Bottom Freezer with Ice & Water in Door

PGCS1R
PFCF1R
PFSS5R
PGSS5R

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BJ 5/11

IMPORTANT SAFETY NOTICE

The information in this presentation is intended for use by individuals possessing adequate backgrounds of electrical, electronic, & mechanical experience. Any attempt to repair a major appliance may result in personal injury & 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

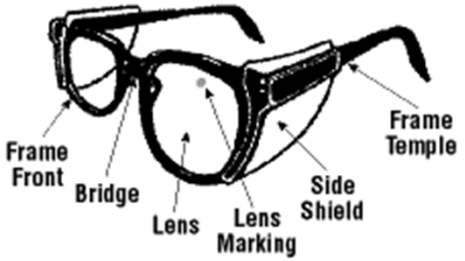
If grounding wires, screws, straps, clips, nuts, or washers used to complete a path to ground are removed for service, they must be returned to their original position & properly fastened.

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

Dyneema® Cut Resistant Glove

Electrically Rated Glove and Dyneema® Cut Resistant Glove Keeper

Plano Type Safety Glasses



Prescription Safety Glasses

Steel Toe Work Boot

Brazing Glasses

Safety Glasses must be ANSI Z87.1-2003 compliant

Refrigerator Warranty. *(For customers in the United States)*

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

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

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

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Marketing Features

Key selling messages:

- GE's Tallest Dispenser
- Zero Space - Pin-Point LED Lighting
- Large, Easy to Read / Use Display
- Shelf Management System (Up to 5)
- **8 Models**

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New Ice & Water Section

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New Ice and Water in Door

Lift slightly “up” to remove bucket

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Ice Operation

Bucket holds approximately 4 lbs

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Ice Operation

Cubes

Crushed

imagination at work

Ice Operation – Basic Logic

The new BM Ice in Door model has multiple and unique logic and calculations that are accomplished with the board, the control settings, and feedback from thermistors.

<u>However</u>, the new ice door does not have its own thermistor and therefore calculations are accomplished with input from the FF and FZ thermistors.

The new BM does utilize a dedicated blower fan to send cold air up from the freezer, through a channel and into the ice section.

<u>Ice Making/Harvest mode</u>: this mode looks for water valve or dispenser action within a two hour period of time. (4 minute response time) If seen, the ice section temperature should be approximately 0° F degrees.

<u>Ice Storage mode:</u> if above activity is not detected, the temperature in the ice section could raises as high as approximately 15° - 25°F.

<u>Ice Hardening mode</u>: this mode tries to account for high number of door openings and maintain similar temperatures as the ice storage mode

Remember that temperature in the ice section is tied to the control settings so the warmer the FZ section is set for, the warmer the ice section. A freezer setting below "5" will produce the warmest ice section temperature.

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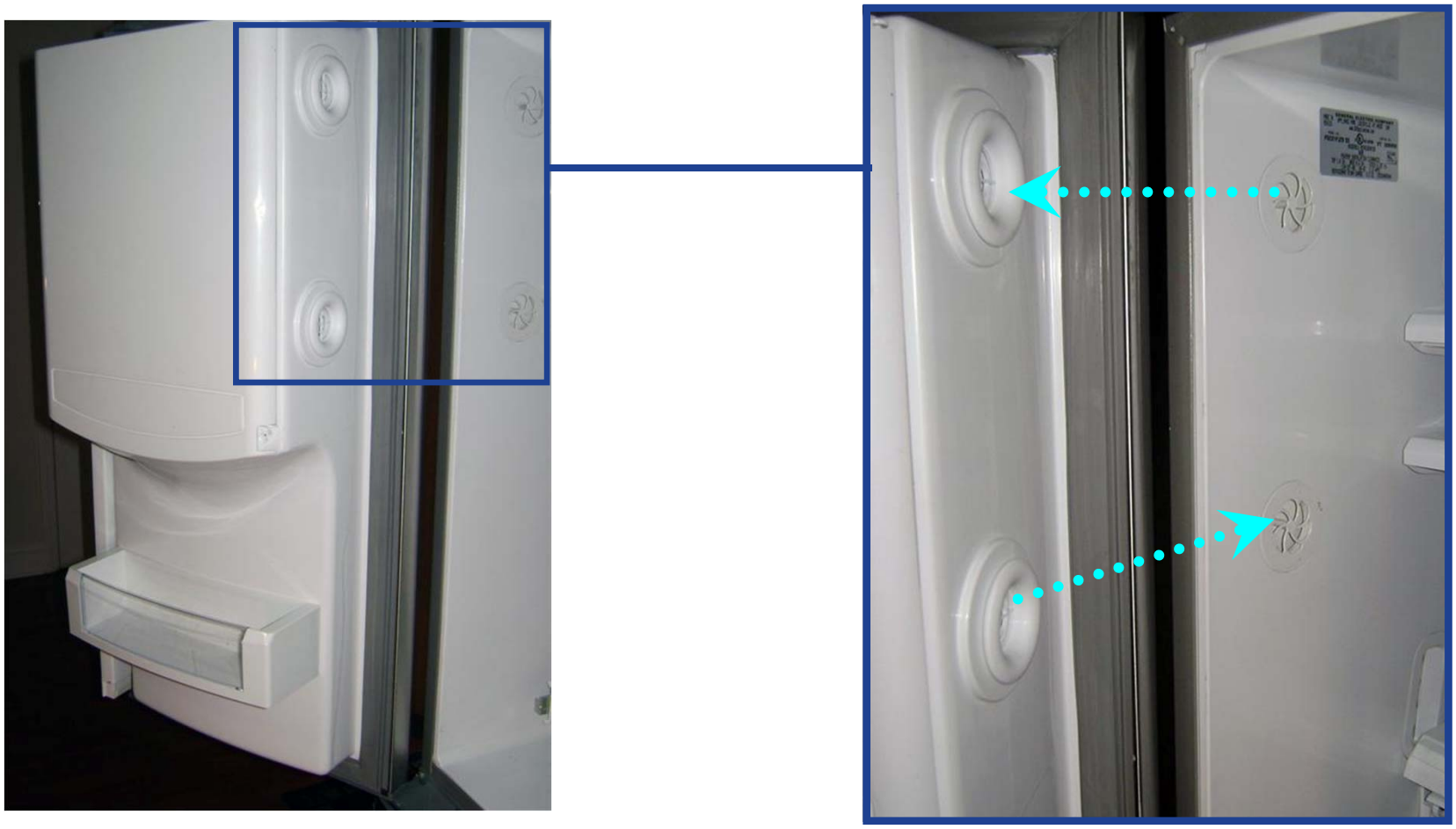
<u>NOTE: Ice stored for more than 10days could clump.</u>

Left Side FF Door Open



- **Air enters the new Ice section via duct within the liner**
- **Air is forced up from the freezer via a dedicated ice door fan and returns to the freezer via duct.**

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Ice Bucket Removal

Press in on door latch

Lift up on ice bucket from opening at top

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Ice Door Gasket & Hinge

Gasket pulls off and pushes on

Two Phillips-head screws secure hinge

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Ice Door Latch

Pry gently around the lip of the cover with a small screwdriver to remove

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Ice Door Latch

Simple design as metal “catch” bends in and out to secure and release door strike

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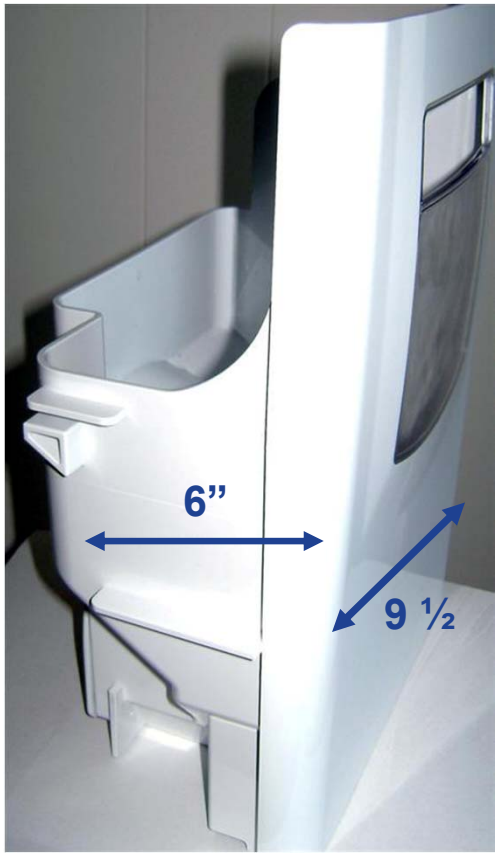
Ice Bucket



Bucket appx 6” deep and 9 ½ wide

Bucket holds approximately 4 lbs

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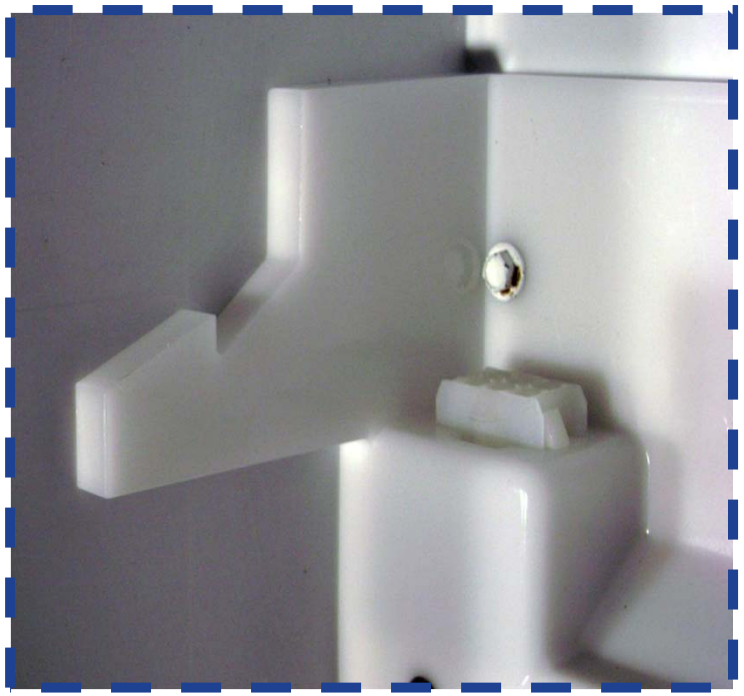
Ice Bucket



(Inside Ice room area)

Bucket held in place with guides

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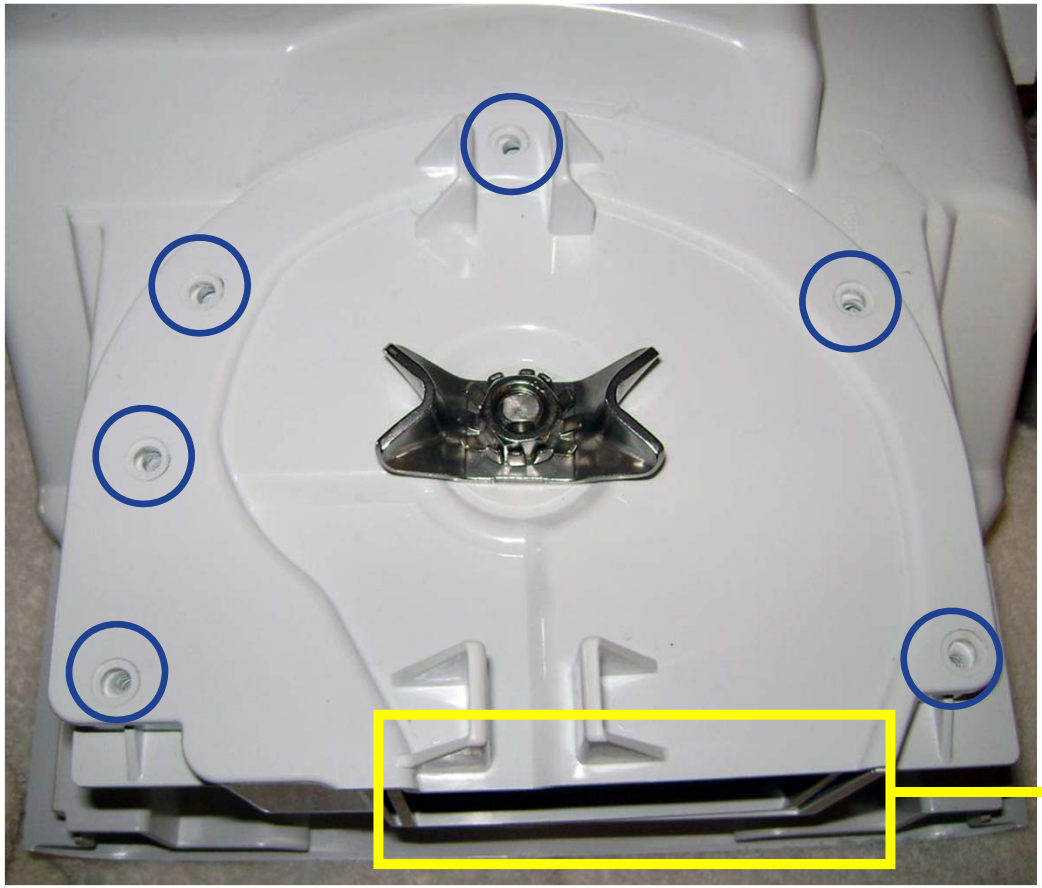
Ice Auger



To access blades:

- **Remove 6 Phillips-head screws**
- **Remove ---- Nut (CCW to loosen - Note locking barbs)**

View looking up into blades

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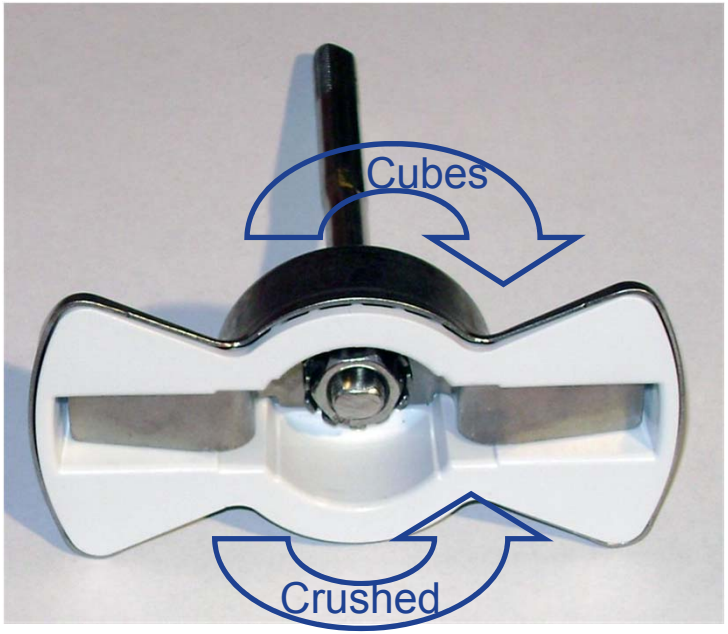
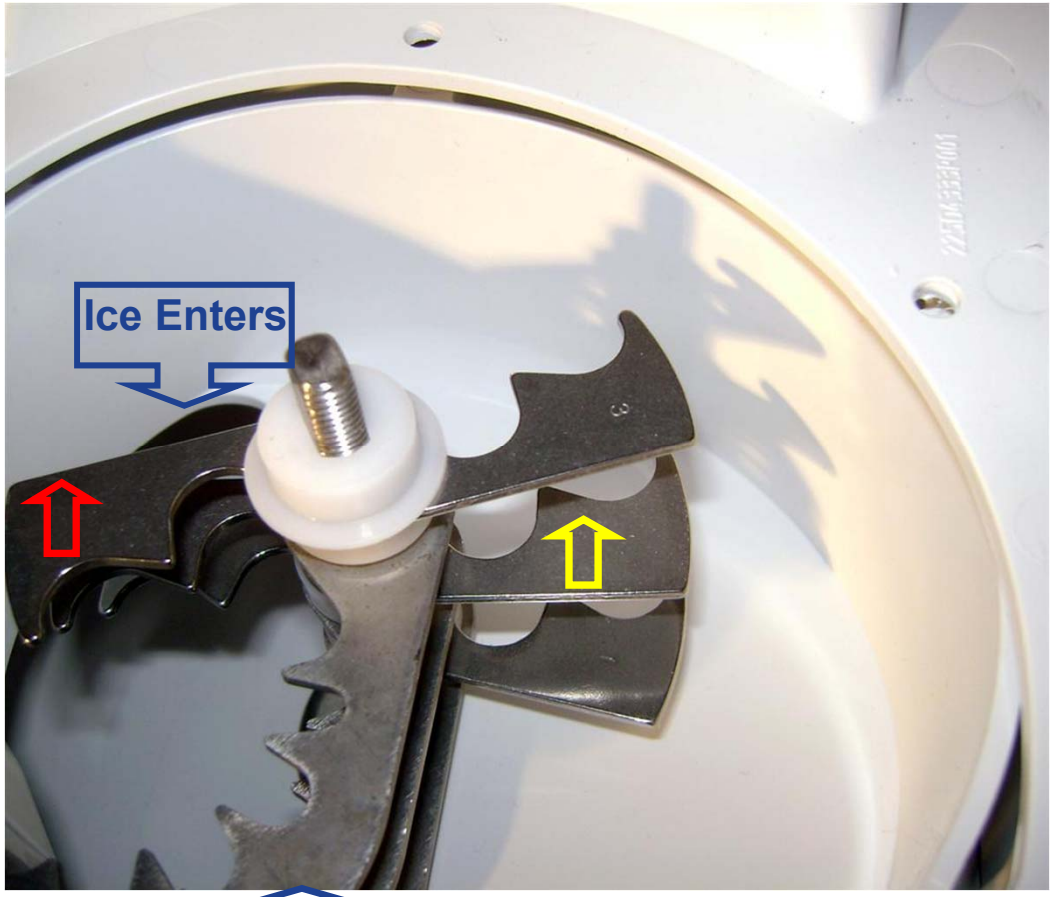
Ice Auger blades

Cubes: rotation uses back side of rotating blades Ice avoids going through cutting side.
Crushed: rotates using cutting side and stationary blades



Clockwise - Cubes
Counter-clockwise - Crushed

(Facing bucket)



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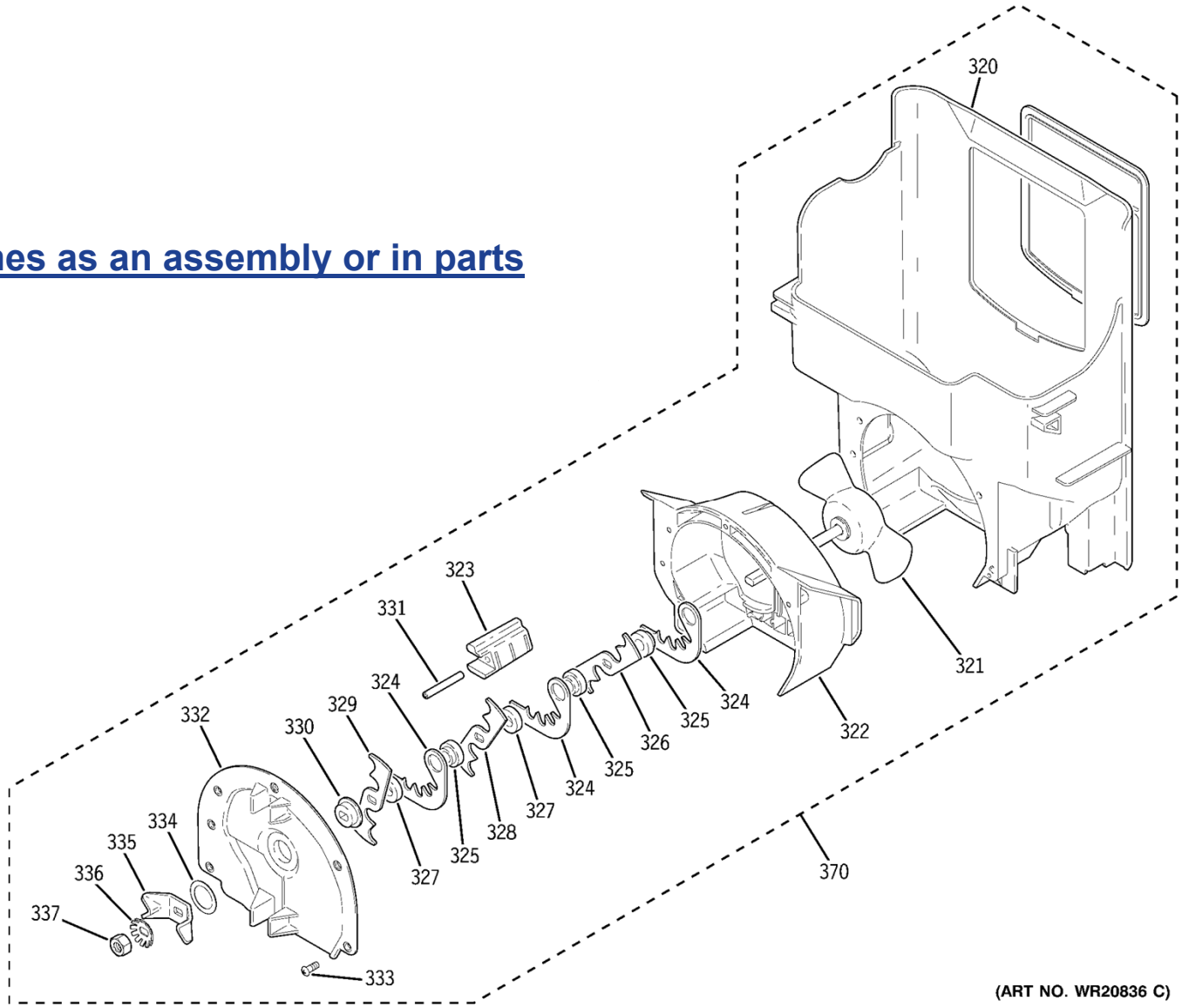
Ice Auger Assembly

Comes as an assembly or in parts



(ART NO. WR20836 C)

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Ice Maker

- **Remove IM with two mounting screws.**
- **Disconnect IM plug**

Cold air enters and exits from side openings.

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Ice Maker

WR30X10150

Curved design fill cup to prevent water splashing with door opening
NOTE: Fill cup comes with IM.

