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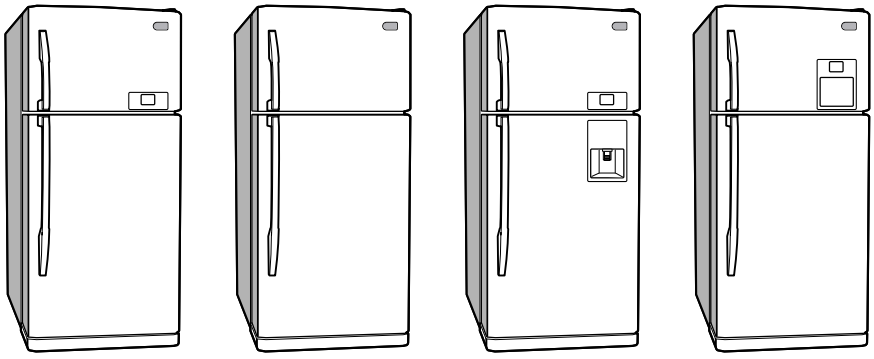
REFRIGERATOR

SERVICE MANUAL

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



MODEL : GR-M652Y*A/M712Y*A
GR-M652Y*Y/M712Y*Y
GR-B652Y*B/B712Y*B
GR-B652Y*Y/B712Y*Y
GR-B652Y*C/B712Y*C
GR-M652Y*X/M712Y*X
GR-M652Y*Q/M712Y*Q
GR-B652Y*S/B712Y*S
GR-B652Y*Q/B712Y*Q

CONTENTS

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 vaporator.
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)

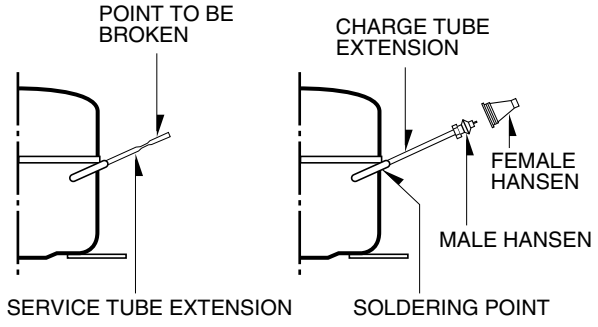


Figure 1

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)

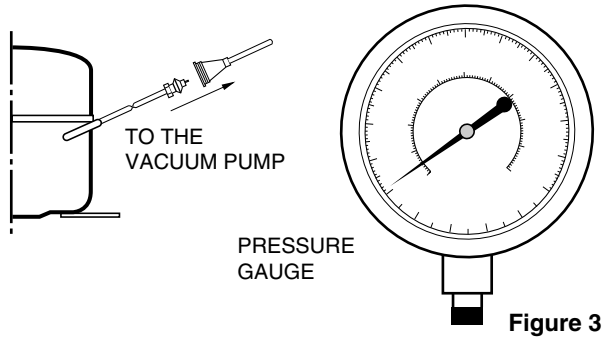


Figure 3

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 60 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 $\pm$5 grams that can be added. (Figure 4)

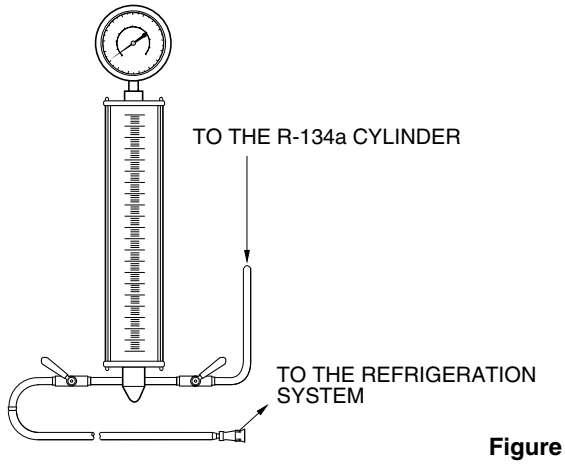


Figure 4

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)

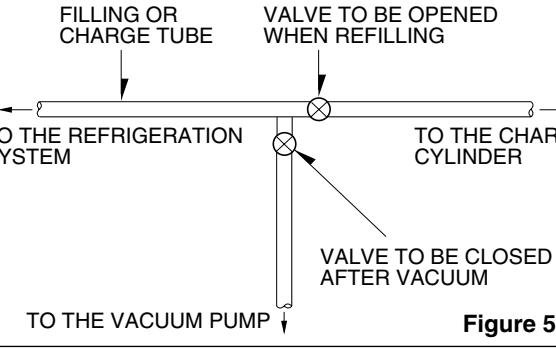


Figure 5

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 0.10 to 0.4 atmosphere.

1. SPECIFICATIONS

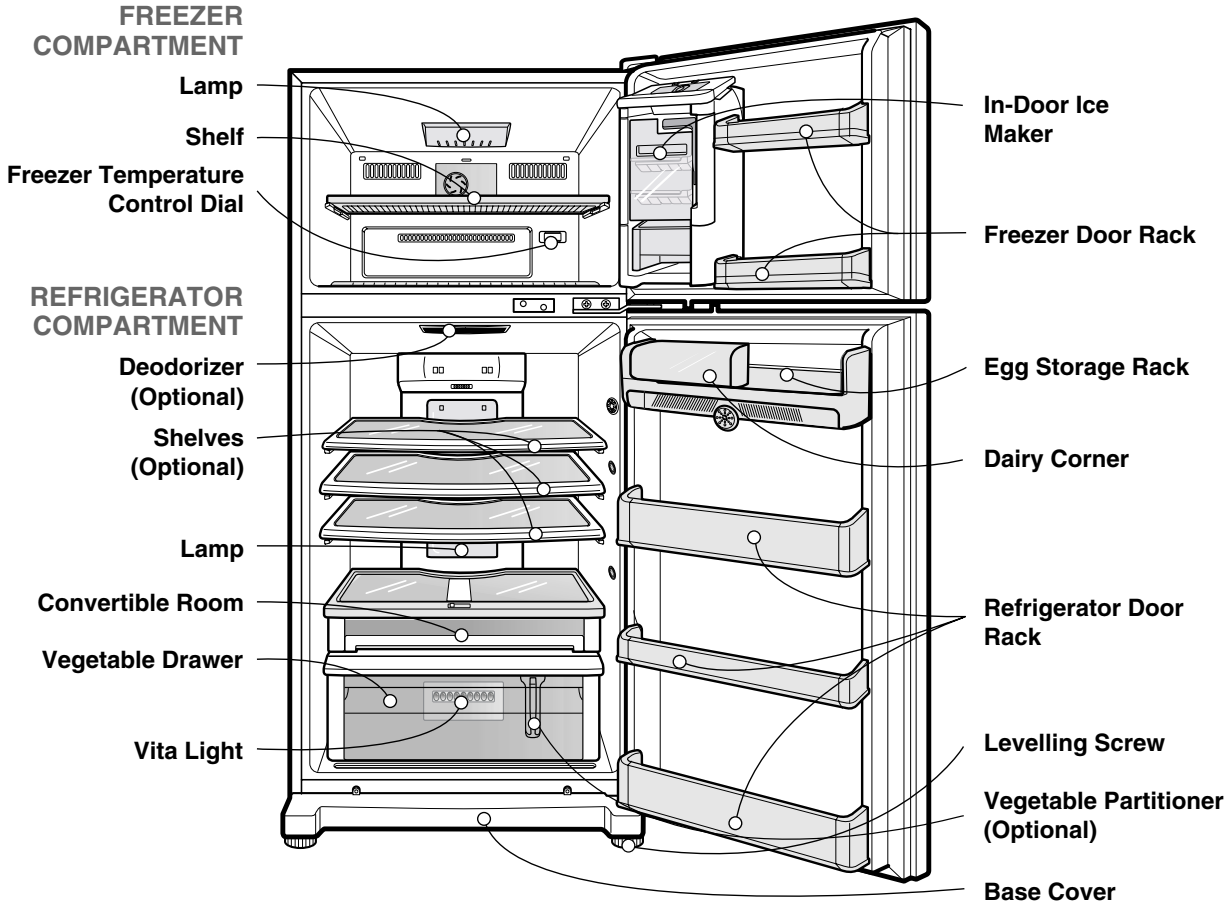
ITEMS		SPECIFICATIONS	
		GR-M712Y*A/ M712Y*X/ M712Y*Y, GR-B712Y*Y/ B712Y*Q/ B712Y*C	GR-B712Y*B/ B712Y*S
NET CAPACITY (ℓ)	FREEZER	157	157
	REFRIGERATOR	409	393
	TOTAL	566	550
DIMENSIONS (mm)		860(W) X 750.5(D) X 1794(H)	860(W) X 750.5(D) X 1794(H)
NET WEIGHT (kg)		97	96
TEMPERATURE CONTROL	FREEZER	Knob Dial	
	REFRIGERATOR	Micom Control	
DEFROSTING SYSTEM		Full Automatic	
		Heater Defrost	
OUT CASE		Pre Coated Metal	
INNER CASE		A B S	
INSULATION		Cyclo-Pentane Foam	
SHELF	FREEZER	1 EA	
	REFRIGERATOR	2 EA/ 3EA(Option)	
VEGETABLE TRAY		Drawer Type	
EGG TRAY		1 Piece	
ICE TRAY		2 Piece	
ICE BANK		1 Piece	
COMPRESSOR		P.T.C Starting Type	
EVAPORATOR		Fin Tube Type	
CONDENSER		Wire Condenser / Screw Condenser	
REFRIGERANT		R134a (140g) / R600a (69g)	
DEFROSTING DEVICE		Heater	

ITEMS		SPECIFICATIONS	
		GR-M652Y*A/ M652Y*X/ M652Y*Y, GR-B652Y*C/ B652Y*Y/ B652Y*Q	GR-B652Y*B/ B652Y*S
NET CAPACITY (ℓ)	FREEZER	151	151
	REFRIGERATOR	394	378
	TOTAL	545	529
DIMENSIONS (mm)		860(W) X 730.5(D) X 1794(H)	860(W) X 730.5(D) X 1794(H)
NET WEIGHT (kg)		95	94
TEMPERATURE CONTROL	FREEZER	Knob Dial	
	REFRIGERATOR	Micom Control	
DEFROSTING SYSTEM		Full Automatic	
		Heater Defrost	
OUT CASE		Pre Coated Metal	
INNER CASE		A B S	
INSULATION		Cyclo-Pentane Foam	
SHELF	FREEZER	1 EA	
	REFRIGERATOR	2 EA/ 3EA(Option)	
VEGETABLE TRAY		Drawer Type	
EGG TRAY		1 Piece	
ICE TRAY		2 Pieces	
ICE BANK		1 Piece	
COMPRESSOR		P.T.C Starting Type	
EVAPORATOR		Fin Tube Type	
CONDENSER		Wire Condenser / Screw Condenser	
REFRIGERANT		R134a (140g) / R600a (69g)	
DEFROSTING DEVICE		Heater	

2. PARTS IDENTIFICATION

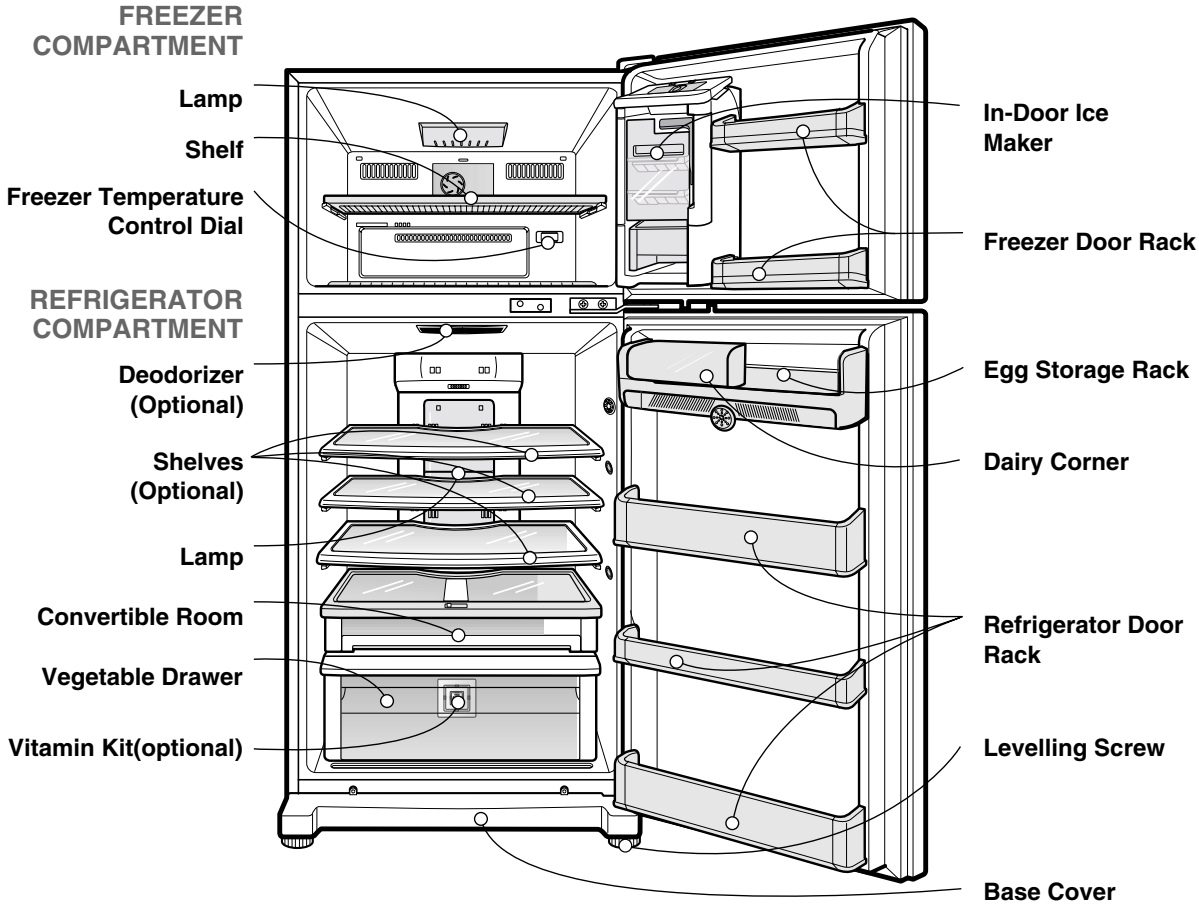
2-1. FEATURE CHART

▶ **GR-M652Y*A/M712Y*A, GR-M652Y*X/M712Y*X**



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

▶ **GR-M652Y*Y/M712Y*Y**



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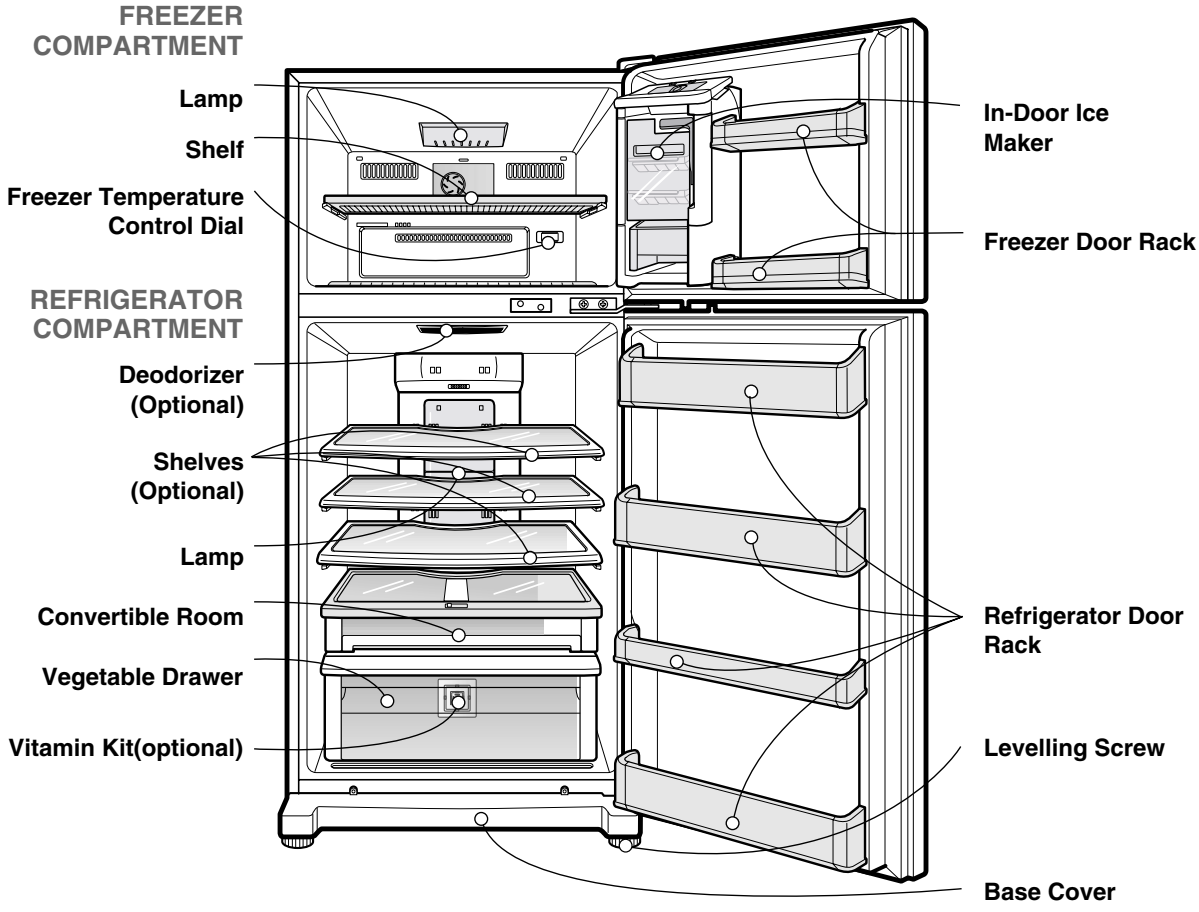
▶ **GR-B652Y*Y/B712Y*Y**



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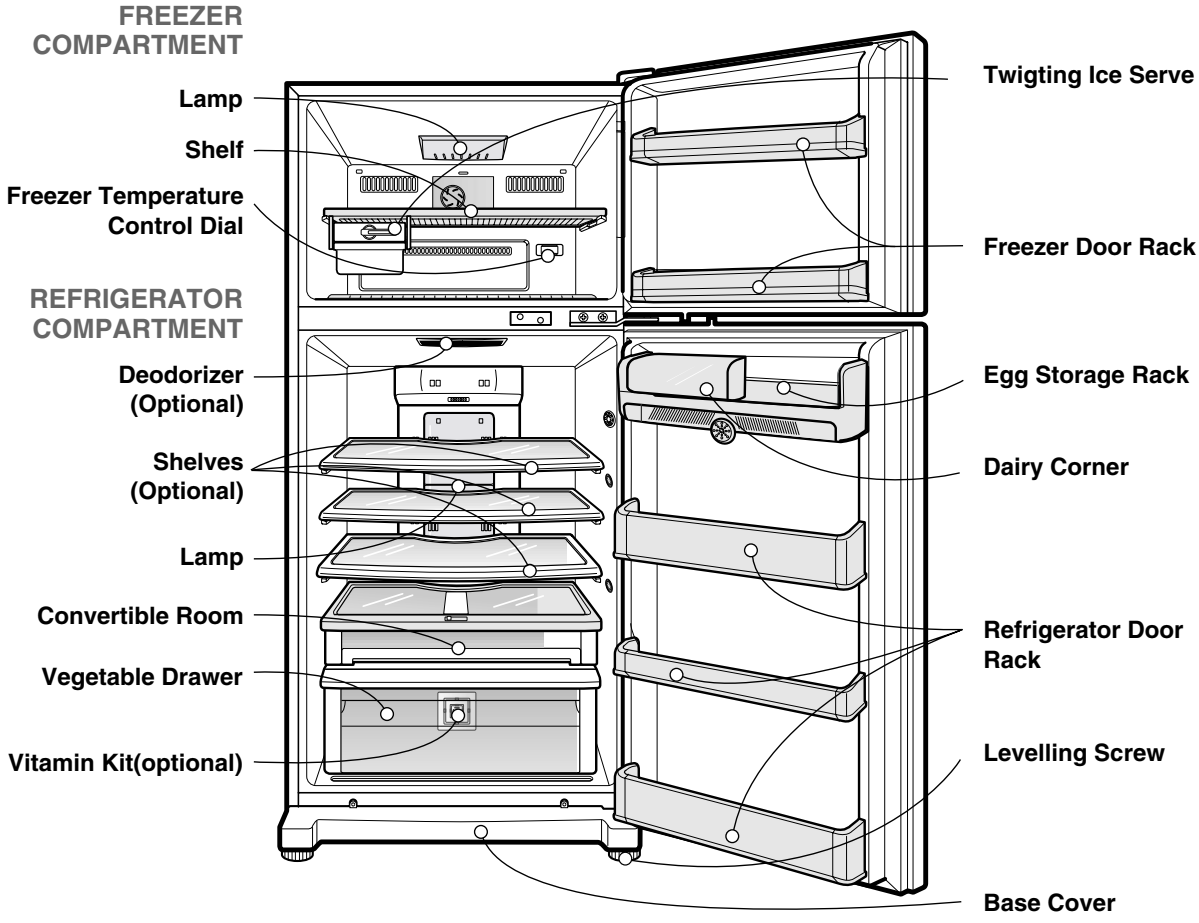
▶ **GR-M652Y*Q/M712Y*Q**



