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LG GM-B228JTCA Owner's Manual

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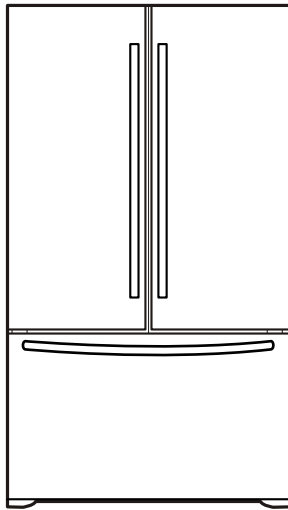


LG

REFRIGERATOR

SERVICE MANUAL

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



MODELS:
LFC22760**

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SAFETY PRECAUTIONS

Please read the following instructions before servicing your refrigerator.

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

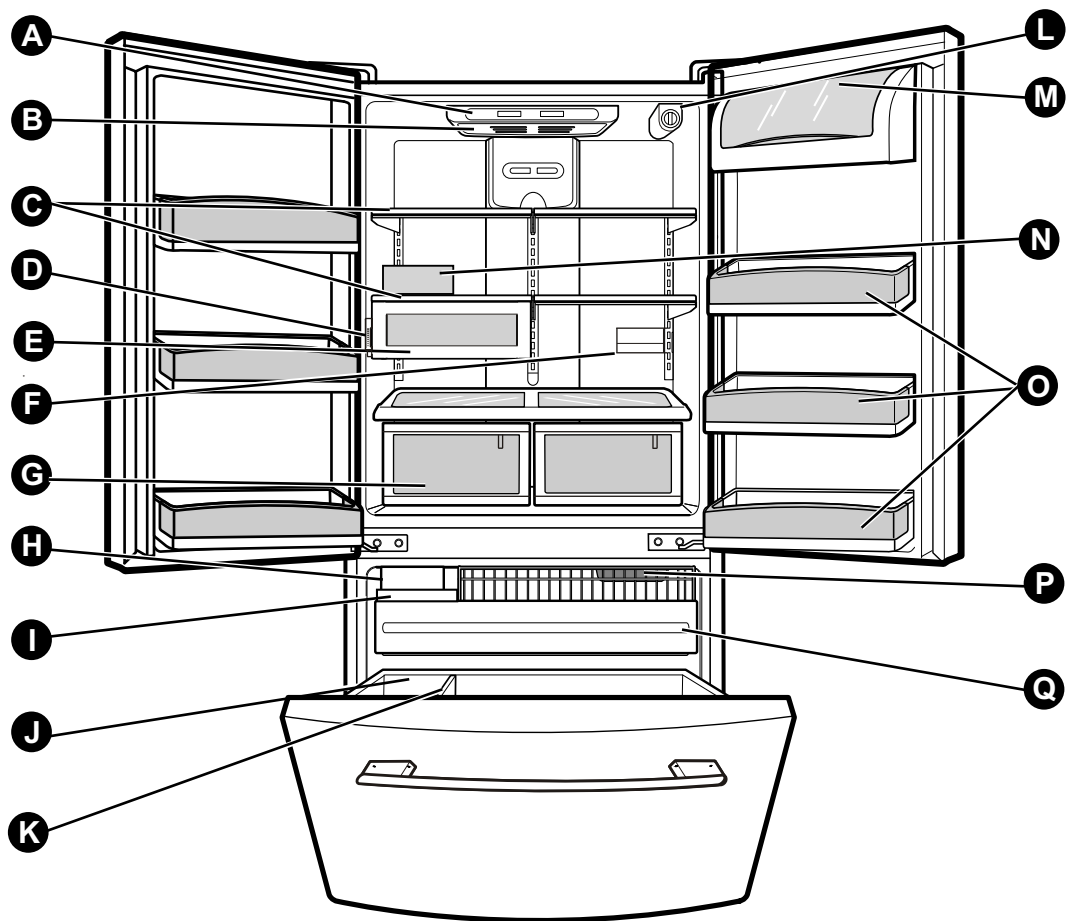
1. SPECIFICATIONS

22 cu. Ft. (22.4 cu. Ft.)

ITEMS	SPECIFICATIONS
DOOR DESIGN	Side Rounded
DIMENSIONS	W(836)x D(870)x H(1754) mm W(32.91)x D(34.25)x H(69.06) in
NET WEIGHT	127.5 Kg 281.09 pounds
COOLING SYSTEM	Fan Cooling
TEMPERATURE CONTROL	Micom Control
DEFROSTING SYSTEM	Full Automatic Heater Defrost
DOOR FINISH	Embossed Metal, PCM Smooth, Stainless
HANDLE TYPE	Bar
INNER CASE	ABS Resin
INSULATION	Polyurethane Foam

ITEMS	SPECIFICATIONS	
VEGETABLE TRAY	Opaque Drawer Type	
COMPRESSOR	PTC Starting Type	
EVAPORATOR	Fin Tube Type	
CONDENSER	Wire Condenser	
REFRIGERANT	R-134a (120 g)	
LUBRICATING OIL	ISO10 (220 ml)	
DEFROSTING DEVICE	SHEATH HEATER	
LAMP	REFRIGERATOR	60 W (2EA)
	FREEZER	60 W (1EA)

2. PARTS IDENTIFICATION



Use this section to become more familiar with the parts and features.

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

A Digital Sensor Control*

B Refrigerator Light

C Shelves

D Temperature Control*

E Chef Fresh / Snack Pan

F Can Dispenser

G Optibin Crisper
Keeps fruits and vegetable fresh and crisper

H Customcube Icemaker*

I Ice Tray *

J Durabase

K Divider

L Filter (Inside)*

M Dairy Bin

N Egg Box

O Refrigerator Door Rack

P Freezer Light

Q Pull out Drawer

*on some models

3. DISASSEMBLY

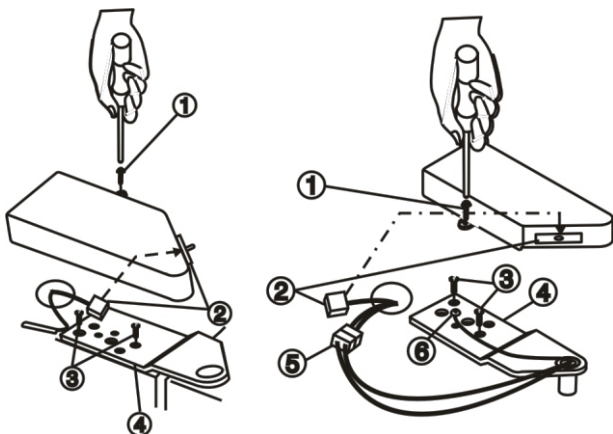
3-1 DOOR

► Left Door

- Loosen the cover screw (1).
- Disconnect door switch wire (2).
- Loosen hinge bolts (3).
- Lift off the top hinge (4).
- Place the door on a non-scratching surface with the inside up.

► Right Door

- Loosen the cover screw (1).
- Disconnect door switch wire (2).
- Disconnect wire harness (5).
- Loosen hinge bolts (3).
- Loosen ground screw (6).
- Lift off the top hinge (4).
- Place the door on a non-scratching surface with the inside up.



Left

Right

Figure 1

Door Gasket Removal

1. Remove door frame cover

Starting at top of cover and working down, snap cover out and away from door.

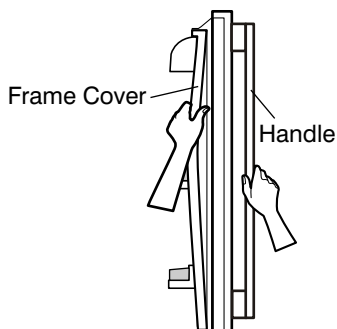


Figure 2

2. Remove gasket bracket clips

There are two clips on each door. Start bracket removal near one of the middle clips.

- 1) Pull gasket back to expose gasket bracket clip and door frame.
- 2) Insert a flat tip screwdriver into seam between gasket bracket and door frame and pry back until clips snaps out.
- 3) Continue prying back along seam until all clips snap out.

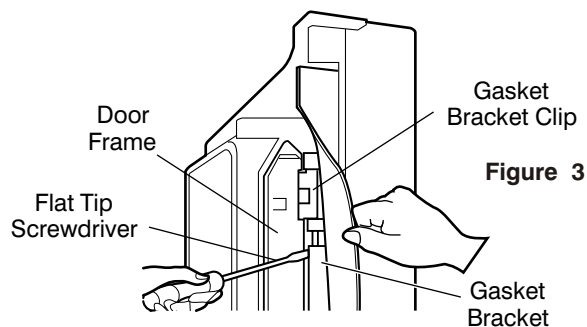


Figure 3

3. Remove gasket

Pull gasket free from gasket channel on the three remaining sides of door.

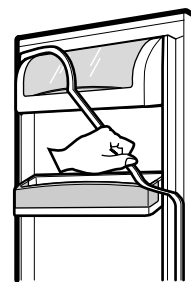


Figure 4

Door Gasket Replacement

1. Insert gasket bracket clips

- 1) Insert gasket bracket edge beneath door frame edge.
- 2) Turn upper gasket bracket spring so that both spring ends are in the door channel.
- 3) Push in clip until you hear it snap securely into place.

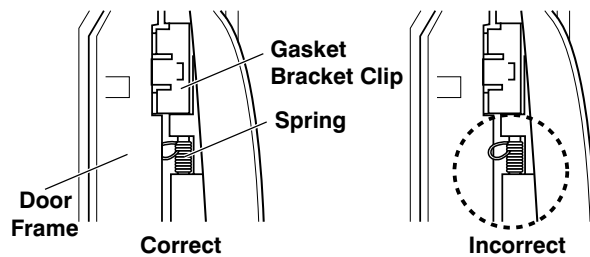


Figure 5

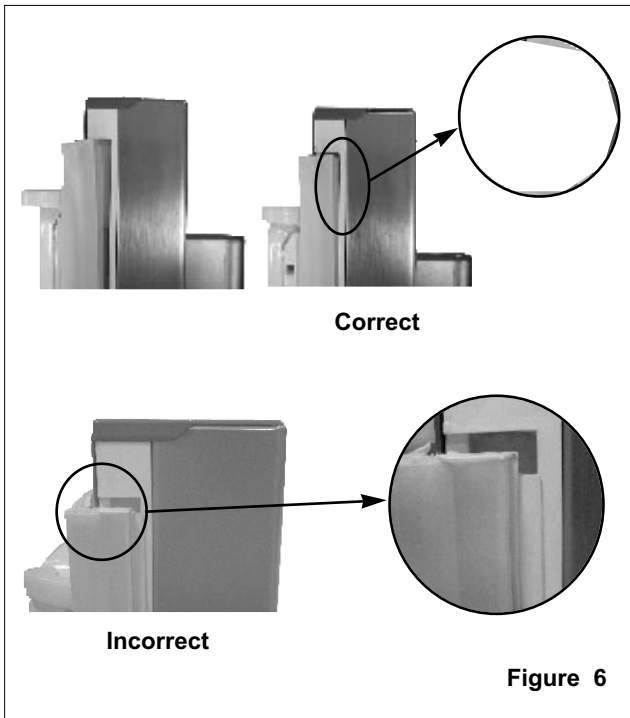
- 4) Push in remaining two clips until you hear each snap securely into place.

Note: Make sure that no part of gasket bracket edge protrudes from beneath door frame edge.

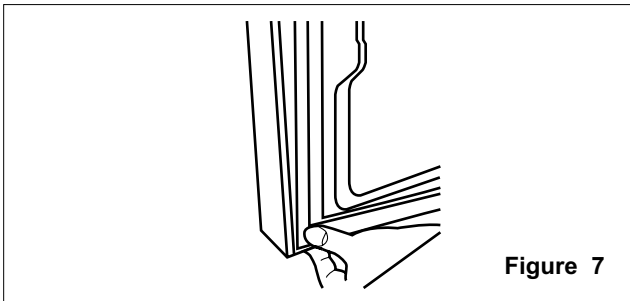
2. Insert gasket into channel

1) Snap gasket assembly into the door bracket.

<Inserting the Gasket Assembly into the Bracket Door>

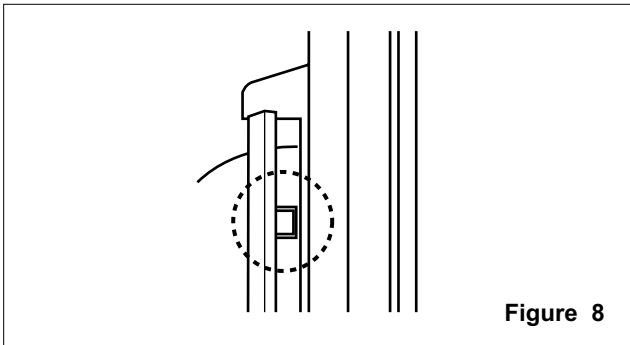


2) Press gasket into channels on the three remaining sides of door.



3. Replace door frame cover

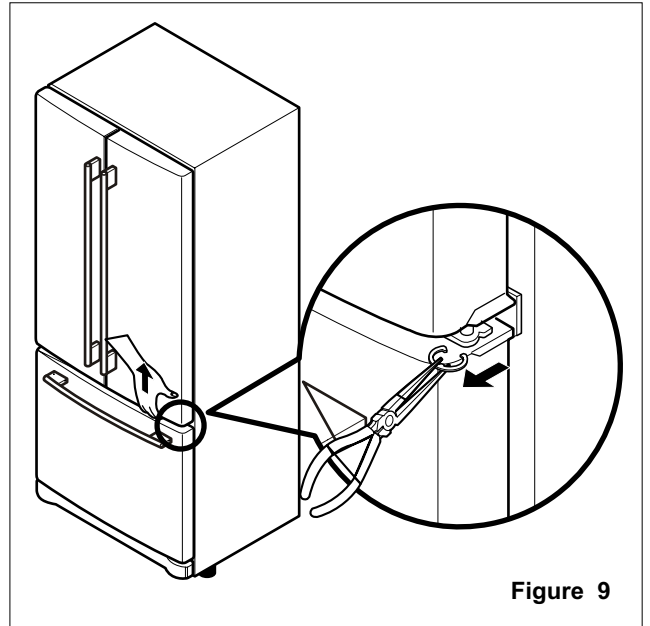
Starting at top of cover and working down, snap cover back into door.



3-2 DOOR ALIGNMENT

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

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



3-3 FAN AND FAN MOTOR

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

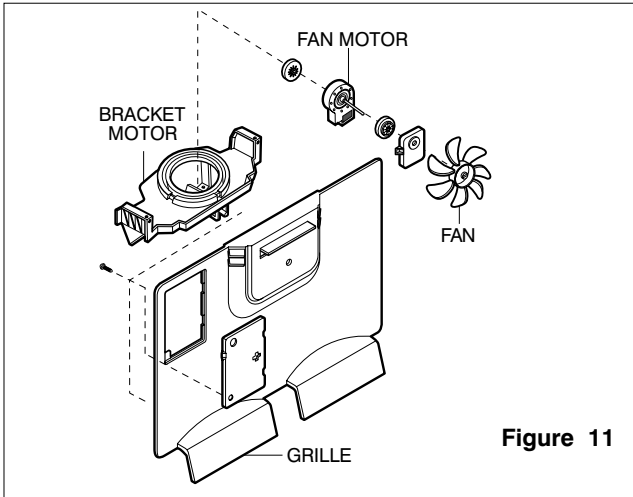


Figure 11

3-4 DEFROST CONTROL ASSEMBLY

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

The Defrost Sensor works to defrost automatically. It is attached to the metal side of the Evaporator and senses its temperature. At 72°C, it turns the Defrost Heater off. Fuse-M is a safety device for preventing over-heating of the Heater when defrosting.

1. Pull out the grille assembly. (Figure 12)
2. Separate the connector with the Defrost Control assembly and replace the Defrost Control assembly after cutting the Tie Wrap. (Figure 13)

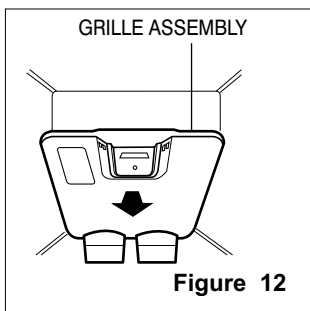


Figure 12

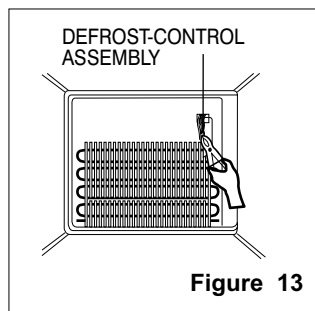


Figure 13

3-5 LAMP

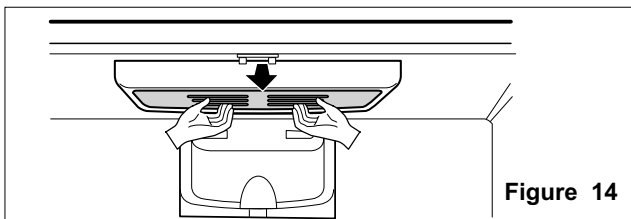


Figure 14

3-5-1 Refrigerator Compartment Lamp

1. Unplug the power cord from the outlet.
2. Remove refrigerator shelves.
3. Release the hooks on both ends of the lamp shield and pull the shield downward to remove it.
4. Turn the lamp counterclockwise.
5. Assembly is the reverse of disassembly. Replacement bulb must be the same specification as the original (Max. 60 W2EA).

