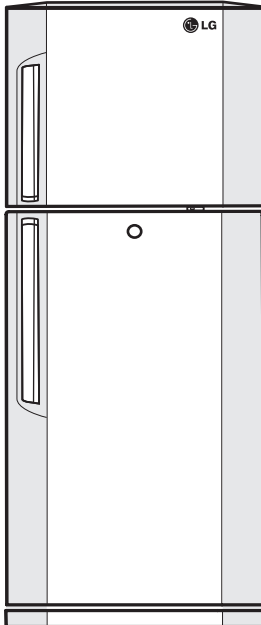




# REFRIGERATOR SERVICE MANUAL

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



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## SAFETY PRECAUTIONS

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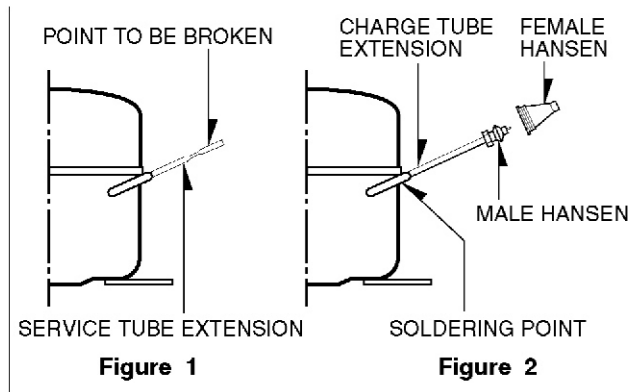
Please read the followings before servicing your refrigerator.

1. Check if an electric leakage occurs in the set.
2. To prevent electric shock, unplug prior to servicing.
3. In case of testing with power on, wear rubber gloves to prevent electric shock.
4. If you use any appliances, check regular current, voltage and capacity.
5. Don't touch metal products in cold freezer with wet hand. It may cause frostbite.
6. Prevent water flowing to electric elements in mechanical parts.
7. When you stand up during observing the lower part with the upper door open, move with care to prevent head wound which may happen by hitting the upper door.
8. When sloping the set, remove any materials on the set, especially thin plate type. (ex.: glass shelf or books.)
9. When servicing evaporator part, wear cotton gloves without fail. It is to prevent wound by sharp fin of evaporator.
10. Leave a breakage of refrigerating cycle to a heavy service center. The gas in cycle inside may soil ambient air.

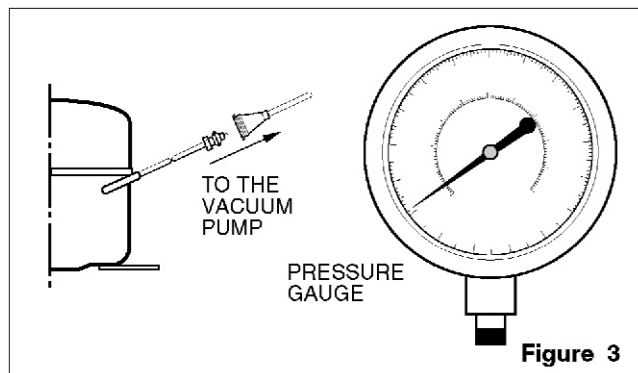
# SERVICING PRECAUTIONS

## AIR RECHARGING IN COMPRESSOR

Test the refrigeration system by connecting it electrically before refilling operation. It is necessary to ascertain the function of the motor-compressor and identify the defects immediately. If defects have been found, empty the old system of possible R134a residue by breaking off the end of the extension piece at its narrow point. (Figure 1) Replace the filter and any damaged components. Unsolder and pull off the piece remaining inside the service tube and then attach an complete extension completely with male Hansen and at last, solder it to the same tube again (Figure 2)



It is necessary to execute the soldering operation with valve open so that the fumes caused by oil residue can come out freely without blowholes between two tubes during the heating of the point to be soldered. The extension fitted with the male Hansen is connected to the female fitting of the vacuum pump tube. (Figure 3)

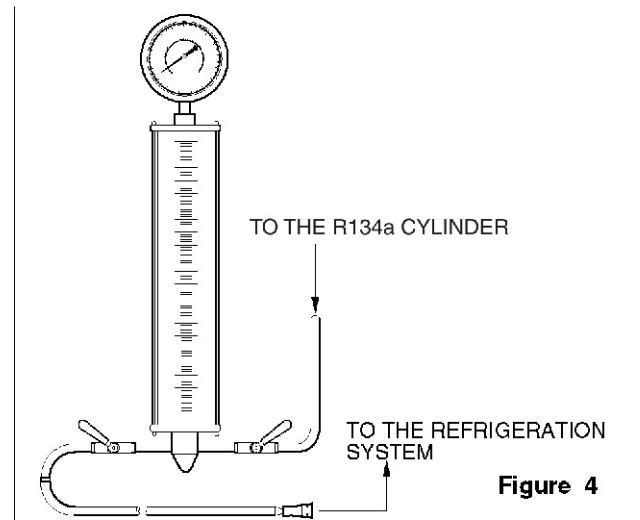


Air evacuating from the system begins as soon as the pump starts. The refrigeration system must be kept under vacuum until the reading on the low-pressure gauge indicates vacuum (0 absolute, -1 atm., -760 Hg) in any case it is advisable to keep the pump running for about 30 minutes. (Figure 3)

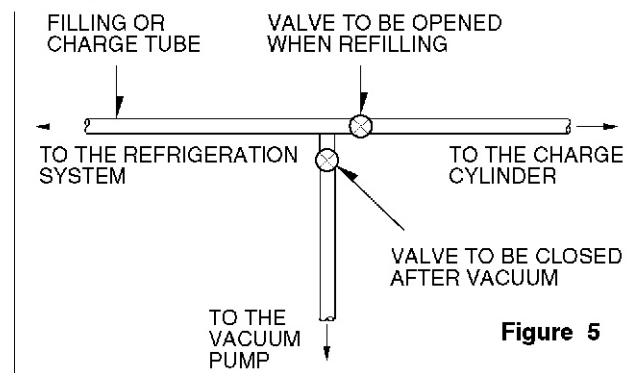
In case that a considerable leakage occurs it will be necessary to stop the vacuum pump and to add a small quantity of Freon to the system, if vacuum should not be obtained (pressure gauge can't fall to 1 atmosphere), start the refrigeration unit and find the leakage with the special leak-finder. When the defective soldering point is visible, re-do it after opening the extension tube valve and reestablishing the normal outside pressure inside the group.

Because the melted alloy is sucked into the tubes and block them, the pressure must be rebalanced when vacuum is in the system in soldering. As soon as the

vacuum operation is over, add the quantity in grams of R134a to the refrigeration system. Remember that every system has an exact quantity of R134a with a tolerance of  $\pm 5$  grams that can be added. (Figure 4)



