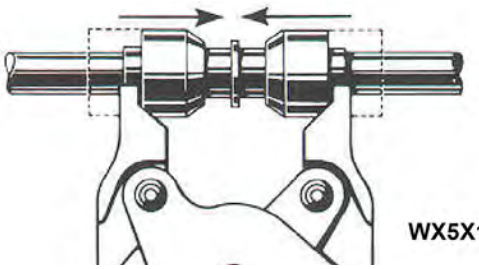
WR88X16 LokPrep

16. Insert the tubing ends into the LokRing union connector as far as they will go (internal stop). Then rotate the connector a full 360° to distribute the LokPrep evenly.



WR97X10014 3/8" Union

17. Compress the LokRings by placing the jaws of the LokRing tool against the outer edges of the LokRings, as shown below. Then squeeze the handles of the assembly tool together, driving the LokRing connectors together to the external stop. Allow approximately 5 minutes prior to pressurizing the system.



WX5X1 LokRing Tool

18. Reroute the heater wires behind the evaporator tubes on the right side. Place the defrost thermostat back on the evaporator tube. Attach the terminals to the new defrost calrod heater.

19. Remount the evaporator fan with mounting screws. Reattach all wires to the fan. Replace the freezer floor and evaporator cover, using the original mounting screws.

20. Install the new foam nozzle and air tower.

21. Reinstall the shelves and ice trays, or icemaker (if used) in the freezer compartment.

22. Install a drier, in accordance with instructions included with the replacement drier.

23. **NOTE**: A WR86X10 valve should have been previously installed on the low pressure process tube at the compressor.

24. Dress the tubing to prevent rattling.

25. Evacuate and charge the system, using the original refrigerant type only, and original factory charge quantity (see model/serial plate).

Sealed System - Heat Exchanger

The heat exchanger consist of a suction line and a capillary tube that are brazed together. The heat exchanger is the means that connects the evaporator to the compressor through the suction line and to the outlet of the drier by way of the capillary tube. The function of the heat exchanger is to transfer heat from the warm liquid flowing through the capillary to the cool vapor flowing through the suction tube. The heat exchange occurs where the capillary is soldered to the outside of the suction tube. This arrangement improves the efficiency of the system. By reducing the heat of the capillary, the boiling point of the liquid entering the evaporator is lowered. Increasing the heat of the suction tube increases the density of the vapor entering the compressor and also helps to prevent the suction tube from sweating.

NOTE: The heat exchanger is foamed into the cabinet of the refrigerator. However, if any part of the heat exchanger (suction or capillary tube) fails due to restriction or leak, a replacement heat exchanger can be installed, order part number WR85X10077.

Sealed System - Compressor

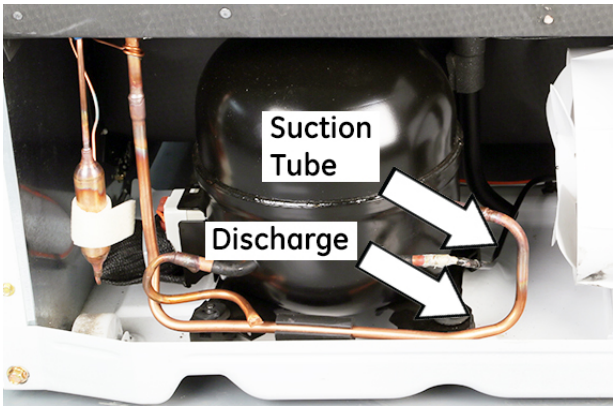
Compressor Motor

The compressor motor drives a piston to compress refrigerant gas. As the piston travels downward it creates a vacuum to the suction line drawing in the refrigerant until the piston is to its lowest point. On the up stroke of the piston it creates a positive pressure, pushing the reed open and forcing refrigerant out to the discharge line; thus providing the means for refrigeration. The motor rests on springs that are mounted to the compressor shell. This motor has two windings. One is a start winding and the other a run winding. The windings are connected together internally, forming a common connection. A lead is connected to one end of each winding and to the common connection.