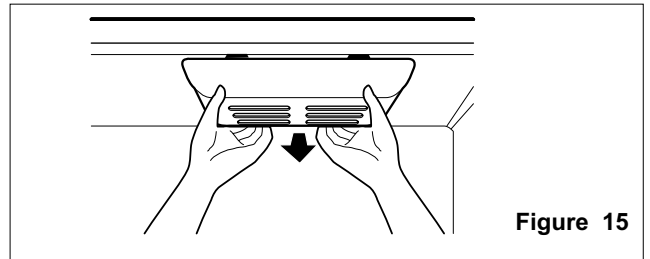


Figure 15

3-5-2 Freezer Compartment Lamp

1. Unplug refrigerator or disconnect power.
2. Reach behind light shield to remove bulb.
3. Replace bulb with a 60-watt appliance bulb.
4. Plug in refrigerator or reconnect power.

3-6 CONTROL BOX-REFRIGERATOR

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

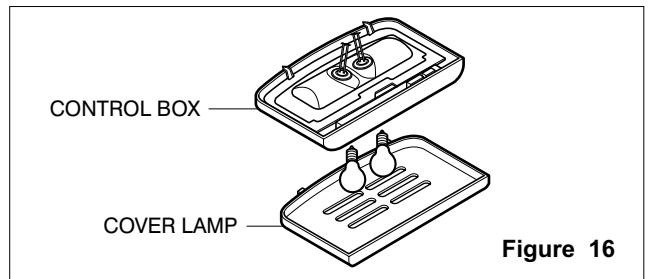


Figure 16

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

3-7 MULTI DUCT

1. Remove the upper and lower Caps by using a flat screwdriver, and remove 2 screws. (Figure 17)
2. Disconnect the lead wire on the bottom position.

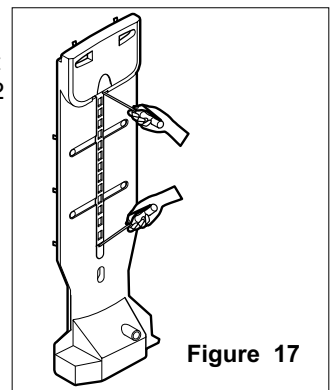


Figure 17

4. ADJUSTMENT

4-1 COMPRESSOR

4-1-1 Role

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

4-1-2 Composition

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

4-1-3 Note for Usage

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

4-2 PTC-STARTER

4-2-1 Composition of PTC-Starter

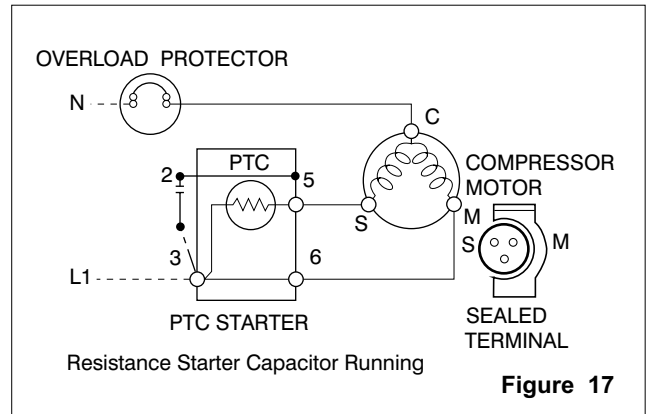
- (1) PTC (Positive Temperature Coefficient) is a no-contact semiconductor starting device which uses ceramic material consisting of BaTiO₃.
- (2) The higher the temperature is, the higher the resistance value. These features are used as a starting device for the Motor.

4-2-2 Role of PTC-Starter

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

4-2-3 PTC-Applied Circuit Diagram

□ Starting Method for the Motor



4-2-4 Motor Restarting and PTC Cooling

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

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

- (1) If the compressor attempts to restart before the PTC device is cooled, the PTC device will allow current to flow only to the main winding.
- (2) The OLP will open because of the over current condition. This same process will continue (3 to 5 times) when the compressor attempts to restart until the PTC device has cooled. The correct OLP must be properly attached to prevent damage to the compressor.
Parts may appear physically identical but could have different electrical ratings. Replace parts by part number and model number. Using an incorrect part could result in damage to the product, fire, injury, or possibly death.

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

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

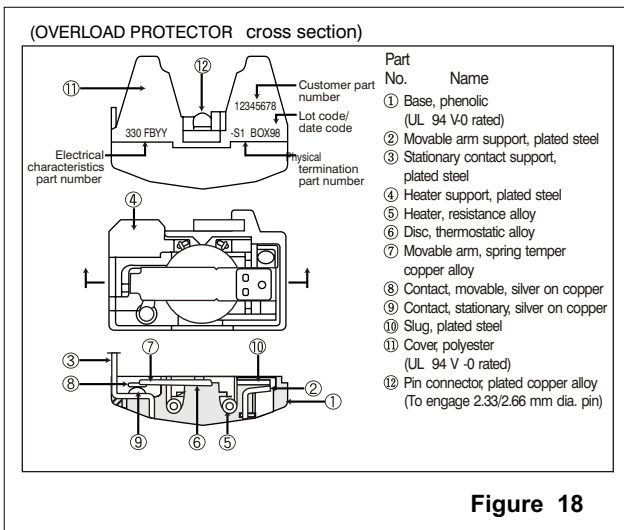
4-3 OLP (OVERLOAD PROTECTOR)

4-3-1 Definition of OLP

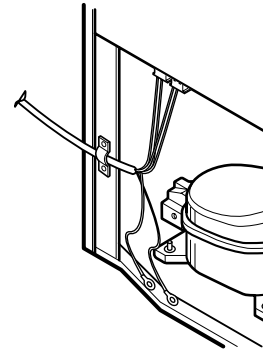
- (1) OLP (OVERLOAD PROTECTOR) is attached to the Compressor and protects the Motor by opening the circuit to the Motor if the temperature rises and activating the bimetal spring in the OLP.
- (2) When high current flows to the Compressor motor, the Bimetal works by heating the heater inside the OLP,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

4-3-2 Role of the OLP

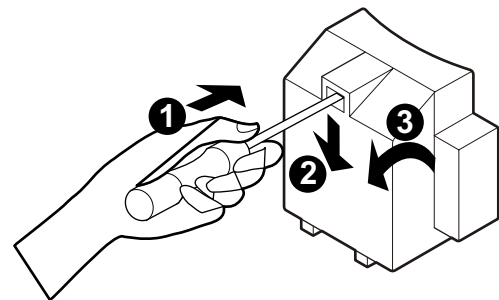
- (1) The OLP is attached to the Sealed Compressor used for the Refrigerator. It prevents the Motor Coil from being started in the Compressor.
- (2) For normal operation of the OLP, do not turn the Adjust Screw of the OLP in any way.



4-4 TO REMOVE THE COVER PTC



- 1) Remove the Cover Back M/C.
- (2) Disconnect two housing upper side of comp connected in.
- (3) Loosen two screws on comp base.

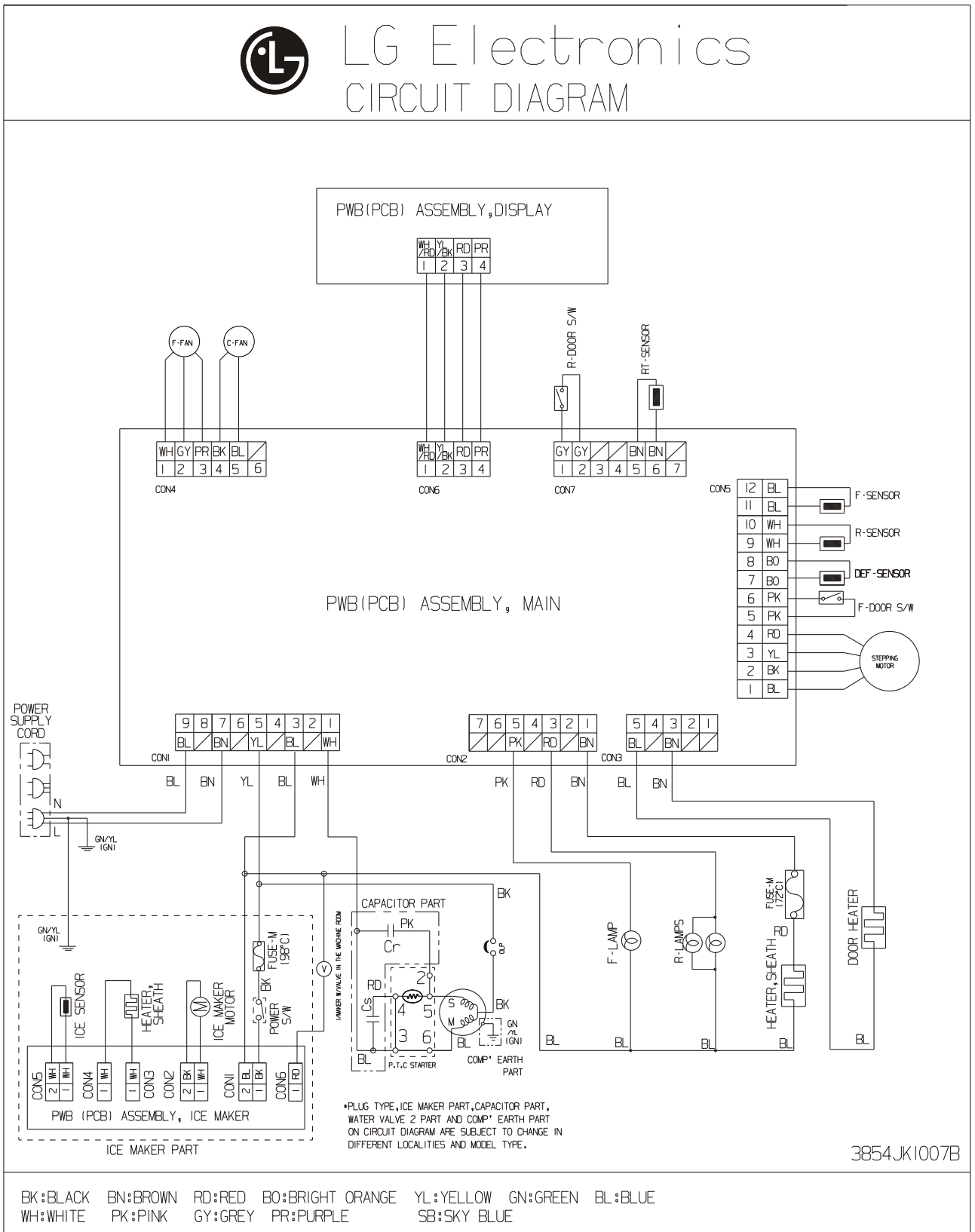


- (4) Use a L-shaped flap tool to pry off the cover.
- (5) Assembly in reverse order of disassembly.

5. CIRCUIT DIAGRAM



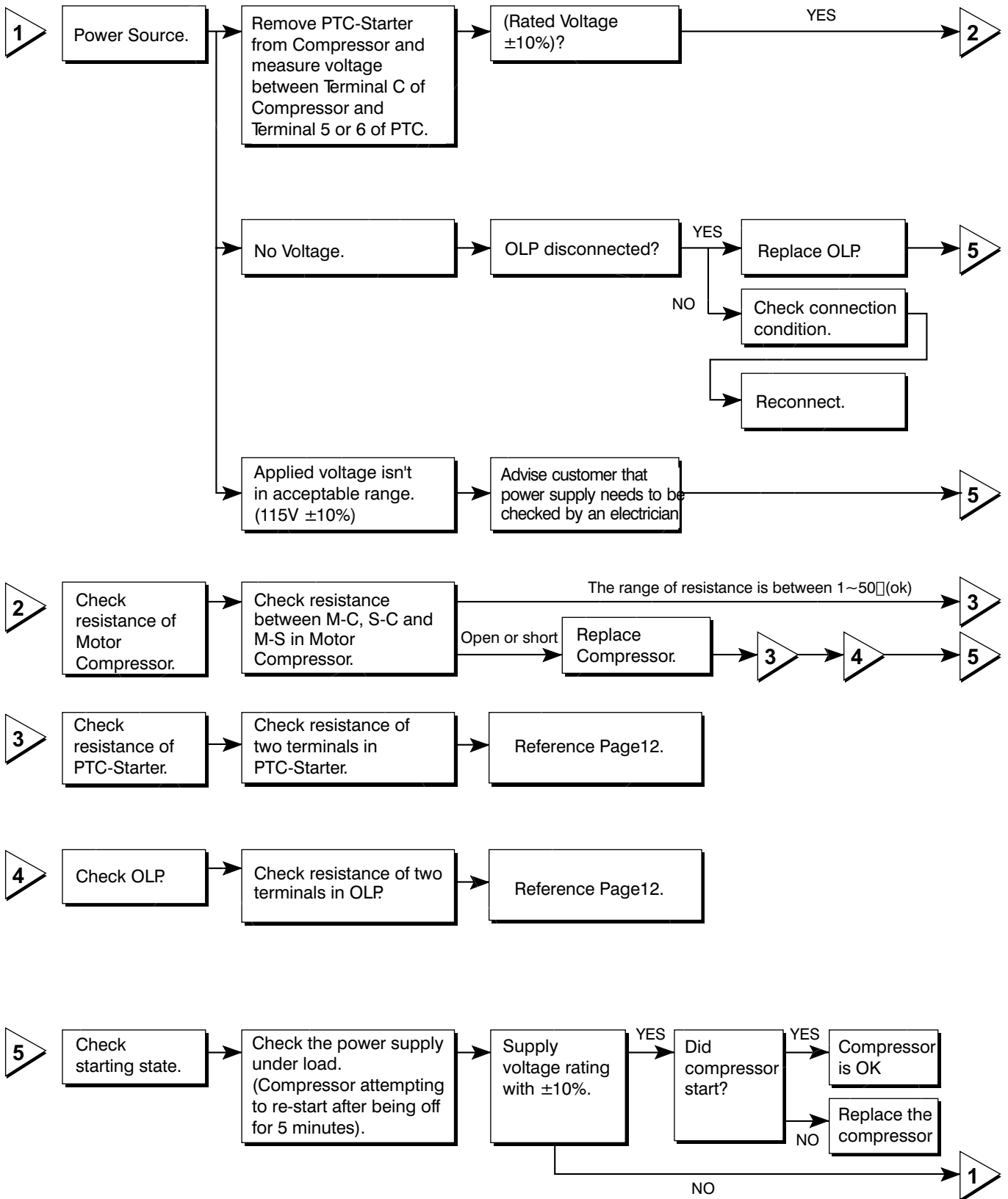
LG Electronics CIRCUIT DIAGRAM



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6. TROUBLESHOOTING

6-1 COMPRESSOR AND ELECTRIC COMPONENTS



6-2 PTC AND OLP

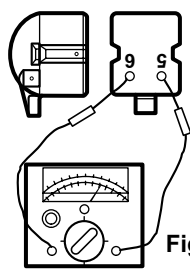
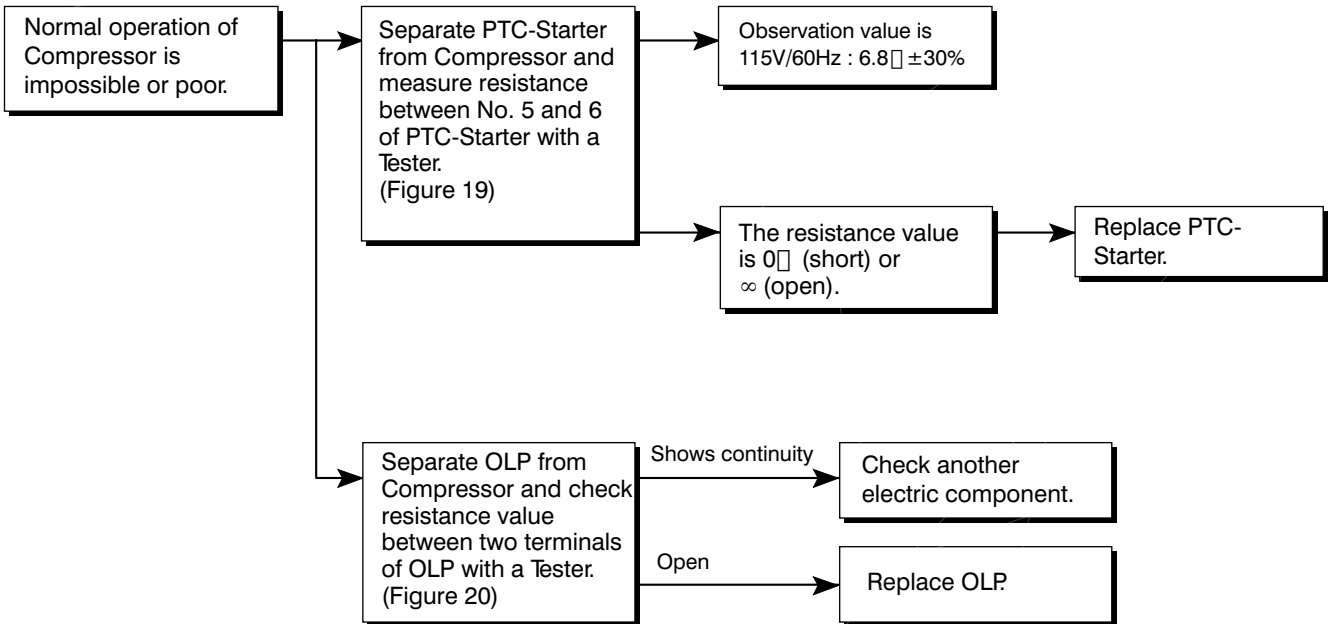