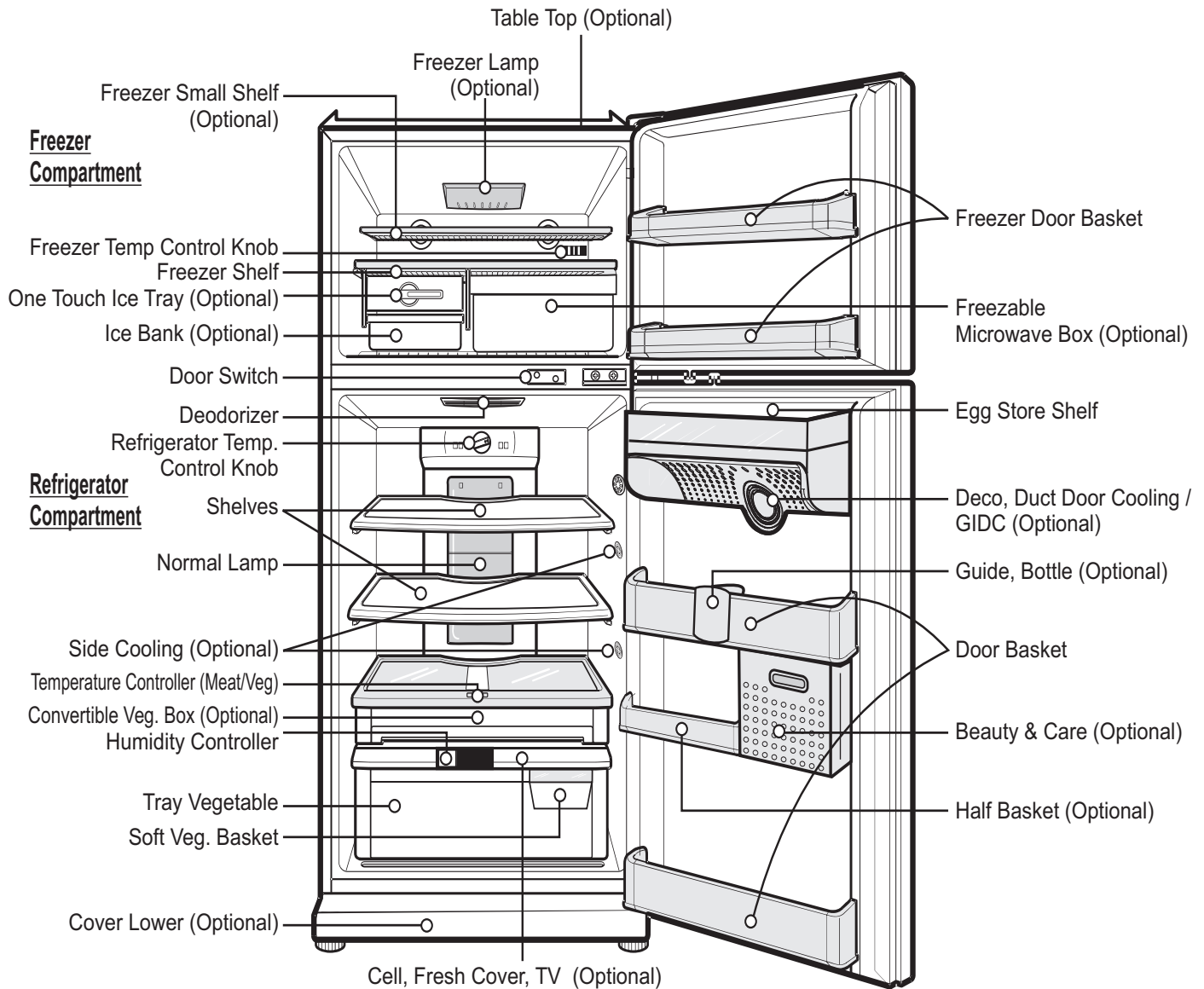
Before performing this operation (if the vacuum pump and refilling cylinder are connected), make sure that the valve placed between the vacuum pump and the refilling tube are closed in order to keep the Freon for addition to the system. (Figure 5)



In addition, check the graduated scale on the cylinder for the quantity of R134a to be added, for example, if we have 750 grams of Freon in the cylinder and must add 165 grams to the group, this amount will be reached when R134a has dropped to 585 grams, remembering that the indicator shows a lower limit of meniscus. Do this after choosing the scale corresponding to the gas pressure different scales reported as the same gas pressure indicated by the pressure gauge on the top of the column. To make R134a flow into the system, open the valve placed at the base of the cylinder and connected to the filling tube. The amount of Freon cannot be added to the system all at once because it may cause a blocking of motor-compressor. Therefore, proceed by adding the original quantity of about 20-30 grams and close the valve immediately.

The pressure rises and the motor compressor must start sucking the gas and lowering the pressure again. Regulate the valve again, maintaining the same manner until reaching to the quantity of R134a established for the system being charged. When the system is running, the suction pressure must be stabilized between 0.30 to 0.6 atmosphere.

## 2. Part Identification



**NOTE** This guide covers several different models. The refrigerator you have purchased may have some or all of the features shown above.



# 3. DISASSEMBLY

## 3-1 DOOR

### ● Freezer Door

1. Remove the hinge cover by pulling it upwards.
2. Loosen hexagonal bolts fixing the upper hinge to the body and lift the freezer door.

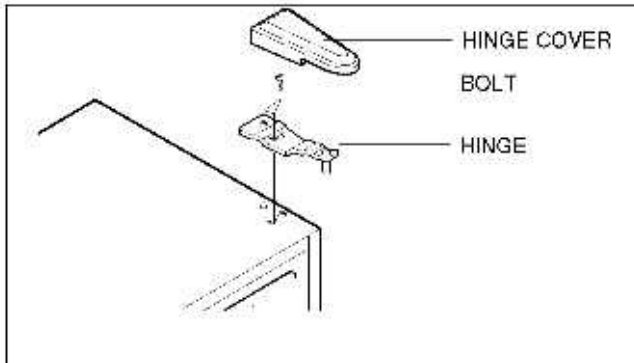


Figure 6

3. Pull out the door gasket to remove from the door foam Ass'y.

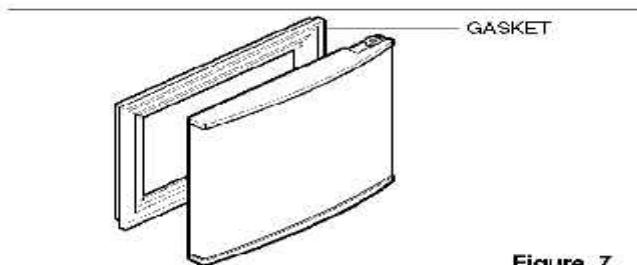


Figure 7

### ● Refrigerator Door

1. Loosen hexagonal bolts fixing the lower hinge to the body to remove the refrigerator door only.

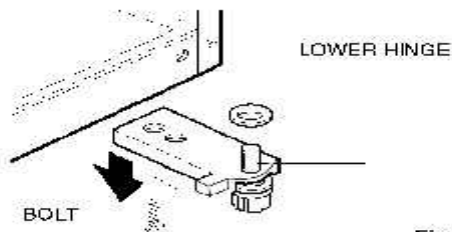


Figure 8

2. Pull out the door gasket to remove from the door foam Ass'y.

## 3-2 DOOR SWITCH

1. To remove the door switch, pull it out with a '—' type driver as shown in (figure 9).
2. Disconnect the lead wire from the switch.

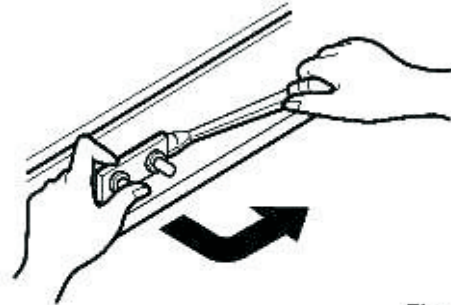


Figure 9

## 3-3 FAN AND FAN MOTOR

1. Remove the freezer shelf.
2. Remove the Cover Lamp-F by loosening 1 screw fixed to ceiling of Inner Liner.

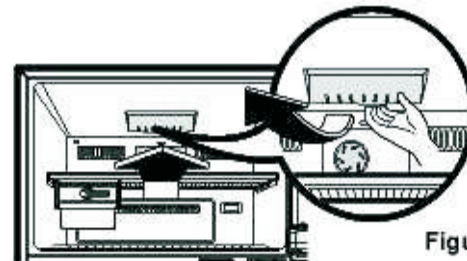


Figure 10

3. Remove the Grille by pulling it out.
4. Pull out the Shroud and remove the Fan Motor Assy by loosening 2 screws.
5. Pull out the fan and, separate the Fan Motor, Brackets and the Guide Fan.

