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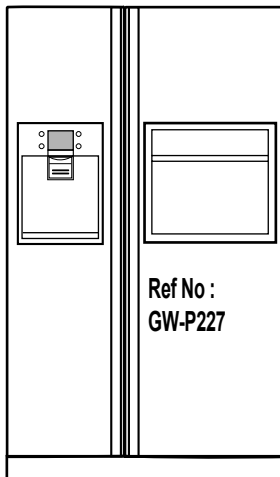
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SXS REFRIGERATOR

SERVICE MANUAL

CAUTION

**PLEASE READ CAREFULLY THE SAFETY PRECAUTIONS OF THIS BOOK
BEFORE CHECKING OR OPERATING THE REFRIGERATOR.**



CONTENTS

WARNINGS AND PRECAUTIONS FOR SAFETY	3
SPECIFICATIONS.....	4
PARTS IDENTIFICATION	5
HOW TO INSTALL THE REFRIGERATOR	8
HOW TO ADJUST DOOR HEIGHT OF THE REFRIGERATOR	8
HOW TO INSTALL WATER PIPE.....	9
HOW TO CONTROL THE AMOUNT OF WATER SUPPLIED TO THE ICEMAKER	13
MICOM FUNCTION	15
EXPLANATION FOR MICOM CIRCUIT.....	26
EXPLANATION FOR PWB CIRCUIT	26
COMPENSATION CIRCUIT FOR WEAK-COLD, OVER-COLD AT FREEZING ROOM.....	54
PWB PARTS DRAWING AND LIST	55
ICE MAKER AND DISPENSER WORKING PRINCIPLES AND REPAIR	67
WORKING PRINCIPLES.....	67
FUNCTION OF ICE MAKER	67
ICE MAKER TROUBLESHOOTING.....	71
CIRCUIT	73
TROUBLE DIAGNOSIS.....	75
TROUBLE SHOOTING	75
FAULTS	85
COOLING CYCLE HEAVY REPAIR	102
HOW TO DEAL WITH CLAIMS.....	109
HOW TO DISASSEMBLE AND ASSEMBLE	114
DOOR	114
HANDLE	115
SHROUD, GRILLE FAN	115
ICEMAKER	115
WATER VALVE DISASSEMBLY METHOD	116
FAN and FAN MOTOR DISASSEMBLY METHOD.....	116
DISPENSER	117
HOME BAR.....	118
EXPLODED VIEW	120
REPLACEMENT PARTS LIST	129

WARNINGS AND PRECAUTIONS FOR SAFETY

Please observe the following safety precautions in order to use safely and correctly the refrigerator and to prevent accident and danger during repair.

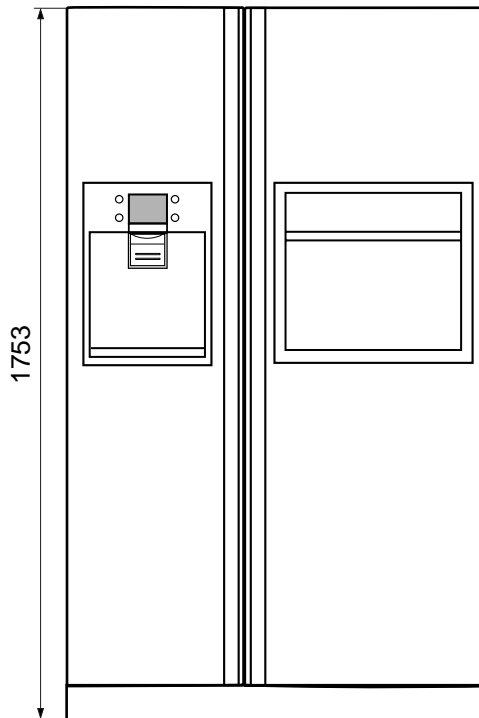
1. Be care of an electric shock. Disconnect power cord from wall outlet and wait for more than three minutes before replacing PWB parts. Shut off the power whenever replacing and repairing electric components.
2. When connecting power cord, please wait for more than five minutes after power cord was disconnected from the wall outlet.
3. Please check if the power plug is pressed down by the refrigerator against the wall. If the power plug was damaged, it may cause fire or electric shock.
4. If the wall outlet is over loaded, it may cause fire. Please use its own individual electrical outlet for the refrigerator.
5. Please make sure the outlet is properly earthed, particularly in wet or damp area.
6. Use standard electrical components when replacing them.
7. Make sure the hook is correctly engaged. Remove dust and foreign materials from the housing and connecting parts.
8. Do not fray, damage, machine, heavily bend, pull out, or twist the power cord.
9. Please check the evidence of moisture intrusion in the electrical components. Replace the parts or mask it with insulation tapes if moisture intrusion was confirmed.
10. Do not touch the icemaker with hands or tools to confirm the operation of geared motor.
11. Do not let the customers repair, disassemble, and reconstruct the refrigerator for themselves. It may cause accident, electric shock, or fire.
12. Do not store flammable materials such as ether, benzene, alcohol, chemicals, gas, or medicine in the refrigerator.
13. Do not put flower vase, cup, cosmetics, chemicals, etc., or container with full of water on the top of the refrigerator.
14. Do not put glass bottles with full of water into the freezer. The contents shall freeze and break the glass bottles.
15. When you scrap the refrigerator, please disconnect the door gasket first and scrap it where children are not accessible.

SPECIFICATIONS

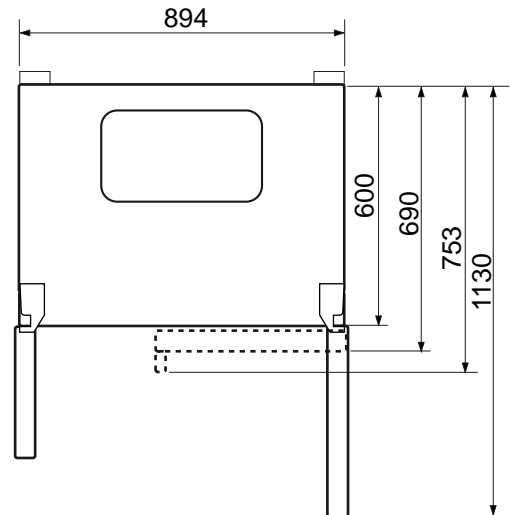
1. Ref No. : GW-P227/L227/C227/B227

ITEMS	SPECIFICATIONS
DIMENSIONS (mm)	894(W)x753(D)x1753(H)
NET WEIGHT (kg)	128(P227), 123(L227), 119(B227), 114(B227)
COOLING SYSTEM	Fan Cooling
TEMPERATURE CONTROL	Micom Control
DEFROSTING SYSTEM	Full Automatic
	Heater Defrost
INSULATION	Cyclo-Pentane
COMPRESSOR	P.T.C. Starting Type
EVAPORATOR	Fin Tube Type
CONDENSER	Wire Condenser
REFRIGERANT	R134a (180g)
LUBRICATING OIL	FREOL @10G (310 cc)
DRIER	ID 0.83
CAPILLARY TUBE	MOLECULAR SIEVE XH-7

ITEMS	SPECIFICATIONS
FIRST DEFROST	4 - 5 Hours
DEFROST CYCLE	13 - 15 Hours
DEFROSTING DEVICE	Heater, Sheath
ANTI SWEAT HEATER	Dispenser Duct Door Heater
	Dispenser Heater
	Home Bar Heater
ANTI-FREEZING HEATER	Damper Heater
FREEZER LAMP	40W (1 EA)
REFRIGERATOR LAMP	40W (1 EA) or 40W (2 EA)



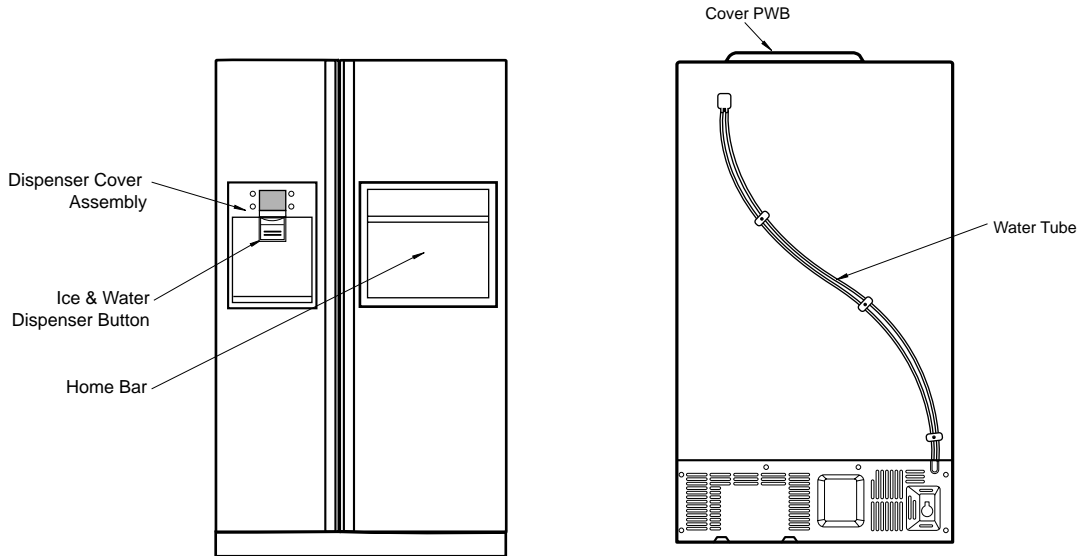
<Front View>



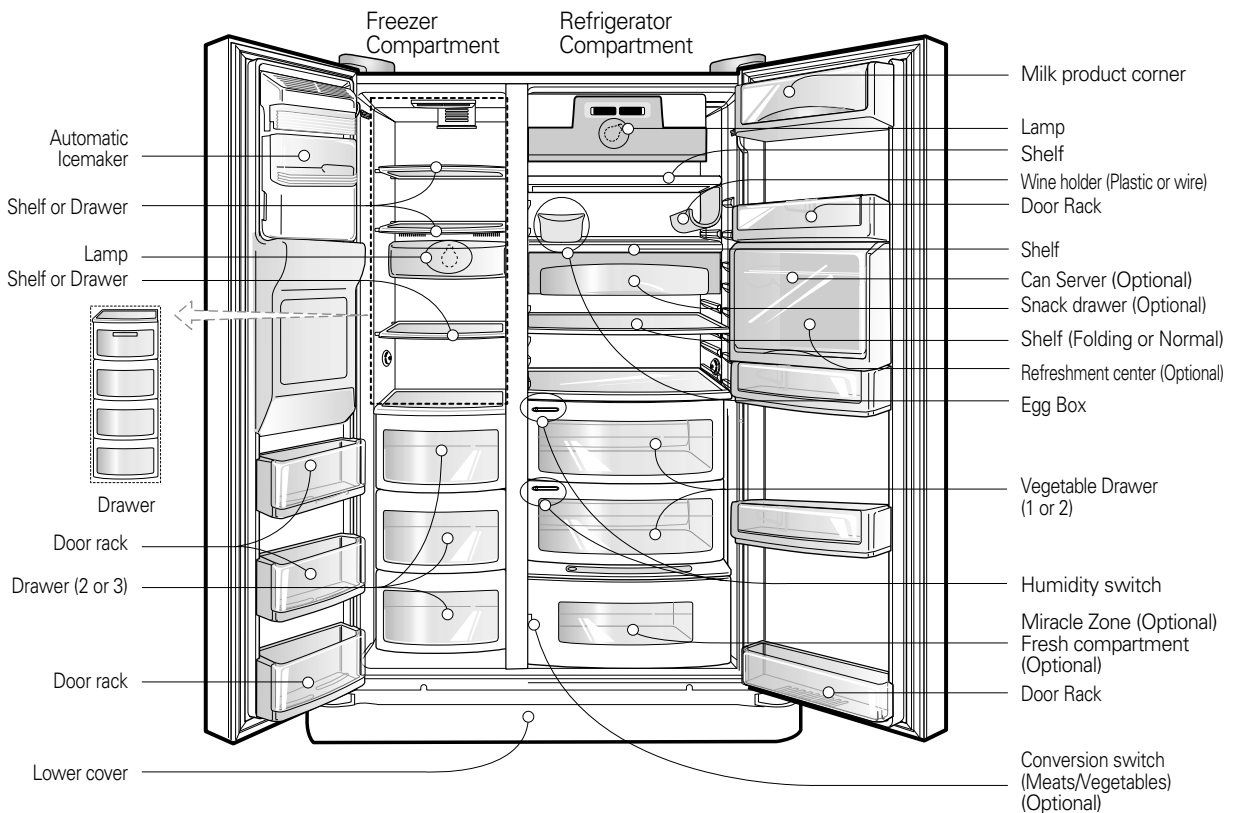
<Plane View>

PARTS IDENTIFICATION

1. Ref No. : GW-P227/L227(INTERNAL FILTER)

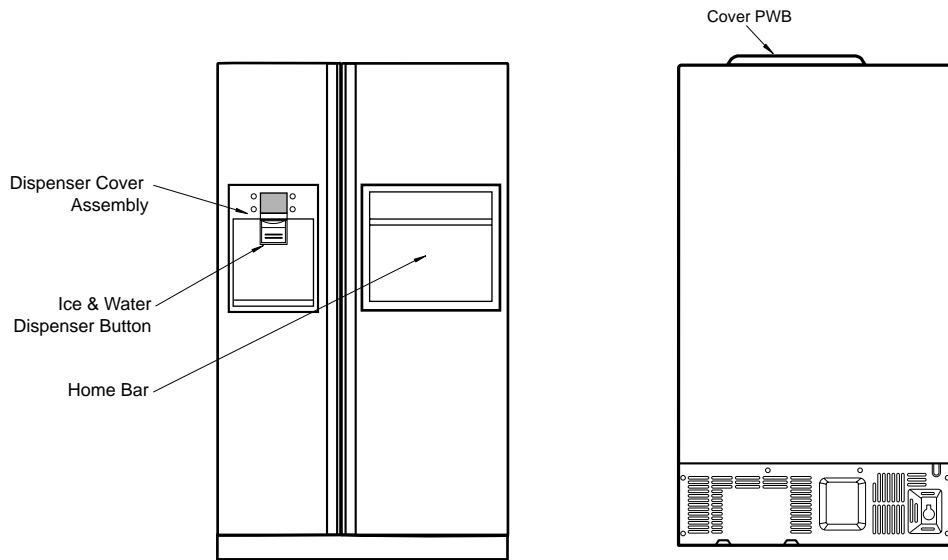


*L227: Non Home bar

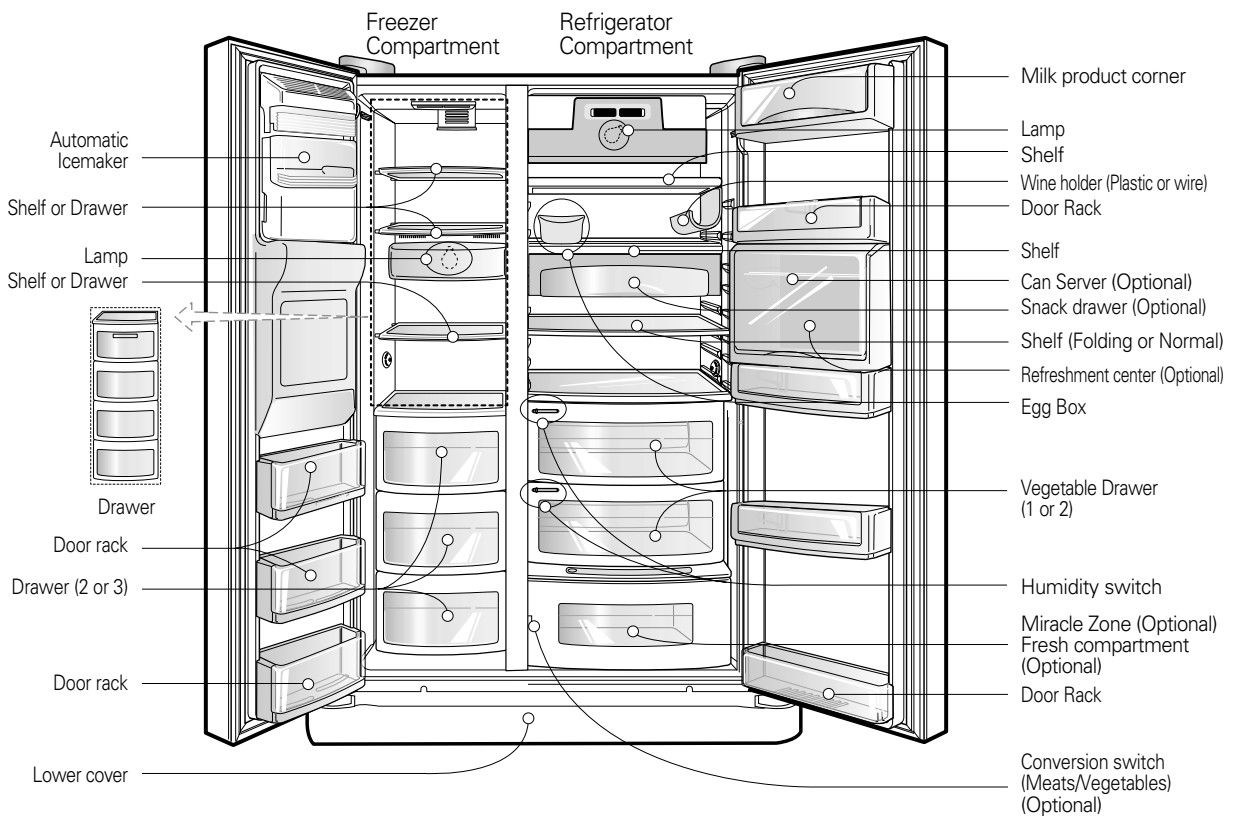


PARTS IDENTIFICATION

2. Ref No. : GW-P227/L227(EXTERNAL FILTER)

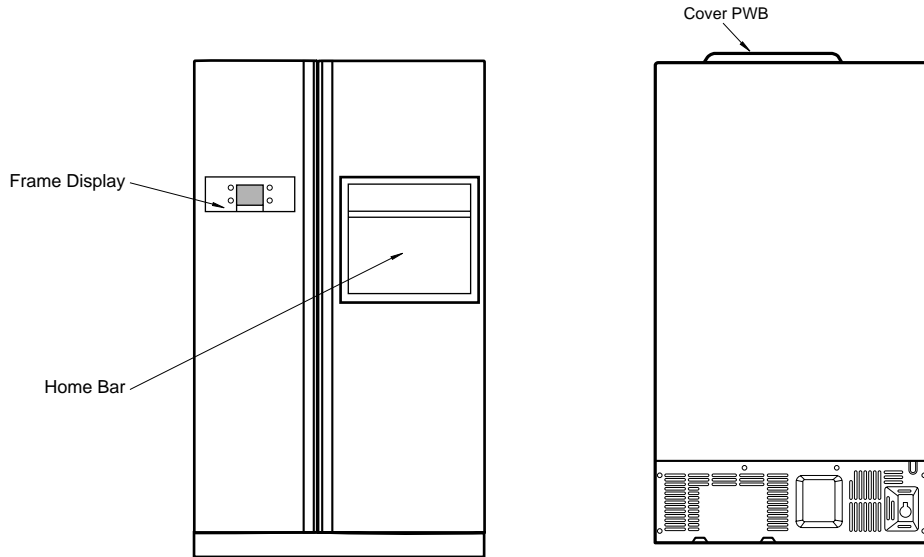


*L227: Non Home bar

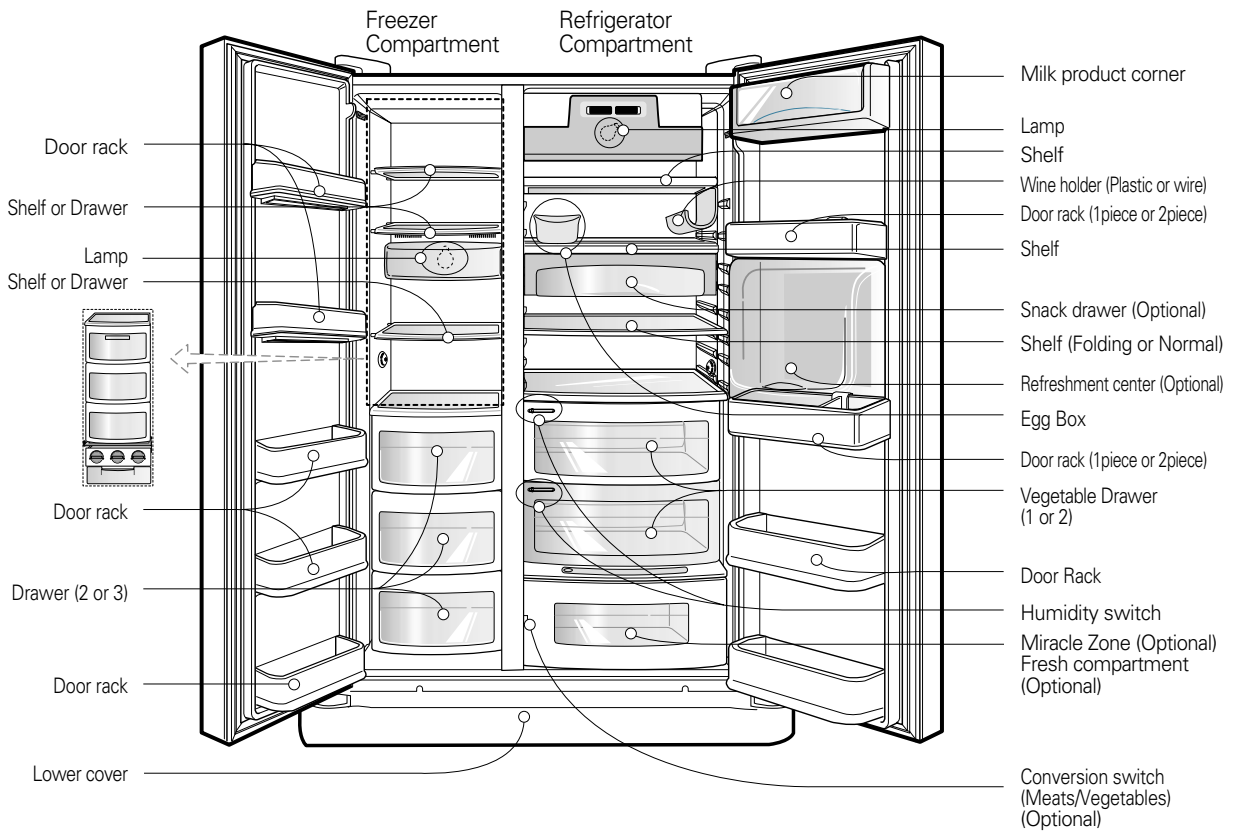


PARTS IDENTIFICATION

3. Ref No. : GW-C227/B227



*B227: Non Home bar



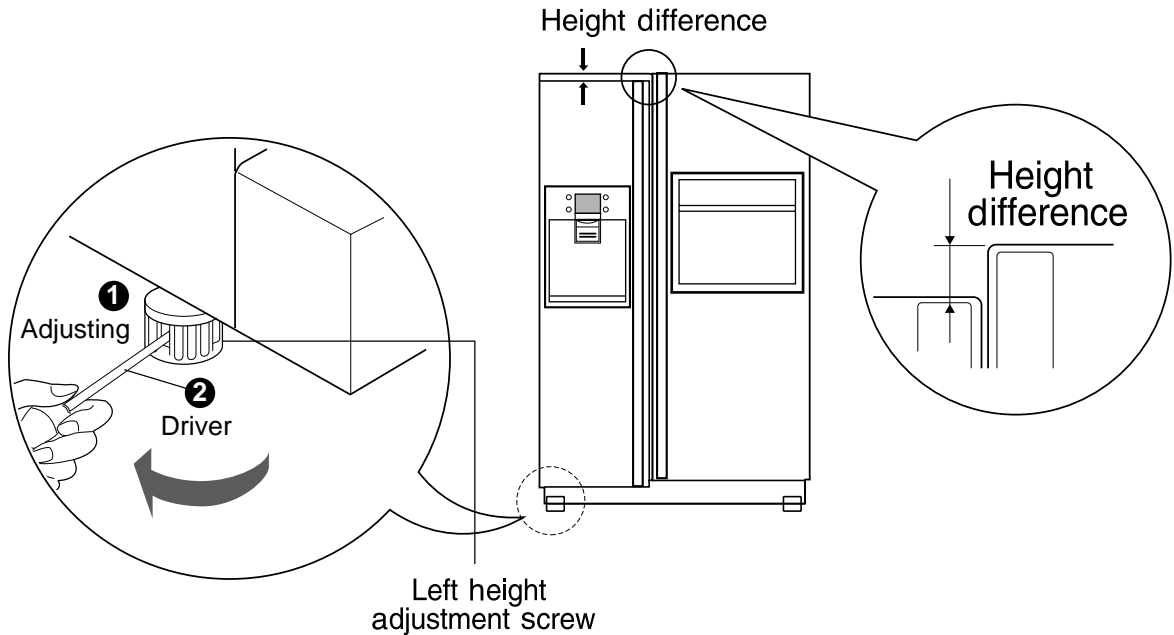
HOW TO INSTALL REFRIGERATOR

1. How to Adjust Door Height of Refrigerator

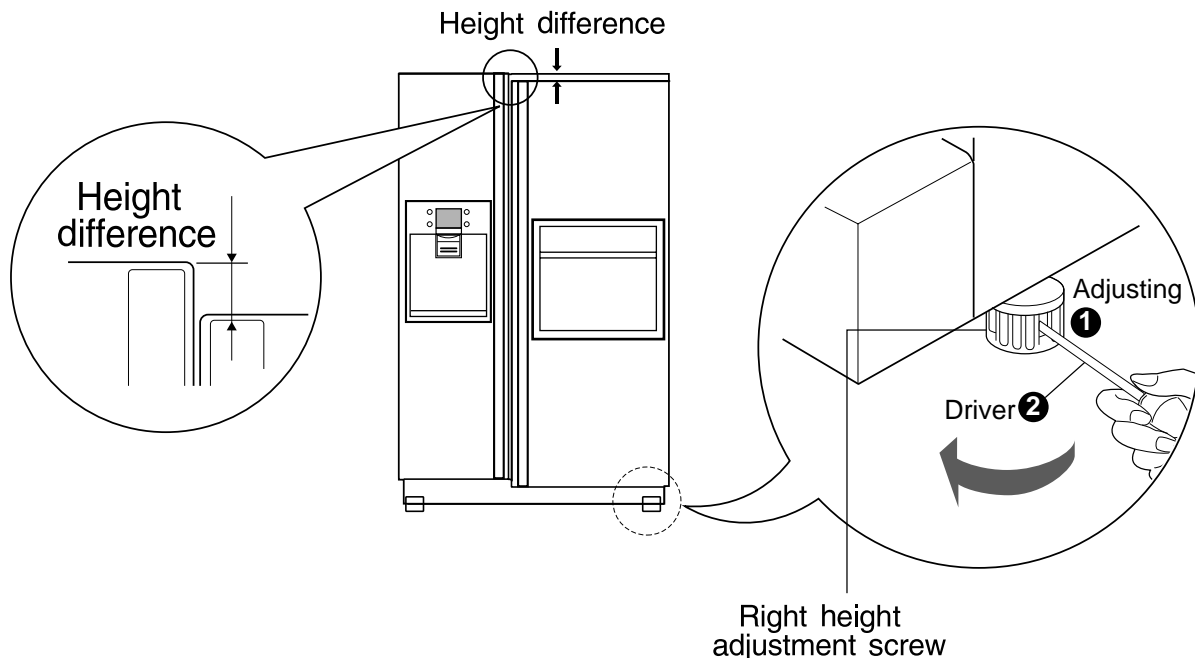
■ Make the refrigerator level first. (If the refrigerator is not installed on the flat floor, the height of freezer and refrigerator door may not be the same.)

1. If the height of freezer door is lower than that of refrigerator compartment :

2. If the height of freezer door is higher than that of refrigerator compartment :



Left height adjustment screw



Right height adjustment screw

Insert a driver ② into the groove ① of adjusting screw and rotate driver in arrow direction (clockwise) until the refrigerator becomes horizontal.

Insert a driver ② into the groove ① of adjusting screw and rotate driver in arrow direction (clockwise) until the refrigerator becomes horizontal.

HOW TO INSTALL REFRIGERATOR

2. Connection to Main Water Supply

■ Before Installation

1. The icemaker requires the water pressure of 1.5 - 8.5kgf/cm². (It is acceptable if city water fills a cup of 180cc with water for 3 seconds)
2. Install booster pump where the city water pressure is below 1.5kgf/cm² for normal operation of water and ice dispenser.
3. The total length of water pipe shall be less than 12m. Do not bend the pipe at right angle. If the length is more than 12m, there will be troubles on water supply due to water pressure drop.
4. Please install water pipe where there is no heat around.

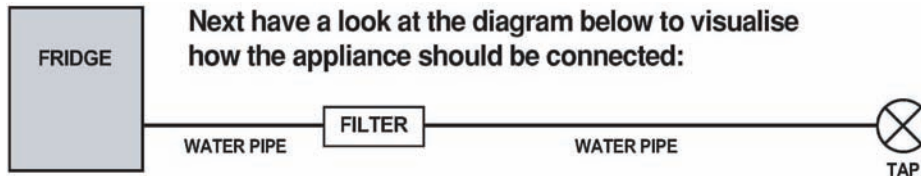
2-1. Check all correct items (In case of External Filter Models).



- 1 x Connector type Water Filter
- 2 x Clips
- 1 x 8mm Water Pipe



- Plastic Pipe Connector
- Rubber Washer



2-2. Connection to the Appliance (In case of External or Internal Filter Models).

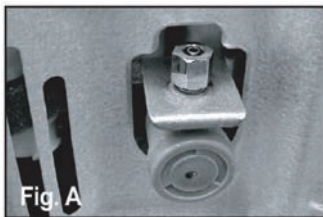


Fig. A

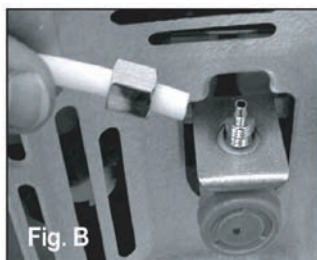


Fig. B



Fig. C

- At the back of the appliance you will see the water inlet valve. (See Fig. A)
- Unscrew the metal threaded collar and place it over one end of the water pipe. (See Fig. B)
- Firmly push the water pipe onto the water inlet valve and tighten up the metal collar. (See Fig. C)

- You now need to cut the water pipe to the right length for connection of the water filter. It is suggested that **approximately 1.5m of pipe is used** - this should allow the filter to be located in an accessible position (for periodic replacement) and also allow some slack in the pipe behind the machine so that it can be pulled out for cleaning or servicing purposes.

You must also ensure that the cut is square and not at any sort of angle as this could cause a leak.



HOW TO INSTALL REFRIGERATOR

2-3. Connection of Water Filter (In case of External Filter Models).

Now you have cut the pipe from the back of the appliance to length. It needs to be attached to the water filter. The filter is marked with with the direction of the water flow (i.e. from tap to fridge).

Remember however that the connection is being done from the refrigerator to the tap (i.e. the reverse of the water flow when in use).



Fig. E



Fig. F

Note the direction markings on the filter!

- Just insert tube into the end of the filter that the flow arrow points until the tube stop. (See Fig. E)
- After inserting tube, put together the clip strongly. The clip fix the tube. (See Fig. F)



Fig. H



Fig. I

- Repeat on the other end of the filter using the remainder of the water pipe. (See Fig. H)
- If you have connector type filter, put together the clip strongly. The clip fix the tube. (See Fig. I)

2-4. Connection to the Water Tap (In case of External and Internal Filter Models).

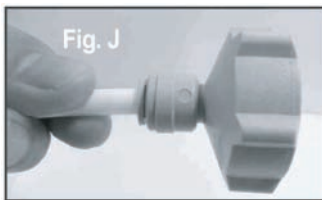
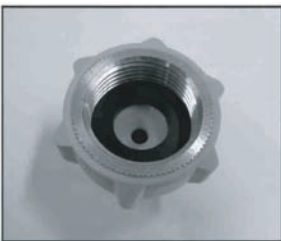


Fig. J

- Cut the pipe that is connected to the water filter to the correct length. Again, make sure that the cut is nice and square to avoid leaks.
- Push the pipe into the smaller hole of the connector supplied in the plumbing adapter kit. The pipe should be held firm. (See Fig. J)

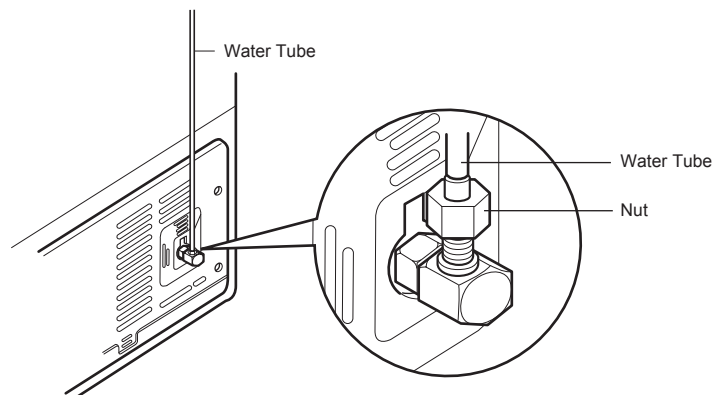


- Place the rubber washer inside the threaded tap connector and screw onto water tap.

CAUTION: feed pipe should be connected to cold water line. If it's connected to hot water line, trouble may occur.

2-5. Water Supply

- 1) After the installation of feed water, plug the refrigerator to the earthed wall outlet, press the water dispenser button for 2 - 3 minutes, and confirm that the water comes out.
- 2) Check leakage at connecting part, then arrange water tube and locate the refrigerator at its regular place if there is no leaking.



HOW TO INSTALL REFRIGERATOR

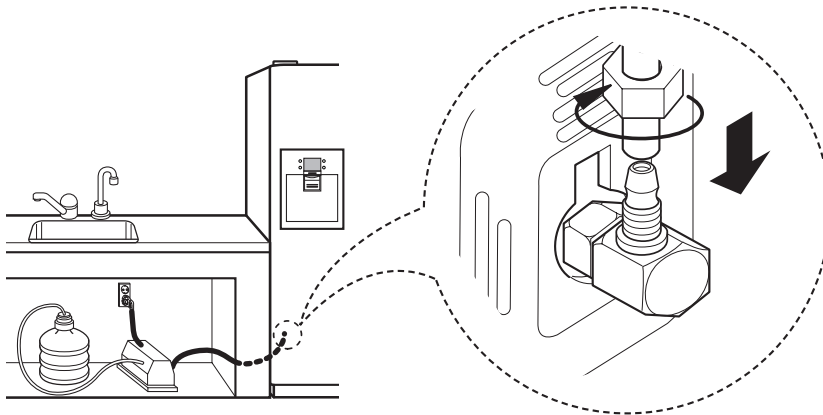
3. When customer uses bottled water.

*If customer wants to use bottled water, extra pump should be installed as shown below.

1. The pump system should not be on the floor (it may cause noise and vibration). Securely fasten the inlet and outlet nuts of pump.
2. If there is any leakage after installation, cut the water tube at right angle and reassemble.
3. When put the water tube end into the bottle, leave a clearance between bottle bottom and water tube end.
- 4 Check water coming out and any leakage.

Caution :

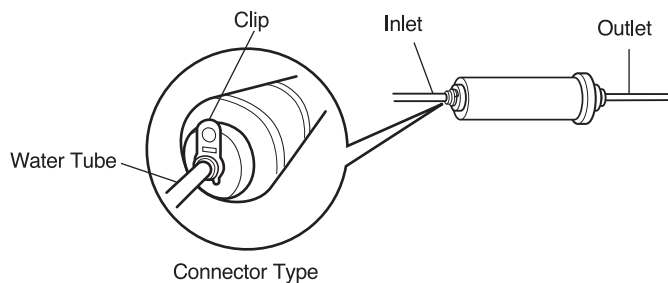
- If feed tube is more than 4m, less water will come out due to pressure drops.
- Use standard feed tube to prevent leaking.



■ Outernal Filter

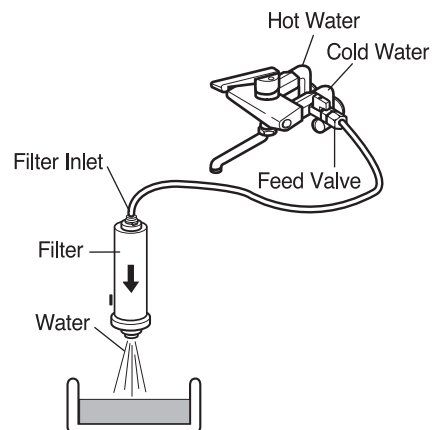
1. Filter Fixation

- 1) Connect feed tube to the filter outlet and water valve connecting tube.
- 2) Fix the filter at proper place around the sink where it is easy to replace the filter and to receive the cleaning water. Please consider the length of tube shall be less than 8m when locating filter.



2. Filter Cleaning

- 1) Connect feed tube to the inlet of feed valve and filter.
- 2) Clean the main valve and feed valve with water for at least one minute until clean water comes out.

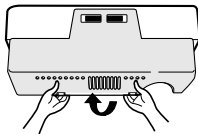
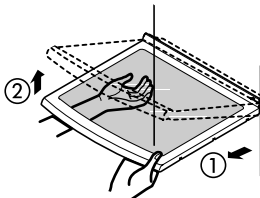


HOW TO INSTALL REFRIGERATOR

■ Install Water Filter (Applicable to some models only)

■ Before Installing water filter

1. Before installing the filter, take out the top shelf of the refrigerator after tilting it to the direction (①) and lifting it to the direction (②) and move it to the lower part.
2. Remove the lamp cover by pressing the protrusion under the cover and pulling the cover to the front.



■ Installing water filter

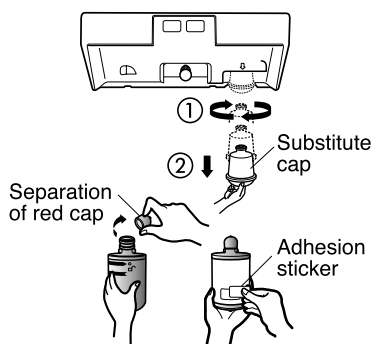
1. Initial installation of water filter

Remove the filter substitute cap by turning it counterclockwise (①) by 90 degrees and pulling it down.

Note : Keep it safe to use it later when you do not use the filter.

Remove the red cap from the filter and attach the sticker. Insert the upper part of the filter (①) after aligning with the guideline marked on the control box, and fasten it by turning it clockwise by 90 degrees.

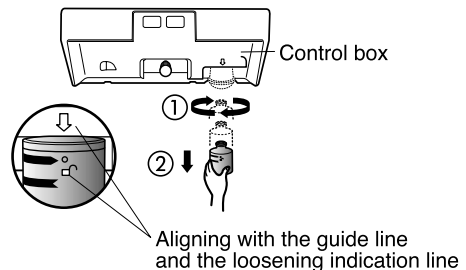
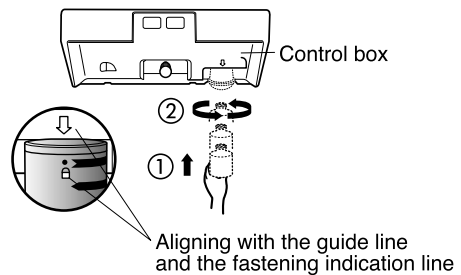
Note : Check that the guideline and the fastening indication line are aligned.



2. Replacement of water filter

While holding the lower part of the filter, turn it counterclockwise (①) by 90 degrees and pull it down.

Note : Check that the guideline and the loosening indication line are aligned.

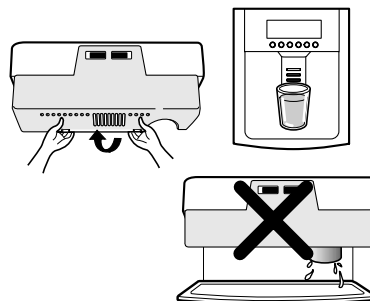


■ After installing water filter

Reassemble the lamp cover and the top shelf of the refrigerator. To place the top shelf of the refrigerator, raise the front part of the shelf a bit so that the hook of the shelf is fit into the groove.

In order to clean the water filter system, drain water for about 3 min.

Note : Then open the door of the refrigerator and check for water droppings on the shelf under the filter.

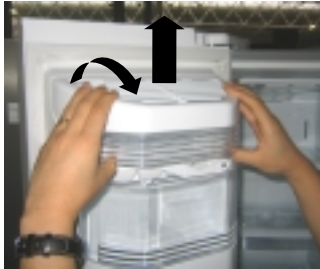


HOW TO INSTALL REFRIGERATOR

3. How to Control the Amount of Water Supplied to Icemaker.

3-1. Confirm the amount of water supplied to the icemaker.

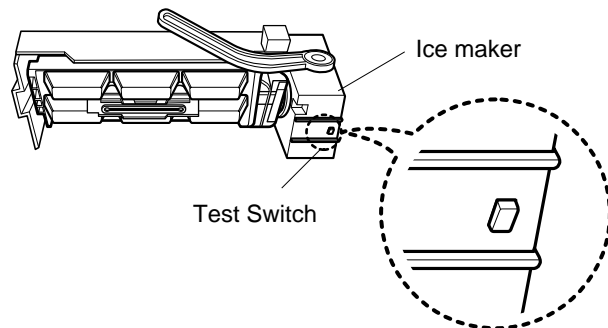
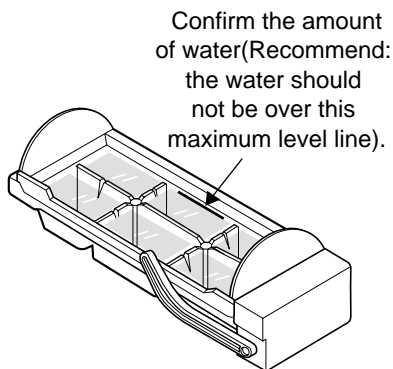
1. Remove the cover bucket : Lift the cover with a slight twisting.
2. Remove the ice bucket : Lift the lower part slightly and take the ice bucket out slowly.



- **Caution :** • Do not put your hands or tools into the chute to confirm the operation of geared motor. It may damage refrigerator or hurt your hands.
- Check the operation of motor with its operation noise.

3. Apply electricity after connecting water pipe.

- 1) Press test switch under the icemaker for two seconds as shown below.
- 2) The bell rings(ding~dong) and ice tray rotates and water comes out from the icemaker water tube.
- 3) The water shall be supplied two or three times into the tray. The amount of water supplied for each time is small. Put a water container under the ice tray and press test switch.
- 4) When ice tray rotates, the water in it will spill. Collect the spilt water and throw away into the sink.
- 5) When ice tray has finished rotation, water comes out from the water tube. Confirm the amounts of water in the ice tray. (refer to fig. The optimum amount of water is 80cc)



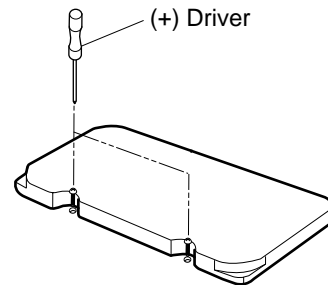
* It is acceptable if the adjusted level of water is a bit smaller than maximum level.

HOW TO INSTALL REFRIGERATOR

3-2. Control the amount of water supplied to the icemaker.

Caution : • Please unplug the power cord from the wall outlet and wait for more than three minutes before disconnecting PCB cover as 310V is applied in the control panel.

1. Disconnect PCB cover from the upper part of the refrigerator.
2. Adjust the amount of water supplied by using DIP switch.



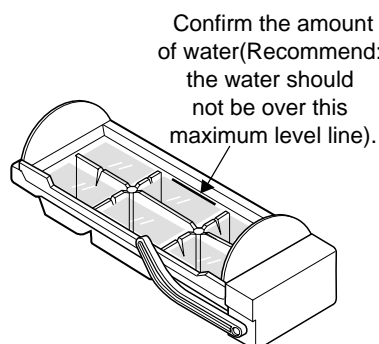
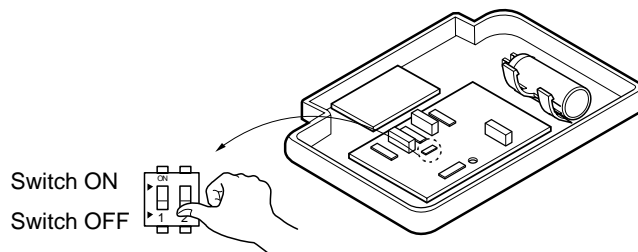
■ Water Supplying Time Control Option

No	DIP SWITCH SETTING		WATER SUPPLY TIME	REMARKS
	S1	S2		
1	OFF	OFF	4.5 SEC	* The quantity of water supplied depends on DIP switch setting conditions and water pressure as it is a direct tap water connection type. (the water supplied is generally 60 cc to 100 cc) * DIP switch is on the main PCB.
2	ON	OFF	4.0 SEC	
3	OFF	ON	5.5 SEC	
4	ON	ON	6.5 SEC	

- 1) The water supplying time is set at 4.5 seconds when the refrigerator is delivered.
- 2) The amount of water supplied depends on the setting time and water pressure (city water pressure).
- 3) If ice cube is too small, increase the water supplying time. This happens when too small water is supplied into the ice tray.
- 4) If ice cube sticks together, decrease the water supplying time. This happens when too much water is supplied into the ice tray.

Caution : When adjusting the amount of water supplied, adjust step by step. Otherwise the water may spill over.

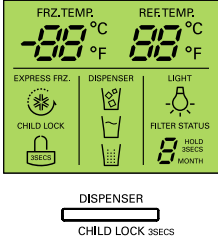
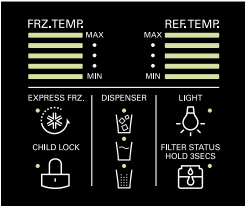
3. When adjustment of control switch for the amount of water supplied is complete, check the level of water in the ice tray.




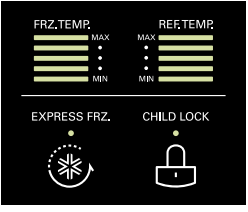
MICOM FUNCTION

1. Monitor Panel

1-1. GW-P227, GW-L227

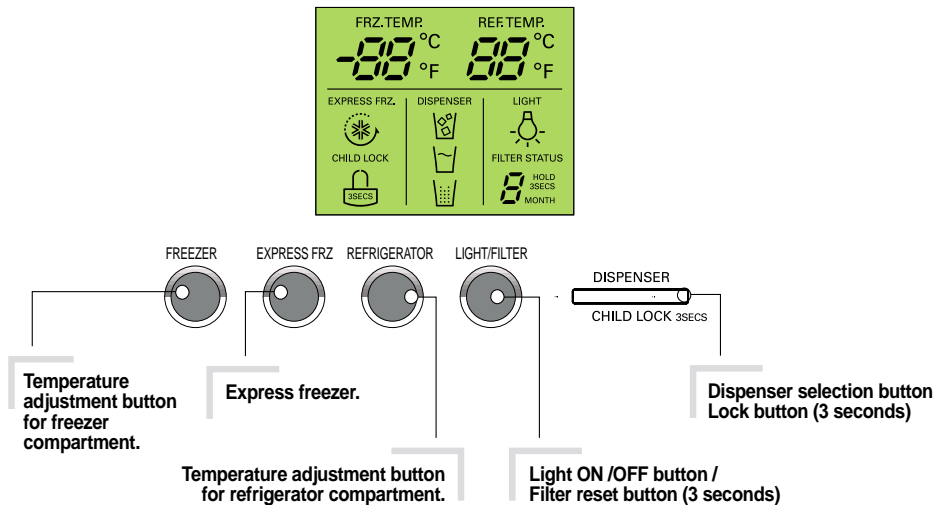
Optional	Function display board	
<p>Type-1 (88-LED)</p>	<p>FREEZER</p> <p>EXPRESS FRZ.</p>	 <p>REFRIGERATOR</p> <p>LIGHT/FILTER</p> <p>DISPENSER</p> <p>CHILD LOCK 3SECS</p>
<p>Type-2 (Bar-LED)</p>	<p>FREEZER</p> <p>EXPRESS FRZ.</p> <p>CHILD LOCK 3SECS</p>	 <p>REFRIGERATOR</p> <p>LIGHT/FILTER</p> <p>DISPENSER</p>

1-2. GW-C227, B227

Optional	Function display board	
<p>Type-1 (88-LED)</p>	<p>FREEZER</p> <p>EXPRESS FRZ.</p>	 <p>REFRIGERATOR</p> <p>CHILD LOCK 3SECS</p>
<p>Type-2 (Bar-LED)</p>	<p>FREEZER</p> <p>EXPRESS FRZ.</p>	 <p>REFRIGERATOR</p> <p>CHILD LOCK 3SECS</p>

MICOM FUNCTION

1-3. Display Second Function



1. Buzzer sound mute Mode

The buzzer sound is set to OFF.

It activates by sounding the recognition sound of “Ding~” after pressing and holding “Express FRZ” button more than 5 seconds. It inactivates when resetting the mode power.

2. Display Power saving Mode

It places display in standby mode until door is opened.

Press “Freezer” and “Express FRZ” buttons simultaneously to turn all leds become ON and then OFF with the recognition sound of “Ding~” after 5 seconds. (Be sure not to press only one button to work.)

Once the mode activates, the display is always OFF. Until door is opened or display button is pressed. When 30 seconds has elapsed after closing door or pressing button, the display turns OFF. To deactivate this mode is same as the activation methods. The mode inactivates when resetting the power.

3. Exhibition Mode

This function is available when exhibiting a refrigerator in the shopping mall.

Function is inserted with recognition sound “Ding ~” if pressing both the “Express FRZ” button and the “REFRIGERATOR” button at the same time for more than 5 seconds. If function is inserted, all basic refreezing functions at the R/F room and the Storage room (COMP, F-FAN, C-FAN) turns off and the display normally operates. However, the dispenser function normally operates.

The DEMO stops if pressing the button during DISPLAY DEMO, DEMO stops and the display normally operates but performs DEMO operation again if not pressing the button again for more than 30 seconds (DEMO: Display scenario when using the display).

Release method is same as input method.

The mode is released if power is reset.

MICOM FUNCTION

2. Description of Function

2-1. Function of Temperature Selection

Division		Power Initially On		1st Press		2nd Press		3th Press		4th Press	
Change of Indication Lamp	Type-1 (88-LED)	-13 °C	3 °C	-22 °C	2 °C	-23 °C	0 °C	-15 °C	5 °C	-17 °C	4 °C
	Type-2 (Bar-LED)										
Temperature Control		Middle		Middle Strong		Strong		Weak		Middle Weak	
Freezer Control		(-19.0 °C) <-19.0 °C>		(-21.5 °C) <-21.0 °C>		(-22.5 °C) <-22.5 °C>		(-14.5 °C) <-14.5 °C>		(-16.5 °C) <-16.5 °C>	
Refrigeration Control		(3.5 °C) <4.5 °C>		(2.5 °C) <3.5 °C>		(1.0 °C) <1.5 °C>		(7.5 °C) <8.0 °C>		(5.5 °C) <6.0 °C>	

* The temperature can vary ± 3 °C depending on the load condition.

