

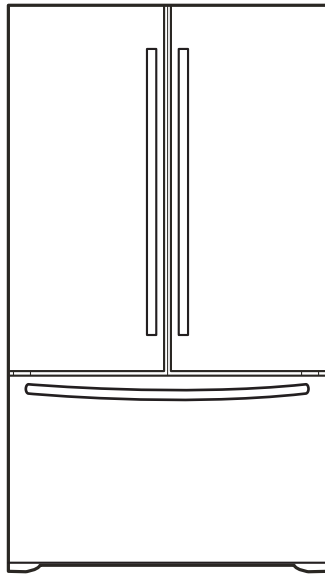


LG

REFRIGERATOR

SERVICE MANUAL

CAUTION
BEFORE SERVICING THE UNIT,
READ THE SAFETY PRECAUTIONS IN THIS MANUAL.



MODELS:

LFC23760ST / 03

LFC23760SW / 03

LFC23760SB / 03

ECN (Engineering Change Number)

Rev.01

Change Cover Lower, Case PCB and Rail

Rev.02

Change compressor & base compressor

Holder, Shelf

Cover, Lamp

Door Assembly, Refrigerator (Left)

Door Foam Assembly, Refrigerator

Cover Assembly, Display

Cap Assembly, Duct

Cover Assembly, Machinery (Rear)

Compressor, Set Assembly

Thermistor Assembly, PTC

Overload Protect

Cover, Relay

Grille Assembly, Fan

Motor, DC

Bracket Assembly, Motor

PCB Assembly

Ice Maker Assembly, Kit

Motor, AC Dispenser

Rev.03

Valve inclined in order to improve water house connection

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SAFETY PRECAUTIONS

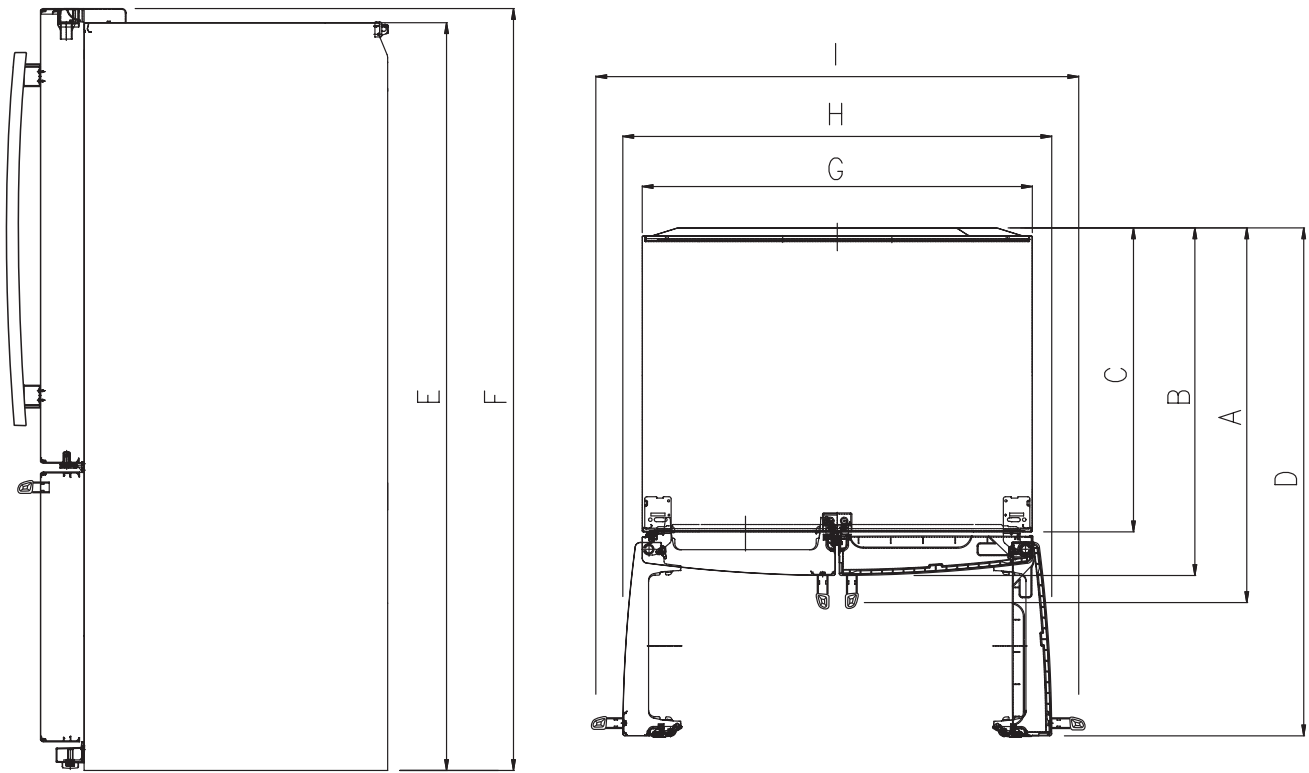
Please read the following instructions before servicing your refrigerator.

1. Check the refrigerator for current leakage.
2. To prevent electric shock, unplug before servicing.
3. Always check line voltage and amperage.
4. Use standard electrical components.
5. Don't touch metal products in the freezer with wet hands. This may cause frost bite.
6. Prevent water from spilling on to electric elements or the machine parts.
7. Before tilting the refrigerator, remove all materials from on or in the refrigerator.
8. When servicing the evaporator, wear gloves to prevent injuries from the sharp evaporator fins.
9. Service on the refrigerator should be performed by a qualified technician. Sealed system repair must be performed by a CFC certified technician.

1. SPECIFICATIONS

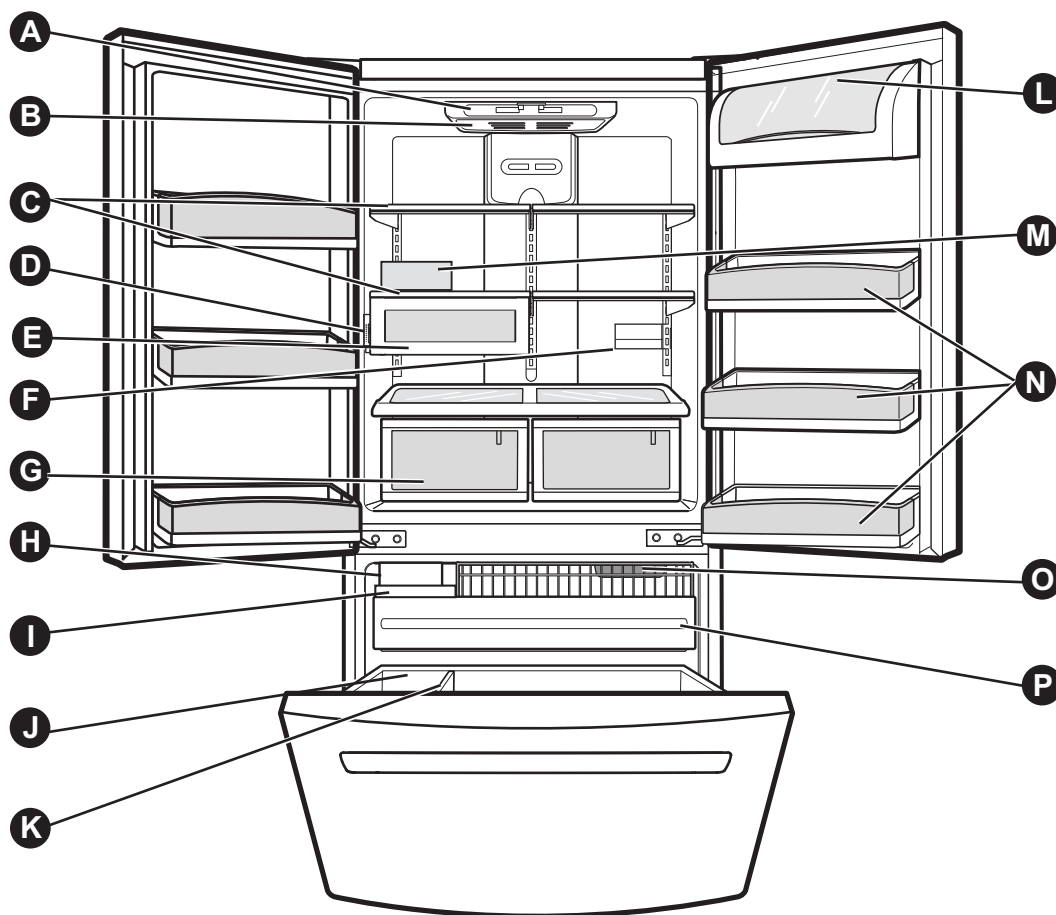
SPECIFICATIONS		MODELS		
		LFC23760SW	LFC23760ST	LFC23760SB
GENERAL FEATURES	Color	Super White	Stainless	Black
	Dimensions	892 (W) x 925 (D) x 1860 (H) mm		
	Net Weight	123 Kg		
	Capacity	23 cuft		
	Refrigerant	R134a		
	Climate class	Temperate (T)		
	Rated Rating	115V~ / 60Hz		
	Cooling System	Fan Cooling		
	Temperature Control	MICOM control		
	Defrosting System	Full Automatic		
		Heater Defrost		
	Insulation	Cyclo, Pentane		
	Compressor	MQ53LAUM PTC Starting Type		
	Evaporator	Fin Tube Type		
	Condenser	Wire Condenser		
	Lubricating Oil	Polyol Ester (POE) RL-7H/7 cst 220 ± 10cc		
	Drier	MOLECULAR SIEVE XH-7		
	Capillary Tube	ID Ø0.75		
	First Defrost	4 Hours		
	Defrost Cycle	7 - 40 Hours		
	Defrosting Device	Heater, Sheath		
	Anti-freezing Heater	Water Tank Heater		
	Case Material	Embo (normal)		
REFRIGERATOR	Door Material	PCM	Stainless	VCM
	Handle Type	Vista		
	Display Graphic	ICE PLUS		
	Basket, Quantity	3 left + 3 right		
	Ice Tray & Bank	1B/(1EA)		
	Lamp	Yes (2) 40W/Blue		
	Shelf	1Fix(S/Proof)+1Fold+2S/Out(S/Proof)		
	Tray meat	No		
	Egg Bank	Yes (Cover + Egg tray)		
	FREEZER	Basket, Quantity	No	
Lamp		Yes (1) 40W/Blue		
Shelf		No		

DIMENSIONS



Description		LFC23760**
Depth w/ Handles	A	34 ⁵ / ₈
Depth w/o Handles	B	32 ¹ / ₈
Depth w/o Door	C	28 ¹ / ₄
Depth (Total with Door Open)	D	45 ¹ / ₂
Height to Top of Case	E	67 ¹ / ₁₆
Height to Top of Door Hinge	F	69 ¹ / ₁₆
Width	G	32 ³ / ₄
Width (door open 90 deg. w/o handle)	H	36 ¹ / ₄
Width (door open 90 deg. w/ handle)	I	41 ¹ / ₄

2. PARTS IDENTIFICATION

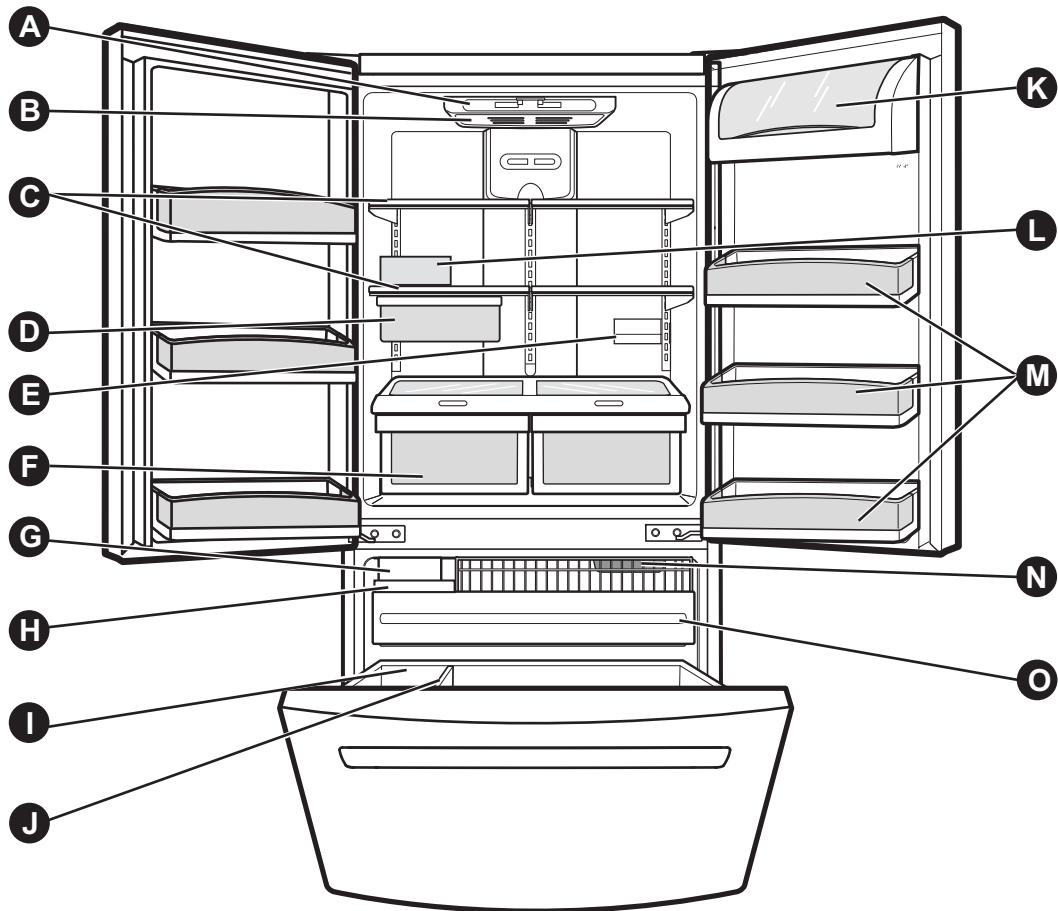


Read this section to familiarize yourself with the parts and features of your new refrigerator.

NOTE: This guide covers different models. Your refrigerator could have some or all of the features and parts listed below. The location of some of the parts may not correspond to that of your model.

- | | |
|--|---------------------------------|
| A Digital Sensor Control * | I Ice Bin |
| B Refrigerator Light | J Durabase |
| C Shelves | K Durabase Divider |
| D Temperature Control * | L Dairy Compartment |
| E Chef Fresh / Snack Pan | M Egg Compartment * |
| F Can Dispenser * | N Refrigerator Door Rack |
| G Optibin Crisper
Keeps fruits and vegetable fresh and crisp | O Freezer Light |
| H Icemaker | P Pull out Drawer |

* On some models



Read this section to familiarize yourself with the parts and features of your new refrigerator.

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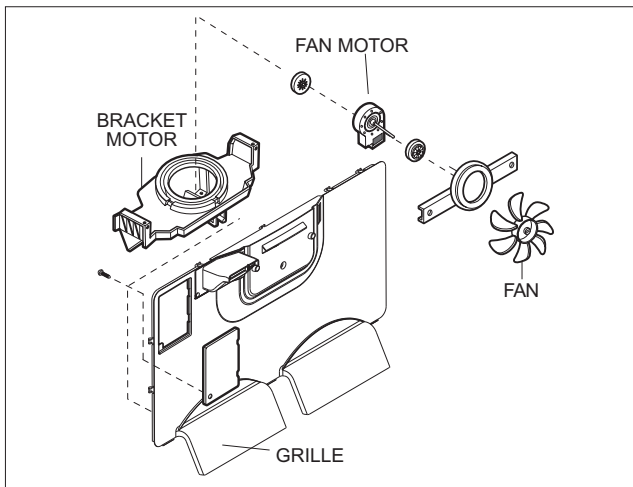
- | | |
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| A Digital Sensor Control * | I Durabase |
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Keeps fruits and vegetable fresh and crisper | N Freezer Light |
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* On some models

3. DISASSEMBLY

3-1 FAN AND FAN MOTOR

1. Remove the freezer shelf. (If your refrigerator has an icemaker, remove the icemaker first).
2. Remove the plastic guide for slides on left side by unscrewing phillips head screws.
3. Remove the grille by removing one screw and pulling the grille forward.
4. Remove the Fan Motor assembly by loosening 2 screw and disassemble the shroud.
5. Pull out the fan and separate the Fan Motor and Bracket.



3-2 DEFROST CONTROL ASSEMBLY

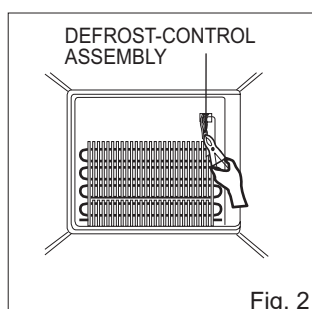
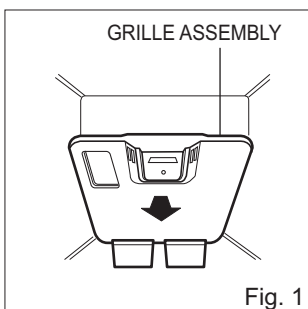
Defrost Control assembly consist of Drefrost Sensor and FUSE-M.