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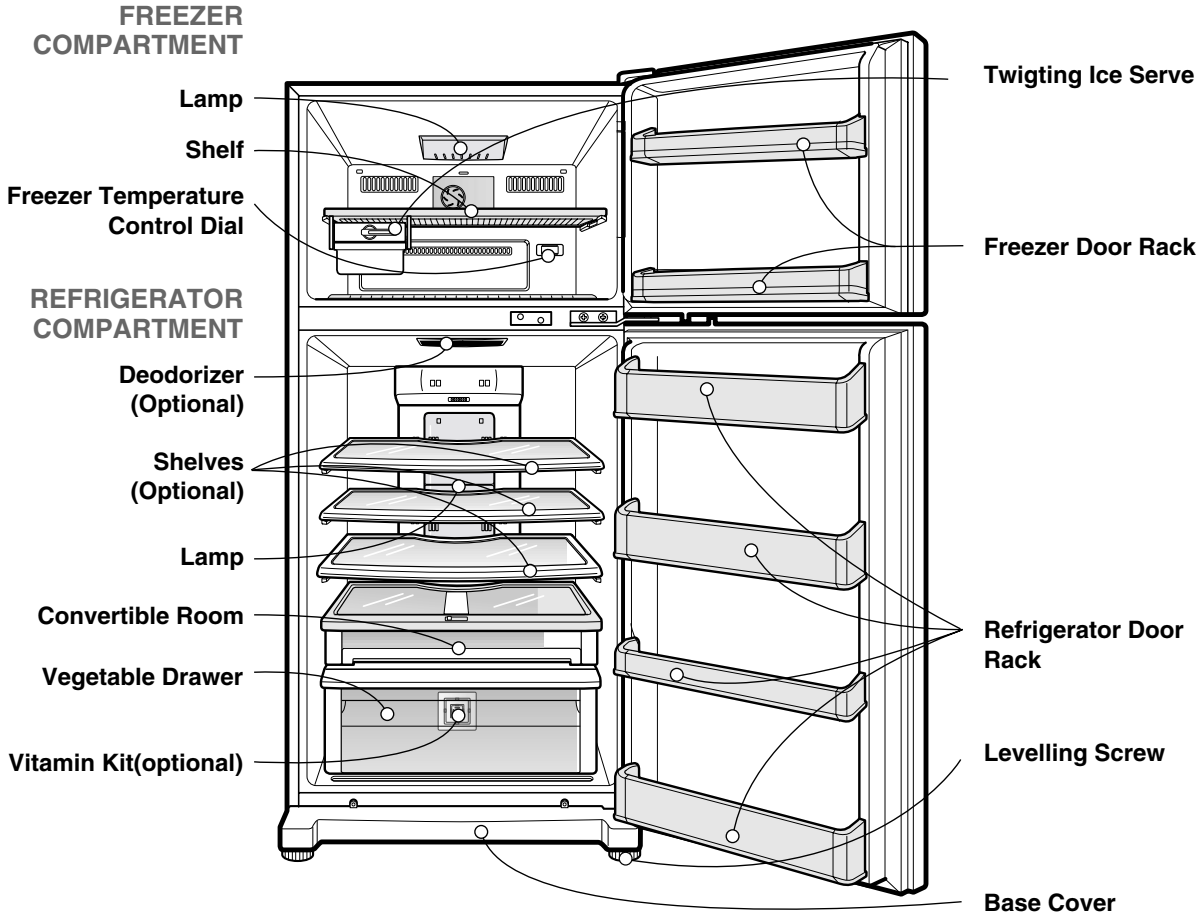
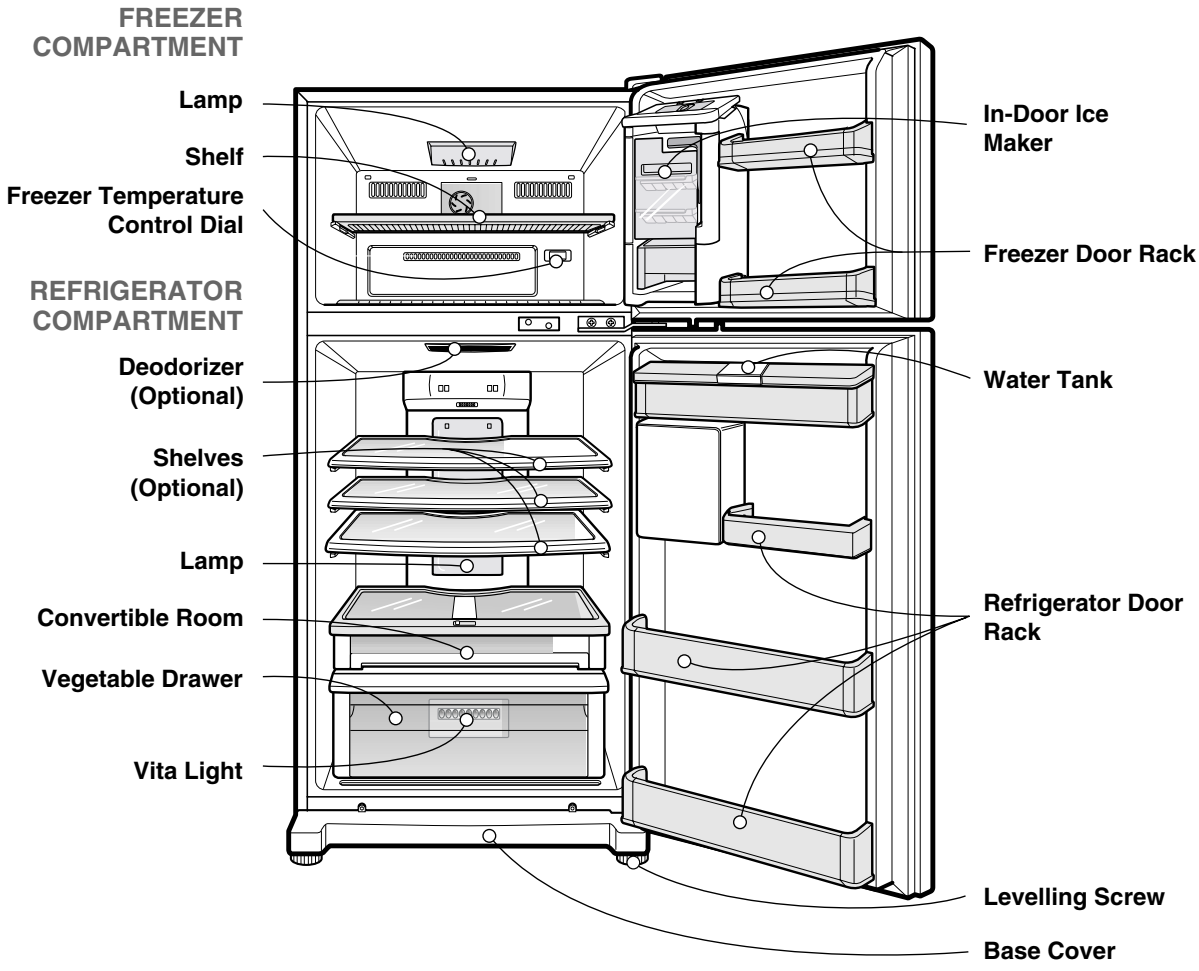
▶ **GR-B652Y*Q/B712Y*Q**



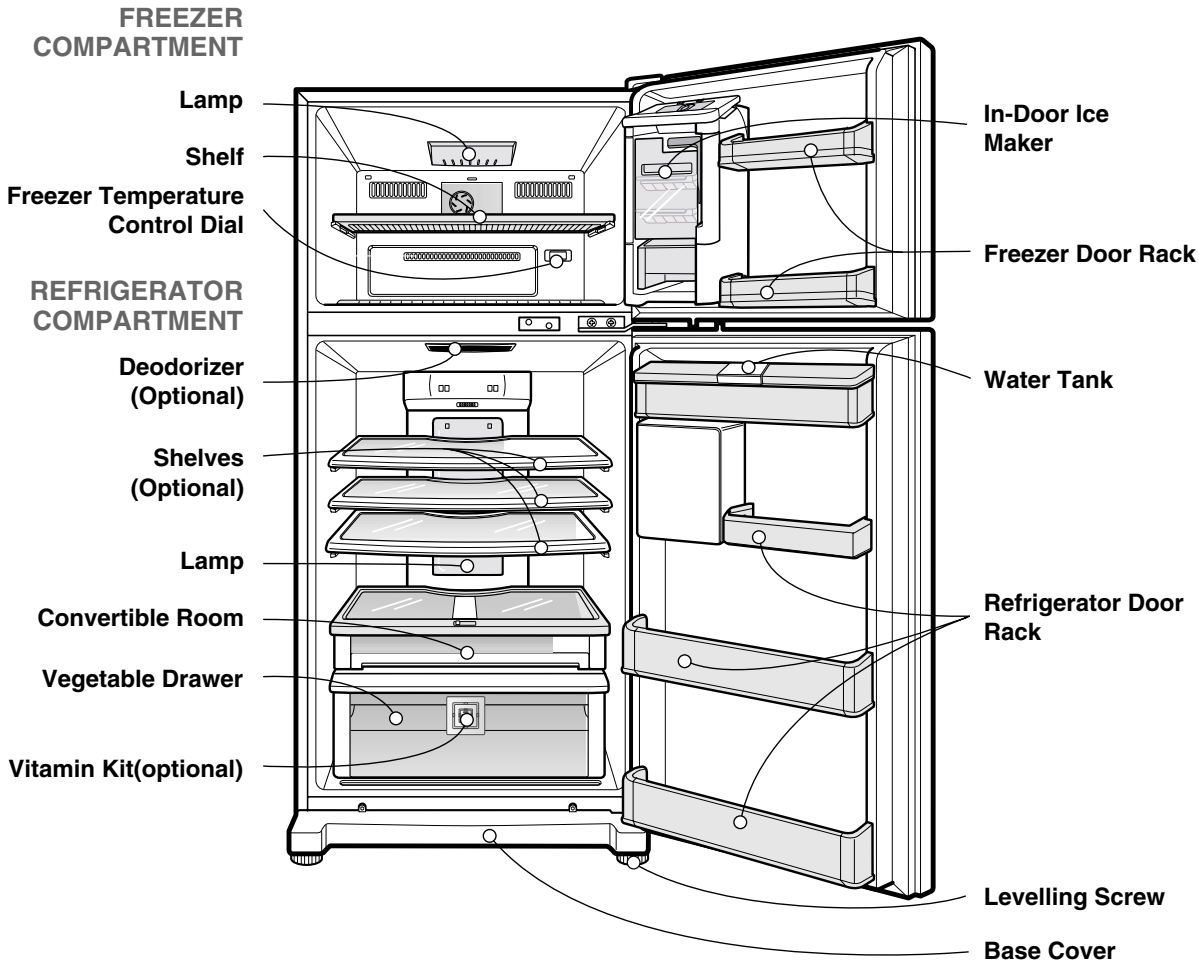
NOTE : This guide covers several different models.The refrigerator you have purchased may have some or all of the features shown above.

▶ **GR-B652Y*B/B712Y*B**



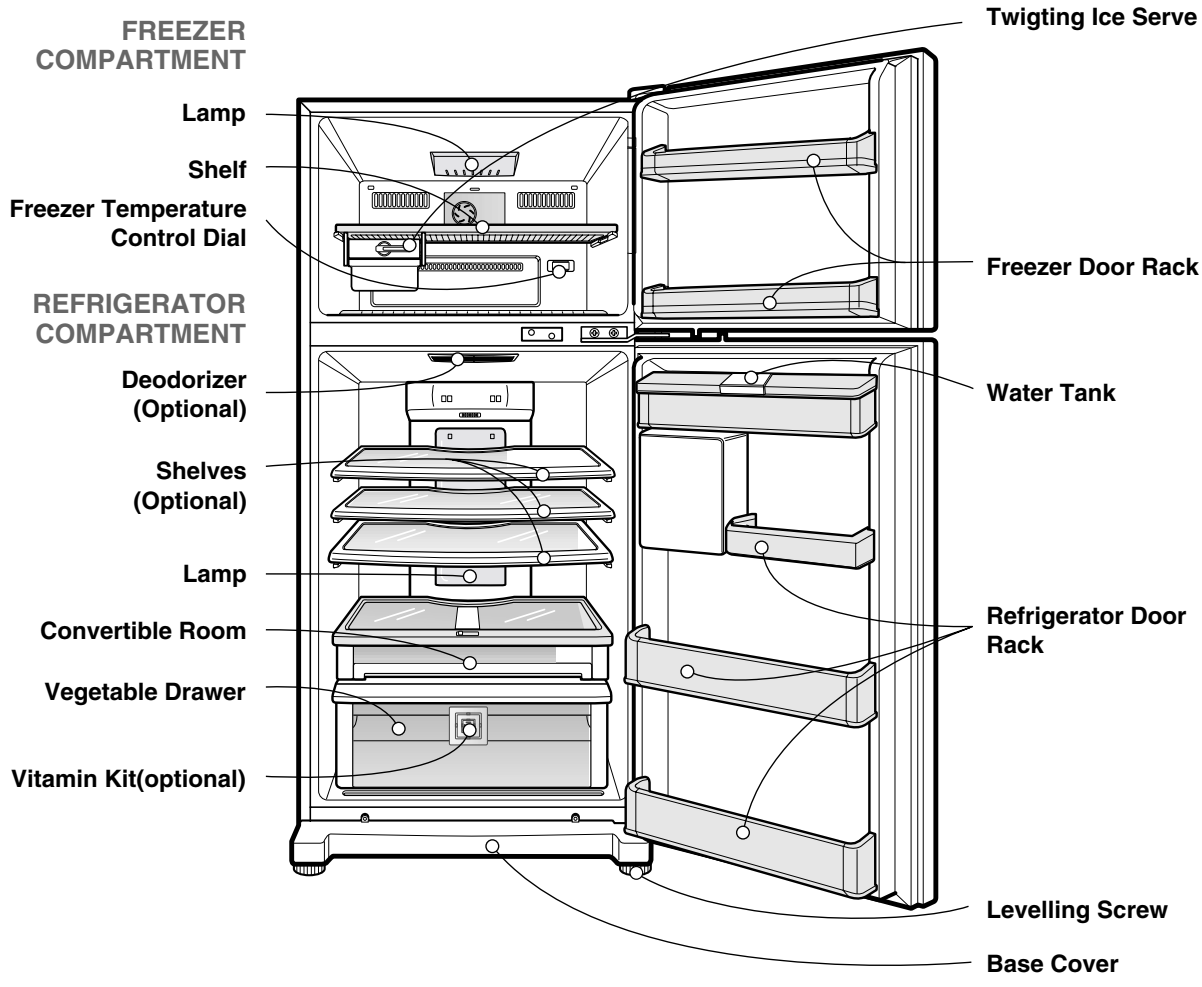
NOTE : This guide covers several different models.The refrigerator you have purchased may have some or all of the features shown above.

▶ **GR-B652Y*S/B712Y*S**



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

▶ **GR-B652Y*P/B712Y*P**



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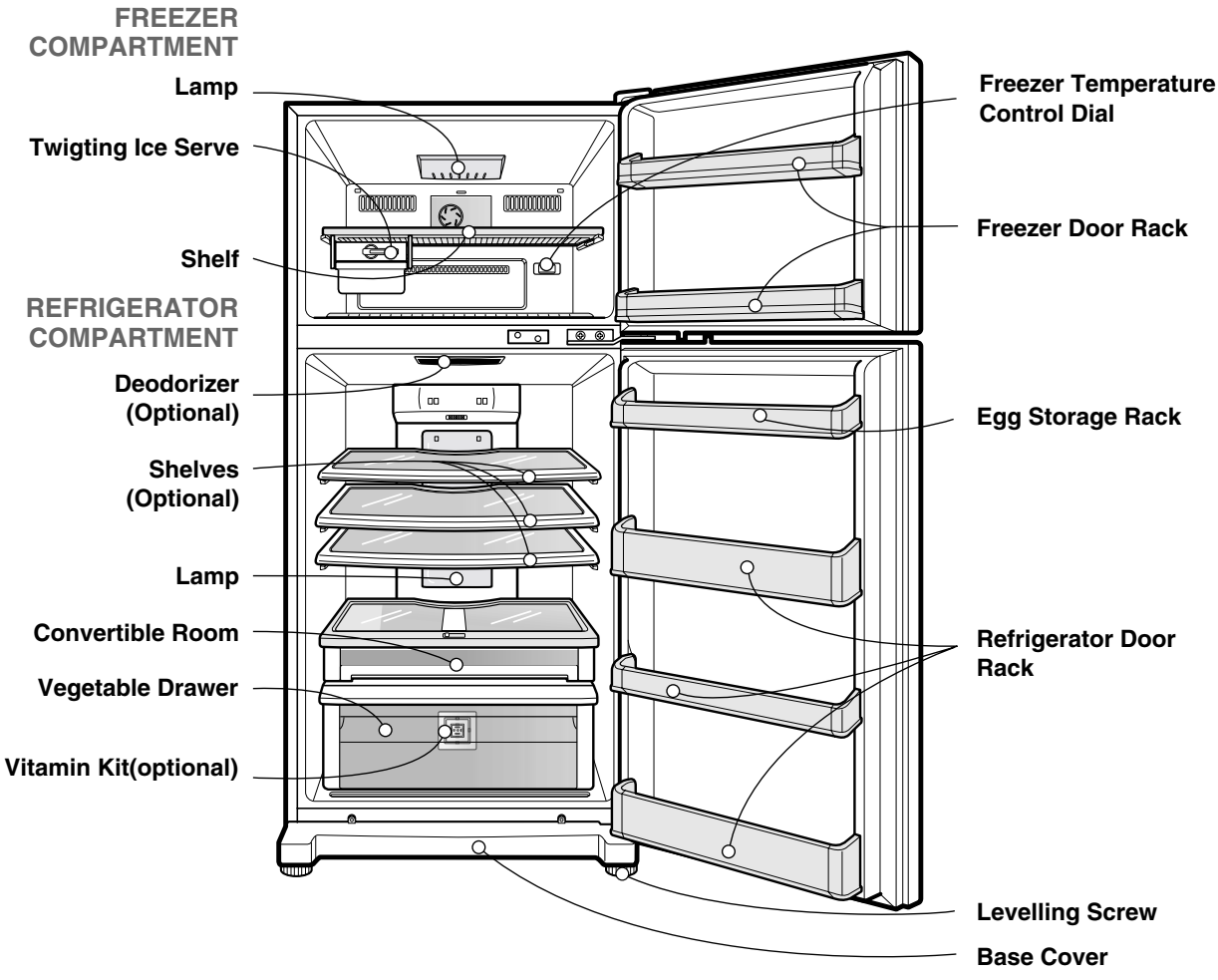
▶ **GR-B652Y*C/B712Y*C**



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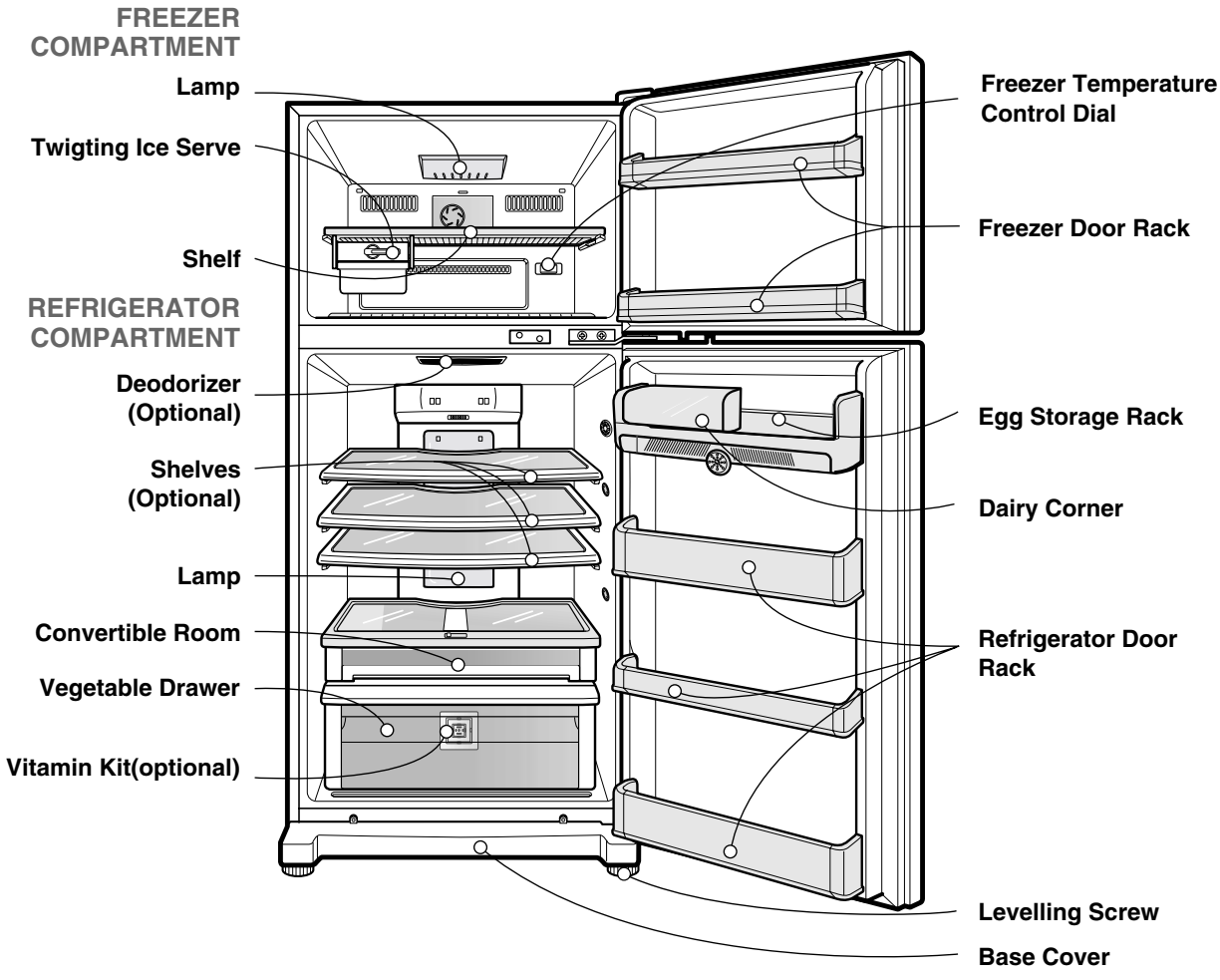
▶ **GR-M652Y*C/M712Y*C**