*() : P227, L227

*< > : C227, B227

- When power is initially applied or reapplied after power cut, "Medium" is automatically selected.
- When the temperature selection switch in the freezer and refrigerator compartments is pressed, the light is on in the following sequence:
"Middle" → "Middle Strong" → "Strong" → "Weak" → "Middle Weak"
- The temperature setting condition of freezer and refrigerator compartments shall not be indicate in the standard model (GW-P227, GW-L227, GW-C227, GW-B227) when refrigerator or home bar door is closed.

MICOM FUNCTION

2-2. Automatic ice maker

- The automatic ice maker can automatically make 6 pieces of ice cube at a time, 50~60 pieces a day. But these quantities may be varied according to various conditions including how many times the refrigerator door opens and closes.
- Ice making stops when the ice storage bin is full.
- If you don't want to use automatic ice-maker, change the ice-maker switch to ON-OFF.
If you want to use automatic ice-maker again, change the switch to OFF-ON.

NOTE : It is normal that a noise is produced when ice made is dropped into the ice storage bin.

2-3. When ice maker does not operate smoothly

Ice is lumped together

- When ice is lumped together, take the ice lumps out of the ice storage bin, break them into small pieces, and then place them into the ice storage bin again.
 - When the ice maker produces too small or lumped together ice, the amount of water supplied to the ice maker need to be adjusted. Contact the service center.
- * If ice is not used frequently, it may lump together.

Power failure

- Ice may drop into the freezer compartment. Take the ice storage bin out and discard all the ice then dry it and place it back. After the machine is powered again, crushed ice will be automatically selected.

The unit is newly installed

- It takes about 12 hours for a newly installed refrigerator to make ice in the freezer compartment.

2-4. Express freezing

1. Express freezing is function to improve cooling speed of the freezing room by consecutively operating compressors and freezing room fan.
2. Express freezing is released if power failure occurs and then returns to the original status.
3. Temperature setting is not changed even if selecting the express freezing.
4. The change of temperature setting at the freezing room or the cold storage room is allowed with express freezing selected and processed.
5. The cold storage room operates the status currently set with Express freezing selected and processed.
6. If selecting the Express freezing, the Express freezing function is released after continuously operating compressor and freezing room fan.
7. If frost removal starting time is arrived during Express freezing, Express freezing operation is done only for the remaining time after completion of frost removal when the Express freezing operation time passes 90 minutes. If passing 90 minutes, Express freezing operation is done only for 2 hours after completion of frost removal.
8. If pressing Express freezing button during frost removal, the Express freezing LED is turned on but if pressing the Express freezing, compressor operates after the remaining time has passed.
9. If selection Express freezing within 7 minutes (delay for 7 minutes of compressor) after the compressor stops, compressor operates after the remaining time has passed.
10. The freezing room fan motor operates at the high speed of RPM during operation of Express freezing.

MICOM FUNCTION

2-5. Control of variable type of freezing room fan

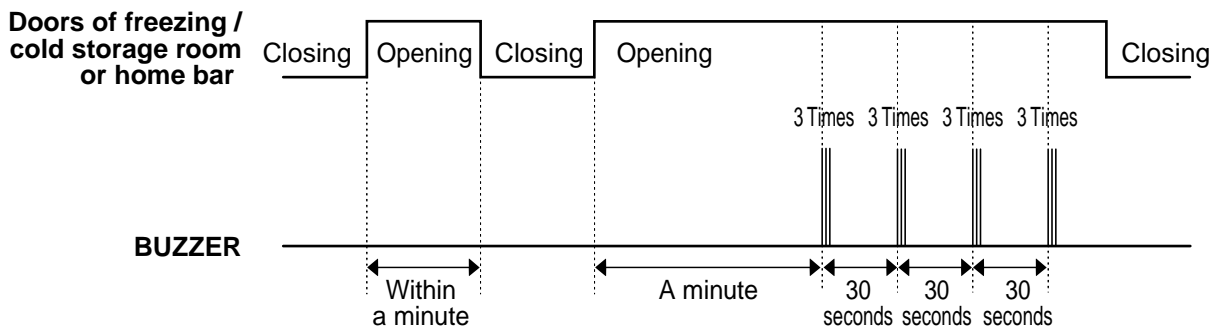
1. To increase cooling speed and load response speed, MICOM variably controls freezing room fan motor at the high speed of RPM and standard RPM.
2. MICOM only operates in the input of initial power or special freezing operation or load response operation for the high speed of RPM and operates in the standard RPM in other general operation.
3. If opening doors of freezing / cold storage room or home bar while fan motor in the freezing room operates, the freezing room fan motor normally operates (If being operated in the high speed of RPM, it converts operation to the standard RPM). However, if opening doors of freezing room or home bar, the freezing room fan motor stops.
4. As for monitoring of BLDC fan motor error in the freezing room, MICOM immediately stops the fan motor by determining that the BLDC fan motor is locked or poor if there would be position signal for more than 65 seconds at the BLDC motor. Then it displays failure (refer to failure diagnosis function table) at the display part of refrigerator, performs re-operation in the cycle of 30 minutes. If normal operation is performed, poor status is released and refrigerator returns to the initial status (reset).

2-6. Control of M/C room fan motor

1. The M/C room fan motor performs ON/OFF control by linking with the COMP.
2. It controls at the single RPM without varying RPM.
3. Failure sensing method is same as in fan motor of freezing fan motor (refer to failure diagnosis function table for failure display).

2-7. Door opening alarm

1. Buzzer generates alarm sound if doors are not closed even when more than a minute consecutively has passed with doors of freezing / cold storage room or home bar opened.
2. Buzzer rings three times in the interval of 0.5 second after the first one-minute has passed after doors are opened and then repeats three times of On/Off alarm in the cycle of every 30 seconds.
3. If all the doors of freezing / cold storage room or home bar are closed during door open alarm, alarm is immediately released.



2-8. Ringing of button selection buzzer

1. If pressing the front display button, "Ding ~ " sound rings.

2-9. Ringing of compulsory operation, compulsory frost removal buzzer

1. If pressing the test button in the main PCB, "Phi ~ " sound rings.
2. In selecting compulsory operation, alarm sound is repeated and completed in the cycle of On for 0.2 second and Off for 1.8 second three times.
3. In selecting compulsory frost removal, alarm sound is repeated and completed in the cycle of On for 0.2 second , Off for 0.2 second, On for 0.2 second and Off for 1.4 second three times.

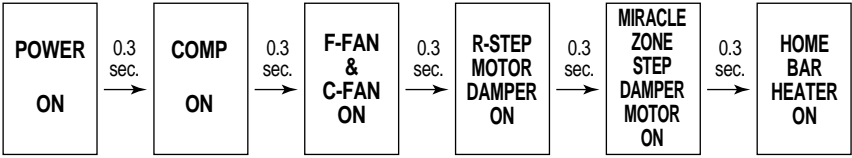
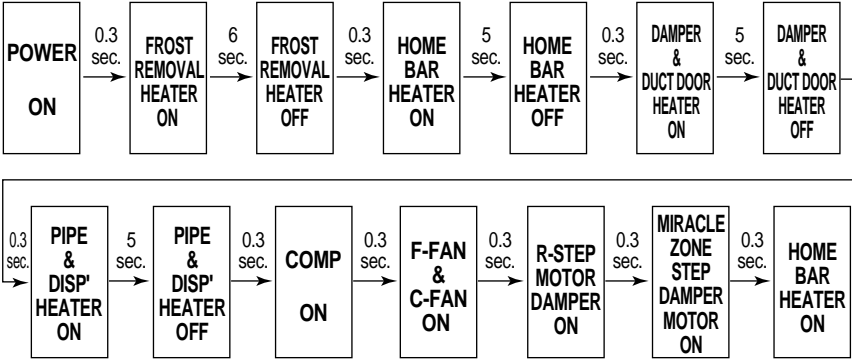
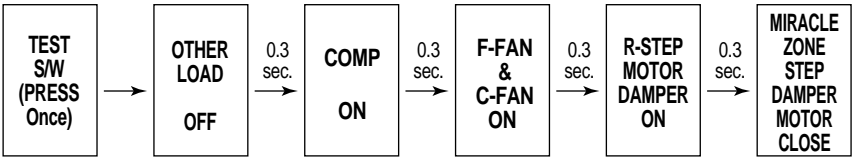
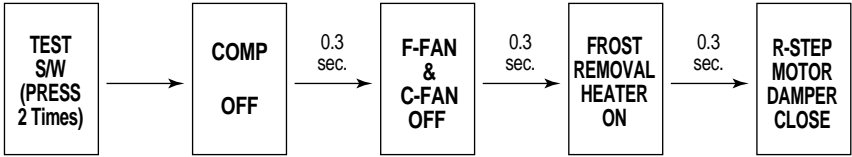
MICOM FUNCTION

2-10. Frost removal function

1. Frost removal is performed whenever total operation time of compressor becomes 7 ~ 7.5 hour.
2. In providing initial power (or returning power failure), frost removal starts whenever total operation time of compressor becomes 4 ~ 4.5 hour.
3. Frost removal is completed if temperature of a frost removal sensor becomes more than 5°C after starting frost removal.
Poor frost removal is not displaced if it does not arrive at 5°C even if two hours have passed after starting frost removal.
4. No removal is done if frost removal sensor becomes poor (snapping or short-circuit).

2-11. Sequential operation of built-in product

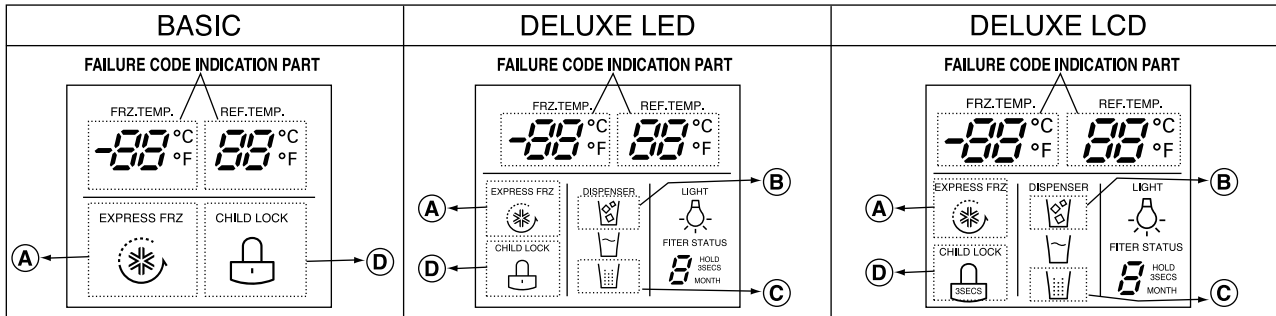
Built-in products such as compressor, frost removal heater, freezing room fan, Cooling Fan and step motor damper are sequentially operated as follows for preventing noise and part damage occurred due to simultaneous operation of a lot of parts in applying initial power and completing test.

Function	Load Operation Sequence	Remark
In applying Initial power	<p>When temperature of a frost removal sensor becomes more than 45°C (In purchase, movement)</p> 	<p>If error occurs during operation, initial operation is not done.</p> <p>■ Sequence of load operation when closing F-room and R-room.</p>
	<p>When temperature of a frost removal sensor becomes less than 45°C (In power failure, service)</p> 	
TEST MODE	<p>Test mode 1 (Compulsory function)</p> 	<p>If pressing switch once more in the test mode 2 or temperature of a frost removal sensor is more than 5°C, it immediately returns to the test mode for initial operation (COMP operates after 7 minutes).</p>
	<p>Test mode 2 (Compulsory frost removal)</p> 	

MICOM FUNCTION

2-12. Function of Trouble Diagnosis(88-LED)

1. Failure diagnosis function is function to facilitate service when nonconforming matters affecting performance of product during use of product.
2. In occurrence of failure, pressing the function adjustment button does not perform function and only alarm sound (“Ding-”) rings.
3. If nonconforming matters occurred are released during display of failure code, MICOM returns to the original state (Reset).
4. Failure code is displayed on the display part of setting temperature for the freezing room and the display part of setting temperature for the cold storage room of LED, which are placed at the display part of a refrigerator. All the LED graphics other than a failure code are turned off.



○ : PROPER OPERATION

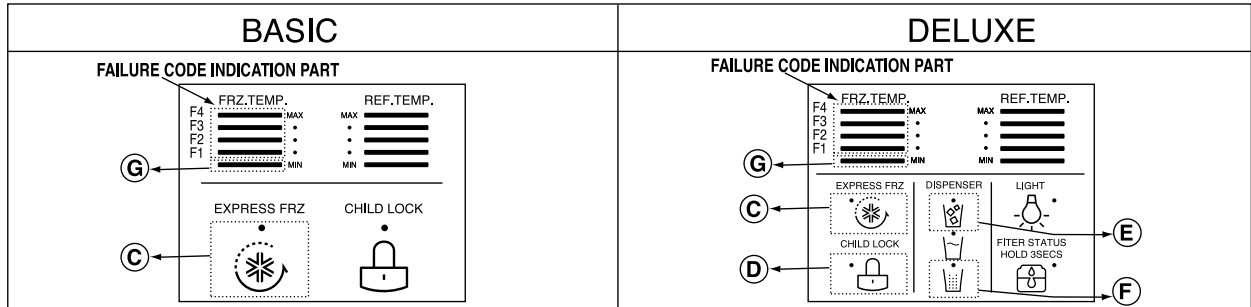
NO	ITEM	FAILURE CODE INDICATION PART		CONTENTS OF FAILURE	PRODUCT OPERATION STATUS IN FAILURE				
		FREEZER ROOM NOTCH TEMPERATURE DISPLAY	REFRIGERATOR ROOM NOTCH TEMPERATURE DISPLAY		COMPRESSOR	FREEZING BLDC MOTOR	COOLING BLDC MOTOR	DEFROST HEATER	STEPPING MOTOR DAMPTER
1	ABNORMAL FREEZER SENSOR	Er	FS	FREEZER SENSOR SHORT CIRCUIT	ON FOR 15 MINUTES / OFF FOR 15 MINUTES	STANDARD RPM	○	○	○
2	ABNORMAL REFRIGERATOR SENSOR1(R1) (UPPER PART IN THE REFRIGERATOR COMPARTMENT)	Er	rS	REFRIGERATOR SENSOR1 SHORT CIRCUIT	○	STANDARD RPM	○	○	FULL OPENING FOR 10 MINUTES/ FULL CLOSING FOR 15 MINUTES
3	ABNORMAL REFRIGERATOR SENSOR2(R2) (LOWER PART IN THE REFRIGERATOR COMPARTMENT)	NORMAL DISPLAY (NOTE2)		REFRIGERATOR SENSOR2 SHORT CIRCUIT	○	STANDARD RPM	○	○	○
4	ABNORMAL DEFROST SENSOR	Er	dS	ABNORMAL SHORT CIRCUIT	○	STANDARD RPM	○	NO DEFROST	○
5	FAILED DEFROSTING	Er	dH	DEFROST HEATER, TEMPERATURE FUSE SHORT CIRCUIT, UNPLUGGED CONNECTOR(INDICATED 4 HOUR LATER AFTER TROUBLE)	○	STANDARD RPM	○	○	○
6	ABNORMAL FREEZING BLDC MOTOR	Er	FF	MOTOR DEFECT, HOOKED OF LEAD WIRE TO FAN, CONTACT OF STRUCTURES WITH FAN, SHORT OR OPEN OF LEAD WIRE(THERE IS NO SIGNAL OF BLDC MOTOR MORE THAN 115 SECONDS IN OPERATION OF FAN MOTOR)	○	OFF	○	○	○
7	ABNORMAL COOLING BLDC MOTOR	Er	CF		○	STANDARD RPM	OFF	○	○
8	ABNORMAL COMMUNICATION	Er	CO	SHORT OR OPEN OF LEAD WIRE CONNECTING BETWEEN MAIN PCB AND DISPLAY PCB, TRANSMISSION TR AND RECEIVING PART	○	STANDARD RPM	○	○	○
9	ABNORMAL AMBIENT SENSOR	NORMAL DISPLAY (NOTE1)		AMBIENT SENSOR SHORT CIRCUIT	○	○	○	○	○
10	ABNORMAL ICE-MAKER SENSOR	NORMAL DISPLAY (NOTE2)		ICE-MAKER SENSOR SHORT CIRCUIT	○	○	○	○	○
11	ABNORMAL ICE-MAKER UNIT	NORMAL DISPLAY (NOTE2)		FAULTY ICE-MAKER UNIT MOTOR OR HALL IC, LEAD WIRE SHORT CIRCUIT, FAULTY MOTOR DRIVING CIRCUIT	○	○	○	○	○

* In display of the failure mode, all LEDs of setting temperature for freezing/ setting temperature for cold storage are turned off (excluding Note1 and Note2).

MICOM FUNCTION

2-13. Function of Trouble Diagnosis(Bar-LED)

1. Function of trouble diagnosis is to make the repair service easy when the refrigerator is out of order during service.
2. The function control button does not work but the recognition sound is heard when the refrigerator is out of order.
3. It returns to normal conditions when trouble code led is off. (reset)
4. Trouble code is indicated by the freezing temperature indicator led in the refrigerator display. All leds except trouble code are off.



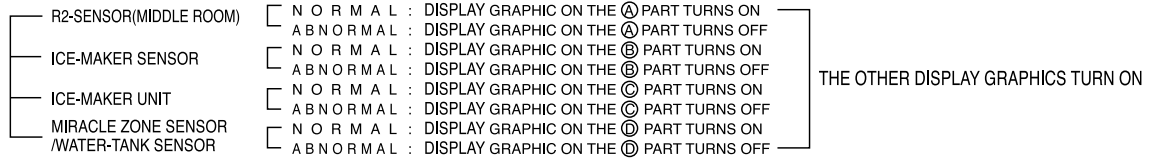
◐ : On ● : Off ○ : PROPER OPERATION

NO	ITEM	TROUBLE CODE INDEX F1 F2 F3 F4	CONTENTS OF FAILURE	PRODUCT OPERATION STATUS IN FAILURE				
				COMPRESSOR	FREEZING BLDC MOTOR	COOLING BLDC MOTOR	DEFROST HEATER	STEPPING MOTOR DAMPTER
1	ABNORMAL FREEZER SENSOR	◐ ● ● ●	FREEZER SENSOR SHORT CIRCUIT	ON FOR 15 MINUTES / OFF FOR 15 MINUTES	STANDARD RPM	○	○	○
2	ABNORMAL REFRIGERATOR SENSOR1(R1) (UPPER PART IN THE REFRIGERATOR COMPARTMENT)	● ◐ ● ●	REFRIGERATOR SENSOR1 SHORT CIRCUIT	○	STANDARD RPM	○	○	FULL OPENING FOR 10 MINUTES / FULL CLOSING FOR 15 MINUTES
3	ABNORMAL REFRIGERATOR SENSOR2(R2) (LOWER PART IN THE REFRIGERATOR COMPARTMENT)	NORMAL DISPLAY (NOTE 1)	REFRIGERATOR SENSOR2 SHORT CIRCUIT	○	STANDARD RPM	○	○	○
4	ABNORMAL DEFROST SENSOR	● ● ◐ ●	ABNORMAL SHORT CIRCUIT	○	STANDARD RPM	○	NO DEFROST	○
5	FAILED DEFROSTING	◐ ◐ ◐ ◐	DEFROST HEATER, TEMPERATURE FUSE SHORT CIRCUIT, UNPLUGGED CONNECTOR (INDICATED 4 HOUR LATER AFTER TROUBLE)	○	STANDARD RPM	○	○	○
6	ABNORMAL FREEZING BLDC MOTOR	◐ ● ● ◐	MOTOR DEFECT, HOOKED OF LEAD WIRE TO FAN, CONTACT OF STRUCTURES WITH FAN, SHORT OR OPEN OF LEAD WIRE (THERE IS NO SIGNAL OF BLDC MOTOR MORE THAN 65 SECONDS IN OPERATION OF FAN MOTOR)	○	OFF	○	○	○
7	ABNORMAL COOLING BLDC MOTOR	◐ ◐ ● ●		○	STANDARD RPM	OFF	○	○
8	ABNORMAL AMBIENT SENSOR	NORMAL DISPLAY (NOTE 1)	AMBIENT SENSOR SHORT CIRCUIT	○	○	○	○	○
9	ABNORMAL ICE-MAKER SENSOR	NORMAL DISPLAY (NOTE 1)	ICE-MAKER SENSOR SHORT CIRCUIT	○	○	○	○	○
10	ABNORMAL ICE-MAKER UNIT	NORMAL DISPLAY (NOTE 1)	FAULTY ICE-MAKER UNIT MOTOR OR HALL IC, LEAD WIRE SHORT CIRCUIT, FAULTY MOTOR DRIVING CIRCUIT	○	○	○	○	○
11	ABNORMAL W/T SENSOR	NORMAL DISPLAY (NOTE 1)	WATER TANK SENSOR SHORT CIRCUIT	○	○	○	○	○

MICOM FUNCTION

Function of Trouble Diagnosis(88LED)

NOTE1) IN CASE OF ABNORMAL AMBIENT SENSOR,"Er", "H" INDICATED ON THE FAILURE CODE INDICATION PART.(OTHER DISPLAY PARTS ARE INDICATED NORMALLY)
 NOTE 2) R2-SENSOR, ICE-MAKER SENSOR,MIRACLE ZONE SENSOR, WATER-TANK SENSOR AND ICE-MAKER UNIT IS NOT INDICATED ON THE FAILURE INDICATING PART BUT INDICATED IN CHECKING DISPLAY PART. (WHEN PRESSING FOR MORE THAN THE BUTTON OF FREEZING TEMPERATURE AND EXPRESS FREEZING BUTTON FOR MORE THAN 1 SECOND)



2-14. Test Function

1. The purpose of test function is to check function of the PWB and product and to search for the failure part at the failure status.
2. Test button is placed on the main PCB of refrigerator (test switch), and the test mode will be finished after maximum 2 hours irrespective of test mode and then is reset to the normal status.
3. Function adjustment button is not perceived during performance of test mode but only warning sounds ring.
4. In finishing test mode, always pull the power cord out and then plug-in it again for the normal state.
5. If nonconforming contents such as sensor failure are found during performance of test mode, release the test mode and display the failure code.
6. Even if pressing the test button during failure code display, test mode will not be performed.

MODE	OPERATION	CONTENTS		REMARKS
TEST1	PRESS TEST BUTTON ONCE <STRONG COLD MODE>	1. CONTINUOUS OPERATION OF COMPRESSOR 2. CONTINUOUS OPERATION OF FREEZING BLDC MOTOR (HIGH-SPEED RPM) AND COOLING BLDC MOTOR 3. DEFROST HEATER TURNS OFF	4. STEPPING MOTOR DAMPER IS COMPLETELY OPENED (OPEN OF BAFFLE) 5. ALL DISPLAY GRAPHICS TURNS ON	FREEZING FAN TURNS OFF IN DOOR OPENING
TEST2	PRESS TEST BUTTON ONCE AT THE TEST MODE 1 STATUS <FORCED DEFROST MODE>	1. COMPRESSOR OFF 2. FREEZING BLDC MOTOR AND COOLING BLDC MOTOR TURN OFF 3. DEFROST HEATER TURNS ON	4. STEPPING MOTOR DAMPER IS COMPLETELY CLOSED(CLOSING OF BAFFLE) 5. ALL DISPLAY GRAPHICS TURNS OFF(ONLY FAILURE CODE INDICATION PART TURNS ON '22' STATUS)	RETURN TO THE NORMAL MODE WHEN THE DEFROST SENSOR IS ABOVE +5°C
NORMAL STATUS	PRESS TEST BUTTON ONCE AT THE TEST MODE 2 STATUS	RETURNING TO INITIAL STATUS		COMPRESSOR WILL OPERATE AFTER DELAY FOR 7 MINUTES

MICOM FUNCTION

Function of Trouble Diagnosis(BAR LED)

NOTE 1) R2-SENSOR, WATER TANK SENSOR, ICE MAKER-SENSOR, ICE MAKER UNIT AND AMBIENT SENSOR ARE NOT INDICATED ON THE FAILURE INDICATING PART BUT INDICATED IN CHECKING DISPLAY (WHEN PRESSING THE BUTTON OF FREEZING TEMPERATURE AND EXPRESS FREEZER BUTTON FOR MORE THAN 1 SECOND).

R2-SENSOR(MIDDLE ROOM)	[N O R M A L : LED GRAPHIC ON THE (C) PART TURNS ON	THE OTHER LED GRAPHICS TURN ON
		A B N O R M A L : LED GRAPHIC ON THE (C) PART TURNS OFF	
WATER TANK SENSOR	[N O R M A L : LED GRAPHIC ON THE (D) PART TURNS ON	
		A B N O R M A L : LED GRAPHIC ON THE (D) PART TURNS OFF	
ICE-MAKING SENSOR	[N O R M A L : LEDS GRAPHIC ON THE (E) PART TURNS ON	
		A B N O R M A L : LEDS GRAPHIC ON THE (E) PART TURNS OFF	
ICE-MAKER UNIT	[N O R M A L : LEDS GRAPHIC ON THE (F) PART TURNS ON	
		A B N O R M A L : LEDS GRAPHIC ON THE (F) PART TURNS OFF	
AMBIENT SENSOR	[N O R M A L : LEDS GRAPHIC ON THE (G) PART TURNS ON	
		A B N O R M A L : LEDS GRAPHIC ON THE (G) PART TURNS OFF	

2-15. Test Function

1. The purpose of test function is to check function of the PWB and product and to search for the failure part at the failure status.
2. Test button is placed on the main PCB of refrigerator (test switch), and the test mode will be finished after maximum 2 hours irrespective of test mode and then is reset to the normal status.
3. Function adjustment button is not perceived during performance of test mode but only warning sounds ring.
4. In finishing test mode, always pull the power cord out and then plug-in it again for the normal state.
5. If nonconforming contents such as sensor failure are found during performance of test mode, release the test mode and display the failure code.
6. Even if pressing the test button during failure code display, test mode will not be performed.

MODE	OPERATION	CONTENTS		REMARKS
TEST1	PRESS TEST BUTTON ONCE (STRONG COLD MODE)	1. CONTINUOUS OPERATION OF COMPRESSOR 2. CONTINUOUS OPERATION OF FREEZING BLDC MOTOR (HIGH-SPEED RPM) AND COOLING BLDC MOTOR 3. DEFROST HEATER TURNS OFF	4. STEPPING MOTOR DAMPER IS COMPLETELY OPENED (OPEN OF BAFFLE) 5. ALL DISPLAY LEDS GRAPHICS TURN ON.	FREEZING FAN TURNS OFF IN DOOR OPENING
TEST2	PRESS TEST BUTTON ONCE AT THE TEST MODE 1 STATUS (FORCED DEFROST MODE)	1. COMPRESSOR OFF 2. FREEZING BLDC MOTOR AND COOLING BLDC MOTOR TURN OFF 3. DEFROST HEATER TURNS ON 4. STEPPING MOTOR DAMPER IS COMPLETELY CLOSED (CLOSING OF BAFFLE)	5. ALL DISPLAY LEDS GRAPHICS TURN OFF, EXCEPT FOR FRZ TEMP, REF TEMP MIDDLE NOTCH LED	RETURN TO THE NORMAL MODE WHEN THE DEFROST SENSOR IS ABOVE +5°C
NORMAL STATUS	PRESS TEST BUTTON ONCE AT THE TEST MODE 2 STATUS	RETURNING TO INITIAL STATUS		COMPRESSOR WILL OPERATE AFTER DELAY FOR 7 MINUTES

MICOM FUNCTION

- * LED check function- When freezer and refrigerator temperature control buttons are pressed for more than 1 second at the same time, all LEDs on the display are on. And it returns to the normal conditions when the buttons are released.
- * Check of freezer fan rpm variation- Freezer fan speed changes from high speed to standard speed and vice versa for 30 seconds whenever freezer and refrigerator temperature control buttons are pressed at the same time for more than 1 second when freezer fan is in operation and returns to the previous rpm.

2-16. Functions of Ice Dispenser and Water Dispenser

1. Ice and cold water are available without opening refrigerator door.
2. The desired ice (crushed or cube) or cold water are dispensed when dispenser press button (rubber button) is pressed after selection of ice or cold water. When ice is selected, duct door opens by electric solenoid when dispenser press switch is pressed. When dispenser press switch is released, duct door closes after it opens for 5 seconds.
3. Ice and water dispensing function stops when freezer door is open.
4. Geared motor and solenoid are automatically off if there is no signal after 3 minutes when ice (crushed and cube) or water is selected and dispenser switch is pressed down. Solenoid (duct door) stops after 5 seconds when solenoid is off. (in order to protect short circuit from solenoid heat generation)
5. Dispenser Lamp On/Off Function. The dispenser lamp shall be on or off whenever dispenser button is pressed or released, respectively after selection of ice (crushed or cube) or water.
6. Water/Crushed Ice/Cube Ice Selection function
 - 1) It is to select water/crushed ice/cube ice by user from the function control part and it will be indicated and selected by pressing button.
 - 2) Crushed ice is automatically selected when power is initially on.
 - 3) When crushed ice is selected and its button is pressed, geared motor operates and crushed ice is dispensed.
 - 4) When cube ice is selected and its button is pressed, geared motor and ice solenoid operate and cube ice is dispensed.
7. Function of Water Dispenser
 - 1) When user selects water in the function control parts, it is indicated in the LED and water is selected.
 - 2) Water dispenser is a direct tap water connection type. The water solenoid valve on the right of machine room opens and water dispenses when user selects water and presses button.

EXPLANATION FOR MICOM CIRCUIT

1. Explanation for PWB circuit

1-1. Power circuit

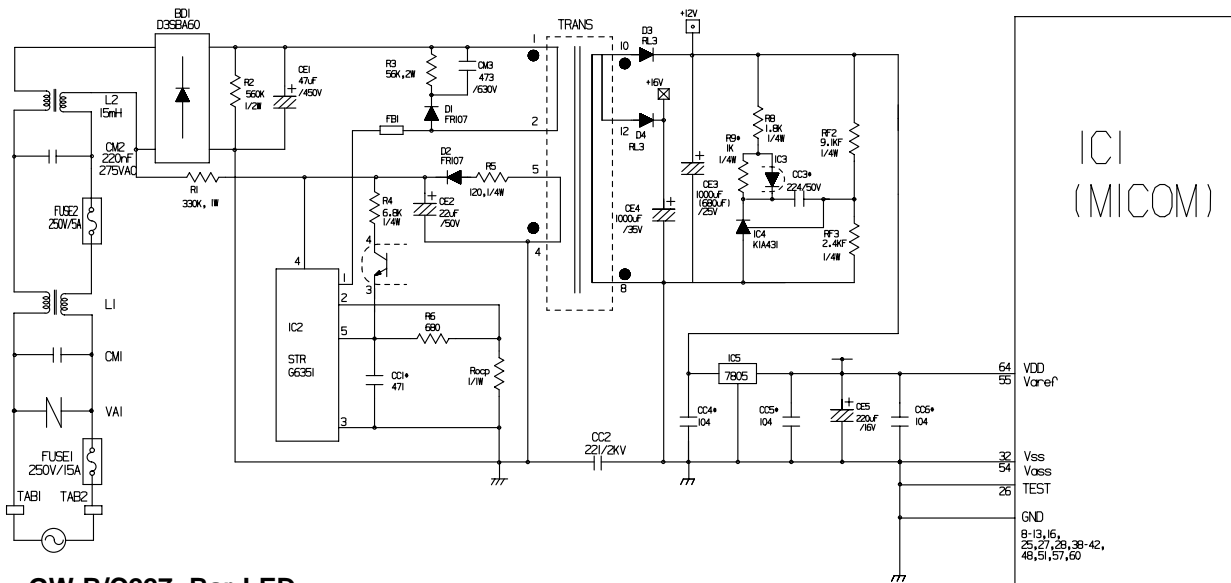
Power circuit consists of SMPS (SWITCHING MODE POWER SUPPLY) power. The SMPS consist of the rectifying part (BD1, CE1) converting AC voltage to DC voltage, the switching part (IC2) switching the converted DC voltage, transformer transferring energy of the primary side of the switching terminal to the secondary side and the feedback part (IC3, IC4) transferring it to the primary side.

Caution : Since high voltage (DC310V) is maintained at the power terminal, please take a measure after more than 3 minutes have passed after removing power cords in the abnormal operation of a circuit.

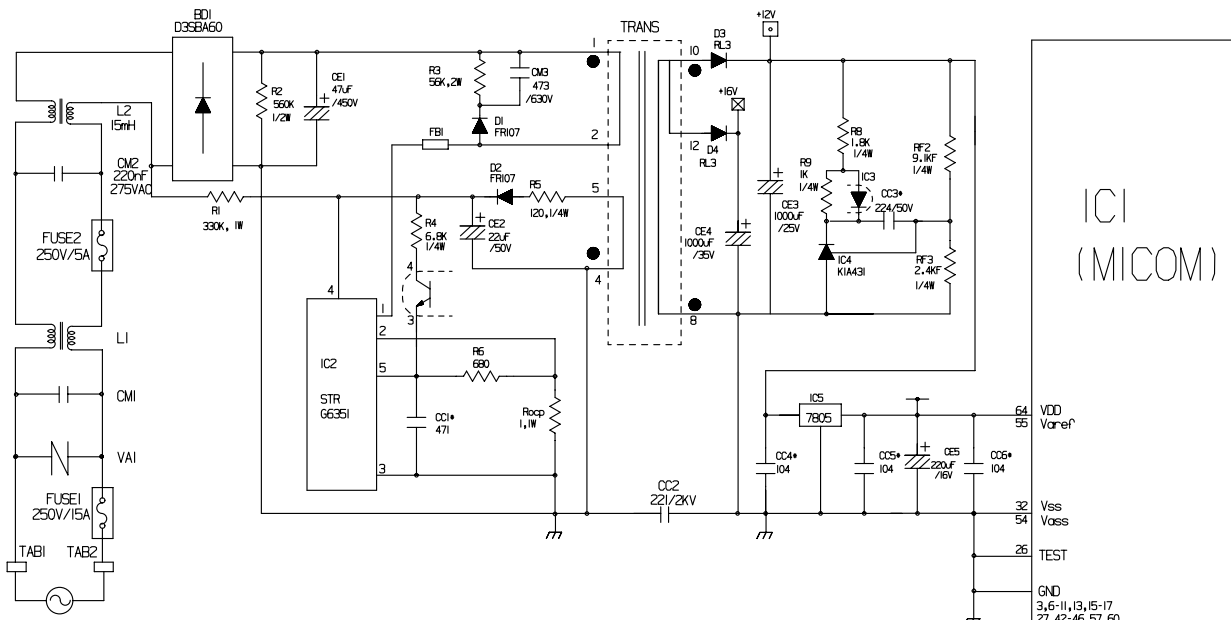
Voltage of every part is as follows:

Part	VA1	CE1	CE2	CE3	CE4	CE5
Voltage	230 Vac	inspection Vdc	13~16 Vdc	12 Vdc	15.5 Vdc	5 Vdc

<GW-B/C227: 88-LED>

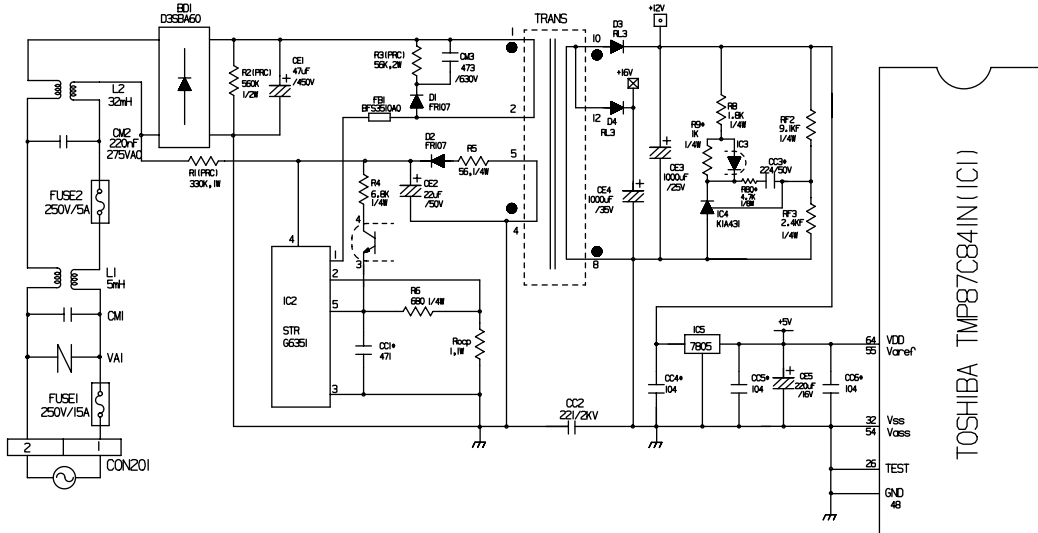


<GW-B/C227: Bar-LED>

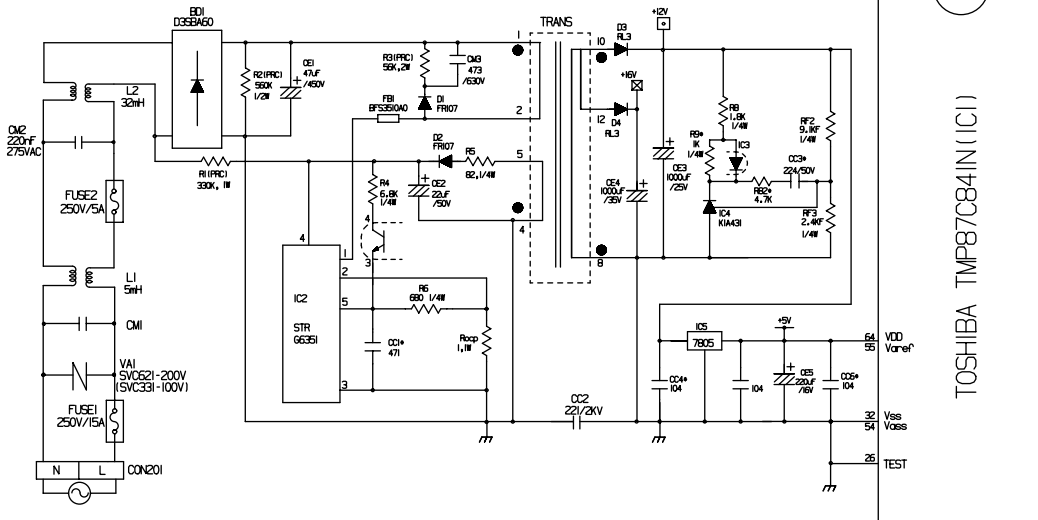


EXPLANATION FOR MICOM CIRCUIT

<GW-P/L227: 88-LED>



<GW-P/L227: Bar-LED>

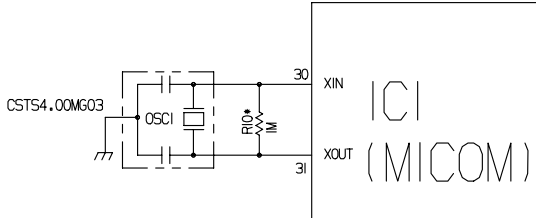


EXPLANATION FOR MICOM CIRCUIT

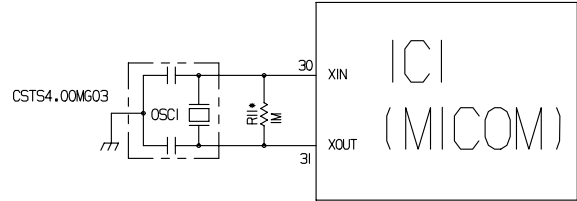
1-2. Oscillation circuit

Oscillation circuit is a circuit with the purpose of generating basic time for clock occurrence for synchronization and time calculation in relation with information transmission/reception of inside elements of IC1 (MICOM). The OSC1 must always use rated parts since if SPEC is changed, time calculated at the IC1 may be changed or no operation is done.

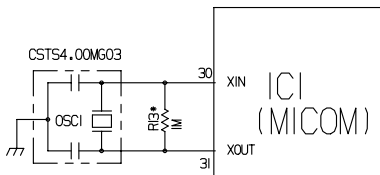
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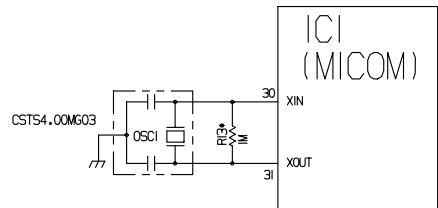
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<GW-P/L227: 88-LED>



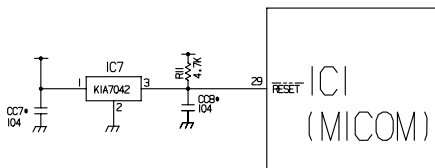
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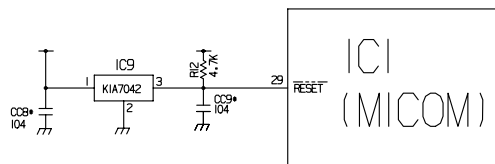
1-3. Reset circuit

The reset circuit is circuit allowing various parts such as RAM inside of MICOM (IC1) to initialize and the whole of function to start from the initial status, when initial power is input or when power is applied again to MICOM by a spontaneous power failure. 'LOW' voltage is applied to the reset terminal of MICOM in the beginning of power supply for a constant time (10ms). Reset terminal during general operation is 5V (No MICOM operates in failure of RESET IC).

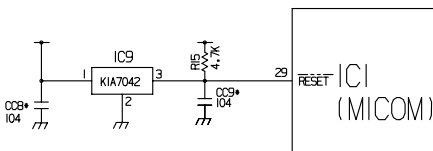
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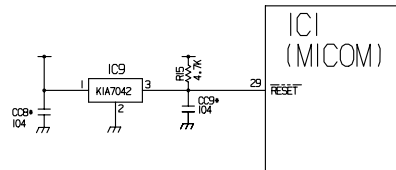
<GW-B/C227: Bar-LED>



<GW-P/L227: 88-LED>



<GW-P/L227: Bar-LED>



EXPLANATION FOR MICOM CIRCUIT

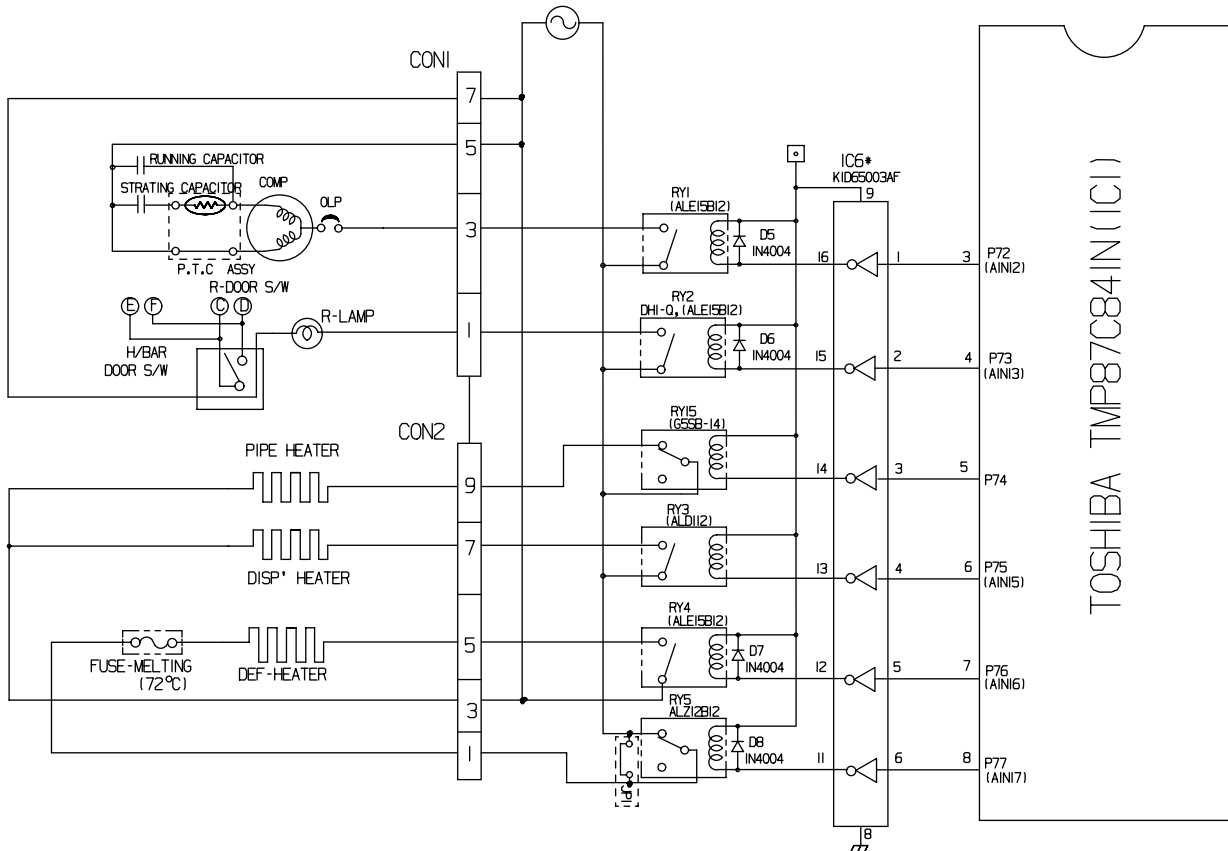
1-4. Load/dispenser operation, buzzer driving, door opening circuit

1. LOAD DRIVING CIRCUIT

- * In Even if opening the door of freezing room or cold storage room during operation of fan motor at the freezing room, this circuit does not stop and operates at the standard RPM. In addition, if doors of freezing room or cold storage room, the fan motor normally operates at the RPM previously operated.
- * (A), (B), (C) and (D) of door switch for the freezing room or cold storage room are connected to the door open sensing circuit in parallel toward both ends of switch to determine door open at MICOM.
- * Since a door switch of the home bar is connected to door switch (C), (D) of the cold storage room, it senses door opening if even one of both is opened.
- * The fan motor is immediately stop if opening doors of the freezing room or cold storage room at the TEST mode and it immediately operates if closing them.

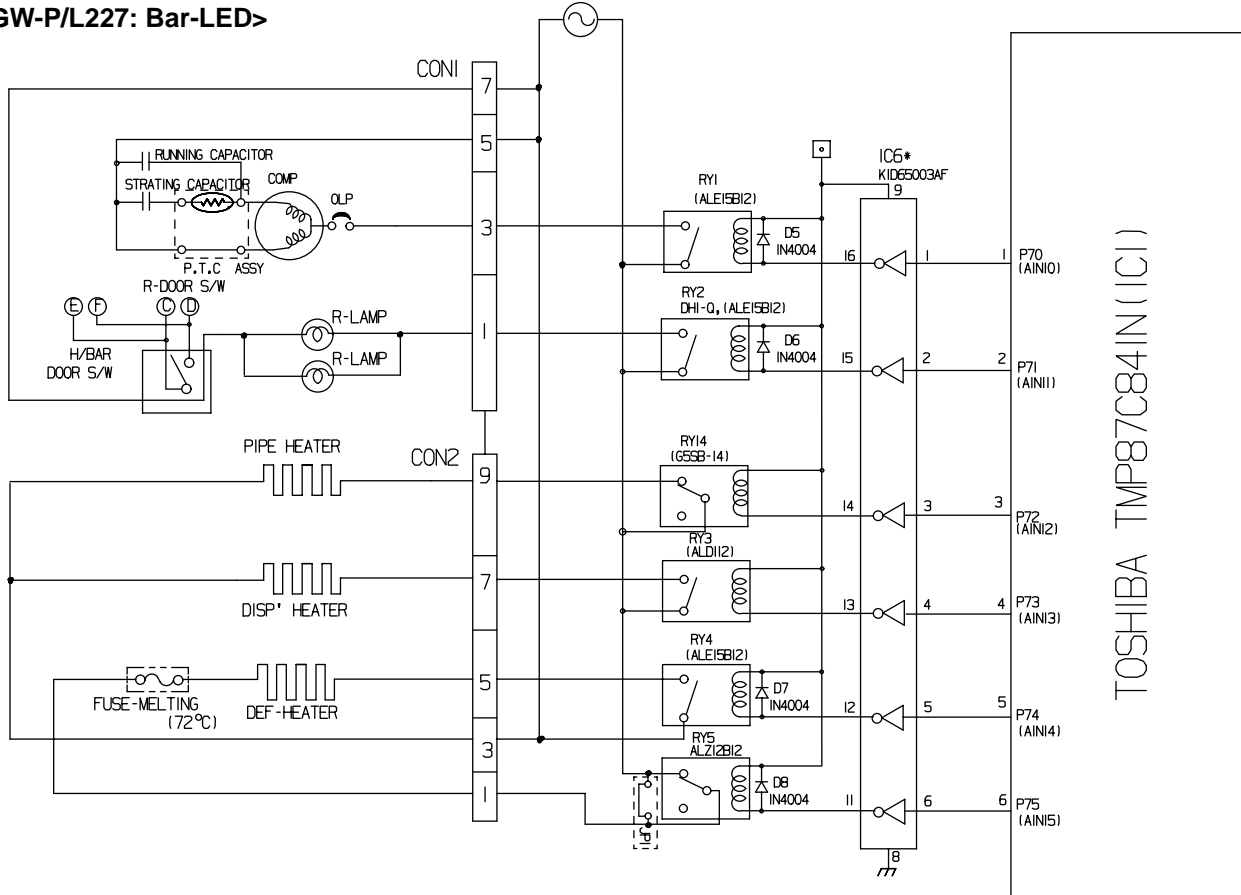
Type of Load	COMP	Frost Removal Heater	AC Converting Relay	R-room LAMP	Dispenser Heater	Pipe Heater
Measuring part (IC6)	No.16	No.12	No.11	No.15	No.13	No.14
Status	ON	Within 1 V				
	OFF	12 V				

<GW-P/L227: 88-LED>



EXPLANATION FOR MICOM CIRCUIT

<GW-P/L227: Bar-LED>

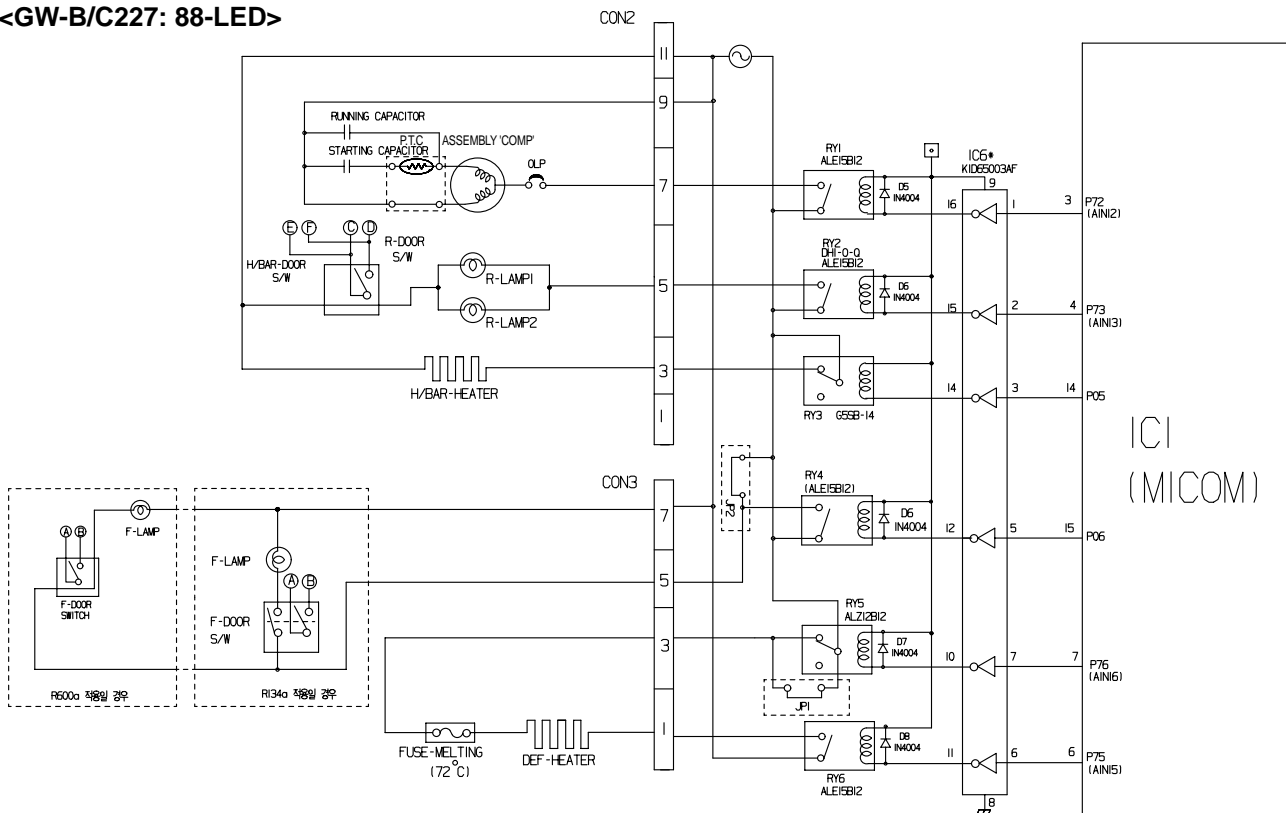


EXPLANATION FOR MICOM CIRCUIT

- * The fan motor at the freezing room does not stop but operates if opening doors of the freezing room or cold storage room or the home bar during operation of the fan motor at the freezing room.
- * (A), (B), (C) and (D) of door switch for the freezing room or cold storage room are connected to the door open sensing circuit toward both ends of switch to determine door open at MICOM.
- * Since a door switch of the home bar is connected to door switch (C), (D) of the cold storage room, it senses door opening if even one of both is opened.