The Defrost Sensor works to defrost automatically. It is attached to the metal side of the Evaporator and senses its temperature.

Fuse-M is safety device for preventing over-heating of the Heater when defrosting.

At 72°C, it turns the Defrost Heater off.

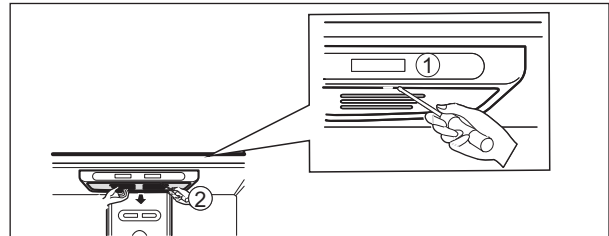
1. Pull out the grille assembly. (Fig. 1)
2. Separate the connector with the Defrost Control assembly and replace the Defrost Control assembly after cutting the Tie Wrap. (Fig. 2)



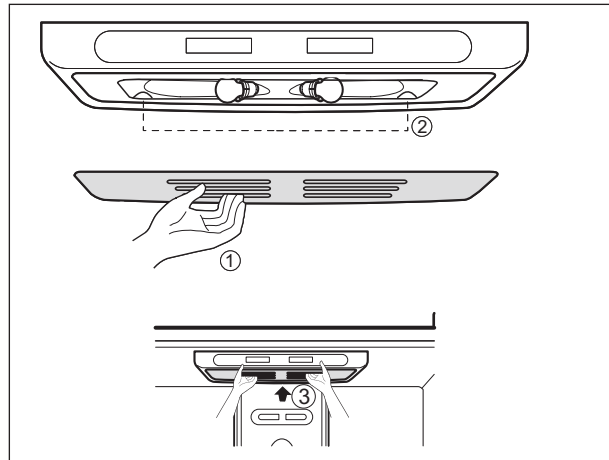
3-3 LAMP

3-3-1 REFRIGERATOR COMPARTMENT LAMP

1. Unplug your refrigerator.
2. Pull out all of the shelves.
3. Slide a flat screwdriver (1) into the opening of the light bulb, and pull it downwards (2).

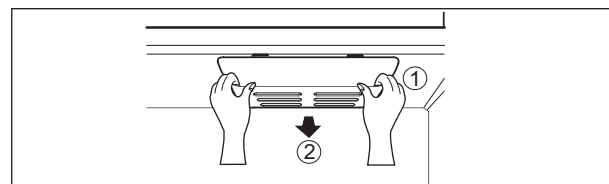


4. Turn the bulb counter clockwise and remove it.
5. Install the new light bulb.
6. Take the cover (1), lock the hooks (2) from the rear part of the light bulb and push it upwards (3).

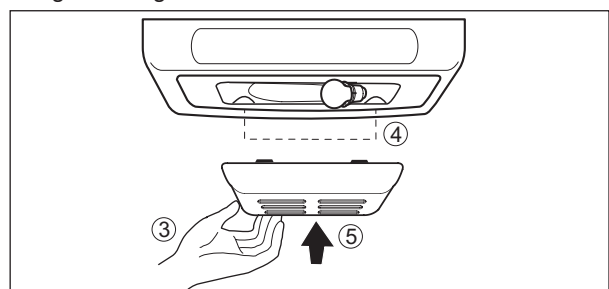


3-3-2 FREEZER COMPARTMENT LAMP

1. Unplug refrigerator.
2. Unlock the cover of the light bulb using your thumbs (2).

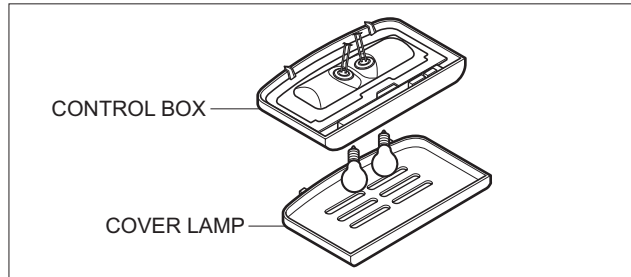


3. Remove the light bulb and replace it with a new one.
4. Take the cover (3), lock the hooks of it (4) and push it upwards (5).
5. Plug the refrigerator back in.



3-4 CONTROL BOX-REFRIGERATOR

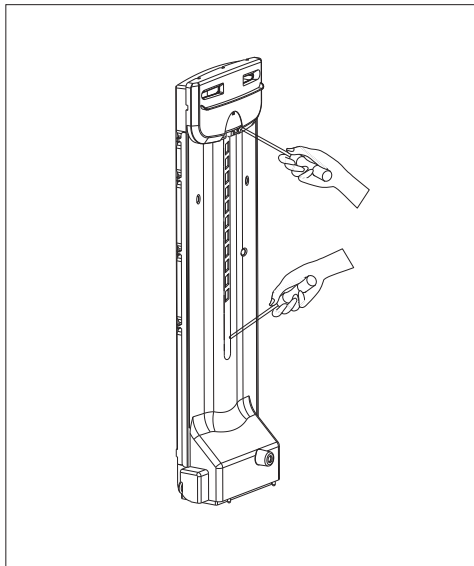
1. First, remove all shelves in the refrigerator, than remove the Refrigerator control Box by loosening 2 screws.



2. Remove the Refrigerator Control Box by pulling it downward.
3. Disconnect the lead wire on the right position and separate the lamp sockets.

3-5 MULTI DUCT

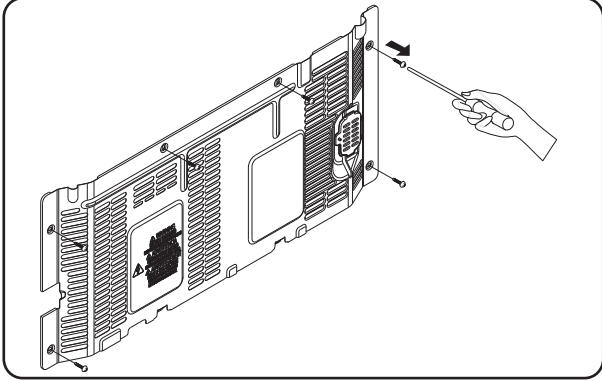
1. Remove an upper and lower Cap by using a flat screwdriver, and loosen 2 screws.
2. Disconnect the lead wire on the botton position.



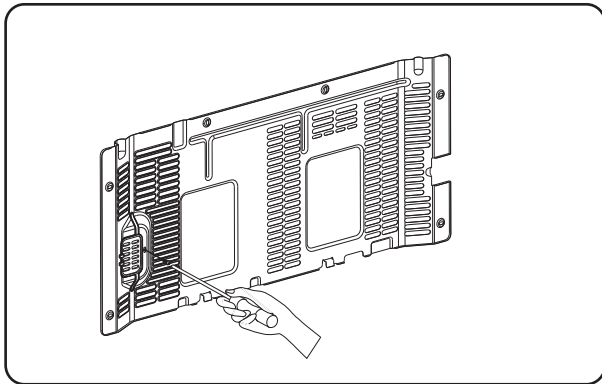
3-6 VALVE COVER (in some models)

3-6-1 DISASSEMBLE

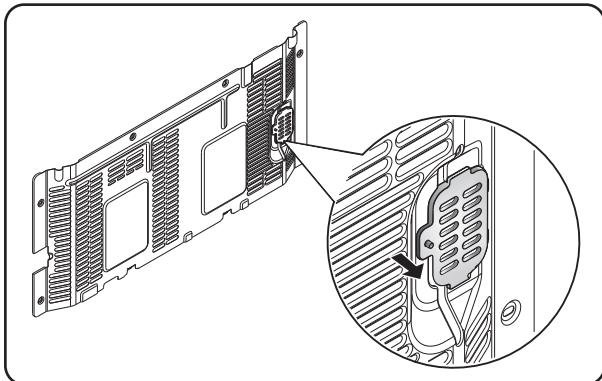
1. Unscrew the back cover.



2. Unscrew the valve cover from the back side.

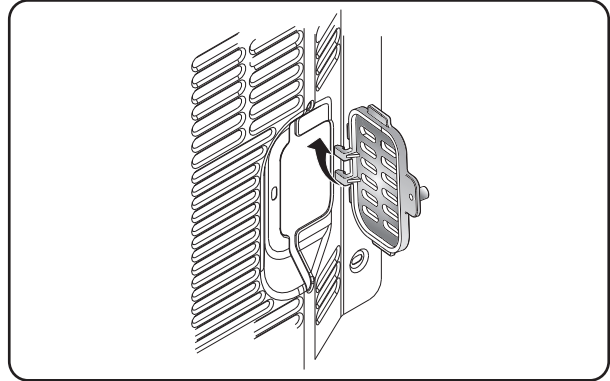


3. Push to the left and release.

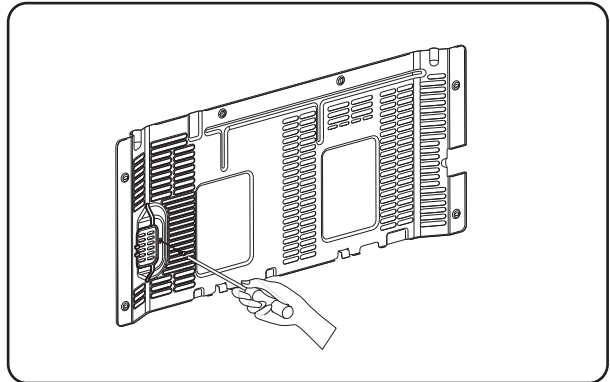


3-6-2 ASSEMBLE

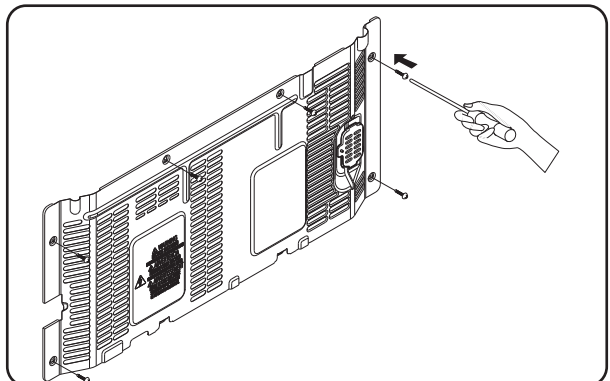
1. Insert the ribs to the right side of the back cover hole .



2. Screw the valve cover from the back side.



3. Screw the back cover.



3-7 DOOR DISASSEMBLY

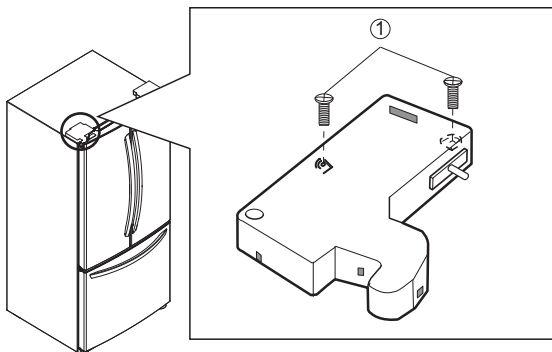
1. To remove Refrigerator door

IMPORTANT: Before you begin, turn the refrigerator OFF and Unplug it. Remove all food and the shelves from the doors.

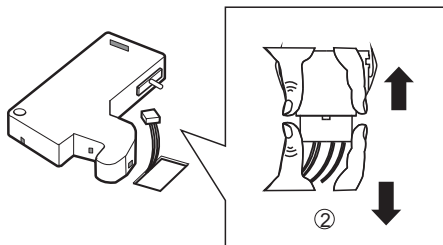
► Left Door

NOTE: The appearance of the handle might be different.

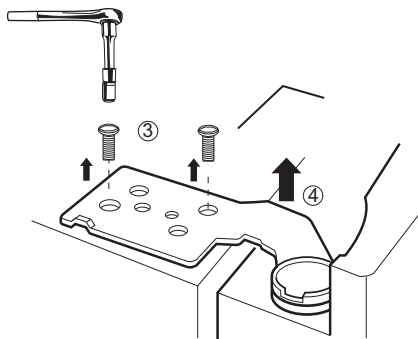
With the Philips screw driver, loose the two screws from the upper lid (1) remove it after that.



Unplug the switches cable (2) it's optional, it's no necessary do it for removing the door.

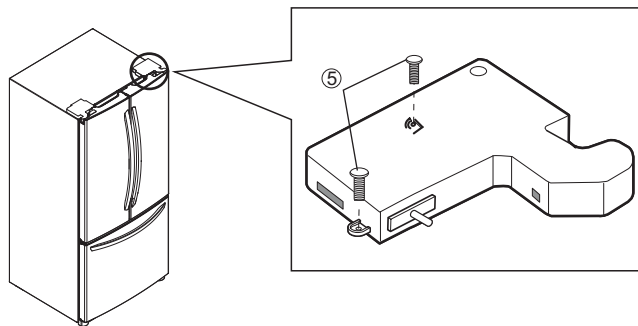


With the 10mm socket wrench, loose the two pins from the hinge (3) and remove it (4).

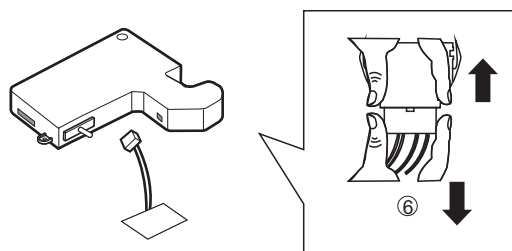


Place the door with the inner face over the surface so it won't scratch.

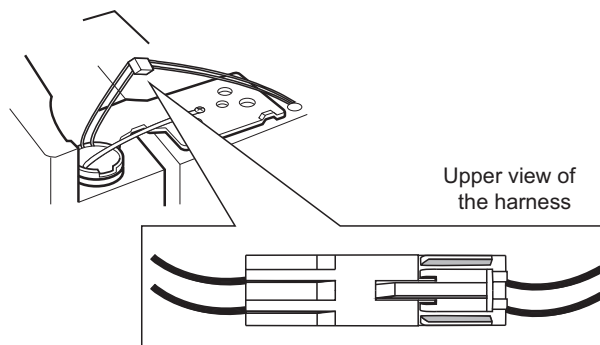
► Right Door

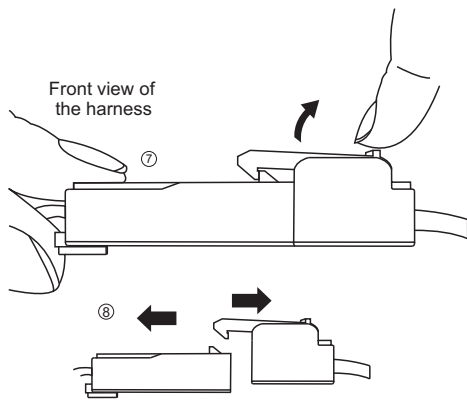


Unplug the switches cable (6) it's optional, it's no necessary do it for removing the door.

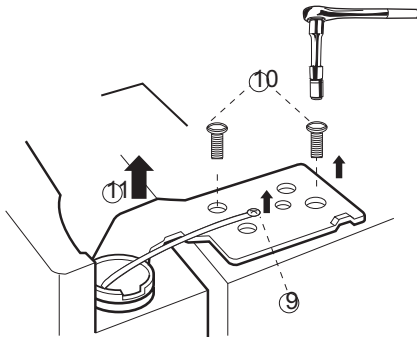


Unplug the cable harness pulling up the hook located in the upper part of it (7) and separate both parts of the harness (8).





Loose the grounding screw (9) and the pins (10) located over the hinge, after, lift the hinge and remove it (11).

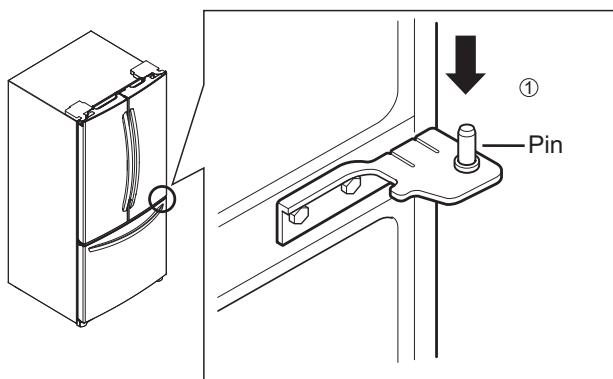


Remove the door and place it over its inner face to avoid scratching.

