GE APPLIANCES
a Haier company

Technical Service Guide

January 2019

2017 & 2018 19, 21, 25, 27 Cu. Ft. Bottom-Freezer Refrigerators

GNE21FMKFF
GNE21FMKGF
GNE21FSKFF
GNE21FSKGF
GNE25JGKFF
GNE25JGKGF
GNE25JMKFF
GNE25JMKGF
GNE25JSKFF
GNE25JSKGF
GNE27ESMAF
GNE27JGMAF
GNE27JMMAF
GNE27JSMAF
GWE19JGLAF
GWE19JGLGF
GWE19JMLAF
GWE19JMLGF
GWE19JSLAF
GWE19JSLGF
QNE27JBMAF
QNE27JSMAF
XNE25JGKBF
XNE25JSKBF

31-9296

Safety Information

IMPORTANT SAFETY NOTICE

The information in this service guide is intended for use by individuals possessing adequate backgrounds of electrical, electronic, and mechanical experience. Any attempt to repair a major appliance may result in personal injury and property damage. The manufacturer or seller cannot be responsible for the interpretation of this information, nor can it assume any liability in connection with its use.

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.

Warranty

For Warranty Information:

1. Go to http://products.geappliances.com
2. Search the model number.
3. Click on the Literature tab.
4. Click on Use and Care Manual.
5. Locate the Warranty page.

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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.

Brazing Glasses

Prescription Safety Glasses

Safety Glasses must be ANSI Z87.1-2003 compliant

Plano Type Safety Glasses

Dyneema®Cut Resistant Glove

Cut Resistant Sleeve(s)

Electrically Rated Glove and Dyneema® Cut Resistant Glove Keeper

Steel Toed Work Boot

⚠ WARNING

Prior to disassembly of the 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

Nomenclature

Model Number

G N E 27 E S M A F S S

Brand
G: GE Appliances
Q: Haier
X: Crosley

Configuration
N: Full Depth
W: Counter Depth

Energy
E: E-Star

Capacity
19: 18.6 Cubic Feet
21: 20.8 Cubic Feet
25: 24.8 Cubic Feet
27: 27.0 Cubic Feet

Feature Pack
E: Base
F: Base
J: Deluxe

Finish
B: Black Stainless
G: High Gloss
M: Slate
S: Stainless Steel

Model Year:
K: 2016
L: 2017
M: 2018

Engineering Digit

Door Swing
F: French

Color
B: Black
D: Black Slate
E: Slate
S: Stainless Steel
T: Black Stainless
W: White

Handle Color
B: Black
S: Stainless Steel
W: White

The nomenclature breaks down and explains what the letters and numbers mean in the model number.

Serial 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: FL123456S = March, 2018

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 Mini Manual is located under the right hinge cover.

The Model Serial ID Tag is located on the left side of the refrigerator compartment.

Specifications

⚠ WARNING **Electrical Shock Hazard**

Death or serious injury can result from failure to follow these instructions.

- **Service by a qualified service technician only.**
- Disconnect power before servicing this product.
- Reconnect all grounding devices after service.
- Replace all parts and panels before operating.

ELECTRICAL SPECIFICATIONS	
Max Defrost Control	
w/No Door Openings	96 hrs @ 40 min
Defrost Thermostat	95 - 65°F
Defrost Heater	120 VAC / 33Ω
Fill Tube Heater	13 VDC / 136Ω
Mullion Heater	13 VDC / 24Ω
Damper Motor	415Ω
Isolation Valve	120 VAC / 320Ω
Icemaker Valve	120 VAC / 320Ω
Dispenser Valve	120 VAC / 120Ω
Compressor Windings	120 VAC / 4Ω & 6Ω
Evaporator Fan	8 - 11 VDC
Condenser Fan	9 - 10 VDC
Icemaker	120 VAC

NO LOAD PERFORMANCE		
CONTROL POSITION 0 / 37°F and		
AMBIENT TEMPERATURE OF	65°F	90°F
Fresh Food, °F	38 - 40	36 - 38
Frozen Food, °F	0 - 1	0 - 2
Percent Running Time	25 - 50	50 - 80

REFRIGERATION SYSTEM	
Minimum Equalized Pressure	
@ 70°F	40/45 PSIG
@ 90°F	48/60 PSIG
R134a Refrig. Chg.	
19 - 21 cu. ft. models:	4.00 ounces
25 cu. ft. models:	4.25 ounces
27 cu. ft. models:	4.48 ounces

REFRIGERATION DIAGNOSIS

To access the low pressure side of the system, install a WJ56X61 valve only on the process tube extending from the compressor case.

Installation

Refrigerator Location

The product should not be installed in the following locations:

- Where the temperature will go below 60°F (16°C) because it will not run often enough to maintain proper temperatures.
- Where the temperature will go above 100°F (37°C) because it will not perform properly.
- In a location exposed to water (rain, etc.) or direct sunlight.
- The refrigerator should be installed on a floor strong enough to support it fully loaded.

NOTE: Not recommended for installation on carpeted flooring.

Additional Specifications

- 115 volt 60Hz, 15 or 20-amp power supply is required.
- An individual properly grounded branch circuit or circuit breaker is recommended.

NOTE: A GFI (Ground Fault Interrupter) is not recommended.

⚠ WARNING **Electrical Shock Hazard**

- It is required that the refrigerator be plugged into a grounded 3-prong outlet.
- Ground prong should not be removed.
- Use of a 2-prong adapter or an extension cord is prohibited.
- Frayed or damaged power cord should immediately be replaced.

Clearances

These refrigerators should have the following clearances for ease of installation, proper air circulation, and enough room for plumbing and electrical connections.

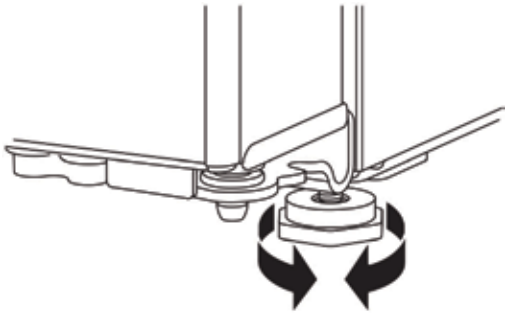
- **Sides**: 1/8 inch
- **Top (Cabinet/Hinge Cover)**: 1 inch
- **Back**: 2 inches

Leveling

The refrigerators have adjustable legs at the front corners. The leveling legs should be set so the refrigerator is firmly positioned on the floor and the front is raised enough that the doors close easily when opened about halfway.

To Adjust the Leveling Legs:

- Turn the legs clockwise to raise, or counterclockwise to lower the refrigerator.

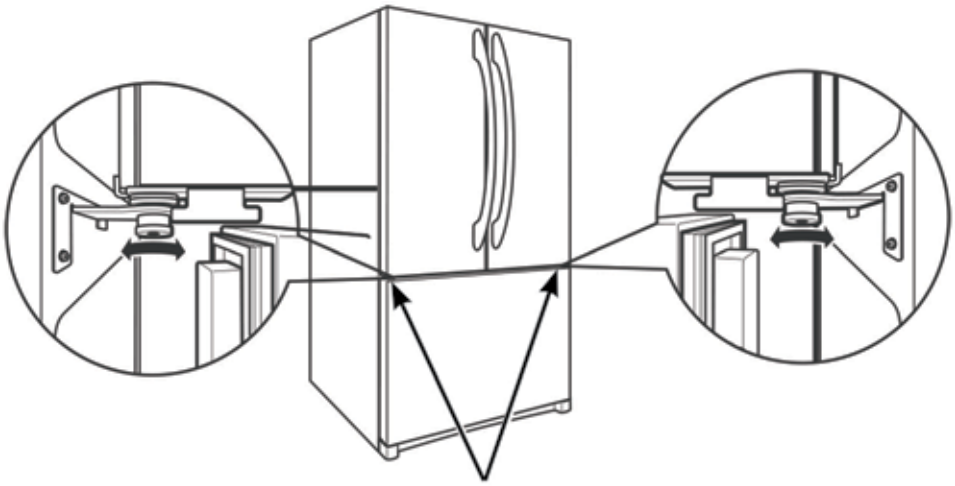


Leveling Refrigerator Doors

The refrigerators door height can be adjusted on both doors. Prior to adjusting the door height, the refrigerator should be leveled for best results. After the cabinet has been properly leveled, a 1/4-in. Allen wrench can be used to turn the pin in the bottom hinges of the refrigerator doors.

To Adjust the Door Height:

- Turn the left or right adjustment pin clockwise to raise, or counterclockwise to lower the corresponding door.



Adjustment Pin Locations

Operating Instructions

Temperature Control

The temperature display will only show the set temperatures of the refrigerator.

Default freezer temperature is 0°F. Freezer temperature can be set to -6°F to 6°F. To change the temperature setting, press the **Freezer** pad to display the current set temperature and "wake up" the display. Then press the **Freezer** pad again to increase the set temperature. Once the set temperature reaches 6°F the next press of the **Freezer** pad will cycle the set temperature back to -6°F.

The default refrigerator temperature is 37°F. Refrigerator temperature can be set to 34°F to 44°F. To change the temperature setting, press the **Fridge** pad to display the current set temperature and "wake up" the display. Then press the **Fridge** pad again to increase the set temperature. Once the set temperature reaches 44°F the next press of the **Fridge** pad will cycle the set temperature back to 34°F.

The actual temperature will vary from the set temperature based on factors such as door opening, amount of food, defrost cycling and room temperature.

NOTE: Frequent door openings or a door left open for periods of time may increase the internal temperature of the refrigerator compartment temporarily.

Water Filter Reset

Pressing the **Water Filter** pad for three seconds will reset the filter timer.

Cooling System Off

To turn off the cooling system, press and hold both **Fridge** and **Freezer** pads until the display shows OFF. To turn the cooling system on, press either **Fridge** or **Freezer** pads and the display will show the set temperature.

°F to °C

To change the temperature display between Fahrenheit and Celsius, press and hold **Door Alarm** and **Freezer** for 5 seconds. Temperature display can also be changed using Service Mode Test t14 (see **Service Mode Tests** in the in the **Service Mode** section of this service guide).

Tone Volume

Door alarm volume or the sound in response to pressing a pad cannot be changed.

Door Alarm

Press the **Door Alarm** pad to toggle the door alarm between ON and OFF states. The alarm will sound if any door or drawer is left open for more than two minutes. Once the door or drawer is closed, the alarm will stop.

Turbo Cool

TurboCool™ rapidly cools the refrigerator compartment in order to more quickly cool foods. Use TurboCool™ when adding a large amount of food to the refrigerator compartment, putting away foods after they have been sitting out at room temperature, or when putting away warm leftovers. It can also be used if the refrigerator has been without power for an extended period.

To set the TurboCool™, press the **Turbo Cool** pad for 3 seconds. The display will show "tC".

NOTE: The refrigerator temperature cannot be changed during TurboCool™. The freezer temperature is not affected during TurboCool. When opening the refrigerator door during TurboCool™, the fans will continue to run if they have cycled on.

Demo Mode

Demo mode deactivates compressor, fans, and defrost heater. All keys on the control panel are functional. The display will show and blink **888** then switch to displaying the set temperature. To enter Demo Mode press **Door Alarm**, **Freezer**, and **Fridge** pads simultaneously for 5 seconds. To exit Demo Mode, cycle power to the refrigerator. Demo Mode can also be entered from Service Mode Test t1.

Sabbath Mode

Sabbath Mode is designed to eliminate changes in operations of the refrigerator due to human interactions. This mode is entered by the consumer during observance of the Sabbath or during specific religious holidays.

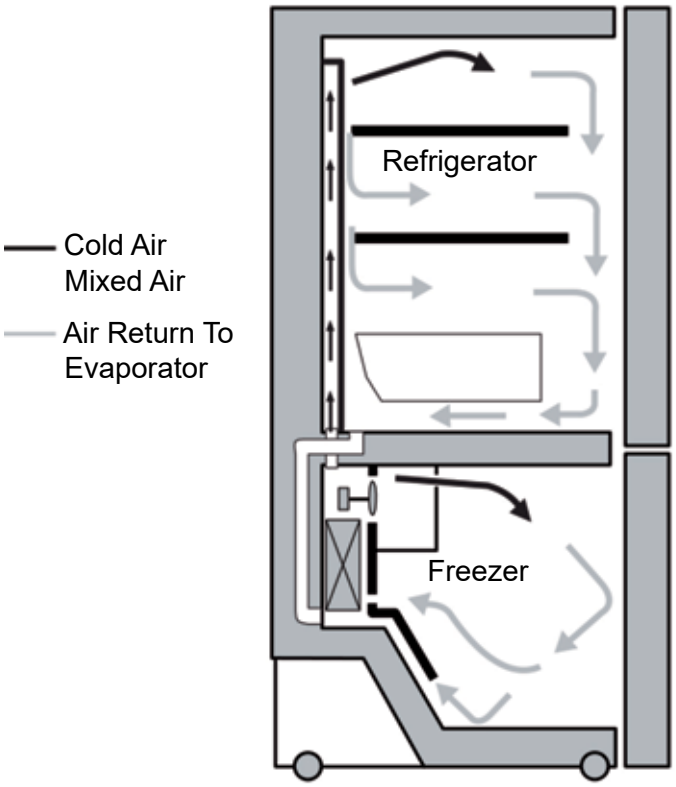
While in the Sabbath Mode, the appliance will still operate normally. However, the appliance will not respond any consumer actions.

While in the Sabbath Mode, it may be noticed that the fan is running when the door is opened; however, this is not a result of any interactions with the refrigerator. The fan will operate at random times. The defrost heater will continue to defrost the appliance and defrost will be activated on a timer. The defrost heater will not defrost as a result of door openings or any consumer actions.

DISPLAYS, ALARMS and LIGHTS: The main temperature control displays will be deactivated; therefore, theywill not be lit, sound a tone or operate when touched. Door alarms will be disabled. Lights will always be on but at a dim light setting.

To turn on Sabbath Mode, press and hold the **Door Alarm** and **Water Filter** pads until the display shows **SA** briefly before going blank. Repeat the process to turn off Sabbath Mode. Temperature set point will be displayed. Sabbath mode will automatically exit four days after being entered.

Air Flow



Refrigeration Air Flow

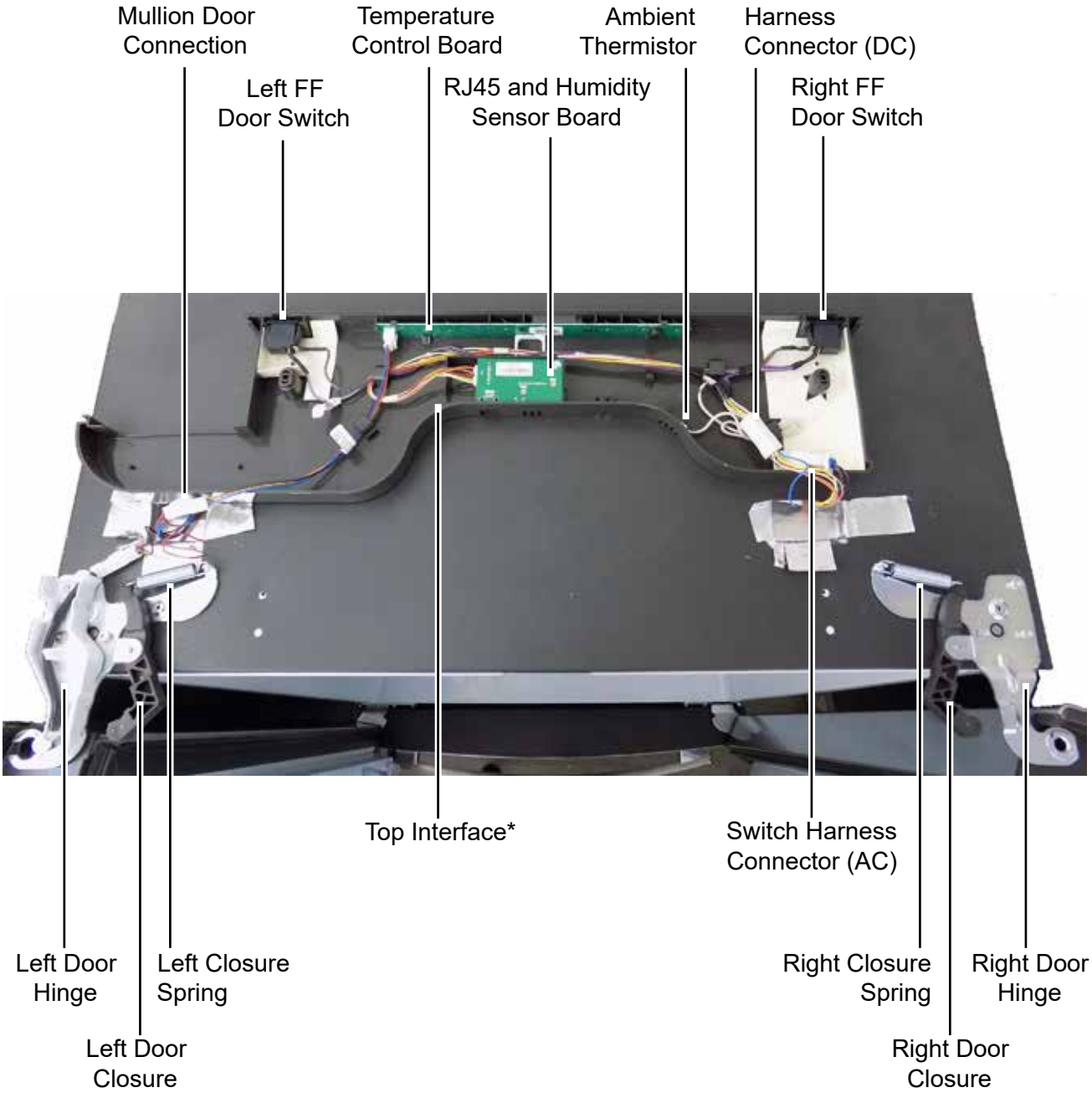
Cold air is circulated into the compartment by the evaporator fan. When cooling is required, the main board opens the damper and turns on the fan to push cold air from the evaporator up and out the air tower. The air circulates through the refrigerator compartment and is pulled back to the freezer below the evaporator by the way of the air return passage behind the evaporator. That warm moist air then gets pull back across the evaporator coil to extract the heat and moisture.

Freezer Air Flow

Cold air is circulated in the Freezer by the evaporator fan. When cooling is required, the main board turns on the fan to circulate cold air from the evaporator through the evaporator cover. The air is pulled back to the evaporator through two ducts built into the bottom of the evaporator cover. That air then gets pull back across the evaporator coil to extract the heat and moisture.

Cabinet Top

Cabinet Top Components



*Top interface shown in service position.

Hinge Covers

Left and right hinge covers need to be removed in order to access the components under the top interface and to remove the doors.

Hinge Cover Removal

1. Remove one Phillips-head screw for the desired hinge cover.

2. For the left hinge cover, use a flat-blade screwdriver inserted into the slot on the left side of the hinge cover and pry to the right while lifting up on the cover. For the right hinge cover, proceed to next step.

3. Lift the hinge cover up to remove the cover from the hinge.

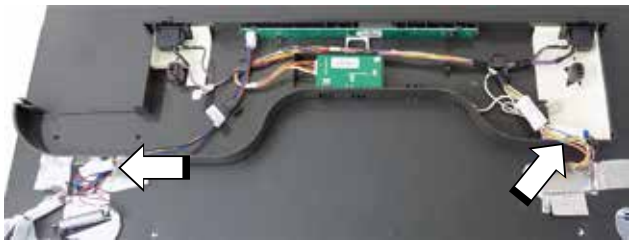
Top Interface

The top interface houses the refrigerator door switches, temperature control board, ambient thermistor, switch harness, DC harness, and RJ45 connector and humidity sensor board. If the interface needs to be replaced, all of the components under the interface will come as part of the assembly. If a component under the interface needs to be replaced, that component can be ordered separately (except for the temperature control board). To service any of the components under the top interface, the top interface must be put into the service position (see the **Top Interface** callout under **Cabinet Top Components** in this section of this service guide).

Top Interface Removal

1. Remove the left and right hinge covers.
2. Remove two Phillips-head screws.

3. Flip the top interface back (put into service position).



4. Disconnect the AC and DC harness connectors.
5. Remove the interface from the top of the cabinet.

Temperature Control Board

Through the temperature control board, the user can change the set temperature, temperature units (°C or °F) and enter special modes such as Sabbath, Demo, and Service Mode. The temperature control board is a component of the top interface and cannot be replaced separately.

Temperature Control Board Diagnosing

If the temperature display board is not illuminated, verify proper voltage is going to the temperature control board. If voltage is present, replace the temperature control board. If voltage is not present, check connections at the cabinet and main board before replacing the main board. The display LEDs and numerical segments can be tested by using Service Mode Test t3.

J2 to J4 on Main Board

- J2 pin 8 (**red**/**silver**) to J4 pin 1 (**black**): 13 VDC
- J2 pin 8 (**red**/**silver**) to J4 pin 3 (**blue**): 13 VDC

(*Continued next page*)

Temperature Control Board

- **Red**/**yellow** to **black**: 13 VDC
- **Red**/**yellow** to **blue**: 13 VDC

Temperature Control Board Removal

- Follow Top Interface Removal steps.

Top Door Hinges

Door hinges incorporate a spring loaded closure. The closure arms roll over cams mounted to the top of the refrigerator doors to close the doors once the doors are a couple inches from closing. The closure arm and hinge come as an assembly but the spring can be ordered separately.

Top Left Door Hinge Removal

NOTE: Leave the doors shut during this process to prevent damage to doors or damage to the consumer's property**.**

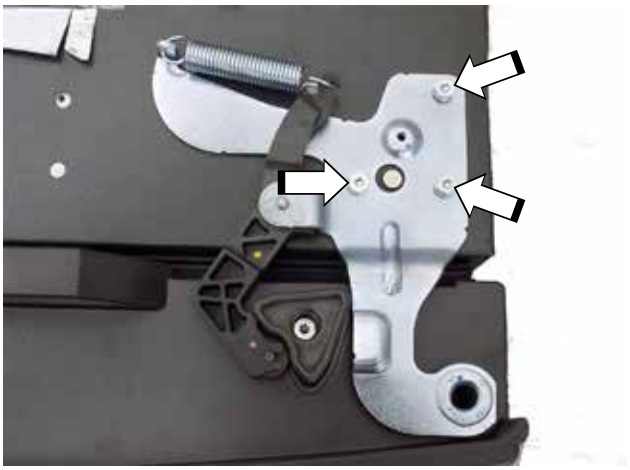
1. Remove the left hinge cover.
2. Disconnect the door wiring connector.