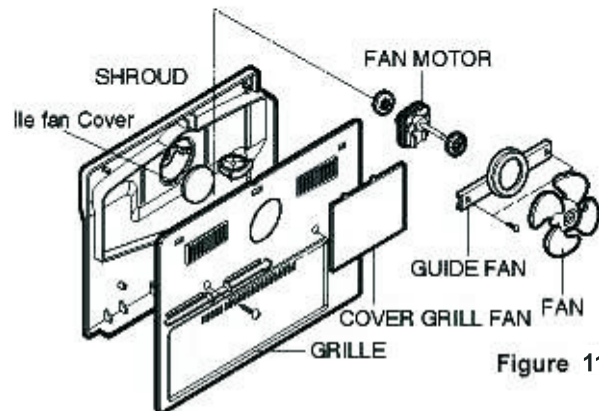


Figure 11

### 3-3 THERMOSTAT

1. Pull the Control Box-R.
2. Disconnect the Housing of lead wire.
3. Separate the INSU'Multi Duct and Control Box-R.
4. Dissassemble the Knob.
5. Separate the Thermostat and Control Box-R.
6. Disconnect the lead wire.

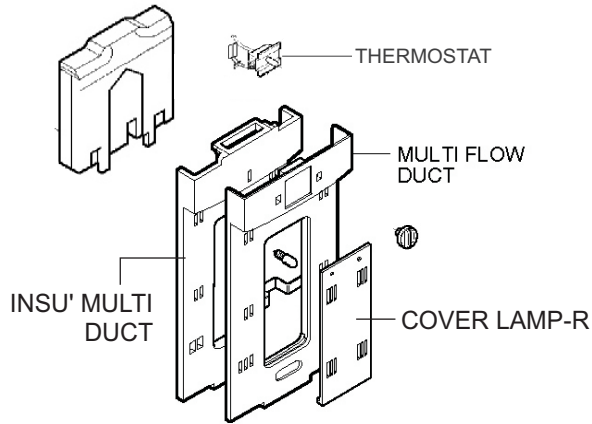


Figure 12

### 3-5 DEF' CONTROL ASSY

Def control Assy consists of Defrost Thermostat and FUSE-M. Defrost Thermostat functions to defrost automatically and it is attached to metal side of the Evaporator and senses Temp.

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

At the temperature of 77°C, it stops the emission of heat from the heater.

1. Pull out the Shroud after removing the Grille.
2. Separate the connector connected with the Def Control Assy and replace the Def Control Assy after cutting the Tie Wrap and removing the Holder Fuse. (Figure 14)

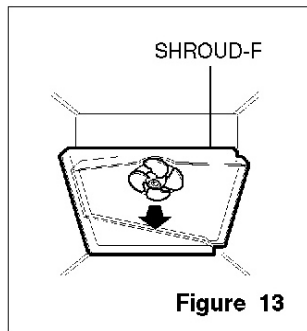


Figure 13

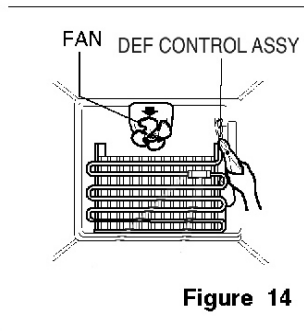


Figure 14

### 3-6 REFRIGERATOR ROOM LAMP

- Unplug the power cord from the outlet.
- Remove refrigerator shelves.
- Remove the cover lamp by pulling outside, then pushing it left/right by finger.
- Make sure the bulbs are cool to the touch. Remove the lamp by turning it counterclockwise.
- Lamp Cover Replacement Information.

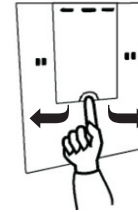


Figure 15

### 3-7 CONTROL BOX-R

1. Remove the Cover Lamp-R. by pulling with a (-) type driver

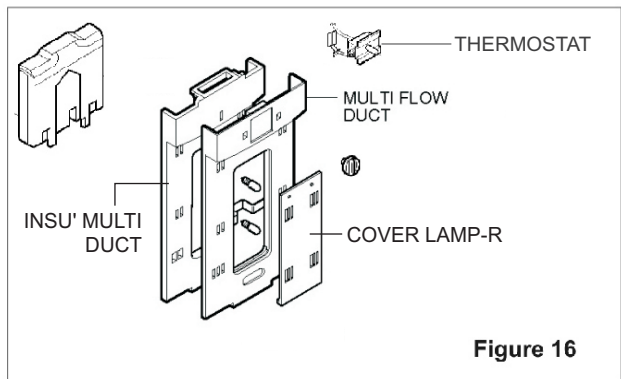


Figure 16

2. Loosen screws.
3. Pull the Control Box-R.
4. Separate the lead wire Housing.

# 4. ADJUSTMENT

## 4-1 COMPRESSOR

### 4-1-1 Role

The compressor inhales low temperature and low pressure gas evaporated from Evaporator of the Refrigerator, and condenses this gas to high temperature and high pressure gas, and then plays delivering role to Condenser.

### 4-1-2 Composition

The Compressor is Composed of Compressor Apparatus compressing gas, Compressor Motor moving Compressor Apparatus and Case protecting Compressor Apparatus and Motor. There are PTC-Starter, and Over Load Protector (OLP) in the Compressor outside. On the other hand, because the Compressor consists of 1/1000mm processing precision components and is sealed after producing without dust or humidity, **Seal** and repair with care.

### 4-1-3 Note to Use

- (1) Be careful not to allow over-voltage and over-current.
- (2) No Strike  
If applying forcible power or strike (dropping or careless dealing), poor operation and noise may occur.
- (3) Use proper electric components appropriate to the Compressor.
- (4) Note to Keep Compressor.  
If Compressor gets wet in the rain and rust in the pin of Hermetic Terminal, poor operation and poor contact may cause.
- (5) Be careful that dust, humidity, and flux due to welding don't inflow in Compressor inside in replacing Compressor. Dust, humidity, and flux due to welding which inflows to Cylinder may cause lock and noise

## 4-2 PTC-STARTER

### 4-2-1 Composition of PTC-Starter

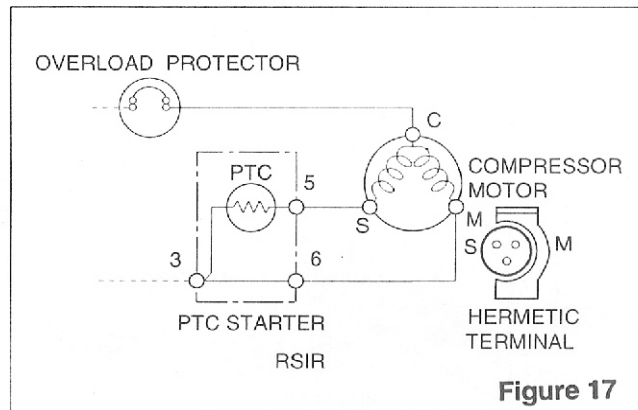
- (1) PTC (Positive Temperature Coefficient) is no-contact semiconductor starting device which uses ceramic material and the material consists of BaTiO<sub>3</sub>.
- (2) The higher the temperature is, the higher resistance value becomes. These features are used as starting device of Motor.

### 4-2-2 Role of PTC-Starter

- (1) PTC is attached to Hermetic Compressor used for Refrigerator, Show Case and starts Motor.
- (2) Compressor for household refrigerator applies single-phase induction Motor.  
For normal operation of single-phase induction motor, in the starting operation flows in both main coil and sub-coil. After the starting is over, the current is cut off in subcoil. The proper features of PTC play the above all roles. So, PTC is used as a starting device of motor.

### 4-2-3 PTC-Applied Circuit Diagram

● According to Starting Method of Motor



### 4-2-4 Motor Restarting and PTC Cooling

- (1) For restarting after power off during normal Compressor Motor operation, plug the power cord after 5 min. for pressure balance of Refrigerating Cycle and PTC cooling.
- (2) During normal operation of Compressor Motor, PTC elements generate heat continuously. Therefore, if PTC isn't cooled for a while after power off, Motor can't operate again.

