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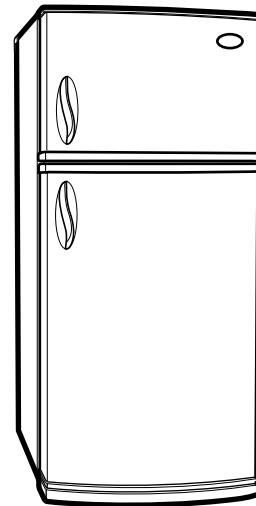
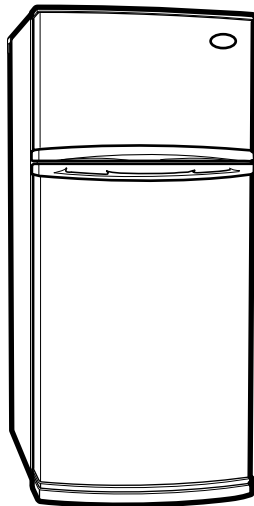
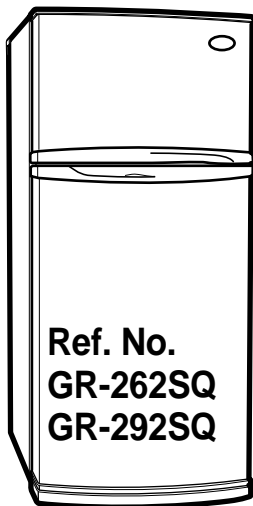
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REFRIGERATOR

SERVICE MANUAL

CAUTION

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



**MODEL: GR-262SQ
GR-292SQ**

COLOR: SUPER WHITE

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SAFETY PRECAUTIONS

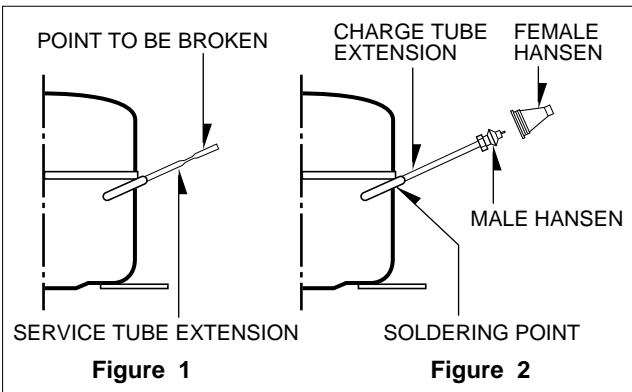
Please read the followings before servicing your refrigerator.

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

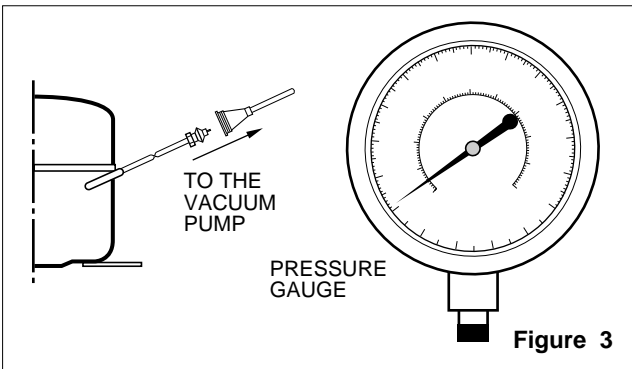
Air Recharging in Compressor

Test the refrigeration by connecting it electrically before refilling operation. It is necessary to ascertain the function of the motor-compressor and identify the defects immediately. If the defects have been found, empty the old system of eventual R-134a 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 extension completely with male Hansen and 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 heating 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)

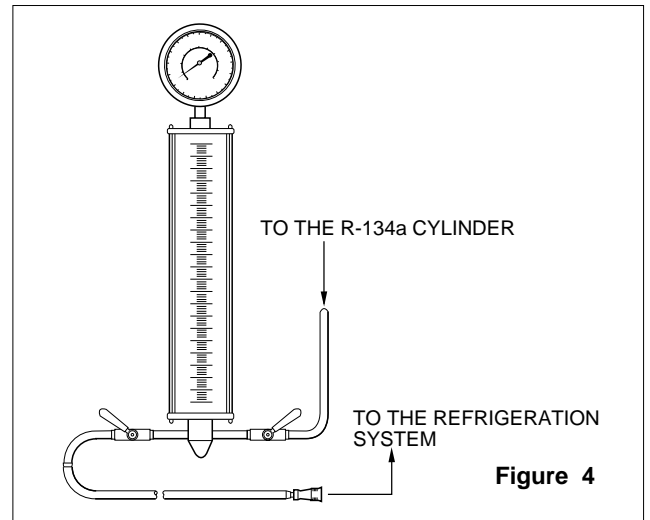


Air evacuating from the system begins so soon as the pump starts. The refrigeration system must be kept under vacuum until the reading on the low-pressure gauge indicates vacuum (0 absolute, -1 atm., -760 mm hg) in any case it is advisable to keep the pump running for about 30 minutes. (Figure 3)

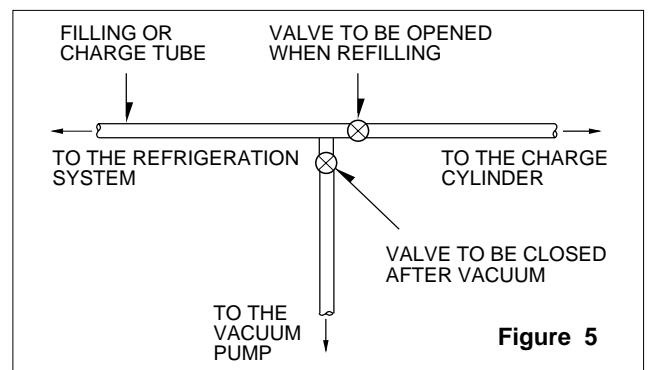
In case that a considerable leakage occurs and to stop the vacuum pump will be necessary and add a small quantity of Freon to the system, if vacuum should not be obtained (pressure gauge can't fall to 1 atmosphere), start the refrigeration unit and find the leakage with the special leak-finder. When 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 R-134a to the refrigerant system. Remember that every system has an exact quantity of R-134a with a tolerance of ± 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 refilling tube are closed to keep the Freon for adding to the system. (Figure 5)



In addition, check the graduated scale on the cylinder for the quantity of R-134a 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 R-134a 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 R-134a 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 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 making the pressure go down again. Regulate the valve again, maintaining the same manner until reaching to the quantity of R-134a established for the system being charged. When the system is running, the suction pressure must be stabilized between 0.30 to 0.6 atmosphere.

1. SPECIFICATIONS

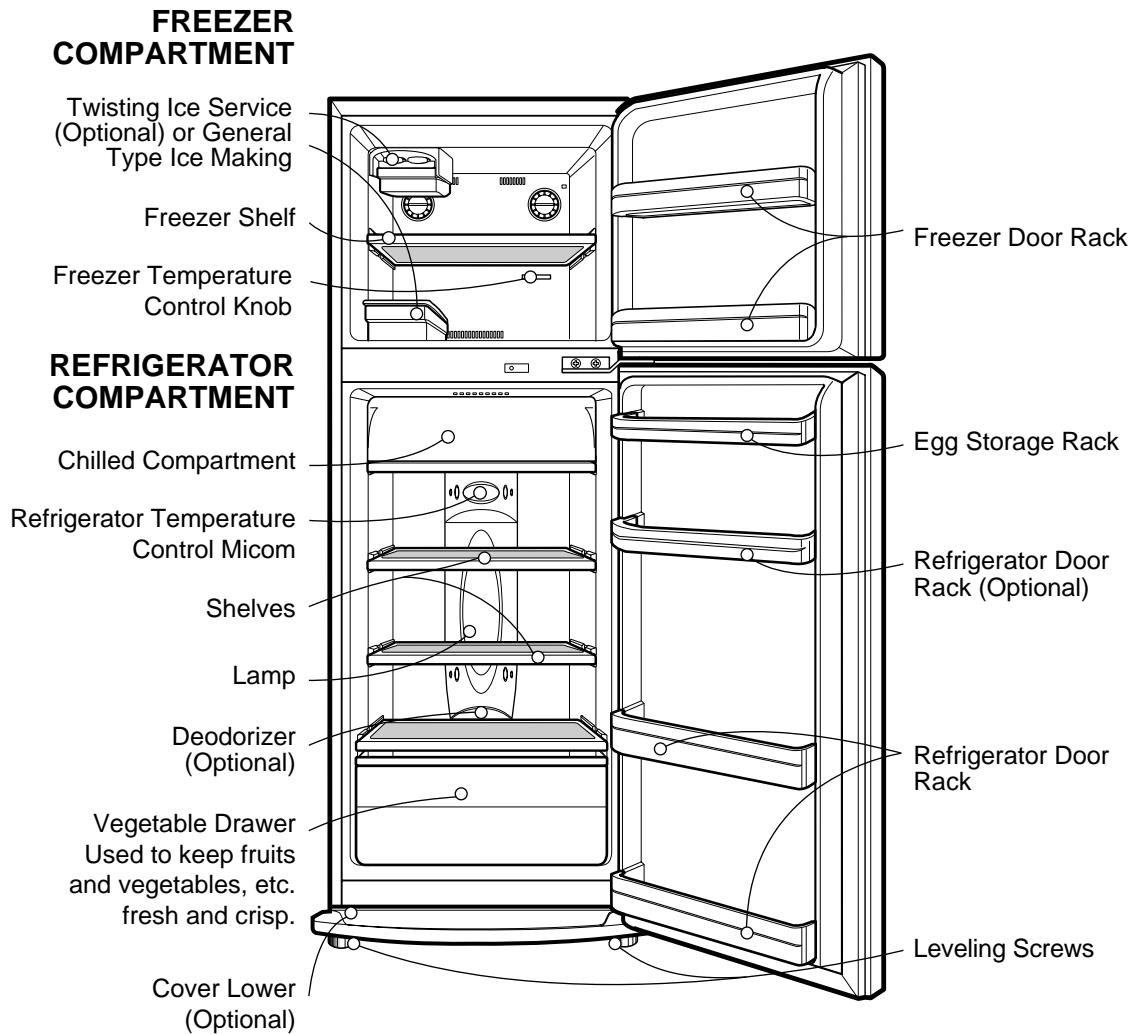
1-1 GR-262

ITEMS		SPECIFICATIONS		ITEMS		SPECIFICATIONS	
NET CAPACITY (l)	FREEZER	61		SHELF	FREEZER	1 EA	
	REFRIGERATOR	158			REFRIGERATOR	2 EA	
	TOTAL	219		VEGETABLE TRAY		Drawer Type	
DIMENSIONS (mm)		GR-262S(V)Q	540(W)x610(D)x1510(H)	EGG TRAY		1 Piece	
		GR-262Q(V)C	540(W)x628(D)x1510(H)	ICE TRAY		1 Piece (*2)	
NET WEIGHT (kg)		46		ICE BANK		1 Piece	
COOLING SYSTEM		Fan Cooling		COMPRESSOR		P.T.C Starting Type	
TEMPERATURE CONTROL	FREEZER	Knob Shutter		EVAPORATOR		Fin Tube Type	
	REFRIERATOR	Micom Control		CONDENSER		Pipe On Sheet Type	
DEFROSTING SYSTEM		Full Automatic		REFRIGERANT		R134a (120g)	
		Heater Defrost		LUBRICATING OIL		FREOL α 22G (210cc)	
OUT CASE		Coated Steel Sheet		DEFROSTING DEVICE		L-CORD, PLATE HEATER	
INNER CASE		A B S		(*) : OPTION			
INSULATION		Polyurethane Foam					

1-2 GR-292

ITEMS		SPECIFICATIONS		ITEMS		SPECIFICATIONS	
NET CAPACITY (l)	FREEZER	61		SHELF	FREEZER	1 EA	
	REFRIGERATOR	176			REFRIGERATOR	2 EA	
	TOTAL	237		VEGETABLE TRAY		Drawer Type	
DIMENSIONS (mm)		GR-292S(V)Q	540(W)x610(D)x1600(H)	EGG TRAY		1 Piece	
		GR-292Q(V)Q	540(W)x628(D)x1600(H)	ICE TRAY		1 Piece (*2)	
NET WEIGHT (kg)		49		ICE BANK		1 Piece	
COOLING SYSTEM		Fan Cooling		COMPRESSOR		P.T.C Starting Type	
TEMPERATURE CONTROL	FREEZER	Knob Shutter		EVAPORATOR		Fin Tube Type	
	REFRIERATOR	Micom Control		CONDENSER		Pipe On Sheet Type	
DEFROSTING SYSTEM		Full Automatic		REFRIGERANT		R134a (120g)	
		Heater Defrost		LUBRICATING OIL		FREOL α 22G (210cc)	
OUT CASE		Coated Steel Sheet		DEFROSTING DEVICE		L-CORD, PLATE HEATER	
INNER CASE		A B S		(*) : OPTION			
INSULATION		Polyurethane Foam					

2. PARTS IDENTIFICATION



NOTE : This is a basic model. The shape of refrigerator is subject to change.