3. Remove three 5/16 in. hex-head screws and lift the hinge from the cabinet.

Top Right Door Hinge Removal

NOTE: Leave the doors shut during this process to prevent damage to doors or damage to the consumer's property**.**

1. Remove the right hinge cover.
2. Remove three 5/16 in. hex-head screws and lift the hinge from the cabinet.



Humidity Sensor Board

The Humidity board is located under the center of the top interface. The humidity sensor on the board provides the main board with relative humidity percentages based on the feedback voltage (see table below). The feedback voltage will range between 1 to 4 VDC. The relative humidity percentage is used to determine the articulating mullion heater on time (the greater the humidity, the greater the heater run time).

Relative Humidity	Voltage (DC)
20%	1.5 V
50%	2.3 V
80%	3.1 V

Humidity Sensor Board Diagnosing

Before changing the board ensure the proper voltages are going to the humidity board. Humidity sensor voltages can be checked at the humidity board or main board. Disconnecting the humidity sensor and waiting 20 minutes will cause the main board to turn on the articulating mullion heater 100 percent.

Connector on Humidity Board

- **Orange** to **tan**/**black**: 13 VDC
- **Orange** to **white**: 13 VDC
- **White** or **tan**/**black** to **red**/**white**: 5 VDC
- **Yellow** to **red**/**white**: 1 - 4 VDC

NOTE: 0 or 5 VDC from **yellow** to **red**/**white** may indicate a bad humidity sensor, replace the humidity board if there are no open or shorted wires to the board.

Connectors on Main Board

- J4 pin 4 (**orange**) to J4 pin 3 (**blue**): 13 VDC
- J4 pin 4 (**orange**) to J4 pin 5 (**tan**/**black**): 13 VDC
- J5 pin 5 (**red**/**white**) to J4 pin 3 (**blue**) or J4 pin 5 (**tan**/**black**): 5 VDC
- J5 pin 5 (**red**/**white**) to J5 pin 6 (**yellow**/**white**): 1 - 4 VDC

NOTE: 0 or 5 VDC from J5 pin 5 to J5 pin 6 may indicate a bad humidity sensor. Replace the humidity board if there are no open or shorted wires to the board.

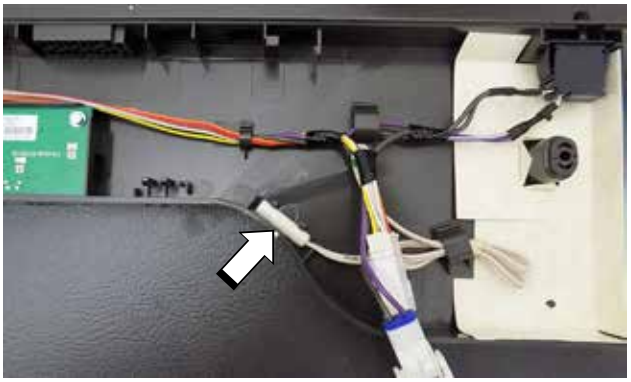
Humidity Sensor Board Removal

1. Place the top interface in the service position (see **Top Interface Removal**, under **Top Interface** in this section of the service guide).
2. Remove one 1/4 in. hex-head screw and disconnect the wiring harness.

Ambient Thermistor

The ambient thermistor is located under the top interface. The thermistor clips into the backside of the top interface and is used to determine the offset temperature of the refrigerator.

The offset temperature is the temperature the main control targets. Air temperature inside a compartment is typically lower than the thermistor reading due to cabinet thermistors proximity to cabinet walls. The main control increases the offset temperature when the ambient temperature increases.



To access the thermistor, place the top interface in the service position (see **Top Interface Removal**, under **Top Interface** in this section of the service guide).

To test or replace the thermistor, follow the steps in the **Thermistors** section of this service guide.

FF Door Switches

The FF door switches are AC volt switches that have Normally Closed contacts (NC). The switches are actuated by the top of the doors to tell the main board to turn the refrigerator LEDs on or off.

FF Door Switch Diagnosing

When one of the doors are opened, the switch contacts are closed allowing 120 VAC to travel to the main board. When closed, the doors engage the switch to open the switch contacts, breaking the 120 VAC circuit to the main board.

Switch Not Pressed (Door or Doors Open)

J7 on Main Board

- Pin 6 (**purple**/**white**) to pin 9 (**orange**): 120 VAC

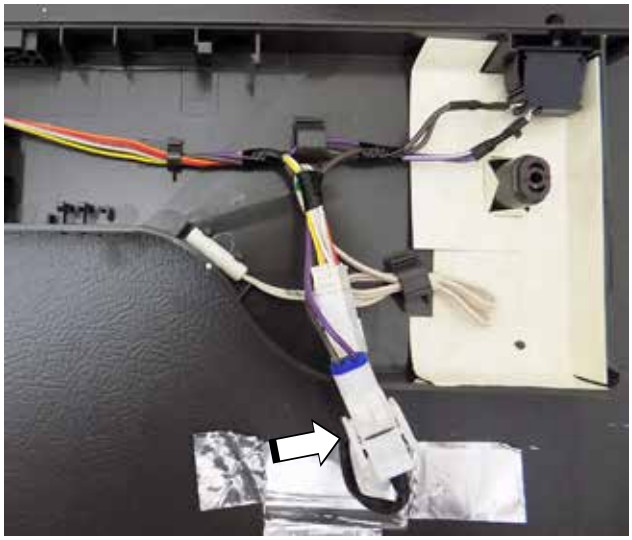
Switch Pressed (Doors Closed)

J7 on Main Board

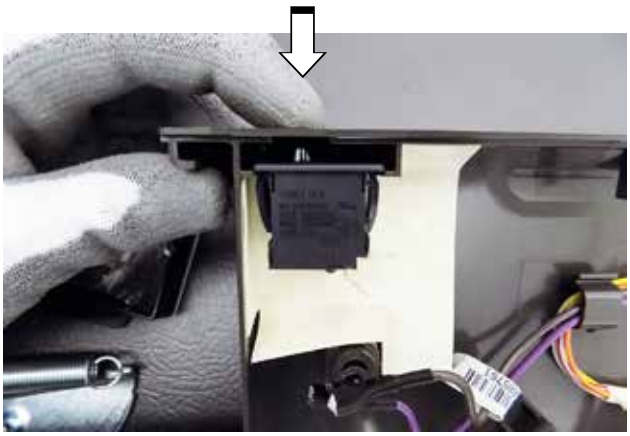
- Pin 6 (**purple**/**white**) to pin 9 (**orange**): 0 VAC

FF Door Switch Removal

1. Place the top interface in the service position (see **Top Interface Removal**, under **Top Interface** in this section of the service guide).
2. Disconnect the two pin switch harness to remove power from the switches.



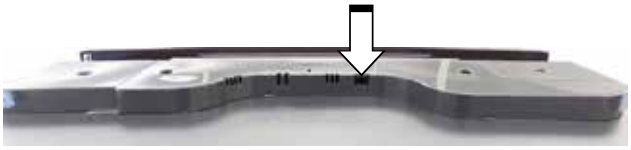
3. Disconnect the wires from the desired switch.
4. Push in on the plunger of the switch.



5. With the plunger pressed in, slide the switch out of the top interface.

RJ45 Connector

The RJ45 connector is mounted to the humidity sensor board inside the top interface and is only available with the humidity sensor board. The RJ45 connector is the access point to update software using a software update module (SUM) or to connect a service diagnostic tool.



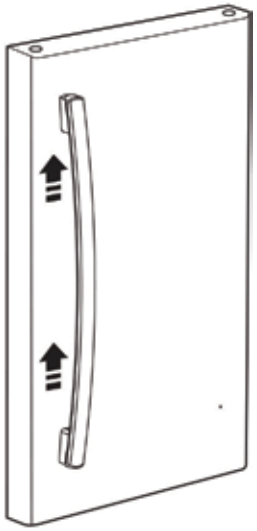
Door and Drawer Handles

Door Handles

Door handles slide and lock into fasteners mounted to the doors. QNE models have pocket handles which are a part of the door and cannot be removed. If a handle on QNE models is damaged, the door will need to be replaced.

Door Handle Removal

1. Slide the handle up to release it from the mounting fasteners (be aware it takes some force to release the handle from the mounting fasteners mounted to the door).
2. Pull the handle away from the door.

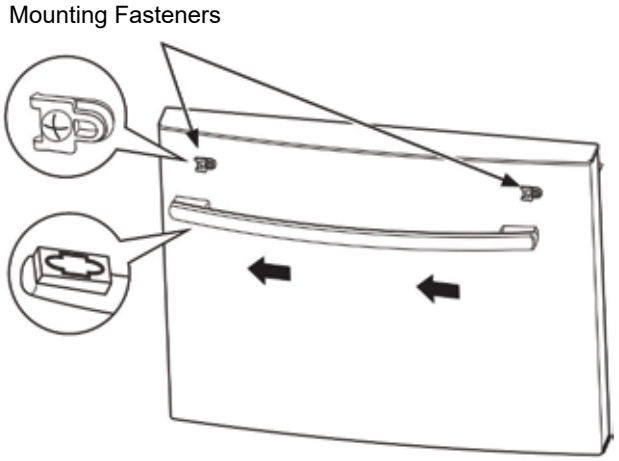


Freezer Drawer Handle

The drawer handle slides and locks into fasteners mounted to the drawer. QNE models have pocket handles which are a part of the drawer front and cannot be removed. If the freezer handle on QNE models is damaged, the drawer front will need to be replaced.

Drawer Handle Removal

1. Slide the handle to the left to release it from the mounting fasteners.
2. Pull the handle away from the door.



Door and Drawer Gaskets

Each door and drawer have a magnetic gasket that creates a positive seal to the front of the steel cabinet. The magnetic gaskets are secured to the door or drawer by a barbed edge that locks into a retainer channel.

Gasket Removal and Replacement

1. Starting at any corner, pull the old gasket out of the retaining channel.

2. Soak the new gasket in warm water to make it pliable.
3. Push the barbed edge of the gasket into the retainer channel.

NOTE: A thin coat of petroleum jelly or paraffin wax can be applied to the hinge side of the gaskets to improve closure across the cabinet.

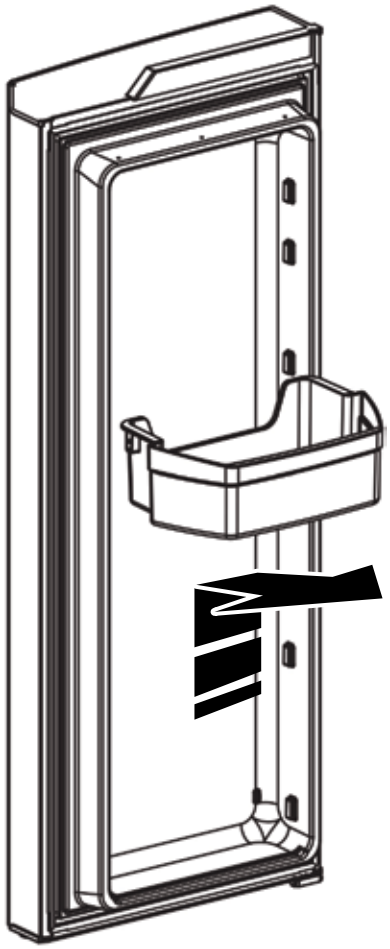
The refrigerator door gaskets have a left and right side. When installing a new gasket, ensure the wider ends at the top and bottom of the gasket (shown in the image to the right) are on the mullion side of the door.

Door Bins

The refrigerator doors have four removable door bins. The top three bins can be interchanged but the bottom bin must be used in the bottom location.

Door Bin Removal

To remove door bins, slide bin up and then pull away from the door.



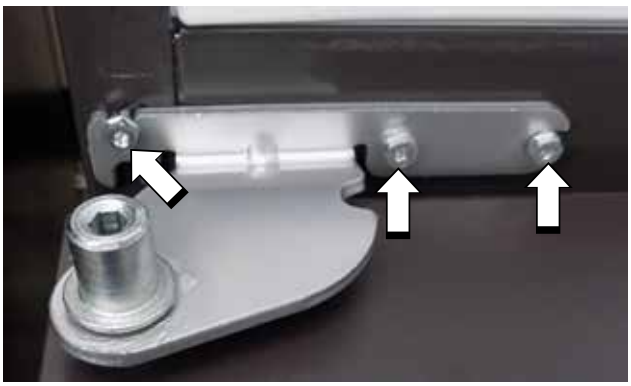
Left Door

Left Door Removal

1. Remove the door bins (see the **Door Bins** section of this service guide).
2. Follow **Top Left Door Hinge Removal** steps under **Top Door Hinges** in the **Cabinet Top** section of this service guide.
3. Lift the door off the center hinge.

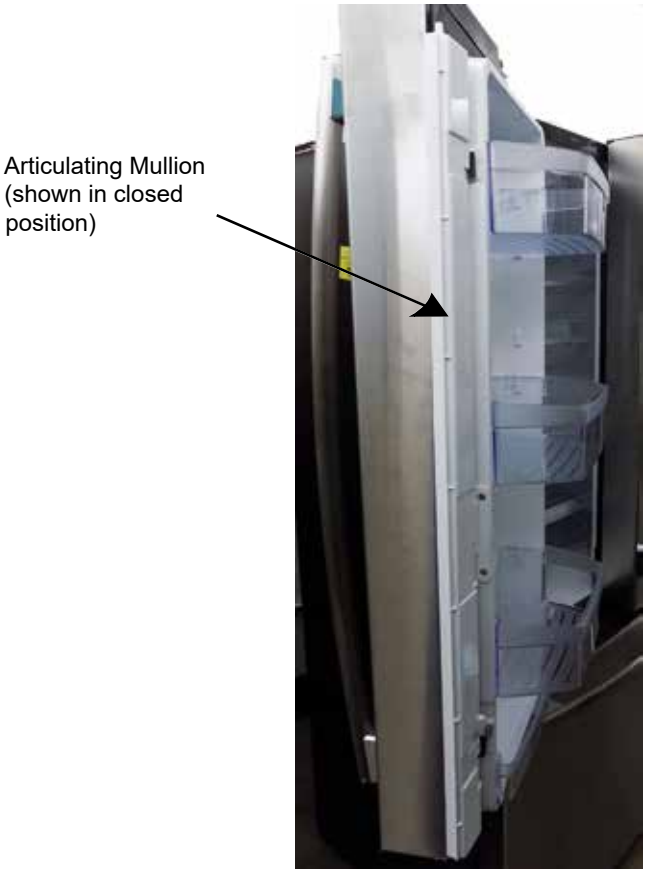
Left Center Hinge Removal

1. Remove the dispenser door.
2. Remove three screws for the center hinge using a 5/16-in. socket or T20 Torx-head bit.



Articulating Mullion

The articulating mullion contains a DC heater to keep the mullion from forming condensation. The heater ON time is based on the relative humidity percentage calculated by the main board. The calculation is based on the feedback provided by the humidity sensor. The top of the articulating mullion engages with the mullion striker to open and close the mullion. When the mullion is in the closed position, the mullion provides the mating surface for the right door. If the articulating mullion does not make contact with the mullion striker, the left door will need to be raised.



<u>Articulating Mullion Diagnosing</u>

The heater in the mullion has a resistance of 24-ohms. Disconnecting the humidity sensor and waiting 20 minutes will cause the main board to turn on the articulating mullion heater 100 percent.

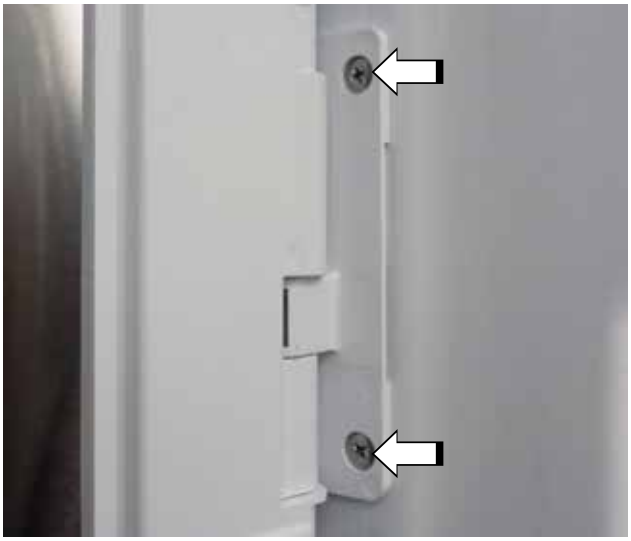
J2 on Main Board

- Pin 8 (**red**/**silver**) to pin 6 (**black**/**yellow**): 13 VDC

(*Continued next page*)

Articulating Mullion Removal

1. Open the dispenser door and flip the articulating mullion to the closed position.
2. Remove two Phillips-head screws securing the center mounting plate to the door (heater connections are behind this plate).



3. Slide the mullion up off the door.

4. Disconnect the two pin connector.

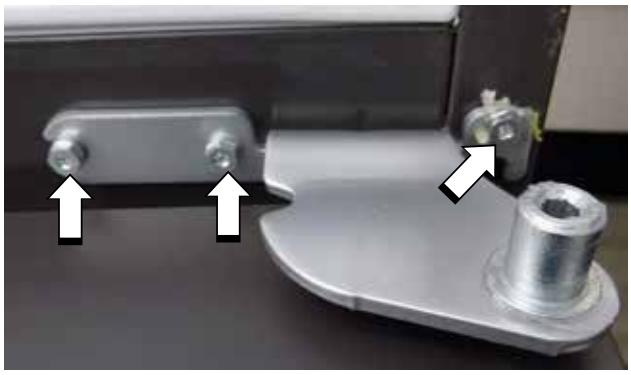
Right Door

Right Door Removal

1. Remove the door bins (see the **Door Bins** section of this service guide).
2. Follow **Top Right Door Hinge Removal** steps under **Top Door Hinges** in the **Cabinet Top** section of this service guide.
3. Lift the door off the center hinge.

Right Center Hinge Removal

1. Remove the right door.
2. Remove three screws for the center hinge using a 5/16-in. socket or T20 Torx-head bit.



Door - Top

Door - Top Component Locator

*The door harness passes through the top hinge bushing on left doors.

Top Door Bumper

Top Door Bumper Removal

1. Remove the door gasket.
2. Push down on the door bumper to remove it from the door.

Closure Cam

The spring loaded closure from the hinge rolls across the closure cam to close the door when the door is a couple inches from closing.

Closure Cam Removal

1. Follow top hinge removal steps (see **Top Door Hinges** in the **Cabinet Top** section of this service guide) for the side needing to be removed.
2. Remove one T20 Torx-head screw.

Top Hinge Bushing

The top hinge inserts into the top bushing. If worn, the bushing can be replaced.

Top Hinge Bushing Removal

1. Follow top hinge removal steps (see **Top Door Hinges** in the **Cabinet Top** section of this service guide) for the side needing to be removed.
2. Using a putty-knife or flat-blade screwdriver pry the bushing from the top of the door.

Door - Bottom

Door - Bottom Component Locator

Bottom Door Bumper

Bottom Door Bumper Removal

1. Remove the door gasket.
2. Rotate the bumper up.

3. Using a small flat-blade screwdriver, pry the bumper from the bottom of the door.

Bottom Hinge Bushing

The center hinge pin inserts into the bottom bushing. If worn, the bushing can be replaced.

Bottom Hinge Bushing Removal

- Follow the **Door Stop Removal** steps below.

Door Stop

The door stop prevents the door from opening too far. When the door is fully opened the stop makes contact with the outside of the center hinge, preventing the door handle from coming in contact with the cabinetry. Should the door be travelling past the stop position, check for a bent or broken door stop, or a center hinge pin that has been raised too high.

Door Stop Removal

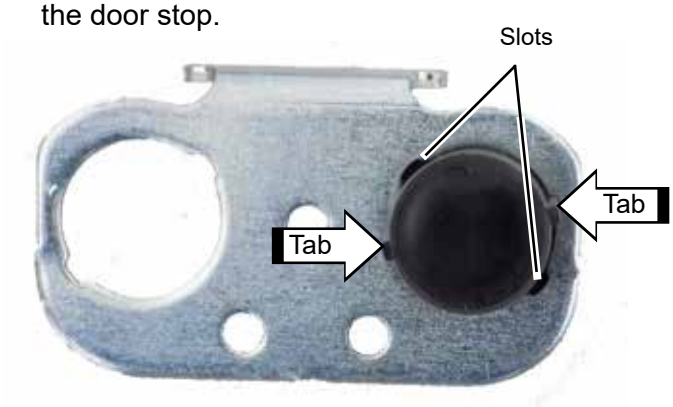
1. Follow top hinge removal steps (see **Top Door Hinges** in the **Cabinet Top** section of this service guide) for the side needing to be removed.
2. Lift the door off the center hinge.

(*Continued next page*)

3. Remove two T20 Torx-head screws.

4. Pull the door stop and bushing out of the door.

5. The bushing is keyed, turn the bushing to align the tabs of the bushing with the slots in the door stop.



6. Pull the bushing out of the door stop.

NOTE: Like the door stop, the door is also keyed. Once a bushing is reinstalled into a door stop the tabs of the bushing will need to be aligned with the slots in the door to reinstall the door stop.

Water Filter Cartridges

The water filter cartridge is located in the right rear upper corner of the refrigerator. There will be two different style of cartridges depending on the model size and when the models were manufactured. The 27 cu. ft. models use the XWF style filter. The 19, 21, and 25 cu. ft. model use MWFP style filters until they transition to XWF filters mid-2018.

XWF

MWFP

When to Replace the Filter

There is a replacement indicator light for the water filter cartridge on the dispenser. A red light will start blinking when the filter needs to be replaced soon. The filter cartridge should be replaced when the replacement indicator light turns red or if the flow of water to the dispenser or icemaker decreases or if the ice cubes are getting hollow or small. The indicator should turn red after 6 month or 170 gallons have been dispensed.

Water Filter (MFWP)

MWFP Filter Cartridge Removal

- Slowly turn the filter to the left. Do not pull down on the cartridge.

MWFP Filter Cartridge Installation

1. Fill the replacement cartridge with water from the tap to allow for better flow from the dispenser immediately after installation.
2. Line up the arrow on the cartridge and the manifold. Place the top of the new cartridge up inside the holder. Do not push it up into the manifold.
3. Slowly turn it to the right until the filter cartridge stops. DO NOT OVERTIGHTEN. The cartridge will move about a 1/2 turn.

4. Run water from the dispenser for 1-1/2 gallons (about three minutes) to clear the system and prevent sputtering.
5. Press and hold the Water Filter pad on the temperature control board for three seconds.

