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# LG LTC22350SW Owner's Manual

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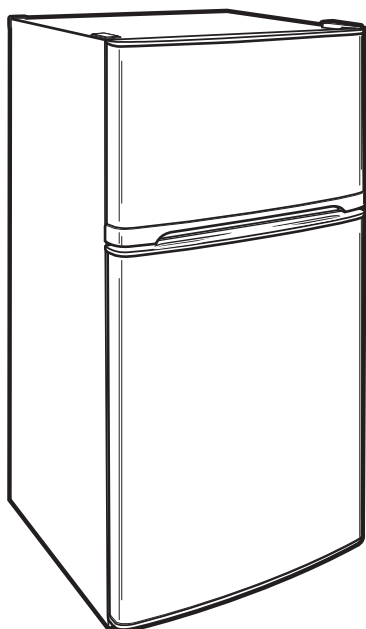
----- Manual continues below -----



# REFRIGERATOR

# SERVICE MANUAL

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



**MODELS:**

LTC22350ST /01  
LTC22350SW /01

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## SAFETY PRECAUTIONS

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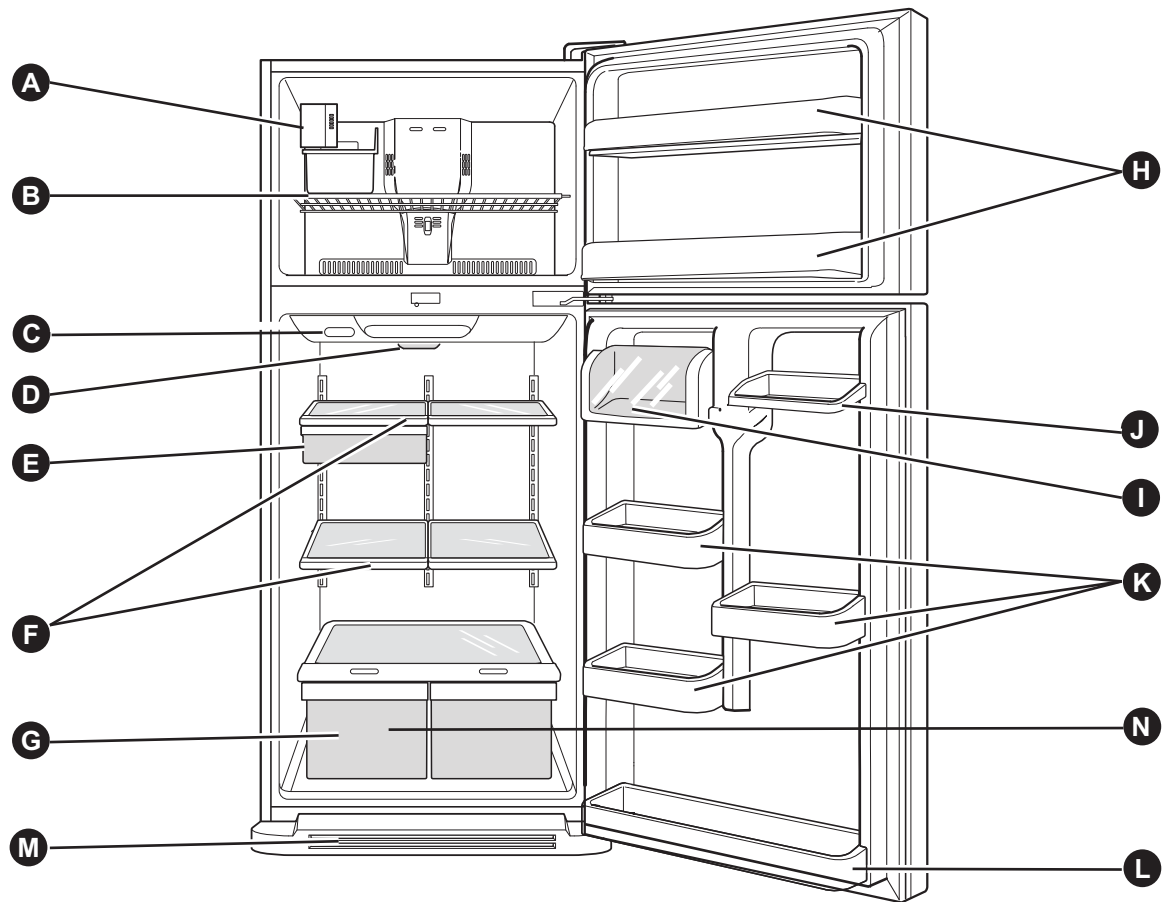
Please read the following instructions before servicing your refrigerator.

1. Check the refrigerator for current leakage.
2. To preven telectric 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 spiling 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	LTC22350SW /01	LTC22350ST /01
			White
Color		White	Stainless
Dimensions		889 (W) x 856 (D) x 1811 (H) mm	
Net Weight		97 Kg	
Capacity		22cuft	
Refrigerant		R134a	
Climate class		Temperate (N)	
Rated Rating		115V~ / 60Hz	
Cooling System		Fan Cooling	
Temperature Control		MICOM control	
Defrosting System		Full Automatic	
		Heater Defrost	
Insulation		Cyclo, Pentane	
Compressor		MQ53LAUM 115-127V/60 Hz PTC Starting Type	
Evaporator		Fin Tube Type	
Condenser		Wire Condenser	
Lubricating Oil		Polyol Ester (POE) RL-7H/7 cst 220 ± 10 cc	
Drier		MOLECULAR SIEVE XH-7	
Capillary Tube		ID Ø0.75	
First Defrost		4 Hours	
Defrost Cycle		7 - 40 Hours	
Desfrosting Device		Heater, Sheath	
Anti-freezing Heater		Water Tank Heater	
Case Material		Embo (normal)	
Door Material		PCM	Stainless
Handle Type		Pocket Handle	
Basket, Quantity		3EA (Normal)	
Ice Tray & Bank		In Door Auto Ice maker	
Cover, T/V		T/Glass	
Lamp		Yes (1) 40W/Blue	
Shelf		4 Fix	
Tray meat		Yes	
Tray Egg		No	
FREEZER	Basket, Quantity	Plastic (2)	
	Lamp	No	
	Shelf	Wire	

## 2. PARTS IDENTIFICATION



Use this section to become more familiar with the parts and features. Page references are included for your convenience.

**NOTE:**This guide covers several different models.The refrigerator you have purchased may have some or all of the items listed below.The locations of the features shown below may not match your model.

- A** CustomCube Ice maker
- B** Freezer Shelf
- C** Digital Sensor Control
- D** Refrigerator Light
- E** Snack Pan
- F** Shelves
- G** Crisper  
Keeps fruits and vegetables fresh and crisp

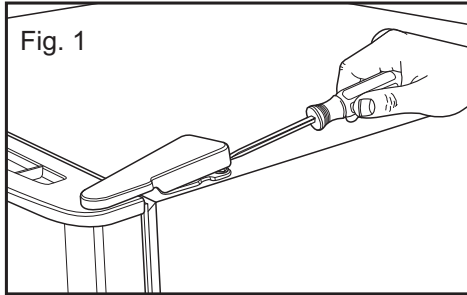
- H** Freezer Door Bin
- I** Dairy Corner
- J** Can Dispenser
- K** Door Bin
- L** Refrigerator Door Rack
- M** Base Grille
- N** Vitabox (Inside)\*

\*On some models

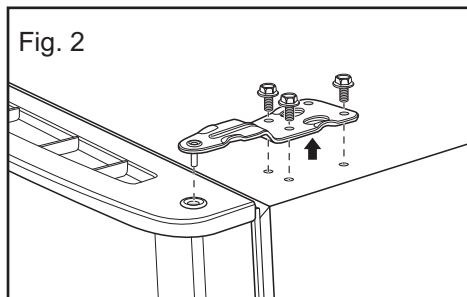
# 3. DISASSEMBLY

## 3-1 REMOVE FREEZER DOOR

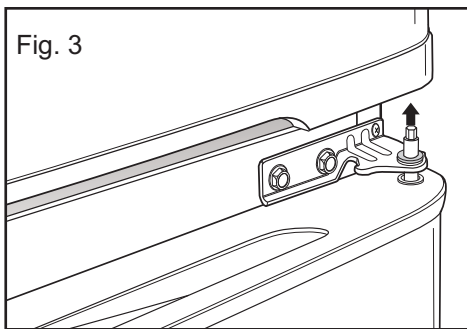
- Gently pry off the Top Hinge Cover with a flat head screwdriver and remove (see Fig 1).



- Using a 10 mm or 13/32-inch socket wrench, remove the 3 bolts and lift off the Top Hinge (see Fig. 2). Set parts aside.

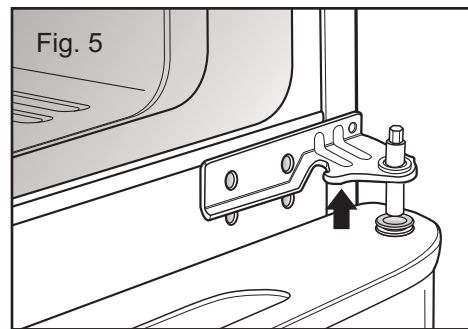
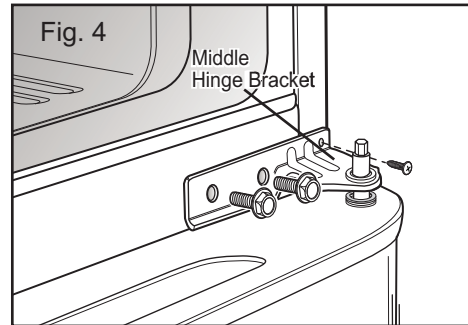


- Lift freezer door slightly and remove it. (Fig. 3). Set aside.

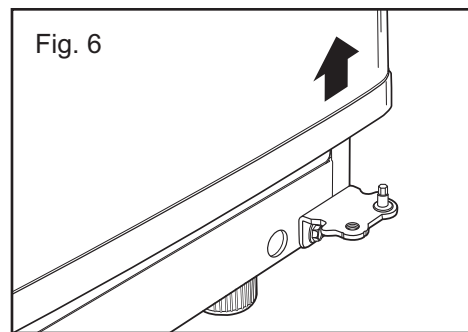


## 3-2 REMOVE REFRIGERATOR DOOR

- Loosen and remove the 2 bolts and the Phillips head screw to remove the Middle Hinge Bracket from refrigerator housing (Fig. 4 and 5). Set parts aside.



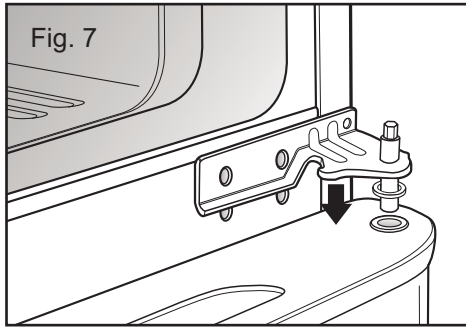
- Lift up door slightly and remove it.



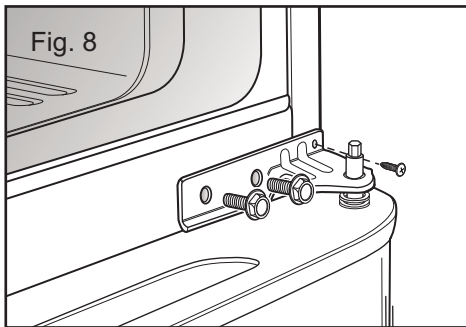
To replace doors, begin with refrigerator door and then follow with freezer door.

### 3-3 REPLACE REFRIGERATOR DOOR

- Set door onto Bottom Hinge Pin.
- Place Hinge Pin of Middle Hinge Bracket inside Hinge Pin Insert on top of door (Fig. 7). Hold door in place and line up the Middle Hinge Bracket with the holes in refrigerator housing.

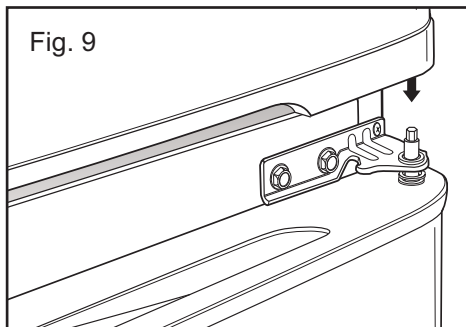


- Use the 2 bolts and phillips screw to refasten the Middle Hinge Bracket and door to the refrigerator housing. (Fig. 8).

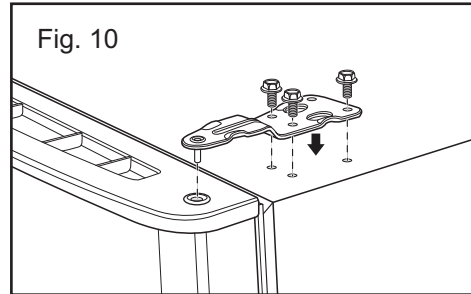


### 3-4 REPLACE FREEZER DOOR

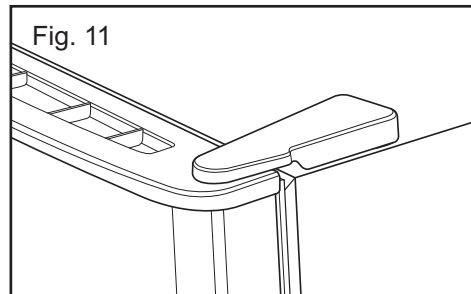
- Set the freezer door onto the Middle Hinge Pin (Fig. 9).