Mechanical IM will not work in this model

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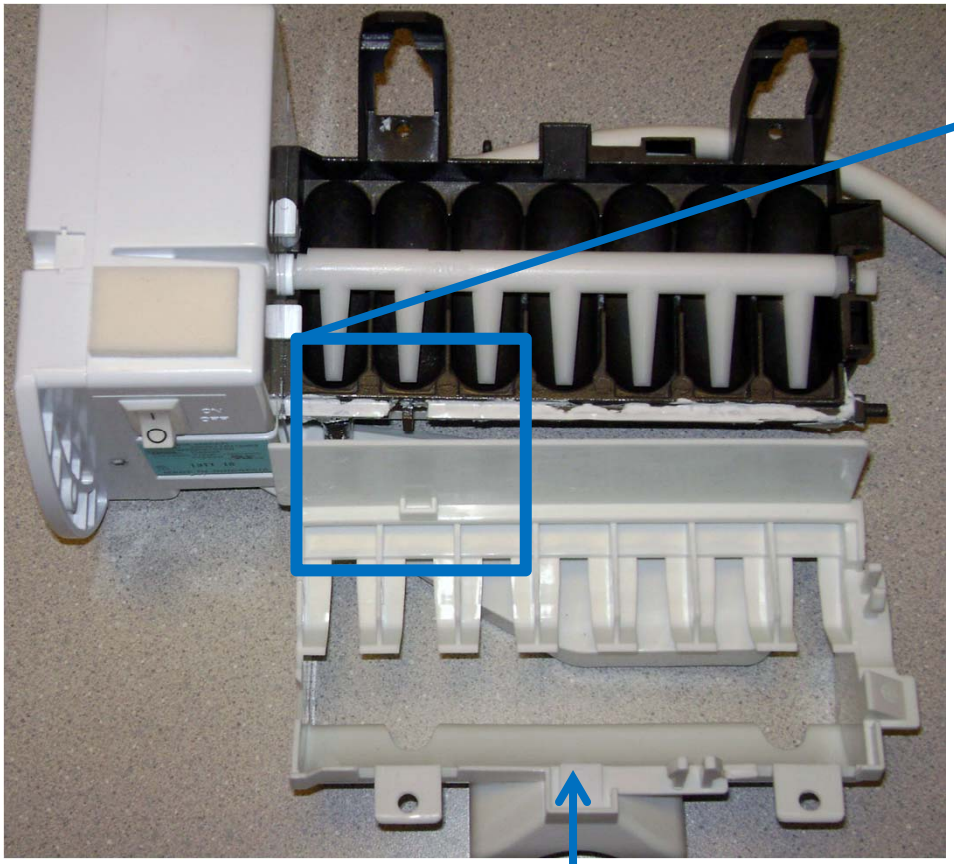
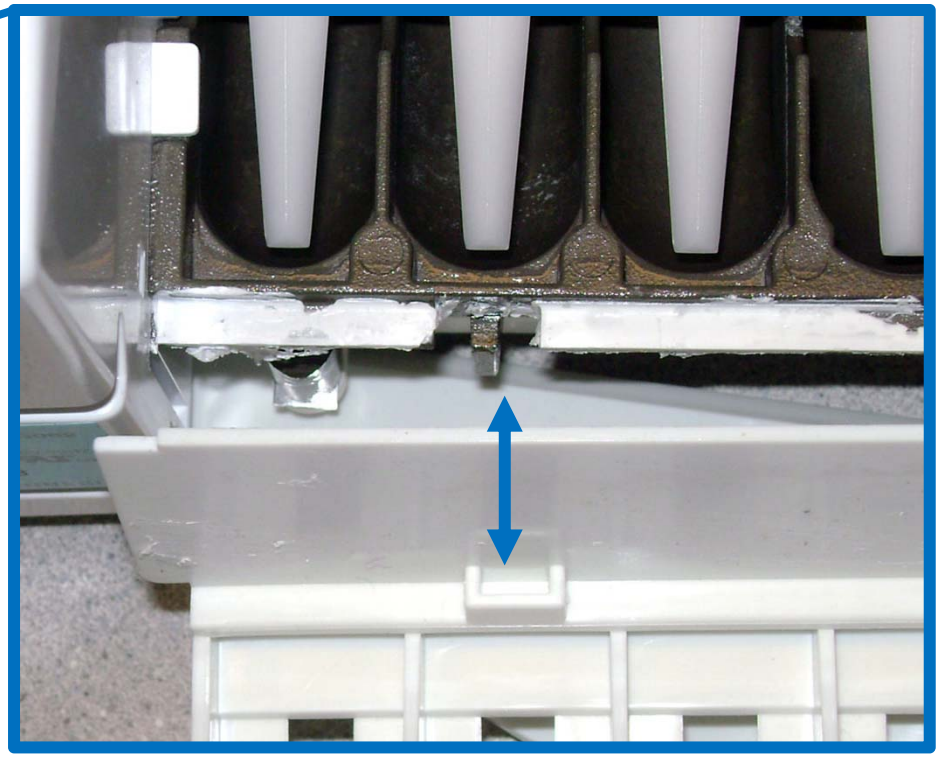
Ice Maker





Note fill cup assembly removed and upside down for better viewing.

Electronic IM has different mold than mechanical. (See notched area)
The fill cup assembly will not mount to the mechanical IM.

imagination at work

Ice Maker

Electronic factory I/M

Mechanical model

- **Also note the different shapes of the mold body that prevent mounting of the fill cup assembly that is used on this model. **

- **Mechanical I/M does not utilizes a thermistor which is required for this model**
- **WR30X10150 is sealed to prevent water leaks.**

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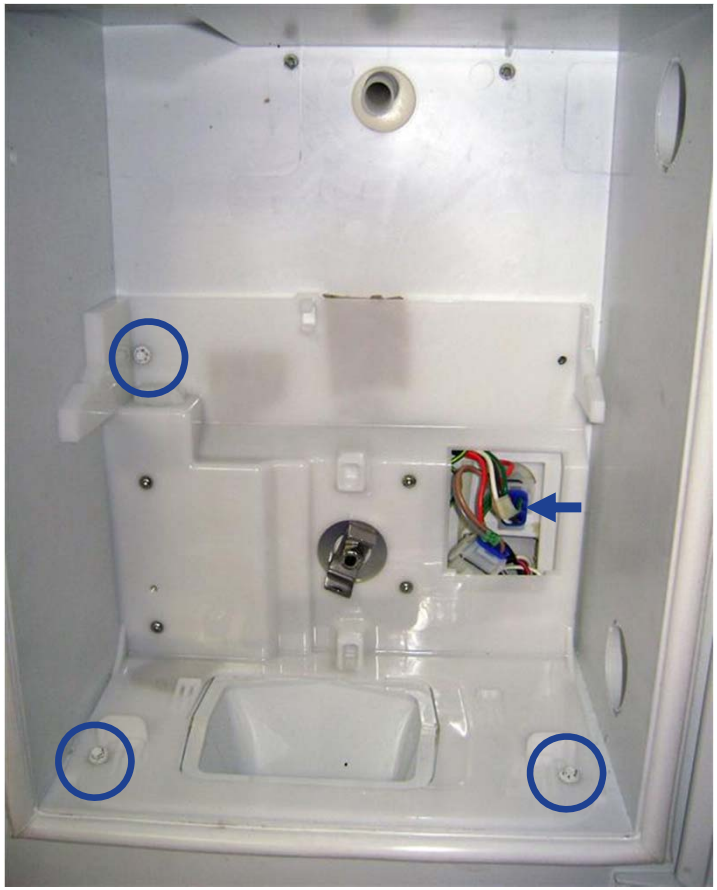
Auger Motor



- **Remove wire connector cover (removed in picture)**
- **Remove 3 - ¼ white hex head screws**
- **Disconnect wire harness plug**

Auger motor removed

<u>NOTE:</u> Fill tube foamed in door

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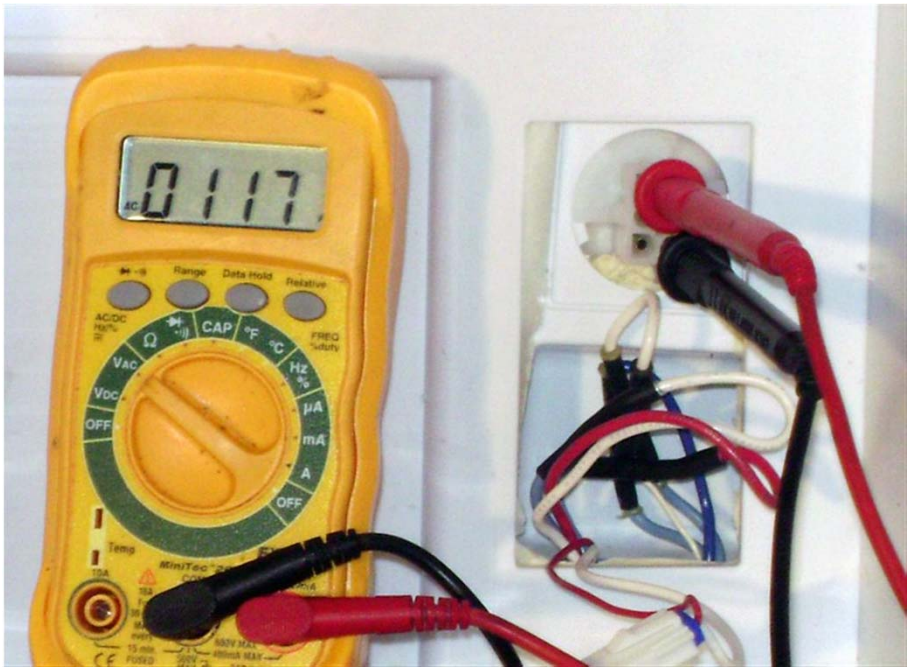
Ice Maker Testing



Orange and Brown wire connectors

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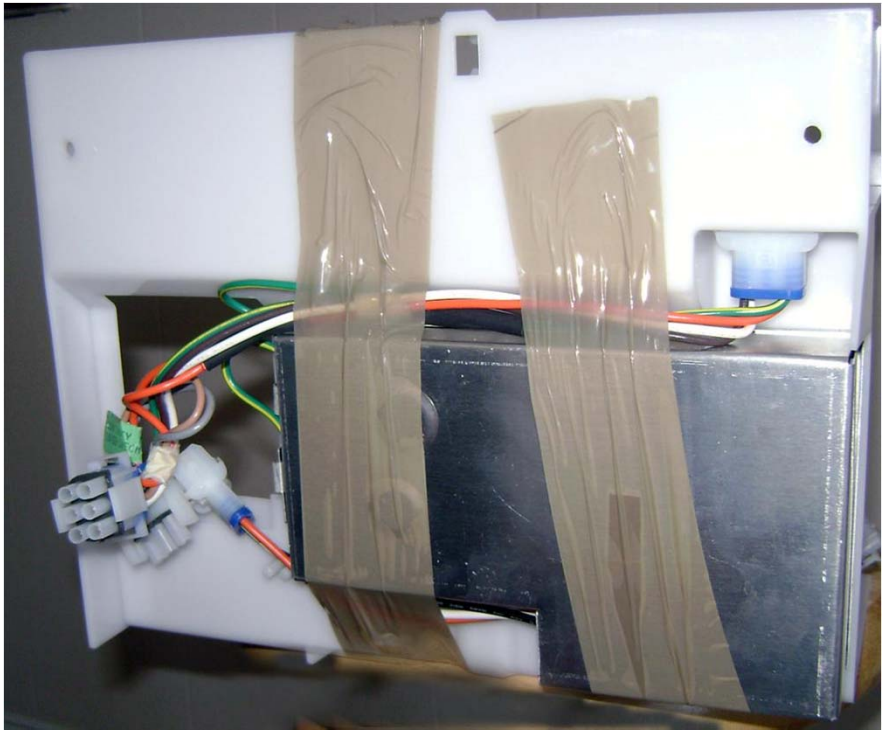
Auger Motor

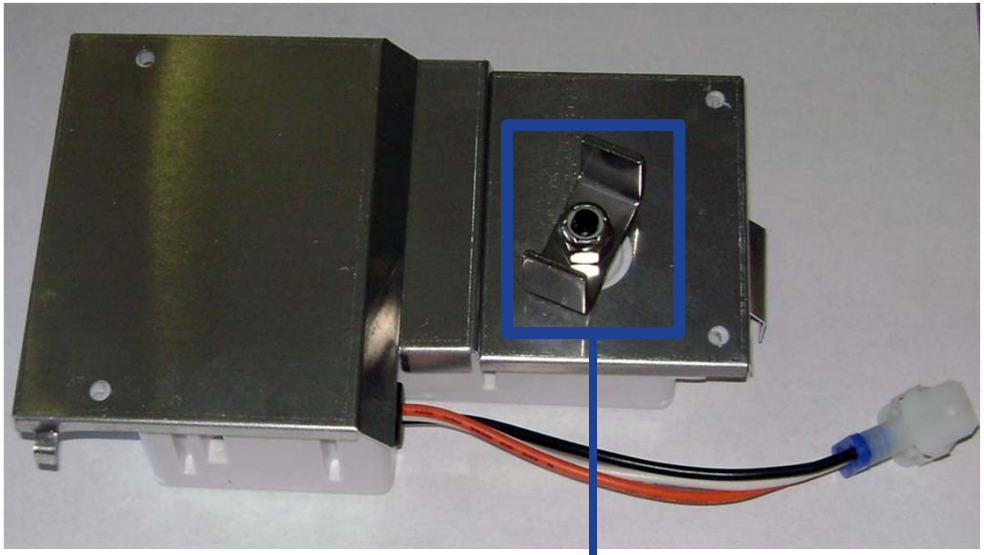


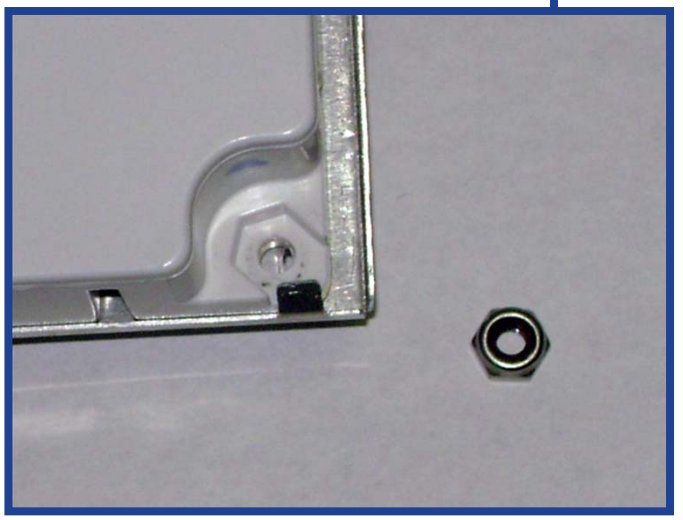
- **Cut tape and remove metal back plate**
- **Metal plate has tabs that hold it in place and it just pulls straight off.**

Remove 4 mounting screws and nuts located in the 4 corners.

imagination at work

Auger Motor





Remove auger fork by removing nut

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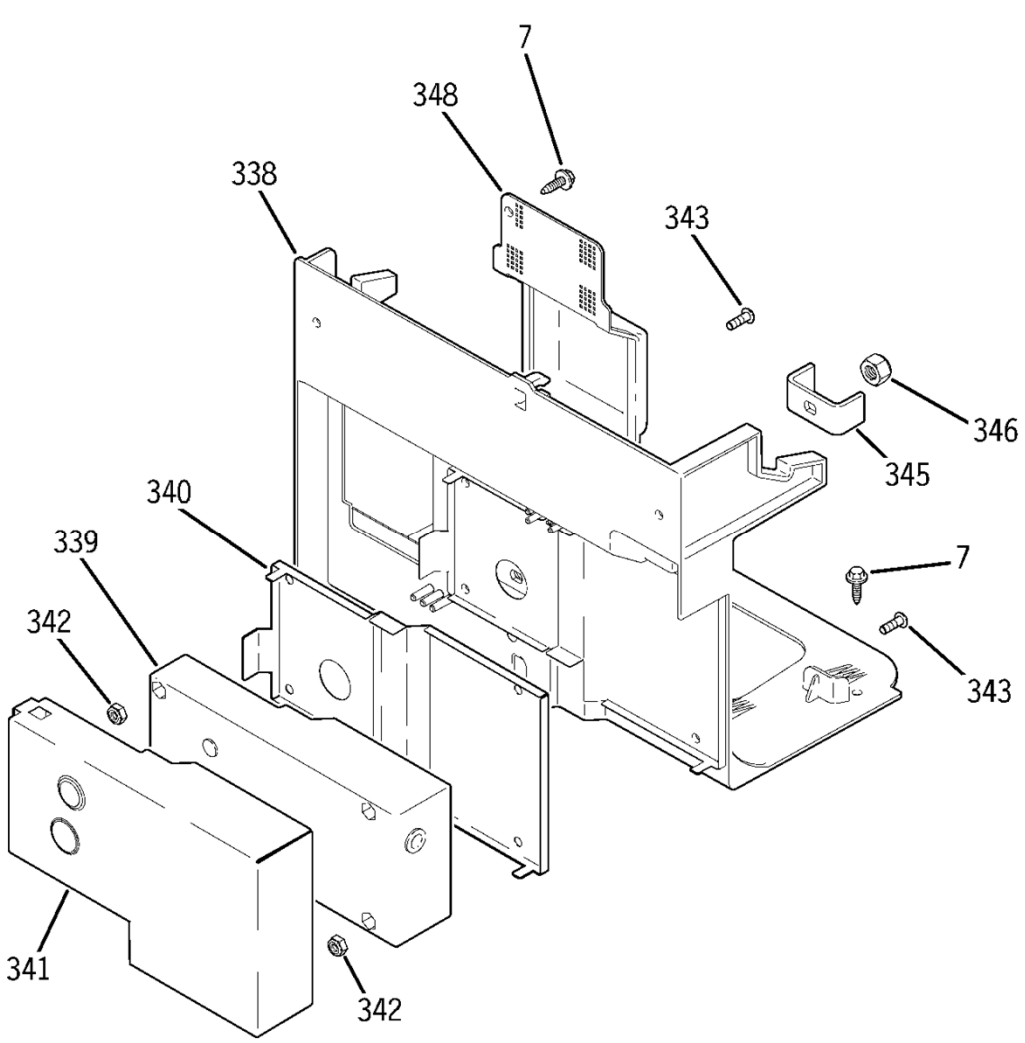
Auger Motor



Components come as shown

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Auger Motor

Orange & Beige wire = **Crushed**

Orange & Silver wire = **Cubes**

NOTE: Auger motor does a quick “reverse” action when dispensing is stopped (glass removed) to center the ice bucket cam and unload the crusher (Not noticeable to consumer) Voltage can be measured at appropriate pins.

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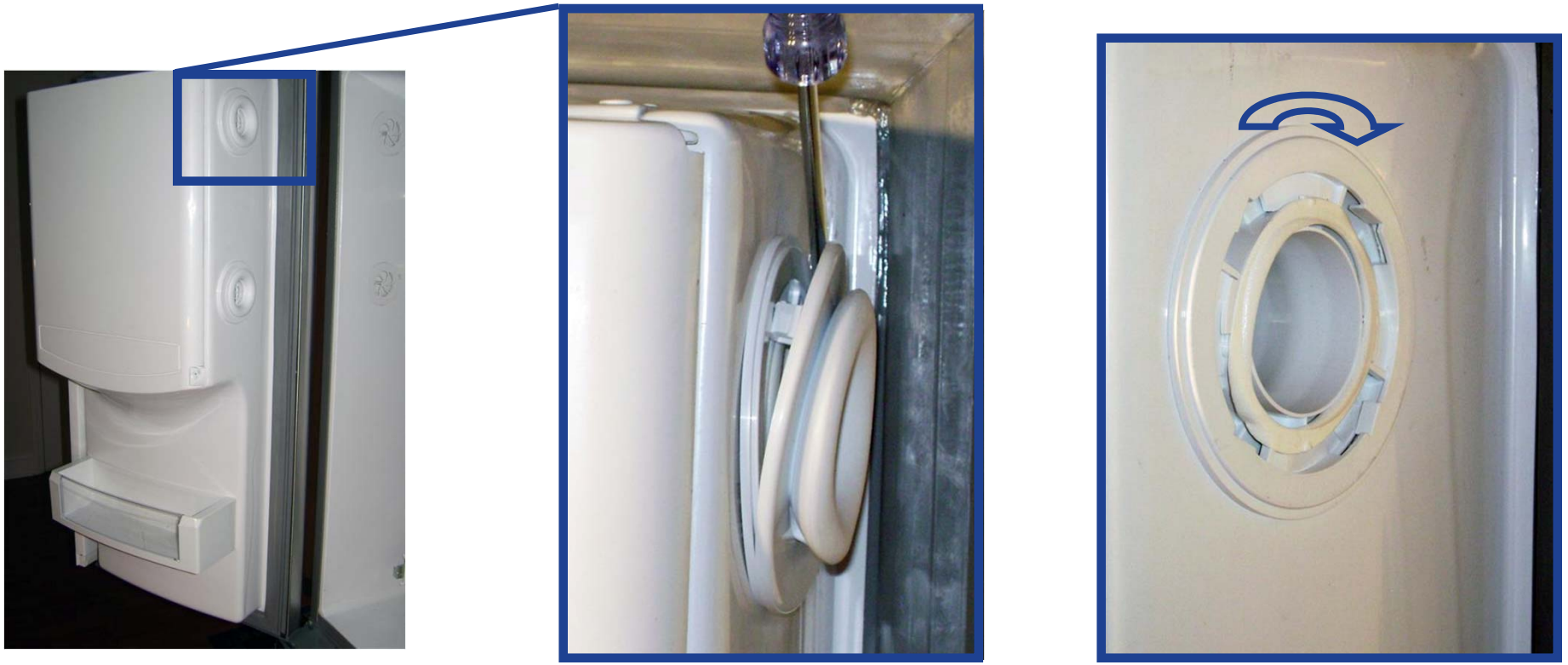
Ice Door Air Vent



Pry gently off

Turn slightly clockwise
and pull straight off.