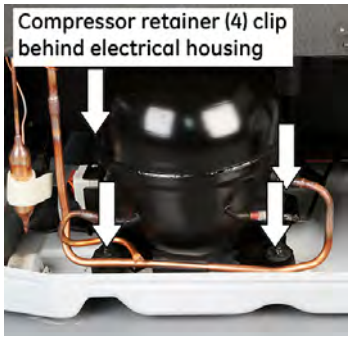
These three leads are then connected to glass-sealed terminals that extend through the compressor case. The terminals are clustered in a triangle (pyramid) pattern and, reading from left to right, are identified: Start, Common and Run.

Replacing the Compressor

1. Disconnect power to the refrigerator.
2. Remove the four 1/4 in. hex head screws from the rear access cover.
3. Recover the refrigerant.
4. Remove the combo device retainer (see **Combo Device** section in this Guide).
5. Unbraze the suction tube.
6. Unbraze the discharge tube.



7. Remove the four compressor retaining clips.
8. Remove the compressor.
9. Reposition the new compressor.
10. Braze or Lokring the discharge tube to the compressor discharge port.
11. Braze or Lokring the suction tube to the suction port of the compressor.
12. Braze or Lokring the drier to the hot gas loop and capillary tubes.



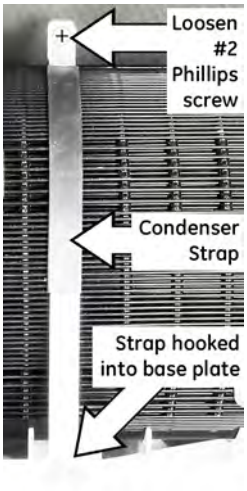
13. Evacuate and recharge the system using currently accepted procedures.

NOTE: Make sure the suction tube grommet is secured to the suction tube. See the image below.

Sealed System - Condenser

Condenser Removal

1. Disconnect power to the refrigerator.
2. Remove the five 1/4 in. hex head screws from the rear access cover.
3. Recover the refrigerant.
4. Move the water valve out of the way (if applicable).
5. Remove the condenser fan assembly (see **Condenser Fan Assembly Removal** section in this Guide).
6. Loosen the condenser fastening strap, using a #2 Phillips screw driver.
7. Disengage the condenser strap from the base plate.



8. Unbraze the discharge line from the compressor.
9. Cut the hot gas line, leaving enough room to braze the tubing or connect lokring (Cut as close to the braze joint as possible). (See **Service Guide 31-9067** for additional Lokring information).
10. Remove the condenser.

The condenser support is the platform that the condenser sits on and is secured to the base plate by the condenser fastening strap.

There are two types of condensers, one for Estar, and one for Non-Estar.

- Energy star has 8 condenser tubing passes
- Non-Energy star has 6 condenser tubing passes

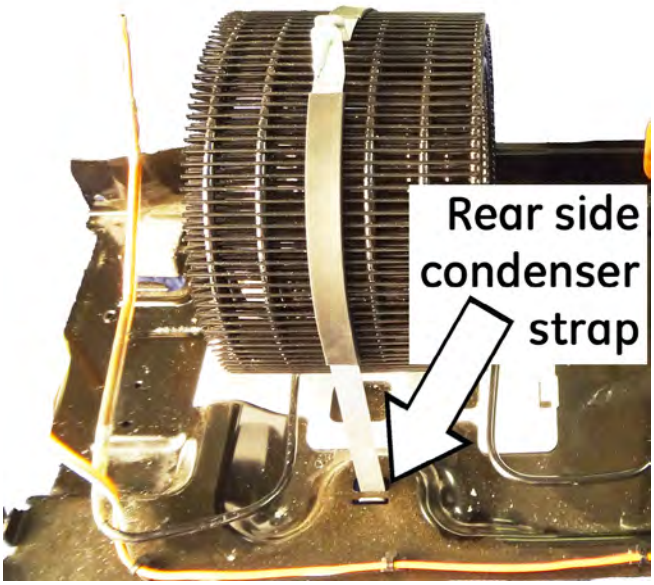
**When replacing the condenser, an Energy star condenser (8 pass condenser) will be sent for Energy star models and Non-Energy star models, unit charge will not change.

11. Position the new condenser to the condenser support.
12. Tighten the condenser strap using a #2 screw driver.
13. Braze or Lokring the hot gas line to condenser.
14. Braze or Lokring the discharge tube to the compressor.
15. Install a replacement drier.
16. Evacuate and recharge the system.