Figure 19

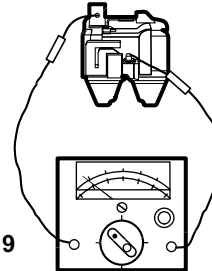
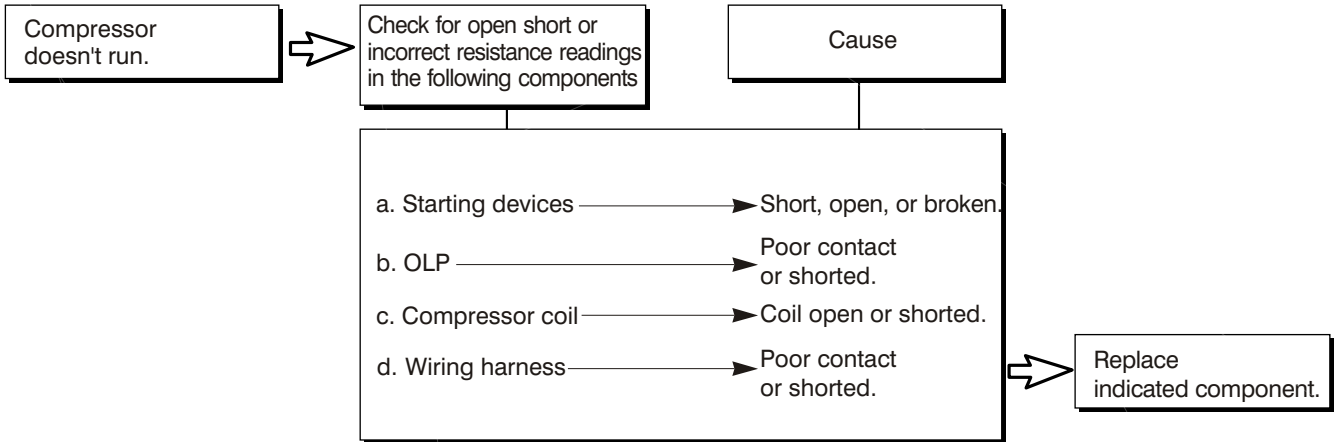


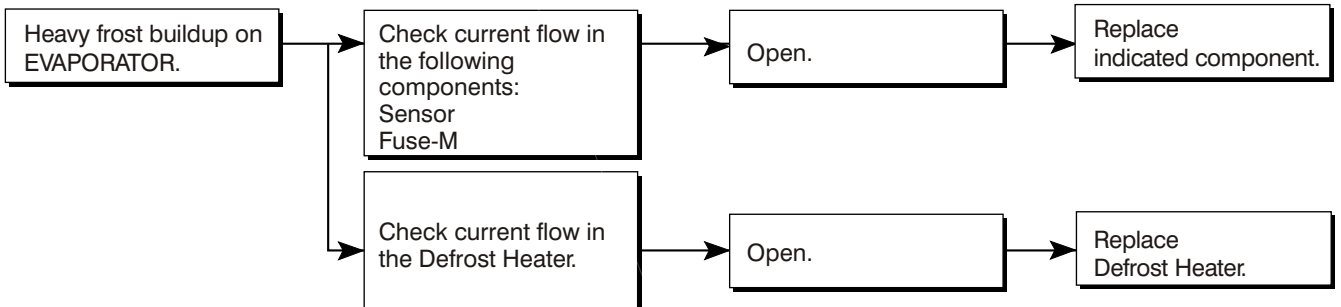
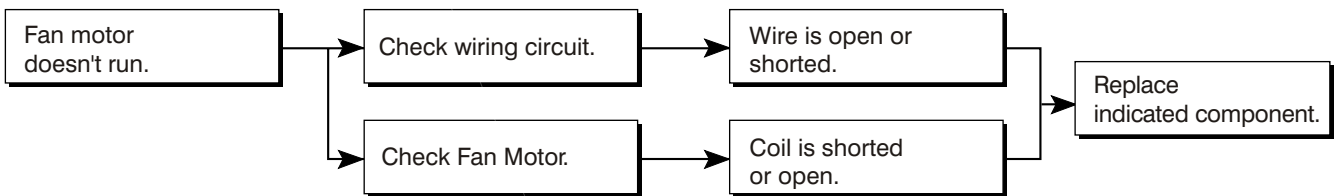
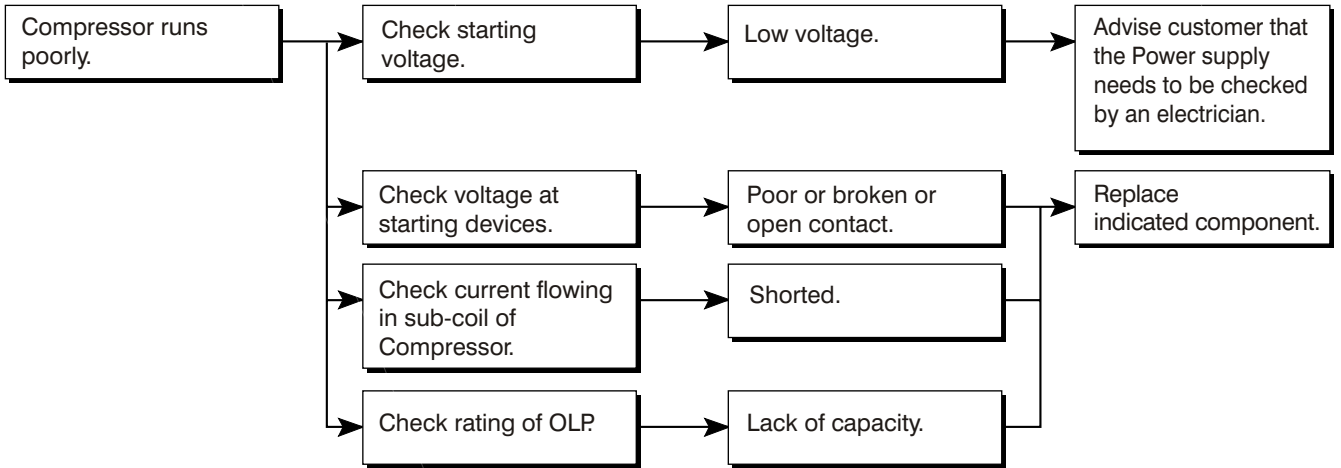
Figure 20

6-3 OTHER ELECTRICAL COMPONENTS

□ Not cooling at all



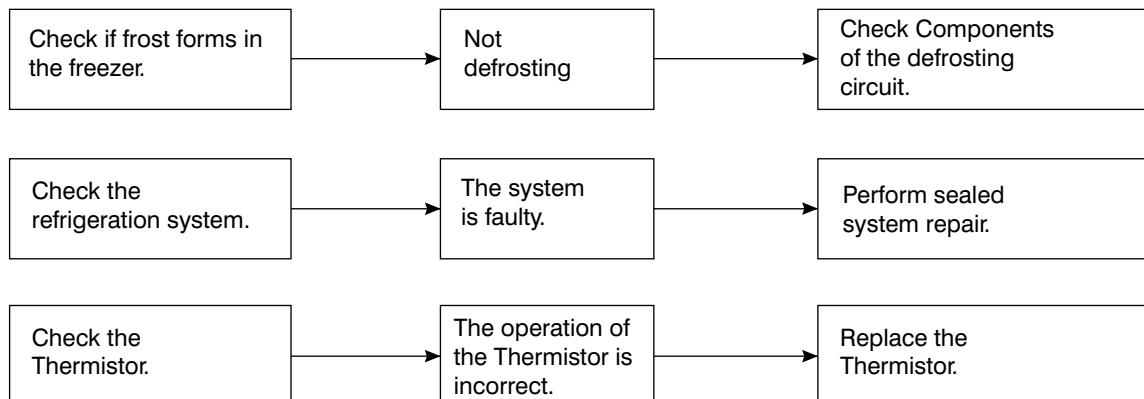
□ Poor cooling performance



6-4 SERVICE DIAGNOSIS CHART

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

Other possible problems:

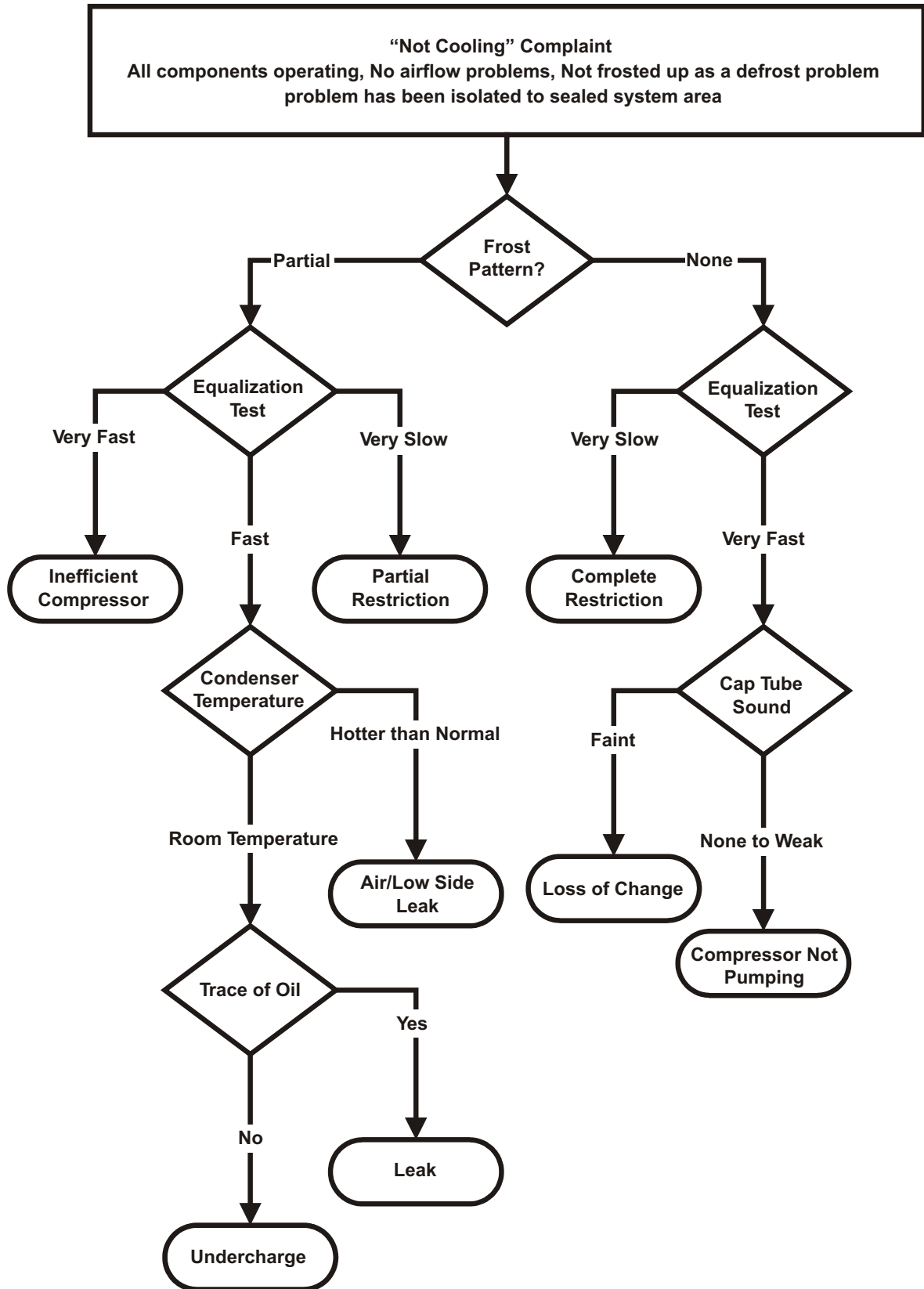


6-5 REFRIGERATION CYCLE

Troubleshooting Chart

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

6-5-1 SEALED SYSTEM DIAGNOSIS

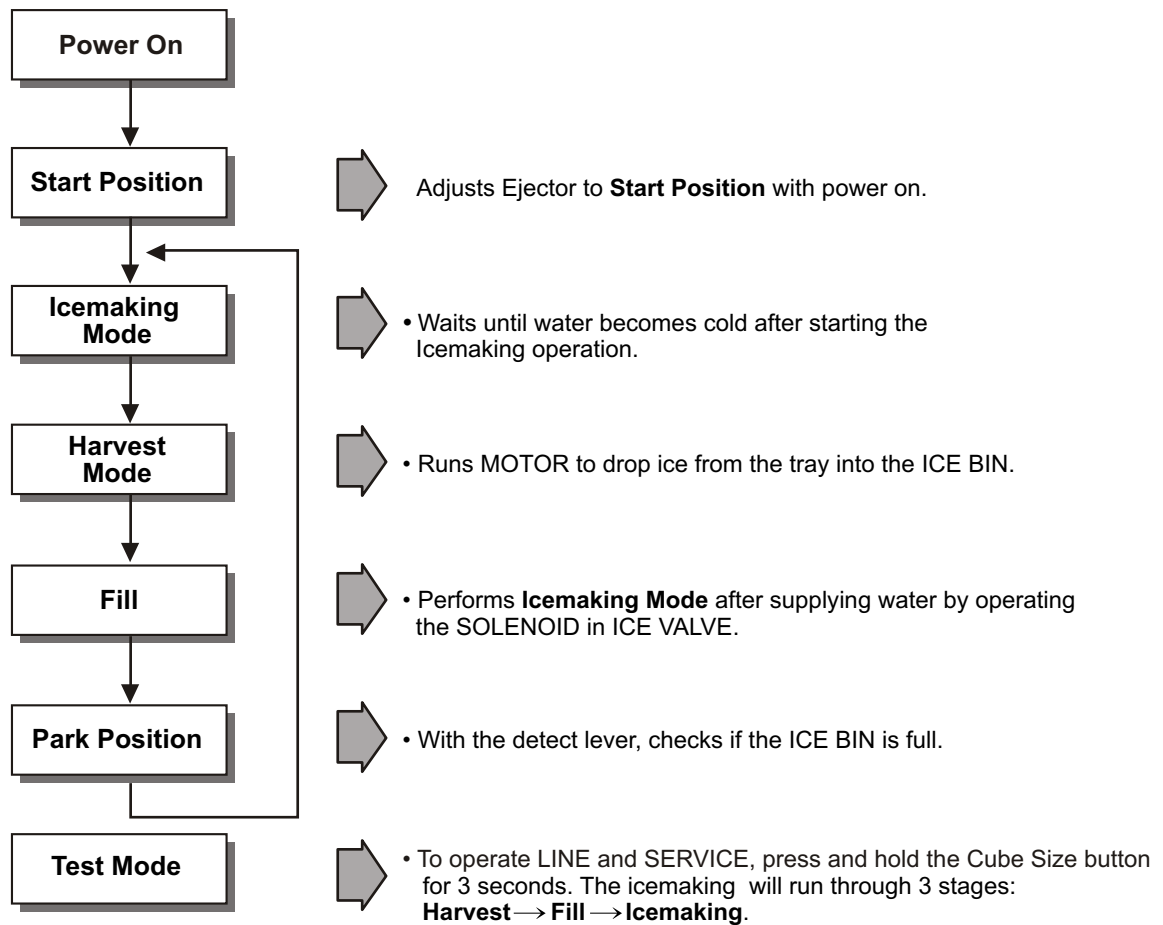


(The equalization test is trying to restart a compressor using a start kit after it has been operating.)