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Ice Door Air Vent

Non-replaceable part
(Screw comes in from backside)

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Water Lines

Water line connections on lower right hand corner of FF section

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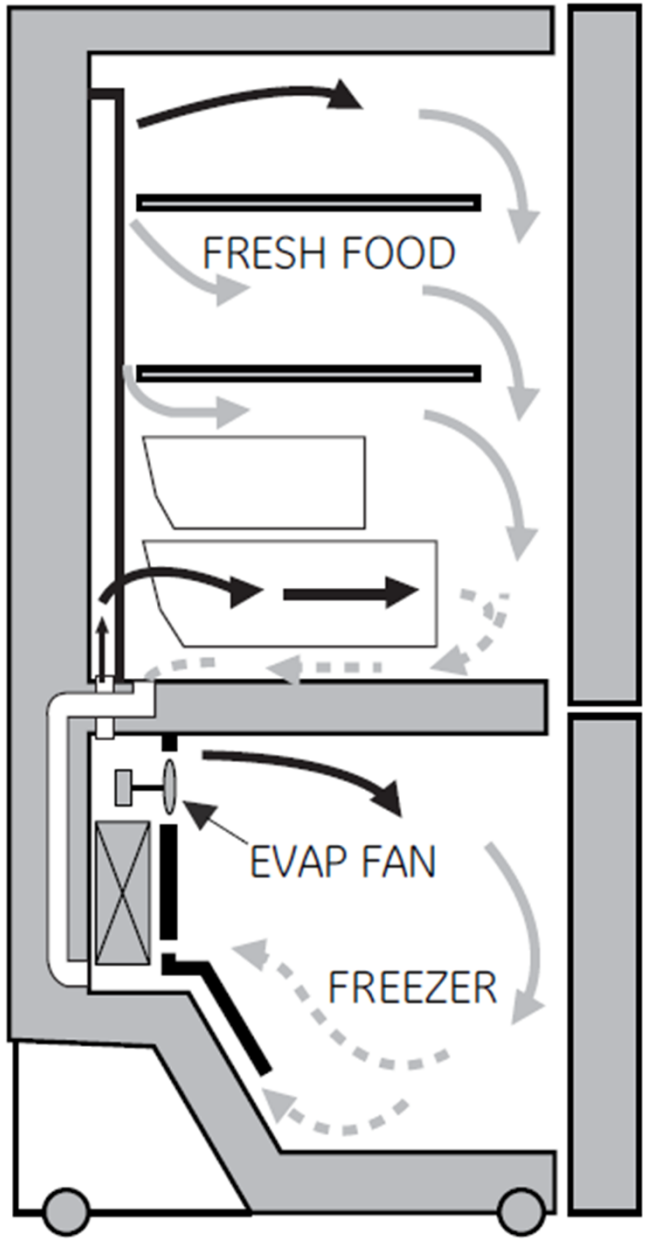
Fan Section

Evaporator Fan

COLD AIR

MIXED AIR

AIR RETURN TO EVAPORATOR



REFRIGERATOR AIRFLOW

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Freezer Evaporator Fan

Remove fan cover screw and swing off

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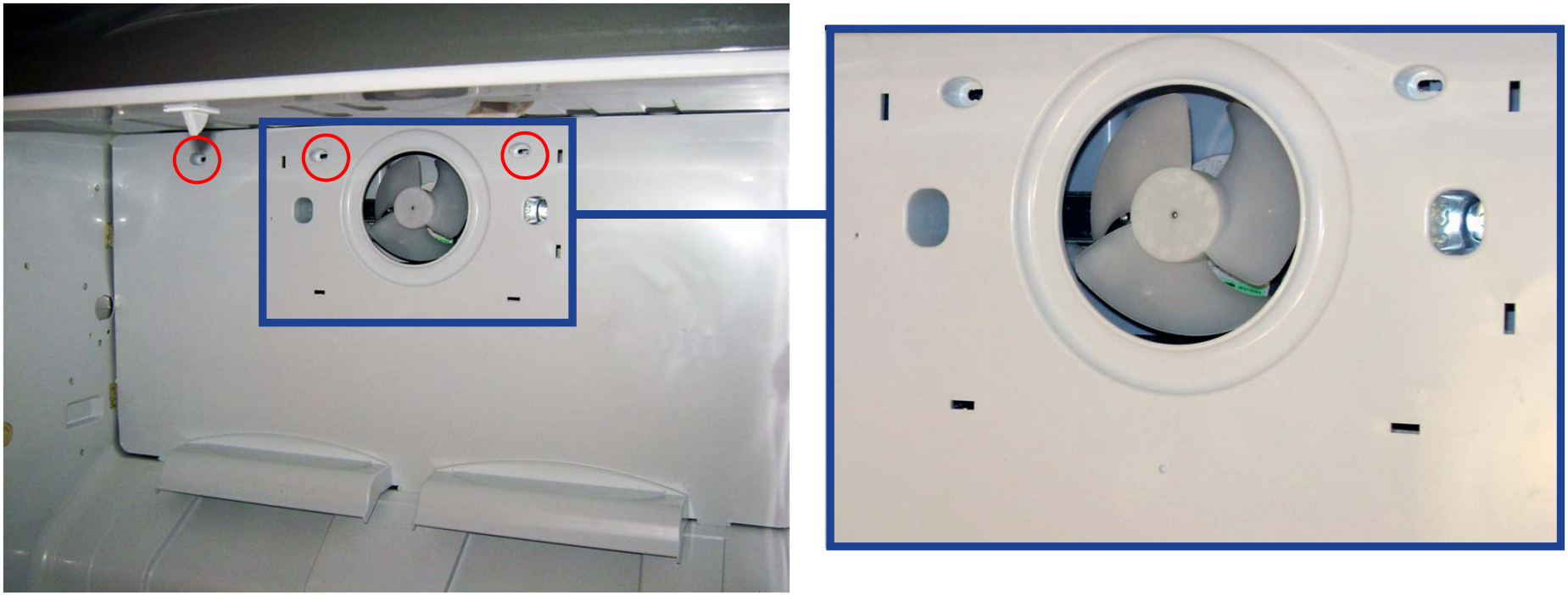
Freezer Evaporator Fan



- Remove side drawer tracks (both sides)
- Remove evaporator cover **3** screws

(More on track removal in drawer section)

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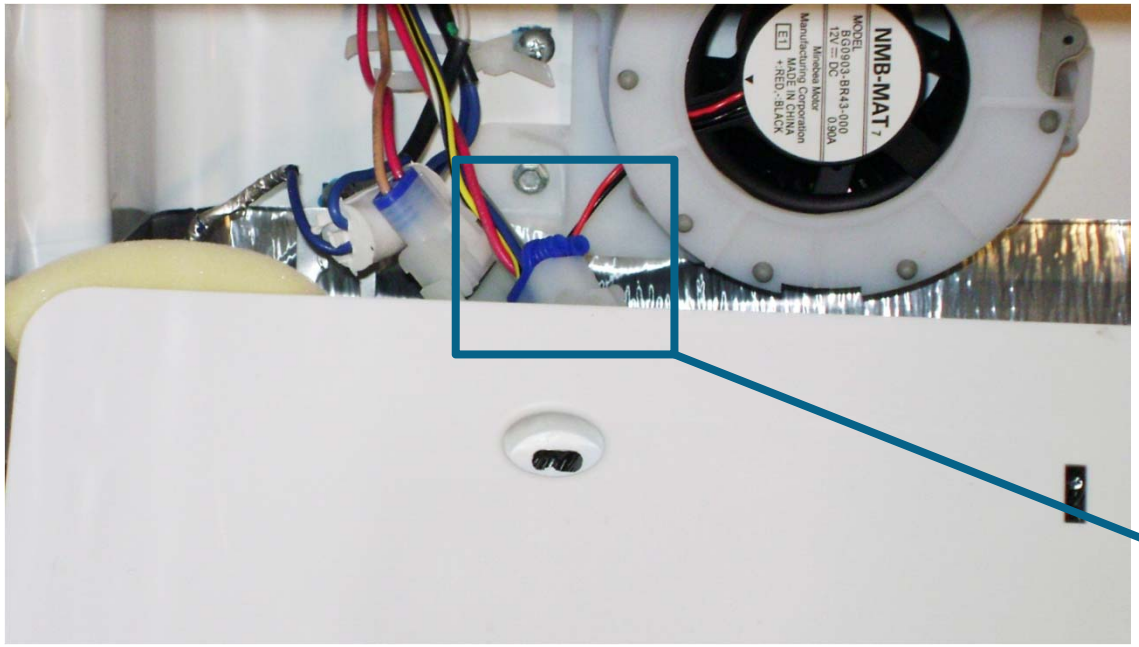
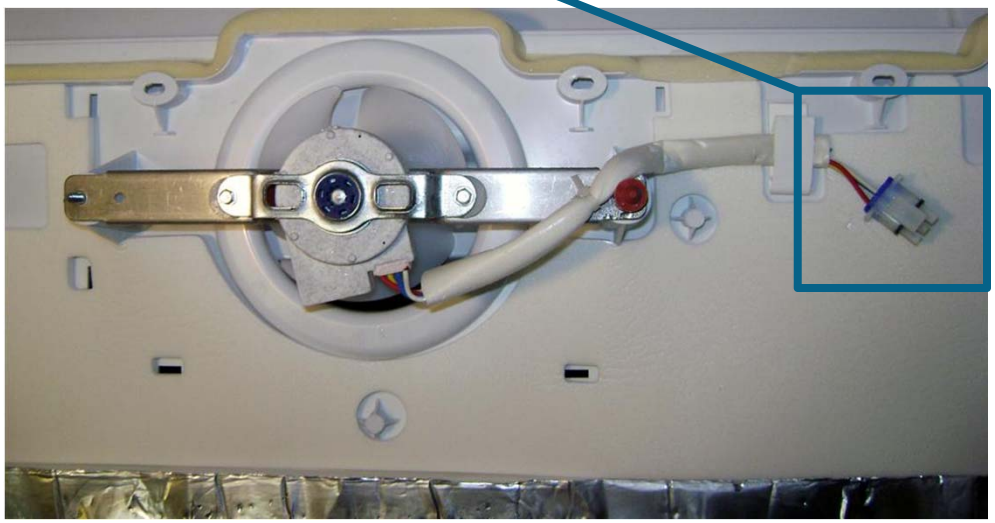
Freezer Evaporator Fan



Tight fit for Evaporator fan plug.



- Remove fan blade. (noting position on shaft)
- Remove fan mounting bracket two ¼ screws
- 12 VDC. Testing accomplished at plug or main board.

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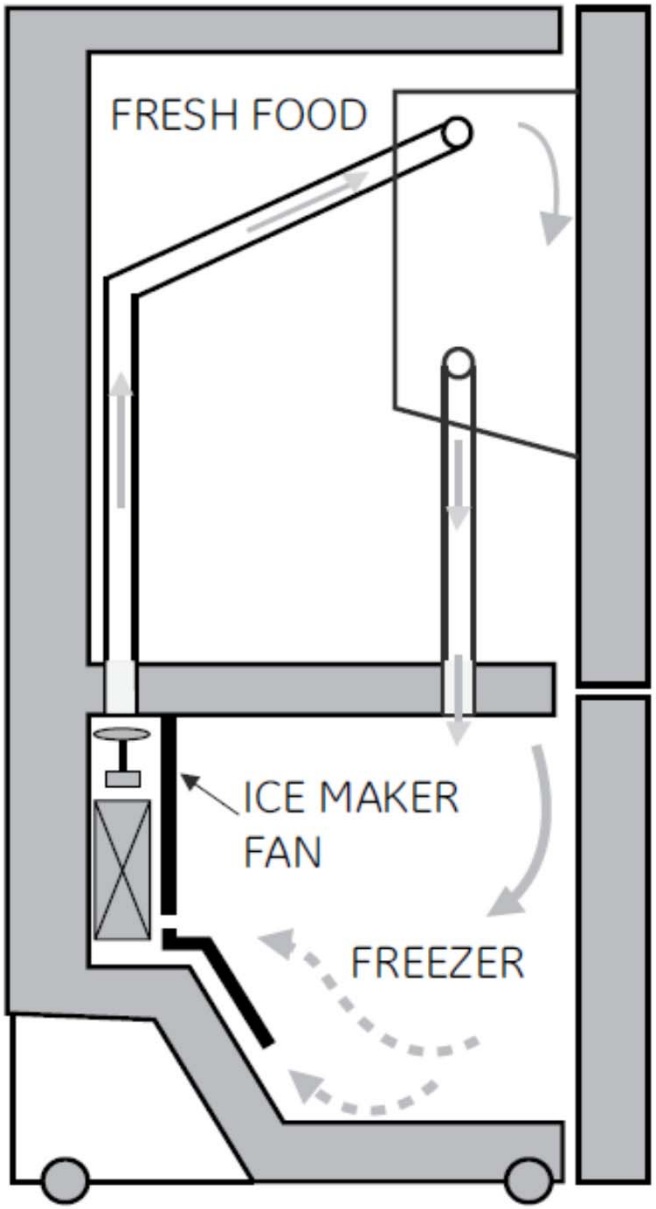
Ice Fan - Duct



ICE SYSTEM AIRFLOW

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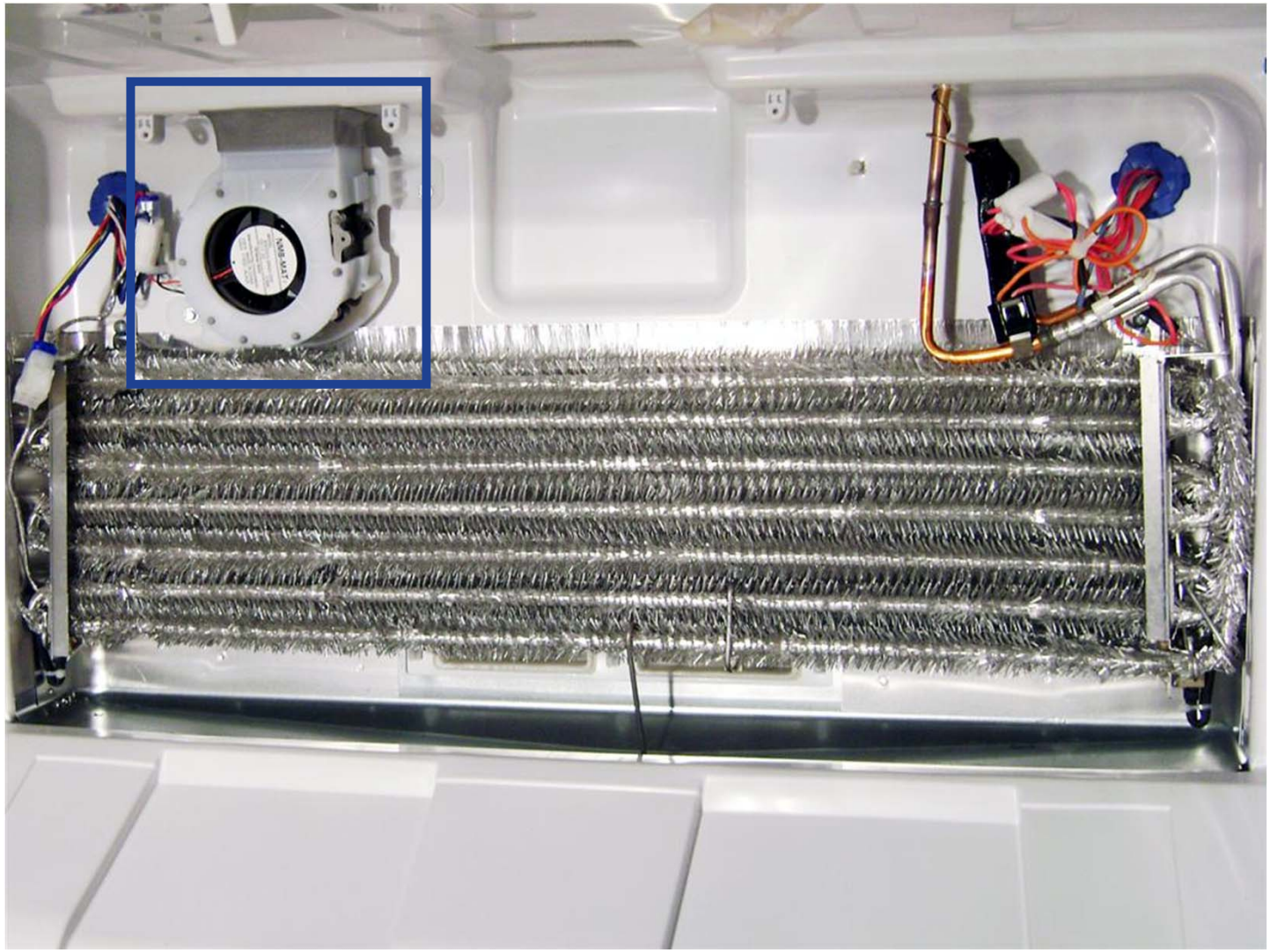
Ice Fan - Duct



12VDC 3 speed fan

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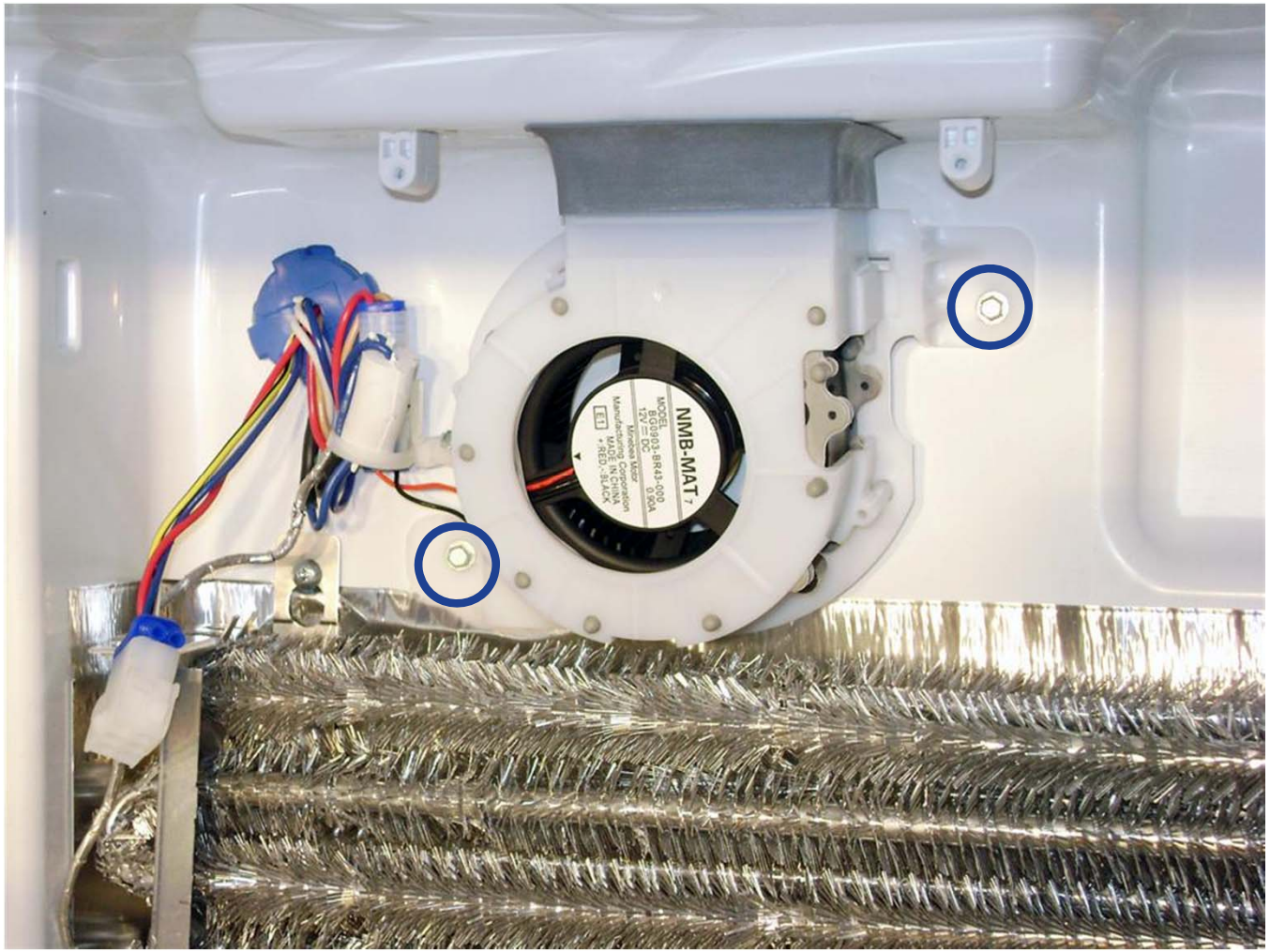
Ice Fan - Duct

- 10 CFM motor
- Ice fan off when compressor off.
- Ice fan duty cycle's are 100% or 50% based on temperature settings.
- Twenty minutes on/off time during 50% duty cycle.
- Ice Making mode- fan on 100%.



Disconnect plug.
Remove two ¼ hex head screws to remove blower

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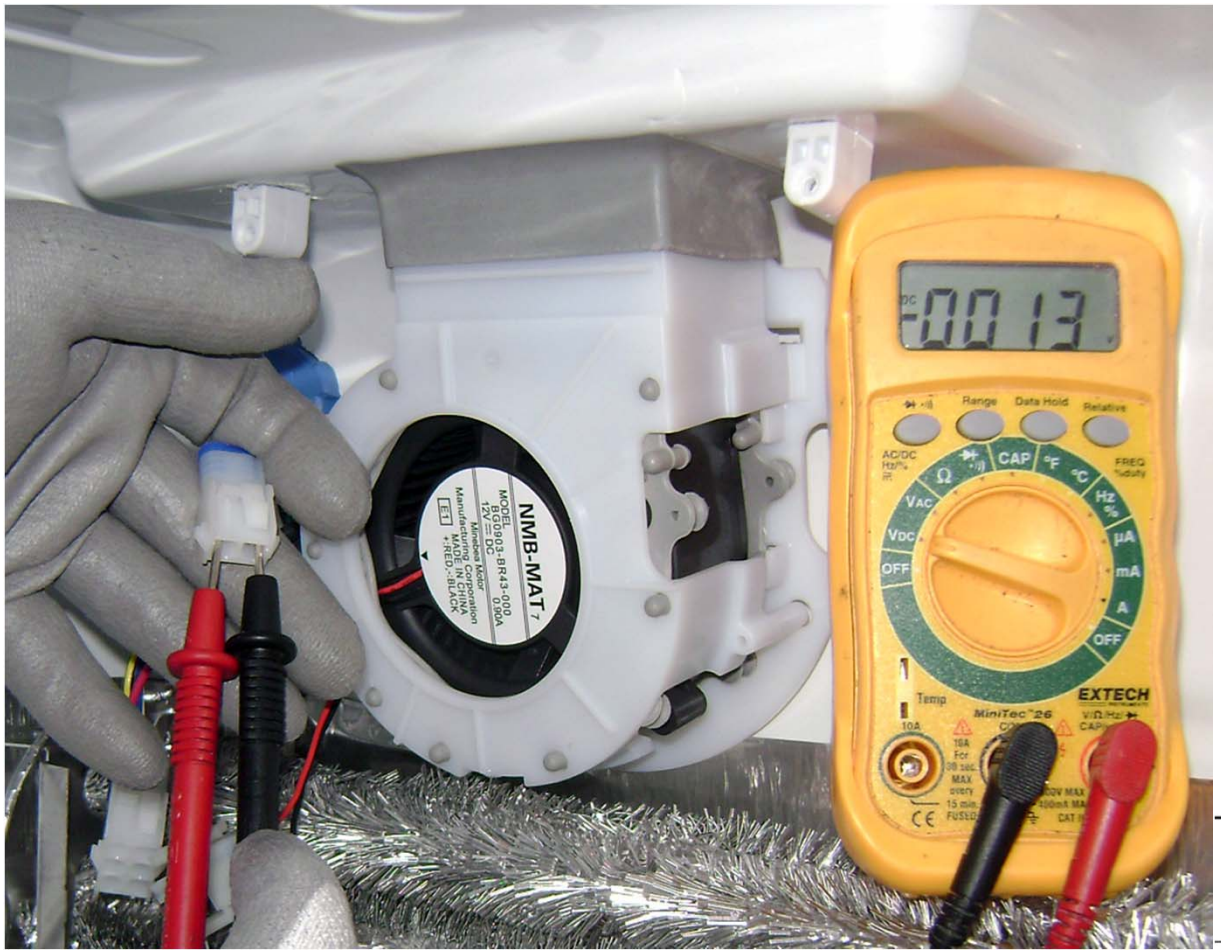
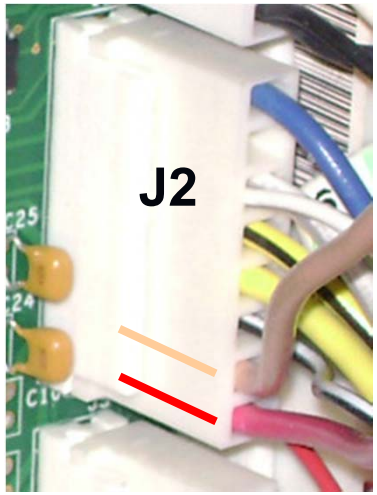
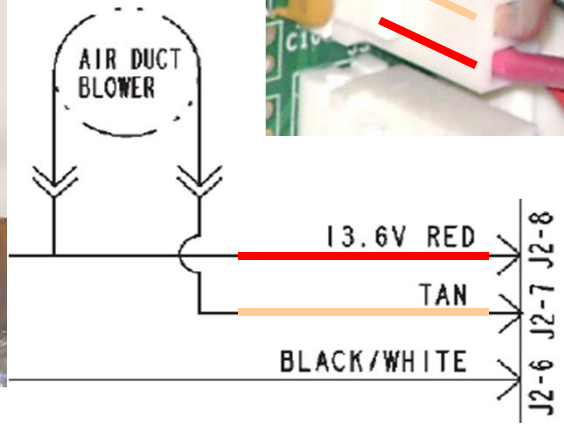
Ice Fan - Testing