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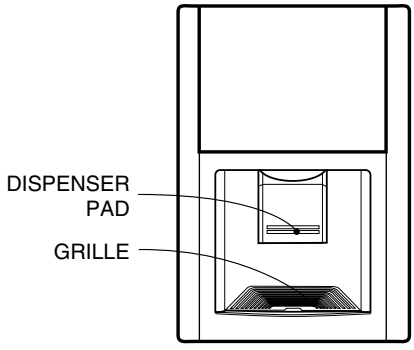
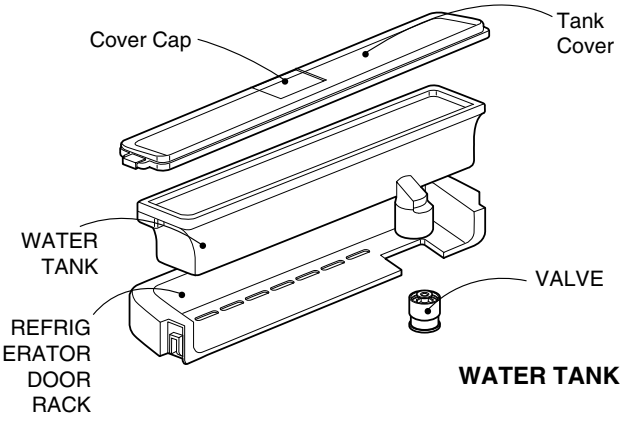
2-2 WATER DISPENSER

● **Features**

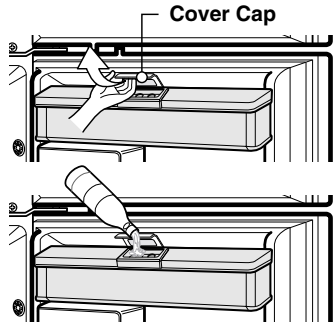




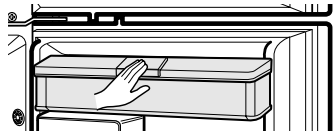
WATER TANK

● **Putting The Water In The Water Tank**

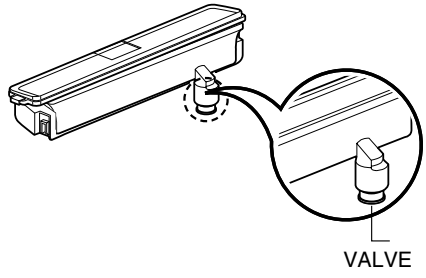
1. Open the cover cap and pour water into the water tank.



2. Close the cover cap.



3. Make sure that the valve under the water tank is in position. Push the connecting part into the hole.

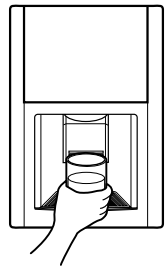


CAUTION

1. Do not use anything other than water including soft drinks, milk and juices.
2. Hot water needs to be cooled before being put in the water tank.

● **Drinking**

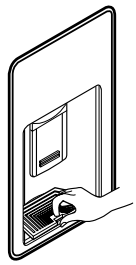
1. Press the dispenser pad with the glass.
2. The water is released when the dispenser pad is pressed. The pad returns to its original position when the glass is removed, and the water stops its flow.



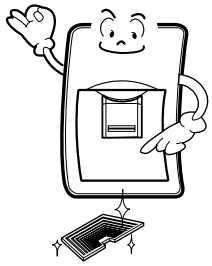
● **Cleaning**

Grille and Drip Tray

1. Remove with the grille.

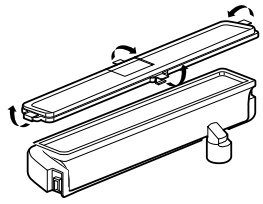


2. Wash the grille with a mild detergent and rinse thoroughly.

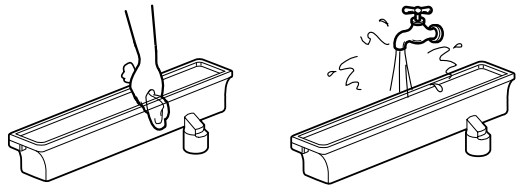


Water Tank

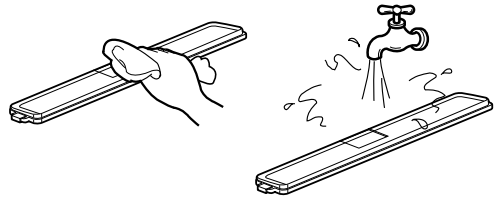
1. Remove the Cover.



2. Clean the inside and outside of the water tank with dishwashing detergent and rinse thoroughly under running water.



3. Clean the tank cover with dishwashing detergent and rinse thoronghly under running water.



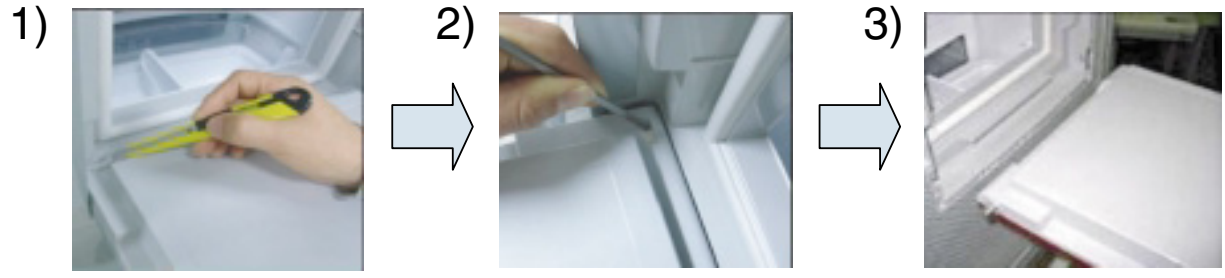
CAUTION

1. Use lukewarm water when cleaning.
2. Do not use anything other than water. If it is used with soft drinks, put water in the water tank and discharge three or four cups of water shortly.

2-3 HOME BAR

● **How to disassemble and assemble the ice access door (H/BAR Door)**

1) Open the ice access door to carefully remove left rubber packing.
2) While pressing the hinge separated using a pointed tool (driver, drill), move it to the right and carefully separate the ice access door.
3) The assembly is made in reverse order.



2-4 HOW TO DISASSEMBLE AND ASSEMBLE HANDLE

1. Disassemble the handle, deco and handle, base

1) Remove handle, deco by pulling it out with tooling.

Freezer handle

Refrigerator handle

2) Remove handle, base by loosening 3 screws.

Upper (1 screw)

Lower (2 screws)

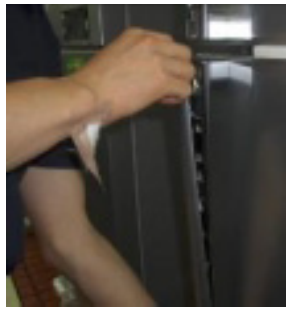
2. Assemble the new handle, deco and handle, base

1) Assemble new handle, base by tightening 3 screws.

Upper (1 screw)

Lower (2 screws)

2) Assemble handle, deco by pushing it after inserting upper and lower part first.



3. DISASSEMBLY

3-1 DOOR

● **Freezer Door**

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

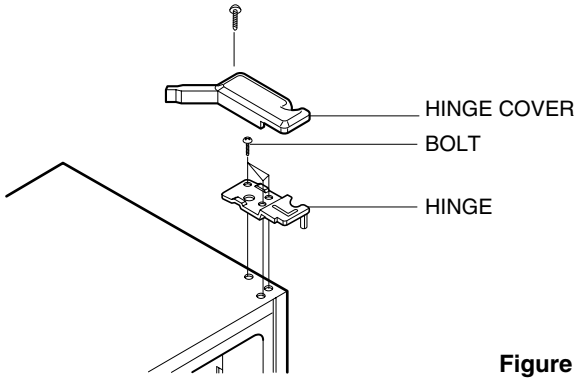


Figure 6

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

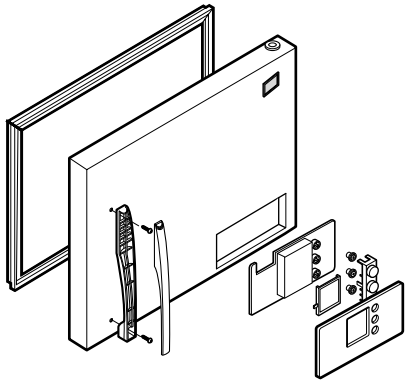


Figure 7

● **Refrigerator Door**

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

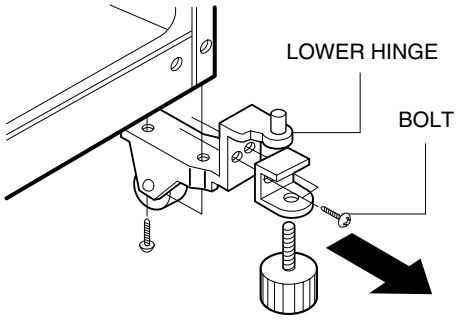


Figure 8

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.

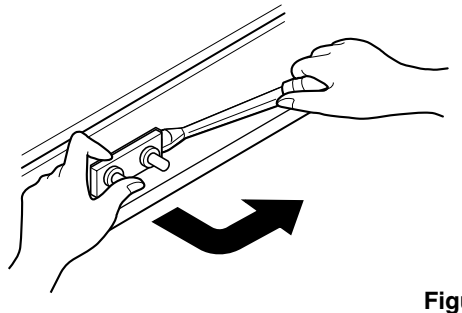


Figure 9

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.

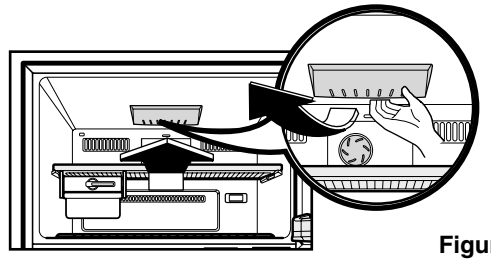


Figure 11

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.

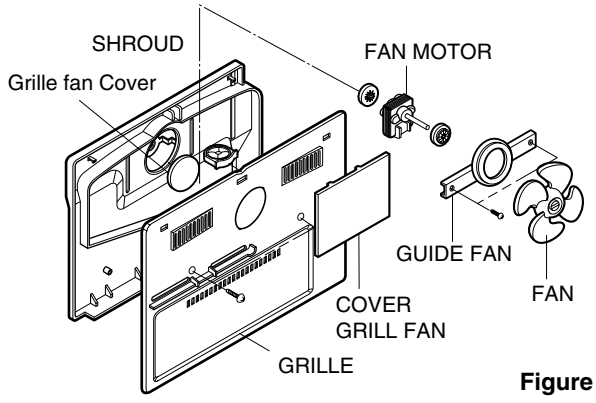


Figure 12

3-4 DEF' CONTROL ASSY

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 overheating of the Heater when defrosting.
At the temperature of 77°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)

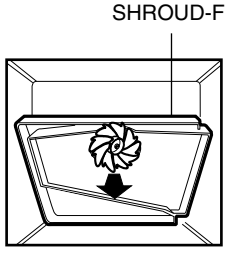


Figure 13

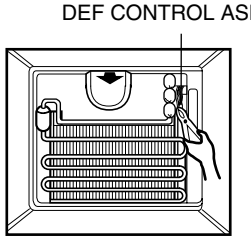


Figure 14

3-5 LAMP

FREEZER ROOM LAMP

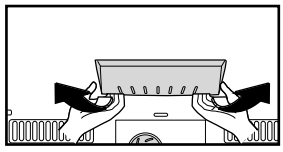


Figure 16

REFRIGERATOR ROOM LAMP

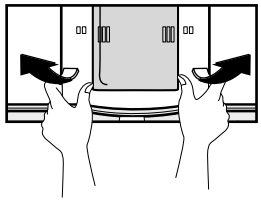


Figure 17

3-5-1 Freezer room lamp

1. Unplug the power cord from the outlet.
2. Remove the room lamp lid by loosening 1screw and take down while pulling it forward with both hands as shown in figure.
3. Remove the lamp by turning it counterclockwise.

3-5-2 Refrigerator room lamp

1. Unplug the power cord from the outlet.
2. Remove refrigerator shelves.
3. Remove the room lamp lid by pulling it forward.
4. Make sure the bulbs are cool to the touch. Remove the lamp by turning it counterclockwise.

3-6 CONTROL BOX-R

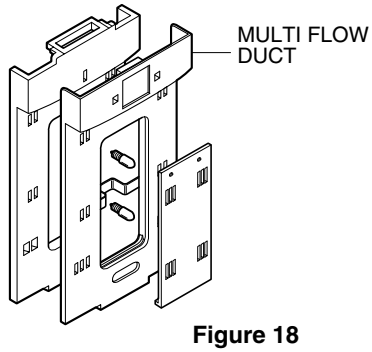


Figure 18

1. First, remove all shelves in the refrigerator.
2. Loosen 1 screws fixing the Control Box-R to The Inner Case.
3. Remove the Control Box-R by pulling it downward.

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 $BaTiO_3$.
(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 singlephase induction Motor.
For normal operation of single-phase induction motor, in the starting operation flows in both main coil and subcoil.
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**

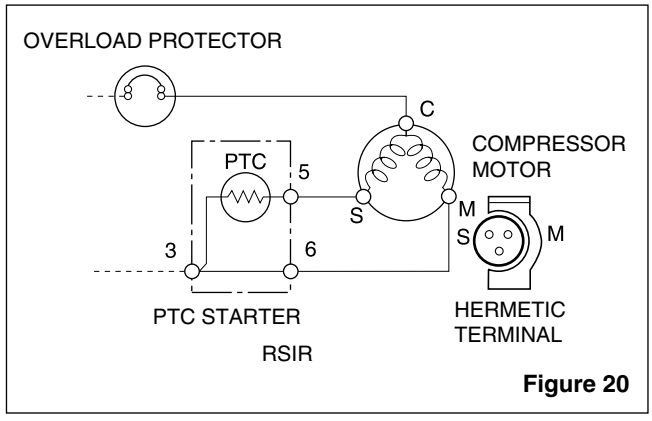


Figure 20

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 circuitshort 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)

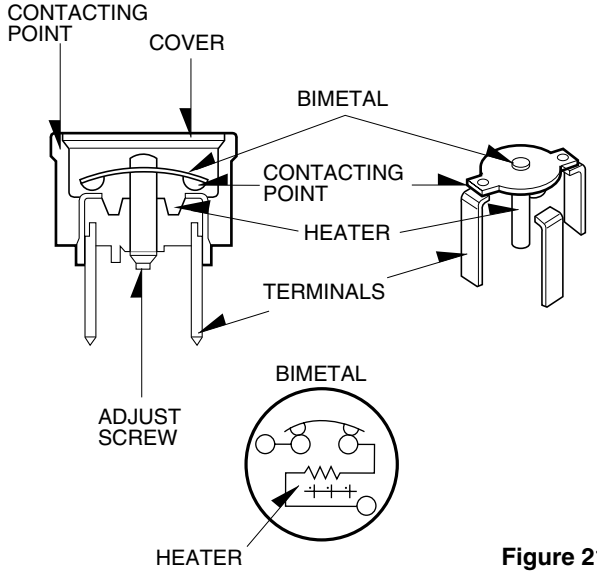
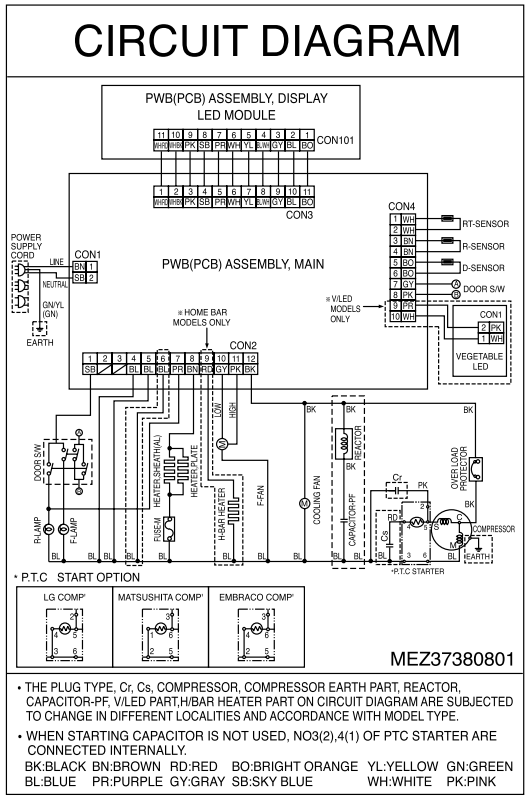


Figure 21

5. CIRCUIT DIAGRAM

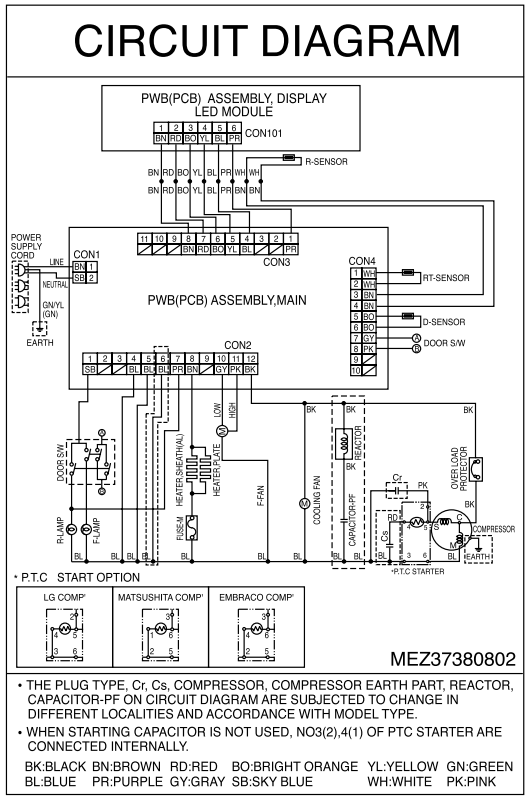
▶ **GR-M652Y*A/M712Y*A, M652Y*X/M712Y*X, M652Y*Y/M712Y*Y**
GR-B652Y*B/B712Y*B,
B652Y*S/B712Y*S,
B652Y*Y/B712Y*Y
GR-B652Y*Q/B712Y*Q



- THE PLUG TYPE, Cr, Cs, COMPRESSOR, COMPRESSOR EARTH PART, REACTOR, CAPACITOR-PF, V/LED PART,H/BAR HEATER PART ON CIRCUIT DIAGRAM ARE SUBJECTED TO CHANGE IN DIFFERENT LOCALITIES AND ACCORDANCE WITH MODEL TYPE.
- WHEN STARTING CAPACITOR IS NOT USED, NO3(2),4(1) OF PTC STARTER ARE CONNECTED INTERNALLY.