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.

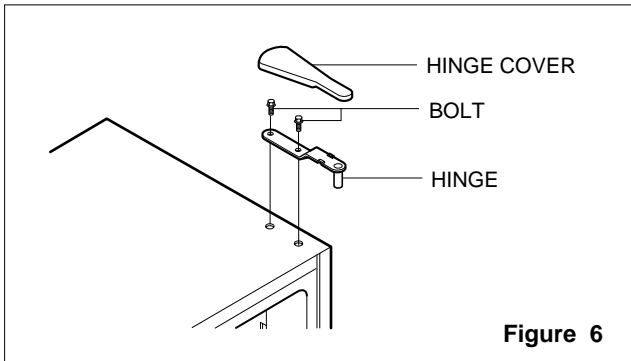


Figure 6

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

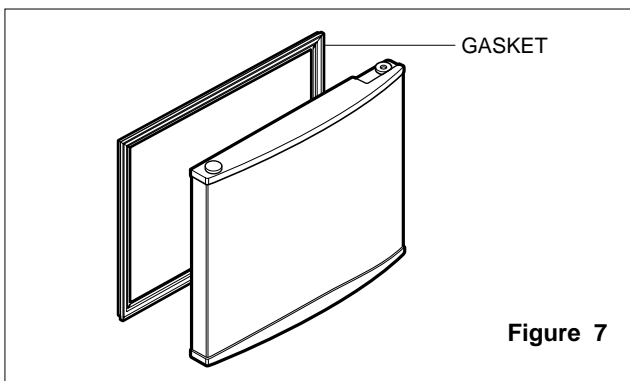


Figure 7

● Refrigerator Door

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

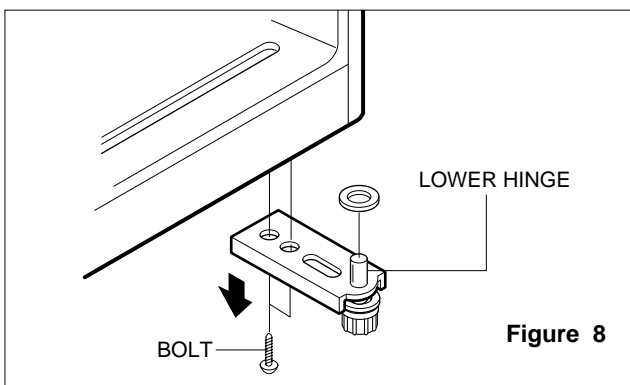
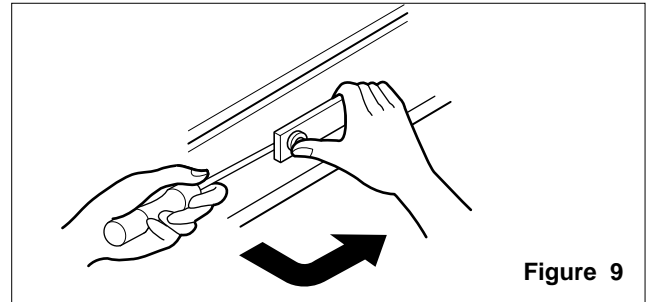


Figure 8

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 out it with a '—' type driver as shown in (figure 9).
2. Disconnect the lead wire from the switch.



3-3 THERMISTOR

1. Remove the Cover Lamp-R by the use of '—' type driver inserting in the low holes of the cover.
2. Loose 2 screw.
3. Pull the Control Box-R.
4. Disconnect the Housing of lead wire.
5. Separate the INSU'Multi Duct and Control Box-R.
6. Separate the Thermistor and Control Box-R.
7. Separate the Thermistor and Display PCB.

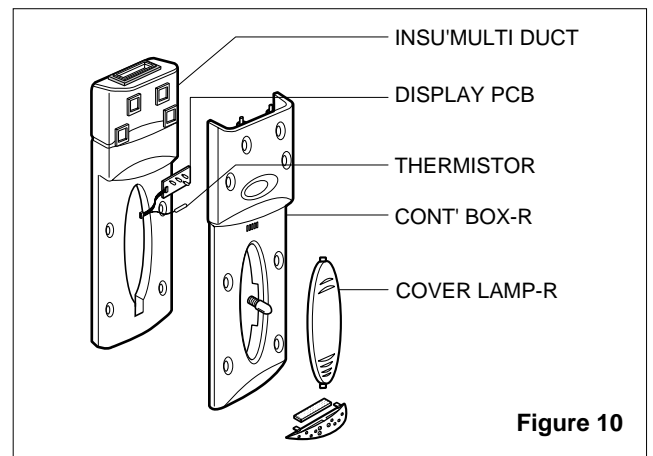


Figure 10

3.4 FAN AND FAN MOTOR

1. Remove the freezer shelf.
2. Separate the twist by pulling right.
3. Loose 1 screw.
4. Pull out the Grille Fan and Shroud-F.

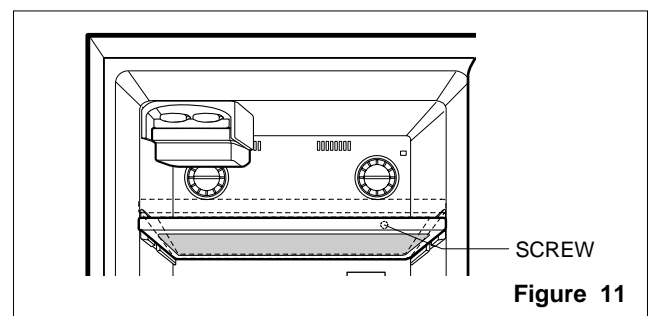
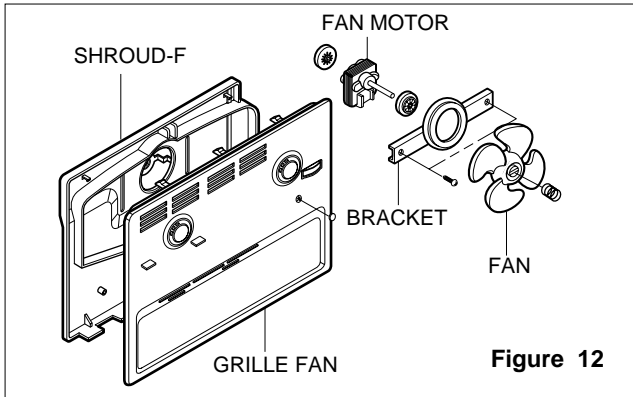


Figure 11

5. Disconnect the housing of lead wire.
6. Separate the Fan Assy.
7. Loose 2 screw fixed to the Bracket.
8. Pull out Shroud-F remove the Fan Motor Assy.
9. Separate the Motor Bracket and Rubber.



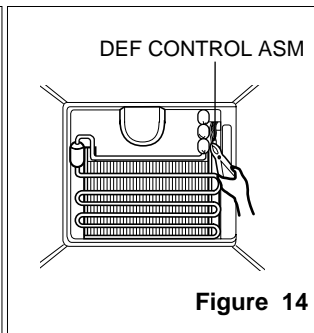
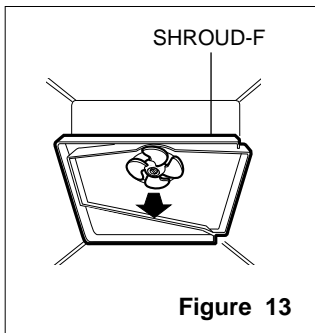
3-5 DEF' CONTROL ASM

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

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

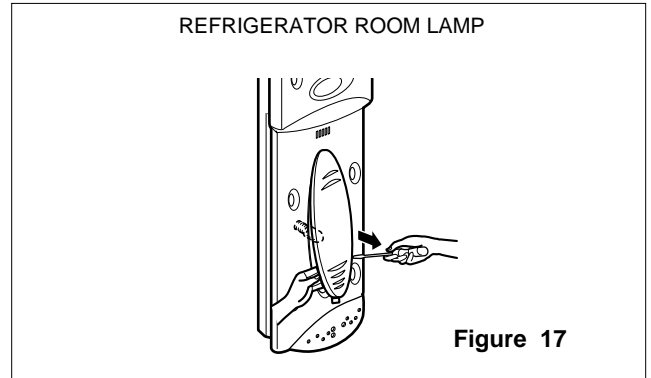
At the temperature of 72°C, it stops the emission of TEMP from the Defrost Heater.

1. Pull out the shroud-F after removing the Grille Fan. (Figure 13)
2. Separate the connectors connected with the Def Control ASM and replace the Def Control ASM after cutting the Tie Wrap. (Figure 14)



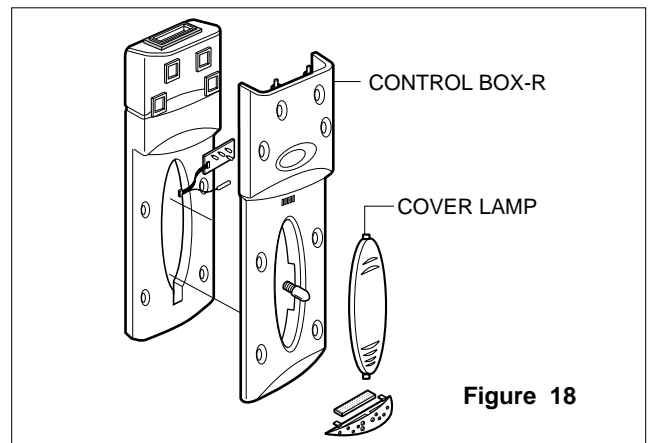
3-6 REFRIGERATOR ROOM LAMP

1. Remove the cover lamp-R by pulling with a '—' type driver.
2. Remove the lamp-R by turning.



3-7 CONTROL BOX-R

1. Remove the Cover Lamp-R.



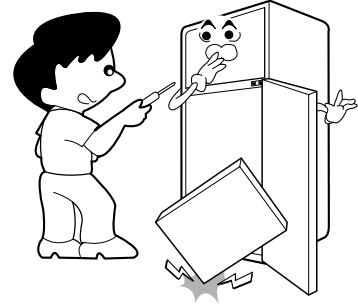
2. Loosen 2 screws.
3. Full the Control Box-R.
4. Separate the lead wire Housing.

- Converting Door is Optional

3-8 REPLACEMENT OF DOOR OPENING TYPE

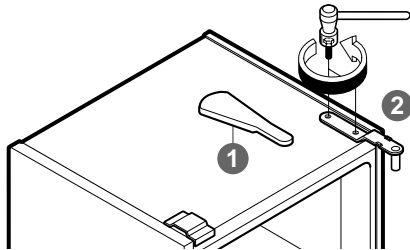
● Precaution

1. Before replacing the door opening type, first of all, you should take out foodstuffs and accessories like shelves or trays, and so on which are not fixed in the refrigerator.
2. Use the '+' Driver, Bolt Driver, Torque Wrench or Spanner to fix or remove the bolt.
3. Be careful not to fall down the refrigerator in disassembling or assembling the Hinge Lower and the Adjustable Screw Asm. Don't lay the refrigerator down in working with it, it will cause to get out of order.
4. Be careful not to drop the door in disassembling or assembling the freezer or the refrigerator door.
5. This refrigerator, according to the install position or user's liking, can be used as the type of opening from the right or the left.

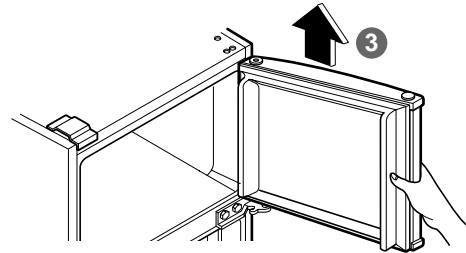


■ HOW TO REPLACE THE DOOR OPENING TYPE

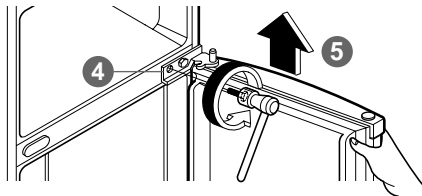
- 1** Separate the Cap ① and Hinge Upper ②.



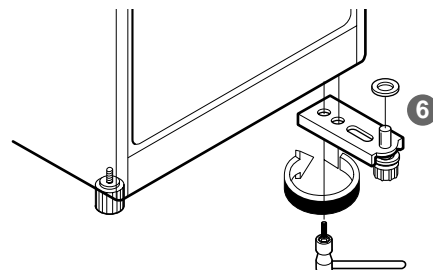
- 2** Separating the Freezer Door ③.