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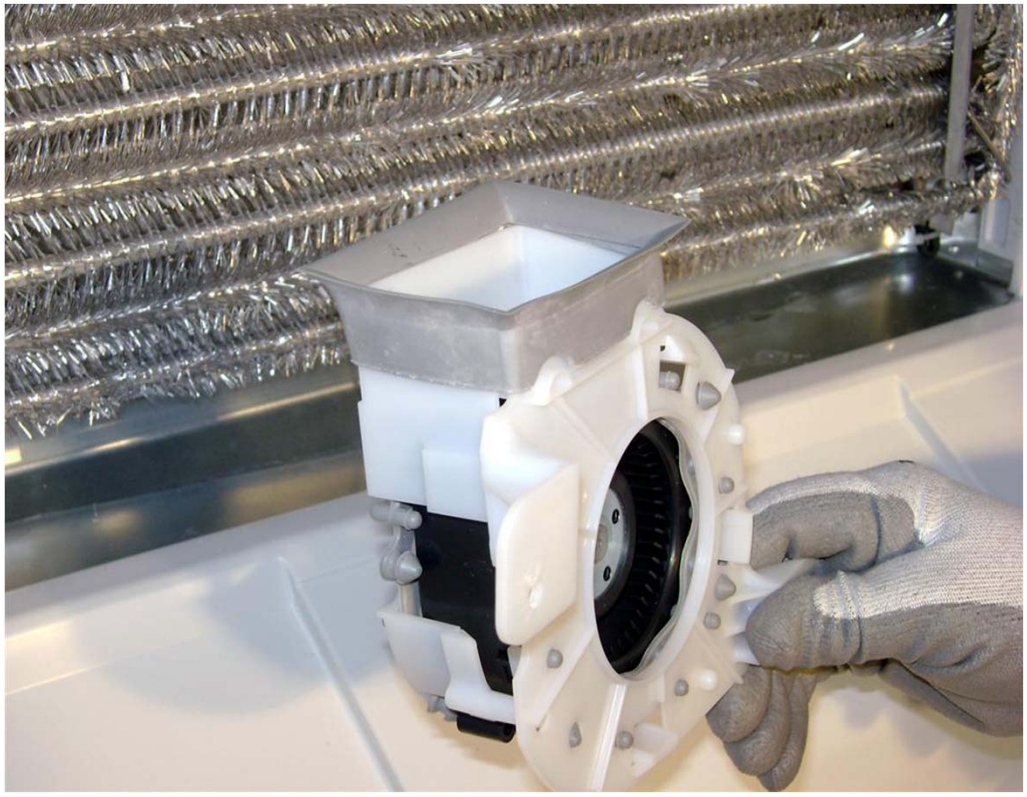
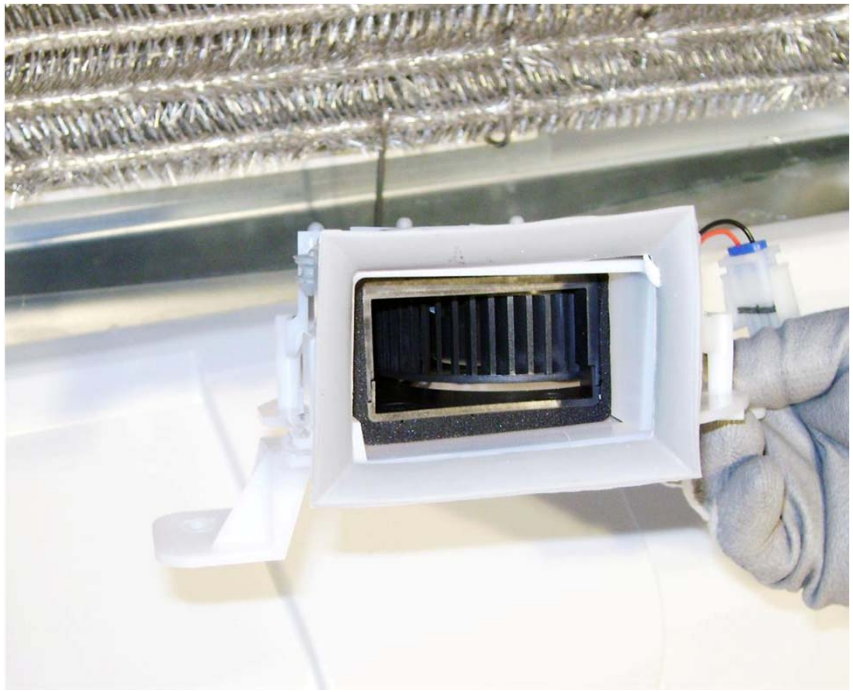
Ice Fan - Duct





Blower comes as an assembly
Rubber boot separate part.

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Ice Fan - Duct

Freezer air travels up through channel and into ice door section

Returns from ice door back into freezer

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Ice Fan – More Basic Operation

Ice Hardening mode: Fan on high speed, while compressor is on.

Ice Storage mode: Fan on low speed, while compressor is on.

Fan speed and on-time are calculated with a multitude of algorithms.

Changes to the time and speed can vary.

Changing the FZ temp settings will prompt new calculations.

Ice fan off during all phases of defrost. (Defrost, Dwell & Post-dwell)

<u>Abnormal modes:</u>

When the unit is in liner protection mode, the ice box fan will run in low speed (along with the evaporator fan in low speed)

If the FF damper has been open for 2 hours continuously and the unit is in ice storage mode, the icebox fan will turn on at low speed and run until the damper closes

Condenser Fan

- Measure supply voltage between red & white wires = 13.6VDC.
- Measure signal voltage between yellow & white wires = between 5.5 to 12VDC, depending on the speed of the fan.

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Condenser Fan

- Remove one ¼” hex head screw from top of fan shroud.
- Unplug power connector.
- Tilt fan assembly towards compressor & lift assembly out.

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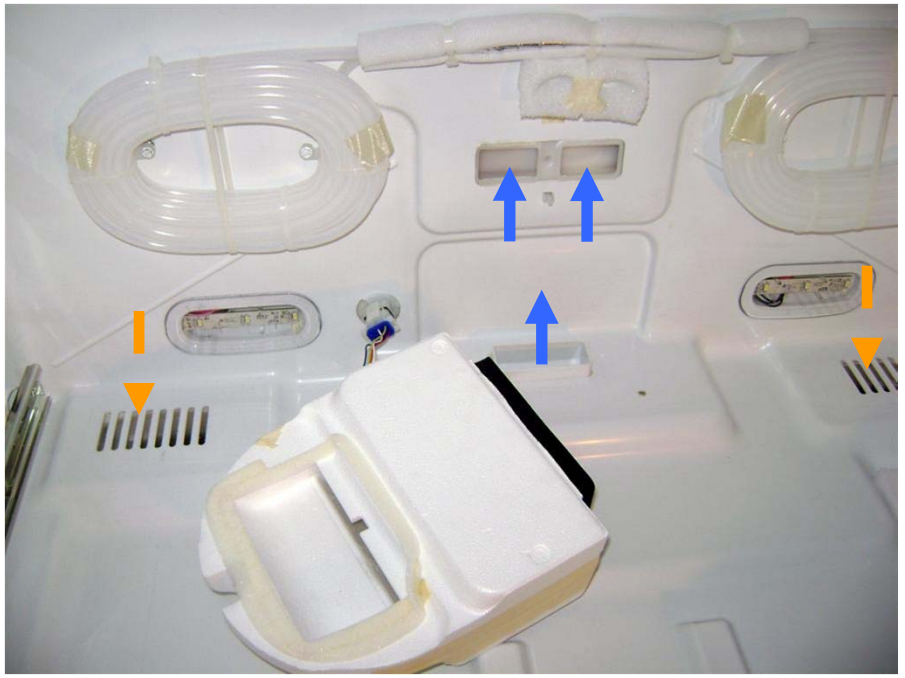
Damper



- Remove one ¼ in screw securing housing to back wall
- Disconnect wiring harness
- 12VDC damper.
- Comes as an assembly

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New LED Lighting

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All LED Lighting

9 LED light pads in FF
1 LED light pad in FZ

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LED Lighting

Gently pry with putty knife or small flat bladed screwdriver at the top **“notched”** end. Assembly snaps out and lifts slightly up from the bottom.

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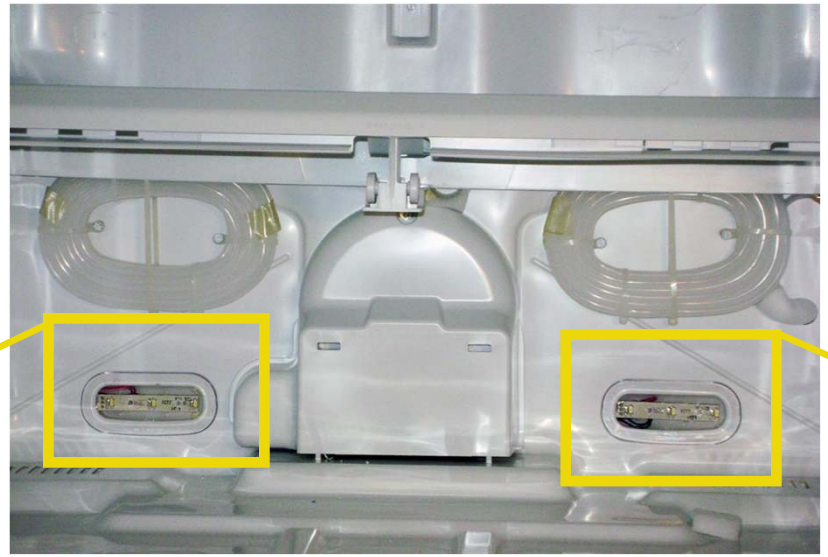
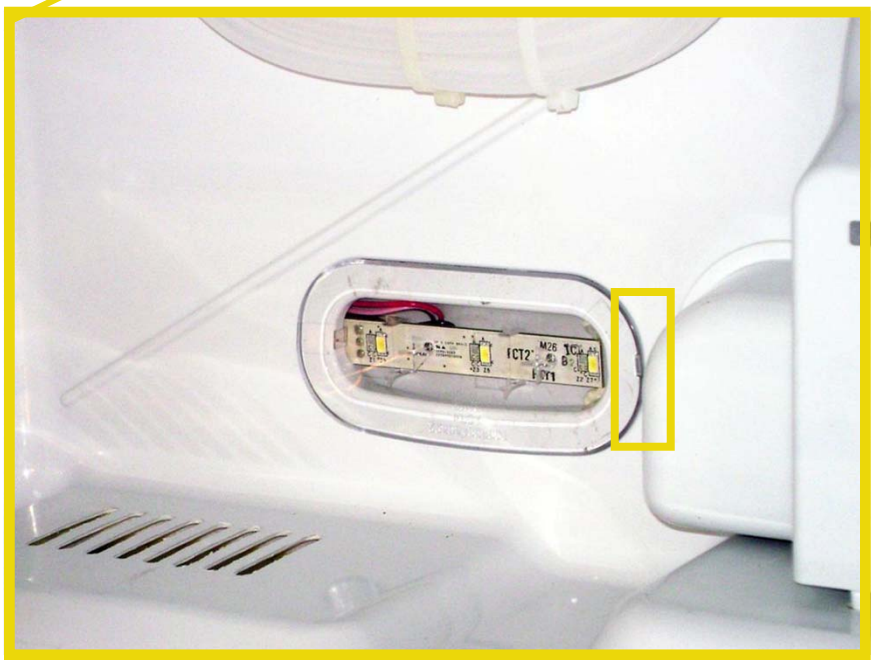
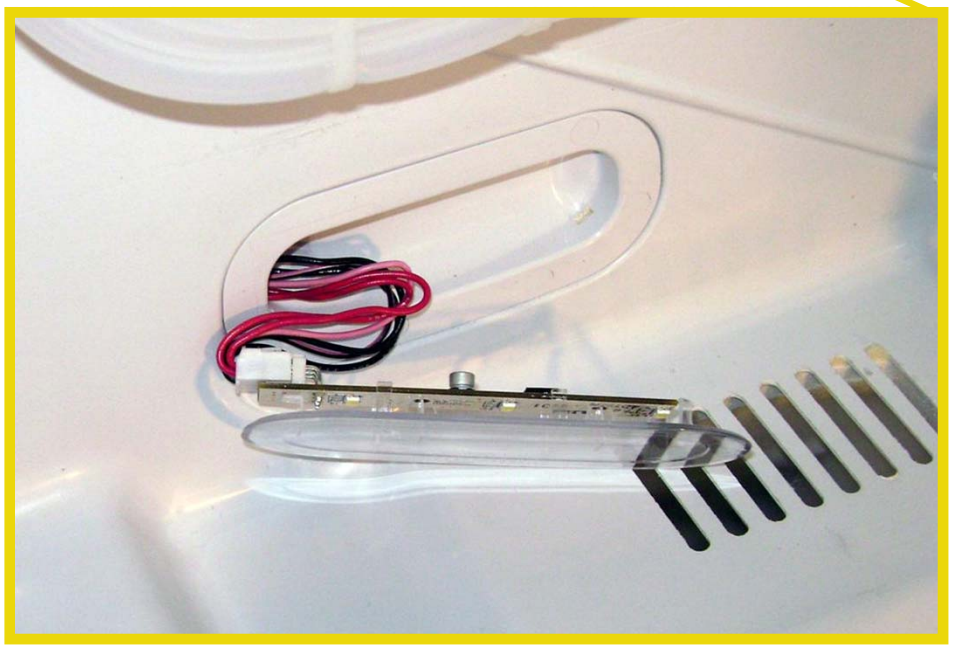
LED Lighting





Gently pry at notch



Lights in parallel circuit. Bk to Red 13VDC
Bk to Pink 12VDC

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LED Lighting

Freezer LED is on ceiling in the middle

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LED Lighting

LED lighting turns off after 10 minutes of door open. Once door closed and re-opened the 10 minute count starts over. (FF & FRZ)

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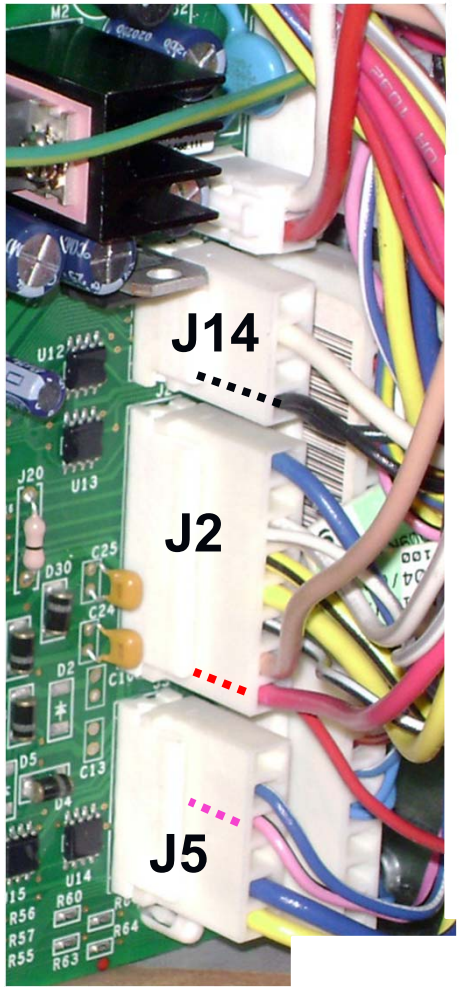
LED Lighting

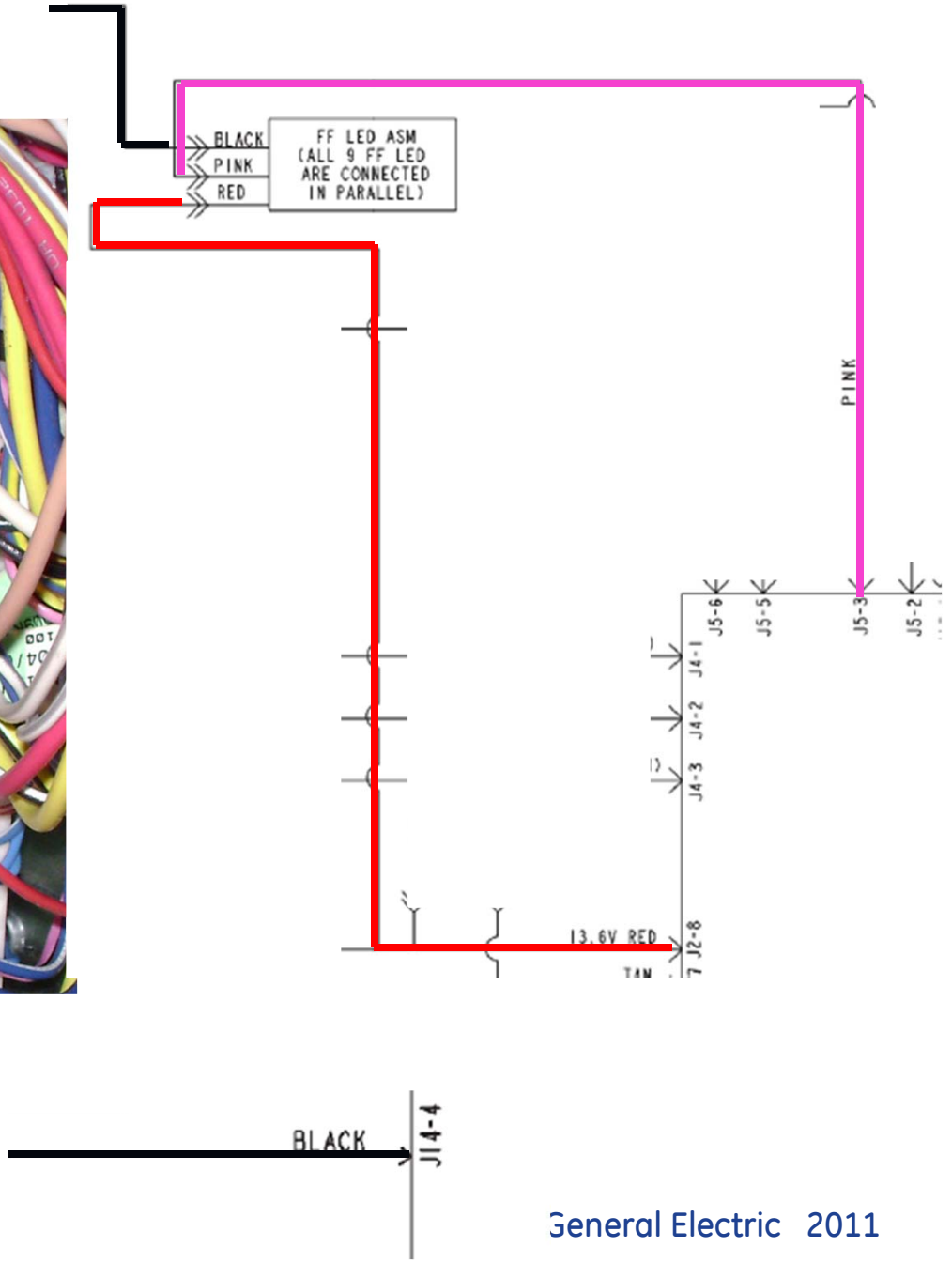
J14 – 4 (BK) LED grnd

J2 – 8 (RED) 13VDC

J5 – 3 (PK) LED enable

NOTE: White wire on J14 is not going to be in production as it was used for Precise fill feature.





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Heaters

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Heater List

NOTE: New Version being tested to incorporate new heaters

A/C heaters

Return Duct heater LH 440 Ω
Return Duct heater RH 440 Ω
Air Duct heater 578 Ω
Supply Duct heater 1653 Ω
Duct Port heater 1200 Ω
* Defrost heater 31 Ω
* Double Drawer (DD) Mullion heater 827 Ω
Horizontal Mullion between FF & FZ 1653 Ω

D/C heaters

**Door Gasket heater 62 Ω
**Recess heater 145 Ω
* Duct Door heater 109 Ω
* French Door Vertical Mullion 24 Ω
**Fill tube heater 300 Ω

No asterisk indicates non replaceable
* Replaced as individual heater
** Replaced as door assembly

imagination at work

Heater Basic Operation

Duct Port heater - cycles based on temperatures and ice box condition. (Ex: mid –mid settings appx 30% on time.) Located around the holes for ice door.

Supply Duct heater - come on with abnormally high door opening time and high room humidity
Air Duct heater (abnormal is appx. 70 FF openings for 12 sec. or more in 16 hours)

Door Gasket heater - are on all of the time with a FZ setting of 4 or lower. Above that varies.
Recess
Duct door

Fill Tube heater - on for 2 hours after water valve activation or when ice is dispensed.