- Place Upper Hinge's Pin in the top of freezer door and line up the Upper Hinge with holes in top of refrigerator. Use the 3 bolts to replace Hinge (Fig. 10).



- Carefully force-t Top Hinge Cover back into place over Hinge (Fig.11).



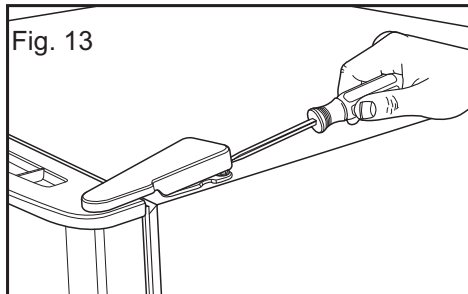
### **⚠ WARNING**

#### **ELECTRICAL SHOCK HAZZARD**

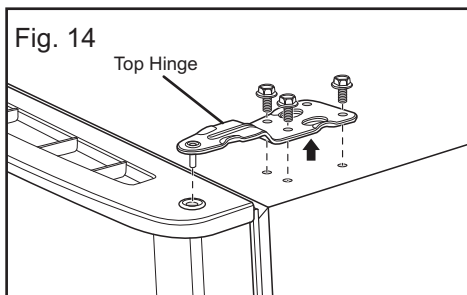
Before you begin, either unplug the refrigerator or turn o power at the circuit breaker or fuse box. Remove food and any Adjustable Door or Utility Bins from doors. Failure to do so could result in death or serious injury.

### 3-5 REVERSE FREEZER DOOR

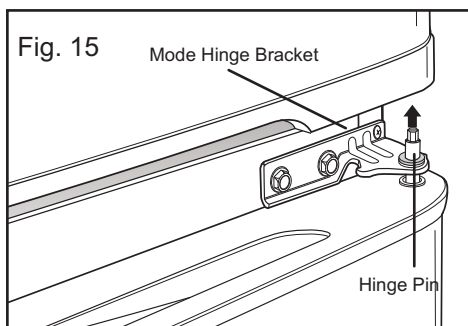
- Gently pry off the Top Hinge Cover with a flat head screwdriver and remove (see Fig. 13).



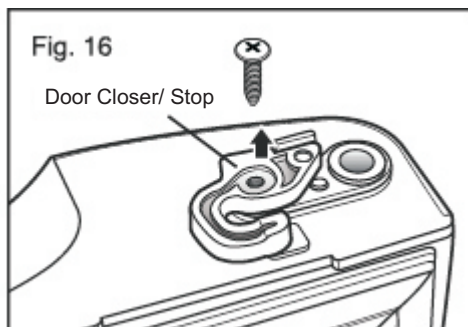
- Using 10mm or 13/32-inch socket wrench, remove the 3 bolts and lift off the Top Hinge (see Fig. 14). Set parts aside.



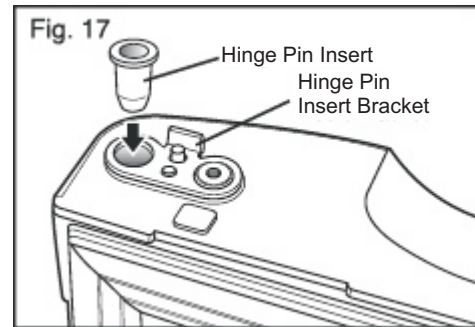
- Lift up door slightly and remove it (Fig. 15).



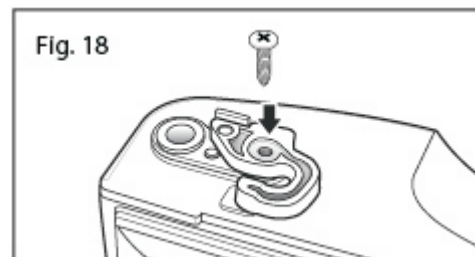
- Turn freezer door upside down on a non-scratch surface and loosen the screw to remove Door Closer/Stop and Hinge Pin Insert (see Fig. 16).



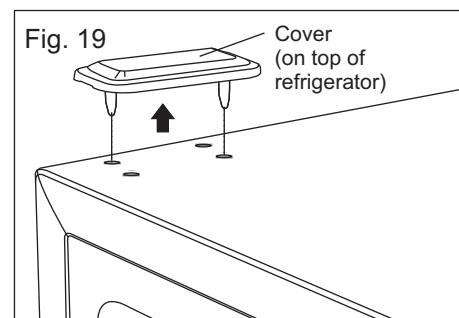
- Move the Hinge Pin Insert Bracket to the other side of the door, keeping the same orientation, and move the Hinge Pin Insert into the hole on the left side of the bracket (Fig. 17).



- Reverse Door Closer/Stop by flipping over (see Fig. 18), place on top of Hinge Pin Insert Bracket, and tighten both down with the screw.



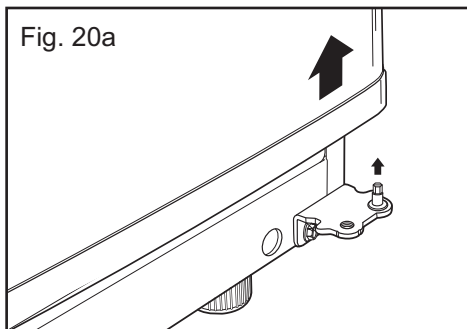
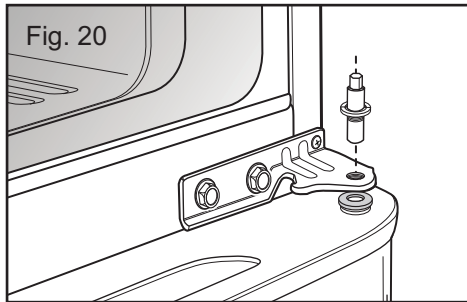
- Pry off cover on top of refrigerator on left side to uncover screw holes (Fig. 19).
- Set freezer door and Top Hinge parts to the side and remove refrigerator door.



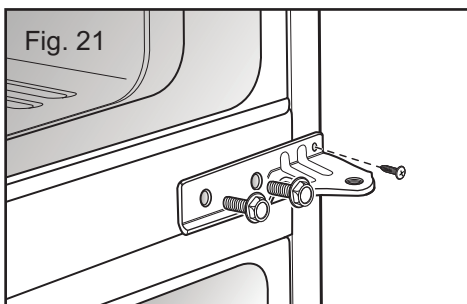
### 3-6 REVERSE AND REATTACH REFRIGERATOR DOOR

- Using a ¼-inch socket wrench, loosen and remove Hinge Pin from the Middle Hinge Pin Bracket. Remove washer underneath the middle hinge and set aside

**NOTE:** At this point the door will be loose, lift up door slightly and remove it. (Fig. 20 and 20a).



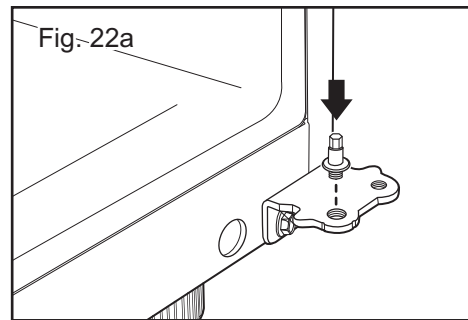
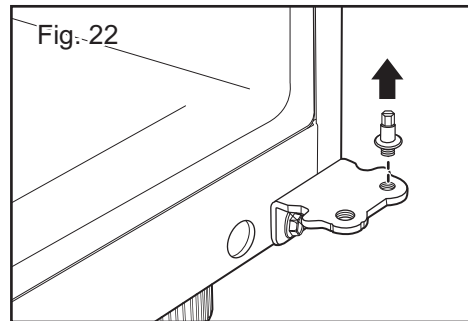
- Loosen and remove the 2 bolts and the phillips head screw to remove the Middle Hinge Bracket from refrigerator housing (Fig. 21). Set parts aside.



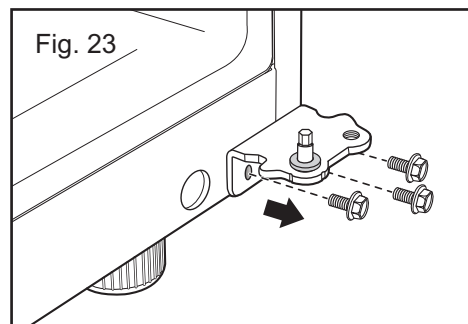
- Remove base grill.
- Remove the washer from the Bottom Hinge Pin (Fig.22).

- Using a ¼-inch socket wrench, loosen and remove the Hinge Pin from the Bottom Hinge. Reattach the Hinge Pin to the opposite side of the Hinge (see Fig. 22 and 22a).

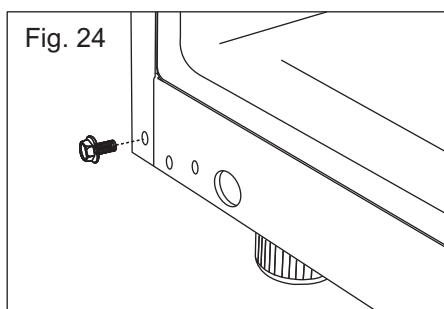
**NOTE:** This is easier to do while the Hinge is still attached.



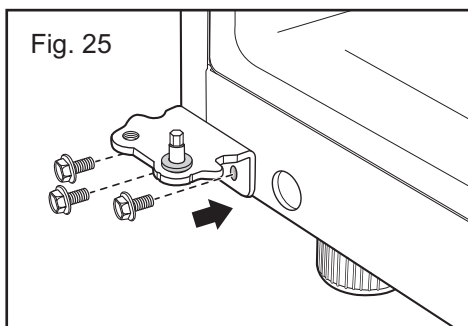
- Using 10 mm or 13/32-inch socket wrench with 2-inch extension, loosen the 3 bolts and remove the Bottom Hinge from right side of housing (Fig. 23).



- At this point, remove the Decorative Bolt on bottom on refrigerator housing from the left side of refrigerator (Fig. 24). You will need this hole for the Bottom Hinge.

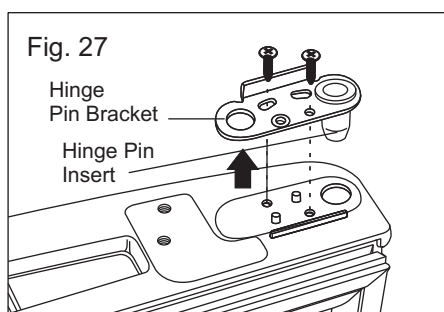
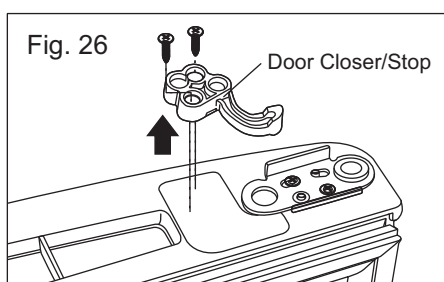


- Move the Bottom Hinge to the left side of housing keeping the same orientation, and reattach with 3 bolts (Fig. 25). Now move Decorative Bolt to hole on lower right side of housing.

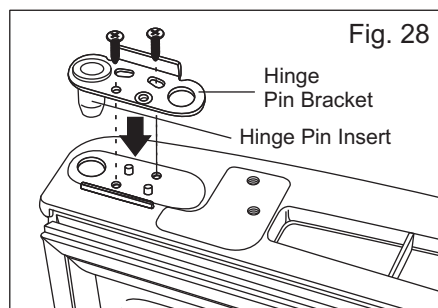


- Turn refrigerator door upside down on a non-scratching surface.
- With door upside down, loosen the 2 screws and remove the Door Closer/Stop (Fig. 26), then loosen the other two screws to remove the bottom Hinge Pin Insert Bracket with Hinge Pin Insert (see Fig. 27).

**NOTE:** The Refrigerator Door Closer/Stop is not used on all models. The model you have may not include this part.

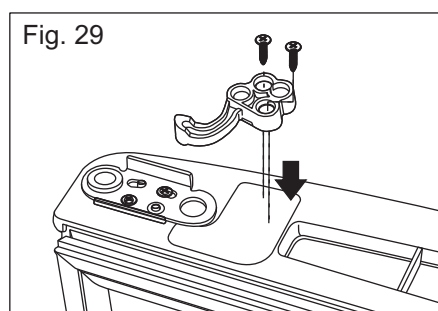


- Take out the Hinge Pin Insert and move the Bracket to the other side of the door, keeping the same orientation (Fig. 28).
- Place Hinge Pin Insert into the left side of the bracket. Tighten Hinge Pin Bracket to door (Fig. 28).

