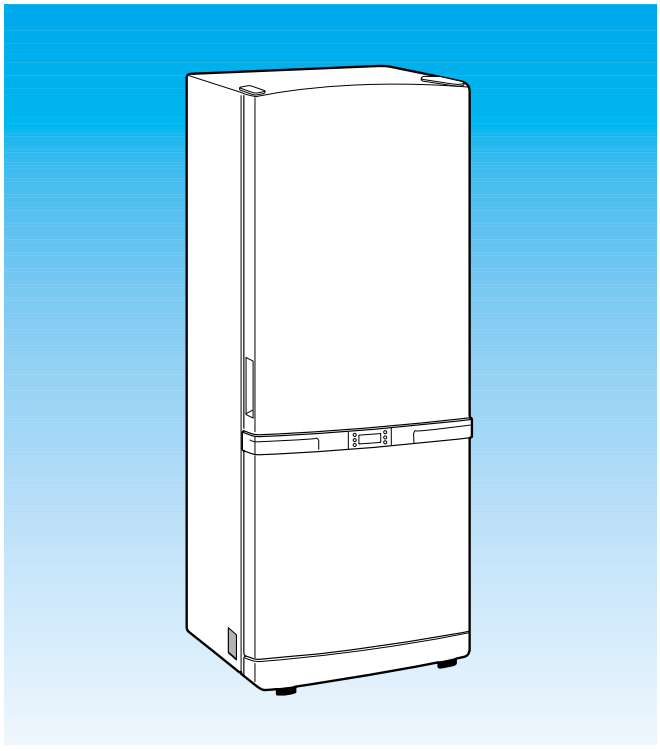
SAMSUNG

REFRIGERATOR

Model Name : RB195/215B*
(Model Code)

SERVICE Manual

REFRIGERATOR



PRODUCT FEATURE

- Reversible Door
- Auto Ice-Maker
- Fridge Wire Box

For the latest parts information, Please access to our service web site (http://itself.sec.samsung.co.kr)

WARNING

IMPORTANT SAFETY NOTICE

The service guide is for service men with adequate backgrounds of electrical, electronic, and mechanical experience. Any attempt to repair a major appliance may result in personal injury and property damage. The manufacturer or dealer cannot be responsible for the interpretation of this information.

SAMSUNG ELECTRONICS AMERICA, INC.

Technical Service Guide

Contents

1. INSTALLATION

1) To protect refrigerator in movement
Use padded hand truck from side only.