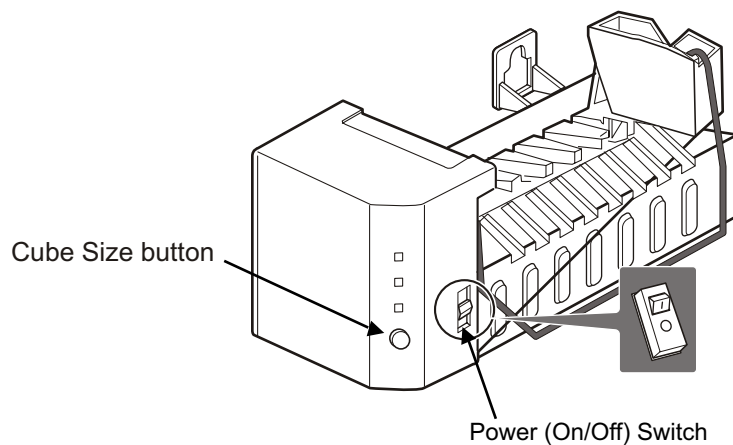
7. OPERATION PRINCIPLE AND REPAIR METHOD OF ICEMAKER

7-1 OPERATION PRINCIPLE

7-1-1 Operation Principle of Icemaker



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



7-2 ICE MAKER FUNCTIONS

7-2-1 Ice Making Mode

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

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

7-2-2 Harvest Mode




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

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

7-2-3 Fill/Park Position

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






Water supply amount table

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

7-2-5 Function TEST



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

Diagnosis TABLE

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

7-3 DEFECT DIAGNOSIS FUNCTION

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

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

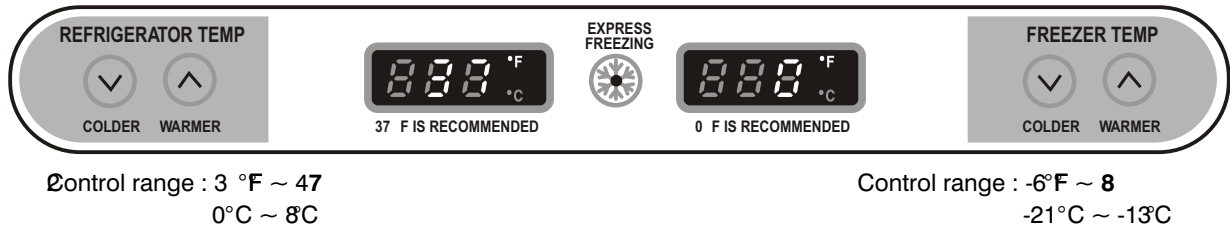
* ERROR indicators in table can be checked only in TEST mode.

9. DESCRIPTION OF FUNCTION & CIRCUIT OF MICOM

9-1 FUNCTION

9-1-1 Function

1. When the appliance is plugged in, it is set to 37°F for Refrigerator and 0°F for freezer.
You can adjust the Refrigerator and the Freezer control temperature by pressing the ADJUST button.
2. When the power is initially applied or restored after a power failure, it is automatically set to "37" & "0".



9-1-2 How to Toggle the display between °F&°C

1. The display temperature mode can be changed from °F to °C or °C to °F by pressing and holding the **COLDER FREEZER TEMP** and the **COLDER REFRIGERATOR TEMP** keys at the same time for over one second.
2. The initial setting is °F. Whenever the mode is changed, the LED lights are changed.

9-1-3 Control of freezer fan motor

1. Freezer fan motor has high and standard RPMs.
2. High RPM is used when electricity is first on, for express freezing, and when refrigerator is overloaded.
Standard RPM is used for normal usage.
3. Fan motor stops when refrigerator or freezer door opens.

9-1-4 EXPRESS FREEZING

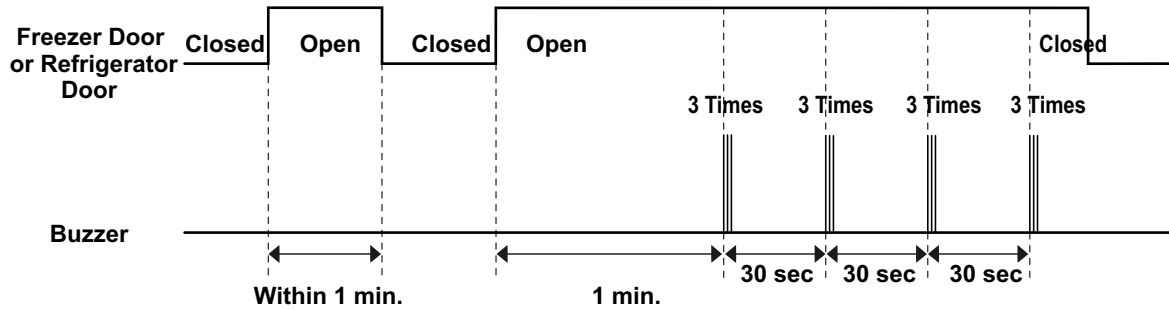
1. The purpose of this function is to intensify the cooling speed of freezer and to increase the amount of ice.
2. Whenever selection switch is pressed, selection/release, the LED will turn ON or OFF.
3. If there is a power outage and the refrigerator is powered on again, EXPRESS FREEZING will be canceled.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

9-1-5 REFRIGERATOR LAMP AUTO OFF

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

9-1-6 Alarm for Open Door

1. This feature sounds a buzzer when the freezer or refrigerator door is not closed within 1 minute after it is opened.
2. One minute after the door is opened, the buzzer sounds three times each for 1/2 seconds. These tones repeat every 30 seconds.
3. The alarm is cancelled when the freezer or the refrigerator is closed while the buzzer sounds.



9-1-7 Buzzer Sound

When the button on the front Display is pushed, a Ding~ Dong~ sound is produced.

9-1-8 Defrosting (removing frost)

1. Defrosting starts each time the COMPRESSOR running time reaches 7 hours.
2. For initial power on or for restoring power, defrosting starts when the compressor running time reaches 4 hours.
3. Defrosting stops if the sensor temperature reaches 6°C or more. If the sensor doesn't reach 8°C in 2 hours, the defrost mode is malfunctioning.
4. Defrosting won't function if its sensor is defective (wires are cut or short circuited)

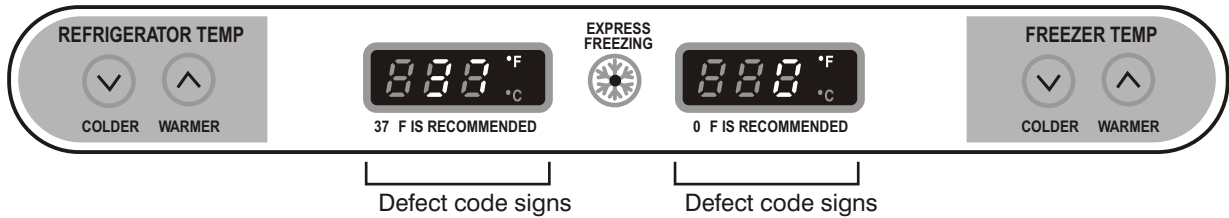
9-1-9 Electrical Parts Are Turned On Sequentially

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

OPERATING		ORDERS				
Initial power on	Temperature of Defrosting Sensor is 45°C or more (when unit is newly purchased or when moved)	POWER ON	in 0.5 sec →	COMP ON	in 0.5 sec →	Freezer FAN ON
	Temperature of defrosting sensor is lower than 45°C (when power cuts, SERVICE)	POWER ON	in 0.5 sec →	Defrosting heater ON	in 10 sec →	Defrost heater OFF
		in 0.5 sec →	COMP ON	in 0.5 sec →	Freezer FAN ON	
Reset to normal operation from TEST MODE		Total load OFF	in 7 min →	COMP ON	in 0.5 sec →	Freezer FAN ON

9-1-10 Defect Diagnosis Function

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



ERROR CODE on display panel

NO	ITEM	ERROR CODE		CONTENTS	REMARKS
1	Failure of freezer sensor	E		Cut or short circuit wire	Inspect Connecting wires on each sensor
2	Failure of Refrigerator sensor	E		Cut or short circuit wire	
3	Failure of defrost sensor	E		Cut or short circuit wire	
4	Failure of Room Temperature sensor	When display check mode: Er rt		Cut or short circuit wire	
5	Failure of defrost mode	E		When defrost sensor doesn't reach 8°C within 2 hours after starting defrost.	Snapping of defrost heater or Temperature fuse, pull-out of connector (indicated minimum 2 hours after failure occurs)
6	Failure of BLDC Fan Motor at Freezing Compartment	E		If there is no fan motor signal for more than 65sec in operation fan motor	Poor motor, hooking to wires of fan, contact of structures to fan, snapping or short circuit of Lead wires

Note 1) Room Temperature Sensor is not indicated on the failure indicating part but indicated in checking Display. (When pressing for more than the warmer key of Refrigerator Temp. and the warmer key of Freezer Temp for more than 1 second).

LED check function: If simultaneously pressing the warmer key of Refrigerator Temp and the warmer key of Freezer Temp for a second, all display LED graphics on. If releasing the button, the LED graphics displays the previous status.

9-1-11 TEST Mode

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

MODE	MANIPULATION	CONTENTS	REMARKS
TEST1	Push Express Freezing Key and COLDER KEY of Freezer Temp. at the Same time for 3 seconds. OR Push TEST S/W (on the main Board) Once.	1) Continuous operation of the COMPRESSOR and the Freezer fan 2) Stepping DAMPER OPEN 3) Defrosting HEATER OFF 4) DISPLAY LED all ON	
TEST2	Push Express Freezing Key and COLDER KEY of Freezer Temp. at the Same time for 3 seconds. In TEST MODE 1 OR Push TEST S/W Once in TEST MODE 1	1) Continuous operation of the COMPRESSOR and the Freezer fan 2) Stepping DAMPER CLOSE 3) Defrosting HEATER OFF 4) DISPLAY LED ahows no. 2	
TEST3	Push Express Freezing Key and COLDER KEY of Freezer Temp. at the Same time for 3 seconds. In TEST MODE 2 OR Push TEST S/W Once in TEST MODE 2	1) COMPRESSOR and the Freezer fan OFF 2) Stepping DAMPER CLOSE 3) Defrosting HEATER ON 4) DISPLAY LED ahows no. 3	Reset if the Temperature of the Defrosting sensor is 8°C or more.
Reset	Push Express Freezing Key and COLDER KEY of Freezer Temp. at the Same time for 3 seconds. In TEST MODE 3 OR Push TEST S/W Once in TEST MODE 3	Reset to the previously setting Before TEST MODE	The compressor will Start after a 7-minute Delay.

Freezer Fan RPM

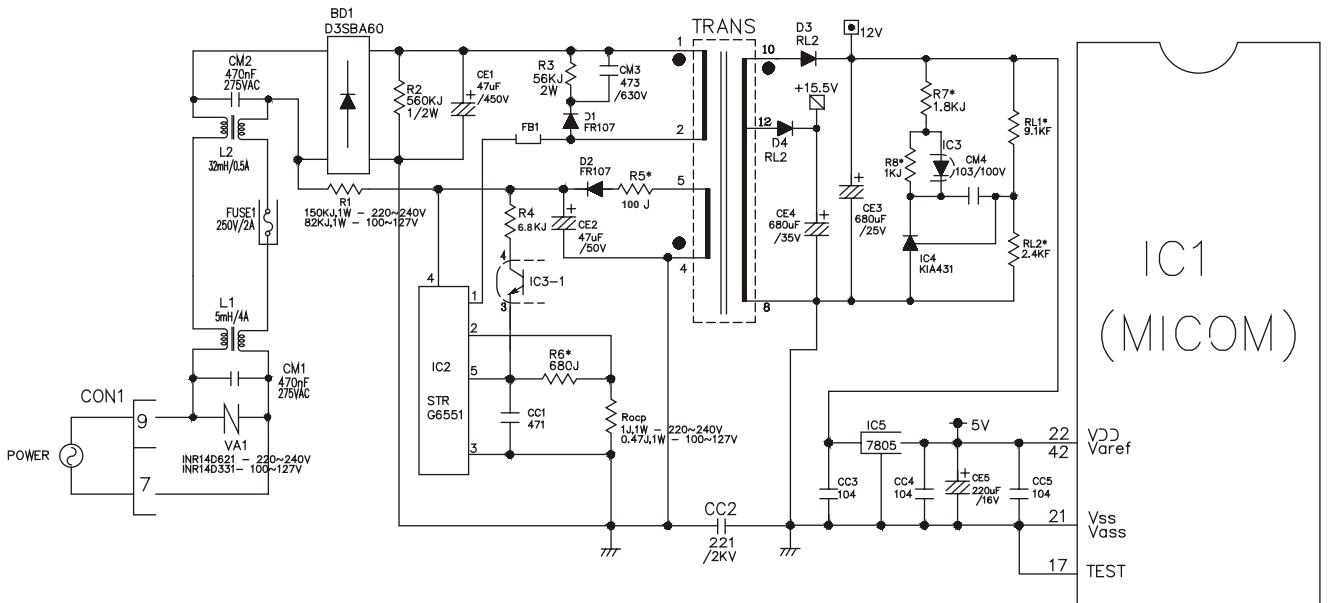
In case the freezer fan is in operation when the WARMER KEY in Refrigerator and Freezer Temp. Control are pressed for more than one second at the same time freezer fan RPM changes. (for example if high speed, to normal speed or if normal speed, to high speed for 30 seconds)
After 30 seconds, it turns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

* Demonstration (Display) MODE:

1. To enter this mode, raise either the Refrigerator or Freezer temperature to its highest setting. Then, press that Warmer Key and hold for about 5 seconds.
2. The LED panels will display OFF, to indicate that the Compressor, Circulating Fan, Damper, and Defrost Heater are not operating.
3. The Open Door Alarm and the Lamp Auto-Off feature will work normally and can be demonstrated.
4. To reset to normal operation, press and hold either Warmer Key for about 5 seconds.

9-2 PCB FUNCTION

9-2-1 Power Circuit



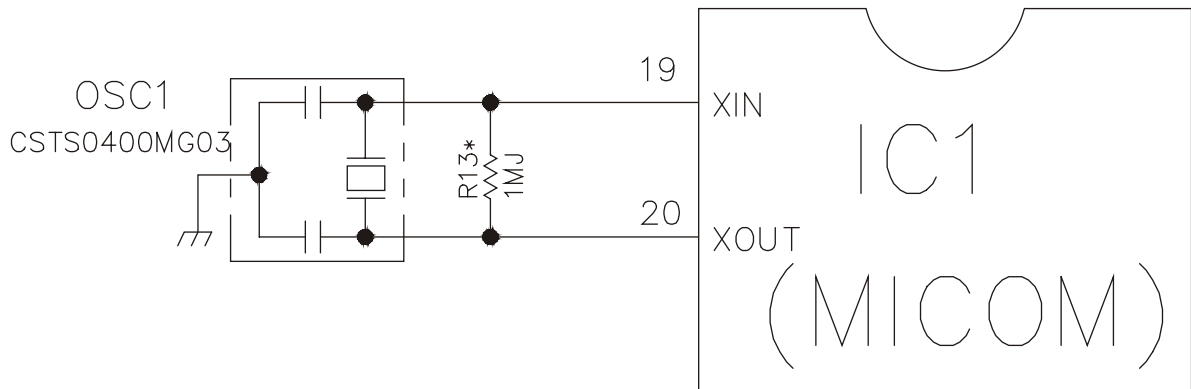
The secondary part of the TRANSFORMER is composed of the power supply for the display, the BLDC FAN Motor drive (15.5 V), the relay drive (12 Vdc) and the MICOM and IC (5 Vdc).