NOTE: Remove the water filter to immediately stop any water leak from the Icemaker/Dispenser system. The water filter manifold acts as a cut-off valve when the filter is removed and will prevent further leaking.

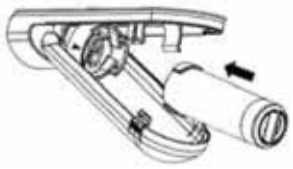
Water Filter (XWP)

XWF Filter Cartridge Removal

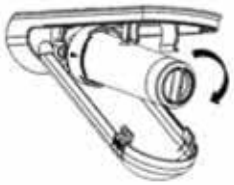
1. Open the filter cartridge housing by squeezing two front tabs and gently pull the cover down.
2. Rotate the filter down.
3. Grasp the filter and slowly turn it counterclockwise about a 1/4 turn. The filter should automatically release itself when it has been rotated far enough to the left.

Filter Cartridge Installation

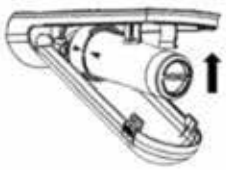
1. Follow **XWF Filter Cartridge Removal** steps (above).



2. Line the ports on the filter with the ports of the manifold, and gently insert the filter.
3. Slowly turn the filter to the right until it stops. DO NOT OVERTIGHTEN. The filter will move about a 1/4 turn (90 degrees), until the arrow on the filter aligns with the arrow on the manifold.



4. Slowly push the filter up into the clips. Close the filter cover by pushing upwards on the cover until the tabs lock into place.



5. Run water from the dispenser for 2 gallons (about five minutes) to clear the system and prevent sputtering. If water is not flowing check to make sure the filter has been fully rotated to the right.
6. Press and hold the Water Filter pad on the temperature control board for three seconds.

NOTE: Remove the water filter to immediately stop any water leak from the Icemaker/Dispenser system. The water filter manifold acts as a cut-off valve when the filter is removed and will prevent further leaking.

Refrigerator Compartment

Refrigerator Component Locator

*MWFP style filter is shown. 27 cu. ft. models will use XWF style filter. 19, 21, and 25 cu. ft. model will transition to XWF filters mid-2018.

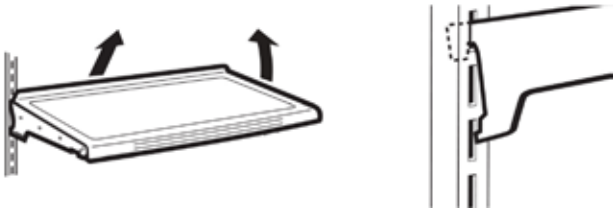
**Models with an "E" feature pack will not have a climate zone meat pan.

Adjustable Shelves

The refrigerator has four adjustable shelves. Each shelf can be raised or lowered but cannot be moved right to left or vise-versa because the center is the only location of a shelving track. Instead of outer tracks, the shelves use the liner to support the liner side of each shelf.

Adjustable Shelf Removal

1. Tilt the front of the shelf up.
2. Lift the rear of the shelf up to disengage the top hook of the shelf from the center track.



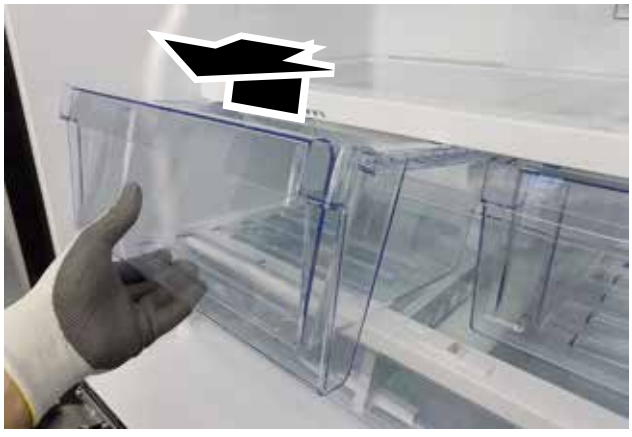
3. Pull the shelf out from the refrigerator.

Climate Zone Pans

The refrigerator has three pans (models with an "E" feature pack will only have two pans since they do not have a climate zone meat pan); each pan has a climate zone slide associated with it to increase or decrease airflow into the pans. The top two are vegetable pans and the lower full width pan is the meat pan.

Climate Zone Pan Removal

1. Slide the pans out to the stop position.
2. Lift the front of the desired pan up and out of the pan cover.



Pan Covers

The refrigerator has two pan covers (models with an "E" feature pack will only have one pan cover using the upper climate control slide style since they do not have a climate zone meat pan). The two vegetable climate zone pans slide in and out of the upper pan cover. The lower meat climate zone pan slides in and out of the lower pan cover. Each pan cover has a climate zone slide to adjust the air flow into the pans. Moving the upper climate zone slides to the left and the lower slide to the right increases the air flow.

Upper Climate Control Slides

Lower Climate Control Slide

Each side of the pan covers are supported by two studs which are screwed into the liner (19 cu. ft. models) or one stud and the rear indent in the liner (21, 25, and 27 cu. ft. models).

Pan Cover Removal

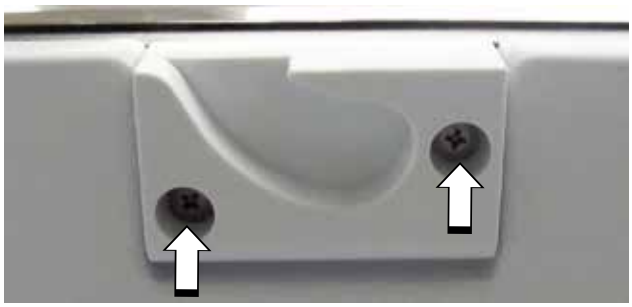
1. For the upper pan cover, remove both vegetable pans. For the lower pan cover, remove all pans.
2. Lift up on the front of the upper pan cover and pull the cover out. Repeat the process for the lower cover.

Mullion Striker

The top of the articulating mullion engages with the mullion striker to open and close the mullion. When the articulating mullion does not make contact with the mullion striker, the dispenser door may need to be raised.

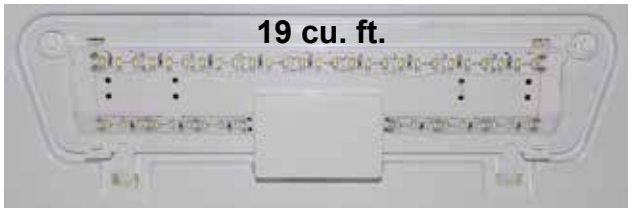
Mullion Striker Removal

- Remove two Phillips-head screws.



Upper LED Housing

The main source of light comes from the upper LED housing. Strip LEDs are connected to the outside of the housing while the inside of the housing holds the foam block which the refrigerator (FF) thermistor slides into. If any of the LEDs fail the housing would need to be replaced. Counter-depth models use a smaller LED housing.



Upper LED Diagnosing

- When the LED housing fails completely, the lower LED boards will still work.

Main Board with Door Open

- J4 pin 2 (**red**/**yellow**) to J5 pin 1 (**pink**/**black**): 4 - 13 VDC *(see **NOTE**)

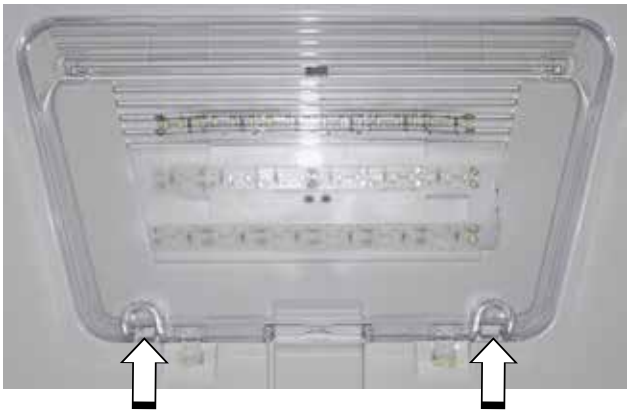
2-Pin Connector at Cabinet

- **Red** to **black**: 4 - 13 VDC *(see **NOTE**)

NOTE: When one or both of the refrigerator doors are opened, the main board delivers 4 VDC to the LED housing and gradually increases the voltage to 13 VDC for full brightness.

Upper LED Removal

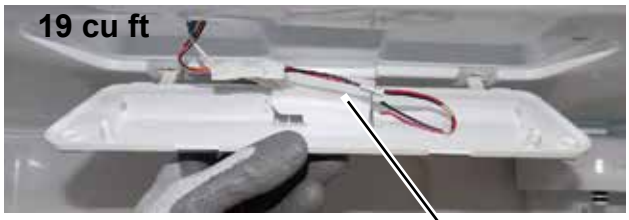
1. Using two fingers push forward on the indicated areas to release the rear tabs of the shield to lower the rear of the shield.

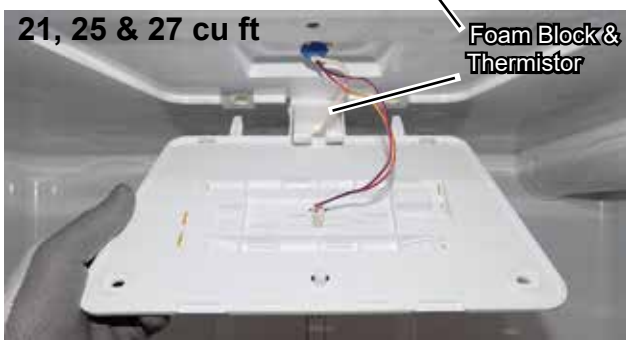


2. Pull forward and down to release the front lip of the LED shield.
3. Remove two 1/4-in. hex-head screws.

(*Continued next page*)

4. Tip the front of the LED housing down and pull the housing away from the refrigerator.



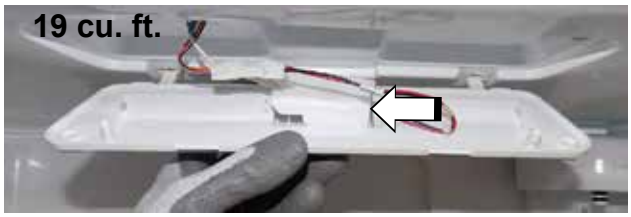


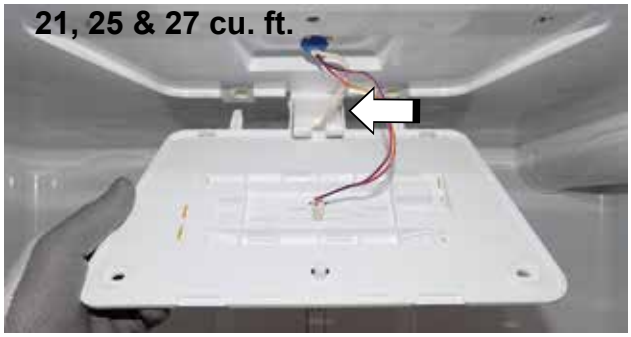
NOTE: When lowering the LED housing, pay attention to the foam block and where the block is located. It is important that the thermistor be reinstalled in the block behind the LED housing to maintain proper temperatures.

5. Disconnect 2-pin connector.

Fresh Food Thermistor

The main board uses one thermistor to maintain proper temperature in the refrigerator. The thermistor can be found in a foam block behind the upper LED housing. It is important that the thermistor be reinstalled in the block behind the LED housing to maintain proper temperatures.





To test or replace the thermistor, follow the steps in the **Thermistors** section.

Lower LEDs

The refrigerator has two lower LED boards to illuminate the pans. The LEDs can be found in the cabinet next to the climate zone vegetable pans.

Lower LED Diagnosing

When one of the LED boards fails completely, the other lower LED board and LED housing will still work.

Main Board with Door Open

- J2 pin 8 (**red**/**silver**) to J5 pin 1 (**pink**/**black**): 4 - 13 VDC *(see **NOTE**)

3-Pin Connector at Cabinet

- **Red**/**silver** to **pink**/**black**: 4 - 13 VDC *(see **NOTE**)

NOTE: When one or both of the refrigerator doors are opened, the main board delivers 4 VDC to the LED boards and increases the voltage to 13 VDC for full brightness.

Lower LED Removal

The LED board and LED shield are separate parts, it is recommended to replace both parts when an LED board is being replaced.

1. Remove all shelves, pans, and pan covers.
2. Using a putty-knife or small flat-blade screw driver, gently pry the LED shield away from the cabinet. For the left LED pry from the upper rear corner (as shown below) and for the right LED pry from the lower rear corner.

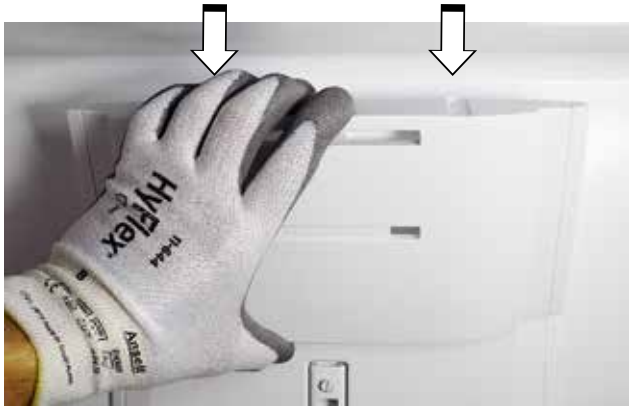
3. Once tipped out of the cabinet, lift the left LED shield out of the cabinet and pull down on the right LED shield to remove it from the cabinet.
4. Disconnect the 3-pin connector and unclip the LED board from the LED shield.

Air Tower

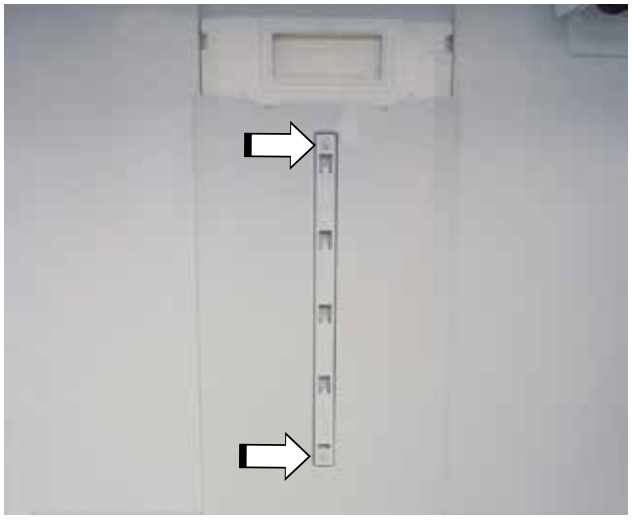
Air travels from the freezer into the refrigerator section through the air tower mounted to the back wall of the refrigerator. The damper is inserted in the bottom of the air tower, to access the damper the air tower needs to be removed from the back wall.

Air Tower Removal

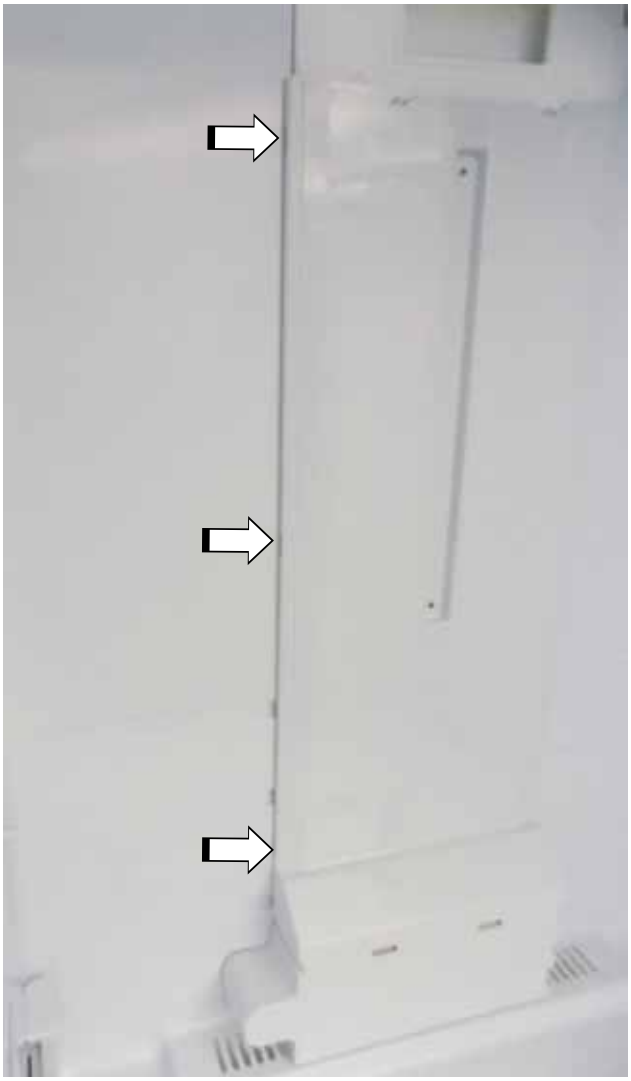
1. Remove all shelves, pans, and pan covers.
2. Push down on the top center of the air tower grill to release two tabs holding the grill to the back wall (location indicated by the arrows below) then tilt the grill down.



3. Lift the air tower grill up and off the air tower.
4. Remove two 1/4 in. hex-head screws to remove the center track.



5. Using a flat-blade screw driver, push in on three of the six tabs (one side) securing the air tower to the back wall.



6. Tip the top of the air tower away from the back wall.
7. Disconnect the 6-pin connector by squeezing the release tabs on the long sides of the connector.

Damper

Inserted into the bottom of the air tower is an electrical damper. The main board uses the damper to allow or block air flow into the refrigerator based on the FF thermistor reading.

Damper Diagnosing

The damper can be operated using Service Mode Test t7. In Test t7 will open the damper, pause briefly, then close the damper. The damper motor has an approximate resistance of 415 ohms and can be checked at the damper connector or at the J3 of the main board.

J3 on Main Board

- Pin 1 (**blue**/**yellow**) to pin 2 (**white**/**black**): 415 ohms
- Pin 3 (**red**/**black**) to pin 4 (**yellow**): 415 ohms

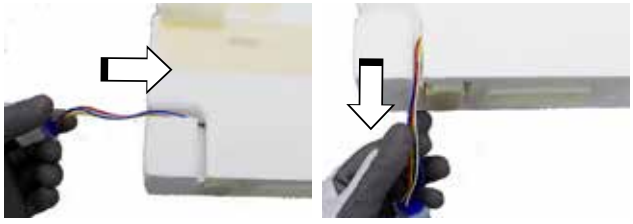
Damper Connector

- **Blue** to **white**: 415 ohms
- **Red** to **yellow**: 415 ohms

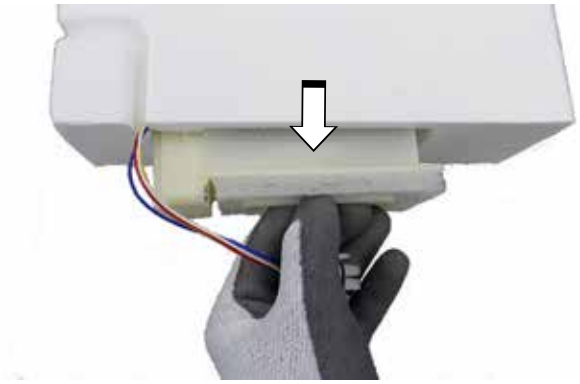
Damper Removal

1. Follow the **Air Tower Removal** steps under **Air Tower** in this section of the service guide.
2. Separate the Styrofoam duct from the plastic cover of the air tower.
3. Peel away the tape across the bottom of the Styrofoam.

4. Move the damper harness down in the channel to be parallel with the duct.



5. Pull the damper out of the duct.

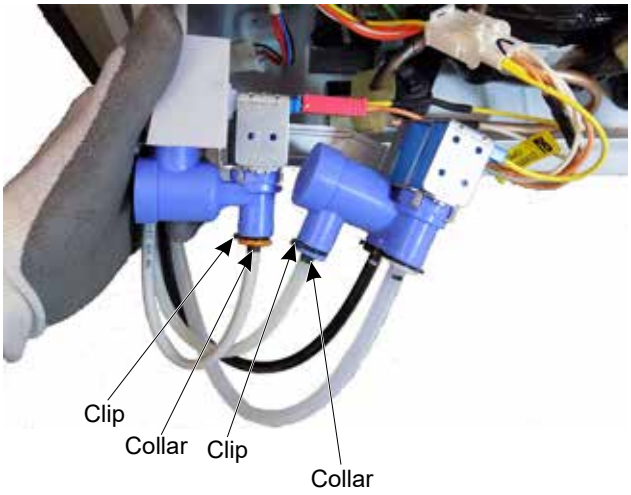


MWFP Manifold

The MWFP manifold is made up of the filter head the filter locks into and the water lines. The water lines of the manifold connect to the inlet of the dual valve and the outlet of the isolation valve.

MWFP Manifold Removal

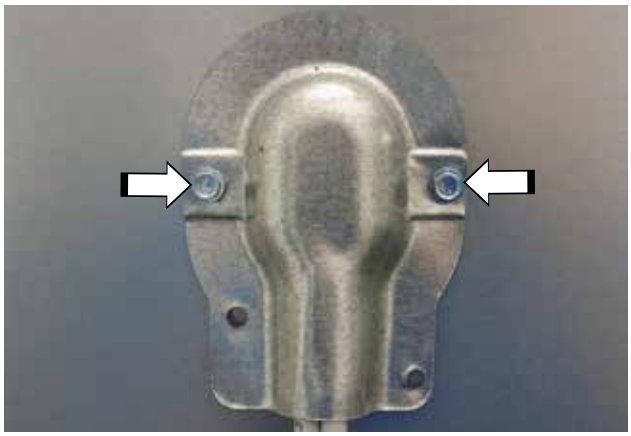
1. Remove the machine compartment cover.
2. Remove one 1/4 in. hex-head screw to remove the valve from the machine compartment.
3. Pull the clips from the collar of the isolation valve and the inlet of the dual valve.



4. Push in on the collars of the water valves while pulling the water lines from the valves.
5. Unclip the manifold water line from the backside of the cabinet.

(*Continued next page*)

6. Remove two 1/4 in. hex-head screws to remove the manifold water line cover.



7. Remove the Permugum from around the opening and save for reinstallation.

8. Remove the water filter cartridge.

9. Pull the water filter cover away from the manifold to remove the cover.

10. Remove two 1/4 in. hex-head screws at the top of the manifold.

11. Tilt the manifold down and lift the manifold up to remove the triangular tabs of the manifold from the water filter spacer mounted to the liner.