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

- (1) If power off during operation of Compressor and power on before PTC is cooled, (instant shut-off within 2 min. or reconnect a power plug due to misconnecting), PTC isn't cooled and a resistance value grows. As a result, current can't flow to the sub-coil and Motor can't operate and OLP operates by flowing over current in only main-coil.
- (2) While the OLP repeats on and off operation about 3-5 times, PTC is cooled and Compressor Motor performs normal operation.  
If OLP doesn't operate when PTC is not cooled, Compressor Motor is worn away and causes circuit-short and fire. Therefore, use a proper fixed OLP without fail.

### 4-2-6 Note to Use PTC-Starter

- (1) Be careful not to allow over-voltage and over-current.
- (2) No Strike  
Don't apply a forcible power or strike.
- (3) Keep apart from any liquid.  
If liquid such as oil or water inflows into PTC, PTC materials it may break due to insulation breakdown of material itself.
- (4) Don't change PTC at your convenience.  
Don't disassemble PTC and mold. If damaging to outside of PTC-starter, resistance value alters and poor starting of compressor motor may cause.
- (5) Use a properly fixed PTC.



### 4-3 OLP (OVER LOAD PROTECTOR)

#### 4-3-1 Definition of OLP

- (1) OLP (OVER LOAD PROTECTOR) is attached to Hermetic Compressor and protects Motor by cutting off current in Compressor Motor by Bimetal in the OLP in case of over-rising temperature.
- (2) When over-voltage flows to Compressor motor, Bimetal works by heating the heater inside OLP, and OLP protects Motor by cutting off current which flows to Compressor Motor.

#### 4-3-2 Role of OLP

- (1) OLP is attached to Hermetic Compressor used to Refrigerator and Show Case and prevents Motor Coil from being started in the Compressor.
  - (2) Do not turn the Adjust Screw of OLP in any way for normal operation of OLP.
- (Composition and connection Diagram of OLP)

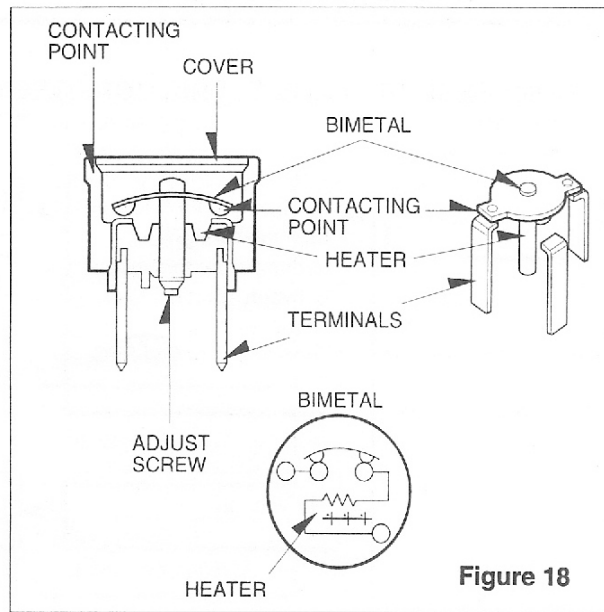
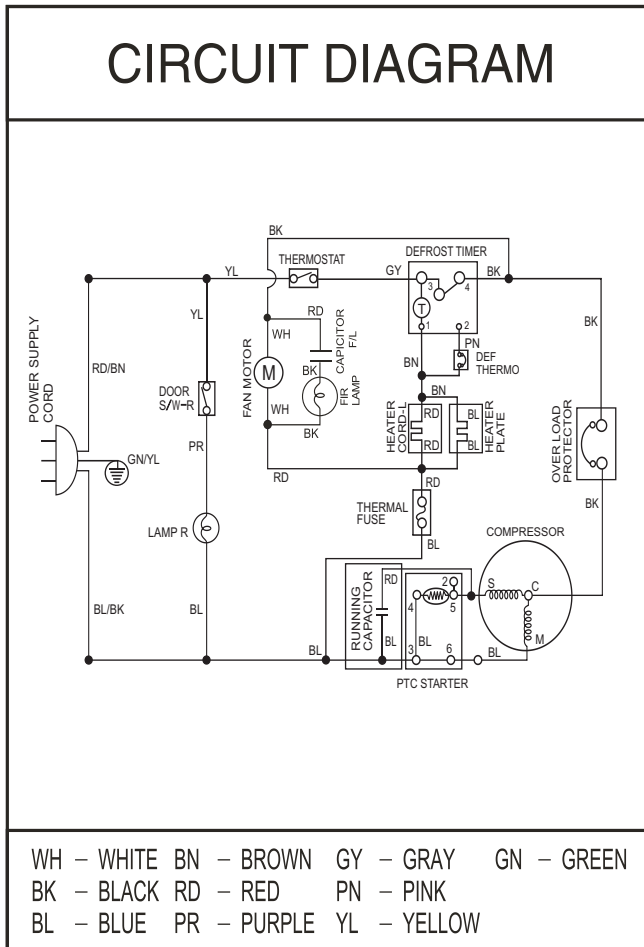


