GE Profile 42” & 48” Refrigerators

PSB42LSRBV
PSB42LGRWV
PSB42LGRBV
PSB48LSRBV
PSB48LGRWV
PSB48LGRBV

imagination at work

GE Consumer & Industrial Training Team

2005

GE Consumer & Industrial Training

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

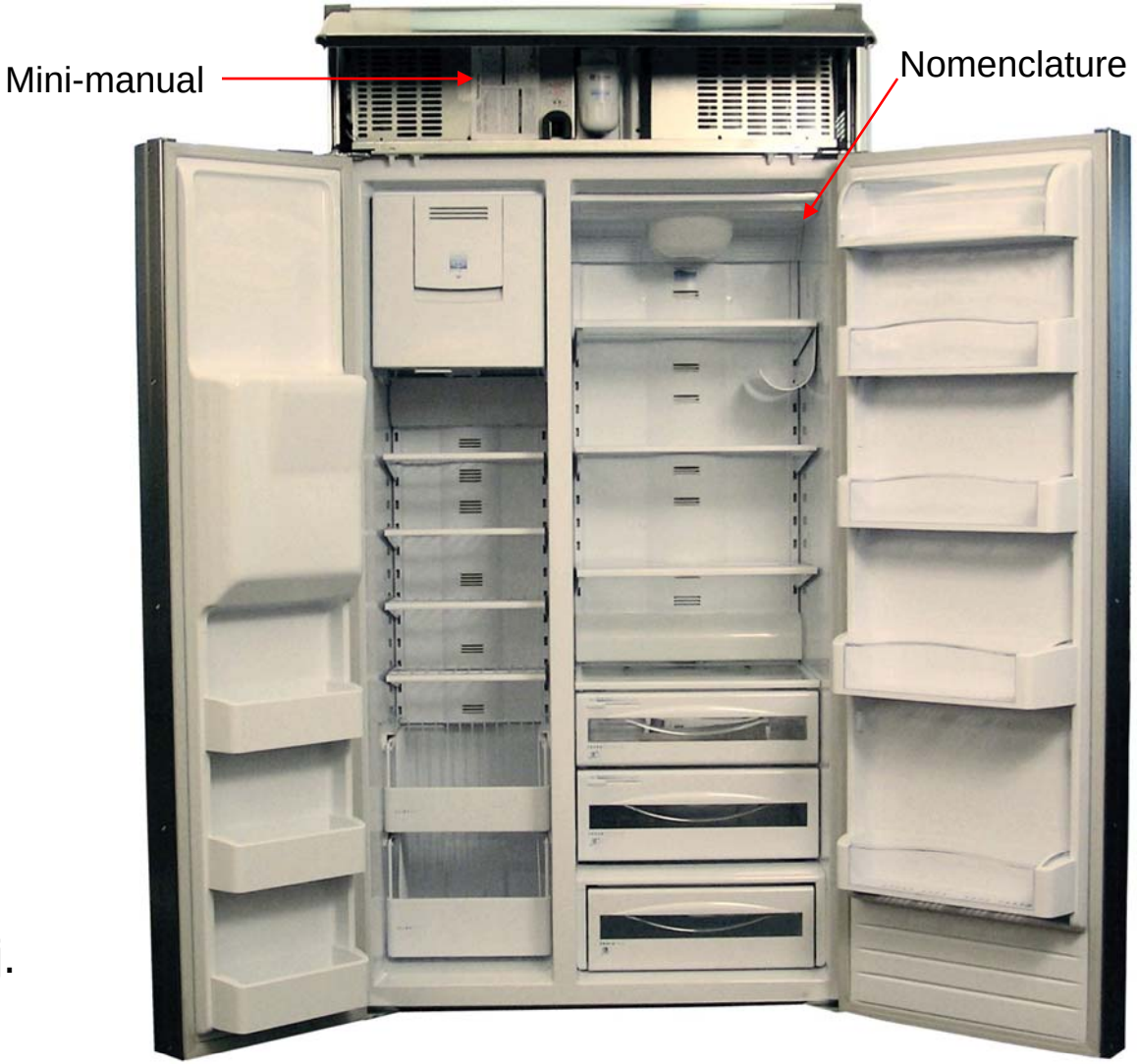
- ✓ To avoid personal injury, disconnect power before servicing this product. If electrical power is required for diagnosis or test purposes, disconnect the power immediately after performing the necessary checks.

RECONNECT ALL GROUNDING DEVICES

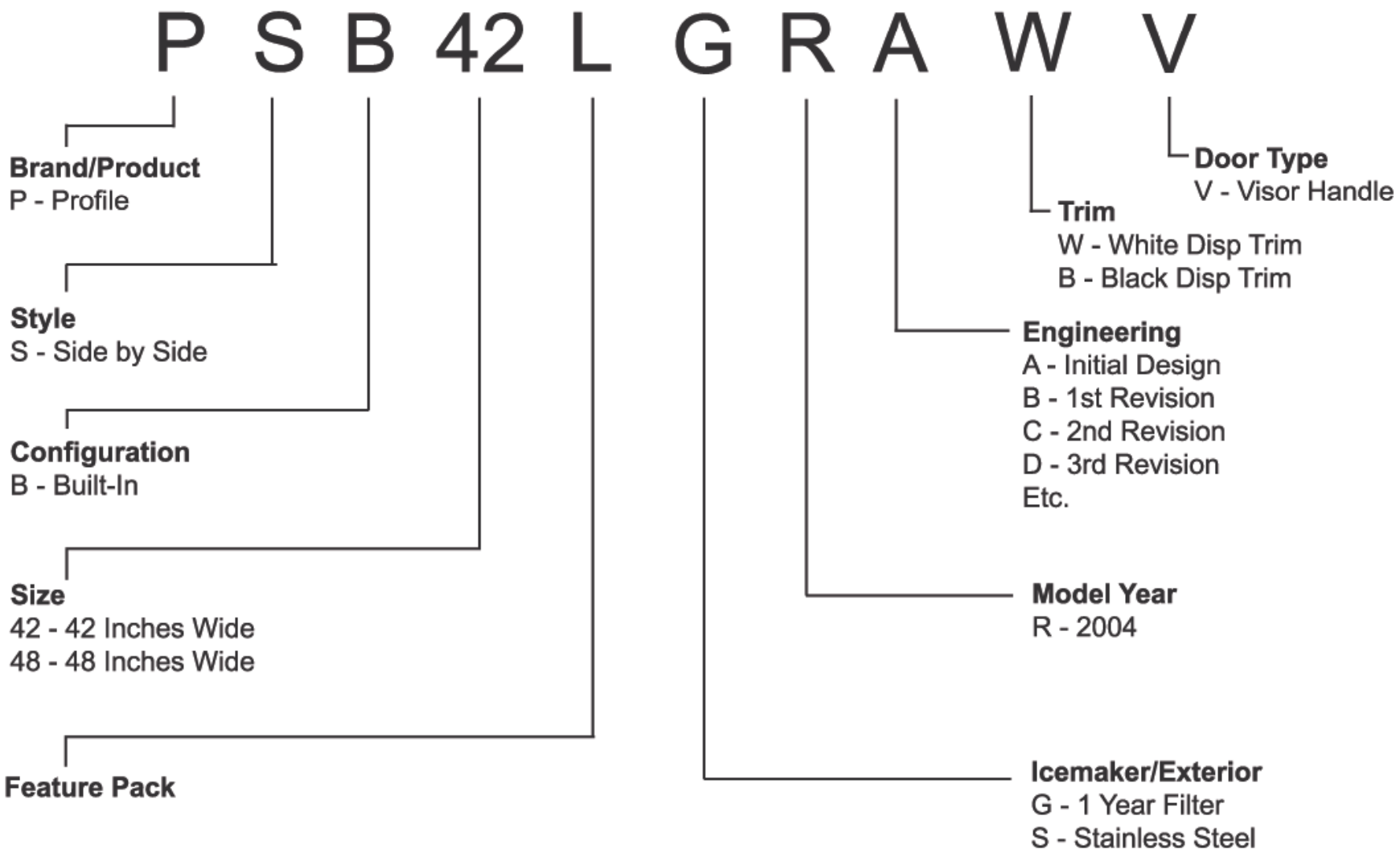
- ✓ If grounding wires, screws, straps, clips, nuts, or washers used to complete a path to ground are removed for service, they must be returned to their original position & properly fastened.

Introduction

- Separate Evaporators
- 3-Way Valve
- Control Board with Inverter
- Room Ambient Thermistor
- Dispenser Cube Motor
- Duct Door Motor & Cam
- 4 Point Leveling – All Front Adj.



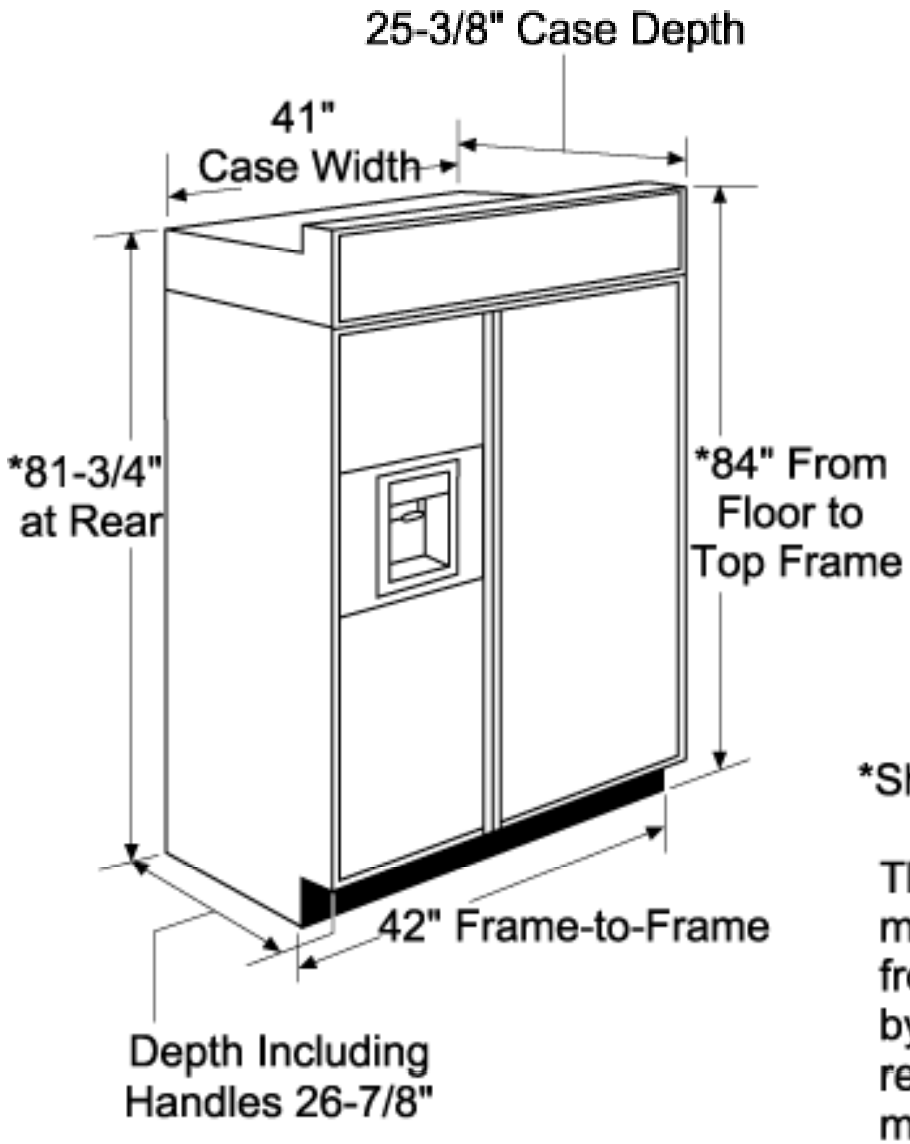
Nomenclature



Warranty

For The Period Of:	GE Will Replace:
Two Years *From the date of the original purchase*	***Any part*** of the refrigerator which fails due to a defect in materials or workmanship. During this ***full two-year warranty,*** GE will also provide, ***free of charge,*** all labor and in-home service to replace the defective part.
Five Years *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 ***full five-year sealed refrigerating system warranty,*** GE will also provide, ***free of charge,*** all labor and in-home service to replace the defective part in the sealed refrigerating system.
Limited Additional Seven Years *From sixth to twelfth year after original purchase date of the refrigerator*	***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 additional seven-year sealed refrigerating system warranty,*** GE will provide, ***free of charge,*** replacement parts.
Thirty Days *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.

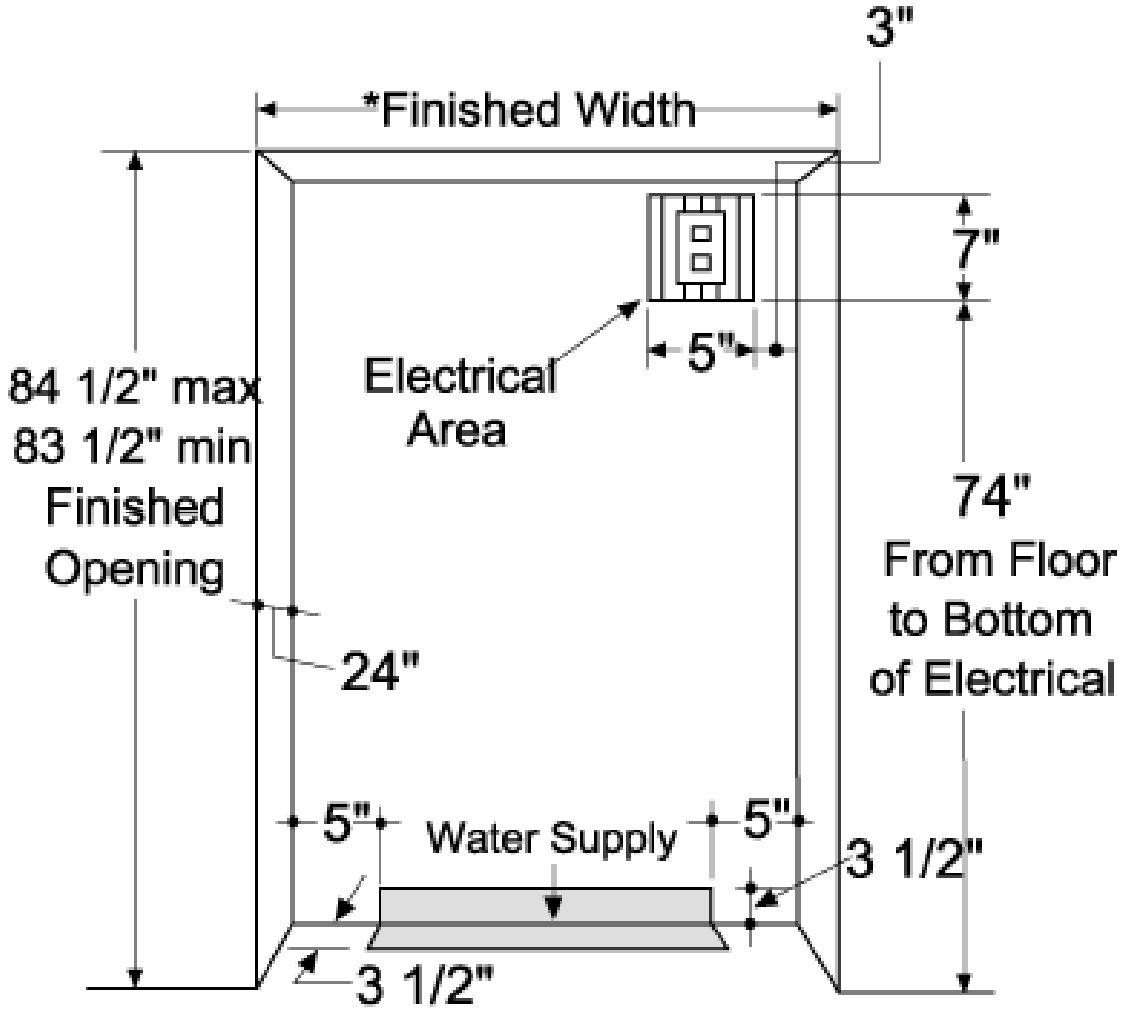
Installation



*Shipping height

The front height may be adjusted from 83-1/2" to 84-1/2" by adjusting front and rear leveling legs a maximum of 1".

Installation



*The finished cutout width must be:

41-1/2" for 42" models

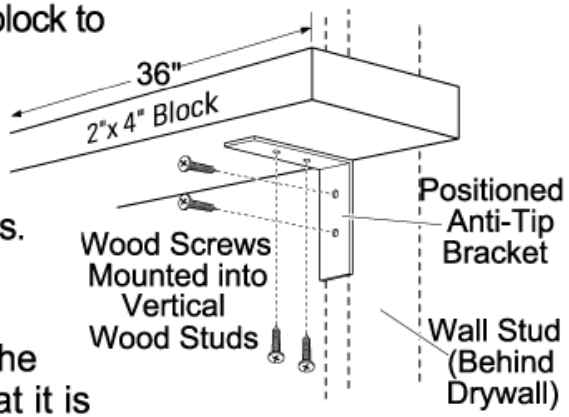
Installation

INSTALL ANTI-TIP BRACKETS

⚠ WARNING: ANTI-TIP PRECAUTIONS

The refrigerator is Top-Heavy and must be secured to prevent the possibility of tipping forward.

- Cut a 2" x 4" wood block 36" long, and secure the block to the mounting brackets provided, using #12 or #14 wood screws.



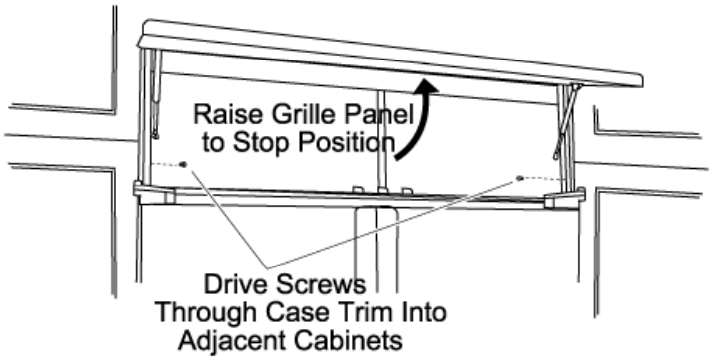
- Secure the brackets with wood block to the back wall so that it is 82" (or the rear installation height) from the finished floor . Use #12 or #14 wood screws.
- Screws must penetrate at least 1" into vertical wall studs.

SECURE REFRIGERATOR TO CABINETS

Whenever possible, perform this step for anti-tip security

The refrigerator must be secured to prevent tipping.

- Raise the grille panel to access case trim.
- Drive a screw through the trim and into the adjacent cabinet using holes provided.
- Follow the same procedure on the opposite side.

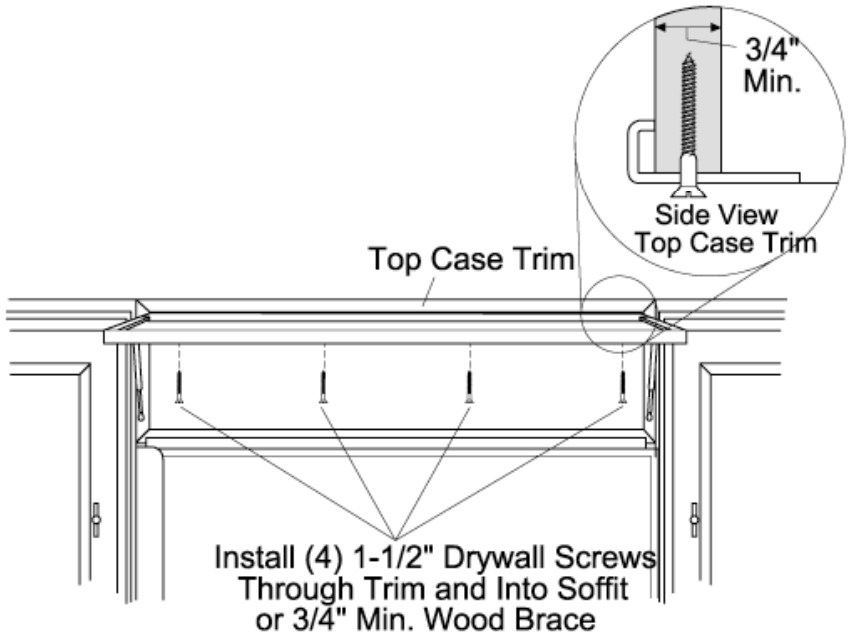


Installation

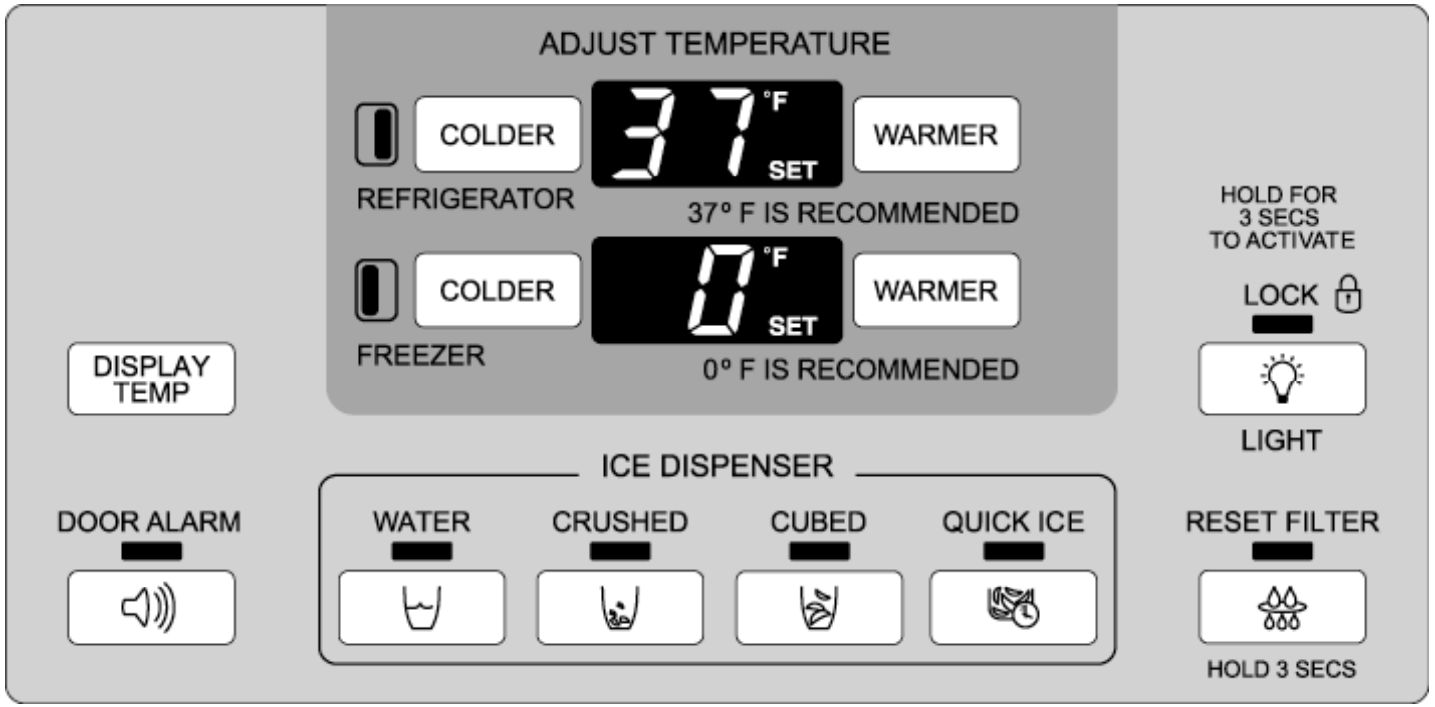
ALTERNATE ANTI-TIP PRECAUTIONS

SKIP THIS STEP WHEN USING ANTI-TIP BRACKETS

All Profile built-in refrigerators are Top-Heavy. They must be secured to prevent the possibility of tipping forward. Use this alternative method to secure the refrigerator whenever steel wall studs are encountered.



Dispenser Control



- **Refrigerator temperature can be adjusted between 34°F (1°C) & 47°F (8°C)**
- **Freezer temperature can be adjusted between -6°F (-21°C) & 8°F (-13°C)**

Display after a Power Failure

Display after power failure:

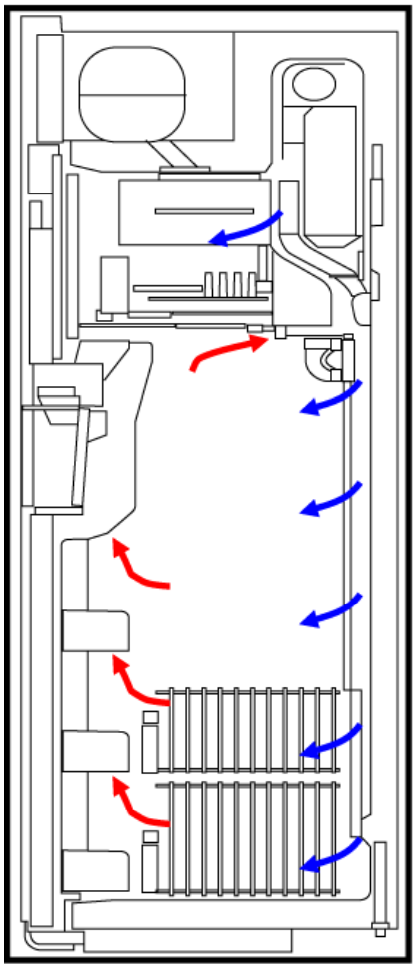
After a power failure, the display will reset based on freezer temperature. If the freezer temperature is below 40˚F, the display will retain the settings prior to power loss. The chart at the right describes the possible settings.

Control Function	Freezer<40˚F	Freezer>40˚F
Refrigerator Set Temperature	Previous Setting	Default (37˚F)
Freezer Set Temperature	Previous Setting	Default (0˚F)
Door Alarm	Previous Setting	Previous Setting
Dispenser Option	Previous Setting	Default (Crushed Ice)
Quick Ice	Previous Setting	OFF
Reset Filter	Previous Setting	Previous Setting
Lock	Previous Setting	Previous Setting
Dispenser Light	Previous Setting	OFF

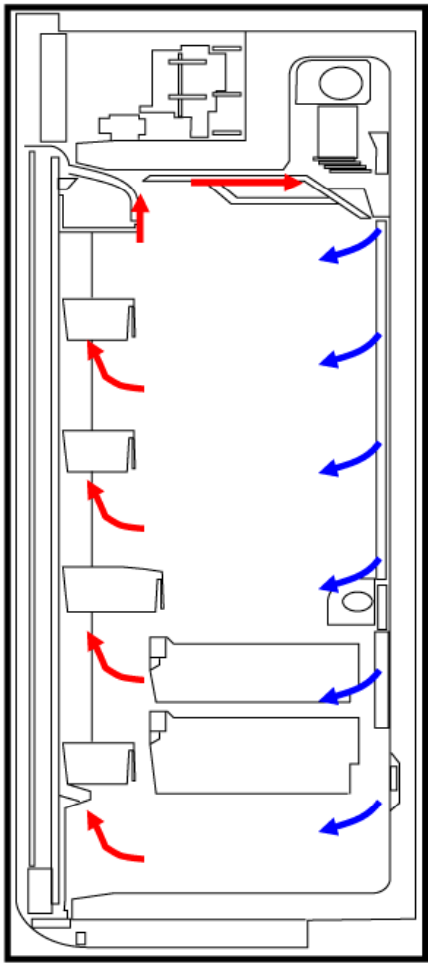
Air Flow

- The fans are extremely quiet.
- Fans turn off when the doors are opened (DC door switches control operation).
- Fans delay 10 seconds before restarting when the doors are closed again.
- The freezer door switch controls only the freezer fan.
- The fresh food door switch controls both the fresh food and freezer fan operation.

Freezer Air Flow



Fresh Food Air Flow

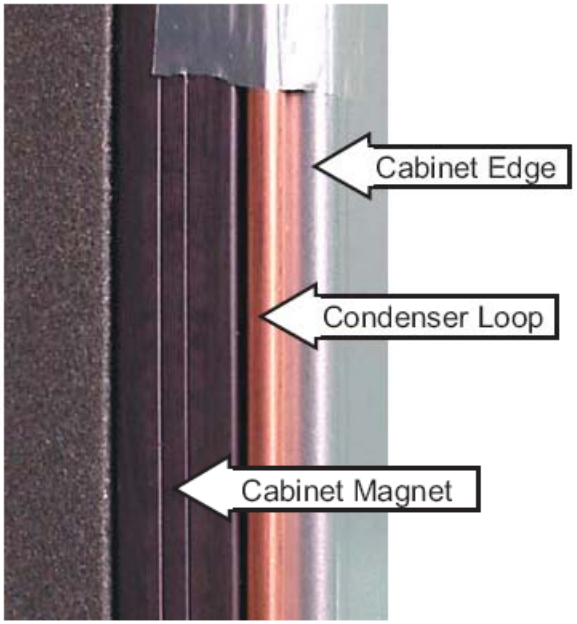


Warm Circulated Air

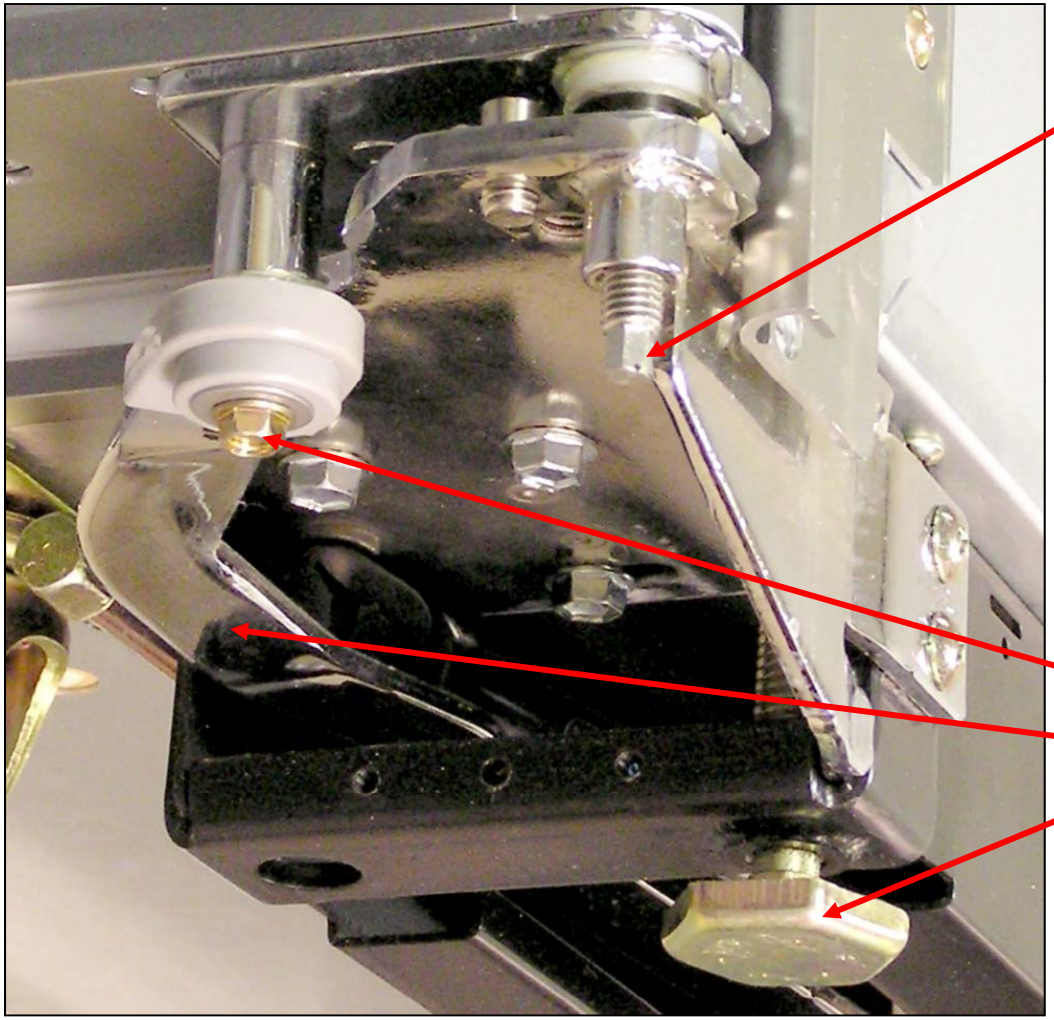
Fresh Cold Air

Door Gasket

Shown With Plastic Liner Removed



Fresh Food Door Alignment & Door Closure Assembly



- Freezer door is fixed in position.
- 7/32” socket or open end wrench.
- Clockwise to raise door.
- Raising the fresh food door too high will cause binding with the machine compartment door.