The voltage for each part is as follows:

PART	VA 1	CE 3	CE 4	CE 5
VOLTAGE	115 Vac	12 Vdc	15.5 Vdc	5 V

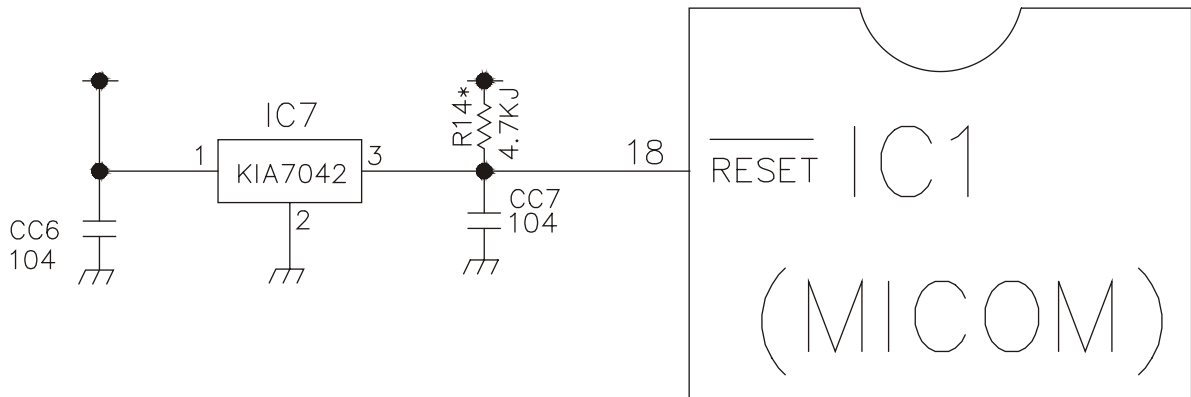
VA1 is a part for preventing over voltage and noise. When 385V or higher power is applied, the inside elements are short-circuited and broken, resulting in blowout of the fuse in order to protect the elements of the secondary part of the TRANSFORMER.

9



This circuit generates 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 specified replacement parts, since calculating time by the IC1 may be changed. If changed, the OSC1 SPEC will not work.

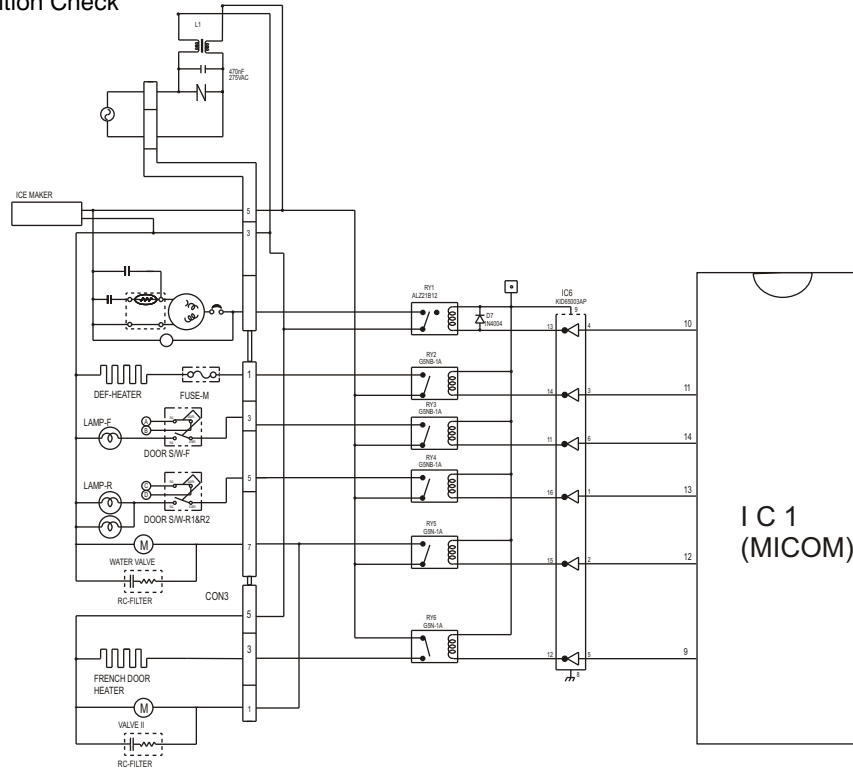
9



The RESET circuit allows 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 malfunction occurs in the RESET IC, the MICOM will not operate.)

9-2-4 Load / Buzzer Drive & Open Door Detection Circuit

1. Load Drive Condition Check

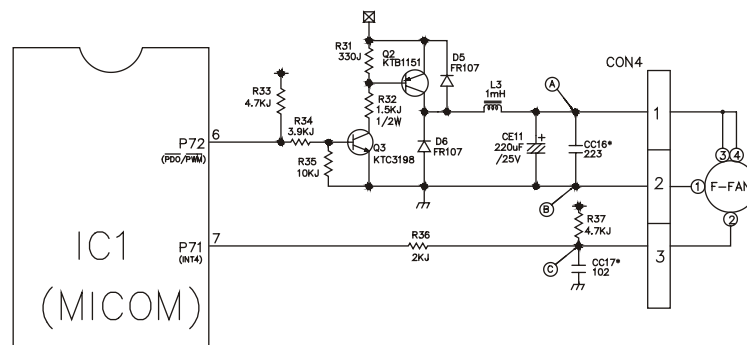


LOAD TYPE		COMP	DEFROSTING HEATER	LAMP	FRENCH DOOR HEATER 1, 2 / DEW HEATER	VALVE
Measurement Location (IC6)		NO.13	NO.14	NO.16	NO.12	NO.15
Condition	ON	1V or below				
	OFF	12V				

2. Motors driving circuit

2.1 Fan motor driving circuit (freezing compartment fan)

1. The circuit makes standby power 0 by cutting off power supplied to Lss inside on the fan motor in the fan motor OFF.
2. This is a circuit to perform a temporary change of speed for the fan motor and applies DC voltage up to 7.5V ~ 16V to motor.
3. This circuit prevents over-driving the fan motor by cutting off power applied to the fan motor in the lock of fan motor by sensing the operation RPM of the fan motor.

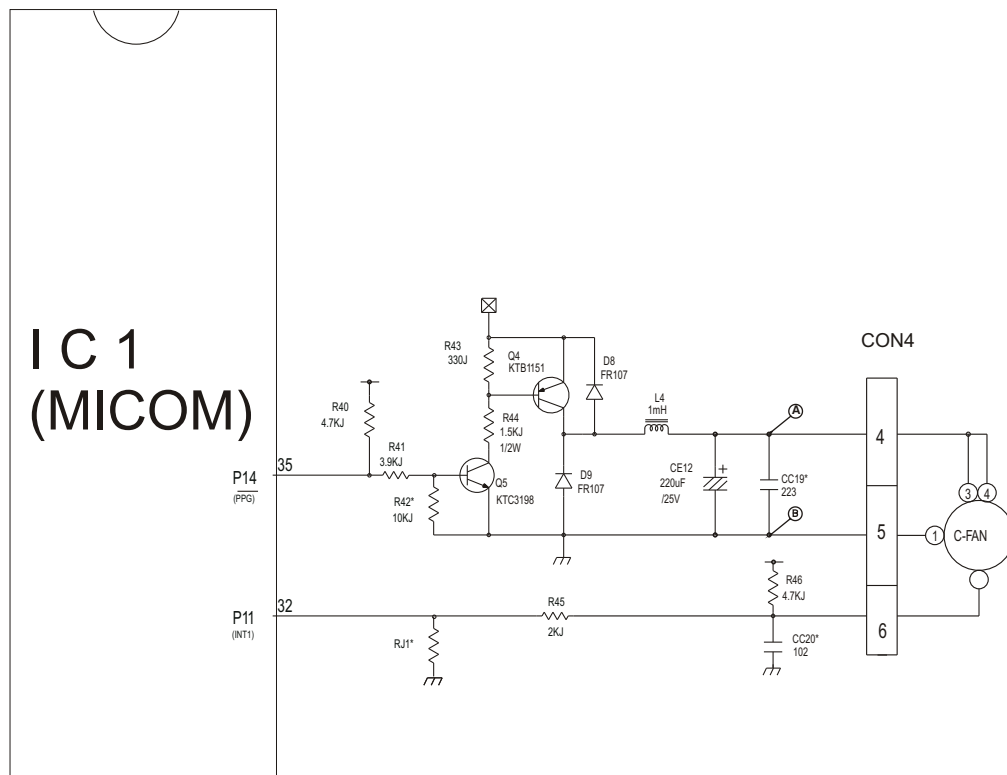


	Ⓐ part	Ⓑ part	Ⓒ part
MOTOR OFF	2V or less	0V	5V
MOTOR ON	13V~15V	0V	2V~3V

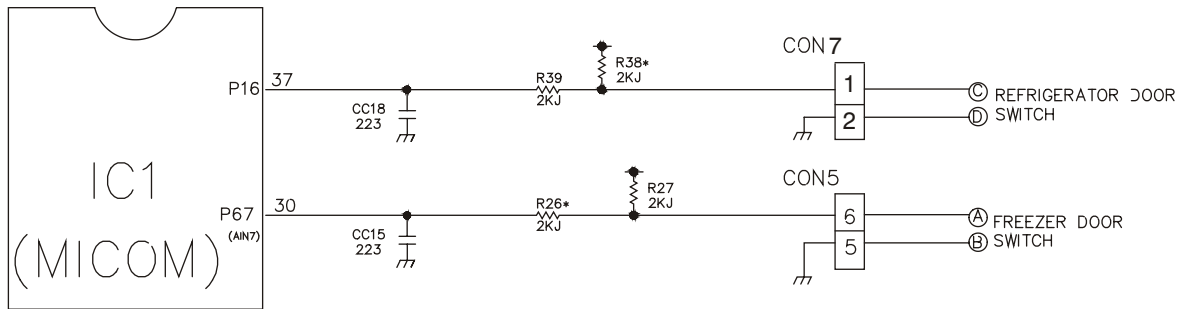
2.2 Cooling motor driving circuit (machine room)

1. This circuit makes standby power 0 by cutting off power supplied to ISs inside of the fan motor in the fan motor OFF
2. This circuit prevents over-driving the fan motor by cutting off power applied to the fan motor in the lock of fan motor by sensing the operation RPM of the fan motor

	Ⓐ Part	Ⓑ part
MOTOR OFF	2V or less	0V
MOTOR ON	13V~15V	0V

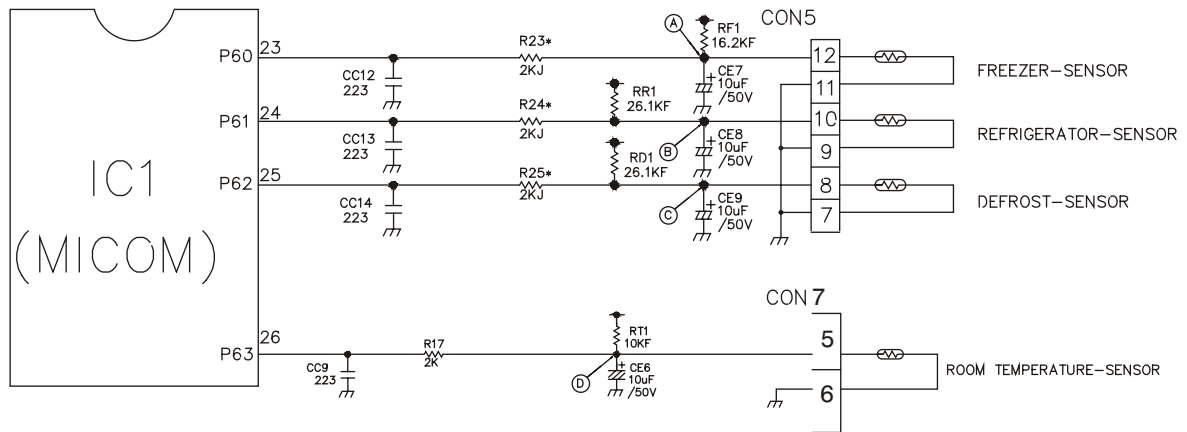


3. Open Door Detection Circuit Check



Measurement Location	(PIN NO.30 & PIN NO.37)
Freezer/ Refrigerator Door Closed	5 V
Open	0 V

9-2-5 Temperature Sensor Circuit

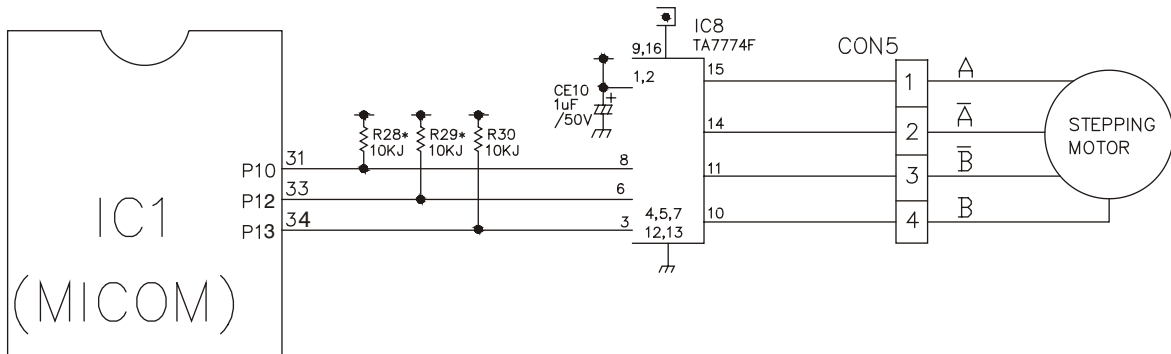


The upper CIRCUIT reads REFRIGERATOR temperature, FREEZER Temperature, and DEFROST-SENSOR temperature for defrosting and the indoor temperature for compensating for the surrounding temperature into MICOM. OPENING or SHORT state of each TEMPERATURE SENSOR are as follows:

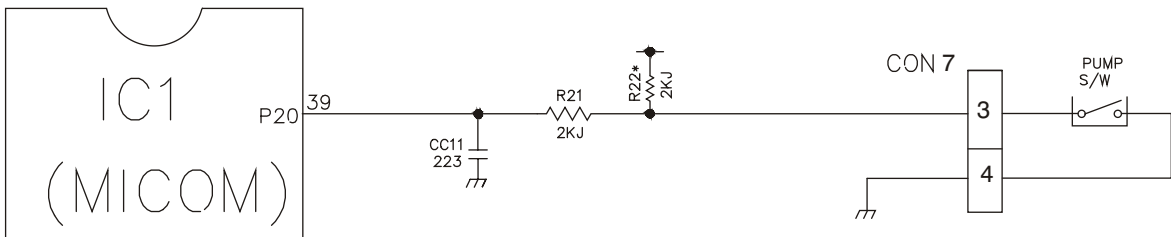
SENSOR	CHECK POINT	NORMAL (-30iC ~ 50iC)	SHORT-CIRCUITED	OPEN
Freezer Sensor	POINT (A) Voltage	0.5 V ~ 4.5 V	0 V	5 V
Refrigerator Sensor	POINT (B) Voltage			
Defrosting Sensor	POINT (C) Voltage			
Room Temperature sensor	POINT (D) Voltage			

9-2-6 Refrigeration Compartment Stepping Motor Damper Circuit

* The circuit shown below is the damper circuit to regulate the refrigerator temperature.

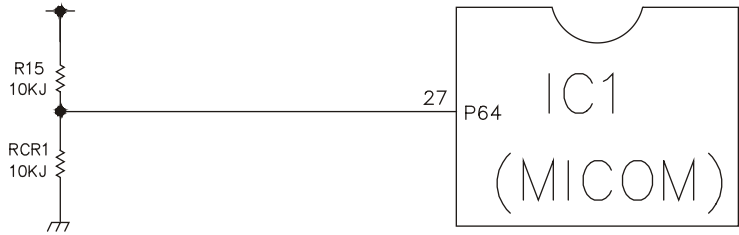


9-2-7 Dispenser Input



9-2-8 Temperature Compensation & Overcooling /Undercooling Compensation circuit

1. Refrigerator Temperature Compensation



Refrigerator		Remark
Resistance (RCR)	Temperature Compensation	
180 K	+2.5°C	Compensation by raising the temperature ↑
56 K	+2.0°C	
33 K	+1.5°C	
18 K	+1.0°C	
12 K	+0.5°C	
10 K	0 °C	Standard Temperature
8.2 K	-0.5°C	Compensation by lowering the temperature ↓
5.6 K	-1.0°C	
3.3 K	-1.5°C	
2 K	-2.0°C	
470	-2.5°C	

Table of Temperature Compensation by adjusting the resistance (difference from the current temperature) e.g., If the refrigerator compensation resistance (RCR) is changed from 10K (the current resistance) to 18K (the adjustment resistance), the temperature of the refrigerator rises 33.8°F (+1°C).