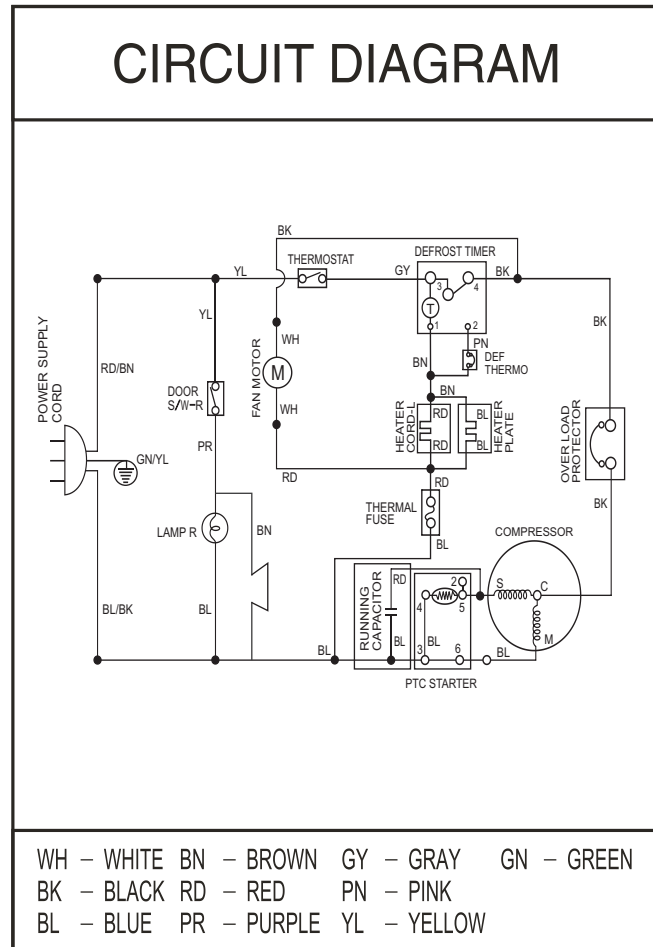
Figure 18

## 5. CIRCUIT DIAGRAM

### 1) Without Buzzer

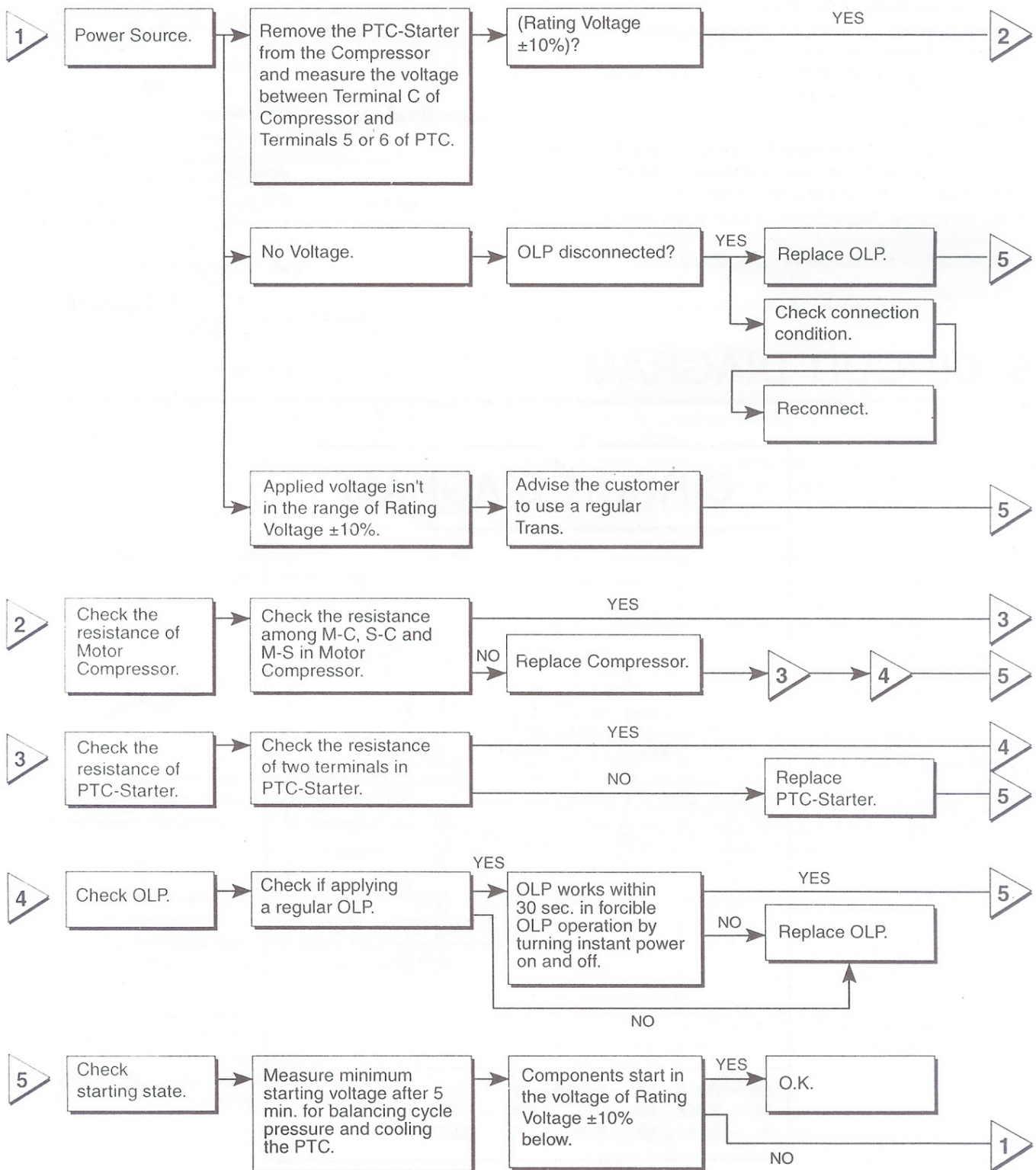


### 2) With Buzzer



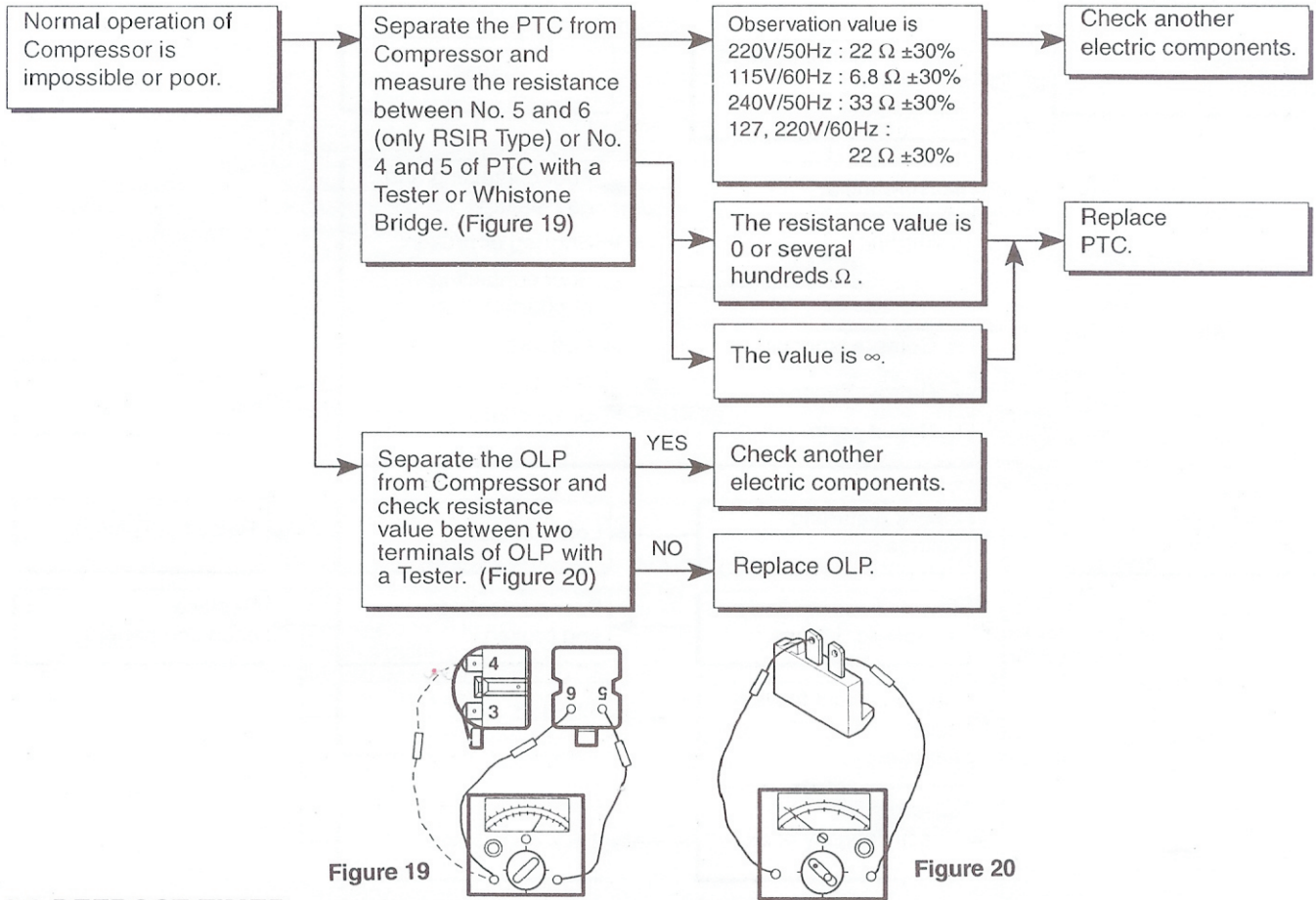