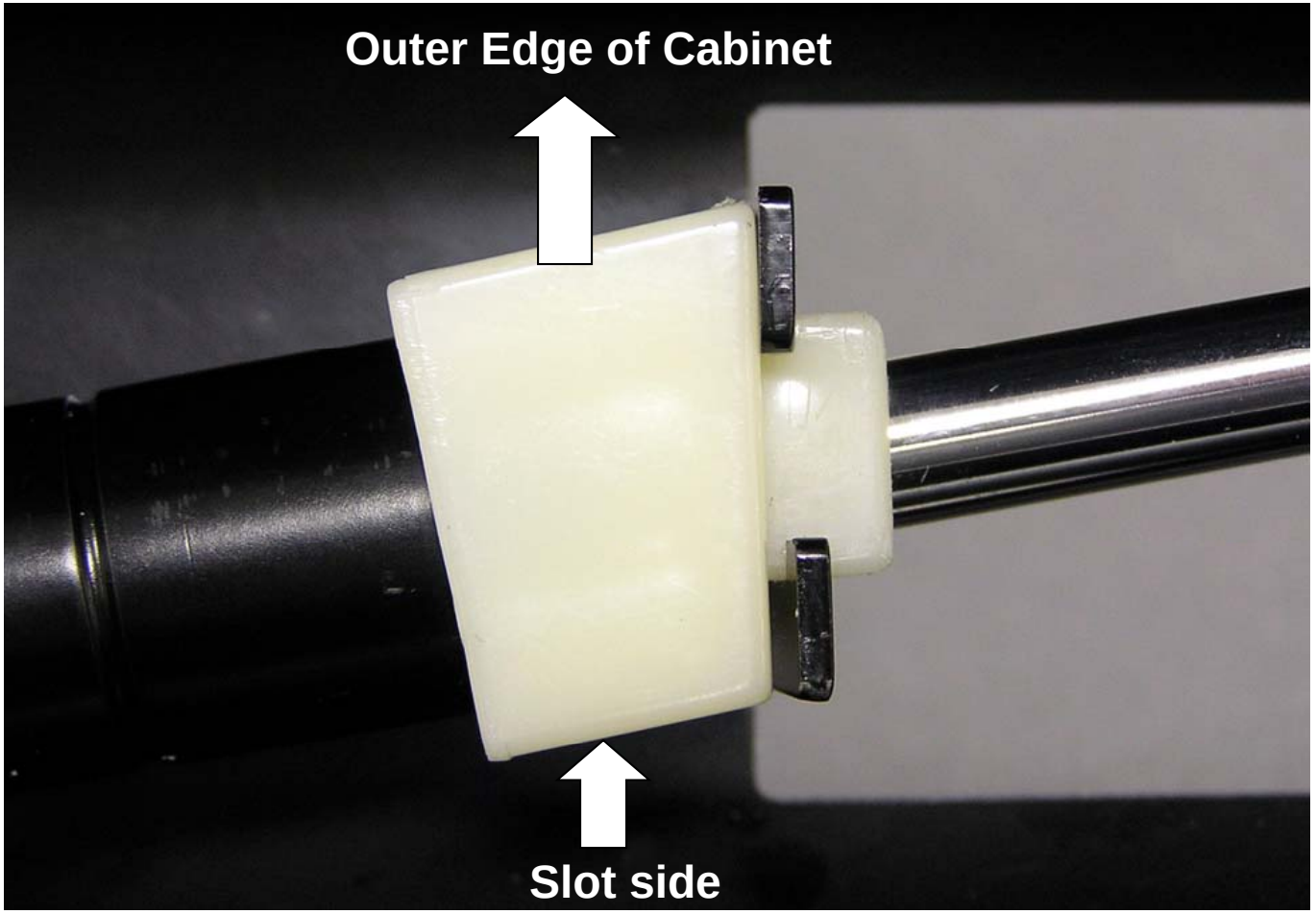
- 5/16” or 8mm hex head
- Linkage
- Shock absorber

Removing the Door Closer

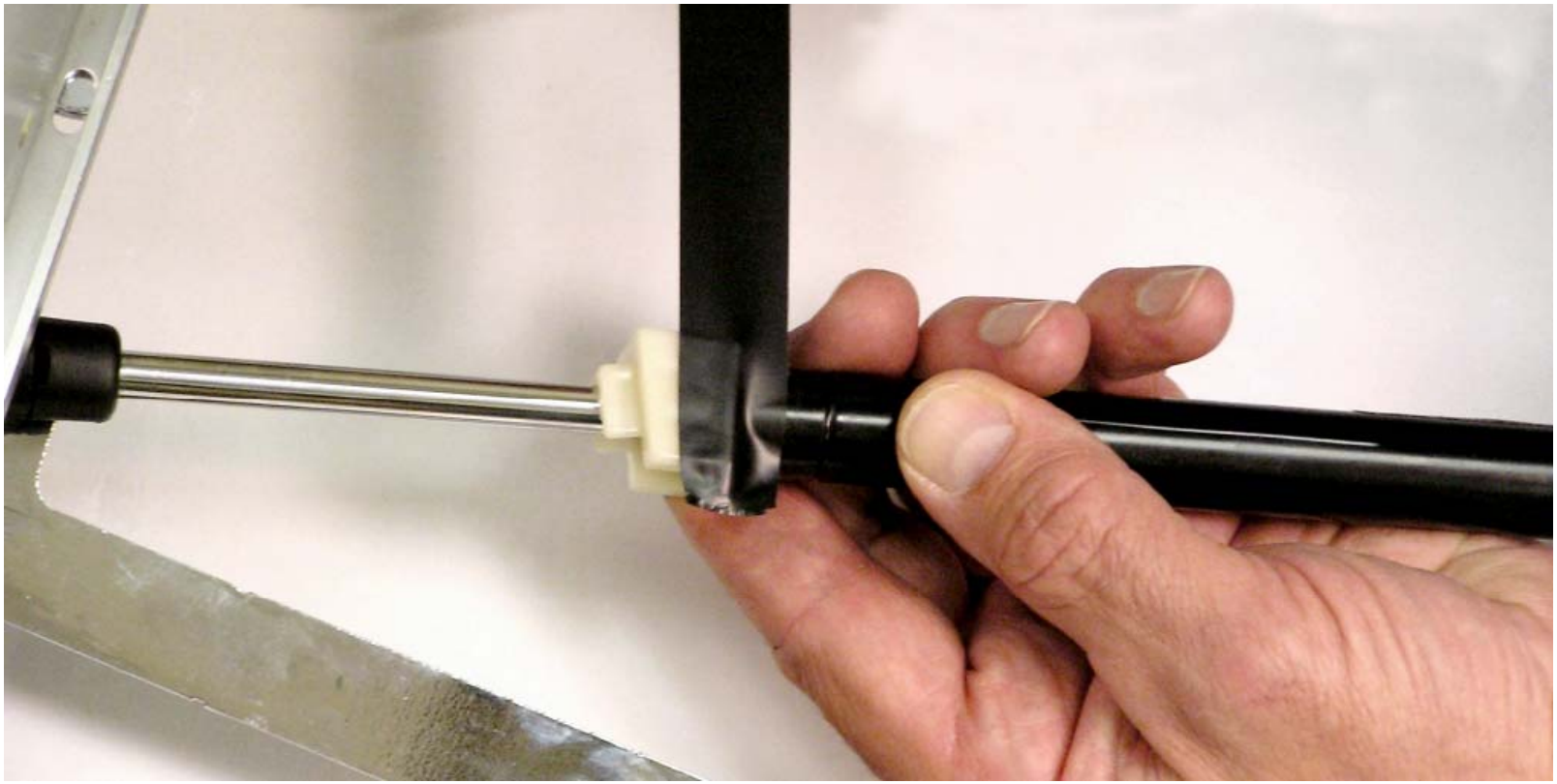
1. Remove the toe plate.
2. Remove the 8-mm mounting screw.
3. Insert a small screwdriver into the retaining clip at the bottom of the shock absorber and lift up (see photo).
4. Using a large screwdriver, lever the shock absorber off the pivot ball as shown.
5. Remove the door closer assembly by pulling it forward. Make certain to retain the white nylon shock absorber support.

Removed from frame for clarity

Door Closer Support



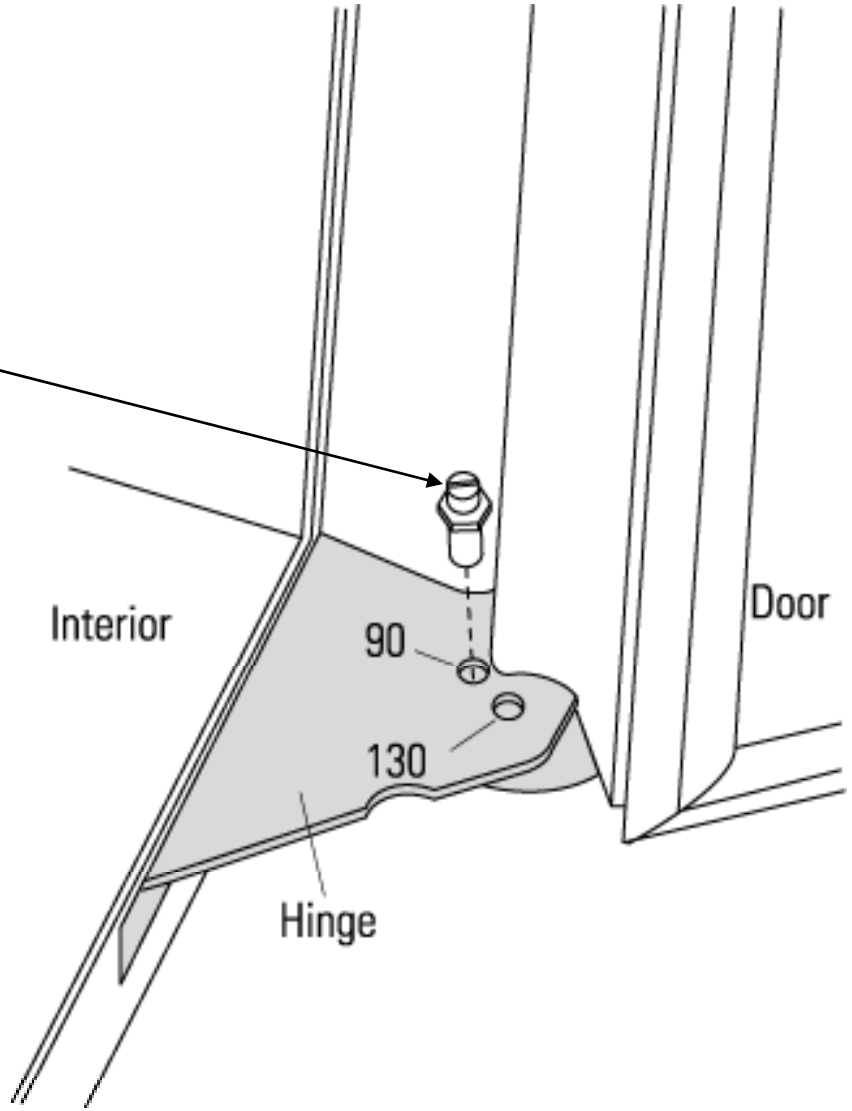
Reinstalling the Support



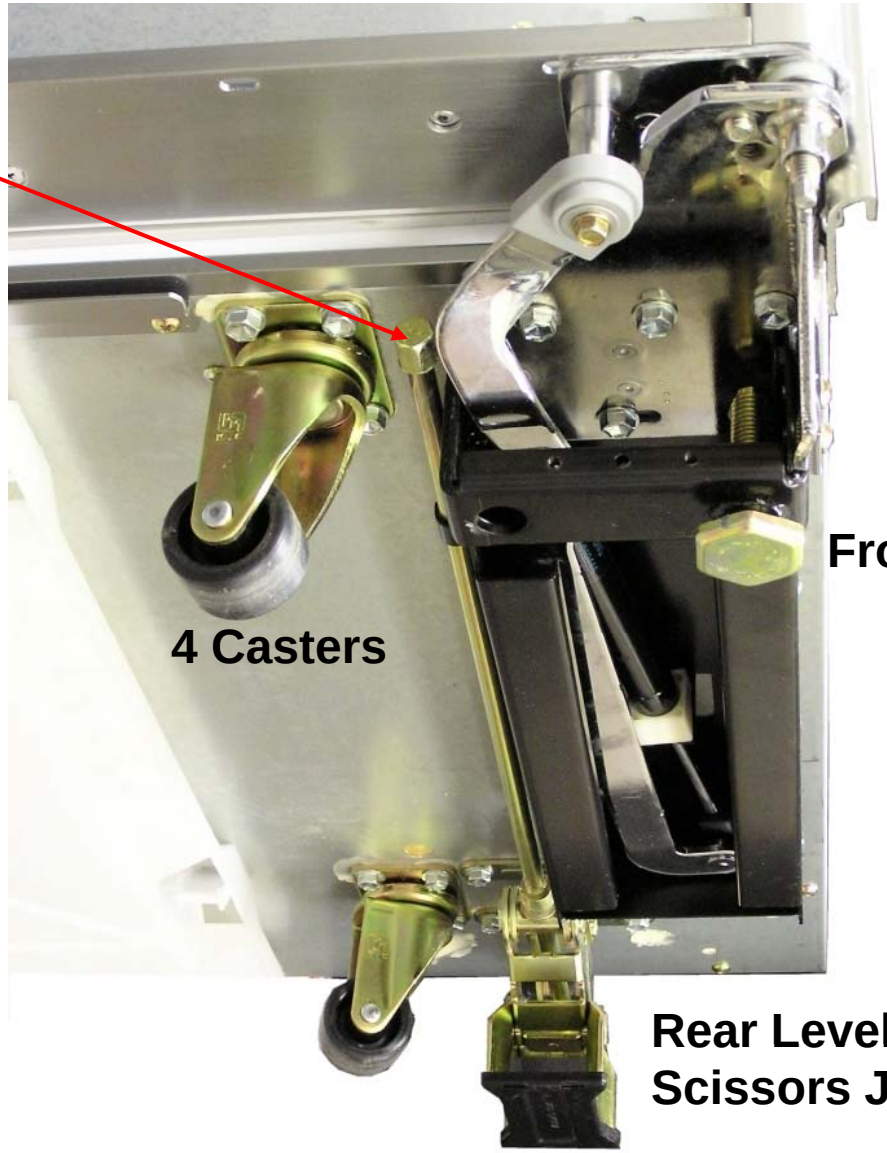
1. To make installation of the shock absorber easier, secure the white nylon support to the cylinder body with electrical tape .
2. Ensure the opening on the white nylon support faces towards the inside of the cabinet.
3. Make sure the door closer assembly support is fully seated in the bracket to ensure alignment of ball and socket.

Door Stop

The refrigerator has a 2-position door stop. When space does not allow the door to swing open fully to 130°, the stop can be adjusted to a 90° door swing. The pin is factory installed in the 130° location. To change the stop location, use a flat-head screwdriver to move the stop pin.



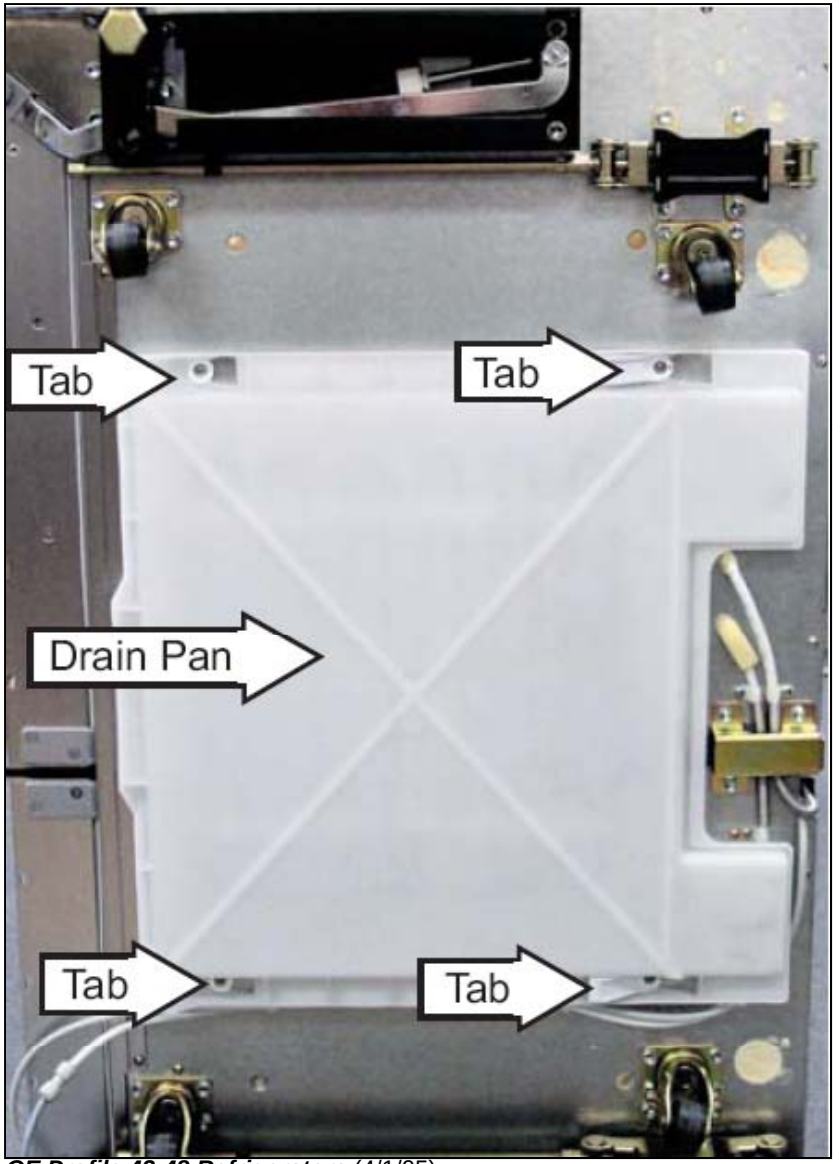
Casters & Leveling



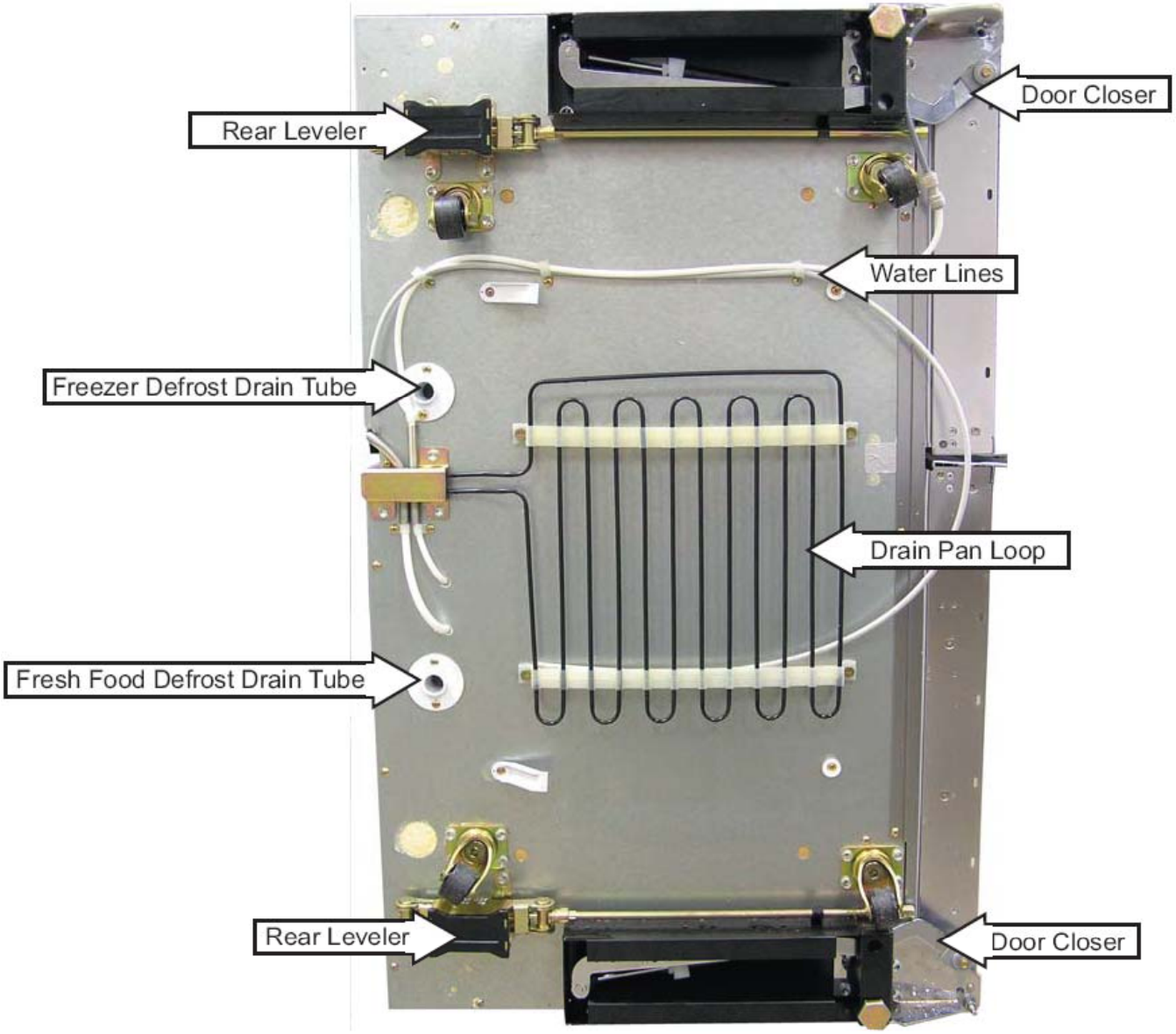
Drain Pan

Drain pan removal:

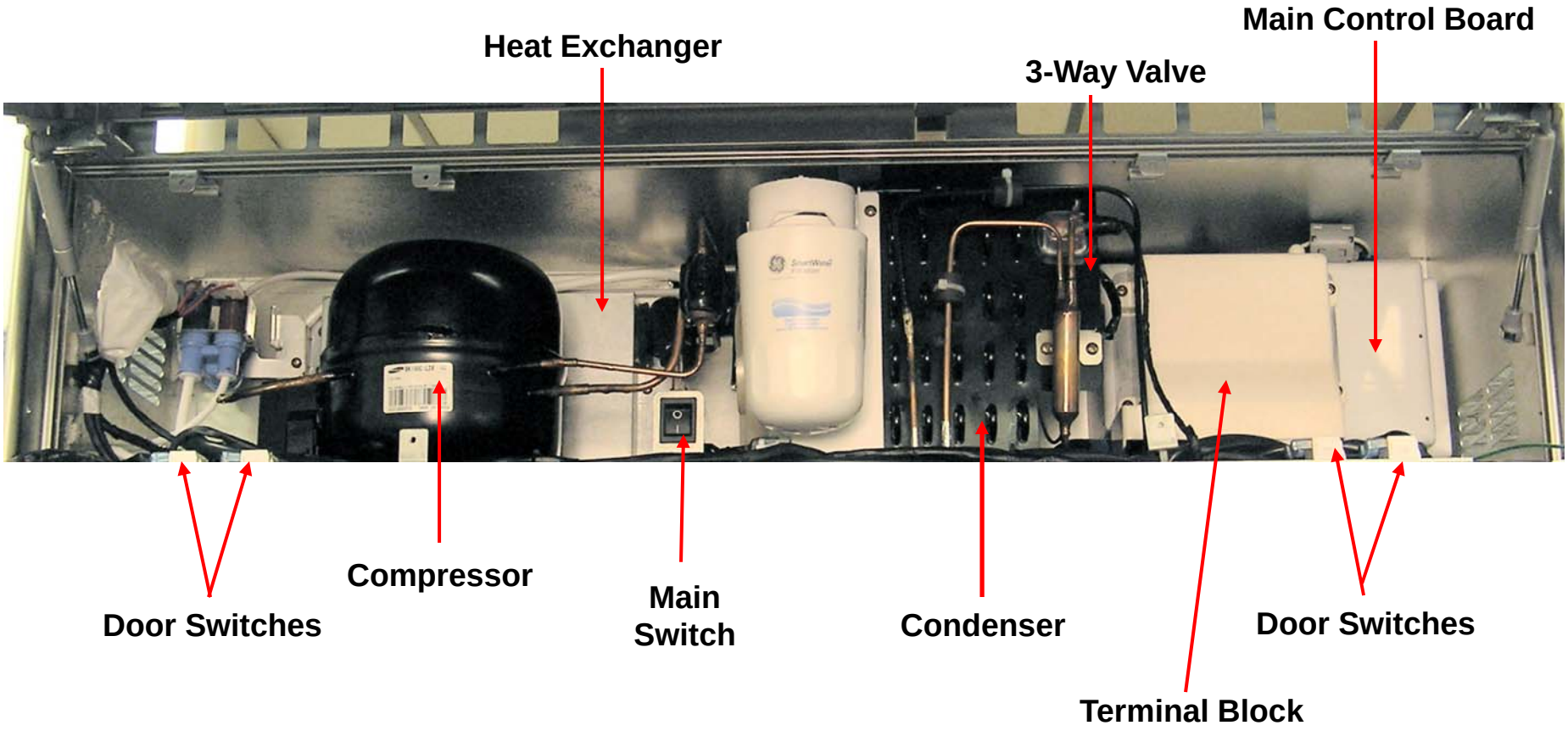
1. Remove the toe plate.
2. To remove the drain pan, grasp the center of the drain pan and pull outward.
3. To install the drain pan, slide it back into position so the rear and front mounting tabs engage.
4. Firmly push the drain pan into position.



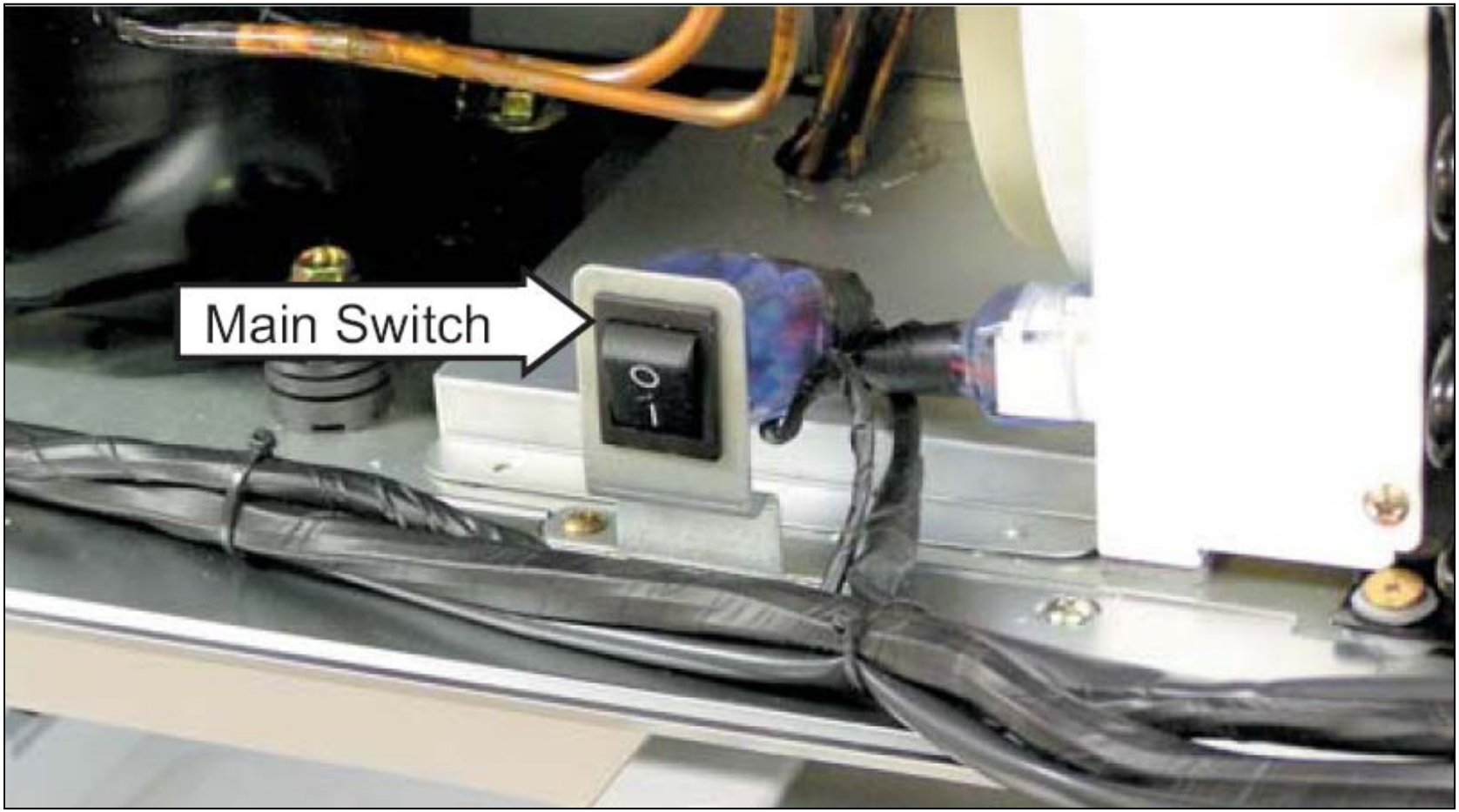
Underside of Cabinet



Machine Compartment View

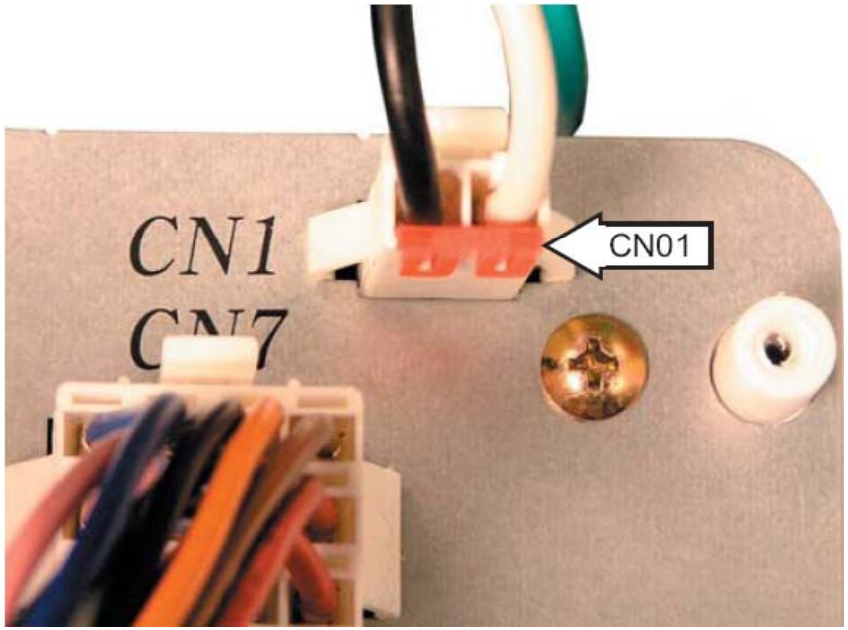


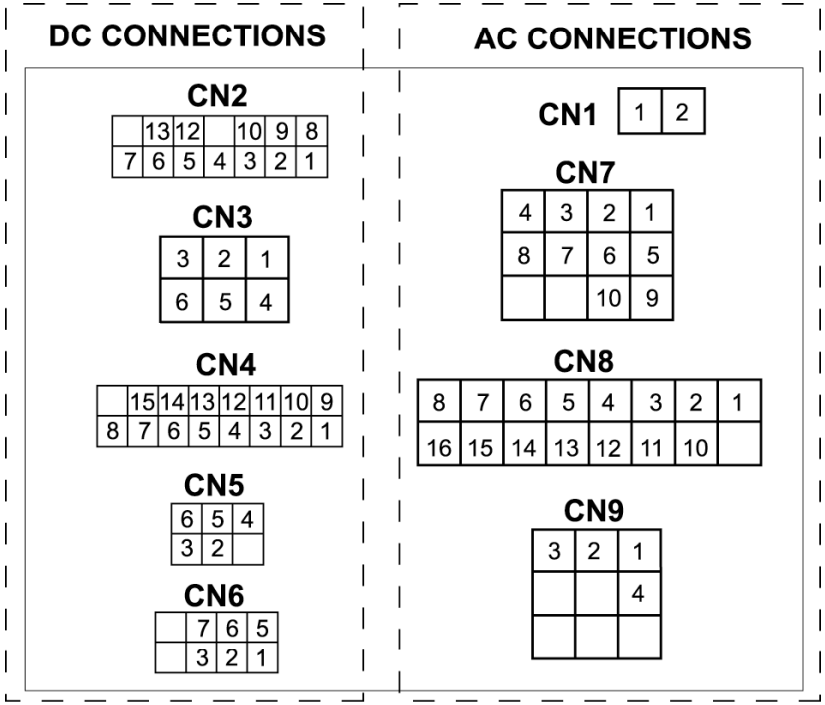
Main Switch

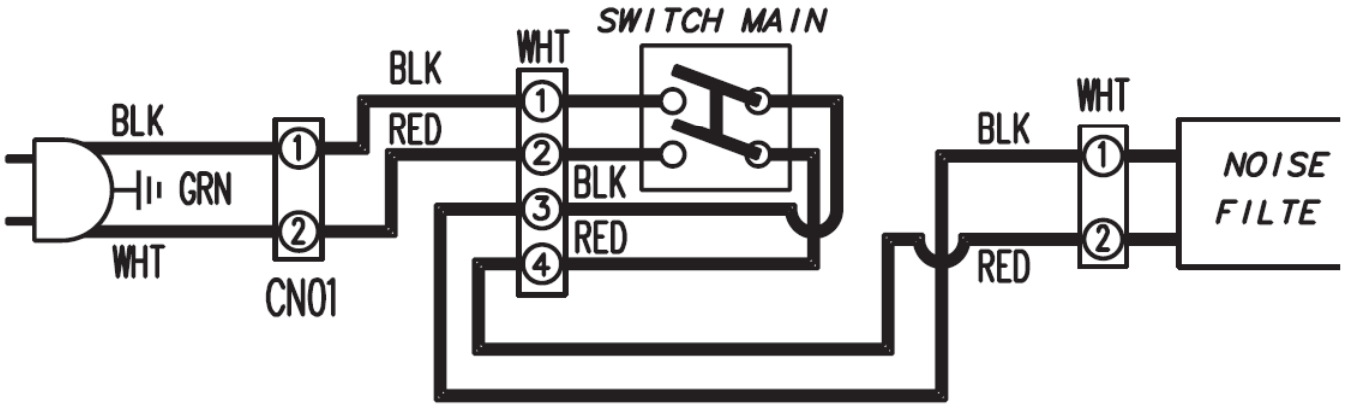


- **The main switch is supplied as part of an AC wiring harness & opens both the L1 & neutral side of the line.**

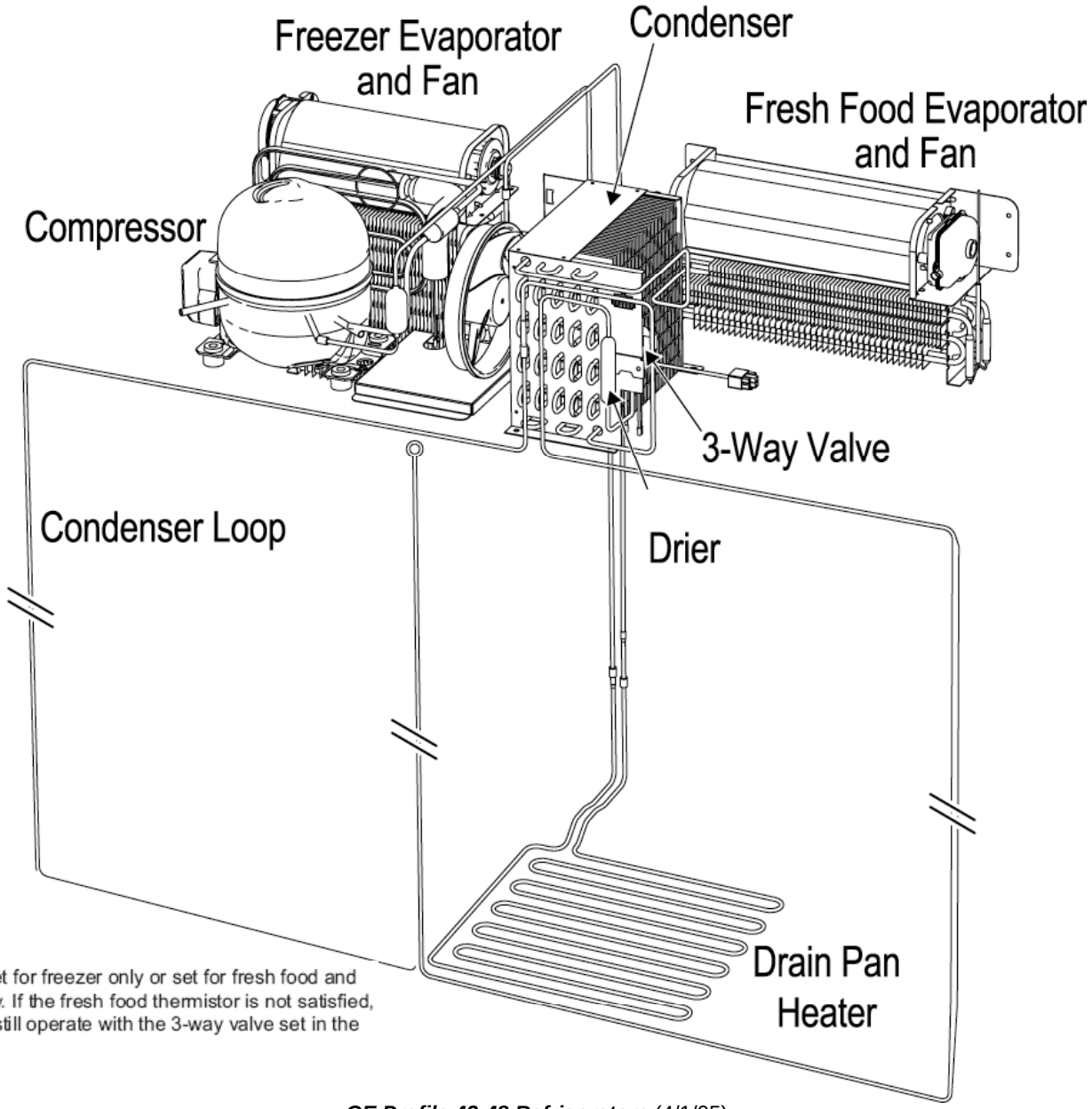
Main Switch Circuit







Refrigerant System



Note: The refrigerator will operate with the 3-way valve set for freezer only or set for fresh food and freezer. There is no 3-way valve setting for fresh food only. If the fresh food thermistor is not satisfied, but the freezer thermistor is satisfied, the refrigerator will still operate with the 3-way valve set in the fresh food and freezer mode.