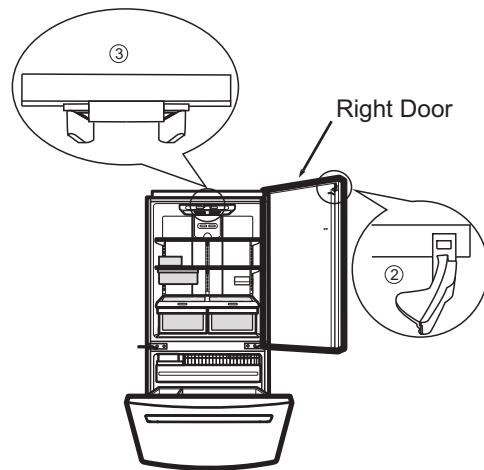
2. To install Refrigerator door

► Right Door

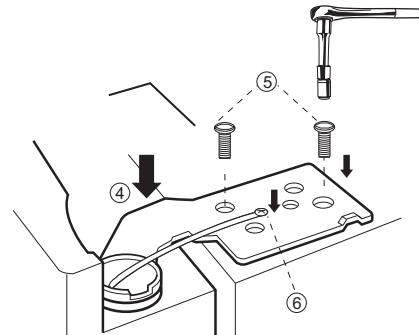
Take the door and place it gently over the pin of the hinge (1).



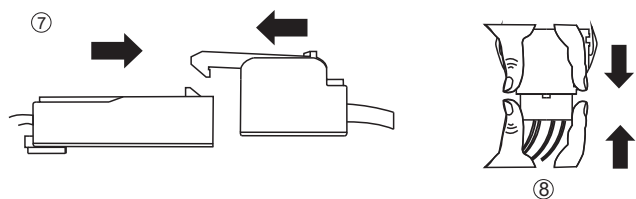
Be sure the hook (2) (located in the upper part of the door) matches with the divisor of the refrigerator's door (3). Check that the sealing patch of the door is leveled to the refrigerator and that it isn't bended.



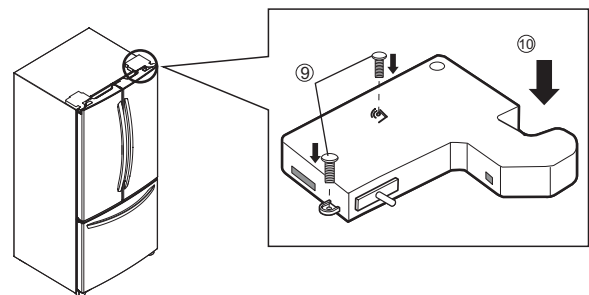
Place the hinge in its original position (4) assembly the two pins (5) and the ground screws (6).



Plug the cable harness (7) and the switch (8) (just in case if you unplugged the switch).

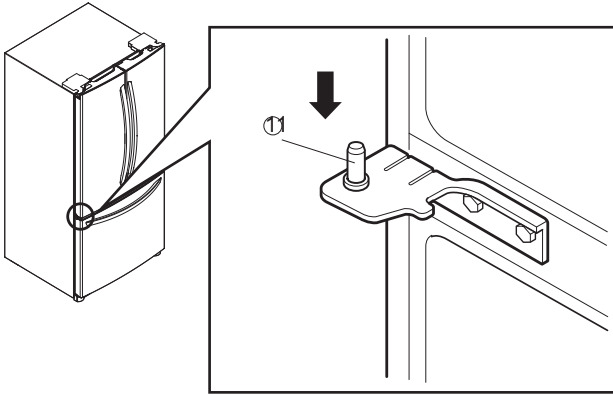


Place the hinge lid (9) and install both screws (10). Be sure the door is correctly assembled.

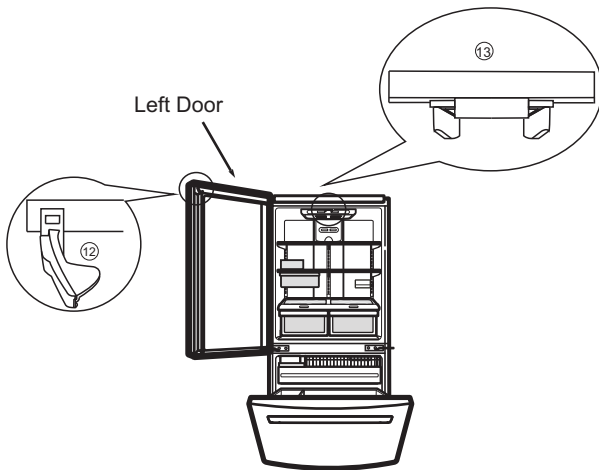


► Left Door

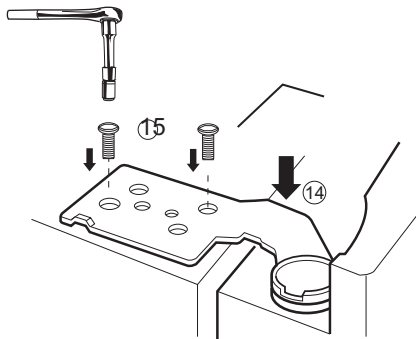
Take the left door and place it over the hinge (11).



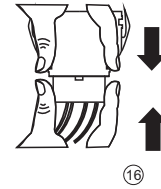
Be sure that the hook (12) located in the upper part of the door matches with the splitter of the refrigerator (13). Check that the sealing patch of the door ends leveled with the refrigerator and that it isn't bended.



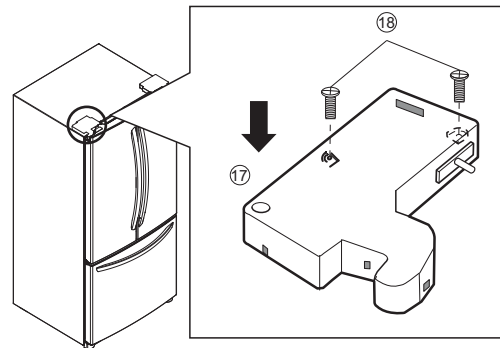
Place the hinge in its original position (14) and place the two screws (15).



Plug the cable to the switch (16) (just in case if you unplugged the switch).



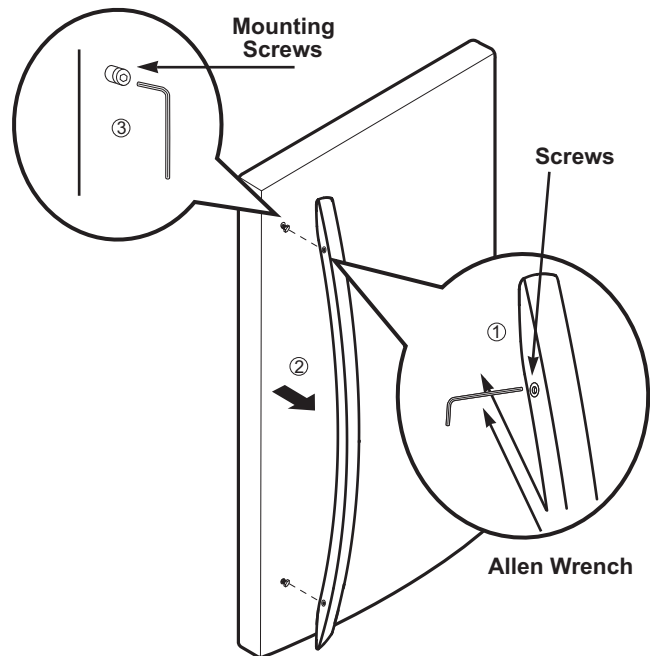
Place the hinge's lid (17) and screw the two screw (18). Check that the door is well installed.



3-8 HOW TO REMOVE DOOR HANDLE

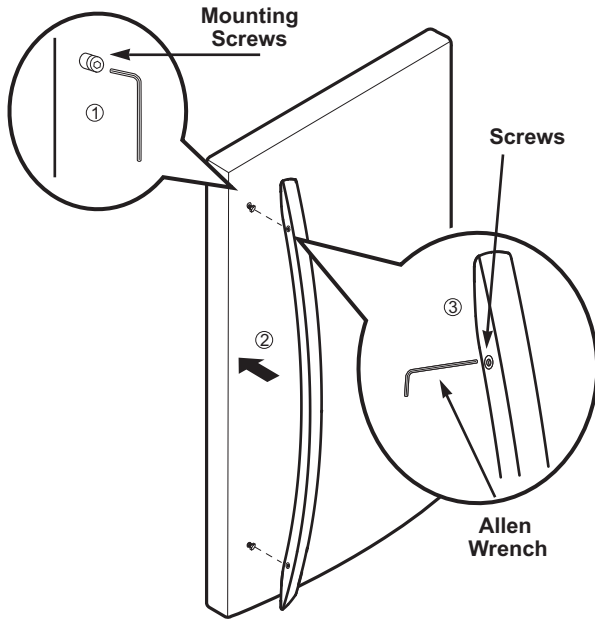
Loose the screws (1) with the Allen tool 3/32" and remove the handle (2).

Remove the mounting screws with the 1/4" Allen tool (3).



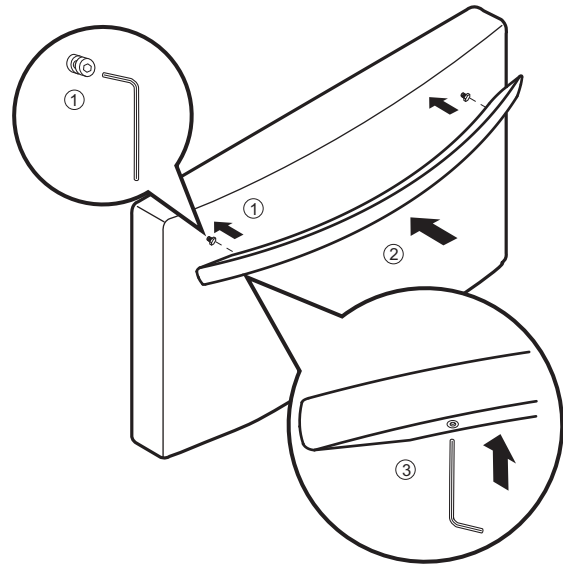
1. To install the handle of the refrigerator

Install the mounting screws over the door (1) place the handle over them (2) and tight the screws up (3).



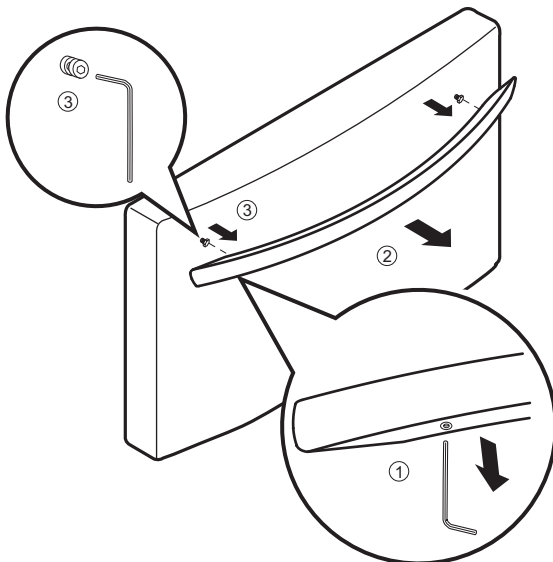
3. To install the freezer's handle

Install the mounting screws over the door (1) place the handle over them (2) and tight the screws up (3).



2. To remove the freezer's handle

With an 3/32" Allen tool, loose the screws (1) located on the bottom of the handle, remove it (2) remove the screws from the door (3) with an 1/4" Allen tool.

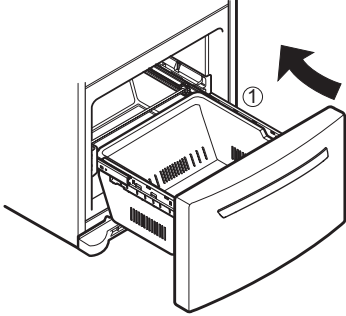


3-9 HOW TO REMOVE PULL OUT DRAWER

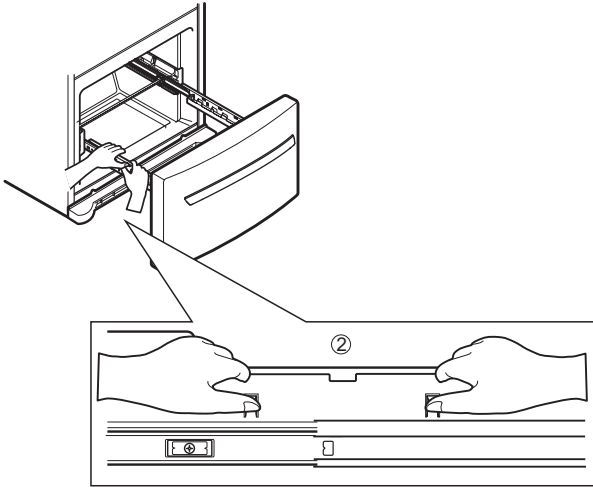
IMPORTANT: To avoid possible injury or damage to the product or your property, please use two people to perform the following instructions:

1. Removing the Pull Out Drawer

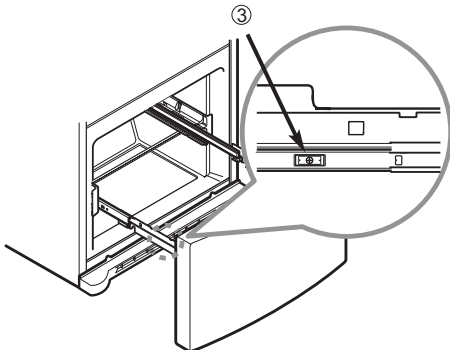
- Pull the drawer out to maximum extension. Remove the bottom rack (1) by tilting it back a little and then lifting it off the railing tracks.



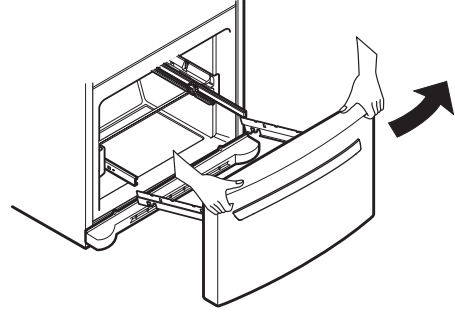
- Put pressure on the two hangers (2) with your thumbs in order to lift it up.
- Separate the left and right rail cover.



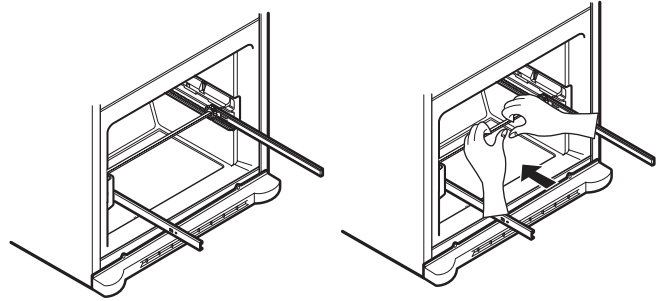
- Remove the screws (3) from both sides of the rail track.



- With both hands, hold both sides of the door and pull up to separate it.



- With both hands, hold the center of the bar and push it in so that it is fit to both rails simultaneously.

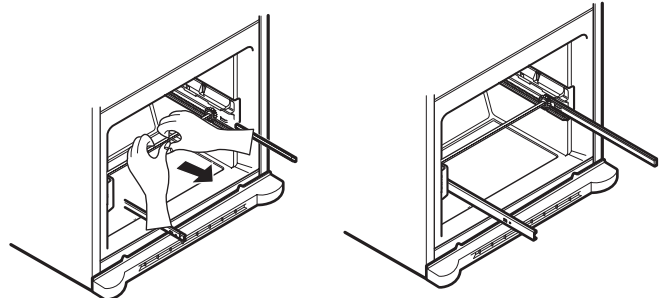


⚠ CAUTION: When removing the drawer, do not hold the handle. If it comes off, it could cause personal injury.

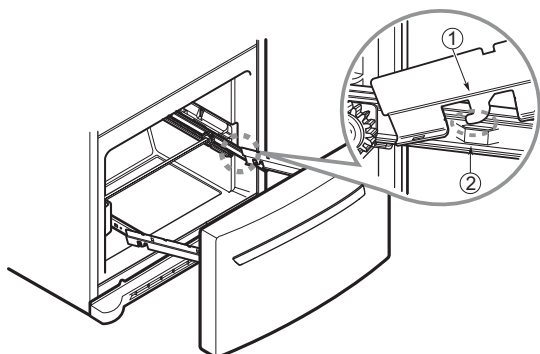
⚠ CAUTION: To place the drawer on the floor, take care not to damage the floor or hurt your feet with the sharp edges on the side with the hinges.

2. Installing the Pull Out Drawer

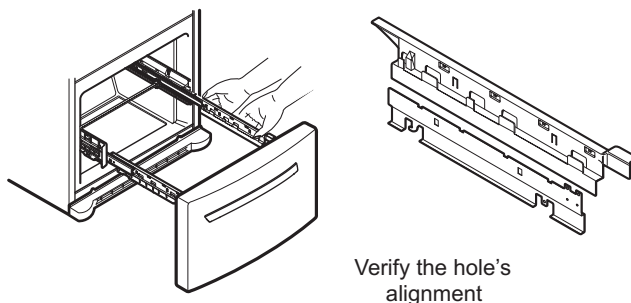
- With both hands, hold the center of the bar and pull it outward so that the two rails extend out at the same time.