# 6. TROUBLESHOOTING

## 6-1 COMPRESSOR AND ELECTRIC COMPONENTS

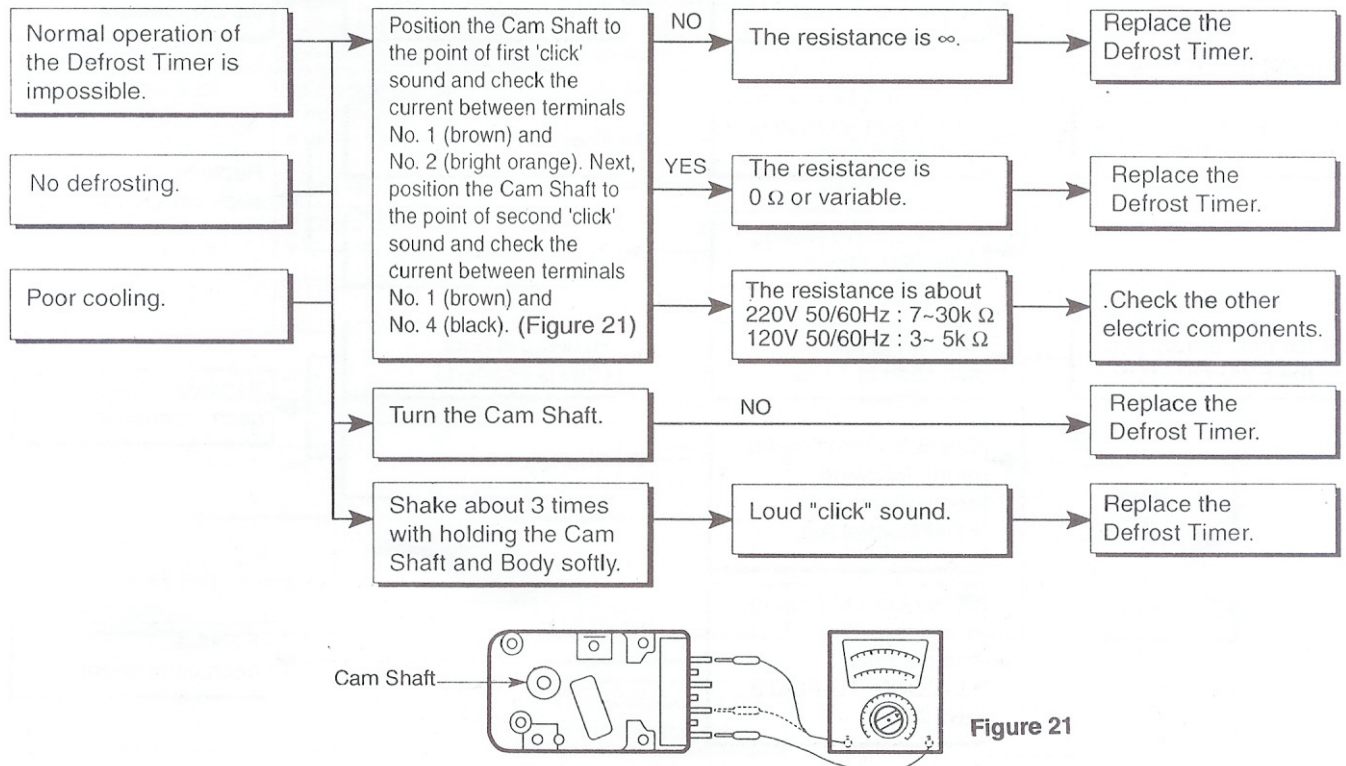




## 6-2 PTC AND OLP

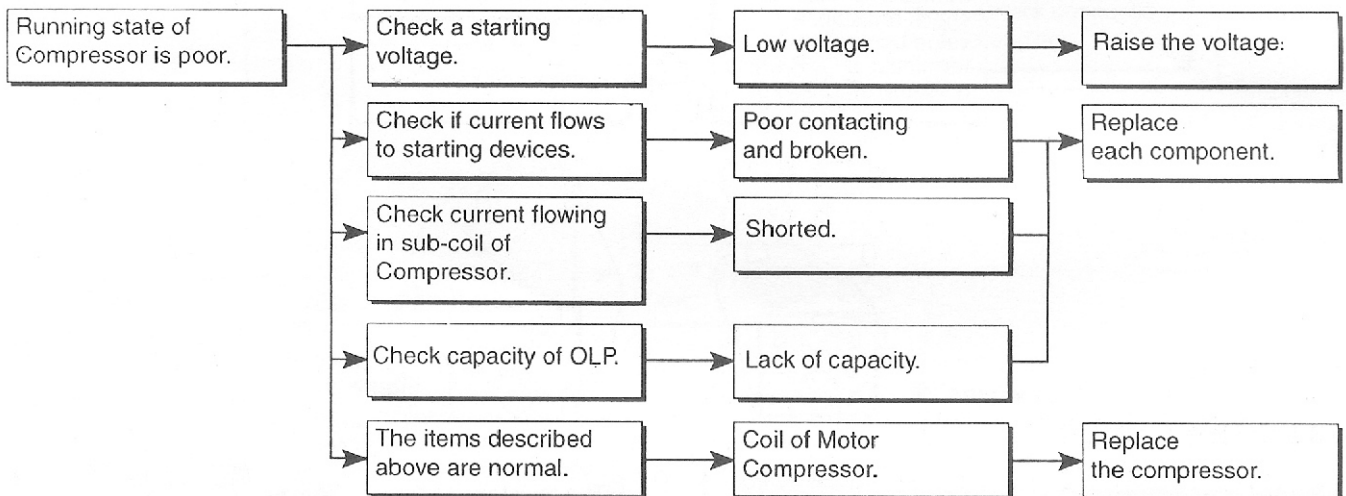
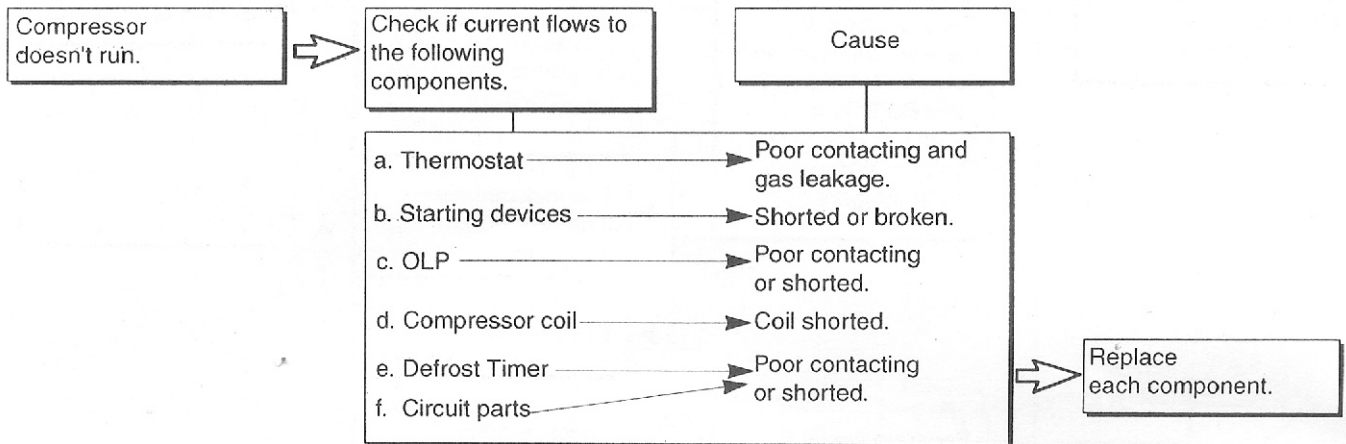