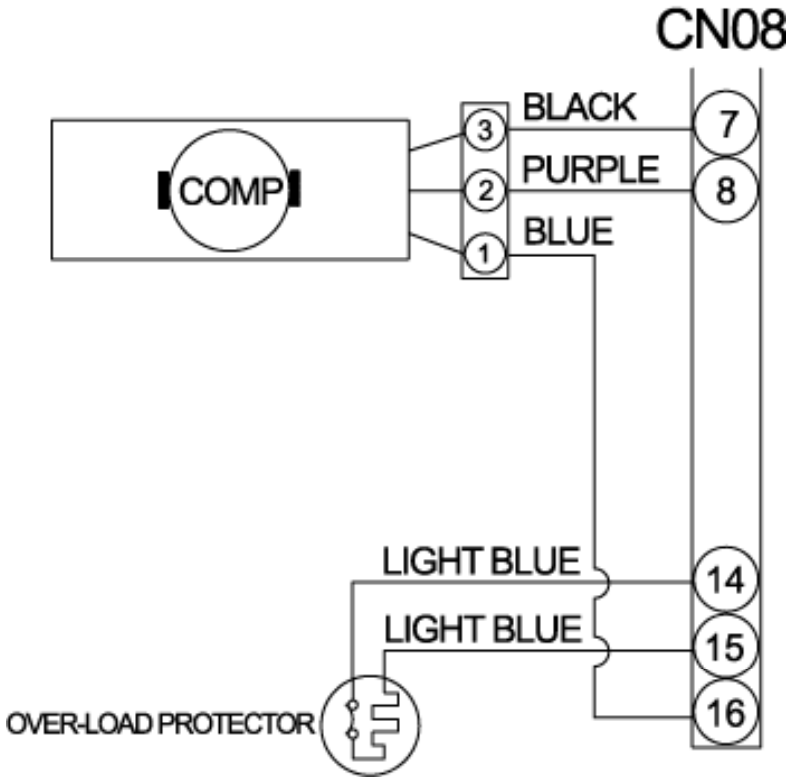
Compressor

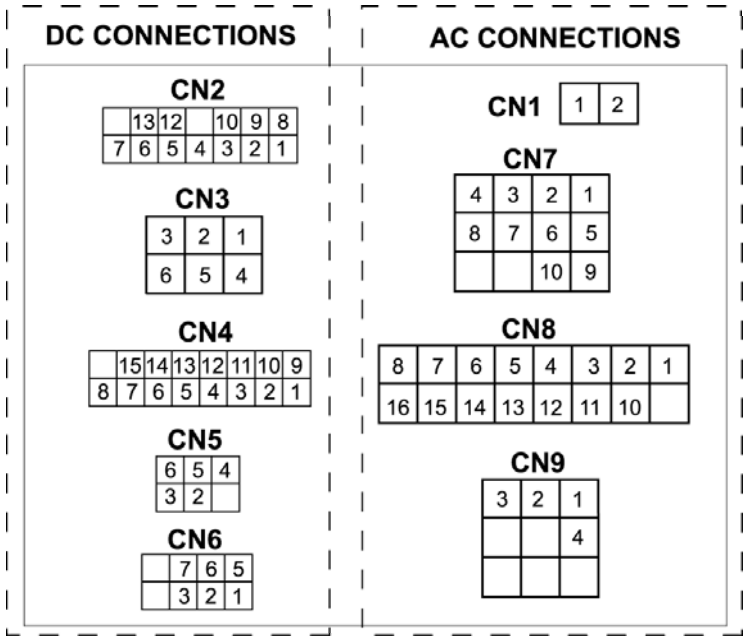
- The refrigerator uses a variable speed (2200 – 3800 RPM) inverter compressor.
- The inverter is built into the power control board.
- The compressor will delay one minute after power is applied to the refrigerator.
- The compressor resistance should be approximately 12Ω between any 2 pins.
- The thermal overload within the compressor terminal cover will open at 257°F (125°C) & reset at 156°F (69°C).

REFRIGERATION SYSTEM	
Refrigerant Charge (R134a)	8.11 ounces
Compressor	738-1270 BTU/hr
Minimum Compressor Capacity	
Vacuum	26 inches
Minimum Equalized Pressure	
@70˚F	66 PSIG
@90˚F	74 PSIG

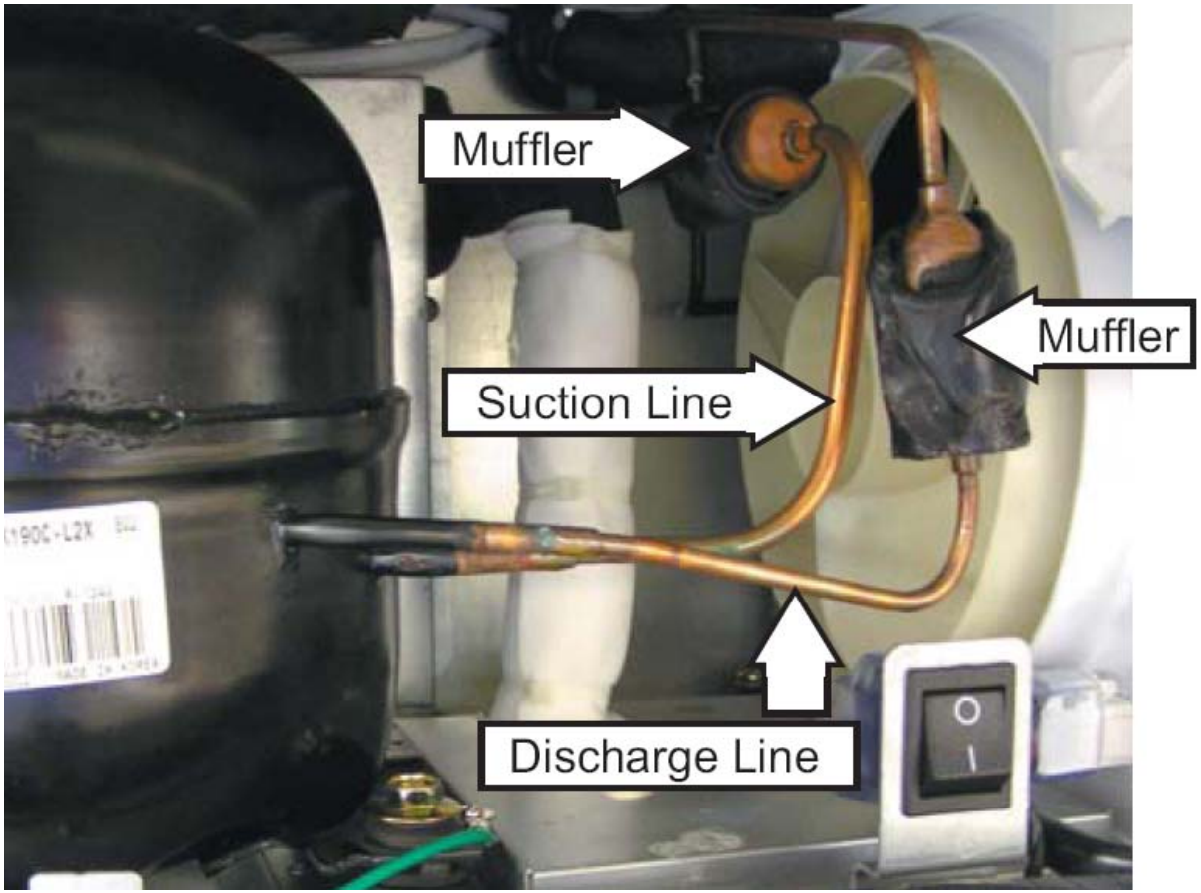
An open compressor overload will prevent the power control board from operating.

Compressor Circuit





Mufflers

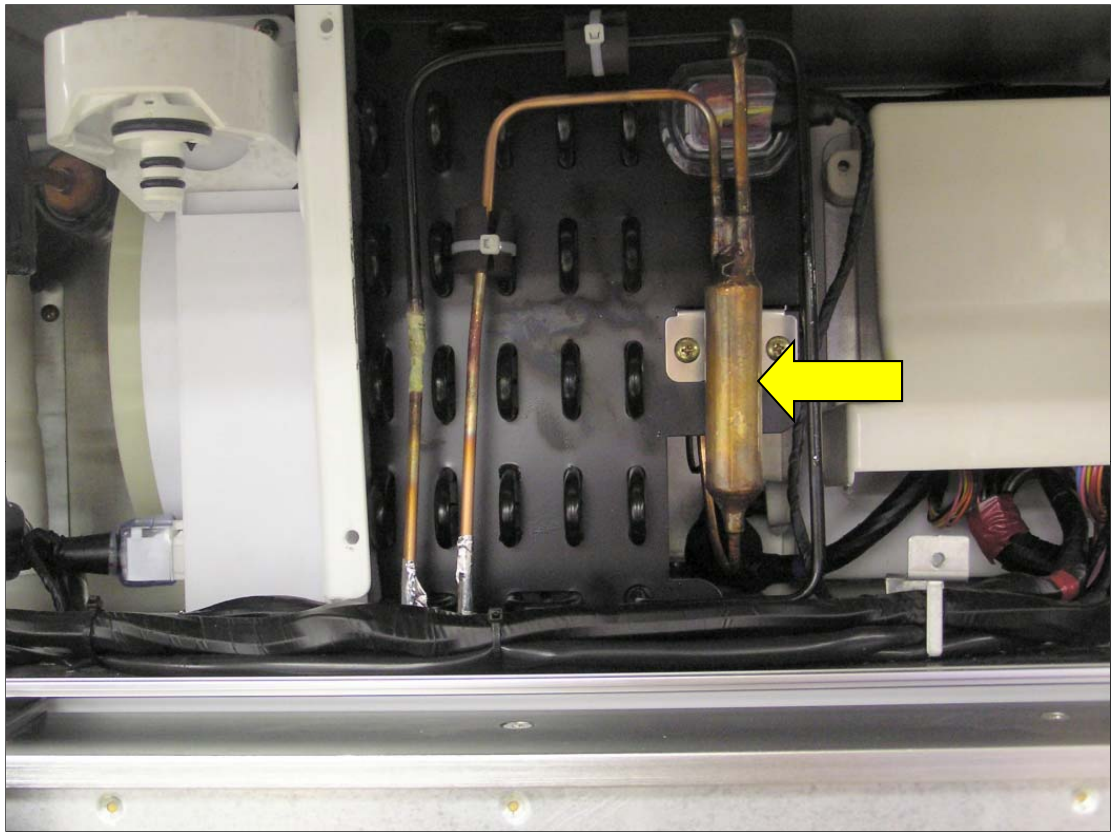


Discharge

Suction

- The mufflers are used to reduce refrigerant flow sound levels.

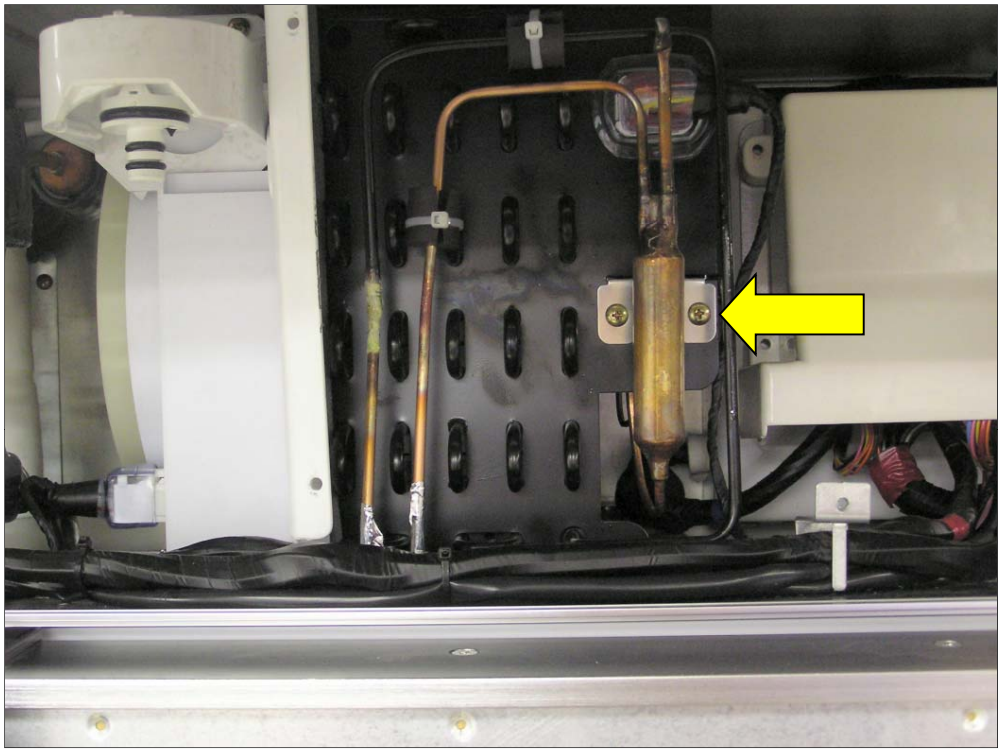
Refrigerant Drier

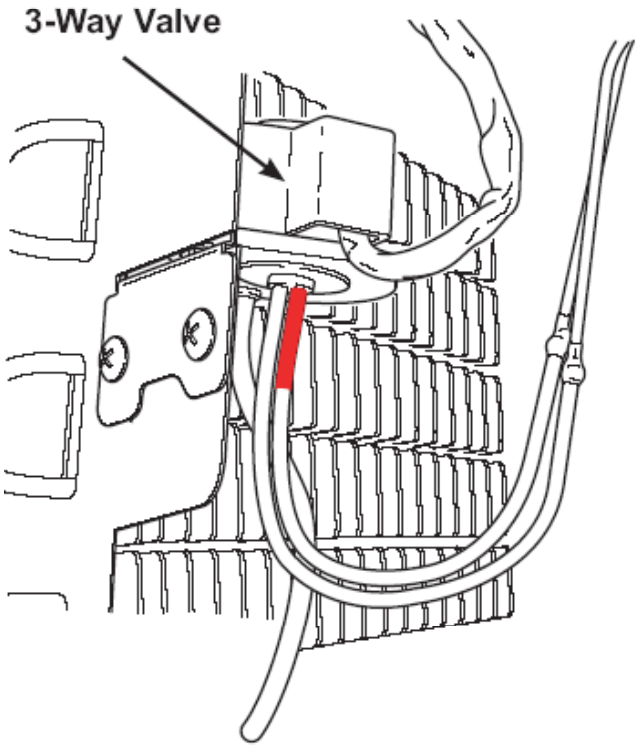


- The standard replacement is **WR86X93**.
- Use **WR86X96** if the system has been contaminated.

NOTE: Under certain conditions, shortly after the compressor first cycles off there may be moisture beads on the drier & it may feel cold to the touch.

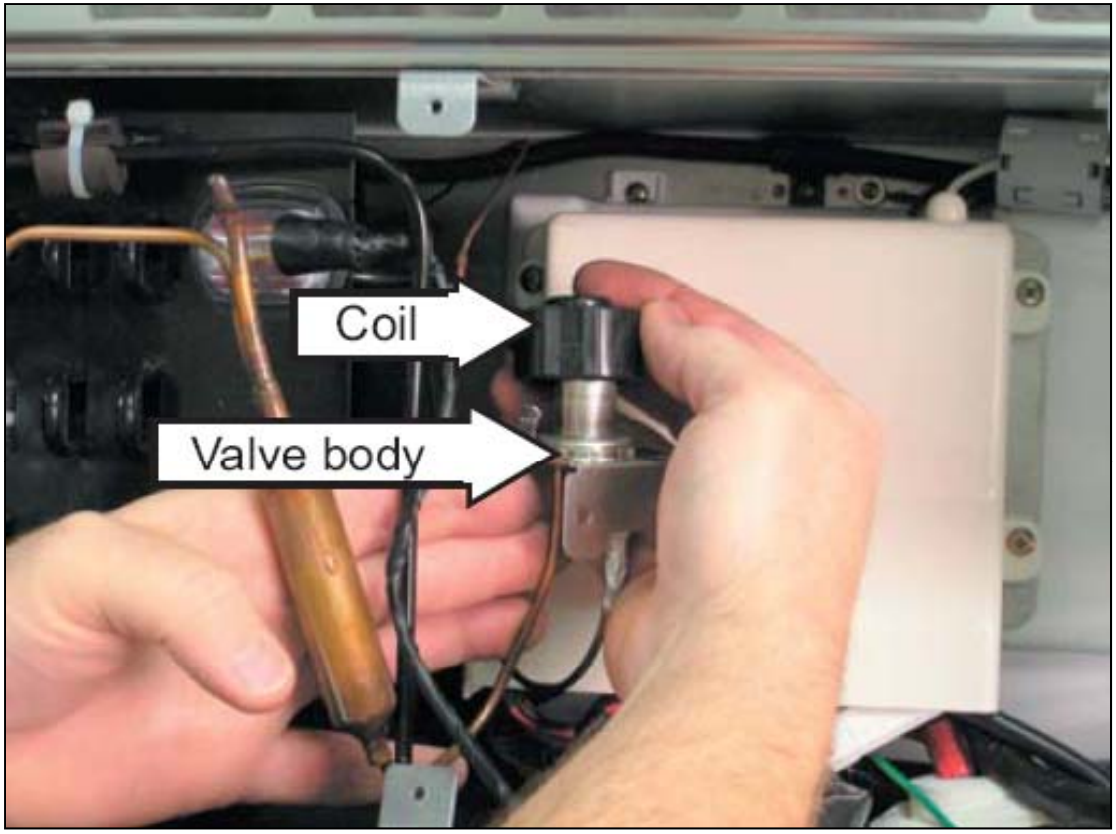
3-Way Valve





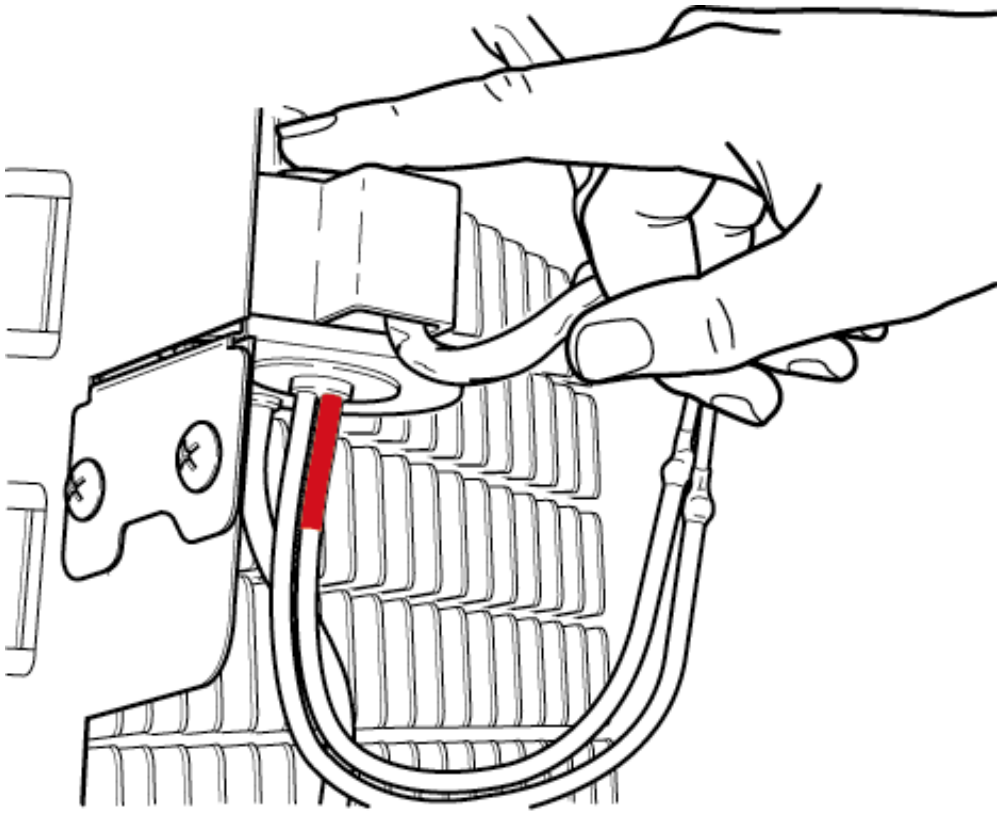
- The 3-way valve is located behind the drier, mounted to the condenser with 2 Phillips screws.
- It directs the refrigerant either to both the freezer & fresh food evaporators or to the freezer only.

3-Way Valve Coil & Body



- The valve consists of the valve body & a separate coil.
- The coil is removed from the valve body by gently prying up with a small screwdriver.
- The valve body is covered by the sealed system warranty, the coil by the 2-year warranty.

3-Way Valve Testing



- To test the 3-way valve, turn the power off at the main switch for 10 seconds.
- Place a finger on top of the valve & turn the switch back on.
- Movement should be felt as the valve moves to the home position.

3-Way Valve Circuit

Orange - Gray = 40 Ω

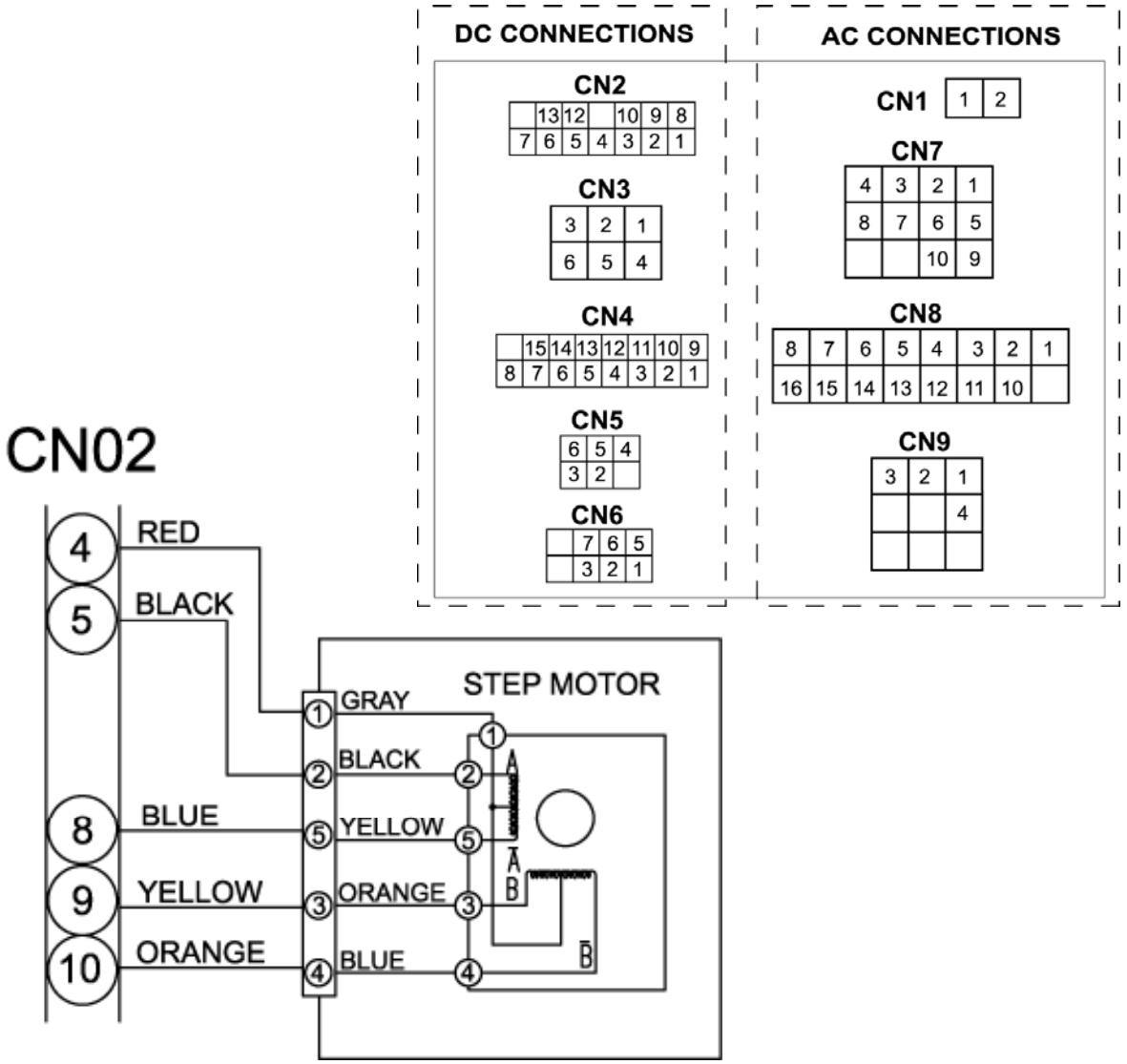
Blue - Gray = 40 Ω

Orange - Blue = 80 Ω

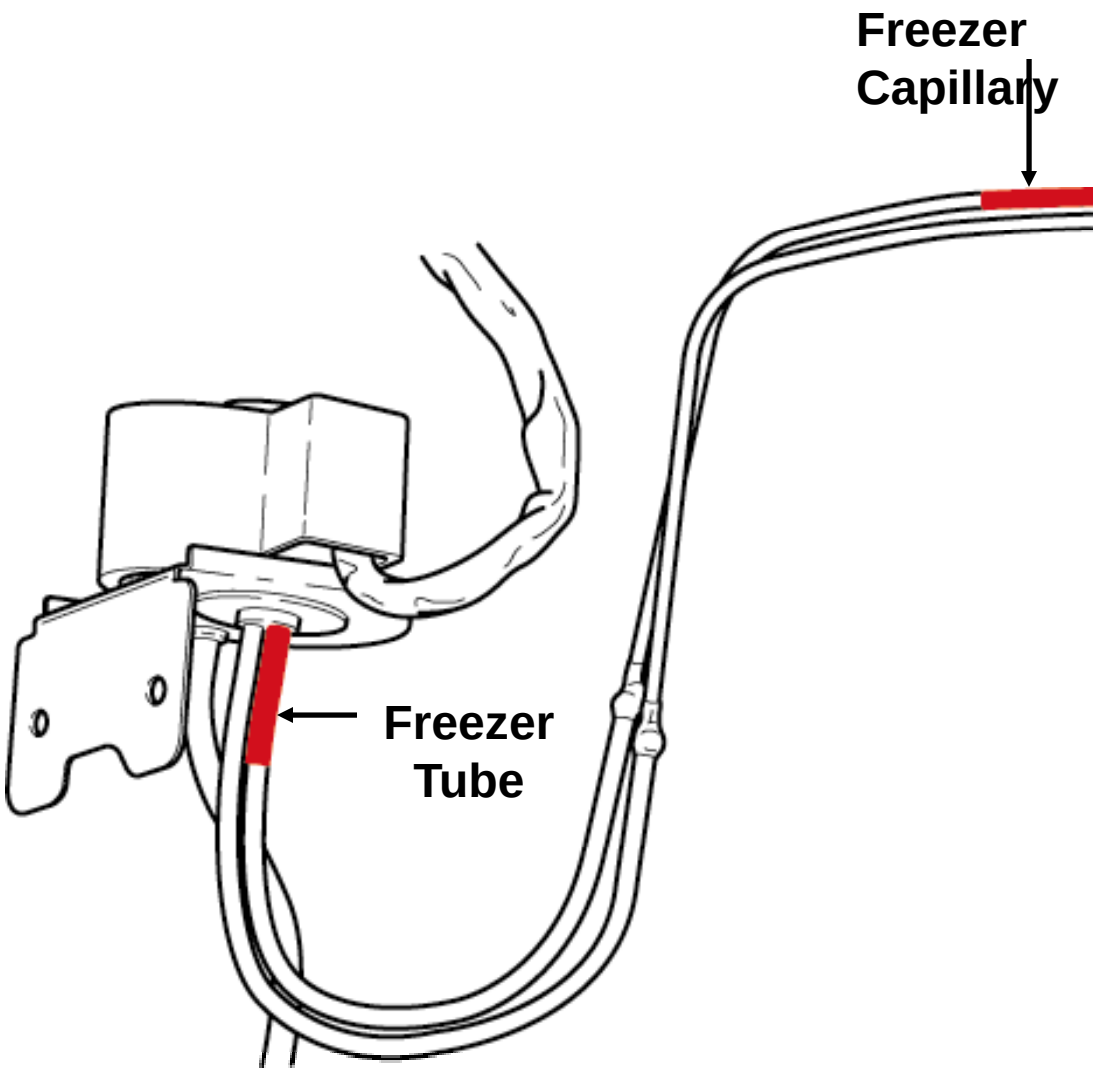
Gray - Black = 40 Ω

Gray - Yellow = 40 Ω

Yellow - Black = 80 Ω

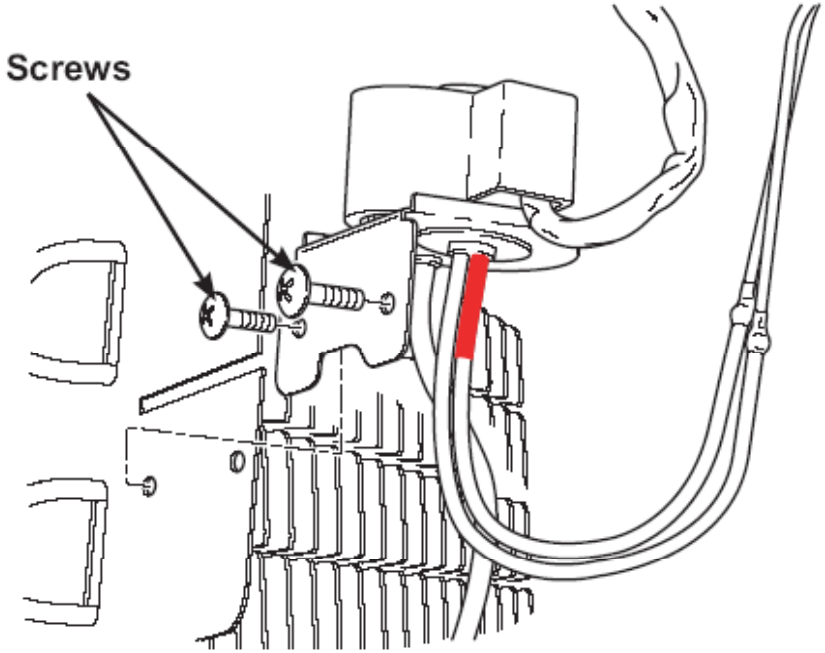


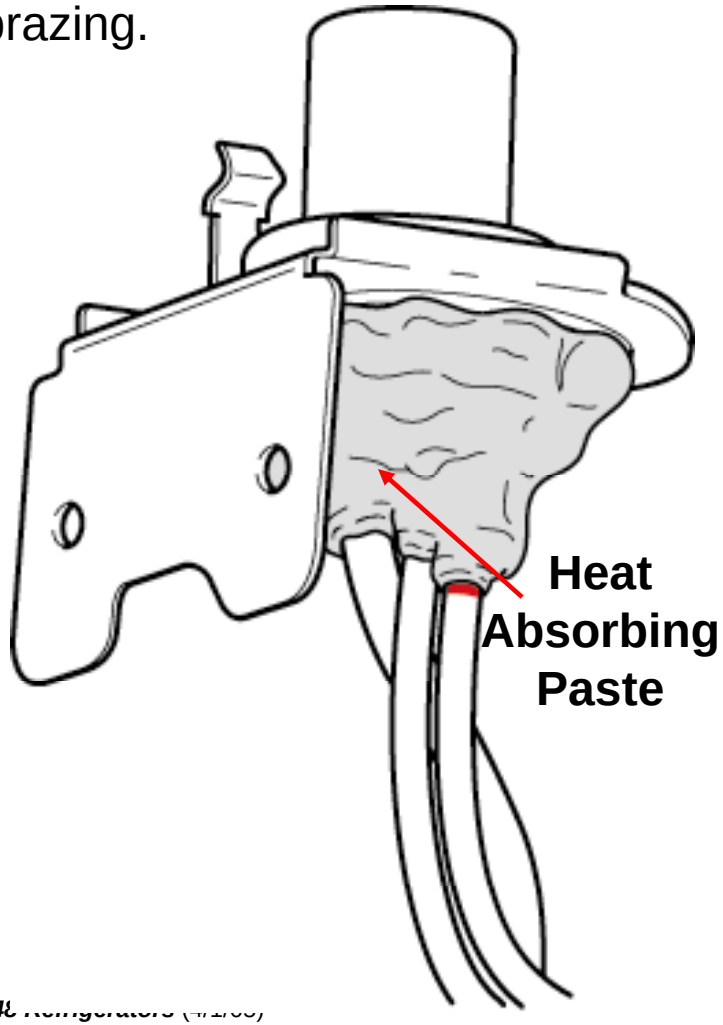
3-Way Valve Capillaries



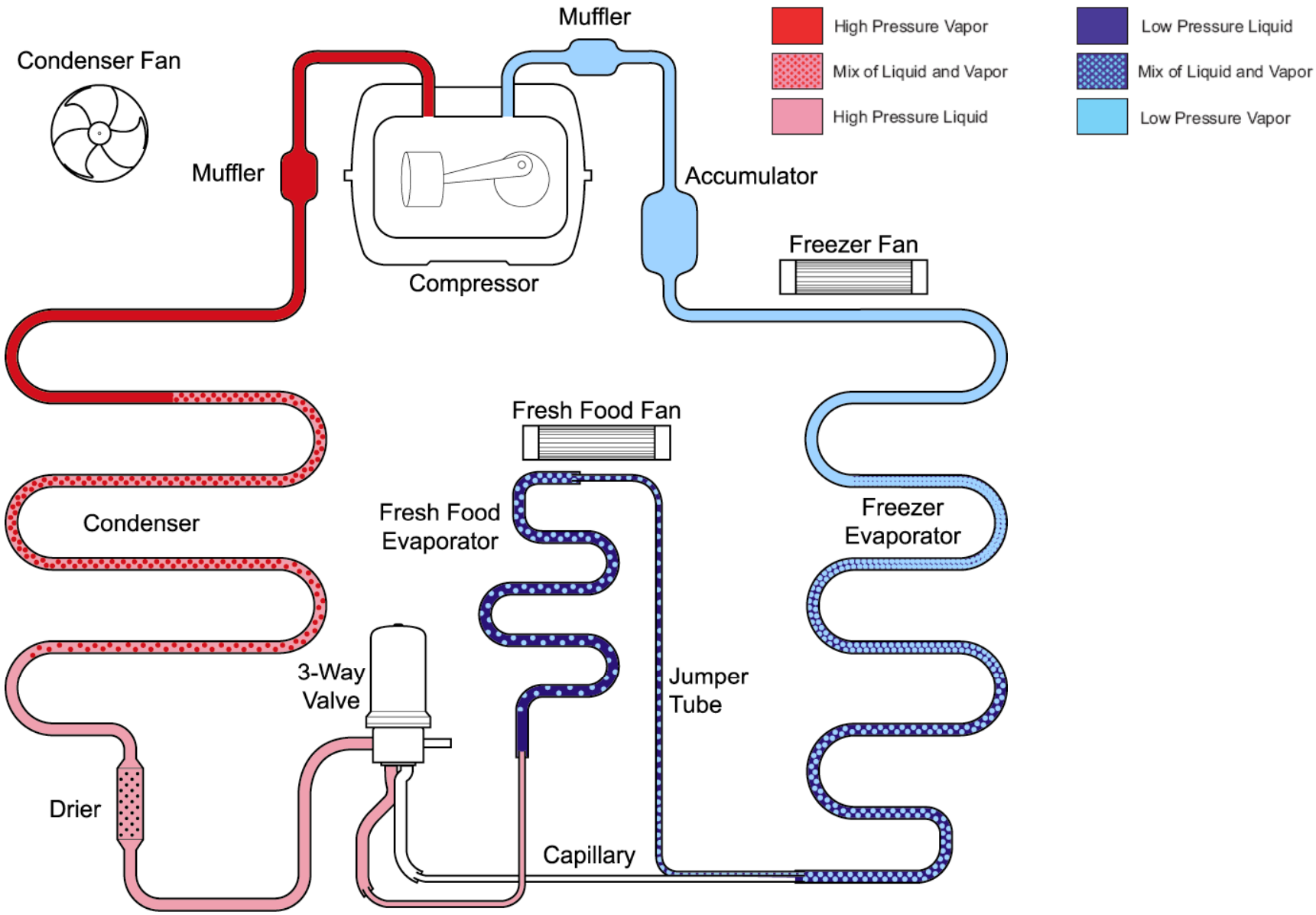
Replacing the 3-Way Valve

- The valve body is extremely heat sensitive.
- Apply a liberal amount of heat absorbing paste **WR5X8927**.
- Direct the flame away from the valve body when brazing.