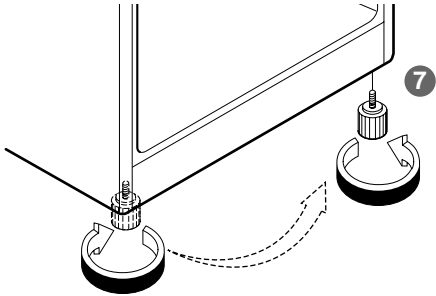
- 3** Separating the Hinge-C ④ and the Refrigerator Door ⑤.



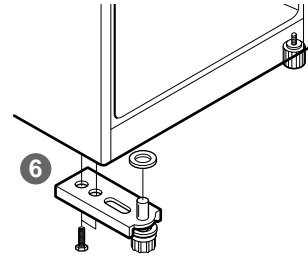
- 4** Separating the Hinge Lower ⑥.



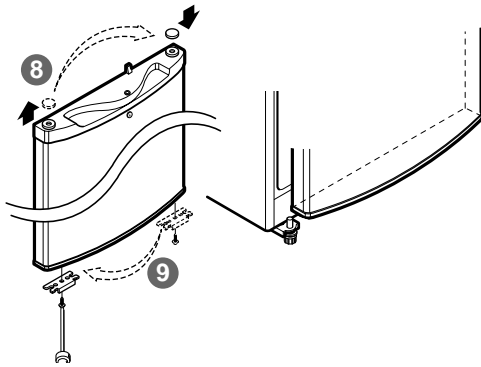
5 Move the Position of Adjustable Screw Assembly **7**.



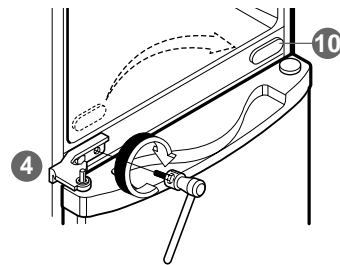
6 Assemble the Hinge Lower **6**.



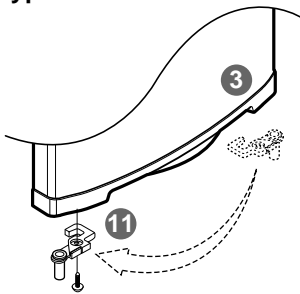
7 Move the Cap **8**, Bracket **9** of the Refrigerator Door.



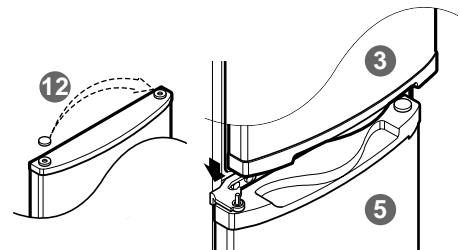
8 Move the Cap **10** and Assemble the Hinge-C **4**. After removing the washer.



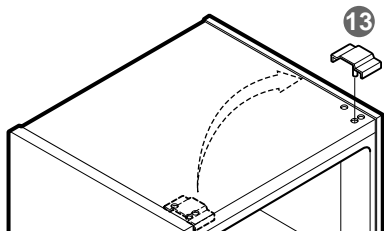
9 Assemble the Door Stopper-F **11** for Right Opening Type.



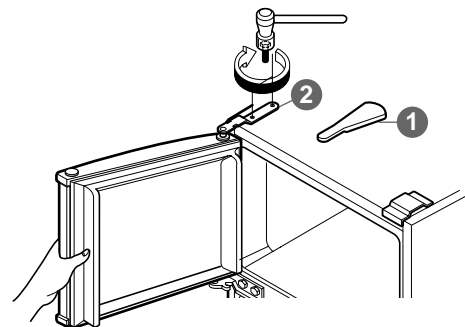
10 Move the Cap **12** and Assemble the Freezer Door **3**.



11 Move the Pin Position **13** of the Hinge Upper.



12 Assemble the Hinge Upper **2** and the Cap **1**.



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, deal 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 BaTiO₃.
- (2) The higher the temperature is, the higher resistance value becomes. These features are used as starting device of Motor.

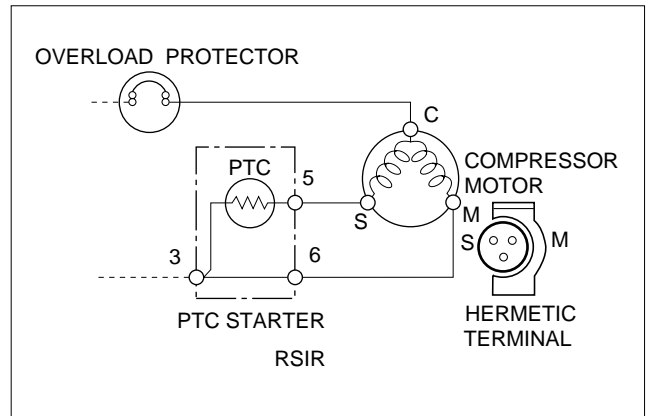
4-2-2 Role of PTC-Starter

- (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

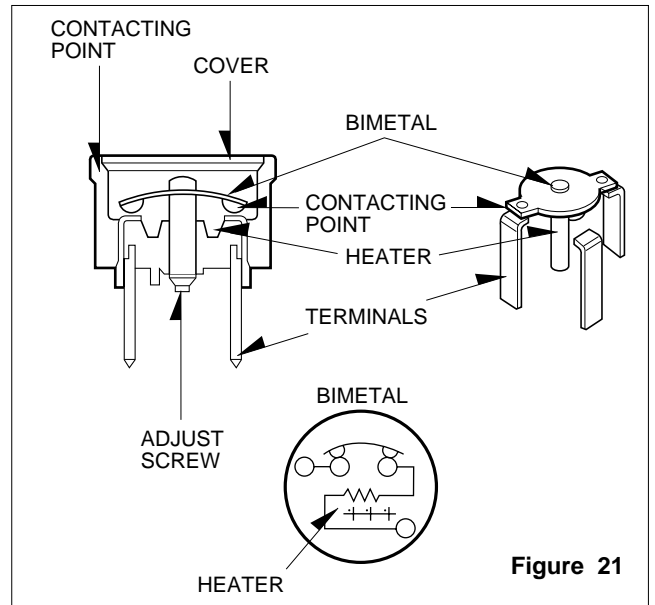
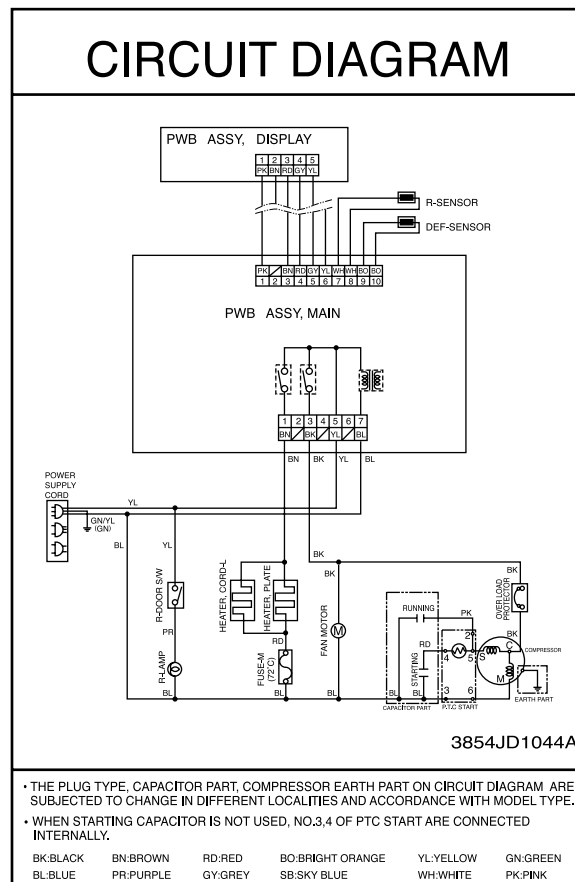


Figure 21

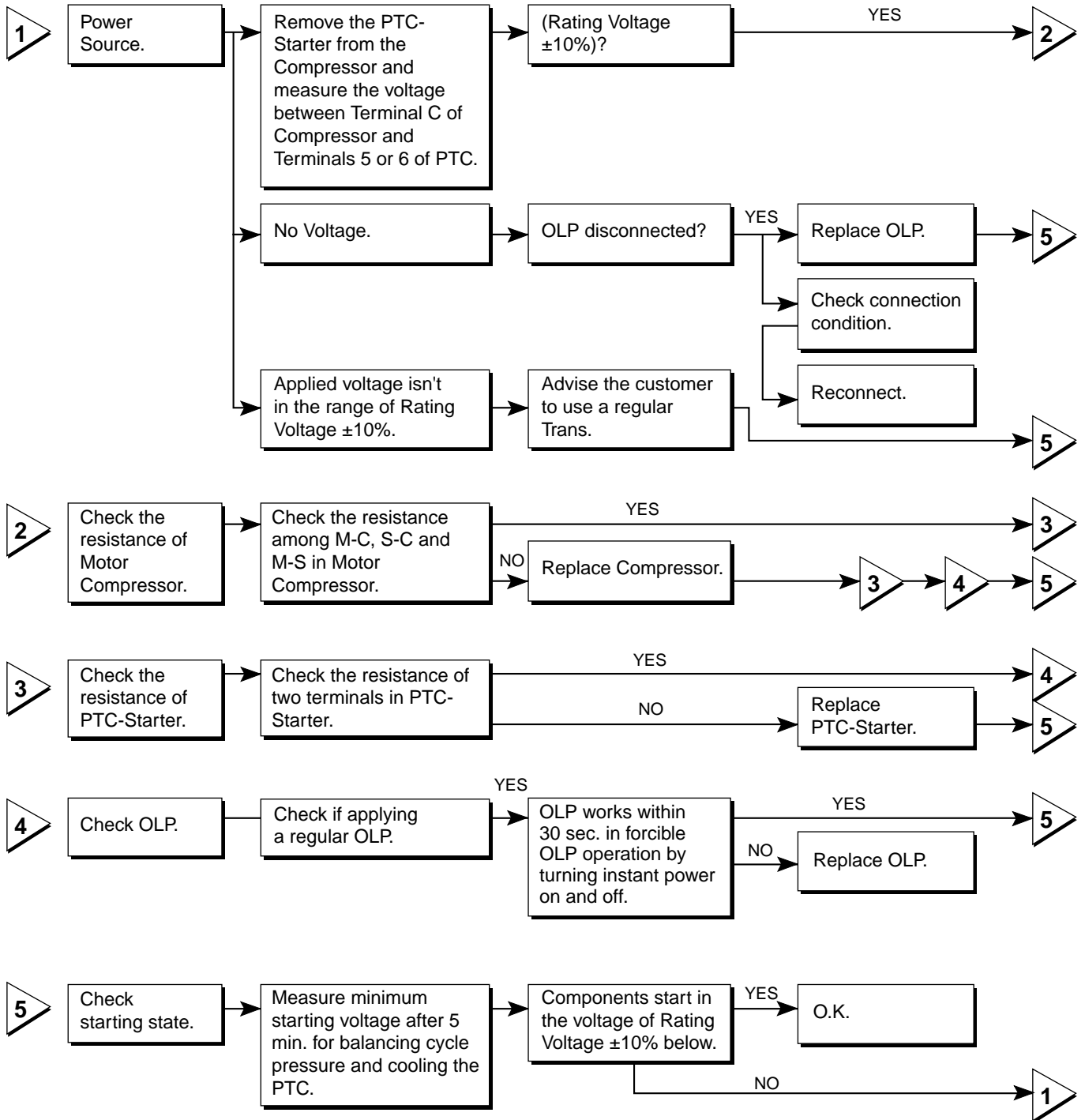
5. CIRCUIT DIAGRAM



NOTE : 1. This is a basic diagram and specifications vary in different localities.