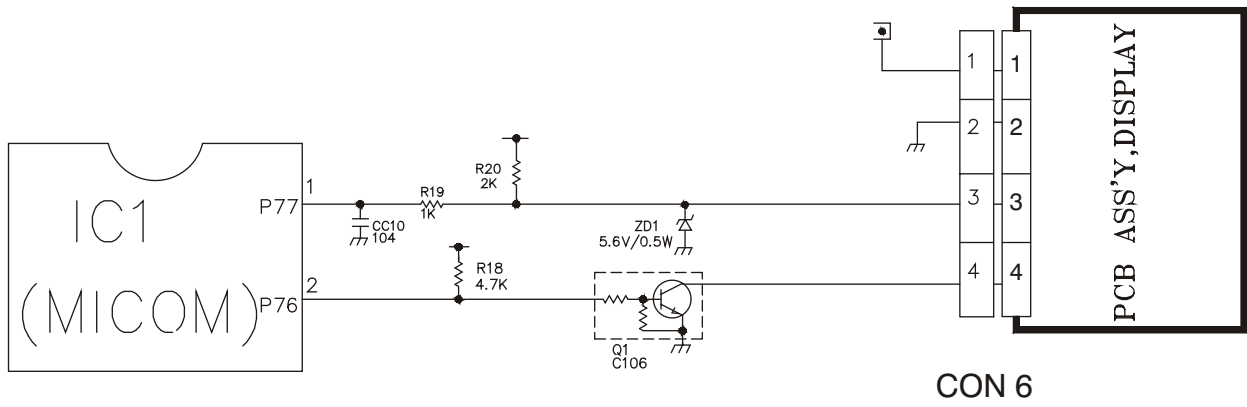
2. The temperature compensation for refrigerator compartment is in the following table:

	Revised resistance / Present resistance	470	2k	3.3k	5.6k	8.2k	10k	12k	18k	33k	56k	180k
Refrigerator (RCR)	470	No change	0.5°C Up	1°C Up	1.5°C Up	2°C Up	2.5°C Up	3°C Up	3.5°C Up	4°C Up	4.5°C Up	5°C Up
	2k	0.5°C Down	No Change	0.5°C Up	1°C Up	1.5°C Up	2°C Up	2.5°C Up	3°C Up	3.5°C Up	4°C Up	4.5°C Up
	3.3k	1°C Down	0.5°C Down	No Change	0.5°C Up	1°C Up	1.5°C Up	2°C Up	2.5°C Up	3°C Up	3.5°C Up	4°C Up
	5.6k	1.5°C Down	1°C Down	0.5°C Down	No Change	0.5°C Up	1°C Up	1.5°C Up	2°C Up	2.5°C Up	3°C Up	3.5°C Up
	8.2k	2°C Down	1.5°C Down	1°C Down	0.5°C Down	No Change	0.5°C Up	1°C Up	1.5°C Up	2°C Up	2.5°C Up	3°C Up
	10k	2.5°C Down	2°C Down	1.5°C Down	1°C Down	0.5°C Down	No Change	0.5°C Up	1°C Up	1.5°C Up	2°C Up	2.5°C Up
	12k	3°C Down	2.5°C Down	2°C Down	1.5°C Down	1°C Down	0.5°C Down	No Change	0.5°C Up	1°C Up	1.5°C Up	2°C Up
	18k	3.5°C Down	3°C Down	2.5°C Down	2°C Down	1.5°C Down	1°C Down	0.5°C Down	No Change	0.5°C Up	1°C Up	1.5°C Up
	33k	4°C Down	3.5°C Down	3°C Down	2.5°C Down	2°C Down	1.5°C Down	1°C Down	0.5°C Down	No Change	0.5°C Up	1°C Up
	56k	4.5°C Down	4°C Down	3.5°C Down	3°C Down	2.5°C Down	2°C Down	1.5°C Down	1°C Down	0.5°C Down	No Change	0.5°C Up
180k	5°C Down	4.5°C Down	4°C Down	3.5°C Down	3°C Down	2.5°C Down	2°C Down	1.5°C Down	1°C Down	0.5°C Down	No Change	

NOTE: This circuit is designed to input the necessary temperature compensation values into the MICOM. This adjusts the refrigerator temperature, which is different in each model.

9-2-9 Key Button Input & Display Light-On Circuit

The circuit shown above determines whether a function control key on the operation display is pushed. It also turns on the corresponding function indication LED Module SEVEN SEGMENT DISPLAY. The drive type is the scan type.



9-3 RESISTANCE SPECIFICATION OF SENSOR.

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

The resistance of the SENSOR has a $\pm 5\%$ common difference.

Measure the resistance of the SENSOR after leaving it for over 3 minutes in the measuring temperature.

This delay is necessary due to sensor response speed.

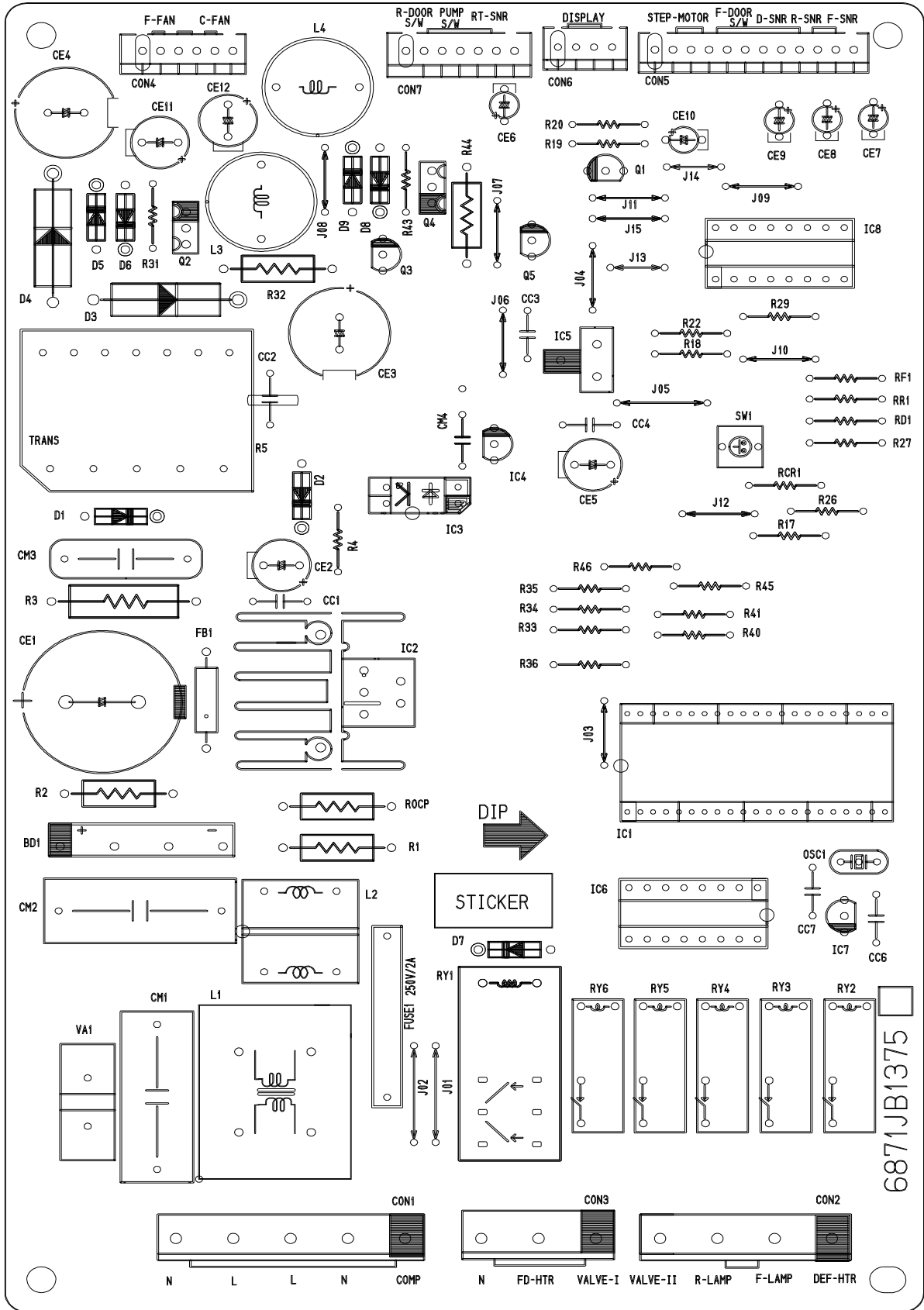
9-4 TROUBLESHOOTING

PROBLEM	INDICATED BY	CHECK	CHECKING METHOD	CAUSE	SOLUTION
POWER SOURCE is poor.	1. The whole DISPLAY LED/SEVEN SEGMENT DISPLAY is off. 2. DISPLAY LED/SEVEN SEGMENT DISPLAY operates abnormally	1. FREEZER/REFRIGERATOR.	Check if FREEZER/REFRIGERATOR DOOR IS OPEN and check display	POWER SOURCE is poor.	Check outlet Voltage.
		2. If LAMP is dim. 3. The connection of the MAIN PWB CONNECTOR.	Check visually Check connection of CONNECTOR.	Applied voltage error. CONNECTOR connection is poor. TRANS FUSE is open.	Use boosting TRANS. Reconnect CONNECTOR. Replace TRANS.
COOLING is poor.	NO COOLING.	1. If the COMPRESSOR operate. 2. If refrigerant is leaking.	USE TEST MODE1 (forced COOLING). If less than 7 minutes pass after compressor shuts off, don't press the KEY and wait. Measure the amount of frost sticking on EVAPORATOR and the surface temperature of the condenser pipe.	COMPRESSOR locked or blocked. OLP PTC is poor. COMPRESSOR RELAY is poor. THE CONNECTING WIRE is poor.	Replace COMPRESSOR. Replace OLP PTC. Replace MAIN PWB. Check the connection of the black wire of the MAIN PWB CONNECTOR (CON2).
				1. If FAN MOTOR operates. 2. If FAN MOTOR operates. 3. If SENSOR is normal. 4. Door Line contact.	USE TEST MODE1 (forced COOLING). FAN MOTOR is poor. CONNECTING WIRE is poor.
FREEZER TEMPERATURE is incorrect				Refrigerant leakage.	Replace the leaking part and replace any lost refrigerant.
				1. If DEFROSTING is normal. 2. If DEFROSTING is normal. 3. If SENSOR is normal. 4. Door Line contact.	DEFROSTING is poor. SENSOR RESISTANCE is poor. Door liner damaged.

PROBLEM	INDICATED BY	CHECK	CHECKING METHOD	CAUSE	SOLUTION
COOLING is poor.	If REFRIGERATOR TEMPERATURE is too low.	1. If FREEZER TEMPERATURE is normal.	Check is FREEZER TEMPERATURE is too low.		Make sure the DOOR is attached.
		2. If amount of cool air from FAN MOTOR is sufficient.	Make sure that the amount and speed of cool air are sufficient by touching the check supplied on the REFRIGERATOR.	FAN MOTOR is poor: Passage of cool air is blocked. EVA frozen.	Replace FAN MOTOR. Remove impurities.
		3. Door Line contact.	Check door seal when door is closed.	Door liner damaged.	Replace Door liner.
DEFROSTING is poor.	NO DEFROSTING.	1. If HEATER emits heat.	USE TEST MODE3 (forced DEFROSTING).	HEATER disconnection.	Replace HEATER.
				TEMPERATURE FUSE disconnection.	Replace TEMPERATURE FUSE.
				Connection is poor.	Check EVAPORATOR connection and wire of MAIN PWB CONNECTOR.
				DEFROST-SENSOR is poor.	Replace DEFROST-SENSOR.
				HEATER RELAY is poor.	Replace RY2 of MAIN PWB.
				DRAIN PIPE is blocked.	Remove ice and impurities.
					Check HEATER PLATE resistance.
					Reassemble the DEFROST-SENSOR.
					Reassemble DOOR.
					Replace GASKET.
	3. If ice remains after DEFROSTING.	Make sure that DEFROST SENSOR is connected. Make sure that FREEZER / REFRIGERATOR DOOR is closed.	Connection is poor: DOOR does not close properly.		