BK:BLACK BN:BROWN RD:RED BO:BRIGHT ORANGE YL:YELLOW GN:GREEN
BL:BLUE PR:PURPLE GY:GRAY SB:SKY BLUE WH:WHITE PK:PINK

▶ **GR-B652Y*C/B712Y*C**



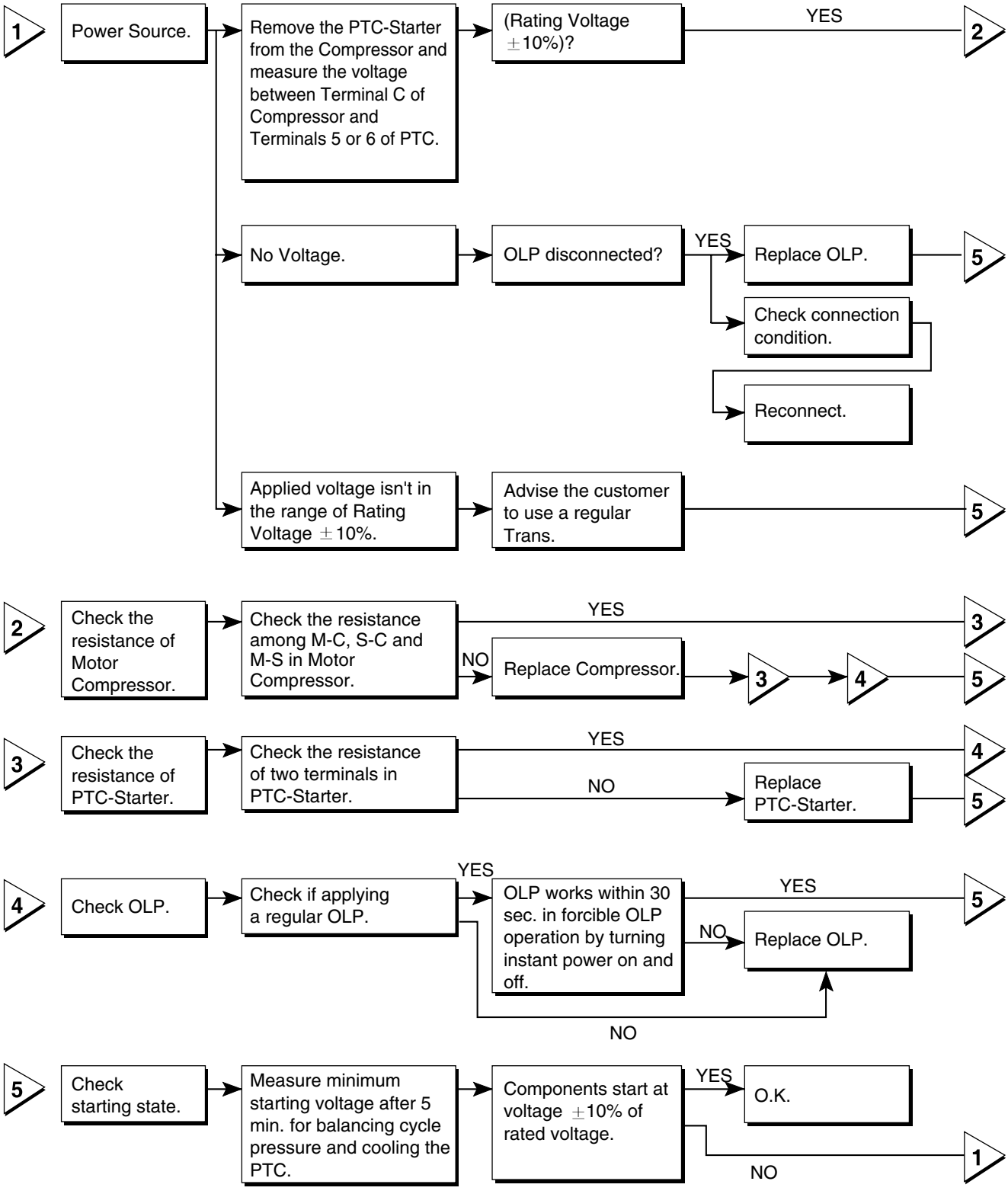
- THE PLUG TYPE, Cr, Cs, COMPRESSOR, COMPRESSOR EARTH PART, REACTOR, CAPACITOR-PF ON CIRCUIT DIAGRAM ARE SUBJECTED TO CHANGE IN DIFFERENT LOCALITIES AND ACCORDANCE WITH MODEL TYPE.
- WHEN STARTING CAPACITOR IS NOT USED, NO3(2),4(1) OF PTC STARTER ARE CONNECTED INTERNALLY.

BK:BLACK BN:BROWN RD:RED BO:BRIGHT ORANGE YL:YELLOW GN:GREEN
BL:BLUE PR:PURPLE GY:GRAY SB:SKY BLUE WH:WHITE PK:PINK

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

Normal operation of Compressor is impossible or poor.

Separate the PTC from Compressor and measure the resistance between No. 5 and 6 (only RSIR Type) or No. 4 and 5 of PTC with a Tester or Wheat stone bridge. (Figure 22)

Observation value at
220V/50Hz : 47Ω ±30%
220 - 240V/50Hz : 47Ω±30%
110 -115V/60Hz : 6.8Ω±30%
220V/60Hz : 47Ω ±30%
127V/60Hz : 22Ω ±30%

→ Check another electric components.

The resistance value is 0 or several hundreds Ω or infinity.

→ Replace PTC.

Separate the OLP from Compressor and check resistance value between two terminals of OLP with a Tester. (Figure 23)

YES → Check another electric components.

NO → Replace OLP.

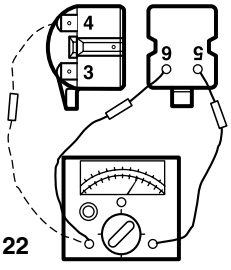


Figure 22

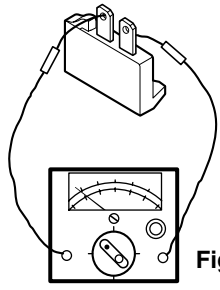
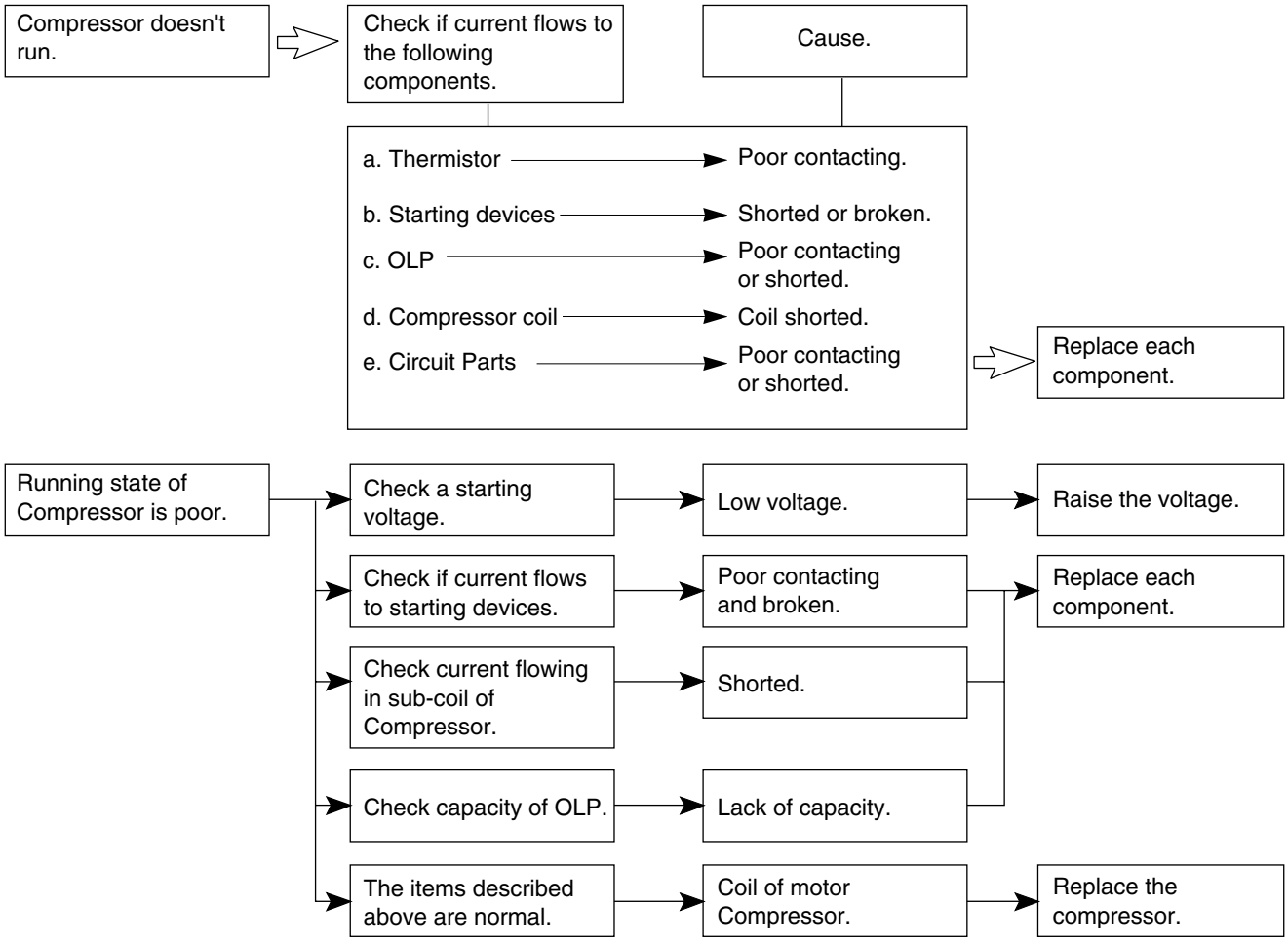


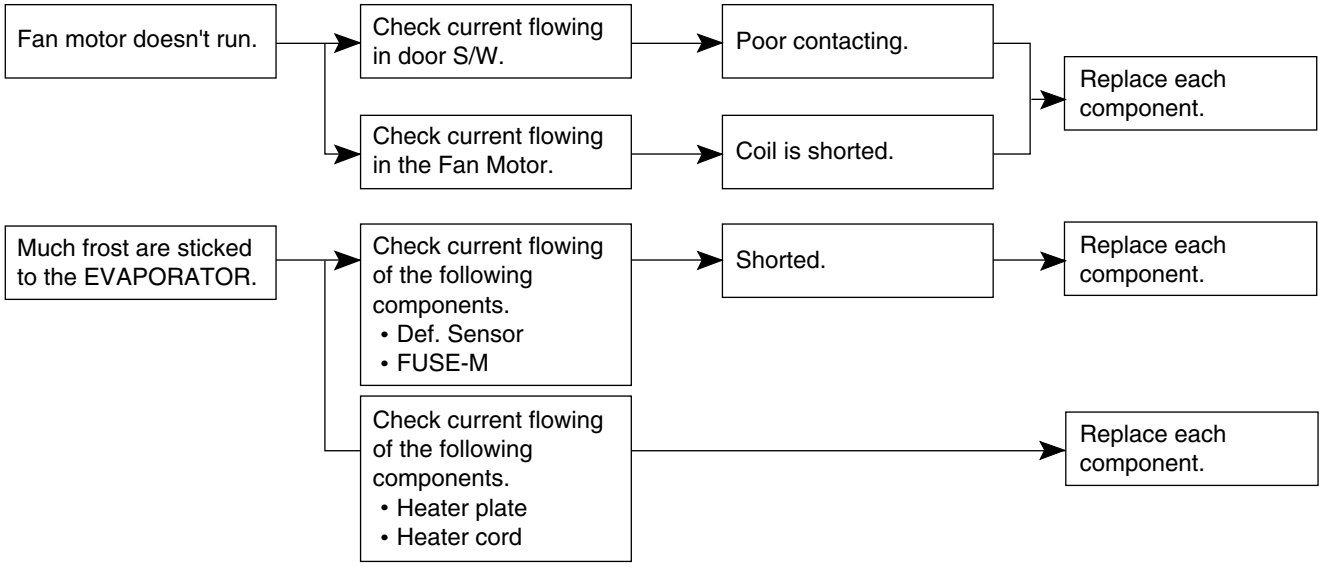
Figure 23

6-3 ANOTHER ELECTRIC COMPONENTS

▼ **Cooling is impossible**



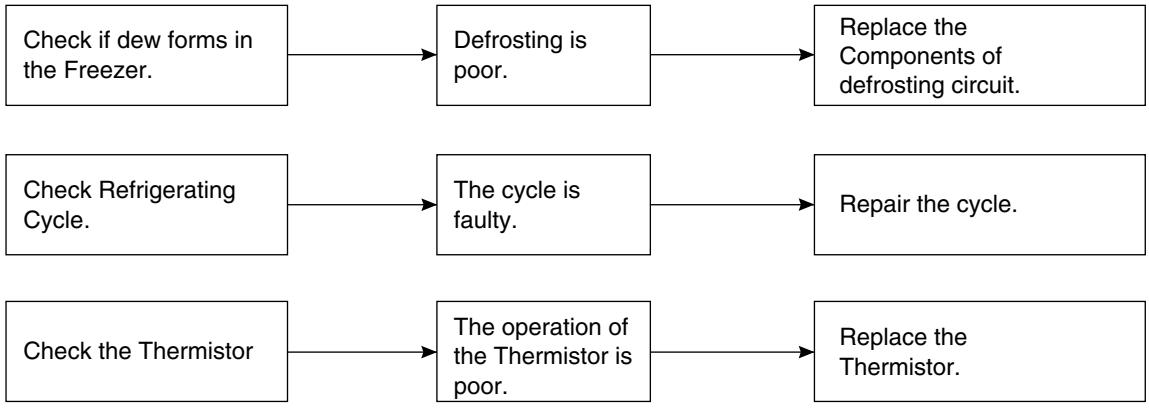
▼ **Cooling ability is poor**



6-4 SERVICE DIAGNOSIS CHART

COMPLAINT	POINTS TO BE CHECKED	REMEDY
Cooling is impossible.	• 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.	• Plug to the outlet. • Set the switch to ON. • Replace a regular fuse. • If voltage is low, wire newly.
Cooling ability is poor.	• 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”.	• 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.	• Are foods placed in cooling air outlet? • Check if the Display LED is set to "0~1". • Is the ambient temperature below 5°C?	• Place foods in high temperature section. (Front Part) • Set the Display LED to "3". • Set the Display LED to "5~6".
Dew or ice forms in the chamber of the set.	• 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.	• 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.	• Check if ambient temperature and humidity of surrounding air are high. • Is the gap in the door packed?	• Wipe dew with a dry cloth. This happening is solved in low temperature and humidity naturally. • Fill up the gap.
Abnormal noise generates.	• 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 back side is taken out.	• Adjust the Leveling 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.	• 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?	• 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.	• Check if the inside of the set becomes dirty. • Did you keep smelly foods without wraping? • It smells plastic.	• 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.



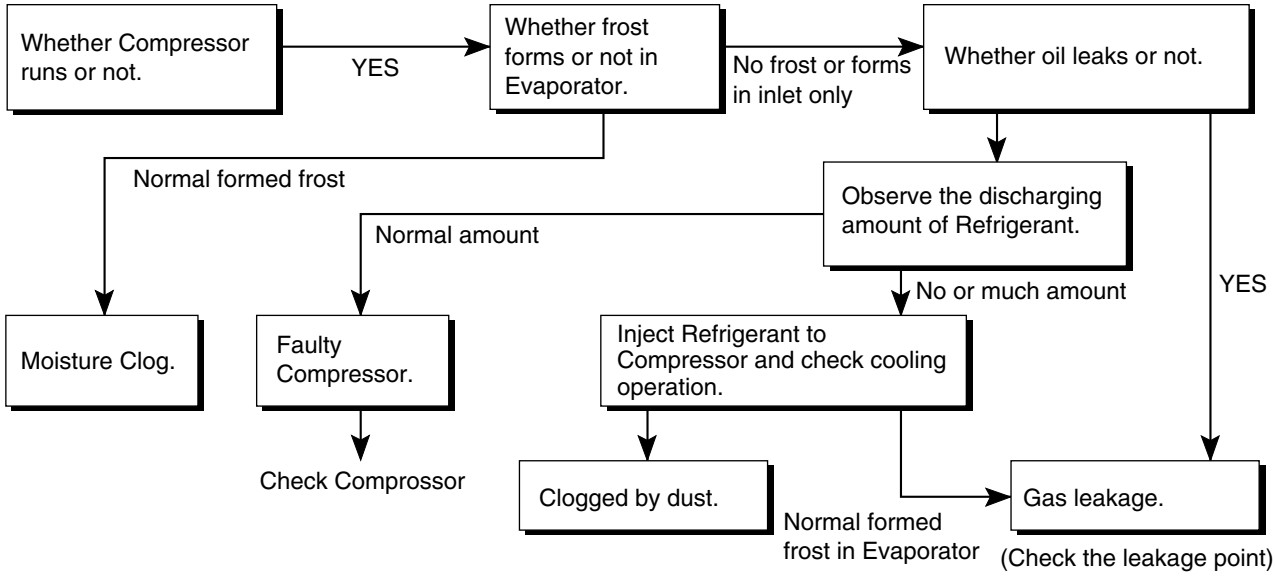
6-5 REFRIGERATING CYCLE

▼ Troubleshooting Chart

CAUSE		STATE OF THE SET	STATE OF THE EVAPORATOR	TEMPERATURE OF THE COMPRESSOR	REMARKS
LEAKAGE	PARTIAL LEAKAGE	Freezer and Refrigerator don't get cold normally.	Low flowing sound of Refrigerant is heard and frost forms in inlet only	A little higher than ambient temperature.	• A little Refrigerant discharges. • Normal cooling is possible when injecting Refrigerant of regular amount.
	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.	• No discharging of Refrigerant. • Normal cooling is possible when injecting Refrigerant of regular amount.
CLOGGED BY DUST	PARTIAL CLOG	Freezer room and Refrigerator don't get cold normally.	Flowing sound of Refrigerant is heard and frost forms in inlet only.	A little higher than ambient temperature.	• Normal discharging of refrigerant. • The capillary tube is faulty.
	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.	• Normal discharging of Refrigerant.
MOISTURE CLOG		Cooling operation stops periodically.	Flowing sound of Refrigerant is not heard and frost melts.	Lower than ambient temperature	• Cooling operation restarts when heating the inlet of 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 higher than ambient temperature.	• 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.	• 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	(1) H 30 • Chemical Ingredients Ag : 30%, Cu : 27%, Zn : 23%, Cd : 20% • Brazing Temperature : 710~840°C (2) Bcup-2 • Chemical Ingredients Cu : About 93% P : 6.8~7.5% The rest : within 0.2% • Brazing Temperature : 735~840°C	• Recommend H34 containing 34% Ag in the Service Center.
2	FLUX	• 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.	• 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	(1) Assemble the drier within 30min. after unpacking. (2) Keep the unpacked drier at the temperature of 80~100°C.	• Don't keep the drier in a outdoor because humidity damages to it.
4	VACUUM	(1) When measuring with pirant Vacuum gauge of charging M/C, vacuum degree is within 1 Torr. (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. (3) Vacuum degree of vacuum pump must be 0.05 Torr. below after 5 min. (4) Vacuum degree must be same to the value described item (2) above for more than 20 min.	• 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	(1) The pressure of dry air must be more than 12~16Kg/cm^2 (2) Temperature must be more than -20~-70°C. (3) Keep the pressure to 12~6Kg/cm^2 also when substituting dry air for Nitrogen Gas.	
6	NIPPLE AND COUPLER	(1) Check if gas leaks with soapy water. (2) Replace Quick Coupler in case of leakage.	• Check if gas leaks from connecting part of Coupler.
7	PIPE	• 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

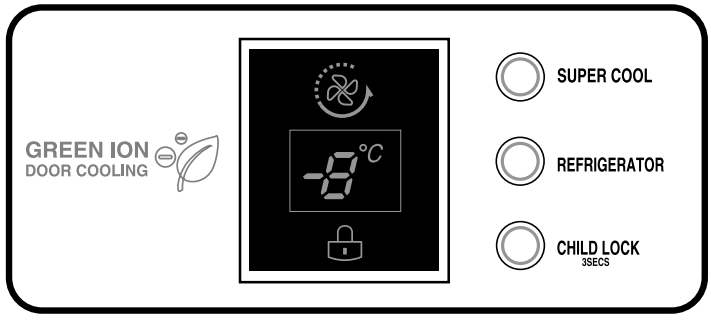
The following description is basically for GR-M652Y*A/M712Y*A, M652Y*X/M712Y*X, M652Y*Y/M712Y*Y, GRB652Y*B/B712Y*B, B652Y*S/B712Y*S, B652Y*Y/B712Y*Y, GR-B652Y*Q/B712Y*Q
For the other models, refer to the diagram of the entire PCB circuit.

7-1 FUNCTION

7-1-1 FUNCTION

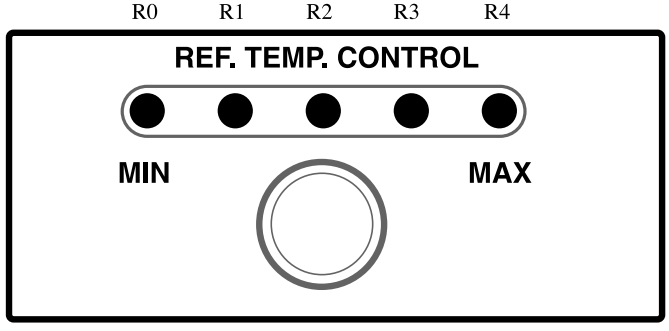
1. When the appliance is plugged in, it is set to 'Medium'. Each time the button is pushed, Exterior display is set to '**3**' → '**2**' → '**1**' → '**0**' → '**6**' → '**5**' → '**4**' in order and Interior display is set to '**R2**' → '**R3**' → '**R4**' → '**R0**' → '**R1**'.
2. When the power is initially applied or restored after a power failure, it is automatically set to '3' against the interruption of electric power.