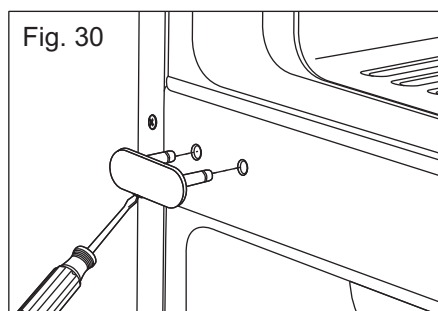


- Take Door Closer/stop and flip (see Fig. 29). Line up screw holes and mount on left side of door bottom with the two screws. Turn door upright. It is now ready for re-attaching.

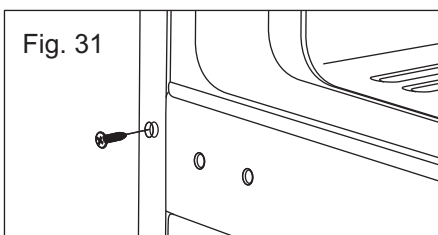
**NOTE:** The Refrigerator Door Closer/Stop is not used on all models. The model you have may not include this part.



- With flat-head screwdriver, carefully pry off and remove the cover over the screw holes on the left side of refrigerator housing (Fig. 30).



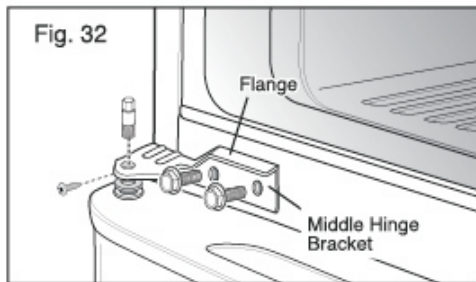
- Remove the outer lower Decorative Screw from housing at area between freezer and refrigerator doors (Fig. 31). (You will need this hole for the Middle Hinge Bracket).



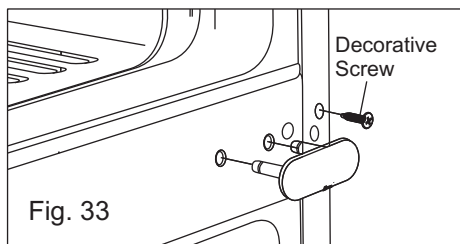
- Following illustration, flip the Middle Hinge Bracket (Flange will now be on top) and position on left side of refrigerator and re-attach with two bolts and a Phillips screw. (Fig. 32).
- Place refrigerator door down over pin on bottom hinge. (Fig. 32).

- Place washer between refrigerator door and middle hinge and re-attach Hinge Pin to Hinge Bracket with 1/4-in. socket wrench.

**NOTE:** Bracket has been flipped, but Hinge Pin stays in the same orientation with its hexagonal end facing upward.

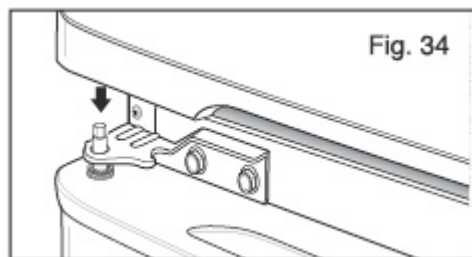


- Place Decorative Screw into outer hole on right side of housing.
- Attach cover on the right side. Cover is force-fitted

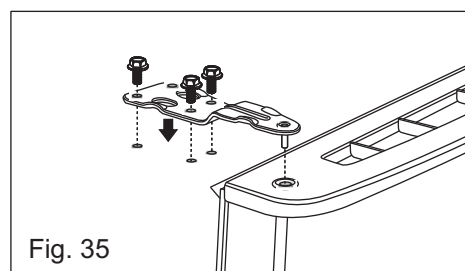


### REATTACHING FREEZER DOOR

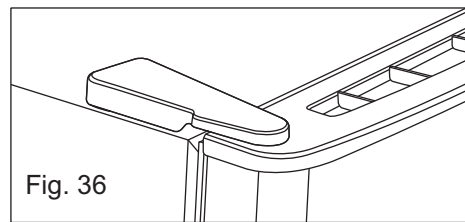
- Put freezer door down over the Hinge Pin on the Middle Hinge Pin Bracket



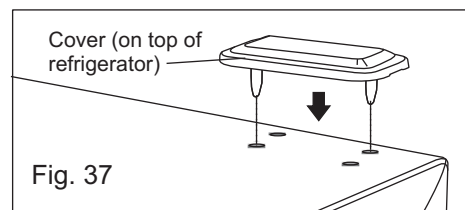
- Place Upper Hinge's Pin in the top of freezer door and line up the Upper Hinge with holes in top of refrigerator. Use the 3 bolts to replace Hinge.



- Tighten bolts. Force-fit Top Hinge Cover over Top Hinge.



- Replace cover from left side of refrigerator top onto the right of top to cover the holes. Cover is also force-fitted



After changing doors, make sure that the corners of the Door Gaskets are not folded over. To ensure a good seal, apply a small amount of silicon grease on the corners of gaskets.

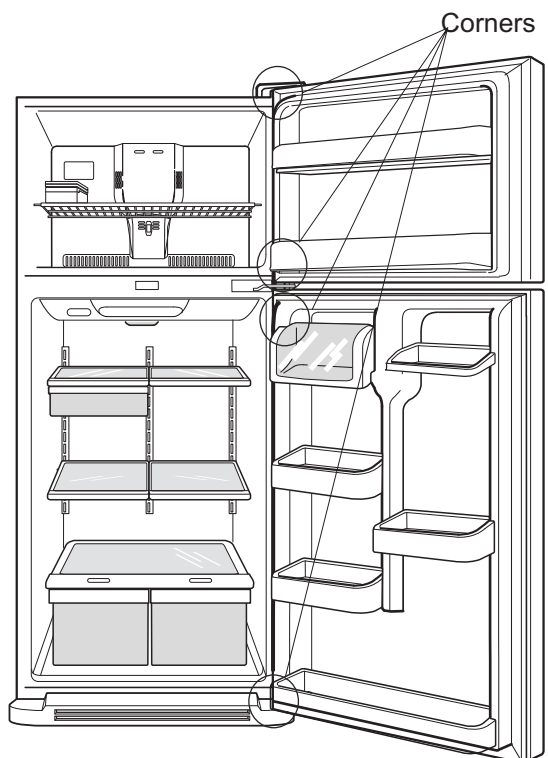


Fig. 38

### 3-7 LEVELING AND DOOR CLOSING

To avoid vibration, the unit must be leveled. If necessary, adjust the Leveling Legs to compensate for unevenness of the floor. The front should be slightly higher than the rear to aid in door closing.

Your refrigerator has two Front Leveling Screws – one on the right and one on the left. If your refrigerator seems unsteady or you want the doors to close more easily, adjust the refrigerator's tilt using the instructions below:

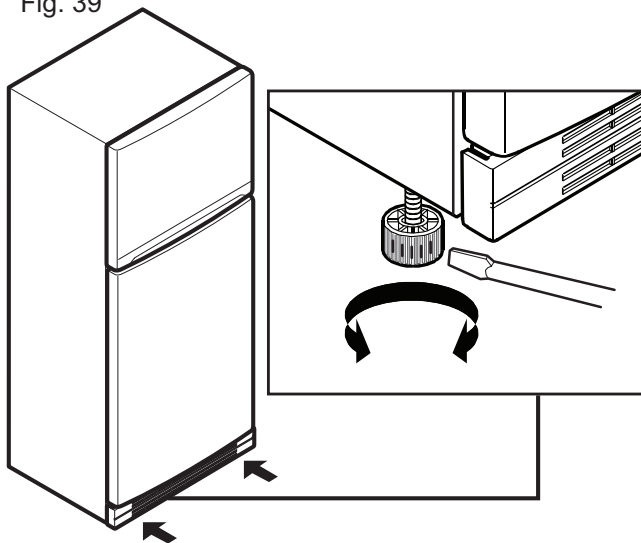
1. Plug refrigerator power cord into a 3-prong grounded outlet. Move the refrigerator into its final position.
2. Remove the base grill.

The two Leveling Screws are located on the bottom of the refrigerator on either side (see Fig. 39).

3. Insert a flat screwdriver in slots to adjust the Leveling Screws (Fig. 39). Turn the leveling screw clockwise to raise that side of the refrigerator or counterclockwise to lower it. It may take several turns of the Leveling Screw to adjust the tilt of the refrigerator.

**NOTE:** Having someone push against the top of the refrigerator takes some of the weight off the Leveling Screws. This makes it easier to adjust the screws.

Fig. 39



4. Open both doors again and check to make sure that they close easily. If not, tilt the refrigerator slightly more to the rear by turning both Leveling Screws clockwise. It may take several more turns, and you should turn both Leveling Screws the same amount.

5. Replace the base grill.

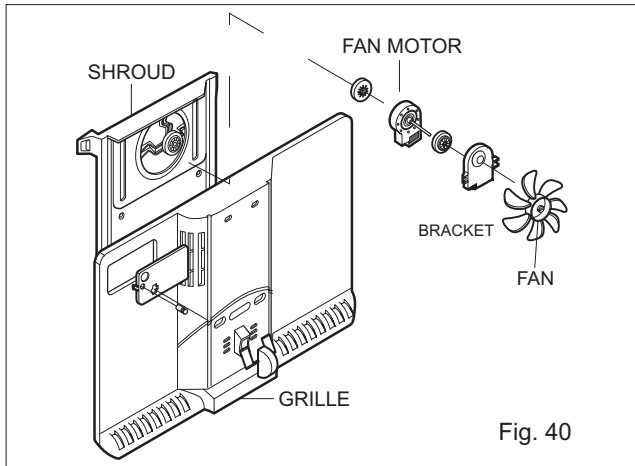
### 3-8 DOOR ALIGNMENT

If the space between your doors is uneven, follow the instructions below to align the doors:

1. Gently pry off the Top Hinge Cover with a flat head screwdriver and remove. Loosen the Top Hinge Bolts using a 10 mm or 13/32-in. socket wrench or open-end wrench.
2. Have someone hold the freezer door so the space between the two doors is even, and retighten the top hinge bolts.
3. Replace the Top Hinge Cover.

### 3-9 FAN AND FAN MOTOR

1. Remove the freezer shelf. (If your refrigerator has an icemaker, unplug and remove the icemaker first).
2. Remove the screw of the cover grille fan
3. Remove the grille by pulling it out and by loosening a screw.
4. Remove the Fan Motor assembly by loosening 4 screws and disassemble the shroud.
5. Pull out the fan and separate the Fan Motor and Bracket.



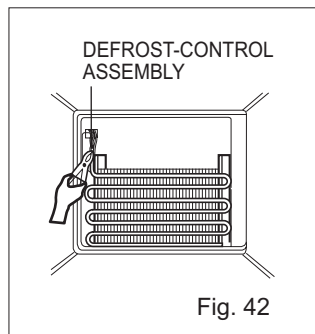
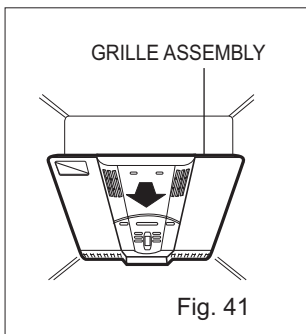
### 3-10 DEFROST CONTROL ASSEMBLY

Defrost Control assembly consists of Defrost Sensor and FUSE-M.

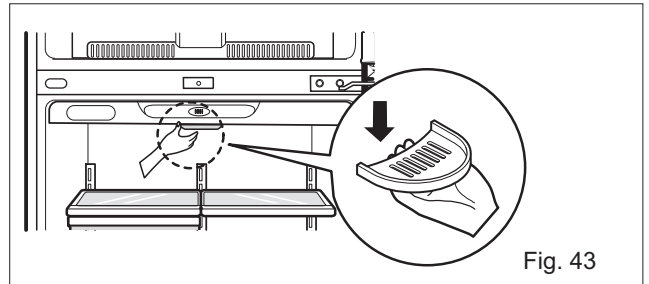
Defrost sensor functions to defrost automatically. It is attached to metal side of the Evaporator and senses Temperature. At the temperature of 162°F(72°C), it stops the emission of heat from the Heater.

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

1. Pull out the grille assembly. (Figure 41)
2. Separate the connector of the Defrost Control assembly and replace the Defrost Control assembly after cutting the Tie Wrap. (Figure 42)



### 3-11 LAMP

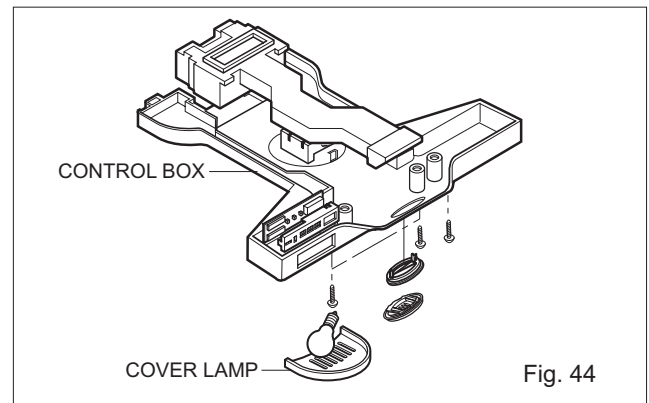


#### 3-11-1 Refrigerator Compartment Lamp

1. Unplug the power cord from the outlet.
2. Remove refrigerator shelves.
3. Release the hooks on both ends of the lamp shield and pull the shield downward to remove it.
4. Turn the lamp counterclockwise.
5. Assemble in reverse order of disassembly. Replacement bulb must be the same specification as the original (Max. 40 W-1EA).