6. TROUBLESHOOTING

6-1 COMPRESSOR AND ELECTRIC COMPONENTS



6-2 PTC AND OLP

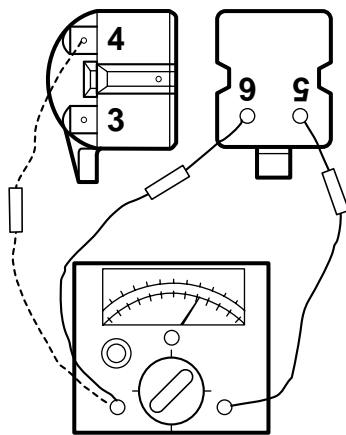
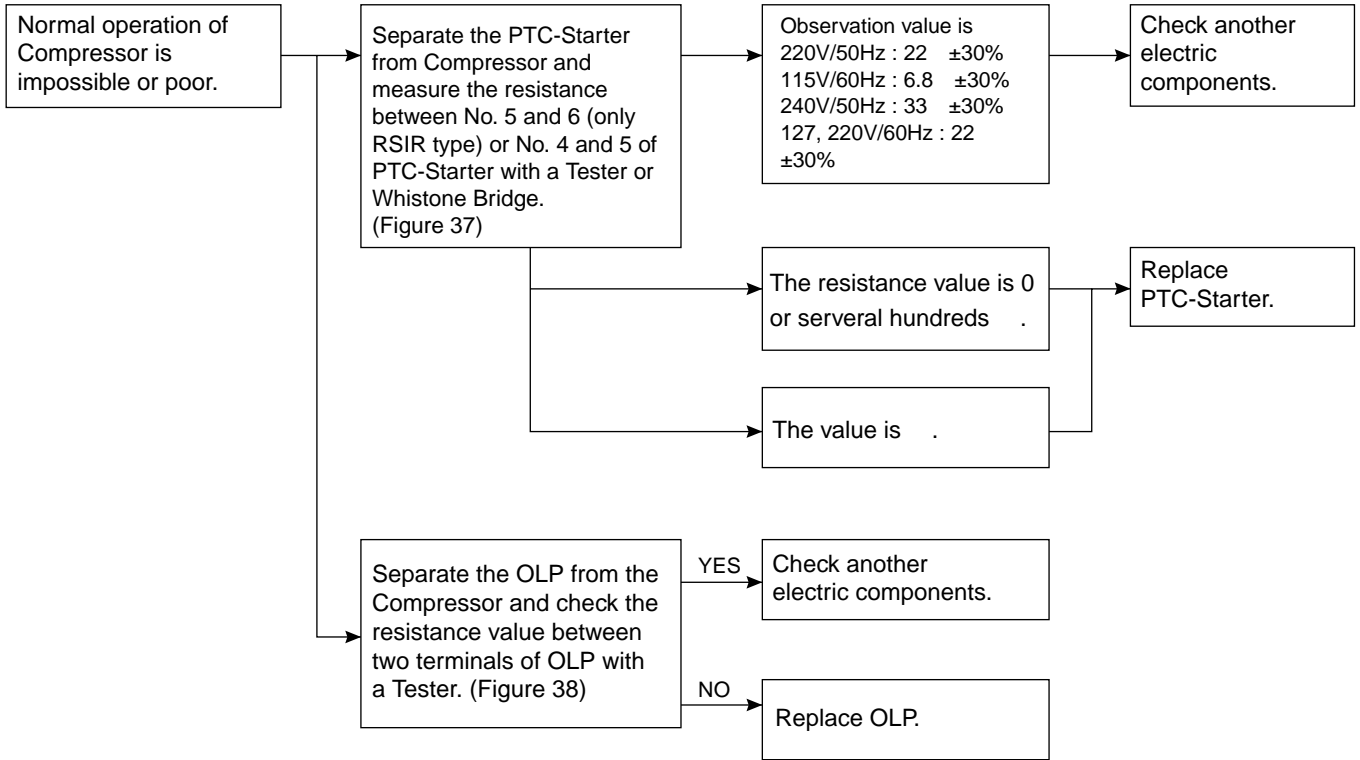


Figure 37

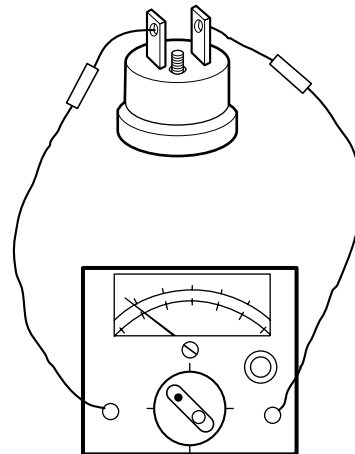
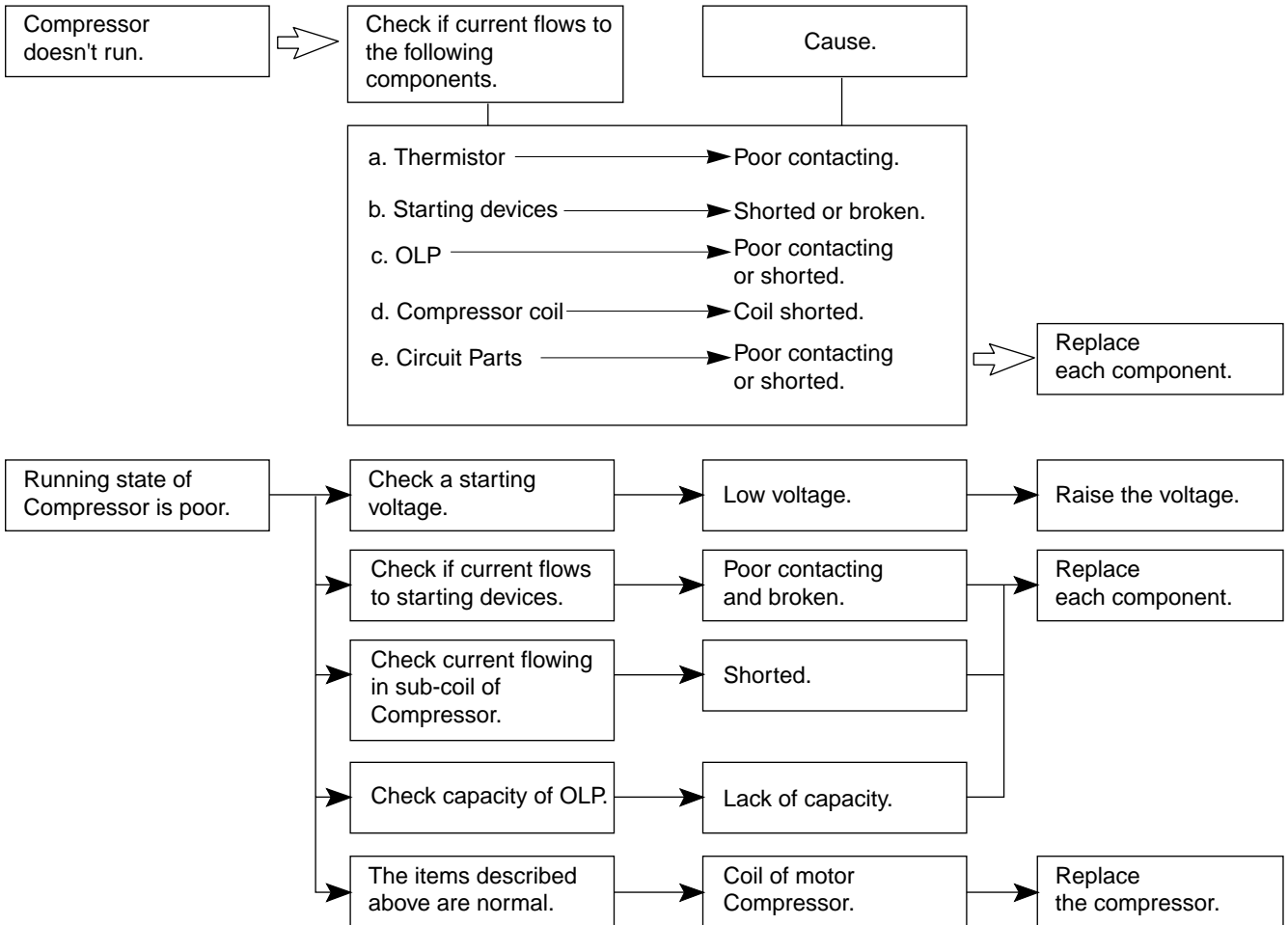