## 6-3 DEFROST TIMER

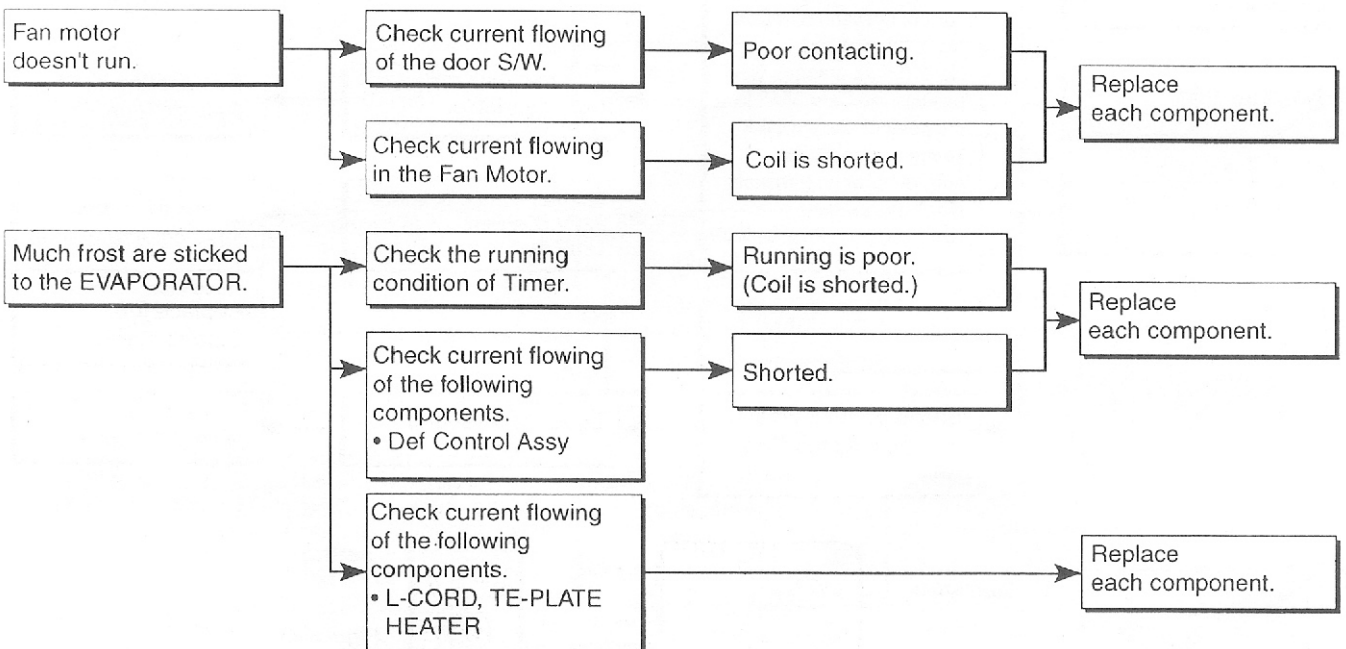


## 6-4 ANOTHER ELECTRIC COMPONENTS

### ▼ Cooling is impossible



### ▼ Cooling ability is poor

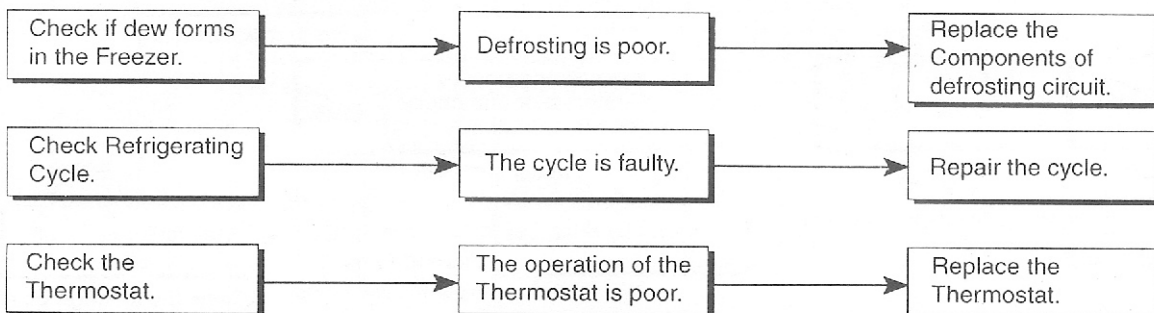




## 6-5 SERVICE DIAGNOSIS CHART

COMPLAINT	POINTS TO BE CHECKED	REMEDY
Cooling is impossible.	<ul style="list-style-type: none"> <li>• Is the power cord unplugged from the outlet?</li> <li>• Check if the power S/W is set to OFF.</li> <li>• Check if the fuse of power S/W is shorted.</li> <li>• Measure the voltage of power outlet.</li> </ul>	<ul style="list-style-type: none"> <li>• Plug to the outlet.</li> <li>• Set the switch to ON.</li> <li>• Replace a regular fuse.</li> <li>• If voltage is low, wire newly.</li> </ul>
Cooling ability is poor.	<ul style="list-style-type: none"> <li>• Check if the set is placed close to wall.</li> <li>• Check if the set is placed close to stove, gas cooker and direct rays.</li> <li>• Is the ambient temperature high or the room door closed?</li> <li>• Check if putting in hot food.</li> <li>• Did you open the door of the set too often or check if the door is closed up?</li> <li>• Check if the Thermostat is set to "MIN."</li> </ul>	<ul style="list-style-type: none"> <li>• Place the set with the space of about 10cm.</li> <li>• Place the set apart from these heat sources.</li> <li>• Make the ambient temperature below.</li> <li>• Put in food after they get cold.</li> <li>• Don't open the door too often and close it firmly.</li> <li>• Set the knob to "NORMAL"</li> </ul>
Freezing ability is poor	<ul style="list-style-type: none"> <li>• Is the ambient temperature too LOW(10°C)?</li> <li>• Check if thermostat is set to 1~3?</li> </ul>	<ul style="list-style-type: none"> <li>• For colder freezer, turn the FREEZER TEMP. CONTROL to "7"~"9", and the Refrigerator Temp. Control to "6"~"7".</li> <li>• Check if the regulator is well attached to thermostat with AI Tape.</li> </ul>
Food in the Refrigerator are frozen.	<ul style="list-style-type: none"> <li>• Are food placed in cooling air outlet?</li> <li>• Check if the Thermostat is set to "MAX."</li> <li>• Is the ambient temperature within 5°C?</li> </ul>	<ul style="list-style-type: none"> <li>• Place food in high temperature section. (Front Part)</li> <li>• Set the knob to "NORMAL"</li> <li>• Set the knob to "MIN."</li> </ul>
Dew or ice forms in the chamber of the set.	<ul style="list-style-type: none"> <li>• Are watery food kept?</li> <li>• Check if putting in hot food.</li> <li>• Did you open the door of the set too often or check if the door is closed up.</li> </ul>	<ul style="list-style-type: none"> <li>• Seal up watery food with vinyl wrap.</li> <li>• Put in food after getting cold.</li> <li>• Don't open the door too often and close it firmly.</li> </ul>
Dew forms in the Out Case.	<ul style="list-style-type: none"> <li>• Check if ambient temperature and humidity are high.</li> <li>• Is the gap in the door packing?</li> </ul>	<ul style="list-style-type: none"> <li>• Wipe dew with a dry cloth. This happening is solved in low temperature and humidity naturally.</li> <li>• Fill up the gap.</li> </ul>
Abnormal noise generates.	<ul style="list-style-type: none"> <li>• Is the set positioned in a firm and even place?</li> <li>• Does any unnecessary objects exist in the back side of the set?</li> <li>• Check if the Cover Evaporating Tray is omitted.</li> <li>• Check if the cover of mechanical room in below and front side is taken out.</li> </ul>	<ul style="list-style-type: none"> <li>• Adjust the Leveling Screw, and place in the firm place.</li> <li>• Remove the objects.</li> <li>• Place it on an original position.</li> <li>• Place the cover at an original position.</li> </ul>
To close the door is not handy.	<ul style="list-style-type: none"> <li>• Check if the door packing becomes dirty by filth such as juice.</li> <li>• Is the set positioned in a firm and even place?</li> <li>• Are too much food put in the set?</li> </ul>	<ul style="list-style-type: none"> <li>• Clean the door packing.</li> <li>• Position in the firm place and adjust the Leveling Screw.</li> <li>• Keep foods from reaching to the door.</li> </ul>
Ice and food smell unpleasant.	<ul style="list-style-type: none"> <li>• Check if the inside of the set becomes dirty.</li> <li>• Did you keep smelly foods without wrapping?</li> <li>• It smells plastic.</li> </ul>	<ul style="list-style-type: none"> <li>• Clean the inside of the set.</li> <li>• Wrap smelly food.</li> <li>• The new products smell plastic, but it is removed after 1-2 weeks.</li> </ul>

● In addition to the items described above, refer to the followings to solve the complaint.