### 3-12 CONTROL BOX-REFRIGERATOR

1. First, remove all shelves in the refrigerator. Then 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.

# 4. COMPRESSOR ELECTRICAL

## 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-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. If the hermetic connector rusts out or fails, refrigerant and oil will be expelled into the contact area, probably resulting in smoke and fire.
- (5) When replacing the compressor, be careful that dust, humidity, and soldering flux don't contaminate the inside of the compressor. Contamination in the cylinder may cause noise, improper operation or even cause it to lock up.

## 4-2 PTC-STARTER/ COMBO

### 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 BaTiO<sub>3</sub>.
- (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 Combo TSD

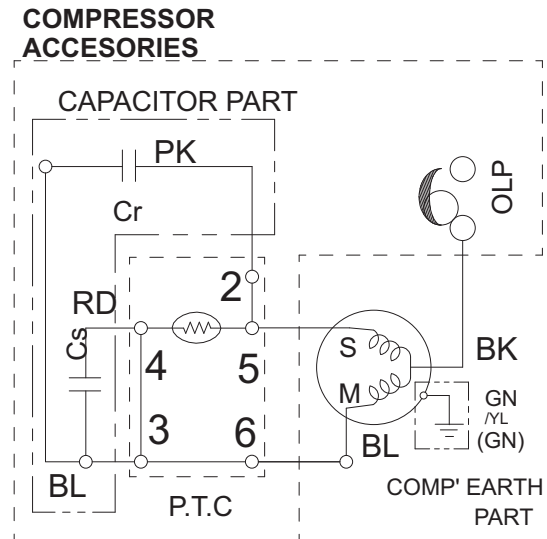
TSD (Time Starting Device) is a new electronic starting system for high efficiency compressors due to the following characteristics:

- (1) Combo concept-overload protector, electronic board and cover in a single casing.
- (2) Fully electronic concept.
- (3) Full integration of starting and protection devices.
- (4) Free from mechanical and electromagnetic noises.

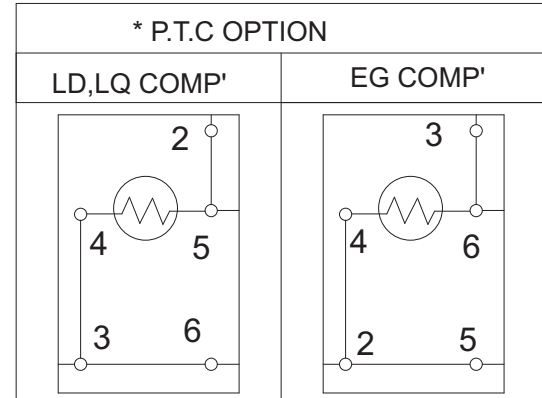
### 4-2-4 Role of Combo TSD

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

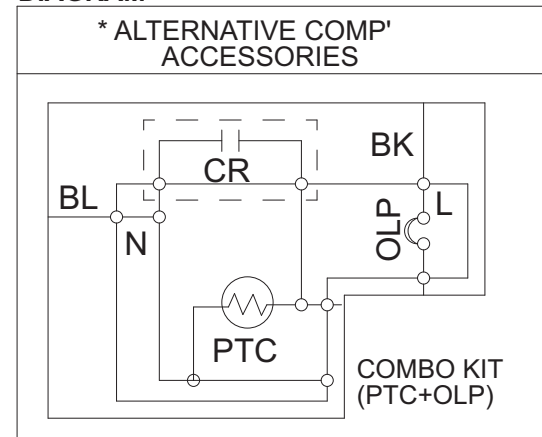
### 4-2-5 PTC/Combo - Applied Circuit Diagram Starting Method for the Motor



### PTC DIAGRAM



### COMBO KIT DIAGRAM



## 4-2-6 Motor Resarting and PTC/ Combo Cooling

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

## 4-2-7 Relation of PTC-Starter / Combo and OLP

- (1) If the compressor attempts to restart before the PTC/Combo device is cooled, the PTC/Combo 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/Combo 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.

## 4-2-8 Note for using the PTC-Starter / Combo

- (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/Combo, PTC/Combo materials may fail due to breakdown of their insulating capabilities.
- (4) If the exterior of the PTC/Combo 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/Combo 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.

## 4-3-2 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 anyway.

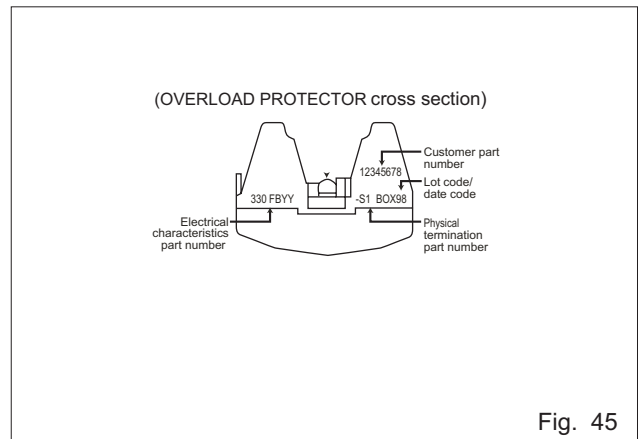


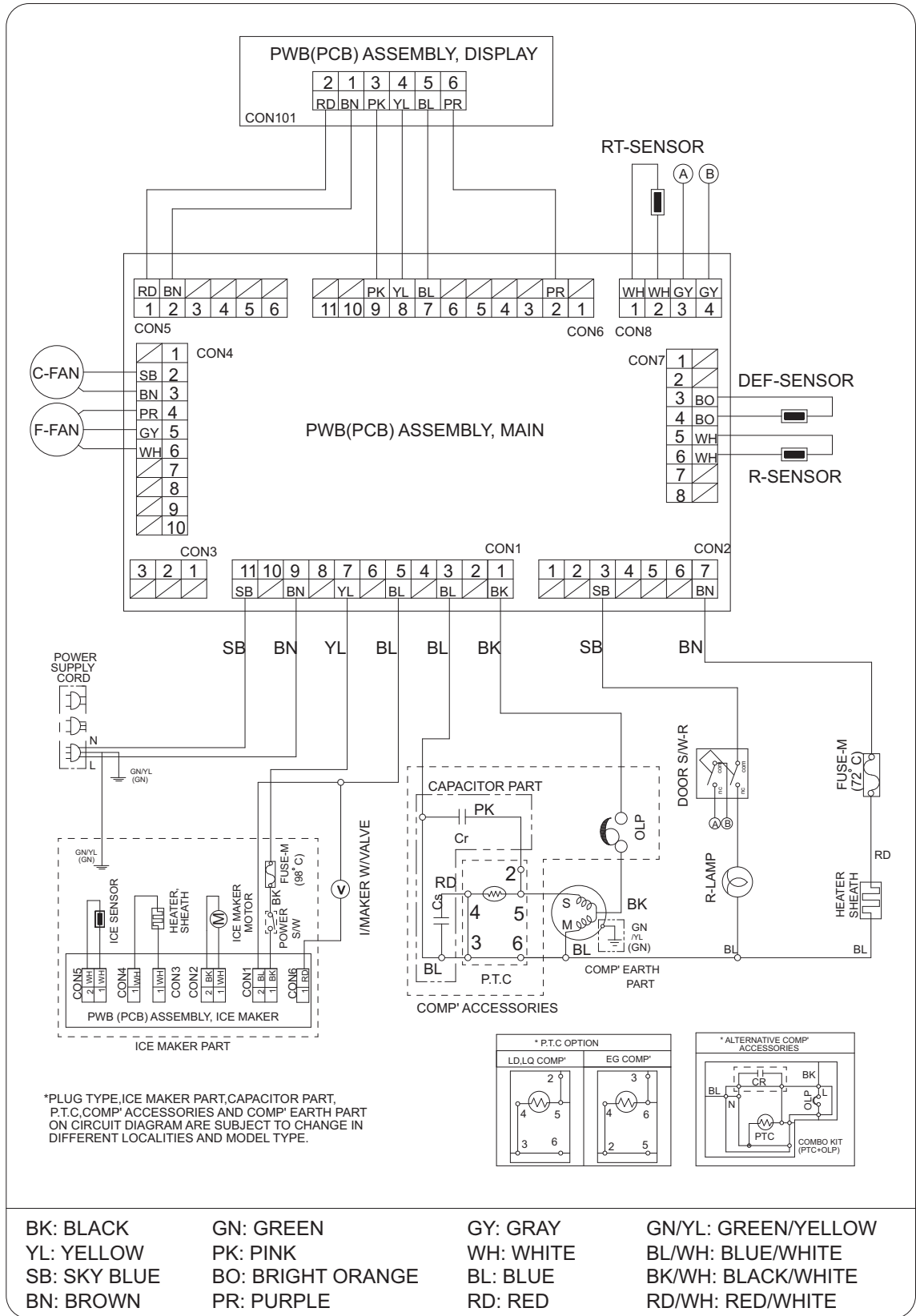
Fig. 45

## 4-3 OLP (OVERLOAD PROTECTOR)

### 4-3-1 Definition of OLP

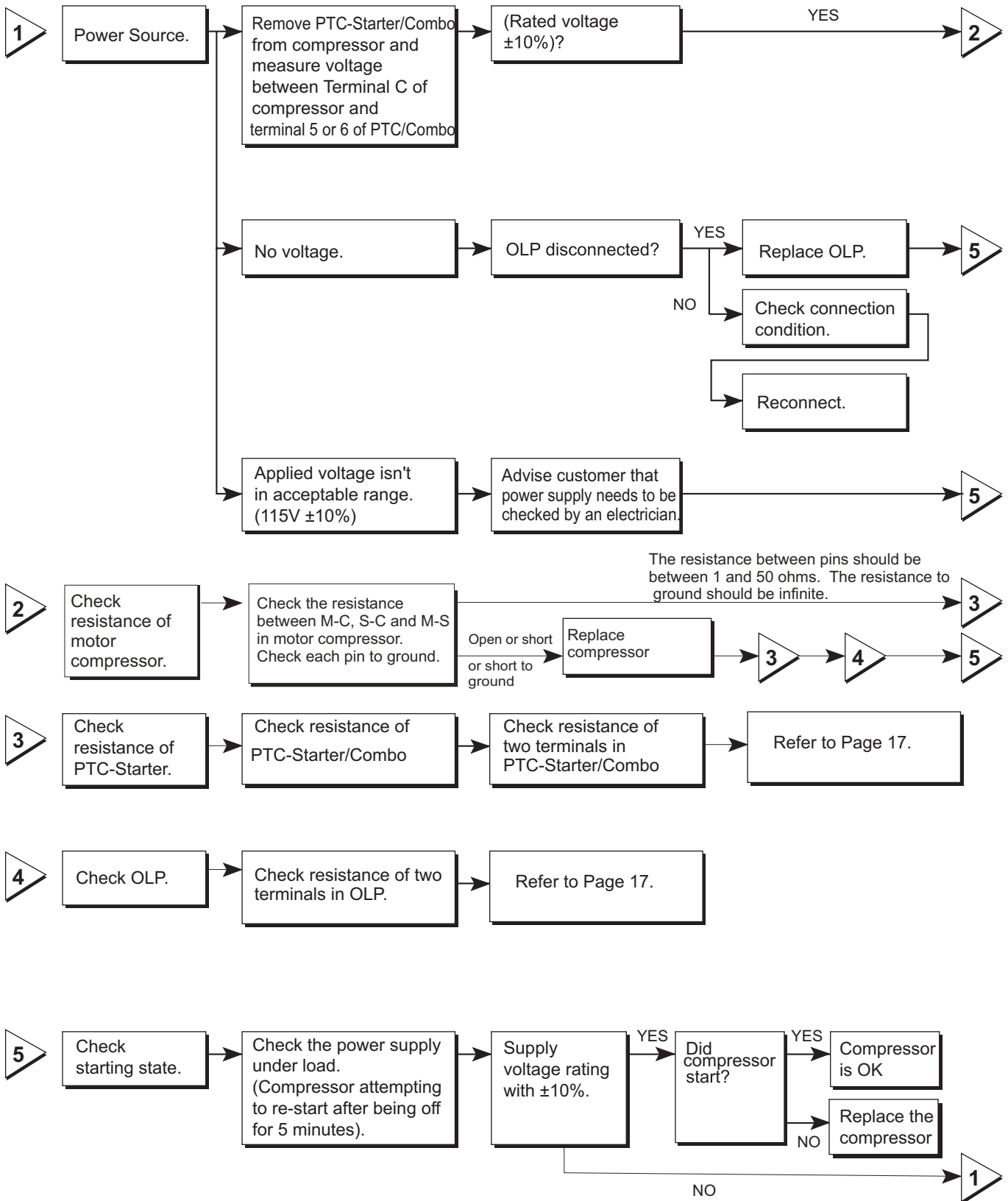
- (1) OLP (OVERLOAD PROTECTOR) is attached to the compressor and protects the motor by opening the circuit to the motor if the temperature rises activating the bimetal spring in the OLP.
- (2) When high current flows to the compressor motor, the bimetal works by heating the heater inside the OLP, and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