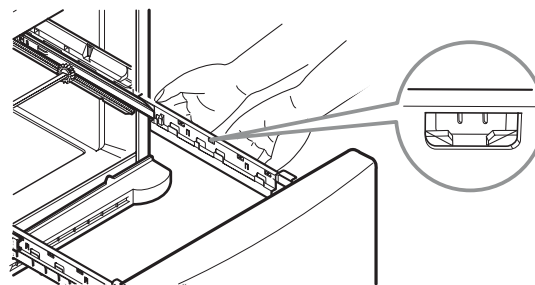
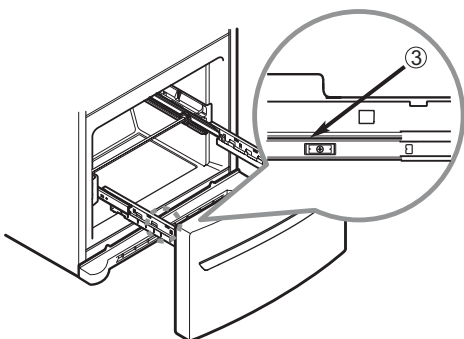
- Mount door supports (1) into the tabs on the railing track (2), starting in the back first and then connecting the part in the front last, as shown in the figure.



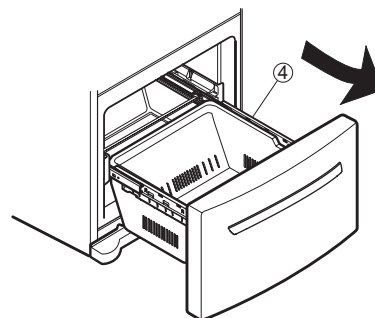
- Align the top holes of the rail cover with the top holes of the door supports to mount the cover.



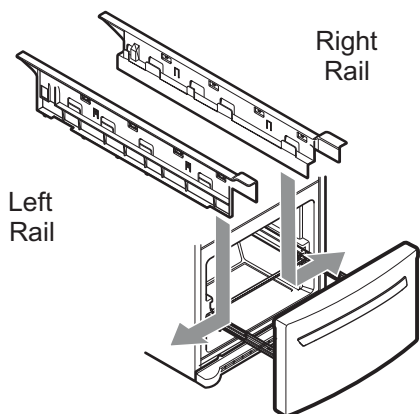
- Push the drawer down into position and tighten the screws (3).



- With the drawer fully extended, insert the lower basket over the front part of the rail assembly and then the back part (4).



- Compare the left and right rail covers on each side.



⚠ WARNING: To prevent entrapment risk and accidental child or animal suffocation, DO NOT permit them to play inside of the drawer.

⚠ WARNING: DO NOT step or sit on the Freezer Door.

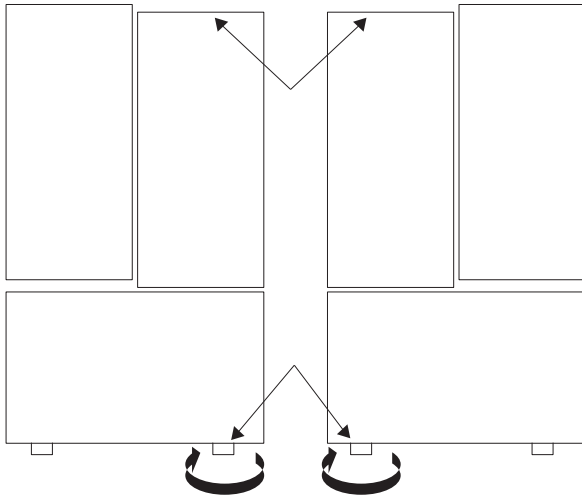
3-10 CLOSING AND ALIGNING THE DOORS

Closing the Doors

Your refrigerator has two front leveling screws, one on the right and one on the left. If your refrigerator seems unstable or if you would like the doors to close more easily, simply adjust the inclination of the refrigerator by following the instructions below:

1. Plug the refrigerator into a 3 prong grounded outlet. Move the refrigerator into its final position.
2. Remove the base grille (Refer to the section on "Installation of Base Grille").
3. Use a flat head screwdriver to adjust the leveling screws, turning clockwise to raise the side of the refrigerator and counter-clockwise to lower it. It may take several turns to adjust it to the inclination you would like.

NOTE: Having someone push against the top of the refrigerator takes some weight off the leveling screws. This will make it easier to adjust the screws.

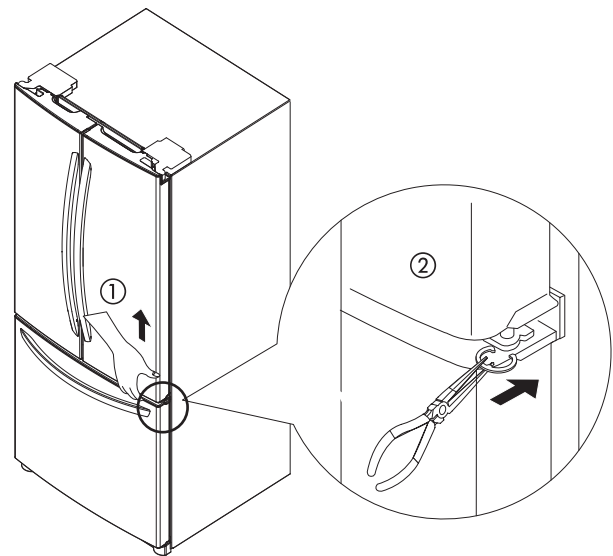


4. Open both doors again and check to make sure that they close easily. If not, slightly tilt the refrigerator further back by turning both leveling screws clockwise. It may take several more turns. Make sure that you turn both leveling screws the same amount.
5. Ensure that the refrigerator is even by using a level.
6. Replace the base grille.

Aligning the Doors

If the spacing between the doors is uneven, follow the instructions below to align them:

1. With one hand, lift up the door you want to raise at middle hinge.
2. With other hand, use pliers to insert snap ring as shown.
3. Insert additional snap rings until the doors are aligned. (Three snap rings are provided per unit.)



4. ADJUSTMENT

4-1 COMPRESSOR

4-1-1 Role

The compressor intakes low temperature and low pressure gas from the evaporator of the refrigerator and compresses this gas to high-temperature and high-pressure gas. It then delivers the gas to the condenser.

4-1-2 Composition

The compressor includes overload protection. The PTC starter and OLP (overload protector) are attached to the outside of the compressor. Since the compressor is manufactured to tolerances of 1 micron and is hermetically sealed in a dust and moisture-free environment, use extreme caution when repairing it.

4-1-3 Note for Usage

- (1) Be careful not to allow over-voltage and over-current.
- (2) If compressor is dropped or handled carelessly, poor operation and noise may result.
- (3) Use proper electric components appropriate to the Particular Compressor in your product.
- (4) Keep Compressor dry.
If the Compressor gets wet (in the rain or a damp environment) and rust forms in the pin of the Hermetic Terminal, poor operation and contact may result.
- (5) When replacing the Compressor, be careful that dust, humidity, and soldering flux don't contaminate the inside of the compressor. Dust, humidity, and solder flux contaminate the cylinder and may cause noise, improper operation or even cause it to lock up.

4-2 PTC-STARTER

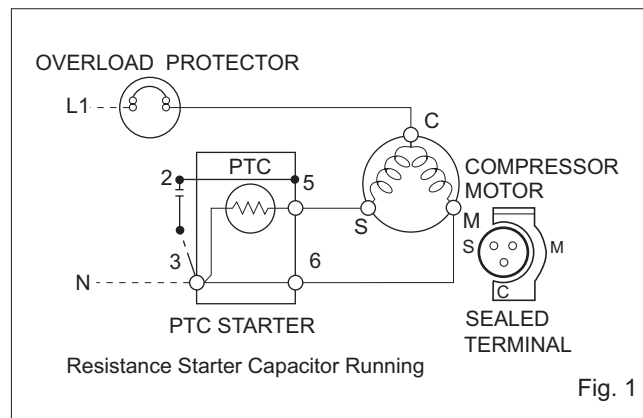
4-2-1 Composition of PTC-Starter

- (1) PTC (Positive Temperature Coefficient) is a no-contact semiconductor starting device which uses ceramic material consisting of BaTiO₃.
- (2) The higher the temperature is, the higher the resistance value. These features are used as a starting device for the Motor.

4-2-2 Role of PTC-Starter

- (1) The PTC is attached to the Sealed Compressor and is used for starting the Motor.
- (2) The compressor is a single-phase induction motor. During the starting operation, the PTC allows current flow to both the start winding and main winding.

4-2-3 PTC-Applied Circuit Diagram Starting Method for the Motor



4-2-4 Motor Restarting and PTC Cooling

- (1) It requires approximately 5 minutes for the pressure to equalize before the compressor can restart.
- (2) The PTC device generates heat during operation. Therefore, it must be allowed to cool before the compressor can restart.

4-2-5 Relation of PTC-Starter and OLP

- (1) If the compressor attempts to restart before the PTC device is cooled, the PTC device will allow current to flow only to the main winding.
- (2) The OLP will open because of the over current condition. This same process will continue (3 to 5 times) when the compressor attempts to restart until the PTC device has cooled. The correct OLP must be properly attached to prevent damage to the compressor.

Parts may appear physically identical but could have different electrical ratings. Replace parts by part number and model number. Using an incorrect part could result in damage to the product, fire, injury, or possibly death.

4-2-6 Note for Using the PTC-Starter

- (1) Be careful not to allow over-voltage and over-current.
- (2) Do not drop or handle carelessly.
- (3) Keep away from any liquid.
If liquid such as oil or water enters the PTC, PTC materials may fail due to breakdown of their insulating capabilities.
- (4) If the exterior of the PTC is damaged, the resistance value may be altered. This can cause damage to the compressor and result in a no-start or hard-to-start condition.
- (5) Always use the PTC designed for the compressor and make sure it is properly attached to the compressor. Parts may appear physically identical but could have different electrical ratings. Replace parts by part number and model number. Using an incorrect part could result in damage to the product, fire, injury, or possibly death.

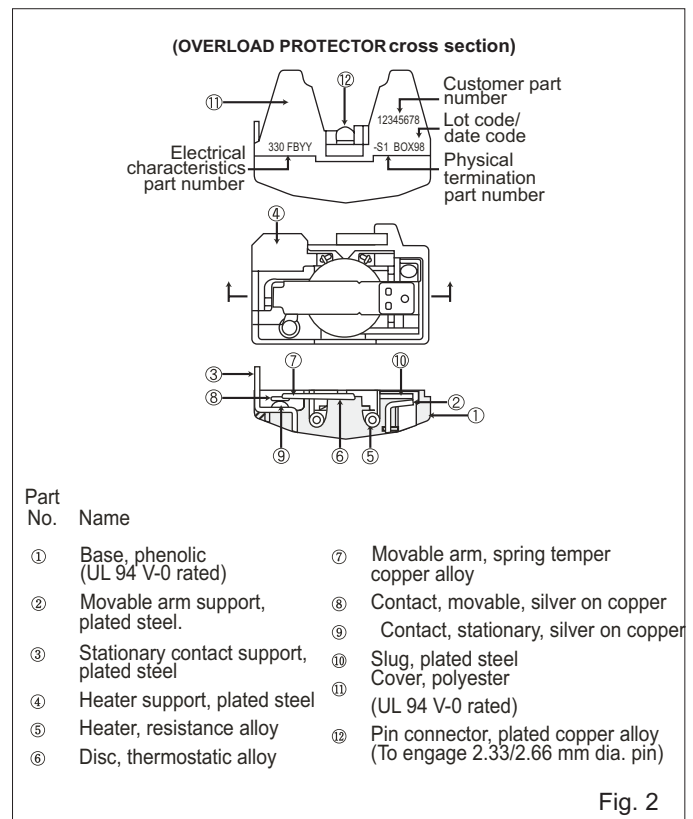
4-3 OLP (OVERLOAD PROTECTOR)

4-3-1 Definition of OLP

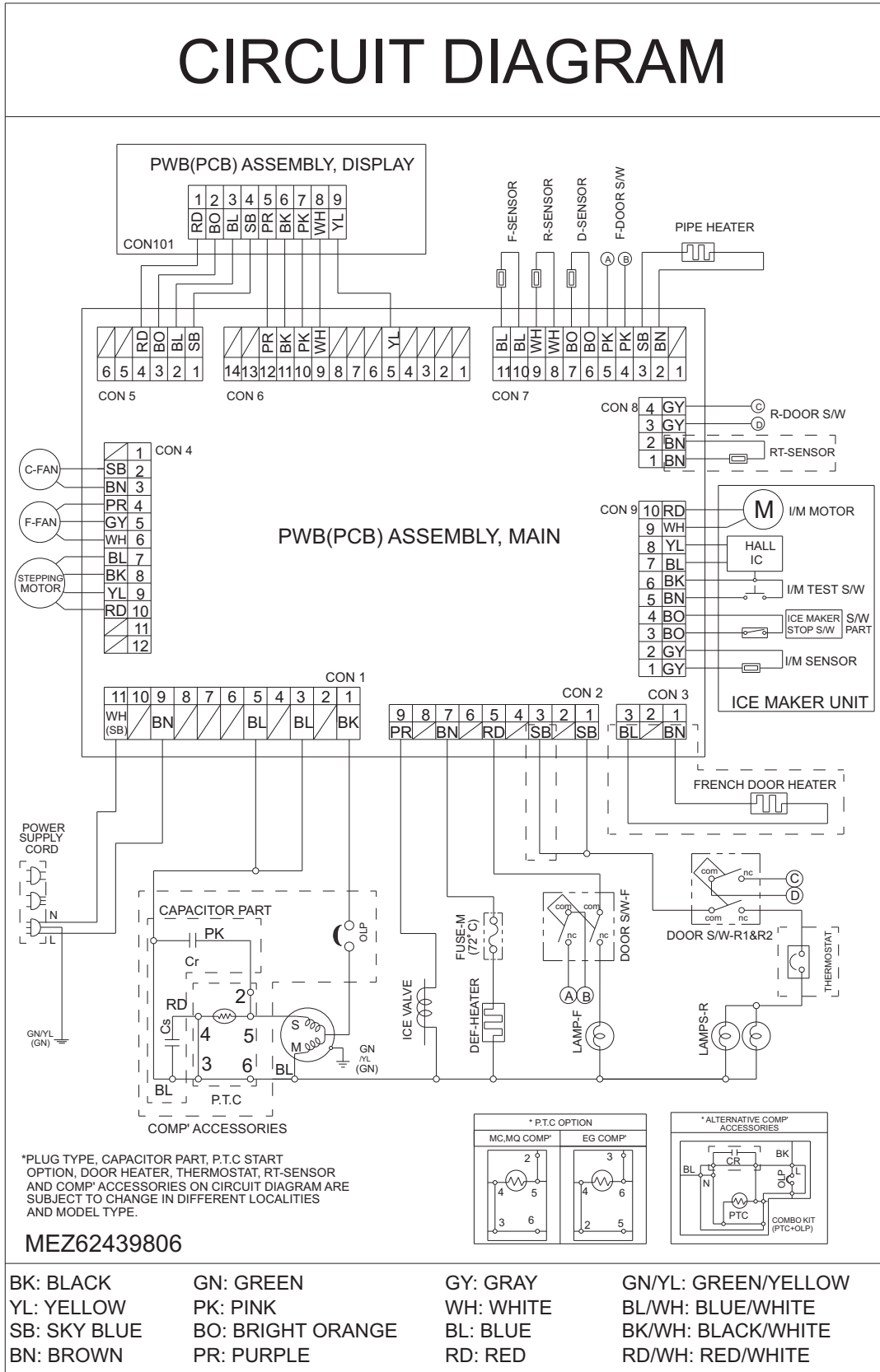
- (1) OLP (OVERLOAD PROTECTOR) is attached to the Compressor and protects the Motor by opening the circuit to the Motor if the temperature rises and activating the bimetal spring in the OLP.
- (2) When high current flows to the Compressor motor, the Bimetal works by heating the heater inside the OLP, and the OLP protects the Motor by cutting off the current flowing to the Compressor Motor.

4-3-2 Role of the OLP

- (1) The OLP is attached to the Sealed Compressor used for the Refrigerator. It prevents the Motor Coil from being started in the Compressor.
- (2) For normal operation of the OLP, do not turn the Adjust Screw of the OLP in any way.