12. Once the manifold is out of the spacer, pull the manifold and the manifold water lines out of the cabinet.

XWF Manifold

The XWF manifold is made up of the filter head the filter locks into, water lines, and manifold housing. The filter cover is not part of the manifold. The water lines of the manifold connect to the door water line and the outlet of the isolation valve. The housing slides and clips into the top of the cabinet.

Manifold Removal

1. Follow steps 1 through 7 of **MWFP Manifold Removal** in this section of the service guide.
2. Push two locking tabs of the housing down while pulling forward on the housing.

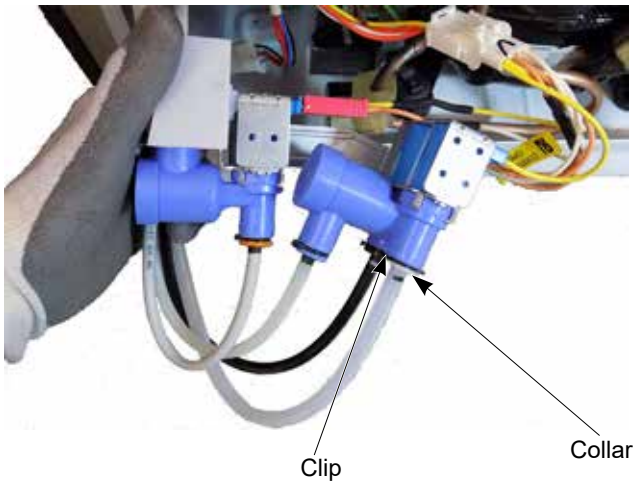
3. Continue pulling the housing forward to remove the housing and water lines from the cabinet.
4. Remove the filter cover from the housing.

Water Tank

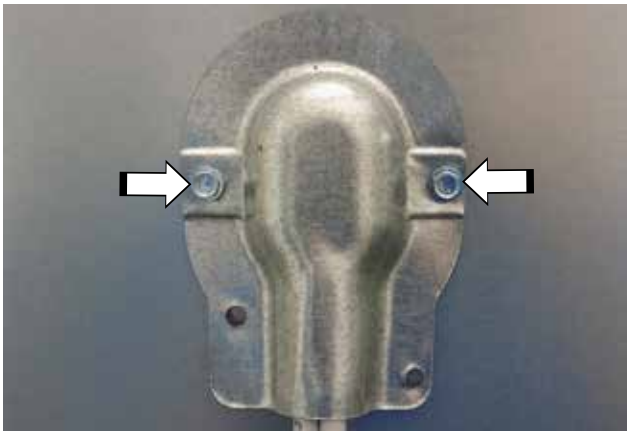
The water tank is a coil of water tubing. The tank is located in the lower left corner of the refrigerator behind the vegetable pan.

Water Tank Removal

1. Remove the machine compartment cover (see **Machine Compartment Cover Removal** under **Machine Compartment Cover** in the **Machine Compartment** section of this service guide).
2. Remove one 1/4 in. hex-head screw to remove the valve from the machine compartment.
3. Pull the clip from the collar of the water valve assembly with the 5/16-in. water line.

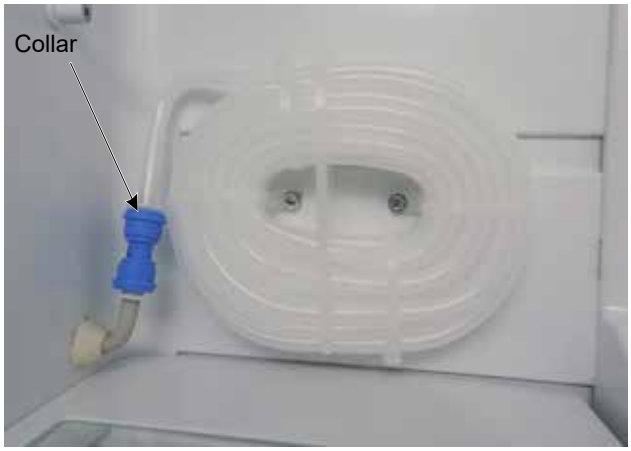


4. Push in on the collar of the water valve while pulling on the 5/16-in. tubing to release the water tank tubing from the valve.
5. Remove two 1/4-in. hex-head screws to remove the tank water line cover.

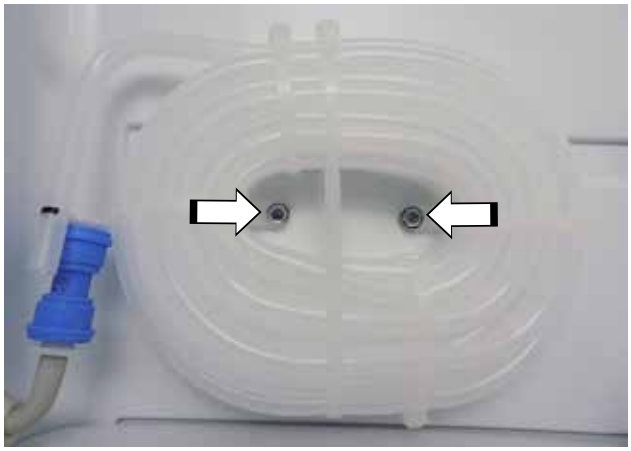


(*Continued next page*)

6. Remove the Permugum from around the opening and save for reinstallation.
7. Remove the vegetable pans.
8. Remove the upper pan cover.
9. Push in on the collar of the water line union while pulling the water tank line from the union.



10. Remove two 1/4-in. hex-head screws securing the water tank to the cabinet.



11. Pull the tank and the tubing running through the cabinet out of the refrigerator.

Internal Dispenser Switch

The internal dispenser switch is located inside the refrigerator on the left wall. Behind the internal dispenser assembly is a circuit board with a push button style micro-switch. The grey button on the internal dispenser assembly has a plunger on the back side that presses the micro-switch to close the switch contacts. When the contacts close, 13 VDC is sent to J14 on the main board to tell the board to activate the dispenser valve side of the isolation valve assembly.

Internal Dispenser Switch Diagnosing

The switch can be tested at the main board or at the 2-pin switch connector behind the internal dispenser assembly.

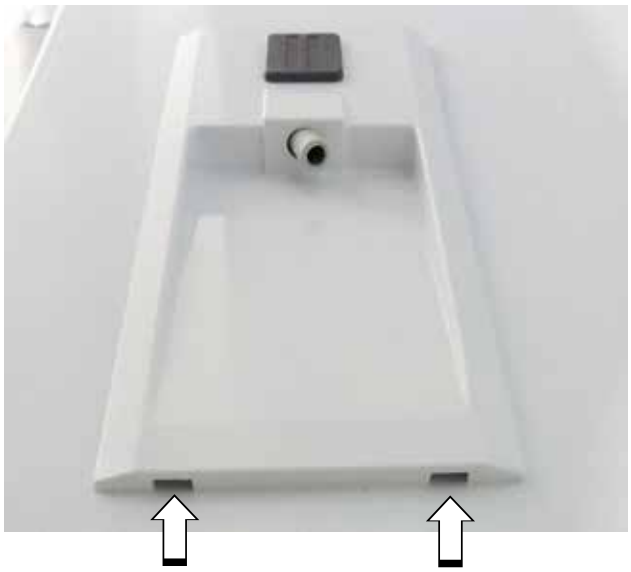
J2 to J14 on Main Board (Switch Pressed)

- J2 pin 8 (**red**/**silver**) to J14 pin 3 (**silver**/**black**): 13 VDC

(*Continued next page*)

Internal Dispenser Switch Removal

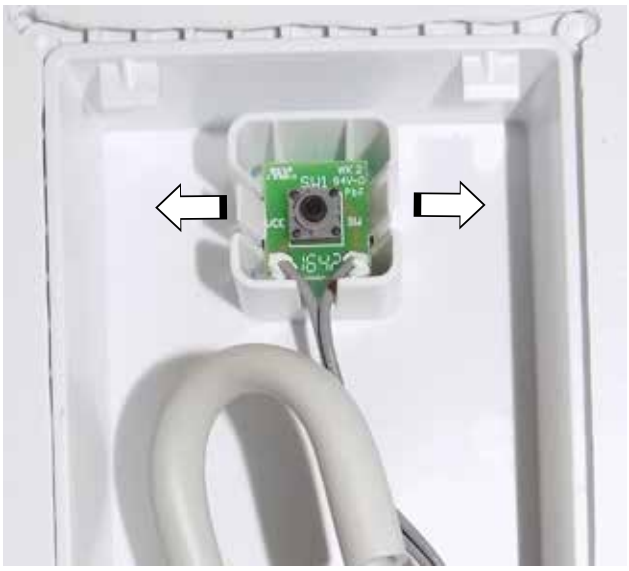
1. Insert a small flat-blade screwdriver into two openings at the bottom of the internal dispenser assembly and gently pry the bottom of the assembly away from the cabinet.



2. Pull down on the internal dispenser assembly to remove the assembly from the cabinet and water line.

3. Disconnect the 2-pin connector.

4. Spread the tabs holding the micro-switch circuit board in place to remove the dispenser switch from the cabinet.



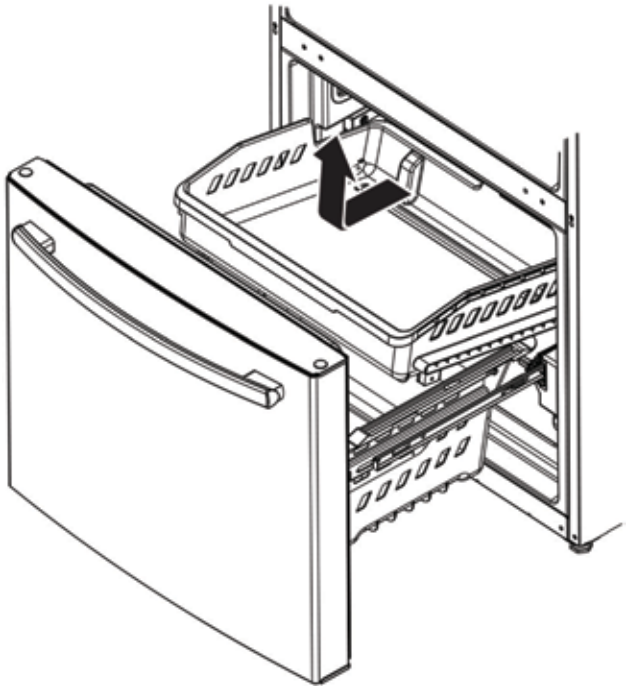
Freezer Drawer

Upper Basket

The upper basket will pull out half way when the drawer is fully opened. The basket is supported by the lower basket and upper slides connected to the freezer liner.

Upper Basket Removal

1. Pull the basket out to the stop location.
2. Lift the basket up to release it from the slides.

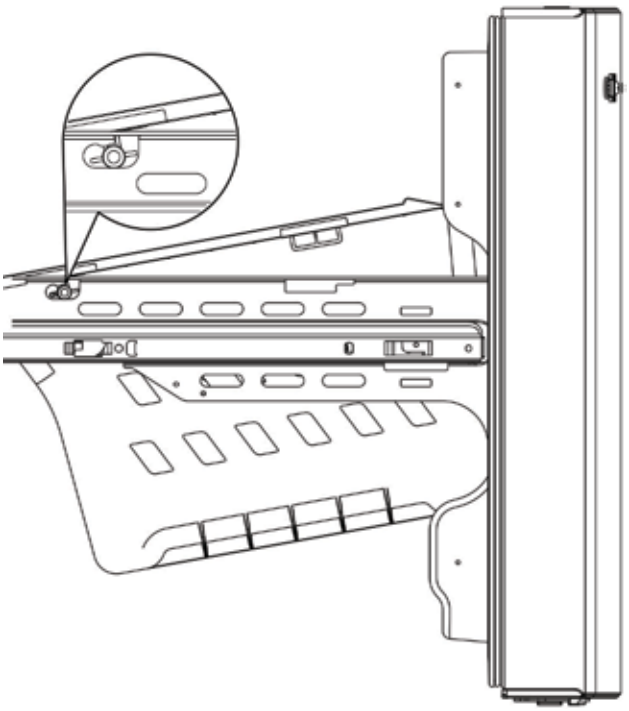


Bottom Basket

The bottom basket rests in slots of the lower slides and pulls in and out with the drawer front. The upper sides of the basket support and allow the front of the upper basket to roll in and out. The basket should not be filled higher than the rim of the basket. If overfilled, the basket may stick or jam when opening or closing.

Bottom Basket Removal

1. Open the freezer drawer front until it stops.
2. Remove upper basket.
3. On 19 cu. ft. models, open the refrigerator doors (doors do not need to be opened on 21, 25 and 27 cu. ft. models).
4. Lift the front of the basket up and pull the basket forward to release the rear pins of the basket from the slots in the lower slides.

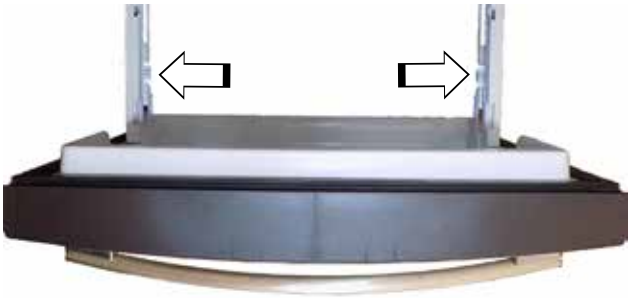


Drawer Front Removal

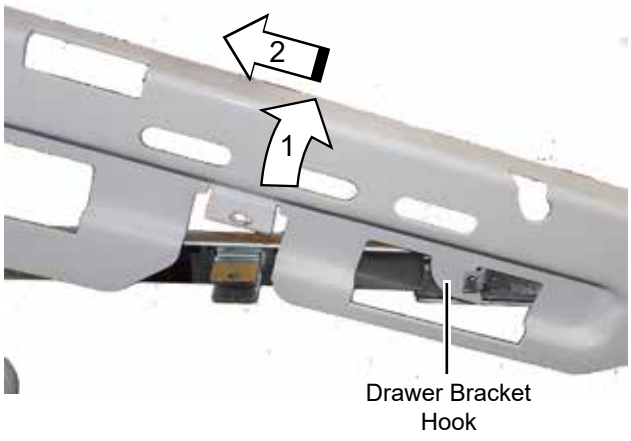
The drawer front should be removed from the freezer without disconnecting the front from the drawer brackets. Following the steps below will help maintain proper seal and alignment during the re-attachment process.

For 19 Cubic Foot Models

1. Remove the upper and lower baskets.
2. Remove two 1/4-in. hex-head screws securing the drawer brackets to the lower basket slides.

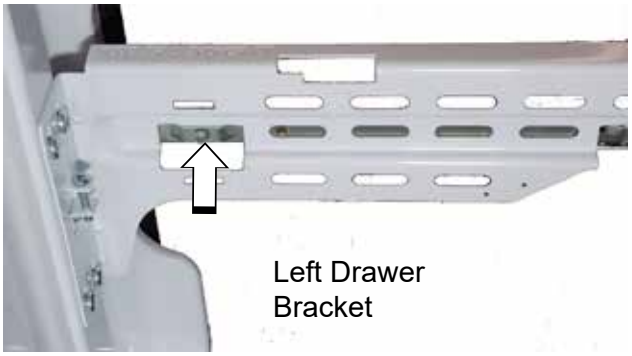


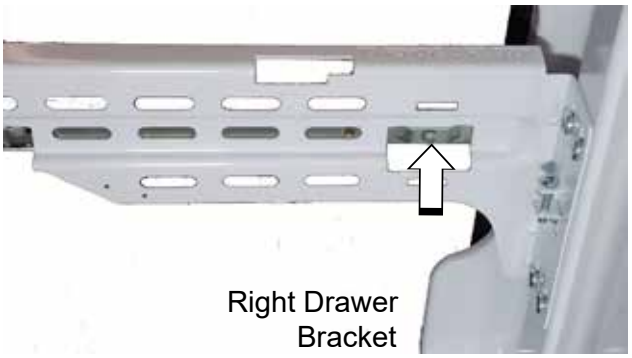
3. Tilt the drawer front up (1), then pull it away from the freezer (2) to release the drawer bracket hooks from the lower basket slides.



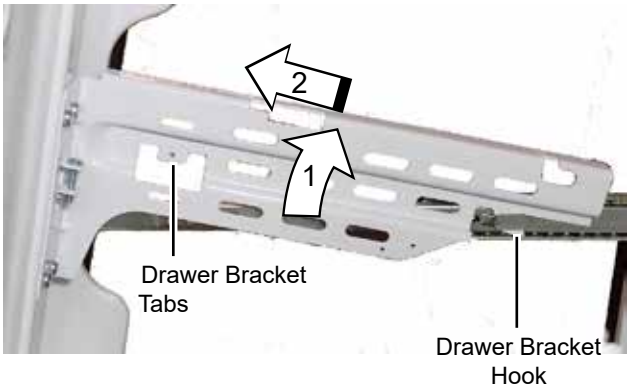
For 21, 25, and 27 Cubic Foot Models

1. Remove the upper and lower baskets.
2. Remove two 1/4-in. hex-head screws securing the drawer brackets to the lower basket slides (located on the inside of the drawer brackets).



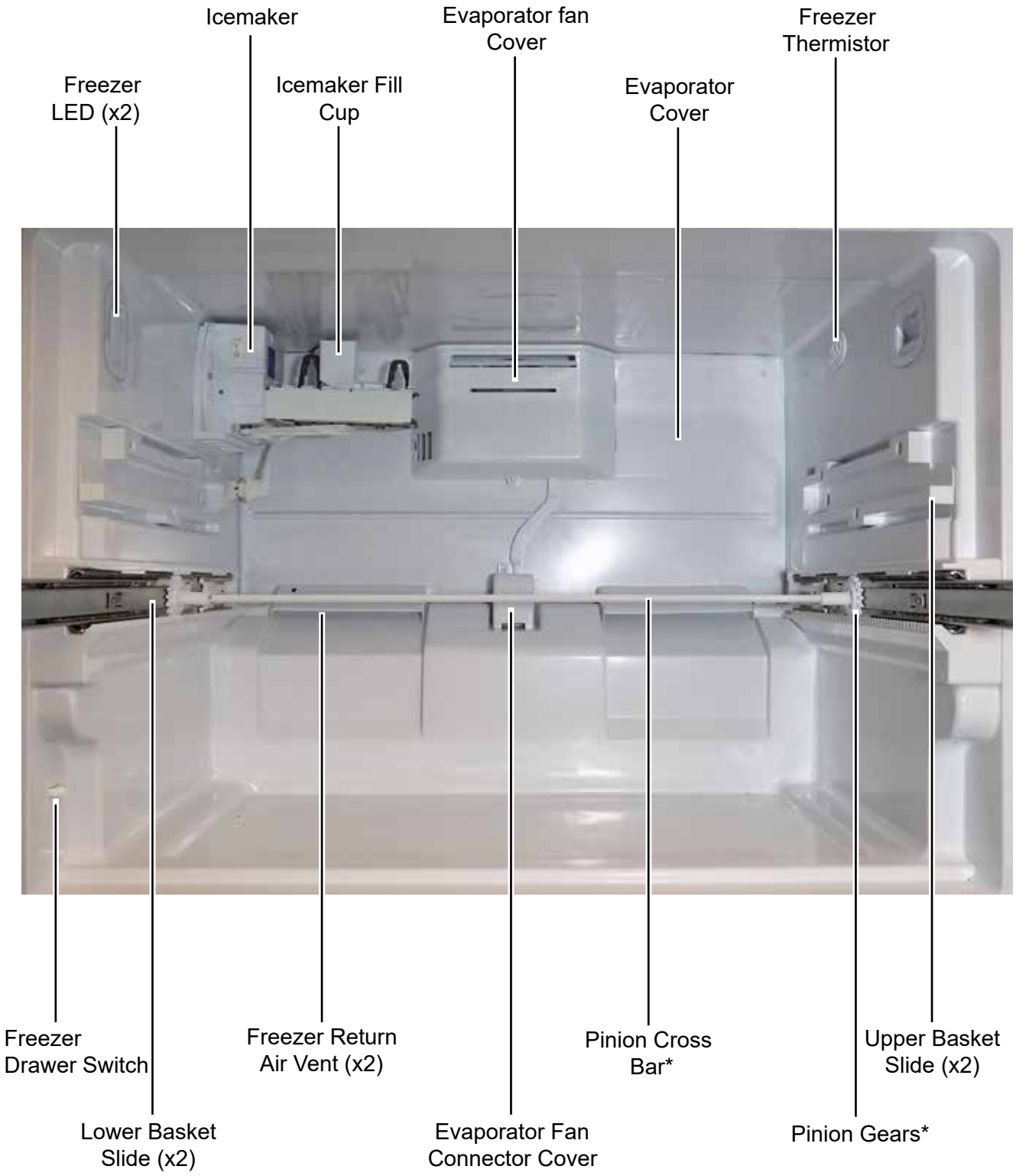


3. Tilt the drawer front up (1) to remove the tabs of the drawer bracket from the lower basket slides, then pull it away from the freezer (2) to release the drawer bracket hooks from the lower basket slides.



Freezer

Freezer Component Locator



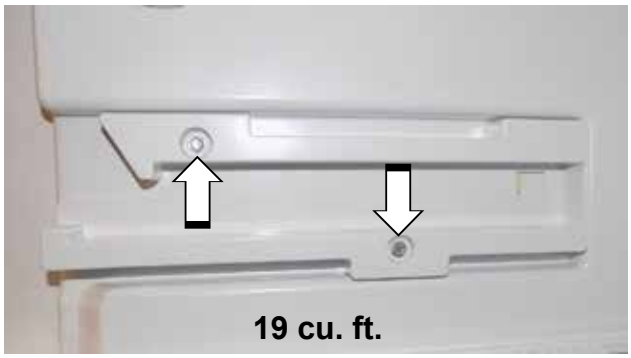
*Not present on 19 cu ft models.

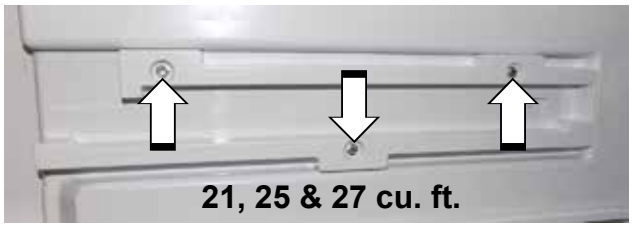
Upper Basket Slides

Upper basket slides support the rear wheels of the upper basket.

Upper Basket Slide Removal

1. Remove the upper basket.
2. Remove two (19 cu. ft. models) or three (21, 25, and 27 cu. ft. models) 1/4-in. hex-head screws.