Type of Load	COMP	Frost Removal Heater	AC Converting Relay	R-room LAMP	Homebar Heater
Measuring part (IC6)	No.16	No.11	No.10	No.15	No.14
Status	ON	Within 1 V			
	OFF	12 V			

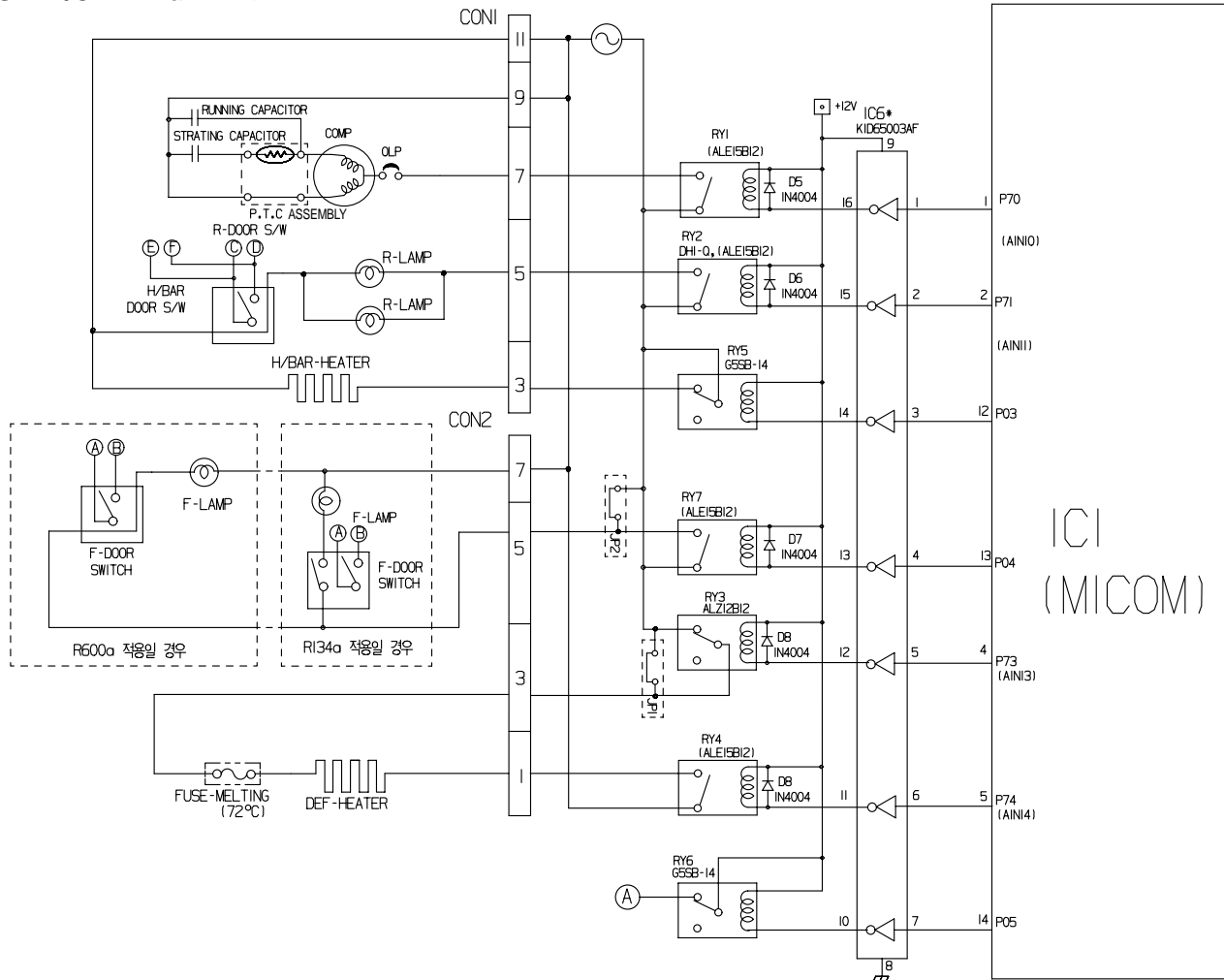
<GW-B/C227: 88-LED>



EXPLANATION FOR MICOM CIRCUIT

Type of Load	COMP	Frost Removal Heater	AC Converting Relay	R-room LAMP	Homebar Heater
Measuring part (IC6)	No.16	No.11	No.12	No.15	No.14
Status	ON	Within 1 V			
	OFF	12 V			

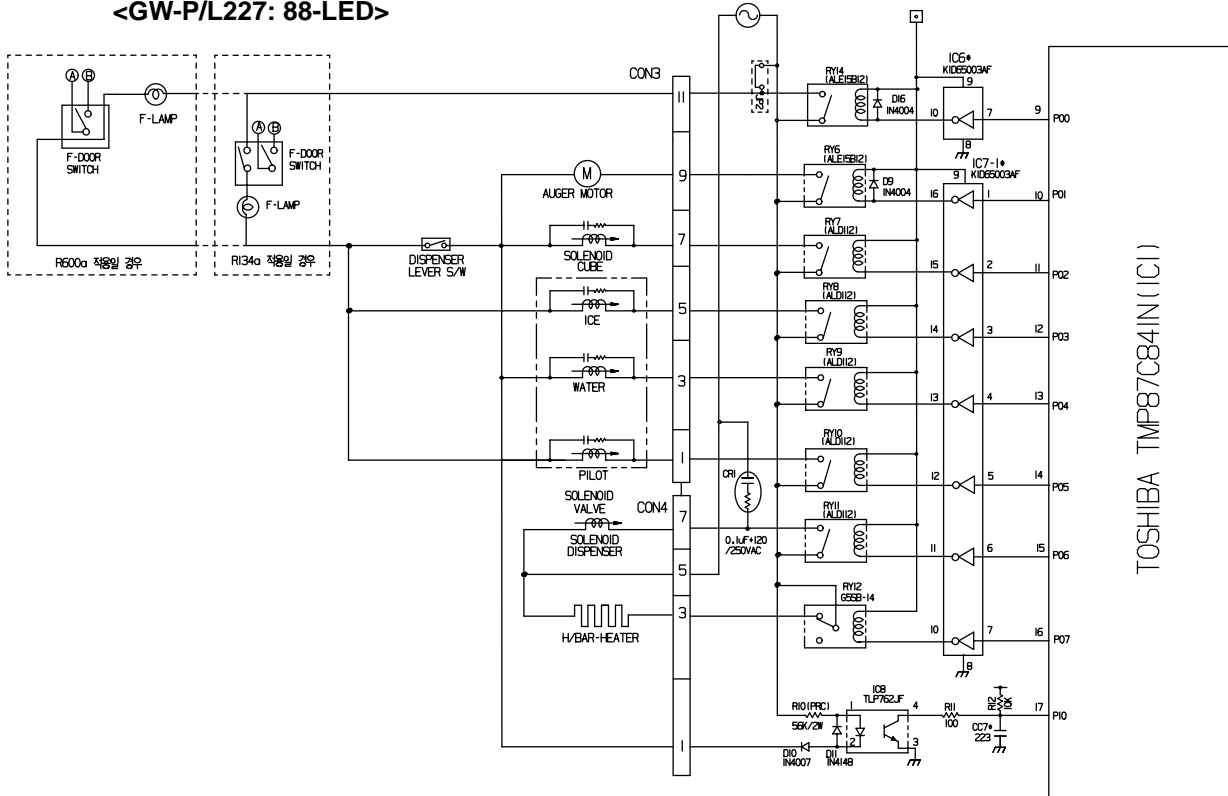
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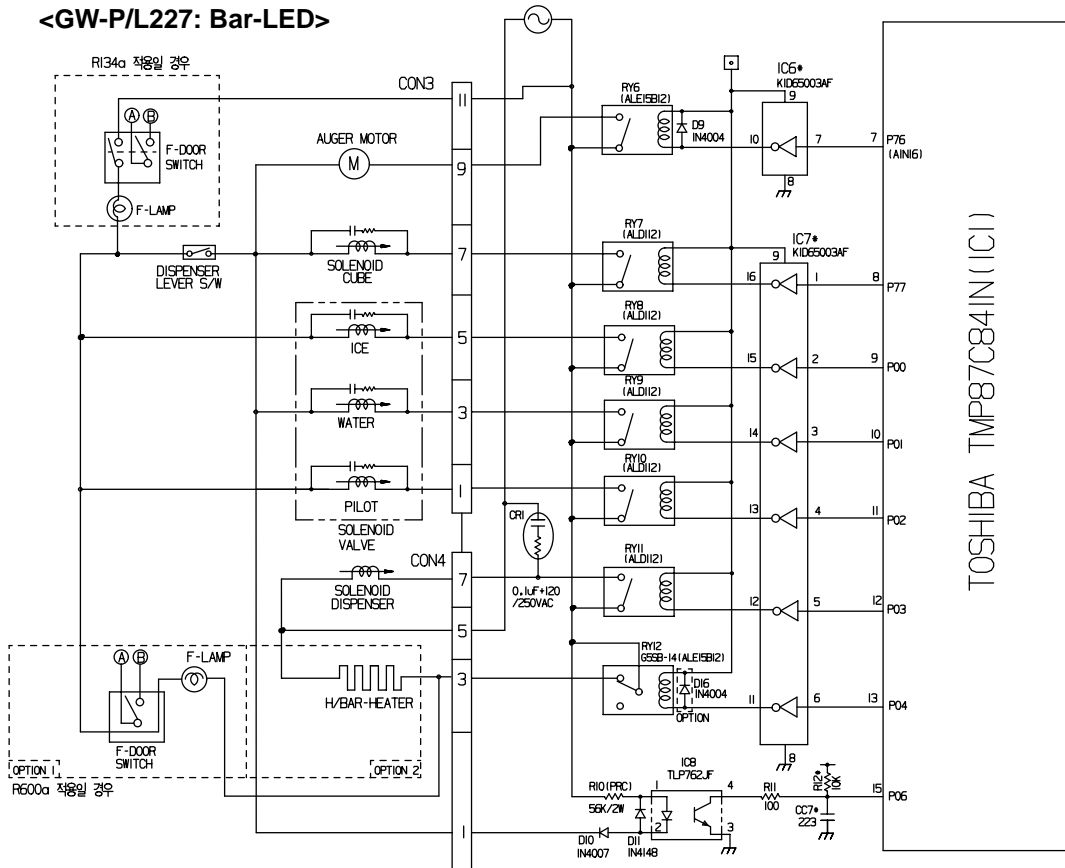
EXPLANATION FOR MICOM CIRCUIT

2. Dispenser operation circuit

<GW-P/L227: 88-LED>



<GW-P/L227: Bar-LED>



EXPLANATION FOR MICOM CIRCUIT

1) Check load driving status

Type of Load	GEARED MOTOR	SOLENOID CUBE	WATER VALVE		PILOT VALVE	SOLENOID DISPENSER	HOME BAR HEATER
			ICE	WATER			
Measuring part	IC7-No.16	IC7-No.15	IC7-No.14	IC7-No.13	IC7-No.12	IC7-No.11	IC7-No.10
Status	ON	Within 1 V					
	OFF	12 V					

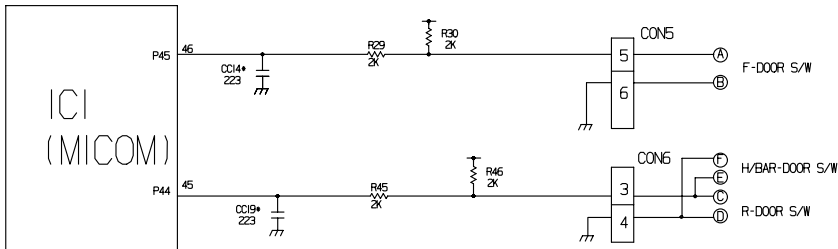
2) Lever S/W sensing circuit

Measuring part Lever S/W	IC1(Micom) No.15 (16)	
On(Press)	<p>5 V 0 V (60 Hz)</p>	
OFF	5V	

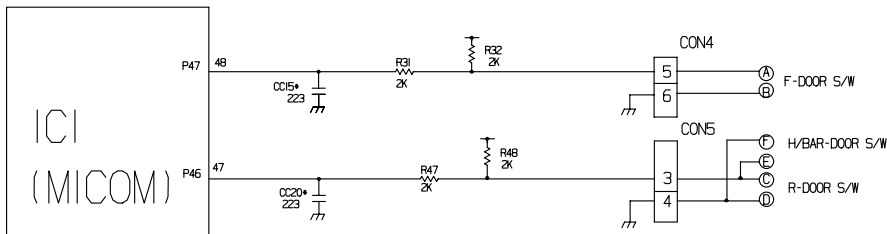
EXPLANATION FOR MICOM CIRCUIT

3. Door opening sensing circuit

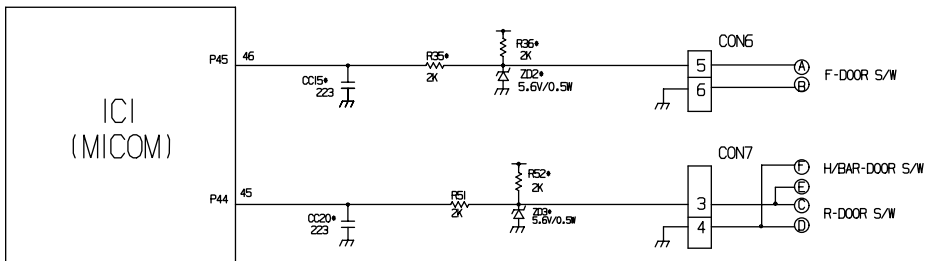
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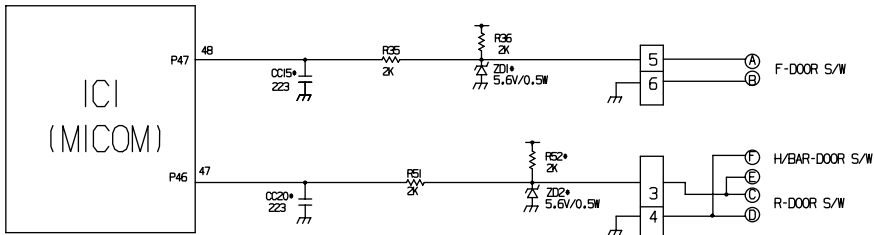
<GW-B/C227: Bar-LED>



<GW-P/L227: 88-LED>



<GW-P/L227: Bar-LED>



EXPLATION FOR MICOM CIRCUIT

CONDITIONS MEASURING POINTS	Bell sounds when button on display is pressed.	Beep sounds when warning door opening.	OFF
IC1 (No. 48 Pin)			5 V
IC1 (No. 51 Pin)			0 V

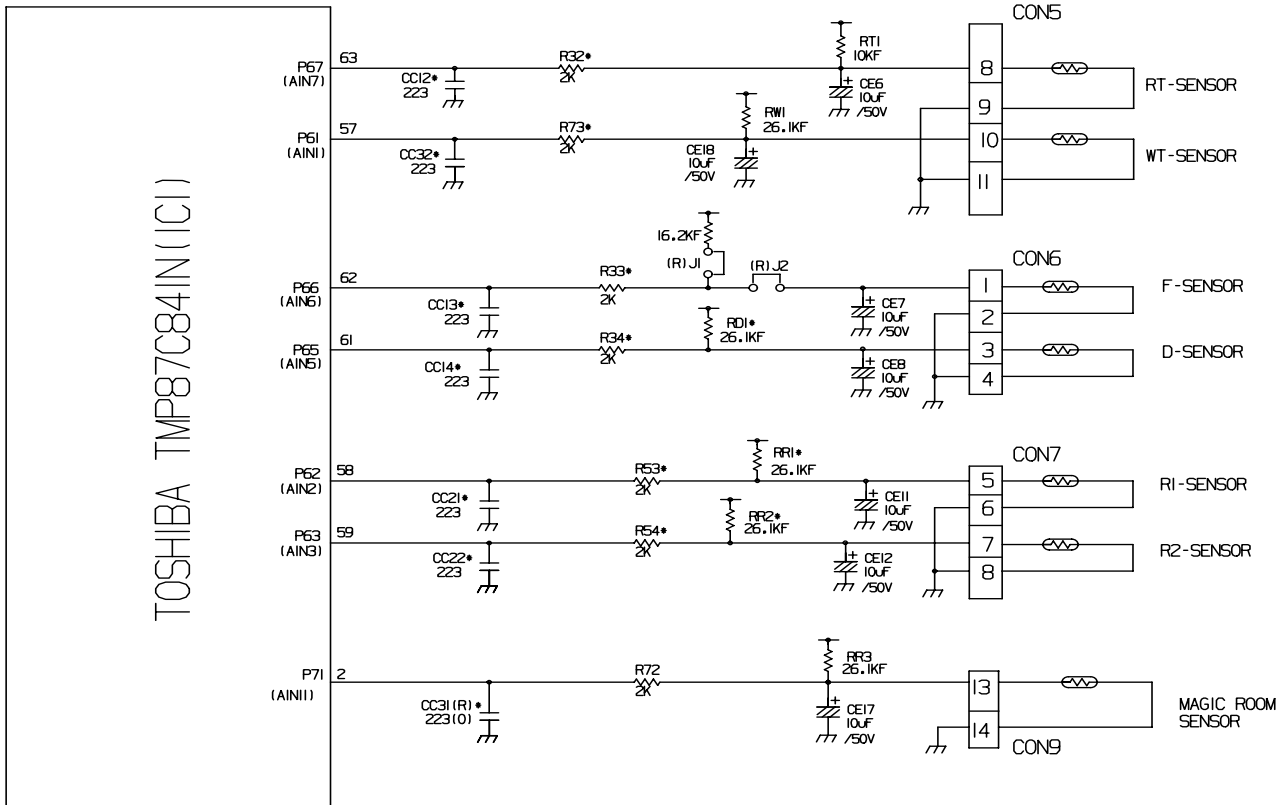
Measuring part	IC1 (MICOM) No. 47, 46 Pin
Door of Freezing/Cold Storage Room	
Closing	5 V (A) - (B), (C) - (D), (E) - (F). S/W at both ends are at Off status)
Opening	5 V (A) - (B), (C) - (D), (E) - (F). S/W at both ends are at On status)

- * Since door switch sensing switch (A), (B) are a separate switch even if the door switch of the freezing room normally operates, they may fail to sense door opening in the failure of switch at both ends of (A) and (B) or in failure of the L/wire.
- * Lamp does at the cold storage room not turn on if the door switch of the cold storage room fails to sense the door open switch (c), (d) or the home bar switch.

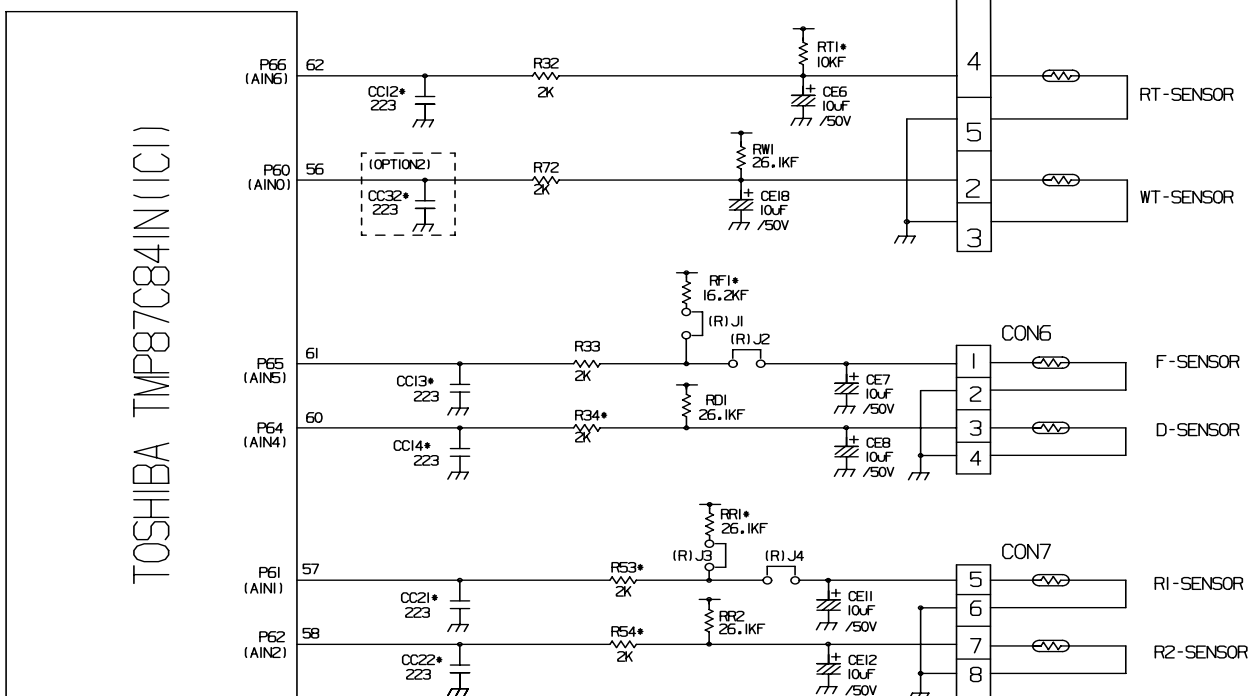
EXPLANATION FOR MICOM CIRCUIT

1-5. Temperature sensing circuit

<GW-P/L227: 88-LED>



<GW-P/L227: Bar-LED>



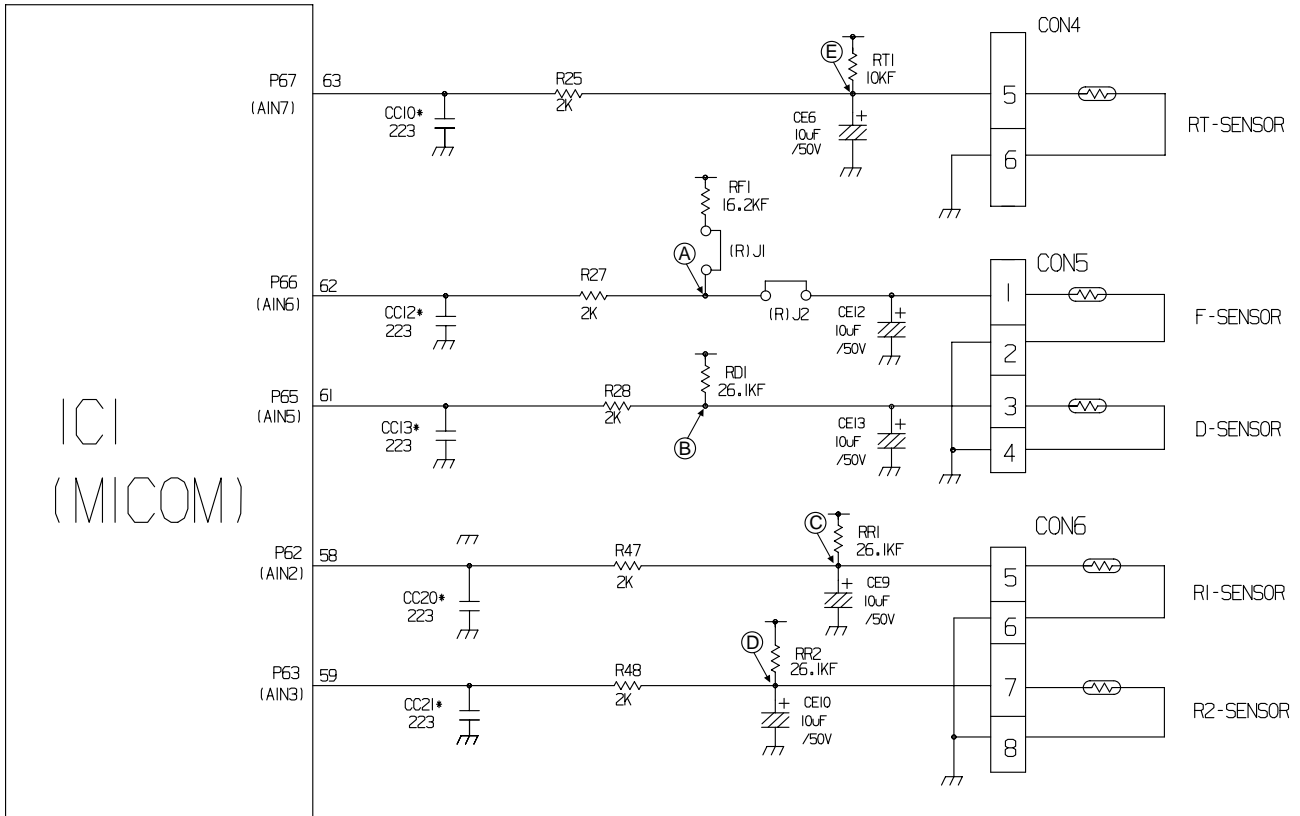
EXPLANATION FOR MICOM CIRCUIT

The above circuits are circuits attached to freezing room sensor or cold storage room sensor for adjusting setting temperature at the freezing room and cold storage room, ice-making sensor for sensing water temperature in ice-making, or an evaporator for sensing temperature of a frost removal sensor necessary for frost removal. Short or open status of every temperature sensor is as follows:

SENSOR	CHECK POINT	NORMAL(-30 °C ~ 50 °C)	IN SHORT	IN OPEN
Freezing sensor	POINT (A) Voltage	0.5 V~4.5 V	0 V	5 V
Frost removal sensor	POINT (B) Voltage			
Cold storage sensor 1	POINT (C) Voltage			
Cold storage sensor 2	POINT (D) Voltage			
Ice making sensor	POINT (E) Voltage			
Room temperature sensor	POINT (F) Voltage			

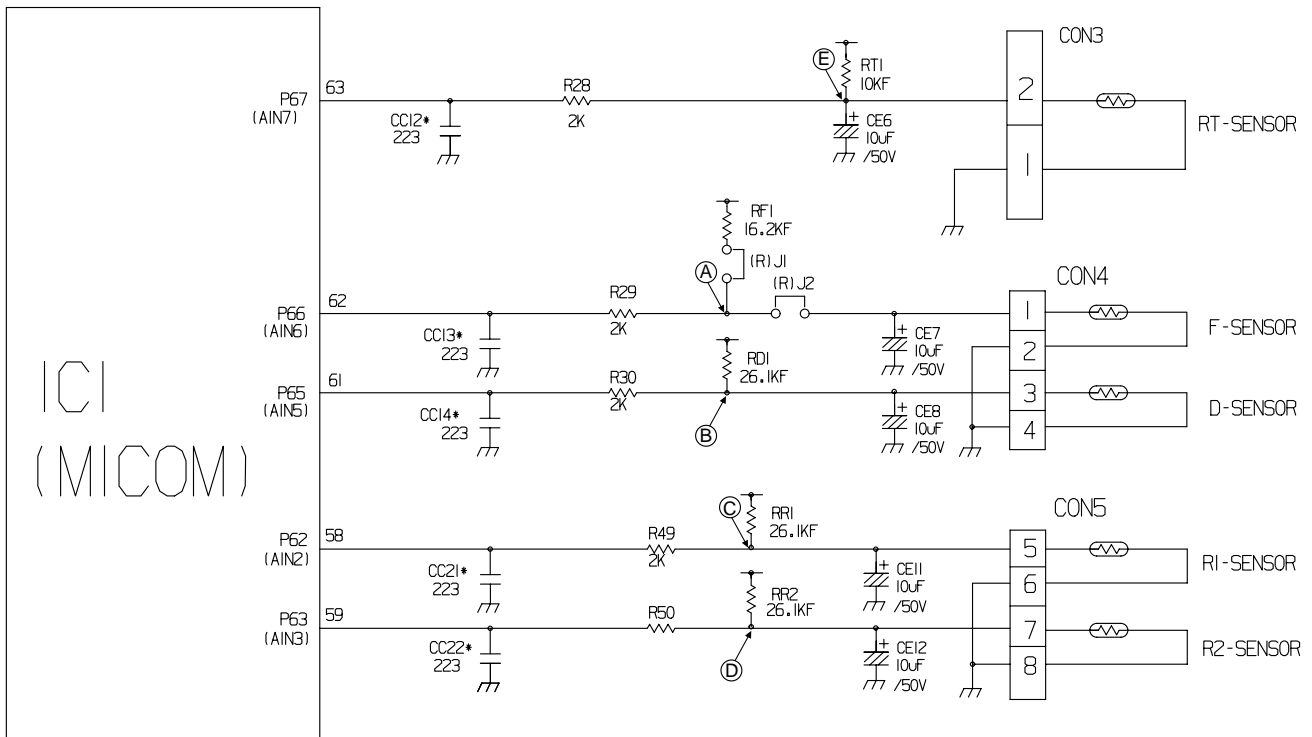
EXPLANATION FOR MICOM CIRCUIT

<GW-B/C227: 88-LED>



EXPLANATION FOR MICOM CIRCUIT

<GW-B/C227: Bar-LED>



The above circuits are circuits attached to freezing room sensor or cold storage room sensor for adjusting setting temperature at the freezing room and cold storage room, ice-making sensor for sensing water temperature in ice-making, or an evaporator for sensing temperature of a frost removal sensor necessary for frost removal. Short or open status of every temperature sensor is as follows:

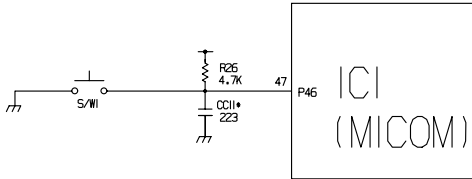
SENSOR	CHECK POINT	NORMAL(-30 °C ~ 50 °C)	IN SHORT	IN OPEN
Freezing sensor	POINT (A) Voltage	0.5 V~4.5 V	0 V	5 V
Frost removal sensor	POINT (B) Voltage			
Cold storage sensor 1	POINT (C) Voltage			
Cold storage sensor 2	POINT (D) Voltage			
Room temperature sensor	POINT (E) Voltage			

EXPLANATION FOR MICOM CIRCUIT

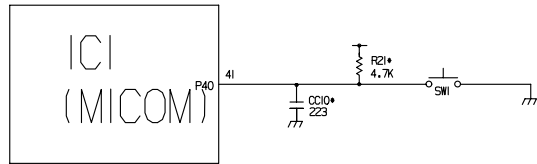
1-6. Switch entry circuit

The following circuits are entry circuits for sensing signal form test S/W, electronic single motor damper reed S/W for examining refrigerator.

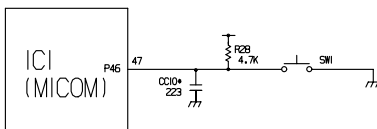
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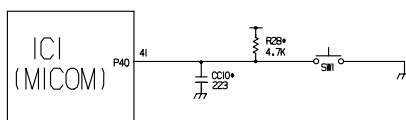
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<GW-P/L227: 88-LED>

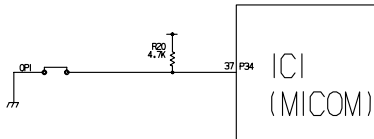


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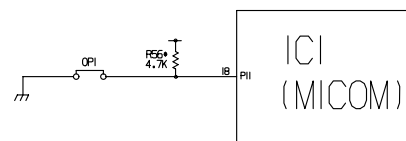


1-7. Option designation circuit (model separation function)

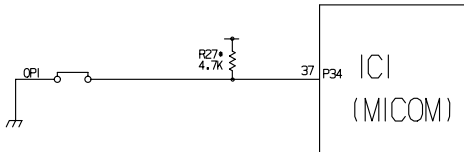
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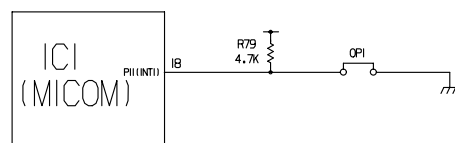
<GW-B/C227: Bar-LED>



<GW-P/L227: 88-LED>



<GW-P/L227: Bar-LED>



The above circuits are used for designating separation by model as option and notifying it to MICOM. Designation of option by model and the application standards are as follows:

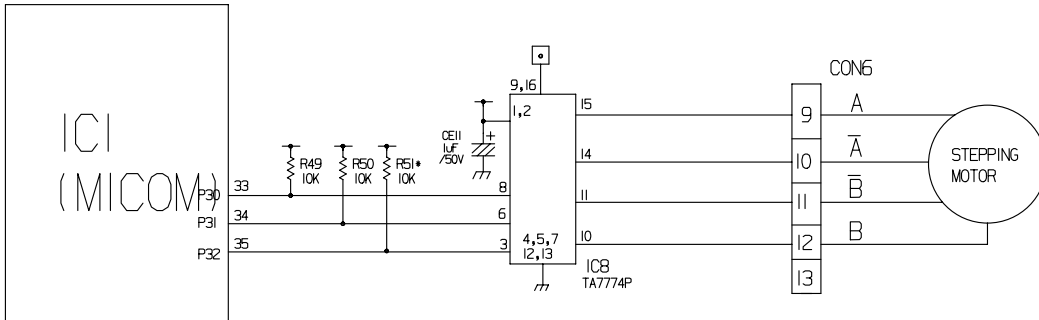
- ▶ These circuits are accurately pre-adjusted in shipment from factory and so you must not additionally add or remove option.

Separation	Connection Status	Application Standard
OP1	Connection	Export model
	OUT	Domestic model

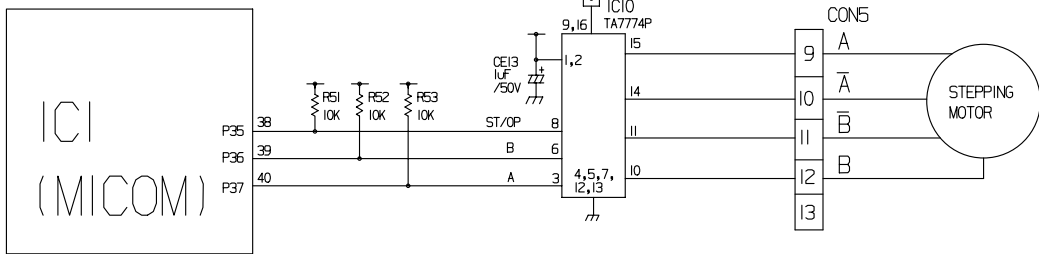
EXPLANATION FOR MICOM CIRCUIT

1-8. Stepping motor operation circuit

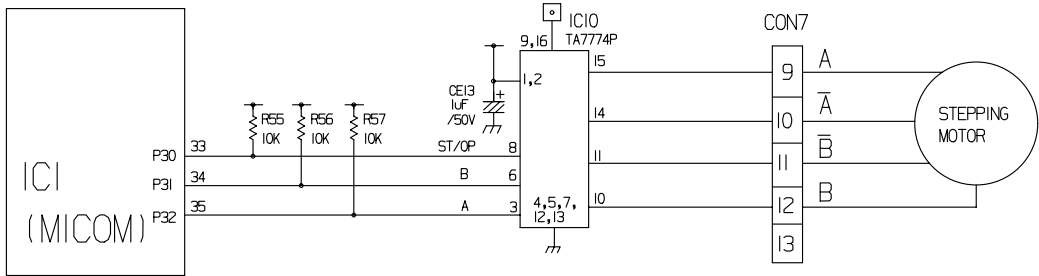
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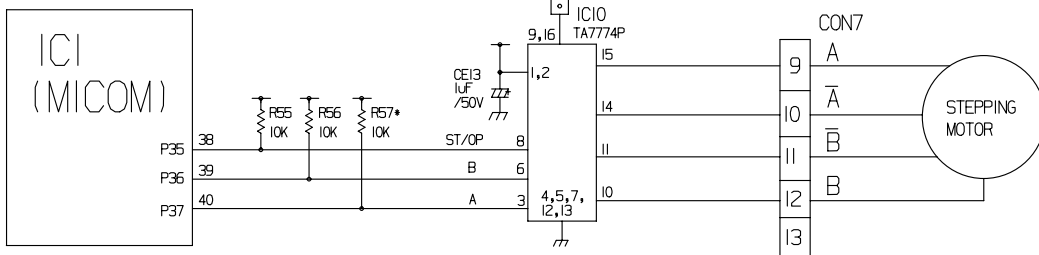
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<GW-P/L227: 88-LED>



<GW-P/L227: Bar-LED>



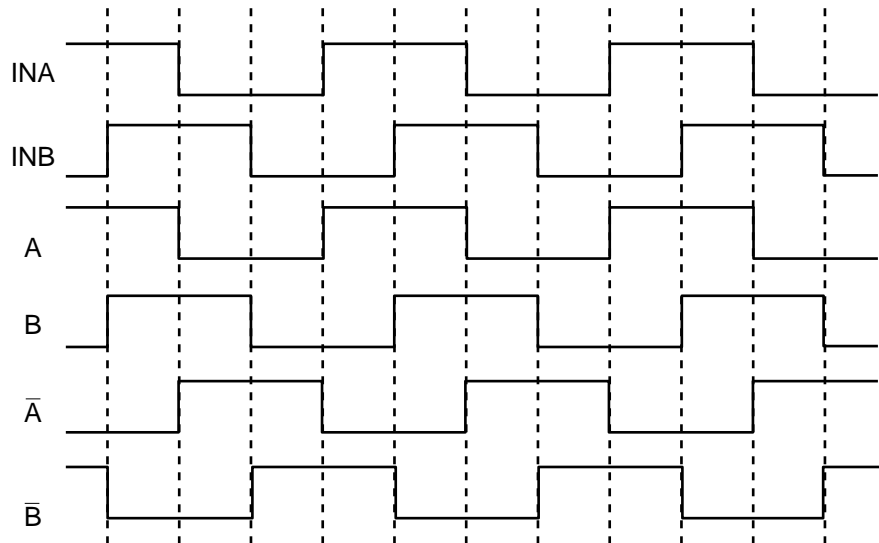
EXPLANATION FOR MICOM CIRCUIT

For motor driving method, rotation magnetism is formed at coils wound on each phase of motor and stator and so motor becomes to rotate if applying "High" signal to the IC8 (TA7774F) at the MICOM PIN 33 and outputting "High", "Low" signal by step numbers fixed through MICOM PIN 34 and 35,.

Explanation) For driving method of the stepping motor, send signals in the cycle of 3.33 mSEC using terminal of MICOM PIN 33, 34 and 35 as shown in wave form of the following part.

These signals are output to the output terminal (No.10, 11, 14, 15) via the input terminal (No. 3, 6, 8) of the IC10 (TA7774F) as IC for motor driving. Output signals allow motor coils wound on each phase of stator to form rotation magnetic field and the motor to rotate. Inputting as below figure to the input terminal (INA, INB) as IC (TA7774AF) for motor driving allows motor coils wound on each phase of stator to form rotation magnetic field and the stepping motor damper to rotate

CCW (Reverse rotation) ← ————— ————— → (Positive rotation) CW



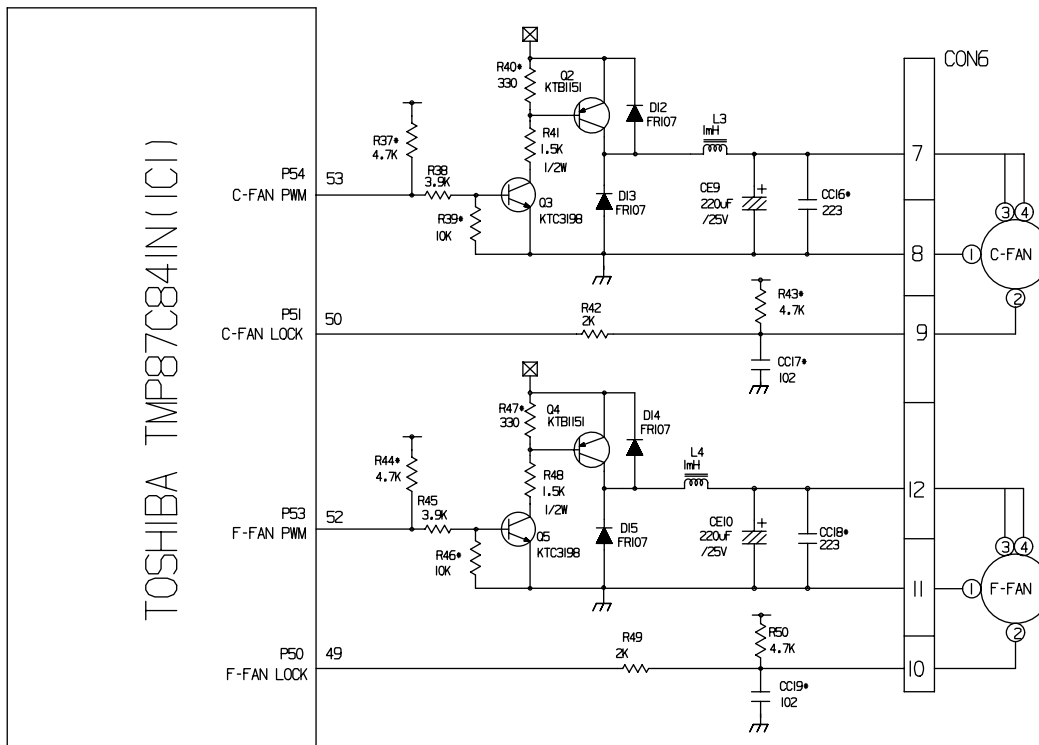
EXPLANATION FOR MICOM CIRCUIT

1-9. Fan motor driving circuit (freezing room, M/C room)

1. This circuit performs function to make standby power '0' by cutting off power supplied to ICs inside of 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 performs function not to drive the fan motor further by cutting off power applied to the fan motor in the lock of fan motor by sensing the operation RPM of the fan motor.

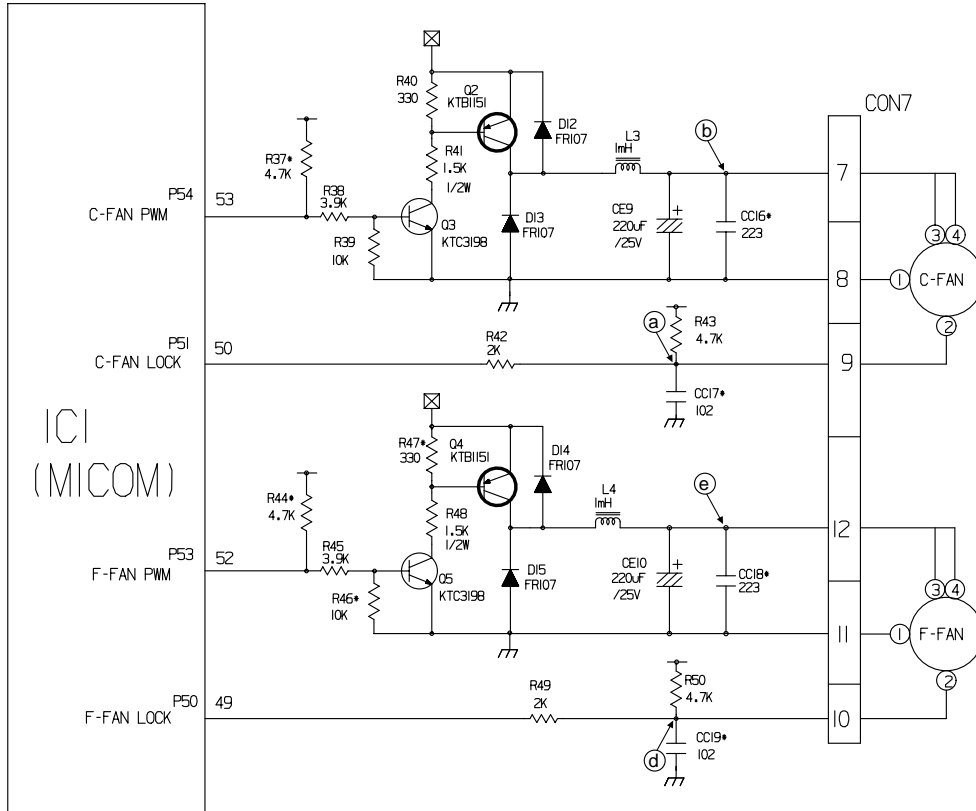
	Ⓐ, Ⓓ part	Ⓑ part	Ⓔ part
Motor OFF	5V	2V or less	2V or less
Motor ON	2 ~ 3V	12 ~ 14V	8 ~ 16V

<GW-P/L227: 88-LED>



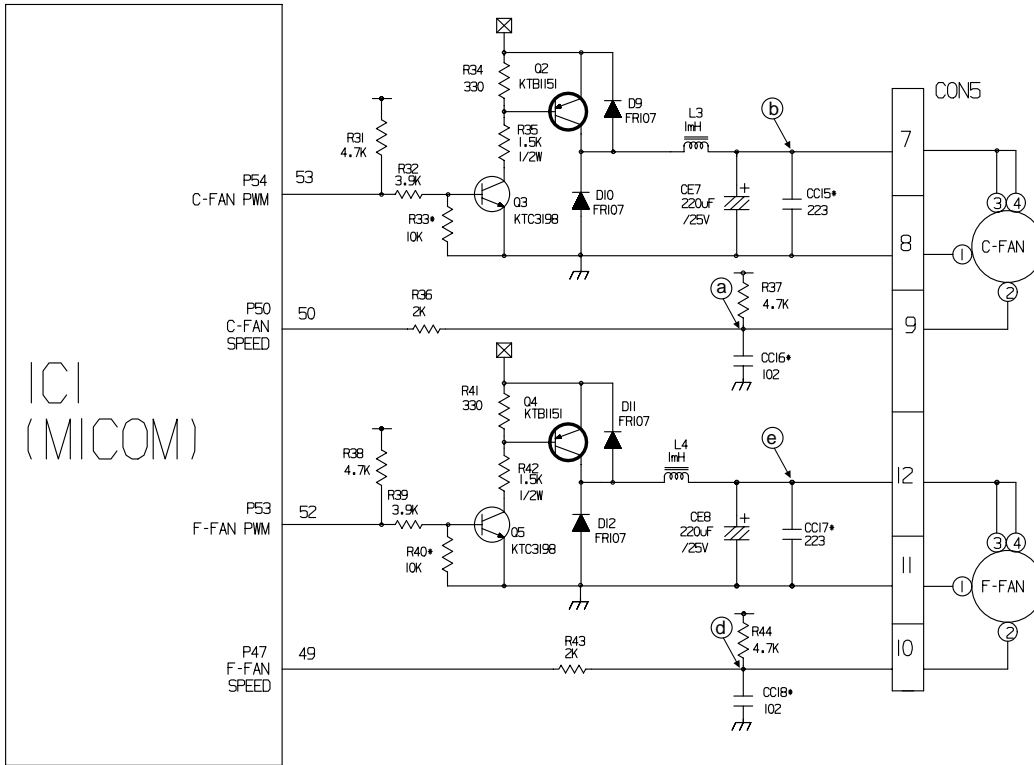
EXPLANATION FOR MICOM CIRCUIT

<GW-P/L227: Bar-LED>

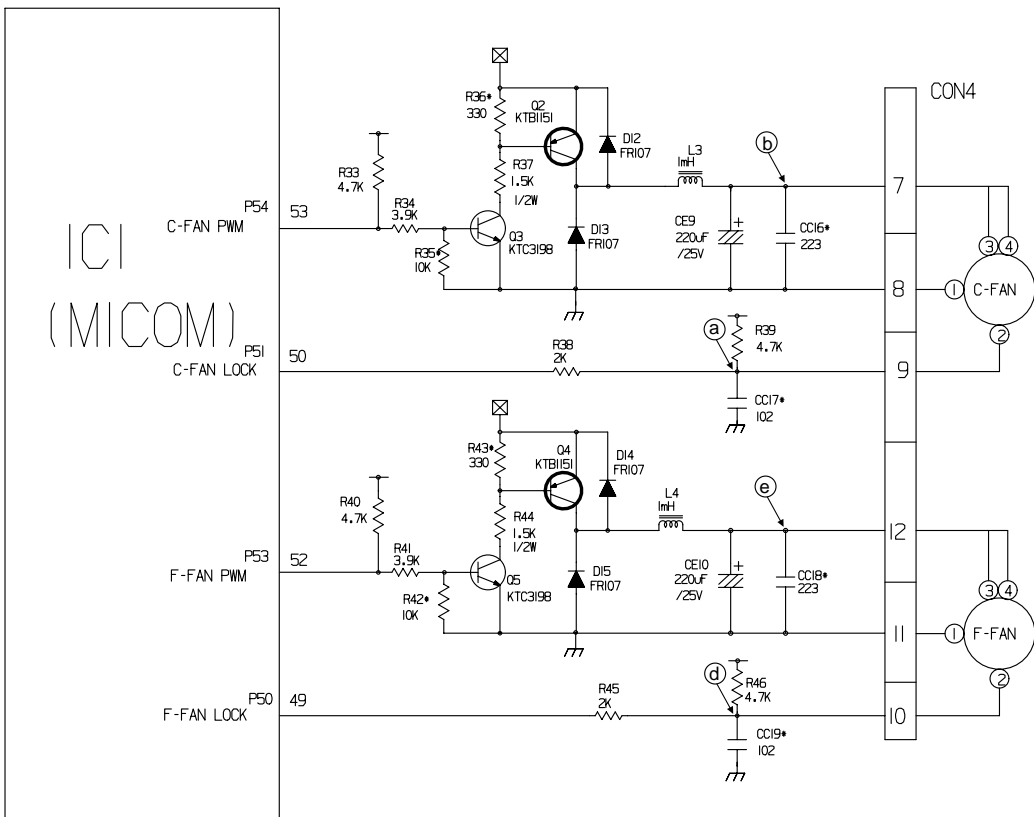


EXPLANATION FOR MICOM CIRCUIT

<GW-B/C227: 88-LED>



<GW-B/C227: Bar-LED>

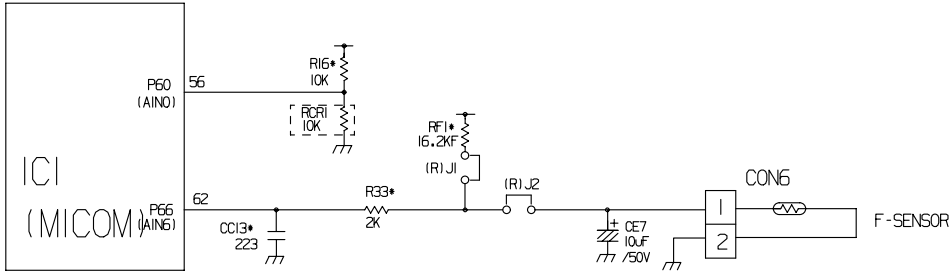


EXPLANATION FOR MICOM CIRCUIT

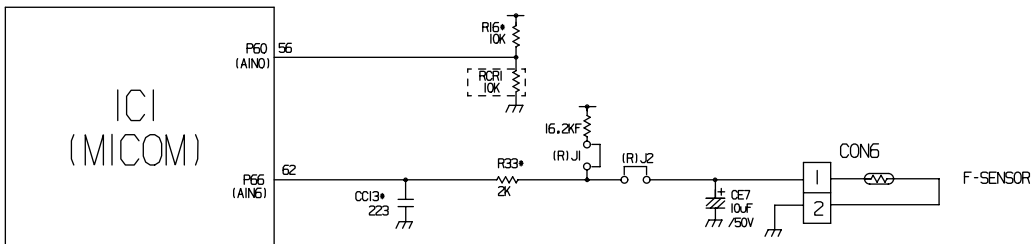
1-10. Temperature compensation and over-cool/weak-cool compensation circuit

1. Temperature compensation at freezing room, cold storage room

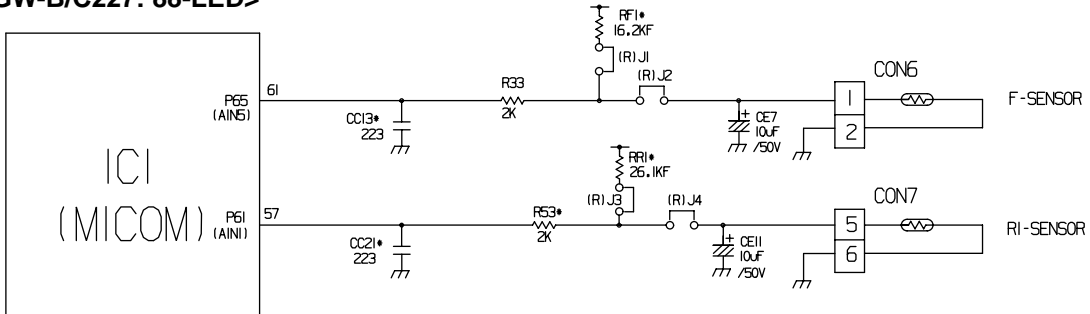
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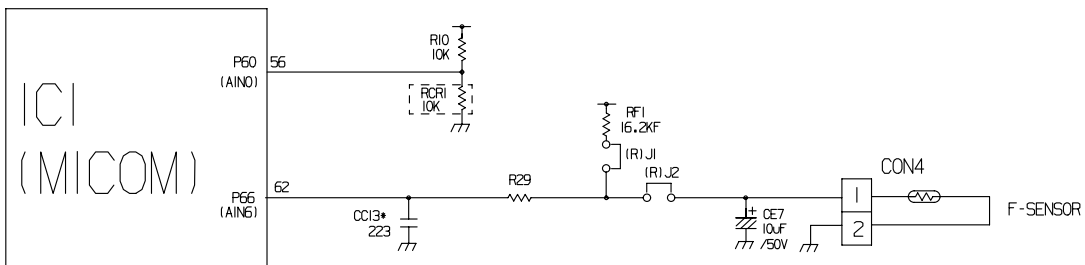
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













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
EXPLANATION FOR MICOM CIRCUIT


 : JUMP WIRE

Freezing room			Cold storage room		Remarks
Resistance value		Temperature compensation	Resistance value (RCR1)	Temperature compensation	
(R)J1	(R)J2				
	6.2 kΩ	+5 °C	180 kΩ	+2.5 °C	Warmly compensate ↑
	5.1 kΩ	+4 °C	56 kΩ	+2.0 °C	
	3 kΩ	+3 °C	33 kΩ	+1.5 °C	
	2.4 kΩ	+2 °C	18 kΩ	+1.0 °C	
	1.2 kΩ	+1 °C	12 kΩ	+0.5 °C	
		0 °C	10 kΩ	0 °C	Reference temperature
1 kΩ		-1 °C	8.2 kΩ	-0.5 °C	↓ Coolly compensate
1.8 kΩ		-2 °C	5.6 kΩ	-1.0 °C	
2.7 kΩ		-3 °C	3.3 kΩ	-1.5 °C	
3.9 kΩ		-4 °C	2 kΩ	-2.0 °C	
5.1 kΩ		-5 °C	470 Ω	-2.5 °C	

► Temperature compensation table by adjustment value (difference value against current temperature)

Ex) If changing compensation resistance at a cold storage room (RCR1) from 10 kΩ (current resistance) to 18 kΩ (modified resistance), temperature at the cold storage will increase by +1°C.