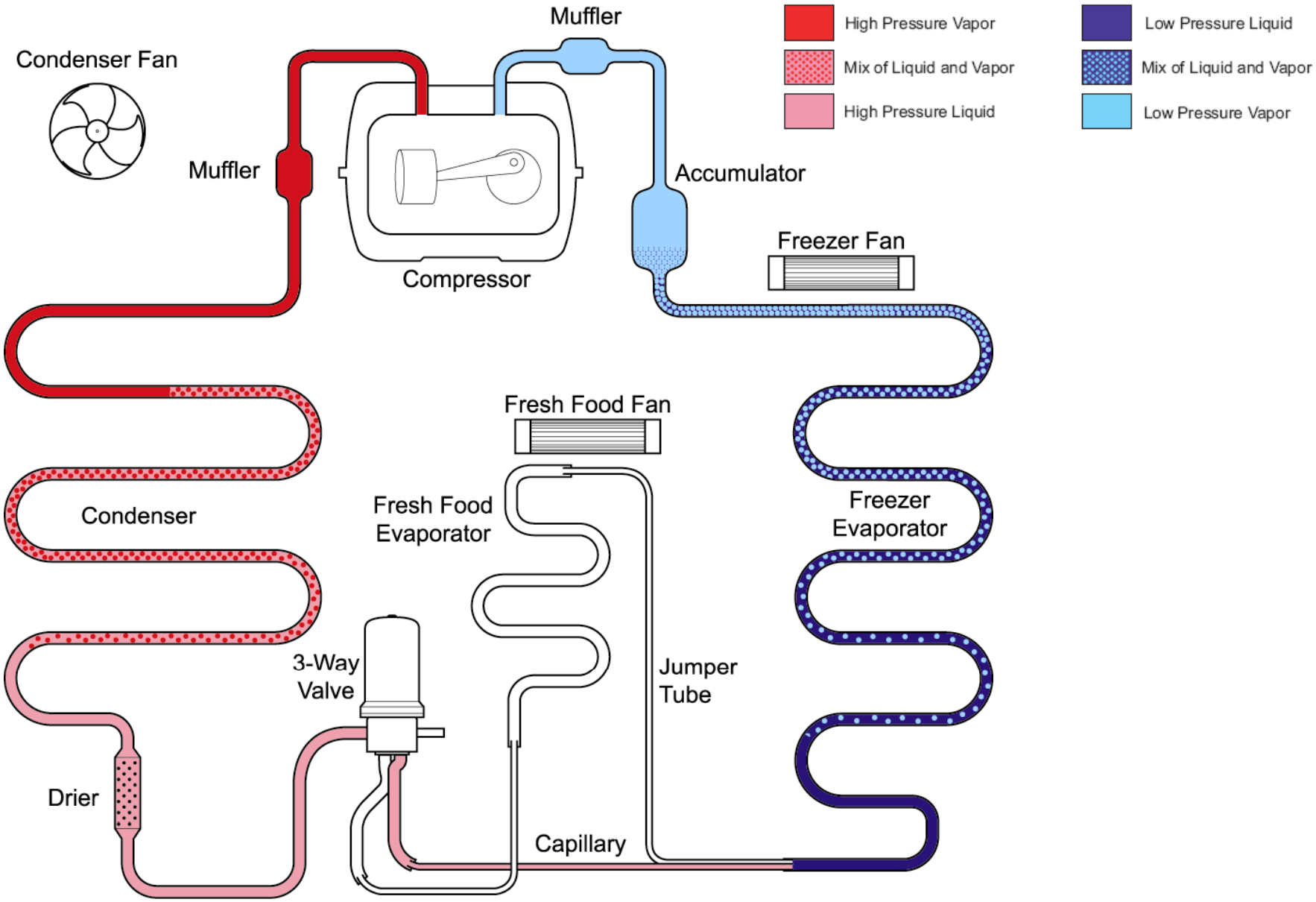




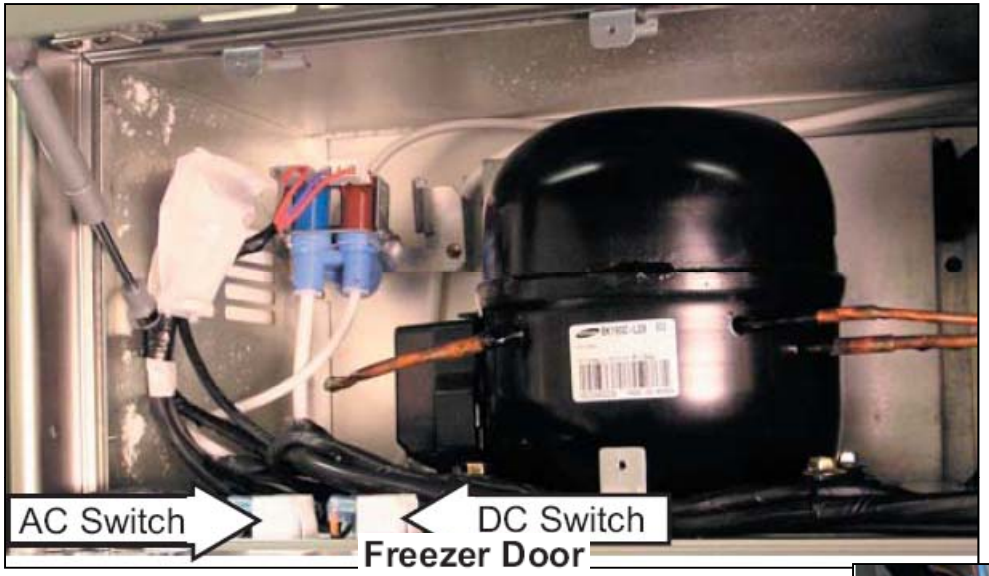
FRESH FOOD AND FREEZER SECTION COOLING



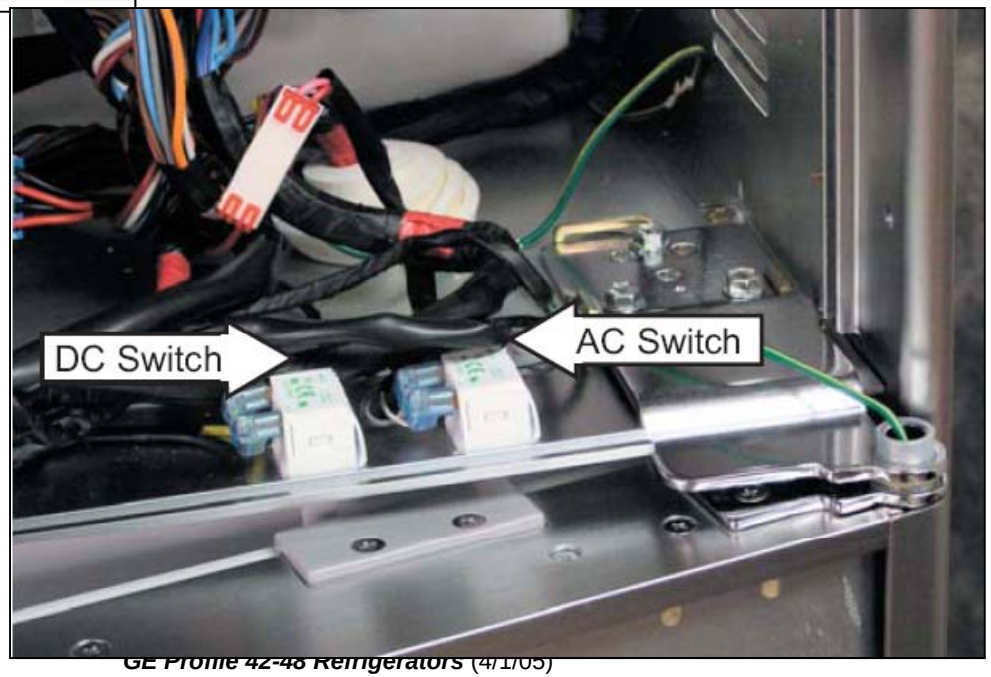
FREEZER SECTION COOLING



Door Switches

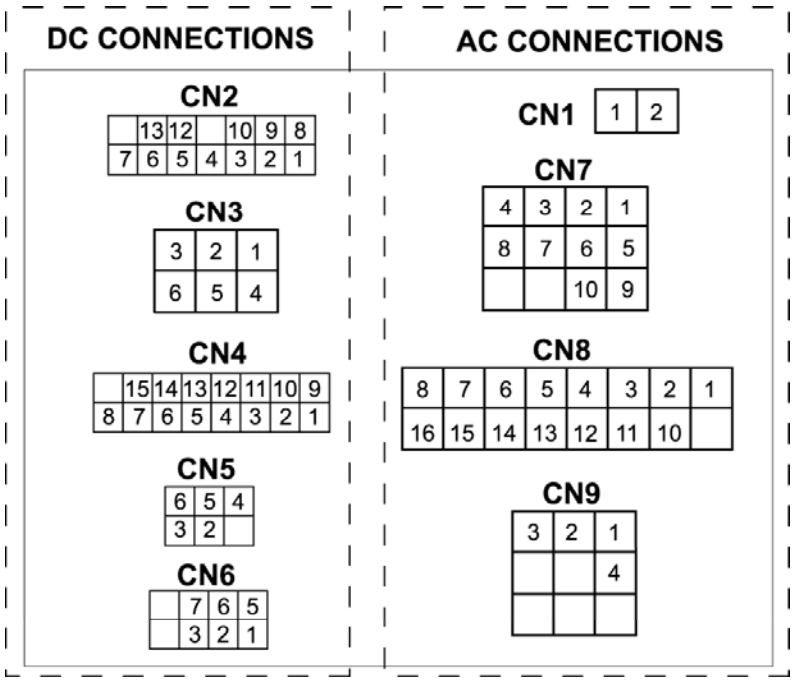


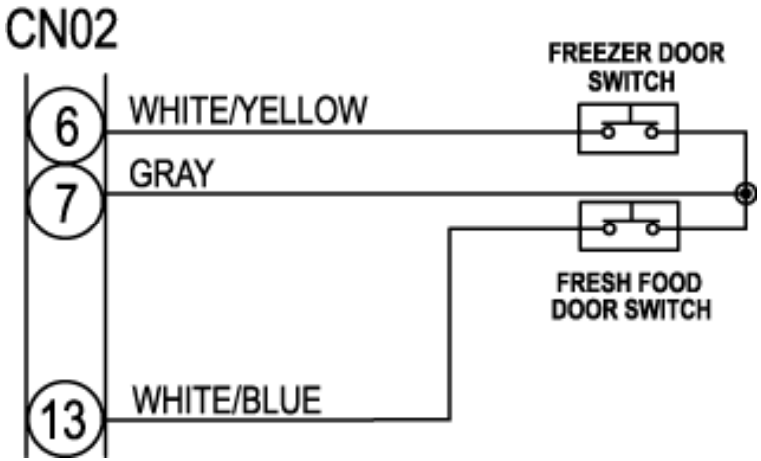
Fresh Food Door



Door Switches – DC Circuit

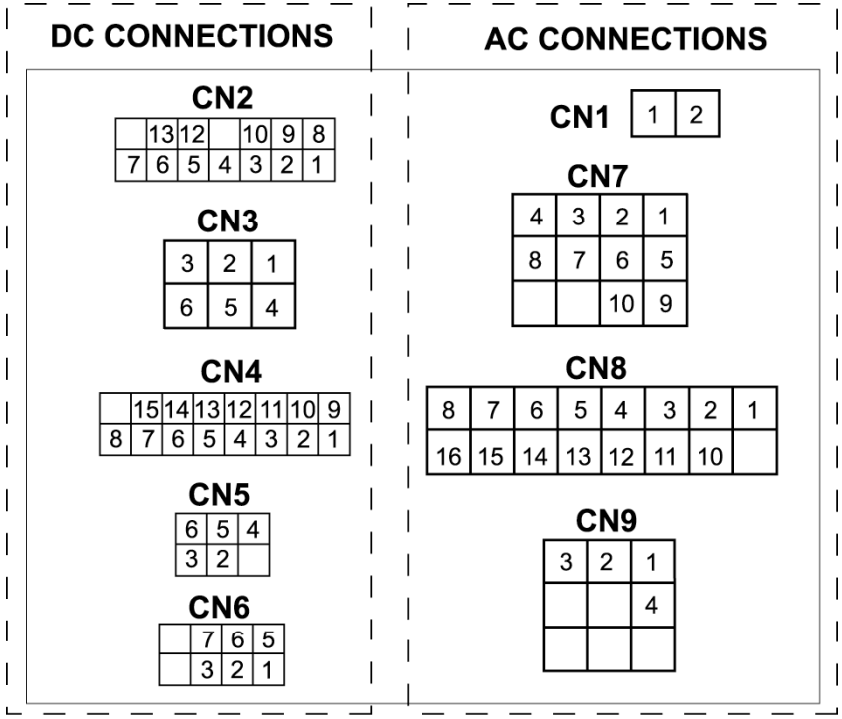
- The DC door switches provide “door open” information to the power control board.
- The freezer evaporator fan turns off when the freezer door is opened.
- The fresh food & freezer evaporator fans turn off when the fresh food door is opened.
- When the door is closed, the fan(s) delays for 10 seconds before starting again.

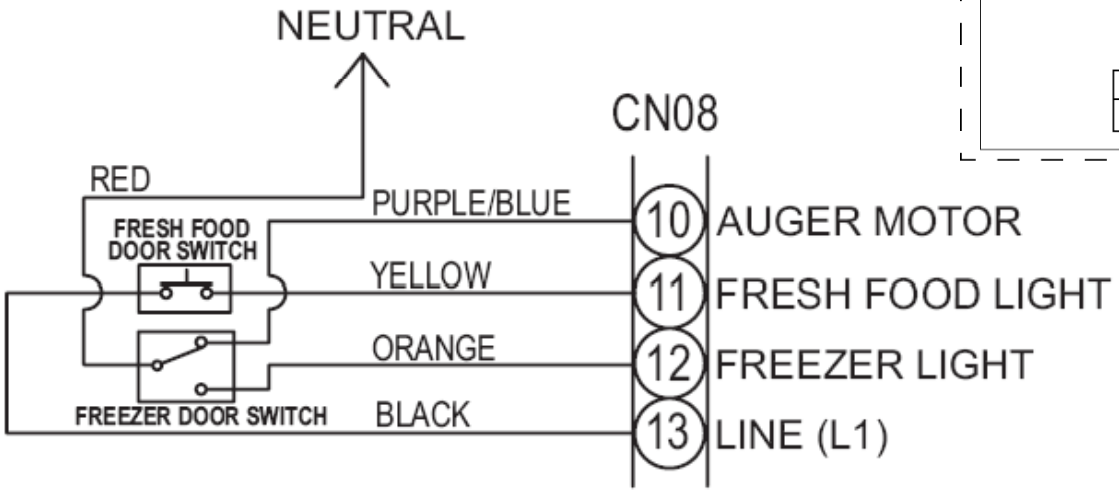




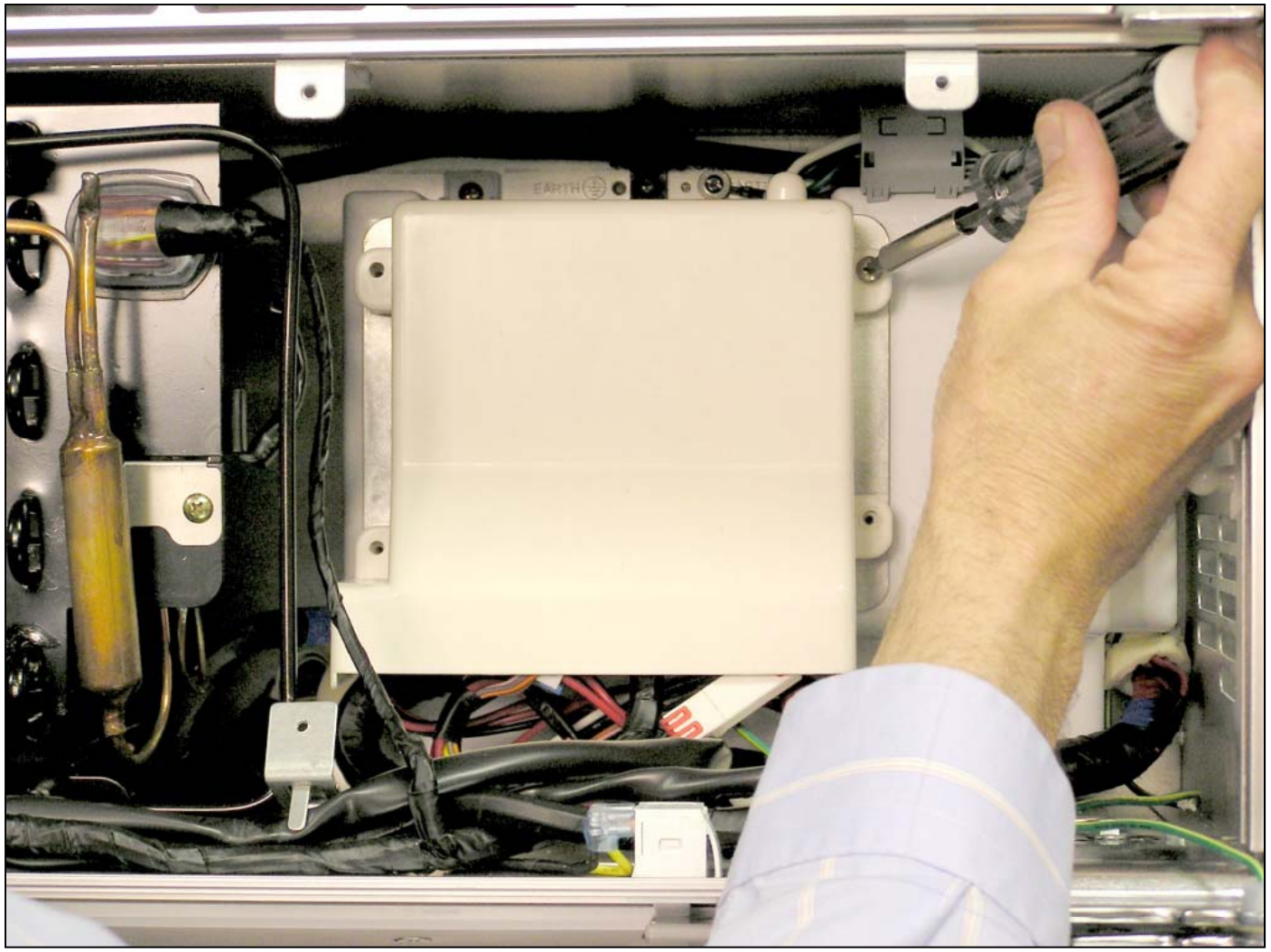
Door Switches – AC Circuit

- The fresh food AC door switch controls the fresh food interior lights.
- The freezer AC door switch controls the freezer interior lights & the auger motor operation.





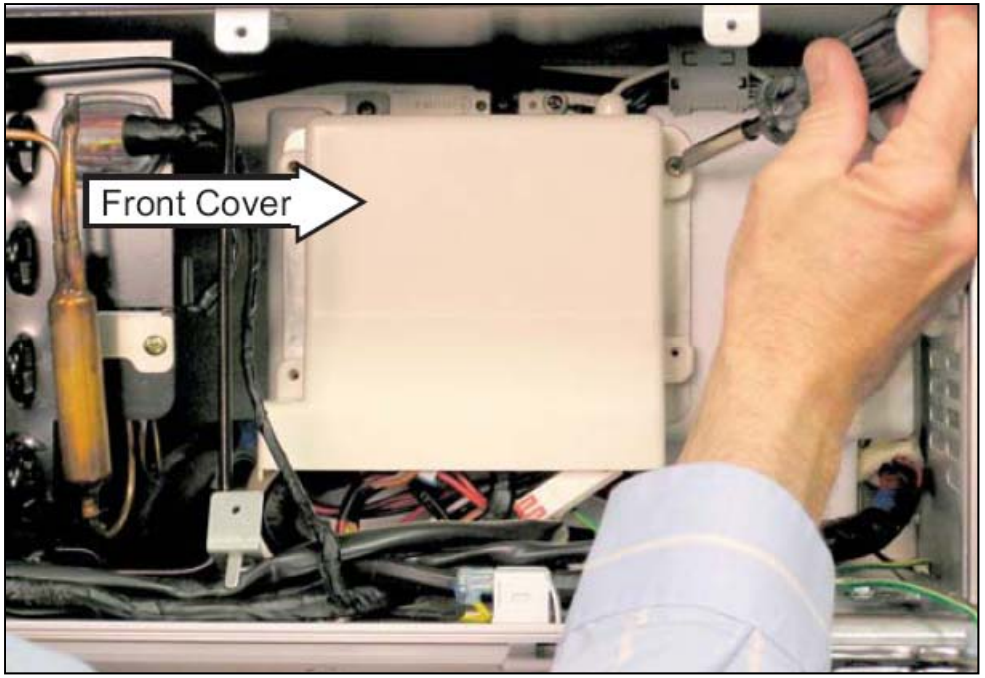
Terminal Panel Cover



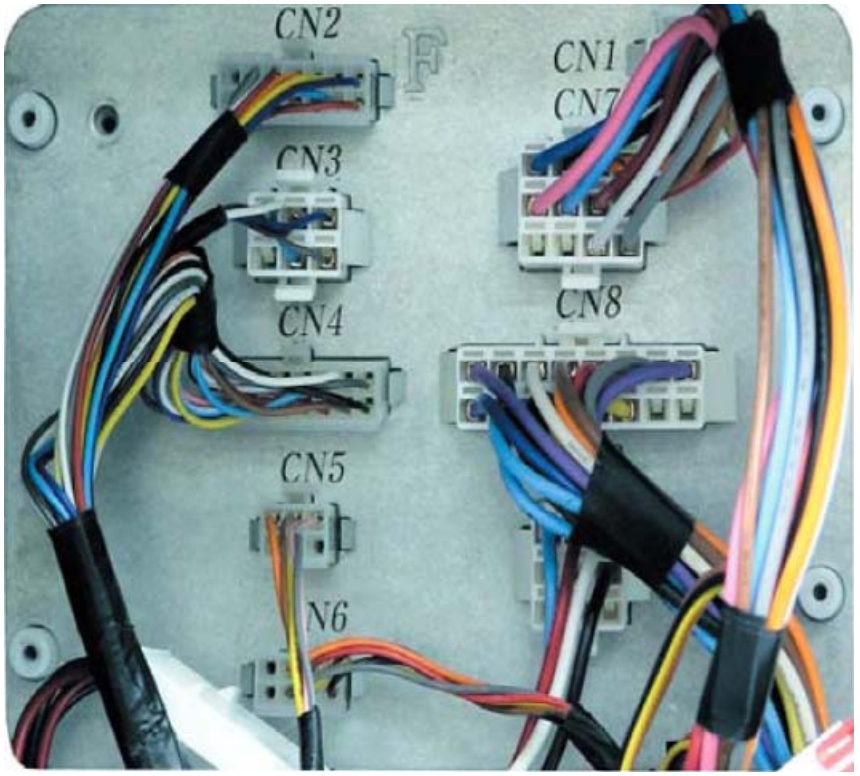
Terminal Block Panel

The terminal block panel is located on the right side of the machine compartment and attached to the PCB housing cover. The terminal block consists of AC and DC wire harness connectors.

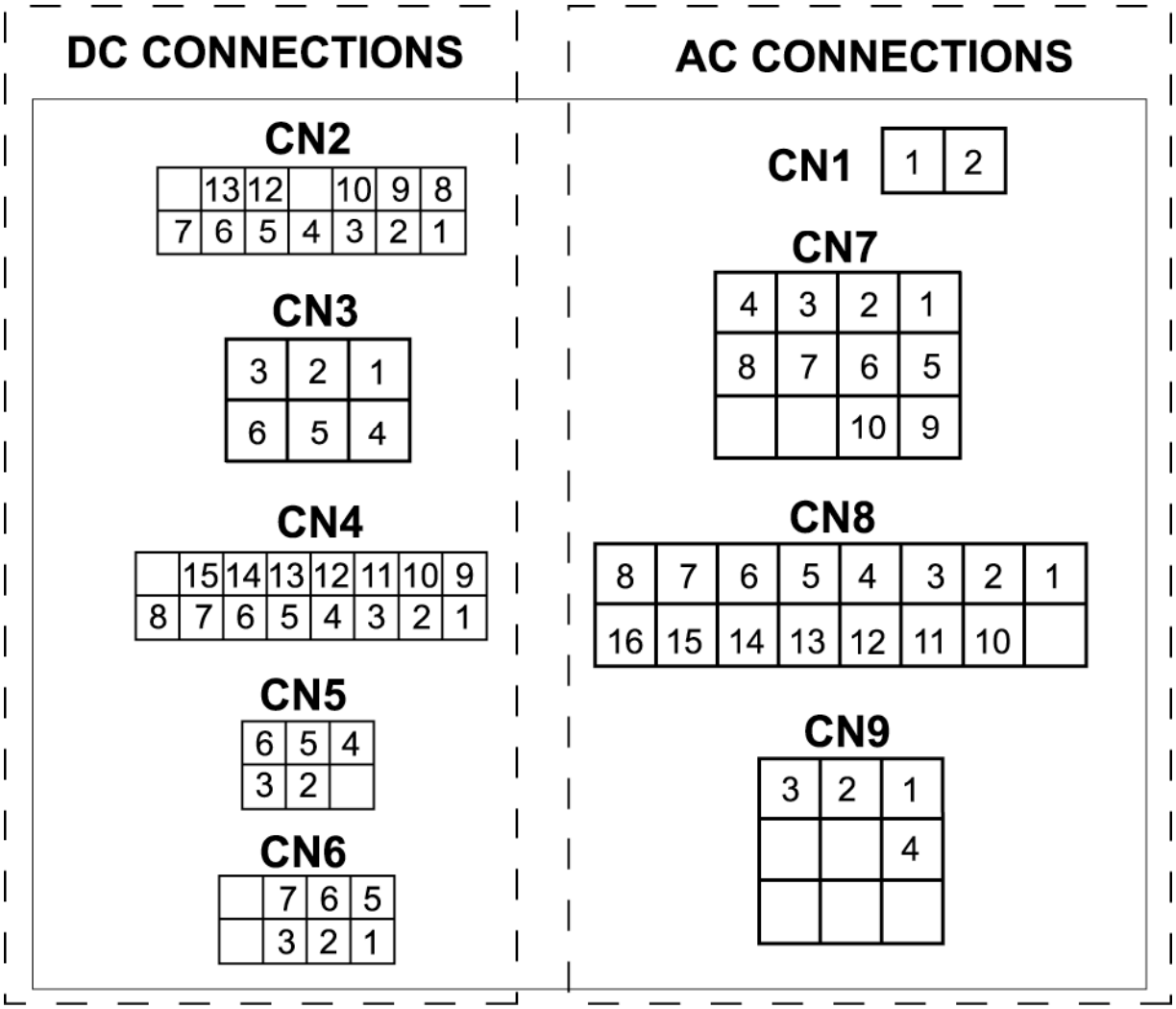
To access the wire harness connectors, remove the 4 Phillips-head screws that hold the front cover in place.



Terminal Block Panel with Cover Removed

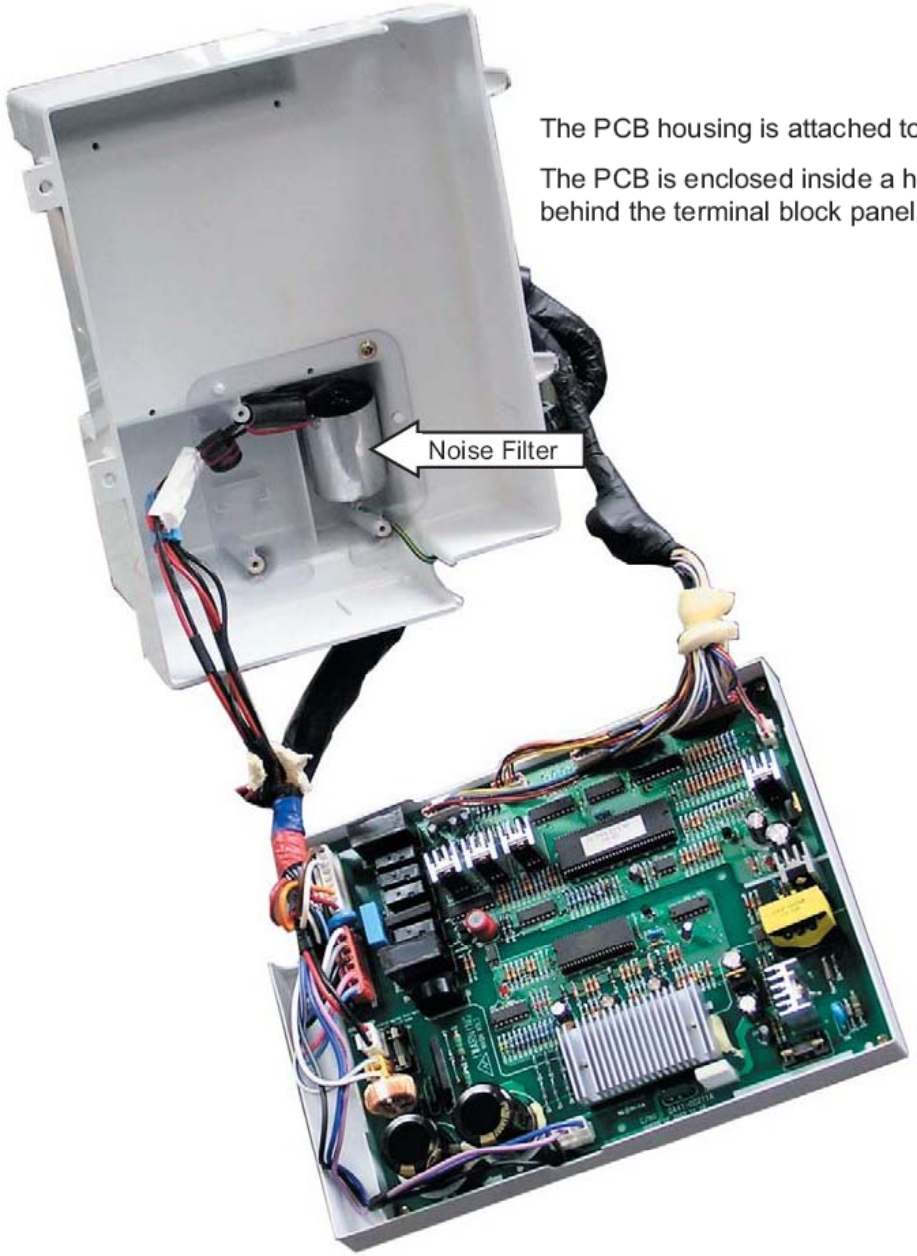


Terminal Panel Connections



Note: Throughout the service guide, reference to the terminal block connectors may or may not contain a zero (i.e., CN3 and CN03 are the same connector.)

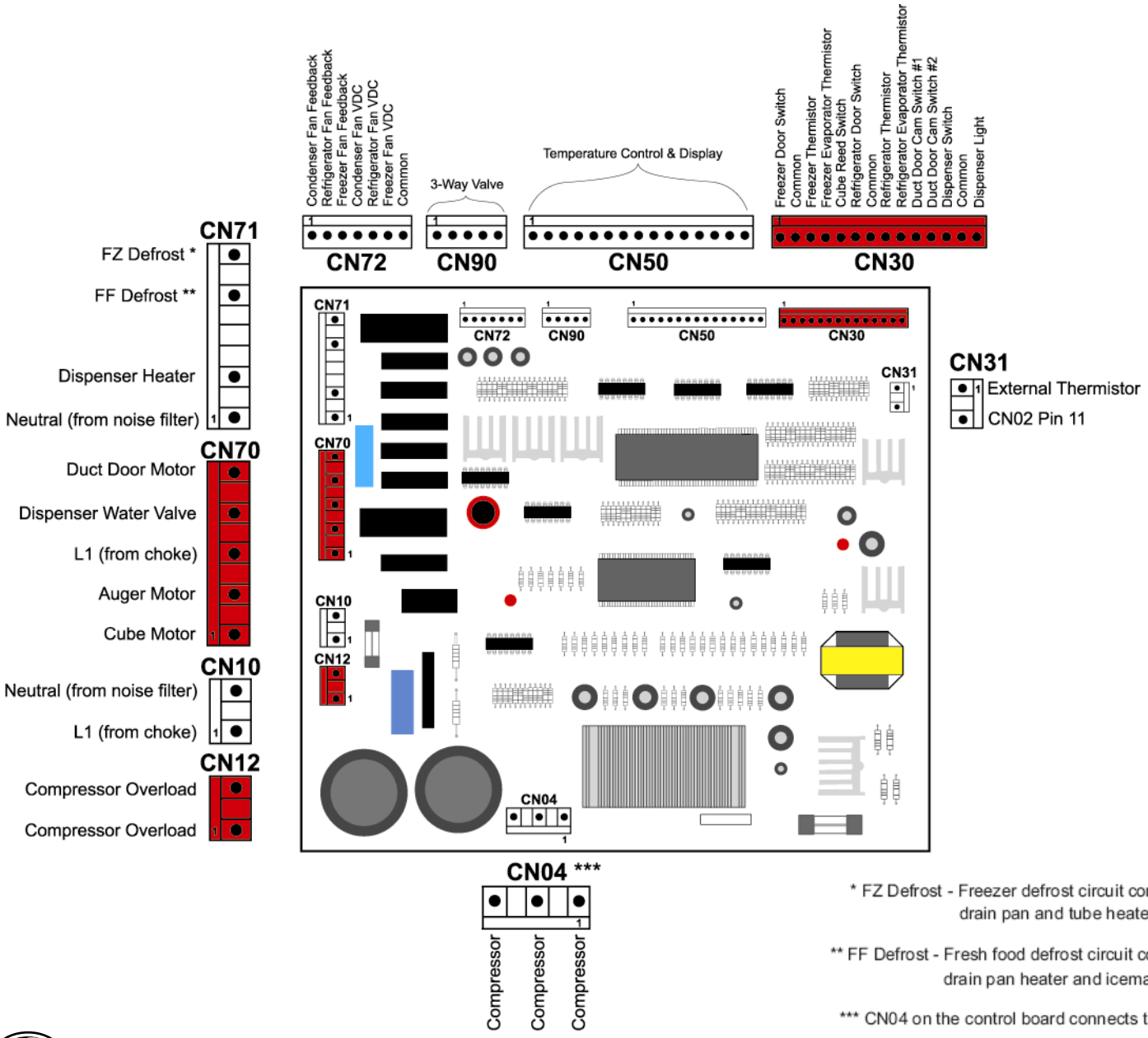
Control Board



The PCB housing is attached to the rear wall of the machine compartment by 2 Phillips-head screws.