3. Remove slide from liner.

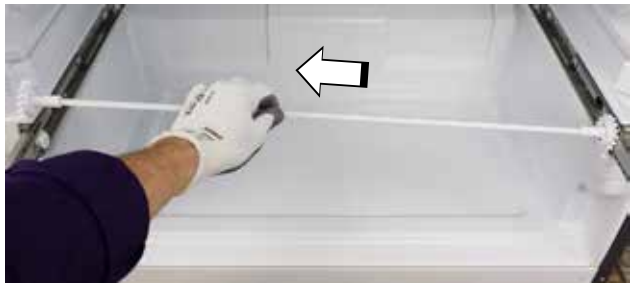
Pinion Cross Bar

Pinion cross bars keep the drawer from twisting while the drawer is being opened or closed. On 21, 25 and 27 cu. ft. models the pinion gears holding the pinion bar are connected to the lower drawer slides. The 19 cu. ft. models do not use a pinion cross bar.

Pinion Cross Bar Removal

1. Remove the drawer front (see **Drawer Front Removal** in the **Freezer Drawer** section in this service guide).
2. Leave the inner rails of the lower slides extended.
3. Gently pry one of the pinion gears away from the inner rail of the slide.

4. Once the pinion bar is removed from one side slide the bar to the opposite side to remove the bar from the other pinion gear.



Pinion Gears

Pinion gears connect to the inner rail of the freezer slide. The gears hold the pinion bar in place and move back and forth over the bottom of the slide holders.

Pinion Gear Removal

1. Follow **Pinion Cross Bar Removal** steps under **Pinion Cross Bar** in this section of the service guide.
2. Slide the gear off the pinion cross bar.

Lower Basket Slides

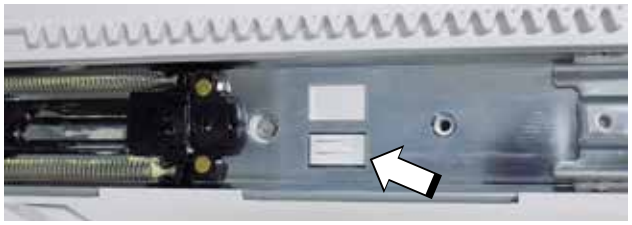
The lower basket slides are made up of an outer and inner rails, ball bearings, and closure mechanism. On 21, 25 and 27 cu. ft. models the pinion gear connector is riveted to the inner rail (shown below).

The inner rails slide in and out on the ball bearings to allow the lower basket to be pulled out. Spring actuated closure mechanisms are located in the rear of the outer rail to assist in closing the drawer once the drawer is within two inches from the cabinet.

Lower Basket Slide Removal

1. Remove the drawer front (see **Drawer Front Removal** in the **Freezer Drawer** section in this service guide).
2. Leave the inner rails extended.
3. For 21, 25 and 27 cu. ft. models remove the pinion cross bar (see **Pinion Cross Bar Removal** in this section of this service guide).
4. Remove one T20 Torx-head screw.

5. Push in on the release tab located behind the previously removed screw while pulling forward on the slide. Continue pulling the slide assembly forward until the slide is removed from the slide holder.

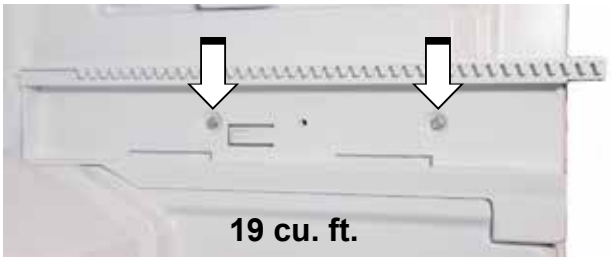


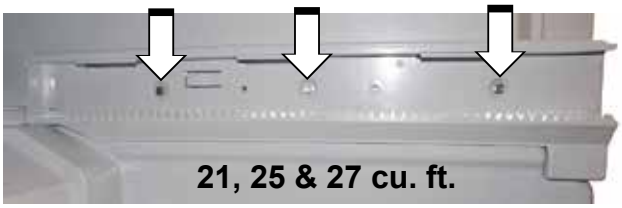
Slide Holders

The lower basket slides are slid into and mounted to the slide holders. On 21, 25, and 27 cu. ft. models, the pinion gears roll across the bottom lip of the slide holders.

Slide Holder Removal

1. Follow the **Lower Basket Slide Removal** steps in the previous section.
2. Remove two (19 cu. ft. models) or three (21, 25, and 27 cubic ft models) 1/4 in. hex-head screws.

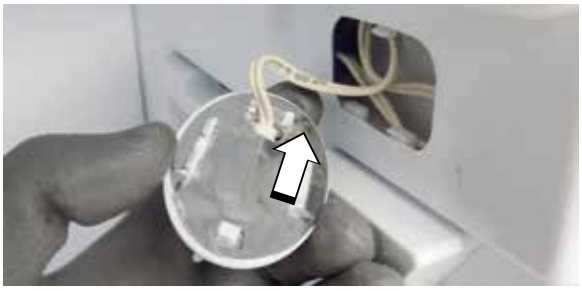




3. Remove slide holder from liner.

Freezer Thermistor

The freezer thermistor is located on the right freezer wall. To access the thermistor, gently pry the thermistor grill from the cabinet then slide the thermistor out of the grill and shunt.



To test or replace the thermistor, follow the steps in the **Thermistors** section.

Freezer Drawer Switch

The freezer drawer switch is an AC volt switch that has Normally Closed contacts (N.C.). The switch is actuated by the drawer front to tell the main board to turn the freezer LEDs on or off.

Freezer Drawer Switch Diagnosing

When the drawer is opened, the switch contacts are closed allowing 120 VAC to travel to the main board. When closed, the drawer front engages the switch to open the switch contacts, breaking the 120 VAC circuit to the main board.

Switch Not Pressed (Drawer Open)

J7 on Main Board

- Pin 7 (**red**) to pin 9 (**orange**): 120 VAC

Switch Pressed (Drawer Closed)

J7 on Main Board

- Pin 7 (**red**) to pin 9 (**orange**): 0 VAC

Freezer Drawer Switch Removal

1. Remove upper and lower baskets.
2. Using a flat-blade screw driver, gently pry the top of the switch away from the freezer liner.

3. Using a flat-blade screw driver, gently pry the bottom of the switch away from the freezer liner.
4. Pull the switch from the liner and disconnect wires from the switch.

Freezer LEDs

The freezer has two lower LED boards. The LEDs can be found in the left and right sides of the cabinet.

Freezer LED Diagnosing

When one of the freezer LED boards fails completely, the other lower LED board and LED housing will still work.

Left LED Main Board Connections

- J2 pin 3 (**white**/**silver**) to J2 pin 8 (**red**/**silver**): 13 VDC
- J2 pin 3 (**white**/**silver**) to J3 pin 5 (**pink**): 2-5 VDC (switched voltage; see **NOTE**)

Left LED Three Pin Connector

- **Red**/**silver** - **blue**: 13 VDC (constant voltage)
- **Pink** - **blue**: 2 - 5 VDC (switched voltage; see **NOTE**)

Right LED Main Board Connections

- J2 pin 3 (**white**/**silver**) to J4 pin 2 (**red**/**yellow**): 13 VDC
- J2 pin 3 (**white**/**silver**) to J3 pin 5 (**pink**): 2 - 5 VDC (switched voltage; see **NOTE**)

Right LED Three Pin Connector

- **Red**/**yellow** to **white**/**silver**: 13 VDC (constant voltage)
- **Pink** to **white**/**silver**: 2 - 5 VDC (switched voltage; see **NOTE**)

NOTE: When the freezer drawer is opened, the main board delivers 2 VDC to the LED boards and increases the voltage to 5 VDC for full brightness.

(*Continued next page*)

Freezer LED Removal

The LED board and LED shield are separate parts, it is recommended to replace both parts when an LED board is being replaced.

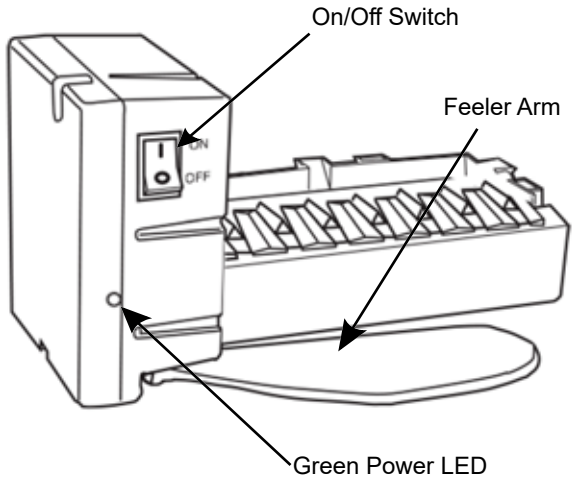
1. Remove all shelves, pans, and pan covers.
2. Using a putty-knife or small flat-blade screw driver, gently pry the LED shield away from the cabinet. For the left LED, pry from the upper rear corner (as shown below); and for the right LED, pry from the lower front corner.

3. Once tipped out of the cabinet, lift the left LED shield out of the cabinet and pull forward on the right LED shield to remove it from the cabinet.
4. Disconnect the 3-pin connector and unclip the LED board from the LED shield.

Icemaker

The refrigerator uses an electronic icemaker. The toggle switch on the front of the icemaker turns the icemaker on/off. The green LED on the front of the icemaker indicates there is power to the icemaker and the icemaker is turned on.

The icemaker will produce seven cubes per cycle (approximately 100 to 130 cubes in a 24-hour period), depending on freezer compartment temperature, room temperature, number of door openings and other use conditions. The icemaker will fill with water when the mold body thermistor of the icemaker cools to 15°F (–10°C). A newly installed refrigerator may take 12 to 24 hours to begin making ice cubes. When the bin fills to the level of the feeler arm (keeping the feeler arm in the back position), the icemaker will stop producing ice.



Normal Operation

- To hear a buzzing sound each time the icemaker fills with water.
- For several cubes to be joined together.
- If ice is not used frequently, old ice cubes will become cloudy, taste stale and shrink.

(*Continued next page*)

Icemaker Diagnosing

To manually cycle the icemaker, turn the icemaker off for 30 seconds then turn it back on and press in and release the feeler arm of the icemaker three times within 5 seconds. When the icemaker calls for water it will deliver 120 VAC to the isolation and icemaker valves.

Icemaker Valve (During Fill)

- **White** to **orange**: 120 VAC

Isolation Valve Connector (During Fill)

- **Yellow** and **white** to **orange**: 60 VAC*

*As a result of the diodes in the isolation valve circuit, only 60 VAC will be read from a voltmeter when checking for voltage going to the isolation valve.

Icemaker Removal

1. Remove the upper and lower freezer baskets.
2. Remove the freezer drawer front.
3. Disconnect the icemaker connector.
4. Remove one 1/4-in. hex-head screw.

5. Slide the icemaker forward to remove the icemaker from the icemaker mounting bracket.

Fill Tube Heater

Foamed into the cabinet is a 2,880-ohm heater designed to keep the fill tube from freezing. The heater is in parallel with the defrost heater.

Fill Tube Heater Diagnosing

The fill tube heater can be operated using Service Mode Test t11.

J19 to J7 on Main Board

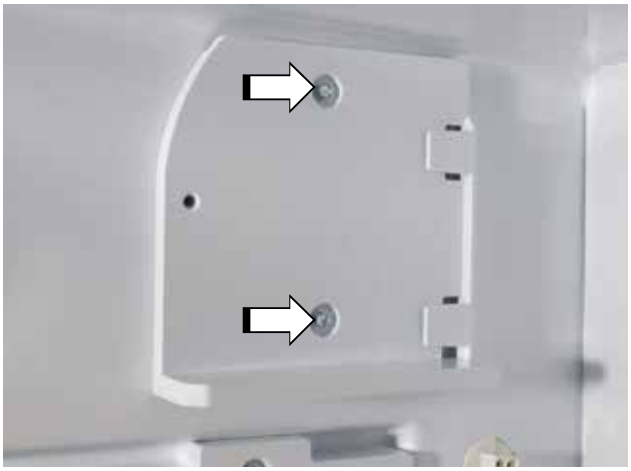
- J19 pin 2 (**blue**) to J7 pin 9 (**orange**): 120 VAC

Evaporator Cover

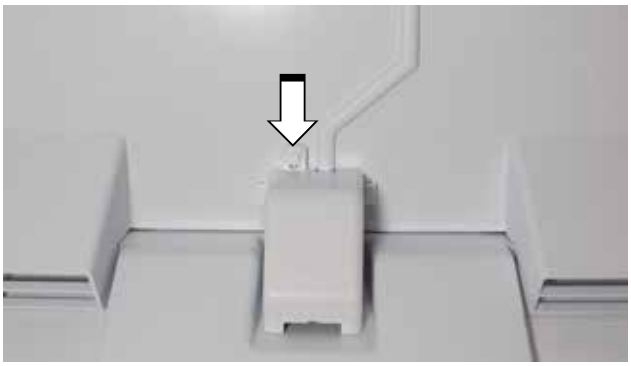
The icemaker blower fan, evaporator thermistor, defrost thermostat, defrost heater, and evaporator are located behind the evaporator cover. The evaporator fan is mounted to the backside of the evaporator cover.

Evaporator Cover Removal

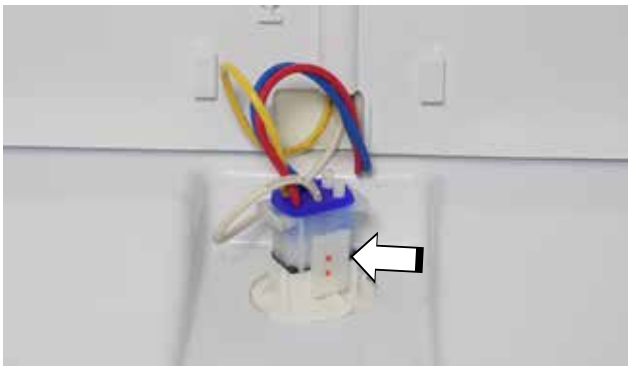
1. Remove baskets (see **Upper Basket Removal** under **Upper Basket** and **Bottom Basket Removal** under **Bottom Basket** in the **Freezer Drawer** section of this service guide).
2. Remove the drawer front (see **Drawer Front Removal** in the **Freezer Drawer** section in this service guide).
3. Remove the icemaker (see **Icemaker Removal** under **Icemaker** in this section of the service guide).
4. Remove two 1/4-in. hex-head screws to remove the icemaker mounting bracket.



5. Remove one 1/4-in. hex-head screw for the evaporator fan connector cover.

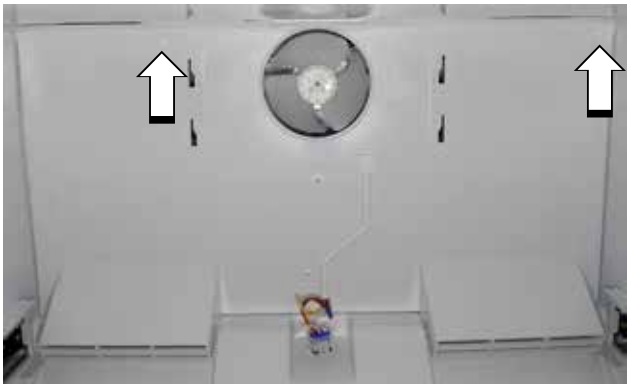


6. Slide the connector cover up to remove it from the evaporator cover.
7. Disconnect the 6-pin fan connector by squeezing the release tabs on the long sides of the connector.



8. Remove one 1/4-in. hex-head screw for the evaporator fan cover.

9. Using a flat-blade screwdriver or putty-knife, gently pry the lower corners of the fan cover away from the tabs of the evaporator cover (circled in the above image) while pushing down on the fan cover.
10. Once the fan cover is in the down position, pull the fan cover off of the evaporator cover.
11. Remove two 1/4-in. hex-head screws from the evaporator cover.



(*Continued next page*)

12. Pull the bottom of the cover out and down as much as the lower rails will allow.

13. Grab the evaporator cover from the fan opening and tilt the evaporator cover down.

14. Grab the top of the evaporator cover and pull the cover out of the freezer.

Evaporator Fan

The refrigerator uses a DC fan motor to circulate the cold air from the evaporator into the refrigerator and freezer compartments. The main board uses the RPM feedback from the fan to operate the fan at low or high speed.

Evaporator Fan Diagnosing

Use Service Mode Test t8 to operate the evaporator fan.

J2 and J4 on Main Board

- J2 pin 3 (**white**/**silver**) to J4 pin 2 (**red**/**yellow**): 13 VDC
- J2 pin 3 (**white**/**silver**) to J2 pin 1 (**blue**/**silver**): 3 - 4 VDC

Low Speed ~2200 RPM

- J2 pin 3 (**white**/**silver**) to J2 pin 4 (**yellow**/**black**): 7 - 8 VDC

High Speed ~2800 RPM

- J2 pin 3 (**white**/**silver**) to J2 pin 4 (**yellow**/**black**): 10 - 11 VDC

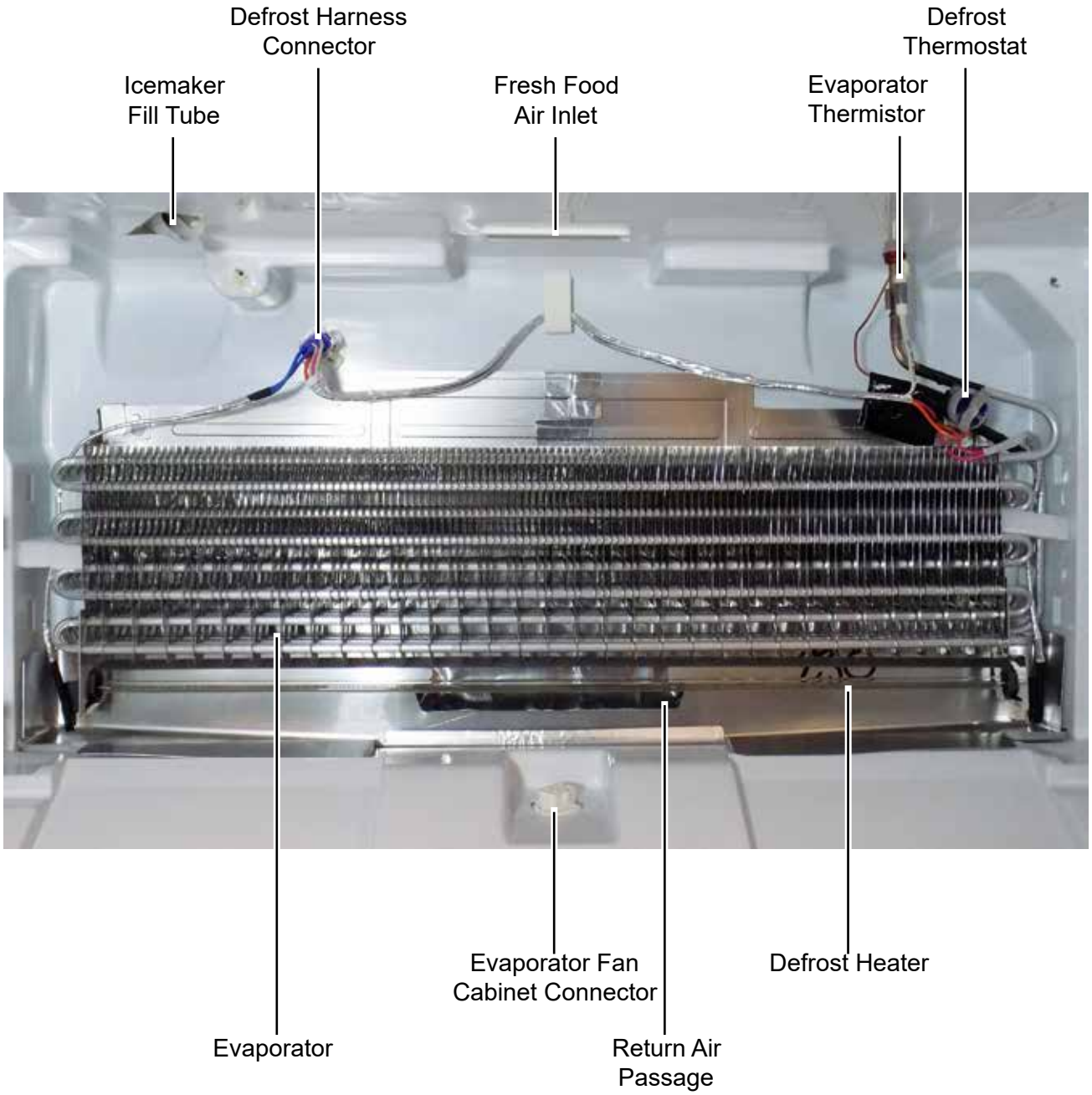
Evaporator Fan Removal

The evaporator fan is a component part of the evaporator cover and cannot be replaced separately from the cover.

- Follow **Evaporator Cover Removal** steps, under **Evaporator Cover** in this section of the service guide.

Evaporator Components

Evaporator Component Locator



Defrost Thermostat

The defrost thermostat (over-temperature thermostat) is located in the upper right-rear corner of the freezer. The defrost thermostat is clipped to the inlet line of the evaporator coil to prevent a run-away state of defrost. The thermostat will open when a temperature of approximately 95°F is reached and close again at approximately 65°F.

Defrost Thermostat Diagnosing

Check for an open defrost circuit.

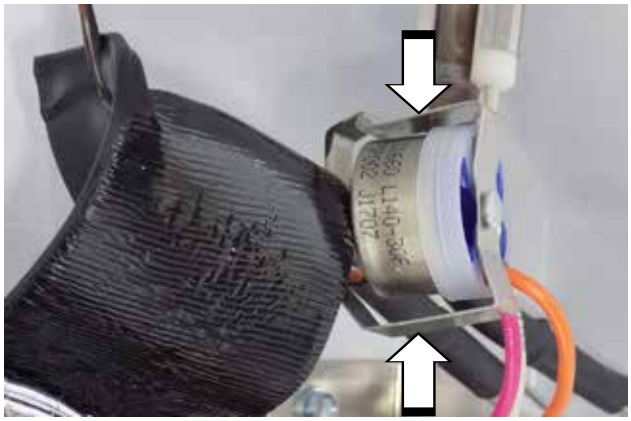
J19 to J7 on Main Board

- J7 pin 9 (**orange**) to J19 pin 2 (**blue**): 33 ohms

If open, check the thermostat at the **orange** wire at the 9-pin connector to the **pink** wire on the defrost heater to verify the thermostat is open and the defrost heater is not at fault.