▶ **GR-M652Y*A/M712Y*A**
GR-M652Y*X/M712Y*X
GR-M652Y*Y/M712Y*Y
GR-B652Y*B/M712Y*B
GR-B652Y*S/B712Y*S
GR-B652Y*Y/B712Y*Y
GR-B652Y*Q/B712Y*Q



Temp Control	Very Low	Low	Medium/ Low	Medium	Medium/ High	High	Very High
TEMP(°C)	6	5	4	3	2	1	0
ROOM	REFRIGERATOR						

▶ **GR-B652Y*C/B712Y*C**



Temp Control	Low	Medium/ Low	Medium	Medium/ High	High
TEMP(°C)	●○○○○	●●○○○	●●●○○	●●●●○	●●●●●
ROOM	REFRIGERATOR				

7-1-2 SUPER COOL

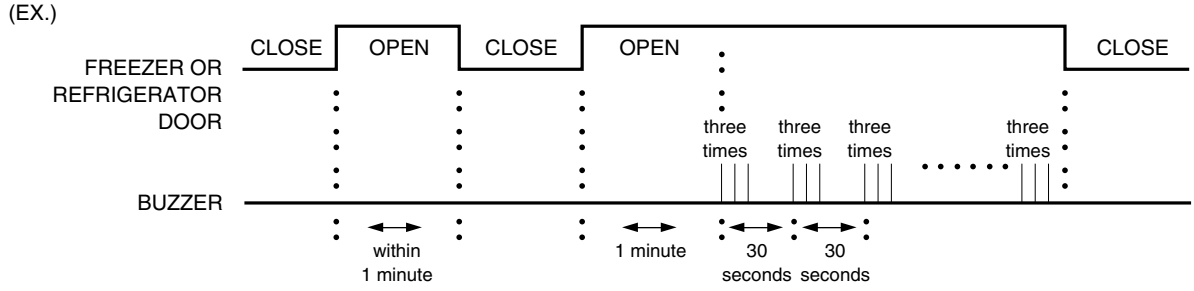
1. This feature is to shorten the cooling time of the refrigerator by keeping the comp, fan running for a while. When the Super Cool button is pushed, the Super Cool LED turns on in order and the comp keeps on running. In 2 hours, the Super Cool mode will be cleared.
2. When the Defrosting mode starts while in the Super Cool mode, defrosting is performed. After that, the Super Cool mode resumes for the remaining time.
3. When the Super Cool button is pushed while in the Defrosting mode, the Super Cool mode starts in 7 minutes after the completion of the defrosting even though the Super Cool LED turns on.
4. If a power failure occurs while in the Super Cool mode, the Super Cool mode will be cancelled when the power is restored.
5. If the Super Cool mode is selected when it has not passed 7 minutes since the comp stopped, the comp will start running after the remaining time elapses.
6. In Super Cool mode, Freezer fan motor operates with High speed RPM.

7-1-3 CONTROL OF VARIABLE SPEED FAN IN THE FREEZER COMPARTMENT

1. Fan motor in the freezer compartment shall change from standard to high speed rpm in order to increase cooling speed and load corresponding speed.
2. Hign speed rpm is only used for the initial power application, super cool mode and load corresponding operation. But standard rpm is used in the general working conditions.
3. When the door of freezer room or refrigerator room is opened, the FAN MOTOR is stoped immediately, then when the door is closed, the FAN MOTOR is operated.

7-1-4 ALARM FOR OPEN DOOR

1. This feature is to alarm by the buzzer when the door of the freezer or the refrigerator is not closed in 1 minute after it is opened.
2. In 1 minute after the door is opened, the buzzer sounds three times at the interval of 0.5 second. After that, every 30 seconds, the buzzer sounds three times with 0.5 sec ON/OFF.
3. The alarming is cancelled when the door of the freezer or the refrigerator is closed while the buzzer sounds.



7-1-5 BUZZER SOUND

1. When the button on the front Display is pushed, “Ding-” sound is produced and it works as follows.

7-1-6 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 7-1-10. Error Diagnostic Mode.)
4. With the defective defrosting sensor (cut or short-circuited wire), the defrosting will not be performed.

7-1-7 SEQUENTIAL OPERATION OF ELECTRIC COMPONENTS

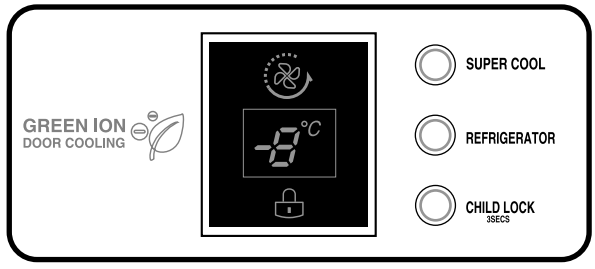
The electric components, such as the comp, defrosting heater, and cooling fan, start sequentially to avoid the noise and damage to the part, which may result from the simultaneous start of various components on turning the power on or after the completion of a test.

<table>
<tr><th colspan="2">Condition of Operation</th><th>Operating Sequence</th></tr>
<tr><td rowspan="2">When the power is turned on</td><td>If the temp of the defrosting sensor is 45 °C or above (For the initial use after the purchase or grounding)</td><td>POWER ON → (in 0.5 sec) COMP ON → (in 0.5 sec) COOLING FAN ON</td></tr>
<tr><td>If the temp of the defrosting sensor is below 45 °C (After a power failure or SVC)</td><td>POWER ON → (in 0.5 sec) DEFROSTING HEATER ON → (in 5 sec) DEFROSTING HEATER OFF
→ (in 0.5 sec) HOME BAR HEATER ON → (in 0.5 sec) HOME BAR HEATER OFF
→ (in 0.5 sec) COMP ON → (in 0.5 sec) COLLING FAN ON</td></tr>
<tr><td colspan="2">When returned from the Test mode</td><td>ALL LOADS OFF → (in 7 min) COMP ON → (in 0.5 sec) COOLING FAN ON</td></tr>
</table>

7-1-8 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. However, the recognition tone (beep~) sounds.
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.

▶ **GR-M652Y*A/M712Y*A**
GR-M652Y*X/M712Y*X
GR-M652Y*Y/M712Y*Y
GR-B652Y*B/M712Y*B
GR-B652Y*S/B712Y*S
GR-B652Y*Y/B712Y*Y
GR-B652Y*Q/B712Y*Q

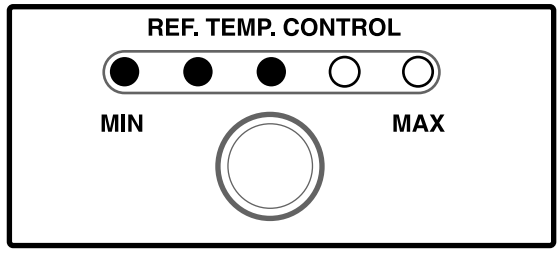


NO	Error	Error Code Display	Cause	State of Operation with Error		
				Comp	Cooling fan	Defrosting heater
1	Faulty refrigerator (R) sensor	r	Cut or short-circuited wire of refrigerator sensor	15 min ON/ 15 min OFF	Low RPM	Normal Condition
2	Faulty defrosting sensor	d	Cut or short-circuited wire of defrosting sensor	Normal Condition	Low RPM	No defrosting
3	Faulty Room temperature sensor (in the main PCB)	when super cool and refrigerator key pressed together display will be all off	Cut or short-circuited wire of intake air temperature sensor	Normal Condition	Low RPM	Normal Condition
4	Defrosting failure	H	Cut or disconnected wire of defrosting heater or temperature fuse(indicated at least 4 hours later after the error occurs)	Normal Condition	Low RPM	Normal Condition

7-1-9 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.

▶ **GR-B652Y*C/B712Y*C**



○ : OFF ● : ON

NO	Error	Error Code Display					Cause	State of Operation with Error	
		R0	R1	R2	R3	R4		Comp / Cooling fan	Defrosting heater
1	Faulty refrigerator sensor (on the control box of the refrigerator)	○	○	●	○	○	Cut or short-circuited wire of refrigerator sensor	15 min ON/ 15 min OFF	Normal Condition
2	Faulty defrosting sensor	○	○	○	●	○	Cut or short-circuited wire of defrosting sensor	Normal Condition	No defrosting
3	Faulty room temp. sensor in the main PCB	○	○	○	○	○	Cut or short-circuited wire of defrosting sensor	Normal Condition	Normal Condition
4	Defrosting failure	○	●	●	●	●	Cut or disconnected wire of defrosting heater or temperature fuse(indicated at least after 2 hrs of error occurrence)	Normal Condition	Normal Condition

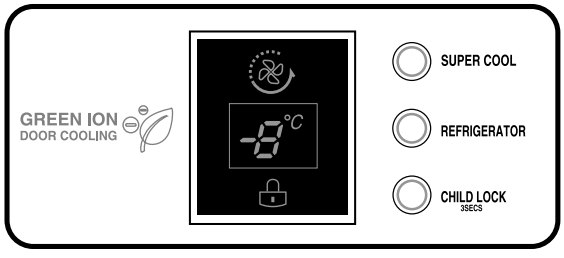
7-1-10 TEST MODE

1. The test mode allows checking the PCB and the function of the product as well as finding out the defective part in case of an error.
2. The test button is on the main PCB of the refrigerator (Test S/W). The test mode will be cleared in 5 minutes on test mode 1 and in 2 hours on test mode 2 and then reset.
3. While in the test mode, the function control button is not recognized though the recognition tone (beep~) sounds.
4. After exiting the test mode, be sure reset by unplugging and then plugging in the appliance.
5. If an error, such as a sensor failure, is detected while in the test mode, the test mode is cleared and the error code is displayed.
6. While an error code is displayed, the test mode will not be activated even if the test button is pushed.

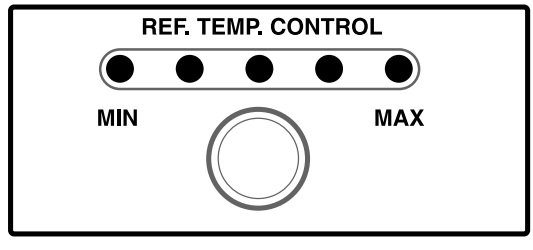
Mode	Manipulation	Contents	Remark
TEST 1	Push the test button once.	1. Continuous operation of the comp 2. Continuous operation of the freezer fan 3. Defrosting heater OFF 4. Every display LED ON 5. F-lamp can be switch on/off by door open close	
TEST 2	Push the test button once while in the TEST MODE 1.	1. Comp OFF 2. Freezer fan OFF 3. Defrosting heater ON 4. Every display LED OFF (except the refrigerator temp. status keys displaying '2') 5. H-lamp can be switch on-off by door open/close for 5 sec's	Reset if the temp of the defrosting sensor is 13°C or above.
Reset	Push the test button once while in the TEST MODE 2.	Reset to the default setting	The compressor will start in 7 minute-delay.

* LED Check Mode: When the refrigerator temp control button and the Super Cool button are pushed and held together for 1 sec or longer, every LED on the display turns on simultaneously. When the buttons are released, the previous mode is restored.
* FAN RPM VARIETY CHECK : Press super cool button and the refrigerator temp control button are pushed and held together for 1 sec or longer, FAN RPM is reversed for 30 second (HIGH ↔LOW) and return to the previous condition.

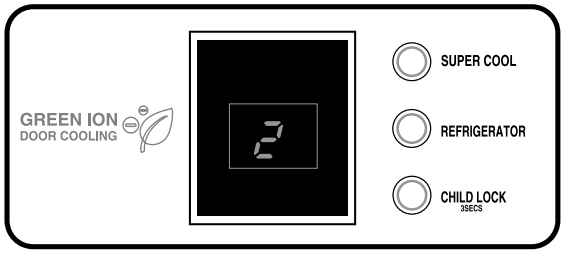
<TEST MODE1 STATUS LED>



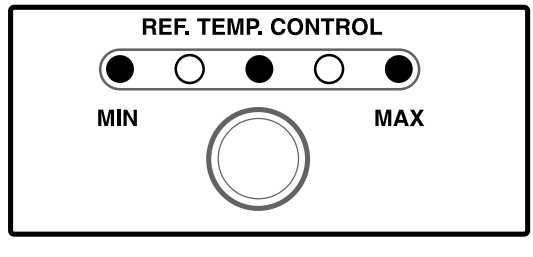
<TEST MODE1 STATUS LED>



<TEST MODE2 STATUS LED>

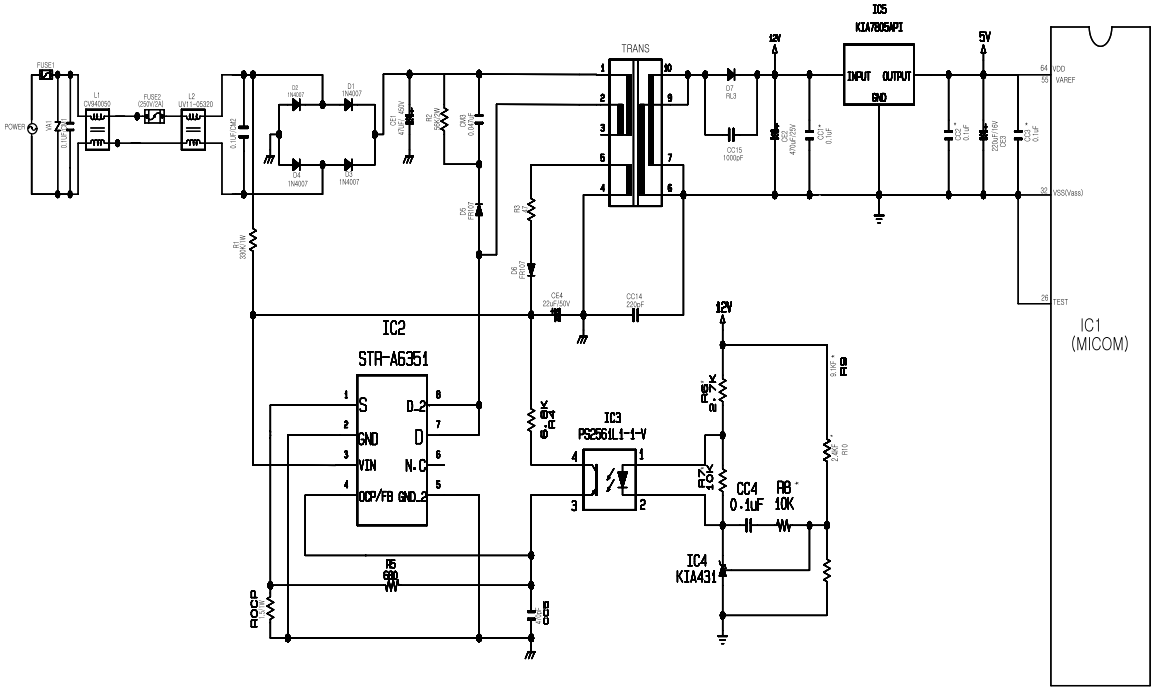


<TEST MODE2 STATUS LED>



7-2 PCB FUNCTION

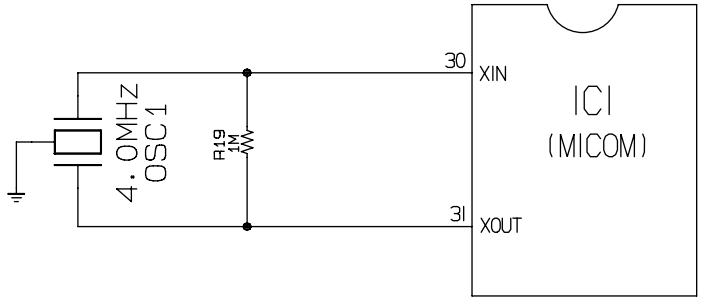
7-2-1 POWER CIRCUIT



The power circuit consists of the noise attenuation part and the SMPS (Switch Mode Power Supply) part. The SMPS consists of the rectifier (D1, D2, D3, D4 & CE1) to convert AC voltage to DC voltage, switching part (IC2) to switch the converted DC voltage, transformer to transmit energy of the first side of the switching end to the second side, the secondary power to supply power to MICOM and IC, and the feedback part (IC3) to feedback the secondary voltage to the first side of the transformer in order to maintain the secondary voltage constant.

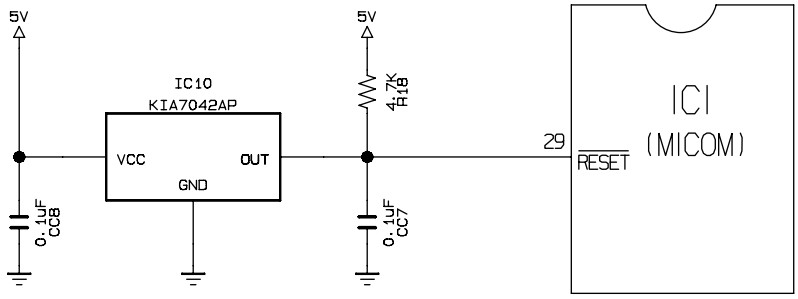
Caution : High voltage (DC 310V) is maintained in this circuit. Wait at least 3 minutes after unplugging to allow the current to dissipate. There is a danger of electric shock.

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.

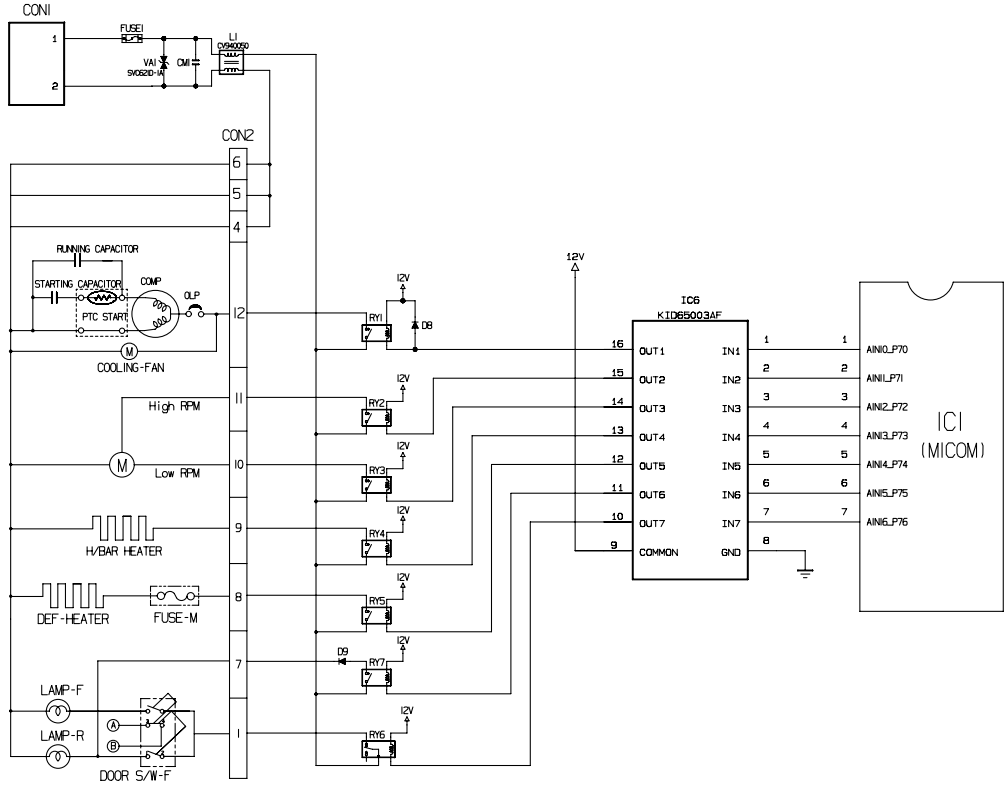
7-2-3 RESET CIRCUIT



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/BUZZER DRIVE & OPEN DOOR DETECTION CIRCUIT

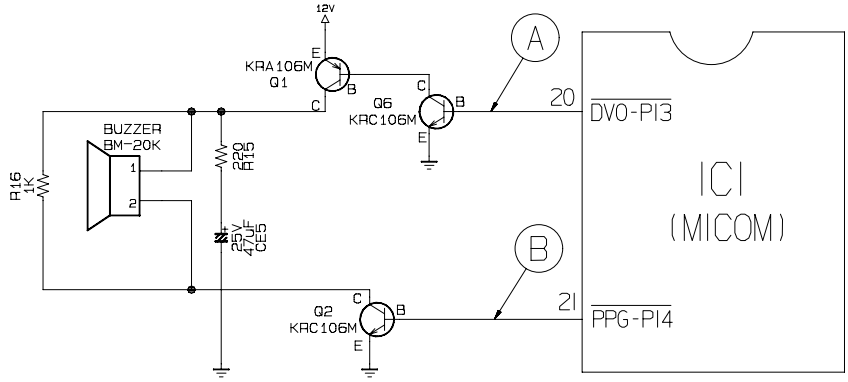
1. Load Drive Condition Check

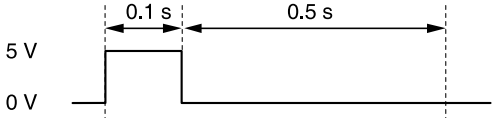
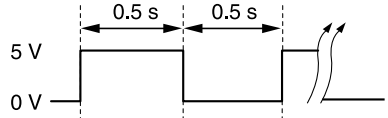
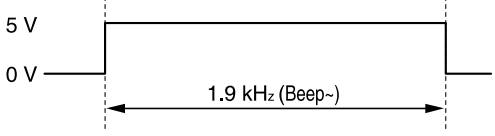
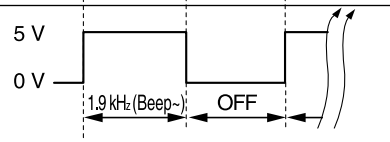


Load Type		COMP	Defrosting Heater	Lamp	Fan Motor HIGH RPM	Fan Motor Low RPM	Home Bar Heater	R-Lamp
Measurement Location (IC6)		NO.16	NO.12	NO.10	NO.15	NO.14	NO.13	NO.11
Condition	ON	1V or below						
	OFF	12V						

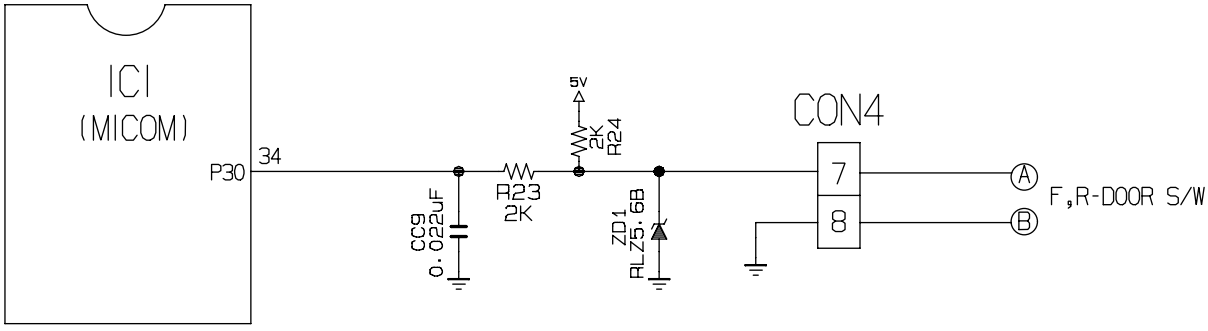
* When the door of the freezer/refrigerator is left open for 7 minutes or longer, the lamp of the freezer/refrigerator turns off automatically.