The PCB is enclosed inside a housing and mounted on the right side of the machine compartment behind the terminal block panel.

To check the noise filter, look for the epoxy molding to be broken or burnt by heat or a power surge. The noise filter resistance should be approximately 500K Ω between the black and red wires.

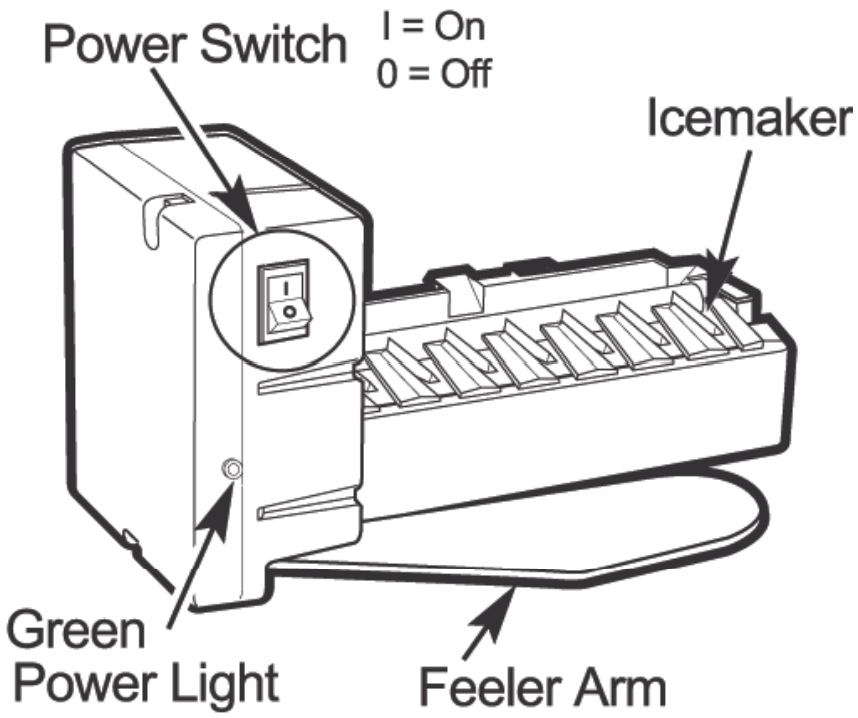


* FZ Defrost - Freezer defrost circuit consists of the defrost heater, bi-metal thermostat, drain pan and tube heater and suction line drain pan heater.

** FF Defrost - Fresh food defrost circuit consists of the defrost heater, bi-metal thermostat, drain pan heater and icemaker fill tube heater.

*** CN04 on the control board connects to the CN8 connector on the terminal block panel.

Icemaker

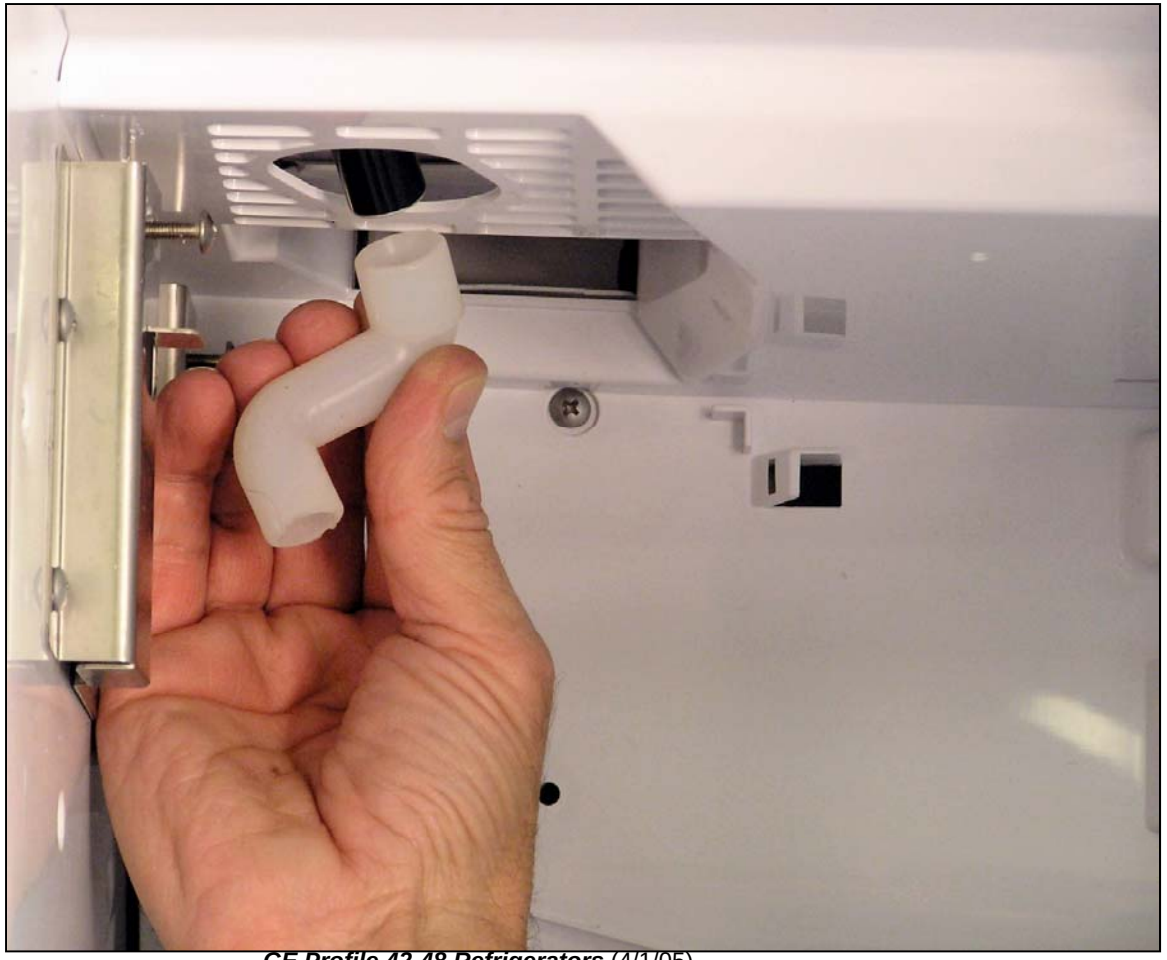


Under normal operating conditions, the icemaker is capable of producing approximately 4.3 lbs of ice in a 24-hour period. During QUICK ICE, the icemaker is capable of producing 5.5 lbs of ice in a 24-hour period.

Fill Tube Extension

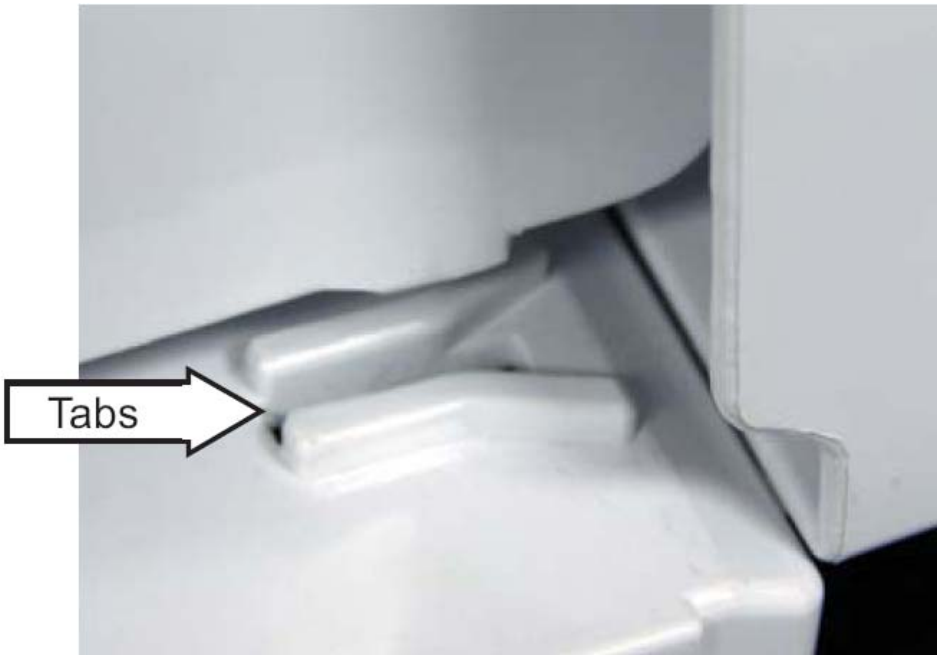
To remove the icemaker fill tube and heater:

1. Remove the ice bin and icemaker (see ***Ice Bin and Icemaker***).
2. Remove the elbow from the end of the fill tube.



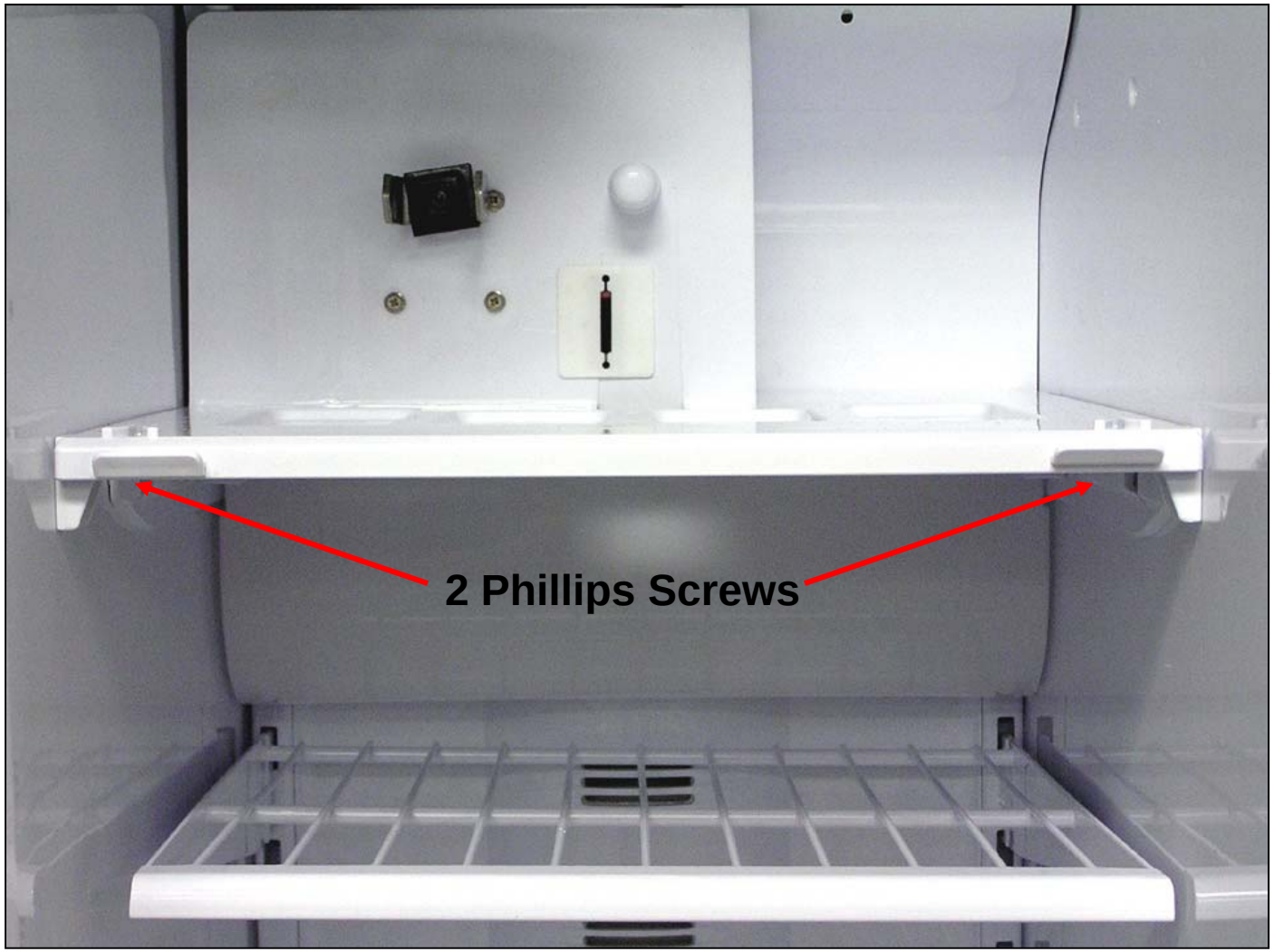
Ice Bin

- The ice bin holds approximately 7 lbs of ice, equivalent to about 230 cubes.
- Lift the ice bin up to clear the notch, then pull forward.

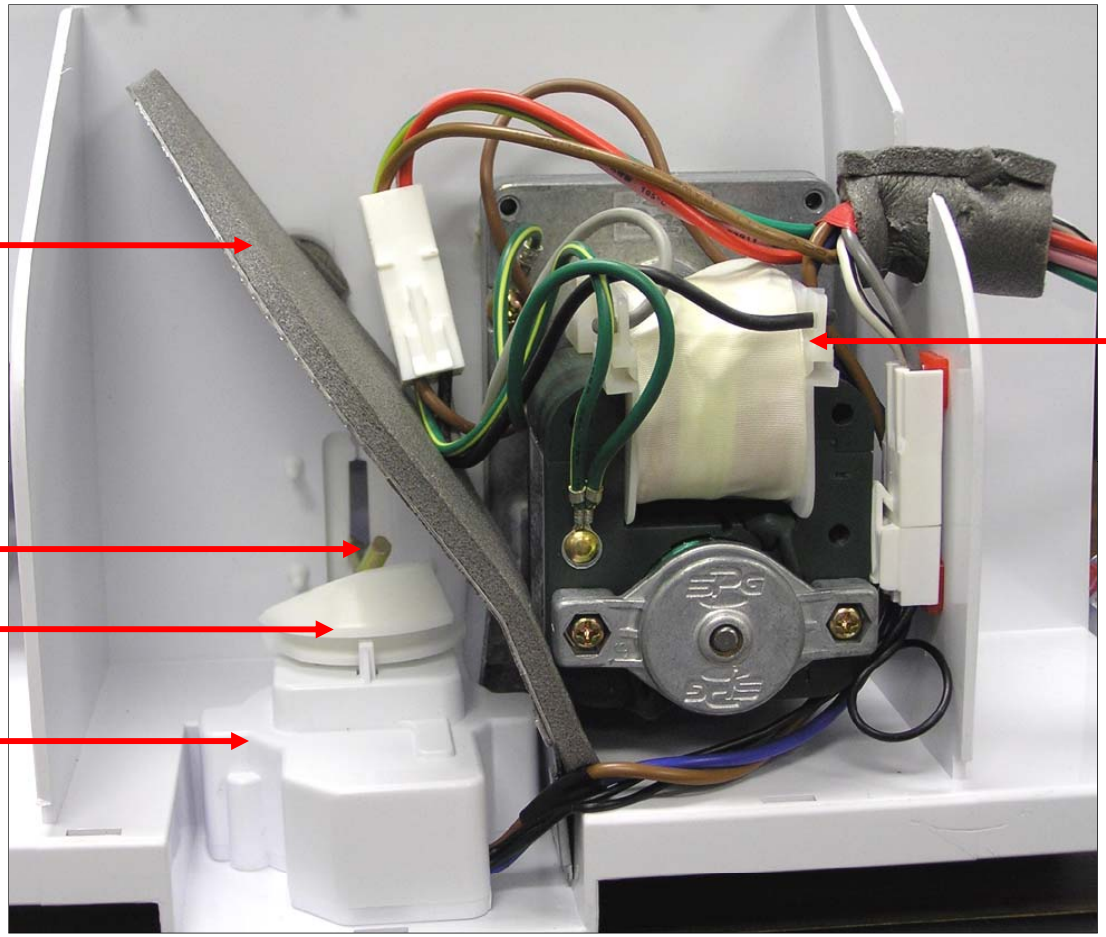


Ice Bin & Auger

Servicing The Auger Motor Shelf



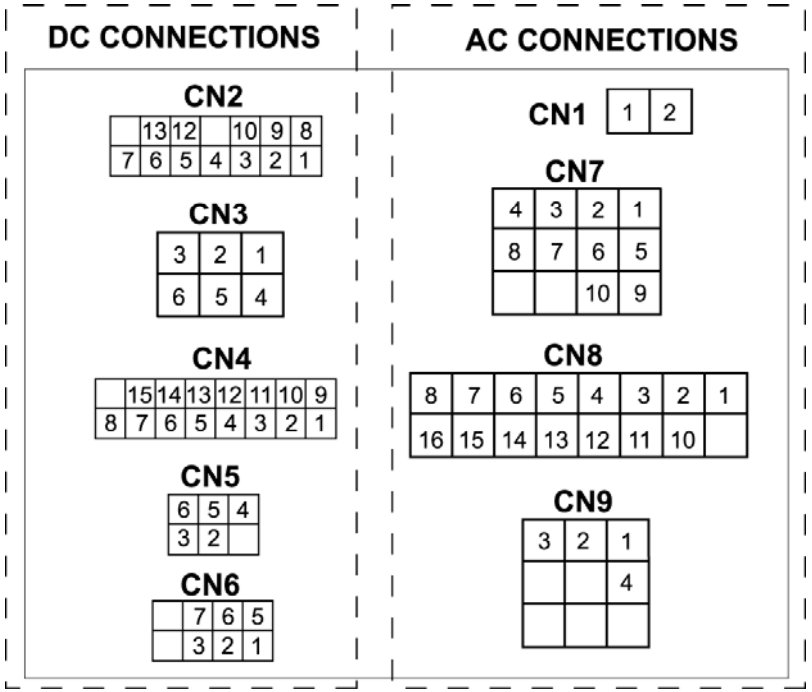
Auger & Cube Motor

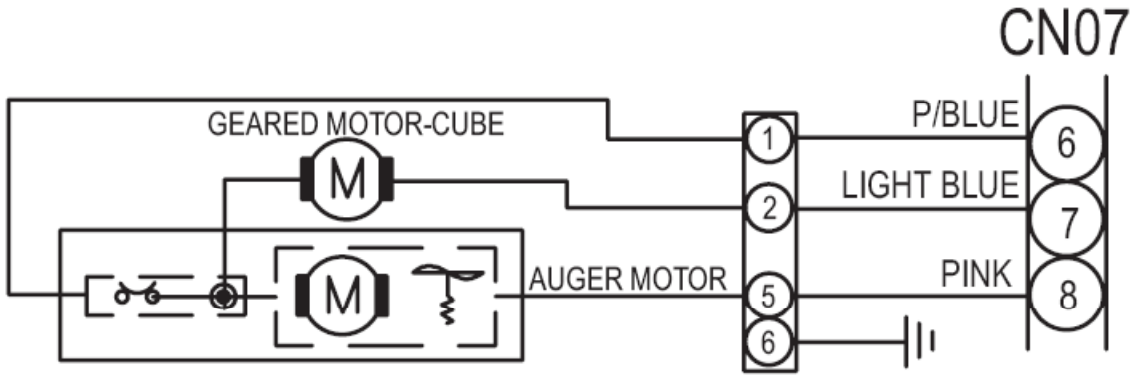


- When cubes are selected, the cube motor rotates first, then the auger turns.

Auger & Cube Motor Circuit

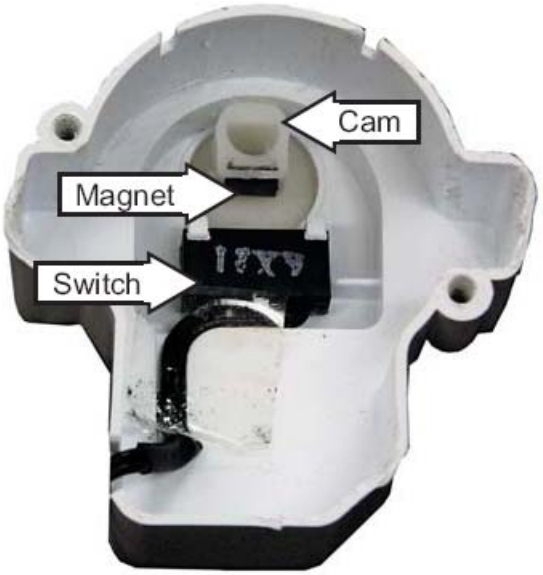
- Measure 120VAC at CN07 pins 6 & 8 for Auger Motor operation.
- To check Auger Motor, measure 3.7Ω at CN07 pins 6 & 8.
- The cube motor is in series with the thermal protector inside the auger motor.
- Measure 120VAC at CN07 pins 6 & 7 for Cube Motor operation.
- To check Cube Motor, measure 2KΩ at CN07 pins 6 & 7.



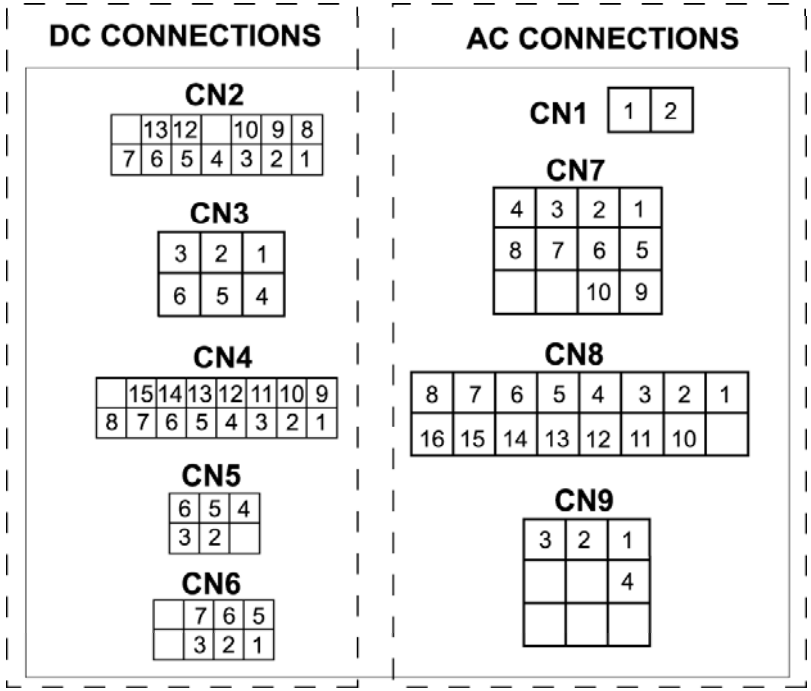


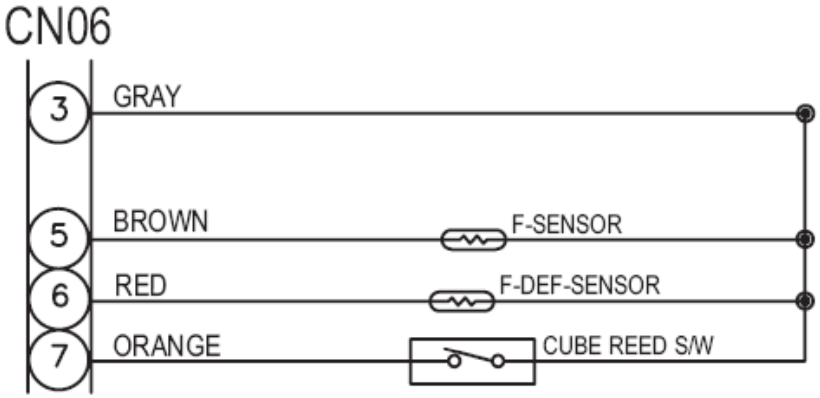
Cube Switch Circuit

- Shown with motor removed.
- Motor & switch come as an assembly.

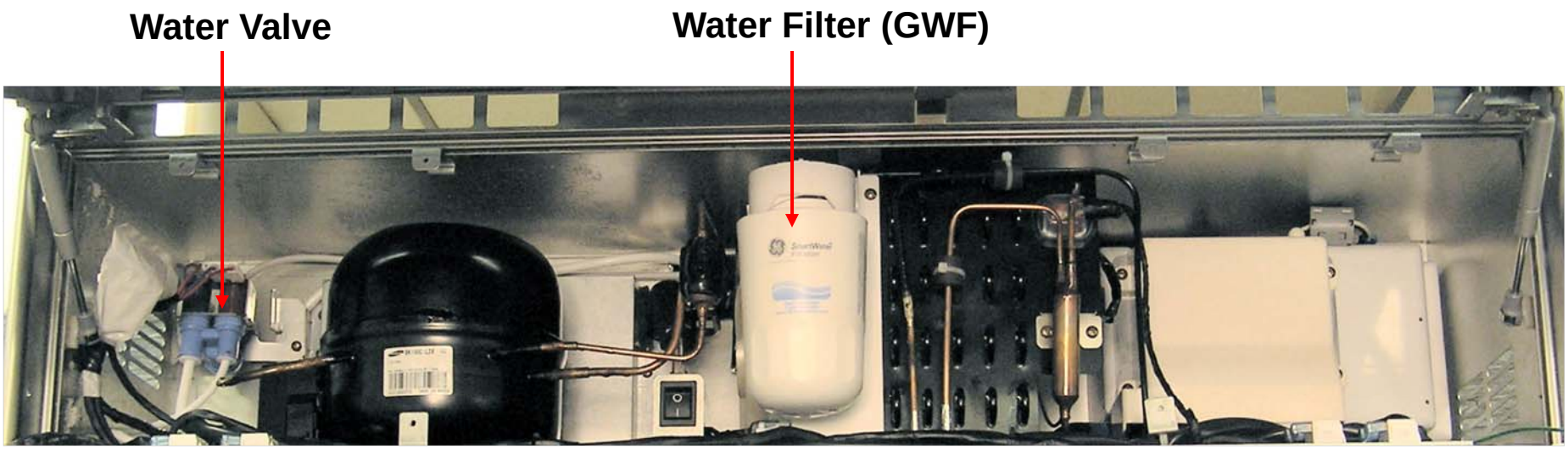


- Switch informs power control board of cube motor cam position.
- Measure 5VDC at CN06 pins 3 & 7.





Water Valve & Filter Location

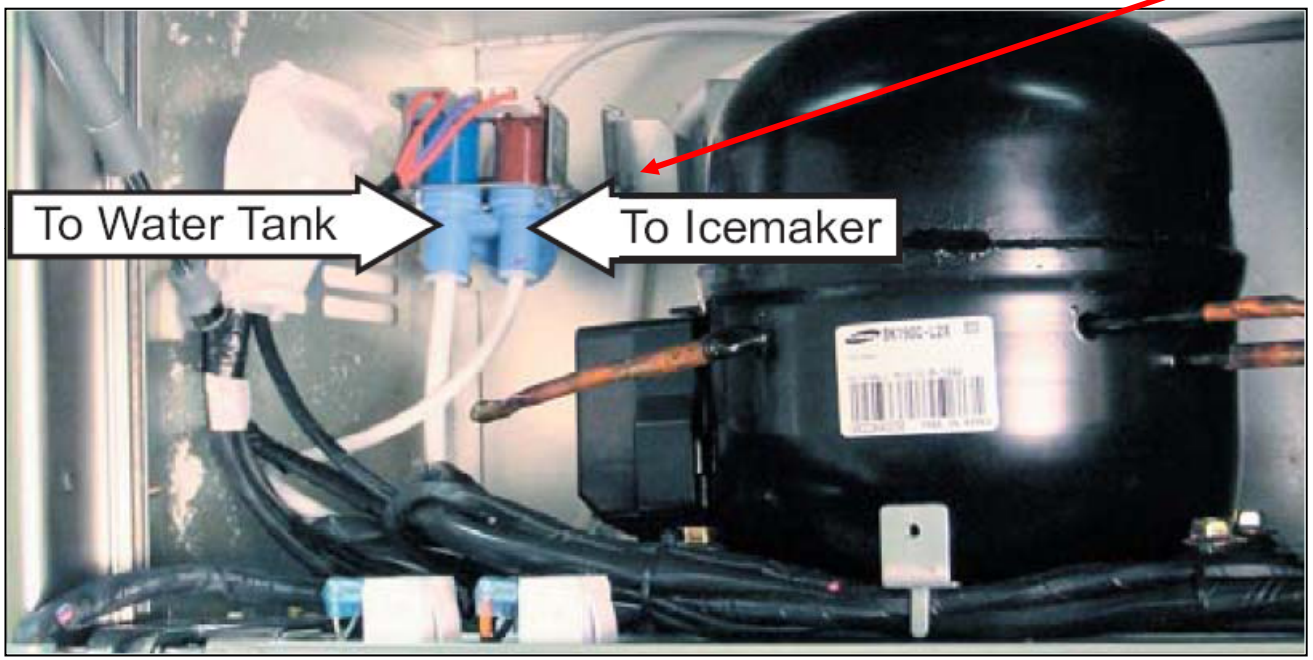


- Inlet water flows from the supply connection at the bottom of the refrigerator, up the rear channel into the GWF water filter & through to the water valve.

Note: The water filter should NOT be installed if the home has a water filtration system in place (reverse osmosis filter system, etc.) Replace the filter with the bypass plug.

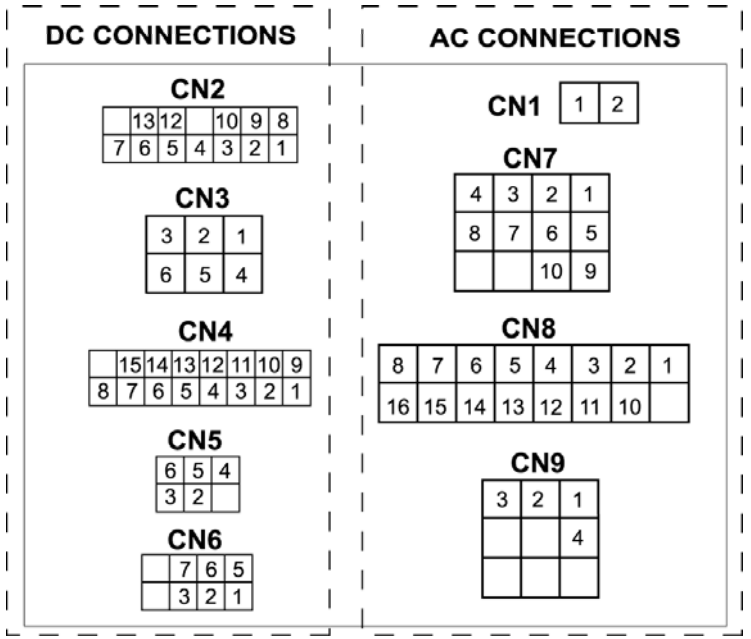
Water Valve

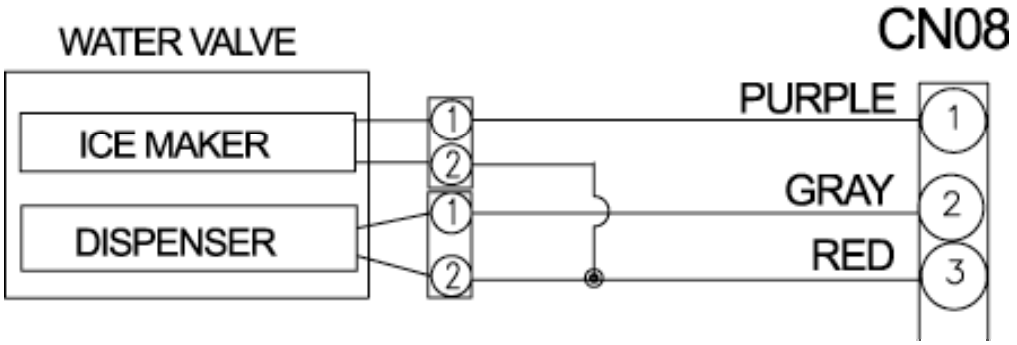
- Water valve is held in place by 1 Phillips screw.



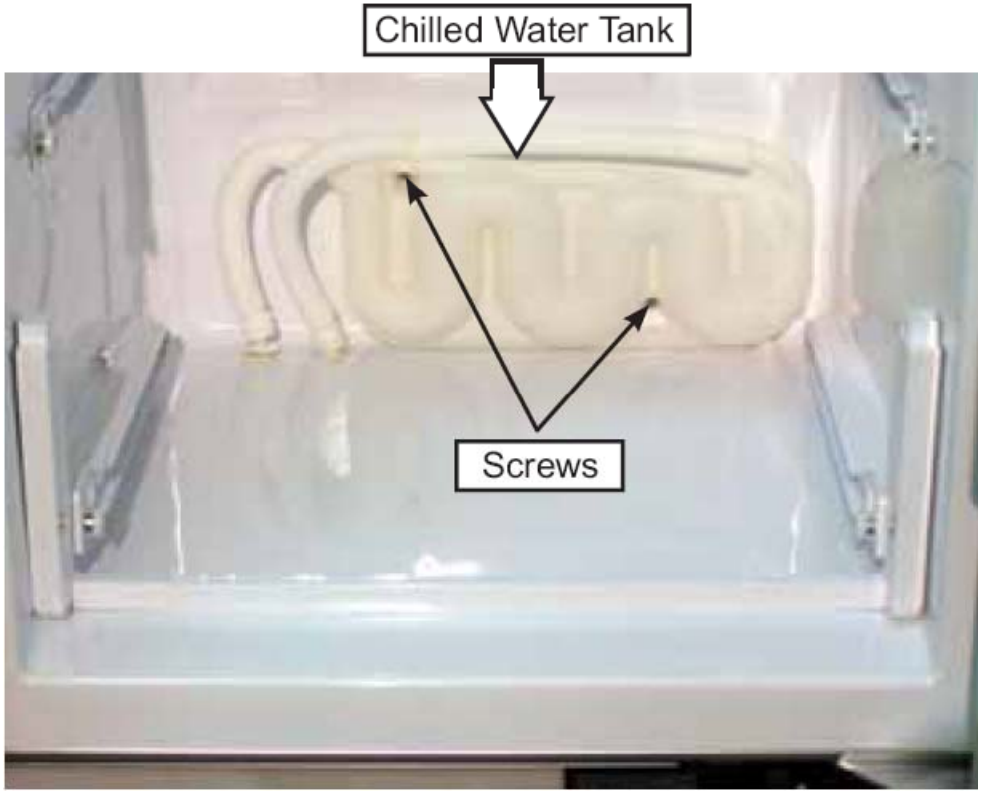
Water Valve Circuit

- The icemaker valve (brown coil) - 180Ω
- The dispenser valve (blue coil) - 325Ω
- Measure 120VAC at CN08 pins 2 & 3 when water is selected.
- Measure 120VAC at CN08 pins 1 & 3 when icemaker is calling for water.