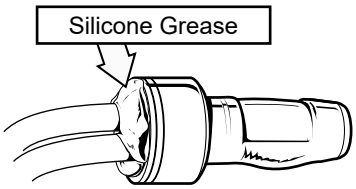
Defrost Thermostat Removal/Replacement

1. Remove the evaporator cover (see **Evaporator Cover Removal**, under **Evaporator Cover** in the **Freezer** section of this service guide).
2. Squeeze the sides of the metal retaining clip to release the clip.



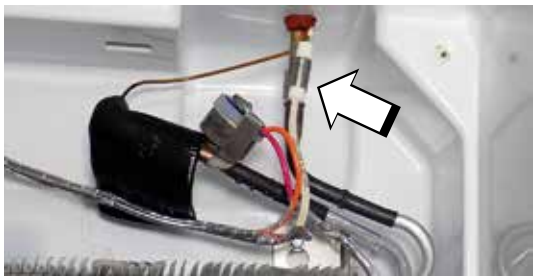
NOTE: The defrost thermostat can be replaced individually or as part of the evaporator harness.

3. If replacing the thermostat as part of the evaporator harness, unclip the evaporator thermistor and defrost thermostat, disconnect the 9-pin connector, 3-pin icemaker blower connector, and defrost heater connectors. If only replacing thermostat, proceed to the next step.
4. Cut the thermostat wiring as close to the thermostat as possible.
5. Strip the two wires back 3/16 inch for splicing.
6. Prepare the replacement thermostat by cutting the wiring 4 inches back from the thermostat and strip the wires back 3/16 inch.
7. Using two bell connectors (**Part #**: WR2X4686D), splice the wiring. After the splices are complete, fill the bell connectors fully with silicone grease (**Part #**: WR97X163).



8. Clip the thermostat to the inlet tube of the evaporator.

Evaporator Thermistor



The evaporator thermistor is located in the upper right-rear corner of the freezer. A metal clip secures the thermistor to the outlet line of the evaporator. The thermistor is used to monitor evaporator temperature and terminate defrost when the thermistor reaches 55°F.

To access the evaporator thermistor, the evaporator cover must be removed (see the **Evaporator Cover Removal** section). To test or replace the thermistor, follow the steps in the **Thermistors** section.

Defrost Heater

The defrost heater is a 33-ohm glass tube style heater which is mounted to the bottom of the evaporator coil.

Defrost Heater Diagnosing

The heater can be tested by using Service Mode Test t11 and testing voltages at the main board or heater.

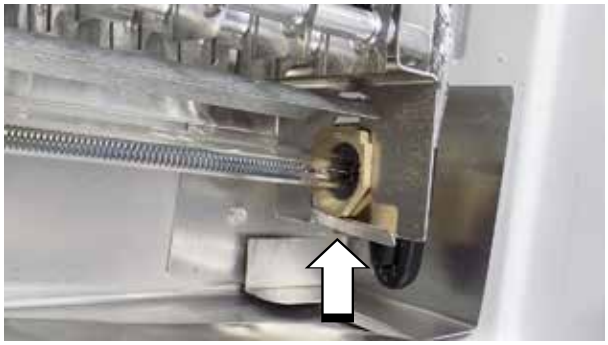
J7 to J19 on Main Board

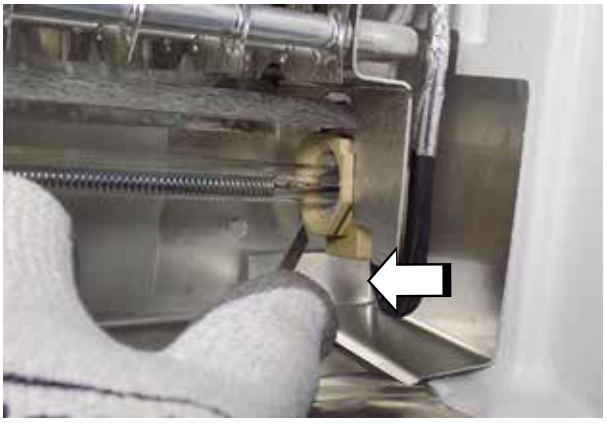
- J7 pin 9 (**orange**) to J19 pin 2 (**blue**): 120 VAC
- J7 pin 9 (**orange**) to J19 pin 2 (**blue**): 33 ohms

If defrost circuit is open, check the thermostat at the **orange** wire at the 9-pin connector to the **pink** wire on the defrost heater to verify the that an open defrost thermostat is not at fault.

Defrost Heater Removal

1. Remove the evaporator cover (see **Evaporator Cover Removal** steps).
2. Bend the tabs of the evaporator bracket towards the back liner to release the heater from the evaporator.





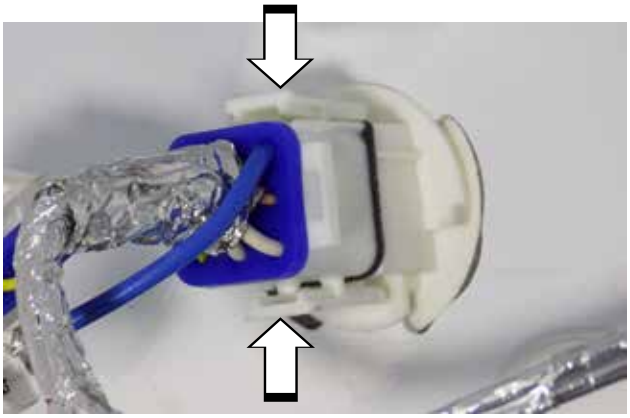
3. Disconnect the defrost heater connectors.

Evaporator

The evaporator coil is an aluminum set of coils located in the freezer. The refrigerant in the aluminum coils pulls the heat energy from the air circulated across it by the evaporator fan causing the air to become cold.

Evaporator Removal

1. Remove the evaporator cover (see **Evaporator Cover Removal** steps).
2. Remove the icemaker blower fan.
3. Unclip the defrost thermostat and evaporator thermistor from the evaporator tubing.
4. Disconnect the ground wire from the evaporator coil bracket.
5. Disconnect the 9-pin connector for the evaporator harness by squeezing the tabs on the top and bottom of the connector.



6. Follow recover procedure and disconnect the inlet and outlet lines of the evaporator.
7. Loosen two 1/4-in. hex-head screws and lift the evaporator off the screws.

8. Remove the defrost heater and evaporator harness from the evaporator (foam blocks on the left and right side of the evaporator will need to be reused on the new evaporator).

Thermistors

The procedure for testing and replacing thermistors can be found in this section.

Thermistor Check Points

Testing points are listed to the right and thermistor values chart is listed below. Service Mode Test t4 will display **P** (Pass), **F** (Fail), **O** (Open), or **S** (Short) for each thermistor (see **Service Mode Tests** in the **Service Mode** section of this service guide).

Thermistor Values		
Temperature Degrees (°F)	**Temperature Degrees (°C)**	**Resistance in Kilo-Ohms**
-40	-40	166.8 kΩ
-31	-35	120.5 kΩ
-22	-30	88 kΩ
-13	-25	65 kΩ
-4	-20	48.4 kΩ
5	-15	36.4 kΩ
14	-10	27.6 kΩ
23	-5	21 kΩ
32	0	16.3 kΩ
41	5	12.7 kΩ
50	10	10 kΩ
59	15	7.8 kΩ
68	20	6.2 kΩ
77	25	5 kΩ
86	30	4 kΩ
95	35	3.2 kΩ
104	40	2.6 kΩ
113	45	2.2 kΩ
122	50	1.8 kΩ
131	55	1.5 kΩ
140	60	1.2 kΩ

To accurately test a thermistor, place the thermistor in a glass of ice and water (approximately 33°F) for several minutes and check for approximately 16k ohms.

FF Thermistor (Main Board)

- J1 pin 1 (**white**/**black**) to J1 pin 5 (**red**/**white**)

FZ Thermistor (Main Board)

- J1 pin 3 (**white**/**blue**) to J1 pin 5 (**red**/**white**)

Evaporator Thermistor (Main Board)

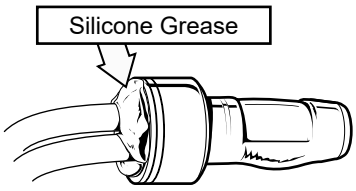
- J1 pin 4 (**white**/**green**) to J5 pin 5 (**red**/**white**)

Ambient Thermistor (Main Board)

- J1 pin 2 (**white**/**red**) to J5 pin 5 (**red**/**white**)

Thermistor Replacement

1. Unplug the refrigerator.
2. Access the thermistor.
3. Cut the thermistor wiring as close to the thermistor as possible.
4. Strip the outer insulation from the thermistor case harness back 1 inch. Strip the two internal wires back 3/16 inch for splicing.
5. Prepare the replacement thermistor by cutting the wiring 4 inches back from the thermistor and strip the wires back 3/16 inch.
6. Using two bell connectors (**Part #**: WR01X10466), splice the wiring. After the splices are complete, fill the bell connectors fully with silicone grease (**Part #**: WR97X163).



7. Reinstall the thermistor into its original location.

Defrost Operation

Adaptive Defrost

Adaptive Defrost is a defrost system that adjusts to a refrigerator's surrounding environment and household usage. Unlike conventional defrost systems that use electromechanical timers with a fixed defrost cycle time, Adaptive Defrost utilizes electronic controls to determine when the defrost cycle is necessary. In order to accomplish the optimum defrost cycle time, the main control board monitors the following refrigerator operations:

- Length of time the refrigerator doors were open since the last defrost cycle
- Length of time the compressor has run since the last defrost cycle
- Amount of time the defrost heaters were on in the last defrost cycle

If the doors are not opened, the compressor will run up to 96 hours between defrosts.

Defrost is divided into 4 separate cycles. Those operations are:

- Pre-Chill
- Defrost Heater Operation
- Dwell
- Post Dwell

Pre-Chill

After accumulating the required amount of time between defrost cycles, the unit will keep running until the freezer temperature reaches -15°F or 45 minutes of run time has occurred. Once pre-chill max time has passed or pre-chill minimum temperature is achieved defrost will begin.

Defrost Heater Operation

Once defrost is initiated, all fans are off, compressor is off, and the heater is on, until evaporator thermistor temperature reaches 55°F or until the heater on time reaches 40 minutes (whichever happens first).

Dwell

After defrost has completed the defrost heater will be off for 10 minutes before the compressor starts. This time allows residual moisture from defrost to drop off the evaporator and exit through the defrost drain.

Post Dwell

Post-dwell is the final cycle of defrost. After dwell is completed, the compressor and condenser fan will start but the evaporator fan will remain off. The evaporator fan will start once the post-dwell minimum evaporator temperature of -10°F is met or the max time of 10 minutes is achieved (whichever occurs first). Once the evaporator fan starts, the refrigerator returns to normal operation and restarts the adaptive defrost time.

Abnormal Defrost

Abnormal defrost is a defrost cycle that lasted for 25 or more minutes. Should an abnormal defrost occur the next defrost will begin after 10 hours of compressor run time.

Cabinet - Rear

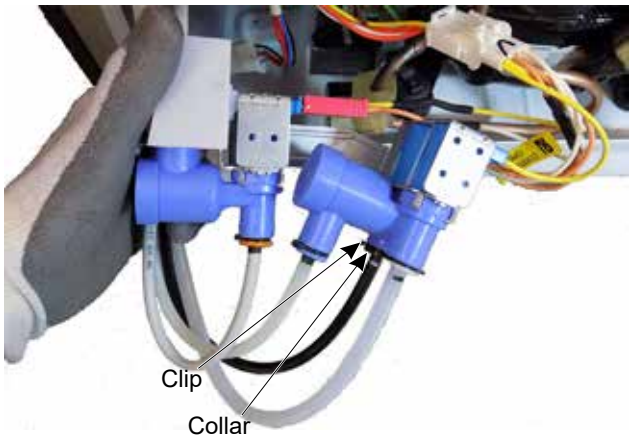
Cabinet - Rear Component Locator

Fill Tube

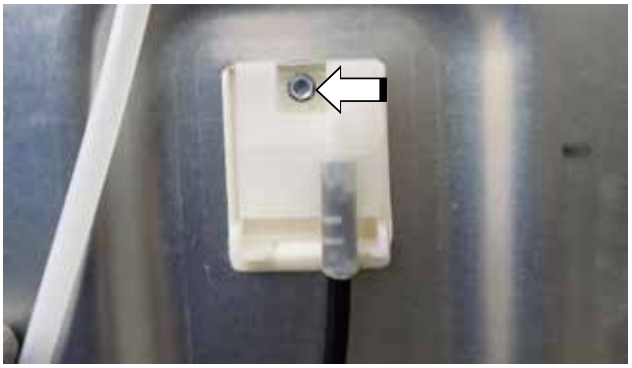
The fill tube is removed from the rear of the refrigerator. The tube is replaced as an assembly and includes the icemaker water line, fill tube grommet, and fill tube.

Fill Tube Removal

1. Remove the machine compartment cover.
2. Remove one 1/4-in. hex-head screw securing the isolation valve assembly to the cabinet and pull the valve out of the machine compartment.
3. Pull the clip from the collar of the icemaker valve (valve with black tubing).

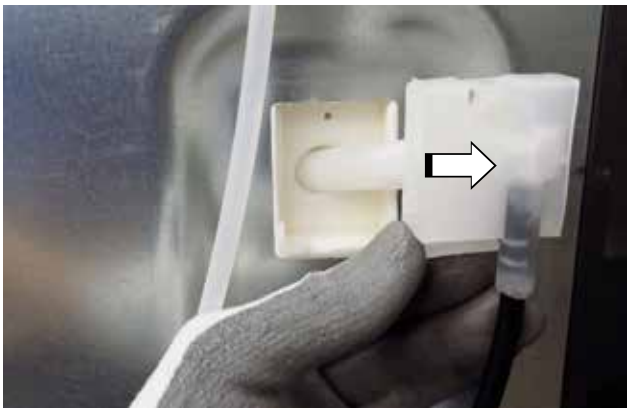


4. Push in on the collar of the water valve while pulling the icemaker water line from the valve.
5. Unclip the black icemaker water line from the backside of the cabinet.
6. Remove one 1/4-in. hex-head screw from the fill tube grommet.



7. Use a flat-blade screw driver to release the bottom tab of the grommet from the cabinet.

8. Slide the fill tube assembly out and to the right to remove the assembly from the cabinet.



Main Board

The main board is located on the backside of the refrigerator behind a cover above the machine compartment. The main board contains all the logic for refrigerator operation based on the selection or modes selected from the temperature control board.

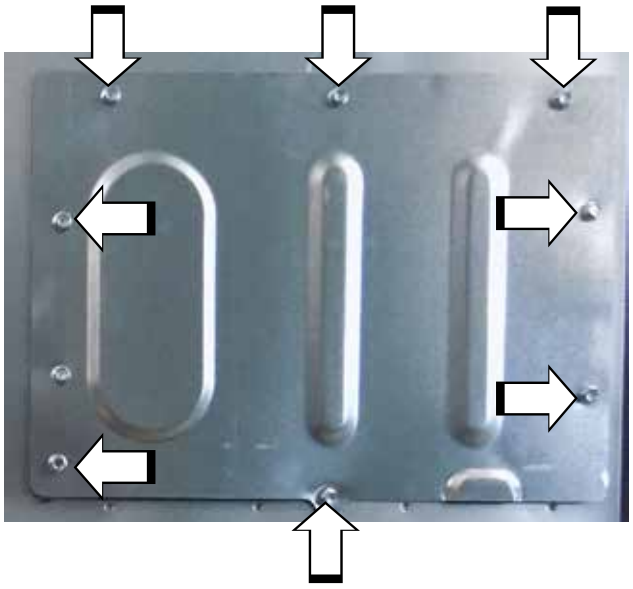
Main Control Board Diagnosing

The main board has a green LED which blinks during normal operation. If the LED is not on verify proper voltage is going to the board. A shorted component may create the appearance that the main board has failed. If proper voltage is present to the board, disconnect all DC loads from the board and cycle power using the master switch to see if the green LED returns. If the green LED does return do not replace the main board but isolate the failed component.

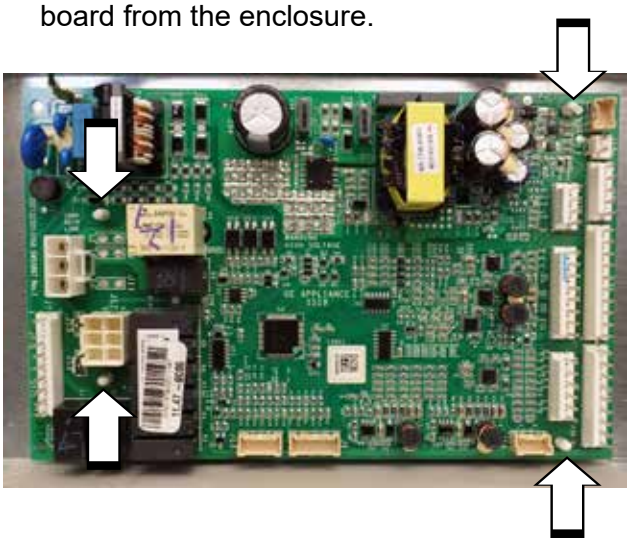
J19 pin 3 (**brown**) to J7 pin 9 (**orange**): 120 VAC

Main Board Removal

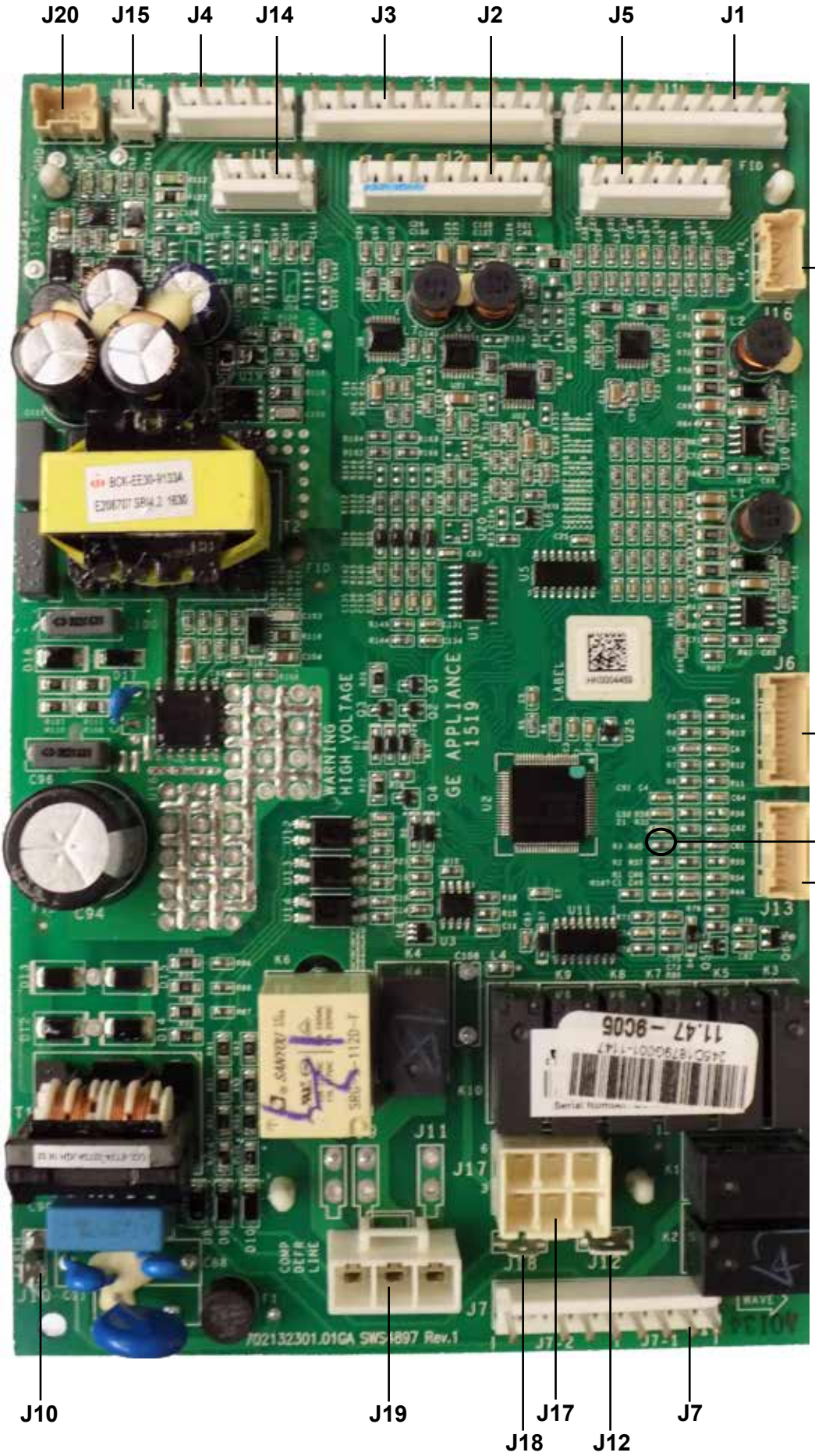
1. Disconnect power to the refrigerator.
2. Remove the main board cover by removing eight 1/4-in. hex-head screws.



3. Disconnect the harness connections on the board.
4. Squeeze four retaining pins to release the board from the enclosure.



Main Board Connector Locations



Connector Locations (continued)

J1-1: FF thermistor input

J1-2: Ambient thermistor input

J1-3: FZ thermistor input

J1-4: Evaporator thermistor input

J1-5: +5 VDC output to FF and FZ thermistors

J1-6: Model ID jumper from J1-5 (21 cu. ft.)

J1-7: Model ID jumper from J1-5 (19, 21, 27 cu. ft.)

J1-8: Not used

J1-9: Model ID jumper from J1-5 (25 cu. ft.)