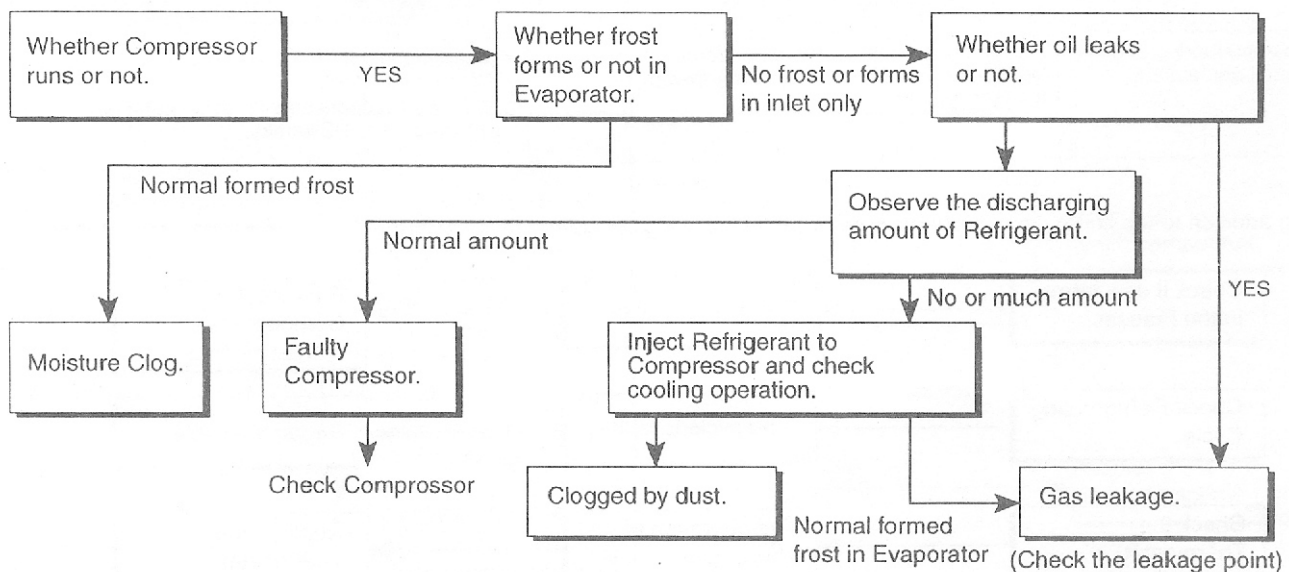
## 6-6 REFRIGERATING CYCLE

### ▼ Troubleshooting Chart

CAUSE		STATE OF THE SET	STATE OF THE EVAPORATOR	TEMPERATURE OF THE COMPRESSOR	REMARKS
LEAKAGE	PARTIAL LEAKAGE	Freezer and Refrigerator don't get cold normally.	Low flowing sound of Refrigerant is heard and frost forms in inlet only	A little high more than ambient temperature.	<ul style="list-style-type: none"> <li>• A little Refrigerant discharges.</li> <li>• Normal cooling is possible when injecting Refrigerant of regular amount.</li> </ul>
	WHOLE LEAKAGE	Freezer and Refrigerator don't get cold at all.	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 when injecting Refrigerant of regular amount.</li> </ul>
CLOGGED BY DUST	PARTIAL CLOG	Freeze room and Refrigerator don't get cold normally.	Flowing sound of Refrigerant is heard and frost forms in inlet only.	A little high more than ambient temperature.	<ul style="list-style-type: none"> <li>• Normal discharging of refrigerant.</li> <li>• The capillary tube is faulty.</li> </ul>
	WHOLE CLOG	Freezer and Refrigerator don't get cold.	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 Refrigerant.</li> </ul>
MOISTURE CLOG		Cooling operation stops periodically.	Flowing sound of Refrigerant is not heard and frost melts.	Low than ambient temperature	<ul style="list-style-type: none"> <li>• Cooling operation restarts when heating the inlet of capillary tube.</li> </ul>
DEFECTIVE COMPRESSION	COMP-RESSION	Freezer and Refrigerator don't get cold.	Low flowing sound of Refrigerant is heard and frost forms in inlet only.	A little high than ambient temperature.	<ul style="list-style-type: none"> <li>• The pressure of high pressure part in compressor is low.</li> </ul>
	NO COMP-RESSION	No compressing operation.	Flowing sound of Refrigerant is not heard and no frost.	Equal to ambient temperature.	<ul style="list-style-type: none"> <li>• No pressure of high pressure part in compressor.</li> </ul>

### ▼ Leakage Detection

Observe discharging point of refrigerant which may be in oil discharging part in compressor and hole of evaporator.



▼ General Control of Refrigerating Cycle

NO.	ITEMS	CONTENTS AND SPECIFICATIONS	REMARKS
1	WELDING ROD	<p>(1) H 30</p> <ul style="list-style-type: none"> <li>• Chemical Ingredients Ag: 30%, Cu: 27%, Zn: 23%, Cd: 20%</li> <li>• Brazing Temperature: 710~840°C</li> </ul> <p>(2) Bcup-2</p> <ul style="list-style-type: none"> <li>• Chemical Ingredients Cu: About 93% P: 6.8~7.5% The rest: within 0.2%</li> <li>• Brazing Temperature: 735~840°C</li> </ul>	<ul style="list-style-type: none"> <li>• Recommend H34 containing 34% Ag in the Service Center.</li> </ul>
2	FLUX	<ul style="list-style-type: none"> <li>• Ingredients and how to make Borax 30% Borax 35% Fluoridation kalium: 35% Water: 4% Mix the above ingredients and boil until they are transformed into liquid.</li> </ul>	<ul style="list-style-type: none"> <li>• Make amount for only a day. Holding period: 1 day</li> <li>• Close the cover of container to prevent dust putting in the FLUX.</li> <li>• Keep it in a stainless steel container.</li> </ul>
3	DRIER ASM	<p>(1) Assemble the drier within 30min. after unpacking.</p> <p>(2) Keep the unpacked drier at the temperature of 80~100°C.</p>	<ul style="list-style-type: none"> <li>• Don't keep the drier in a outdoor because humidity damages to it.</li> </ul>
4	VACUUM	<p>(1) When measuring with pirant Vacuum gauge of charging M/C, vacuum degree is within 1 Torr.</p> <p>(2) If the vacuum degree of the cycle inside is 10 Torr. below for low pressure and 20 Torr. for high pressure, it says no vacuum leakage state.</p> <p>(3) Vacuum degree of vacuum pump must be 0.05 Torr. below after 5 min.</p> <p>(4) Vacuum degree must be same to the value described item (2) above for more than 20 min.</p>	<ul style="list-style-type: none"> <li>• Apply M/C Vacuum Gauge without fail.</li> <li>• Perform vacuum operation until a proper vacuum degree is built up.</li> <li>• If a proper vacuum degree isn't built up, check the leakage from the Cycle Pipe line part and Quick Coupler Connecting part.</li> </ul>
5	DRY AND AIR NITROGEN GAS	<p>(1) The pressure of dry air must be more han 12~16Kg/cm<sup>2</sup></p> <p>(2) Temperature must be more than -20~-70°C.</p> <p>(3) Keep the pressure to 12~6Kg/cm<sup>2</sup> also when substituting dry air for Nitrogen Gas.</p>	
6	NIPPLE AND COUPLER	<p>(1) Check if gas leaks with soapy water.</p> <p>(2) Replace Quick Coupler in case of leakage.</p>	<ul style="list-style-type: none"> <li>• Check if gas leaks from connecting part of Coupler.</li> </ul>
7	PIPE	<ul style="list-style-type: none"> <li>• Put all Joint Pipe in a clean box and cover tightly with the lid so that dust or humidity is not inserted.</li> </ul>	



# 7. EXPLODED VIEW

The parts of refrigerator and the shape of each part is subject to change in different models.