Dispenser Water Tank



Approximate water temperature by the glass:

- Room Ambient at 76˚F (24˚C).
- 8-ounce glass.
- One-minute interval between dispensing water.

1st glass	53˚F	12˚C	5th glass	66˚F	19˚C
2nd glass	48˚F	9˚C	6th glass	69˚F	21˚C
3rd glass	52˚F	11˚C	7th glass	71˚F	22˚C
4th glass	57˚F	14˚C	8th glass	73˚F	23˚C

➢ The water tank holds approximately 35 oz. of water.

Dispenser Trim

The dispenser control panel contains the control module and room ambient thermistor. The panel is available in black or white. Stainless steel models come with black trim. To remove the dispenser control panel on stainless steel front models, insert a flat-bladed screwdriver and lift the frame outward to release the 15 retaining hooks from the freezer door. Protect the freezer door with cloth or tape to prevent marring the surface.

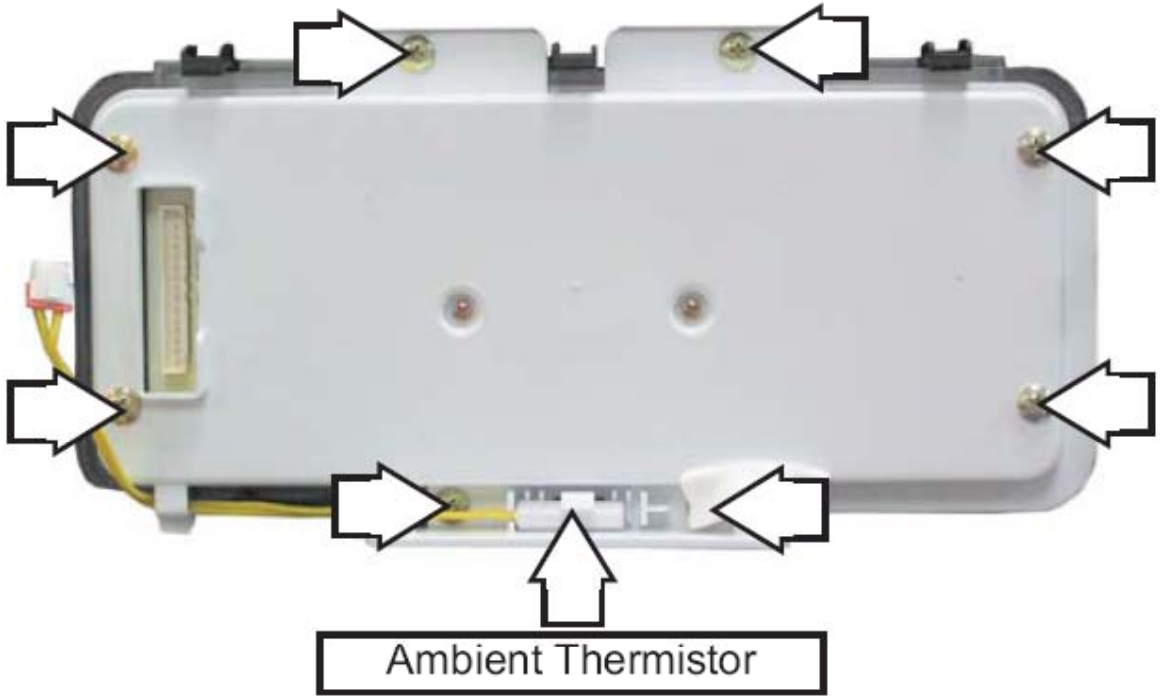
Dispenser Trim

To remove the dispenser frame on trimmed models, remove the door handle first, then slide out the top panel. The dispenser cover can then be removed by pulling it away from the door front.

Note: Some force is required to remove the trim frame.

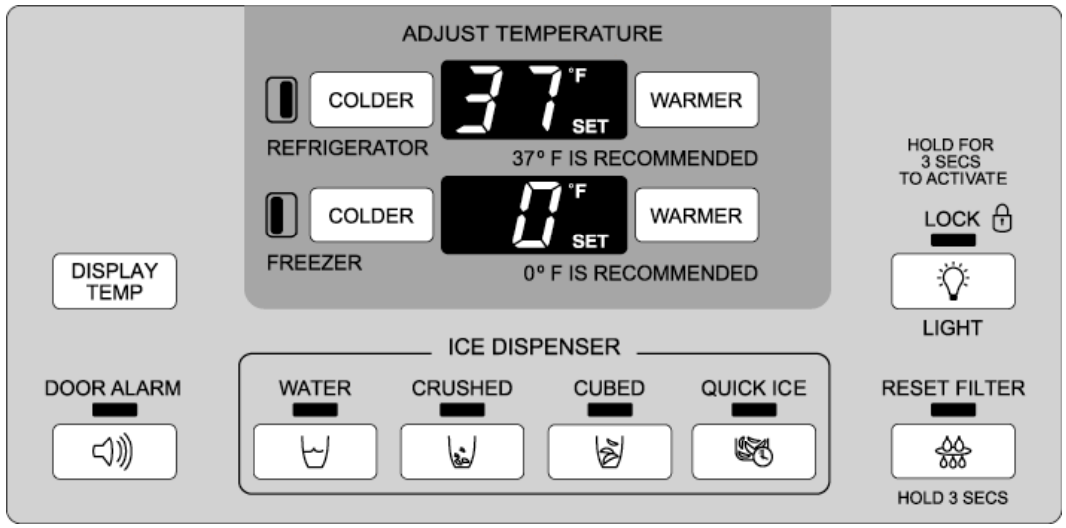
Control Module

- The control module is located on the back of the dispenser control panel.
- The control module is held in place by 8 Phillips-head screws.
- The ambient thermistor is clipped to the bottom of the module housing.



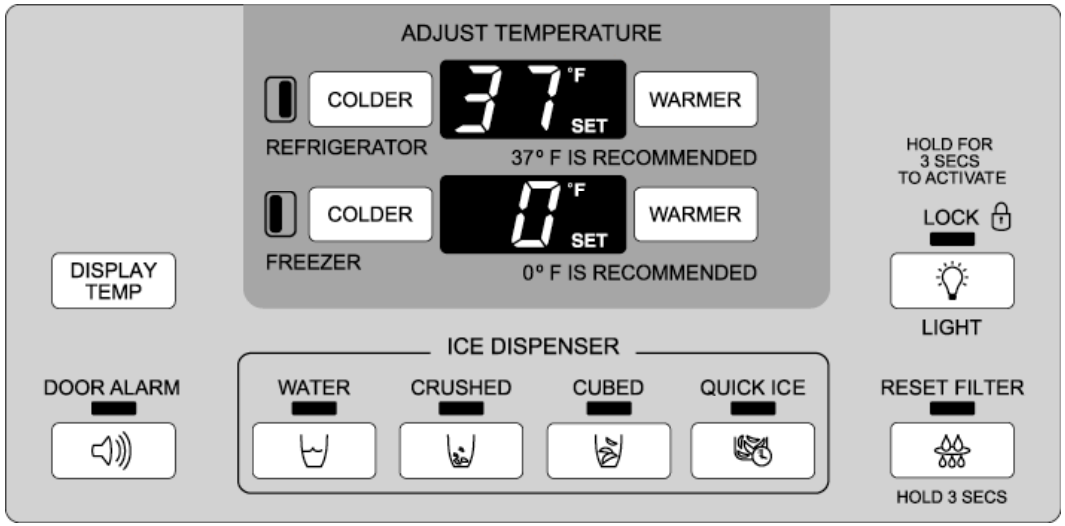
Dispenser Operation

- The control module operates the water, crushed ice & cubed ice functions.
- LED lights to identify the selection.
- With any ice selection, the auger motor delays until the duct door is open.
- The duct door delays closing after the dispenser switch is released.



- The dispenser light is a 6 watt, 12VDC bulb (**WR02X10675**).

Dispenser Testing



Testing the Dispenser Control Pads

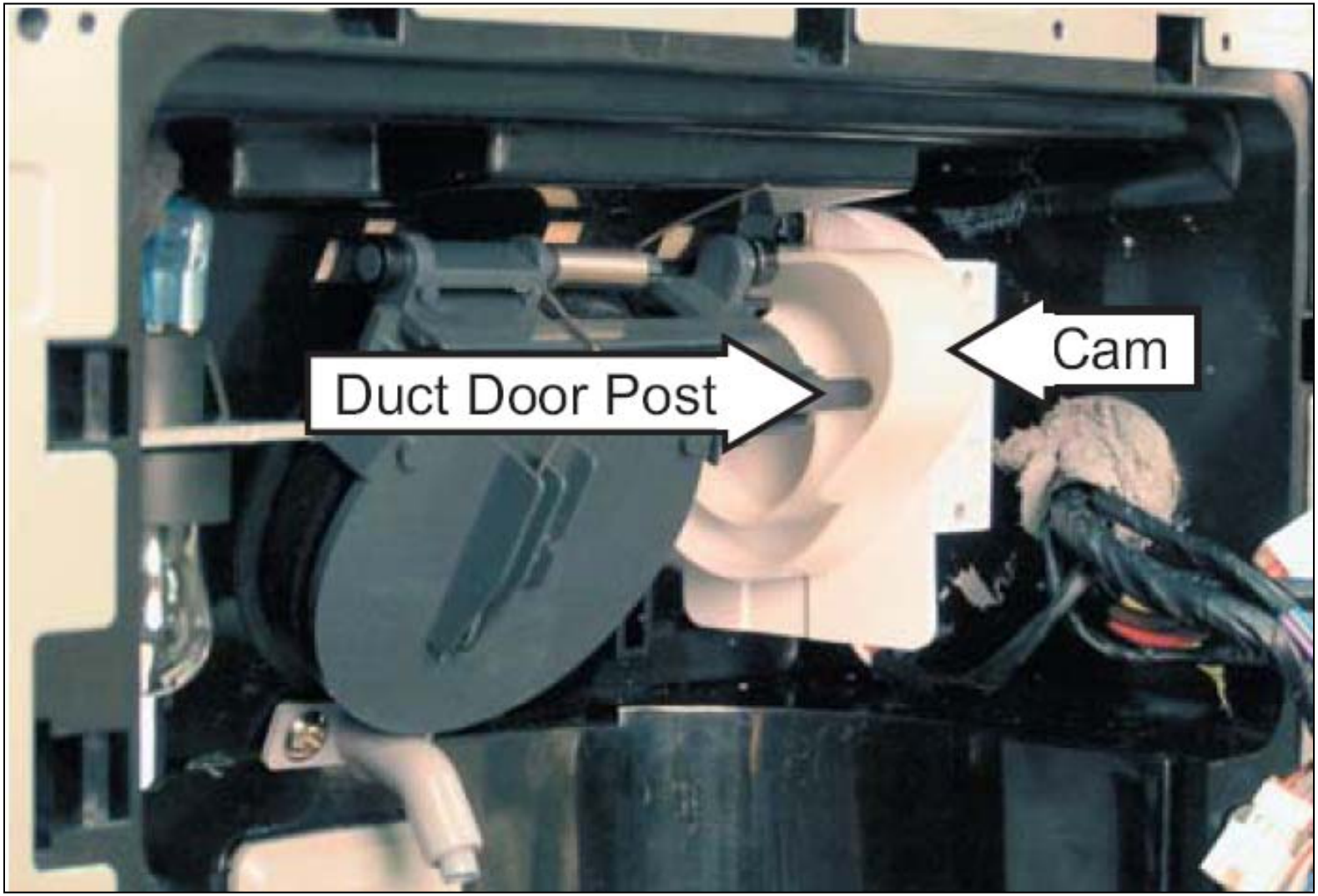
Run the HMI Self-Test **0 6** (see ***Service Diagnostics***). If any portion of the test fails, the control module pads can be tested at the CN04 connector on the terminal block (see ***Terminal Block Panel***).

Disconnect the CN04 connector and read the resistance between the wires to the control module. When each pad is pressed, a reading of approximately 10K Ω should be present between the pins as shown in the chart below.

Dispenser Testing

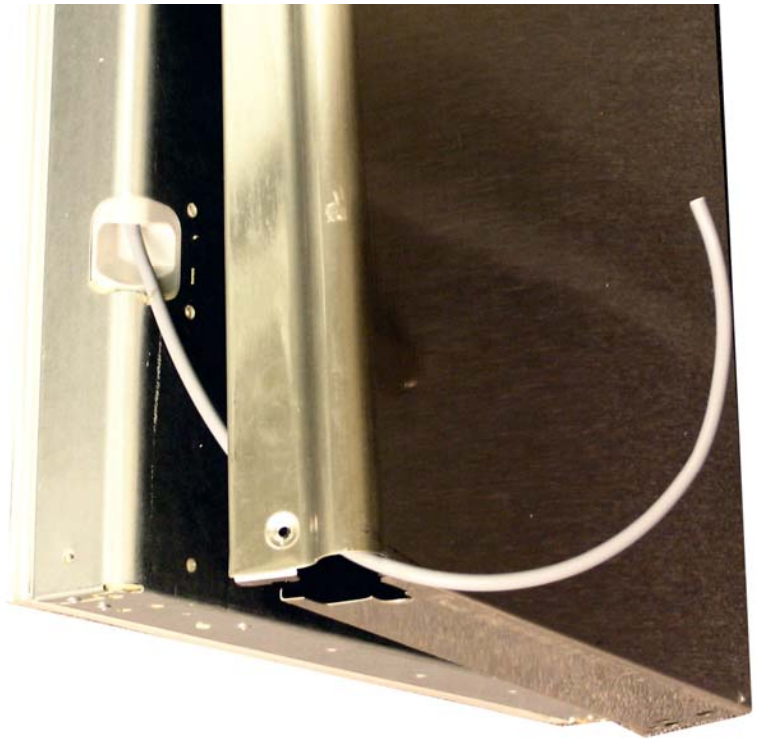
Pad Description	Pin	Wire	Pin	Wire
REFRIGERATOR COLDER	8	Purple	14	White/Blue
REFRIGERATOR WARMER	9	Gray	14	White/Blue
FREEZER COLDER	10	White	14	White/Blue
FREEZER WARMER	11	Light Blue	14	White/Blue
DISPLAY TEMP	12	White/ Black	14	White/Blue
DOOR ALARM	13	White/ Red	14	White/Blue
WATER	8	Purple	15	White/Yellow
CRUSHED	9	Gray	15	White/Yellow
CUBE	10	White	15	White/Yellow
QUICK ICE	11	Light Blue	15	White/Yellow
RESET FILTER	12	White/ Black	15	White/Yellow
LIGHT/LOCK	13	White/ Red	15	White/Yellow

Duct Door & Cam



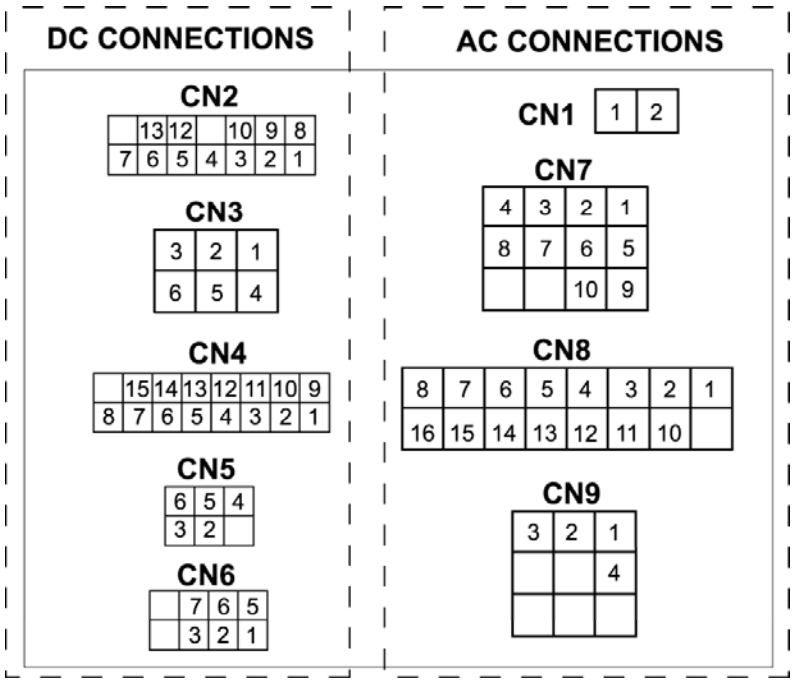
Dispenser Water Line

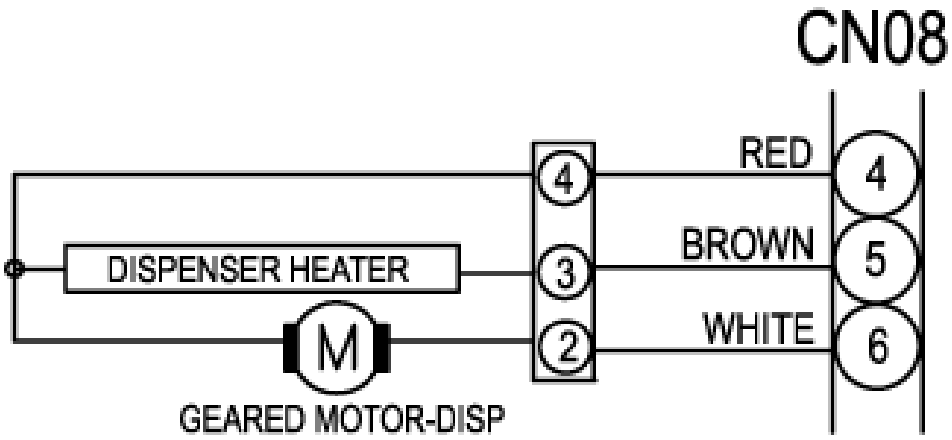
- Water line is replaceable.
- 5/16” tubing (connector **WR02X10471**).
- Pull the tube down from the bottom of the door to remove.
- Insert from the top & route it down through the door.



Dispenser Heater Circuit

- Dispenser heater operation is based on ambient thermistor.
- Below 46°F (8°C) – constantly on.
- Between 46°F (8°C) & 80°F (27°C) – cycles on & off with compressor.
- Between 80°F (27°C) 98°F (37°C) – cycles on 5 minutes & off 5 minutes while the compressor is running (5 minutes on & 25 minutes off when the compressor is not running).
- Above 98°F (37°C) – cycles on & off with compressor.





Thermistors

There are 5 thermistors:

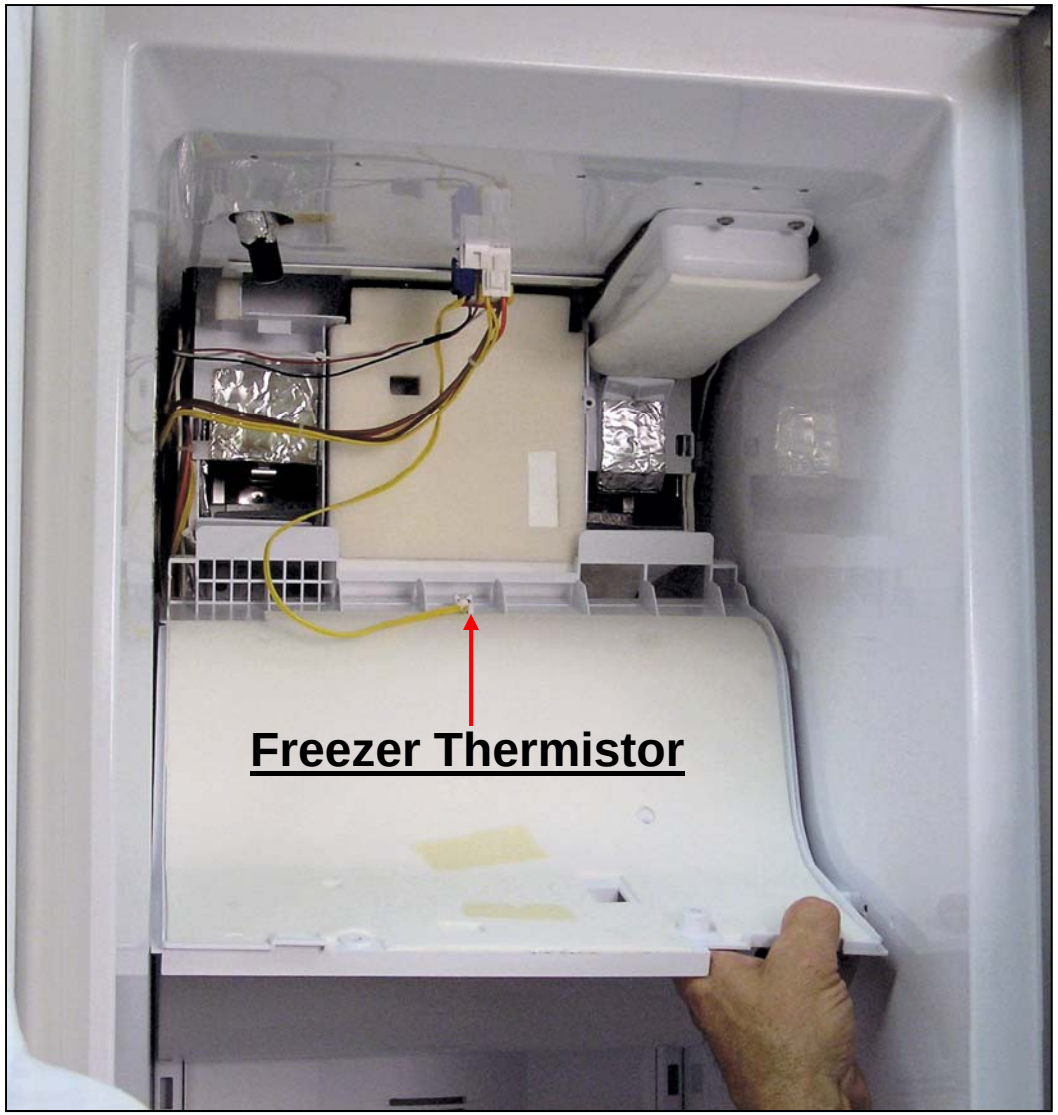
- Freezer Air
- Fresh Food Air
- Freezer Evaporator
- Fresh Food Evaporator
- Ambient Air

To accurately test a thermistor, place the thermistor in a glass of ice water for several minutes before measuring resistance.

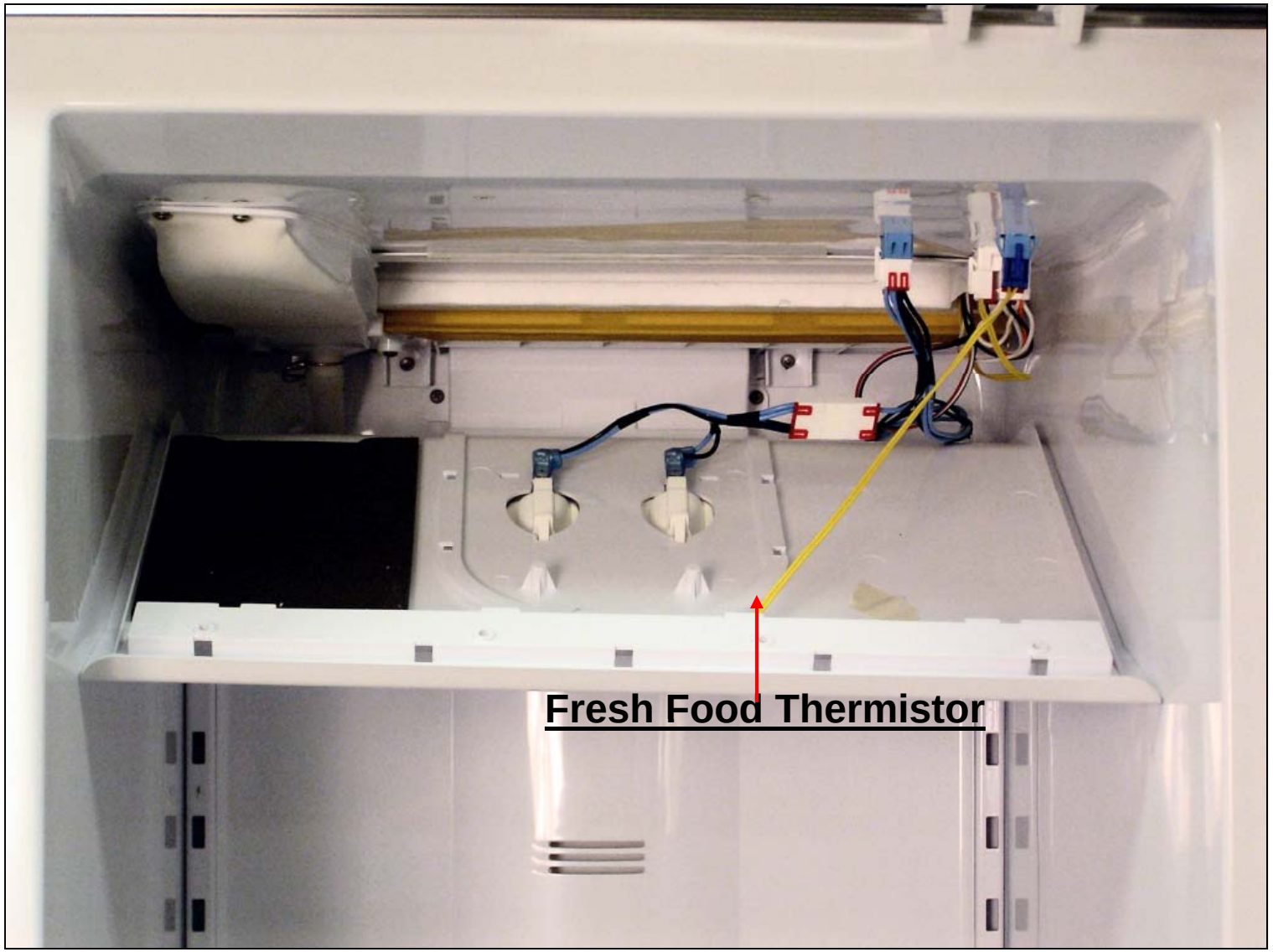
Thermistor Chart

˚F	Resistance In Ohms (K)	˚C
-9	37K	-23
-6	34K	-21
0	29K	-18
6	25K	-14
32	13K	0
37	12K	3
50	8.8K	10
77	5K	25
86	4.2K	30
95	3.5K	35

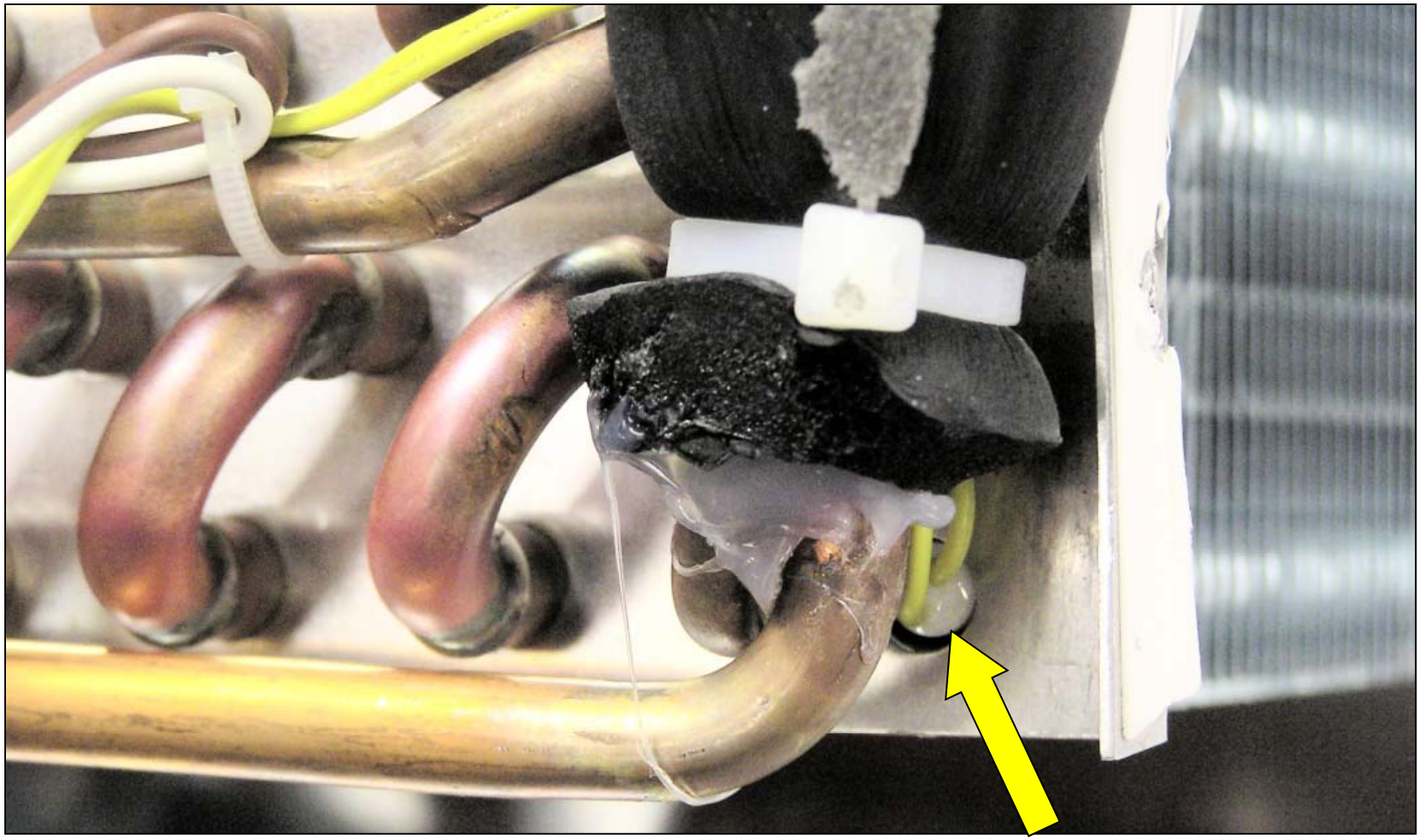
Freezer Thermistor



Fresh Food Thermistor

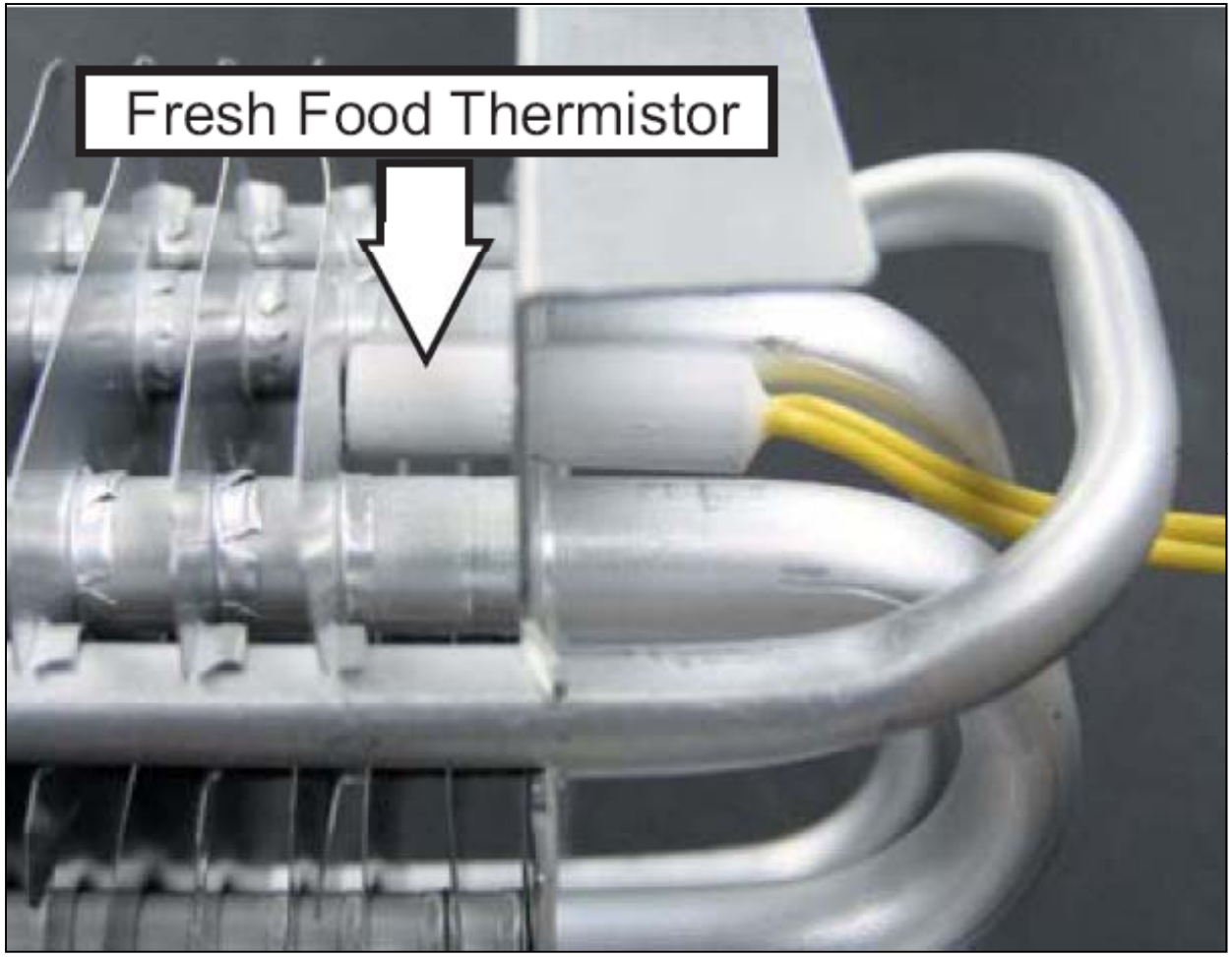


Freezer Evaporator Thermistor



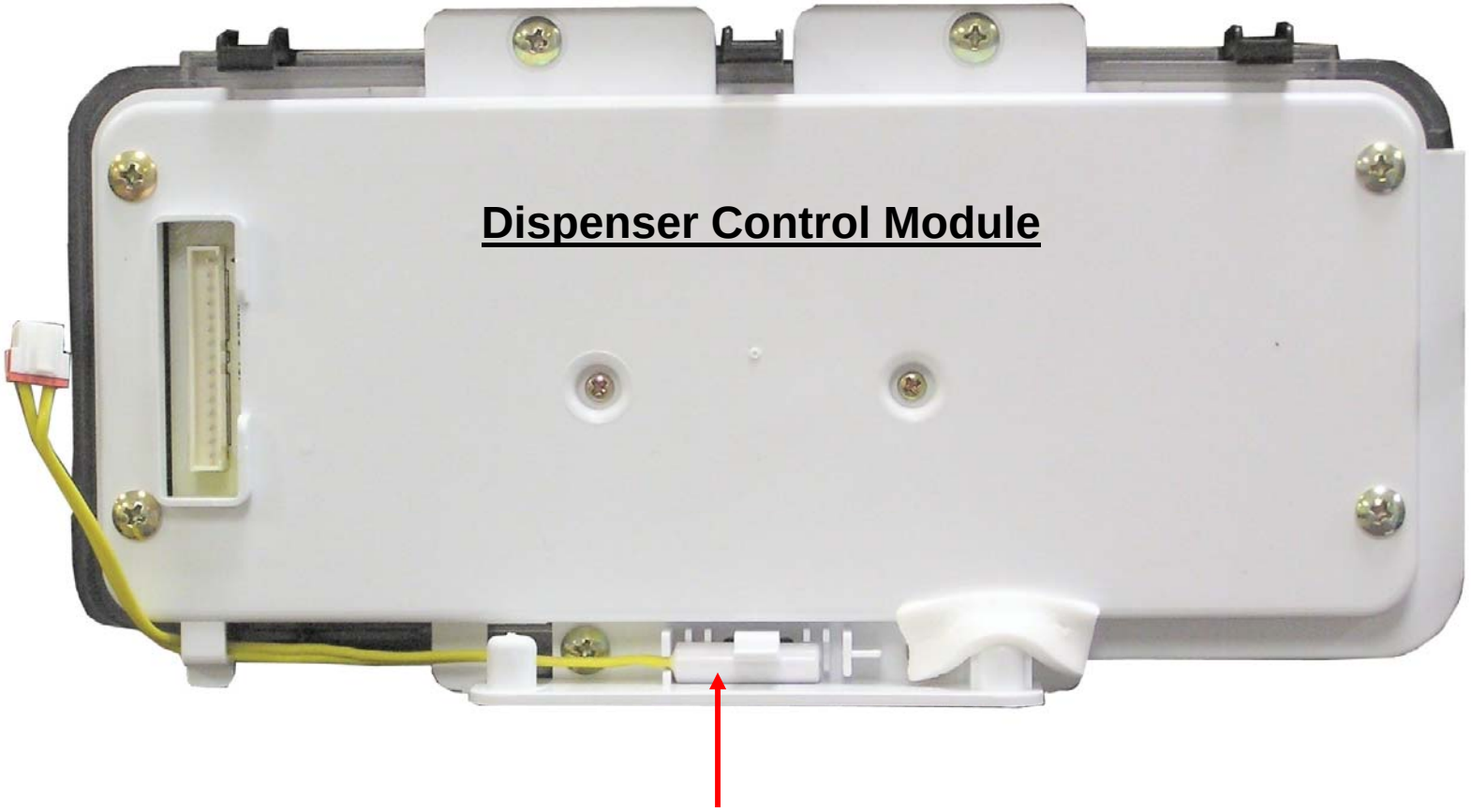
Freezer Evaporator Thermistor

Fresh Food Evaporator Thermistor



- To remove the fresh food evaporator thermistor, pull it straight out from its mounting tube.