2. Buzzer Drive Condition Check



Condition / Measure-ment Location	Tone (Beep~) when the button on the display is pushed	Alarm for open door (beep-beep-beep)	OFF
IC1 (Ⓐ)			0V
IC1 (Ⓑ)			0V

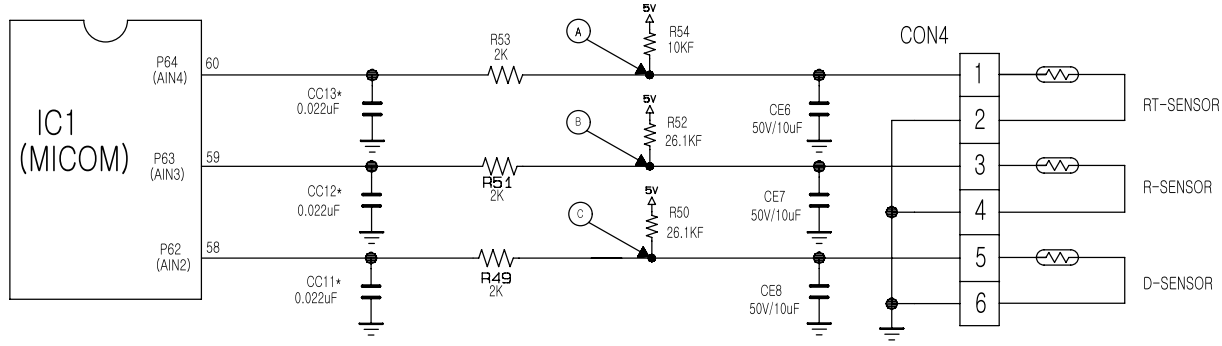
3. Open Door Detection Circuit Check



Freezer/ Refrigerat Door / Measurement Location	(PIN NO. 34)
Closed	0V
Open	5V

7-2-5 TEMPERATURE SENSOR CIRCUIT

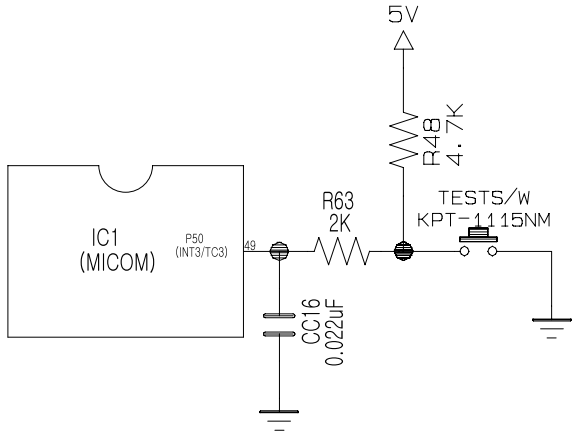
The following temperature sensor circuit consists of a sensor to detect the outside (ambient) temperature, sensor in refrigerator compartment to detect freezer & refrigerator temp. The status of each sensor, whether open or shorted, is shown below.



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

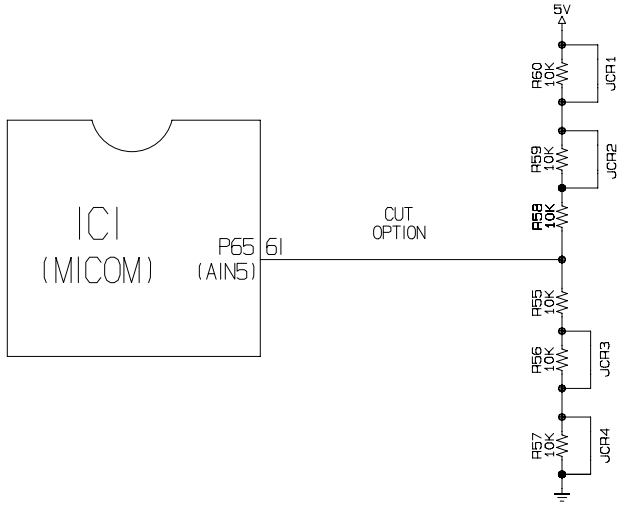
7-2-6 SWITCH INPUT CIRCUIT

* The circuit shown below is the input circuit to detect the signals of the test S/W for checking the refrigerator.



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

1. The circuits for less cooling and overcooling compensation in a refrigerator compartment

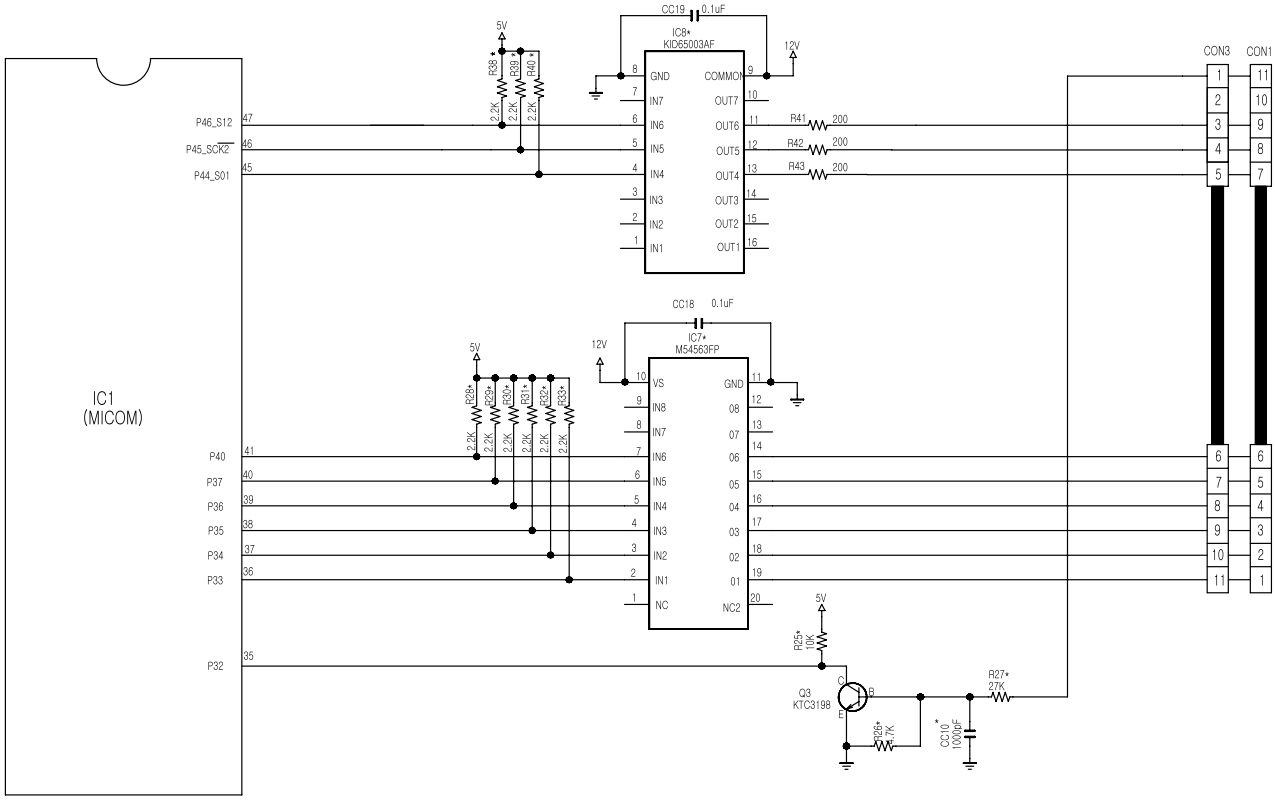


OVER COOLING COMPENSATION		LESS COOLING COMPENSATION		REFRIGERATOR TEMPERATURE COMPENSATION VALUES	REMARKS
JCR1	JCR2	JCR3	JCR4		
CUT	⌒	⌒	⌒	+1°C	
CUT	CUT	⌒	⌒	+2°C	
⌒	⌒	CUT	⌒	-1°C	
⌒	⌒	CUT	CUT	-2°C	
CUT	⌒	CUT	⌒	0°C	
⌒	CUT	CUT	⌒	0°C	
CUT	CUT	⌒	CUT	+1°C	
⌒	CUT	CUT	CUT	-1°C	
⌒	⌒	⌒	⌒	0°C(AT FACTORY)	

• The above OPTION circuit is to compensate refrigerator temperature by simply cutting during service.

7-2-8 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 (LED Module). The drive type is the scan type.



7-3. RESISTANCE SPECIFICATION OF SENSOR

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

- The resistance of SENSOR has ±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

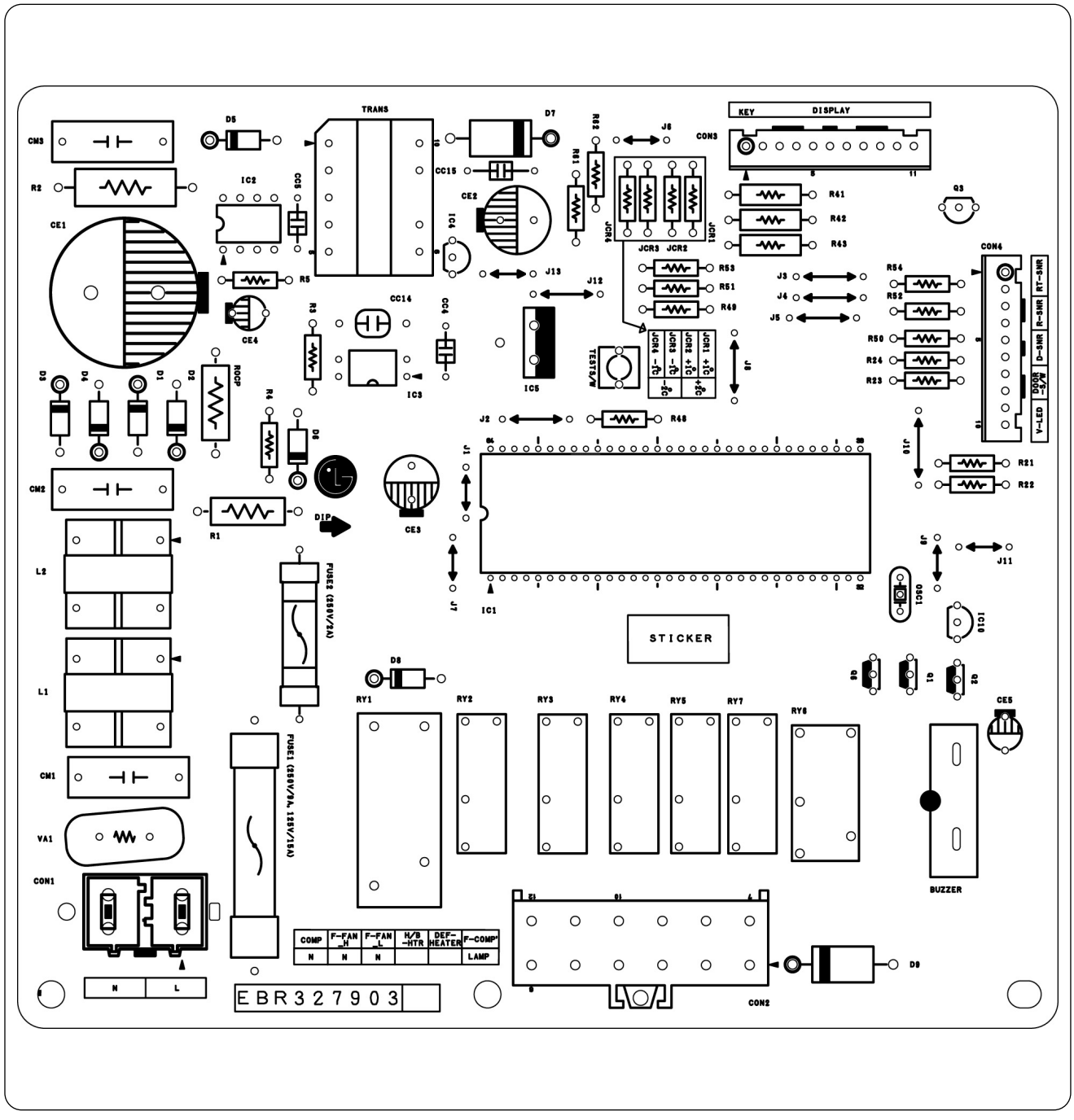
- Replace PCB when no trouble after checking the contents of trouble shooting chart.

CLASSIFICATION	STATE OF TROUBLE	POINT BE CHECKED	STAGECHECKING METHOD	CONTENT	REMEDY
POWER SOURCE is poor	1. All the DISPLAY LED OFF 2. DISPLAY LED represents abnormal operation.	1. FREEZER/ REFRIGERATOR	FREEZER/REFRIGERATOR DOOR OPEN	POWER SOURCE is poor	Certify Fuse. Certify outlet Voltage.
		2. LAMP is dim.	CHECK with the naked.	Applied voltage mistake	Use boosting TRANS.
		3. The connection of CONNECTOR of MAIN PWB.	Certify connection of CONNECTOR.	CONNECTOR connection is poor.	Reconnect CONNECTOR.
				TRANS FUSE open.	Replace TRANS.
COOLING is poor	NO COOLING	1. COMPRESSOR operates?	PRESS TEST KEY on MAIN PWB once. (forced COOLING) * If pass less than 7 minutes after stop of COMP, don't press it and stand-by.	COMPRESSOR lock or blocked.	Replace COMPRESSOR.
				OLP, PTC is poor.	Replace OLP, PTC.
				COMPRESSOR RELAY is poor	Replace MAIN PWB RY1
				THE CONNECTING WIRE is poor.	Certify the black wire of MAIN PWB CONNECTOR (CON2)
		2. Whether refrigerant leaks or not.	Measure the amount of frost sticking on EVA and the surface temperature of condenser pipe.	Refrigerant leakage.	Remedy the leaking part and reaching Refrigerant.
	FREEZER TEMPERATURE is poor	1. Whether FAN MOTOR operates or not.	PRESS TEST KEY on MAIN PWB once. (forced COOLING)	FAN MOTOR is poor	Replace FAN MOTOR.
				DOOR LINEAR contact.	Replace DOOR LINER.
				CONNECTING WIRE is poor.	Certify MOTOR and the connection of the black wire of MAIN PWB CONNECTOR. (CON2)
		2. DEFROSTING normal?	Certify the amount of frost sticking on EVA.	DEFROSTING is poor.	See the DEFROSTING trouble.
		3. SENSOR normal?	Check resistance the SENSOR in the Refrigerator	SENSOR RESISTANCE is poor.	Replace SENSOR

CLASSIFICATION	STATE OF TROUBLE	POINT BE CHECKED	STAGECHECKING METHOD	CONTENT	REMEDY
COOLING is poor.	REFRIGERATOR TEMPERATURE is poor.	1. FREEZER TEMPERATURE is normal?	See "FREEZER TEMPERATURE is poor".		Certify the attaching stateof 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.	Replace FAN MOTOR.
				Passage of cool air blocking.	Remove impurities.
				EVA frozen.	See "DEFROSTING is poor".
DEFROSTING is poor.	NO DEFROSTING.	1. HEATER emit heat?	PRESS TEST KEY on MAIN PWB three times. (forced DEFROSTING)	HEATER disconnection.	Replace HEATER.
				TEMPERATURE FUSE disconnection.	Replace TEMPERATURE FUSE.
				Connection is poor.	Certify EVA connection and wire of MAIN PWB CONNECTOR
				DEF-SENSOR is poor.	Replace DEF-SENSOR.
				HEATER RELAY is poor.	Replace RY5 of MAIN PWB.
		2. DRAIN PIPE blocking?	Certify DRAIN PIPE.	DRAIN PIPE blocking.	Remove ice and impurities.
					Certify HEATER PLATE resistance.
		3. Remain ice at DEFROSTING?	Certify the attaching of DEF-SENSOR.	Attaching is poor.	Reassemble DEF-SENSOR.
			Certify the attaching state(gap) of FREEZER/REFRIGERATOR DOOR.	DOOR sticking is poor.	Reassemble DOOR.
					Replace GASKET.

7-5 MAIN PWB ASS'Y AND PARTS LIST

7-5-1 MAIN PWB ASS'Y



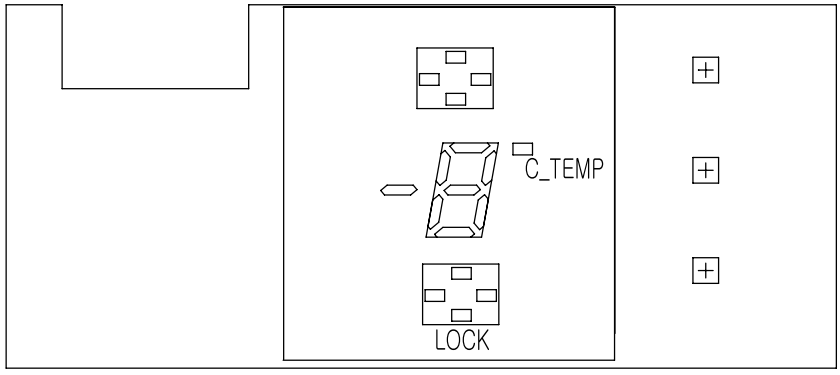
* In the case of GR-M652/M712 (203V) model.
P/No of main ASS'Y is used as EBR327903.