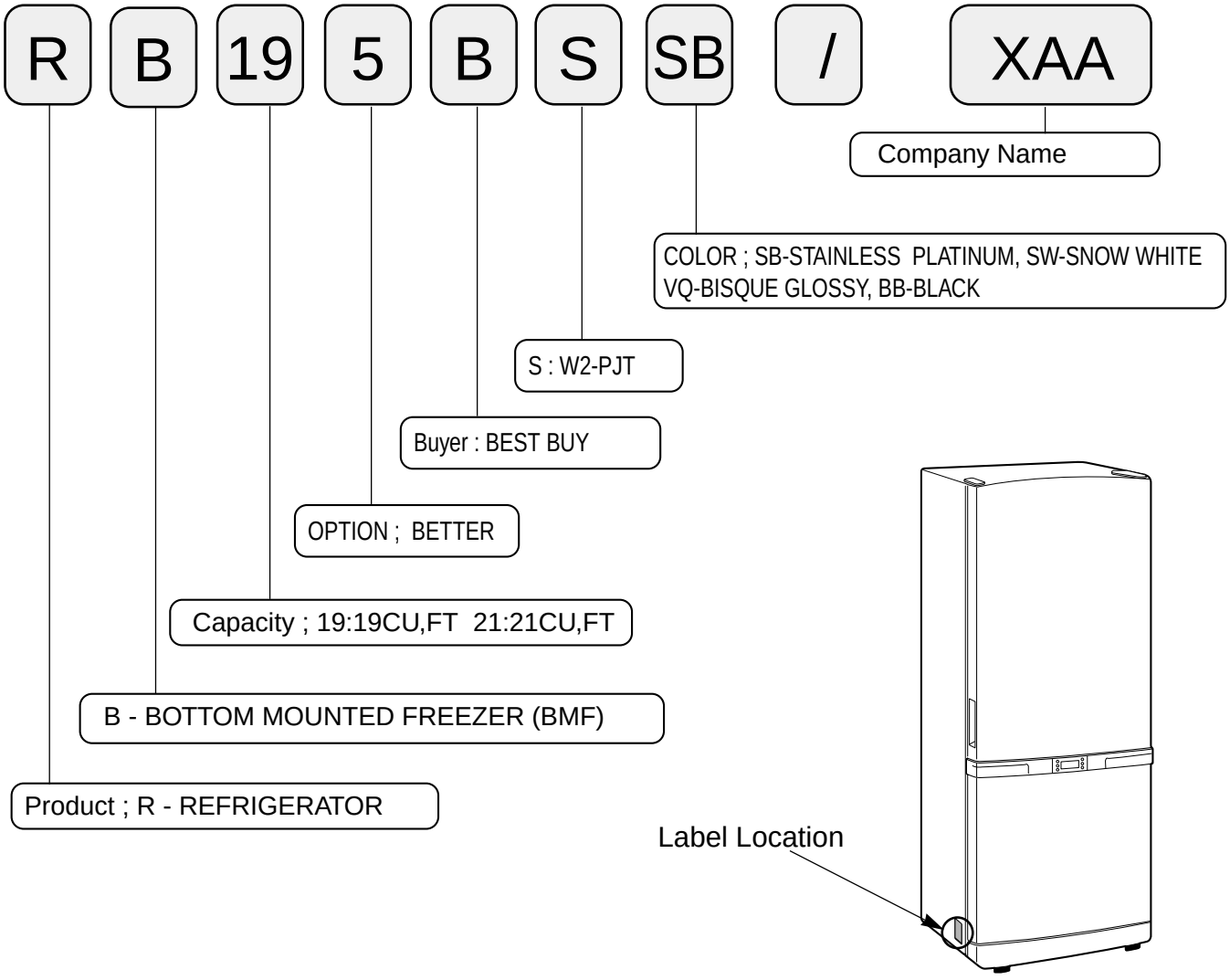
2) Remove all protective tape and pad from the refrigerators.
Connect power cord. Adjust the clearance between the doors.

3) Temperature controls and preset in the factory for recommended settings.
The refrigerator should runs smoothly and lower the temperature gradually.

4) Once the refrigerator temperature is sufficiently low
It is recommended to store foods in the refrigerator.
It takes a few hours to reach the preset temperatures.

2. NOMENCLATURE

2005 Models



3. PRODUCT SPECIFICATIONS

Model		RB195BSSW, RB195BSSB, RB195BSVQ, RB195BSBB	RB215BSSW, RB215BSSB, RB215BSBB, RB215BSVQ
Type		BMF 2 Door	
Temperature control		Electronic control	
Net Capacity (ft^3)	Total	18.7	20.4
	Freezer	5.9	6.5
	Refrigerator	12.8	13.9
Net dimension (W X D X H)		32.3 X 28.3 X 69.9	32.3 X 30.3 X 69.9
Foam	Cabinet insulation	CYCLO-PENTANE	
	Door insulation	CYCLO-PENTANE	
Liner	Cabinet	A.B.S	
	Door	A.B.S	
Net weight(lb)		227	241

4. ELECTRICAL PART SPECIFICATIONS & STANDARD

ITEM		STANDARD	
Model		RB195BSSW, RB195BSSB, RB195BSVQ, RB195BSBB	RB215BSSW, RB215BSSB, RB215BSBB, RB215BSVQ
Rated Voltage		115V	
Frequency		60HZ	
Compressor	Model	MK172C-L2U	
	Starting type	RSCR	
	Refrigerant	R134a	
	Oil Charge	Freol α-10c(Ester), 265cc	
Evaporator	Freezer	Split Fin & Tube Type	
	Refrigerator	Split Fin & Tube Type	
Condenser		Forced & Natural Convection Type	
Dryer		Molecular Sieve XH-9	
Capillary tube		ID0.82 X L3000	
Earth screw		BSBN(Brass screw)	
Door switch		AC125V 1.4A(SSD-6D)	