9-5 MAIN PWB ASSEMBLY AND PARTS LIST

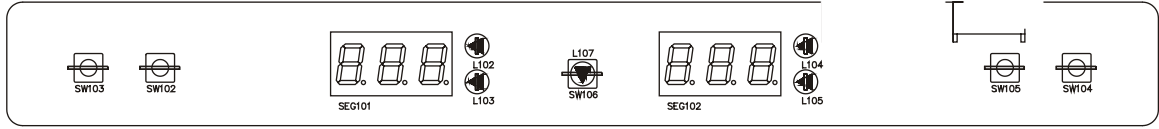
9-5-1 Main PWB Assembly



9-5-2 Replacement Parts List

APPLICATION	No	P/NO	DESCRIPTION	SPEC	MAKER	REMARK
	1	6870JB8203A	PWB(PCB)	BEST BRAVO-PJT	DOO SAN	T=1.6
	2	6170JB2012B	TRANSFORMER,SMPS(COIL)	DL-PJT 2.9MH/20W	SAM IL	TRANS TRANS
	3	6170JB2012C	TRANSFORMER,SMPS(COIL)			
	4	6630AQ9106D	CONNECTOR (CIRC),WAFER	YW96-09AV	YEON HO	CON1
	5	6630AQ9106E	CONNECTOR (CIRC),WAFER	YW96-07AV	YEON HO	CON2
	6	6630AQ9106B	CONNECTOR (CIRC),WAFER	YW96-05AV	YEON HO	CON3
	7	6630JB8004E	CONNECTOR (CIRC),WAFER	SMW250 YEONHO 6P 2.5MM STRAIGHT SN	YEON HO	CON4
	8	6630JB8004L	CONNECTOR (CIRC),WAFER	SMW250 YEONHO 12P 2.5MM STRAIGHT SN	YEON HO	CON5
	9	6630JB8004C	CONNECTOR (CIRC),WAFER	SMW250 YEONHO 4P 2.5MM STRAIGHT SN	YEON HO	CON6
	10	6630JB8004F	CONNECTOR (CIRC),WAFER	SMW250 YEONHO 7P 2.5MM STRAIGHT SN	YEON HO	CON7
	11	01ZZJB2054V	IC DRAWING	TM987C846N 42P SDIP BK MASK BRAVO33-PJT BEST/BETTER	TOSHIBA	IC1
	12	01SK635100A	IC POWER MANAGEMENT	STR-G6351 5PIN BK SMPS 2.4PIN FORM	SANKEN	IC2
	13	01PMGNE001A	IC POWER MANAGEMENT	PS2561L1-1-V NEC 4P DIP BK = TLP721F	NEC	IC3
	14	01KE431000A	IC KECC	KIA431 3 PIN TP -	KEC	IC4
	15	01KE780500Z	IC LINEAR	KIA7805PI 3DIP BK 5V 1A REFORM	KEC	IC5
	16	01KE650030B	IC KECC	KID65003AP 16P SDIP BK DRIVE IC	KEC	IC6
	17	01KE704200A	IC KECC	KIA7042P KEC 3P BK RESET	KEC	IC7
	18	01T077400A	IC DRAWING	TA7744P 16 SDIP BK DRIVE,IC STEPPING MOTOR	TOSHIBA	IC8
	19	6920AL2001B	RELAY	ALZ12812 NAIS 250VAC 16A 12VDC 1A NO VENTING	NAIS	RY1
	20	6920JB2003A	RELAY	C5M14A OMRON 250VAC 1.5A 12VDC 1A JAPAN	OMRON	RY5,RY6
	21	6920JB2003E	RELAY	C5MB-1A E(CHINA) OMRON 250VAC 5A 12VDC 1A NO VENTING	OMRON	RY2-4
	22	6920JB2009B	RELAY	G5SB-14 OMRON 250VAC 5A 12VDC TC NO VENTING	OMRON	-
	23	-	-	-	-	-
	24	6212JB8001B	RESONATOR,CERAMIC	CST90400M0303 MURATA 4MHZ TP -	MURATA	OSC1
	25	6102JB8001B	VARIATOR	NR14D621 ILJIN ULVDE BK 620V	ILJIN	VA1
	26	6102W5V007A	VARIATOR	NR14D331K ILJIN ULVCSA/VDE BK	ILJIN	VA1
	27	0DB360000AA	DIODE RECTIFIERS	D3S8A60 BK SHINDENGEN - 600V 4A 80A - 10UA	SHINDENGEN	B01
	28	0DD400409AC	DIODE RECTIFIERS	RECT1N4004 TP	DELTA	D7
	29	0DR107009AA	DIODE RECTIFIERS	FR107 TP RECTRON D041 1000V 1A 30A 500NSEC 5A	DELTA	D1,D2,D5,D6,D8,D9
	30	0DRAS00070A	DIODE RECTIFIERS	RL2 SANKEN BK NON 400V 2A 40A 50NSEC 10UA	SANKEN	D3,D4
	31	0CE105BK638	CAPACITOR FIXED ELECTROLYTIC	1UF KME RG YX 50V 0.2 FMS TP 5	SAM WHA	CE10
	32	0CE106EK638	CAPACITOR FIXED ELECTROLYTIC	1000UF KMG 50V 20% FMS TP 5	SAM WHA	CE6-CE9
	33	0CE227BF638	CAPACITOR FIXED ELECTROLYTIC	220UF KME TYPE 16V 20% FMS TP 5	SAM WHA	CE5
	34	0CE227BH638	CAPACITOR FIXED ELECTROLYTIC	220UF KME RG 25V 20% FMS TP 5	SAM WHA	CE11,CE12
	35	-	-	-	-	-
	36	0CE476BK638	CAPACITOR FIXED ELECTROLYTIC	47UF KME TYPE 50V 20% FMS TP 5	SAM WHA	CE2
	37	0CE476ZV6E0	CAPACITOR FIXED ELECTROLYTIC	47UF HE 450V 20% BULK SNAP IN	SAM WHA	CE1
	38	0CE687YH6E0	CAPACITOR FIXED ELECTROLYTIC	680UF RX 25V 20% BULK SNAP IN	SAM WHA	CE3
	39	0CE687YJ618	CAPACITOR FIXED ELECTROLYTIC	680UF RX 35V 20% TP 5 FL	SAM WHA	CE4
	40	0CK102DK96A	CAPACITOR FIXED CERAMIC(HIGH DIELECTRIC)	1NF 2012 50V 80% -20% R1P X7R	MURATA	CC17,CC20
	41	0CK1040K949	CAPACITOR FIXED CERAMIC(High dielectric)	0.1UF D 50V 80% -20% F1Y5V TA52	SAM WHA	CC3,CC4,CC6,CC7
	42	0CK104DK98A	CAPACITOR FIXED CERAMIC(High dielectric)	0.1UF 2012 50V 80% -20% R1P JE	MURATA	CC5,CC10
	43	0CK22102510	CAPACITOR FIXED CERAMIC(High dielectric)	220P 2KV K B S	SAM WHA	CC2
	44	0CK2230K949	CAPACITOR FIXED CERAMIC(High dielectric)	22NF 50V Z F TA52	SAM WHA	-
	45	0CK2230K96A	CAPACITOR FIXED CERAMIC(HIGH DIELECTRIC)	22NF 2012 50V 80% -20% R1P X7R	MURATA	CC8,CC9,CC11-15,CC18
	46	0CK4710K519	CAPACITOR FIXED CERAMIC(High dielectric)	470PF 50V K B TA52	SAM WHA	CC1
	47	0CO1041N509	CAPACITOR FIXED FILM	0.1UF D 100V 10% PE TP5	MURATA	CM4
	48	0CK102DK96A	CAPACITOR FIXED CERAMIC(HIGH DIELECTRIC)	1NF 2012 50V 80% -20% R1P X7R	MURATA	CC20
	49	0CO4732Y430	CAPACITOR FIXED FILM	47000PF S 630V 5% MPP NI R	SAM WHA	CM3
	50	0CO47418670	CAPACITOR FIXED FILM	0.47UF D 275V 20% MPP NI R	SAM WHA	CM1
	51	0LR1001M4F0	INDUCTOR RADIAL LEAD	100UH 20% R 6X12.5 BULK	TNC	L3,L4
	52	0RD1001G609	RESISTOR FIXED CARBON FILM	1K OHM 1/4 W 5% TA52	SMART	R19
	53	0RD1002G609	RESISTOR FIXED CARBON FILM	10K OHM 1/4 W 5% TA52	SMART	R20,R35,RCR1
	54	0RD2001G609	RESISTOR FIXED CARBON FILM	2K OHM 1/4 W 5% TA52	SMART	R17,R20,R21,R22,R26,R27,R36
	55	0RD3901G609	RESISTOR FIXED CARBON FILM	3.9K OHM 1/4 W 5% TA52	SMART	R34,R41
	56	0RD4701G609	RESISTOR FIXED CARBON FILM	4.7K OHM 1/4 W 5% TA52	SMART	R18,R33,R40
	57	0RD5603H609	RESISTOR FIXED CARBON FILM	560K OHM 1/2 W 5% TA52	SMART	R2
	58	0RD2001G609	RESISTOR FIXED CARBON FILM	2K OHM 1/4 W 5% TA52	SMART	R45
	59	0RD4701G609	RESISTOR FIXED CARBON FILM	4.7K OHM 1/4 W 5% TA52	SMART	R46
	60	0RJ2701L622	RESISTOR METAL GLAZED(CHIP)	2.7K OHM 1/8 W 5% 2012 R1P	ROHM	R21
	61	0RH1002L622	RESISTOR METAL GLAZED(CHIP)	10KOHM 1/8 W 5% 2012 R1P	ROHM	R15,R28,R30,R42,R8
	62	0RH1004L622	RESISTOR METAL GLAZED(CHIP)	10MOHM 1/8 W 5% 2012 R1P	ROHM	R13
	63	0RH1001L622	RESISTOR METAL GLAZED(CHIP)	1K OHM 1 / 8 W 2012 5.00% D	ROHM	R7
	64	0RH2001L622	RESISTOR METAL GLAZED(CHIP)	2K OHM 1 / 8 W 5% 2012 R1P	ROHM	R23-R25,R38,R39
	65	0RH300L622	RESISTOR METAL GLAZED(CHIP)	30K OHM 1/8 W 5% 2012 R1P	ROHM	R31,R43
	66	0RH4701L622	RESISTOR METAL GLAZED(CHIP)	4.7K OHM 1/8 W 5% 2012 R1P	ROHM	R14,R16,R37
	67	0RD1000E672	RESISTOR METAL GLAZED(CHIP)	100 OHM 1/8 W 5% 2012 R1P	ROHM	R5
	68	0RD1501H609	RESISTOR FIXED CARBON FILM	1.5K OHM 1/2 W 5% TA52	SMART	R32,R44
	69	0RJ0000E672	RESISTOR METAL GLAZED(CHIP)	0 OHM 1/8 W 5% 2012 R1P	ROHM	RJ1
	70	0RJ2401E472	RESISTOR METAL GLAZED(CHIP)	2.4K OHM 1/8 W 1% 2012 R1P	ROHM	RL2
	71	0RJ6800E672	RESISTOR METAL GLAZED(CHIP)	680 OHM 1/8 W 5% 2012 R1P	ROHM	R6
	72	0RD6801G609	RESISTOR FIXED CARBON FILM	6.8K OHM 1/4 W 5% TA52	SMART	R4
	73	0RJ9101E472	RESISTOR METAL GLAZED(CHIP)	9.1K OHM 1/8 W 1% 2012 R1P	ROHM	RL1
	74	0RJ1002E472	RESISTOR FIXED METAL FILM	10K OHM 1/8 W 1.00% 2012 R1P	ROHM	RT1
	75	0RN1622G409	RESISTOR FIXED METAL FILM	16.2K OHM 1/4 W 1.00% TA52	SMART	RF1
	76	0RN2612G409	RESISTOR FIXED METAL FILM	26.1K OHM 1/4 W 1.00% TA52	SMART	RR1,RD1
	77	0RS015L609	RESISTOR FIXED METAL OXIDE FILM	1.5 OHM 1 W 5.00% TA52	SMART	ROCP
	78	0RS010L609	RESISTOR FIXED METAL OXIDE FILM	1 OHM 1 W 5% TA52	SMART	ROCP
	79	0RS502K641	RESISTOR FIXED METAL OXIDE FILM	50K OHM 2 W 5.00% F20	SMART	R3
	80	0RS3303J609	RESISTOR FIXED METAL OXIDE FILM	330K OHM 1 W 5.00% TA52	SMART	R1
	81	0TR319009AA	TRANSISTOR	KTC3198-TP-Y (KTC1815)KEC	KEC	Q3,Q5
	82	0TRKE00008A	TRANSISTOR,BIPOLARS	KEC KT8151 BK T0126 60V 5A	KEC	Q2,Q4
	83	0TRKE80016A	TRANSISTOR,BIPOLARS	KEC NRC108S R1P SOT23 50V 100MA	KEC	Q1
	84	6200JB8004A	FILTER(CIRC),EMC	CV940050 TNC -	TNC	L1
	85	6200JB8007X	FILTER(CIRC),EMC	UV11-95320 TNC BK 0.5A 320MHZ	TNC	L2
	86	6210JB8001A	FILTER(CIRC),EMC	BFS351040 SAMWHA TP52 BEAD FILTER	SAM WHA	FB1
	87	860RR0012	SWITCH TACT	JTP12804S JEIL 12VDC 50MA	JEIL	SW1
	88	0DZMR00029A	DIODE,ZENERS	1NS2328 MOTORORA TP D034 0.5W 5.6V 81MA PF	DEL TA	ZD1
	89	6854B50001A	JUMP WIRE	0.6MM 52MM TP TAPING SN	DAE A LEAD	J13,J14(8MM)
	90	0FZZJB3001A	FUSE,DRAWING	2A 250V - SLOW-BLOW LITTELFUSE,TRIAD	SAM JU KYO YUK	J01,J02,J05(12.5MM)
	91	1S8F0302418	SCREW TAP TITE(S),BINDING HEAD	+ D3.0 L8.0 MSWR3/FZY	HAENG SUNG	FUSE1
	92	-	-	-	-	-
	93	4920JB3007A	HEAT SINK	23.3*17*25 DRIVE IC STR R-564.65.73.2PIN 1-SCREW 3MM -	(IC2)	(IC2)
	94	49111004	SOLDER,SOLDERING	NA HEESUNG METAL BAR SN 63% NA	-	-
	95	59333105	FLUX	JS-71 KOKI SANEI KOREA(KSK) SG.0 808 +/0.003	-	-
	96	9VWF0120000	SOLDER(ROSN WIRE) R50	D1.20	-	-

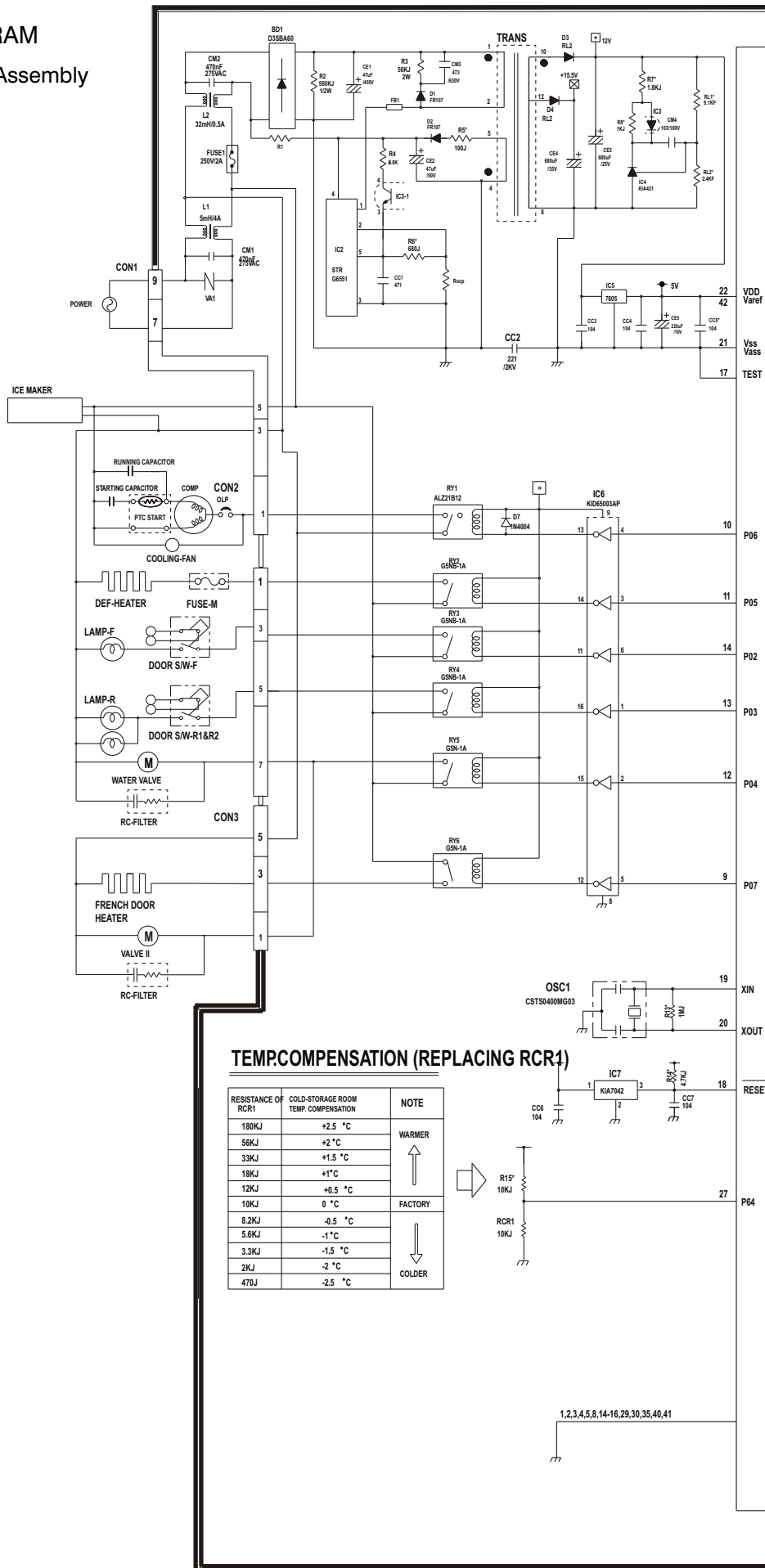
9-5-3 PWB Assembly, Display and parts list



A		WORK					
BETTER APPLICATION	Qty	No	P/NO	DESCRIPTION	SPEC	MAKER	REMARK
	1	1	6870JB8199A	PWB(PCB)	BRAVO 33 DISPLAY		
	1	2	6635JB8095C	CONNECTOR (CIRC, WAFER)	SMAW25-04		CON01
	1	3	01ZJJB77777	IC, DRAWING	TM9P1C499M 38, SOP28-P-450 BRAVO 33	YEHON HO	IC1
	1	4	01STLM1001A	IC, STANDARD LOGIC	M54583FP MITSUBISHI 28 R/TP CONVERT	TOSHIBA	IC4
	1	5	0K659030C	IC, KEC	KID5903AF 16SOP BK 7CH DRIVER	KEC	IC5, IC6
	1	6	01STLKE002A	IC, STANDARD LOGIC	KIA78L05F KEC SOT-89 TP REGULATOR	KEC	IC2
	1	7	01STLKE003A	IC, STANDARD LOGIC	KIA7842AF KEC SOT-89 TP RESET IC	KEC	IC3
	1	8	01STLKE005A	IC, STANDARD LOGIC	KRC1065 KEC SOT-23 TP TRANSISTOR	KEC	Q1
	1	9	6212BB3245A	RESONATOR CERAMIC	CSTCR4M00G3-R0 MURATA 4.0MHZ +/- 0.5% T/R SMD	MURATA	OSC1
	1	10	0CE476VH6DC	CAPACITOR, FIXED ELECTR	47UF MV 25V 20% R/TP(SMD) SMD	SAMHWA	CE2
	1	11	0CE107VF6DC	CAPACITOR, FIXED ELECTR	100UF MV 16V 20% R/TP(SMD) SMD	SAMHWA	CE1
	1	12	0CK104DK94A	CAPACITOR, FIXED CERAMIC	100NF 2012 50V 80%, -20% R/TP (F15V)	MURATA	CC1-CC7
	2	13	0CK102DK96A	CAPACITOR, FIXED CERAMIC	1NF 2012 50V 80%, -20% R/TP X7R	MURATA	CC8-CC9
	1	14	0RH2200L622	RESISTOR METAL GLAZED (CHIP)	220 OHM 1/8 W 2012 5.00% D	ROHM	R5
	2	15	0RD1001E672	RESISTOR METAL GLAZED (CHIP)	1K OHM 1/8 W 5% 2012 R/TP	ROHM	R3, R4
	1	16	0RD2001E672	RESISTOR METAL GLAZED (CHIP)	2K OHM 1/8 W 5% 2012 R/TP	ROHM	R2
	6	17	0RD4701E672	RESISTOR METAL GLAZED (CHIP)	4.7K OHM 1/8 W 5% 2012 R/TP	ROHM	R1, R7, R21-R24
	1	18	0RD1004E672	RESISTOR METAL GLAZED (CHIP)	1M OHM 1/8 W 5% 2012 R/TP	ROHM	R6
	9	19	0RL8200H672	RESISTOR METAL GLAZED (CHIP)	820 OHM 1/2 W 5% 2012 R/TP	ROHM	R8-R16
	2	20	0RH2001L622	RESISTOR METAL GLAZED (CHIP)	2K OHM 1/8 W 2012 5.00% D	ROHM	R17, R19
	2	21	0RH1000L622	RESISTOR METAL GLAZED (CHIP)	100 OHM 1/2 W 5% 2012 R/TP	ROHM	R18, R20
	1	22	0DZRM00188A	DIODE ZENERS	RLZ OHM R/TP LLD(SLL-3A) 500MW 5.6V 20MA PF	ROHM	ZD1
	5	23	0DSRM00698A	DIODE SWITCHING	RLS4148 ROHM R/TP LLD(SLL-3A) 75V 450MA 2000MA	ROHM	D108-D112
	-	24	0DD414899AA	DIODE SWITCHING	IN4149 28 MM	PYUNG CHANG DELTA	-
	2	25	03Z1JB9911A	DISPLAY LED ASSEMBLY	LN4923-12EWRS GREEN 2 IV 1.7MCD	LEDTECH	SEG1, SEG2
	4	26	0DL4E0991A	LED	LT8323-41-BCN 2 IV D3 TP GREEN	LEDTECH	L102-L105
	-	27	0DL4E099AA	LED	LT8323-41-BCN 2 IV D3 TP GREEN	LEDTECH	L101, L107
	1	28	6988JB3002D	BUZZER	PQ272072PL-20C-2000 SUNWAY PIEZO 2KHZ 80DB (CHINA)	SUNWAY	BUZZER
	4	29	6609JB9005A	SWITCH TACT	KPT-1105A	KYUNG IN	SW102-SW105
	-	-	6609RRT022K	SWITCH TACT	JTP1230A JEK 12V DC 59MA	JEK	-
	1	30	6609JB9004A	SWITCH TACT	KPT-1109R	KYUNG IN	SW106
	-	-	-	SWITCH TACT	KPT-1109G	KYUNG IN	-
	2g	31	49111001	SOLDER, SOLDERING	SOLDER (ROSIN WIRE) R50	HUSUNG	-
	5g	32	49111004	SOLDER, SOLDERING	H63A	HUSUNG	-
	0.5g	33	59333105	FLUX	SG-0.825-0.830 KOREA FH-206	KOK1	-