Sealed System - Dryer

Condenser continued

Rear view of the condenser, and the condenser strap connected to the base pan

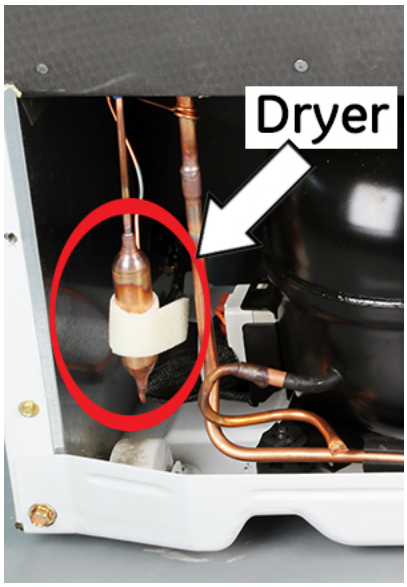


Drier

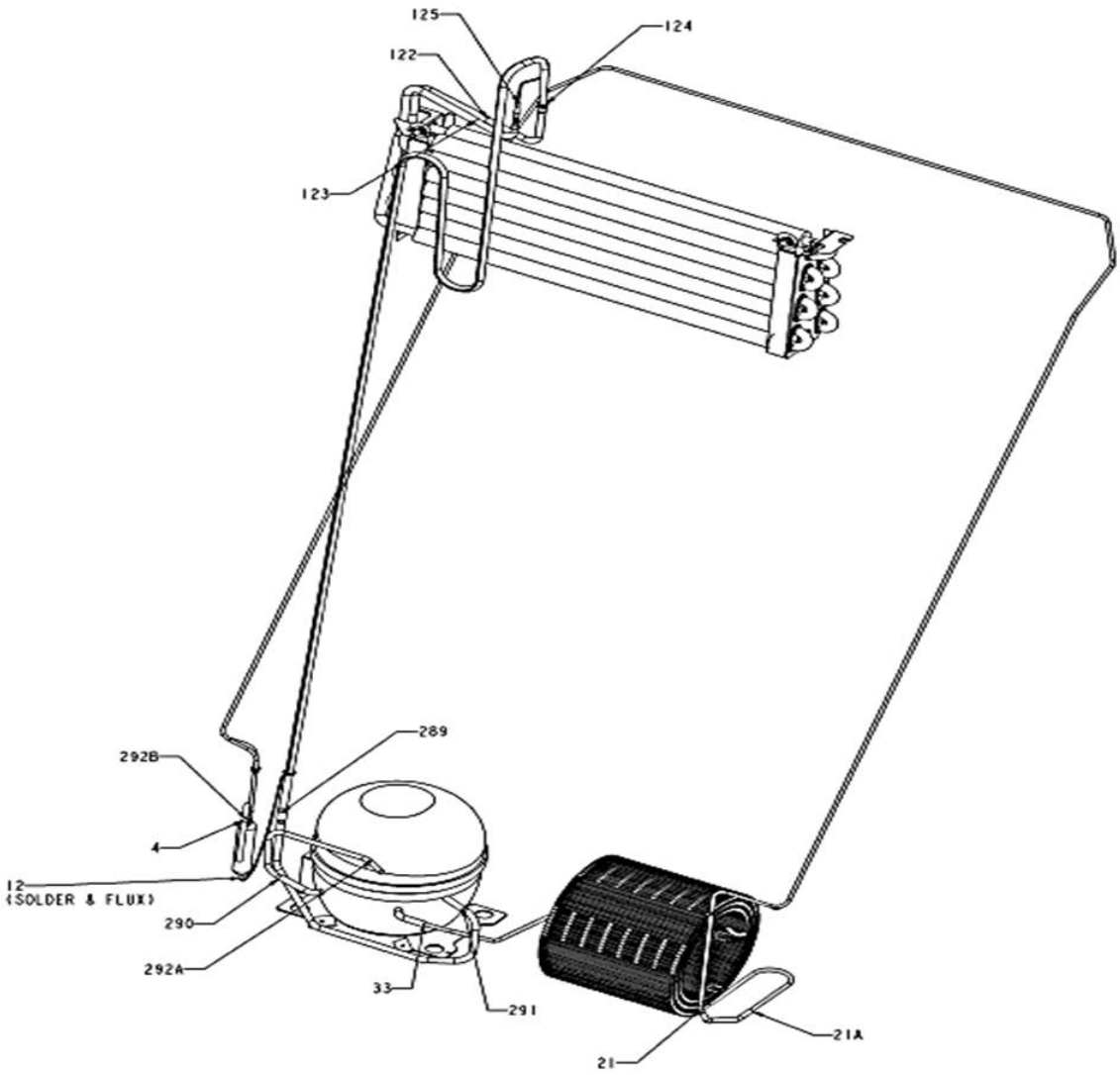
The drier is part of the refrigerators sealed system. The purpose of the drier is to remove non-condensable such as moisture and small debris that may have been introduced into the system during production or sealed system repairs.