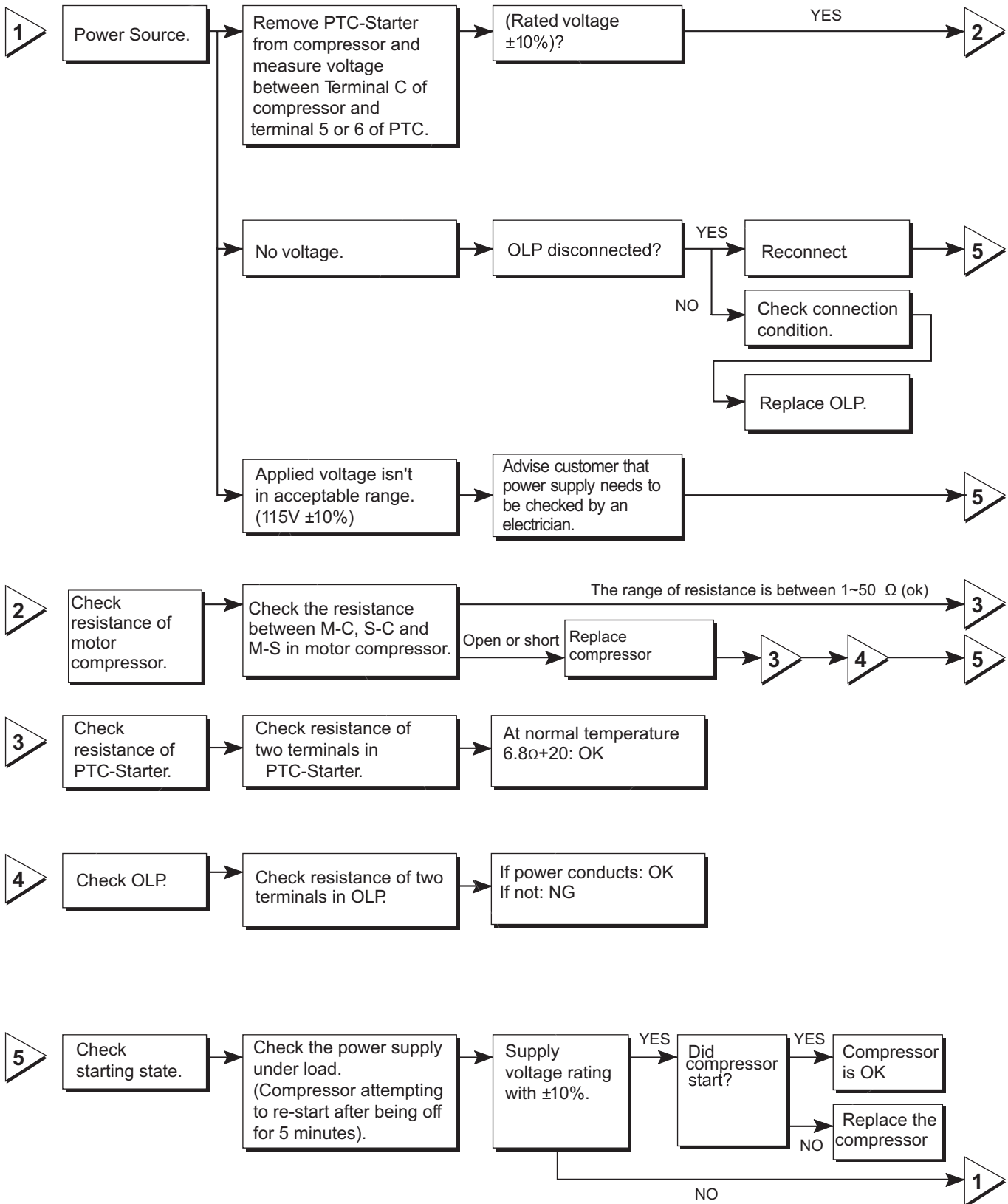


5. CIRCUIT DIAGRAM



6. TROUBLESHOOTING

6-1. COMPRESSOR AND ELECTRIC COMPONENTS



6-2. PTC AND OLP

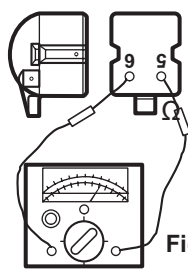
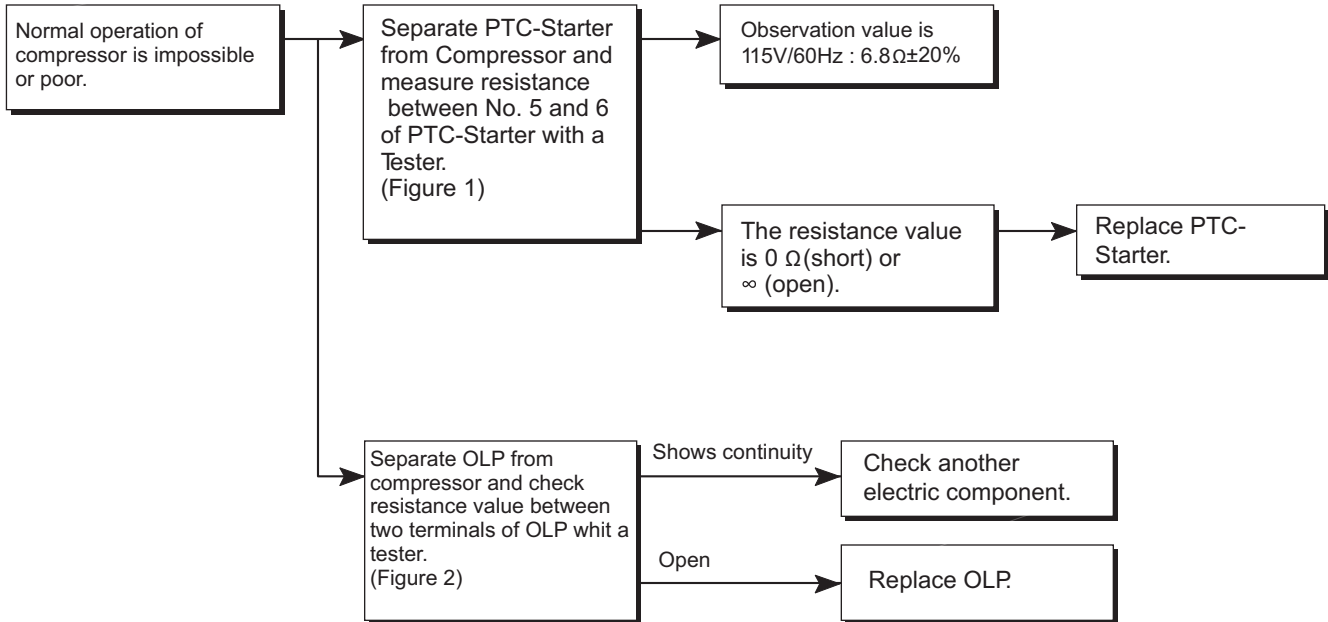


Figure 1

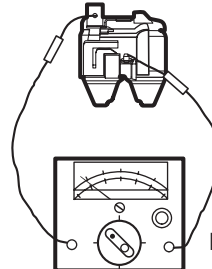
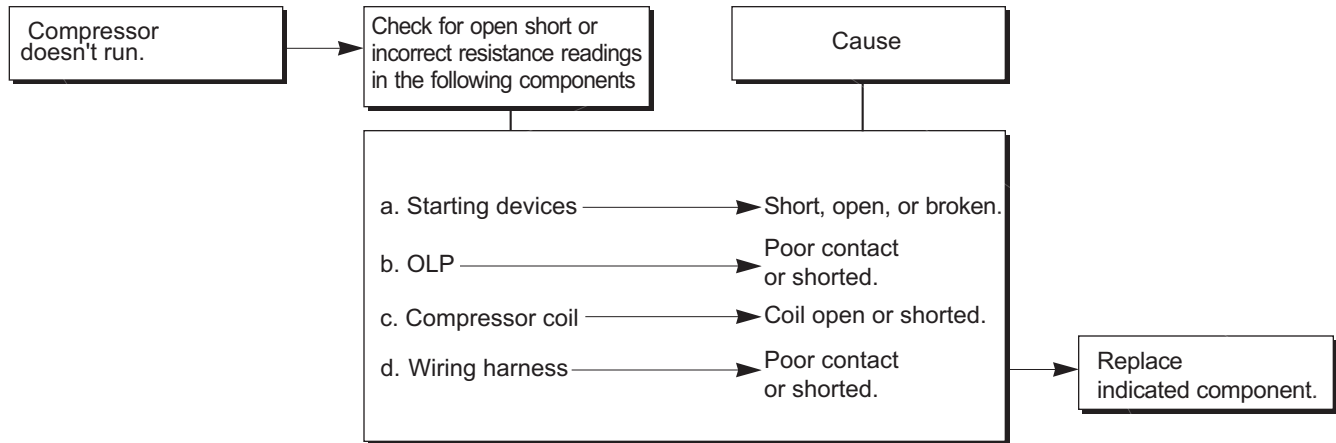


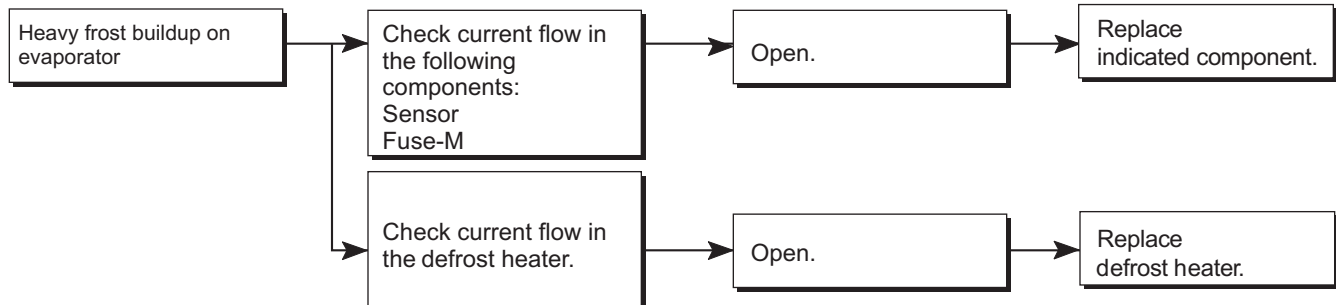
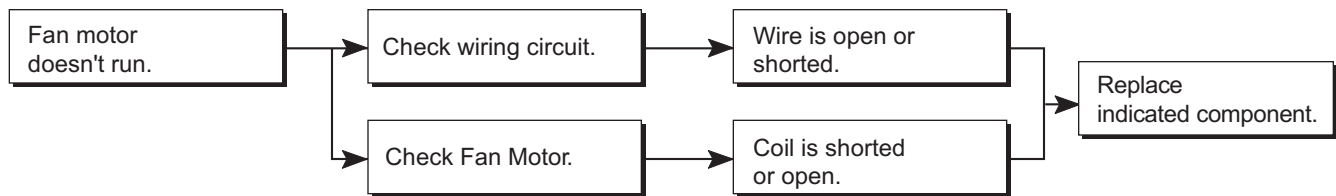
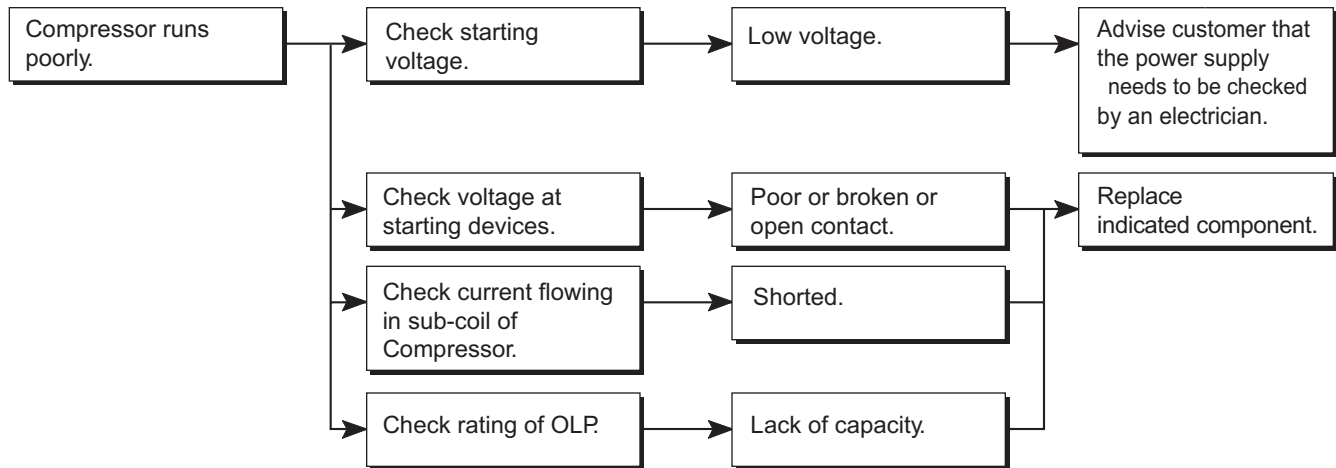
Figure 2

6-3 OTHER ELECTRICAL COMPONENTS

• Not cooling at all



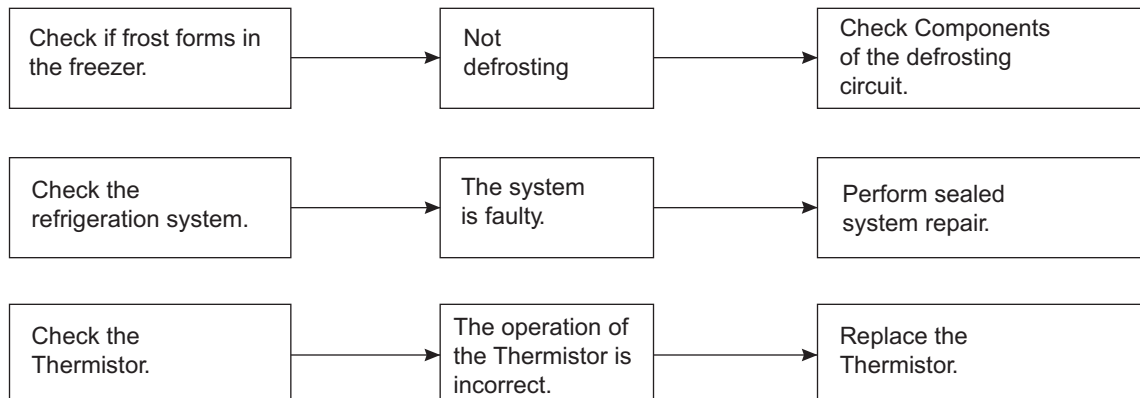
• Poor cooling performance



6-4 SERVICE DIAGNOSIS CHART

COMPLAINT	POINTS TO BE CHECKED	REMEDY
No Cooling.	<ul style="list-style-type: none"> • Is the power cord unplugged from the outlet? • Check if the power switch is set to OFF. • Check if the fuse of the power switch is shorted. • Measure the voltage of the power outlet. 	<ul style="list-style-type: none"> • Plug into the outlet. • Set the switch to ON. • Replace the fuse. • If the voltage is low, correct the wiring.
Cools poorly.	<ul style="list-style-type: none"> • Check if the unit is placed too close to the wall. • Check if the unit is placed too close to the stove, gas cooker, or in direct sunlight. • Is the ambient temperature too high or the room door closed? • Check if food put in the refrigerator is hot. • Did you open the door of the unit too often or check if the door is sealed properly? • Check if the Control is set to Warm position. 	<ul style="list-style-type: none"> • Place the unit about 4 inches (10 cm) from the wall. • Place the unit away from these heat sources. • Lower the ambient temperature. • Put in foods after they have cooled down. • Don't open the door too often and close it firmly. • Set the control to Recommended position.
Foods in the Refrigerator are frozen.	<ul style="list-style-type: none"> • Is food placed in the cooling air outlet? • Check if the control is set to colder position. • Is the ambient temperature below 41°F(5°C)? 	<ul style="list-style-type: none"> • Place foods in the high-temperature section. (front part) • Set the control to Recommended position. • Set the control to Warm position.
Condensation or ice forms inside the unit.	<ul style="list-style-type: none"> • Is liquid food sealed? • Check if food put in the refrigerator is hot. • Did you open the door of the unit too often or check if the door is sealed properly? 	<ul style="list-style-type: none"> • Seal liquid foods with wrap. • Put in foods after they have cooled down. • Don't open the door too often and close it firmly.
Condensation forms in the Exterior Case.	<ul style="list-style-type: none"> • Check if the ambient temperature and humidity of the surrounding air are high. • Is there a gap in the door gasket? 	<ul style="list-style-type: none"> • Wipe moisture with a dry cloth. It will disappear in low temperature and humidity. • Fill up the gap.
There is abnormal noise.	<ul style="list-style-type: none"> • Is the unit positioned in a firm and even place? • Are any unnecessary objects placed in the back side of the unit? • Check if the Tray Drip is not firmly fixed. • Check if the cover of the compressor enclosure in the front lower side is taken out. 	<ul style="list-style-type: none"> • Adjust the Leveling Screw, and position the refrigerator in a firm place. • Remove the objects. • Fix the Tray Drip firmly in the original position. • Place the cover in its original position.
Door does not close well.	<ul style="list-style-type: none"> • Check if the door gasket is dirty with an item like juice. • Is the refrigerator level? • Is there too much food in the refrigerator? 	<ul style="list-style-type: none"> • Clean the door gasket. • Position in the firm place and level the Leveling Screw. • Make sure food stored in shelves does not prevent the door from closing.
Ice and foods smell unpleasant.	<ul style="list-style-type: none"> • Check if the inside of the unit is dirty. • Are foods with a strong odor unwrapped? • The unit smells of plastic. 	<ul style="list-style-type: none"> • Clean the inside of the unit. • Wrap foods that have a strong odor. • New products smell of plastic, but this will go away after 1-2 weeks.