Room Ambient Thermistor



Thermistor Emergency Operation

- If the freezer thermistor opens (or shorts), the unit defaults to the freezer evaporator thermistor.
- The compressor & freezer fan cycle off when the freezer evaporator temperature is -22°F (-30°C) or colder.
- The compressor & freezer fan cycle on when the freezer evaporator temperature is -2°F (-19°C) or warmer.
- If the fresh food thermistor opens (or shorts), the fresh food cooling operation defaults to the freezer thermistor.
- Refrigerant will flow through the fresh food evaporator any time the freezer evaporator is cooling.
- The fresh food fan will cycle off once the fresh food evaporator thermistor reaches 5°F (-15°C) or colder.

Defrost Cycles

- This model uses 2 types of defrost cycles:
  - manual or natural draft
  - heated

- Manual (fresh food section only) occurs once the compressor has accumulated 2 hrs. & ambient room temp is above 66ºF & the freezer temp is satisfied, the compressor cycles off & refrigerant continues to flow through freezer evap as it equalizes, the warm thermal mass defrosts the evap. Also, when the defrost thermistor is below 23ºF, the evap fan continues to run moving air across the evap. Once the thermistor reaches 28ºF, the fan cycles off.

- Heated defrost occurs for the fresh food evap every 5 hours of compressor operation & for the freezer evap every 10 hours of compressor operation.

- If either defrost thermistor fails (open/short), the PCB defaults to a timed defrost based on cabinet temps.

Defrost Operation

Natural Defrost (Fresh Food only):

- Once the fresh food temperature is satisfied, natural defrost occurs if the following conditions have been satisfied:
  1.) The compressor has accumulated 2 hours of run time.
  2.) The room temperature is above 66°F (19°C).
  3.) The freezer temperature is satisfied.
- If the above conditions have been met when the fresh food temperature is satisfied & the compressor cycles off, the 3-way valve will open to both the fresh food & freezer evaporators.
- The warm thermal mass (refrigerant) flowing through the evaporator helps to remove frost. It has very little impact on the freezer evaporator due to the cold freezer temperature.
- In addition, when the fresh food evaporator thermistor is below 23°F (-5°C), the fresh food fan will run to help move air across the evaporator. Once the thermistor reaches 28°F (-2°C), the fan will cycle off.

NOTE: If the compressor is still cooling the freezer section when the fresh food is satisfied, or the room temperature is below 66°F (19°C), natural defrost will not occur.

Defrost Operation

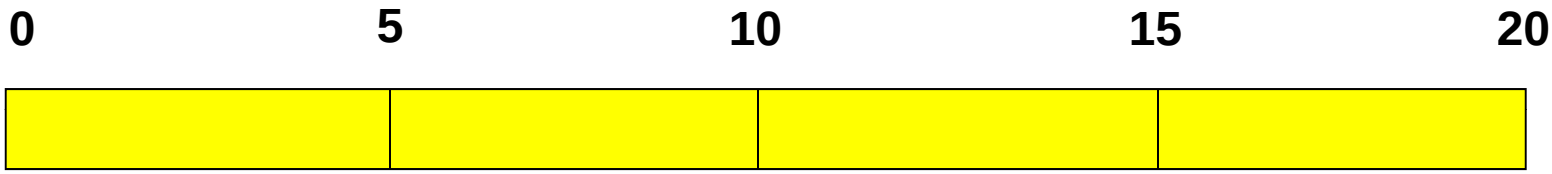
Heated Defrost:

- In normal cooling operation (normal food load, door openings, etc.), the power control board will energize the fresh food defrost heater every 5 hours & the freezer defrost heater every 10 hrs. of compressor running time.
- The fresh food heater cycles off when the fresh food evaporator thermistor reaches 63°F (17°C).
- The freezer heater cycles off when the freezer evaporator thermistor reaches 68°F (20°C),
- The compressor & fans do not operate when either section is defrosting, regardless of cabinet temperature.
- There is a 10-minute dwell period after the heater cycles off for each section.

ELECTRICAL SPECIFICATIONS
Max Defrost Control w/No Door Openings.....16 hrs
Evap Defrost Thermistor.....68˚F (FZ)..63˚F (FF)
Electrical Rating: 115V AC 60 HZ.....5.4 amp
Maximum Current Leakage.....0.75 mA
Maximum Ground Path Resistance.....0.1
Energy Consumption Model 42.....50.5 KWh/mo
Energy Consumption Model 48.....53.75 KWh/mo

Defrost Operation

Hours Of Compressor Run Time



Fresh Food

Fresh Food & Freezer

Fresh Food

Fresh Food & Freezer

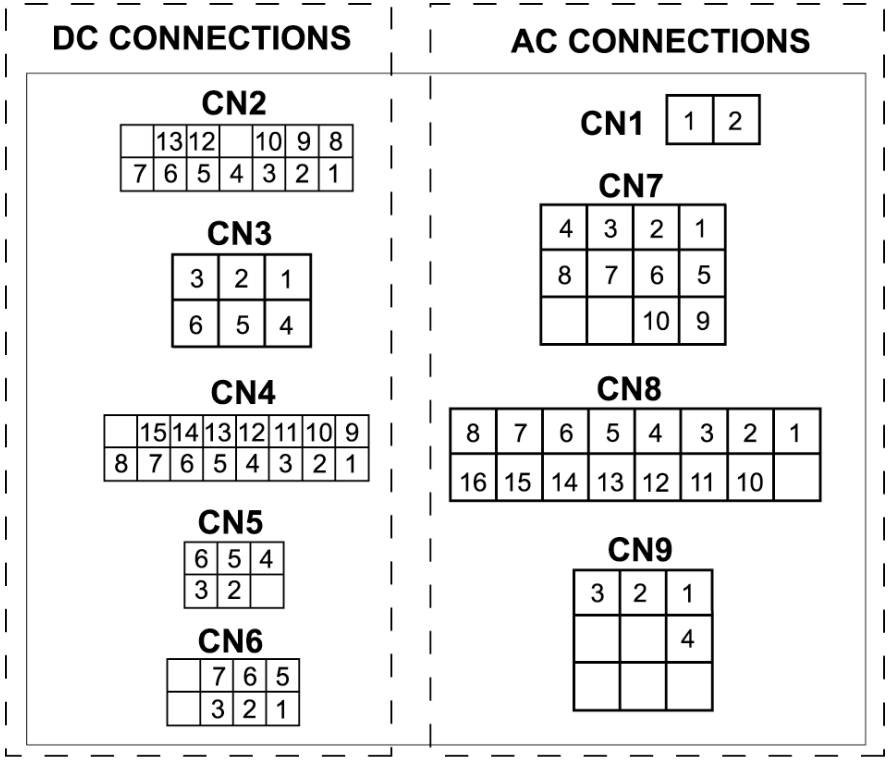
Defrost Cycle(s)

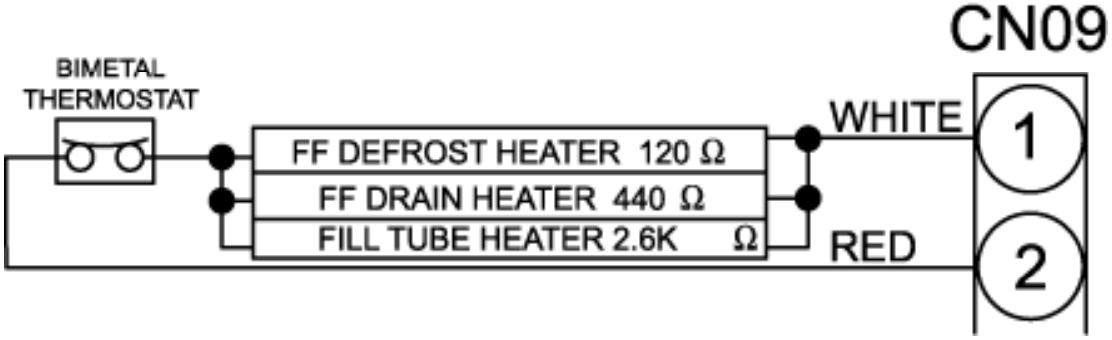
Thermistor Error Defrost Operation

- If either evaporator thermistor fails (open or shorted), the power control board (PCB) defaults to a timed defrost cycle based on cabinet temperature.
- If the freezer evaporator thermistor fails (open or shorted) & the freezer temperature is below 27°F (-3°C), the freezer defrost heater will be energized for 20 minutes.
- If the freezer temperature is above 27°F (-3°C), the heater will not come on.
- If the fresh food evaporator thermistor fails (open or shorted) & the fresh food temperature is below 68°F (20°C), the fresh food defrost heater will be energized for 10 minutes.
- If the fresh food temperature is above 68°F (20°C), the heater will not come on.
- During thermistor error operation, the control defaults to fresh food defrost every 5 hrs. & freezer defrost every 10 hours of accumulated compressor run time.

Fresh Food Defrost Circuit

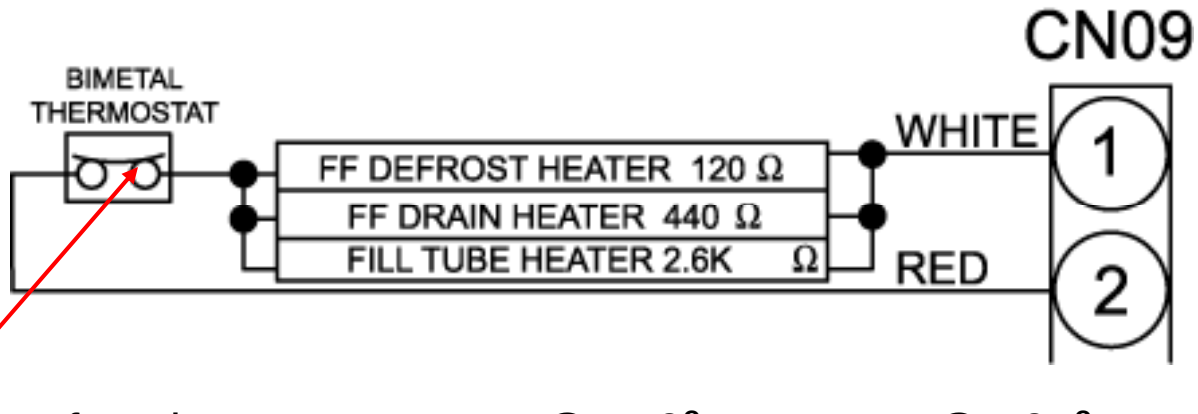
- The resistance value of the defrost heater is approximately 120 Ω.
- The resistance value of the drain pan heater is approximately 440 Ω.
- The resistance value of the icemaker fill tube heater (referred to as the “PIPE HEATER ICE WATER” on some schematics) is approximately 2.6K Ω.
- The defrost safety thermostat is a bimetal type which will open at 140°F (60°C) and will reset at 104°F (40°C).





Fresh Food Defrost Heater Testing

- The fresh food defrost, evap drain pan, & icemaker fill tube heaters are in a parallel circuit.
- The heaters are in series with a bi-metal defrost safety thermostat.
- Check for a combined resistance of 91Ω at terminal block CN09 between pin 1 & pin 2 (when defrost safety thermostat is closed).
- Check for 120VAC at terminal block CN09 between pin 1 & pin 2 when the fresh food is in defrost mode.

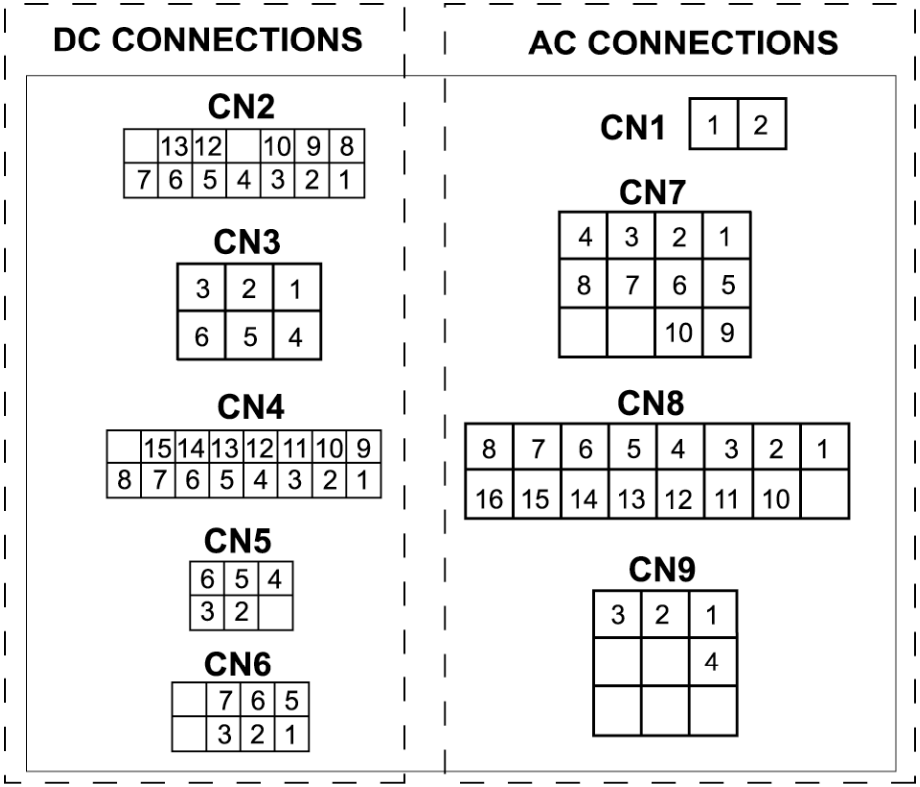


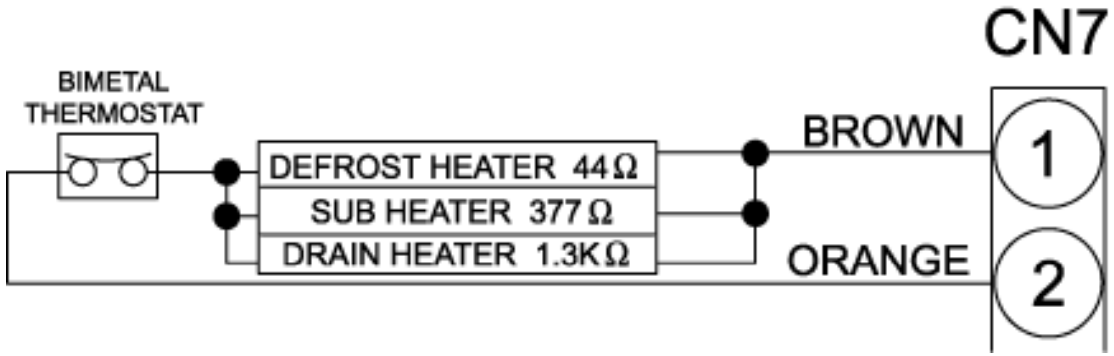
- The defrost safety thermostat opens @ 140ºF & resets @ 104ºF

Note: Access to the evaporator is necessary to complete testing of the above components, with exception of the icemaker fill tube heater.

Freezer Defrost Circuit

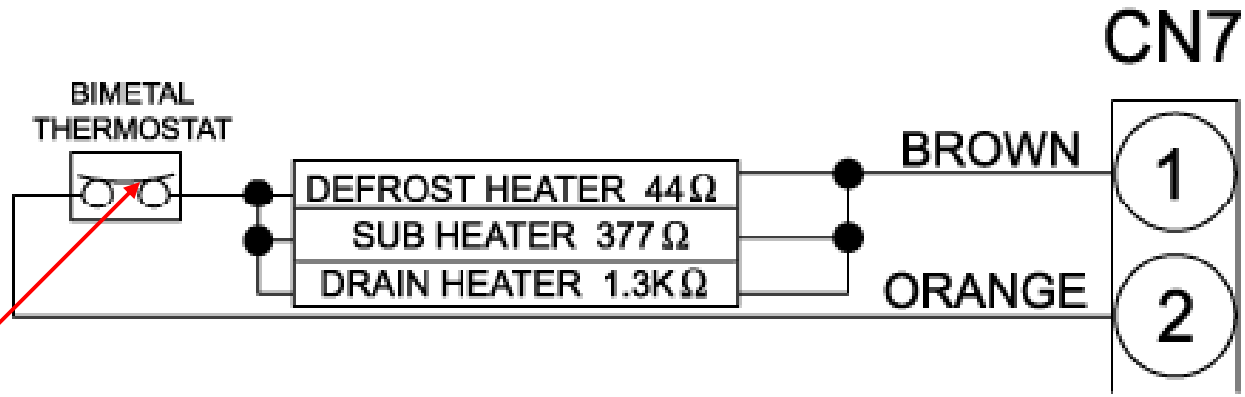
- The resistance value of the defrost heater is approximately 44 Ω.
- The resistance of the suction line drain pan heater (referred to as the "DRAIN HEATER" on some schematics) is approximately 1.3K Ω.
- The resistance value of the evaporator drain pan and drain tube heater (referred to as the "SUB HEATER" on some schematics) is approximately 377 Ω.
- The defrost safety thermostat is a bimetal type which will open at 140°F (60°C) and will reset at 104°F (40°C).





Freezer Defrost Heater Testing

- The freezer defrost, suction line drain trough, & evap drain pan/drain tube heaters are in a parallel circuit.
- The heaters are in series with a bi-metal defrost safety thermostat.
- Check for a combined resistance of 38Ω at terminal block CN07 between pin 1 & pin 2 (when defrost safety thermostat is closed).
- Check for 120VAC at terminal block CN07 between pin 1 & pin 2 when the freezer is in defrost mode.



- The defrost safety thermostat opens @ 140ºF & resets @ 104ºF

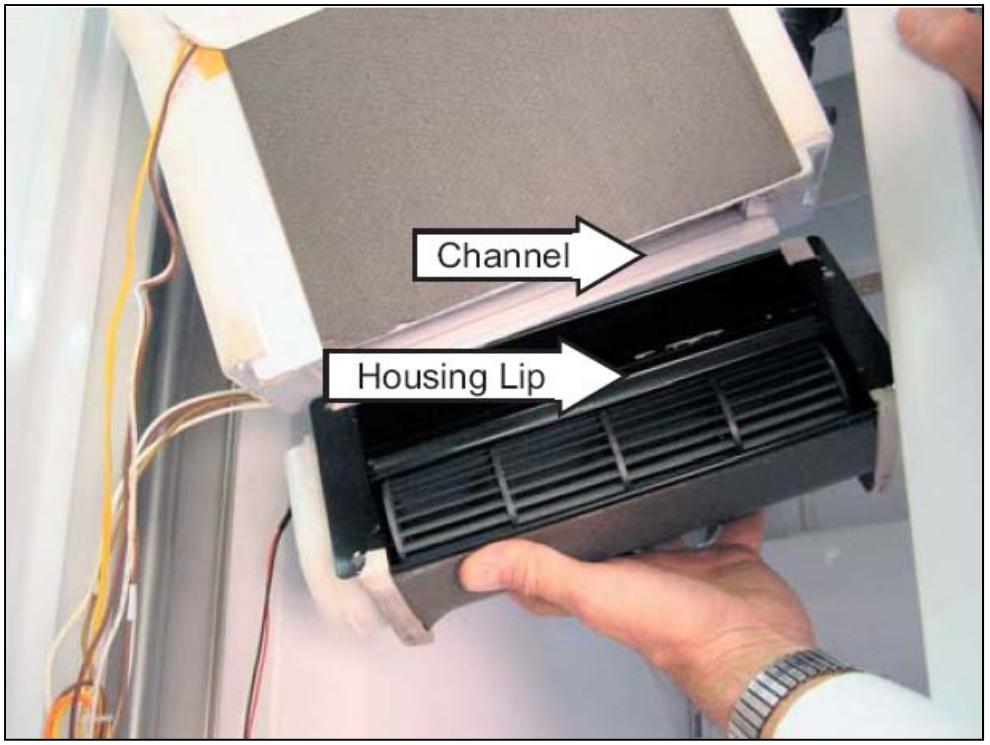
Note: Access to the evaporator is necessary to complete testing of the above components, with the exception of the suction line drain pan heater.

Fan Operation

- All 3 fans (condenser, freezer, & fresh food) are variable speed DC fans.
- The speed of each is controlled by the PCB & determined by room ambient, thermal load, temp settings, number of door openings, & etc.
- The fans are extremely QUIET & determining speed is very difficult.
- The freezer fan assembly is mounted directly to freezer evap & can be ordered as a complete unit or individual parts.
- If ambient air is 82ºF or higher, the freezer fan will delay 5 min. after the compressor starts; but if ambient air is below 82ºF , the fan starts right away.
- The fresh food fan assembly is mounted directly to the fresh food evap & can be ordered as a complete unit or individual parts.
- The condenser fan assembly is mounted directly to the condenser.
- If ambient air is less than 45ºF, the condenser fan will not run when the compressor is on; but if the ambient air is between 45ºF & 50ºF, the fan will turn on 5 min. after the compressor has started & if ambient is above 50ºF (or the thermistor is open/shorted), the fan is synchronized with the compressor.

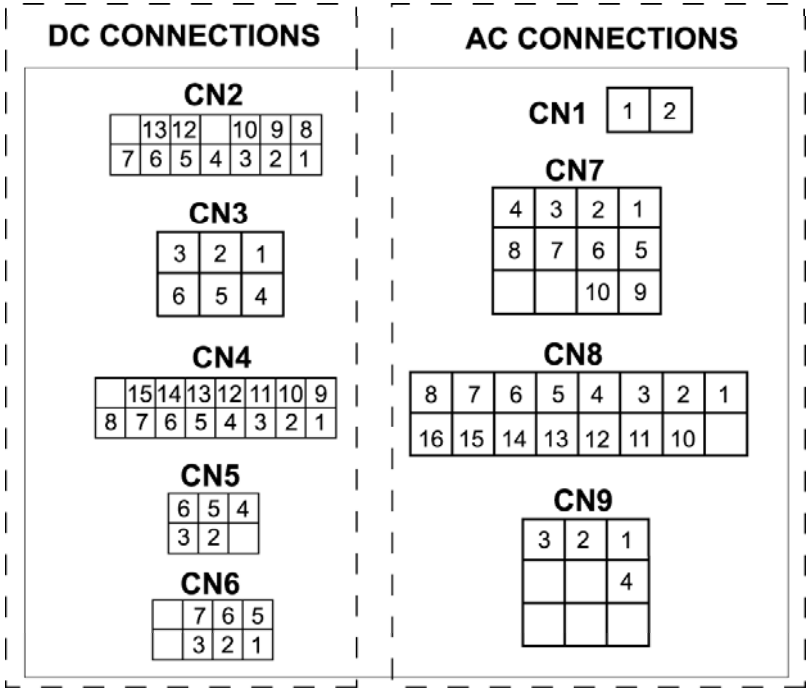
Evaporator Fans

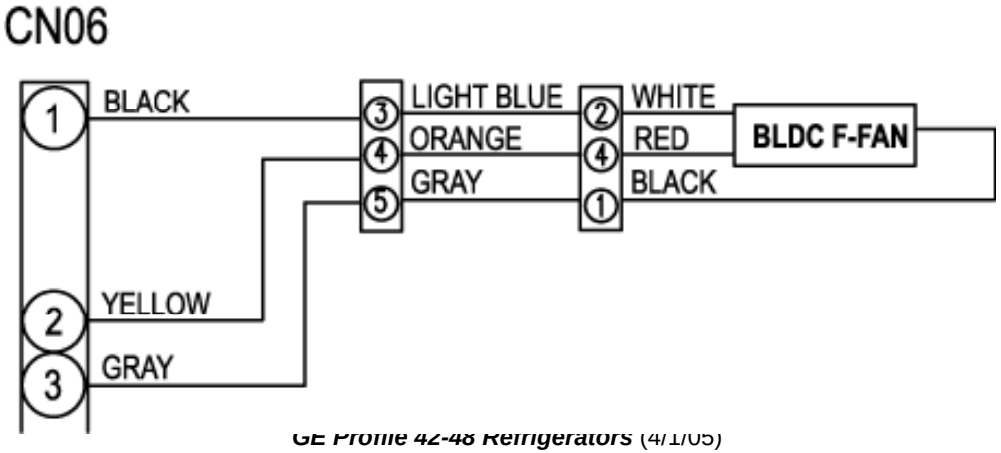
- Freezer & fresh food fans are the same squirrel cage blower design.
- Extremely quiet operation.
- The fan assembly consists of the motor, blower & housing.
- The fan assembly is available as a separate part or as a part of the complete evaporator assembly.
- Fans can be tested using a 9 volt battery.



Freezer Fan Circuit

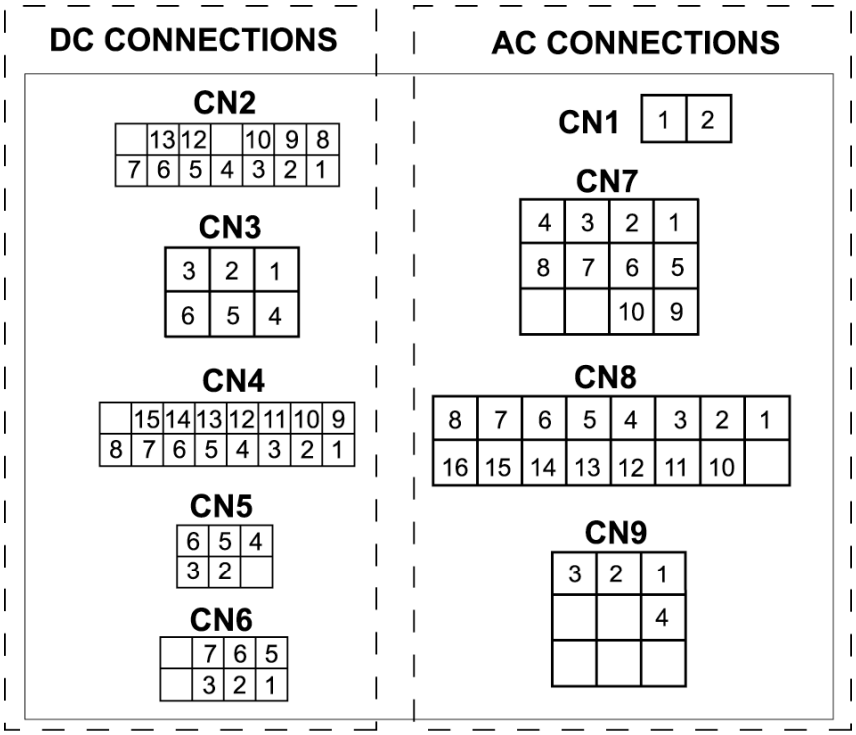
- Variable speed DC motor.
- Check for approximately 8 - 11VDC at CN06 between pin 2 & pin 3.
- Check for approximately 2.25VDC feedback at CN06 between pin 1 & pin 3.
- If the room temperature is 82°F or higher, the fan will delay running for 5 minutes after the compressor has started.
- If the room temperature is below 82°F, the fan will start right away with the compressor.

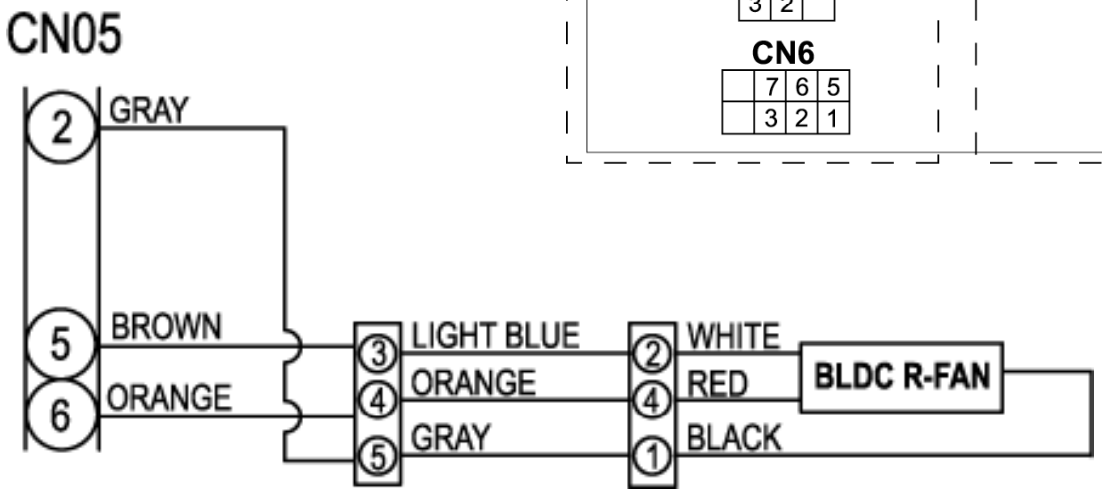




Fresh Food Fan Circuit

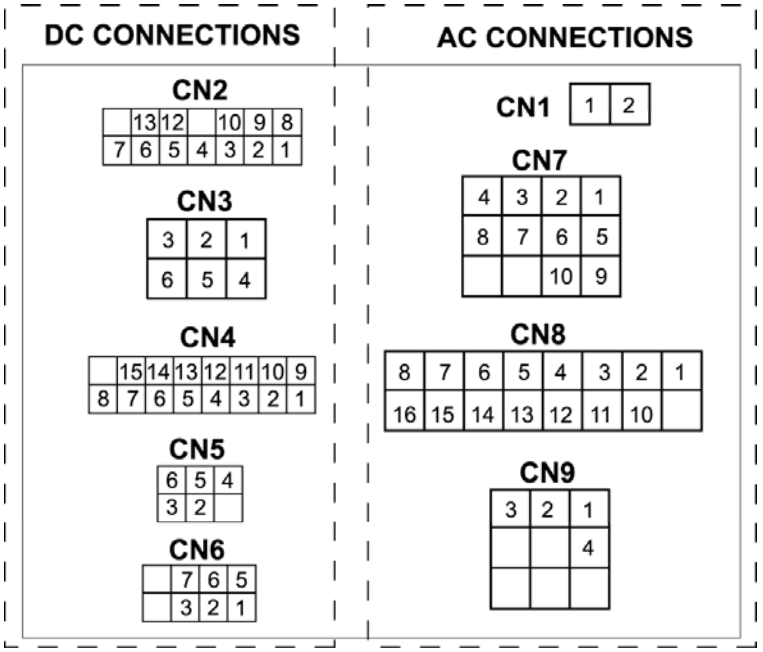
- Variable speed DC motor.
- Check for approximately 7- 8VDC at CN05 between pin 2 & pin 6.
- Check for approximately 2VDC feedback at CN05 between pin 2 & pin 5.

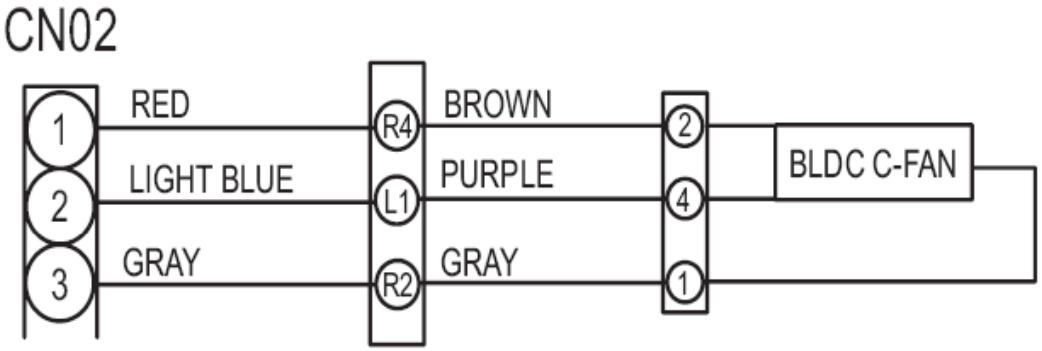




Condenser Fan Circuit

- Check for 9-10VDC at CN02 between pins 2 & 3.
- Check for approximately 2VDC at CN02 pins 1 & 3.
- Ambient temperature affects operation.
- If the room temperature is less than 45°F, the fan will not run when the compressor is on.
- Between 45°F & 50°F, the fan will start 5 minutes after the compressor starts.
- Above 50°F, or if the ambient thermistor is open or shorted, the fan is synchronized with the compressor.