Replacing Dryer:

1. Disconnect power to the refrigerator.
2. Remove the five 1/4 in. hex head screws from the rear access cover.
3. Recover refrigerant.
4. Cut the hot gas line section of the drier out using tubing cutters.
5. Using a file or cap tube cutters (WX05X10050), score the cap tube and bend tubing until the cap tube separates. **NOTE**: Make sure that the cap tube ID is free from obstructions.
6. Braze or Lokring the drier to the hot gas line and capillary tubes.
7. Evacuate and recharge the system using currently accepted procedures.

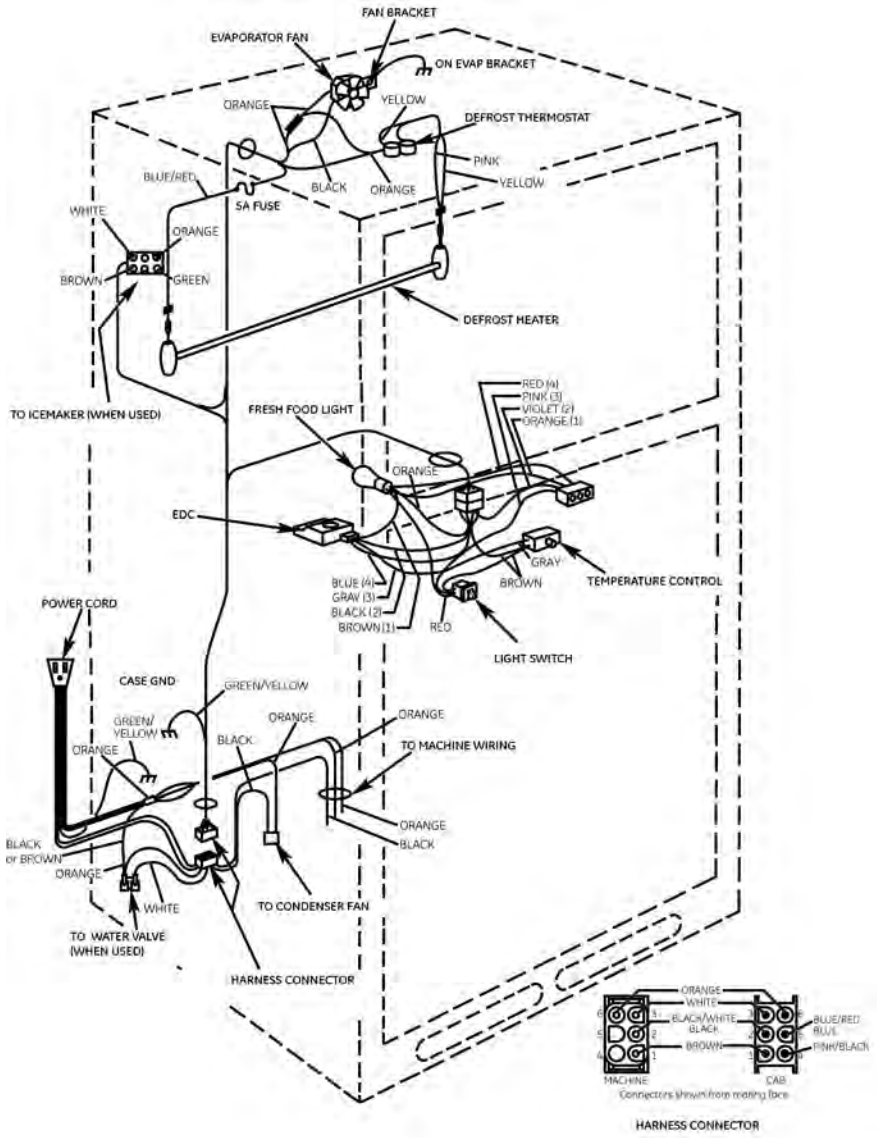


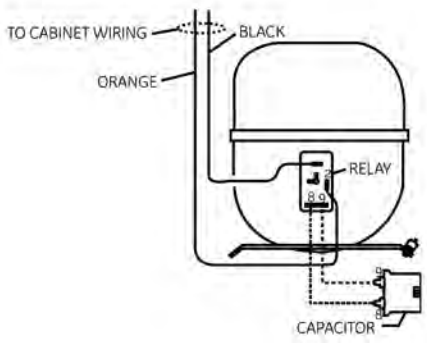
Sealed System Brazed Joints



Joint	Connecting Tubing	Joint Size	Connecting Tubing	Joint Size	Material
4	(Replacement) Dryer	0.251	HGL (O.D.)	0.156	Copper/Copper
12	(Replacement) Dryer	0.251	Cap Tube (O.D.)	0.076	Copper/Copper
21	HGL Jumper (I.D.)	0.170	HGL (O.D.)	0.156	Copper/Copper
21A	HGL Jumper (I.D.)	0.194	Condenser (O.D.)	0.188	Copper/Copper
33	Compressor Discharge port (I.D.)	0.194	Condenser (O.D.)	0.188	Copper/Steele
122	EVAP	0.321	Tube jumper cap (O.D.)	0.312	Copper/Copper
123	EVAP	0.321	Tube jumper Suc (O.D.)	0.312	Copper/Copper
124	Tube Jumper Suc (I.D.)	0.317	Suction tube (O.D.)	0.312	Copper/Copper
125	Tube Jumper cap (I.D.)	0.082	Tube cap (O.D.)	0.076	Copper/Copper
289	Suction Jumper (I.D.)	0.319	Suction tube (O.D.)	0.312	Copper/Copper
290	Compressor Process port (I.D.)	0.256	Process tube (O.D.)	0.250	Copper/Copper
291	Compressor suction port (I.D.)	0.319	Suction Jumper	0.312	Copper/Copper