J2-1: Evaporator fan RPM feedback

J2-2: Open

J3-3: Fan Common

J2-4: Evaporator fan speed

J2-5: Condenser fan speed

J2-6: Vertical Mullion Heater

J2-7: Open

J2-8: +13.6 VDC (Mullion Heater, internal dispenser switch, Left FZ LED, and Lower FF LEDs)

J3-1: Damper motor

J3-2: Damper Motor

J3-3: Damper motor

J3-4: Damper motor

J3-5: FZ LED

J3-6 through 10: Open

J4-1: GEA Bus - Communications

J4-2: +13.6 VDC

J4-3: Board DC Ground

J4-4: +13.6 VDC

J4-5: GEA2 Bus - Communications

J5-1: Lower FF LEDs

J5-2: Open

J5-3: Open

J5-4: Open

J5-5: +5 VDC output to Ambient, Evap thermistors, and Humidity Sensor

J5-6: Humidity Sensor

J6: Not Used

J7-1: Open

J7-2: Open

J7-3: Isolation and Dispenser Water Valve

J7-4: Open

J7-5: Open

J7-6: Refrigerator door/s open 120 VAC input

J7-7: Freezer drawer open 120 VAC input

J7-9: VAC neutral

J10: Chassis ground (line noise)

J12: Not used

J13: Not used

J14-1: Open

J14-2: Open

J14-3: Internal dispenser switch input

J14-4: Common

J15-1: Not used

J15-2: Not used

J16: Not used

J17: Not used

J18: Not used

J19-1: 120 VAC output to Compressor

J19-2: 120 VAC output to defrost and fill tube heaters

J19-3: 120 VAC supply

J20: Not used

Machine Compartment

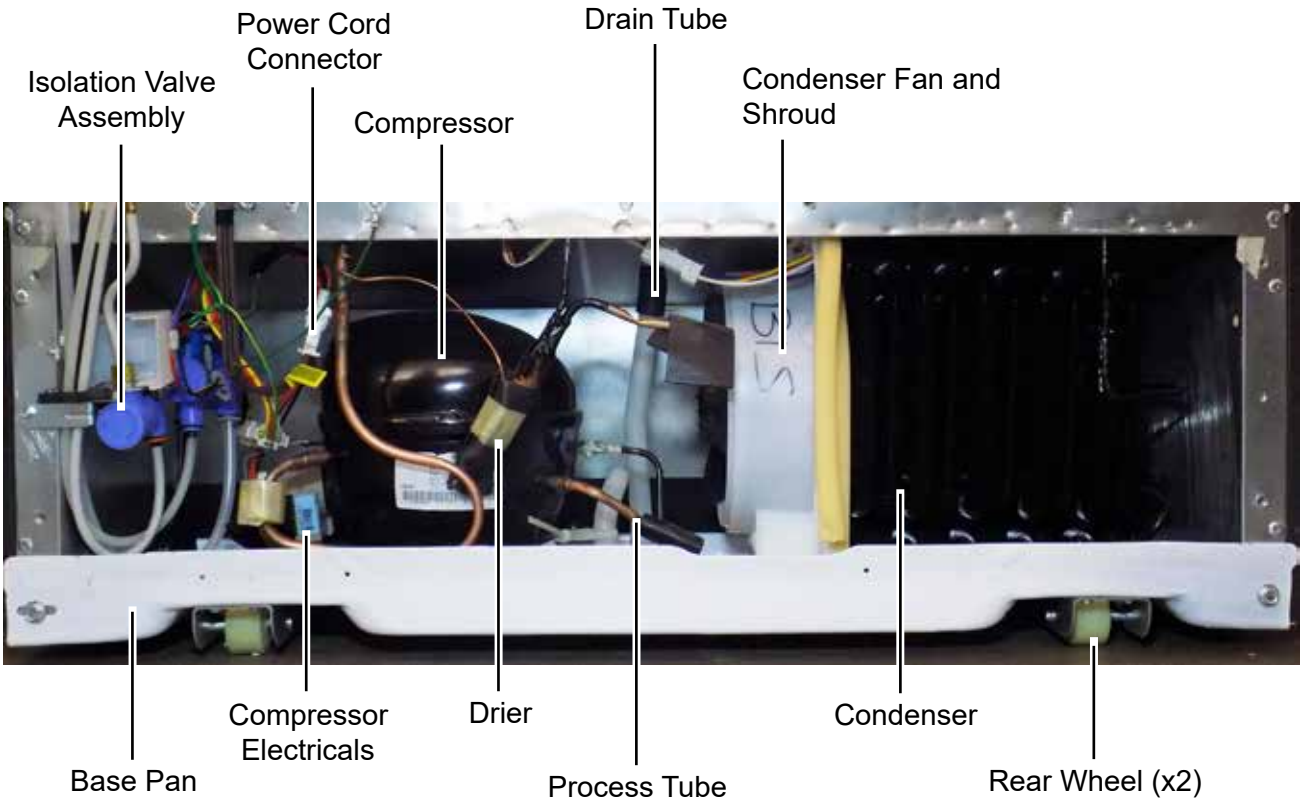
Machine Compartment Cover

Machine Compartment Cover Removal

1. Remove one 1/4-in. hex-head screw (see image in step 2).
2. Remove five 5/16-in. hex-head screws.

3. Lift cover off of the base pan.

Machine Compartment Component Locator



Isolation Valve Assembly

While facing the rear of the refrigerator, the isolation valve assembly is located in the left side of the machine compartment. When the water dispenser or icemaker call for water the isolation valve opens to allow water to pass through the filter head to the dual water valve of the assembly. Since the isolation valve is shared between the dispenser and icemaker valves circuits, diodes (see **Diodes**, in this section of this service guide) are used to prevent voltage from the main board going to the valve not intended to be energized.

Isolation Valve Assembly Diagnosing

To test the isolation valve, engage the internal dispenser switch or cycle the icemaker. Voltage checks can be performed at the isolation valve connector.

Isolation Valve Connector

- **Yellow**/**black** to **orange**: 60 VAC*

Icemaker Side of Dual Valve Connector (during fill):

- **White** to **orange**: 120 VAC

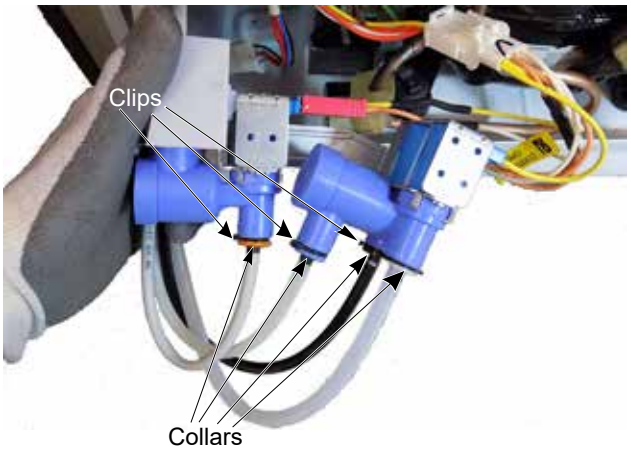
Dispenser Side of Dual Valve Connector (during fill):

- **Yellow** to **orange**: 120 VAC

*As a result of the diodes in the isolation valve circuit, only 60 VAC will be read from a voltmeter when checking for voltage going to the isolation valve.

Isolation Valve Assembly Removal

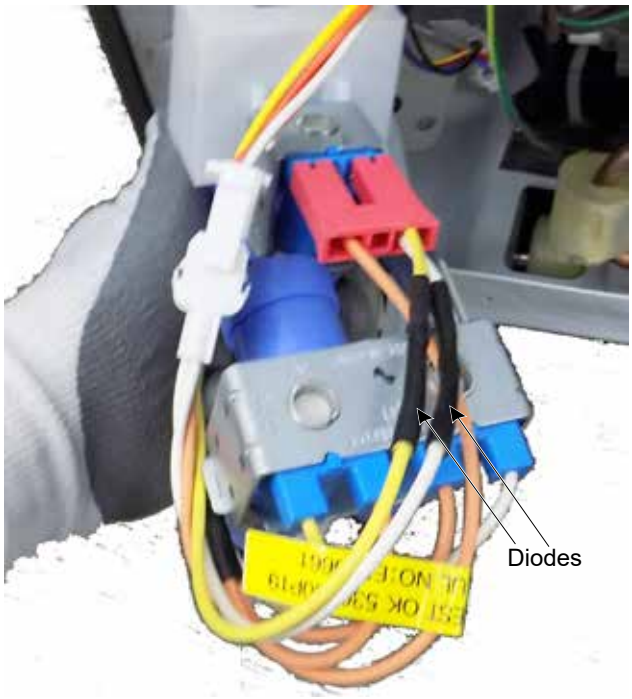
1. Turn off the water supply to the refrigerator.
2. Remove the machine compartment cover.
3. Use a 1/2-in. wrench to disconnect the house supply line from the valve.
4. Remove one 1/4-in. hex-head screw to remove the valve from the machine compartment.
5. Pull the clips from the collars of the water valve assembly.



6. Push in on the collar of the water valve while pulling on the tubing to release the manifold tubing from the valve.
7. Disconnect the harness connector from the valve.

Diodes

The isolation valve is shared between the dispenser and icemaker valves circuits; diodes are used to prevent voltage from the main board going to the valve not intended to be energized. The diodes are part of the isolation valve assembly harness attached to the dual valve solenoids. Should one of the diodes fail, replace the isolation valve assembly.

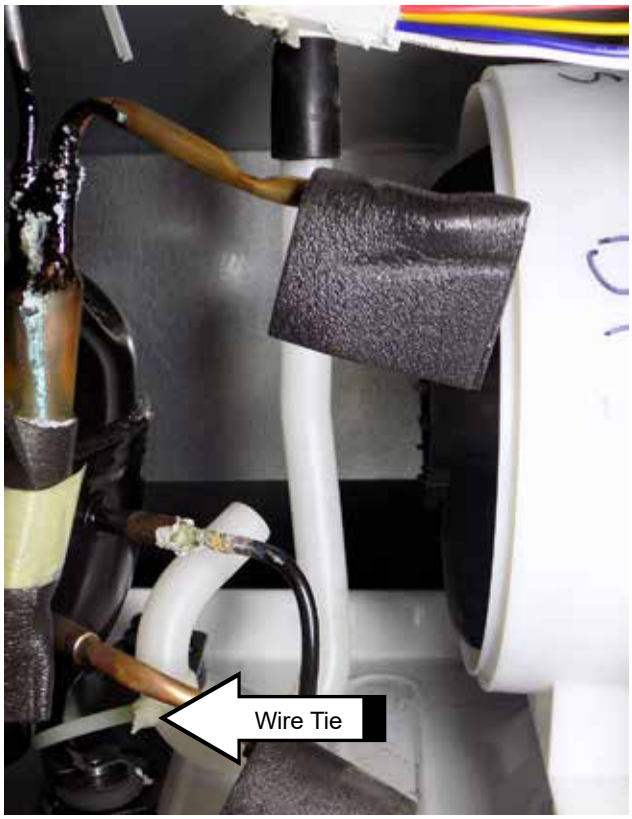


Diode Diagnosing

When a diode fails it can either open or short. If one of the diodes should open, the isolation valve will not receive power for one of the water operations. If one of the diodes should short, one of the water operations will cause both the icemaker and dispenser valve to activate.

Drain Tube

The refrigerator utilizes a J-trap style drain tube. The bend at the end of the drain tube traps some defrost water in the bottom of the tube to prevent ambient air from entering the freezer compartment through the drain.



Drain Tube Removal

1. Remove the machine compartment cover.
2. Pull down on the drain tube to remove the tube from the top of the machine compartment.
3. Without cutting the wire tie, remove the tube from the wire tie securing the tube to the base of the compressor.

NOTE: Put the drain tube back in the wire tie when reinstalling the drain tube, this will prevent the tube from coming in contact with the condenser fan blade.

Condenser Fan

The condenser fan is located inside the machine compartment in between the compressor and condenser. The fan comes as part of an assembly that includes the motor, fan blade, motor brackets, motor grommets, shroud, and shroud gasket. The fan is a DC fan motor that operates at three speeds: high, medium, and low, although low and medium have the same target speed. The speed of the fan is controlled by the voltage output from the main control board. The main control board does not monitor the speed of the motor since the motor does not have a fourth wire for RPM feedback.

Condenser Fan Diagnosing

Use Service Mode Test t8 or t9 to operate the condenser fan.

J2 and J4 on Main Board

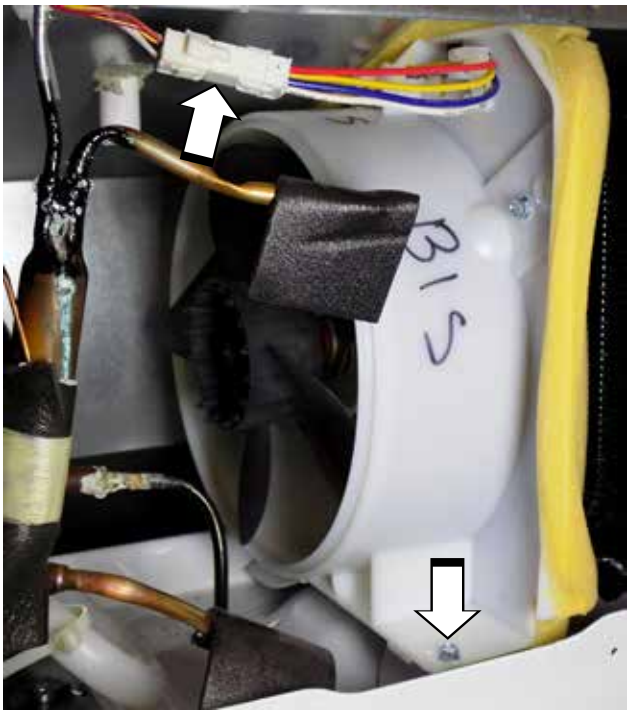
- J4 pin 2 (**red**/**yellow**) to J2 pin 3 (**white**/**silver**): 13 VDC
- J2 pin 5 (**yellow**/**red**) to J2 pin 3 (**white**/**silver**): 9 - 10 VDC

Condenser Fan Removal

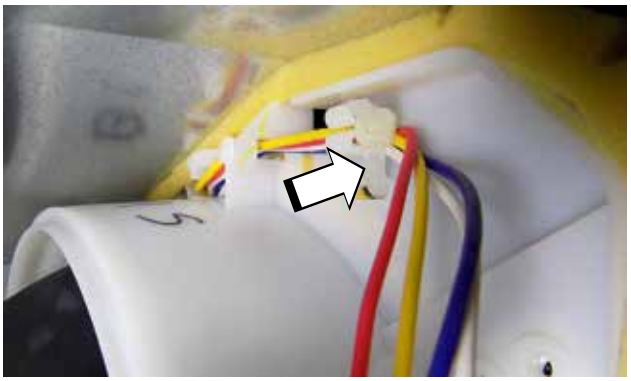
1. Remove the machine compartment cover.
2. Pull the drain tube down to release the tube from the top of the machine compartment then push the tube to the left (slightly tucking it behind the compressor; the bottom of the tube can be left in the wire tie) or remove the tube from the machine compartment.

NOTE: If the drain tube is removed, ensure the drain tube is put back in the wire tie when reinstalling the drain tube, to prevent the tube from coming in contact with the condenser fan blade.

3. Disconnect the harness connector and remove the lower 1/4-in. hex-head screw.

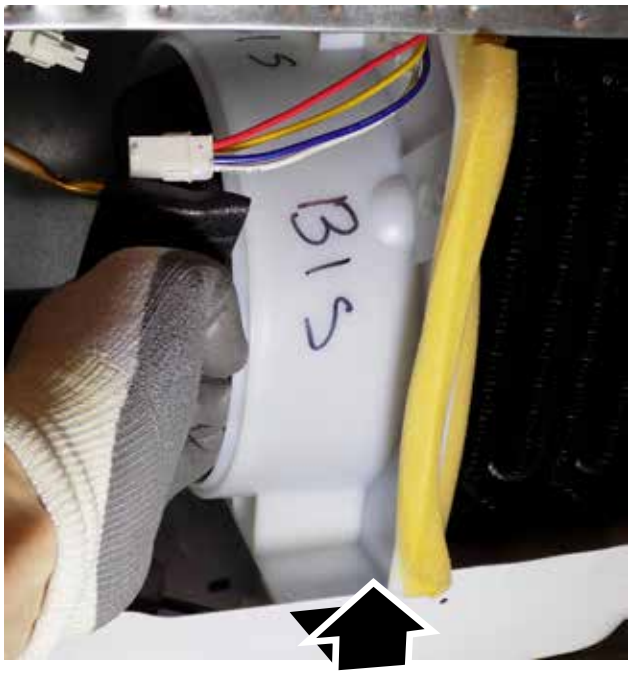


4. Clip and remove the wire tie at the top of the condenser fan shroud (this wire tie is present to ensure the shroud stayed in place during shipping and does not need to be replaced during reassembly).



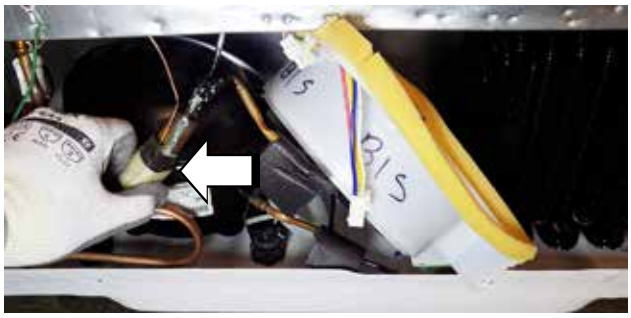
(*Continued next page*)

5. Pull the shroud towards the base pan then up to release the shroud from the mounting bracket underneath the shroud.



6. Once the shroud is released from the mounting bracket, tip the shroud towards the compressor.

7. Carefully push the drier towards the left to provide the shroud with an opening for removal.



8. Pull the shroud and fan assembly out of the machine compartment.

9. Pull the fan blade from the motor shaft.

10. Remove two 1/4-in. hex-head screws to separate the fan motor bracket and remove the motor from the shroud.

PTCR Relay/Overload

The PTCR Relay/Overload is mounted on the left side of the compressor and is secured with a retainer clip. The PTCR relay and overload come together as an assembly.

PTCR Relay/Overload Diagnosing

The compressor can be turned on using Service Mode Test t9. Voltage can be checked at the main board and overload/relay wiring. Resistance can also be read across the terminals, if reading open replace the PTCR.

Main Board

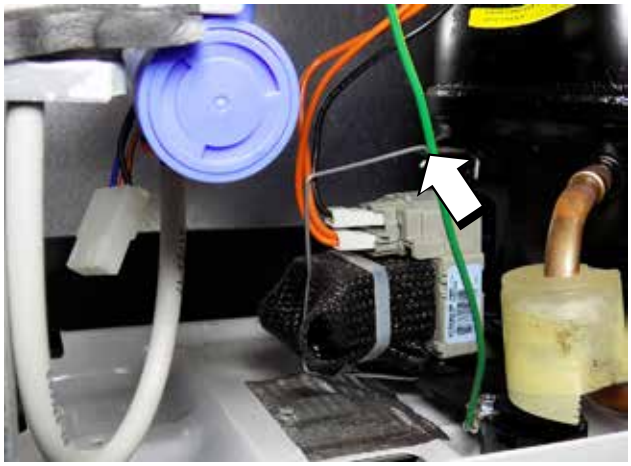
- J19 pin 1 (**black**) to J7 pin 9 (**orange**): 120 VAC

Overload/Relay Wiring

- **Orange** to **black**: 120 VAC

PTCR Relay/Overload Removal

1. Remove the machine compartment cover.
2. Unhook retainer clip securing the PTCR relay/overload to compressor.



3. Pull PTCR relay/overload straight off compressor.

CAUTION: Compressor pin damage could result from prying or pulling off on an angle.

4. Disconnect electrical connectors.

Capacitor

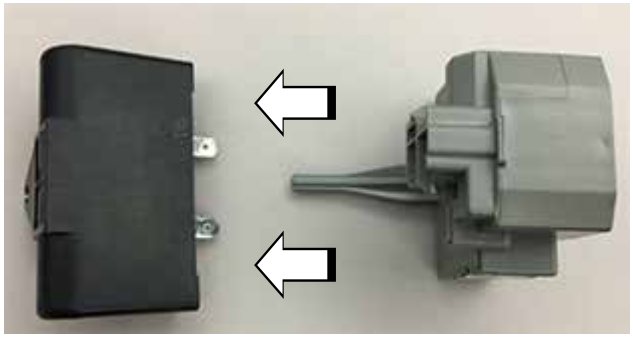
The capacitor plugs directly into the PTCR relay/overload mounted on the left side of the compressor and is secured with a bale strap.

Capacitor Diagnosing

1. Discharged the capacitor by simultaneously touching both terminals against the metal back of the refrigerator.
2. Set multi-meter to ohms. Place meter leads across the capacitor terminals. The resistance should climb until it exceeds about 310k ohms. Then the meter will read OL. (This can be repeated, but the capacitor must be fully discharged each time, before testing).

Capacitor Removal

1. Remove the machine compartment cover.
2. Follow **PTCR Relay/Overload Removal** steps from the previous section.

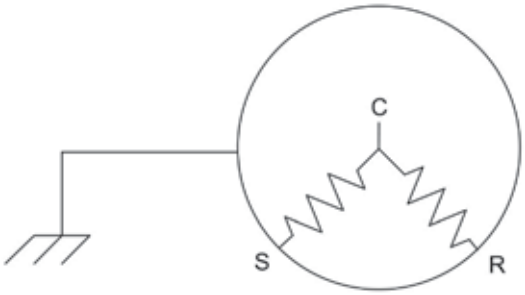


3. Pull capacitor straight off PTC Relay/Overload.

Compressor

The refrigerator uses a single speed reciprocating compressor.

Compressor Diagnosing



Check the resistance of the compressor windings.

- **S to C**: ~6 ohms
- **R to C**: ~4 ohms

If the resistance is not correct or a winding is open or shorted to the case of the compressor, replace the compressor.

The compressor can be turned on using Service Mode Test t9. Voltage can be checked at the main board and overload/relay wiring.

Main Board

- J19 pin 1 (**black**) to J7 pin 9 (**orange**): 120 VAC

Overload/Relay Wiring

- **Orange** to **black**: 120 VAC

NOTE: If voltage is present to the overload/relay verify that the overload and relay are good prior to replacing the compressor.

Compressor Removal

1. Remove the machine compartment cover.
2. Disconnect the compressor electricals (relay/overload and capacitor).
3. Remove one 1/4-in. hex-head screw to disconnect the ground wire from the left side of the compressor.
4. Follow recovery procedure and disconnect the suction and discharge lines.
5. Use a flat-blade screw driver or needle-nose plyers to remove the four locking clips on the compressor posts (fourth clip is located behind the compressor in the image below).

6. Lift the compressor off the posts and out of the machine compartment.

Drier

The drier is use to filter moisture and particulates which may be present out of the sealed system. Any time the sealed system is accessed or repaired the drier should be replaced.

Drier Removal

1. Remove the machine compartment cover.
2. Follow recovery procedures and cut or unbraze the tubing from the drier. If cutting the capillary tube, make sure to take care not to pinch the capillary tube shut.