Ex) Now (R)J1= , (R)J2=1.2kΩ, RCR1=5.6kΩ → want to compensate -2°C for Freezing room temperature and +2°C for Cold storage room temperature

(R)J1 = 12kΩ → 1kΩ
 (R)J2 = 12kΩ → 
 RCR1 = 5.6kΩ → 18kΩ

EXPLATION FOR MICOM CIRCUIT

► Temperature compensation table at the cold storage room is as follows:

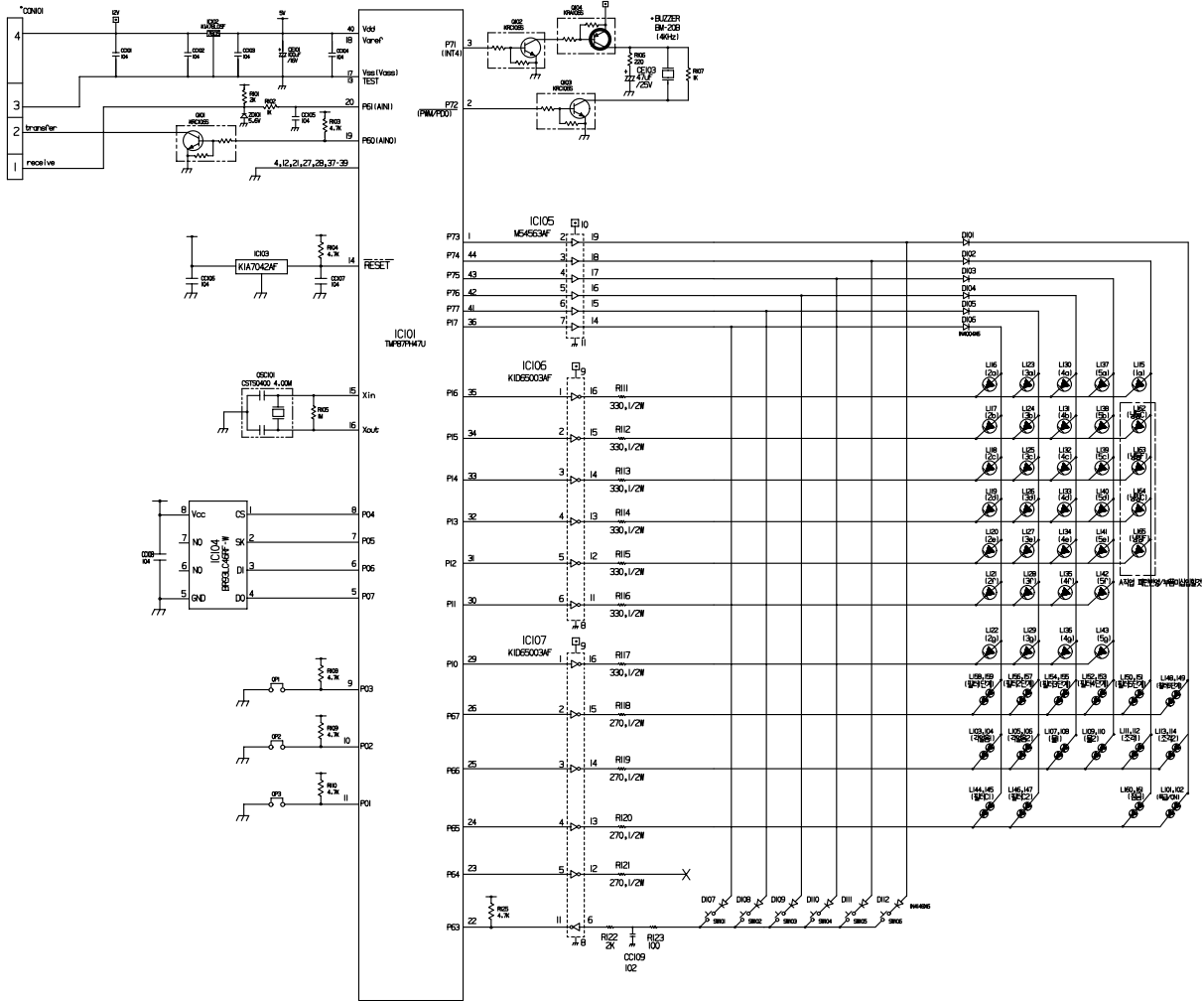
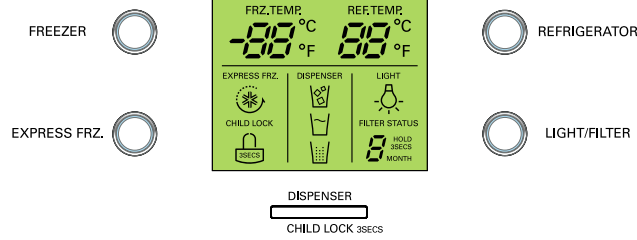
	Modification resistance	470 Ω	2 kΩ	3.3 kΩ	5.6 kΩ	8.2 kΩ	10 kΩ	12 kΩ	18 kΩ	33 kΩ	56 kΩ	180 kΩ
	Current resistance											
Cold storage room (RCR1)	470Ω	No change	0.5 °C Up	1 °C Up	1.5 °C Up	2 °C Up	2.5 °C Up	3 °C Up	3.5 °C Up	4 °C Up	4.5 °C Up	5 °C Up
	2 kΩ	0.5 °C Down	No change	0.5 °C Up	1 °C Up	1.5 °C Up	2 °C Up	2.5 °C Up	3 °C Up	3.5 °C Up	4 °C Up	4.5 °C Up
	3.3 kΩ	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
	5.6 kΩ	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
	8.2 kΩ	2 °C Down	1.5 °C Down	1 °C Down	0.5 °C Drop	No change	0.5 °C Up	1 °C Up	1.5 °C Up	2 °C Up	2.5 °C Up	3 °C Up
	10 kΩ	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
	12 kΩ	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
	18 kΩ	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
	33 kΩ	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
	56 kΩ	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
	180 kΩ	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

► This circuit is a circuit to enter the necessary level of temperature compensation for adjusting different temperature every model at the cold storage room into MICOM.

EXPLANATION FOR MICOM CIRCUIT

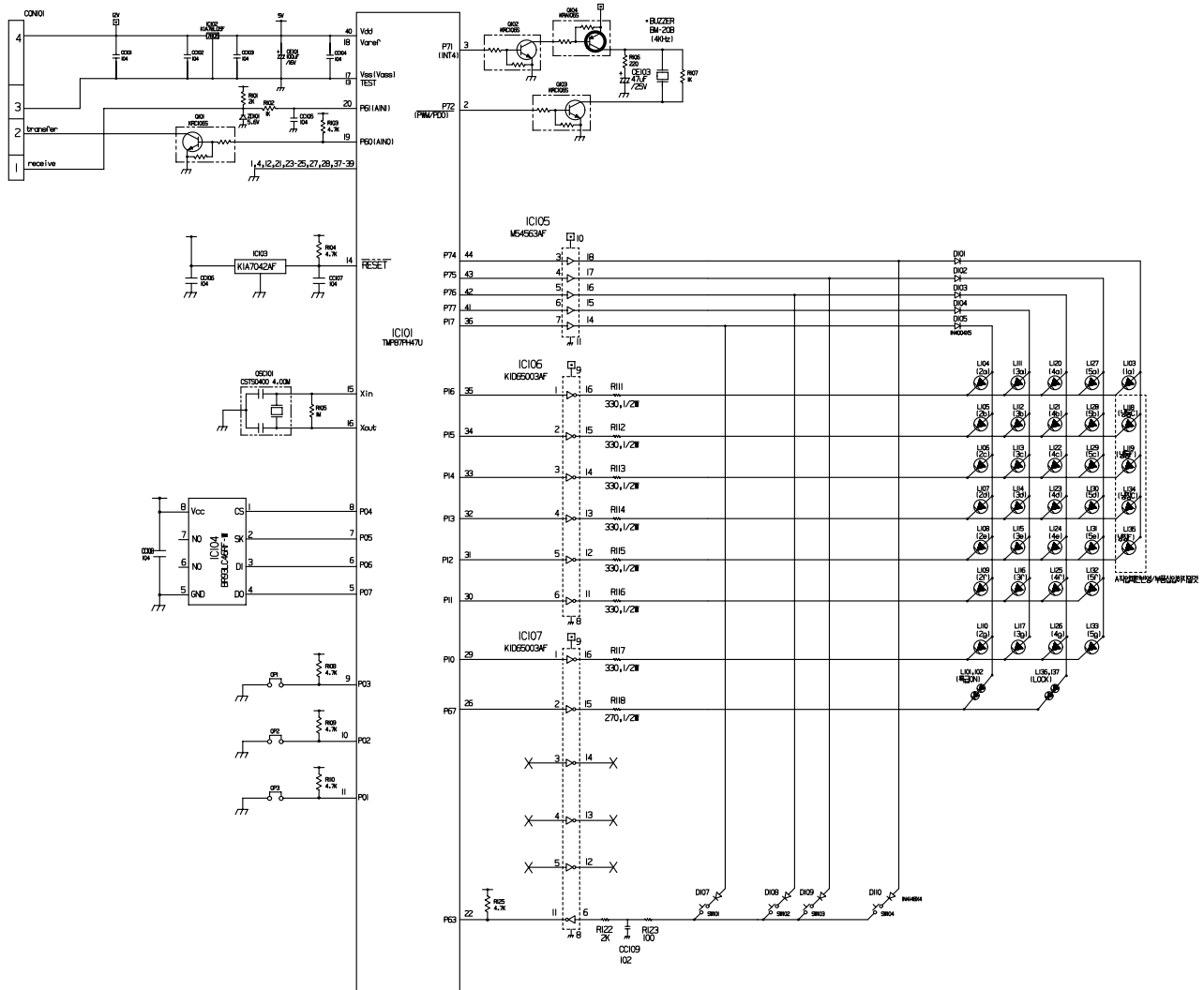
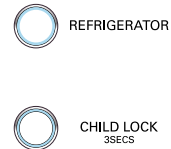
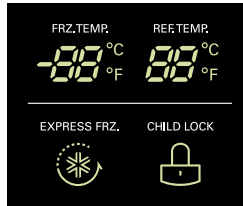
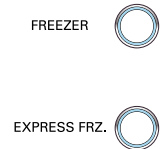
1-11. Display Circuit

<GW-P/L227>



EXPLANATION FOR MICOM CIRCUIT

<GW-B/C227>

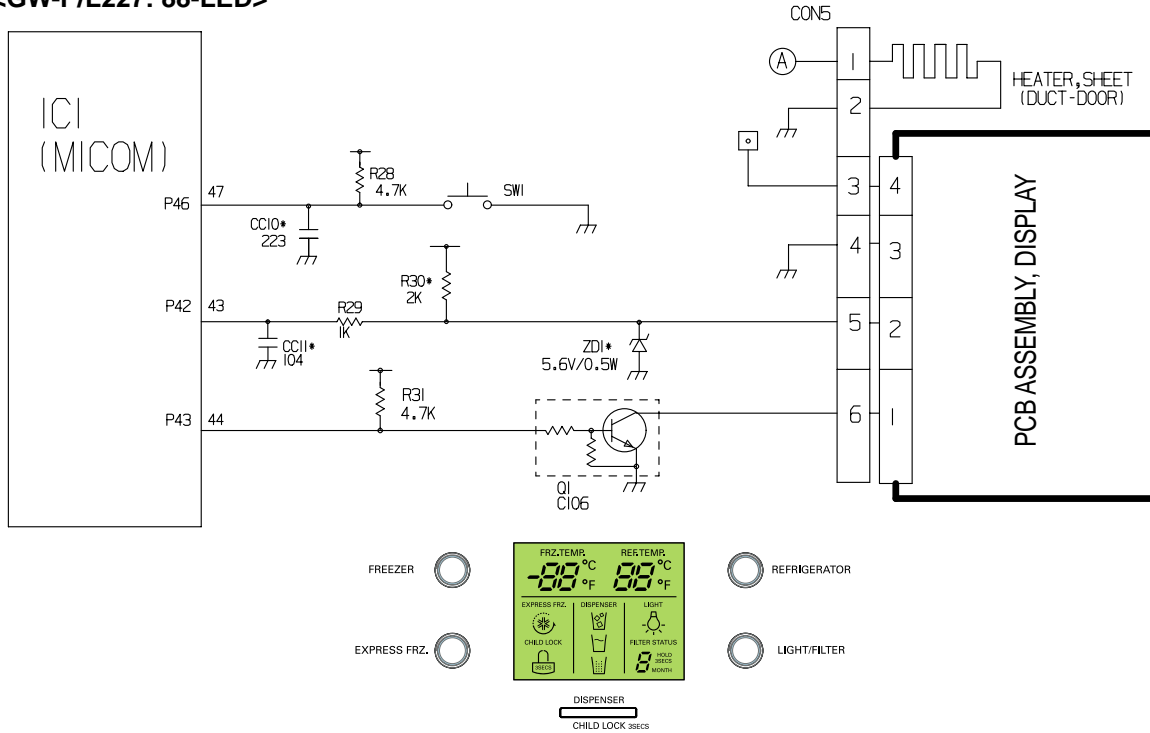


EXPLANATION FOR MICOM CIRCUIT

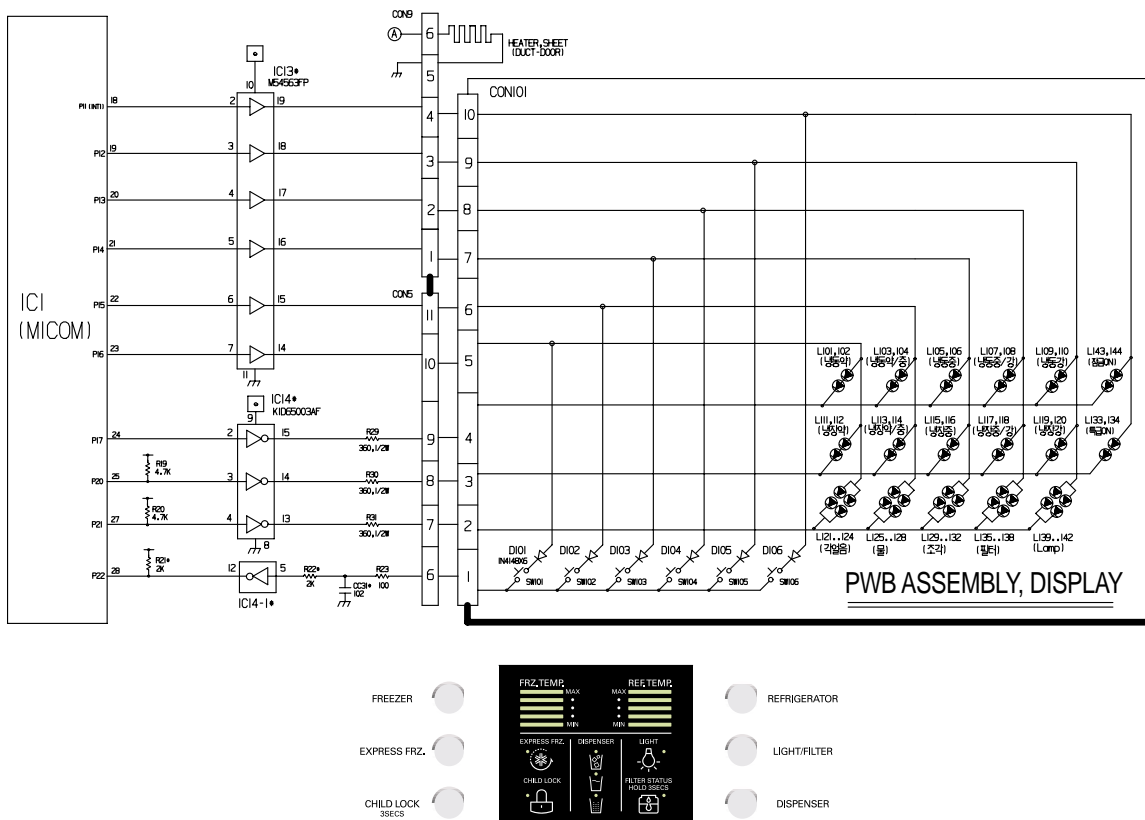
1-12. Key Button Input and Display Lighting Circuit

This circuit is to judge the work of function control button on the operation panel and to light each function indication led (LED module). It is driven by SCAN method.

<GW-P/L227: 88-LED>

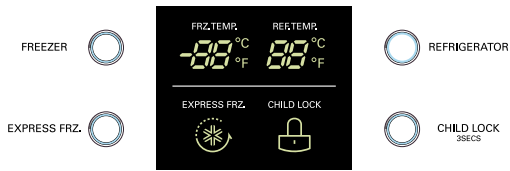
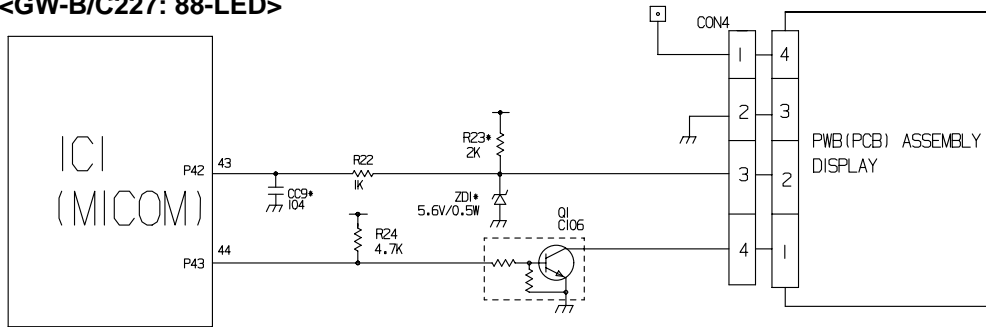


<GW-P/L227: Bar-LED>

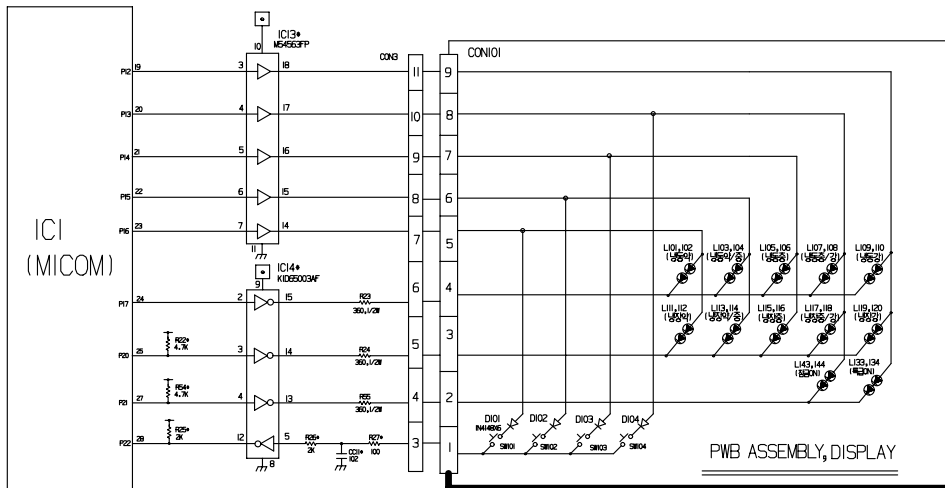


EXPLANATION FOR MICOM CIRCUIT

<GW-B/C227: 88-LED>



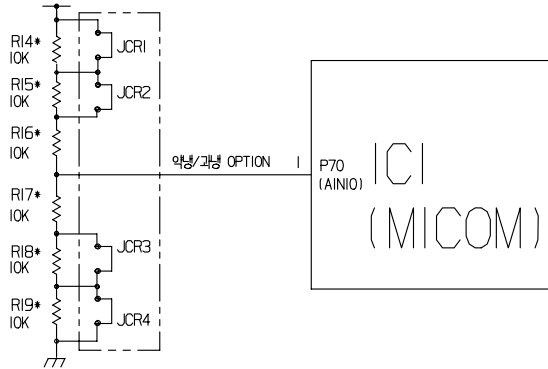
<GW-B/C227: Bar-LED>



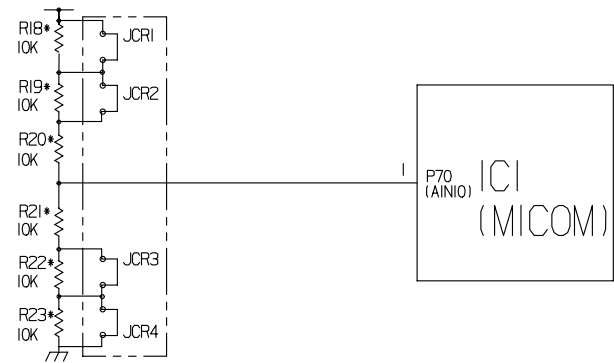
EXPLANATION FOR MICOM CIRCUIT

2. Compensation circuit for weak-cold, over-cold at freezing room

<GW-P/L/B/C227: 88-LED>



<GW-P/L/B/C227: Bar-LED>



	Temperature compensation in CUT	
JCR1	+1 °C	+2 °C
JCR2	+1 °C	
JCR3	-1 °C	-2 °C
JCR4	-1 °C	

Compensation for weak-cold		Compensation for over-cold		Temperature compensation value at cold storage room	Remarks
JCR3	JCR4	JCR1	JCR2		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0 °C (In shipment from factory)	
CUT	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-1 °C	
<input type="checkbox"/>	CUT	<input type="checkbox"/>	<input type="checkbox"/>	-1 °C	
<input type="checkbox"/>	<input type="checkbox"/>	CUT	<input type="checkbox"/>	+1 °C	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	CUT	+1 °C	
CUT	CUT	<input type="checkbox"/>	<input type="checkbox"/>	-2 °C	
<input type="checkbox"/>	<input type="checkbox"/>	CUT	CUT	+2 °C	
CUT	<input type="checkbox"/>	CUT	<input type="checkbox"/>	0 °C	
CUT	<input type="checkbox"/>	<input type="checkbox"/>	CUT	0 °C	
<input type="checkbox"/>	CUT	CUT	<input type="checkbox"/>	0 °C	
<input type="checkbox"/>	CUT	<input type="checkbox"/>	CUT	0 °C	
CUT	CUT	CUT	<input type="checkbox"/>	-1 °C	
<input type="checkbox"/>	CUT	CUT	CUT	+1 °C	
CUT	CUT	CUT	CUT	0 °C	

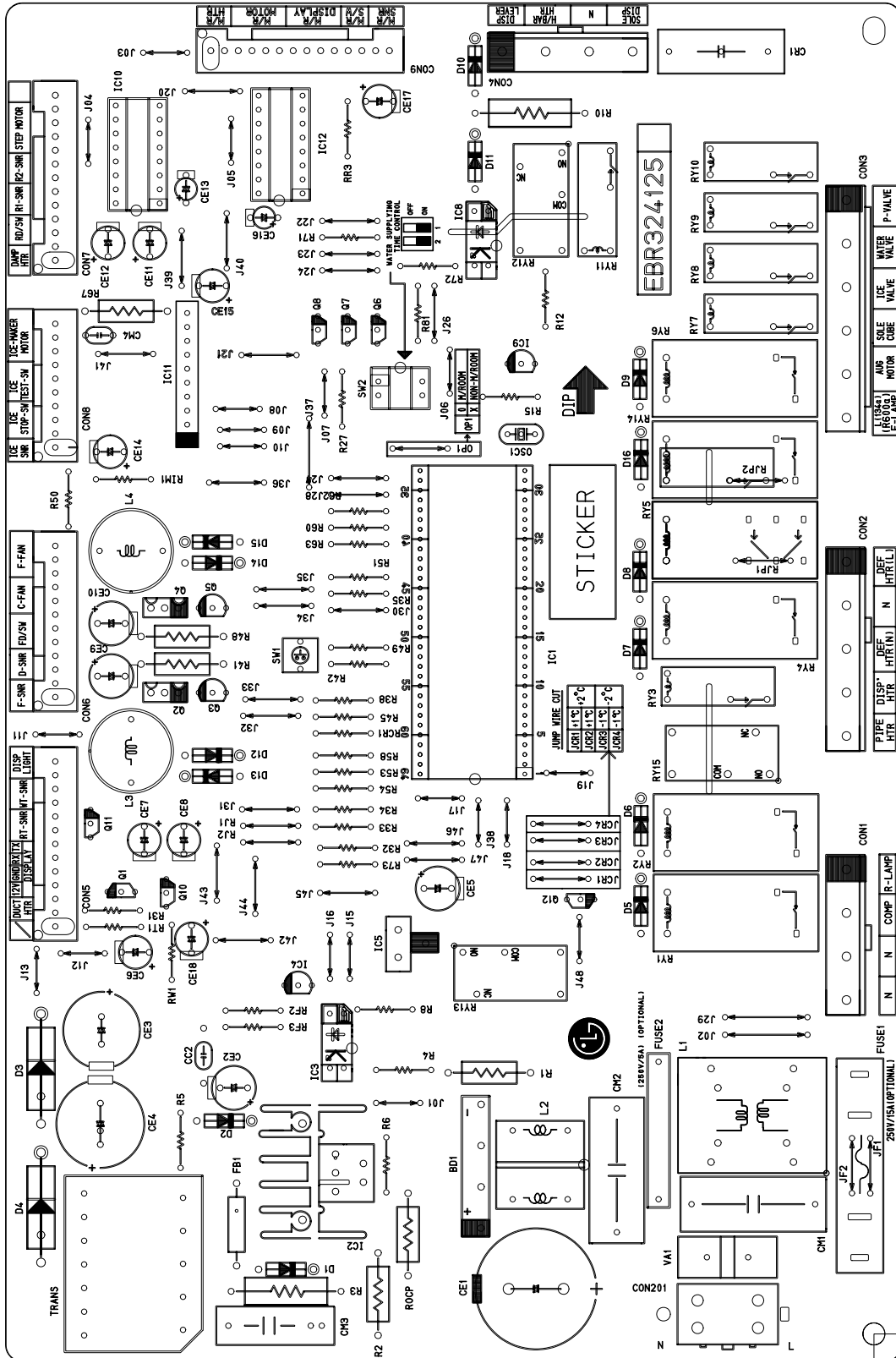
► The above option circuit is a circuit to compensate for temperature at the cold storage room by simply cutting in service.

EXPLANATION FOR MICOM CIRCUIT

3. PWB Parts Drawings and List

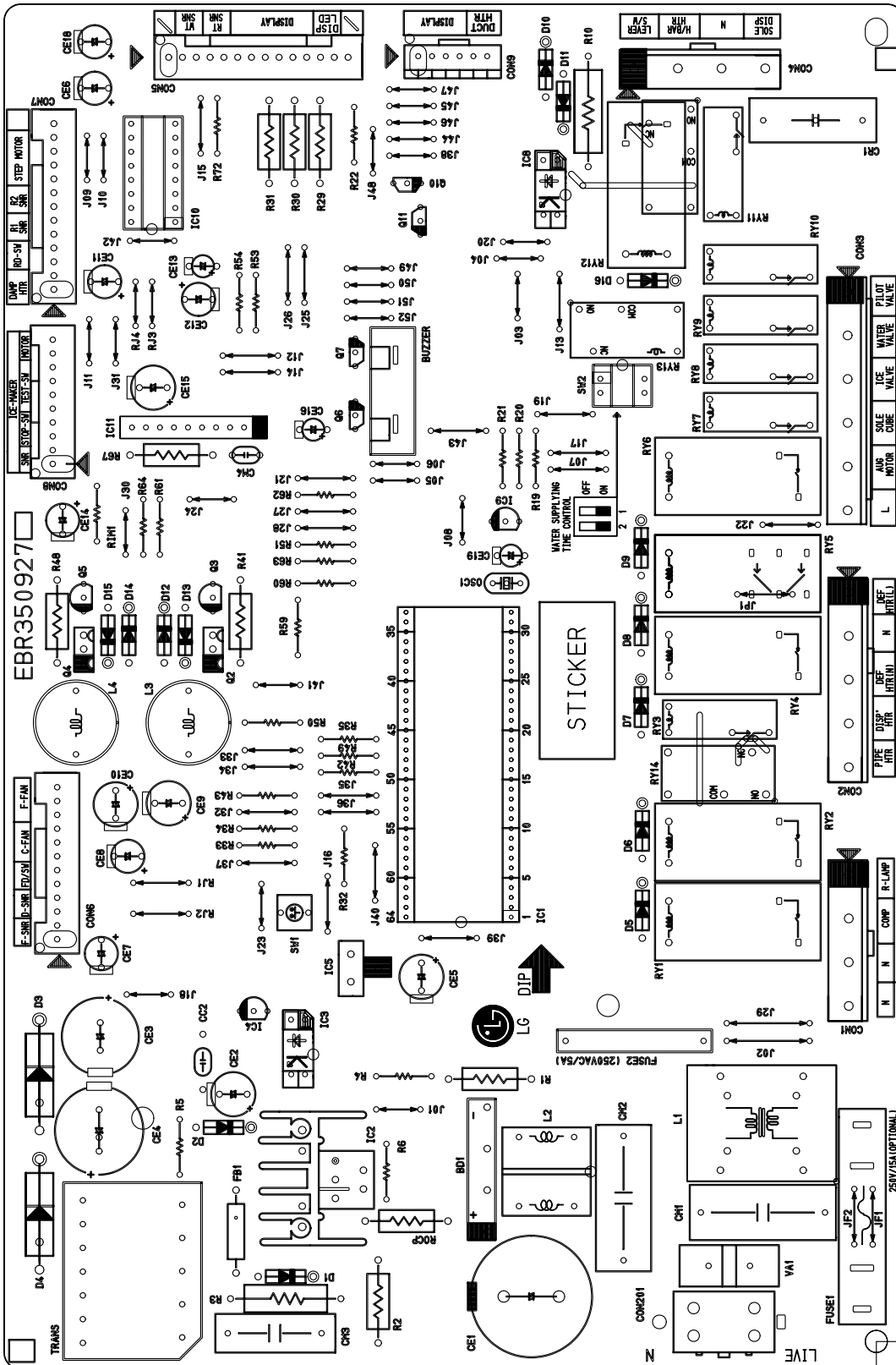
3-1. PWB Assembly Main Parts Drawings

<GW-P/L227: 88-LED>



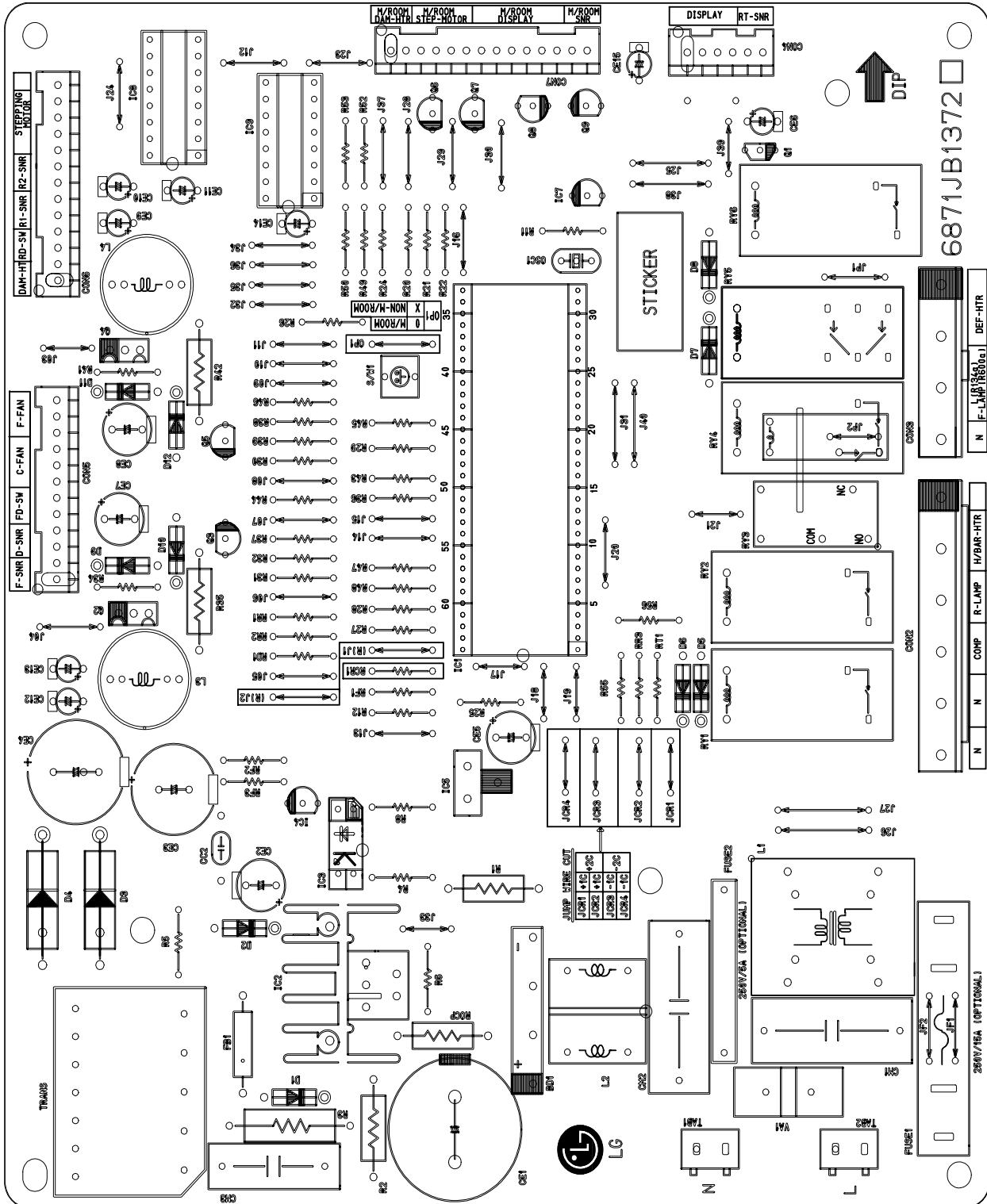
EXPLANATION FOR MICOM CIRCUIT

<GW-P/L227: Bar-LED>



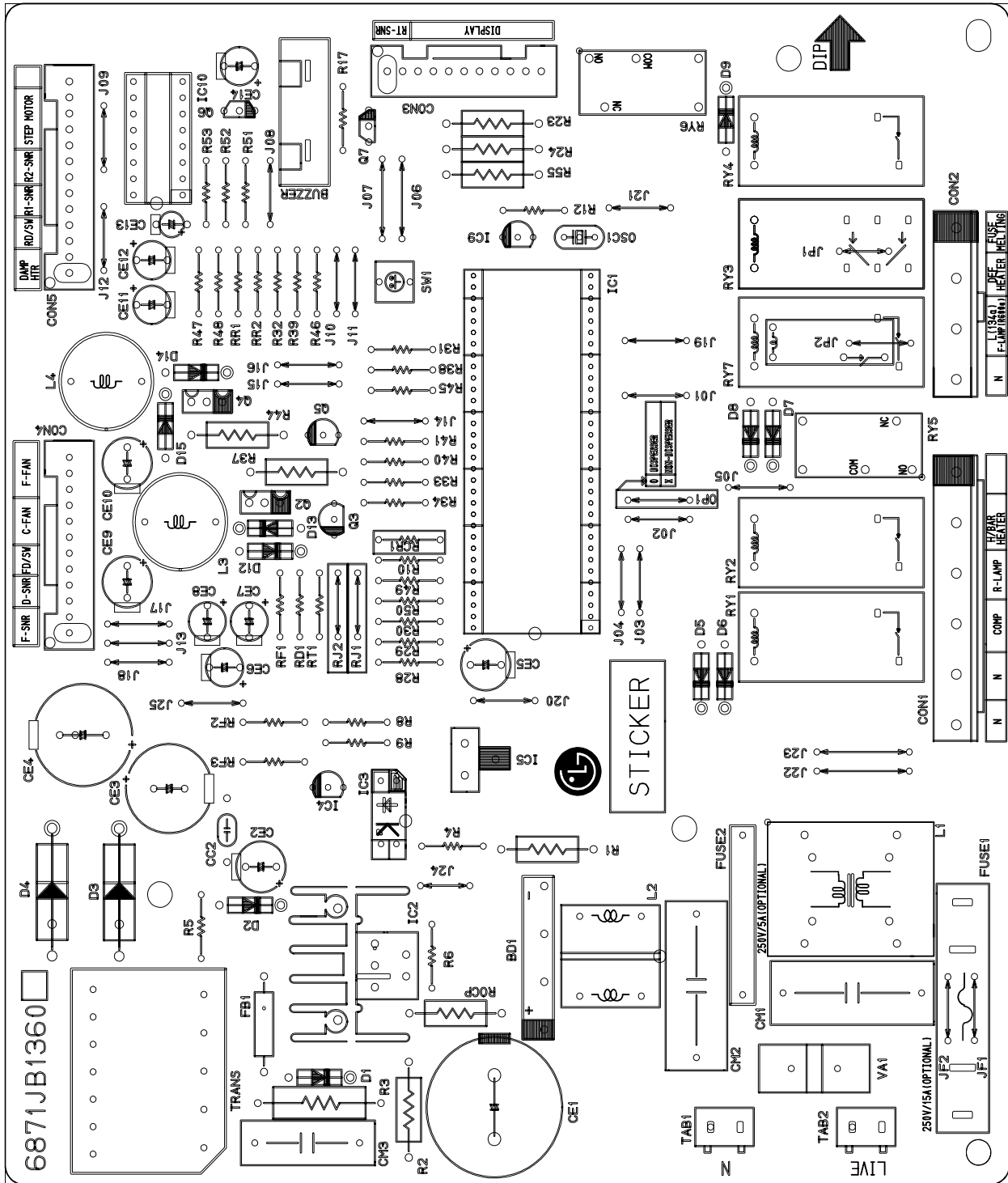
EXPLANATION FOR MICOM CIRCUIT

<GW-B/C227: 88-LED>



EXPLANATION FOR MICOM CIRCUIT

<GW-B/C227: Bar-LED>



EXPLANATION FOR MICOM CIRCUIT

<GW-P/L227: 88-LED>

Nb	P/N0	DESCRIPTION	SPEC	MAKER	REMARK
116	ORJ1002E47Z	RESISTOR,METAL GLAZED(CHIP)	10K OHM 1/8 W 1% 2012 R/TP	ROHM	RT1
117	ORJ1001E67Z	RESISTOR,METAL GLAZED(CHIP)	3.3K OHM 1/8 W 5% 2012 R/TP	ROHM	R3B,45
118	ORJ2001E67Z	RESISTOR,METAL GLAZED(CHIP)	2.0K OHM 1/8 W 5.00% 2012 R/TP	ROHM	RS2,5B
119	ORJ2001E67Z	RESISTOR,METAL GLAZED(CHIP)	2.0K OHM 1/8 W 5.00% 2012 R/TP	ROHM	R36,80
120	ORJ502E67Z	RESISTOR,METAL GLAZED(CHIP)	15.0K OHM 1/8 W 5.00% 2012 R/TP	ROHM	R81
121	620J.B8001A	FILTER(CIRC),EMC	BES3E10A0 SAMMHA 52 -	SAM MHA	F81
122	OTR127309AD	TRANSISTOR,BIPOLARS	KTA1273-1 PNP -5V -30V -2A IW TP 3P KEC COOPERATION	KEC	011
123	OTR4E00028A	TRANSISTOR,BIPOLARS	KEC KT1B151 BK T0125 60V 5A	KEC	02,4
124	OTR1919609AB	TRANSISTOR	KTCS1981(KTC1B15) KEC TP T092 NA NA	KEC	03,5
125	OTR1060009AC	TRANSISTOR	KRA 106M(KRA2205) KEC TP T092M 50V 100MA	KEC	06
126	OTR1060009AF	TRANSISTOR	KPC 106M KEC TP T092M 50V 100MA	KEC	07,10
127	6600PRT001W	SWITCH,TACT	THM502GAA POSTECH 12V DC 50MA TAPING	POSTECH	SW1
128	6600J.B8003B	SWITCH,DIP	KSD02H OTAX NONE NONE 2P DIP S/W	OTAX	SW2
129	6654E50001A	JUMP WIRE	0.6MM (75,100,125,150MM) TP TAPING SN	DAE A LEAD	J01-52
130	6654E50001A	JUMP WIRE	0.6MM (75,100,125,150MM) TP TAPING SN	DAE A LEAD	-
131	6654E50001A	JUMP WIRE	0.6MM (75,100,125,150MM) TP TAPING SN	DAE A LEAD	J1
132	6654E50001A	JUMP WIRE	0.6MM (75,100,125,150MM) TP TAPING SN	DAE A LEAD	-
133	6654E50001A	JUMP WIRE	0.6MM (75,100,125,150MM) TP TAPING SN	DAE A LEAD	(R1)J1
134	6654E50001A	JUMP WIRE	0.6MM (75,100,125,150MM) TP TAPING SN	DAE A LEAD	(R1)J2
135	6654E50001A	JUMP WIRE	0.6MM (75,100,125,150MM) TP TAPING SN	DAE A LEAD	(R1)J3
136	6654E50001A	JUMP WIRE	0.6MM (75,100,125,150MM) TP TAPING SN	DAE A LEAD	(R1)J4
137	6654E50001A	JUMP WIRE	0.6MM (75,100,125,150MM) TP TAPING SN	DAE A LEAD	J1,J2
138	6908J.B3002A	BUZZER	BM-20X BLUEON PIEZO 2KHZ 80DB	BLUEON	BUZZER
139	620J.B8001B	FILTER(CIRC),EMC	120*0.1UF PILKOR - -	PILKOR	C81
140	620J.B8009B	FILTER(CIRC),EMC	CH840050 TNC BK -	TNC	L1
141	620J.B8007X	FILTER(CIRC),EMC	UV11-05320 TNC BK 0.5A 320MH	TNC	L2
142	0UR1001M4F0	INDUCTOR,RADIAL LEAD	1000UH 20% R 6X12,5 BULK	TNC	L3,4
143	3L02447C	FUSE,DRAWING	15A 250V - 5F	SAM JU	FUSE1
144	690J.B8001A	FUSE ASSEMBLY	K0FE-PJT N/S	SAM JU	FUSE HOLDER
145	0FS5001E502	FUSE,SLOW BLOW	5000MA 250 V 5.2X20 LD/GL UL / CSA	SAM JU	FUSE2
146	0001030F	CONNECTOR (CIRC),WAFER	GP88191-2 HAN KUK DAN JA NA NA NA	KET	-
147	4920J.B3007A	HEAT SINK	23,3*17*25 DRIVE IC STR R-S64,65,73 2PIN 1-SCREW 3MM	TAE SUNG, PHOTOSELL	(1)C2
148	199F030241B	SCREW TAP TITE(S), BINDING HEAD	+ D3,0 LB,0 MSHR3/F2Y	TAE SUNG, PHOTOSELL	(1)C2
149	530000009A	SOLDER(ROSN WIRE) R50	SP-34 PB FREE, LFH-48	-	-
150	530Z1-L05AA	SOLDER,SOLDERING	LFH-38 SN 3.0Ag-0.50% 3.0MM	HEE SUNG	-
151	72452B0004A	FLUX	SV-PBF-06 KSK 12.5 WTX 0.85+0.003	KOKI	-
152	002M00188A	DIODE,ZENERS	RLZ ROHM R/TP LLD5(LL-34) 500MM 5.6V 20MA .PF	ROHM	ZD1,2,3,4
153	6630V9021A	CONNECTOR (CIRC),WAFER	1743330-1 2P 1L,00MM IR STRAIGHT DIP BK NATURAL AMP	AMP	CON201
154	0R024004609	RESISTOR,FIXED CARBON FILM	240 OHM 1/2 W 5% TAB2	SMART, CHOHYANG	R81
155	00D400409AA	DIODE,RECTIFIERS	1M4004 PYUNG CHANG TP26 10041 400V JA 30A 75NS SJA	DEL TA, PYUNGCHANG	D16
156	00C1059K63B	CAPACITOR,FIXED ELECTROLYTIC	1UF KMC,R5 50V 20% FM6 TP 5 (1X)/SM	SHANGHAI SHANGHAI(RUBICON)	CE19(85)