# 5. CIRCUIT DIAGRAM



# 6. TROUBLESHOOTING

## 6-1 COMPRESSOR AND ELECTRIC COMPONENTS



## 6-2 PTC / COMBO AND OLP

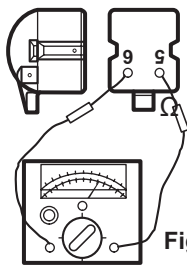
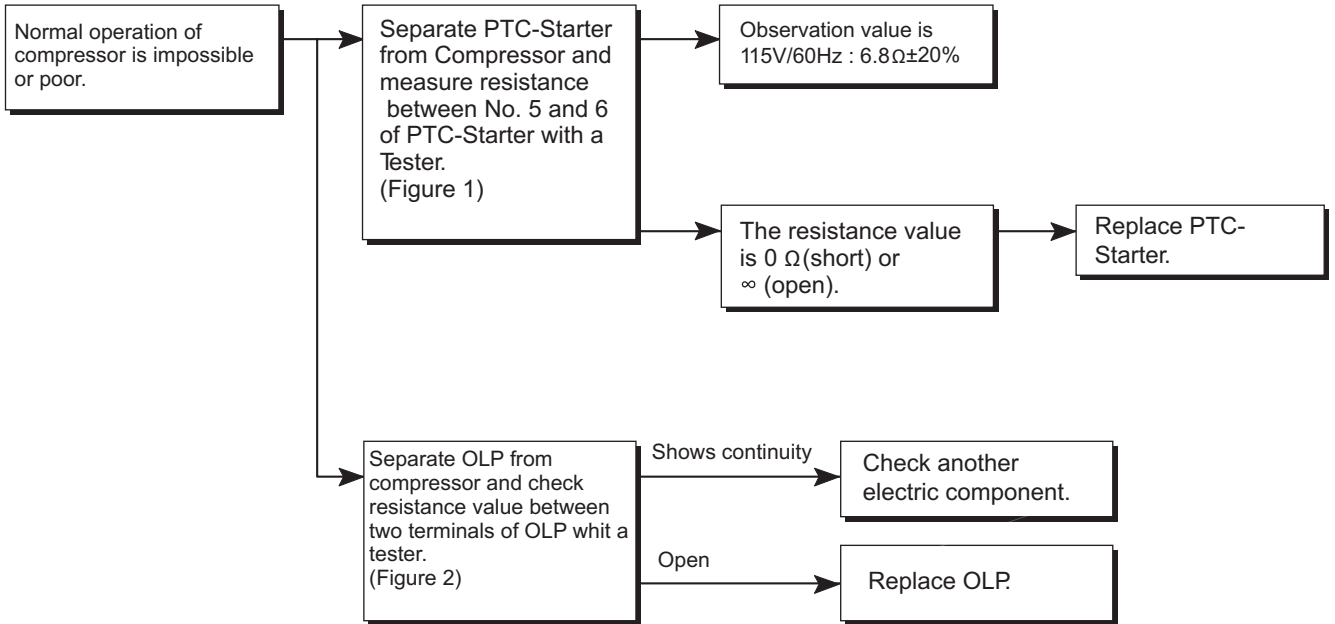


Figure 1

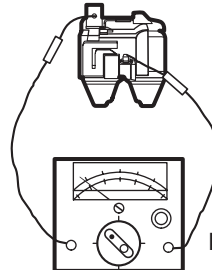
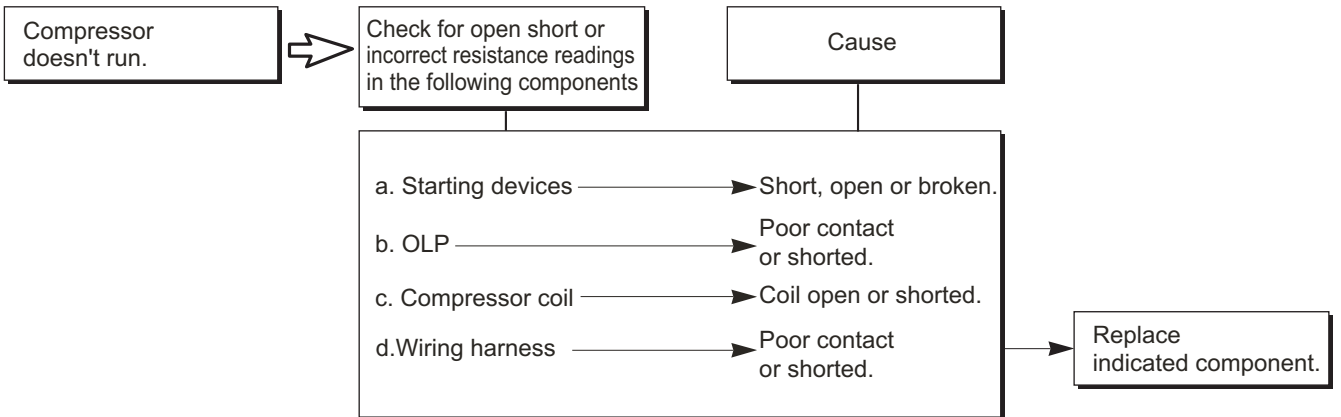


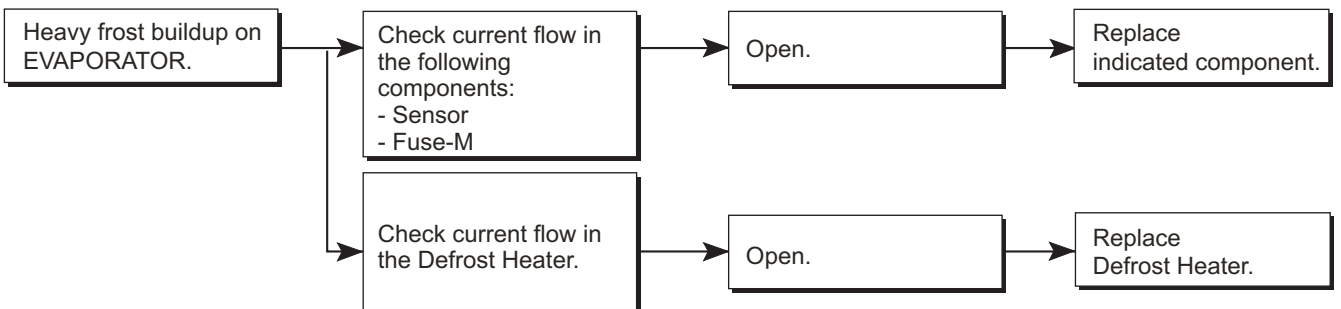
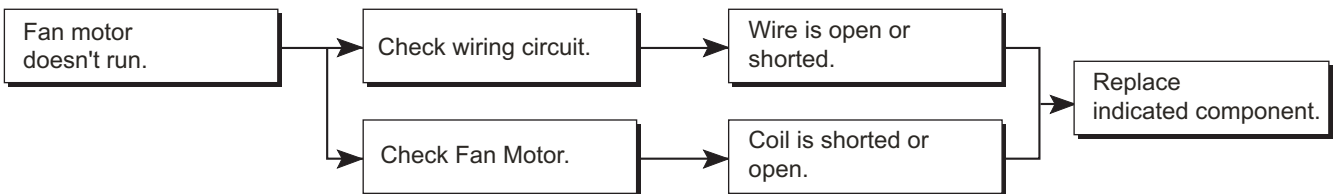
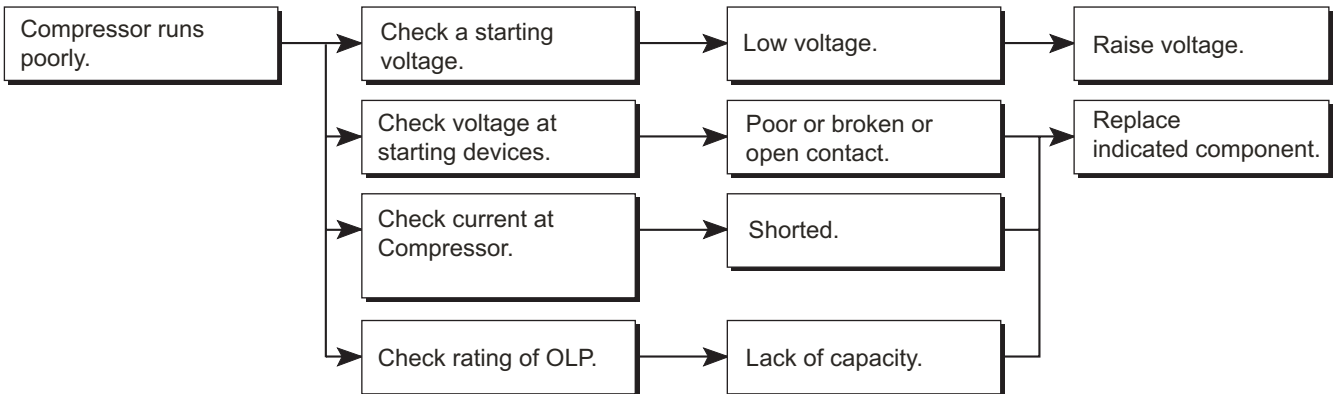
Figure 2

### 6-3 OTHER ELECTRIC COMPONENTS

• Not cooling at all



• Poor cooling performance



## 6-4 SERVICE DIAGNOSIS CHART

COMPLAINT	SYMPTOM	POSSIBLE CAUSES	SOLUTION
Electronic Display not operating correctly	1. No Display at all	<ol style="list-style-type: none"> <li>1. Supply voltage not within specifications</li> <li>2. Open in wiring harness from PWB board</li> <li>3. Open in door monitor switch circuit</li> </ol>	<ol style="list-style-type: none"> <li>1. Check supply voltage to refrigerator</li> <li>2. Check wiring and connectors to PWB board</li> <li>3. Check door monitor circuit</li> </ol>
	2. Partial or abnormal display	<ol style="list-style-type: none"> <li>1. Supply voltage not within specifications</li> <li>2. Open wiring harness from PWB board</li> </ol>	<ol style="list-style-type: none"> <li>1. Check supply voltage to refrigerator</li> <li>2. Check wiring and connectors to PWB board</li> </ol>
Not cooling	1. Display on but compressor not operating	<ol style="list-style-type: none"> <li>1. Compressor not operating</li> <li>2. Open in compressor circuit</li> </ol>	<ol style="list-style-type: none"> <li>1. Check for compressor operation by using the test key on main circuit board.</li> <li>2. Check for open on OLP, PTC, compressor, wiring, etc.</li> </ol>
Not cold enough	1. Display on compressor is operating	<ol style="list-style-type: none"> <li>1. Condenser fan motor not operating</li> <li>2. Condenser coils blocked</li> <li>3. Evaporator fan motor not operating</li> <li>4. Internal air flow blocked</li> <li>5. Sensor not operating properly</li> <li>6. Door not sealing</li> <li>7. Evaporator frosted up</li> <li>8. Sealed system related problem</li> </ol>	<ol style="list-style-type: none"> <li>1. Check condenser fan motor and wiring circuit</li> <li>2. Check air flow across condenser</li> <li>3. Check evaporator fan motor and wiring circuit</li> <li>4. Check air ducts</li> <li>5. Check refrigerator and freezer sensors</li> <li>6. Check for proper door seal</li> <li>7. Check defrost circuit components</li> </ol>
Not defrosting	1. Freezer has too much frost	<ol style="list-style-type: none"> <li>1. Open in defrost circuit</li> <li>2. Defrost sensor not operating correctly</li> <li>3. Defrost drain clogged</li> </ol>	<ol style="list-style-type: none"> <li>1. Check defrost heater and circuit using Test Key</li> <li>2. Check sensor</li> <li>3. Check drain</li> </ol>