• Other possible problems:

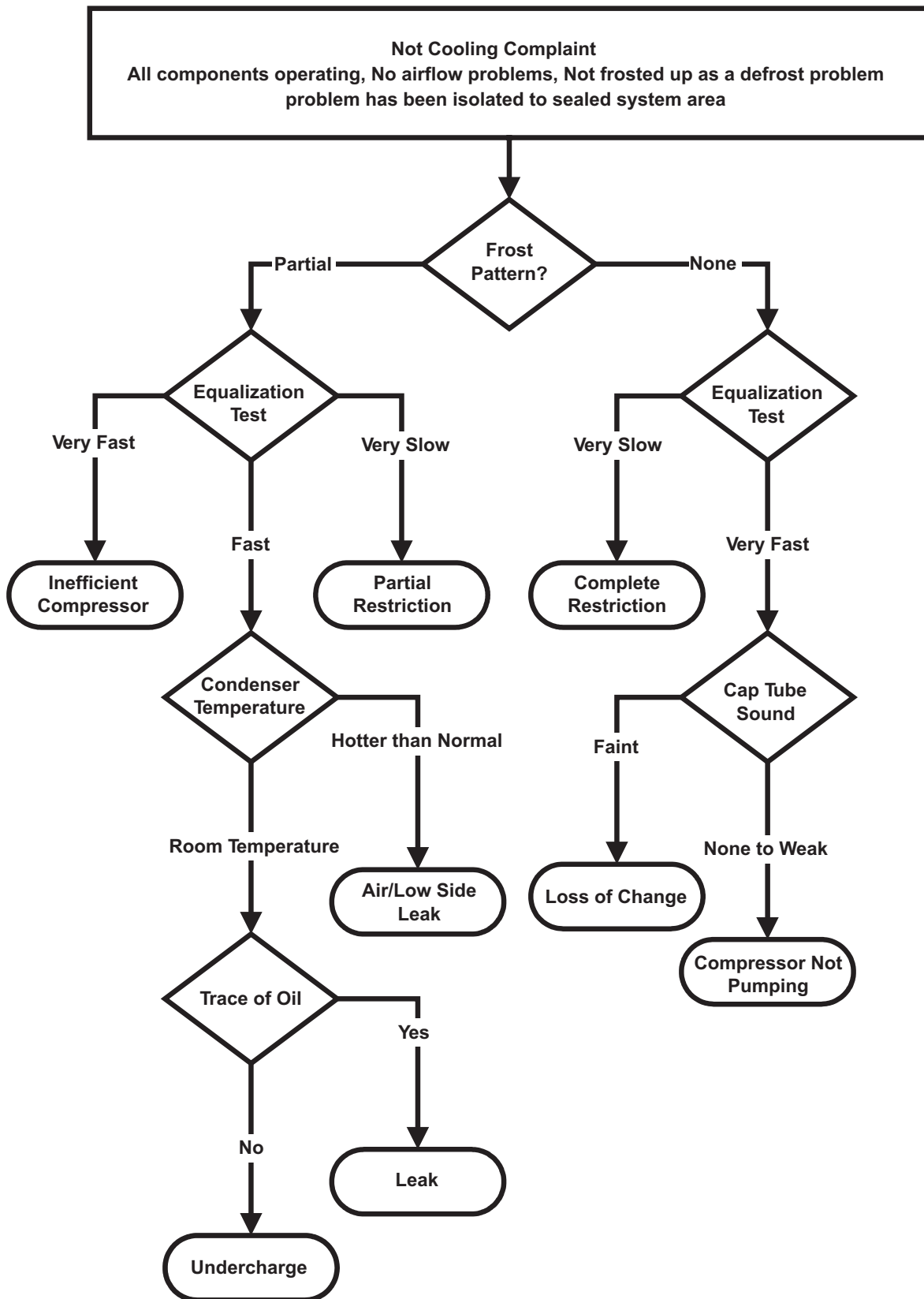


6-5 REFRIGERATION CYCLE

• Troubleshooting Chart

CAUSE		STATE OF THE UNIT	STATE OF THE EVAPORATOR	TEMPERATURE OF THE COMPRESSOR	REMARKS
LEAKAGE	PARTIAL LEAKAGE	Freezer compartment and refrigerator don't cool normally	Low flowing sound of refrigerant is heard and frost forms in inlet only.	A little higher than ambient temperature.	- Refrigerant level is low due to a leak. - Normal cooling is possible by restoring the normal amount of refrigerant and repairing the leak.
	COMPLETE LEAKAGE	Freezer compartment and refrigerator don't cool normally	Flowing sound of refrigerant is not heard and frost isn't formed.	Equal to ambient temperature.	- No discharging of refrigerant. - Normal cooling is possible by restoring the normal amount of refrigerant and repairing the leak.
RESTRICTION	PARTIAL RESTRICTION	Freezer compartment and refrigerator don't cool normally	Flowing sound of refrigerant is heard and frost forms in inlet only.	A little higher than ambient temperature.	- Normal discharging of the refrigerant. - The capillary tube is faulty.
	COMPLETE RESTRICTION	Freezer compartment and refrigerator don't cool.	Flowing sound of refrigerant is not heard and frost isn't formed.	Equal to ambient temperature.	- Normal discharging of the refrigerant.
MOISTURE RESTRICTION		Cooling operation stops periodically.	Flowing sound of refrigerant is not heard and frost melts.	Lower than ambient temperature.	- Cooling operation restarts when heating the inlet of the capillary tube.
DEFECTIVE COMPRESSION	COMPRESSSION	Freezer and refrigerator don't cool.	Low flowing sound of refrigerant is heard and frost forms in inlet only.	A little higher than ambient temperature.	- Low pressure at high side of compressor due to low refrigerant level.
	NO COMPRESSSION	No compressing operation.	Flowing sound of refrigerant is not heard and there is no frost.	Equal to ambient temperature	- No pressure in the high pressure part of the compressor.

6-5-1 SEALED SYSTEM DIAGNOSIS

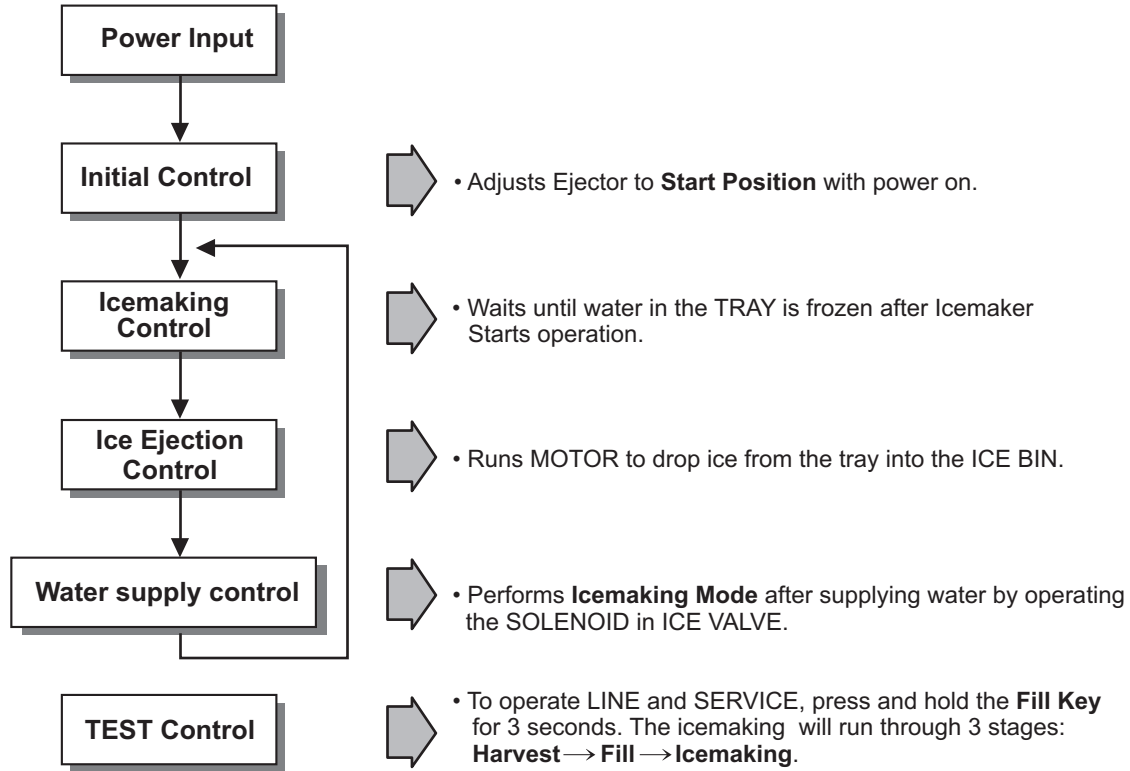


(The equalization test is trying to restart a compressor after it has been operating.)

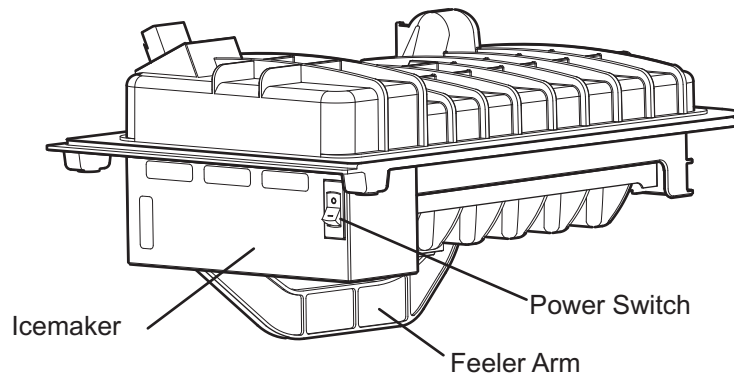
7. OPERATION PRINCIPLE AND REPAIR METHOD OF ICEMAKER

7-1 OPERATION PRINCIPLE

7-1-1 Operation Principle of Icemaker



1. Turning the Icemaker stop switch off (O) stops the icemaking function.
2. Setting the Icemaker switch to OFF and then turning it back on will reset the icemaker control.



7-2 ICEMAKER FUNCTIONS

7-2-1 Start Position

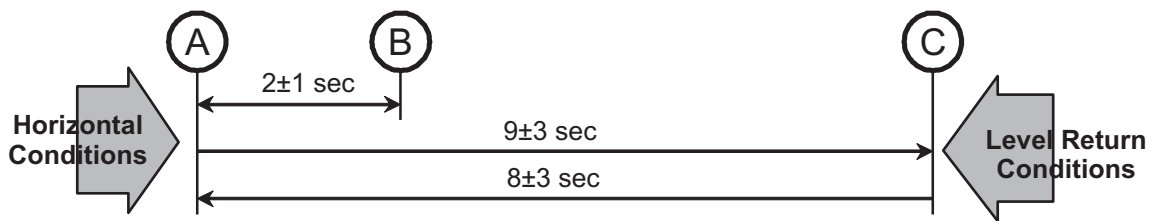
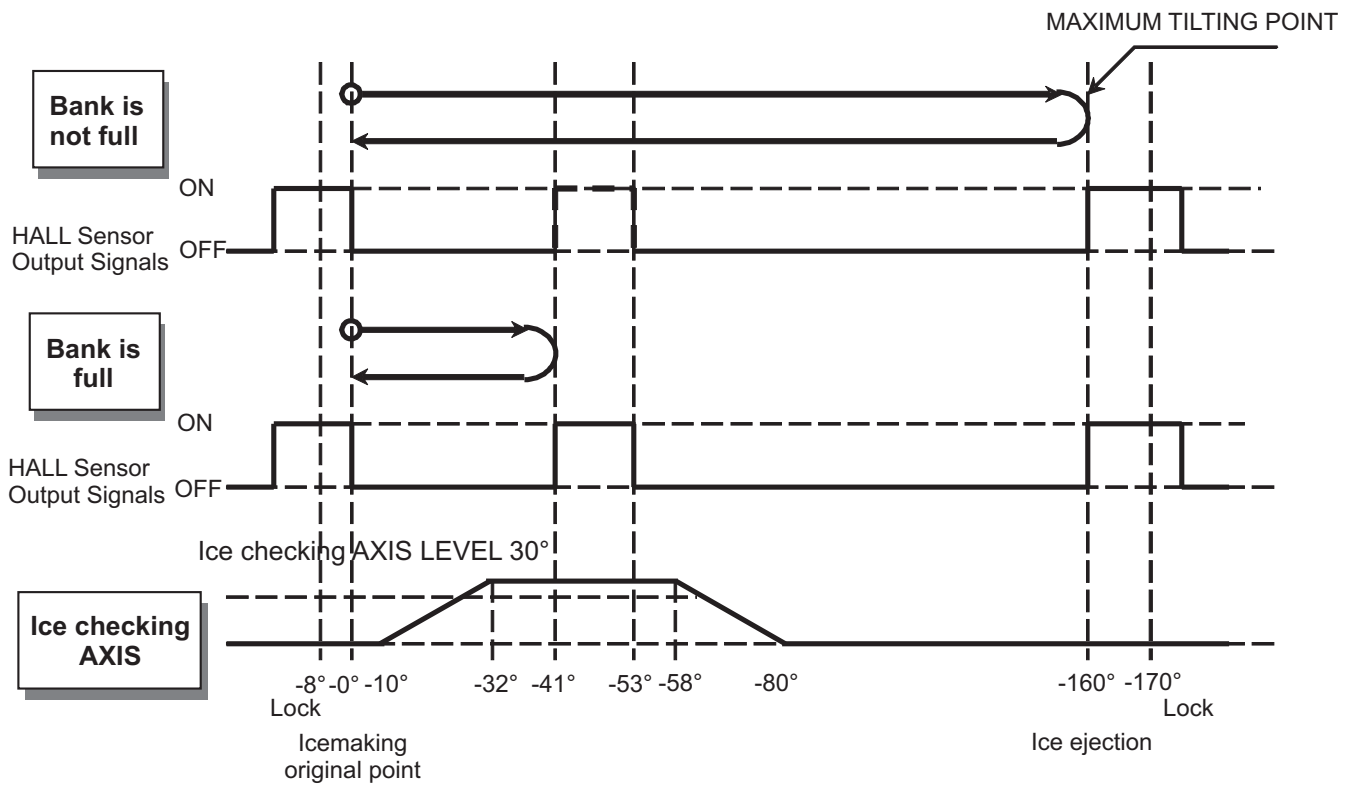
- 1) When power is initially applied or reapplied after power is cut, it detects level of the TRAY after completion of MICOM initialization. The detecting lever moves up and down.
- 2) The level of icemaker tray is judged by output signal, high and low signal, of HALL SENSOR. Make the tray to horizontal by rotating ice ejection motor in normal or reverse direction so that High/Low signal can be applied to MICOM Pin (P22).
- 3) If there is no change in signals one minute after the geared motor starts to operate, it stops icemaker operation and check the signal every hour. It resets initialization of icemaker when it becomes normal. Ice ejection conducts for 1 cycle.

7-2-2 Icemaking Mode

- a) Ice making control is carried out from the completion of water supply to the completion of ice making in the TRAY. Ice making sensor detects the temperature of TRAY and completes ice making. (Ice making sensor is fixed below the TRAY.)
- b) Ice making control starts after completion of water supply control or initial control. Under the ice making control, the F room temperature should be operated with the NOTCH of "Normal/Strong".
- c) It is judged that ice making is completed when ice making sensor temperature reaches at -8 after 70 minutes + 10 minutes when water is supplied to the TRAY.

7-2-3 Ice Ejection Mode

- a) This is to eject ice from the TRAY after ice making is completed.
- b) If Hall IC signal is on within 3.6 seconds after ice ejection motor rotates in normal direction, it does not proceed ice ejection but waits. If the ice bank is full, ice ejection motor rotates in normal direction in every hour to check the condition of ice bank. If the ice bank is not full, the water supply control starts after completion of ice ejection control. If the ice bank is full, ice ejection motor rotates in reverse direction and stops under ice making or waiting conditions.
- c) If ice bank is not full, ice ejection starts. The TRAY tilts to the maximum and ice is separated from the TRAY and ice checking lever raises.
- d) Ice ejection motor stops for 1 second if Hall IC signal changes from OFF (low) to ON (high) after 3.6 seconds when ice ejection motor rotates in normal direction. If there is no change in Hall IC signals within 1 minute after ice ejection motor operates, ice ejection motor stops as ice ejection motor or hall IC is out of order.
- e) If ice ejection motor or Hall IC is abnormal, ice ejection motor rotates in normal direction to exercise initial operation in every hour. It resets the ice maker if ice ejection motor or Hall IC is normal.
- f) The TRAY stops for 1 second at maximum tilted conditions.
- g) The TRAY returns to horizontal conditions as ice ejection motor rotates in reverse direction.
- h) When the TRAY becomes horizontal, the cycle starts to repeat.
Water Supply – Ice making – Ice ejection – TRAY returns to Horizontal.



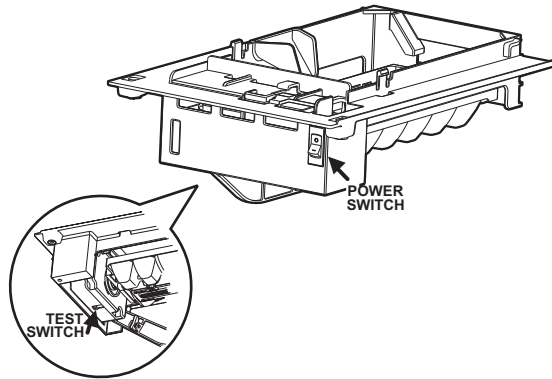
7-2-4 Test Icemaker Mode

Test function starts when test switch is pressed for more than **3 seconds**. User shouldn't force operation while doing test mode, service or cleaning.