ELECTRICAL PART SPECIFICATIONS & STANDARD

ITEM				STANDARD	
Temperature	Freezer	Type	Temperature Selection	ON(˚F)	OFF(˚F)
		F-Sensor	–14˚F	–12.0˚F	–16.0˚F
			–2˚F	0˚F	–4˚F
			8˚F	10˚F	6˚F
	Refrigerator	Type	Temperature Selection	ON(˚F)	OFF(˚F)
		R-Sensor	34˚F	36˚F	32˚F
			38˚F	40˚F	36˚F
			46˚F	48˚F	44˚F
Electrical parts	Defrosting	First Defrost Cycle (Concurrent Defrost of F and R)		4hr ±10min	
		Defrost Cycle(FRE)		Min. 12hrs, Max. 22Hrs	
		Defrost Cycle(REF)		Min. 6hrs, Max. 11Hrs	
		Pause Time		10±2min	
	Sensor	Freezer-Sensor		THERMISTOR (502AT), SPEC:5.0KΩ AT 77˚F	
		Refrigerator-Sensor			
		FRE Evap-Sensor			
		REF Evap-Sensor			
		Ambient TEMP-Sensor			
	Heater	Defrost Heater(FRE)		242W	
		Drain Heater(FRE)		52W	
		Defrost Heater(REF)		120W	
		Drain Heater(REF)		38W	
		Ice-maker Heater		10W	
	Fuse	Thermal-Fuse for preventing overheating of Freezer Defrost-Heater		AC250V 10A 77±5˚C	
		Thermal-Fuse for preventing overheating of Freezer Defrost-Heater			
	Capacitor	RUNNING		RSCR 250VAC, 12㎌	
	Over-Load Protector	MODEL		4TM437RHBYY-53	
		TEMP. ON		130±5	
	STARTING-RELAY	TEMP. OFF		69±9	
		MODEL		J531Q33E100M200-2	
		OPERATION		10±20%	
	MOTOR-FAN	FRE.		IS3210-SNP6D	
		REF.		IS3208-SNP6H	
		CIRCUIT		IS3208-SCH6A	
	LAMP	FRE(INCANDESCENT)		110V-130V/15W ×2	
		REF(INCANDESCENT)		110V-130V/30W	

5. WARRANTY INFORMATION

SAMSUNG REFRIGERATOR
(18 Cubic Feet and Larger Capacity)

LIMITED WARRANTY TO ORIGINAL PURCHASER

This SAMSUNG brand product, as supplied and distributed by Samsung Electronics America, Inc. (SAMSUNG) and delivered new, in the original carton to the original consumer purchaser, is warranted by SAMSUNG against manufacturing defects in materials and workmanship for a limited warranty period of:

One (1) Year Parts and Labor on Refrigerator
Five (5) Years Parts and Labor on Sealed Refrigeration System Only*
(*Compressor, evaporator, condenser, drier, connecting tubing)

This limited warranty begins on the original date of purchase, and is valid only on products purchased and used in the United States. To receive warranty service, the purchaser must contact SAMSUNG for problem determination and service procedures. Warranty service can only be performed by a SAMSUNG authorized service center. The original dated bill of sale must be presented upon request as proof of purchase to SAMSUNG or SAMSUNG's authorized service center.

SAMSUNG will repair or replace any part found to be defective, at our option and at no charge as stipulated herein, with new or reconditioned parts during the limited warranty period specified above. All replaced parts and products become the property of SAMSUNG and must be returned to SAMSUNG. Replacement parts and products assume the remaining original warranty, or ninety (90) days, whichever is longer.

In-home service will be provided during the warranty labor period subject to availability within the contiguous United States. In-home service is not available in all areas. To receive in-home service, the product must be unobstructed and accessible from floor level to service personnel. If during in-home service repair cannot be completed, it may be necessary to remove, repair and return the product. If in-home service is unavailable, SAMSUNG may elect, at our option, to provide for transportation of our choice to and from a SAMSUNG authorized service center. Otherwise, transportation to and from the SAMSUNG authorized service center is the responsibility of the purchaser.

This limited warranty covers manufacturing defects in materials and workmanship encountered in normal, noncommercial use of this product, and shall not apply to the following, including, but not limited to: damage which occurs in shipment; delivery and installation; applications and uses for which this product was not intended; altered product or serial numbers; cosmetic damage or exterior finish; accidents, abuse, neglect, fire, water, lightning or other acts of nature; use of products, equipment, systems, utilities, services, parts, supplies, accessories, applications, installations, repairs, external plumbing and leaks, external wiring, circuit breakers, fuses or connectors not supplied and authorized by SAMSUNG, or which damage this product or result in service problems; incorrect electrical line voltage, fluctuations and surges; customer adjustments and failure to follow operating instructions, cleaning, maintenance and environmental instructions that are covered and prescribed in the instruction book; loss of food due to spoilage; consumable items including filters and light bulbs.