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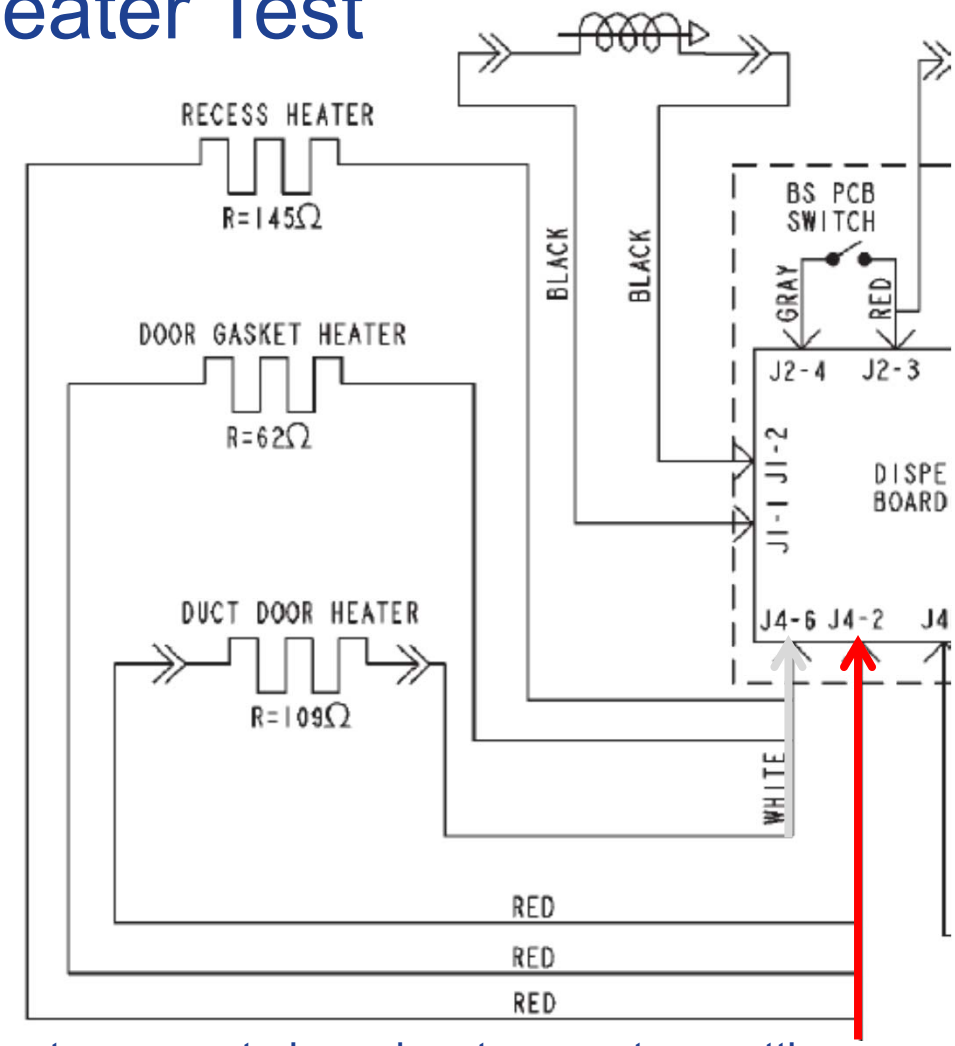
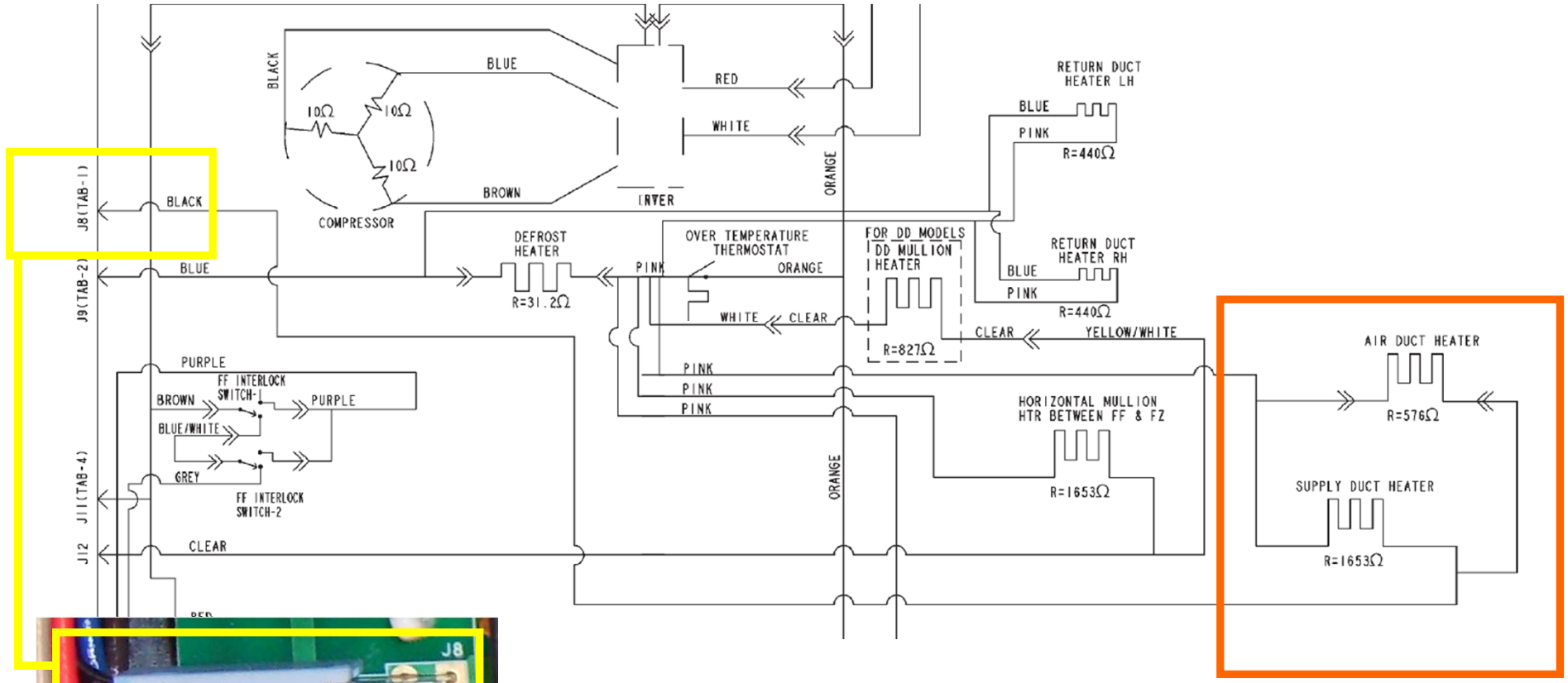
Heater Test

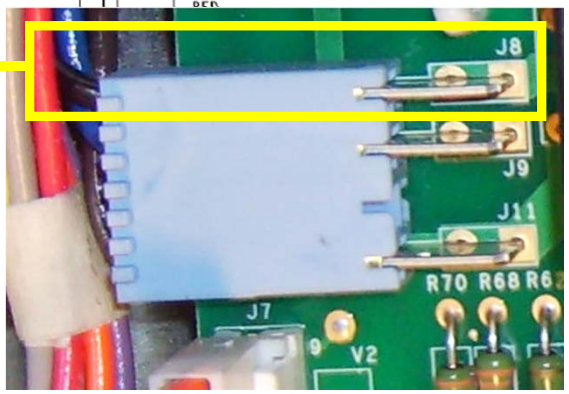


Heaters operate based on temperature settings i.e. FRZ setting of 5 or higher = 100% “On” time except during ice dispense. (Circuit can be tested at dispenser board also. Wh/Red)

imagination at work

Air Duct & Supply Heaters



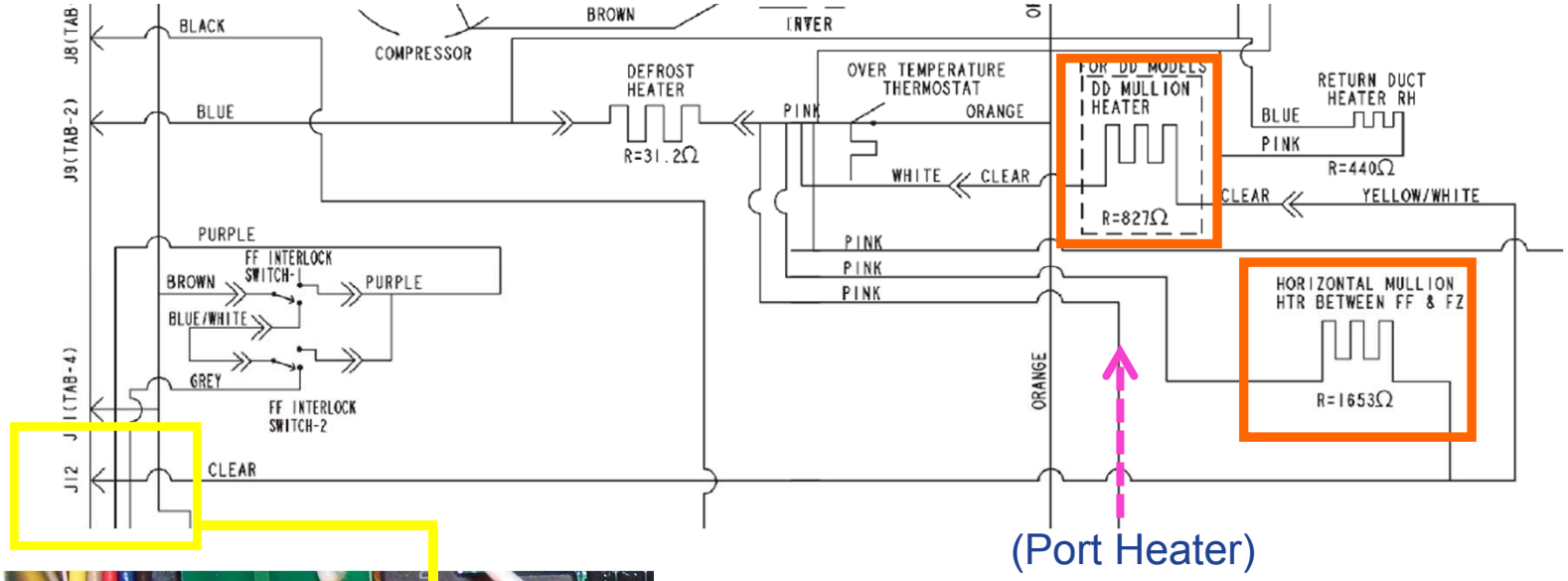


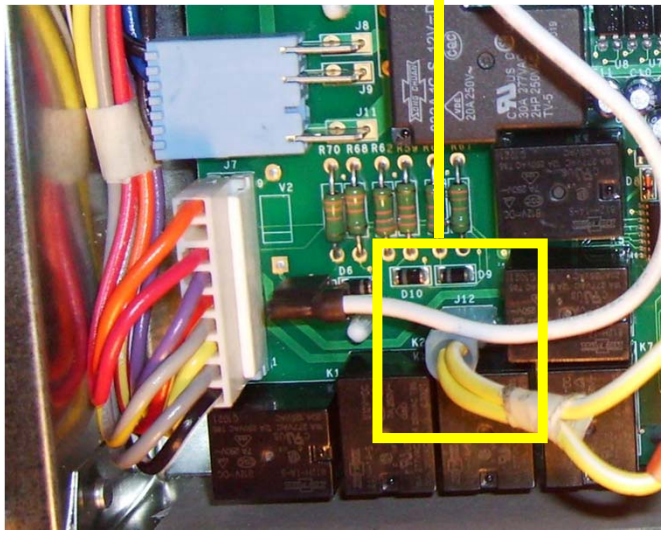
Air Duct and Supply Duct heaters use J8 (compressor) relay

NOTE: This model is inverter controlled so J8 is not used for compressor.

imagination at work

Double Drawer & Horizontal Mullion Heaters

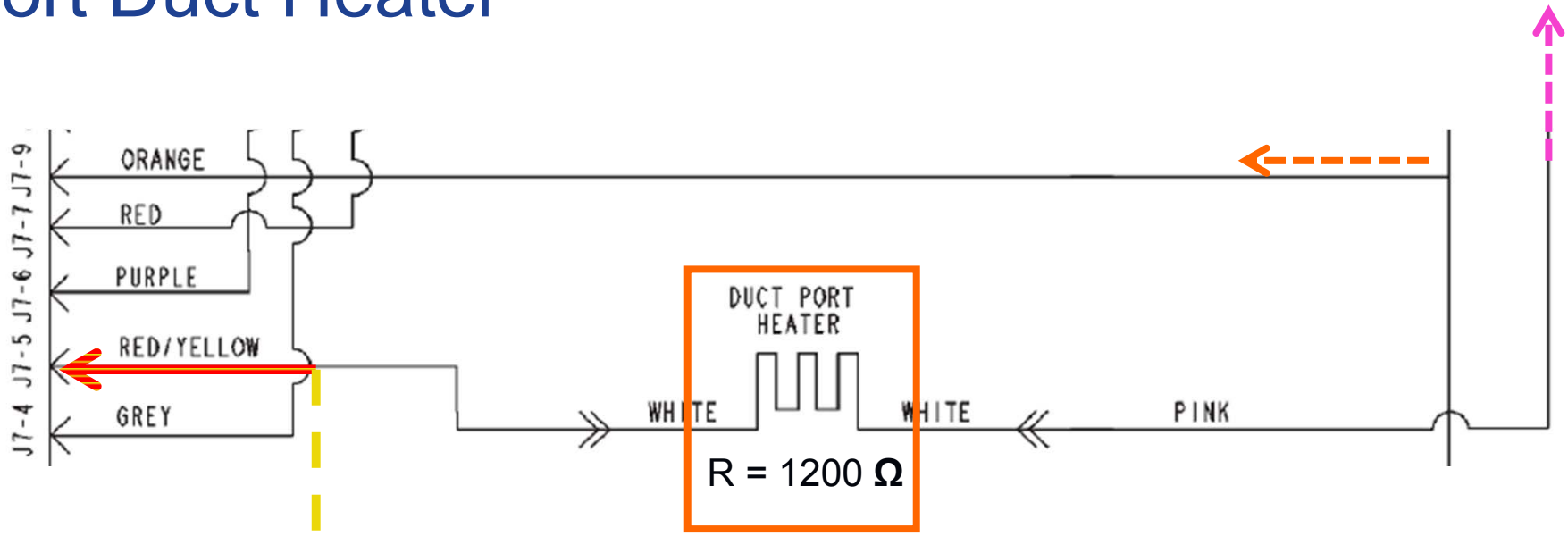


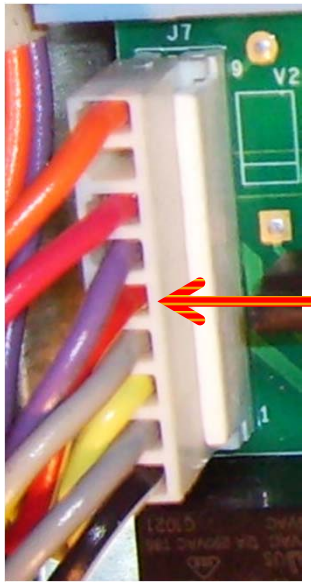


Off during ice dispense to reduce power supply output and remain off for 5 more seconds after ice dispense completed.

imagination at work

Port Duct Heater





Port heater cycles based on temperatures and ice box condition. (Ex: mid –mid settings appx 30% on time.)
Test from J7 – 9 (Orange neutral) to J7 – 5 (Red/Ylw)

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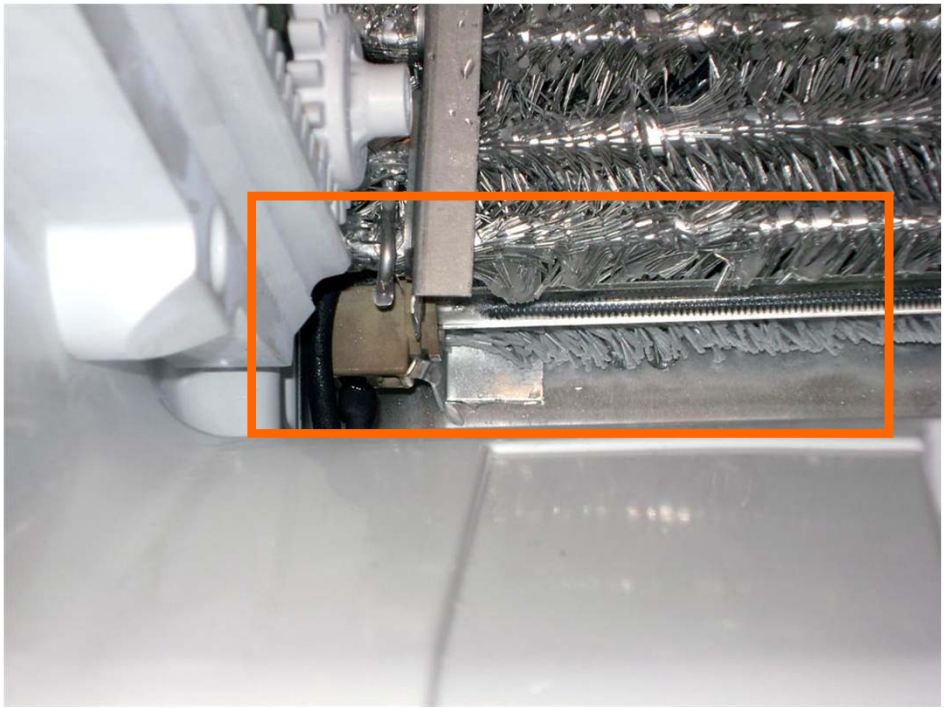
Defrost Heater – Return Duct Heaters LH & RH



31 Ω Defrost heater

440 Ω Return duct heaters. Not replaceable

Heaters are in a parallel circuit and on at the same time

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Door – Drawer Section - Structure

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Top Freezer Drawer

Gasket can be easily removed by peeling away from inner panel and sliding over the outer panel.

Remove outer panel by removing the lower T30 torx screw. Loosen the top one and lit panel up and off.

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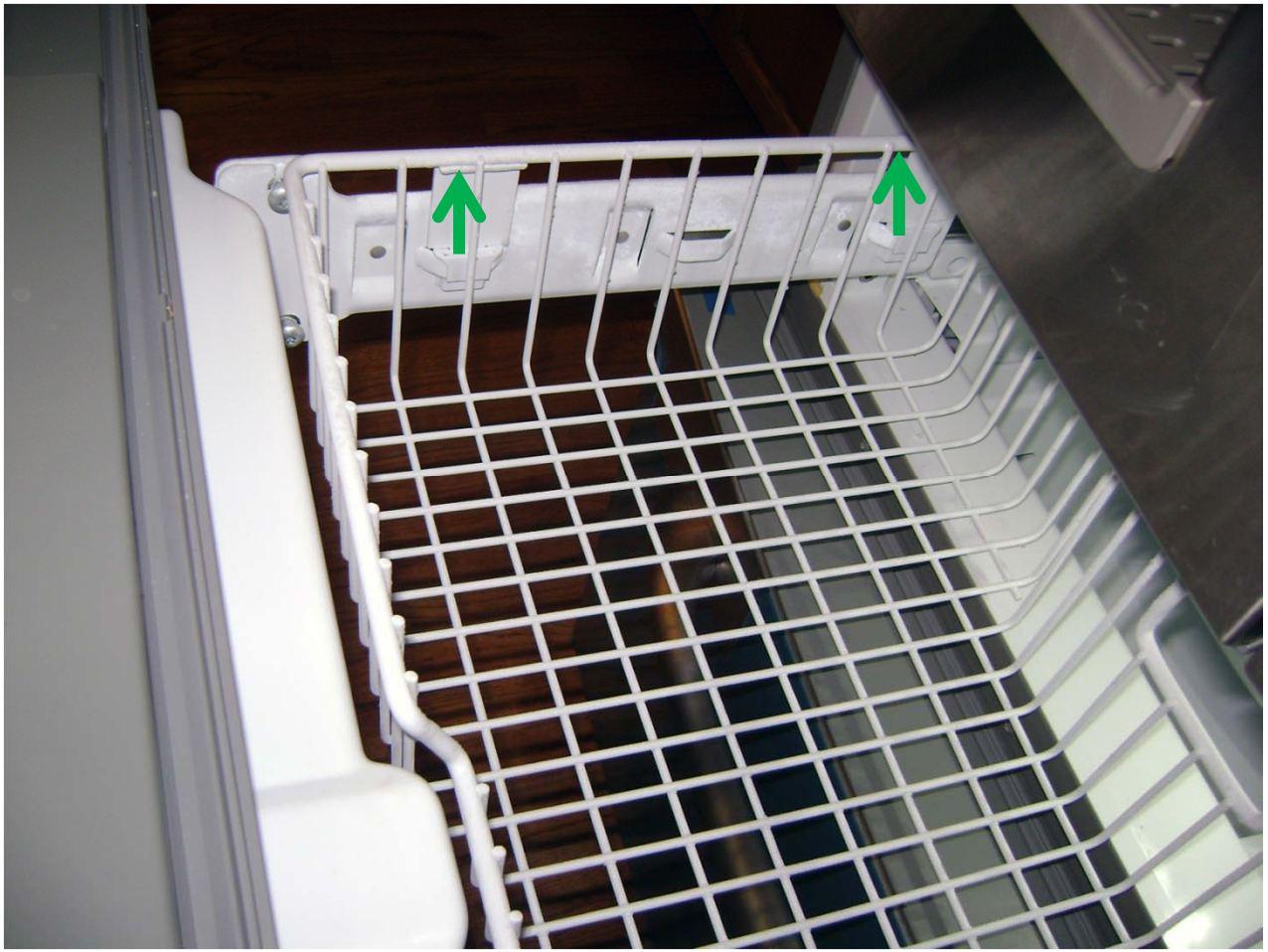
Top Freezer Drawer



Top drawer shelf lifts straight up

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Lower Freezer Drawer

4-Swing locks ; Set to “unlock” position and lift freezer basket up and out

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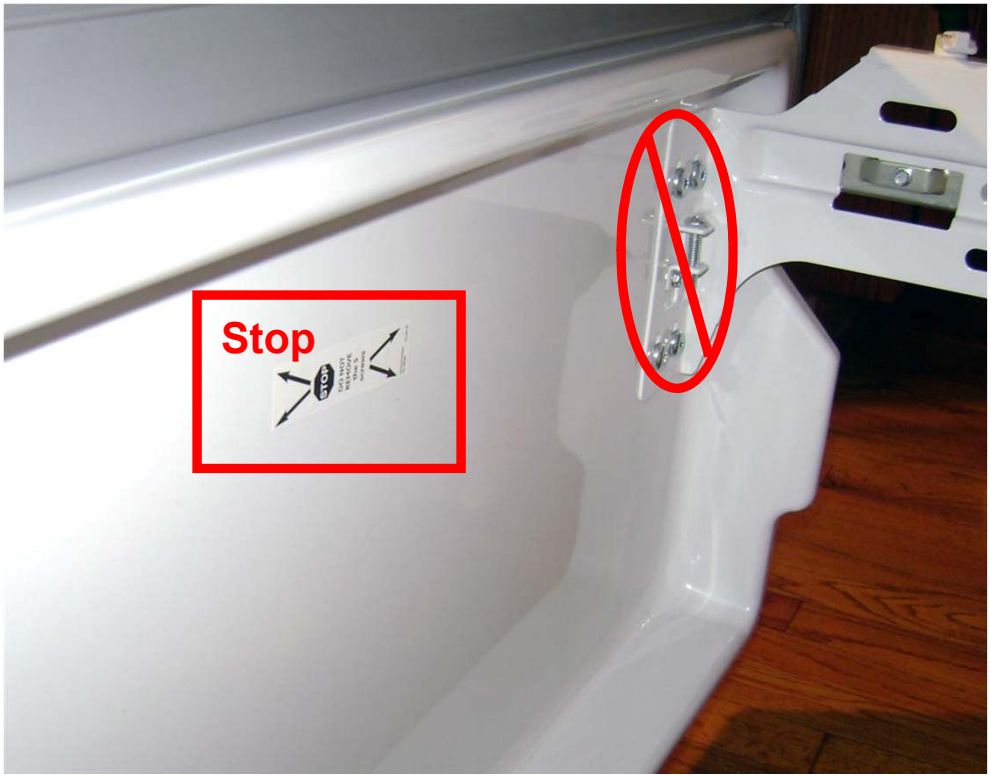
Lower Freezer Drawer



STOP !!!!!

To remove lower drawer front; DO NOT remove the front panel screws!!!!!