Test switch will work only when ice tray its in horizontal position, not during ice ejection or water supplying.

When pressing the Test Switch, feeler arm will sense and then ice tray will start ice ejection, after twisting, ice tray returns to initial position. When returning to horizontal position, water supply will start filling the ice tray. After this, test mode its done.

Test mode cycle elapsed time of 30 seconds its shown as the next sequence:
 Feeler arm sensing – Ice ejecting – Ice tray returns to horizontal position – Water supply.



7-2-5 Water Supply Function

This function is for supply water to tray ,by the mechanic water valve ,when ice ejecting finish and tray return to initial position.

Water supply quantity depend of DIP S W.

Water Supply Time Table

No	DISP S/W		Water Supply Time	Note
	S1	S2		
1	OFF	OFF	9.0	DIP S/W Setting will be depend of water pressure
2	ON	OFF	8.0	
3	OFF	ON	10.0	
4	ON	ON	11.0	

If water supply setting is changed while system is energized, change will be made immediately. But if change occurs when water supply function is working, change will be executed next cycle of icemaker

7-2-6 Ice maker stop switch

- Ice Maker Stop S/W ON state, Ice Maker normal operation
- Ice Maker Stop S/W OFF state: Ice Maker do not operate

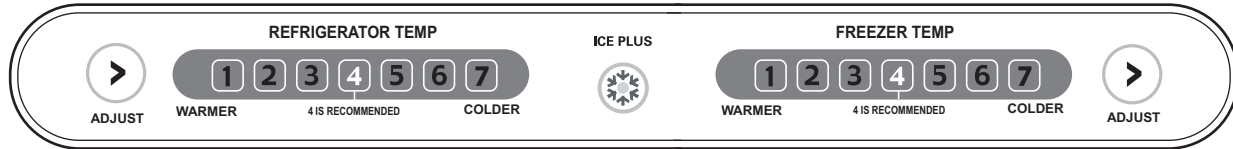
8. CIRCUIT OF MICOM

8-1 FUNCTION

8-1-1 Function

1. When the appliance is plugged in, it is set to "4" for Refrigerator and "4" for freezer.
You can adjust the Refrigerator and the Freezer control temperature by pressing the ADJUST button.
2. When the power is restored after a power failure, it is automatically set to last setting selected.

*Note: To ERROR CODE on display panel refer to page 32.



8-1-2 Control of freezer fan motor

1. Freezer fan motor has high and standard RPMs.
2. High RPM is used when electricity is first on, for ICE PLUS, and when refrigerator is overloaded.
But standard RPM is used for general purposes.
3. To improve cooling speed and load corresponding speed, the RPM of freezer fan motor shall change from normal speed to high speed.
4. High speed (2500RPM) : Initial power on or load corresponding operation, ICE PLUS.
Normal speed (2200 RPM): general working conditions.
5. Fan motor stops when refrigerator or freezer door opens.

8-1-3 ICE PLUS

1. The purpose of this function is to intensify the cooling speed of freezer and to increase the amount of ice.
2. Whenever selection switch is pressed, selection/release, the LED will turn ON or OFF.
3. If there is a power cut and the refrigerator is power on again, ICE PLUS function will be canceled.
4. To activate these function you need to press the ICE PLUS key and the LED will turn ON. This function will remain activated for 24 hrs. The first three hours the compressor and ICE PLUS will be ON. The next 21 hours the freezer will be controlled at the lowest temperature. After 24 hours or if the ICE PLUS key is pressed again, the freezer will return to its previous temperature.
5. For the first three hours notice the following cases:
 - (1) Compressor and freezer fan(HIGH RPM) continuously operate for three hours.
 - (2) If defrost starts during ICE PLUS, ICE PLUS operates for the rest of time after defrost is completed, when ICE PLUS operation time is less than 90 minutes.
If ICE PLUS operates for more than 90 minutes, the ICE PLUS will operate for two hours after defrost is completed.
 - (3) If ICE PLUS is pressed during defrost, ICE PLUS LED is on but this function will start seven minutes after defrost is completed and it shall operate for three hours.
 - (4) If ICE PLUS is selected within seven minutes after compressor has stopped, the compressor (compressor delays seven minutes) shall start after the balance of the delay time.
 - (5) The fan motor in the freezer compartment rotates at high speed during ICE PLUS.
6. For the rest of 21 hours, the freezer will be controlled at the lowest temperature.

8-1-4 Refrigerator Lamp Auto Off

1. To protect the risk of lamp heat, when Refrigerator door opens for 7 min, refrigerator lamp is auto off.

8-1-9 Defect Diagnosis Function

1. Automatic diagnosis makes servicing the refrigerator easy.
2. When a defect occurs, the buttons will not operate; but the tones, such as ding, will sound.
3. When the defect CODE removes the sign, it returns to normal operation (RESET).
4. The defect CODE shows on the Refrigerator and Freezer Display.



ERROR CODE on display panel ● LED OFF LED ON ○

No.	ITEM		ERROR INDICATION	CONTENTS	REMARKS
1	Failure of Freezer Sensor	All Off	● ○ ○ ○ ○ ○ ○	Cut or short circuite wire	Inspect Connecting Wires on each sensor
2	Failure of Refrigerator Sensor	All Off	○ ● ○ ○ ○ ○ ○ ○	Cut or short circuite wire	
3	Failure of Defrost Sensor	All Off	○ ○ ● ○ ○ ○ ○ ○	Cut or short circuite wire	
4	RT- sensor error	All Off	○ ○ ○ ● ○ ○ ○ ○	Cut or short circuite wire	
5	Failure of Defrost Mode	All Off	● ● ● ● ○ ○ ○	When defrost sensor does not reach 8°C within 1 hour after starting defrost	Snapping of defrost heater or temperature fuse, pullout of connector (indicated minimum 2h after failure occurs)
6	Failure of BLDC fan motor at freezing compartment	All Off	● ● ● ● ● ○ ○	If there is no fan motor signal for more than 115s in operation fan motor	Poor motor, hooking to wires of fan, contact of structures to fan, snapping or short circuit of Lead wires.
7	Failure of Icemaker Sensor	All Off	○ ○ ○ ○ ● ○ ○	Snapping or short circuit of ice making sensor.	Connecting Wire Test On Sensor
8	Failure of Icemaker Kit	All Off	○ ○ ○ ○ ○ ● ○	Failure of wires such as motor in I/M KIT, GEAR, HALL IC.	When the ice ejecting does not operated on pressing the I/M TEST S/W

Primary Error: F sensor, R1 sensor, D sensor, Defrost errors, F-FAN errors.

Secondary Error: I / M sensors, I / M Kit, RT sensor.

When an error occur the first 3 hours the Primary Error and Secondary Error is indicated in the display check mode (Pressing refrigerator and freezer temperature control button at the same time more than one second). After the 3 hours and if the error is still present the Primary Error will show in the display automatically (See Note 1) and the Secondary Error is indicated in the display check mode.

Note1: In the Primary Error after 3 hours of the error occurs all display lights turn OFF except the Freezer Temperature (Trouble Code Index) indicating the failure mode.

*LED check function: When there's no error, when the refrigerator temperature control and the freezer temperature control button at the same time are hold for 1 second or longer, every LED on the display turns on at the same time when the button are released, the previous mode is restored.

8-1-10 TEST Mode

1. The Test mode allows checking the PCB and the function of the product as well as finding out the defective part in case of an error.
2. The test mode is operated by pressing two buttons at Display panel.
3. While in the test mode, the function control button is not recognized, but the recognition tone (beep~) sounds.
4. After exiting the test mode, be sure to reset by unplugging and then plugging in the appliance.
5. If an error, such as a sensor failure, is detected while in the test mode, the test mode is cleared and the error code is displayed.
6. While an error code is displayed, the test mode will not be activated.

MODE	MANIPULATION	CONTENTS	REMARKS
TEST1	Push ICE PLUS key and ADJUST key of Freezer Temperature at the same time over 3s. Or Push TEST switch (on the main Board) once. <Cooling MODE>	1. Continuous operation of the compressor and the freezer fan. 2. Stepping Damper OPEN 3. Defrosting Heater OFF 4. Display LED all ON	Maximum test time: 5 minutes.
TEST2	Push ICE PLUS key and ADJUST key of Freezer Temperature at the same time over 3 seconds in TEST MODE 1 Or Push TEST switch once In TEST MODE 1. <Forced desfrosting MODE>	1. Compressor and the freezer fan OFF 2. Stepping Damper CLOSE 3. Defrosting heater ON 4. Display LED 1, 3, 5, 7 ON	Maximum test time: 2 hours Reset if the temperature of the defrosting sensor is 8°C (46°F) or more.
Reset to Normal	Push ICE PLUS key and ADJUST key of Freezer Temp. at the same time over 3 seconds. in TEST MODE 2	Reset to initial status (COMP 7 min delay)	

* Freezer Fan RPM Variable Check:

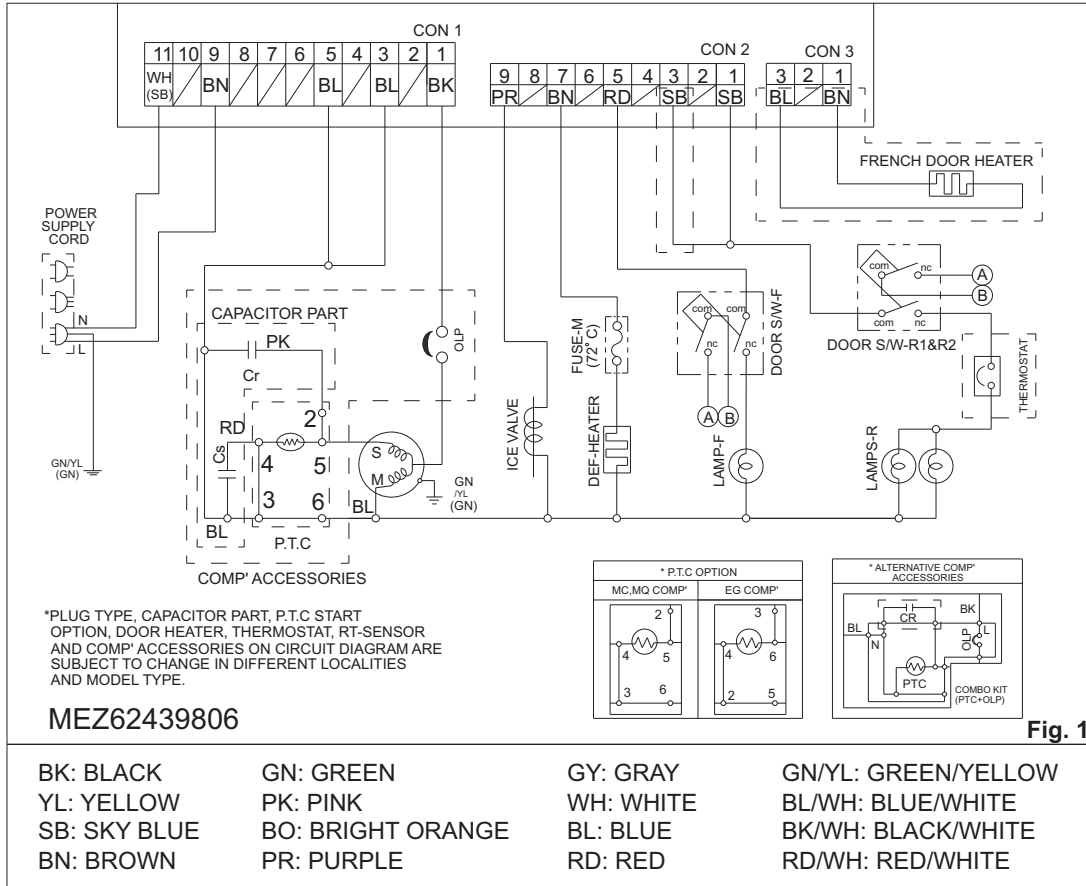
In case the freezer fan is in operation when the ADJUST key in Refrigerator and Freezer Temp. Control are pressed for more than one second at the same time freezer fan RPM changes. (for example if high speed, to normal speed or if normal speed, to high speed for 30 seconds)
 After 30 seconds, it turns to its original RPM.

* Demonstration MODE:

1. When the ICE PLUS key and ADJUST key of refrigerator temperature control are pressed for more than 3 seconds at the same time temperature's it converts to demonstration mode.
2. In this status, each LED is rotated with 1 second interval.
3. In this status, all Loads are off (Compressor / Fan / Damper / Heater)
 (Even is Demonstration Mode, the refrigerator Lamp automatic off function works normally and can be demonstrated)
4. It reset if you do again as clause.

8-2-1 Power Circuit

Power is supplied to the control board at the pin 11 and 9 of connector #1. (Refer to figure 1)



8-2-2 Load and Door Light Circuit (HV)

1. Load Drive Condition Check

To measure outputs of the control board, check voltages between the pins for the following components:
(Refer to Fig. 1).

Circuit	Pin Number	Pin Number	Output Voltage
Compressor	Con 1 Pin 1	Con 1 Pin 3	115 VAC
Defrost Heater	Con 2 Pin 7	Con 1 Pin 3	115 VAC
F Lamp	Con 2 Pin 5	Con 1 Pin 3	115 VAC
R Lamp	Con 2 Pin 1 and/or 3	Con 1 Pin 3	115 VAC
Ice Maker	Con 2 Pin 9	Con 1 Pin 3	115 VAC
French Door Heater	Con 3 Pin 1	Con 3 Pin 3	115 VAC

Connector 1				
Pin	11	9	3	1
	N	L	N	COMP

Connector 2					
Pin	9	7	5	3	1
	Ice Valve	Def Heater	F Lamp	R Lamp	

NOTE: When the door of the refrigerator is left open for 7 minutes or longer, the lamp of the refrigerator turns off automatically.

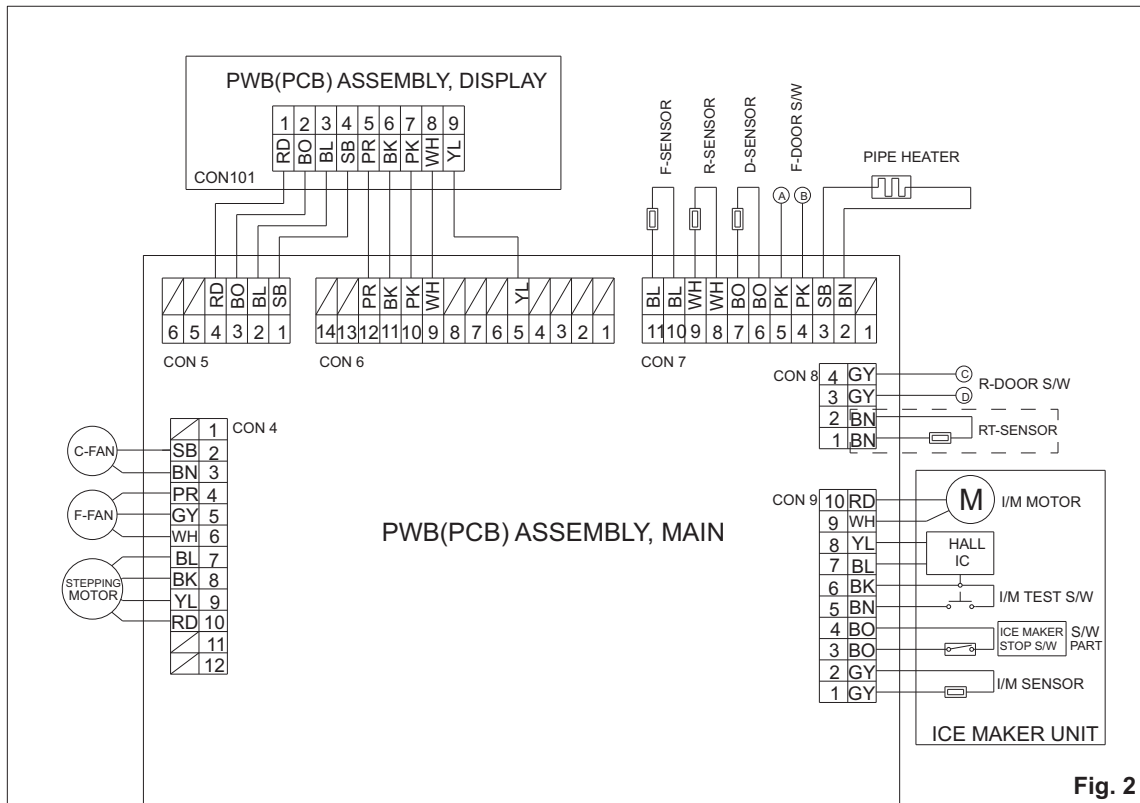


Fig. 2

2. Door Monitor Circuit (LV)

Refrigerator	Pin Number	Pin Number	Voltage
F Door Close	Con 7 Pin 4	Con 7 Pin 5	5 Volts
F Door Open	Con 7 Pin 4	Con 7 Pin 5	0 Volts
R Door Close	Con 8 Pin 3	Con 8 Pin 4	5 Volts
R Door Open	Con 8 Pin 3	Con 8 Pin 4	0 Volts

Connector 8				
Pin	4	3	2	1
	R-Door S/W		RT sensor	

8-2-3 Temperature Sensor Circuit (Refer to Figure 2)

Voltage supplied to each sensor will range between 0.5 volts $-22^{\circ}\text{F}(-30^{\circ}\text{C})$ and 4.5 volts $122^{\circ}\text{F}(50^{\circ}\text{C})$ depending upon the temperature in the compartments. A measurement of 0 volts indicates a short in the sensor circuit. A measurement of 5 volts indicates an open in the sensor circuit.