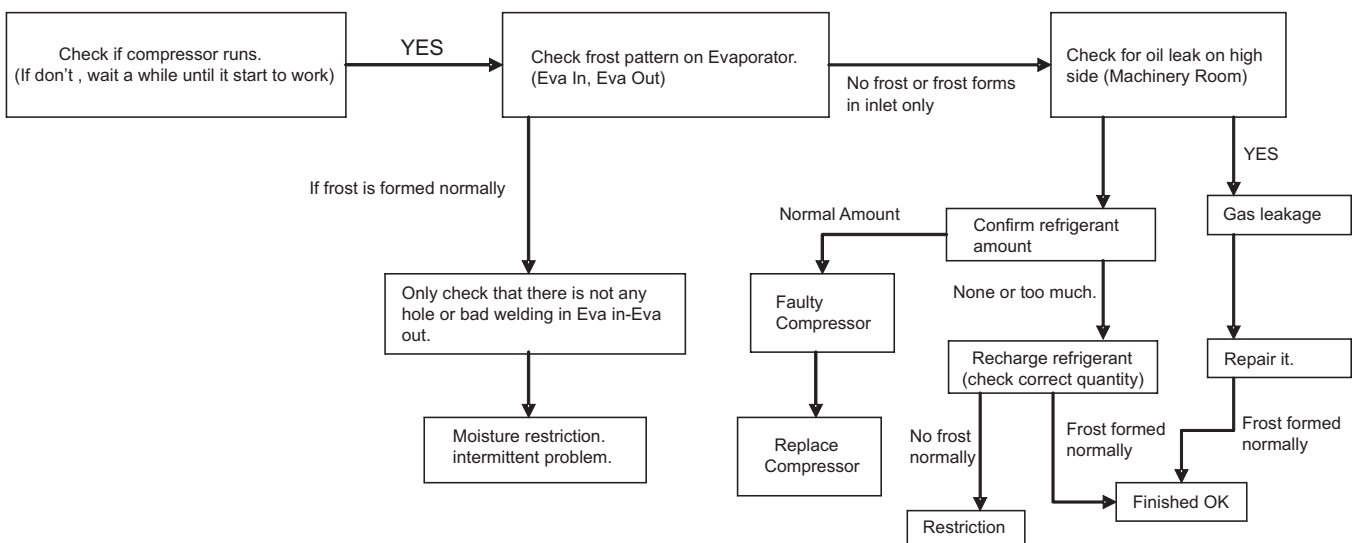
## 6-5 REFRIGERATING CYCLE

### • 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.	<ul style="list-style-type: none"> <li>Refrigerant level is low due to a leak.</li> <li>Normal cooling is possible by restoring the normal amount of Refrigerant and repairing the leak.</li> </ul>
	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.	<ul style="list-style-type: none"> <li>No discharging of Refrigerant.</li> <li>Normal cooling is possible by restoring the normal amount of refrigerant and repairing the leak.</li> </ul>
RESTRICTED BY DUST	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.	<ul style="list-style-type: none"> <li>Normal discharging of the refrigerant.</li> <li>The capillary tube is faulty.</li> </ul>
	WHOLE RESTRICTION	Freezer compartment and Refrigerator don't cool.	Flowing sound of refrigerant is not heard and frost isn't formed.	Equal to ambient temperature.	<ul style="list-style-type: none"> <li>Normal discharging of the refrigerant.</li> </ul>
MOISTURE RESTRICTION		Cooling operation stops periodically.	Flowing sound of refrigerant is not heard and frost melts.	Lower than ambient temperature.	<ul style="list-style-type: none"> <li>Cooling operation restarts when heating the inlet of the capillary tube.</li> </ul>
DEFECTIVE COMPRESSION	COMPRESSION	Freezer and Refrigerator don't cool.	Low flowing sound of refrigerant is heard and frost forms in inlet only.	A little higher ambient temperature.	<ul style="list-style-type: none"> <li>Low pressure at high side of compressor due to low refrigerant level.</li> </ul>
	NO COMPRESSION	No compressing operation.	Flowing sound of refrigerant is not heard and there is no frost.	Equal to ambient temperature.	<ul style="list-style-type: none"> <li>No pressure in the high pressure part of the compressor.</li> </ul>

### Leakage Detection

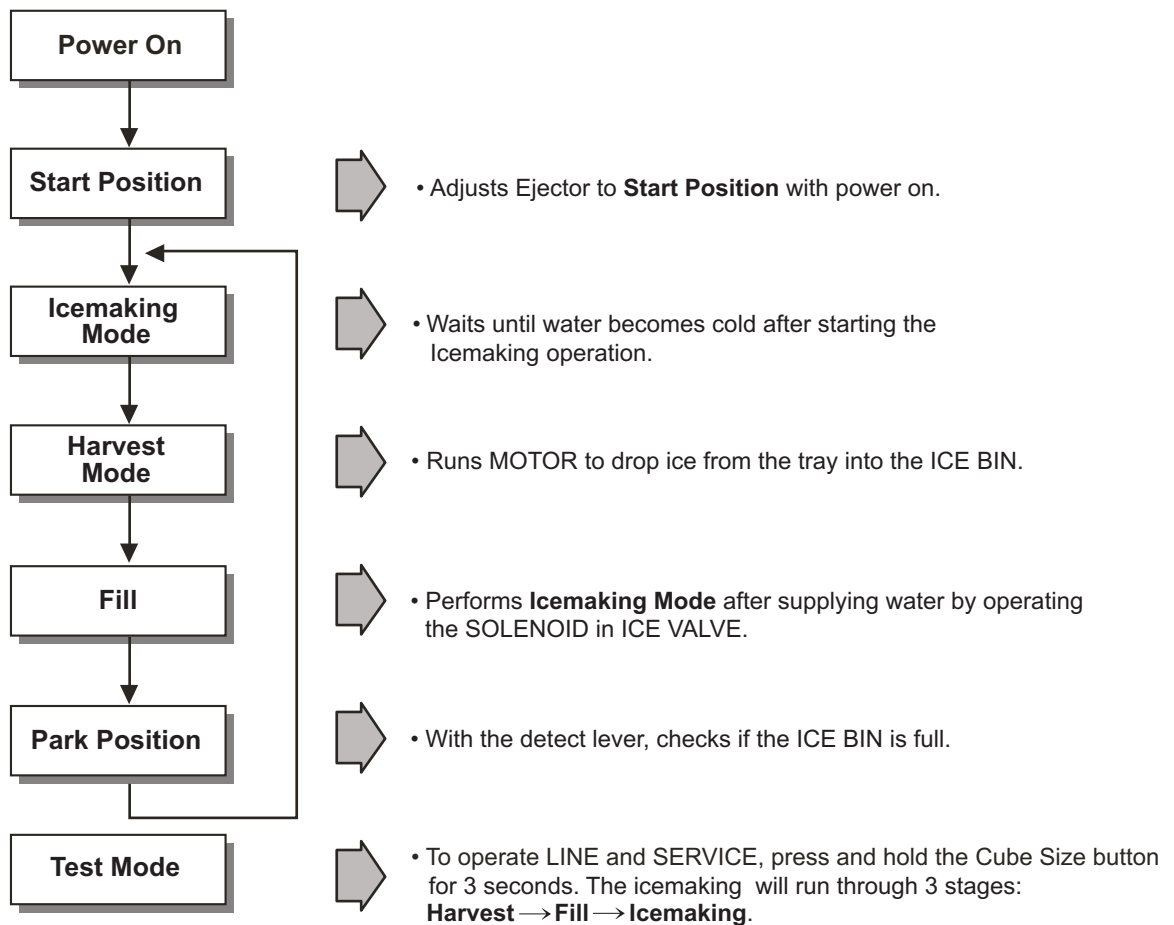
Check sealed system for leak.



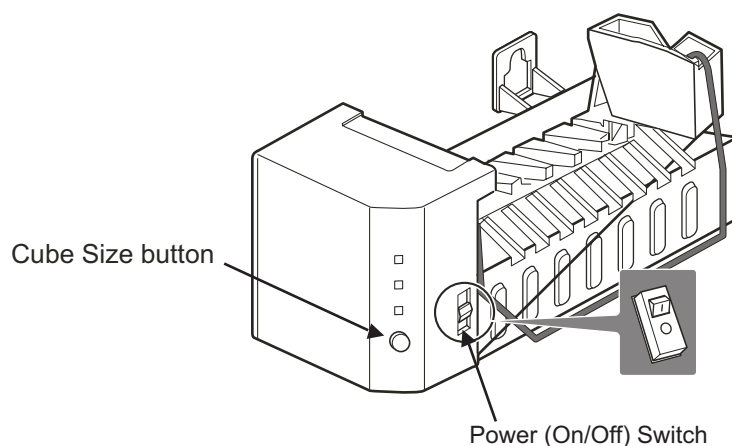
# 7. OPERATION PRINCIPLE AND REPAIR METHOD OF ICEMAKER

## 7-1 OPERATION PRINCIPLE

### 7-1-1 Operation Principle of Ice Maker



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 ICE MAKER FUNCTIONS

### 7-2-1 Ice Making Mode

1. Icemaking refers to the freezing of supplied water in the ice trays. Complete freezing is assured by measuring the temperature of the Tray with icemaking SENSOR.
2. Icemaking starts after completion of the water fill operation.
3. The icemaking function is completed when the sensor reaches  $-7^{\circ}\text{C}$ , 60 to 240 minutes after starting.

**NOTE :** After icemaker power is ON, the icemaker heater will be on for test for 9 sec.

### 7-2-2 Harvest Mode




1. Harvest (Ice removing) refers to the operation of dropping ices into the ice bin from the tray when icemaking has completed.
2. Harvest mode:
  - (1) The Heater is ON for 30 seconds, then the motor starts.
  - (2) Harvest mode is completed if it reaches start position again while Heater & Motor are on at the same time.
    - A. ice bin is full : The EJECTOR stops (heater off).
    - B. ice bin is not full : The EJECTOR rotates twice to open for ice.

**NOTE :** If the EJECTOR does not rotate once within 5 minutes in status (2), separate heater control mode starts operating to prevent the EJECTOR from being constrained. (It is recommended that the user open for ice to return to normal mode.)

### 7-2-3 Fill/Park Position

1. Once a normal harvest mode has been completed, the water solenoid will be activated.
2. The amount of water is adjusted by pressing the fill key repeatedly. This changes the time allowed for fill as illustrated in the table below.






**Water supply amount table**

STAGE	TIME TO SUPPLY	INDICATIONS	REMARKS
1	6 sec.		The water amount will vary depending on the water control switch setting, as well as the water pressure of the connected water line.
2	7 sec.		
3	8 sec.		

## 7-2-5 Function TEST



1. This is a compulsory operation for test, service, cleaning, etc. It is operated by pressing and holding the Cube Size button for 3 seconds.
2. The test works only in the Icemaking Mode. It cannot be entered from the Harvest or Fill mode. (If there is an ERROR, it can only be checked in the TEST mode.)
3. **Caution!** If the test is performed before water in the icemaker is frozen, the ejector will pass through the water. When the fill mode begins (Stage 4), unless the water supply has been shut off, added water will overflow into the ice bin. If the control Doesn't operate normally in the TEST mode, check and repair as needed.
4. After water is supplied, the normal CYCLE is followed: **icemaking** ⇨ **Harvest** ⇨ **Fill** ⇨ **Park Position**.
5. Five seconds after Stage 5 is completed, the icemaker returns to MICOM control. The time needed to supply water resets to the pre- test setting.

### Diagnosis TABLE

STAGE	ITEMS	INDICATOR*	REMARKS
1	HEATER		Five seconds after heater starts, heater will go off if temperature recorded by sensor is 10°C (50°F) or lever is in up position.
2	MOTOR		Five seconds after heater starts, you can confirm that motor is moving.
3	HALL IC (TRAY)		You can confirm Hall IC detection of position.
4	SOLENOID VALVE		Two seconds after detection of initial position, you can confirm that valve is on.
5	HALL IC (LEVER)		You can check when the Hall IC is sensing a full ice condition. (If there is a water fill error, the fifth LED is not on.)
6	Reset	Return to Status prior to TEST MODE	Five seconds after fifth stage is completed, the icemaker resets to initial status.

## 7-3 DEFECT DIAGNOSIS FUNCTION

### 7-3-1 ERROR CODES shown on Ice Maker water supply control panel

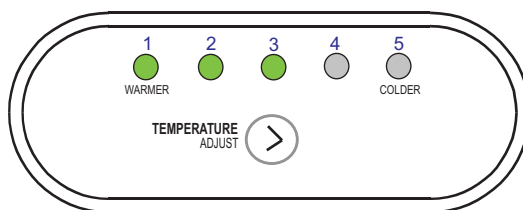
NO	DIVISION	INDICATOR	PROBLEM	REMARKS
1	Normal	Note fill times (see previous page)	None	Display switch operates properly
2	Icemaking Sensor malfunction		Open or shorted wire or sensor	Make sure that the wire on each sensor is connected.
3	Icemaker Kit malfunction		Ejector blades have not reached the park position after 18 minutes from start of harvest mode	Check HALL IC/MOTOR/ HEATER/RELAY

# 8. DESCRIPTION OF FUNCTION & CIRCUIT OF MICOM

## 8-1 FUNCTION

### 8-1-1 Function

1. When the appliance is plugged in, is set to "3" for the refrigerator. You can adjust the Refrigerator control temperature by pressing the ADJUST button.
2. When the power is initially applied or restored after a power failure, it is automatically reset to "3".



### 8-1-2 Defrost Cycle

Defrosting starts each time the accumulated COMPRESSOR running time is between 7 and 50 hours. This time is determinate by how long the doors are opened.

For initial power on or for restoring power, defrosting starts when the compressor running time reaches 4 hours.

Defrosting stops if the sensor temperature reaches 50 °F (10 °C) or more. If the sensor doesn't reach the 50 °F (10 °C) in 1 hour, the defrost mode is malfunctioning. (Refer to the defect diagnosis function).