Top Mount Electronic Defrost

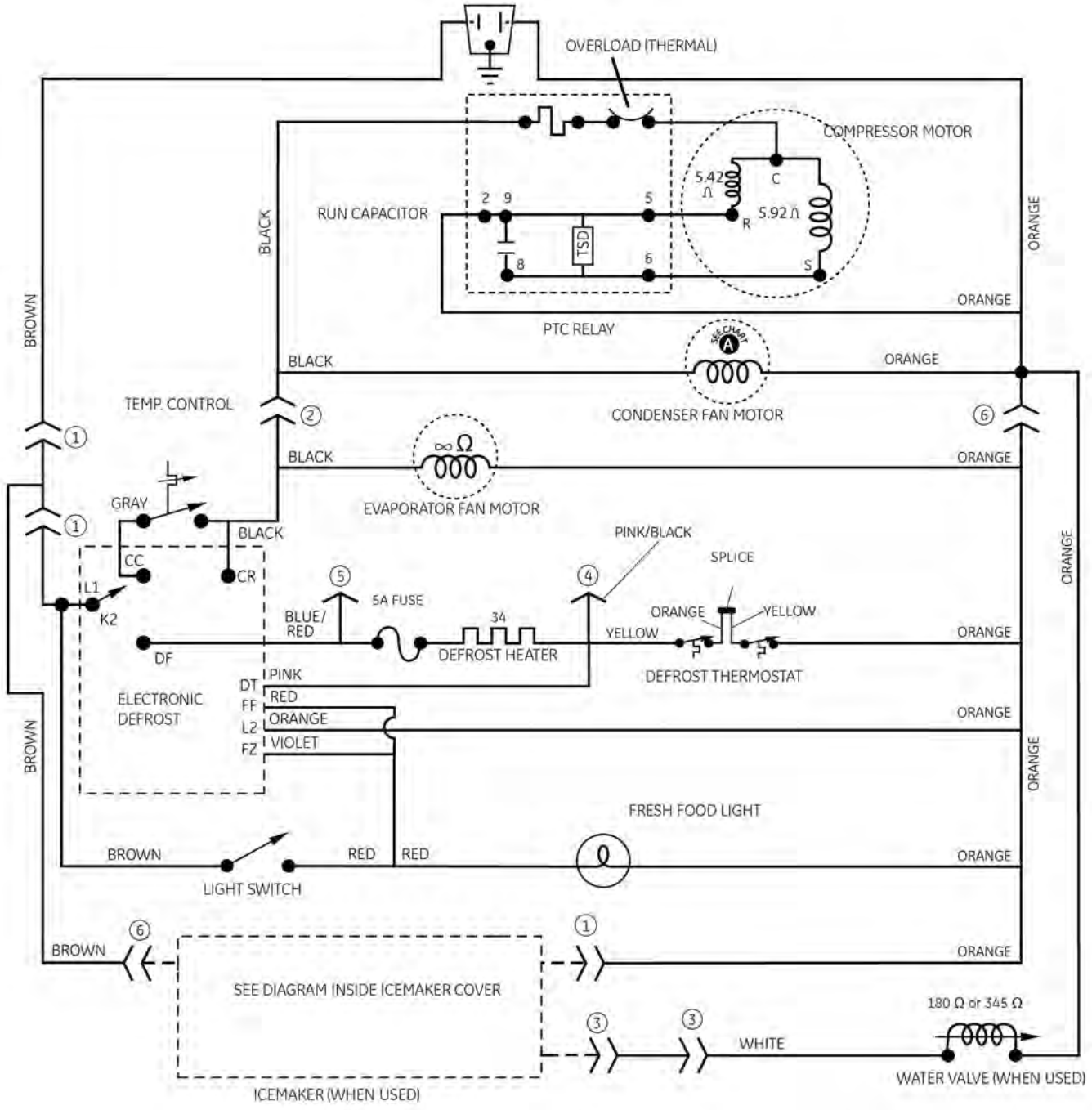




LEGEND:

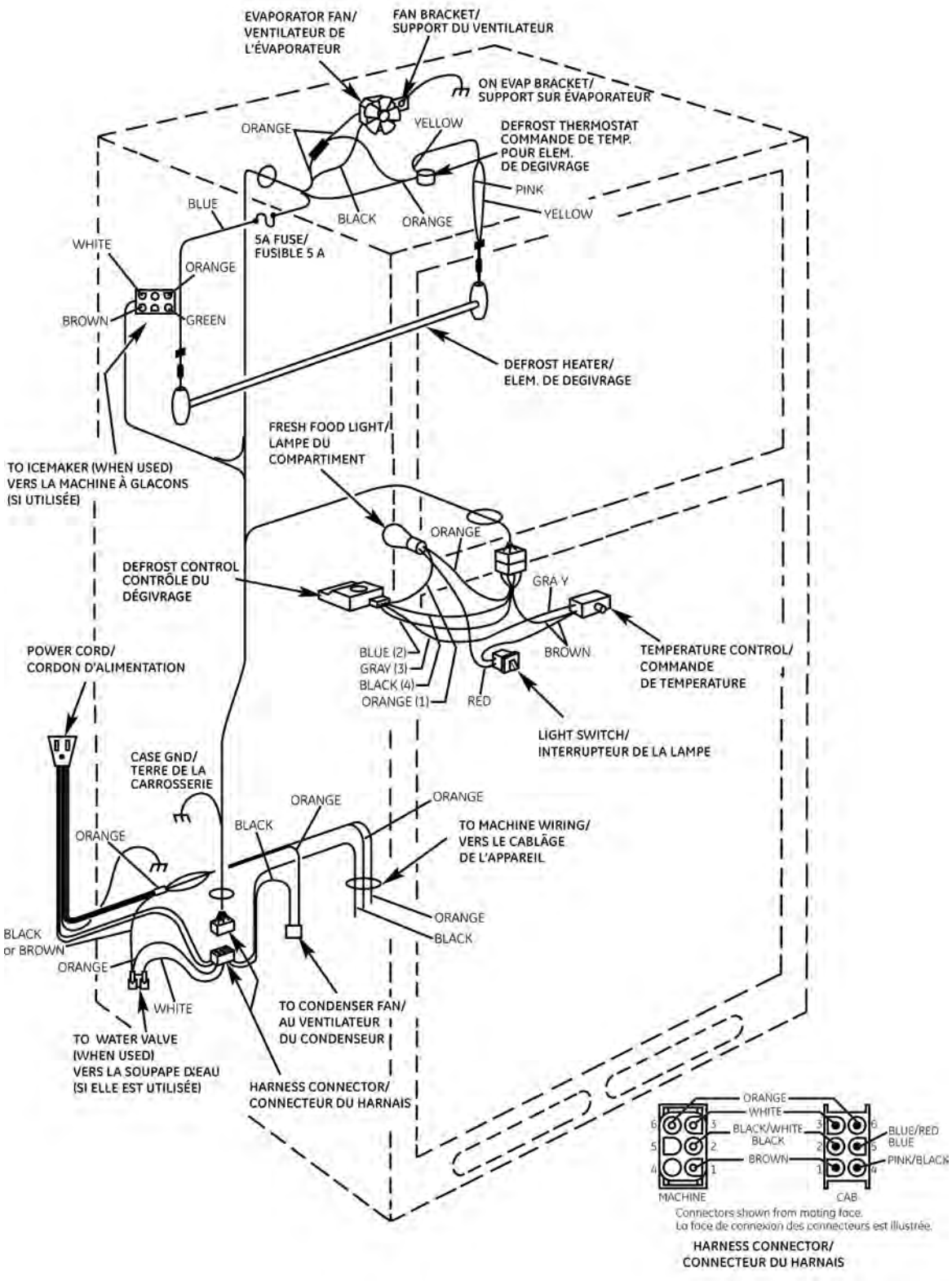
BLACK
BLUE
BROWN
GRAY
ORANGE
PINK
RED
WHITE
YELLOW