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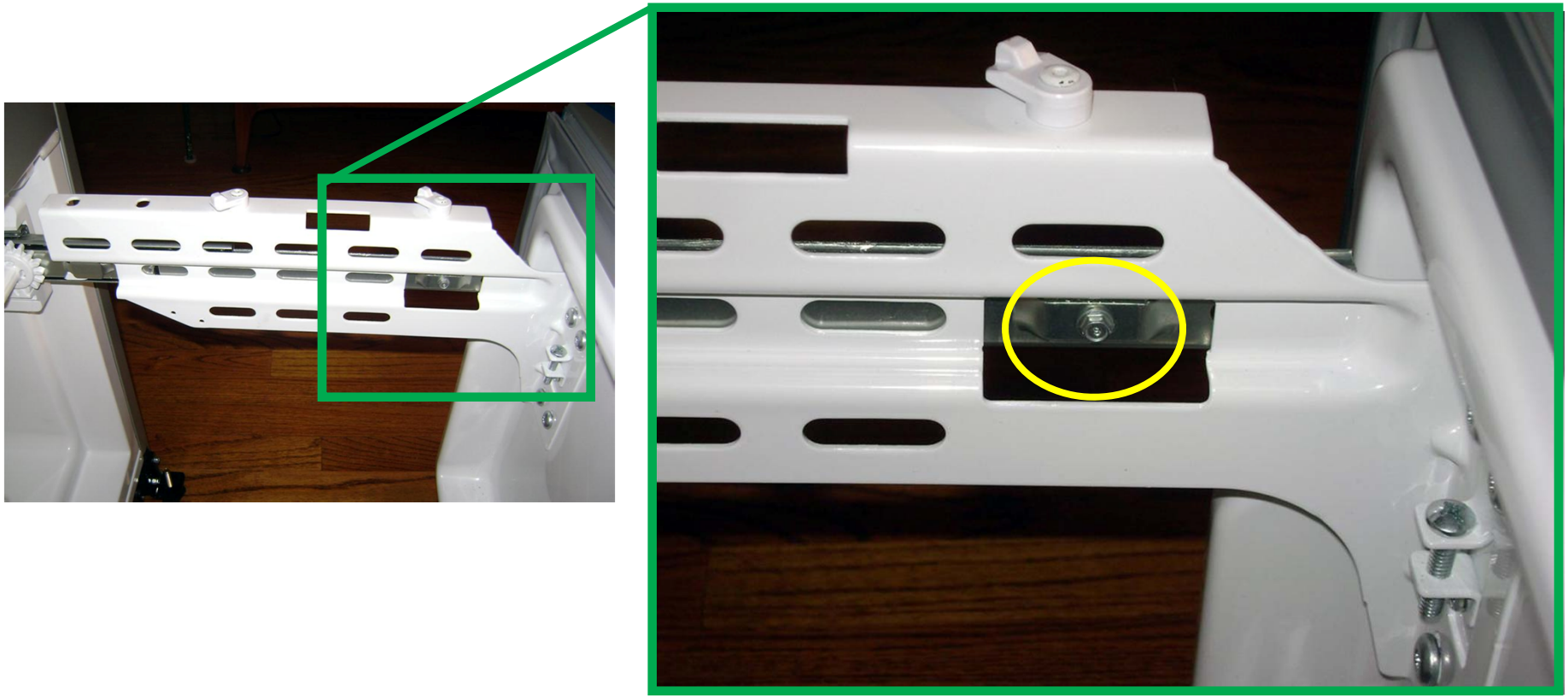
Lower Freezer Drawer



Remove ¼ hex head screw from each side

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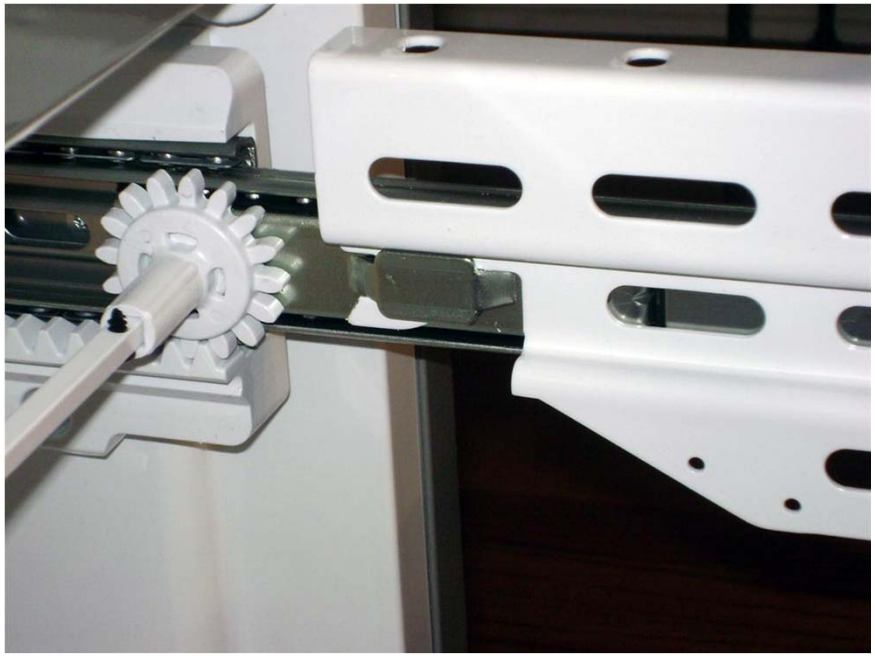
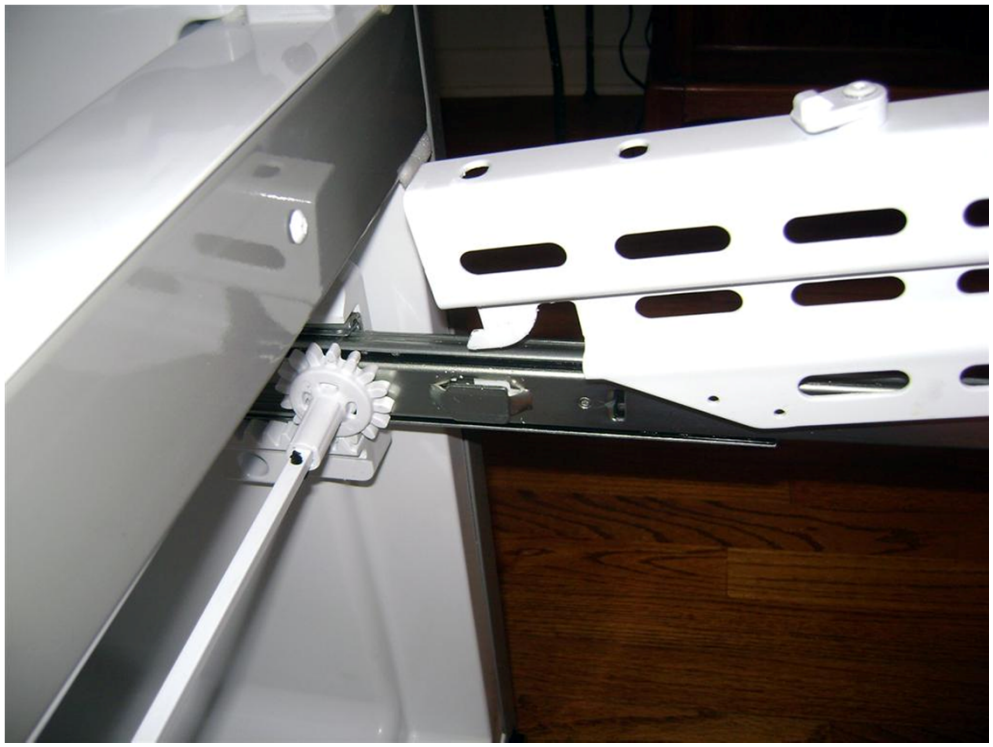
Lower Freezer Drawer





With both screws removed, lift up on drawer front and disengage from rear slots.

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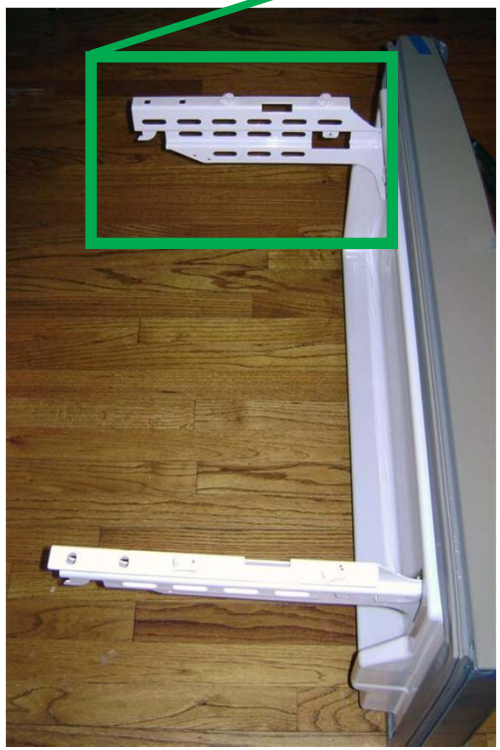
Lower Freezer Drawer



Reassemble by engaging rear tabs first and then re-install two screws

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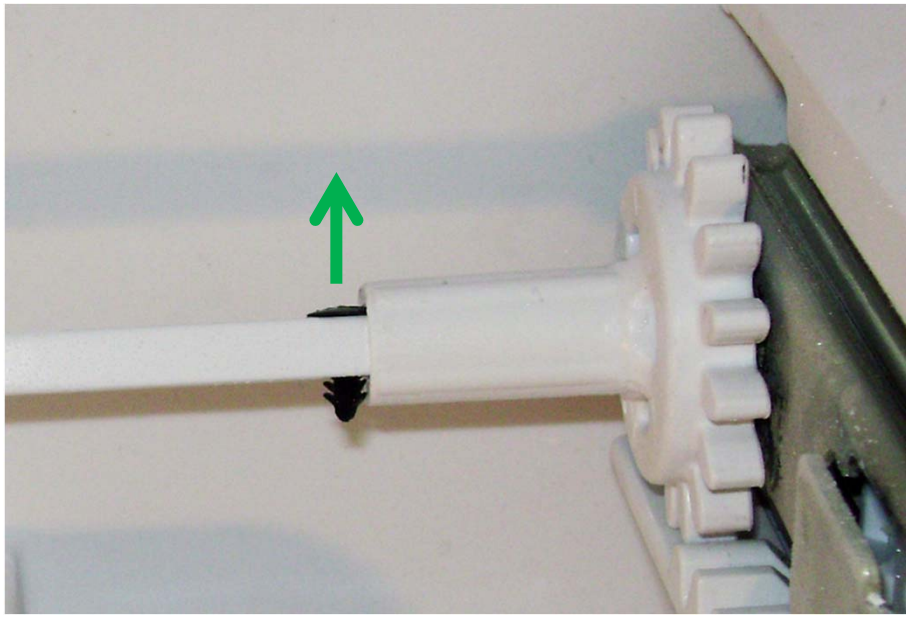
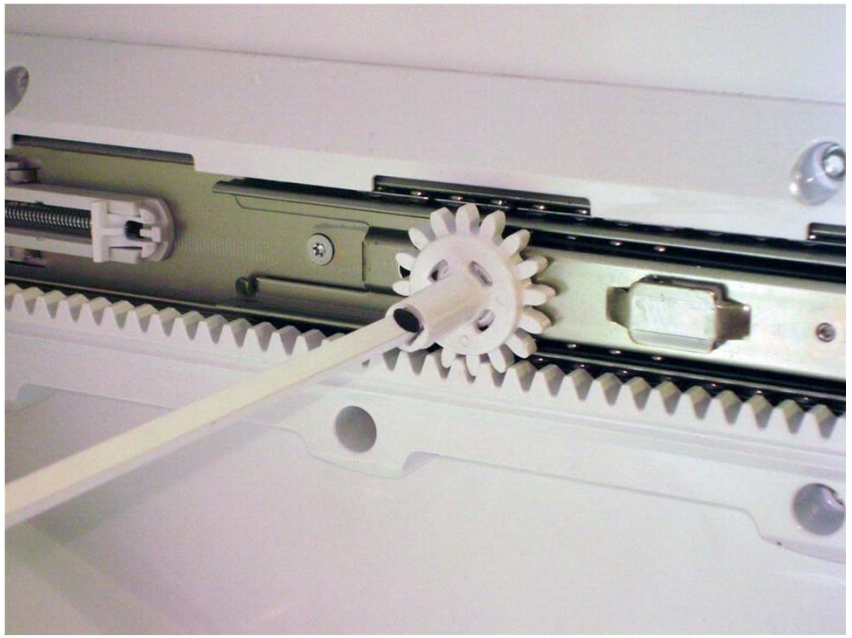
Freezer Drawer Track





To remove side wall tracks, start by removing the roller guide bar. Remove small black locating pin and slide bar to right and remove from rollers.
NOTE: For best results when re-installing start with roller in rear location.

Remove 5 screws to remove track from inner liner.

imagination at work

Freezer Mullion

Remove 4 screws securing mullion heater and face plate.

To replace mullion bar assembly, use T30 torx.

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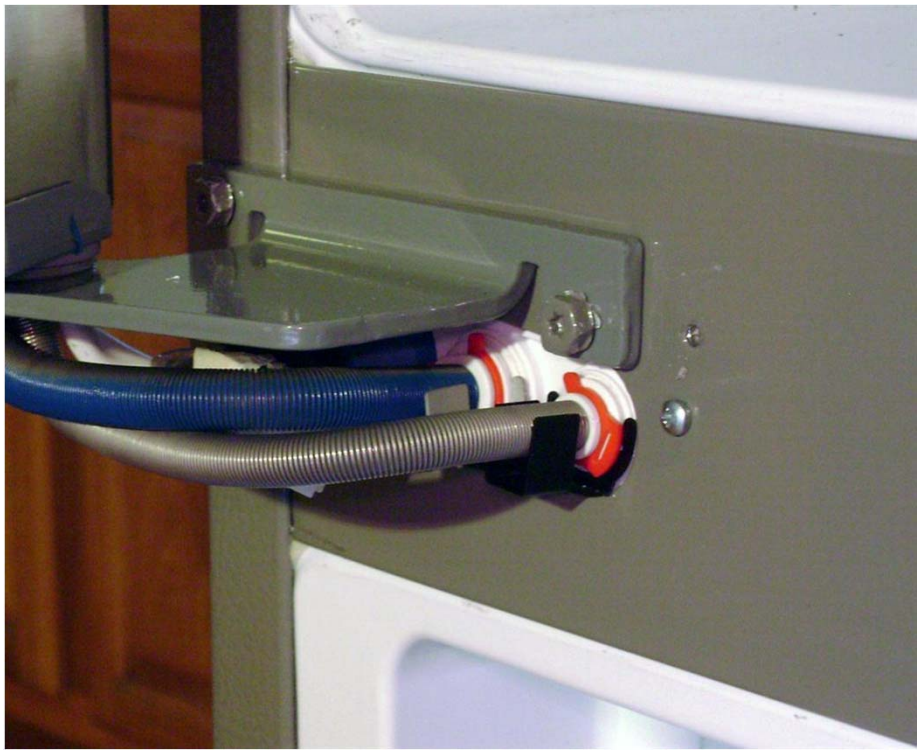
Fresh Food Left door with Ice/Water

Remove 1 screw securing cover



Remove cover

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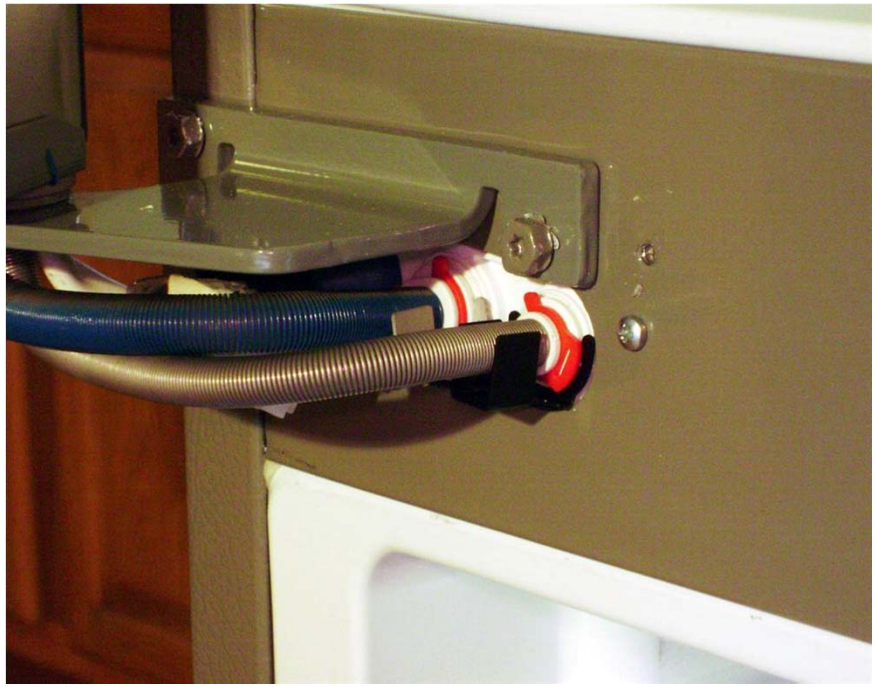
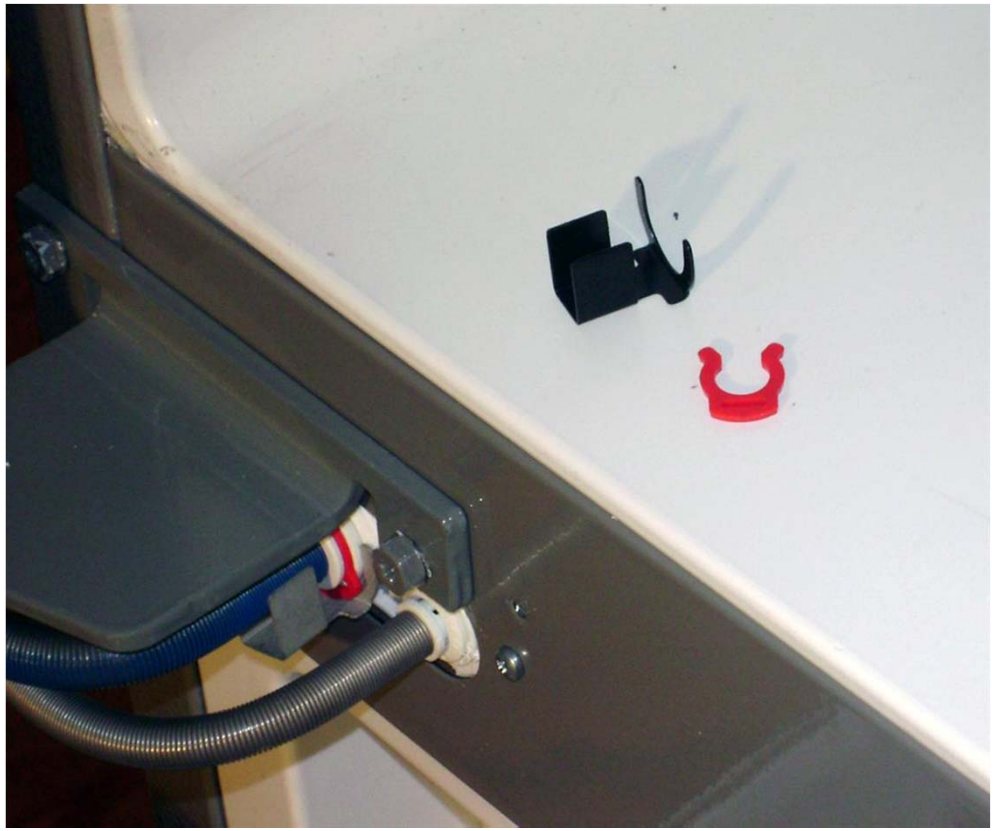
Fresh Food Left door with Ice/Water





Remove black shield and red clip for each water line

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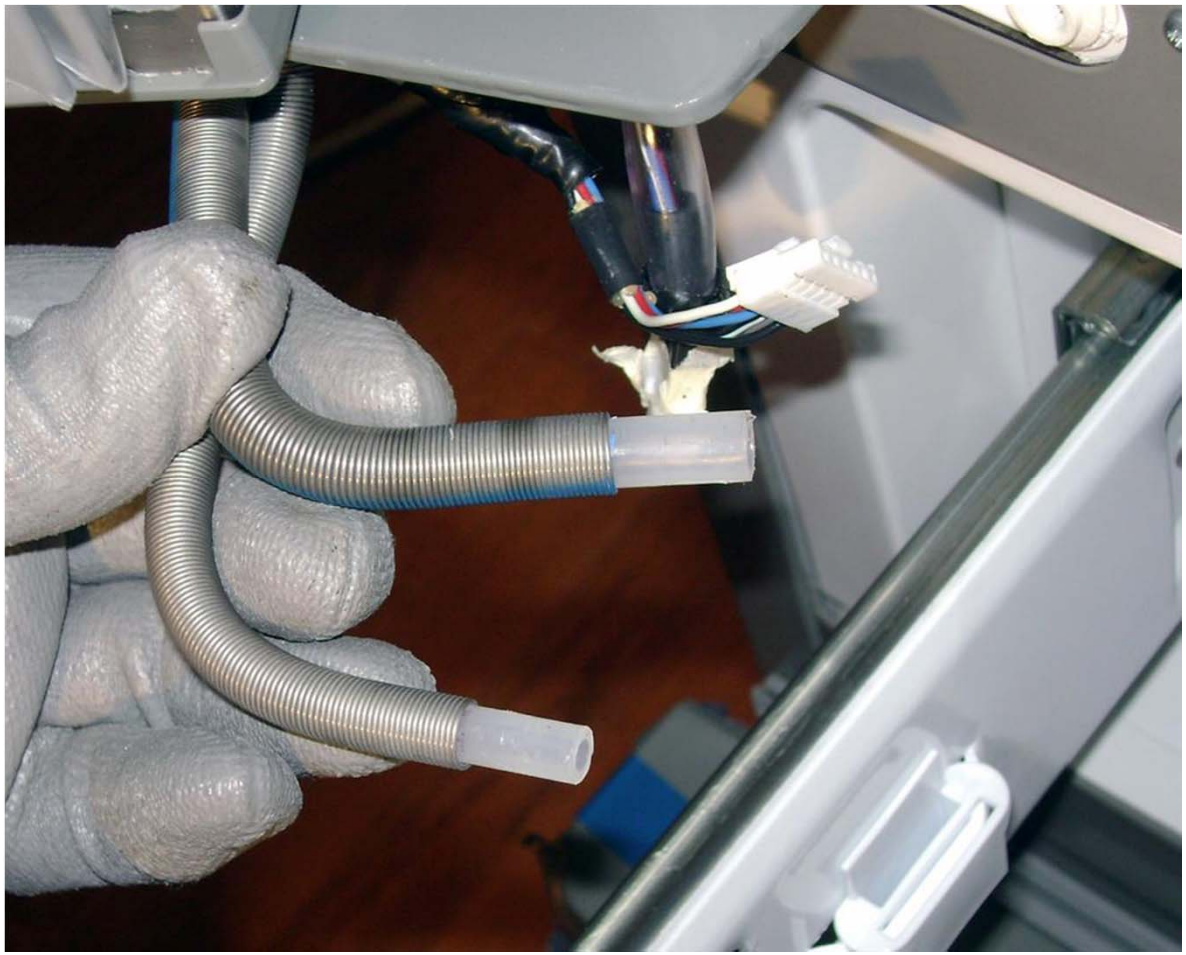
Fresh Food Left door with Ice/Water



NOTE: Water line is larger diameter than IM line

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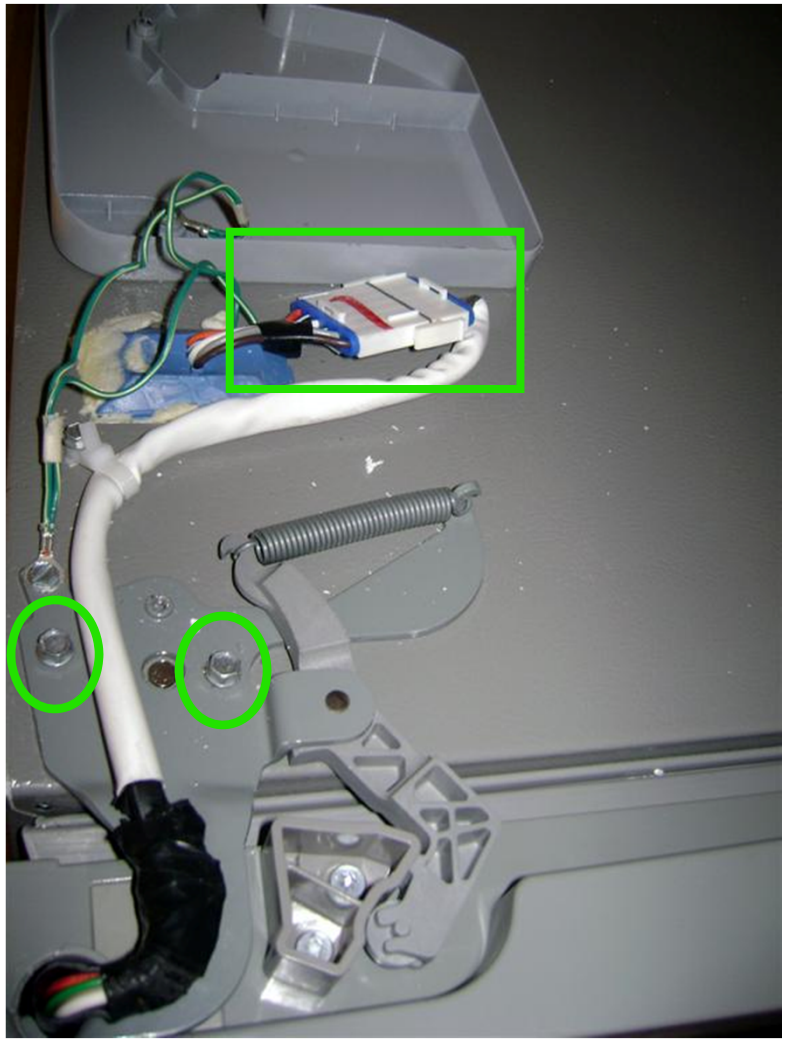
Fresh Food Left Door

Remove 1 Phillips-head screw holding hinge cover.