7-5-2 REPLACEMENT PARTS LIST

05	04	03	02	01	WORK								
CS-PJT 1.2 I-MICOM	CS-PJT 1.2 E-MICOM	CS-PJT 1.2 E-MICOM H/BAR	CS-PJT 1.2 E-MICOM V/LED	CS-PJT 1.2 BEST H/BAR, V/LED	APPLICATION								
Qty	Qty	Qty	Qty	Qty	No	P/NO	DESCRIPTION	SPEC	MAKER	REMARK			
1	1	1	1	1	1	EAX32769802	PWB(PCB)	CS-PJT MAIN FR1	DOOSAN	T=1.6			
1	1	1	1	1	2	6102JB8001B	PROTECT DEVICE,VARISTOR	SVC621D-14A SAMWHA UL/VDE BK 620V	SAMWHA	VA1			
1	1	1	1	1	3	6200JB8004A	FILTER,LINE NOISE	CY9400150	TNC	L1			
1	1	1	1	1	4	6630WM00911	FILTER,LINE NOISE	UW11-05320 TNC BK 0.5A 320MH	TNC	L2			
1	1	1	1	1	5	EAF36332401	PROTECT DEVICE,FUSE	62NR GLASS 250V 9A KS AXIAL BK	ORISEL	FUSE1			
1	1	1	1	1	6	0FZZJB3001A	PROTECT DEVICE,FUSE	250V T2A 52S020H(SLOW-BLOW) LITTELFUSE TRIAD	ORISEL	FUSE2			
4	4	4	4	4	7	0DD4007109A	DIODE,RECTIFIER	1N4007 MOTOROLA TP DO41 600V 1.5A 60A 75NS 10UA	DELTA	D1~D4			
1	1	1	1	1	8	EBJ32621301	TRANSFORMER,SWITCHING	EI 2218 1.3MH 174MH 1.2OHM 0.45	SMC	TRANS			
					9								
					10								
1	1	1	1	1	11	6630V9021SA	CONNECTOR,WAFER	174338-1 AMP 2P 11.0MM POWER CONNECTOR	AMP	CON1			
1	1	1	1	1	12	6630V902144	CONNECTOR,WAFER	917358-1 AMP 12P 2ROW POWER DOUBLOCK	AMP	CON2			
1	1	1	1	1	13	6630JB8004K	CONNECTOR,WAFER	SMW250 YEONHO 11P 2.5MM STRAIGHT SN	YEONHO	CON3			
1	1	1	1	1	14	6630JB8004J	CONNECTOR,WAFER	SMW250 YEONHO 10P 2.5MM STRAIGHT SN	YEONHO	CON4			
2	2	2	2	2	15	0CC0104186?0	CAPACITOR,FILM BOX	0.1uF 20% 275V MPP -40TO+85C NON-IND 18X6.4X12MM 10MM BK	PILKOR	CM1,CM2			
1	1	1	1	1	16	0CF4731Y4?70	CAPACITOR,FILM BOX	0.047UF 0.05PF 630V PP -10TO+85C IND 12.5X5X11MM 12.5MM BK	PILKOR	CM3			
					17								
1	1	1	1	1	18	6920V000001A	RELAY,CONTACT	ALE15B12 MATSUSHITA 250VAC 16A 12VDC 1A NO VENTING,1POLE	MATSUSHITA	RY1			
						EBB35235101		OMIH-SS-112LM OEG AC240V DC12V 16A 1A UL/CSA/VDE/SEMKO DIP OEG	TYCO				
						6920JB2006B		G5JS-1A-NT-12VDC AC250V DC12V 16A 1A UL/CSA/VDE LEAD	OMRON				
						6920JB2006C		DH1U II AC250V DC12V 16A 1A UL/CSA/TUV/SEMKO LEAD	DEC				
3	3	3	3	3	19	6920JB2003H	RELAY,CONTACT	G5NB-1A-E 5VDC AC250V DC5V 5A 1A UL/CSA/VDE 20.5*7.2*15.3 DIP	OMRON	RY2,RY3,RY7			
						6920JB2003D		G5NB-1A-E-12VDC(JPN) AC250V/DC30V DC12V 5A 1A UL/CSA/VDE	OMRON				
						6920JB2003E		G5NB-1A-E-12VDC(CHN) AC250V/DC30V DC12V 5A 1A UL/CSA/VDE	OMRON				
						6920A90002A		6920A90002A AC277VDC30V DC12V 3A 1A UL/CSA/TUV/VDE	MATSUSHITA				
2	2	2	2	2	20	6920JB2003H	RELAY,CONTACT	G5NB-1A-E 5VDC AC250V DC5V 5A 1A UL/CSA/VDE 20.5*7.2*15.3 DIP	OMRON	RY4,RY5			
						6920JB2003D		G5NB-1A-E-12VDC(JPN) AC250V/DC30V DC12V 5A 1A UL/CSA/VDE	OMRON				
						6920JB2003E		G5NB-1A-E-12VDC(CHN) AC250V/DC30V DC12V 5A 1A UL/CSA/VDE	OMRON				
						6920A90002A		6920A90002A AC277VDC30V DC12V 3A 1A UL/CSA/TUV/VDE	MATSUSHITA				
						6920JB2003F		PCJ-112D3MH AC240V DC12V 3A 1A UL/VDE	TYCO				
1	1	1	1	1	21	6920JB2009B	RELAY,CONTACT	G5SB-14 OMRON 250VAC 5A 12VDC 1C NO VENTING,1POLE	OMRON	RY6			
					22								
					23								
1	1	1	1	1	24	EAN36439801	IC,PROCESSOR,MICROCONTROLLERS	TMP87C841N OTP 64SDIP BK CS-PJT 1.2MDL E-MICOM	TOSHIBA	IC1			
					25								
					26								
					27								
					28								
					29								
1	1	1	1	1	30	0IPMGSK003A	IC,LINEAR IC	STR-A6351 SANKEN 8 DIP ST SMPS 1 CHIP	SANKEN	IC2			
1	1	1	1	1	31	0IPM0NE001A	OPTIC ELEMENT,PHOTO COUPLER	PS2561L(1-1)-V NEC 4P DIP BK = TLP721F	NEC	IC3			
1	1	1	1	1	32	0IKE431000A	IC,LINEAR IC	KIA431 3 PIN TP THREE-TERMINAL PROGRAMMABLE SHUNT REGULATOR DIODES	KEC	IC4			
1	1	1	1	1	33	0IKE7805D0H	IC,LINEAR IC	KIA7805API KEC 3P BK REGULATOR	KEC	IC5			
2	2	2	2	2	34	0IKE6500I30C	IC,LOGIC IC	KID65003AF KEC FLP16 BK 7CH DRIVER	KEC	IC6,IC8			
1	1	1	1	1	35	0IST L000662A	IC,STANDARD LOGIC	ULN2003A TOSHIBA 16PINSOP TAPPING NPN TRARRAY	TOSHIBA				
1	1	1	1	1	36	0IRH8346D0D	IC,LOGIC IC	M54563FP MITSUBISHI 20 P/TP CONVERT	MITSUBISHI	IC7			
1	1	1	1	1	37	0IKE7042D0A	IC,MEMORY EEPROM	BR93LC46RF-W 8PIN SOP BK EEPROM,1KBIT	ROHM	IC9			
1	1	1	1	1	38	0IKE7042I0A	IC,LINEAR IC	KIA7042P 3P TP RESET -	KEC	IC10			
					39								
2	2	2	2	2	40	0DR1070094A	DIODE,SWITCHING	FR107 TP DELTA DO41 1000V 1A 30A 500NSEC 5A	DELTA	D5,D6			
1	1	1	1	1	41	0DRSA0007?0A	DIODE,RECTIFIER	RL2 BK SANKEN DO41 400V 2.0A 40A 0.6SEC 10UA	SANKEN	D7			
1	1	1	1	1	42	0DD4004I9AC	DIODE,RECTIFIER	1N4004(S6M0) TP DO204AL 400V 1A 30A 30UA	DELTA	D8			
1	1	1	1	1	43	0DR154080AA	DIODE,RECTIFIER	1N5408 BK DELTA DO201AD 1000V 3A 125A -SEC 5A	DELTA	D9			
1	1	1	1	1	44	0TR1060094C	TRANSISTOR,BIPOLAR	KRA106M (KRA220B) KEC TP TO92M 50V 100MA	KEC	Q1			
2	2	2	2	2	45	0TR1060094F	TRANSISTOR,BIPOLAR	KRC106M KEC TP TO92M 50V 100MA	KEC	Q2,Q6			
1	1	1	1	1	46	0TR3198094A	TRANSISTOR,BIPOLAR	KTC3198(KTC8145) NPN 50V 60V 50V 150MA 100NA 70TO700	KEC	Q3			
1	1	1	1	1	47	0IST LKF005A	TRANSISTOR,BIPOLAR	KRC106S KEC SOT-23 TP TRANSISTOR	KEC	Q4			
1	1	1	1	1	48	0TRKE80077A	TRANSISTOR,BIPOLAR	KTA1544T KEC REEL TAPING TSM 30V 2A	KEC	Q5			
					49								

1	1	1	1	1	1	1	1	1	1	1	50	0CE476BV640	CAPACITOR,ALUMI-ELECTROLYTIC	47UF 20% 450V 250MA -25TO+105C 22X20MM 10MM SNAP IN BK	럭, ?, ?X	CE1
1	1	1	1	1	1	1	1	1	1	1	51	0CE4776H638	CAPACITOR,ALUMI-ELECTROLYTIC	470UF 20% 25V 717MA -40TO+85C GP 10X16MM 5MM STRAIGHT TP	럭, ?, ?X	CE2
1	1	1	1	1	1	1	1	1	1	1	52	0CE2276F638	CAPACITOR,ALUMI-ELECTROLYTIC	220UF,SMS,SG,16V,20%,FM5,TP5	럭, ?, ?X	CE3
1	1	1	1	1	1	1	1	1	1	1	53	0CE226EK638	CAPACITOR,ALUMI-ELECTROLYTIC	22UF 20% 50V 79MA -55TO+105C WT 5X11MM 5MM FORMING TP	럭, ?, ?X	CE4
1	1	1	1	1	1	1	1	1	1	1	54	0CE476BH638	CAPACITOR,ALUMI-ELECTROLYTIC	47UF,KME,RG,YX,25V,20%,FM5,TP5	럭, ?, ?X	CE5
											55					
											56					
											57					
6	6	6	6	6	6	6	6	6	6	6	58	0CK104DK94A	CAPACITOR,CERAMIC,CHIP	0.1UF,2012,50V,80/-20%,F(Y5V),R/TP	MURATA	CC1-CC3,CC6-CC8 ,CC18,CC19
1	1	1	1	1	1	1	1	1	1	1	59	0CK1040K949	CAPACITOR,CERAMIC,AXIAL TYPE	100NF -20TO+80% 50V Y5V -25TO+85C 3.5X1.9MM - TA52	TAEYANG	CC4 ,CC17
1	1	1	1	1	1	1	1	1	1	1	60	0CK4710K519	CAPACITOR,CERAMIC,AXIAL TYPE	470PF,D,50V,20%,F(Y5V),TA26	TAEYANG	CC5
4	4	4	4	4	4	4	4	4	4	4	61	0CK223DK96A	CAPACITOR,CERAMIC,CHIP	22NF -20TO+80% 50V X7R -55TO+125C 2012 TP	MURATA	CC9,CC11-CC13 ,CC16
1	1	1	1	1	1	1	1	1	1	1	62	0CK102DK96A	CAPACITOR,CERAMIC,CHIP	1000PF,2012,50V,80/-20%,X(X7R),R/TP	MURATA	CC10
1	1	1	1	1	1	1	1	1	1	1	63	0CK22102510	CAPACITOR,CERAMIC,RADIAL TYPE	220PF,D,2KV,10%,B(Y5P),R	SAMWHA	CC14
1	1	1	1	1	1	1	1	1	1	1	64	0CK1020K948	CAPACITOR,CERAMIC,AXIAL TYPE	1NF -20TO+80% 50V Y5V -25TO+85C 3.5X1.9MM 5MM TA26	TAEYANG	CC15
1	1	1	1	1	1	1	1	1	1	1	65	6212BA3041A	OSCILLATOR,RESONATOR,CERAMIC	CSTLS4M00G53-A0 MURATA 4MHZ +/-0.5% TA 15PF	MURATA	OSC1
											66					
											67					
1	1	1	1	1	1	1	1	1	1	1	68	0RS0151J609	RESISTOR,FIXED,CARBON FILM	1.5OHM,1W,5%,TA52	SMART	ROCP
1	1	1	1	1	1	1	1	1	1	1	69	EBC32066401	RESISTOR,SURGE(PRC TYPE)	330KOHM,1W,5%,TA52	SMART	R1
1	1	1	1	1	1	1	1	1	1	1	70	EBC32066501	RESISTOR,SURGE(PRC TYPE)	56KOHM,2W,5%,A	SMART	R2
1	1	1	1	1	1	1	1	1	1	1	71	0RD4700G609	RESISTOR,FIXED,CARBON FILM	47OHM,1/4W,5%,TA26	SMART	R3
1	1	1	1	1	1	1	1	1	1	1	72	0RD6801G609	RESISTOR,FIXED,CARBON FILM	6.8KOHM 5% 1/4W 6.5X2.3MM NONE AXIAL TA52	SMART	R4
6	6	6	6	6	6	6	6	6	6	6	73	0RD6800G608	RESISTOR,FIXED,CARBON FILM	680OHM,1/4W,5%,TA26	SMART	R5
1	1	1	1	1	1	1	1	1	1	1	74	0RD2701G608	RESISTOR,FIXED,CARBON FILM	2.7KOHM,1/4W,5%,TA26	SMART	R6
8	8	8	8	8	8	8	8	8	8	8	75	0RJ1002E672	RESISTOR,FIXED,CHIP	10KOHM,1/8W,5%,2012,R/TP	ROHM	R7,R8,R55-R60
3	3	3	3	3	3	3	3	3	3	3	76	0RJ9101E472	RESISTOR,FIXED,CHIP	9.1KOHM,1/8W,1%,2012,R/TP	ROHM	R9
3	3	3	3	3	3	3	3	3	3	3	77	0RJ2401E472	RESISTOR,FIXED,CHIP	2.4KOHM,1/8W,1%,	ROHM	R10
7	7	7	7	7	7	7	7	7	7	7	78	0RH4701L622	RESISTOR,FIXED,CHIP	4.7KOHM,1/8W,5%,2012,D	ROHM	R11-R14,R18,R20,R26
3	3	3	3	3	3	3	3	3	3	3	79	0RH2200L622	RESISTOR,FIXED,CHIP	220OHM 5% 1/8W 2012 R/TP	ROHM	R15
1	1	1	1	1	1	1	1	1	1	1	80	0RJ1001E472	RESISTOR,FIXED,CHIP	1KOHM,1/8W,1%,2012,R/TP	ROHM	R16
1	1	1	1	1	1	1	1	1	1	1	81	0RH1004L622	RESISTOR,FIXED,CHIP	1MOHM,1/8W,5%,2012,R/TP	ROHM	R19
3	3	3	3	3	3	3	3	3	3	3	82	0RD2001G609	RESISTOR,FIXED,CARBON FILM	2KOHM,1/4W,5%,TA26	SMART	R21,R23,R24
1	1	1	1	1	1	1	1	1	1	1	83	0RD3300G609	RESISTOR,FIXED,CARBON FILM	330OHM 5% 1/4W 6.5X2.3MM NONE AXIAL TA52	SMART	R22
1	1	1	1	1	1	1	1	1	1	1	84	0RH1002L622	RESISTOR,FIXED,CHIP	10KOHM,1/8W,5%,2012,R/TP	ROHM	R25
1	1	1	1	1	1	1	1	1	1	1	85	0RJ2702E672	RESISTOR,FIXED,CHIP	27KOHM 5% 1/8W 2012 R/TP	ROHM	R27
9	9	9	9	9	9	9	9	9	9	9	86	0RH2201L622	RESISTOR,FIXED,CHIP	2.2KOHM,1/8W,5%,2012,R/TP	ROHM	R28-R33,R38-R40
3	3	3	3	3	3	3	3	3	3	3	87	0RD2000G609	RESISTOR,FIXED,CARBON FILM	200OHM 5% 1/4W 6.5X2.3MM - AXIAL TA52	SMART	R41-R43
1	1	1	1	1	1	1	1	1	1	1	88	0RD4701G608	RESISTOR,FIXED,CARBON FILM	4.7KOHM,1/4W,5%,TA26	CHOYANG	R48
2	2	2	2	2	2	2	2	2	2	2	89	0RN2612G409	RESISTOR,FIXED,METAL FILM	26.1KOHM,1/4W,1%,TA52	SMART	R50,R52
3	3	3	3	3	3	3	3	3	3	3	90	0RD2001G608	RESISTOR,FIXED,CARBON FILM	2KOHM,1/4W,5%,TA26	CHOYANG	R49,R51,R53
1	1	1	1	1	1	1	1	1	1	1	91	0RN1002G409	RESISTOR,FIXED,METAL FILM	10KOHM 1% 1/4W 6.5X2.3MM NONE AXIAL TA52	SMART	R54
2	2	2	2	2	2	2	2	2	2	2	92	0RD1002G609	RESISTOR,FIXED,CARBON FILM	10KOHM,1/4W,5%,TA52	CHOYANG	R61,R62
1	1	1	1	1	1	1	1	1	1	1	93	0RH2001L622	RESISTOR,CHIP	MCR10EZHJ202 2KOHM 5% 1/8W 2012 R/TP	ROHM	R63
											94					
1	1	1	1	1	1	1	1	1	1	1	95	6908JB3002A	AUDIO PART,SPEAKER	BM-20K BUJEON PIEZO 2KHZ 80DB	BUJEON	BUZZER
6	6	6	6	6	6	6	6	6	6	6	96	6854B50001A	JUMP WIRE	0.6MM 52MM TP TAPING SN	8MM	J1,J6,J7,J9,J11,J13
11	11	11	11	11	11	11	11	11	11	11	97	6854B50001A	JUMP WIRE	0.6MM 52MM TP TAPING SN	10MM	J2-J5,J8,J10,J12,JCR1-JCR4
1	1	1	1	1	1	1	1	1	1	1	98	6600R000008	SWITCH,TACT	JPT1212B JEIL 12VDC 50MA	NAMAE	TESTS/W
0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	99	SS0000008AA	SOLDER (ROSIN WIRE) RSO	SR-34 PB-FREE, LFM-48	-	-
0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	100	SSWZU-L05AA	SOLDER,SOLDERING	LFM-38, SN 3.0AG -0.5CU% 3.0MM	HUISUNG	-
0.0012	0.0012	0.0012	0.0012	0.0012	0.0012	0.0012	0.0012	0.0012	0.0012	0.0012	101	7245ZB0004A	FLUX	SV-PBF-06 KSK 12.5 WT% 0.815+-0.003	KOKI	-
											102					

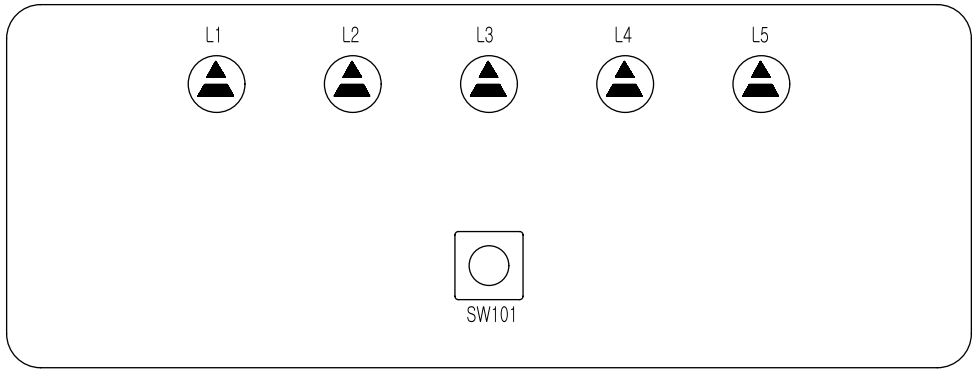
7-5-3 PWB ASS'Y, DISPLAY AND PARTS LIST



01	WORK
CS1.2 E-MICOM	APPLICATION

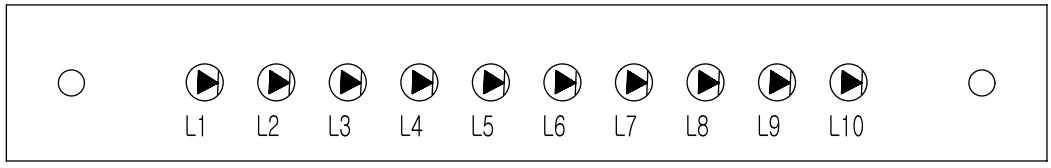
Qty	No	P/NO	DESCRIPTION	SPEC	MAKER	REMARK
1	1	EAX32862402	PWB(PCB)	CS-PJT E-MICOM DISPLAY PCB BARE BOARD FR1	DOO SAN	t=1.6
17	2	EAV36289201	LED,CHIP	SUPER Y/G 2.0V 30mA 35mcd 570nm 100mW 1206	BRIGHT	LD01-LD17
1	3	MGW38269201	REFLECTOR	NORYL	-	-
1	4	MFT37166801	NAME PLATE,P(H)	CS-PJT E-MICOM LED MODULE	-	-
1	5	6630JB8004K	WAFER	$MAW250-11	YEON HO	CON101
3	7	6600R000008	SWITCH,TACT	JPT1212B JEIL 12VDC 50MA	NAMAE	SW101-SW103
6	8	0DRRM00028A	DIODE,RECTIFIERS	RLR4004 ROHM R/TP SOT23 400V 1A 20A .SEC 10MA	ROHM	D101-D106
3	9	0DS414809AB	DIODE,SWITCHING	RLS4148 1V 100V 450MA	ROHM	D107-D109
0.002	12	SS0000008AA	SOLDER(ROSIN WIRE) RSO	SR-34 PB FREE, LFM-48	HEESUNG	-
0.003	13	SSWZU-L05AA	SOLDER,SOLDERING	LFM-38,SN 3.0AG-0.5CU% 3.0MM	HEESUNG	-