EXPLANATION FOR MICOM CIRCUIT

<GW-P/L227: Bar-LED>

No	PAD	DESCRIPTION	SPEC	MANFR	REMARK
1	EAX52470I	RELAY(S)	BLOCKING-PJT NON-MODRM VER-7	000 SAN	T11(LINN-MAGIC ROOM)
2	67A1E003C	TRANSFORMER(S) COIL_1	1000OH-PJT DELUCE N/S	SAM I, SIC	TRANS
3	67A1E003C	TRANSFORMER(S) COIL_1	1000OH-PJT DELUCE N/S	SAM I, SIC	TRANS
4	6630M0209	CONNECTOR (CRCI) WAFER	Y636 VEONHO SP 3.58MM (IP-2,4,6,8)	YEON HO	CON
5	6630M0209	CONNECTOR (CRCI) WAFER	Y636 VEONHO SP 3.58MM Y636-DAV (RED)	YEON HO	CON
6	6630M0209	CONNECTOR (CRCI) WAFER	Y636 VEONHO SP 3.58MM (IP-2,4,6)	YEON HO	CON
7	6630M0209	CONNECTOR (CRCI) WAFER	Y636 VEONHO SP 3.58MM Y636-LAV (IP-2,4,6,8,10)	YEON HO	CON
8	6630L8007N	CONNECTOR (CRCI) WAFER	S77291-1 AMP TP 2.5MM STRAIGHT SN	AMP	CON
9	6630L8007J	CONNECTOR (CRCI) WAFER	S77291-1 AMP TP 2.5MM STRAIGHT SN	AMP	CON
10	6630L8007L	CONNECTOR (CRCI) WAFER	S77291-1 AMP TP 2.5MM STRAIGHT SN	AMP	CON
11	6630L8007O	CONNECTOR (CRCI) WAFER	S77291-1 AMP TP 2.5MM STRAIGHT SN	AMP	CON
12	6630L8007R	CONNECTOR (CRCI) WAFER	S77291-1 AMP TP 2.5MM STRAIGHT SN	AMP	CON
13	EAN5728400	I-CIRCUIT	MP57PMIN GAP SFP ST OTP BLOCKING-PJT BRV DLX BOMDEFN	TOISHIBA	IC1 (EAN5728400I_MASK)
14	EAN5728400	I-CIRCUIT	MP57PMIN GAP SFP ST OTP GR-CO BLOCKING-PJT BRV DLX GRP	TOISHIBA	IC1 (EAN5728400I_MASK)
15	OZ2.B****	I-CIRCUIT	MP57PMIN GAP SFP ST OTP BLOCKING-PJT BRV DLX BOMDEFN ****	TOISHIBA	IC1
16	OZ2.B****	I-CIRCUIT	MP57PMIN GAP SFP ST OTP GR-CO BLOCKING-PJT BRV DLX GRP ****	TOISHIBA	IC1
17	OZ2.B****	I-CIRCUIT	MP57PMIN GAP SFP ST OTP BLOCKING-PJT BRV DLX BOMDEFN ****	TOISHIBA	IC1
18	OZ2.B****	I-CIRCUIT	MP57PMIN GAP SFP ST OTP GR-CO BLOCKING-PJT BRV DLX GRP ****	TOISHIBA	IC1
19	OZ2.B****	I-CIRCUIT	MP57PMIN GAP SFP ST OTP BLOCKING-PJT BRV DLX BOMDEFN ****	TOISHIBA	IC1
20	OZ2.B****	I-CIRCUIT	MP57PMIN GAP SFP ST OTP GR-CO BLOCKING-PJT BRV DLX GRP ****	TOISHIBA	IC1
21	DIPM8000A	I-C POWER MANAGEMENT	STR-GESEL SANVEN 5PIN 10220 ST SMTS 1 OHP	SANKEN	IC2
22	DIPM8000A	I-C POWER MANAGEMENT	PS2681-1 NEP 40-DIP BK : 1LP2681-F	NEC	IC3,B
23	0K632000A	IC,IC	KIA4851-1 PIN TP - - - -	KEC	IC4
24	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
25	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
26	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
27	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
28	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
29	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
30	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
31	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
32	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
33	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
34	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
35	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
36	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
37	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
38	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
39	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
40	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
41	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
42	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
43	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
44	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
45	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
46	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
47	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
48	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
49	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
50	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
51	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
52	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
53	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
54	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
55	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
56	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
57	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
58	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
59	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
60	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
61	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
62	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
63	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
64	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
65	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
66	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
67	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
68	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
69	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
70	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
71	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
72	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
73	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
74	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
75	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
76	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
77	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
78	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
79	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
80	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
81	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
82	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
83	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
84	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
85	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
86	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
87	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
88	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
89	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
90	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
91	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
92	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
93	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
94	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
95	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
96	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
97	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
98	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
99	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5
100	0K632000A	IC,LINEAR	KIA4851-1 - - - -	KEC	IC5

EXPLANATION FOR MICOM CIRCUIT

<GW-P/L227: Bar-LED>

No	P/NO	DESCRIPTION	SPEC	MAKER	REMARK
116	0R1002E472	RESISTOR,METAL GLAZED(CHIP)	10K OHM 1/8 W 1% 2012 R/TP	ROHM	R11
117	0R15001E72	RESISTOR,METAL GLAZED(CHIP)	3.3K OHM 1/8 W 5% 2012 R/TP	ROHM	R36,45
118	0R12001E72	RESISTOR,METAL GLAZED(CHIP)	2.0K OHM 1/8 W 5.00% 2012 R/TP	ROHM	R52,58
119	0R12001E72	RESISTOR,METAL GLAZED(CHIP)	2.0K OHM 1/8 W 5.00% 2012 R/TP	ROHM	R36,80
120	0R1502E72	RESISTOR,METAL GLAZED(CHIP)	15.0K OHM 1/8 W 5.00% 2012 R/TP	ROHM	R81
121	62101B8001A	FILTER(CIRC),EMC	BFS3510A0 SAMMHA 52 -	SAM MHA	FBI
122	0TR127309AD	TRANSISTOR,BIPOLARS	KTA1273-Y PNP -5V -30V -2A IN TP 3P KEC COOPERATION	KEC	Q11
123	0TRK600038A	TRANSISTOR,BIPOLARS	KEC KTB151 BK 10126 60V 5A	KEC	Q2,4
124	0TR3198039AF	TRANSISTOR	KTS1981(KT0815) KEC TP T092 NA NA	KEC	Q3,5
125	0TR106009AC	TRANSISTOR	KRA 106M(KRA2206) KEC TP T092M 50V 100MA	KEC	Q6
126	0TR106009AF	TRANSISTOR	KPC 106M KEC TP T092M 50V 100MA	KEC	Q7,10
127	6600FRT001W	SWITCH,TACT	THM502GAA POSTECH 12V DC 50MA TAPING	POSTECH	SW1
128	66001B8003B	SWITCH,DIP	KSD02H OTAX NONE NONE 2P DIP 5/W	OTAX	SW2
129	6654E50001A	JUMP WIRE	0.6MM (75,100,125,150MM) TP TAPING SN	DAE A LEAD	J01-52
130	6654E50001A	JUMP WIRE	0.6MM (75,100,125,150MM) TP TAPING SN	DAE A LEAD	-
131	6654E50001A	JUMP WIRE	0.6MM (75,100,125,150MM) TP TAPING SN	DAE A LEAD	JPI
132	6654E50001A	JUMP WIRE	0.6MM (75,100,125,150MM) TP TAPING SN	DAE A LEAD	-
133	6654E50001A	JUMP WIRE	0.6MM (75,100,125,150MM) TP TAPING SN	DAE A LEAD	(R)J1
134	6654E50001A	JUMP WIRE	0.6MM (75,100,125,150MM) TP TAPING SN	DAE A LEAD	(R)J2
135	6654E50001A	JUMP WIRE	0.6MM (75,100,125,150MM) TP TAPING SN	DAE A LEAD	(R)J3
136	6654E50001A	JUMP WIRE	0.6MM (75,100,125,150MM) TP TAPING SN	DAE A LEAD	(R)J4
137	6654E50001A	JUMP WIRE	0.6MM (75,100,125,150MM) TP TAPING SN	DAE A LEAD	JF1,JF2
138	69061B3002A	BUZZER	BM-20K BLUEON PIEZO 2KHZ 80DB	BLUEON	BUZZER
139	62001B8001B	FILTER(CIRC),EMC	120*0.1UF PILKOR - -	PILKOR	CR1
140	62001B8003B	FILTER(CIRC),EMC	CH84050 TNC BK - -	TNC	L1
141	62001B8007X	FILTER(CIRC),EMC	UV11-03320 TNC BK 0.5A 320MH	TNC	L2
142	0LR1001M4F0	INDUCTOR,RADIAL LEAD	1000UH 20% R 6X12.5 BULK	TNC	L3,4
143	3102447C	FUSE,DRAWING	15A 250V - EF	SAM JU	FUSE1
144	69011B8001A	FUSE ASSEMBLY	K0RE-PJT N/S	SAM JU	FUSE HOLDER
145	0F35001B502	FUSE,SLOW BLOW	5000MA 250 V 5.2X20 LD/6L UL / CSA	SAM JU	FUSE2
146	0001030F	CONNECTOR (CIRC),WAFER	GP88191-2 HAN KUK DAN JA NA NA	KET	-
147	49201B3007A	HEAT SINK	23.3*17*25 DRIVE IC STR R-564,65,73 2PIN 1-SCREW 3MM	TAE SUNG, PHOTOBELL	(1C2)
148	1581030241B	SCREW TAP TITE (S),BINDING HEAD	+ 13.0 LB.0 M0W43/2ZY	TAE SUNG, PHOTOBELL	(1C2)
149	SS0000008A	SOLDER(ROSN WIRE) R50	SR-34 PB FREE, LFM-48	-	-
150	SSW1Z-L05AA	SOLDER,SOLDERING	LFM-36, SN 3.04G-0.50LX 3.0MM	-	HEE SUNG
151	72452B0004A	FLUX	5V-PBF-06 KSK 12.5 WTX 0.815+-0.003	KOKI	-
152	0027M00188A	DIODE,ZENERS	RLZ ROHM R/TP LLD5(LL-34) 500MW 5.6V 20MA .PF	ROHM	ZD1,2,3,4
153	6630V9021A	CONNECTOR (CIRC),WAFER	17433G0-1 2P 11.00MM IR STRAIGHT DIP BK NATURAL AMP	AMP	CON201
154	0R124004909	RESISTOR,FIXED CARBON FILM	240 OHM 1/2 W 5% T452	SMART,CHOHYANG	R31
155	004004038A	DIODE,RECTIFIERS	1M4004 PYNIG CHANG TE26 D041 400V 1A 30A 75NS SJA	DEL TA, PYNIGCHANG	D16
156	0C105B6K63B	CAPACITOR,FIXED ELECTROLYTIC	1UF KME,FG 50V 20% FMS TP 5 (YXA/SM)	SAMSUNG-SAMMHA(ULRYO)N	CE19(85)

EXPLANATION FOR MICOM CIRCUIT

<GW-B/C227: 88-LED>

No	P/NO	DESCRIPTION	SPEC	MAKER	REMARK
1	6870.BE201A	PMB(PCB)	VIKING-PJT BEST BASIC VER-1	DOOSAN	T-1,6
1	6870.BE201B	PMB(PCB)	VIKING-PJT BEST BASIC M/ROOM VER-1	DOOSAN	T-1,6
2	6170.BE2012A	TRANSFORMER, SMPS COIL 1	DL-PJT 2.9MVA/20V	SAW IL, SMC	TRANS
2	6170.BE2012C	TRANSFORMER, SMPS COIL 1	(GR-B21/257A1G) ELDC 100-127V	SAW IL	TRANS
3	6630.VM0111	CONNECTOR (CIRC), WAFER	YW396 YEONHO 1IP 3.95MM YW396-11AV (1IP-2,4,6,8,10)	YEON-HO	CON2
4	6630.VM02707	CONNECTOR (CIRC), WAFER	YW396 YEONHO 7P 3.95MM (7P-2,4,6)	YEON-HO	CON3
5	6630.BB007E	CONNECTOR (CIRC), WAFER	917784-1 AMP GP 2.5MM STRAIGHT SN	AMP	CON4
6	6630.BB007L	CONNECTOR (CIRC), WAFER	917790-1 AMP I2P 2.5MM STRAIGHT SN	AMP	CON5
7	6630.BB010A	CONNECTOR (CIRC), WAFER	917791-1 AMP I3P 2.5MM STRAIGHT SN	AMP	CON6
8	01ZZ.BE2058T	IC, DRAWING	TMP87PMAIN 64P SDIP ST OTP VIKING-PJT BEST GPOR	TOSHIBA	IC1
8	01ZZ.BE2058U	IC, DRAWING	TMP87PMAIN 64P SDIP ST OTP VIKING-PJT BEST IBCDEFN	TOSHIBA	IC1
9	01PMSK001A	IC, POWER MANAGEMENT	STR-6635L SANKEN SPIN T0220 ST SMPS 1 CHIP	SANKEN	IC2
10	01PMSNE001A	IC, POWER MANAGEMENT	PS2561-1 NEC 4P, DIP BK = TLP762JF	NEC	IC3
11	01KE431000A	IC, KECC	KIA431 3 PIN TP - -	KEC	IC4
12	01KE780500Z	IC, LINEAR	KIA7805P1 - - - -	KEC	IC5
13	01KE650030C	IC, KECC	KID65003AF 1650P BK 7CH DRIVE	KEC	IC6
14	01KE704200A	IC, KECC	KIA7042P KEC 3P BK RESET	KEC	IC7
15	01T077400A	IC, DRAWING	TA7774AP 16, SDIP BK DRIVE, IC STEPPING MOTOR	TOSHIBA	IC8
16	6920.000001A	RELAY	ALE1EB12 MATSUSHITA 250VAC 16A 12VDC IA NO VENTING	MATSUSHITA	
16	6920.BE2005B	RELAY	65J5-1A-NT OMRON 250VAC 16A 12VDC IA NO VENTING 3	OMRON	RY1,6
16	6920.BE2005C	RELAY	DHIU II DEC 250VAC 16A 12VDC IA VENTING	DAIICHI	
17	6920.BE2004D	RELAY	DH12D1-0-0 (JAPAN) DEC 250VAC 10A 12VDC IA	DAIICHI	RY2
18	6920.000001A	RELAY	ALE1EB12 MATSUSHITA 250VAC 16A 12VDC IA NO VENTING	MATSUSHITA	
18	6920.BE2005B	RELAY	65J5-1A-NT OMRON 250VAC 16A 12VDC IA NO VENTING 3	OMRON	RY2(EXPORT)
18	6920.BE2005C	RELAY	DHIU II DEC 250VAC 16A 12VDC IA VENTING	DAIICHI	
18	6920.BE2004E	RELAY	65B-1A-E(CHINA) OMRON 250VAC 5A 12VDC IA NO VENTING	OMRON	
19	6920.BE2005B	RELAY	65B-14 OMRON 250VAC 5A 12VDC IC NO-VENTING	OMRON	RY3(H/BARI)
20	6920.BE2004D	RELAY	DH12D1-0-0 (JAPAN) DEC 250VAC 10A 12VDC IA	DAIICHI	RY4
21	6920.000001A	RELAY	ALE1EB12 MATSUSHITA 250VAC 16A 12VDC IA NO VENTING	MATSUSHITA	
21	6920.BE2005B	RELAY	65J5-1A-NT OMRON 250VAC 16A 12VDC IA NO VENTING 3	OMRON	RY4(EXPORT)
21	6920.BE2005C	RELAY	DHIU II DEC 250VAC 16A 12VDC IA VENTING	DAIICHI	
21	6920.BE2004E	RELAY	65B-1A-E(CHINA) OMRON 250VAC 5A 12VDC IA NO VENTING	OMRON	
22	6920ALZ001A	RELAY	ALZ1EB12 NAIS 250VAC 16A 12VDC IC NO VENTING	NAIS	RY5
23	6212BA3041A	RESONATOR, CERAMIC	CSTLSAM00353-40 MURATA 4.00MHz +/- 0.5% TA 1SPF	MURATA	OSC1
24	6102.BB001A	VARIABLE	SVCE21D-14A SAMMHA UL/VDE BK 620V	SAW WHA, ILJIN	VA1
24	6102W5V006A	VARIABLE	SVCE21D-14A SAMMHA UL/VDE TP	SAW WHA, ILJIN	VA1
25	0DR10009AA	DIODE, RECTIFIERS	FR107 TP DELTA D041 1000V IA 3	DELTA	D1,2,9-12
26	0DRSA00090A	DIODE, RECTIFIERS	RL3 SANKEN BK NON 350V 3.5A 80A 50NSEC 0.1MA	SANKEN	D3
26	0DRSD00100A	DIODE, RECTIFIERS	53L40 SHINDENGEN BK AX14 400V 1.8A 60A 50NSEC 10UA	SHINDENGEN	D3
27	0DRSA00090A	DIODE, RECTIFIERS	RL3 SANKEN BK NON 350V 3.5A 80A 50NSEC 0.1MA	SANKEN	D4
27	0DRSD00100A	DIODE, RECTIFIERS	53L40 SHINDENGEN BK AX14 400V 1.8A 60A 50NSEC 10UA	SHINDENGEN	D4
28	0DR360000AA	DIODE, RECTIFIERS	03B860 BK SHINDENGEN 600V 4A	SHINDENGEN	D01
29	0DD400409AC	DIODE, RECTIFIERS	RECT1N4004 TP	DELTA, PYUNGCHANG	D5,6,8
30	0DD400409AC	DIODE, RECTIFIERS	RECT1N4004 TP	DELTA, PYUNGCHANG	D7
31	0CE476ZV6E0	CAPACITOR, FIXED ELECTROLYTIC	47UF HE 450V 20% BULK SNAP IN	RUBYCON, SAMMHA	CE1(105)
31	0CE476ZV6E0	CAPACITOR, FIXED ELECTROLYTIC	HW 450V-47UF M (122x20) LUG	G-LUXON(MTI)	CE1(105)
32	0CE686ZU6E0	CAPACITOR, FIXED ELECTROLYTIC	68UF MXC 400V 20% BULK SNAP IN	RUBYCON, SAMMHA	CE1(105)
32	0CE686ZU6E0	CAPACITOR, FIXED ELECTROLYTIC	HW 400V-68UF M (122x25) LUG	G-LUXON(MTI)	CE1(105)
33	0CE226ZK638	CAPACITOR, FIXED ELECTROLYTIC	22UF YXA 50V 20% FMS TP 5	RUBYCON, SAMMHA	CE2(105)
33	0CE226ZK638	CAPACITOR, FIXED ELECTROLYTIC	SM 50V-22UF M (15x11) T/P5	G-LUXON(MTI)	CE2(105)
34	0CE108ZH610	CAPACITOR, FIXED ELECTROLYTIC	1000UF YXG 25V 20% FL BULK	RUBYCON, SAMMHA	CE3(105)
34	0CE108ZH610	CAPACITOR, FIXED ELECTROLYTIC	LU 25V-1000UF M (13x20) F/C5	G-LUXON(MTI)	CE3(105)
35	0CE687ZH610	CAPACITOR, FIXED ELECTROLYTIC	680UF YXG 25V 20% FL BULK	RUBYCON, SAMMHA	CE3(105)
35	0CE108ZH610	CAPACITOR, FIXED ELECTROLYTIC	LU 25V-680UF M (13x20) F/C5	G-LUXON(MTI)	CE3(105)
36	0CE108ZL610	CAPACITOR, FIXED ELECTROLYTIC	1000UF YXG 35V 20% FL BULK	RUBYCON, SAMMHA	CE4(105)
36	0CE108ZL610	CAPACITOR, FIXED ELECTROLYTIC	LU 35V-1000UF M (13x25) F/C5	G-LUXON(MTI)	CE4(105)
37	0CE227ZF638	CAPACITOR, FIXED ELECTROLYTIC	220UF YK 16V 20% FMS TP 5	RUBYCON, SAMMHA	CE5(85)
37	0CE227ZF638	CAPACITOR, FIXED ELECTROLYTIC	GR 16V-220UF M (18x11) T/P5	G-LUXON(MTI)	CE5(85)
38	0CE227FH638	CAPACITOR, FIXED ELECTROLYTIC	220UF RD 25V 20% FMS TP 5	RUBYCON, SAMMHA	CE7,8(105)
38	0CE227FH638	CAPACITOR, FIXED ELECTROLYTIC	SM 25V-220UF M (18x11) T/P5	G-LUXON(MTI)	CE7,8(105)
39	0CE106ZK638	CAPACITOR, FIXED ELECTROLYTIC	10UF YK 50V 20% FMS TP 5	RUBYCON, SAMMHA	CE6,9,10,12,13(85)
39	0CE106ZK638	CAPACITOR, FIXED ELECTROLYTIC	GR 50V-10UF M (15x11) T/P5	G-LUXON(MTI)	CE6,9,10,12,13(85)
40	0CE105ZK638	CAPACITOR, FIXED ELECTROLYTIC	1UF YK 50V 20% FMS TP 5	RUBYCON, SAMMHA	CE11(85)
40	0CE105ZK638	CAPACITOR, FIXED ELECTROLYTIC	GR 50V-1UF M (15x11) T/P5	G-LUXON(MTI)	CE11(85)
41	0CF33408670	CAPACITOR, FIXED FILM	330NF 0.275V 20% BULK M/PP NI	PILKOR	CM1
41	0CF33408670	CAPACITOR, FIXED FILM	MPX 275V-0.33UF M F/C22.5	EUROPTRONIC(MTI)	CM1
42	0CF22408670	CAPACITOR, FIXED FILM	220NF 0.275V 20% BULK M/PP NI	PILKOR	CM2
42	0CF22408670	CAPACITOR, FIXED FILM	MPX 275V-0.22UF M F/C22.5	EUROPTRONIC(MTI)	CM2
43	0C04732Y430	CAPACITOR, FIXED FILM	47000PF S 630V J M/PE NI R	SEIL	CM3
43	0C04732Y430	CAPACITOR, FIXED FILM	DMPE 630V-0.047UF K F/C17.5	EUROPTRONIC(MTI)	CM3
44	0C022102510	CAPACITOR, FIXED CERAMIC (HIGH DIELECTRI)	220P 2KV K B S	SAW WHA, DOOSAN	CC2
44	0C022102510	CAPACITOR, FIXED CERAMIC (HIGH DIELECTRI)	DD4 2KV-220PF K YSP1(B) F/C10	HONGMING(MTI)	CC2
45	0C0224DK94A	CAPACITOR, FIXED CERAMIC (HIGH DIELECTRI)	220NF 2012 50V 80%, -20% R/TP F1YSV1	MURATA	CC3
46	0C0104DK94A	CAPACITOR, FIXED CERAMIC (HIGH DIELECTRI)	100NF 2012 50V 80%, -20% R/TP F1YSV1	MURATA	CC4-9
47	0C0223DK96A	CAPACITOR, FIXED CERAMIC (HIGH DIELECTRI)	22NF 2012 50V 80%, -20% R/TP X/R	MURATA	CC10-13,15,17,19-21
48	0C0223DK96A	CAPACITOR, FIXED CERAMIC (HIGH DIELECTRI)	22NF 2012 50V 80%, -20% R/TP X/R	MURATA	CC14
49	0RH0000L622	RESISTOR, METAL GLAZED(CHIP)	0 OHM 1/8 W 5% 2012 R/TP	ROHM	CC14(R)
50	0X102DK96A	CAPACITOR, FIXED CERAMIC (HIGH DIELECTRI)	1NF 2012 50V 80%, -20% R/TP X/R	MURATA	CC16,18
51	0C0471DK96A	CAPACITOR, FIXED CERAMIC (HIGH DIELECTRI)	0.00047UF 2012 50V 80%, -20% R/TP X/R	MURATA	CC1
51	0RW3003L609	RESISTOR, FIXED POWER COATED WIRE-WOUND	330K OHM 1 W 5% T/52	SMART, CHOHYANG	R1
52	0R05603L609	RESISTOR, FIXED CARBON FILM	560K OHM 1/2 W 5% T/52	SMART, CHOHYANG	R2
53	0R55602K641	RESISTOR, FIXED METAL OXIDE FILM	56K OHM 2 W 5.00% F20	SMART, CHOHYANG	R3
54	0R06801G609	RESISTOR, FIXED CARBON FILM	6.8K OHM 1/4 W 5.00% T/52	SMART, CHOHYANG	R4
55	0R01200G609	RESISTOR, FIXED CARBON FILM	120 OHM 1/4 W 5% T/52	SMART, CHOHYANG	R5
56	0R06800G609	RESISTOR, FIXED CARBON FILM	680 OHM 1/4 W 5.00% T/52	SMART, CHOHYANG	R6
57	0RH0100L609	RESISTOR, FIXED POWER COATED WIRE-WOUND	1 OHM 1 W 5% T/52	SMART, CHOHYANG	ROOP
58	0RH0500L609	RESISTOR, FIXED POWER COATED WIRE-WOUND	0.56 OHM 1 W 5% T/52	SMART, CHOHYANG	ROOP
59	0R01801G609	RESISTOR, FIXED CARBON FILM	1.8K OHM 1/4 W 5.00% T/52	SMART, CHOHYANG	R8
60	0RH0010L622	RESISTOR, METAL GLAZED(CHIP)	1K OHM 1/8 W 5% 2012 R/TP	ROHM	R9

EXPLANATION FOR MICOM CIRCUIT

<GW-B/C227: 88-LED>

No	P/NO	DESCRIPTION	SPEC	MAKER	REMARK
61	0RH1004L622	RESISTOR,METAL GLAZED(CHIP)	1MOHM 1/8 W 5% 2012 R/TP	ROHM	R10
62	0RH4701L622	RESISTOR,METAL GLAZED(CHIP)	4.7K OHM 1/8 W 5% 2012 R/TP	ROHM	-
63	0RH1002L622	RESISTOR,METAL GLAZED(CHIP)	10KOHM 1/8 W 5% 2012 R/TP	ROHM	R14-19,33,40,51
64	0RH2001L622	RESISTOR,METAL GLAZED(CHIP)	2K OHM 1/8 W 5% 2012 R/TP	ROHM	R23
65	0RD4701G609	RESISTOR,FIXED CARBON FILM	4.7K OHM 1/4 W 5% TA52	SMART,CHOHYANG	R11,20,21,24,26,31,37,38,44
66	0RD1002G609	RESISTOR,FIXED CARBON FILM	10K OHM 1/4 W 5% TA52	SMART,CHOHYANG	R12,49,50
67	6654E50001A	JUMP WIRE	0.6MM (52)MM TP TAPING SN	DAE A LEAD	(R)J1
67	0RD1001G609	RESISTOR,FIXED CARBON FILM	1K OHM 1/4 W 5% TA52	SMART,CHOHYANG	(R)J1
67	0RD1001G609	RESISTOR,FIXED CARBON FILM	1.8K OHM 1/4 W 5% TA52	SMART,CHOHYANG	(R)J1
68	6654E50001A	JUMP WIRE	0.6MM (52)MM TP TAPING SN	DAE A LEAD	(R)J2
68	0RD1201G609	RESISTOR,FIXED CARBON FILM	1.2K OHM 1/4 W 5% TA52	SMART,CHOHYANG	(R)J2
68	0RD2401G609	RESISTOR,FIXED CARBON FILM	2.4K OHM 1/4 W 5% TA52	SMART,CHOHYANG	(R)J2
69	0RD1202G609	RESISTOR,FIXED CARBON FILM	12K OHM 1/4 W 5% TA52	SMART,CHOHYANG	RCR1
69	0RD1002G609	RESISTOR,FIXED CARBON FILM	10K OHM 1/4 W 5% TA52	SMART,CHOHYANG	RCR1
69	0RD8201G609	RESISTOR,FIXED CARBON FILM	8.2K OHM 1/4 W 5% TA52	SMART,CHOHYANG	RCR1
70	0RD2001G609	RESISTOR,FIXED CARBON FILM	2K OHM 1/4 W 5% TA52	SMART,CHOHYANG	R25,27,28,36,43,45-48
71	0RD2001G609	RESISTOR,FIXED CARBON FILM	2K OHM 1/4 W 5% TA52	SMART,CHOHYANG	R29,30
72	0RD1001G609	RESISTOR,FIXED CARBON FILM	1K OHM 1/4 W 5% TA52	SMART,CHOHYANG	R22
73	0RD3901G609	RESISTOR,FIXED CARBON FILM	3.9K OHM 1/4 W 5% TA52	SMART,CHOHYANG	R32,39
74	0RD1501H609	RESISTOR,FIXED CARBON FILM	1.5K OHM 1/2 W 5.00% TA52	SMART,CHOHYANG	R35,42
75	0RN1622G409	RESISTOR,FIXED METAL FILM	16.2K OHM 1/4 W 1.00% TA52	SMART,CHOHYANG	RF1
76	0RN2612G409	RESISTOR,FIXED METAL FILM	26.1K OHM 1/4 W 1.00% TA52	SMART,CHOHYANG	RD1,RR1,RF2
77	0RN9101G409	RESISTOR,FIXED METAL FILM	9.1K OHM 1/4 W 1.00% TA52	SMART,CHOHYANG	RF2
78	0RN2401G409	RESISTOR,FIXED METAL FILM	2.4K OHM 1/4 W 1.00% TA52	SMART,CHOHYANG	RF3
79	0RN1002G409	RESISTOR,FIXED METAL FILM	10K OHM 1/4 W 1.00% TA52	SMART,CHOHYANG	RT1
80	0RD3300G609	RESISTOR,FIXED CARBON FILM	330 OHM 1/4 W 5.00% TA52	SMART,CHOHYANG	R34,41
81	0TRKE00008A	TRANSISTOR,BIPOLARS	KEC KTB151 BK T0126 60V 5A	KEC	Q2,4
82	0TR319809AA	TRANSISTOR	KTC3198-TP-Y 1KTC18151KEC	KEC	Q3,5
83	0TR106009AF	TRANSISTOR,BIPOLARS	KRC106M KEC TP T092M 50V 100MA	KEC	Q1
84	6210.BB001A	FILTER(CIRC),EMC	BF53510A0 SAMMHA 52 -	SAM WHA	FBI
85	0F55001E502	FUSE,SLOW BLOW	5000MA 250 V 5.2X20 LDV/GL UL / CSA	SAM JU	FUSE2
86	6600RRT001W	SWITCH,TACT	THW5026AA POSTECH 12V DC 50MA TAPING	POSTECH	SW1
87	6654E50001A	JUMP WIRE	0.6MM (52)MM TP TAPING SN	DAE A LEAD	J03-21,23-40
88	6654E50001A	JUMP WIRE	0.6MM (52)MM TP TAPING SN	DAE A LEAD	JCR1-JCR4
89	6654E50001A	JUMP WIRE	0.6MM (52)MM TP TAPING SN	DAE A LEAD	JF1
90	6654E50001A	JUMP WIRE	0.6MM (52)MM TP TAPING SN	DAE A LEAD	JF1,J2
91	6654E50001A	JUMP WIRE	0.6MM (52)MM TP TAPING SN	DAE A LEAD	JP1
92	6654E50001A	JUMP WIRE	0.6MM (52)MM TP TAPING SN	DAE A LEAD	JP2
93	6200.BB009B	FILTER(CIRC),EMC	CHB40050 TNC BK -	TNC	LI
94	6200.BB007X	FILTER(CIRC),EMC	UV11-05320 TNC BK 0.5A 320MH	TNC	L2
95	0LR1001M4F0	INDUCTOR,RADIAL LEAD	1000UH 20% R 6X12.5 BULK	TNC	L3,4
96	3J02447C	FUSE,DRAWING	15A 250V - EF	SAM JU	FUSE1
97	6901.BB001A	FUSE ASSEMBLY	KOPE-PJT N/S	SAM JU	FUSE HOLDER
98	0001030F	CONNECTOR (CIRC),WAFER	GPBB191-2 HAN KUK DAN JA NA NA NA	KET	TAB1,2
99	4920.BB007A	HEAT SINK	23,3*17*25 DRIVE IC STR R-954,65,73 2PIN 1-SCREW 3MM	TAE SUNG	(IC)2
100	1SEF030241E	SCREW TAP TITE1S1,BINDING HEAD	+ D3.0 LB.0 MSNR3/FZY	TAE SUNG	(IC)2
101	9W1F0120000	SOLDER(ROSN WIRE) P50	D1.20	-	(IC)2
102	4911004	SOLDER,SOLDERING	NA HEESUNG METAL BAR SN 63% NA	HISUNG	-
103	59333105	FLUX	SG:0.825-0.830 KOREA F.H-206	KOKI	-
104	007ZM01088A	DIODE,ZENERS	RLZ ROHM R/TP LLD51LL-341 500MM 5.6V 20MA .PF	ROHM	ZD1
	(MAGIC-ROOM)				
105	6630.BB007N	CONNECTOR (CIRC),WAFER	1746062-1 AMP 14P 2.5MM	AMP	CON7
106	0110777400A	IC,DRAWING	TA7774AP 16,SDIP BK DRIVE,1C STEPPING MOTOR	TOSHIBA	IC9
107	0CE1056K638	CAPACITOR,FIXED ELECTROLYTIC	1UF 5MS,56 50V 20% FM5 TP 5	RUBICON	CE14(85)
	0CE1052K638	CAPACITOR,FIXED ELECTROLYTIC	GR 50V-1UF M (5*11) T/P5	G-LUXON(MTI)	CE14(85)
108	0CE1056K638	CAPACITOR,FIXED ELECTROLYTIC	10UF KM TYPE 50V 20% FM5 TP 5	RUBICON	CE15(85)
	0CE1052K638	CAPACITOR,FIXED ELECTROLYTIC	GR 50V-10UF M (5*11) T/P5	G-LUXON(MTI)	CE15(85)
109	0CX2230K96A	CAPACITOR,FIXED CERAMIC(HIGH DIELECTRI)	22NF 2012 50V 80%, 20% R/TP X7R	MURATA	CC22,23
110	0RH1002L622	RESISTOR,METAL GLAZED(CHIP)	10KOHM 1/8 W 5% 2012 R/TP	ROHM	RS4
111	0RH1000L622	RESISTOR,METAL GLAZED(CHIP)	0 OHM 1/8 W 5% 2012 R/TP	ROHM	RI3
112	0RD1002G609	RESISTOR,FIXED CARBON FILM	10K OHM 1/4 W 5% TA52	SMART,CHOHYANG	RS2,53
113	0RD4701G609	RESISTOR,FIXED CARBON FILM	4.7K OHM 1/4 W 5% TA52	SMART,CHOHYANG	RS5
114	0RD2001G609	RESISTOR,FIXED CARBON FILM	2K OHM 1/4 W 5% TA52	SMART,CHOHYANG	RS6
115	0RN2612G409	RESISTOR,FIXED METAL FILM	26.1K OHM 1/4 W 1.00% TA52	SMART,CHOHYANG	RF3
116	0TR106009AC	TRANSISTOR,BIPOLARS	KRA106M (KRA2206) KEC TP T092M 50V 100MA	KEC	Q6-8
117	0TR106009AC	TRANSISTOR,BIPOLARS	KRA106M (KRA2206) KEC TP T092M 50V 100MA	KEC	Q9

EXPLANATION FOR MICOM CIRCUIT

<GW-B/C227: Bar-LED>

No	P/NO	DESCRIPTION	SPEC	MAKER	REMARK
1	6670JB8190A	PWB(PCB)	05LED BASIC KS VER-1	DOO SAN	T-1,6
2	6170JB2012A	TRANSFORMER, SMPS COIL 1	DL-PJT 2.9MH/20W	SAM IL	TRANS
2	6170JB2012C	TRANSFORMER, SMPS COIL 1	GR-B217/257*4(G) BLDC 110-127V	SAM IL	TRANS
3	6630VM02707	CONNECTOR (CIRC), WAFER	YW396 YEONHO 7P 3.96MM (7P-2,4,6)	YEON HO	CON2
4	6630VM02609	CONNECTOR (CIRC), WAFER	YW396 YEONHO 9P 3.96MM (9P-2,4,6,8)	YEON HO	CON1
5	6630JB8007K	CONNECTOR (CIRC), WAFER	917789-1 AMP IIP 2.5MM STRAIGHT SN	AMP	CON3
6	6630JB8007L	CONNECTOR (CIRC), WAFER	917790-1 AMP I2P 2.5MM STRAIGHT SN	AMP	CON4
7	6630JB8010A	CONNECTOR (CIRC), WAFER	917791-1 AMP I3P 2.5MM STRAIGHT SN	AMP	CON5
8	01ZZJB2060S	IC, DRAWING	TMF87PM84IN 64P SDIP ST OTP 05LED NDD-PJT BASIC, 05MD K/S	TOSHIBA	IC1
8	01ZZJB2058J	IC, DRAWING	TMF87PM84IN 64P SDIP ST OTP 05LED NDD(BASIC), VIKING(DLX) GPQR	TOSHIBA	IC1
8	01ZZJB2058V	IC, DRAWING	TMF87PM84IN 64P SDIP ST OTP 05LED NDD(BASIC), VIKING(DLX) IBCDEFN	TOSHIBA	IC1
9	01PMGSK001A	IC, POWER MANAGEMENT	STR-6635IL SANKEN 5PIN TO220 ST SMPS 1 CHIP	SANKEN	IC2
10	01PMGNE001A	IC, POWER MANAGEMENT	PS2561-1 NEC 4P, DIP BK = TLP762.F	NEC	IC3
11	01KE431000A	IC, KEC	K1A431 3 PIN TP - - -	KEC	IC4
12	01KE780500Z	IC, LINEAR	K1A7805PI - - - -	KEC	IC5
13	01KE650030C	IC, KEC	K1D65003AF 16SOP BK 7CH DRIVER	KEC	IC6
14	01KE704200A	IC, KEC	K1A7042P KEC 3P BK RESET	KEC	IC9
15	01T0777400A	IC, DRAWING	TA7774AP 16, SDIP BK DRIVE, IC STEPPING MOTOR	TOSHIBA	IC10
16	01RH934600D	IC, ROM	BR93LC46RF -W 8PIN SOP BK EEPROM	ROHM	IC12
17	01STLM001A	IC, STANDARD LOGIC	M54563FP MITSUBISHI 20 R/TP CONVERT	MISUBISHI	IC13
18	01KE650030C	IC, KEC	K1D65003AF 16SOP BK 7CH DRIVER	KEC	IC14
19	6920JB2005A	RELAY	ALE15B12 MATSUSHITA 250VAC 16A 12VDC IA NO VENTING	MASUSHITA	
	6920JB2005B	RELAY	G5J5-1A-NT OMRON 250VAC 16A 12VDC IA NO VENTING	OMRON	RY1,4
	6920JB2005C	RELAY	DHIU II DEC 250VAC 16A 12VDC IA VENTING	DAIICHI	
20	6920JB2004D	RELAY	DHI2D1-0-0 (JAPAN) DEC 250VAC 10A 12VDC IA NO VENTING	DAIICHI	RY2
	6920JB2004A	RELAY	ALE15B12 MATSUSHITA 250VAC 16A 12VDC IA NO VENTING	MASUSHITA	
21	6920JB2005B	RELAY	G5J5-1A-NT OMRON 250VAC 16A 12VDC IA NO VENTING	OMRON	RY2(EXPORT)
	6920JB2005C	RELAY	DHIU II DEC 250VAC 16A 12VDC IA VENTING	DAIICHI	
21	6920JB2003E	RELAY	G5NB-1A-E(CHINA) OMRON 250VAC 5A 12VDC IA NO VENTING	OMRON	
22	6920ALZ001A	RELAY	ALZ12B12 NAIS 250VAC 16A 12VDC IC NO VENTING	NAIS	RY3
23	6920JB2009B	RELAY	G5SB-14 OMRON 250VAC 5A 12VDC IC NO-VENTING	OMRON	RY5(H/BAR)
24	6920JB2009B	RELAY	G5SB-14 OMRON 250VAC 5A 12VDC IC NO-VENTING	OMRON	RY6
25	6920JB2004D	RELAY	DHI2D1-0-0 (JAPAN) DEC 250VAC 10A 12VDC IA NO VENTING	DAIICHI	RY7
	6920JB2004A	RELAY	ALE15B12 MATSUSHITA 250VAC 16A 12VDC IA NO VENTING	MASUSHITA	
26	6920JB2005B	RELAY	G5J5-1A-NT OMRON 250VAC 16A 12VDC IA NO VENTING	OMRON	RY7(EXPORT)
	6920JB2005C	RELAY	DHIU II DEC 250VAC 16A 12VDC IA VENTING	DAIICHI	
26	6920JB2003E	RELAY	G5NB-1A-E(CHINA) OMRON 250VAC 5A 12VDC IA NO VENTING	OMRON	
27	6212BA3041A	RESONATOR, CERAMIC	CSTLSAM00653-A0 MURATA 4.00MHZ +/- 0.5% TA 15PF	MURATA	OSC1
28	6102JB8001A	VARISTOR	SVC621D-14A SAMMHA UL/VDE BK 620V	SAW WHA, IL JIN	VA1
29	6102JB8001E	VARISTOR	SVC271D-14A SAMMHA UL/VDE BK 270V	SAW WHA, IL JIN	VA1
30	0DR107009AA	DIODE, RECTIFIERS	FR107 TP DELTA D041 1000V IA 3	DELTA	D1,2,12,13,14,15
31	0DRSA00090A	DIODE, RECTIFIERS	RL3 SANKEN BK NON 350V 3.5A 80A 50NSEC 0.1MA	SANKEN	D3
32	0DRSA00090A	DIODE, RECTIFIERS	RL3 SANKEN BK NON 350V 3.5A 80A 50NSEC 0.1MA	SANKEN	D4
33	0DB360000AA	DIODE, RECTIFIERS	D35BA60 BK SHINDENGEN 600V 4A	SHINDENGEN	BD1
34	0DD400409AA	DIODE, RECTIFIERS	IN4004 PYUNG CHANG TP26 D041 400V IA 30A 75NS 5UA	DELTA, PYUNGCHANG	D5-8
35	0CE476ZV6E0	CAPACITOR, FIXED ELECTROLYTIC	47UF HE 450V 20% BULK SNAP IN	RUBYCON, SAMMHA	CE1(105)
36	0CE686ZU6E0	CAPACITOR, FIXED ELECTROLYTIC	68UF MMC 400V 20% BULK SNAP IN	RUBYCON, SAMMHA	CE1(105)
37	0CE226ZK638	CAPACITOR, FIXED ELECTROLYTIC	22UF YXA 50V 20% FMS TP 5	RUBYCON, SAMMHA	CE2(105)
38	0CE108ZH610	CAPACITOR, FIXED ELECTROLYTIC	1000UF YXG 25V 20% FL BULK	RUBYCON, SAMMHA	CE3(105)
39	0CE108ZJ610	CAPACITOR, FIXED ELECTROLYTIC	1000UF YXG 35V 20% FL BULK	RUBYCON, SAMMHA	CE4(105)
40	0CE227ZF638	CAPACITOR, FIXED ELECTROLYTIC	220UF YK 16V 20% FMS TP 5	RUBYCON, SAMMHA	CE5(85)
41	0CE227XH638	CAPACITOR, FIXED ELECTROLYTIC	220UF RD 25V 20% FMS TP 5	RUBYCON, SAMMHA	CE9,10(105)
42	0CE105ZK638	CAPACITOR, FIXED ELECTROLYTIC	1UF YK 50V 20% FMS TP 5	RUBYCON, SAMMHA	CE13(85)
43	0CE106ZK638	CAPACITOR, FIXED ELECTROLYTIC	10UF YK 50V 20% FMS TP 5	RUBYCON, SAMMHA	CE6-8,11,12
44	0CE476GH638	CAPACITOR, FIXED ELECTROLYTIC	47UF SMS, SG 25V 20% FMS TP 5	RUBYCON, SAMMHA	CE14
45	0CK471DK96A	CAPACITOR, FIXED CERAMIC(HIGH DIELECTRIC)	0.00047UF 2012 50V 80%, -20% R/TP X7R	MURATA	CC1
46	0CK221Q2510	CAPACITOR, FIXED CERAMIC(HIGH DIELECTRIC)	220P 2KV K B S	SAW WHA, DOOSAN	CC2
47	0CK224DK94A	CAPACITOR, FIXED CERAMIC(HIGH DIELECTRIC)	220NF 2012 50V 80%, -20% F(Y5V) R/TP	MURATA	CC3
48	0CK104DK94A	CAPACITOR, FIXED CERAMIC(HIGH DIELECTRIC)	100NF 2012 50V 80%, -20% R/TP F(Y5V)	MURATA	CC4-6,8,9,7
49	0CK223DK96A	CAPACITOR, FIXED CERAMIC(HIGH DIELECTRIC)	22NF 2012 50V 80%, -20% R/TP X7R	MURATA	CC10,12-16,18,20-22
50	0CK102DK96A	CAPACITOR, FIXED CERAMIC(HIGH DIELECTRIC)	1NF 2012 50V 80%, -20% R/TP X7R	MURATA	CC17,19,11
51	0CC22418670	CAPACITOR, FIXED FILM	0.22UF D 275V 20% M/PP NI R	PILKOR	CM2
52	0CF33408670	CAPACITOR, FIXED FILM	330NF 0 275V 20% BULK M/PP NI	PILKOR	CM1
53	0CC4732Y430	CAPACITOR, FIXED FILM	47000PF S 630V J M/PE NI R	SEIL	CM3
54	0RW3303J609	RESISTOR, FIXED POWER COATED WIRE-WOUND	330K OHM 1 W 5% TA52	SMART, CHOHYANG	R1
55	0FD5603H609	RESISTOR, FIXED CARBON FILM	560K OHM 1/2 W 5% TA52	SMART, CHOHYANG	R2
56	0RF55602K641	RESISTOR, FIXED METAL OXIDE FILM	56K OHM 2 W 5.00% F20	SMART, CHOHYANG	R3
57	0FD6801G609	RESISTOR, FIXED CARBON FILM	6.8K OHM 1/4 W 5.00% TA52	SMART, CHOHYANG	R4
58	0FD1200G609	RESISTOR, FIXED CARBON FILM	120 OHM 1/4 W 5.00% TA52	SMART, CHOHYANG	R5
59	0FD1000G609	RESISTOR, FIXED CARBON FILM	100 OHM 1/4 W 5.00% TA52	SMART, CHOHYANG	R5
60	0FD6800G609	RESISTOR, FIXED CARBON FILM	680 OHM 1/4 W 5.00% TA52	SMART, CHOHYANG	R6

EXPLANATION FOR MICOM CIRCUIT

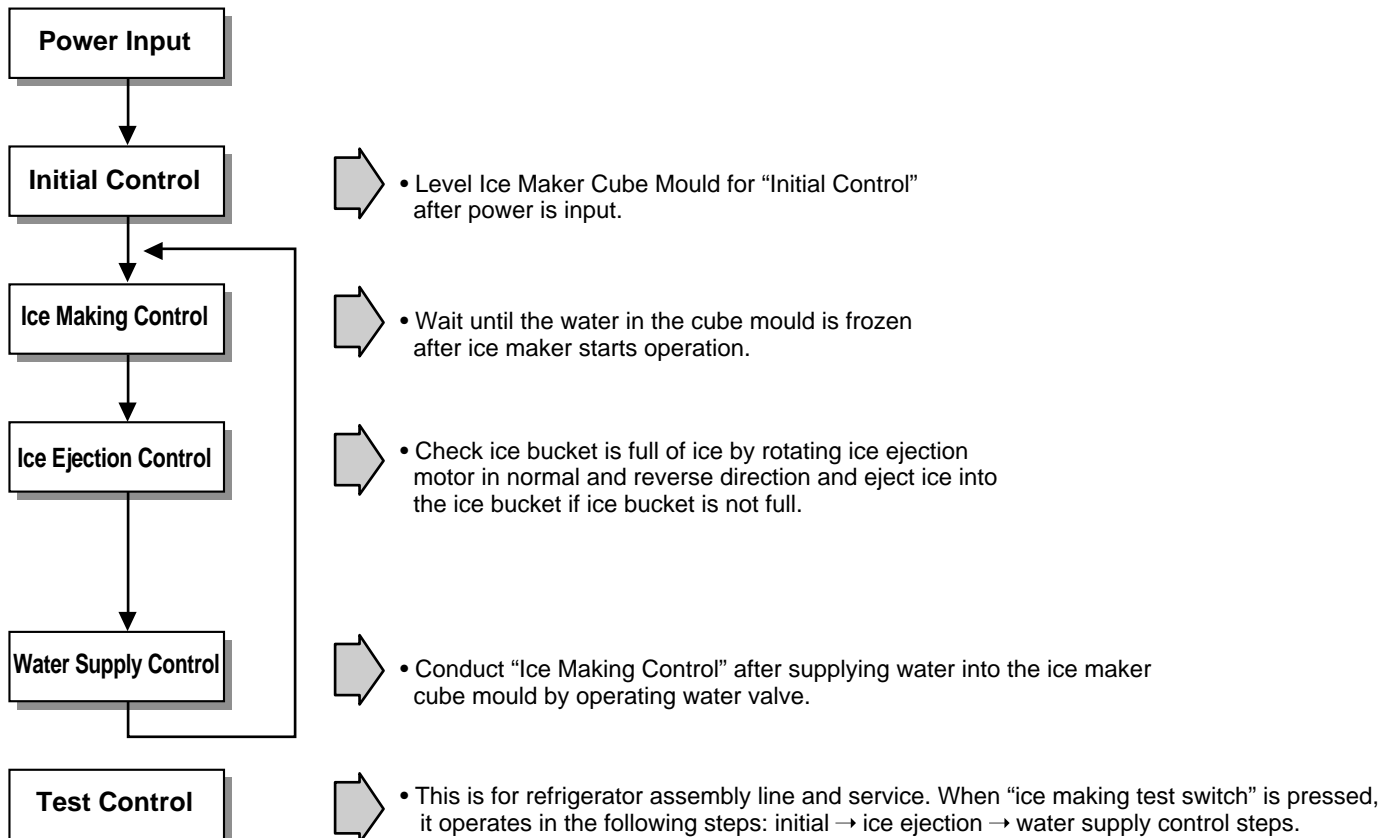
<GW-B/C227: Bar-LED>

No	P/NO	DESCRIPTION	SPEC	MAKER	REMARK
61	ORW010J609	RESISTOR, FIXED POWER COATED WIRE-WOUND	1 OHM 1/4 W 5% TA52 (NON-INDUCTIVE)	SMART, CHO-HYANG	ROCP
62	ORW0560J609	RESISTOR, FIXED POWER COATED WIRE-WOUND	0.56 OHM 1/4 W 5% TA52 (NON-INDUCTIVE)	SMART, CHO-HYANG	ROCP
63	ORD1801G609	RESISTOR, FIXED CARBON FILM	1.8K OHM 1/4 W 5.00% TA52	SMART, CHO-HYANG	RB
64	ORD1002G609	RESISTOR, FIXED CARBON FILM	10K OHM 1/4 W 5% TA52	SMART, CHO-HYANG	R10, 51, 52, 53
65	ORD4701G609	RESISTOR, FIXED CARBON FILM	4.7K OHM 1/4 W 5% TA52	SMART, CHO-HYANG	R12, 33, 39, 40, 46
66	ORD3600H609	RESISTOR, FIXED CARBON FILM	360 OHM 1/2 W 5% TA52	SMART, CHO-HYANG	R23, 24, 55
67	ORD1001G609	RESISTOR, FIXED CARBON FILM	1K OHM 1/4 W 5% TA52	SMART, CHO-HYANG	R9, 17
68	ORH1000L622	RESISTOR, METAL GLAZED (CHIP)	100 OHM 1/8 W 5% 2012 R/TP	ROHM	R27
69	ORH2200L622	RESISTOR, METAL GLAZED (CHIP)	220 OHM 1/8 W 5% 2012 R/TP	ROHM	R19
70	ORH1001L622	RESISTOR, METAL GLAZED (CHIP)	1K OHM 1/8 W 5% 2012 R/TP	ROHM	R18
71	ORH1004L622	RESISTOR, METAL GLAZED (CHIP)	1M OHM 1/8 W 5% 2012 R/TP	ROHM	R11
72	ORH1002L622	RESISTOR, METAL GLAZED (CHIP)	10K OHM 1/8 W 5% 2012 R/TP	ROHM	R35, 42
73	ORH4701L622	RESISTOR, METAL GLAZED (CHIP)	4.7K OHM 1/8 W 5% 2012 R/TP	ROHM	R13-16, 20, 21, 22, 54, 56
74	ORH2001L622	RESISTOR, METAL GLAZED (CHIP)	2K OHM 1/8 W 5% 2012 R/TP	ROHM	R25, 26
75	ORH3300L622	RESISTOR, METAL GLAZED (CHIP)	330 OHM 1/8 W 5% 2012 R/TP	ROHM	R43, 36
76	ORN1002G409	RESISTOR, FIXED METAL FILM	10K OHM 1/4 W 1.00% TA52	SMART, CHO-HYANG	RT1
77	ORD1002G609	RESISTOR, FIXED CARBON FILM	10K OHM 1/4 W 5% TA52	SMART, CHO-HYANG	RCR1
78	ORD1202G609	RESISTOR, FIXED CARBON FILM	12K OHM 1/4 W 5% TA52	SMART, CHO-HYANG	RCR1
79	ORD8201G609	RESISTOR, FIXED CARBON FILM	8.2K OHM 1/4 W 5.00% TA52	SMART, CHO-HYANG	RCR1
80	ORD3901G609	RESISTOR, FIXED CARBON FILM	3.9K OHM 1/4 W 5% TA52	SMART, CHO-HYANG	R34, 41
81	ORD1501H609	RESISTOR, FIXED CARBON FILM	1.5K OHM 1/2 W 5% TA52	SMART, CHO-HYANG	R37, 44
82	ORD2001G609	RESISTOR, FIXED CARBON FILM	2K OHM 1/4 W 5% TA52	SMART, CHO-HYANG	R28-32, 38, 45, 47-50
83	ORN1622G409	RESISTOR, FIXED METAL FILM	16.2K OHM 1/4 W 1.00% TA52	SMART, CHO-HYANG	RF1
84	ORN2612G409	RESISTOR, FIXED METAL FILM	26.1K OHM 1/4 W 1.00% TA52	SMART, CHO-HYANG	RF1, RF1, RF2
85	ORN9101G409	RESISTOR, FIXED METAL FILM	9.1K OHM 1/4 W 1.00% TA52	SMART, CHO-HYANG	RF2
86	ORN2401G409	RESISTOR, FIXED METAL FILM	2.4K OHM 1/4 W 1.00% TA52	SMART, CHO-HYANG	RF3
87	ORD1201G609	RESISTOR, FIXED CARBON FILM	1.2K OHM 1/4 W 5% TA52	SMART, CHO-HYANG	(R1)J1
88	ORD1201G609	RESISTOR, FIXED CARBON FILM	1.2K OHM 1/4 W 5% TA52	SMART, CHO-HYANG	(R1)J2
89	OTRKE00008A	TRANSISTOR, BIPOLARS	KEC KTBI51 BK T0126 60V 5A	KEC	Q2, 4
90	OTR319809AA	TRANSISTOR	KTC3198-TP-Y (KTC1815)KEC	KEC	Q3, 5
91	OTR106009AC	TRANSISTOR	KRA 106M(KRA2206) KEC TP T092M 50V 100MA	KEC	Q6
92	OTR106009AF	TRANSISTOR	KRC 106M KEC TP T092M 50V 100MA	KEC	Q7
93	6210JB8001A	FILTER (CIRC), EMC	BFS3510AD SAMMHA 52 -	SAW WHA	FBI
94	6600RRT001W	SWITCH, TACT	THV5026AA POSTECH 12V DC 50MA TAPING	POSTECH	SW1
95	6854B50001A	JUMP WIRE	0.6MM (52)MM TP TAPING SN	DAE A LEAD	J01-25
96	6854B50001A	JUMP WIRE	0.6MM (52)MM TP TAPING SN	DAE A LEAD	JP1
97	6854B50001A	JUMP WIRE	0.6MM (52)MM TP TAPING SN	DAE A LEAD	JP2
98	6854B50001A	JUMP WIRE	0.6MM (52)MM TP TAPING SN	DAE A LEAD	OP1
99	6854B50001A	JUMP WIRE	0.6MM (52)MM TP TAPING SN	DAE A LEAD	(R1)J1
100	6854B50001A	JUMP WIRE	0.6MM (52)MM TP TAPING SN	DAE A LEAD	(R1)J2
101	6854B50001A	JUMP WIRE	0.6MM (52)MM TP TAPING SN	DAE A LEAD	JF1, JF2
102	6908JB3002A	BUZZER	BM-20K BUJEON PIEZO 2KHZ 80DB	BUJEON	BUZZER
103	6200JB8009B	FILTER (CIRC), EMC	CH940050 TNC BK -	TNC	L1
104	6200JB8007X	FILTER (CIRC), EMC	UV11-05320 TNC BK 0.5A 320MH	TNC	L2
105	0LR1001M4F0	INDUCTOR, RADIAL LEAD	1000UH 20% R 6X12.5 BULK	TNC	L3, 4
106	3J02447C	FUSE, DRAWING	15A 250V - EF	SAM JU	FUSE1
107	6901JB8001A	FUSE ASSEMBLY	KORE-PJT N/S	SAM JU	FUSE HOLDER
108	0F55001B502	FUSE, SLOW BLOW	5000MA 250 V 5.2X20 LD/GL UL / CSA	SAM JU	FUSE2
109	0001030F	CONNECTOR (CIRC), WAFER	GP881191-2 HAN KUK DAN JA NA NA NA	KET	TAB1, 2
110	4920JB3007A	HEAT SINK	23.3*17*25 DRIVE IC STR R-S64, 65, 73 2PIN I-SCREW 3MM	TAE SUNG	(IC2)
111	19BF0302418	SCREW TAP TITE(S), BINDING HEAD	+ D3.0 L8.0 MSWR3/FZY	-	(IC2)
112	9VWF0120000	SOLDER (ROSN WIRE) R50	DI.20	-	-
113	49111004	SOLDER, SOLDERING	NA HEESUNG METAL BAR SN 63% NA	HEE SUNG	-
114	59333105	FLUX	SG; 0.825-0.830 KOREA F.H-206	KOKI	-
115					
116					

ICE MAKER AND DISPENSER WORKING PRINCIPLES AND REPAIR

1. Working Principles

1-1. Ice Maker Working Principles



1-2. Dispenser Working Principles

1. This function is available in Model GW-P227, GW-L227 where water and ice are available without opening freezer compartment door.
2. "Crushed Ice" is automatically selected when power is initially applied or reapplied after power cut.
3. When dispenser selection switch is continuously pressed, light is on in the following sequence: "Water" → "Cube Ice" → "Crushed Ice".
4. Lamp is on when dispenser button is pressed.
5. In case of crushed ice mode, when dispenser button is pressed, dispenser solenoid and geared motor work so that crushed ice can be dispensed if there is ice in the ice bank.
6. In case of cubed ice mode, when dispenser button is pressed, cube ice solenoid and geared motor work so that cube ice can be dispensed if there is ice in the ice bank.
7. In case of water mode, when dispenser button is pressed, water valve opens and water is supplied if water valve is normally installed on the right side of the machine room.
8. Ice and water are not available when freezer door is open.