Top Mount Electronic Defrost

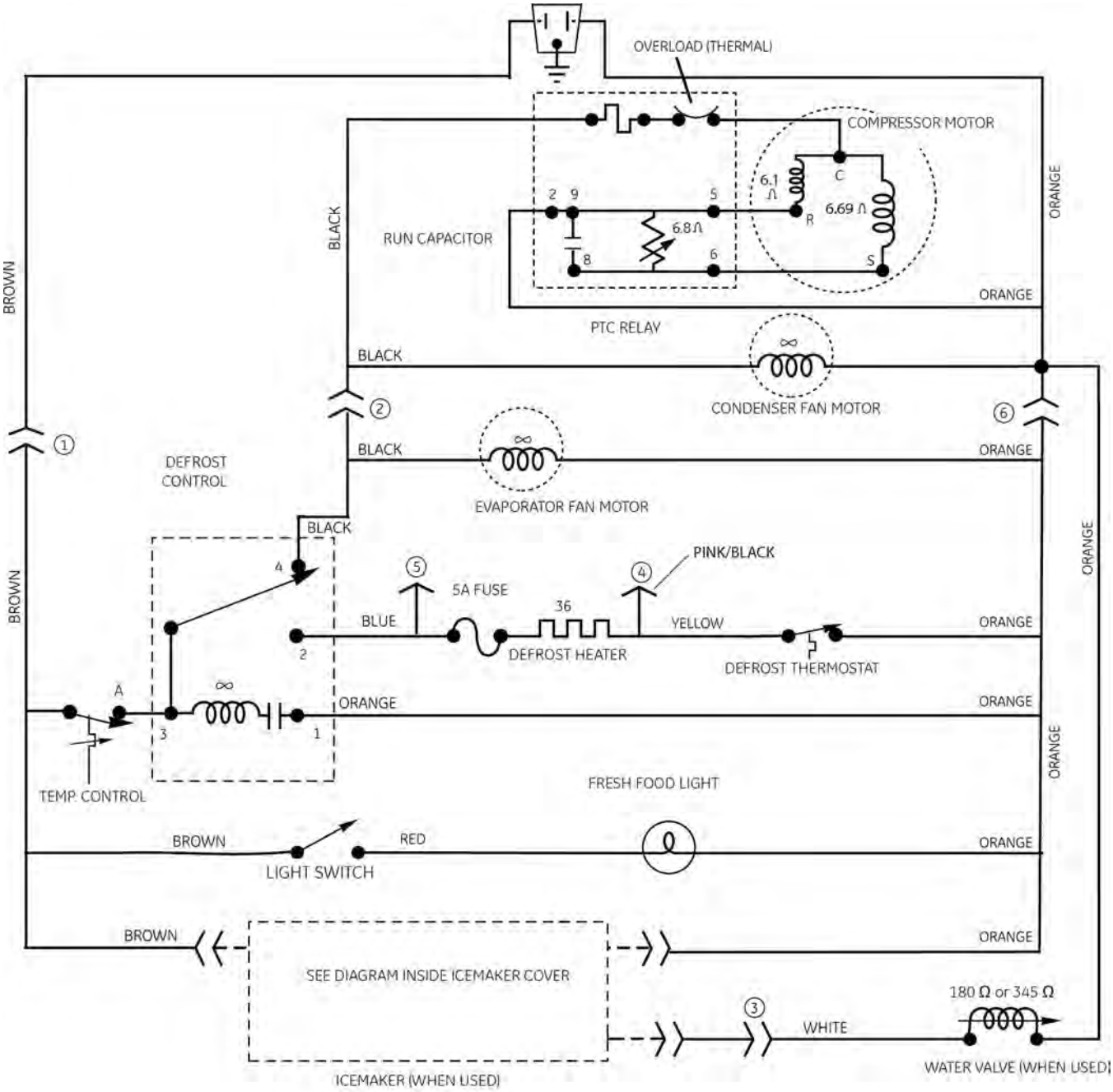


A	Condenser Fan	Resistance Ω
	Sung Shin	78 Ω
	Bitron	∞ Ω

Top Mount Mechanical Timer



Top Mount Mechanical Timer



Warranty

All warranty service provided by our Factory Service Centers, or an authorized Customer Care® technician. To schedule service, visit us online at GEAppliances.com, or call 800.GE.CARES (800.432.2737). Please have serial number and model number available when calling for service.

Staple your receipt here. Proof of the original purchase date is needed to obtain service under the warranty.

For the Period of:	*GE Will Replace*
GE PROFiLE ™ AND GE CAFÉ™ MODELS	
One Year *From the date of the original purchase*	***Any part*** of the refrigerator which fails due to a defect in materials or workmanship. During the ***limited one-year warranty,*** GE will also provide, ***free of charge,*** all labor and related service to replace the defective part.
Thirty Days *(Water filter, if included) From the original purchase date of the refrigerator*	***Any part*** of the water filter cartridge which fails due to a defect in materials or workmanship. During this ***limited thirty-day warranty,*** GE will also provide, ***free of charge,*** a replacement water filter cartridge.
GE PROFiLE MODELS ONLY	
Five Years *(GE Profile models only) From the date of the purchase*	***Any part of the sealed refrigerating system*** (the compressor, condenser, evaporator an all connecting tubing) which fails due to a defect in materials or workmanship. During this ***limited five-year sealed refrigerating system warranty,*** GE will also provide, ***free of charge,*** all labor and related service to replace the defective part in the sealed refrigerating system.

What GE Will Not Cover:

- **Service trips to your home to teach you how to use the product.**
- **Improper installation, delivery or maintenance.**