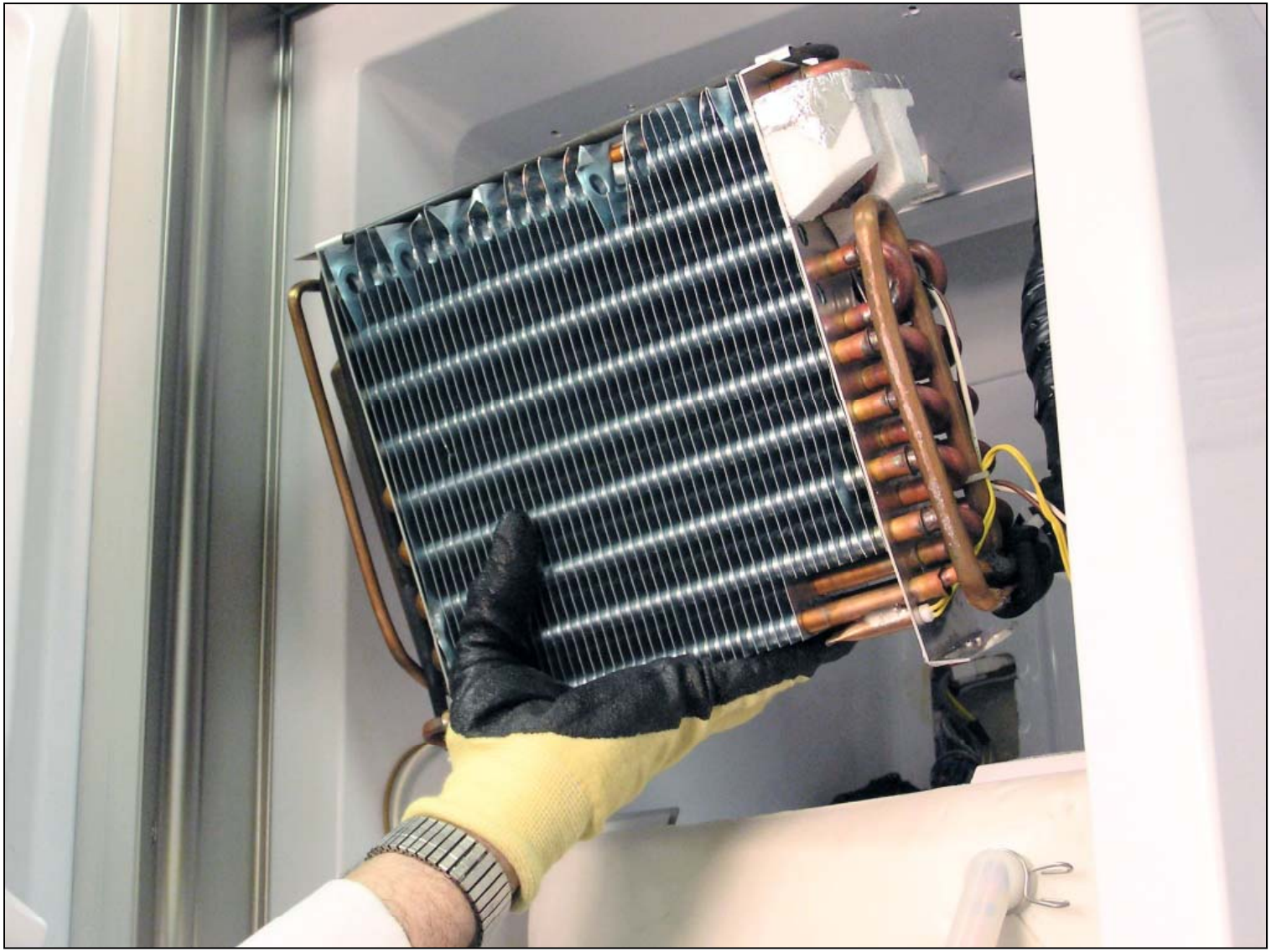




Accessing the Freezer Evaporator

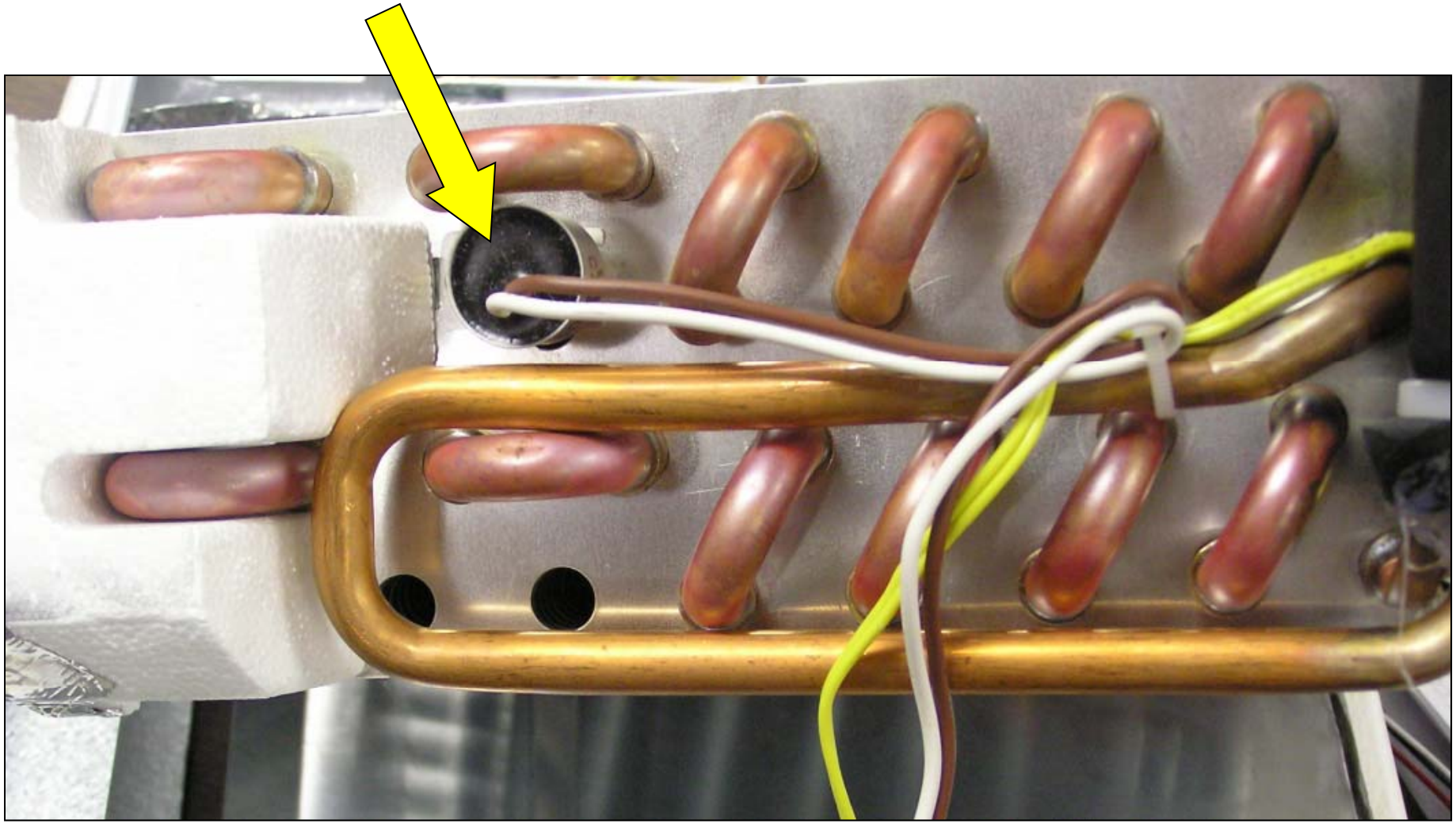
- Remove 4 Phillips screws from the top air duct cover.

Removing the Evaporator

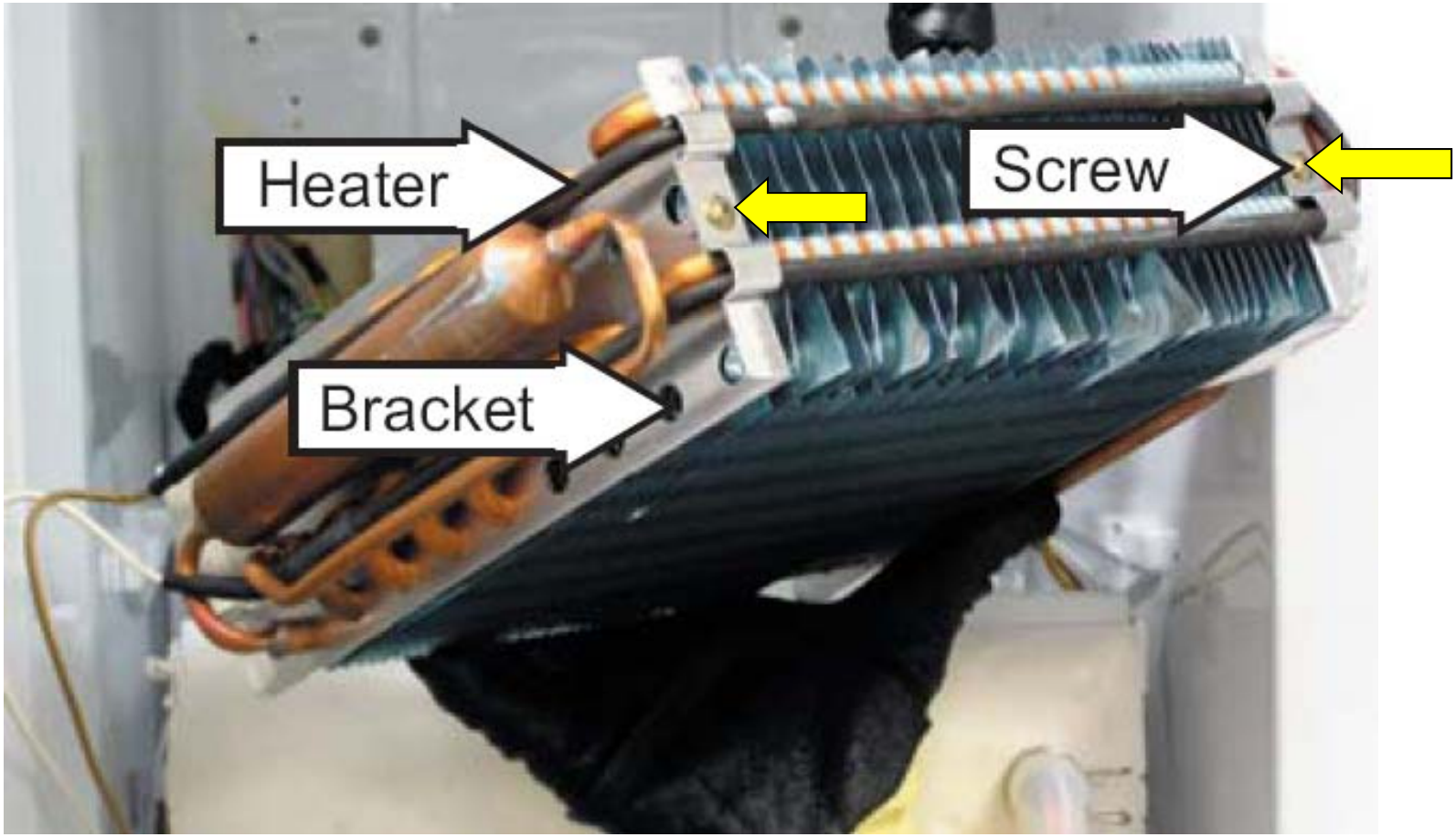


Note: The evaporator is very sharp, wear protective gloves.

Defrost Safety Thermostat



Freezer Defrost Heater

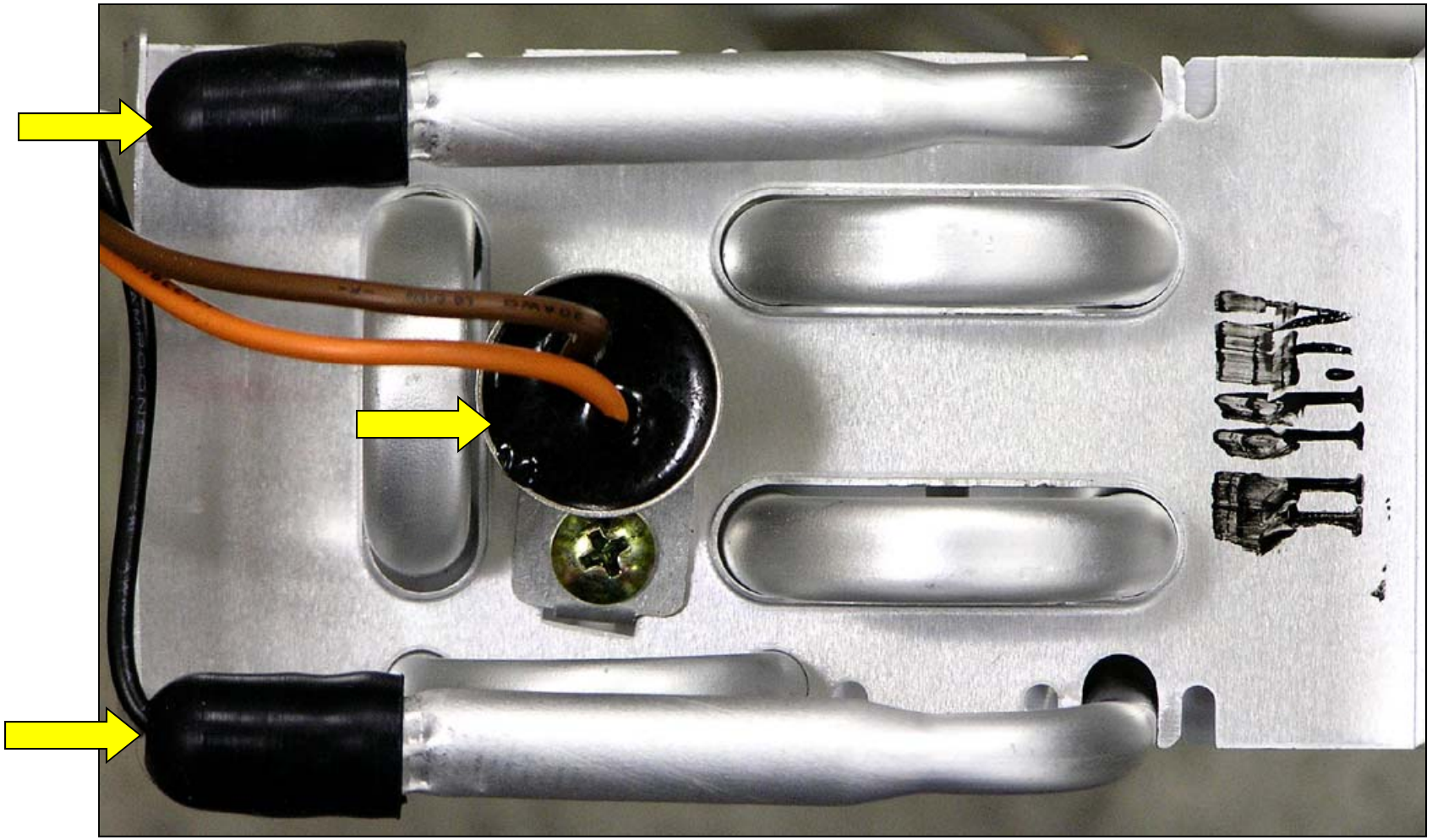


- Remove the 2 Phillips screws holding the defrost heater to the freezer evaporator.

Accessing the Fresh Food Evaporator

- After removing the grille by prying down with a small screwdriver, remove the 4 Phillips screws under the grille.

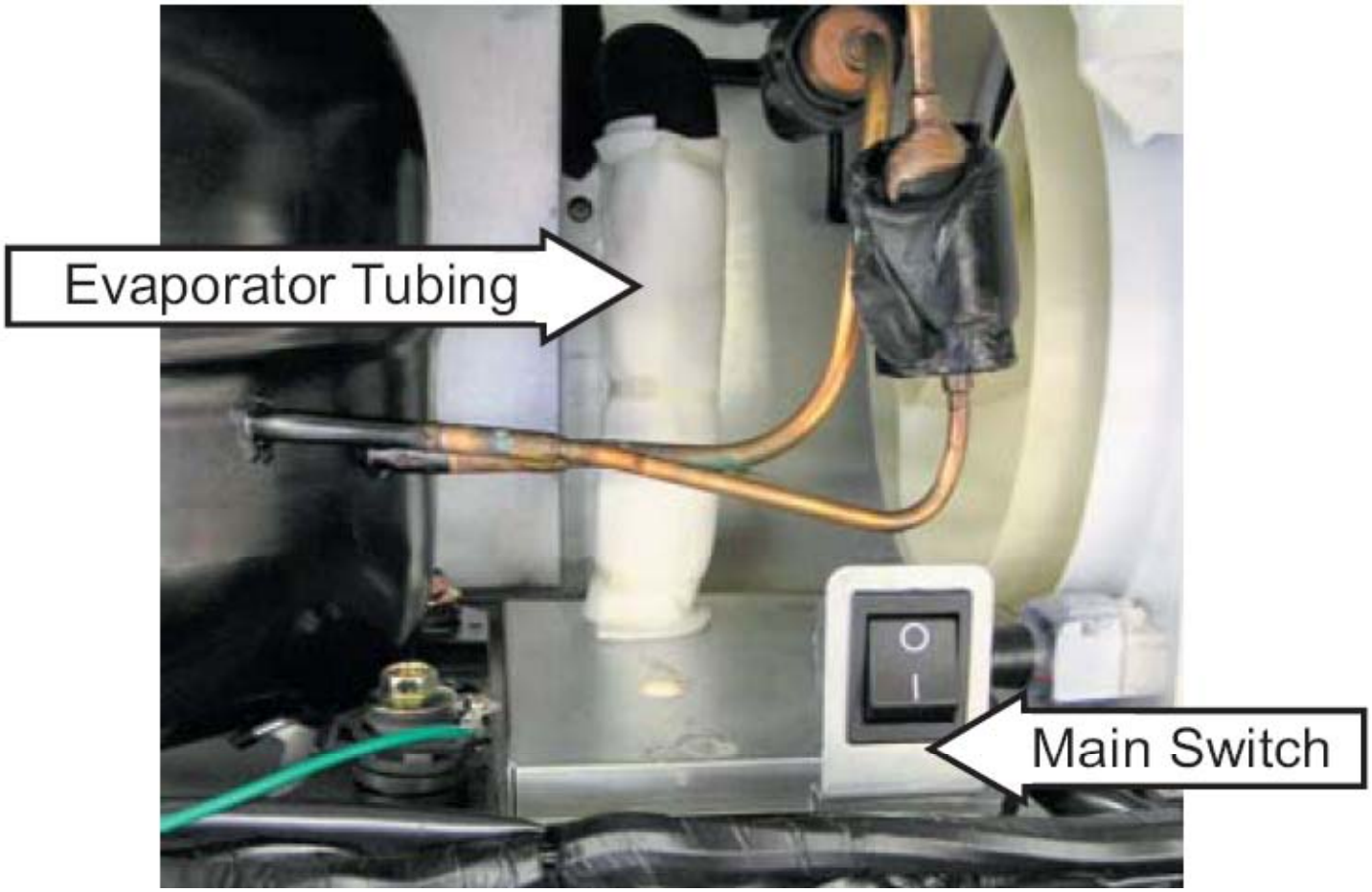
Fresh Food Evaporator Safety Thermostat & Heater



- Disconnect the 2 electrical connectors & lift the fresh food evaporator from the housing.

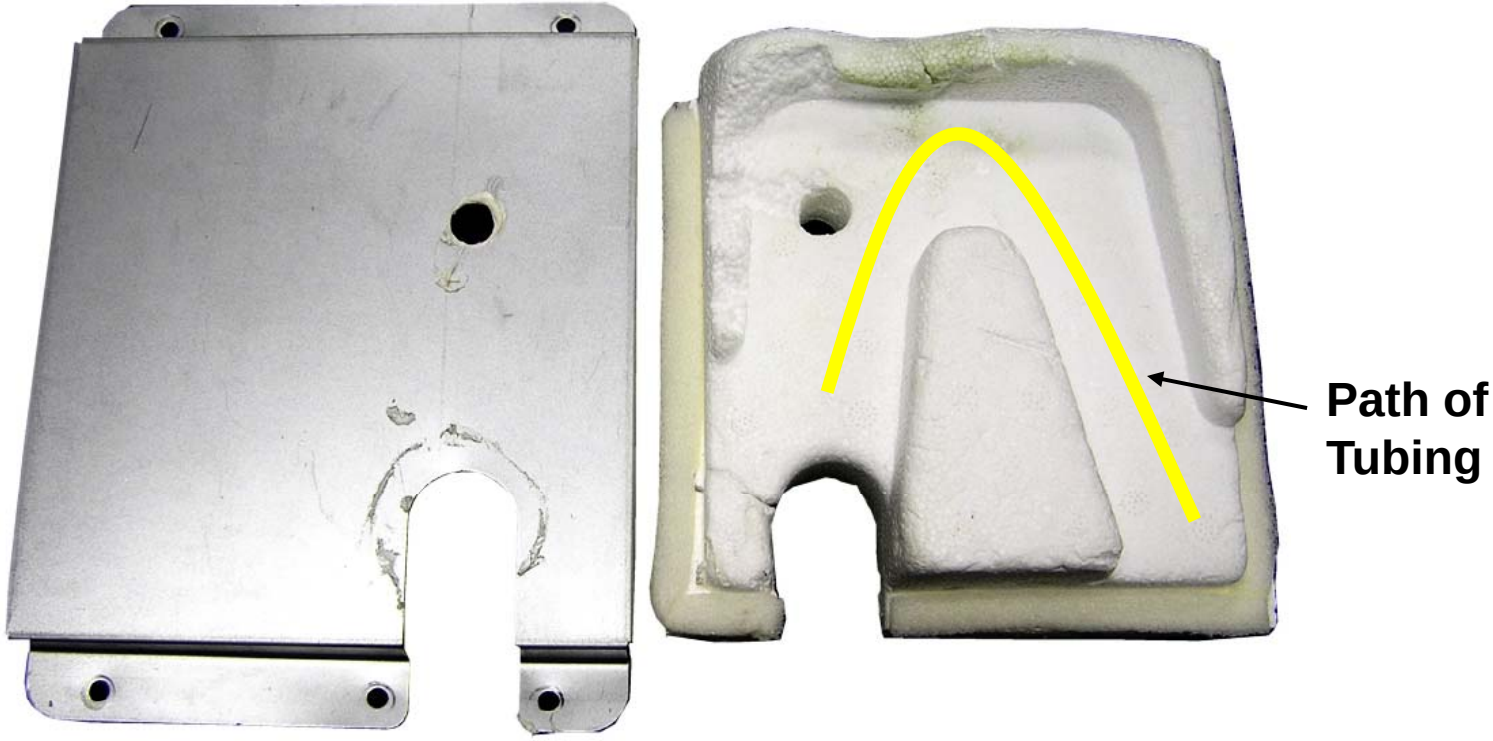
Note: The defrost heater is not available separately and only comes as a part of the evaporator assembly.

Refrigerant Tubing Cover



- Remove the condenser fan & main switch bracket first for easier access.
- Remove the 5 Phillips screws holding the galvanized metal cover.

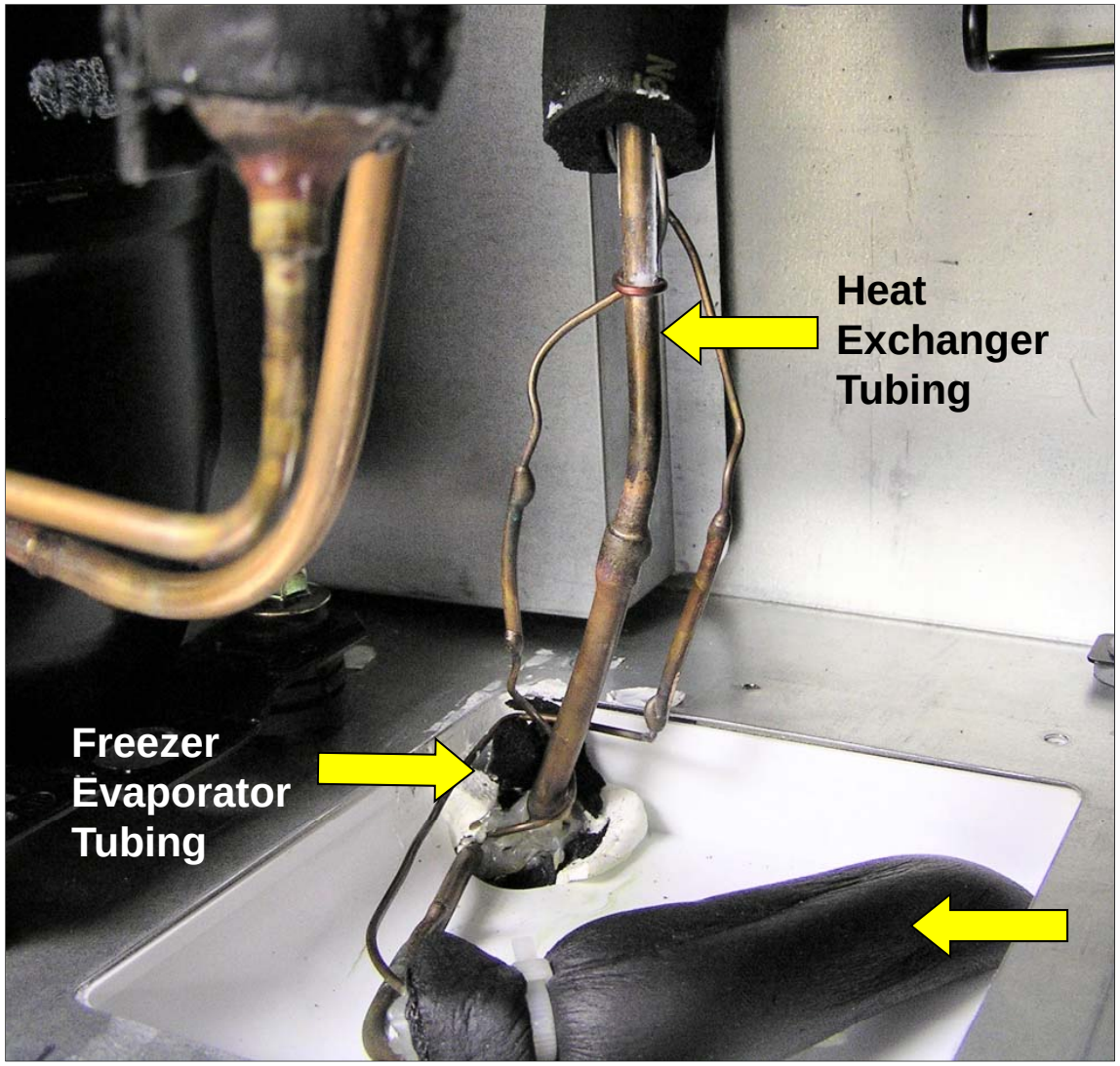
Cover & Insulation



- Insulation will break when removing the cover & expose the brazing joints.
- If replacing an evaporator, order a new foam insulation block when ordering the evaporator.

Note: Adhesive may be holding the Styrofoam block in place after the metal cover is removed.

Refrigerant Tubing Connections



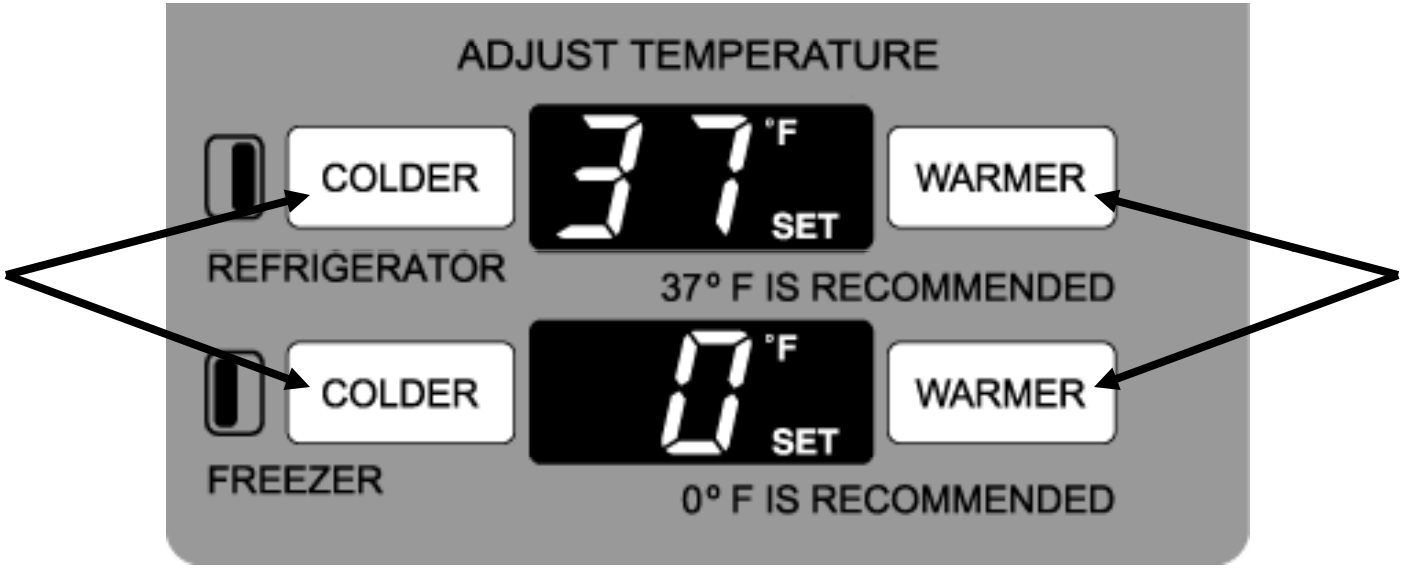
Note: Save the insulation to rewrap the refrigerant tubing after brazing.

Diagnostics & Testing

Service Diagnostics

- To enter Service Mode, press all four temperature pads simultaneously for 3 seconds.

Note: The display must be lit before entering Service Mode – press any pad to light.



- Zeros will flash on the display when service mode has been entered.
- Press any pad other than the temperature pads to lock in the Service Mode.
- A test mode must be selected within 30 seconds or diagnostics will time out.
- Select a test & press COLDER/WARMER pads to the test #, then press another pad to start that test.
- The test mode will automatically time out after 15 minutes of inactivity.

Service Diagnostics

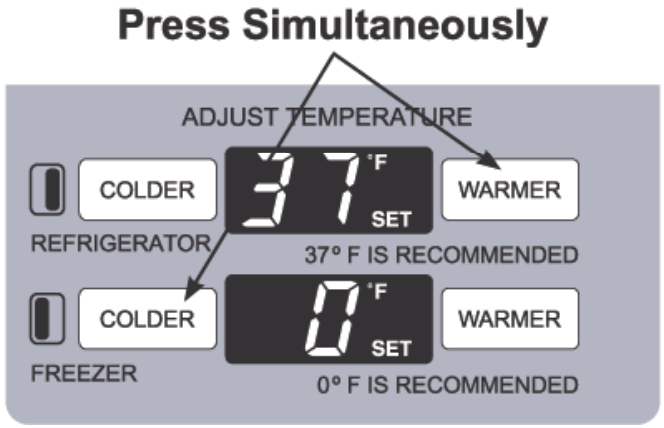
FZ Display	FF Display	Mode	Comments
0	1	Showroom Mode	See Note #1.
0	2	Do Not Use	
0	3	Do Not Use	
0	4	Do Not Use	
0	5	Do Not Use	
0	6	HMI Self Test	See Note #2.
0	7	Control and Sensor Self Test	See Note #3.
0	8	Do Not Use	
0	9	Dispenser Recess Heater Test	Turn the dispenser heater ON for 30 seconds.
1	0	Do Not Use	
1	1	Fan Speed Test	Each fan will run for 5 seconds.
1	2	100% RunTime	See Note #4.
1	3	Do Not Use	
1	4	Toggle the State of Defrost	See Note #5.
1	5	Refrigerator Reset	Causes a system reset except for defrost.
1	6	Test Mode Exit	Exit test mode.
1	7	Do Not Use	
1	8	Do Not Use	

Service Diagnostics

Note #1 (Showroom Mode)

In the showroom mode, the compressor and fans do not operate. The fresh food and freezer lights operate as normal (ON when door is opened). The dispenser and dispenser display operate as normal. Temperature set points can be changed. Press the **DISPLAY TEMP** pad to display the actual cabinet temperature. To exit the Showroom Mode, cycle power OFF or enter test mode **1 5** to reset the unit.

Note: The showroom mode can also be entered outside of the service mode by simultaneously pressing the **COLDER** pad on the **FREEZER** display and the **WARMER** pad on the **REFRIGERATOR** display for 3 seconds (the display must be lit before pressing the pads).



Service Diagnostics

Note #2 (HMI Self Test)

Once the HMI self test is started, all of the LEDs and seven segment LEDs will illuminate. The COLDER pad turns off the seven segment LEDs and the WARMER pad turns off the SET LED for both the FREEZER and REFRIGERATOR displays.

When all the available LEDs have been turned off for that specific temperature board, the COLDER and WARMER pads on the REFRIGERATOR display must be held simultaneously for 3 seconds to exit the HMI self test. This can be done any time during the test.

Service Diagnostics

Note #3 (Control and Sensor System Self-Test)

This test does a check on all thermistors, fans, and defrost circuits. The thermistor test will display pass, open or shorted. The fan and defrost tests will display pass or fail. Once this test is invoked, the test mode will stop flashing and the numbers from 1 to 10 (corresponding to the chart below) will appear on the HMI display.

1	FZ Room Sensor	6	FZ Fan Error
2	FZ Defrost Sensor	7	FF Fan Error
3	FF Room Sensor	8	Condenser Fan Error
4	FF Defrost Sensor	9	FZ Defrost Error
5	Ambient Sensor	10	FF Defrost Error

For each test, the HMI will respond by displaying the following:

P = Pass
F = Fail
O = Open Thermistor Circuit
S = Short Thermistor Circuit

The control will display an **O** if the thermistor value is greater than 149.2K Ω (-58°F (-50°C)). The control will display a **S** if the thermistor value is less than 1.34K Ω (149°F (65°C)).

Service Diagnostics

Note #4 (100% Run Time)

This test runs the sealed system 100% of the time and will automatically time out after 1 hour. Cycle power OFF or enter test mode **1 5** to reset and exit this mode.

Note: The 3-way valve position during 100% run time depends on the fresh food temperature. If the fresh food temperature is satisfied, the 3-way valve opens to the freezer evaporator only. If it is not satisfied, the valve opens to the fresh food evaporator and refrigerant flows through both evaporators.

Note #5 (Toggle the State of Defrost)

Any time a pad on the temperature board (other than the **COLDER** and **WARMER** pads) is pressed, the status of the defrost heaters will toggle in the following sequence:

1. Fresh food heater ON.
2. Fresh food and freezer heaters ON.
3. Fresh food and freezer heaters OFF.

Pressing the pad a fourth time will cycle through the sequence again. During the sequence, heater current can be measured.

- Fresh food heater - approximately 1.2 amps when measured at the CN01 connector black wire.
- Fresh food and freezer heaters - approximately 4 amps when measured at the CN01 connector black wire.

Troubleshooting Notes

Problem	Action
Refrigerator HMI displays a temperature of 80˚F (27˚C), even though the temperature in the refrigerator section is correct.	The HMI may display 80˚F (27˚C) if the refrigerator thermistor (air) is either open or shorted. Run service diagnostics (Test **0 7**) to confirm.
Freezer HMI displays -25˚F (-32˚C), even though the temperature in the freezer section is correct.	The HMI may display -25˚F (-32˚C) if the freezer thermistor (air) is open. Run service diagnostics (Test **0 7**) to confirm.
Freezer HMI displays 80˚F (27˚C), even though the temperature in the freezer section is correct.	The HMI may display 80˚F (27˚C) if the freezer thermistor (air) is shorted. Run service diagnostics (Test **0 7**) to confirm.
Unit is dead. CN1 connector reads 120VAC.	Check the compressor overload. Control board will not receive voltage if the overload is open.
Ambient air thermistor fails service diagnostics test. HMI displays open circuit.	Check the thermistor connection behind the HMI display to see if the pins are pushed out of the connector.

- Display temperatures (first 3 problems) will occur after power is reset.