ICE MAKER AND DISPENSER WORKING PRINCIPLES AND REPAIR

2. Function of Ice Maker

2-1. Initial Control Function

1. When power is initially applied or reapplied after power cut, it detects level of ice maker cube mould after completion of MICOM initialization. The detecting lever moves up and down.
2. The level of ice maker cube mould is judged by output signal, high and low signal, of Hall IC. Make the cube mould to be horizontal by rotating ice ejection motor in normal or reverse direction so that High/Low signal can be applied to MICOM Pin No. 42.(bar LED: Pin NO. 46)
3. If there is no change in signals one minute after the geared motor starts to operate, it stops icemaker operation and check the signal every hour. It resets initialization of icemaker when it becomes normal.
4. It judges that the initial control is completed when it judges the ice maker cube mould is horizontal.
5. Ice ejection conducts for 1 cycle irrespect of ice in the ice bucket when power is initially applied.

2-2. Water Supply Control Function

1. This is to supply water into the ice maker cube mould by operating water valve in the machine room when ice ejection control is completed and ice maker mould is even.
2. The quantity of water supplied is determined by DIP switch and time.

<Water Supply Quantity Table>

No	DIP SWITCH SETTING		WATER SUPPLY TIME	REMARKS
	S1	S2		
1	OFF	OFF	4.5 SEC	* The quantity of water supplied depends on DIP switch setting conditions and water pressure as it is a direct tap water connection type. (the water supplied is generally 60 cc to 100 cc) * DIP switch is on the main PCB.
2	ON	OFF	4.0 SEC	
3	OFF	ON	5.5 SEC	
4	ON	ON	6.5 SEC	

3. If water supply quantity setting is changed while power is on, water supplies for the amended time. If DIP switch is changed during water supply, water shall be supplied for the previous setting time. But it will supply for the amended time from the next supply.
4. When water supply signal is applied to water and ice valves at the same time during water supply, water shall be supplied to water valve. If water supply signal is applied to ice valve during water supply, water shall be supplied to both water and ice valves.

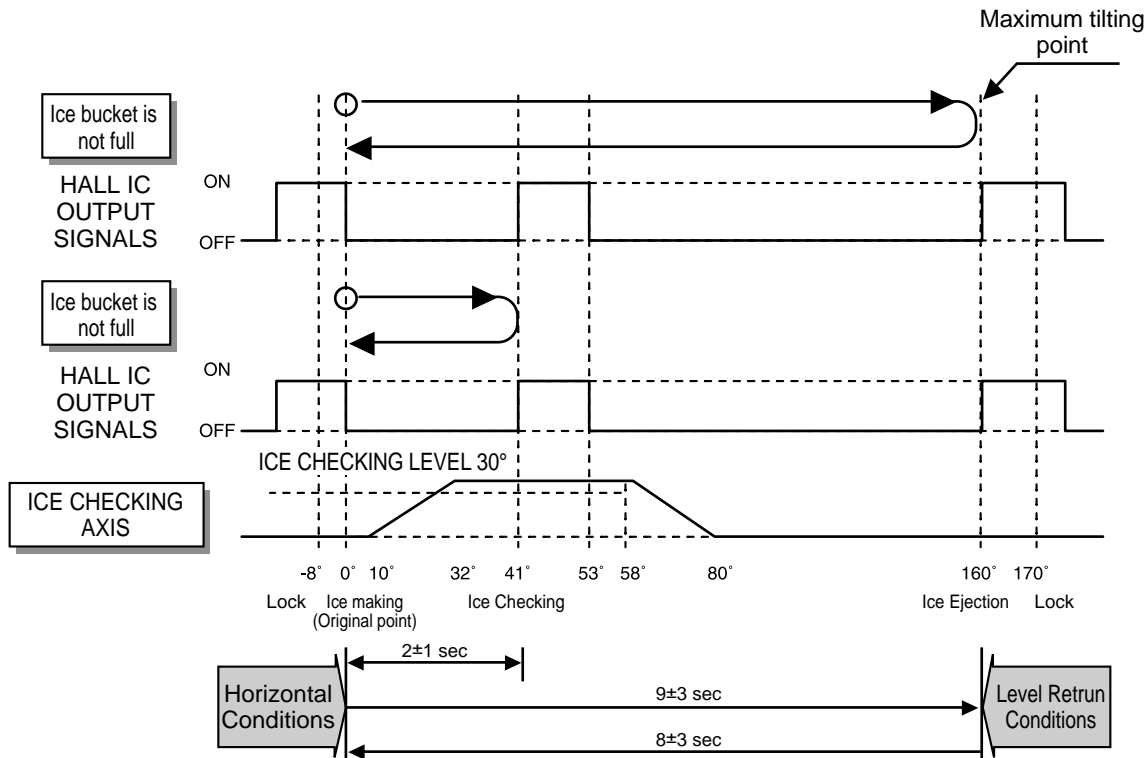
2-3. Ice Making Control Function

1. Ice making control is carried out from the completion of water supply to the completion of ice making in the cube mould. Ice making sensor detects the temperature of cube mould and completes ice making. (ice making sensor is fixed below ice maker cube mould)
2. Ice making control starts after completion of water supply control or initial control.
3. At first, It is judged that ice making is completed when ice making sensor temperature reaches at -8°C after 70 minutes when water is supplied to ice maker cube mould.
4. Finally, It is judged that ice making is completed when ice maker sensor temperature reaches below -12 °C after 20 minutes in condition 3.

ICE MAKER AND DISPENSER WORKING PRINCIPLES AND REPAIR

2-4. Ice Ejection Control Function

1. This is to eject ice from ice maker cube mould after ice making is completed.
2. If Hall IC signal is on within 3.6 seconds after ice ejection motor rotates in normal direction, it does not proceed ice ejection but waits. If the ice bucket is full, ice ejection motor rotates in normal direction in every hour to check the condition of ice bucket. If the ice bucket is not full, the water supply control starts after completion of ice ejection control. If the ice bucket is full, ice ejection motor rotates in reverse direction and sops under ice making or waiting conditions.
3. If ice bucket is not full, ice ejection starts. The cube mould tilts to the maximum and ice is separated from the mould and ice checking lever raises.
4. Ice ejection motor stops for 1 second if Hall IC signal changes from OFF (low) to ON (high) after 3.6 seconds when ice ejection motor rotates in normal direction. If there is no change in Hall IC signals within 1 minute after ice ejection motor operates, ice ejection motor stops as ice ejection motor or hall IC is out of order.
5. If ice ejection motor or Hall IC is abnormal, ice ejection motor rotates in normal direction to exercise initial operation. It resets the ice maker if ice ejection motor or Hall IC is normal.
6. The mould stops for 1 second at maximum tilted conditions.
7. The mould returns to horizontal conditions as ice ejection motor rotates in reverse direction.
8. When the mould becomes horizontal, the cycle starts to repeat:
Water Supply → Ice Making → Ice Ejection → Mould Returns to Horizontal



<Timing Chart During Ice Ejection>

ICE MAKER AND DISPENSER WORKING PRINCIPLES AND REPAIR

2-5 Test Function

1. It is to force the operation during operation test, service, and cleaning. The test switch is mounted under the automatic ice maker. The test function starts when the test switch is pressed for more than 0.5 second.
2. Test button does not work during ice ejection and water supply. It works when it is in the horizontal conditions. If mould is full of ice during test function operation, ice ejection control and water supply control do not work.
3. When test switch is pressed for more than 0.5 second in the horizontal conditions, ice ejection starts irrespective of the mould conditions. Water shall be splashed if test switch is pressed before the water in the mould freezes. Water shall be supplied while the mould returns to the horizontal conditions after ice ejection. Therefore the problems of ice ejection, returning to the horizontal conditions, and water supply can be checked by test switch. When test function performs normally, buzzer sounds and water supply shall carry out. Check it for repair if buzzer does not sound.
4. When water supply is completed, the cycle operates normally as follows: Ice making → Ice ejection → Returning to horizontal conditions → Water supply
5. Remove ice from the ice maker cube mould and press test switch when ice maker cube mould is full of ice as ice ejection and water supply control do not work when cube mould is full of ice.

2-6. Other functions relating to freezer compartment door opening

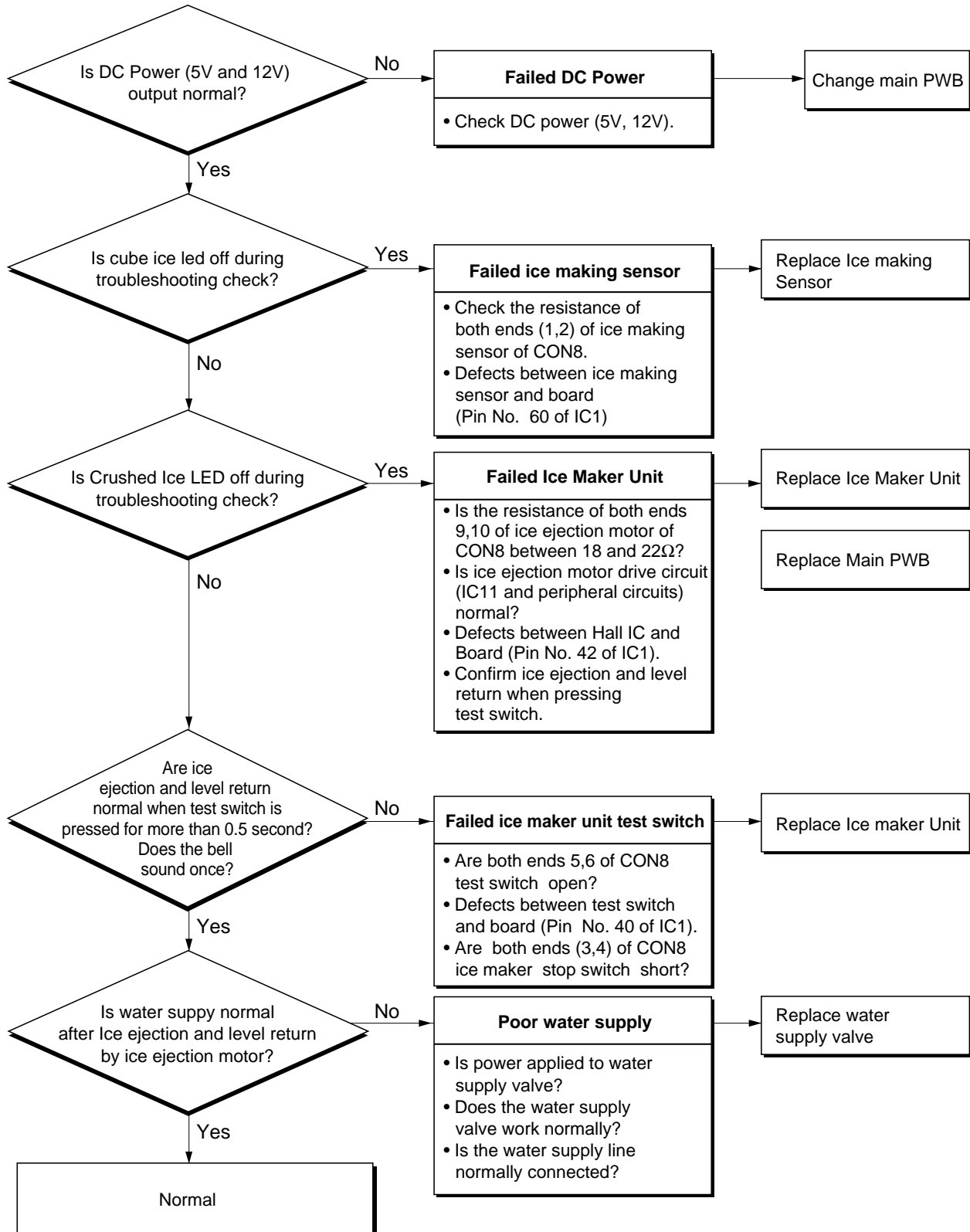
1. When freezer door is open, ice dispenser stops in order to reduce noise and ice drop.
2. When freezer door is open during ice ejection and cube mould returning to horizontal condition, ice ejection and cube mould level return proceed.
3. When freezer door is open, geared motor and cube ice solenoid immediately stop and duct door solenoid stops after 5 seconds.
4. Water dispenser stops in order to protect water drop when freezer door is open.
5. Test function operates normally irrespective of refrigerator compartment door opening.

ICE MAKER AND DISPENSER WORKING PRINCIPLES AND REPAIR

3. Ice Maker Troubleshooting

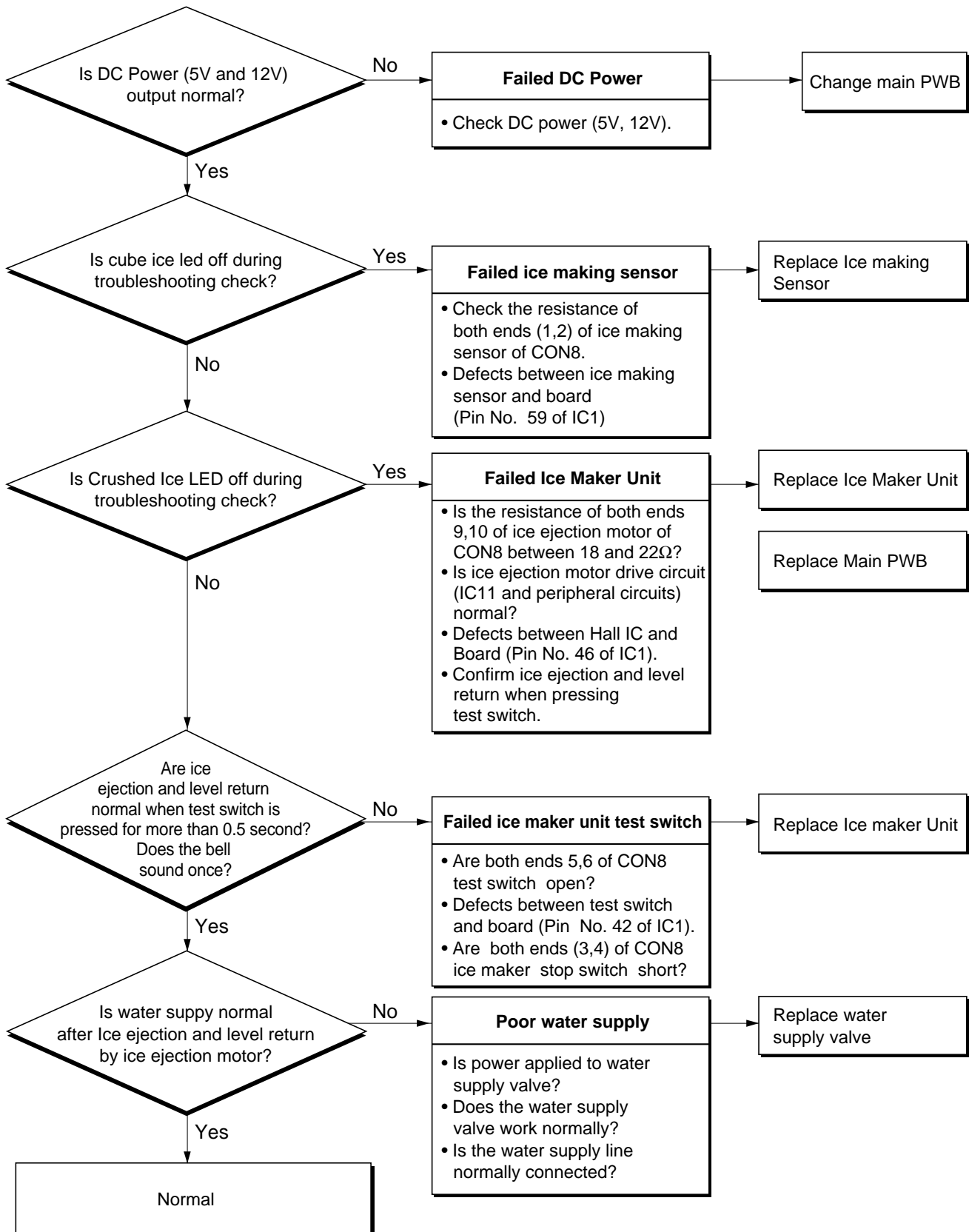
* **Troubleshooting:** it is possible to confirm by pressing freezer and refrigerator temperature control buttons for more than 1 second. (ice maker is normal if all leds are on): refer to trouble diagnosis function in MICOM function 2-8 (page 18)

<GW-P/L227: 88-LED>



ICE MAKER AND DISPENSER WORKING PRINCIPLES AND REPAIR

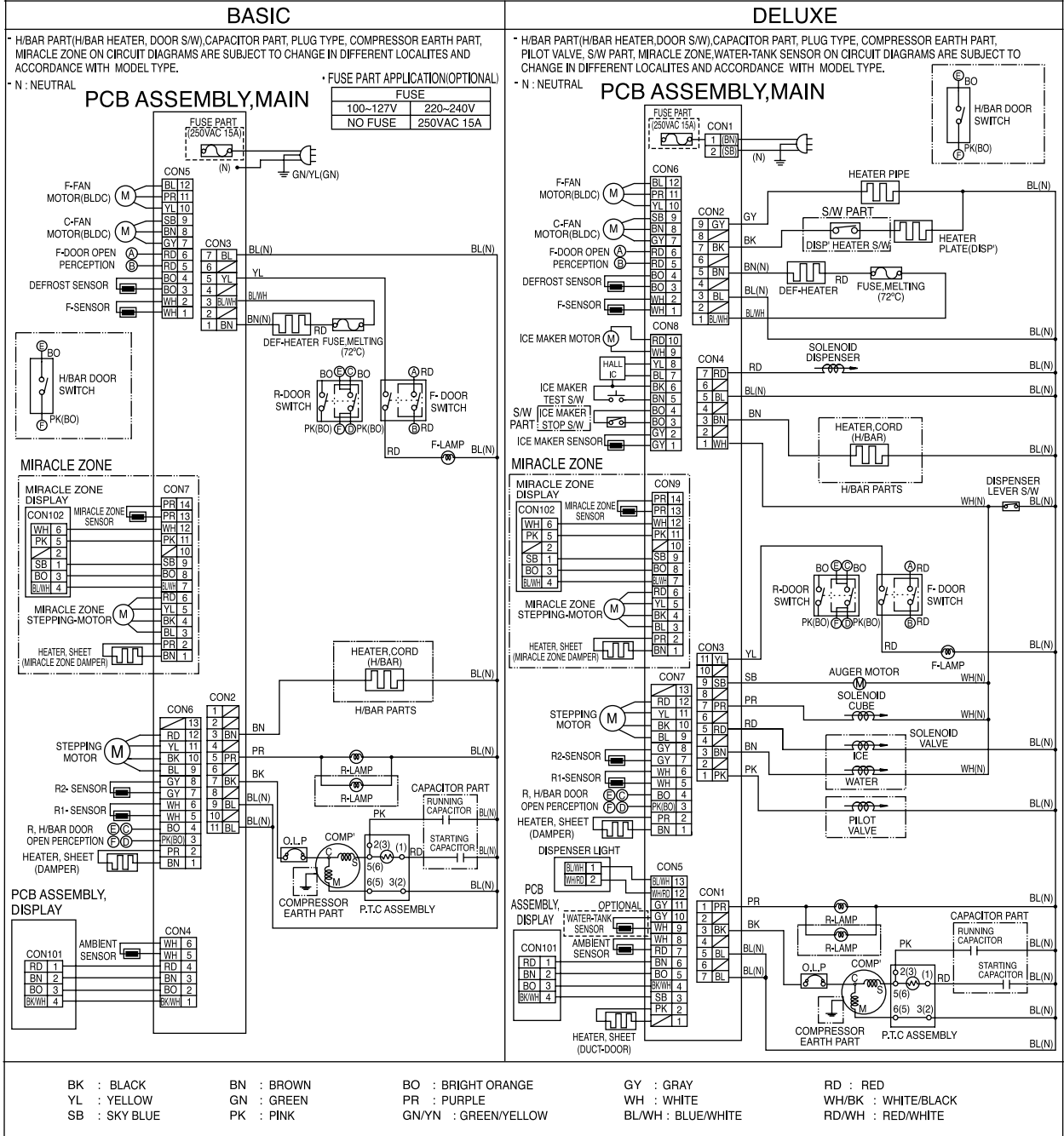
<GW-P/L227: Bar-LED>



CIRCUIT

<GW-P/L/B/C227: 88-LED>

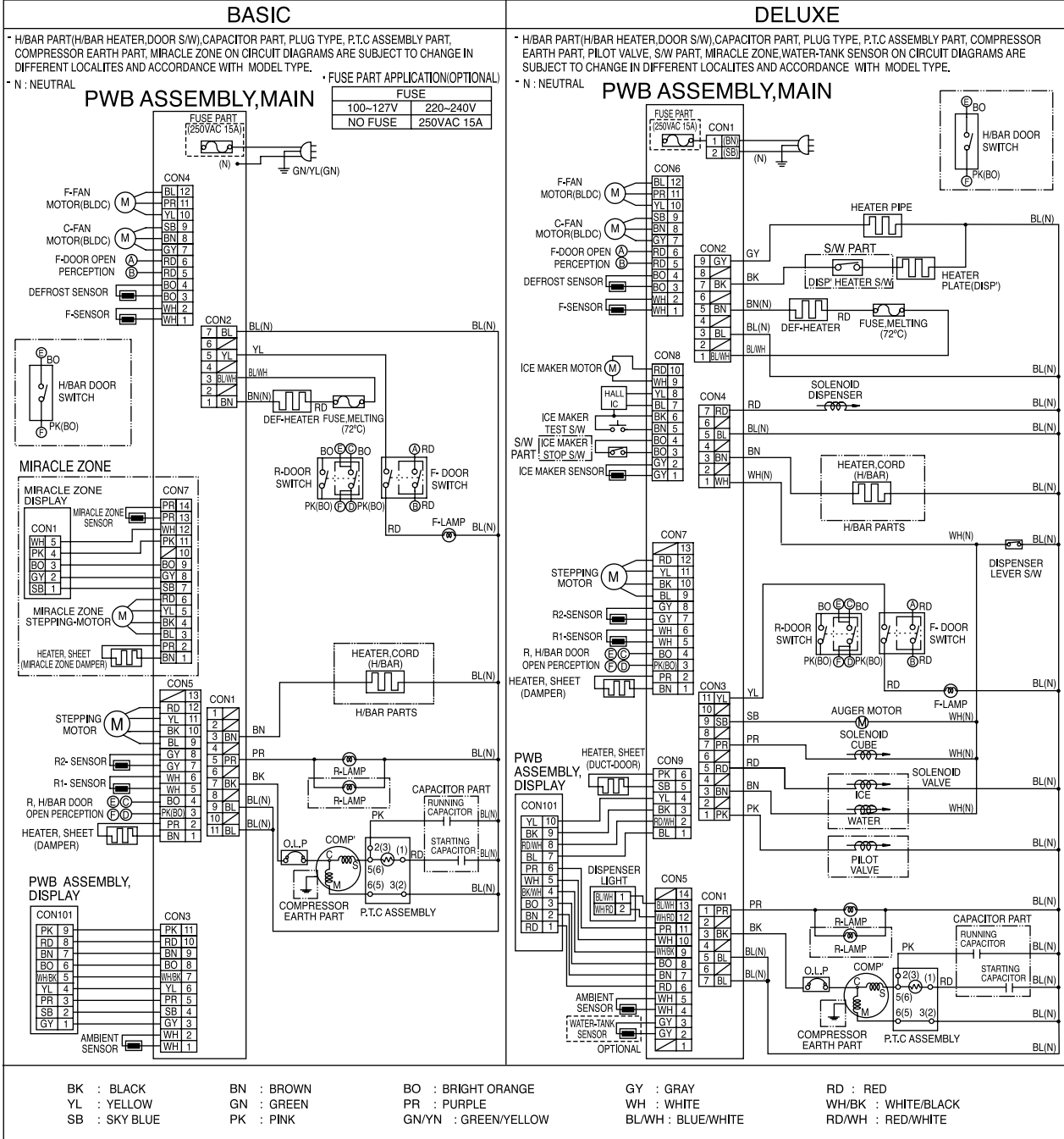
CIRCUIT DIAGRAM



CIRCUIT

<GW-P/L/B/C227: Bar-LED>

CIRCUIT DIAGRAM



TROUBLE DIAGNOSIS

1. TROUBLE SHOOTING

CLAIMS.	CAUSES AND CHECK POINTS.	HOW TO CHECK
<p>1. Faulty start</p>	<p>1) No power on outlet.</p> <p>2) No power on cord.</p> <ul style="list-style-type: none"> - Bad connection between adapter and outlet. (faulty adapter) <ul style="list-style-type: none"> - The Inner diameter of adapter. - The distance between holes. - The distance between terminals. - The thickness of terminal. - Bad connection between plug and adapter (faulty plug). <ul style="list-style-type: none"> - The distance between pins. - Pin outer diameter. <p>3) Shorted start circuit.</p> <ul style="list-style-type: none"> - No power on power cord. <ul style="list-style-type: none"> - Disconnected copper wire. <ul style="list-style-type: none"> - Power cord is disconnected. - Faulty soldering. - Internal electrical short. - Faulty terminal contact. <ul style="list-style-type: none"> - Loose contact. - Large distance between male terminal. - Thin female terminal. - Terminal disconnected. - Bad sleeve assembly. - Disconnected. <ul style="list-style-type: none"> - Weak connection. - Short inserted cord length. - Worn out tool blade. - O.L.P is off. <ul style="list-style-type: none"> - Capacity of O.L.P is small. - Characteristics of O.L.P is bad. - Bad connection. - Power is disconnected. <ul style="list-style-type: none"> - Inner Ni-Cr wire blows out. - Bad internal connection. - Faulty terminal caulking (Cu wire is cut). - Bad soldering. - No electric power on compressor. - Faulty compressor. - Faulty PTC. <ul style="list-style-type: none"> - Power does not conduct. - Damage. - Bad characteristics. - Initial resistance is big. - Bad connection with compressor. <ul style="list-style-type: none"> - Too loose. - Assembly is not possible. - Bad terminal connection. <p>4) During defrost.</p> <ul style="list-style-type: none"> - Start automatic defrost. - Cycle was set at defrost when the refrigerator was produced. 	<p>* Measuring instrument : Multi tester</p> <p>■ Check the voltage. If the voltage is within $\pm 85\%$ of the rated voltage, it is OK.</p> <p>■ Check the terminal movement.</p> <p>■ Check both terminals of power cord. Power conducts : OK. No power conducts : NG</p> <p>■ Check both terminals of O.L.P. If power conducts : OK. If not : NG.</p> <p>■ Check the resistance of both terminals. At normal temperature 6 : OK. If disconnected : ∞.</p>

TROUBLE DIAGNOSIS

CLAIMS.	CAUSES AND CHECK POINTS.	HOW TO CHECK
<p>2. No cooling.</p>	<p>2) Refrigeration system is clogged.</p> <ul style="list-style-type: none"> Moisture clogged. <ul style="list-style-type: none"> Residual moisture in the evaporator. <ul style="list-style-type: none"> Air Blowing. <ul style="list-style-type: none"> Not performed. Too short. Impossible moisture confirmation. Low air pressure. Leave it in the air. <ul style="list-style-type: none"> During rest time. After work. Caps are missed. Residual moisture. <ul style="list-style-type: none"> Not dried in the compressor. Elapsed more than 6 months after drying Caps are missed. No pressure when it is open. No electric power on thermostat. <ul style="list-style-type: none"> Insufficient drier capacity. <ul style="list-style-type: none"> Dry drier - Drier temperature. Leave it in the air. <ul style="list-style-type: none"> Check on package condition. Good storage after finishing. Residual moisture in pipes. <ul style="list-style-type: none"> Caps are missed. <ul style="list-style-type: none"> During transportation. During work. Air blowing. <ul style="list-style-type: none"> Not performed. Performed. <ul style="list-style-type: none"> Too short time. Low air pressure. Less dry air. Moisture penetration - Leave it in the air. - Moisture penetration into the refrigeration oil. Weld joint clogged. <ul style="list-style-type: none"> Short pipe insert. Pipe gaps. <ul style="list-style-type: none"> Too large. Damaged pipes. Too much solder. Drier cloggeing. <ul style="list-style-type: none"> The capillary tube inserted depth. - Too much. Capillary tube melts. - Over heat. Clogged with foreign materials. <ul style="list-style-type: none"> Desiccant powder. Weld oxides. Drier angle. Reduced cross section by cutting. - Squeezed. Foreign material clogging. <ul style="list-style-type: none"> Compressor cap is disconnected. Foreign materials are in the pipe. 	<ul style="list-style-type: none"> ■ Check the clogged evaporator by heating (as soon as the cracking sound begins, the evaporator start freezing) ■ The evaporator does not cool from the beginnig (no evidence of misture attached). The evaporator is the same as before even heat is applied.

TROUBLE DIAGNOSIS

CLAIMS.	CAUSES AND CHECK POINTS.	HOW TO CHECK
<p>3. Refrigeration is weak.</p>	<p>1) Refrigerant Partly leaked. ┌ Weld joint leak. └ Parts leak.</p> <p>2) Poor defrosting capacity.</p> <p style="margin-left: 20px;">┌ Drain path (pipe) clogged. ┌ Inject P/U into drain hose. ┌ Inject through the hole. └ Seal with drain.</p> <p style="margin-left: 60px;">└ Foreign materials penetration. ┌ P/U lump input. └ Screw input. └ Other foreign materials input.</p> <p style="margin-left: 20px;">└ Cap drain is not disconnected.</p> <p style="margin-left: 20px;">┌ Defrost heater does not generate heat. ┌ Parts disconnected. ┌ Heater Sheath ┌ Wire is cut. └ Lead wire. └ Heating wire. └ Contact point between heating and electric wire. └ Dent by fine evaporator. └ Heating wire is corroded └ Water penetration. └ Bad terminal connection.</p>	<p>■ Check visually.</p> <p>■ Check terminal Conduction: OK. No conduction: NG. If wire is not cut, refer to resistance. P=Power V=Voltage R=Resistance</p> $P = \frac{V^2}{R}$ $R = \frac{V^2}{P}$

TROUBLE DIAGNOSIS

CLAIMS.	CAUSES AND CHECK POINTS.	HOW TO CHECK
<p>3. Refrigeration is weak.</p>	<ul style="list-style-type: none"> Residual frost. <ul style="list-style-type: none"> Weak heat from heater. <ul style="list-style-type: none"> Sheath Heater - rated. Heater plate - rated. Too short defrosting time. <ul style="list-style-type: none"> Defrost Sensor. - Faulty characteristics. Seat-D(missing, location, thickness). Structural fault. <ul style="list-style-type: none"> Gasket gap. Air inflow through the fan motor. Bad insulation of case door. No automatic defrosting. Defrost does not return. <p>3) Cooling air leak.</p> <ul style="list-style-type: none"> Bad gasket adhesion <ul style="list-style-type: none"> Gap. Bad attachment. Contraction. Door sag. <ul style="list-style-type: none"> Bad adhesion. Weak binding force at hinge. <p>4) No cooling air circulation.</p> <ul style="list-style-type: none"> Faulty fan motor. <ul style="list-style-type: none"> Fan motor. <ul style="list-style-type: none"> Self locked. Wire is cut. Bad terminal contact. Door switch. <ul style="list-style-type: none"> Faults. <ul style="list-style-type: none"> Contact distance. Button pressure. Melted contact. Contact. Refrigerator and freezer switch reversed. Button is not pressed. <ul style="list-style-type: none"> Poor door attachment. Door liner (dimension). Contraction inner liner. Misalignment. Bad terminal connection. P/U liquid leak. 	<p>■ Check the fan motor conduction: OK. No conduction: NG.</p>

TROUBLE DIAGNOSIS

CLAIMS.	CAUSES AND CHECK POINTS.	HOW TO CHECK
<p>3. Refrigeration is weak.</p>	<p>4) No cooling air circulation.</p> <ul style="list-style-type: none"> Faulty fan motor. — Fan is constrained. <ul style="list-style-type: none"> Fan shroud contact. - Clearance. Damping evaporator contact. Accumulated residual frost. Small cooling air discharge. <ul style="list-style-type: none"> Insufficient motor RPM <ul style="list-style-type: none"> Fan overload. - Fan misuse. Bad low temperature RPM characteristics. Rated power misuse. Low voltage. Faulty fan. <ul style="list-style-type: none"> Fan misuse. Bad shape. Loose connection. - Not tightly connected. Insert depth. Shroud. — Bent. Ice and foreign materials on rotating parts. <p>5) Compressor capacity. <ul style="list-style-type: none"> Rating misuse. Small capacity. Low voltage. </p> <p>6) Refrigerant too much or too little. <ul style="list-style-type: none"> Malfunction of charging cylinder. Wrong setting of refrigerant. Insufficient compressor. - Faulty compressor. </p> <p>7) Continuous operation <ul style="list-style-type: none"> - No contact of temperature controller. - Foreign materials. </p> <p>8) Damper opens continuously. <ul style="list-style-type: none"> Foreign materials jammed. <ul style="list-style-type: none"> P/U liquid dump. EPS water sediment. Screw. Failed sensor. - Position of sensor. Characteristics of damper. <ul style="list-style-type: none"> Bad characteristics of its own temperature. Parts misuse. Change of temperature - Impact characteristics. </p> <p>9) Food storing place. - Near the outlet of cooling air.</p>	<p>■ Check visually after disassembly.</p> <p>■ Check visually after disassembly.</p>

TROUBLE DIAGNOSIS

CLAIMS.	CAUSES AND CHECK POINTS.	HOW TO CHECK
<p>4. Warm refrigerator compartment temperature.</p> <p>5. No automatic operation. (faulty contacts.)</p>	<p>1) Colgged cooling path.</p> <ul style="list-style-type: none"> └ P/U liquid leak. └ Foreign materials. — P/U dump liquid. <p>2) Food storate.</p> <ul style="list-style-type: none"> └ Store hot food. └ Store too much at once. └ Door open. └ Packages block air flow. <p>1) Faulty temperature sensor in freezer or refrigerator compartment.</p> <ul style="list-style-type: none"> └ Faulty contact. └ Faulty temperature characteristics. <p>2) Refrigeration load is too much.</p> <ul style="list-style-type: none"> └ Food. <ul style="list-style-type: none"> └ Too much food. └ Hot food. └ Frequent opening and closing. └ Cool air leak. └ Poor door close. — Partly opens. <p>3) Poor insulation.</p> <p>4) Bad radiation.</p> <ul style="list-style-type: none"> └ High ambient temperature. └ Space is secluded. <p>5) Refrigerant leak.</p> <p>6) Inadequate of refrigerant.</p> <p>7) Weak compressor discharging power.</p> <ul style="list-style-type: none"> └ Different rating. └ Small capacity. <p>8) Fan does not work.</p> <p>9) Button is positioned at "strong."</p>	<p>■ Inspect parts measurements and check visually.</p>
<p>6. Dew and ice formation.</p>	<p>1) Ice in freeezer compartment.</p> <ul style="list-style-type: none"> └ External air inflow. — Rubber motor assembly direction(reverse). └ Door opens but not closes. <ul style="list-style-type: none"> └ Weak door closing power. └ Stopper malfunction. └ Door sag. └ Food hinders door closing. └ Gap around gasket. — Contraction, distortion, loose, door twisted, corner not fully inserted. └ Food vapor. — Storing hot food. — Unsealed food. <p>2) Condensation in the refrigerator compartment.</p> <ul style="list-style-type: none"> └ Door opens but not closes. <ul style="list-style-type: none"> └ Insufficient closing. └ Door sag. └ Food hinders door closing. └ Gasket gap. <p>3) Condensation on liner foam.</p> <ul style="list-style-type: none"> └ Cool air leak and transmitted. <ul style="list-style-type: none"> └ Not fully filled. <ul style="list-style-type: none"> └ Toop table part. └ Out plate R/L part. └ Flange gap. — Not sealed. └ Gasket gap. 	

TROUBLE DIAGNOSIS

CLAIMS.	CAUSES AND CHECK POINTS.	HOW TO CHECK
<p>6. Dew and ice formation.</p>	<p>4) Dew on door.</p> <ul style="list-style-type: none"> — Dew on the duct door. - Duct door heater is cut. — Dew on the dispense recess. <ul style="list-style-type: none"> — Recess Heater is cut. — Duct door is open. / Foreign material clogging. — Dew on the door surface. <ul style="list-style-type: none"> — Not fully filled. <ul style="list-style-type: none"> — Surface. — Liquid shortage. — Corner. — Liquid leak. — P/U liquid contraction. — Dew on the gasket surface. <ul style="list-style-type: none"> — Bad wing adhesion. <ul style="list-style-type: none"> — Wing sag(lower part). — Door liner shape mismatch. — Corner. <ul style="list-style-type: none"> — Too much notch. — Broken. — Home Bar heater is cut. <p>5) Water on the floor.</p> <ul style="list-style-type: none"> — Dew in the refrigerator compartment. — Defrosted water overflows. — Clogged discharging hose. — Discharging hose location. — Evaporation tray located at wrong place. — Tray drip. <ul style="list-style-type: none"> — Damaged. — Breaks, holes. — Small Capacity. — Position of drain. 	
<p>7. Sounds</p>	<p>1) Compressor compartment operating sounds.</p> <ul style="list-style-type: none"> — Compressor sound inserted. <ul style="list-style-type: none"> — Sound from machine itself. — Sound from vibration. <ul style="list-style-type: none"> — Restrainer. — Rubber seat. <ul style="list-style-type: none"> — Too hard. — Distorted. — Aged. — Burnt. — Stopper. — Bad Stopper assembly. <ul style="list-style-type: none"> — Not fit (inner diameter of stopper). — Tilted. — Not — Compressor base not connected. — Bad welding compressor stand(fallen). — Foreign materials in the compressor compartment. — O.L.P. sound. — Chattering sound. — Capacitor noise. — Insulation paper vibration. — Pipe sound. <ul style="list-style-type: none"> — Pipe contacts each other. — Narrow interval. — No vibration damper. <ul style="list-style-type: none"> — Damping rubber-Q. — Damping rubber-S. — Capillary tube unattached. 	

TROUBLE DIAGNOSIS

CLAIMS.	CAUSES AND CHECK POINTS.	HOW TO CHECK
7. Sounds	<p>1) Compressor compartment operating sounds.</p> <ul style="list-style-type: none"> Transformer sound. <ul style="list-style-type: none"> Its own fault. — Core gap. Bad connection. — Correct screw connection. Drip tray vibration sound. <ul style="list-style-type: none"> Bad assembly. Distortion. Foreign materials inside. Back cover machine sound. <ul style="list-style-type: none"> Bad connection. Partly damaged. Condenser drain sound. <ul style="list-style-type: none"> Not connected. Bad pipe caulking. <p>2) Freezer compartment sounds.</p> <ul style="list-style-type: none"> Fan motor sound. <ul style="list-style-type: none"> Normal operating sound. Vibration sound. <ul style="list-style-type: none"> Aged rubber seat. Bad torque for assembling motor bracket. Sounds from fan contact. <ul style="list-style-type: none"> Fan guide contact. Shroud burr contact. Damping evaporator contact. Residual frost contact. <ul style="list-style-type: none"> Poor treatment Cord heater. Narrow evaporator interval. Unbalance fan sounds. <ul style="list-style-type: none"> Unbalance. <ul style="list-style-type: none"> Surface machining conditions. Fan distortion. Misshappen. Burr. Ice on the fan. — Air intake (opposite to motor rubber assembly.) Motor shaft contact sounds. <ul style="list-style-type: none"> Supporter disorted. Tilted during motor assembly. Resonance. Evaporator noise. <ul style="list-style-type: none"> Evaporator pipe contact. — No damping evaporator. Sound from refrigerant. — Stainless steel pipe shape in accumulator. Sound from fin evaporator and pipe during expansion and contraction. <p>3) Bowls and bottles make contact on top shelf.</p> <p>4) Refrigerator roof contact.</p> <p>5) Refrigerator side contact.</p> <p>6) Insufficient Lubricants on door hinge.</p>	

TROUBLE DIAGNOSIS

CLAIMS.	CAUSES AND CHECK POINTS.	HOW TO CHECK
<p>8. Faulty lamp (freezer and refrigerator compartment).</p>	<p>1) Lamp problem. — Filament blows out. — Glass is broken.</p> <p>2) Bad lamp assembly. — Not inserted. — Loosened by vibration.</p> <p>3) Bad lamp socket.</p> <p>— Disconnection. — Bad soldering. — Bad rivet contact.</p> <p>— Short. — Water penetration. — Low water level in tray.</p> <p>— Bad elasticity of contact.</p> <p>— Bad contact (corrosion).</p> <p>4) Door switch. — Its own defect. — Refrigerator and freezer switch is reversed. — Travel distance. — Bad connection. — Bad terminal contact. — P/U liquid leak..</p>	
<p>9. Faulty internal voltage (short).</p>	<p>1) Lead wire is damaged.</p> <p>— Wire damage when assembling P.T.C. Cover. — Outlet burr in the bottom plate. — Pressed by cord heater. lead wire, evaporator pipe.</p> <p>2) Exposed terminal.</p> <p>— Compressor Compartment terminal. - Touching other components. — Freezer compartment terminal. - Touching evaporator pipe.</p> <p>3) Faulty parts.</p> <p>— Transformer. — Coil contacts cover. — Welded terminal parts contact cover.</p> <p>— Compressor. — Bad coil insulation.</p> <p>— Plate heater.</p> <p>— Melting fuse. — Sealing is broken. — Moisture penetration.</p> <p>— Cord heater. — Pipe damaged. — Moisture penetration. — Bad sealing.</p> <p>— Sheath heater.</p>	<p>■ Connect conduction and non-conduction parts and check with tester. Conduction: NG. Resistance∞: OK.</p>

TROUBLE DIAGNOSIS

CLAIMS.	CAUSES AND CHECK POINTS.	HOW TO CHECK
<p>10. Structure, appearance and others.</p>	<p>1) Door foam.</p> <ul style="list-style-type: none"> Sag. <ul style="list-style-type: none"> Weak torque of hinge connection. <ul style="list-style-type: none"> Bolt is loosened during transportaion. Not tightly fastened. Screw worn out . Weak gasket adhesion. <ul style="list-style-type: none"> Adhesion surface. Fixed tape. <ul style="list-style-type: none"> Not well fixed. Noise during operation. <ul style="list-style-type: none"> Hinge interference. <ul style="list-style-type: none"> Bigger door foam. Hinge-Pin tilted-Poor flatness. No washer. No grease and not enough quantity. Malfunction. <ul style="list-style-type: none"> Not closed Refrigerator compartment is opened when freezer compartment is closed (faulty stopper). <ul style="list-style-type: none"> Interference between door liner and inner liner. <ul style="list-style-type: none"> Stopper worn out. Bad freezer compartment door assembly. No stopper. <p>2) Odor.</p> <ul style="list-style-type: none"> Temperature of refrigerator compartment. <ul style="list-style-type: none"> High. <ul style="list-style-type: none"> Faulty damper control. Button is set at "weak". Door is open (interference by food). Deodorizer. <ul style="list-style-type: none"> No deodorizer. Poor capacity. Food Storage. <ul style="list-style-type: none"> Seal condition. Store special odorous food. Long term storage. Others. <ul style="list-style-type: none"> Odors from chemical products. 	