- **Failure of the product if it is abused, misused, or used for other than the intended purpose or used commercially.**
- **Loss of food due to spoilage.**
- **Replacement of house fuses or resetting of circuit breakers.**
- **Damage caused after delivery.**
- **Replacement of the water filter cartridge, if included, due to water pressure that is outside the specified operating range or due to excessive sediment in the water supply.**
- **Replacement of the light bulbs, if included, or water filter cartridge, if included, other than as noted above.**
- **Damage to the product caused by accident, fire, floods or acts of God.**
- **Incidental or consequential damage caused by possible defects with this appliance.**
- **Product not accessible to provide required service.**
- **Damage caused by a non-GE Brand water filter.**

EXCLUSION OF IMPLIED WARRANTIES—Your sole and exclusive remedy is product repair as provided in this Limited Warranty. Any implied warranties, including the implied warranties of merchantability or fitness for a particular purpose, are limited to one year or the shortest period allowed by law.

This warranty is extended to the original purchaser and any succeeding owner for products purchased for home use within the USA. If the product is located in an area where service by a GE Authorized Servicer is not available, you may be responsible for a trip charge or you may be required to bring the product to an Authorized GE Service location for service. In Alaska, the warranty excludes the cost of shipping or service calls to your home.

Some states do not allow the exclusion or limitation of incidental or consequential damages. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. To know what your legal rights are, consult your local or state consumer affairs office or your state's Attorney General

Warrantor: General Electric Company. Louisville, KY 40225