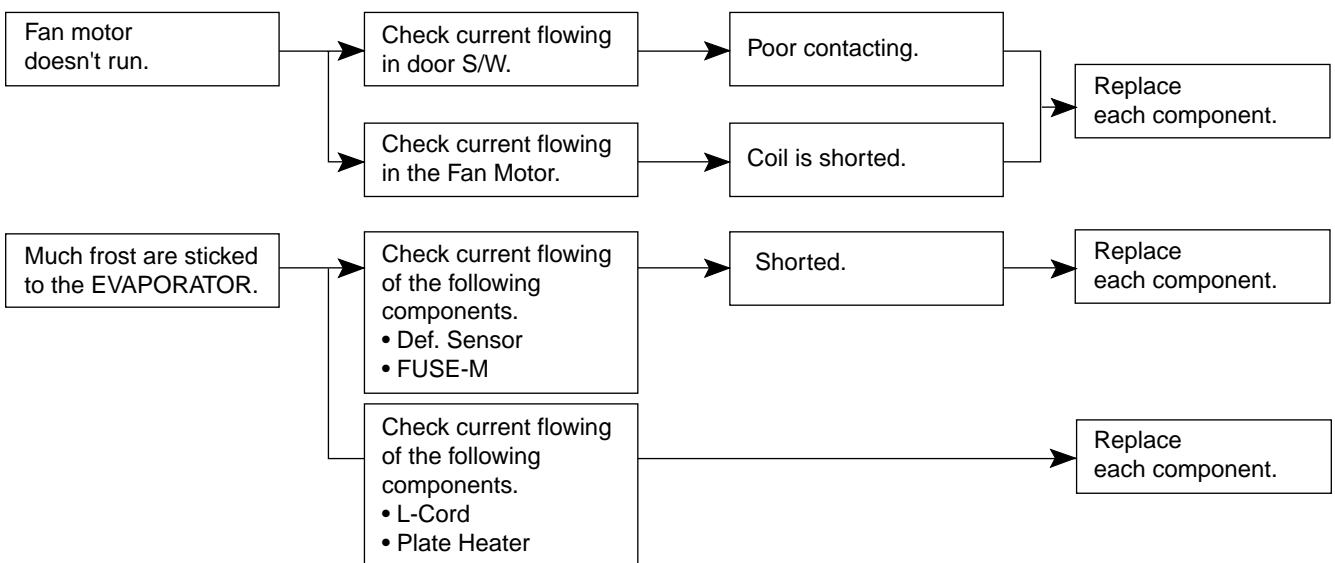
Figure 38

6-3 ANOTHER ELECTRIC COMPONENTS

▼ Cooling is impossible



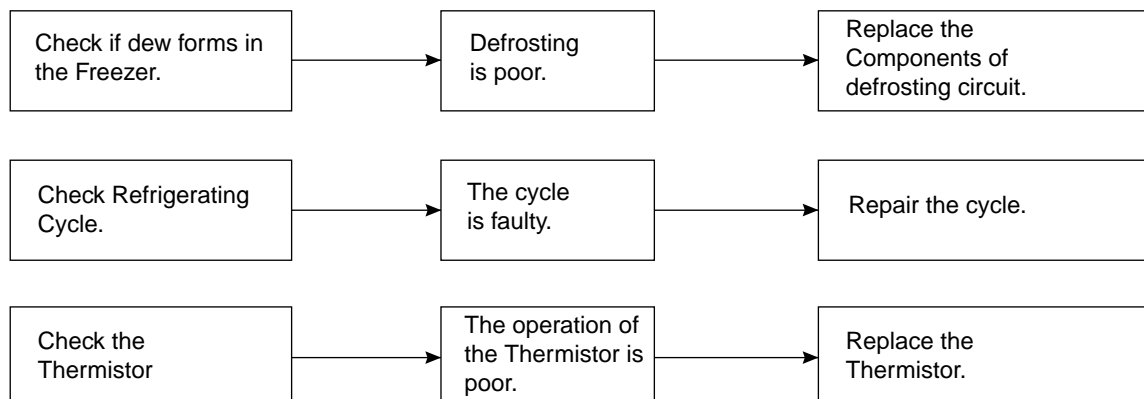
▼ Cooling ability is poor



6-4 SERVICE DIAGNOSIS CHART

COMPLAINT	POINTS TO BE CHECKED	REMEDY
Cooling is impossible.	<ul style="list-style-type: none"> Is the power cord unplugged from the outlet? Check if the power S/W is set to OFF. Check if the fuse of power S/W is shorted. Measure the voltage of power outlet. 	<ul style="list-style-type: none"> Plug to the outlet. Set the switch to ON. Replace a regular fuse. If voltage is low, wire newly.
Cooling ability is poor.	<ul style="list-style-type: none"> Check if the set is placed close to wall. Check if the set is placed close to stove, gas cooker and direct rays. Is the ambient temperature high or the room door closed? Check if putting in hot foods. Did you open the door of the set too often or check if the door is closed up? Check if the Control is set to "Min". 	<ul style="list-style-type: none"> Place the set with the space of about 10cm. Place the set apart from these heat appliances. Make the ambient temperature below. Put in foods after they get cold. Don't open the door too often and close it firmly. Set the control to mid-position.
Foods in the Refrigerator are frozen.	<ul style="list-style-type: none"> Are foods placed in cooling air outlet? Check if the Display LED is set to "Max". Is the ambient temperature below 5°C? 	<ul style="list-style-type: none"> Place foods in high temperature section. (Front Part) Set the Display LED to "Mid". Set the Display LED to "Min".
Dew or ice forms in the chamber of the set.	<ul style="list-style-type: none"> Is watery foods kept? Check if putting in hot foods. Did you open the door of the set too often or check if the door is closed up. 	<ul style="list-style-type: none"> Seal up watery foods with wrap. Put in foods after they get cold. Don't open the door too often and close it firmly.
Dew forms in the Out Case.	<ul style="list-style-type: none"> Check if ambient temperature and humidity of surrounding air are high. Is the gap in the door packed? 	<ul style="list-style-type: none"> Wipe dew with a dry cloth. This happening is solved in low temperature and humidity naturally. Fill up the gap.
Abnormal noise generates.	<ul style="list-style-type: none"> Is the set positioned in a firm and even place? Does any unnecessary objects exist in the back side of the set? Check if the Drip Tray is not firmly fixed. Check if the cover of mechanical room in below and front side is taken out. 	<ul style="list-style-type: none"> Adjust the Adjust Screw, and position in the firm place. Remove the objects. Fix it firmly on an original position. Place the cover at an original position.
To close the door is not handy.	<ul style="list-style-type: none"> Check if the door packing becomes dirty by filth such as juice. Is the set positioned in a firm and even place? Is too much food putted in the set? 	<ul style="list-style-type: none"> Clean the door packing. Position in the firm place and adjust the Adjust Screw. Keep foods not to reach the door.
Ice and foods smell unpleasant.	<ul style="list-style-type: none"> Check if the inside of the set becomes dirty. Did you keep smelly foods without wrapping? It smells plastic. 	<ul style="list-style-type: none"> Clean the inside of the set. Wrap smelly foods. The new products smell plastic, but it is removed after 1-2 weeks.

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



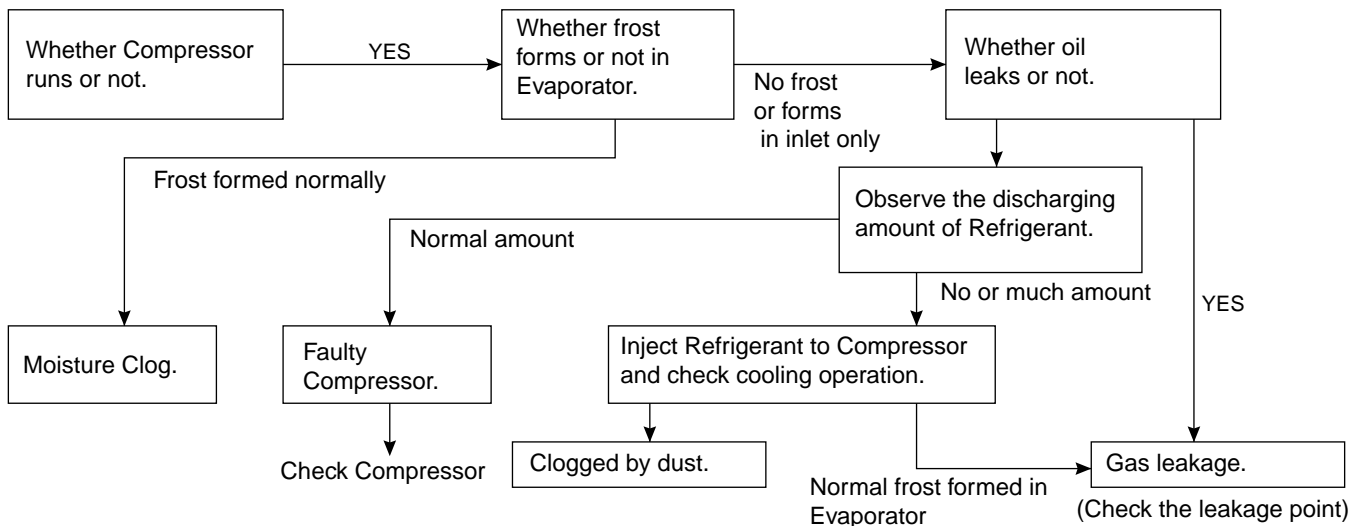
6-5 REFRIGERATING CYCLE

▼ Troubleshooting Chart

CAUSE		STATE OF THE SET	STATE OF THE EVAPORATOR	TEMPERATURE OF THE COMPRESSOR	REMARKS
LEAKAGE	PARTIAL LEAKAGE	Freezer room 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"> • A little Refrigerant discharges. • Normal cooling is possible when injecting Refrigerant of regular amount.
	WHOLE LEAKAGE	Freezer room and Refrigerator don't get cold normally.	Flowing sound of Refrigerant is not heard and frost isn't formed.	Equal to ambient temperature.	<ul style="list-style-type: none"> • No discharging of Refrigerant. • Normal cooling is possible when injecting Refrigerant of regular amount.
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"> • Normal discharging of refrigerant. • The capillary tube is faulty.
	WHOLE CLOG	Freezer room 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"> • Normal discharging of Refrigerant.
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"> • Cooling operation restarts when heating the inlet of capillary tube.
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"> • The pressure of high pressure part in compressor is low.
	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"> • No pressure of high pressure part in compressor.

▼ 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"> • Chemical Ingredients Ag: 30%, Cu: 27%, Zn: 23%, Cd: 20% • Brazing Temperature: 710~840°C <p>(2) Bcup-2</p> <ul style="list-style-type: none"> • Chemical Ingredients Cu: About 93% P: 6.8~7.5% The rest: within 0.2% • Brazing Temperature: 735~840°C 	<ul style="list-style-type: none"> • Recommend H34 containing 34% Ag in the Service Center.
2	FLUX	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • Make amount for only a day. Holding period: 1 day • Close the cover of container to prevent dust putting in the FLUX. • Keep it in a stainless steel container.
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"> • Don't keep the drier in a outdoor because humidity damages to it.
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"> • Apply M/C Vacuum Gauge without fail. • Perform vacuum operation until a proper vacuum degree is built up. • If a proper vacuum degree isn't built up, check the leakage from the Cycle Pipe line part and Quick Coupler Connecting part.
5	DRY AND AIR NITROGEN GAS	<p>(1) The pressure of dry air must be more than 12~16Kg/cm²</p> <p>(2) Temperature must be more than -20 ~ -70°C.</p> <p>(3) Keep the pressure to 12~6Kg/cm² 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"> • Check if gas leaks from connecting part of Coupler.
7	PIPE	<ul style="list-style-type: none"> • Put all Joint Pipe in a clean box and cover tightly with the lid so that dust or humidity is not inserted. 	

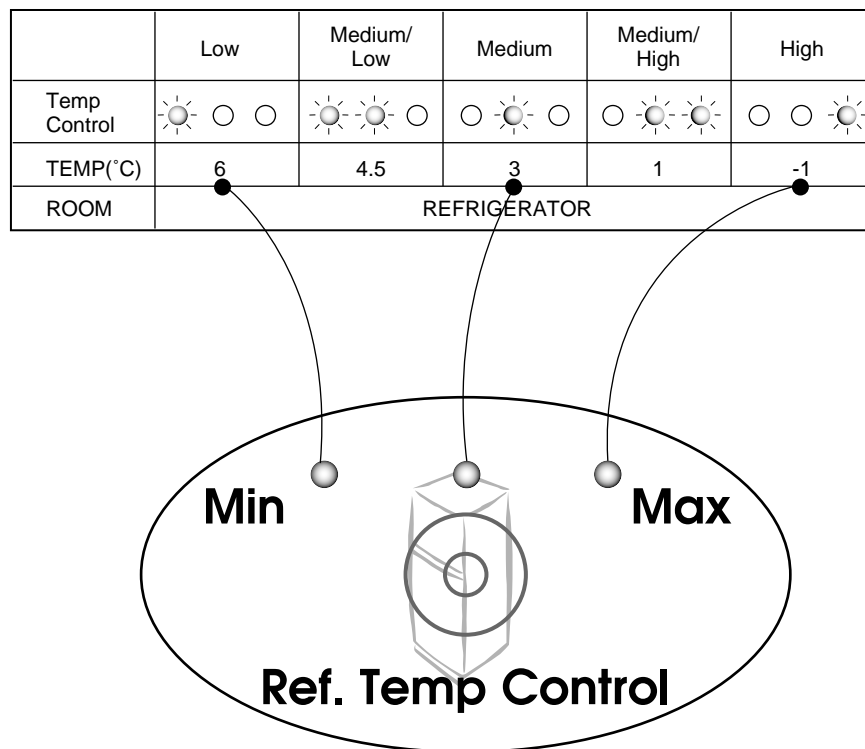
7. DESCRIPTION OF FUNCTION & CIRCUIT OF MICOM

The following description is basically for GR-262/GR-292. For the other models, refer to the diagram of the entire PCB circuit.

7-1 FUNCTION

7-1-1 FUNCTION

1. When the appliance is plugged in, it is set to 'Medium'. Each time the button is pushed, it is set to 'Medium'→'Medium/High'→'High'→'Low'→'Medium/Low'→'Medium' in order.
2. When the power is initially applied or restored after a power failure, it is automatically set to 'Medium'.



7-1-2 DEFROSTING

1. The defrosting is performed each time when the total running time of the compressor reaches 7 hours.
2. After the power is turned on (or restored after a power failure), the defrosting starts when the total running time of the compressor reaches 4 hours.
3. When the temperature of the defrosting sensor reaches 13 °C or above, the defrosting stops. If the temperature does not reach 13 °C in 2 hours after the defrosting starts, the defrosting error code is displayed. (Refer to 7-1-4 Error Diagnostic Mode.)
4. With the defective defrosting sensor (cut or short-circuited wire), the defrosting will not be performed.

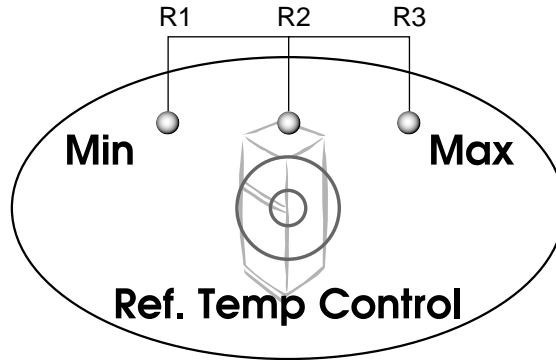
7-1-3 SEQUENTIAL OPERATION OF ELECTRIC COMPONENTS




The electric components, such as the comp, defrosting heater, and cooling fan, start sequentially to avoid the noise and damage to the part, which may result from the simultaneous start of various components on turning the power on or after the completion of a test.














Condition of Operation		Operating Sequence	
When the power is turned on	If the temp of the defrosting sensor is 25 °C or above (For the initial use after the purchase or grounding)	POWER ON	<p style="text-align: center;">in 0.5 sec →</p> <p>COMP & COOLING FAN ON</p>
	If the temp of the defrosting sensor is below 25 °C (After a power failure or SVC)	<p>POWER ON</p> <p style="text-align: center;">in 0.5 sec →</p> <p>DEFROSTING HEATER ON</p> <p style="text-align: center;">in 10 sec →</p> <p>DEFROSTING HEATER OFF</p> <p style="text-align: center;">in 0.5 sec →</p> <p>COMP & COOLING FAN ON</p>	

7-1-4 ERROR DIAGNOSTIC MODE

1. The error diagnostic mode allows the SVC when a fault that may affect the performance of the product occurs while operating the product.
2. Even if the function control button is pushed when an error occurs, the function will not be performed.
3. When the error is cleared while the error code is displayed due to a fault, the appliance returns to the normal condition (Reset).
4. The error code is displayed by the refrigerator temp indication LED on the display of the refrigerator while the remaining LEDs are off.