9-6 PWB DIAGRAM

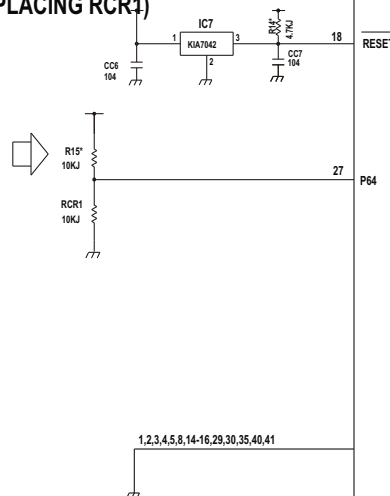
9-6-1 PWB Main Assembly



TOSHIBA TMP87CH46N(IC1)

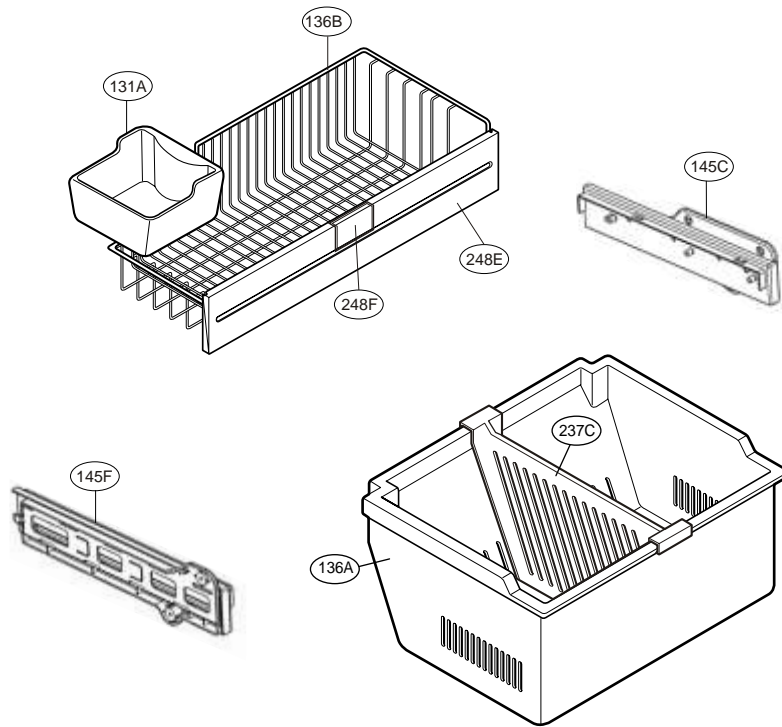
TEMPCOMPENSATION (REPLACING RCR1)

RESISTANCE OF RCR1	COLD-STORAGE ROOM TEMP. COMPENSATION	NOTE
180KJ	+2.5 °C	↑ WARMER
56KJ	+2 °C	
33KJ	+1.5 °C	
18KJ	+1 °C	
12KJ	+0.5 °C	FACTORY
10KJ	0 °C	
8.2KJ	-0.5 °C	
5.6KJ	-1 °C	↓ COLDER
3.3KJ	-1.5 °C	
2KJ	-2 °C	
470J	-2.5 °C	



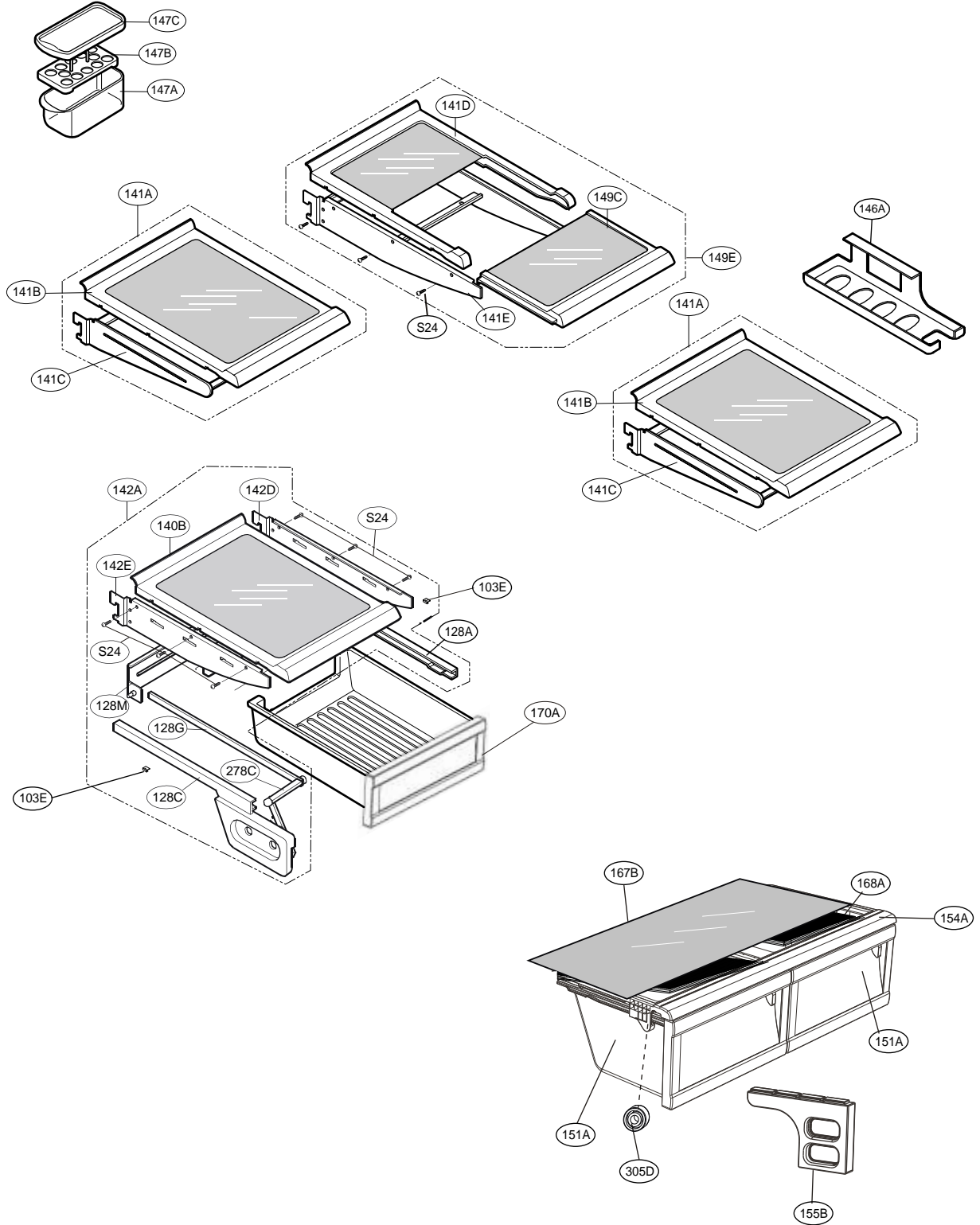
FREEZER PARTS

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



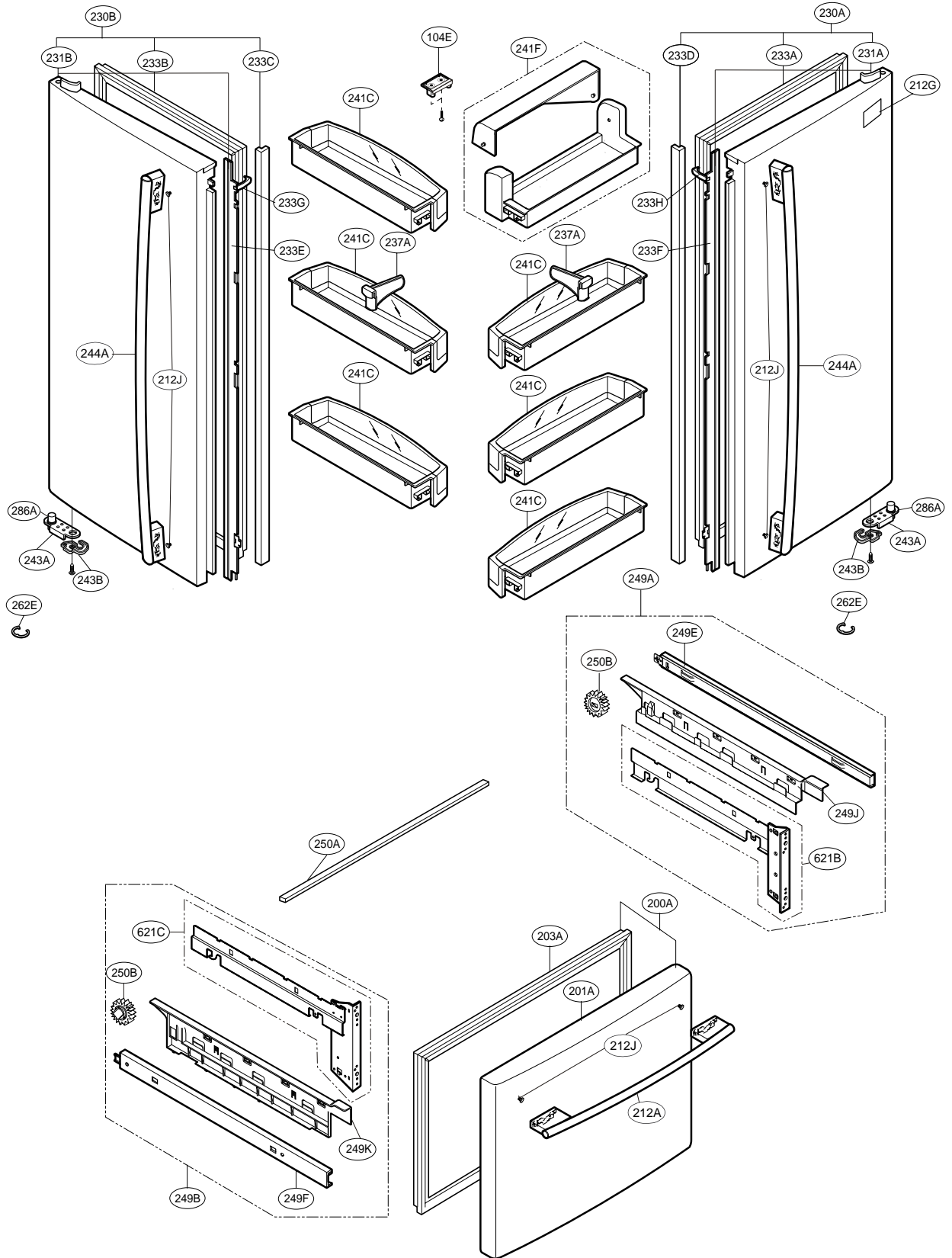
REFRIGERATOR PARTS

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



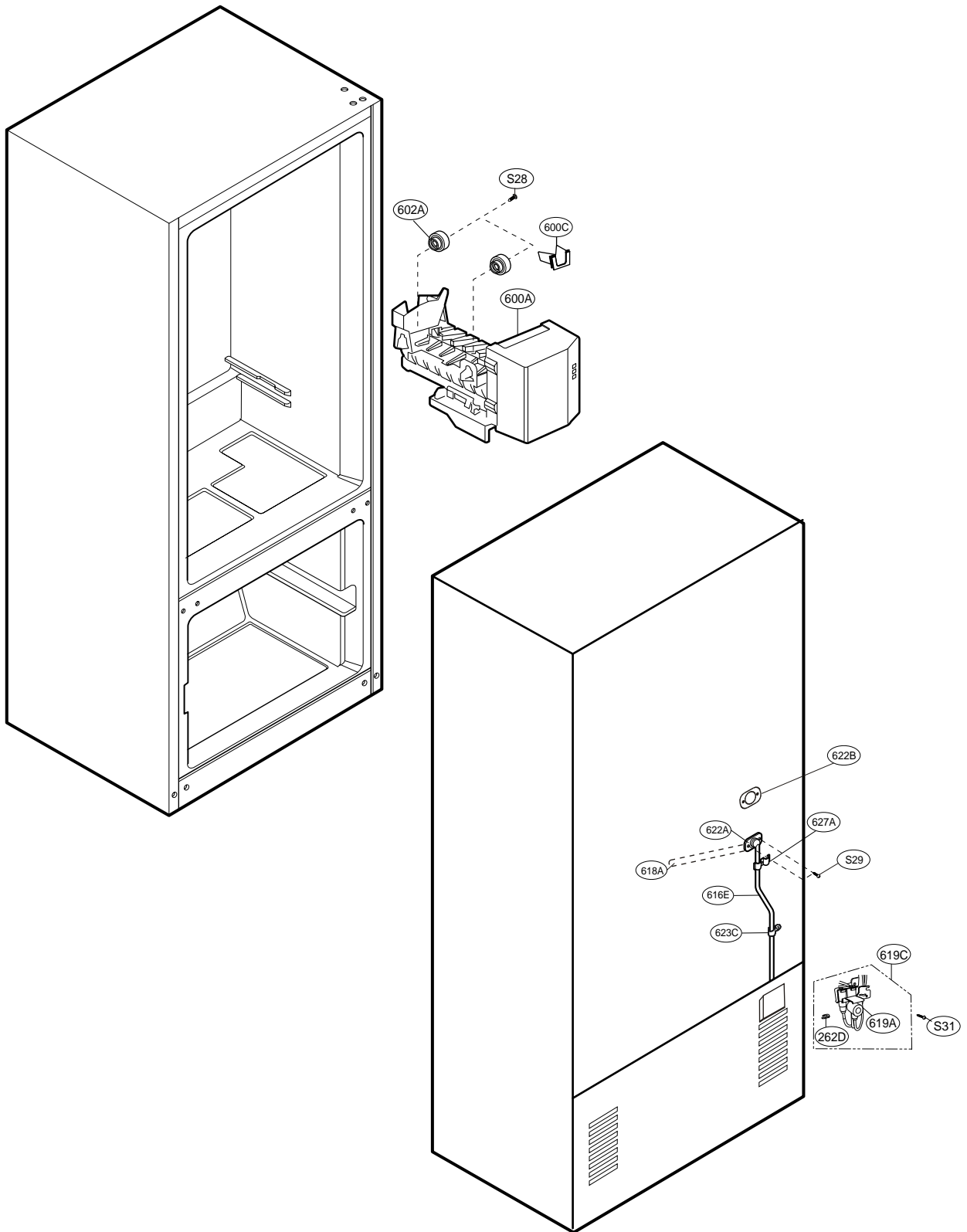
DOOR PARTS

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



WATER & ICEMAKER PARTS

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





April, 2009