7-5-4 PWB ASS'Y, DISPLAY(I-MICOM) AND PARTS LIST



D	WORK					
CS1.2-PJT	APPLICATION					
Qty	No	P/NO	DESCRIPTION	SPEC	MAKER	REMARK
0	1	6870JB3011A	PWB(PCB),DISPLAY	ML-PJT I-MICOM DISPLAY	DOO SAN	-
1	1	6877JB8039B	PWB(PCB)	BP1,2,3,4-PJT I-MICOM DISPLAY (GUIDE HOLE)	DOO SAN	-
1	2	6631JB2008B	CONNECTOR ASSEMBLY	GR-S592,552 BP3,4-PJT I-MICOM DISPLAY		-
1	4	6600RRT002K	SWITCH,TACT	JTP1230A JEIL 12V DC 50MA	JEIL	SW101
5	5	0DLLE0019AA	LED	LEDTECH ELECTRONICS LT1824-81-BCM TP GREEN 2	LEDTECH	L1-L5
1	6	0DD414809AA	DIODE,SWITCHING	1N4148 26MM	ROHM	D101
1	11	6854B50001A	JUMP WIRE	0.6MM 52MM TP TAPING SN	-	J101
0.002	12	SS0000008AA	SOLDER(ROSIN WIRE) RS0	SR-34 PB FREE, LFM-48	HEE SUNG	-
0.01	13	SSWZU-L05AA	SOLDER,SOLDERING	LFM-38,SN 3.0AG-0.5CU% 3.0MM	-	-
0.0005	14	7245ZB0004A	FLUX	SV-PBF-06 KSK 12.5 WT% 0.815+-0.003	KOKI	-

7-5-5 V-LED DISPLAY & PART LIST

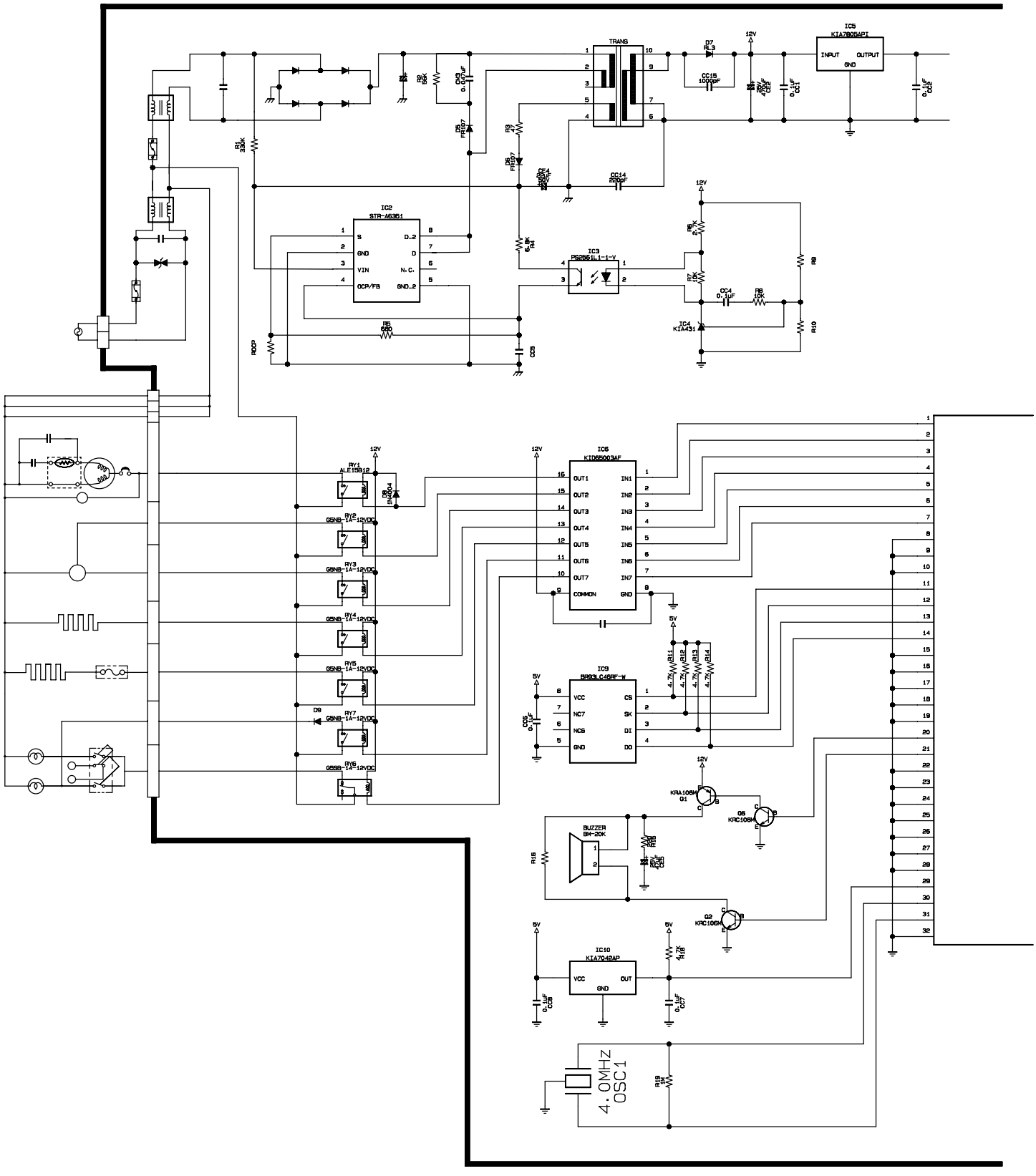


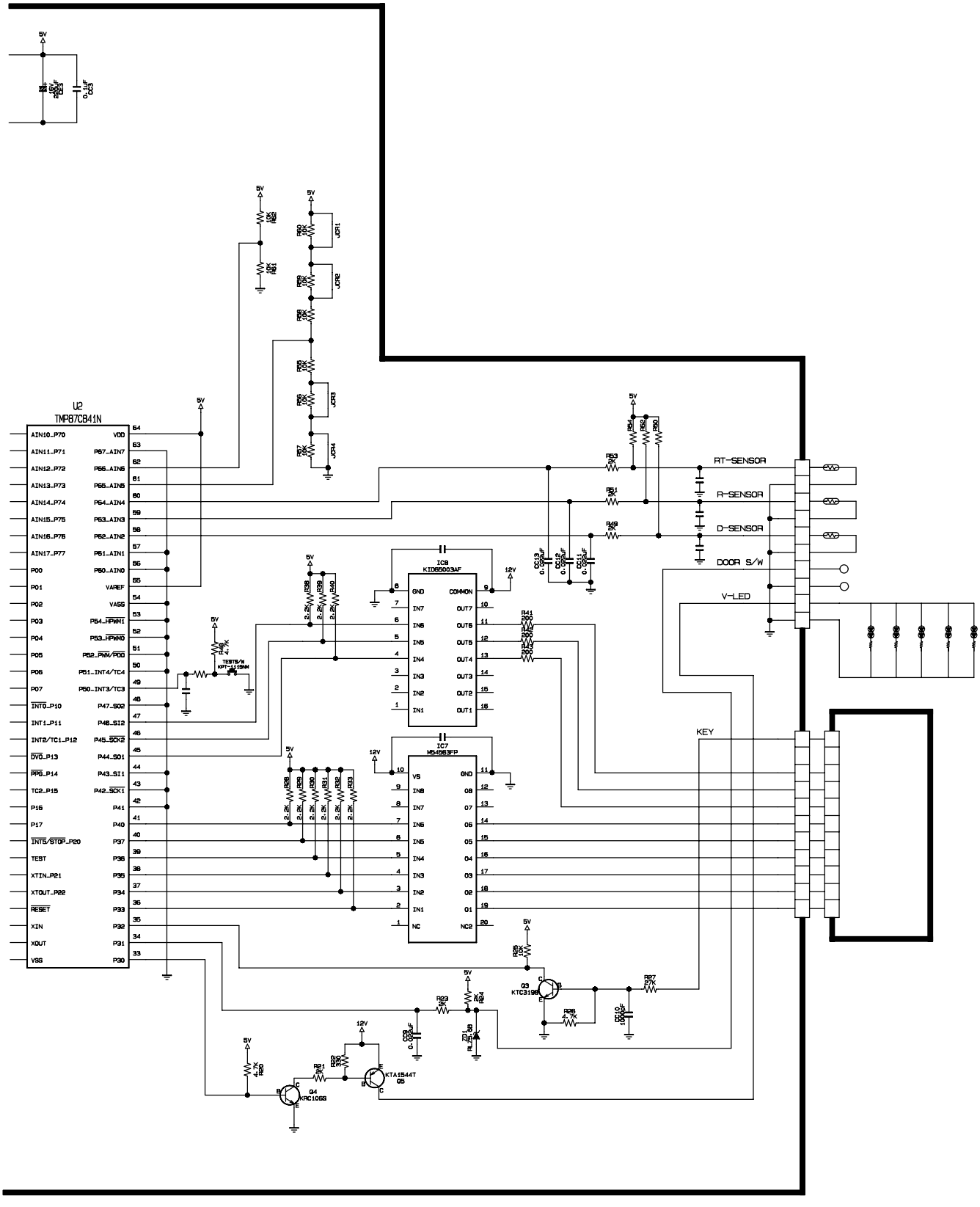
E

CS-PJT V-LED

Qty	P/NO	DESCRIPTION	SPEC	MAKER	REMARK
1C	6870JB8262	PWB(PCB)	ACE-PJT VEGETABLE LED DISPLAY	DOO SAN	-
2	-	HOUSING	35002-0003	MOLEX	CON101
1	-	CONTACT	35021-1201(PBT)	MOLEX	-
1	-	HOUSING	#35151-0610	MOLEX	-
1	-	T.P.A	#35151-0390	MOLEX	-
1	-	REC(M)	#35746-0411	MOLEX	-
1	-	REC(M)	#35748-0410	MOLEX	-
1	-	LEAD WIRE	UL1007 AWG 24(VSF 0.18/12/0.3MM)	-	-
1		LEAD WIRE	UL1007 AWG 24(VSF 0.18/12/0.3MM)	-	-
5	0RD2700G608	RESISTOR	270 OHM 1/4 W 5% TA26	ROHM	R101-105
5	0DLSU0200AB	LED	LW540 TAPING WHITE 4500MCD (Vf:3.0-3.4)	SEOUL SEMICON.	L1,3,5,7,9
5	0DLSU0215AA	LED	LT520 TAPING GREEN 4500MCD (Vf:3.0-3.8)	SEOUL SEMICON.	L2,4,6,8,10
0.289		SOLDER,SOLDERING	HSE-02	HEE SUNG	
0.59	-	FLUX	LF-715K(Pb FREE)	TAE WON	-

7-6 PWB DIAGRAM

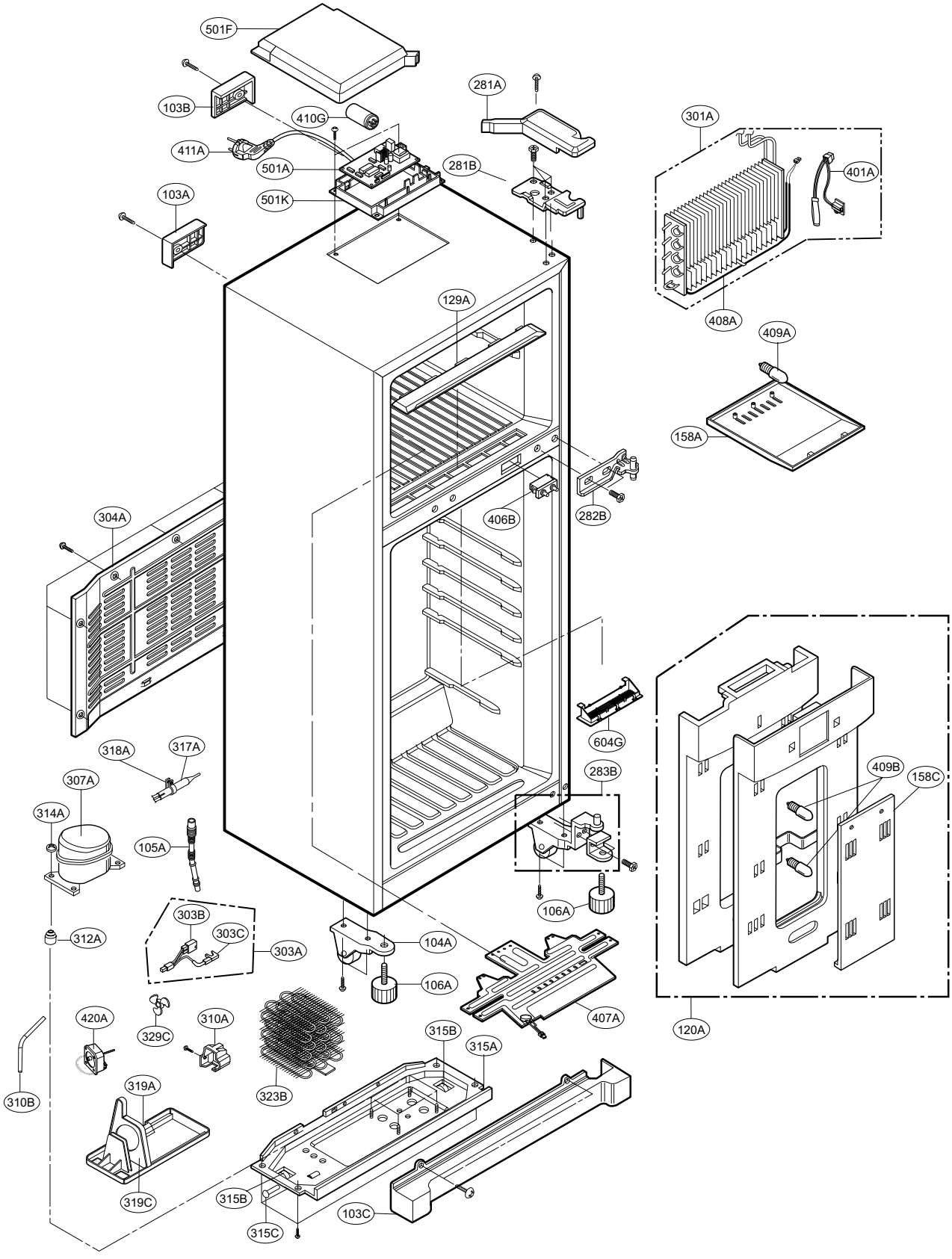



U2
TMP87C841N
IC8
KID65003AF
IC7
M54563FP
RT-SENSOR
R-SENSOR
D-SENSOR
DOOR S/W
V-LED
KEY
Q3
KTC3198
Q4
KRC106S
Q5
KTA1544T
5V
12V

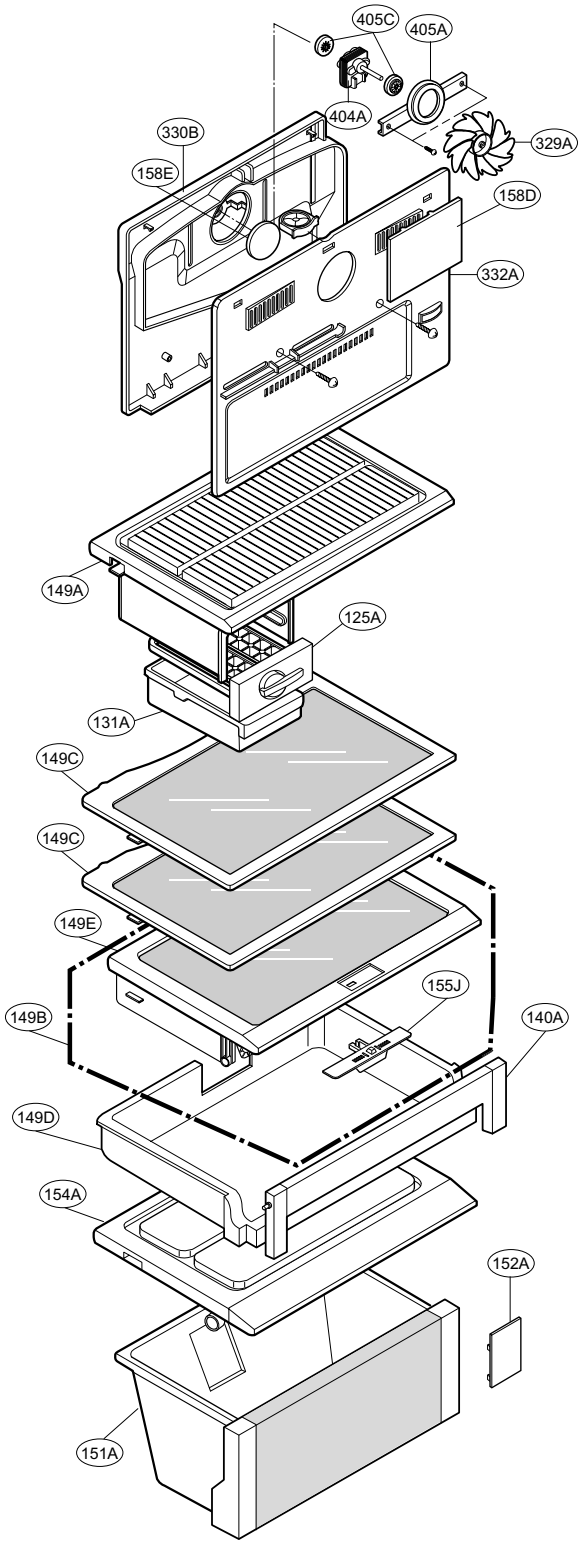
9. EXPLODED VIEW & REPLACEMENT PARTS LIST

9-1.

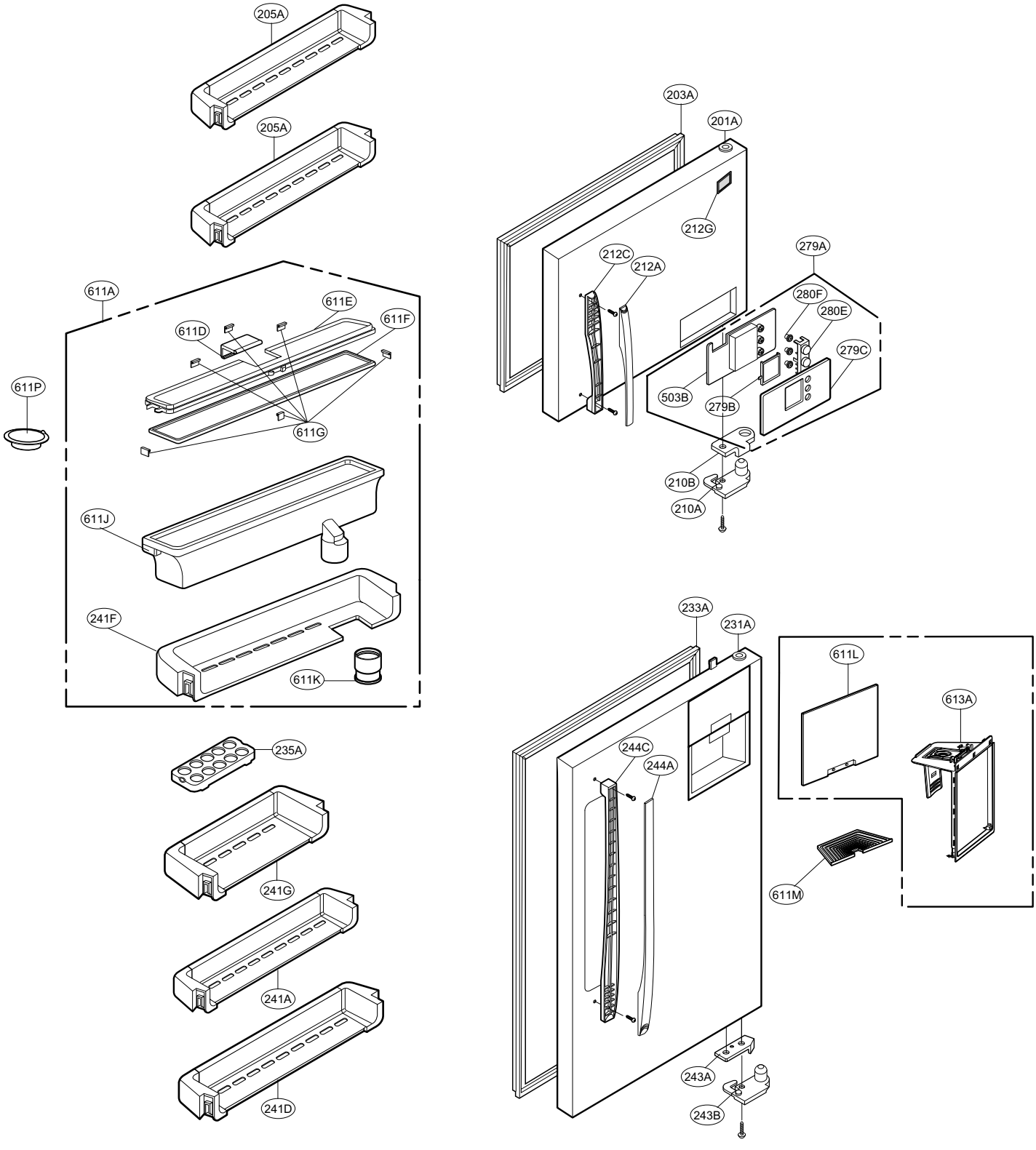
▼ The parts of refrigerator and the shape of each part are subject to change in different localities.
▼ Capacitors and fuse are optional parts.



▶ **GR-B652/712Y****
GR-M652/712Y**



▶ **GR-B652/712Y*P**



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