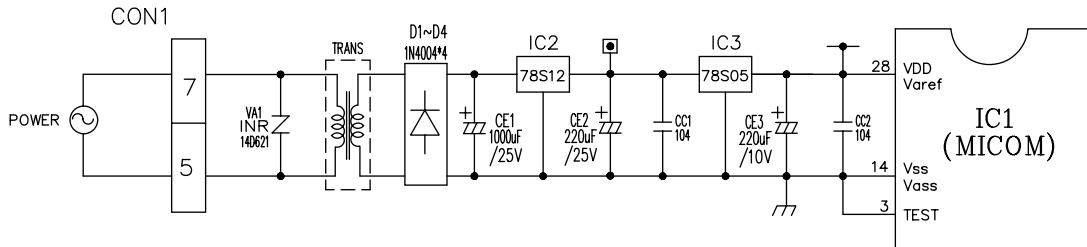


 : BLINK(1sec on/1sec off)
  : OFF
  : NORMAL

NO	Error	Error Code Display			Cause	State of Operation with Error	
		R1	R2	R3		Comp / Cooling fan	Defrosting heater
1.	Faulty refrigerator(R) sensor (on the control box of the refrigerator)				Cut or short-circuited wire of refrigerator sensor	15 min ON/ 15 min OFF	
2.	Faulty defrosting sensor				Cut or short-circuited wire of defrosting sensor		No defrosting
3.	Defrosting failure				Cut or disconnected wire of defrosting heater or temperature fuse(indicated at least 2 hours later after the error occurs)		

7-2 PCB FUNCTION

7-2-1 POWER CIRCUIT



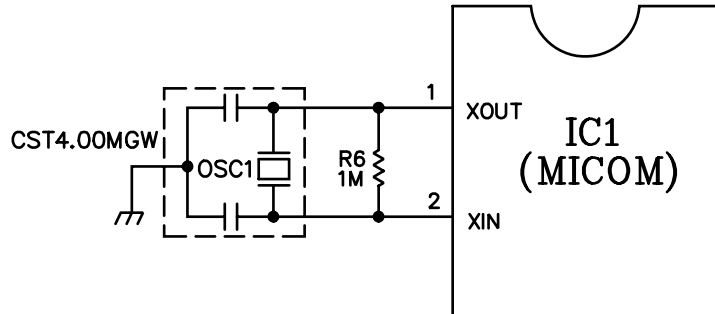
The secondary part of the TRANS is composed of the power supply for the display and relay drive (12Vdc) and that for the MICOM and IC (5Vdc).

The voltage for each part is as follows.

PART	VA 1	CE 2	CE3
VOLTAGE	220 Vac	12 Vdc	5 Vdc

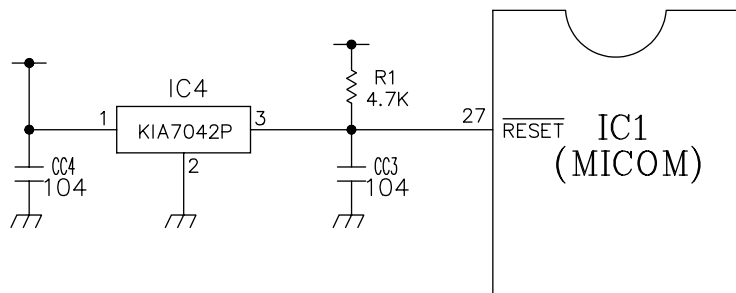
VA1 is a part for preventing the over voltage and noise. When 385V or higher power is applied, the inside elements are short-circuited and broken, resulting in the blowout of the fuse in order to protect the elements of the secondary part of the TRANS.

7-2-2 OSCILLATION CIRCUIT



This circuit is to generate the base clock for calculating time and the synchro clock for transmitting data from and to the inside logic elements of the IC1(MICOM). Be sure to use the authentic parts since the calculating time by the IC1 may be changed or it will not work if the OSC1 SPEC is changed.

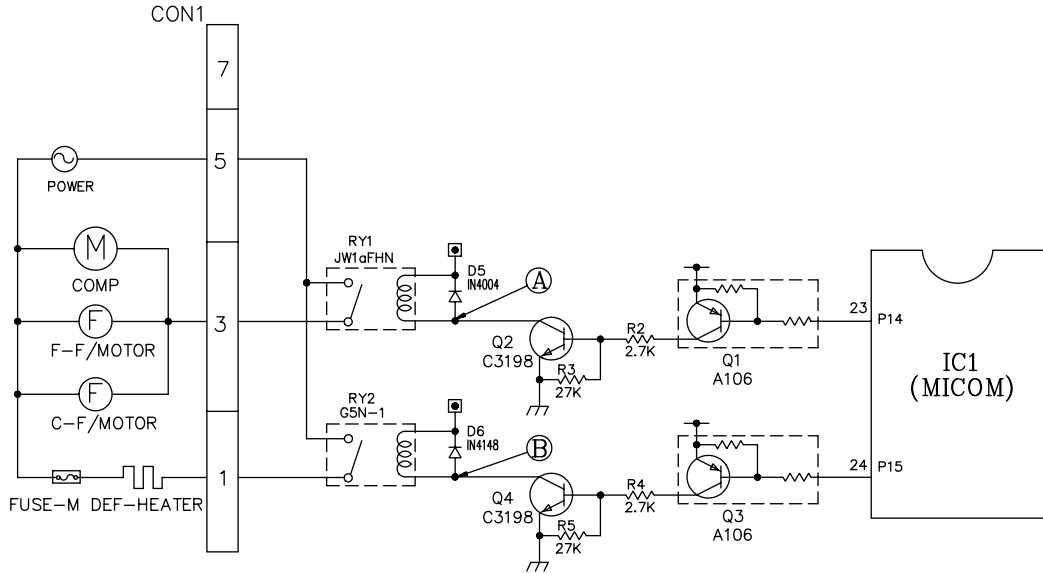
7-2-3 RESET CIRCUIT



The RESET circuit is for allowing all the functions to start at the initial conditions by initializing various parts including the RAM inside the MICOM (IC1) when the power is initially supplied or the power supply to the MICOM is restored after a momentary power failure. For the initial 10ms of power supply, 'LOW' voltage is applied to the MICOM RESET terminal. During a normal operation, 5V is applied to the RESET terminal. (If a trouble occurs in the RESET IC, the MICOM will not work.)

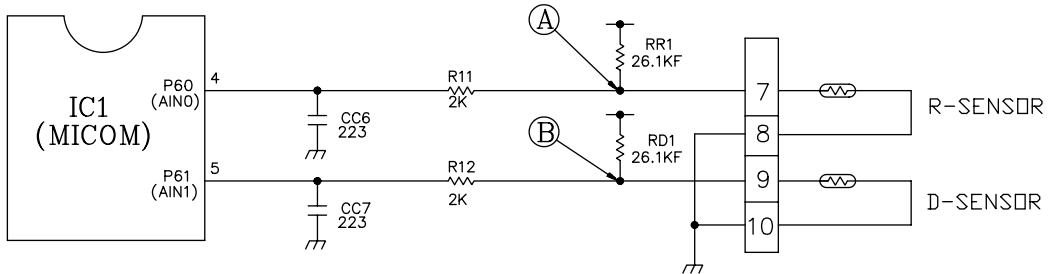
7-2-4 LOAD DRIVE CIRCUIT

1. Load Drive Condition Check



Load Type		Comp, Freezer Fan Motor	Defrosting Heater
Measurement Location		Ⓐ	Ⓑ
Condition	ON	1V or below	
	OFF	12V	

7-2-5 TEMPERATURE SENSOR CIRCUIT

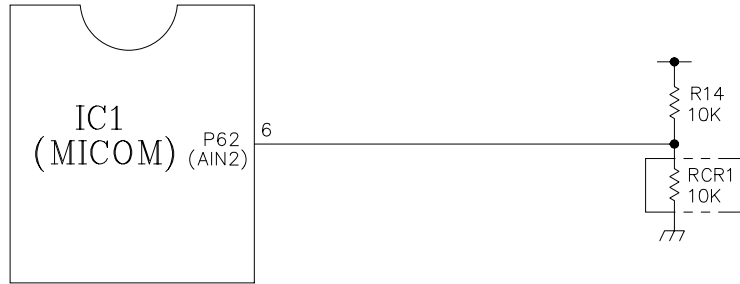


The upper CIRCUIT reads REFRIGERATOR temperature and DEF-SENSOR temperature for defrosting into MICOM. OPENING or SHORT state of each TEMPERATURE SENSOR are as follows.

SENSOR	CHECK POINT	NORMAL(-30 °C ~ 50 °C)	SHORT-CIRCUITED	OPEN
Refrigerator Sensor	POINT (A) Voltage	0.5 V ~ 4.5 V	0 V	5 V
Defrosting Sensor	POINT (B) Voltage			

7-2-6 TEMPERATURE COMPENSATION & OVERCOOLING/UNDERCOOLING COMPENSATION CIRCUIT

1. Refrigerator Temperature Compensation

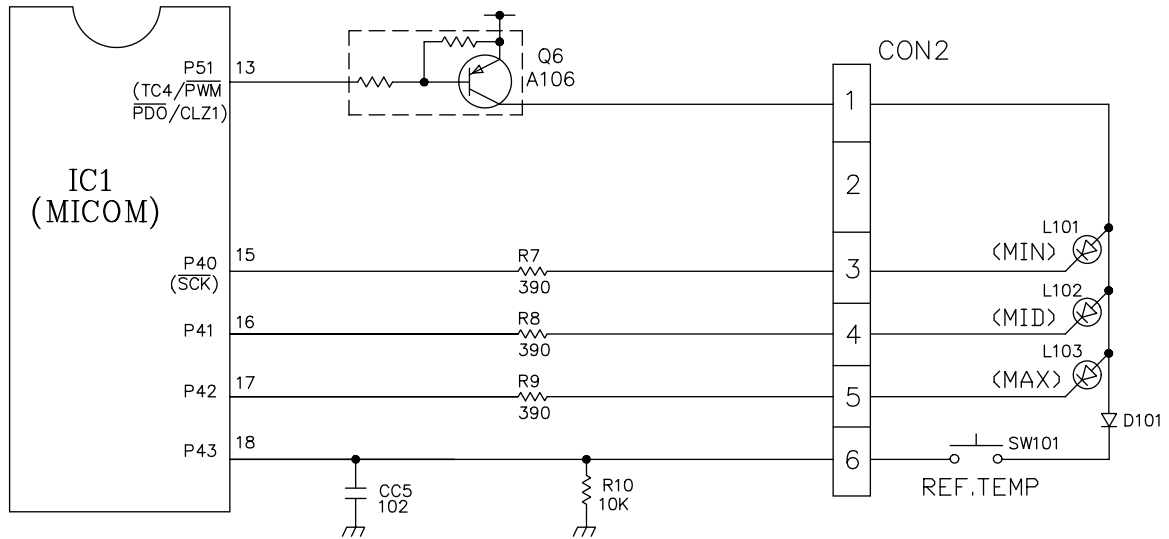


Refrigerator		Remark
Resistance (RCR1)	Temperature Compensation	
180 KΩ	+5.0 °C	Compensation by raising the temperature ↑
56 KΩ	+4.0 °C	
33 KΩ	+3.0 °C	
18 KΩ	+2.0 °C	
12 KΩ	+1.0 °C	
10 KΩ	0 °C	Standard Temperature
8.2 KΩ	-1.0 °C	Compensation by lowering the temperature ↓
5.6 KΩ	-2.0 °C	
3.3 KΩ	-3.0 °C	
2 KΩ	-4.0 °C	
470 Ω	-5.0 °C	

◆ Table of Temperature Compensation by adjusting the resistance (Difference with the current temperature)

E.g.) If the refrigerator compensation resistance (RCR1) is changed from 10K (the current resistance) to 18K (the adjustment resistance), the temperature of the refrigerator rises +2 °C.

7-2-7 KEY BUTTON INPUT & DISPLAY LIGHT ON CIRCUIT



▶ The circuit shown above is to determine whether a function control key on the operation display is pushed and to turn on the corresponding function indication LED. The drive type is the scan type.

7-3. RESISTANCE SPECIFICATION OF SENSOR

TEMPERATURE SENSOR	RESISTANCE OF REFRIGERATOR (DEFROST) SENSOR
- 20 °C	77 KΩ
- 15 °C	60 KΩ
- 10 °C	47.3 KΩ
- 5 °C	38.4 KΩ
0 °C	30 KΩ
+ 5 °C	24.1 KΩ
+ 10 °C	19.5 KΩ
+ 15 °C	15.9 KΩ
+ 20 °C	13 KΩ
+ 25 °C	11 KΩ
+ 30 °C	8.9 KΩ
+ 40 °C	6.2 KΩ
+ 50 °C	4.3 KΩ

- The resistance of SENSOR has $\pm 5\%$ common difference.
- Measure the resistance of SENSOR after leaving it over 3 minutes in measuring temperature. This postponing is necessary because of perceiving speed.