Connector 7											
PIN	11	10	9	8	7	6	5	4	3	2	1
	F-Sensor		R-Sensor		D-Sensor		F-Door S/W		Pipe Heater		NC

To measure the outputs of the sensors, check the voltages between the pins as in the table. And refer the values in the section "RESISTANCE SPECIFICATION OF SENSOR"

Sensor	Pin Number	Pin Number
F- Sensor	Con 7 Pin 10	Con 7 Pin 11
R- Sensor	Con 7 Pin 8	Con 7 Pin 9
D- Sensor	Con 7 Pin 6	Con 7 Pin 7
I/M Sensor	Con 7 Pin 1	Con 9 Pin 2
RT- Sensor	Con 8 Pin 1	Con 8 Pin 2

To measure the outputs of the fans on the control boards check the voltages between the pins for the following components:

FAN	Pin Number	Pin Number	Output Voltage	
			Motor On	Motor Off
Freezer Fan	Con 4 Pin 5	Con 4 Pin 6	10-14Vdc	2Vdc or less
Cooling Fan	con 4 Pin 2	Con 4 Pin 3	10-14Vdc	2Vdc or less

Connector 4												
PIN	12	11	10	9	8	7	6	5	4	3	2	1
	NC		Stepping Motor			F-Fan			C-Fan		NC	
	NC	NC					V	G	F	V	G	NC

8-2-4 ICE MAKER

Connector 9										
PIN	10	9	8	7	6	5	4	3	2	1
	I/M Motor		Hall IC		I/M Test S/W		I/M Stop S/W		I/M Sensor	

Circuit	Pin Number	Pin Number	Output Voltage
I/M Stop S/W	Con 9 Pin 3	Con 9 Pin 4	0~5Vdc
I/M Test S/W	Con 9 Pin 5	Con 9 Pin 6	0~5Vdc

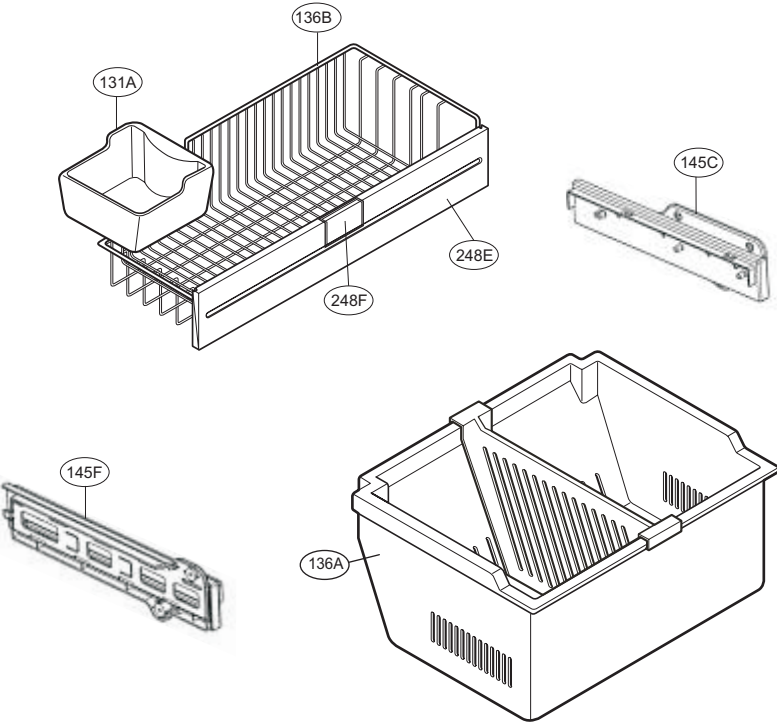
8-3 RESISTANCE SPECIFICATION OF SENSOR

TEMPERATURE DETECTED SENSOR	RESISTANCE OF FREEZER SENSOR	RESISTANCE OF REFRIGERATOR DEFROST SENSOR & ROOM SENSOR
-20°C	22.3 KΩ	77 KΩ
-15°C	16.9 KΩ	60 KΩ
-10°C	13.0 KΩ	47.3 KΩ
-5°C	10.1 KΩ	38.4 KΩ
0°C	7.8 KΩ	30 KΩ
+5°C	6.2 KΩ	24.1 KΩ
+10°C	4.9 KΩ	19.5 KΩ
+15°C	3.9 KΩ	15.9 KΩ
+20°C	3.1 KΩ	13 KΩ
+25°C	2.5 KΩ	11 KΩ
+30°C	2.0 KΩ	8.9 KΩ
+40°C	1.4 KΩ	6.2 KΩ
+50°C	0.8 KΩ	4.3 KΩ

- The resistance of the SENSOR has a $\pm 5\%$ common difference.
- Measure the resistance of the SENSOR after leaving it for over 3 minutes in the measuring temperature. This delay is necessary due to sensor response speed.

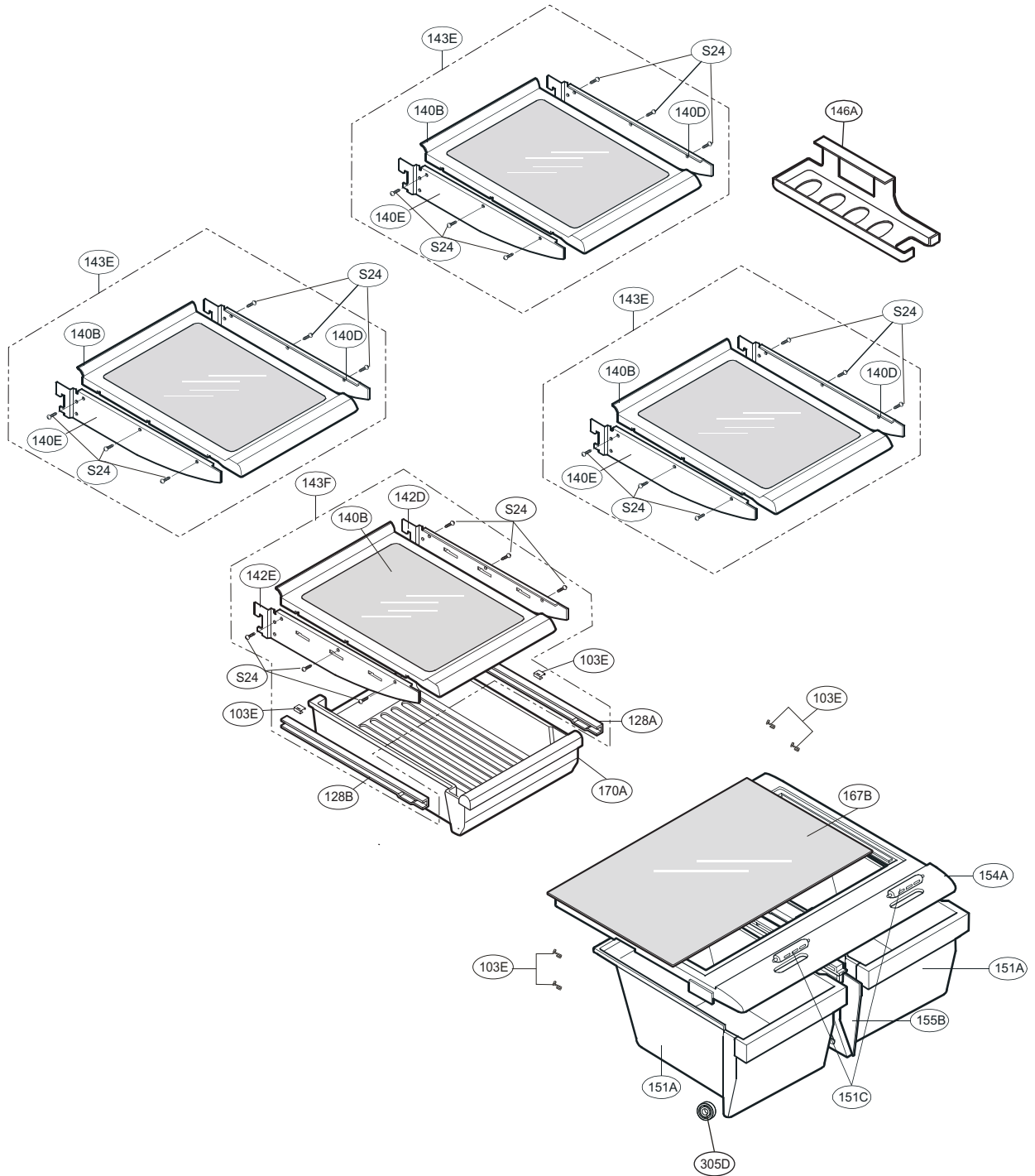
FREEZER PARTS

CAUTION: Use the part number to order part, not the position number.



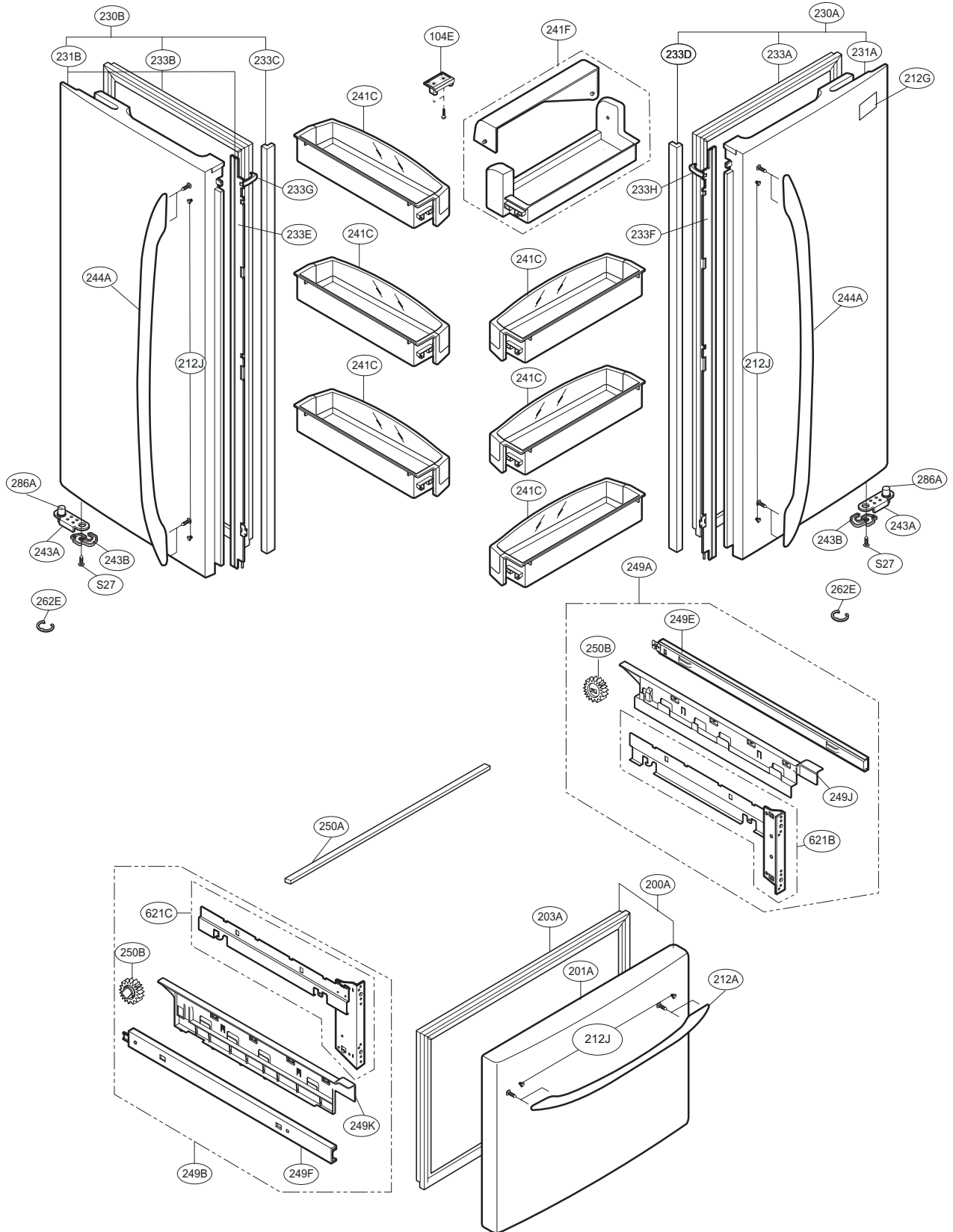
REFRIGERATOR PARTS

CAUTION: Use the part number to order part, not the position number.



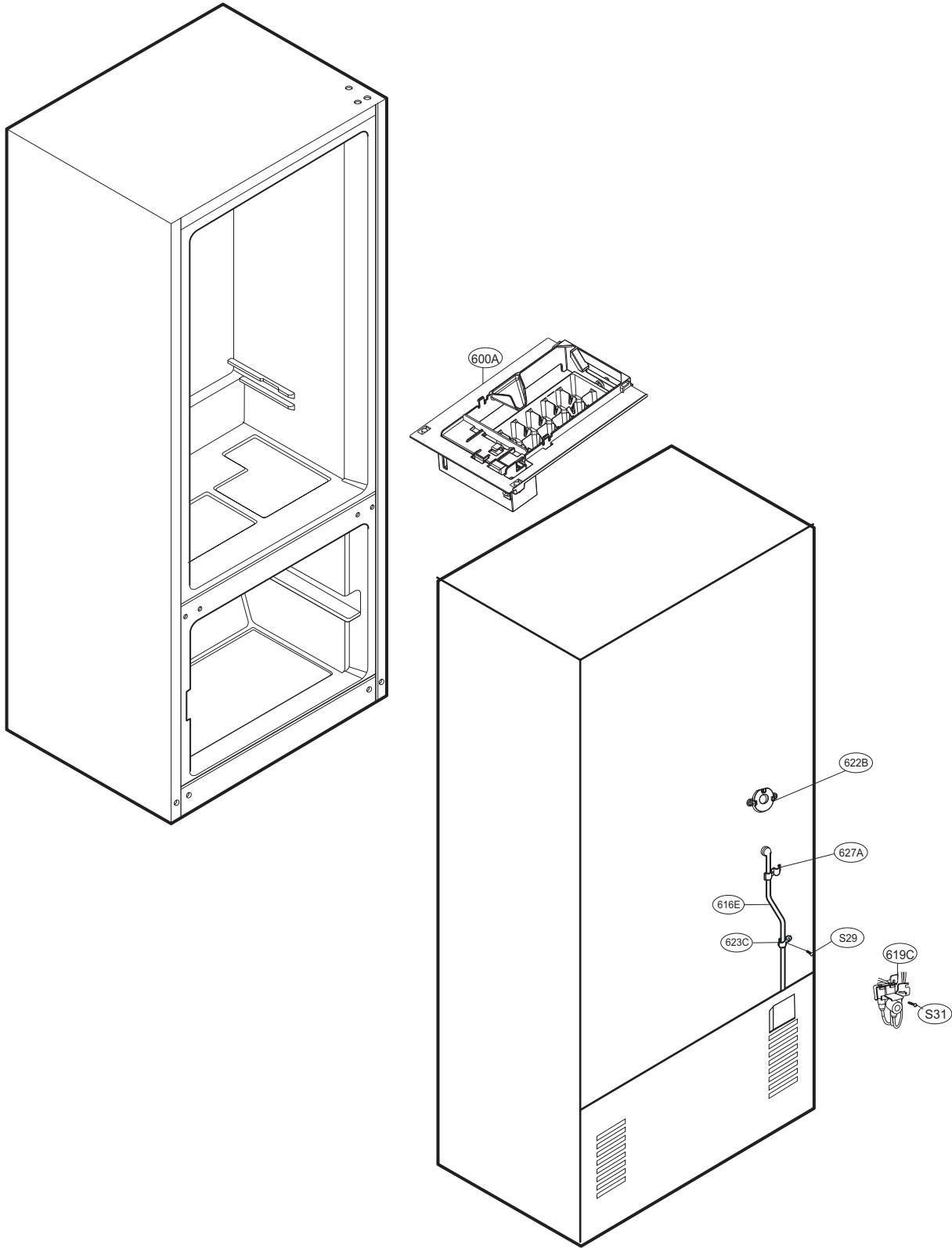
DOOR PARTS

CAUTION: Use the part number to order part, not the position number.



ICEMAKER PARTS

CAUTION: Use the part number to order part, not the position number.





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