Condenser

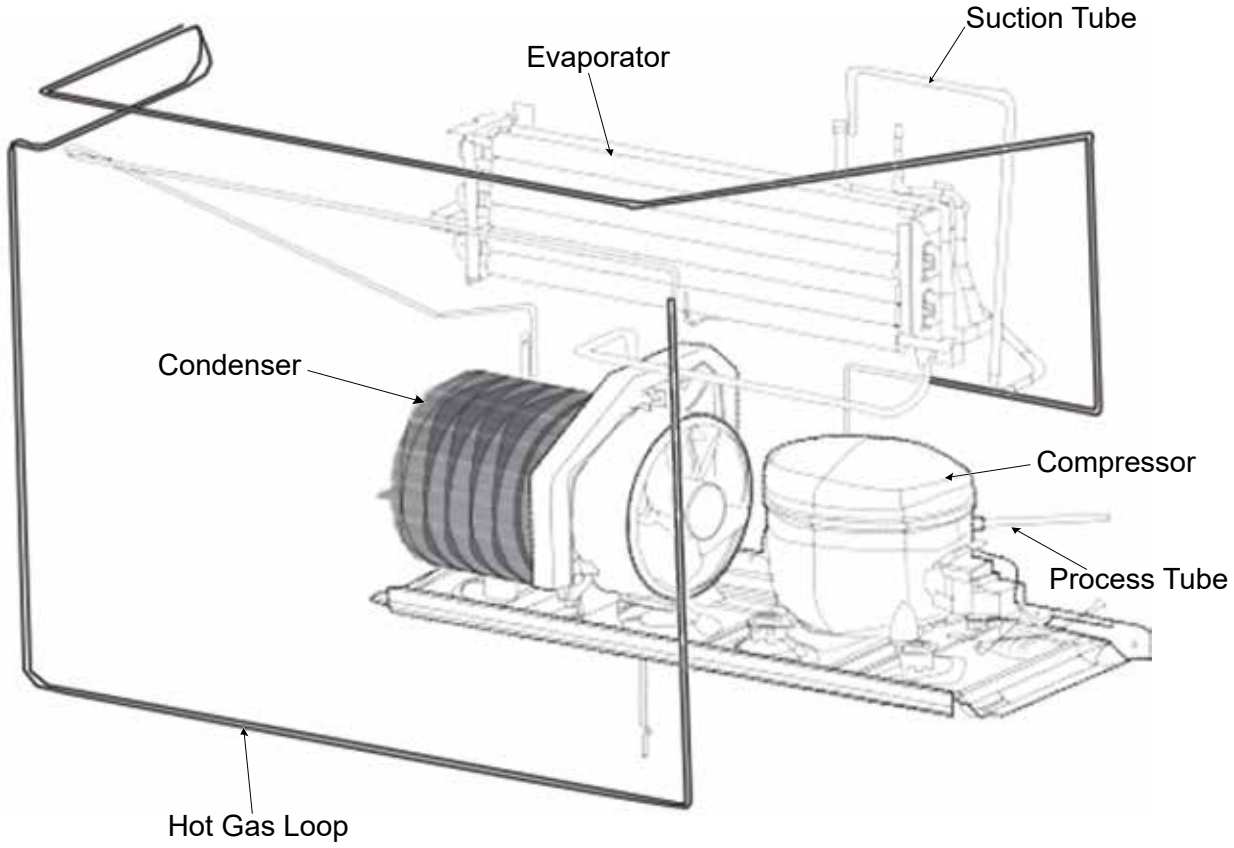
The condenser is a rolled style coil which the refrigerator uses to exchange heat from inside the cabinet to outside the cabinet.

Condenser Removal

1. Remove the machine compartment cover.
2. Remove the drain tube.
3. Remove the condenser fan.
4. Follow recovery procedures and disconnect the inlet and outlet lines of the condenser.
5. Remove two 1/4-in. hex-head screws.

6. Lift and remove the condenser from the machine compartment.

Refrigeration System



The compressor compresses R134a refrigerant, raising its pressure and temperature. Refrigerant vapor is pumped out the compressor discharge, through the condenser, around the hot gas loop, through the drier, and into the evaporator. By the time the refrigerant has reached the evaporator, it has completely condensed into a liquid. As the high pressure liquid passes through the capillary and enters the low pressure evaporator, it quickly expands and evaporates. During evaporation, the refrigerant absorbs heat through the evaporator. At the outlet of the freezer evaporator low pressure vapor returns to the compressor through the suction line.

Replacing Sealed System Components

The following information covers the evacuation and charging procedures for sealed system work.

WARNING:

- 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 appropriate PPE (Personal Protective Equipment) when working with refrigerants and nitrogen holding a charge in some replacement parts. Contact with these gases may cause injury.

Evacuation and Charging Procedures

1. Evacuate the system to ~20-in. vacuum using the refrigerator compressor and/or recovery pump.
2. Purge the system using nitrogen at 25 - 35 SCFH.
3. Perform necessary repairs to the sealed system.
4. Pressurize the system to 250 PSIG with nitrogen and test for leaks.
5. Once confirmed no leaks are present, evacuate the nitrogen and use the compressor to pull the system back into a vacuum.
6. Charge the system with the exact amount of refrigerant specified on the name plate or specified on the instruction sheet includes with the component being replaced.
7. Reinstall caps to Schrader ports.

LOKRING

The LOKRING repair method utilizes tool with a ratchet action that provides proper compression on the LOKRING connector to connect tubing instead of brazing. The repair method uses a solution called LOKPREP to as a sealant to fill any scratches, grooves or imperfections on the surface of the tubing.

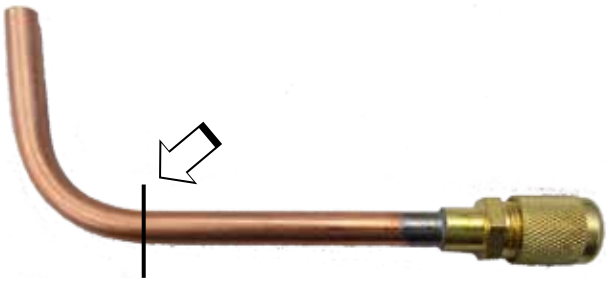
LOKRING

- There must be at least 1 1/8 in. of straight tubing on either side of the cut point.
- Clean the tubing using a circular motion (3M Scotch-Brite™ is recommended).
- The tubing must be clean, dry and free of paint, epoxy, oil and dirt.
- Use only a tubing cutter and cut all the way through the tubing to prevent burrs.
- Apply three drops of LOKPREP to each end of the tubing, staying 1/8-in. from the end.
- Tubing must “bottom-out” at the internal stop when placed in the connector.
- Rotate the fitting at least one complete revolution to evenly distribute LOKPREP.
- LOKPREP should not be used after the expiration date.
- There will be one minute to compress the connector once LOKPREP has been applied.
- Make certain the connector is seated properly in the jaws and the tool is straight and aligned with the tubing to prevent an improper joint.
- Wipe the tool jaws clean after each use.

Process Tube Joint

1. Cut the compressor process tube as pictured below.

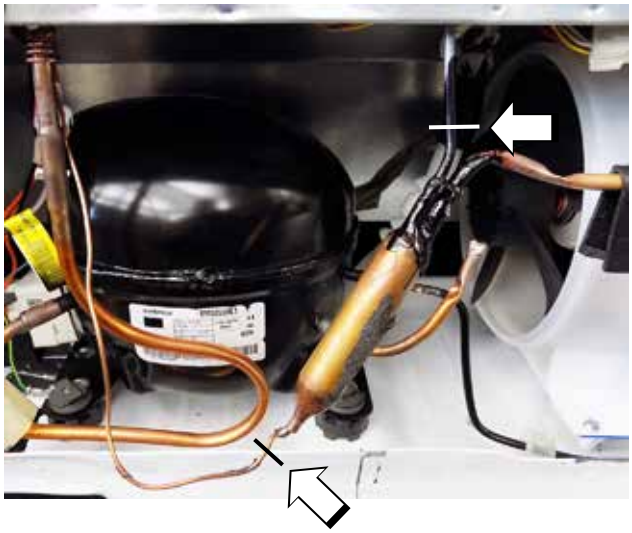
2. Cut the access valve (**Part #**: WJ56X61) as pictured below.



3. Clean the ends of the tubing being connected.
4. Using LOKRING connector WR97X10031, connect the access valve to the process tube.

Drier Joints

1. Cut the hot gas loop tubing as pictured below (cut as close to the drier as possible).

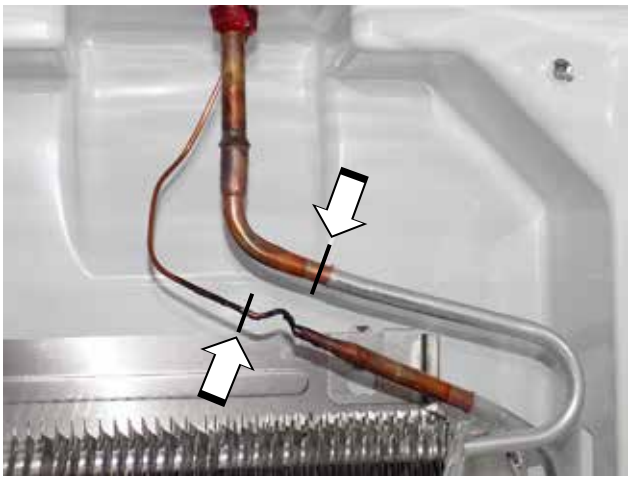


2. Cut the drier (**Part #**: WR86X93) as pictured below.

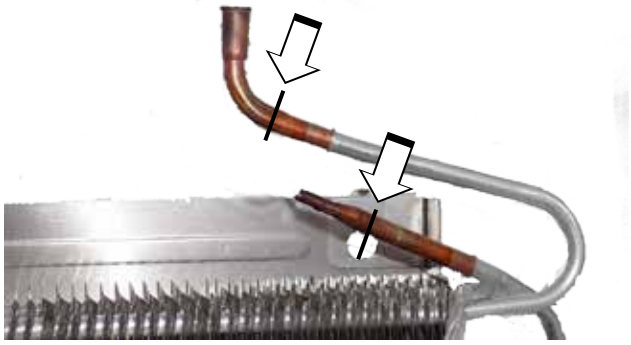
3. Clean the ends of the tubing being connected.
4. Using LOKRING connectors WR97X10033 (for inlet/hot gas loop tube) and WR97X10085 (for capillary tube), connect the tubing to the drier.

Evaporator Joints

1. Remove the rubber wrap and mastic from the joints.
2. Cut the evaporator tubing as pictured below (cut the suction line as close to the aluminum connection as possible). If the capillary joint is not leaking, a cut can be made closer to the aluminum on the capillary side. This allows the evaporator to be reconnected using two suction line connectors that are listed in step 5.



3. Remove the rubber wrap and mastic from the joints of the new evaporator. Cut the replacement evaporator as pictured below (cut as the suction line as close to the bend as possible).

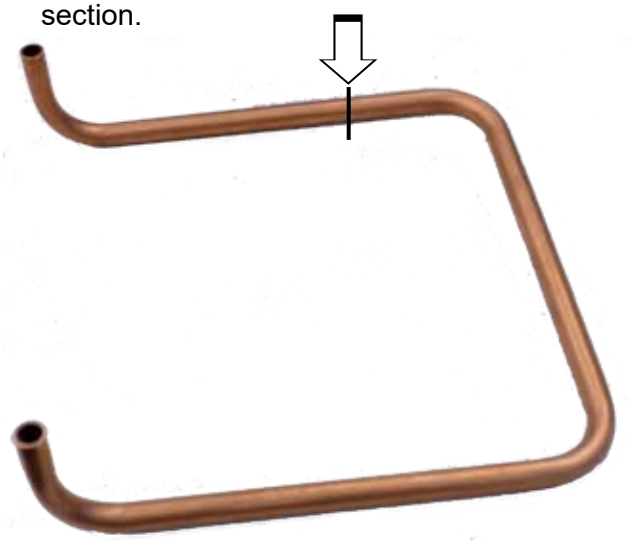


4. Clean the ends of the tubing being connected.
5. Using LOKRING connectors WR97X21881 (for suction tube) and WR97X31409 (for capillary tube), connect the tubing to the evaporator.

Compressor Joints

1. Cut the compressor tubing as pictured below (cut as the discharge/condenser line as close to the compressor connection as possible).

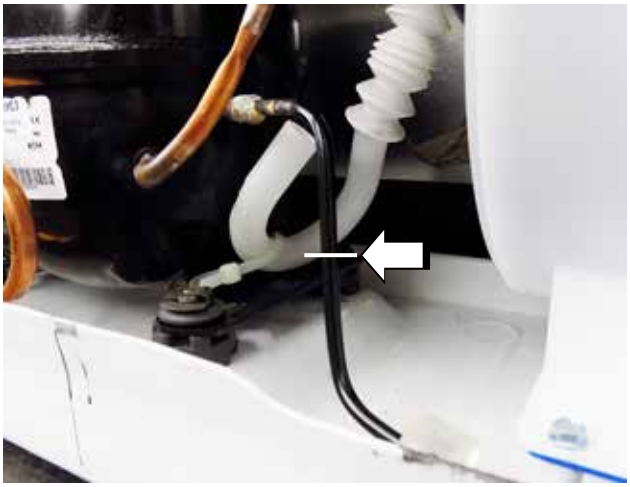
2. Cut a section from WR01X10907 tubing as pictured below (about 4 1/2 in. away from one of the elbow ends). Discard the larger section.



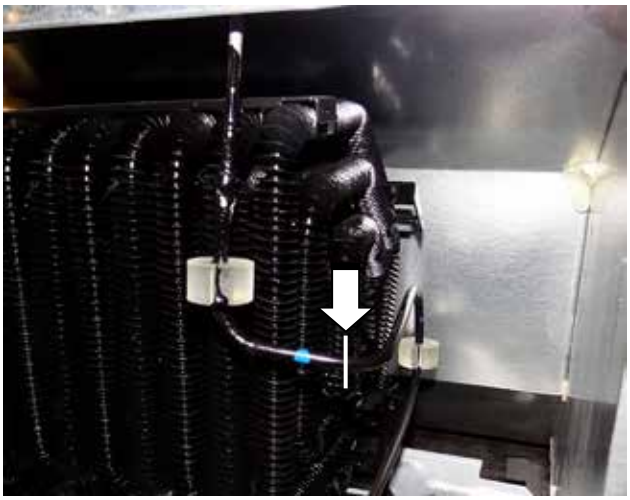
3. Clean the ends of the tubing being connected.
4. Using LOKRING connectors WR97X10034 (for discharge/condenser tube), WR97X10091 (for suction tube to compressor joint), WR97X10021 (for suction jumper created to cabinet suction line, some tubing bending required), and WR97X10078 (for access valve), connect the tubing to the compressor.

Condenser Joints

1. Cut the condenser tubing as pictured below (cut about 2 inches below the elbow entering the compressor).



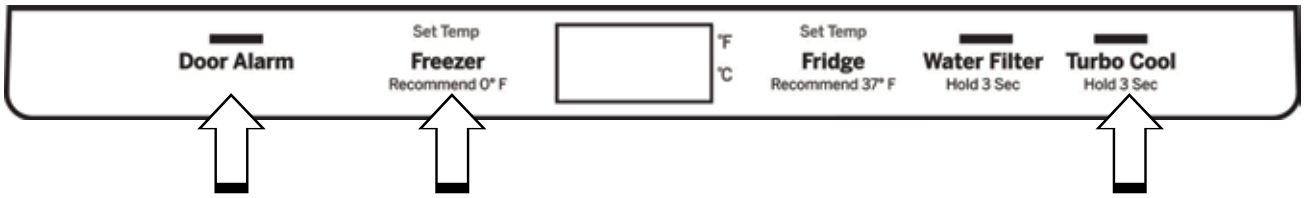
2. Cut the condenser tubing as pictured below (cut as close to the bend as possible).



3. Shorten the ends of the new condenser to leave as much straight tubing as possible to perform LOKRING connections.
4. Clean the ends of the tubing being connected.
5. Using two WR97X10030 LOKRING connectors, connect the tubing to the condenser.

Service Mode

To enter Service Mode, press and hold "**Door Alarm**", "**Freezer**", and "**Turbo Cool**" pads simultaneously for 3 seconds.



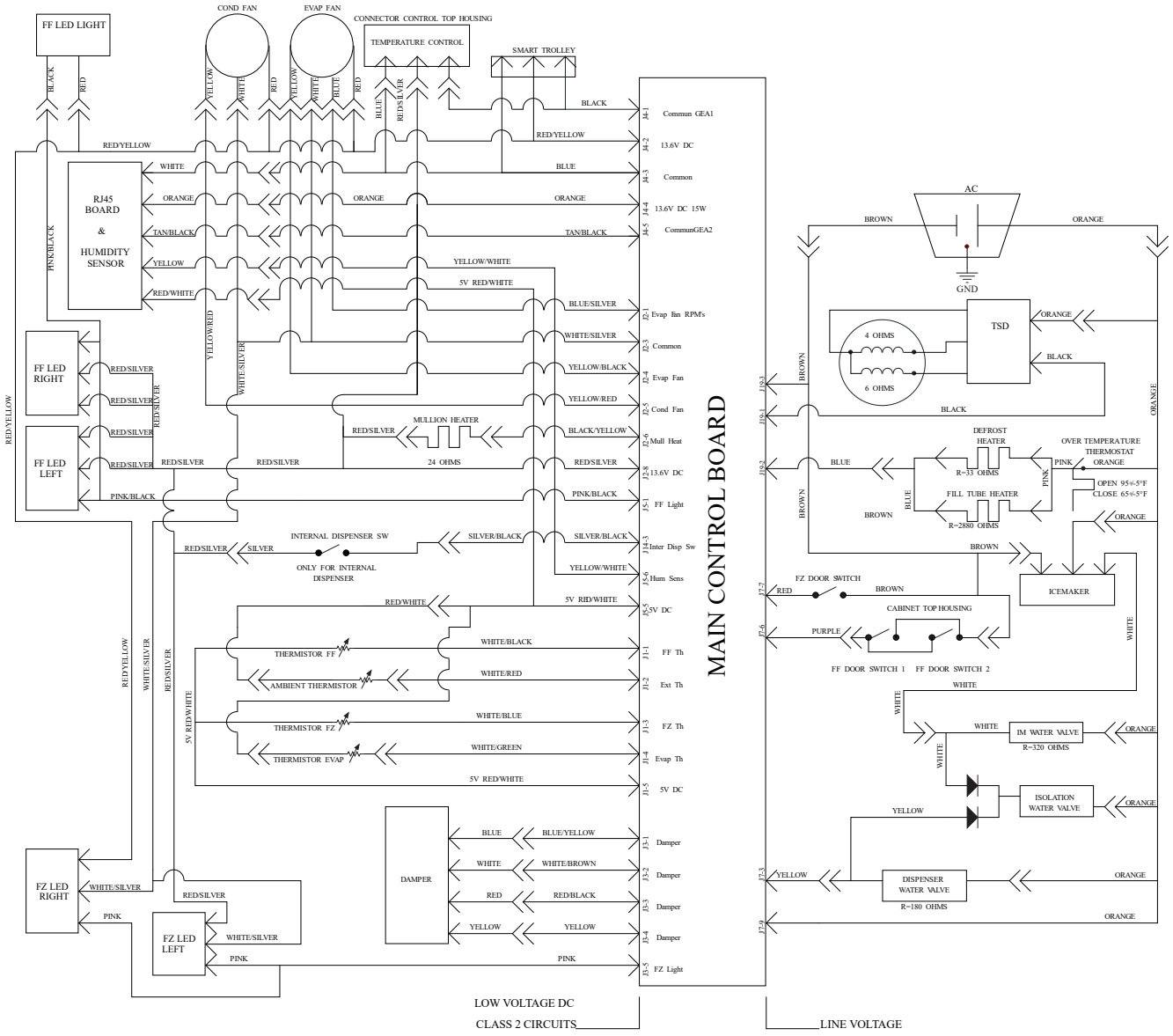
The display will flash "000" to indicate service mode has been entered.

- Use the **Freezer** and **Fridge** pads to choose the desired service test.
- The **Freezer** button decreases the test number while the **Fridge** Button increases the test number.
- Press **Door Alarm** on the temperature control board to execute the test indicated by the displays.
- A test mode must be selected within 30 seconds or the display board will execute a software reset to exit the service mode selection menu.
- To exit Service Mode, select Test t12 (Refrigerator Reset).
- Service mode will automatically exit after 15 minutes of inactivity.

Service Mode Tests

Display	Mode	Comments	
t1	**Demo Mode**	Enters demo mode. All temperature control board functions will operate normally but the unit will not cool. Cycle power to refrigerator to exit Demo Mode.	
t2	**Communication Test**	Temperature control board to main board communications test. Test will query main board for its version, “P”/”F” on most right display if Pass/Fail.	
t3	**Temperature Control Board Display Self-Test**	All of the LEDs and numerical segments will illuminate. All displays will initially show “888”. The Fridge and Freezer pads will be used to increment and decrement the displays. The buttons will be used to toggle the status of the LED it is associated with. To exit this test press Turbo Cool.	
t4	**Sensor Self-Test**	This test does a check on all thermistors located throughout the unit. The test mode will stop flashing and the thermistor numbers from 1 to x (x is the number of thermistors) will appear on the most left display. For each thermistor, the temperature control will respond by displaying the following on the most right display:	
		P: Pass	**O**: Open thermistor circuit
		F: Fail	**S**: Short thermistor circuit
		1: FF Thermistor	**2**: Ambient Thermistor
		3: FZ Thermistor	**4**: Evap Thermistor
t7	**Damper Test**	FF Damper will open, pause briefly, and then close.	
t8	**Fan Speed Test**	Cycles each of the system fans on for 5 seconds in the following order: (Evaporator, Ice Box and Condenser).	
t9	**Cooling System Test**	This mode runs the sealed system 100% of the time. This test will automatically time out after 1 hour of run time. A refrigerator reset may exit this mode.	
t10	**Enter Pre-Chill**	This places the freezer in pre-chill mode essentially issuing a “Force Pre-chill” command to the main control. It will return to normal operation on its own. This command will be ignored if the refrigerator is set to OFF/Standby mode.	
t11	**Toggle Defrost**	Each time any button on the temperature board other than the temperature adjust buttons is pressed the status of the defrost heater will toggle. There will be a 20 second delay before defrost heater will turn on. If the evaporator thermistor temperature is above defrost termination temperature, the heater will not turn on.	
t12	**Refrigerator Reset**	Resets both temperature control and main board. Also exits any tests initiated in service mode.	
t13	**Service Mode Exit**	Causes a soft reset to occur at the temperature control board. Note this will not terminate test modes that the main board is maintaining as a result of the service diagnostics mode. To do that, a Refrigerator Reset should be performed.	
t14	**Celsius / Fahrenheit Selector**	Change temperature display units from Celsius to Fahrenheit or Fahrenheit to Celsius	

Schematic Diagram



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