Defrosting won't function if the sensor is defective (wires are cut or short circuited)

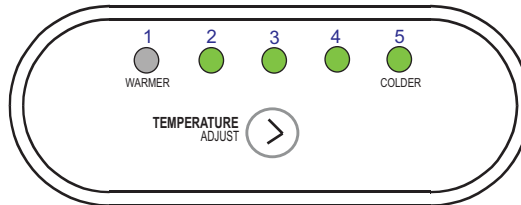
### 8-1-3 Electrical Parts Operation in Sequence.

Electrical parts such as COMP, defrost heater, freezer FAN, etc. Operate in the following order to prevent noise and parts damage. Several parts are started at the same time at initial power on and are turned off together when TEST is completed.

OPERATING	ORDER	REMARKS
INITIAL POWER ON	<p>Temperature of defrost sensor is 113°F (45°C) or more .</p> <pre> graph LR     A[POWER ON] -- "0.5 Sec" --&gt; B[COMP, F-FAN ON]             </pre>	
	<p>Temperature of defrost sensor is lower than 113°F (45°C).</p> <pre> graph LR     A[POWER ON] -- "0.5 Sec" --&gt; B[Def-Heater ON]     B -.- "10 Sec" --&gt; C[Def-Heater OFF]     A -- "0.5 Sec" --&gt; D[COMP, F-FAN ON]             </pre>	

### 8-1-4 Defect Diagnosis Function

1. If there is a problem, an error code will appear..
2. The buttons will not operate.
3. When the problem is repaired, the display will return to normal.
4. The error code is displayed using the LEDs.



• ERROR CODE on Refrigerator Temperature panel

⊙ :ON   ● :OFF

NO	Item	Error Code				Error Description	Remarks
		R2	R3	R4	R5		
1	Ref. Sensor	●	⊙	●	●	Ref. Sensor Open or Short	* Check each sensor
2	Heater Sensor	●	●	⊙	●	Defrost Sensor Open or Short	
3	RT Sensor	●	●	●	⊙	Ambient Sensor Open or Short	
4	Defrosting Problem	⊙	⊙	⊙	⊙	Defrost time last more than one hour and the defrost sensor never reach 10°C or 50°F	Check FUSE-M, DEF-SENSOR, Drain, Heater Drive Relay
5	F-FAN LOCK	●	⊙	⊙	⊙	F-FAN LOCKED	Check if something is locking the F-FAN

## 8-1-5 TEST MODE

1. Test mode allows checking the PCB and the function of the product as well as determining the Defective part in case of an error.
2. The test button is on the main PCB of the refrigerator (Test S/W).
- 3 While in the test mode, the ADJUST button will not operate.
4. After exiting the test mode, be sure to reset by unplugging and 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	Key Control	Operation	Remarks						
TEST 1	Push the test button once	1) Continuous operation of the COMP, Freezer FAN and Cooling FAN. 2) DEFROSTING HEATER OFF 3) ALL DISPLAY ON 4) LAMP RELAY ON/OFF OPERATED BY DOOR SWITCH	*The maximum time for TEST 1 is 5 min.						
TEST	Push the test button once while in TEST MODE 1	1) COMP OFF 2) Freezer FAN and Cooling FAN OFF 3) Defrosting Heater ON 4) 1, 3, 5 LED ON	<table border="1" style="width: 100%; text-align: center;"> <tr> <td>Ref.</td> <td>Temp.</td> <td>Display</td> </tr> <tr> <td>○</td> <td>●</td> <td>○ ● ○</td> </tr> </table> <p>○:ON ●:OFF</p> <p>Operate max 1 Hr</p>	Ref.	Temp.	Display	○	●	○ ● ○
Ref.	Temp.	Display							
○	●	○ ● ○							
RESET	Push the test button Once while in TEST MODE 2	Reset to the default settings (Compressor will delay 7 minutes for Power ON)							

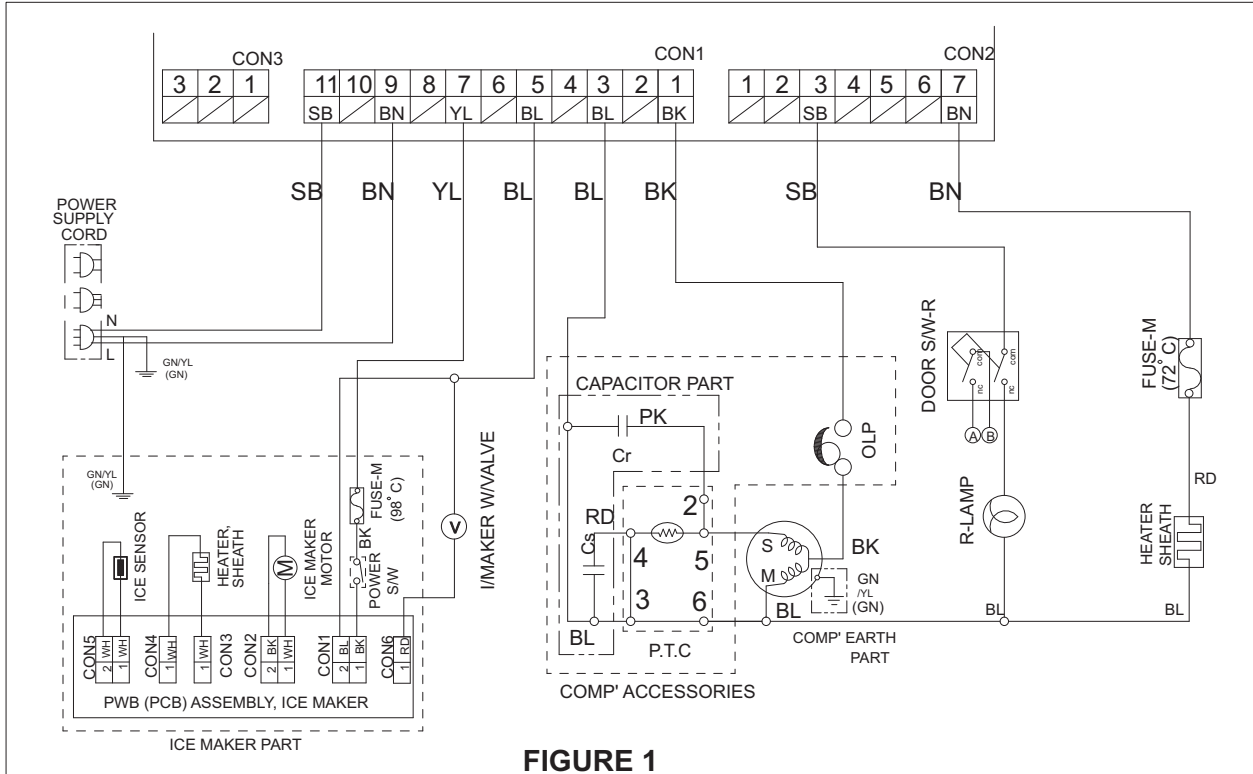
### \* Demonstration MODE

1. To enter this mode open refrigerator and freezer door; press both door switches (display will turn off) at the same time press Temp. Adjust button for 5 seconds.
2. The LED panel will blink sequentially (1-2-3-4-5) to indicate that the compressor, fans and defrost heaters are not operating.
3. The Lamp work normally.
4. To reset to Normal Operating Mode repeat step 1.
5. If a Power Failure occur and the OFF MODE was active, it going to start in OFF MODE.
6. When the off mode is disable the display show the notch 3 (restart).



## 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 figure 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
R LAMP	Con 2 Pin 3	Con 1 Pin 3	115 VAC
Ice Maker	Con 1 Pin 7	Con 1 Pin 5	115 VAC

CONNECTOR 1						
PIN	11	9	7	5	3	1
	N	L1	L(I/M)	N(I/M)	N	COMP

CONNECTOR 2				
PIN	1	3	5	7
	N/C	DOOR LAMP	N/C	DEF-HTR

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

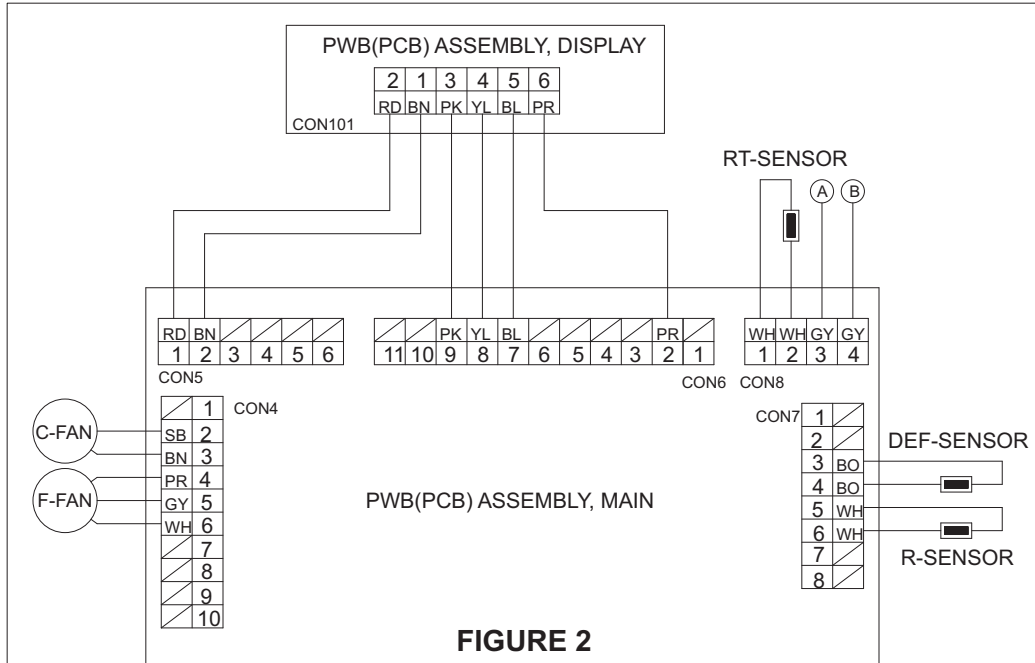
**2. Door Monitor Circuit (LV)**

Refrigerator	Measurement between pins 4 and 3 Con 8
Door Close	0 volts
Door Open	5 volts

CONNECTOR 8				
PIN	1	2	3	4
	RT-SNR		R-DOOR S/W	

**8-2-3 Temperature Sensor Circuit (Refer to figure 2)**

Voltage supplied to each sensor will range between 0.5 volts -22°F(-30°C) and 4.5 volts 122°F(50°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.



**FIGURE 2**

CONNECTOR 7								
PIN	1	2	3	4	5	6	7	8
	N/C	N/C	D-SNR		R-SNR		N/C	N/C

CONNECTOR 8				
PIN	1	2	3	4
	RT-SNR		R-DOOR S/W	

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
D-SNR	Con 7 Pin 3	Con 7 Pin 4
R-SNR	Con 7 Pin 5	Con 7 Pin 6
RT-SNR	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 - 14 VCD	2 VCD or less
Cooling Fan	Con 4 pin 2	Con 4 pin 3	10 - 14 VCD	2 VCD or less

CONNECTOR 4										
PIN	1	2	3	4	5	6	7	8	9	10
	C-FAN			F-FAN			N/C			
	N/C	G	V	F	G	V	N/C	N/C	N/C	N/C

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### 8-3 RESISTANCE SPECIFICATION OF SENSOR

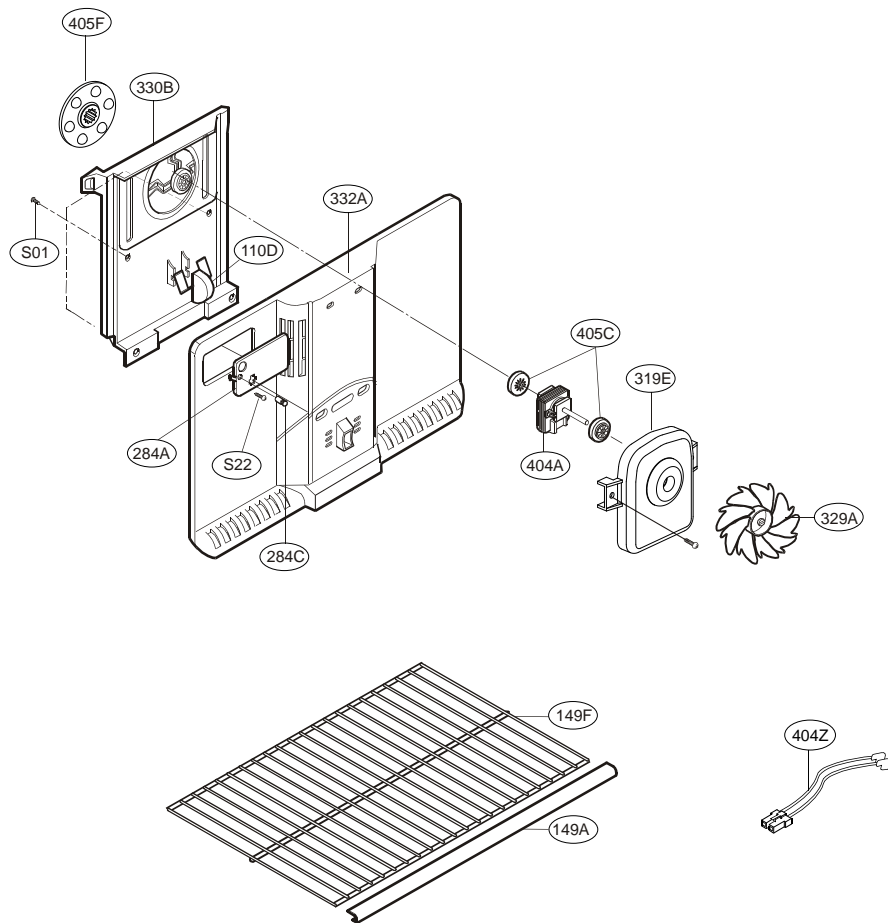
TEMPERATURE DETECTED SENSOR	RESISTANCE OF REFRIGERATOR DEFROST SENSOR	VOLTAGE
-20°C	77 KΩ	3.73
-15°C	60 KΩ	3.49
-10°C	47.3 KΩ	3.22
-5°C	38.4 KΩ	2.95
0°C	30 KΩ	2.67
+5°C	24.1 KΩ	2.4
+10°C	19.5 KΩ	2.14
+15°C	15.9 KΩ	1.89
+20°C	13 KΩ	1.66
+25°C	11 KΩ	1.46
+30°C	8.9 KΩ	1.27
+40°C	6.2 KΩ	0.96
+50°C	4.3 KΩ	0.72

- The resistance of the SENSOR has a  $\pm 5\%$  common difference.
- Temperature of the SENSOR must be stabilized for minimum of 3 minutes before accurate measurement can be taken.