Remove 2 5/16 hex head screws

Disconnect wiring harness



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Fresh Food Left Door

Testing for IM supply and auger motor voltages can be accomplished at the top plug

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Vertical (Articulating) Mullion Heater

Remove 2 Phillips-head screws.

Check heater for 24 Ω resistance or 13 VDC
(voltage only present if heater should be on)

imagination at work

Vertical (Articulating) Mullion Heater

Remove 2 Phillips-head screws and lift off

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Fresh Food Right Door

¼ Allen adjustment screw

3/32 Allen screw
for handle removal

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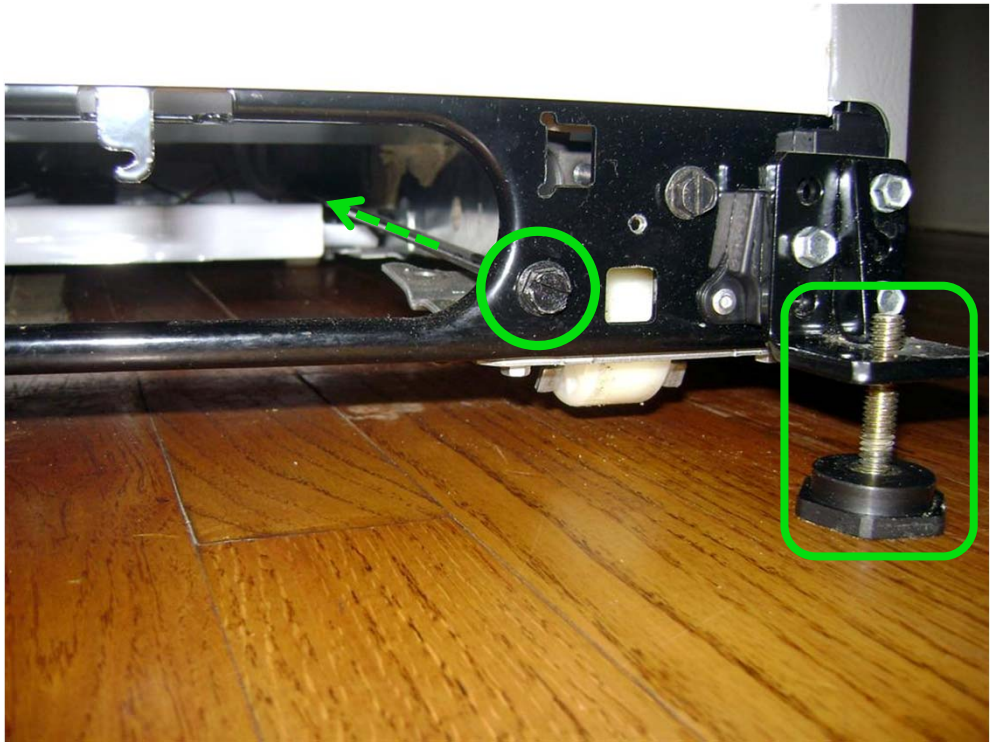
Fresh Food Right Door

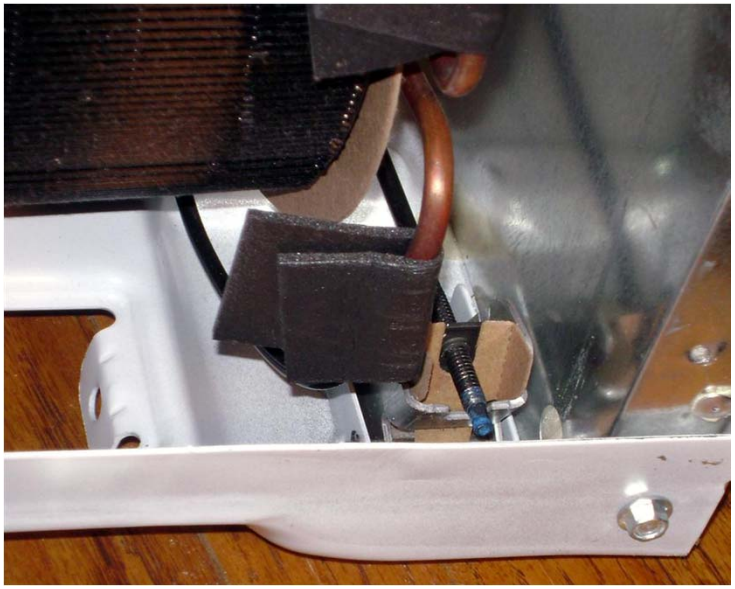
Deep large bins on door.

imagination at work

Level Legs - Rollers



Front View
Rear roller adjusted with 3/8 hex head rod
Front level legs adjustable.



Rear View

NOTE: Adjusting refrigerator pitch too far back could cause IM water leak inside ice bucket

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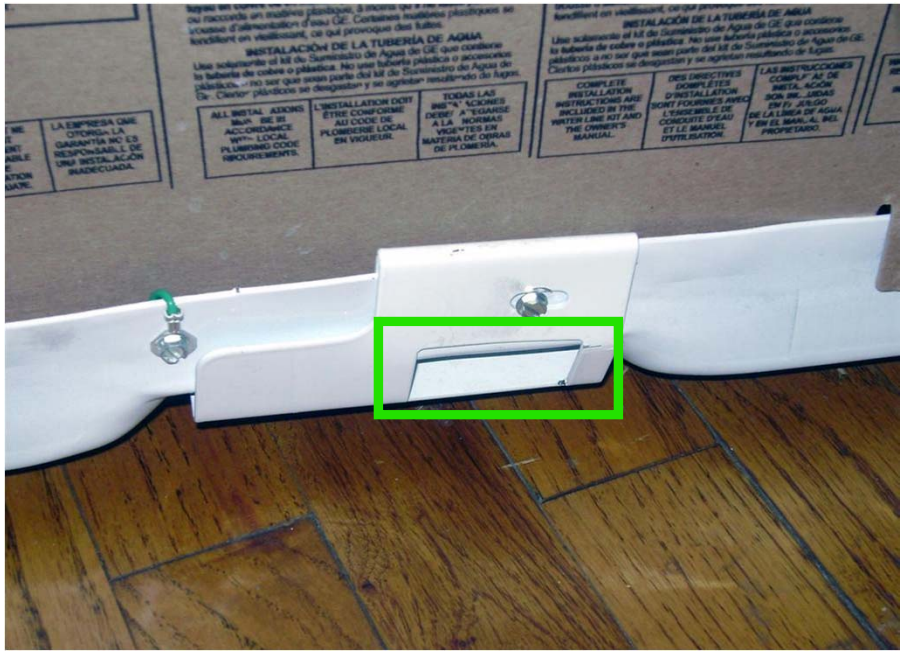
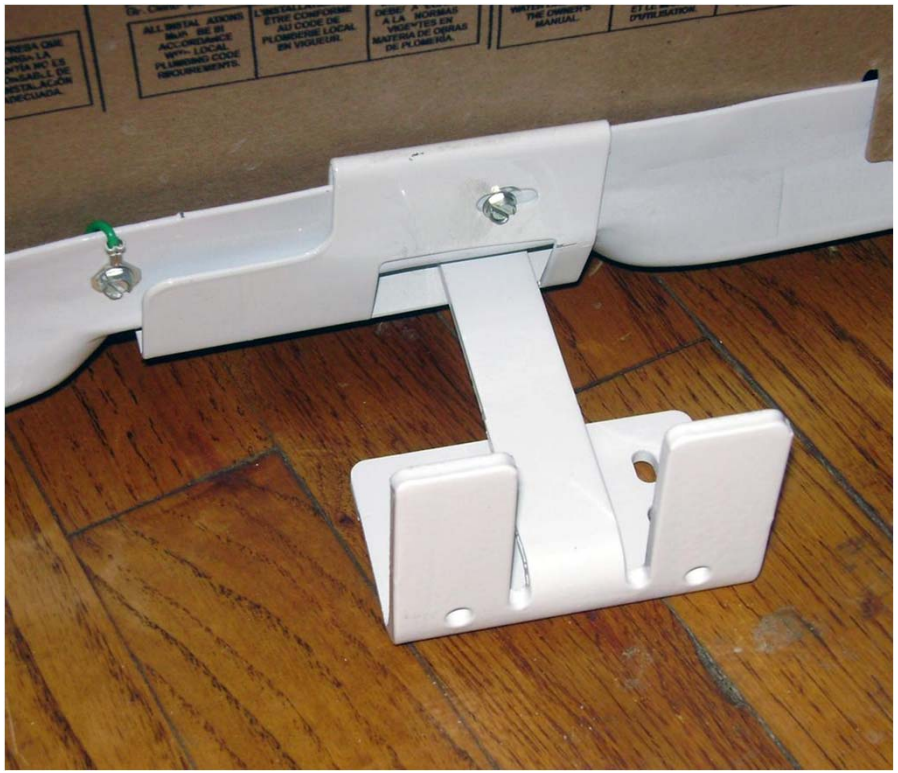
Anti Tip Device



Anti-tip bracket fits into opening when refrigerator is slid back into place.



Anti-tip bracket mounts to floor or wall

- Anti-Tip Device ***MUST*** be installed when supplied.
  - Additionally at least 2 screws must be used.

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Thermistors

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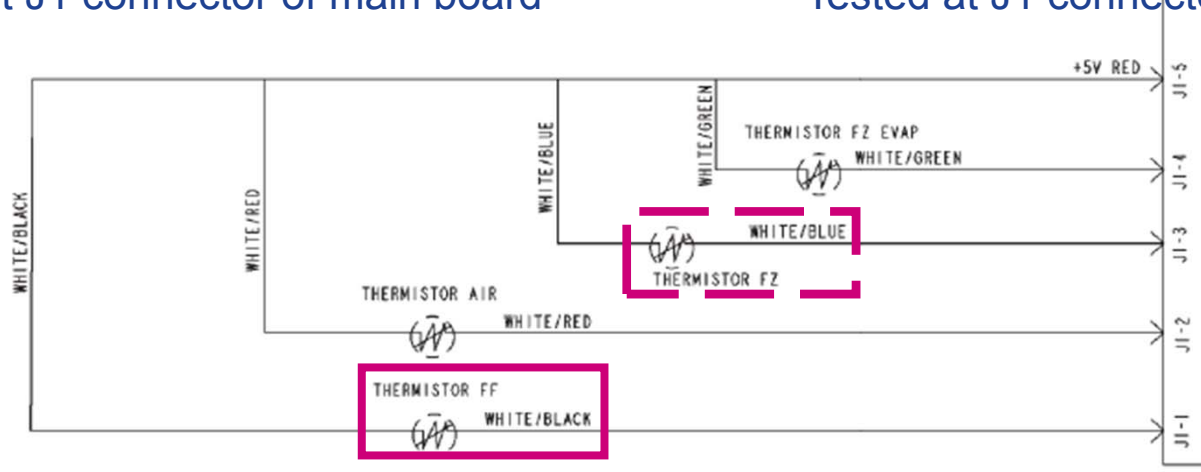
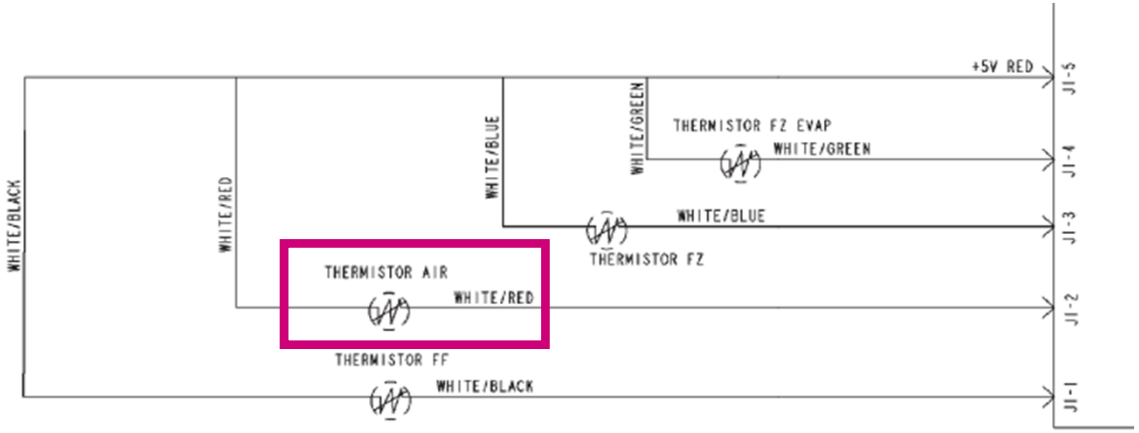
Thermistors – FF & FZ

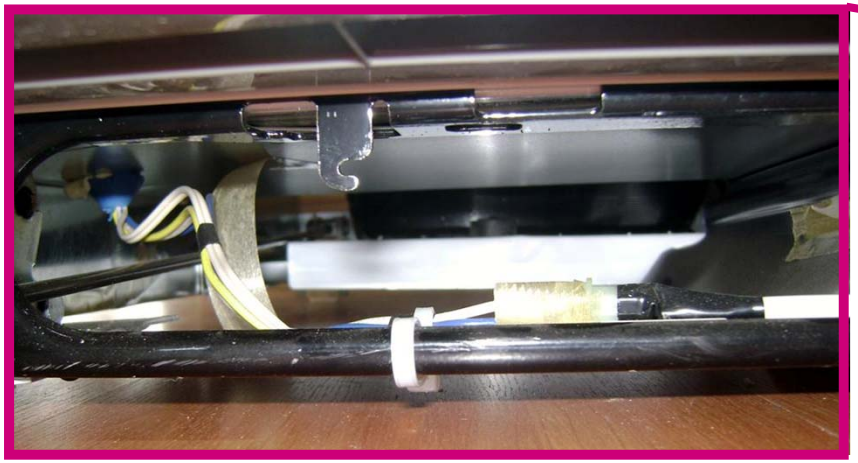
FF Thermistor located on top left side wall
Tested at J1 connector of main board

FZR Thermistor located on right side wall
Tested at J1 connector on main board



Thermistors - Ambient





- Ambient Thermistor located on front lower left.
- Main board uses data from ambient thermistor to recalculate target temperatures under adverse environmental conditions.
- No adjustment if thermistor fails.

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Thermistors - Evaporator

Thermistor Values		
Temperature Degrees (C)	Temperature Degrees (F)	Resistance in Kilo-ohms
-30	-22	88 kΩ
-20	-4	48.4 kΩ
-10	14	27.6 kΩ
0	32	16.3 kΩ
10	50	10 kΩ
20	68	6.2 kΩ
30	86	4 kΩ
40	104	2.6 kΩ

Evaporator thermistor clipped to tubing.

NOTE: Safety Thermostat

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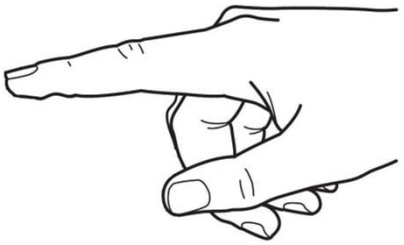
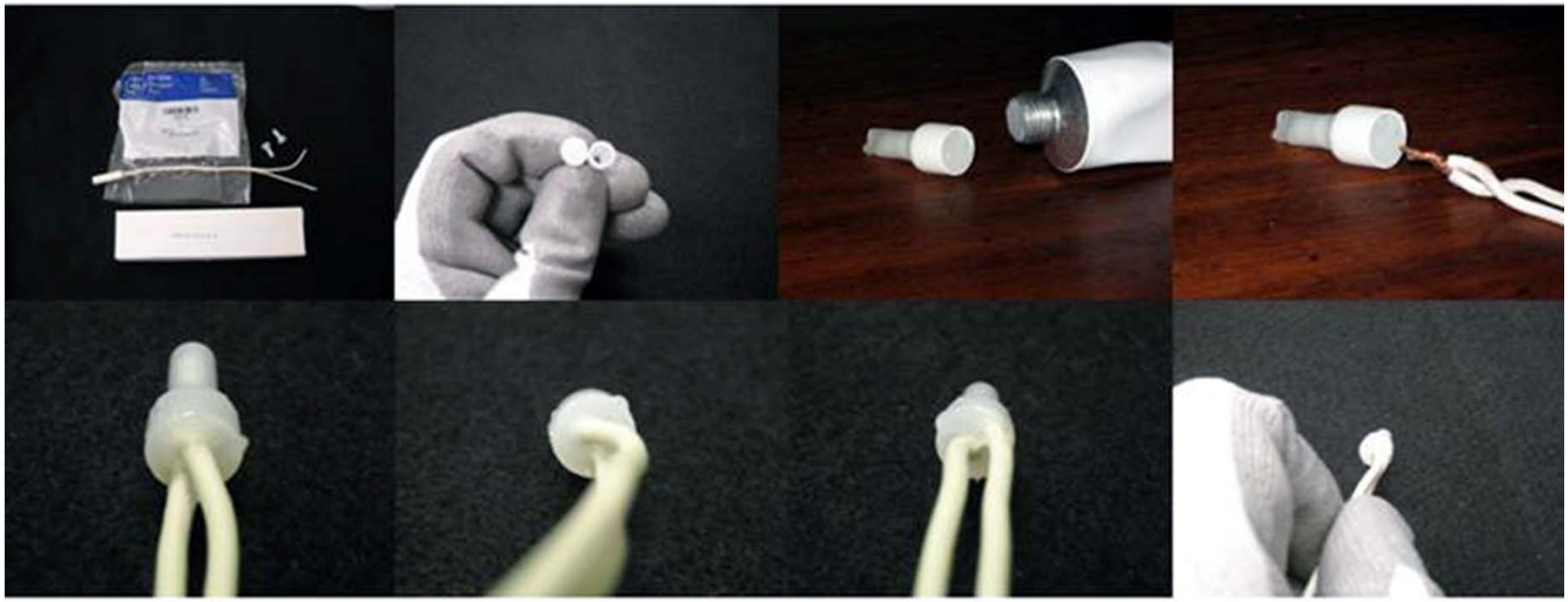
Thermistors - Replacing

WR97X163 Silicone grease

WR01X10466 Bell Connector





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Humidity Sensor

(Front grill removed)

- Humidity Sensor is located behind the front grill at the bottom of the refrigerator.
- Approximately in the center of the lower rail.
- It is held in place with one Phillips-head screw

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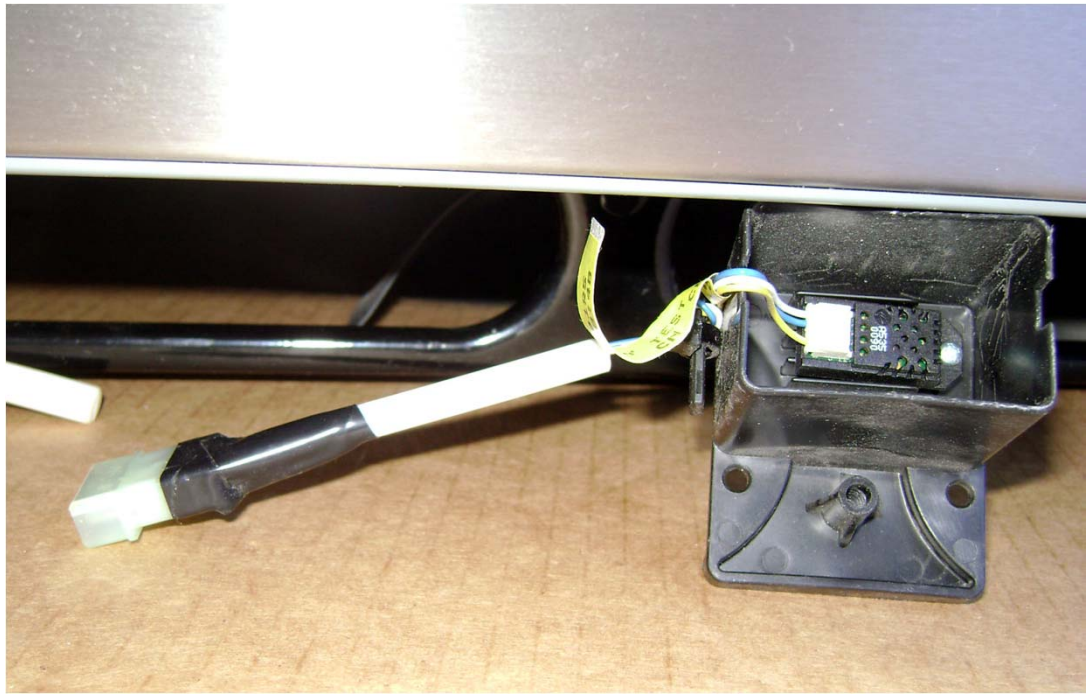
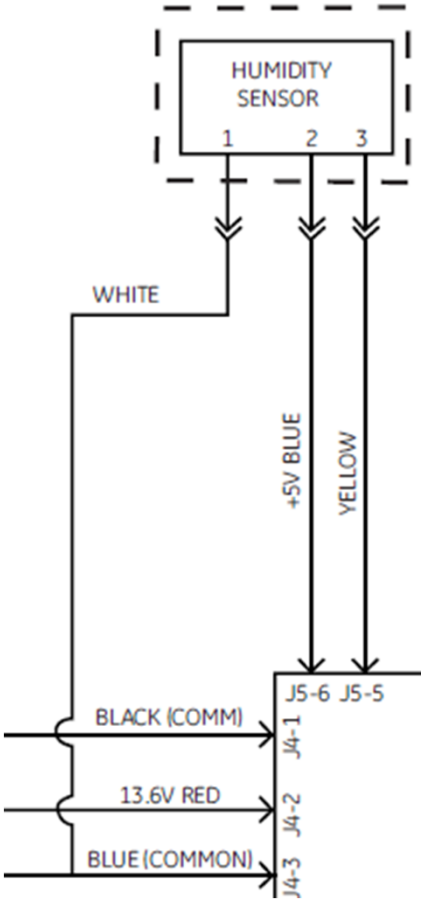
Humidity Sensor - Testing





Pins 1 to 2 --- constant 5 vdc.
Pins 1 to 3 --- varies with humidity from about 1.11 vdc to 3.62 vdc. The higher the humidity the higher the output voltage. Any output higher than @ 4 vdc or lower than 1 vdc, the sensor is bad

F.I. Testing – A reading of appx 0-100 would be considered normal.
A reading of 150 or higher indicates a failed humidity sensor.

NOTE: A failed sensor could keep the heaters on for longer periods.

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Main Control Board and Dispenser Board

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Dispenser Board

Pull out at the bottom to release tabs.