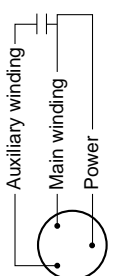
TROUBLE DIAGNOSIS

2. Faults

2-1. Power

Problems	Causes	Checks	Measures	Remarks
No power on outlet.	<ul style="list-style-type: none"> - Power cord cut. - Faulty connector insertion. - Faulty connection between plug and adapter. 	<ul style="list-style-type: none"> - Check the voltage with tester. - Check visually. - Check visually. 	<ul style="list-style-type: none"> - Replace the components. - Reconnect the connecting parts. - Reconnect the connecting parts. 	
Fuse blows out.	<ul style="list-style-type: none"> - Short circuit by wrong connection. - Low voltage products are connected to high voltage. - Short circuit by insects. - Electricity leakage. - High voltage. - Short circuit of components (tracking due to moisture and dust penetration). 	<ul style="list-style-type: none"> - Check the fuse with tester or visually. - Check the input volt are with tester (between power cord and products). - Check the resistance of power cord with testerf (if it is 0Ω, it is shorted). 	<ul style="list-style-type: none"> - Find and remove the cause of problem(ex. short, high voltage, low voltage). - Replace with rated fuse. 	<ul style="list-style-type: none"> - Replace with rated fuse after confirming its specification. ■ If fuse blows out frequently, reconfirm the cause and prevent.

2-2. Compressor

Problems	Causes	Checks	Measures	Remarks
Compressor does not operate.	<ul style="list-style-type: none"> - Faulty PTC. - Compressor is frozen. 	<ul style="list-style-type: none"> - Check the resistance. Value:∞ is defective. - If compressor assembly parts are normal(capacitor, PTC, OLP), apply power directly to the compressor to force operation. 	<ul style="list-style-type: none"> - If resistance is infinite, replace it with new one. - If it is not infinite, it is normal. - Check other parts. - During forced operation: - Operates: Check other parts. - Not operate: Replace the frozen compressor with new one, weld, evacuate, and recharge refrigerant. 	
		<p>OLP</p>  <p>It starts as soon as it is contacted.</p>	<ul style="list-style-type: none"> • Refer to weld repair procedures. 	

TROUBLE DIAGNOSIS

2-3. Temperature

Problems	Causes	Checks	Measures	Remarks
High temperature in the freezer compartment.	Poor cool air circulation due to faulty fan motor.	<ul style="list-style-type: none"> - Lock — Check resistance with a tester. 0Ω: short. ∞Ω: cut. - Rotate rotor manually and check rotation. - Wire is cut. - Bad terminal contact: Check terminal visually. - Fan constraint. — Fan shroud contact: Confirm visually. — Fan icing: Confirm visually. 	<ul style="list-style-type: none"> - Replace fan motor. - Reconnect and reinsert. - Maintain clearance and remove ice (Repair and/or replace shroud if fan is constrained by shroud deformation). 	
	Faulty fan motor due to faulty door switch operation.	<ul style="list-style-type: none"> - Iced button (faulty) operation: Press button to check - Faulty button pressure and contact: Press button to check operation. - Door cannot press door switch button: Check visually. 	<ul style="list-style-type: none"> - Confirm icing causes and repair. - Replace door switch. - Door sag: fix door. - Door liner bent: replace door or attach sheets. 	
	Bad radiation conditions in compressor compartment.	<ul style="list-style-type: none"> - Check the clearance between the refrigerator and wall (50 mm in minimum). - Check dust on the grill in compressor compartment. - Check dust on the coils condenser. 	<ul style="list-style-type: none"> - Keep clearance between refrigerator and walls (minimum 50mm). - Remove dust and contaminants from grill for easy heat radiation. - Remove the dust with vacuum cleaner from the coils condenser while the refrigerator is off. 	<ul style="list-style-type: none"> - The fan may be broken if cleaning performs while the refrigerator is on.

TROUBLE DIAGNOSIS

2-4. Cooling

Problems	Causes	Checks	Measures	Remarks
High temperature in the freezer compartment.	Refrigerant leak.	<p><u>Check sequence</u></p> <ol style="list-style-type: none"> 1. Check the welded parts of the drier inlet and outlet and drier auxiliary in the compressor compartment (high pressure side). 2. Check the end of compressor sealing pipe (low pressure side). 3. Check silver soldered parts. (Cu + Fe / Fe + Fe). 4. Check bending area of wire condenser pipe in compressor compartment (cracks can happen during bending). 5. Check other parts (compressor compartment and evaporators in freezer compartment). 	Weld the leaking part, recharge the refrigerant.	Drier must be replaced.
	Shortage of refrigerant.	<p>Check frost formation on the surface of evaporator in the freezer compartment.</p> <ul style="list-style-type: none"> - If the frost forms evenly on the surface, it is OK. - If it does not, it is not good. 	<ul style="list-style-type: none"> - Find out the leaking area, repair, evacuate, and recharge the refrigerant. - No leaking, remove the remaining refrigerant, and recharge new refrigerant. 	Drier must be replaced.

TROUBLE DIAGNOSIS

Problems	Causes	Checks	Measures	Remarks
High temperature in the freezer compartment.	Cycle pipe is clogged.	<p>Check sequence.</p> <ol style="list-style-type: none"> 1. Check temperature of condenser manually. If it is warm, it is OK. If it is not, compressor discharging joints might be clogged. 2. Manually check whether hot line pipe is warm. If it is warm, it's OK. If it is not, condenser outlet weld joints might be clogged. 	<ul style="list-style-type: none"> - Heat up compressor discharging weld joints with touch, disconnect the pipes, and check the clogging. <p>Remove the causes of clogging, weld, evacuate, and recharge the refrigerant.</p> <ul style="list-style-type: none"> - If it's warm, it's OK. If it's not, condenser discharging line weld joints might be clogged. <p>Disconnect with torch, remove the causes, evacuate, and recharge seal refrigerant.</p>	Drier must be replaced.
	Leak at loop pipe weld joint (discharge) in compressor.	<p>Check sequence.</p> <ol style="list-style-type: none"> 1. Manually check whether condenser is warm, it is not warm and the frost forms partly on the evaporator in the freezer compartment. 	<p>Replace the compressor, weld, evacuate, and recharge refrigerant.</p>	Drier must be replaced.
	Faulty cooling fan in the compressor compartment.	<p>Check sequence.</p> <ol style="list-style-type: none"> 1. Check cooling fan operation. 2. Check that cooling fan is disconnected from the motor. 	<ul style="list-style-type: none"> - Replace if motor does not operate. - If fan is disconnected, check fan damage and reassemble it. <p>■ Refer to fan motor disassembly and assembly sequence.</p>	

TROUBLE DIAGNOSIS

2-5. Defrosting failure

Problems	Causes	Checks	Measures	Remarks
No defrosting.	<p>Heater does not generate heat as the heating wire is cut or the circuit is shorted.</p> <p>1) Heating wire is damaged when inserting into the evaporator.</p> <p>2) Lead wire of heater is cut.</p> <p>3) Heating wire at lead wire contacts is cut.</p>	<p>1. Check the resistance of heater. 0Ω: Short. ∞Ω: Cut. Tens to thousands Ω: OK.</p> <p>2. Check the resistance between housing terminal and heater surface. 0Ω: Short. ∞Ω: Cut. Tens to thousands Ω: Short.</p>	<p>Heating wire is short and wire is cut.</p> <ul style="list-style-type: none"> Parts replacement: Refer to parts explanations. 	<p>Seal the lead wire with insulation tape and heat contraction tube if the cut lead wire is accessible to repair.</p>
Sucking duct and discharging hole are clogged:	<p>1. Impurities.</p> <p>2. Ice.</p>	<p>1. Confirm foreign materials. In case of ice, insert the copper line through the hole to check.</p> <p>2. Put hot water into the drain (check drains outside).</p>	<p>1) Push out impurities by inserting copper wire. (Turn off more than 3hours and pour in hot water if frost is severe.)</p> <p>2) Put in hot water to melt down frost.</p> <p>3) Check the water outlet.</p> <p>4) Push the heater plate to sucking duct manually and assemble the disconnected parts.</p>	
Gap between Sucking duct and Heater plate(Ice in the gap).		<p>1. Confirm in the Sucking duct.</p>	<p>1) Turn off the power, confirm impurities and ice in the gap, and supply hot water until the ice in the gap melts down.</p> <p>2) Push the Heater plate to drain bottom with hand and assemble the disconnected parts.</p>	
Wrong heater rating (or wrong assembly).		<p>1. Check heater label.</p> <p>2. Confirm the capacity after substituting the resistance value into the formula.</p> $P = \frac{V^2}{R}$ <p>(V: Rated voltage of user country) (R: Resistance of tester[Ω])</p> <p>Compare P and label capacity. Tolerance: ±7%</p>	<p>Faults: replace.</p> <p>- How to replace: Refer to main parts.</p>	

TROUBLE DIAGNOSIS

Problems	Causes	Checks	Measures	Remarks
No defrosting	<p>Melting fuse blows out.</p> <p>1) Lead wire is cut.</p> <p>2) Bad soldering.</p> <p>Ice in the Sucking duct.</p> <p>1) Icing by foreign materials in the duct.</p> <p>2) Icing by cool air inflow through the gap of heater plate.</p> <p>3) Icing by the gap of heater plate.</p>	<p>- Check melting fuse with tester. - If 0Ω: OK. If ∞Ω: wire is cut.</p> <p>1. Check the inner duct with mirror.</p> <p>2. Check by inserting soft copper wire into the duct (soft and thin copper not to impair heating wire).</p>	<p>Faulty parts: parts replacement.</p> <p>- Check wire color when measuring resistance with a tester.</p> <p>1) Turn power off.</p> <p>2) Raise the front side(door side), support the front side legs, and let the ice melt naturally. (If power is on, melt the frost by forced defrosting.)</p> <p>3) Reassemble the heater plate.</p>	
	<p>Bad cool air inflow and discharge, and bad defrosting due to faulty contact and insertion (bad connector insertion into housing of heater, melting, fuse and motor fan).</p>	<p>1. Turn on power, open or close the door, check that motor fan operates (If it operates, motor fan is OK).</p> <p>2. Disconnect parts in the refrigerator compartment, check the connection around the housing visually, defrost, and confirm heat generation on the heater. Do not put hands on the sheath heater.</p> <p>3. Check the parts which have faults described in 1, 2 (mechanical model: disconnect thermostat from the assembly).</p>	<p>1) Check the faulty connector of housing and reassemble wrongly assembled parts.</p> <p>2) If the parts are very damaged, remove the parts and replace it with a new one.</p>	

TROUBLE DIAGNOSIS

2-6. Icing

Problems	Causes	Checks	Measures	Remarks
Icing in the refrigerator compartment. - Damper icing. - Pipe icing. - Discharging pipe icing.	1) Bad circulation of cool air. - Clogged intake port in the refrigerator compartment. - Sealing is not good. - Too much food is stored and clogs the discharge port. - Bad defrosting.	- Check the food is stored properly (check discharge and intake port are clogged). - Check icing on the surface of baffle and cool air path (pipe) after dissembling the container box. - Check icing at intake ports of freezer and refrigerator compartment.	- Be acquainted with how to use. - Sealing on connecting parts. - Check the damper and replace it if it has defects. - Check defrost. (After forced defrosting, check ice in the evaporator and pipes.)	- Check the defrost related parts if problem is caused by faulty defrosting.
	2) Faulty door or refrigerator compartment. - Faulty gasket. - Faulty assembly.	- Check gasket attached conditions. - Check door assembly conditions.	- Correct the gasket attachment conditions and replace it. - Door assembly and replacement.	- Replacement should be done when it cannot be repaired.
	3) Overcooling in the refrigerator compartment. - Faulty damper in the refrigerator compartment. - Faulty MICOM (faulty sensor)	- Check refrigerator compartment is overcooled (when button pressed on "weak"). - Check parts are faulty.	- Replace faulty parts.	
	4) Bad defrosting - Heater wire is cut. - Defective defrost sensor. - Defrosting cycle.	- Check frost on the evaporator after dissembling shroud and fan grille. - Check ice on intake port of freezer and refrigerator compartment.	- Check parts related to defrosting. - Check defrosting. (Check ice on the evaporator and pipe.)	- Moisture cannot frost on the evaporator but can be sucked into the refrigerator, being condensed and iced, interferes with cool air circulation, and suppresses sublimation.
	5) Customers are not familiar with this machine. - Door opens. - High temperature, high moisture, and high load.	- Check food interferes with door closing. - Check ice on the ceilings.	- Be acquainted with how to use.	

TROUBLE DIAGNOSIS

Problems	Causes	Checks	Measures	Remarks
Ice in the freezer compartment. - Surface of fan grille. - Wall of freezer compartment. - Cool air discharging port. - Basket(rack) area.	1) Bad cooling air circulation. - Intake port is clogged in the freezer compartment. - Discharging port is Clogged. - Too much food is stored. - Bad defrosting.	- Check food storage conditions visually.(Check clogging at intake and discharging port of cooling air.) - Check food occupation ratio in volume(Less than 75%). - Check frost on the evaporator after dissembling shroud and fan grille. - Check icing at intake port of refrigerator compartment.	- Be acquainted with how to use. - Check defrost (Check ice on the evaporator and pipes after forced defrosting).	- Check the parts related to defrosting if the problem is caused by the faulty defrosting.
- Food surface. - Icing in the shute.	2) Bad freezer compartment door - Faulty gasket - Faulty assembly	- Check gasket attachment conditions. - Check door assembly conditions.	- Correct the gasket attachment conditions and replace it. - Door assembly and replacement.	- Replace when it can not be repaired.
	3) Over freezing in the freezer compartment. - Faulty MICOM.	- Refrigerator operates pull down. (Check if it is operated intermittently) - The Temperature of freezer compartment is satisfactory, but over freezing happens in the refrigerator compartment even though the notch is set at "weak".	- Replace defective parts.	
	4) Bad defrosting. - Heater wire is cut. - Faulty defrost sensor. - Defrosting cycle	- Check frost on the evaporator after dissembling shroud and grille. - Check ice on the intake port in the refrigerator compartment.	- Check parts related to defrosting. - Check defrosting.(Check ice on the evaporator and pipes after forced defrosting.)	
	5) User is not familiar with how to use. - Door opens. - High moisture food(water) is stored.	- Check food holds door open. - Check ice on the ice tray.	- Be acquainted with how to use.	

TROUBLE DIAGNOSIS

2-7. Sound

Problems	Causes	Checks	Measures	Remarks
"Whizz" sound	1. Loud sound of compressor operation.	1.1 Check the level of the refrigerator. 1.2 Check the rubber seat conditions (sagging and aging).	1) Maintain horizontal level. 2) Replace rubber and seat if they are sagged and aged. 3) Insert rubber where hand contact reduces noise in the pipe. 4) Avoid pipe interference. 5) Replace defective fan and fan motor. 6) Adjust fan to be in the center of bell mouth of the fan guide. 7) Leave a clearance between interfering parts and seal gaps in the structures. 8) Reassemble the parts which make sound. 9) Leave a clearance if evaporator pipes and suction pipe touch freezer shroud.	
	2. Pipes resonant sound which is connected to the compressor.	2.1 Check the level of pipes connected to the compressor and their interference. 2.2 Check rubber inserting conditions in pipes. 2.3 Touch pipes with hands or screw -driver (check the change of sound).		
	3. Fan operation sound in the freezer compartment.	3.1 Check fan insertion depth and blade damage. 3.2 Check the interference with structures. 3.3 Check fan motor. 3.4 Check fan motor rubber insertion and aging conditions.		
	4. Fan operation sound in the compressor compartment.	4.1 Same as fan confirmation in the refrigerator. 4.2 Check drip tray leg insertion. 4.3 Check the screw fastening conditions at condenser and drip tray.		

TROUBLE DIAGNOSIS

Problems	Causes	Checks	Measures	Remarks
Vibration sound. ("Cluck")	<ol style="list-style-type: none"> 1. Vibration of shelves and foods in the refrigerator. 2. Pipes interference and capillary tube touching in the compressor compartment. 3. Compressor stopper vibration. 4. Moving wheel vibration. 5. Other structure and parts vibration. 	<ol style="list-style-type: none"> 1-1. Remove and replace the shelves in the refrigerator 1-2. Check light food and container on the shelves. 2-1. Touch pipes in the compressor compartment with hands. 2-2 Check capillary tube touches cover back. 3-1 Check compressor stopper vibration. 4-1 Check vibration of front and rear moving wheels. 5-1 Touch other structures and parts. 	<ol style="list-style-type: none"> 1) Reassemble the vibrating parts and insert foam or cushion where vibration is severe. 2) Leave a clearance where parts interfere with each other. 3) Reduce vibration with rubber and restrainer if it is severe. (especially, compressor and pipe). 4) Replace compressor stopper if it vibrates severely. 	
Irregular sound. ("Click").	<ol style="list-style-type: none"> 1. It is caused by heat expansion and contraction of evaporator, shelves, and pipes in the refrigerator. 	<ol style="list-style-type: none"> 1-1 Check time and place of sound sources. 	<ol style="list-style-type: none"> 1) Explain the principles of refrigeration and that the temperature difference between operation and defrosting can make sounds. 2) If evaporator pipe contacts with other structures, leave a clearance between them (freezer shroud or inner case). 	

TROUBLE DIAGNOSIS

Problems	Causes	Checks	Measures	Remarks
Sound "Burping" (almost the same as animals crying sound).	It happens when refrigerant expands at the end of capillary tube.	<ul style="list-style-type: none"> - Check the sound of refrigerant at the initial installation. - Check the sound when the refrigerator starts operation after forced defrosting. - Check the restrainer attachment conditions on the evaporator and capillary tube weld joints. 	<ul style="list-style-type: none"> - Check the restrainer attached on the evaporator and capillary tube weld joints and attach another restrainer. - If it is continuous and severe, insert capillary tube again (depth: 15±3mm) - Fasten the capillary tube to suction pipes or detach in the compressor compartment. - Explain the principles of freezing cycles. 	
Water boiling or flowing sound.	It happens when refrigerant passes orifice in accumulator internal pipes by the pressure difference between condenser and evaporator.	<ul style="list-style-type: none"> - Check the sound when compressor is turned on. - Check the sound when compressor is turned off. 	<ul style="list-style-type: none"> - Explain the principles of freezing cycles and refrigerant flowing phenomenon by internal pressure difference. - If sound is severe, wrap the accumulator with foam and restrainer. 	
Sound of whistle when door closes.	When door closes, the internal pressure of the refrigerator decreases sharply below atmosphere and sucks air into the refrigerator, making the whistle sound.	<ul style="list-style-type: none"> - Check the sound by opening and closing the refrigerator or freezer doors. 	<ul style="list-style-type: none"> - Broaden the cap of discharge hose for defrosting in the compressor compartment. - Seal the gap with sealant between out and inner cases of hinge in door. 	

TROUBLE DIAGNOSIS

2-8. Odor

Problems	Causes	Checks	Measures	Remarks
Food Odor.	Food (garlic, kimchi, etc)	<ul style="list-style-type: none"> - Check the food is not wrapped. - Check the shelves or inner wall are stained with food juice. - Check the food in the vinyl wraps. - Check food cleanliness. 	<ul style="list-style-type: none"> - Dry deodorizer in the shiny and windy place. - Store the food in the closed container instead of vinyl wraps. - Clean the refrigerator and set button at "strong". 	
Plastic Odor.	Odors of mixed food and plastic odors.	<ul style="list-style-type: none"> - Check wet food is wrapped with plastic bowl and bag. - It happens in the new refrigerator. 	<ul style="list-style-type: none"> - Clean the refrigerator. - Persuade customers not to use plastic bag or wraps with wet food or odorous foods. 	
Odor from the deodorizer.	Odor from the old deodorizer.	<ul style="list-style-type: none"> - Check the deodorizer odors. 	<ul style="list-style-type: none"> - Dry the deodorizer with dryer and then in the shiny and windy place. - Remove and replace the deodorants. 	*Deodorizer : option

TROUBLE DIAGNOSIS

2-9. Micom

Problems	Symptom	Causes		Checks	Measures	Remarks	
Bad PCB electric power.	All display LEDs are off.	Bad connection between Main PCB and display circuit.	Bad connector connection from main PCB to display PCB.	Visual check on connector connection.	Reconnect connector.		
		Defective PCB trans.	PCB Trans winding is cut. PCB Trans temperature fuse is burnt out.	Check resistance of PCB Trans input and output terminals with a tester. (If resistance is infinity, trans winding is cut).	Replace PCB Trans or PCB.	Applicable to model without dispenser.	
Abnormal display LED operation	Defective LED module.	Defective PCB electric circuit parts.	Defective regulator IC (7812, 7805).	Check voltage at input/output terminals.	Replace regulator.	Refer to electric circuit in circuit explanation.	
			PCB electric terminal fuse is burnt out. STR Parts are damaged.	Check fuse in PCB electric terminal with a tester. Check if STR No. 2 and 3 pins are cut when power is off.	Replace PCB fuse. Replace parts.	Applicable to model with dispenser.	
		Bad connection between Main PCB and display circuit.	Lead Wire connecting main PCB and display PCB is cut or connector terminal connection is bad.	Check Lead Wire terminals connecting Main PCB and display PCB with a tester.	Reconnect Lead Wire and directly connect defective contact terminal to Lead Wire.		
			Defective LED module.	Check if all LEDs are on when Main PCB Test switch is pressed (or when both freezer key and power freezer key are pressed at the same time for more than one second.)	Replace display PCB.	Refer to display circuit in circuit explanation.	

TROUBLE DIAGNOSIS

Problems	Symptom	Causes	Checks	Measures	Remarks	
Bad cooling.	Freezer temperature is high.	Compressor does not start.	Compressor Lead Wire is cut.	Check compressor Lead Wire with a tester.	Reconnect Lead Wire.	
			Defective compressor driving relay.	Measure voltage at PCB CON1 (5&7) after pressing main PCB test switch once. It is OK if voltage is normal.	Replace relay (RY1) or PCB.	Refer to load driving circuit in circuit explanation.
		Defective freezer sensor.	Defective Freezer sensor parts.	Check resistance of freezer sensor with a tester.	Replace freezer sensor.	Refer to resistance characteristics table of sensor in circuit explanation.
			Freezer sensor is substituted for other sensor.	Confirm the color of sensor in circuits (main PCB sensor housing).	Repair main PCB sensor housing	
		Defective freezer fan motor.	Fan motor lead wire is cut.	Check fan motor lead wire with a tester.	Reconnect lead wire.	
			<ul style="list-style-type: none"> Defective door switch (freezer, refrigerator, home bar). Defective fan motor. Defective fan motor driving relay. 	Measure the voltage between PCB power blue line and fan motor after pressing test switch of Main PCB. If the voltage is normal, it is OK.	Replace door switch (freezer, refrigerator and home bar). Replace fan motor.	Refer to load driving circuits in circuit explanation.
	Faulty defrost.		Refer to faulty defrost items in trouble diagnosis functions.		Refer to trouble diagnosis function.	

TROUBLE DIAGNOSIS

Problems	Symptom	Causes	Checks	Measures	Remarks		
Bad cooling	Wrong Refrigerator temperature.	Defective AC Damper.	Check AC damper motor and reed switch and lead wire are cut.	Check if AC damper motor and reed switch lead wire are cut with a tester.	Reconnect lead wire.		
			Check AC damper part.	Refer to AC damper in parts repair guide.	Replace AC damper or refrigerator control box Assembly.		
		Motor driving relay in PCB.	Check AC damper	Refer to AC damper in parts repair guide.	Replace relay or PCB.	Refer to single motor damper driving circuits in circuit explanation.	
			Foreign materials in AC damper baffles	Check AC damper baffle visually.	Remove foreign materials.		
		Ice formation on AC damper baffles	Check AC damper Heater	Check if AC damper Heater wire is cut with a tester.	Replace AC damper or refrigerator control Box Assembly.		
			Defective refrigerator sensor parts.	Check the resistance of refrigerator sensor with a tester.	Replace refrigerator sensor.	Refer to sensor resistance characteristic table in circuit explanation.	
		Defective refrigerator sensor	Refrigerator sensor is substituted for other sensor.	Check the sensor color in the circuit. (main PCB sensor housing.)	Repair main PCB sensor housing.		
			Defective refrigerator sensor assembly condition.	Check if refrigerator sensor is not fixed at cover sensor but inner case visually.	Fix again the refrigerator sensor.		

TROUBLE DIAGNOSIS

Problems	Symptom	Causes	Checks	Measures	Remarks
Bad defrost.	Defrost is not working.	Defrost lead wire is cut.	Check if defrost lead wire is cut with a tester.	Reconnect Lead Wire.	
		Defective defrost driving relay.	Check the voltage of CON2 with a tester after pressing main PCB test switch twice. If the voltage is normal then it is OK.	Replace relay or PCB.	Refer to load driving conditions check in circuit explanation.
		Defective defrost sensor parts.	Check the resistance of defrost sensor with a tester.	Replace defrost sensor.	Refer to sensor resistance characteristic table of circuit explanation.
Defective buzzer	Buzzer continuously rings or door opening alarm does not work.	Defective connecting lead wire from main PCB to door switch.	Check lead wire related to door switch with a tester.	Repair lead wire.	
		Defective door switch parts.	Refer to door switch in parts repair guide.	Replace door switch.	
Defective display button	Buzzer does not ring and key does not sense even button is pressed.	Key input wire is cut or bad connector terminal contact in main PCB and display PCB connecting lead wire.	Check input wire with a tester.	Reconnect lead wire and replace or directly connect bad contact terminal to lead wire.	Refer to display circuit in circuit explanation.
		Key is continuously depressed due to structural interference.	Disassemble frame display and confirm visually.	Adjust or replace interfering structures.	

TROUBLE DIAGNOSIS

Problems	Symptom	Causes	Checks	Measures	Remarks
Defective display button.	Buzzer rings but key does not sense even button is pressed.	Trouble mode indication.	Check trouble diagnosis function.	Repair troubles	Refer to mode indication in function explanations.
Door Buzzer	Buzzer continuously rings or door opening alarm does not work.	Defective connecting lead wire from main PCB to door switch.	Check lead wire associated with door switch.	Repair lead wire.	Check model with dispenser.
		Defective freezer compartment door switch parts.	Refer to door switch in parts repair guide.	Replace Freezer compartment door switch.	
Bad water/ice dispenser.	Ice and water are not dispensed.	Defective connecting lead wire from Main PCB to lever switch.	Check Lead Wire associated with lever switch with a tester.	Repair lead wire.	
		Defective lever switch parts	Refer to door switch in parts repair guide.	Replace lever switch.	
		Defective photo coupler IC parts.	Check voltage change at photo coupler output terminals with lever switch pressed. It is OK if voltage change is between 0V - 5V.	Replace photo coupler IC or PCB.	
		Defective relay associated with ice dispense (gearing motor, cube and dispenser solenoid).	Check relay with a tester.	Replace defective relay.	
		Defective parts associated with ice dispense (gearing motor, cube and dispenser solenoid).	Check resistance of parts with a tester.	Replace defective parts.	
Door Buzzer	Buzzer continuously rings or door opening alarm does not work.	Defective relay associated with water dispense.	Check relay with a tester	Replace defective relay.	
		Defective parts associated with water dispenser.	Check resistance of parts with a tester.	Replace defective parts.	

TROUBLE DIAGNOSIS

3. Cooling Cycle Heavy Repair









3-1. The Heavy Repair Standards for Refrigerator with R134a Refrigerant

NO.	Items	Unit	Standards	Purposes	Remarks	
1	Pipe and piping system opening time.	Min.	Pipe:within 1 hour. Comp:within 10 minutes. Drier:within 20 minutes.	To protect Moisture Penetration.	The opening time should be reduced to a half of the standards during rain and rainy seasons (the penetration of water into the pipe is dangerous).	
2	Welding.	Nitrogen Pressure.	Weld under Nitrogen atmosphere (N ₂ pressure: 0.1~0.2 kg/cm ²)	To protect oxide scale formation.	- Refet to repair note in each part. - R134a refrigerant is more susceptible to leaks than R12 and requires more care during welding. - Do not apply force to pipes before and after welding to protect pipe from cracking.	
3	N ₂ sealed parts.	Confirm N ₂ leak.	Confirm air leaking sounds when removing rubber cap. Sound:usable No sound:not usable	To protect moisture penetration.	- In case of evaporator parts, if it doesn't noise when removing rubber cap blow dry air or N ₂ gas for more than 1 min use the parts.	
4	Refrigeration Cycle.	Evacuation time	Min.	More than 40 minutes.	To remove moisture.	Note:Only applicable to the model equipped with reverse flow protect plate. Vaccum efficiency can be improved by operating compressor during evacuation. The rubber pipes for R12 refrigerant shall be melted when they are used for R134a refrigerant(causes of leak).
		Vacuum degree	Torr	Below 0.03(ref)		
		Vacuum	EA	High and low Pressure sides are evacuated at the same time for models above 200 l		
		Vacuum piping	EA	Use R134a exclusive manifold.	To protect mixing of mineral and ester oils.	
		Pipe coupler	EA	Use R134a cxclusive.	To protect R12 Refrigerant mixing.	
		Outlet (Socket) Plug		R134a exclusive. R134a exclusive		
5	Refrigerant weighing.	EA	Use R134a exclusively. Weighing allowance:±5g Note:Winter:-5g Summer:+5g	Do not mix with R12 refrigerant.	- Do not weight the refrigerant at too hot or too cold an area.(25°C is adequate.) - Use copper bombe Socket:2SV Plug: 2PV R134a Note:Do not burn O-ring (rubber) during welding.	
6	Drier replacement.		-Use R134a exclusively for R134a refrigerator -Use R12 exclusively for R12 refrigerator -Replace drier whenever repairing refrigerator cycle piping.	To remove the moisture from pipe.		
7	Leak check.		-Do not use soapy water for check. it may be sucked into the pipe by.	Detect refrigerant leak area.	-Check oil leak at refrigerant leak area. Use electronic leak detector if oil leak is not found. -The electronic leak detector is very sensitive to halogen gas in the air. It also can detect R141b in urethane. Please practice, therefore, many times before use.	

NOTE) Please contact Songso company on +82-53-554-2067 if you have inquiry on heavy repair special facility.

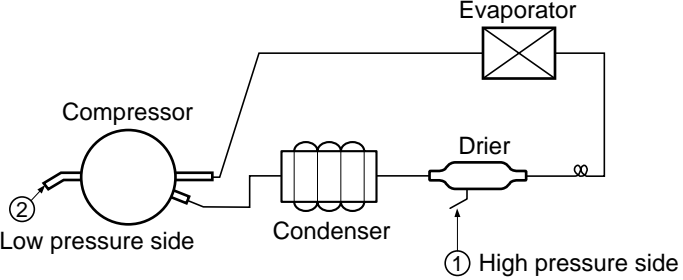
TROUBLE DIAGNOSIS

3-2. Summary Of Heavy Repair

Process	Contents	Tools
		
	- Cut charging pipe ends and discharge refrigerant from drier and compressor.	Filter, side cutters
	- Use R134a oil and refrigerant for compressor and drier - Confirm N ₂ sealing and packing conditions before use. Use good one for welding and assembly. - Weld under nitrogen gas atmosphere.(N ₂ gas pressure: 0.1-0.2kg/cm ²). - Repair in a clean and dry place.	Pipe Cutter, Gas welder, N ₂ gas
	- Evacuate for more than forty minutes after connecting manifold gauge hose and vacuum pump to high (drier) and low (compressor refrigerant discharging parts) pressure sides. - Evacuation Speed:113//min.	Vacuum pump(R134a exclusively), Manifold gauge.
	- Weigh and control the allowance of R134a bombe in a vacuum conditions to be ± 5 g with electronic scales and charge through compressor inlet (Charge while refrigerator operates). - Weld carefully after inlet pinching.	R134a exclusive bombe(mass cylinder), refrigerant(R134a) manifold gauge, electronic scales, punching off flier, gas welding machine
	- Check leak at weld joints. ┌ Minute leak: Use electronic leak detector └ Big leak: Check visually or fingers. Note:Do not use soapy water for check. - Check cooling capacity ① Check radiator manually to see if warm. ② Check hot line pipe manually to see if warm. ③ Check frost formation on the whole surface of the evaporator.	Electronic Leak Detector, Driver(Ruler).
	- Remove flux from the silver weld joints with soft brush or wet rag.(Flux may be the cause of corrosion and leaks.) - Clean R134a exclusive tools and store them in a clean tool box or in their place.	Copper brush, Rag, Tool box
	- Installation should be conducted in accordance with the standard installation procedure.(Leave space of more than 5 cm from the wall for compressor compartment cooling fan mounted model.)	

TROUBLE DIAGNOSIS

3-3. Precautions During Heavy Repair

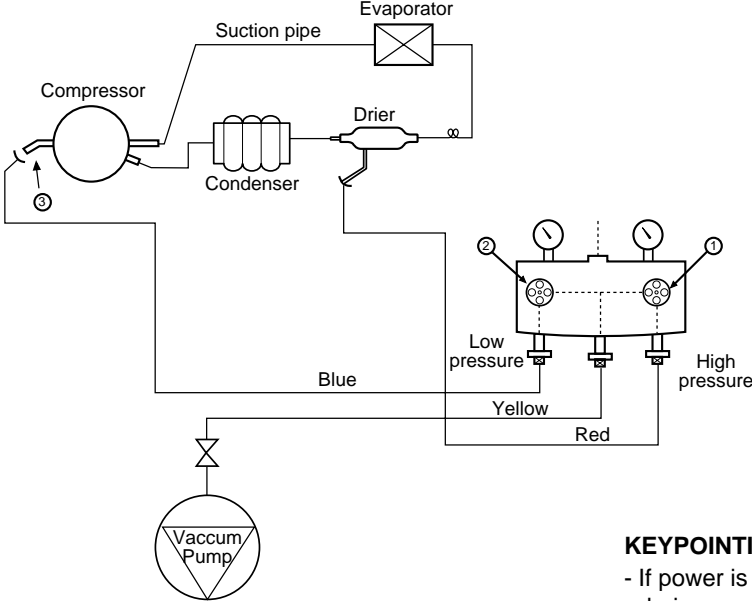
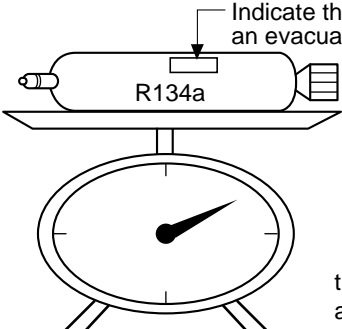
Items	Precautions
1. Use of tools.	1) Use special parts and tools for R134a.
2. Removal of retained refrigerant.	1) Remove retained refrigerant more than 5 minutes after turning off a refrigerator. (If not, oil will leak inside.) 2) Remove retained refrigerant by cutting first high pressure side (drier part) with a nipper and then cut low pressure side. (If the order is not observed, oil leak will happen.) <div style="text-align: center; margin-top: 10px;">  <p>The diagram illustrates a refrigeration cycle with the following components and connections:</p> <ul style="list-style-type: none"> Compressor: Located on the left, with a port labeled '2' and 'Low pressure side'. Condenser: A coil-shaped component connected to the right side of the compressor. Drier: A cylindrical component connected to the right side of the condenser. It has a port labeled '1' and 'High pressure side'. Evaporator: A rectangular component with an 'X' inside, connected to the right side of the drier. Evaporator to Compressor: A line connects the top of the evaporator back to the top of the compressor, completing the cycle. </div>
3. Replacement of drier.	1) Be sure to replace drier with R134a only when repairing pipes and injecting refrigerant.
4. Nitrogen blowing welding.	1) Weld under nitrogen atmosphere in order to prevent oxidation inside a pipe. (Nitrogen pressure : 0.1~0.2 kg/cm ² .)
5. Others.	1) Nitrogen or refrigerant R134a only should be used when cleaning inside of cycle pipes inside and sealing. 2) Check leakage with an electronic leakage tester. 3) Be sure to use a pipe cutter when cutting pipes. 4) Be careful not the water let intrude into the inside of the cycle.

TROUBLE DIAGNOSIS

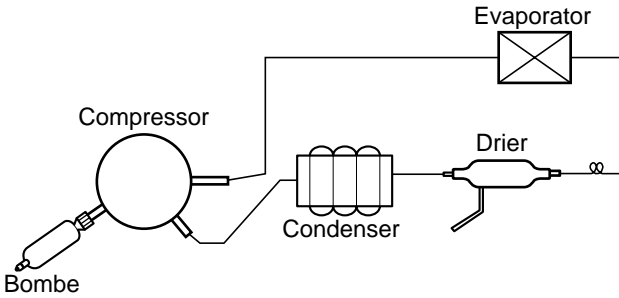
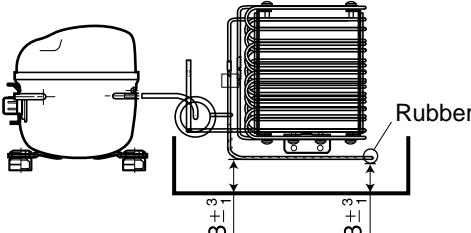
3-4. Practical Work For Heavy Repair

Items	Precautions
<p>1. Removal of residual refrigerant.</p>	<div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="flex: 1;"> <p>1) Remove residual refrigerant more than 5 minutes later after turning off the refrigerator. (If not, compressor oil may leak inside.)</p> <p>2) Remove retained refrigerant slowly by cutting first high pressure side (drier part) with a nipper and then cut low pressure side.</p> </div> <div style="flex: 0.5;"> <p>KEYPOINTING Observe the sequence for removal of refrigerant. (If not, compressor oil may leak.)</p> </div> </div>
<p>2. Nitrogen blowing welding.</p>	<div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="flex: 1;"> <p>When replacing a drier: Weld ① and ② parts by blowing nitrogen(0.1~0.2kg/cm²) to high pressure side after assembling a drier.</p> <p>When replacing a compressor: Weld ① and ② parts by blowing nitrogen to the low pressure side.</p> <p>Note) For other parts, nitrogen blowing is not necessary because it does not produce oxidized scales inside pipe because of its short welding time.</p> </div> <div style="flex: 0.5;"> <p>KEYPOINTING Welding without nitrogen blowing produces oxidized scales inside a pipe, which affect on performance and reliability of a product.</p> </div> </div>
<p>3. Replacement of drier.</p>	<div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="flex: 1;"> <p>Inserting a capillary tube Measure distance with a ruler and put a mark(12^{+3/-0})on the capillary tube. Insert tube to the mark, and weld it</p> </div> <div style="flex: 0.5;"> <p>KEYPOINTING Be sure to check the inserted length of capillary tube when it is inserted. (If too much inserted, a capillary tube is clogged by a filter.)</p> </div> </div>

TROUBLE DIAGNOSIS

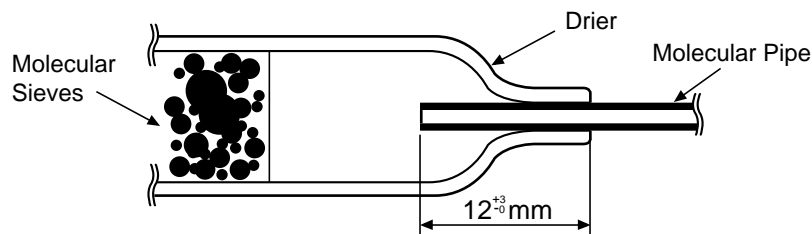
Items	Precautions
<p>4. Vacuum degassing.</p>	<div style="text-align: center;">  </div> <p>Pipe Connection Connect a red hose to the high pressure side and a blue hose to the low pressure side.</p> <p>Vacuum Sequence Open ①, ② valves and evacuate for 40 minutes. Close valve ①.</p> <p>KEYPOINTING</p> <ul style="list-style-type: none"> - If power is applied during vacuum degassing, vacuum degassing shall be more effective. - Operate compressor while charging refrigerant. (It is easier and more certain to do like this.)
<p>5. Refrigerant charging.</p>	<p>Charging sequence</p> <ol style="list-style-type: none"> 1) Check the amount of refrigerant supplied to each model after completing vacuum degassing. 2) Evacuate bombe with a vacuum pump. 3) Measure the amount of refrigerant charged. <ul style="list-style-type: none"> - Measure the weight of an evacuated bombe with an electronic scale. - Charge refrigerant into a bombe and measure the weight. Calculate the weight of refrigerant charged into the bombe by subtracting the weight of an evacuated bombe. <div style="text-align: center;">  </div> <p>KEYPOINTING</p> <ul style="list-style-type: none"> - Be sure to charge the refrigerant at around 25°C. - Be sure to keep -5g in the winter and +5g in summer <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p>Calculation of amount of refrigerant charged</p> </div> <p>the amount of refrigerant charged= a weight after charging - a weight before charging (a weight of an evacuated cylinder)</p>

TROUBLE DIAGNOSIS

Items	Precautions
	 <p>4) Refrigerant Charging Charge refrigerant while operating a compressor as shown above.</p> <p>5) Pinch a charging pipe with a pinch-off plier after completion of charging.</p> <p>6) Braze the end of a pinched charging pipe with copper brazer and take a gas leakage test on the welded parts.</p>
6. Gas-leakage test	* Take a leakage test on the welded or suspicious area with an electronic leakage tester.
7. Pipe arrangement in each cycle	<p>Check each pipe is placed in its original place before closing a cover back-M/C after completion of work. Particularly control the size of Joint Drain Pipe</p> 

3-5. Standard Regulations For Heavy Repair

- 1) Observe the safety precautions for gas handling.
- 2) Use JIG (or wet towel) in order to prevent electric wires from burning during welding. (In order to prevent insulation break and accident.)
- 3) The inner case shall be melted and insulation material (polyurethane) shall be burnt if not cared during welding inner case parts.
- 4) The copper pipe shall be oxidized by overheating if not cared during welding.
- 5) Not allow the aluminum pipes to contact to copper pipes. (In order to prevent corrosion.)
- 6) Observe that the inserted length of a capillary tube into a drier should be 12^{+3} mm.

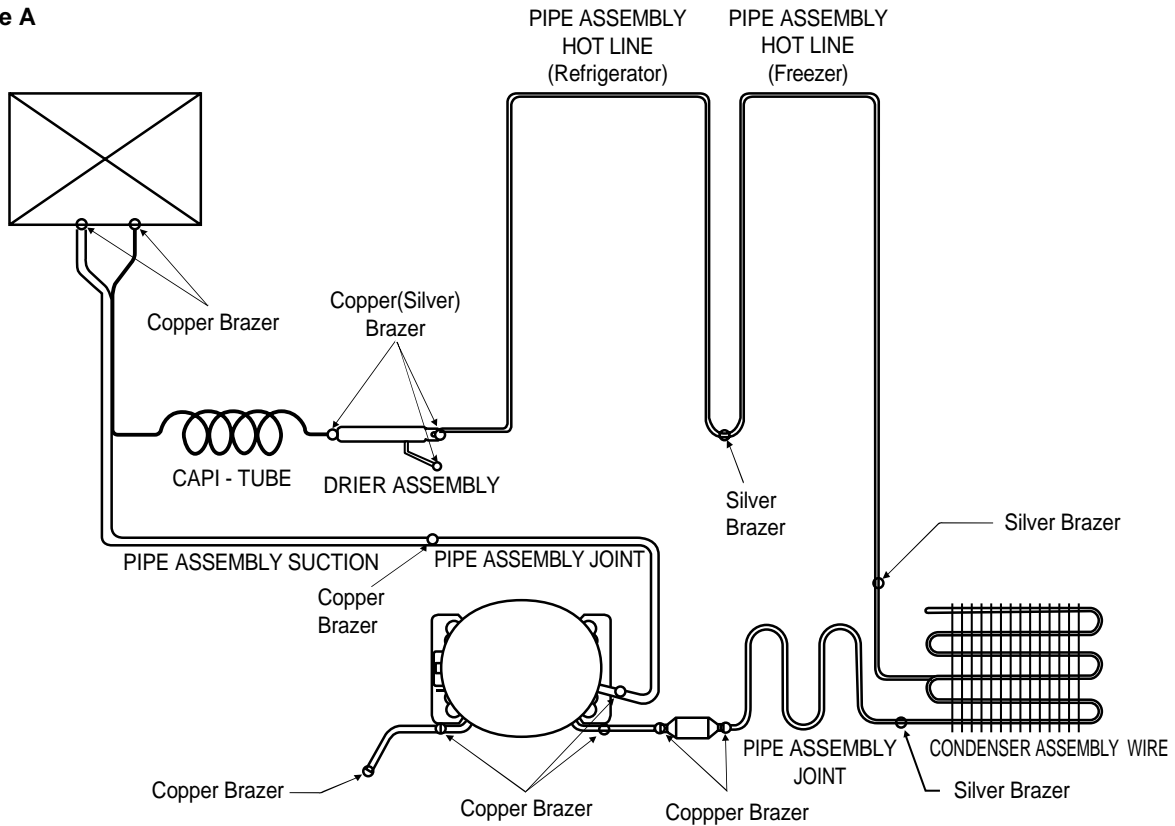


- 7) Make sure that the inner diameter should not be distorted while cutting a capillary tube.
- 8) Be sure that a suction pipe and a filling tube should not be substituted each other during welding. (High efficiency pump.)

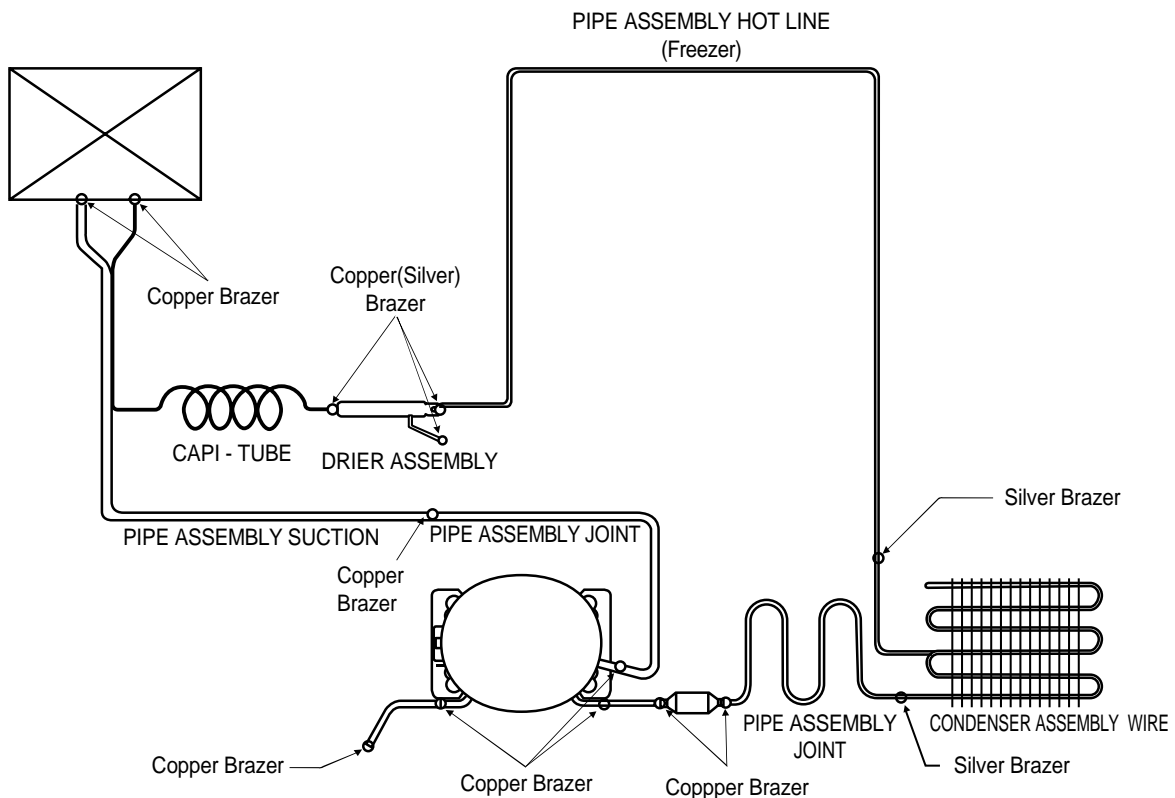
TROUBLE DIAGNOSIS

3-6. Brazing Reference Drawings

1) Type A



2) Type B



TROUBLE DIAGNOSIS

4. HOW TO DEAL WITH CLAIMS

4-1. Sound

Problems	Checks and Measures
"Whizz" sounds	<ul style="list-style-type: none"> ■ Explain general principles of sounds. <ul style="list-style-type: none"> • All refrigerator when functioning properly have normal operating sound. The compressor and fan produce sounds. There is a fan in the freezer compartment which blows cool air to freezer and refrigerator compartments. "Whizz" sounds are heard when the air passes through the narrow holes into the freezer and refrigerator compartments. ■ Cooling Fan sound in the compressor compartment. <ul style="list-style-type: none"> • There is a fan on the back of the refrigerator, which cools the compressor compartment. If there is a small space between the refrigerator and the wall, the air circulation sounds may be noticeable. ■ Noise of Compressor. <ul style="list-style-type: none"> • This operating sound happens when the compressor compresses the refrigerant. The compressor rotates at 3600RPM. The sound of compressor operation becomes louder as the refrigerator capacity increases.
"Click" sounds	<ul style="list-style-type: none"> ■ Explain the principles of temperature change. <ul style="list-style-type: none"> • The sounds happens when pipes and internal evaporator in the refrigerator compartment expand and contract as the temperature changes during the refrigerator operation. This sound also happens during defrosting, twice a day, when the ice on the evaporator melts.
"Clunk" sound	<ul style="list-style-type: none"> ■ Explain that it comes from the compressor when the refrigerator starts. <ul style="list-style-type: none"> • When the refrigerator operates, the piston and motor in the compressor rotate at 3600RPM. This sound is caused by the vibration of motor and piston when they start and finish their operation. This phenomena can be compared with that of cars. When the car engine ignites and starts to rotate, the loud sound becomes gradually quiet. When the engine stops, it stops with vibration.
Vibration sound	<ul style="list-style-type: none"> ■ Check the sound whether it comes from the pipes vibration and friction. <ul style="list-style-type: none"> • Insert rubber or leave a space between pipes to avoid the noise. • Fix the fan blade if the noise is due to the collision of fan and shroud. • Fix the drip tray if it is loosened. ■ Sound depends on the installation location. <ul style="list-style-type: none"> • Sound becomes louder if the refrigerator is installed on a wooden floor or near a wooden wall. Move it to the another location. • If the refrigerator is not leveled properly, a small vibration can make a loud sound. Please adjust the level of the refrigerator.

TROUBLE DIAGNOSIS

Problems	Checks and Measures
<p>Sounds of water flowing</p>	<p>■ Explain the flow of refrigerant.</p> <ul style="list-style-type: none"> • When the refrigerator stops, the water flowing sound happens. This sound happens when the liquid or vapor refrigerant flows from the evaporator to compressor.
<p>"Click" sounds</p>	<p>■ Explain the characteristics of moving parts.</p> <ul style="list-style-type: none"> • This noise comes from the MICOM controller's switch on the top of the refrigerator when it is turned on and off.
<p>Noise of ice maker operation (applicable to model with ice maker).</p> <ul style="list-style-type: none"> - Noise produced by ice dropping and hitting ice bank. - Noise from motor sounds "Whizz". 	<p>■ Explain the procedure and principles of ice maker operation.</p> <ul style="list-style-type: none"> • Automatic ice maker repeats the cycle of water supplying → icemaking → ice ejection. When water is supplied, the water supply valve in the machine room makes sounds like "Whizz" and water flowing also makes sound. When water freezes to ice, freezing sounds such as "click, click" are heard. When ice is being ejected, sounds like "Whizz" produced by a motor to rotate an ice tray and ice dropping and hitting ice bank sounds are also heard.
<p>Noise when supplying water.</p>	<p>■ Explain the principles of water supplied to dispenser.</p> <ul style="list-style-type: none"> • When the water supply button in the dispenser is pressed, the water supply valve in the compressor compartment opens and let the water flow to the water tank in the lower part of the refrigerator compartment. The water is dispensed by this pressure. When this happens, motor sound and water flowing sound are heard.
<p>Noise when supplying ice.</p>	<p>■ Explain the principles of ice supply and procedure of crushed ice making in a dispenser.</p> <ul style="list-style-type: none"> • When ice cube button is pressed, ice stored in the ice bank is moved by a Helix Pusher and dispensed. If crushed ice button is pressed, the cube ice is crushed. When this happens, ice crushing and hitting ice bank sounds are heard.