7-4. TROUBLE SHOOTING

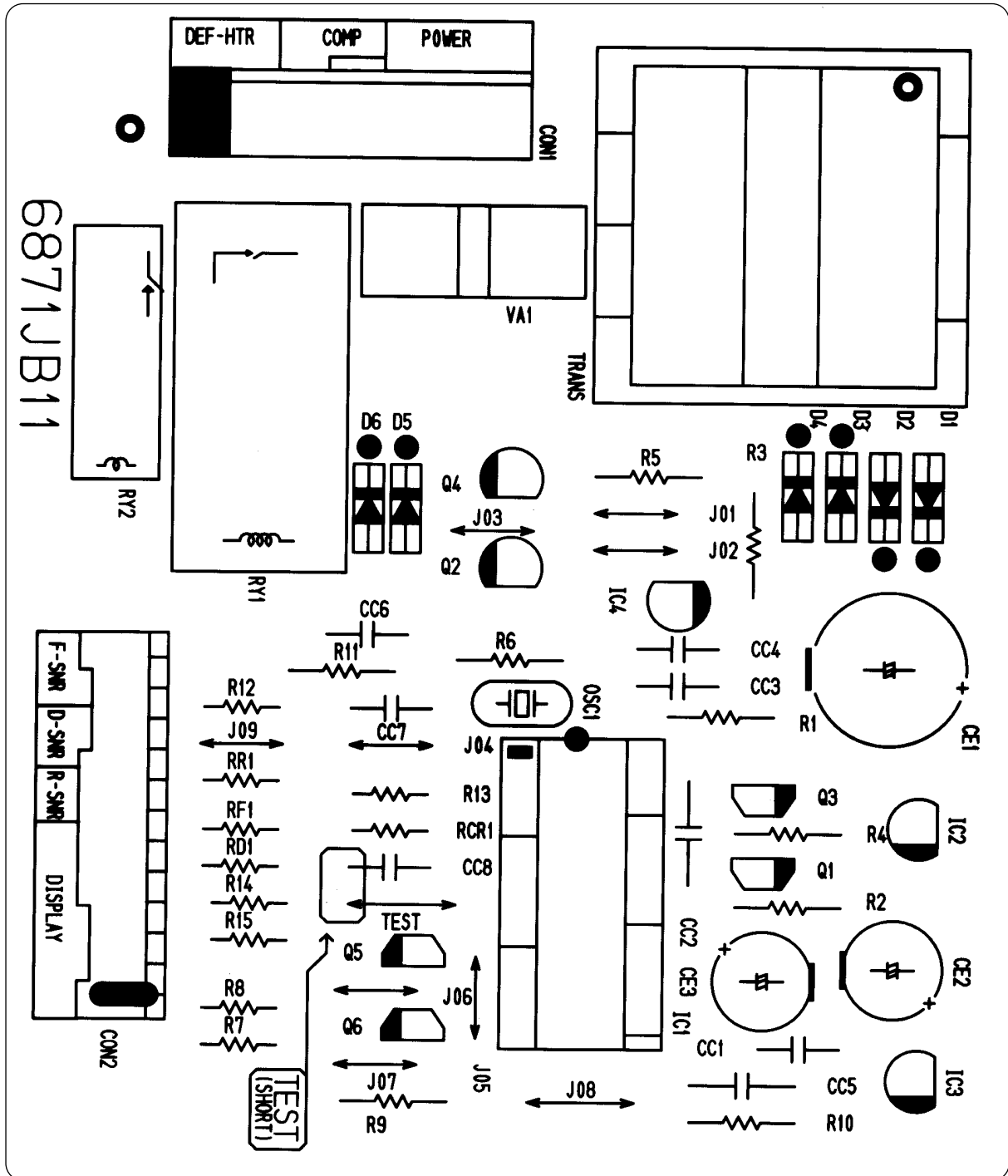
- Replace PCB when no trouble after checking the contents of trouble.

CLASSIFICATION	STATE OF TROUBLE	POINT BE CHECKED	CHECKING METHOD	CONTENT	REMEDY
POWER SOURCE is poor	1. All the DISPLAY LED OFF 2. DISPLAY LED represents abnormal operation.	1. FREEZER/REFRIGERATOR 2. LAMP is dim. 3. The connection of CONNECTOR of MAIN PWB.	FREEZER/REFRIGERATOR DOOR OPEN	POWER SOURCE is poor	Certify Fuse. Certify outlet Voltage.
			CHECK with the naked.	Applied voltage mistake	Use boosting TRANS.
			Certify connection of CONNECTOR.	CONNECTOR connection is poor.	Reconnect CONNECTOR.
COOLING is poor	NO COOLING	1. COMPRESSOR operates? 2. Whether refrigerant leaks or leaks or not. 3. Whether FAN MOTOR operates or not.	Check the MAIN PCB.	COMPRESSOR lock or blocked.	Replace COMPRESSOR.
			Measure the amount of frost sticking on EVA and the surface temperature of condenser pipe.	Refrigerant leakage.	Remedy the leaking part and reaching Refrigerant.
			Check the MAIN PCB.	FAN MOTOR is poor DOOR LINE contact. CONNECTING WIRE is poor.	Replace FAN MOTOR. Replace DOOR LINER. Certify MOTOR and the connection of the black wire of MAIN PWB CONNECTOR. (CON1)
FREEZER TEMPERATURE is poor		1. Whether FAN MOTOR operates or not. 2. DEFROSTING normal? 3. SENSOR normal?	Check the amount of frost sticking on EVA.	DEFROSTING is poor.	See the DEFROSTING trouble.
			Check resistance the SENSOR in the Refrigerator	SENSOR RESISTANCE is poor.	Replace SENSOR

CLASSIFICATION	STATE OF TROUBLE	POINT BE CHECKED	CHECKING METHOD	CONTENT	REMEDY
COOLING is poor.	REFRIGERATOR TEMPERATURE is poor.	1. FREEZER TEMPERATURE is normal?	See "FREEZER TEMPERATURE is poor".		Certify the attaching state of DOOR.
		2. Cool air of FAN MOTOR is sufficient?	Certify the amount of cool air and its speed touching check supplied into REFRIGERATOR	FAN MOTOR is poor. Passage of cool air blocking. EVA frozen.	Replace FAN MOTOR. Remove impurities. See "DEFROSTING is poor".
DEFROSTING is poor.	NO DEFROSTING.	1. HEATER emit heat?	Check the MAIN PCB.	HEATER disconnection.	Replace HEATER.
				TEMPERATURE FUSE disconnection.	Replace TEMPERATURE FUSE.
				Connection is poor.	Certify EVA connection and wire of MAIN PWB CONNECTOR (CON1)
				DEF-SENSOR is poor.	Replace DEF-SENSOR.
				HEATER RELAY is poor.	Replace RY2 of MAIN PWB.
				DRAIN PIPE blocking.	Remove ice and impurities. Certify HEATER PLATE resistance.
					Reassemble DEF-SENSOR.
					Attaching is poor.
					DOOR sticking is poor.
					Reassemble DOOR. Replace GASKET.
		3. Remain ice at DEFROSTING?	Certify the attaching of DEF-SENSOR.		
		2. DRAIN PIPE blocking?	Certify DRAIN PIPE.		

7-4 MAIN PWB ASS'Y AND PARTS LIST

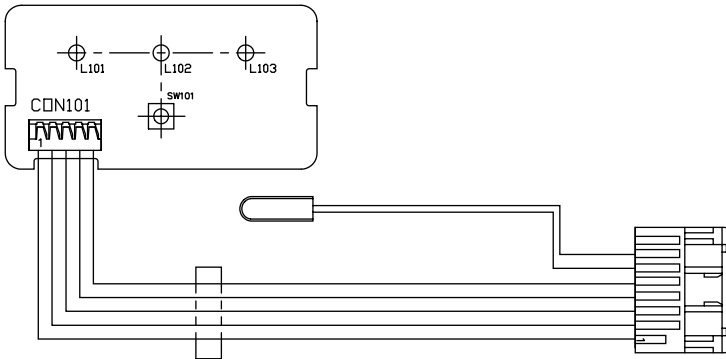
7-4-1 MAIN PWB ASS'Y



7-4-2 REPLACEMENT PARTS LIST

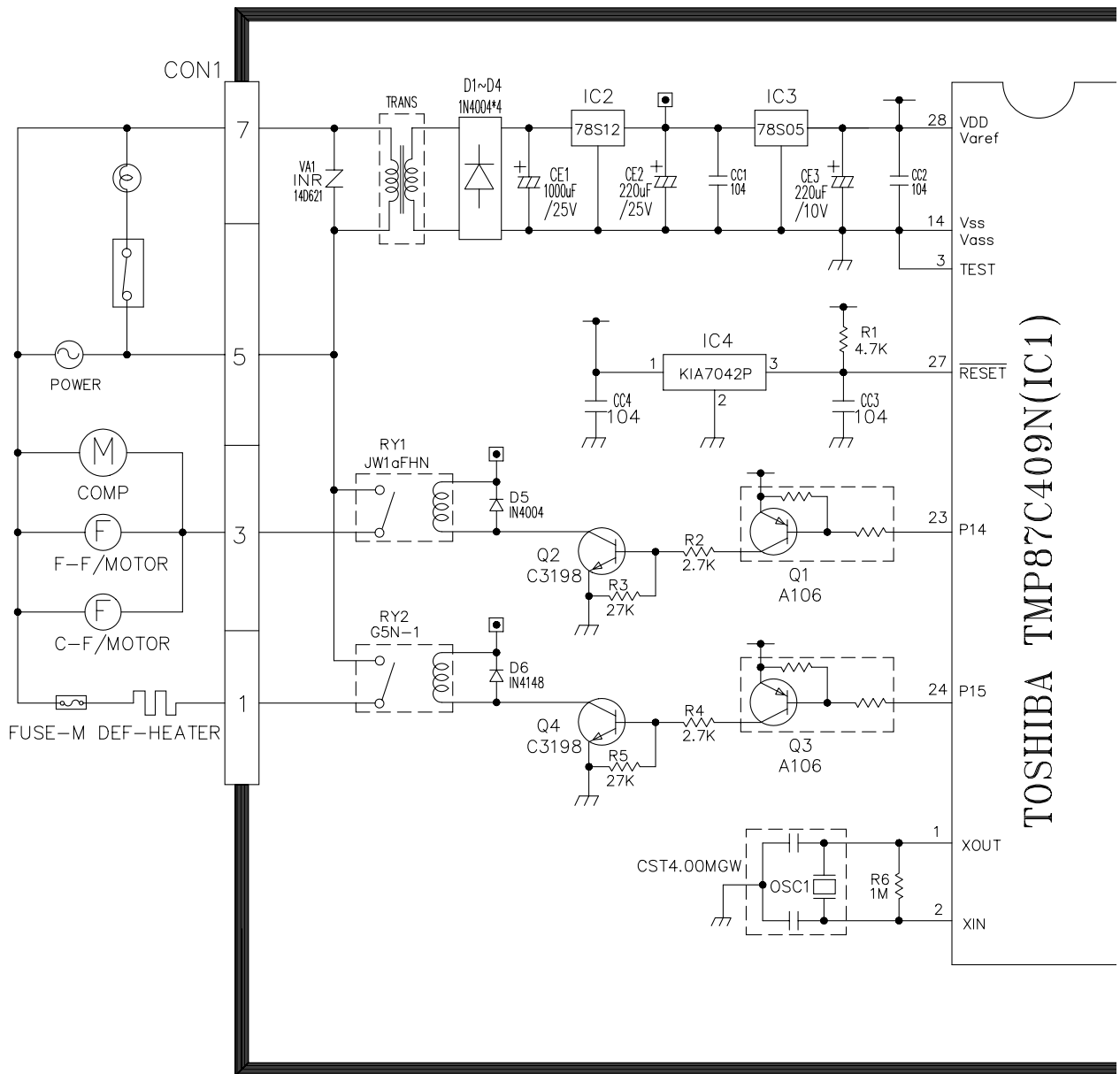
품번 NO.	도 번 DWG. NO.	품 명 DESCRIPTION	스펙/기수 SPEC'	MAKER	비 고 REMARK	
1	6870JB2062	PWB,MAIN	FR-1(DS-1107A)	DOO SAN	t=1.6	
2	6170JB2014	TRANS PCB	I: 220V, O: 15V	TAE SUNG	TRANS	
3	6630JB8001W	WAFER	JE202-1T-04(7P-2,4)	JAE EUN	CON1	
4						
5	6630JB8007J		917788-1(10P)	AMP	CON2	
6						
7	Q1ZZJB2004G	MICOM CHIP	TMP87C409N	TOSHIBA	IC1(=Q1ZZJB2004H)	
8	Q1KE781200A	REGULATOR	K1A78S12P	KEC	IC2	
9	Q1KE780500A		K1A78S05P	KEC	IC3	
10	Q1KE704200A	RESET IC	K1A7042P	KEC	IC4	
11	Q1KD010100A		BMR-0101D	KODENSHI		
12	6920JB2005A	RELAY	JW10FHN	NAIS	RY1	
13	6920JB2003A		G5N-1A	OMRON	RY2	
14	J570-00012A	RESONATOR	CSTS4.00MCW	MURATA	OSC1 (=6212JB8001B)	
15						
16	6102JB8001B	VARISTOR	INR14D621	IL JIN	VA1	
17	0DD400409AA	RECTIFIER DIODE	1N4004	(OPTING CHANG (2)DELTA	D1~5	
18	0DD414800AA	SWITCHING DIODE	1N4148	(OPTING CHANG (2)ROHM	D6	
19	0CE1081H618	ELE' CAPACITOR (105°C)	1000uF/25V	SAM HWA	CE1	
20	0CE227AH638		220uF/25V		CE2	
21	0CE2271F638		220uF/16V		CE3	
22	0CK1040H908	CER' CAPACITOR	104/50V	TAE YANG	CC1,2,3,4	
23	0CK2230H908		223/50V		CC6,7	
24	0CK1020H908		102/50V		CC5	
25	0RD3900F609		390J 1/6W		(1)CHO YANG (2)K-OHM (3)DONG HO (4)SUNG YO	R7,8
26	0RD3900G609	390J 1/4W	R9			
27	0RD2001F609	2KJ 1/6W	R12			
28	0RD2001G609	2KJ 1/4W	R11			
29	0RD2701G609	2.7KJ 1/4W	R2,4			
30	0RD4701F609	4.7KJ 1/6W	R15			
31	0RD4701G609	4.7KJ 1/4W	R1			
32	0RD1002F609	10KJ 1/6W	R14			
33	0RD1002G609	10KJ 1/4W	R10			
34	0RD2702G609	27KJ 1/4W	R3,5			
35	0RD1803F609	180KJ 1/6W	RCR1			
	0RD5602F609	56KJ 1/6W				
	0RD3302F609	33KJ 1/6W				
	0RD1802F609	18KJ 1/6W				
	0RD1202F609	12KJ 1/6W				
	0RD1002F609	10KJ 1/6W				
	0RD8201F609	8.2KJ 1/6W				
	0RD5601F609	5.6KJ 1/6W				
0RD3301F609	3.3KJ 1/6W					
0RD2001F609	2KJ 1/6W					
0RD4700F609	470J 1/6W					
36	0RD1004G609	1MJ 1/4W	R6			
37	0RN2612F409	26.1KF 1/6W	RR1			
38	0RN2612F409	26.1KF 1/6W	RD1			
39	0RN2612G409	26.1KF 1/4W				
40	0RN1622G409	16.2KF 1/4W				
41						
42	0TR106009AC		KRA106M	KEC	Q1,3,6	
43	0TR319809CA		KTC3198 TP	KEC	Q2,4	
44	43607015	JUMP WIRE	0.6*7.5mm		J1~5,7,CC8	
45			0.6*10mm		J8,9,TEST	
46						
47	49111001	SOLDER	ALMIT KR-19RMA			
48	49111004	SOLDER LEAD BAR	H63A	HBE SUNG, DAE JIN SOLD'		
49	59333105	FLUX AUTO	JS71	KOKI		
50						