Dispense tray slides forward

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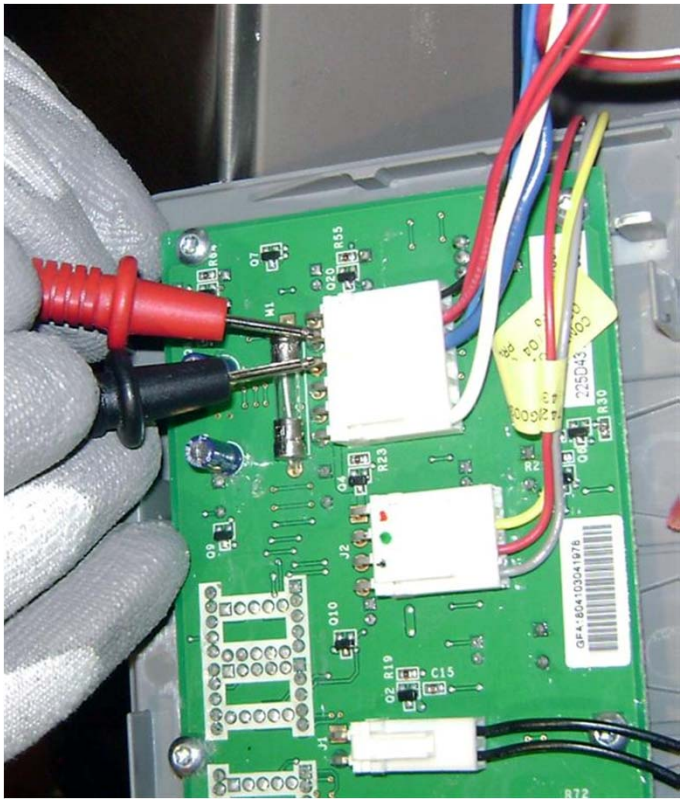
Dispenser Board

Testing for 13VDC supply voltage at Blue &Red pins. Black is Communication



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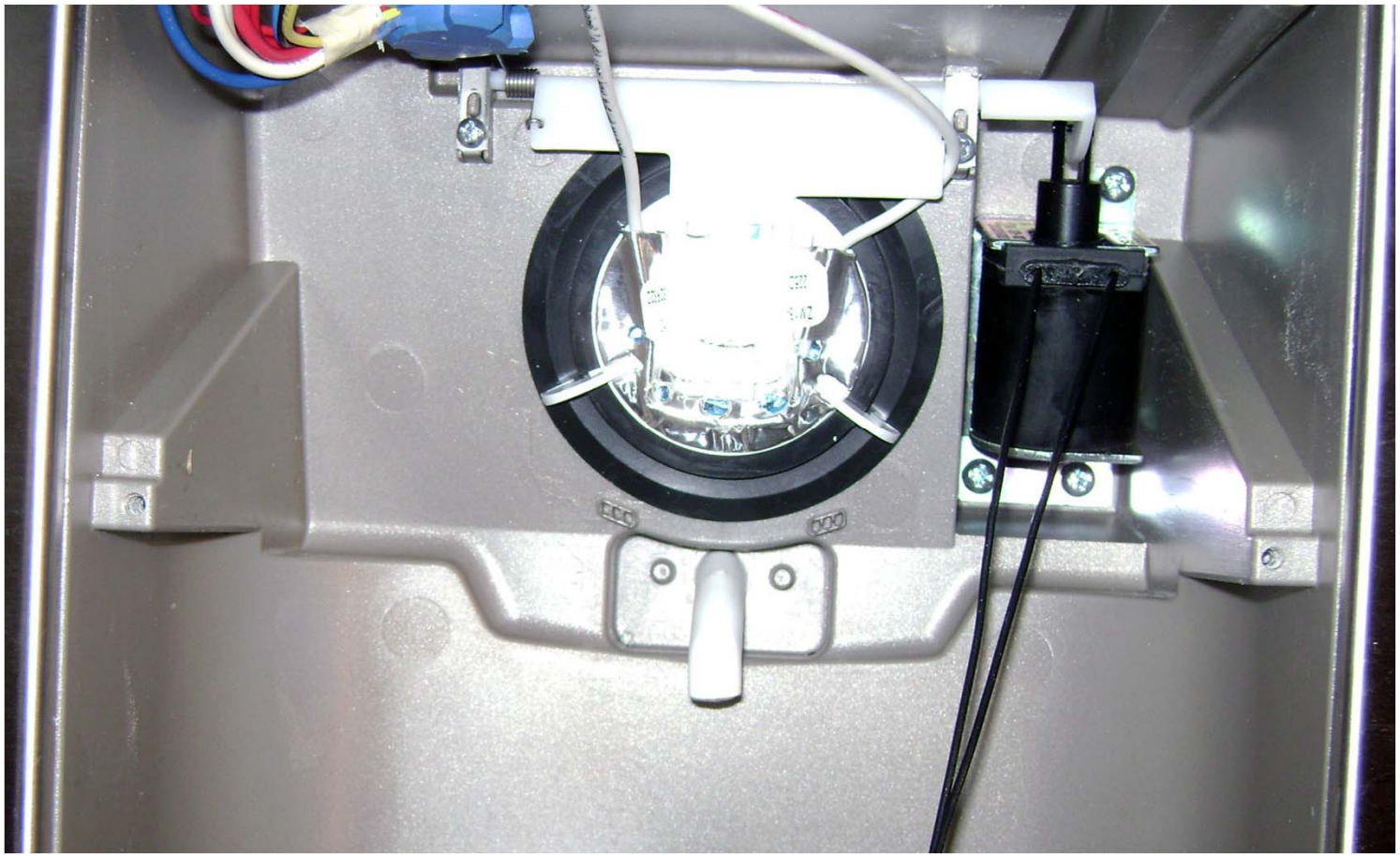
Dispenser Board



Duct door heater location

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Dispenser Board – Off position

To turn refrigerator “Off” consumer has to turn BOTH settings to the warmest AND while control is beeping.

Once one section is turned to “highest” setting and then the other is also set to warmest, the control starts to beep. If customer waits for beeping to stop before pressing warmest pads again, the unit will stay ON and in the warmest setting for both sides

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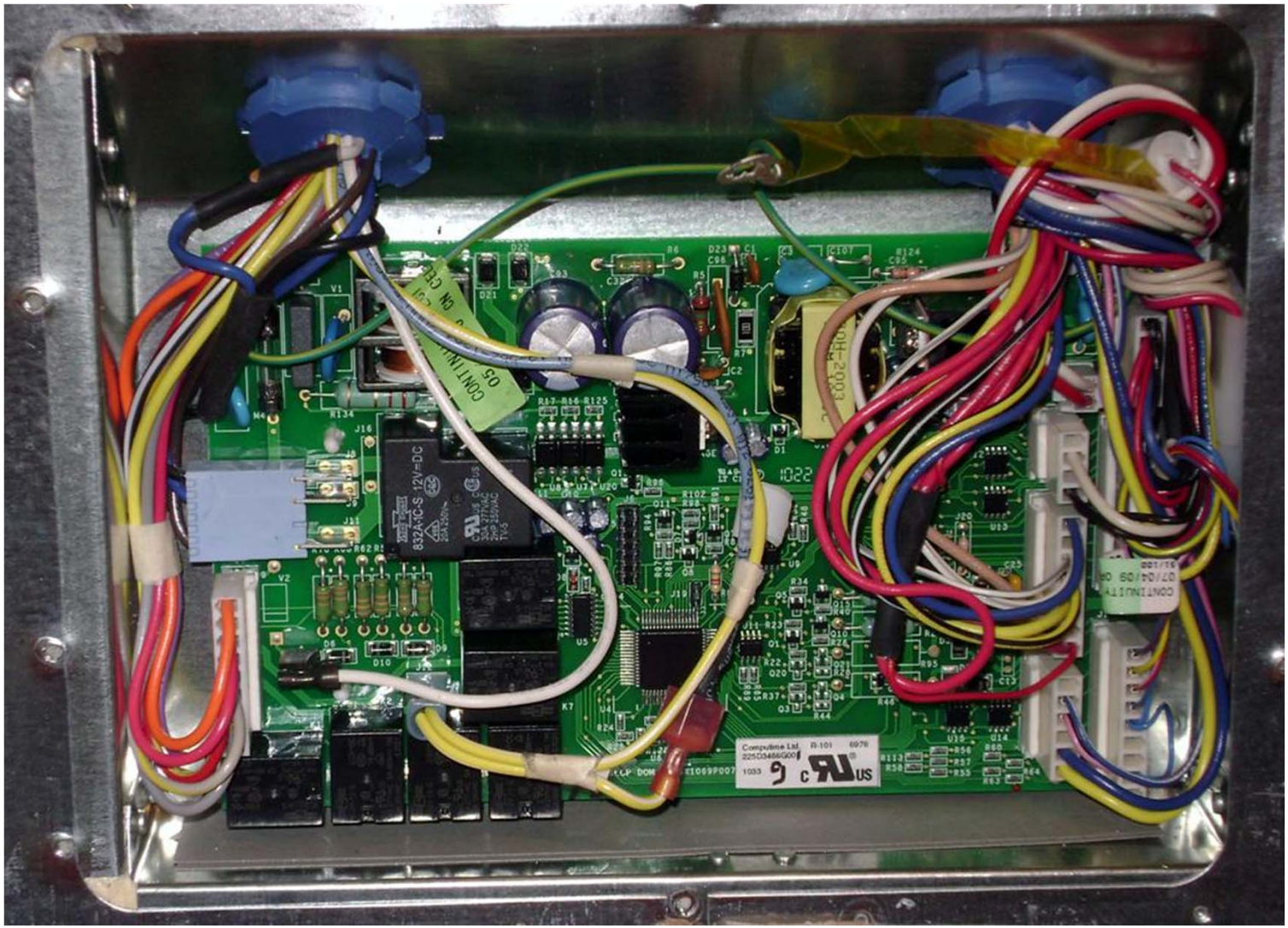
Main Control Board



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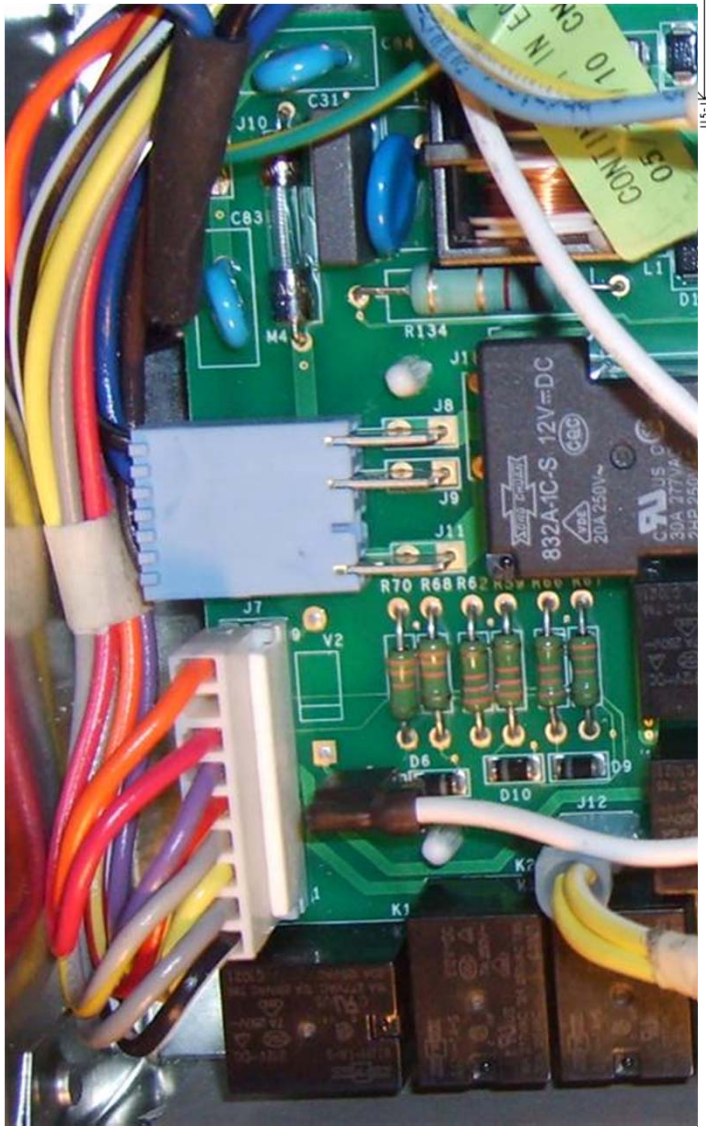
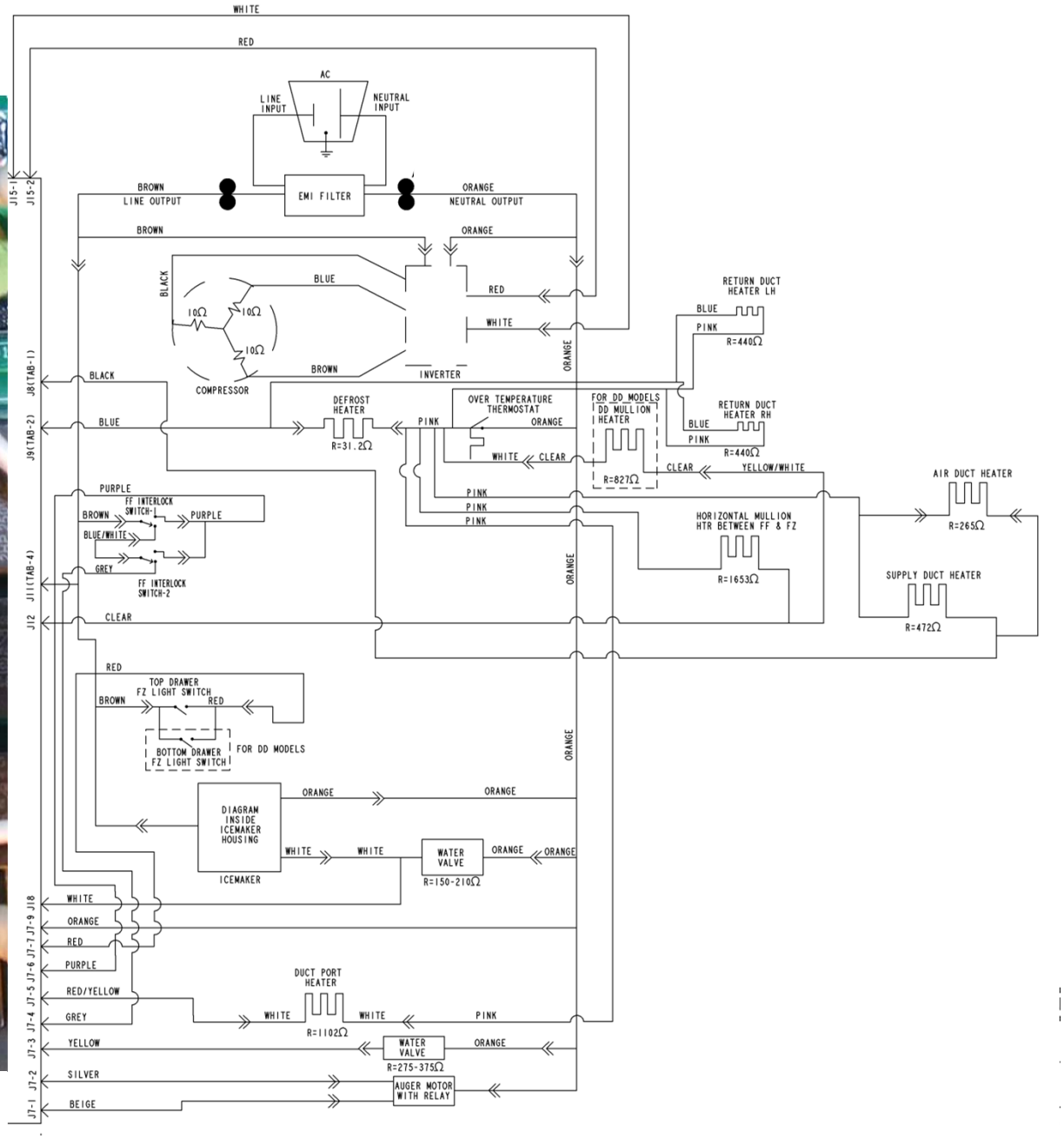
Main Board - A/C





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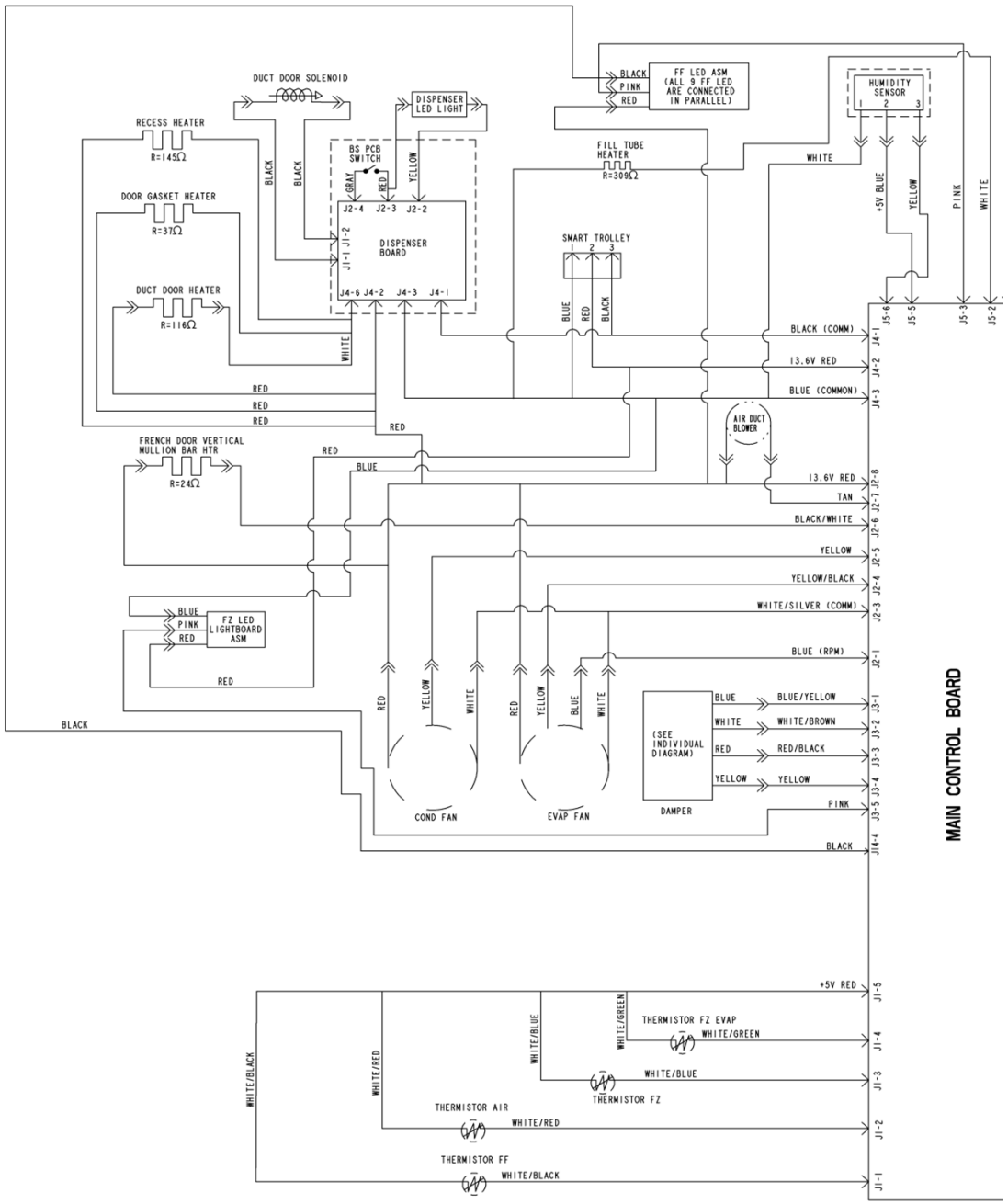
Main Board - D/C



Compressor & Inverter

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Compressor & Inverter

Three speed / three phase inverter controlled compressor

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Compressor & Inverter

Never Direct test an inverter compressor

1) Test for inverter signal voltage 4-6VDC at J15 connector (if unplugged voltage 11-14 VDC)
2) Test for 120VAC supply voltage to inverter
3) Test compressor windings 10 Ω.

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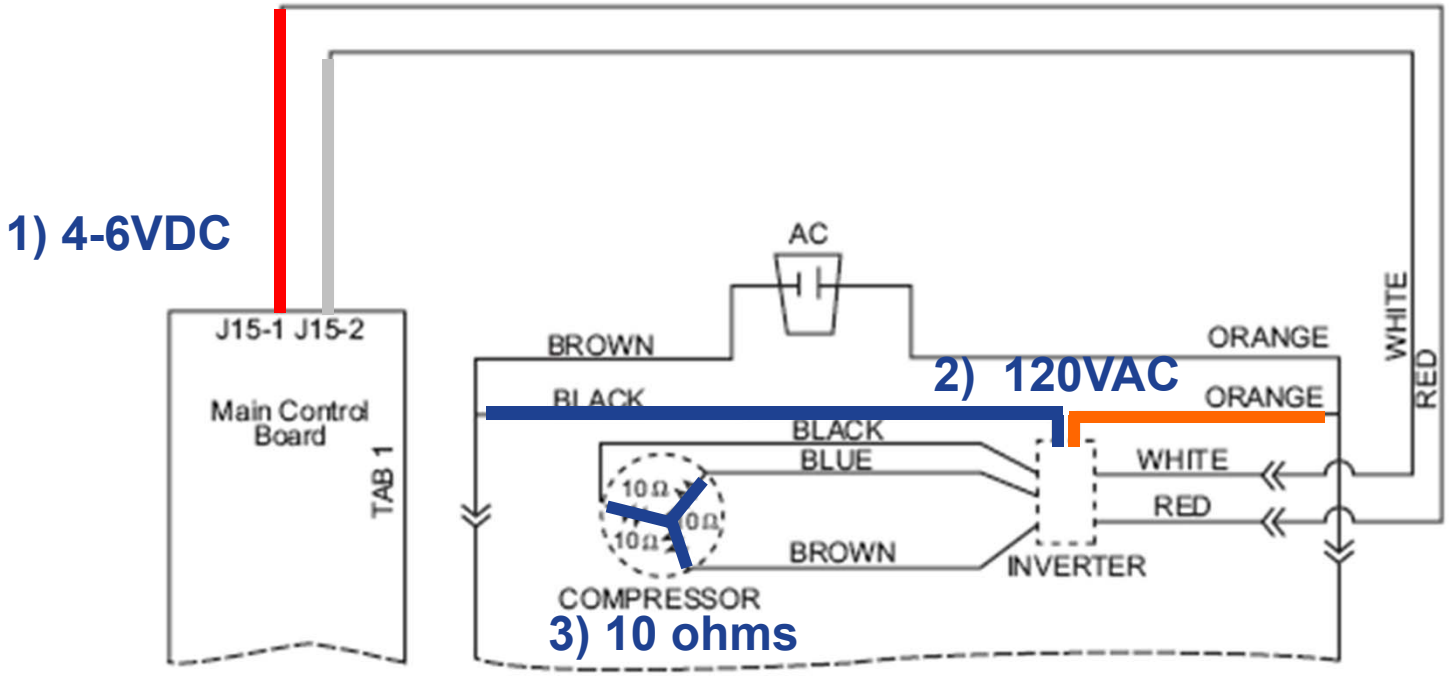
Inverter Compressor Testing



Note: When measuring signal voltage (from the main control board) at the inverter, a reading of 4-6 VDC will be measured with all wires connected. If the inverter wiring is disconnected, the board output will measure between 10-12 VDC.

The inverter receives commands from the main control board. The main control board will send a PWM run signal from the J15 connector of between 4-6 VDC effective voltage to the inverter (all wires must be connected). The inverter will select compressor speed (voltage output) based on this signal.

The main control board will only send a run signal to the inverter when the compressor should be on.

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End of presentation for BM with Ice & Water in the door

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