TROUBLE DIAGNOSIS

4-2. Measures for Symptoms on Temperature

Problems	Checks and Measures
Refrigeration is weak.	<p>■ Check temperature set in the temperature control knob.</p> <ul style="list-style-type: none"> • Refrigerator is generally delivered with the button set at “normal use” (MID). But customer can adjust the temperature set depending on their habit and taste. If you feel the refrigeration is weak, then set the temperature control button at “strong” position. If you adjust the button in the freezer compartment as well, the refrigeration is stronger than adjusting refrigerator only.
The food in the chilled drawer is . not frozen but defrosted	<p>■ The chilled drawer does not freeze food.</p> <ul style="list-style-type: none"> • Use chilled drawer for storing fresh meat or fish for short periods. For storing for a long periods or freezing food, use a freezer compartment. It is normal that frozen foods thaw above the freezing temperature (in the chilled drawer).
Refrigerator water is not cool.	<p>■ Check the water storage location.</p> <ul style="list-style-type: none"> • If water is kept in the door rack, please ask to keep it in the refrigerator compartment shelf. It will then become cooler.
Ice cream softens.	<p>■ Explain the characteristics of ice cream.</p> <ul style="list-style-type: none"> • The freezing point of ice cream is below -15°C. Therefore ice cream may melt if it is stored in the door rack. • Store ice cream in a cold place or set the temperature control button of a freezer at “strong” position.
Refrigeration is too strong.	<p>■ Check the position of temperature control button.</p> <ul style="list-style-type: none"> • Check if refrigeration is strong in whole area of the refrigerator or partly near the outlet of the cooling air. If it is strong in whole area, set the control button at “weak”. If it is strong only near the outlet of cool air, keep food (particularly wet and easy to frozen such as bean curd and vegetables) away from the outlet.
Vegetables are frozen.	<p>■ Check the vegetables storage.</p> <ul style="list-style-type: none"> • If vegetables are stored in the refrigerator shelf or chilled drawer instead of vegetable drawer, they will be frozen. Set the control button at “weak” if they are also frozen in the vegetable drawer.
The food stored at inside of the shelf freezes even the control button is set at “MID”.	<p>■ Check if food is stored near the outlet of the cooling air.</p> <ul style="list-style-type: none"> • The temperature at cooling air outlet is always below the freezing point. Do not store food near the outlet of the cooling air as it block the air circulation. And do not block the outlet. If the outlet of the cooling air is blocked, the refrigerator compartment will not be cooled.

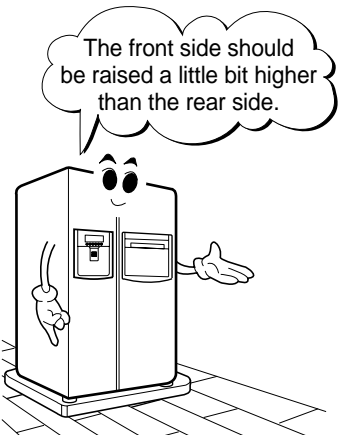
TROUBLE DIAGNOSIS

4-3. Odor and Frost

Problems	Checks and Measures
Odor in the refrigerator compartment.	<ul style="list-style-type: none"> ■ Explain the basic principles of food odor. <ul style="list-style-type: none"> • Each food has its own peculiar odor. Therefore it is impossible to prevent or avoid food odor completely when food is stored in the completely sealed refrigerator compartment. Deodorizer can absorb some portions of the odor but not completely. The intensity of odor depends on refrigerator conditions and environments. ■ Check the temperature control button and set at “strong”. <ul style="list-style-type: none"> • Clean inside of the refrigerator with detergent and remove moisture. Dry inside the refrigerator by opening the door for about 3 or 4 hours and then set the temperature control button at “strong”.
Frost in the freezer compartment	<ul style="list-style-type: none"> ■ Explain the basic principles of frost formation. <ul style="list-style-type: none"> • The main causes for frosting: <ul style="list-style-type: none"> - Door was left open. - Air penetration through the gasket - Too frequent door opening. (parties. etc.) - Hot foods are stored before they are cooled down. The temperature of freezer is -19°C. if temperature is set at “MID”. If hot air comes into the refrigerator, fine frost forms as cold air mixes with hot air. If this happens quite often, much frost forms inside of the refrigerator. If the door is left open in Summer, ice may form inside of the refrigerator.
Frost in ice tray.	<ul style="list-style-type: none"> ■ Explain basic principles of frost formation. <ul style="list-style-type: none"> • When ice tray with full of water is put into a freezer compartment, the water evaporates. If cool air fan operates, the moisture attached to the jaw (protruded part) of ice mold shall freeze and form frost. If warm water was put into the ice mold, the situation will become worse.

TROUBLE DIAGNOSIS

4-4. Others

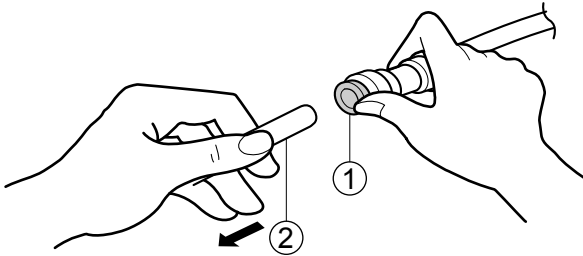
Problems	Checks and Measures
The refrigerator case is hot.	<ul style="list-style-type: none"> ■ Explain the principles of radiator. <ul style="list-style-type: none"> • The radiator pipes are installed in the refrigerator case and partition plate between the refrigerator and the freezer compartment in order to prevent condensation formation. Particularly in summer or after installation of refrigerator, it may feel hot but it is normal. If there is no enough space to dissipate heat, it can be hotter due to lack of heat radiation. Please install a refrigerator in a well-ventilated place and leave a clearance between refrigerator and wall:
Small holes in a door liner	<ul style="list-style-type: none"> ■ Explain that the hole is for releasing gas. <ul style="list-style-type: none"> • A small hole in the door liner is for releasing gas during insulation materials lining work. With a releasing hole, forming can be easily done .
Electric bills are too much.	<ul style="list-style-type: none"> ■ Check the use conditions. <ul style="list-style-type: none"> • Too frequent door opening and hot food storing cause the compressor to operate continuously and hence increase the electric consumption and bills.
Condensation on the inside wall of the refrigerator compartment and the cover of properly vegetable drawer.	<ul style="list-style-type: none"> ■ Explain how to store foods <ul style="list-style-type: none"> • Condensation forms when refrigerator is installed at damp area, door is frequently opened, and wet foods are not stored in the air tight container or wrapped. Be sure to store wet foods in the air tight container or in the wrap.
When is the power connected?	<ul style="list-style-type: none"> ■ When should the power be connected ? <ul style="list-style-type: none"> • You can connect the power right after the installation. But if the refrigerator was laid flat during transportation for a long period of time and the refrigerant and compressor oils are mixed up, then this will affect badly the performance of a refrigerator. Be sure to connect the power 2~3 hours after refrigerator is installed.
Door does not open properly. <div data-bbox="186 1510 527 1947" style="border: 1px solid black; padding: 10px; margin-top: 10px;">  </div>	<ul style="list-style-type: none"> ■ Refrigerator compartment door does not open properly. <ul style="list-style-type: none"> • When the door is open, warm open air comes into the compartment and is mixed up with cool air. This mixed air shall be compressed and increase the internal pressure when door is closed. This causes the door stucked closely to the refrigerator in a moment. (If the refrigerator is used for a long time, it will then open smoothly.) ■ When the refrigerator compartment door is open and close, the freezer compartment door moves up and down. <ul style="list-style-type: none"> • When the refrigerator compartment door is open and close, fresh air comes into the freezer compartment and moves up and down the freezer compartment door. ■ Door opens too easily. <ul style="list-style-type: none"> • There is a magnet in the gasket rubber so that it is ok. if door is securely closed without a gap. It can be open easily if the foods in the refrigerator or freezer compartments hold the door open. ■ A door does not close properly. <ul style="list-style-type: none"> • If the rear side of the refrigerator is raised higher than front side, door shall not be easily closed. Adjust the level of refrigerator with levelling screws.

HOW TO DISASSEMBLE AND ASSEMBLE

1. DOOR

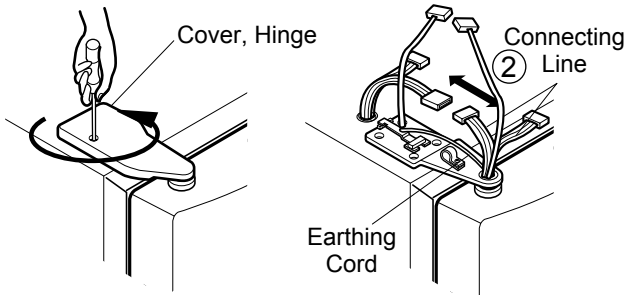
1) Remove lower cover and disconnect water supply tube in the lower part of freezer door.

- Pull a water supply tube ② forward while pressing ① part to disconnect water supply tube as shown below.

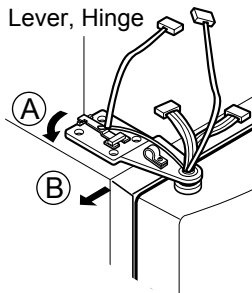


2) Remove a freezer door.

- (1) Loosen hinge cover screw of freezer door and remove cover.
Disconnect all connecting lines except earthing cord.



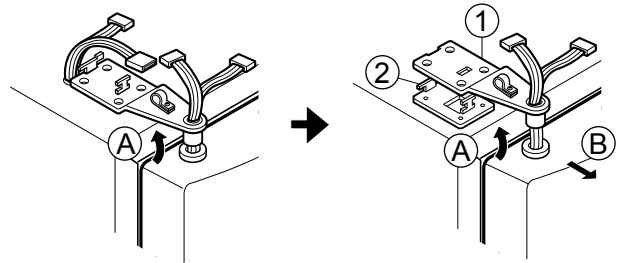
- (2) Turn hinge lever in arrow (A) direction until it is loosened and take it out in arrow (B) direction.



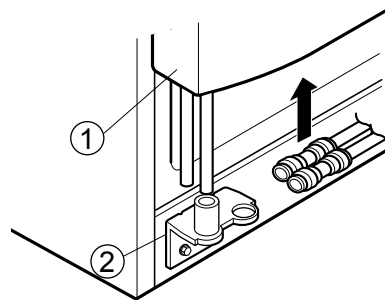
Note : • When disconnecting refrigerator door, turn hinge lever counterclockwise.

- If hinge lever or bracket hinge pin is deformed during assembling freezer and refrigerator doors, fix two screws (Tap Tite Screw, M6: Hinge, L fixing screw) in the hole of upper hinge.

- (3) Disconnect upper hinge ① from a hinge supporter ② by grasping the front part of upper hinge and lifting up (Hinge Assembly, U) in arrow direction (A) and pull forward in arrow (B) direction. Be careful as the door may be fallen down.



- (4) Lift up the freezer door ① in arrow direction and disconnect the door from the lower hinge ②. Don't pull a door forward.



Note : • Lift up a freezer door until a water supply tube is fully taken out.

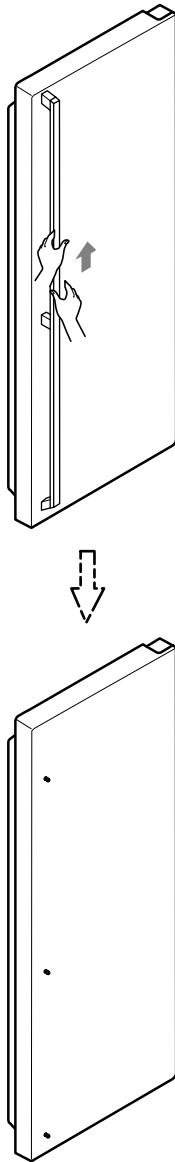
- (5) Assembly is the reverse order of disassembly

HOW TO DISASSEMBLE AND ASSEMBLE

2. HANDLE

1) Aluminum short handle Model

(1) Grasp the handle by both hands and hold it upward.



3. SHROUD, GRILLE FAN

- 1) Loosen screws after disconnecting a cap screw of a grill fan(U) with a blade screwdriver.
- 2) Disassembly of a grille fan(U) : Pull forward after opening hook at → part with a blade screwdriver.
- 3) Disconnect housing and disassembly of shroud F(U) : holding upper part and pull forward

- 4) Disassembly of a grille fan(L) : Hold upper part of a grill fan(L) and pull forward carefully
- 5) Check foam PU sticking conditions around a shroud, F(U) and F(L) during assembling. If damaged, torn or badly stuck, assemble with a new one after sealing well.

4. ICEMAKER ASSEMBLY

1. How to disassemble :

(1) Remove the cover and ice bucket from the freezer door.



(2) Disassemble the Motor, AC and icemaker



Loosen four screws.



Lift up the Motor, AC assembly



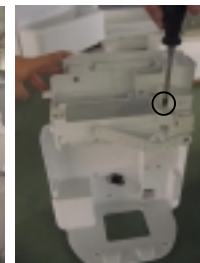
Pull out the Motor, AC with swing like this figure.

• **Caution** : When pulling out the Motor AC, do not damage the water injector.

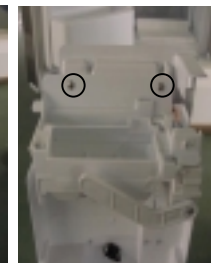
(3) Disconnect housing and loose screws



Disconnect the housing



Loosen screw of guide water



Loosen screws of icemaker and pull out the icemaker.

HOW TO DISASSEMBLE AND ASSEMBLE

4. WATER VALVE DISASSEMBLY METHOD

- 1) Turn off the power of the refrigerator (pull out the plug). Open the FREEZER and REFRIGERATOR Door and disassemble the Lower Cover.



- 2) Lay a dry towel on the floor and get ready to spill water from the water tank. Then press the collet to separate the tube from the connector and pour out the water until emptied.

(Refer to the label attached on Front L on how to separate the tube.)



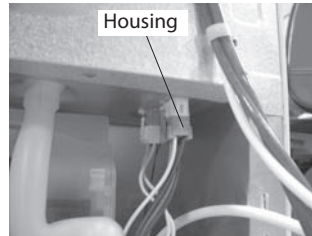
- 3) Turn off the water. Then separate the water line from the valve.



- 4) Separate the Mechanical Cover and Valve Screw.



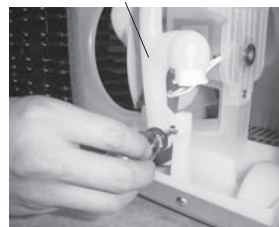
- 5) Separate the housing and pull out the valve.



5. FAN AND FAN MOTOR DISASSEMBLY METHOD

- 1) Using a short screwdriver, loosen one SCREW in DRAIN PIPE ASSEMBLY and one connected to the MOTOR COVER.

DRAIN PIPE ASSEMBLY



MOTOR COVER



- 2) Pull and separate the FAN ASSEMBLY and MOTOR turning counterclockwise based on the MOTOR SHAFT.

FAN ASSEMBLY

MOTOR



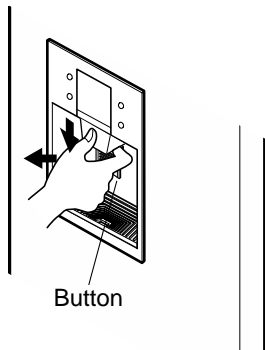
The assembly is in the reverse order of the disassembly and take special care for the following details.

1. Be careful not to bend the tube during assembly.
2. Press the WATER DISPENSER button until water pours out and check for leakage in the CONNECTOR TUBE (It differs by the water pressure but usually takes about 2 minutes until water pours out.)

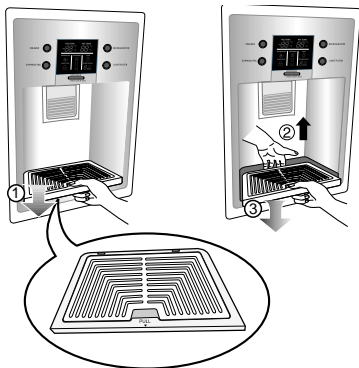
HOW TO DISASSEMBLE AND ASSEMBLE

7. DISPENSER

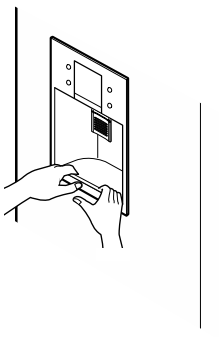
1) Disconnect funnel assembly by pulling down and forward.



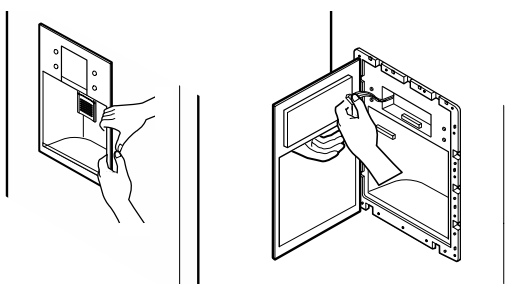
2) Disconnect the cover by pulling it fully to the front ① and pull up the rear end of the cover ② slightly to pull it out ③.



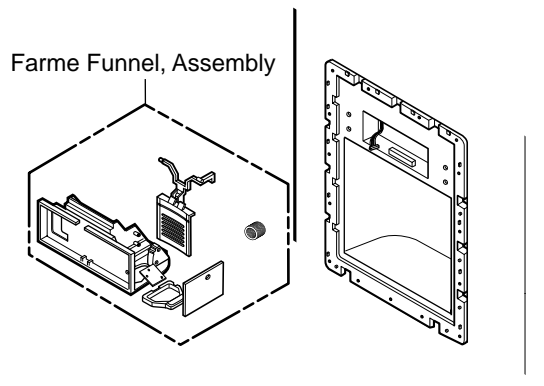
3) Remove a dispenser cover assembly by pulling a low side. It is attached with a hook so be pulled carefully



4) Remove a dispenser cover assembly by pulling a right and left side. It is attached with a hook so be pulled carefully. After separating a dispenser cover, you have to disconnect its housing

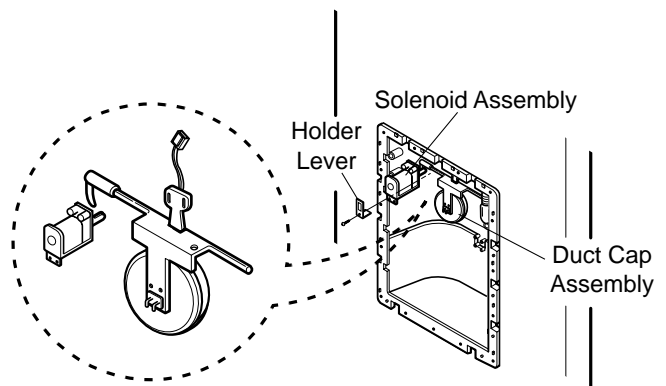


5) Loosen fixed screws with a screwdriver and pull the funnel assembly to disconnect.

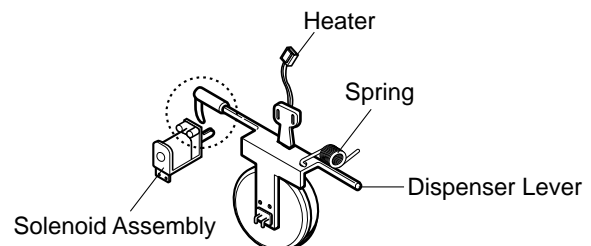


※ You can change LED Lamp in this disassemble state

6) The duct cap assembly can be disconnected if the hold lever connecting screw is loosened with a screwdriver.

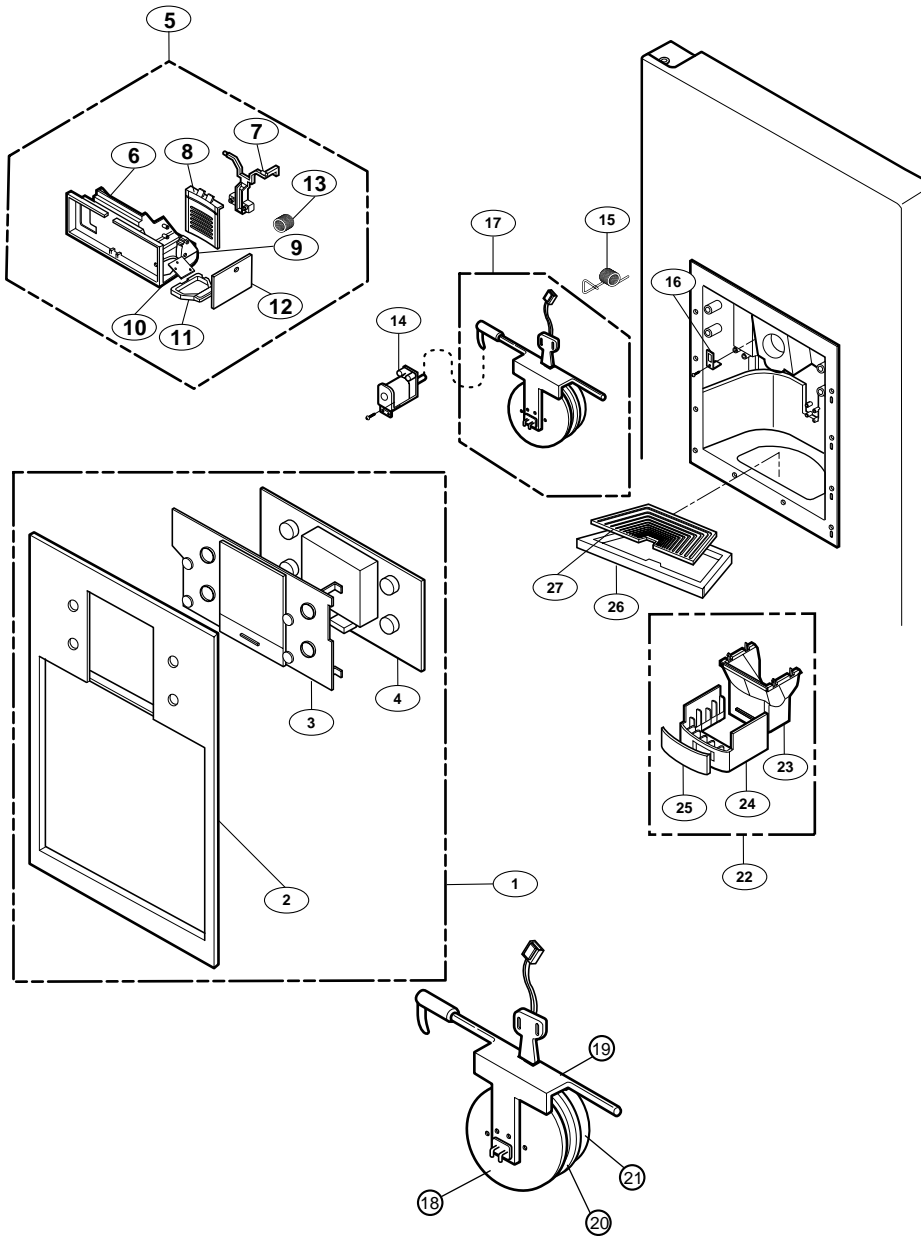


7) To install the duct cap assembly, insert one end of the spring into the right hole of the dispenser lever and insert the other end into the right hole in the top part of the dispenser. Then attach the holder at the solenoid switch.



HOW TO DISASSEMBLE AND ASSEMBLE

8) Dispenser Related Parts



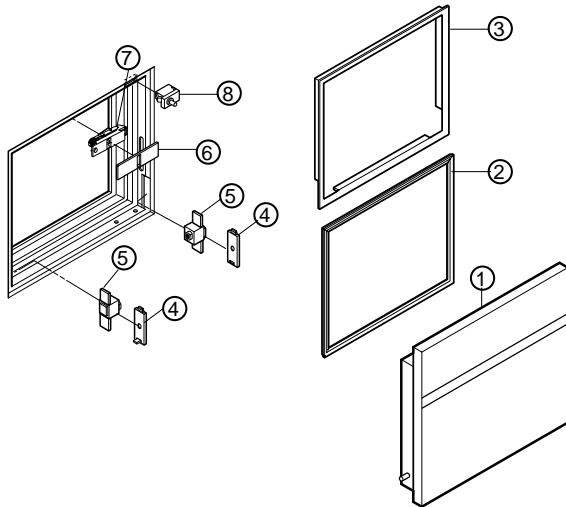
1	COVER ASSEMBLY, DISPENSER
2	COVER, DISPENSER
3	DECO COVER, DISPLAY
4	PWB(PCB) ASSEMBLY, DISPLAY
5	FRAME FUNNEL, ASSEMBLY
6	FRAME, FUNNEL
7	LEVER, DISPENSER
8	BUTTON, LEVER
9	SWITCH, MICRO
10	PCB ASSEMBLY, DISPLAY
11	SUPPORTER, HOLDER
12	SHEET DUCT
13	SPRING, LEVER
14	SOLENOID, ASSEMBLY
15	SPRING
16	LEVER, HOLDER
17	CAP ASSEMBLY, DUCT
18	CAP, DUCT
19	DISPENSER, LEVER
20	FOAM, NEW
21	RUBBER, CAP
22	FUNNEL, ASSEMBLY
23	FUNNEL
24	DECO, COVER
25	DECO, PANEL
26	DECO, DRAIN
27	DECO, DRAIN(COVER)

<17 Cap Assembly, Duct Detailed Drawings>

HOW TO DISASSEMBLE AND ASSEMBLE

8. HOME BAR

8-1. Home Bar related parts



1 DOOR ASSEMBLY, H/BAR	5 HINGE ASSEMBLY, H/BAR
2 GASKET, H/BAR	6 COVER, LEVER
3 COVER, H/BAR	7 HOLDER ASSEMBLY, BRACKET
4 COVER, FRAME	8 SWITCH, PUSH BUTTON

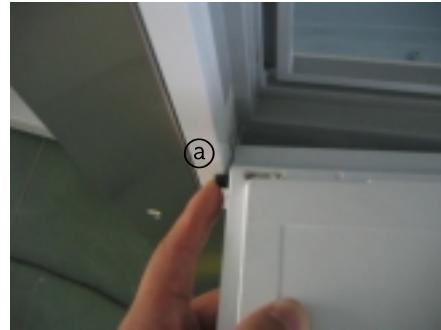
8-2. Home Bar parts disassembly and assembly

1) Disassemble H/Bar.



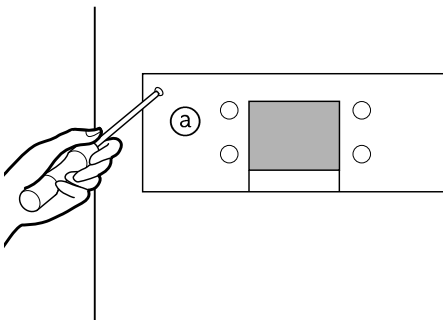
Using a flat driver or a pick tool, separate a home bar

2) Assembly H/Bar.

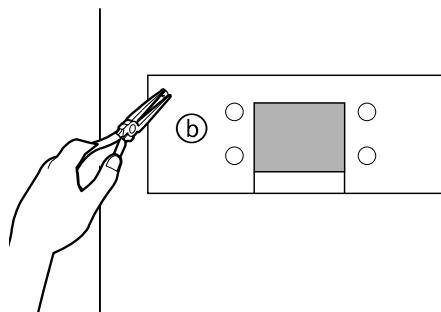


First, you insert a right side, and push a home bar hinge on left side (a).

9. DISPLAY COVER ASSEMBLY (GW-C227/B227)



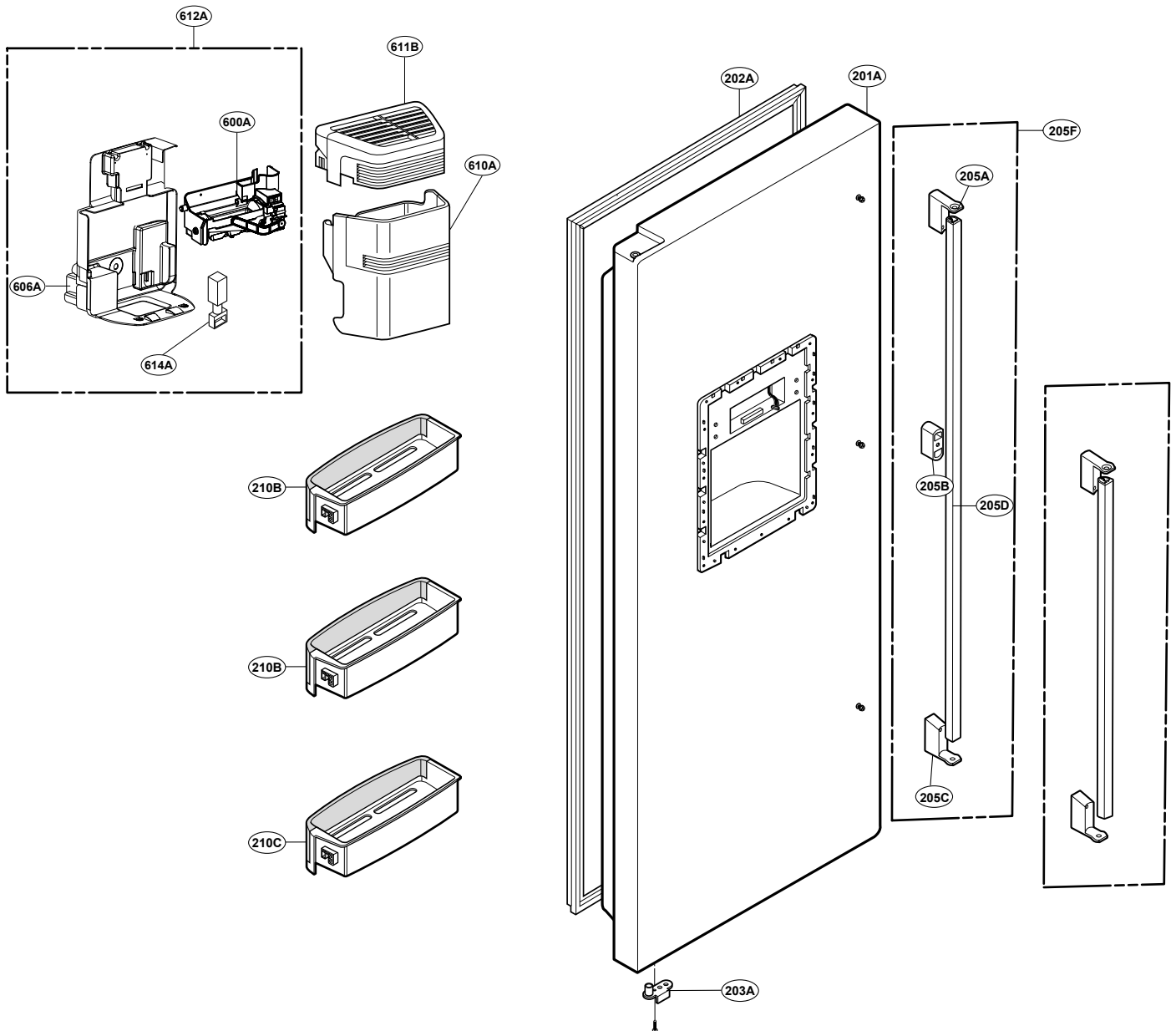
Fixing a screw to the display by using a screwdriver (a).



Separate the display by using a flyer (b).

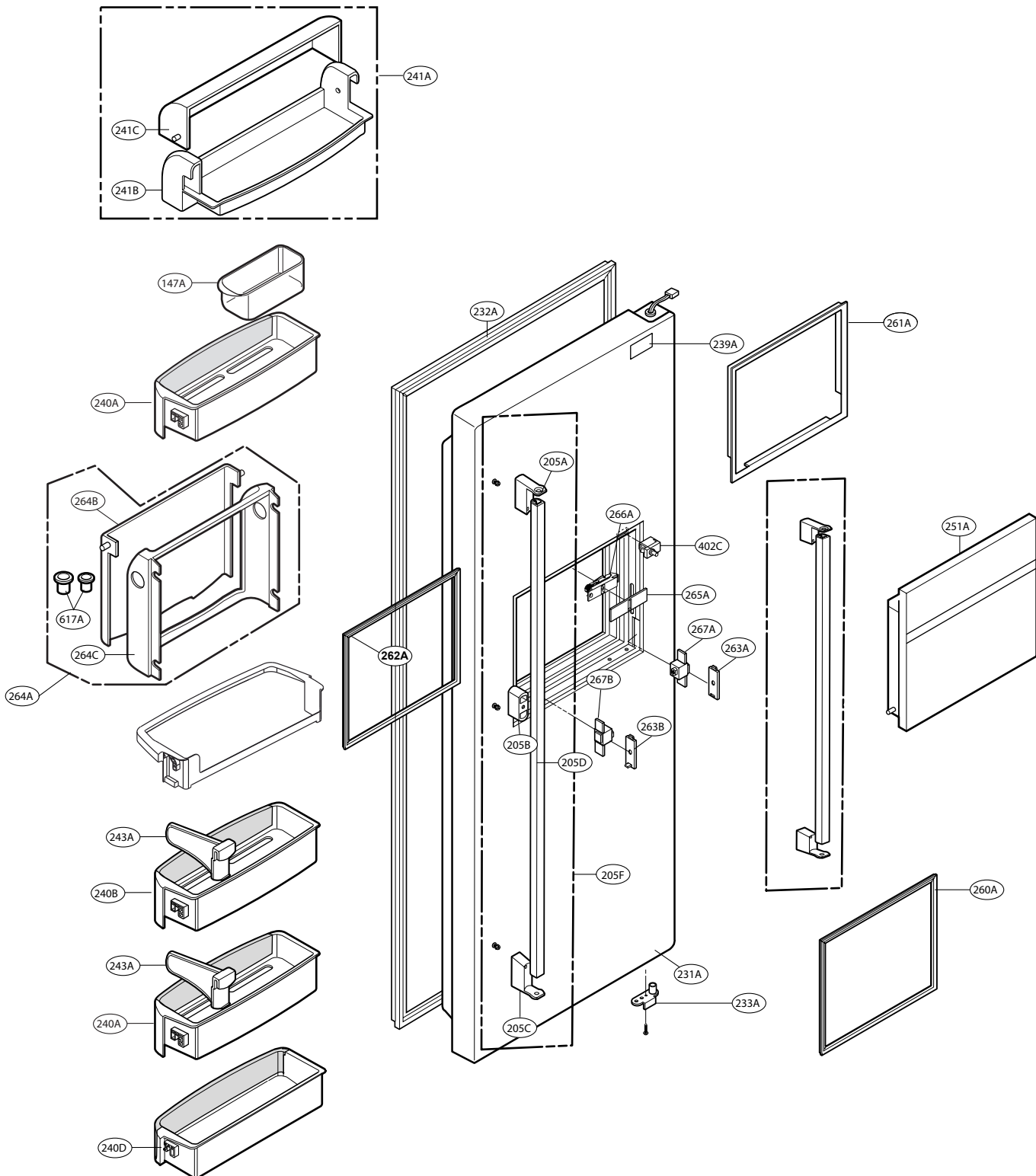
EXPLODED VIEW

FREEZER DOOR PART : GW-P227



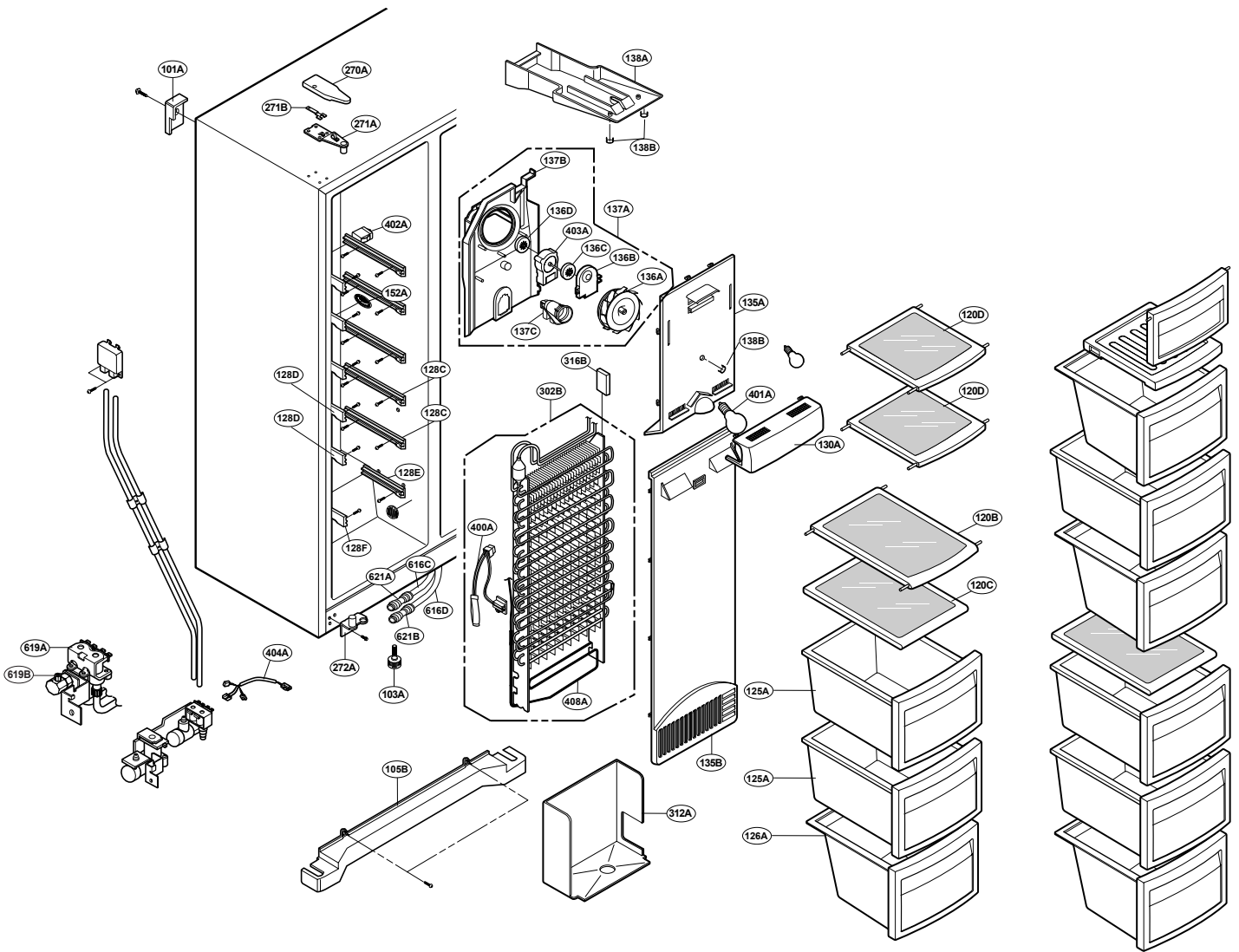
EXPLODED VIEW

REFRIGERATOR DOOR PART: GW-P227



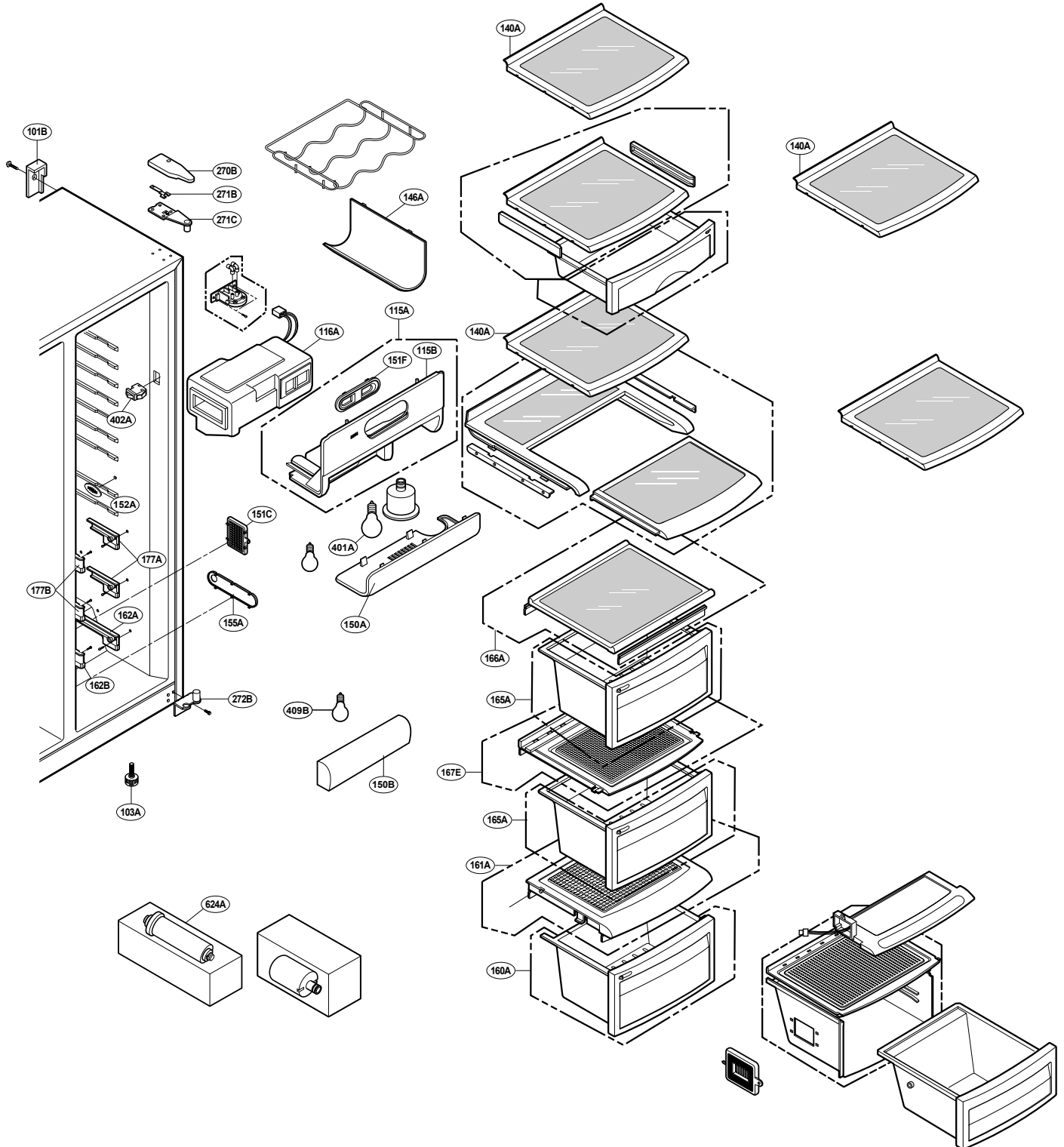
EXPLODED VIEW

FREEZER COMPARTMENT



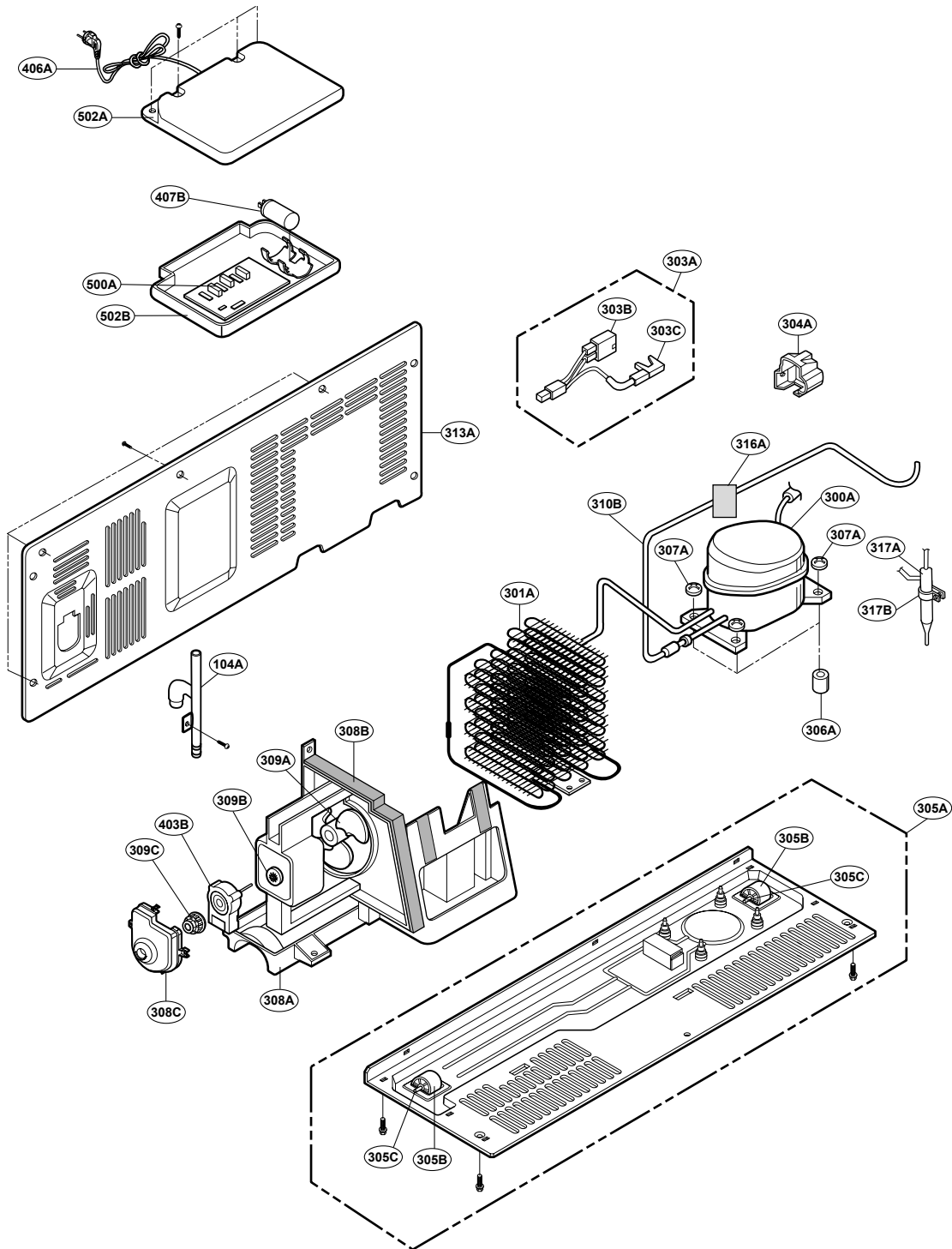
EXPLODED VIEW

REFRIGERATOR COMPARTMENT



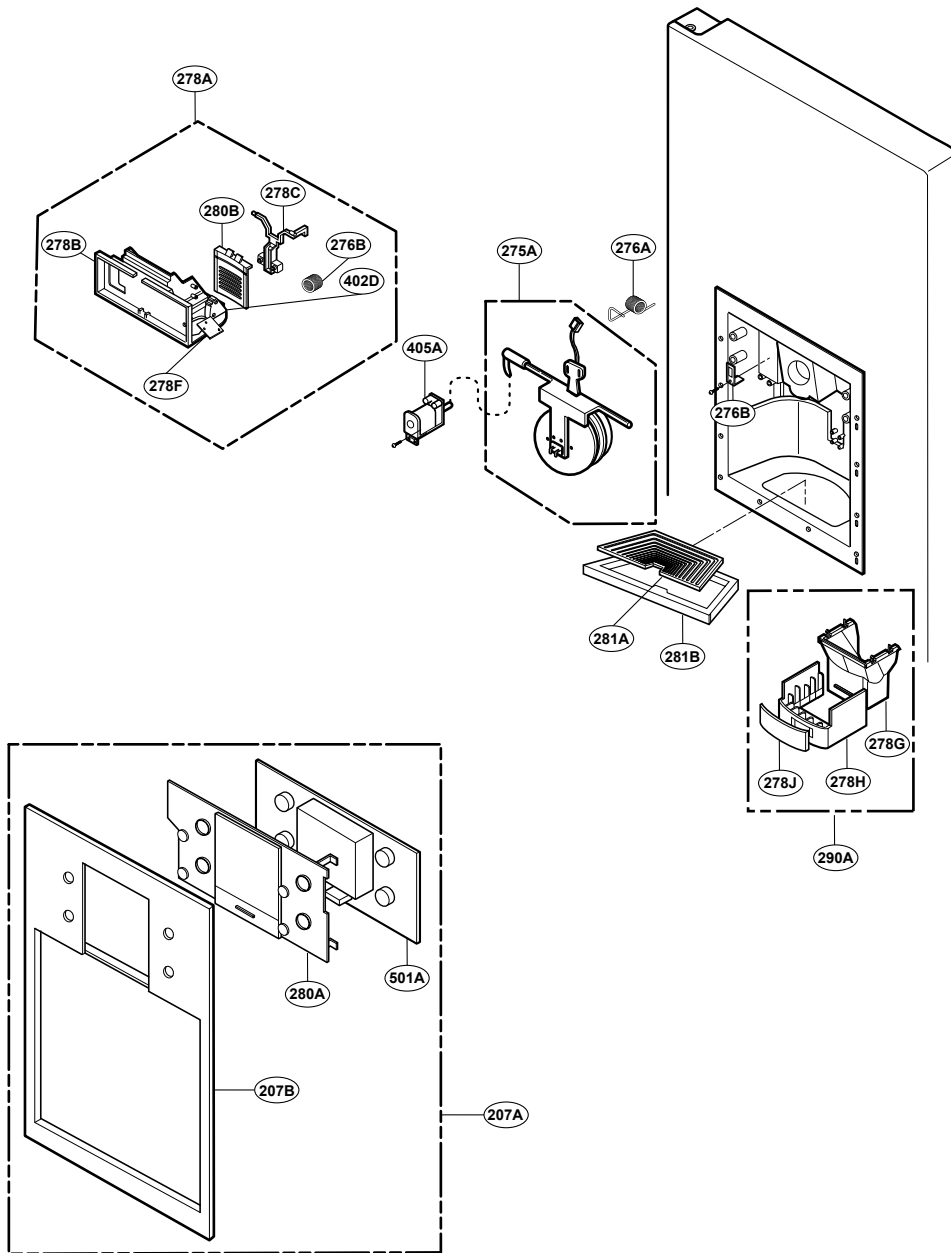
EXPLODED VIEW

MACHINE COMPARTMENT



EXPLODED VIEW

DISPENSER PART





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