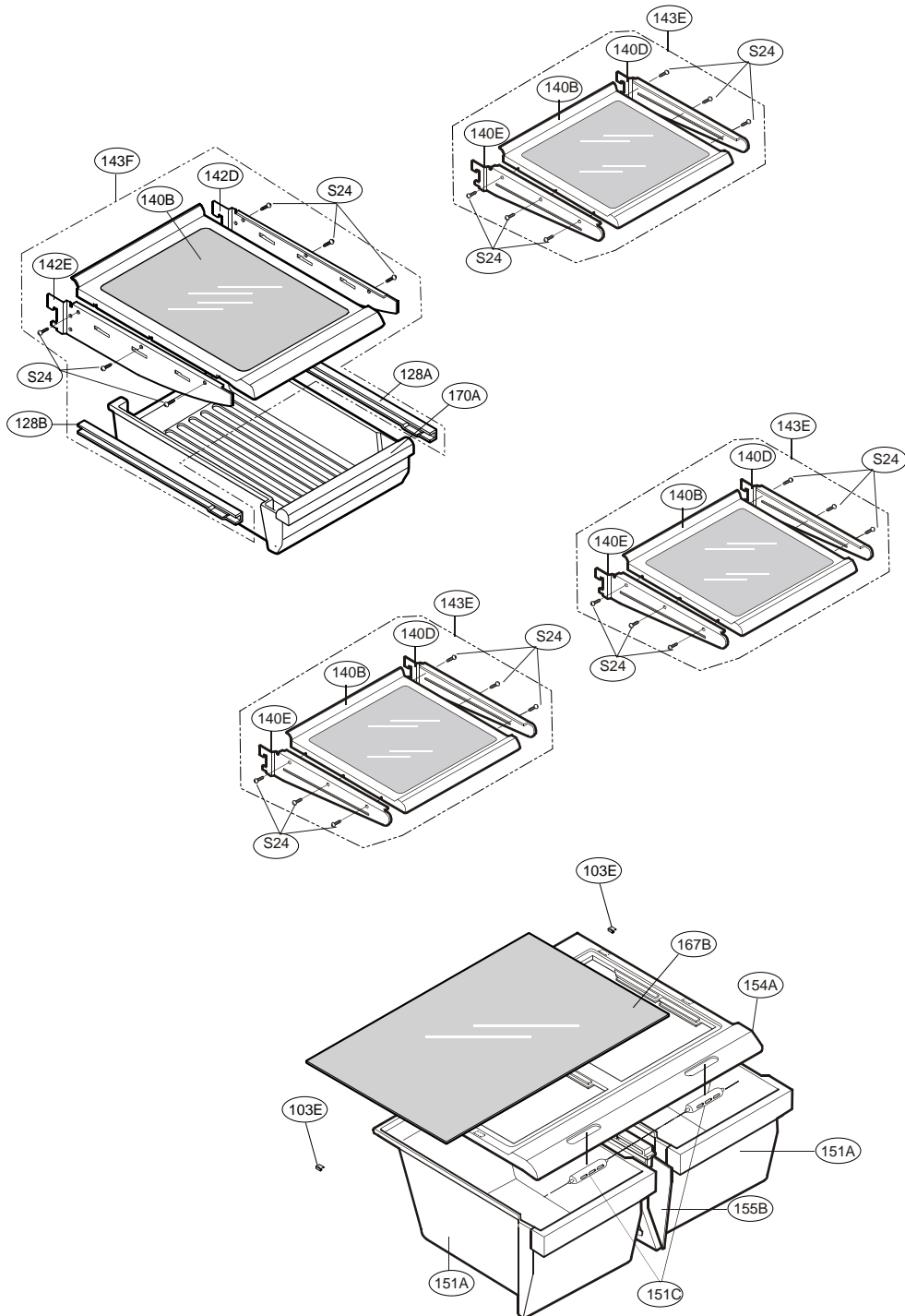
# FREEZER PARTS

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



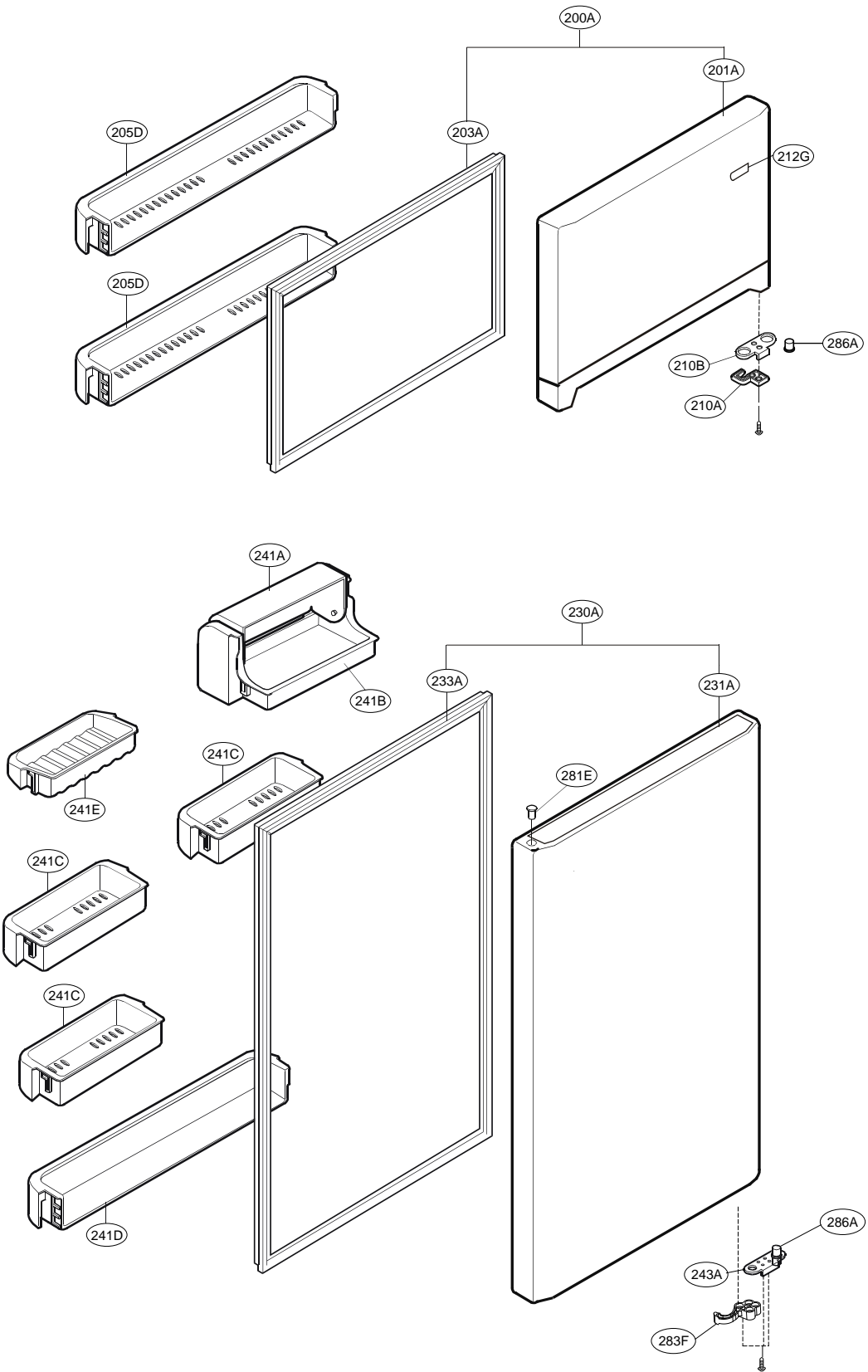
# REFRIGERATOR PARTS

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



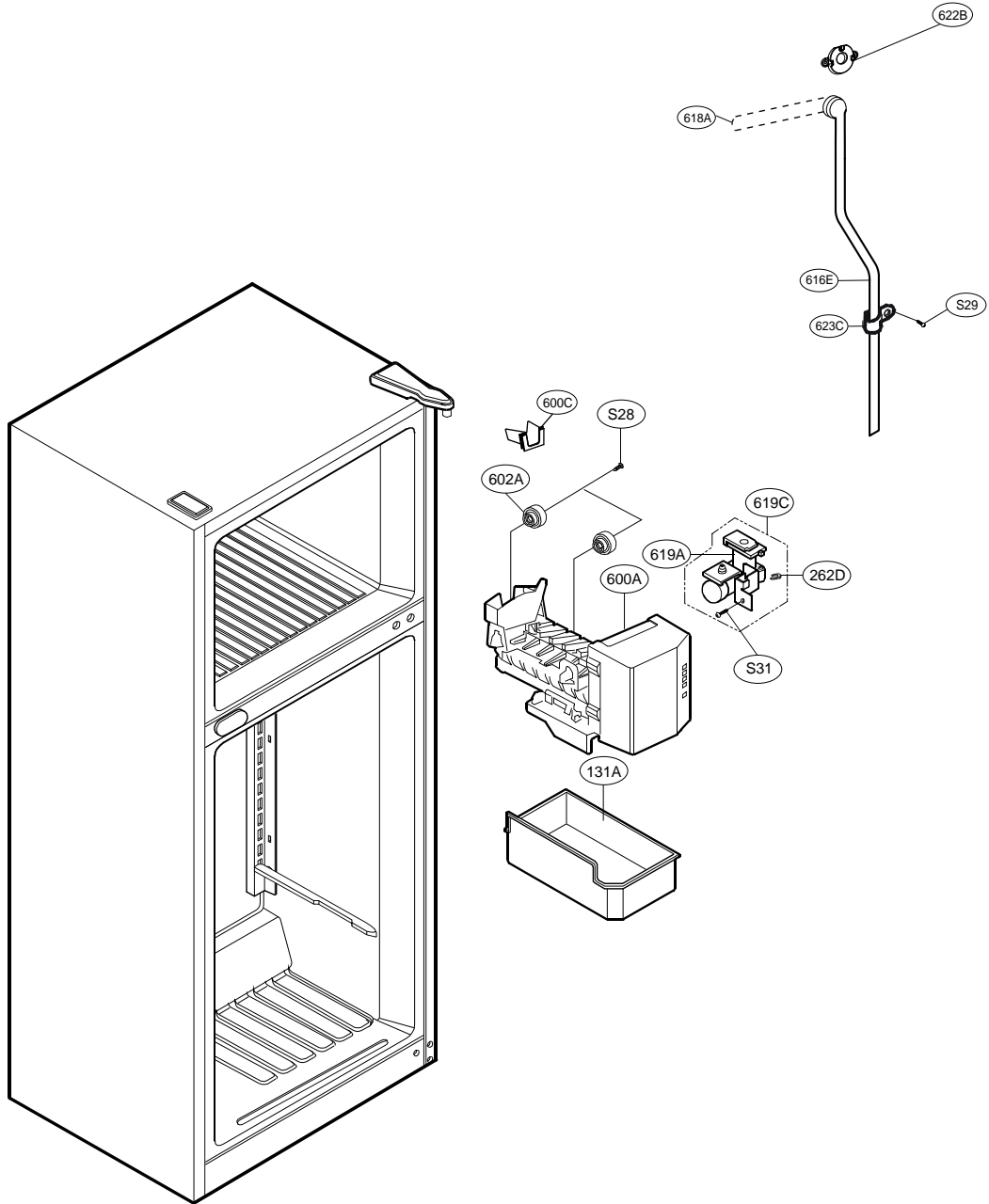
# DOOR PARTS

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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