7-4-3 PWB ASS'Y, DISPLAY AND PARTS LIST



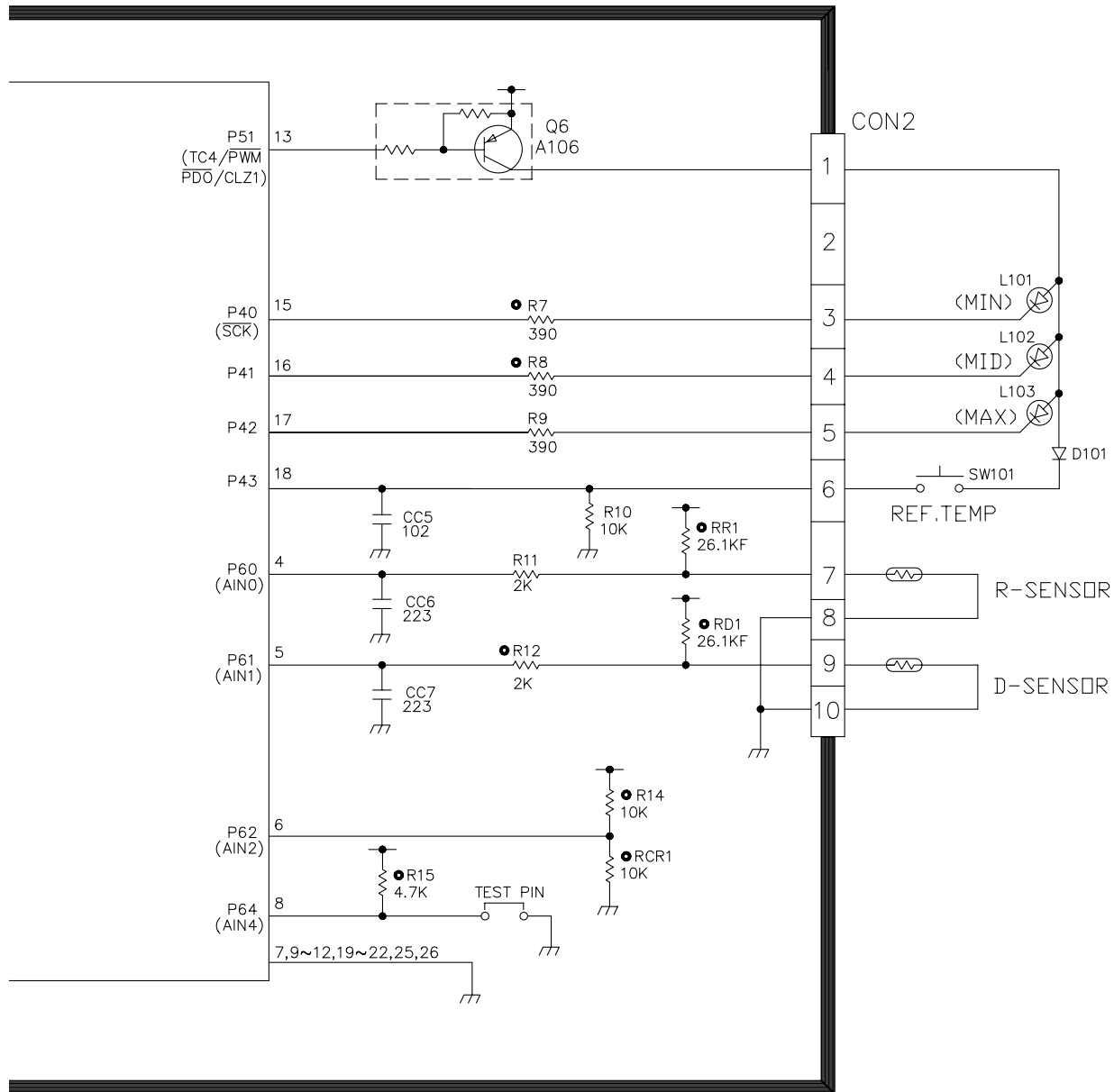
No	P/No	Description	Spec	Maker	Bigo
1	6870JB2061A	PWB(PCB),DISPLAY	R-B29 (HM-PJT)	DOO SAN	-
2	6600JB8005A	SWITCH	KPT-1105A	KYUNG IN	SW101
3	0DL500329AA	LED	SV50-R032BF569GG	SEOUL SEMI.	L101~L103
4	0DD414809AA	DIODE, SWITCHING	1N4148 26MM	-	-
5	-	LEAD WIRE	UL1007 AWG24 (VSF 0.18/12/0.3MM ²)		-
6	-	LEAD WIRE	UL1007 AWG24 (VSF 0.18/12/0.3MM ²)		-
7	-	LEAD WIRE	UL1007 AWG24 (VSF 0.18/12/0.3MM ²)		-
8	-	LEAD WIRE	UL1007 AWG24 (VSF 0.18/12/0.3MM ²)		-
9	-	LEAD WIRE	UL1007 AWG24 (VSF 0.18/12/0.3MM ²)		-
14	-	HOUSING	#316092-1	AMP	8P
15	-	TAP.	#917764-1	AMP	-
16	-	DOUBLE LOCK PLATE	#917704-1	AMP	8P
17	-	HOUSING	#35022-0006	MOLEX	(WHITE)
18	-	CONTACT	#35021-1101(PBT)	MOLEX	-
19	-	TAPE, VINYL	(W19xL60MM=1)	-	
22	6500JB1001S	SENSOR, TEMPERATURE	K43 PVC R-SENSOR	-	(200MM)
26	49111001	SOLDER, SOLDERING	ALMIT KR-19RMA	HEE SUNG	-
27	49111004	SOLDER, LEAD BAR	S63S-B20	DAE JIN	SOLD'
28	59333105	FLUX	JS71	KOKI	-

7-5 PWB DIAGRAM



TOSHIBA TMP87C409N(IC1)

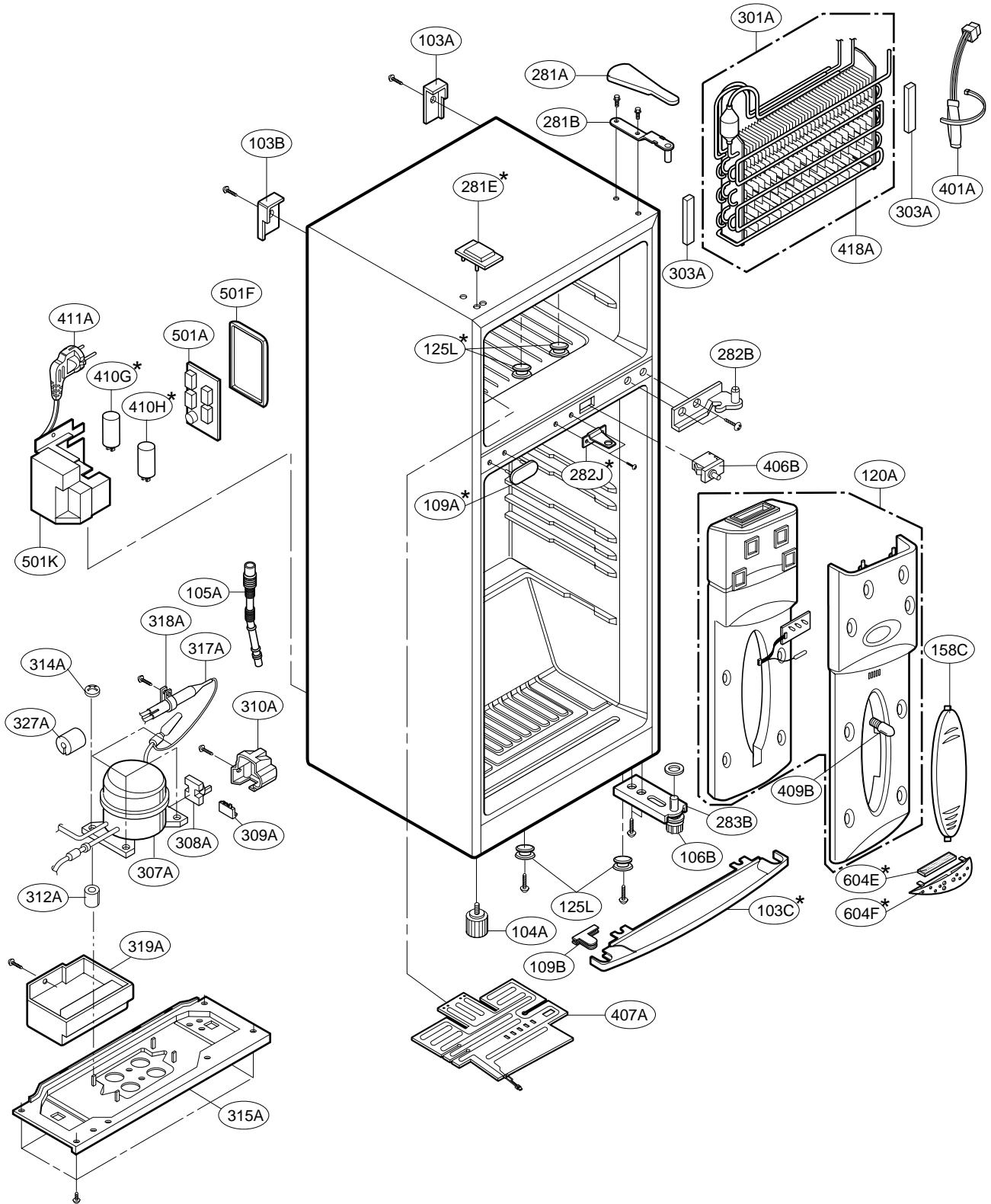
CIRCUIT DIAGRAM



7. EXPLODED VIEW

▼ The parts of refrigerator and the shape of each part are subject to change in different localities.

*: optional parts



*: optional parts