THERE ARE NO EXPRESS WARRANTIES OTHER THAN THOSE LISTED AND DESCRIBED ABOVE, AND NO WARRANTIES WHETHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, SHALL APPLY AFTER THE EXPRESS WARRANTY PERIODS STATED ABOVE, AND NO OTHER EXPRESS WARRANTY OR GUARANTY GIVEN BY ANY PERSON, FIRM OR CORPORATION WITH RESPECT TO THIS PRODUCT SHALL BE BINDING ON SAMSUNG. SAMSUNG SHALL NOT BE LIABLE FOR LOSS OF REVENUE OR PROFITS, FAILURE TO REALIZE SAVINGS OR OTHER BENEFITS, OR ANY OTHER SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES CAUSED BY THE USE, MISUSE OR INABILITY TO USE THIS PRODUCT, REGARDLESS OF THE LEGAL THEORY ON WHICH THE CLAIM IS BASED, AND EVEN IF SAMSUNG HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. NOR SHALL RECOVERY OF ANY KIND AGAINST SAMSUNG BE GREATER IN AMOUNT THAN THE PURCHASE PRICE OF THE PRODUCT SOLD BY SAMSUNG AND CAUSING THE ALLEGED DAMAGE. WITHOUT LIMITING THE FOREGOING, PURCHASER ASSUMES ALL RISK AND LIABILITY FOR LOSS, DAMAGE OR INJURY TO PURCHASER AND PURCHASER'S PROPERTY AND TO OTHERS AND THEIR PROPERTY ARISING OUT OF THE USE, MISUSE OR INABILITY TO USE THIS PRODUCT SOLD BY SAMSUNG NOT CAUSED DIRECTLY BY THE NEGLIGENCE OF SAMSUNG. THIS LIMITED WARRANTY SHALL NOT EXTEND TO ANYONE OTHER THAN THE ORIGINAL PURCHASER OF THIS PRODUCT, IS NONTRANSFERABLE AND STATES YOUR EXCLUSIVE REMEDY.

Some states do not allow limitations on how long an implied warranty lasts, or the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights, and you may also have other rights, which vary from state to state.

To obtain warranty service, please contact SAMSUNG at:

SAMSUNG CUSTOMER CARE CENTER
400 Valley Road, Suite 201, Mt. Arlington, NJ 07856, Tel: 973-601-6000, Fax: 973-601-6001
1-800-SAMSUNG (1-800-726-7864) and www.SAMSUNGUSA.com

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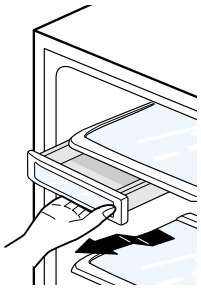
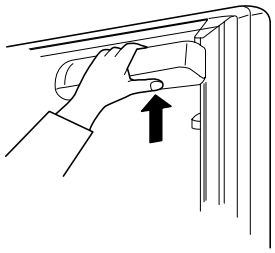
6. Interior Views and Dimensions

6-1) Shelves and Bins

• Deli drawer
Pull it out to disassemble.

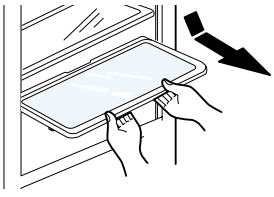


• Door Bin
Push it up and slide it out to disassemble.



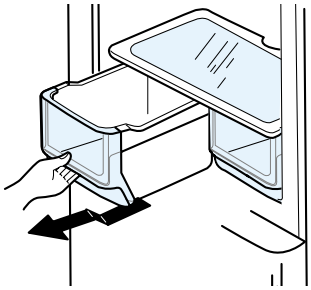
Light

• Glass Shelf
Pull it out until its stop
Tilt down and slide it out.

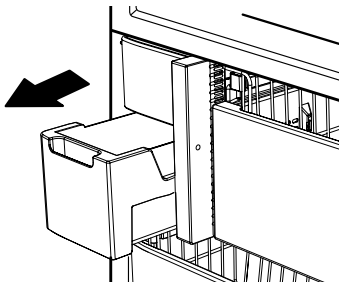


• Gallon Bin

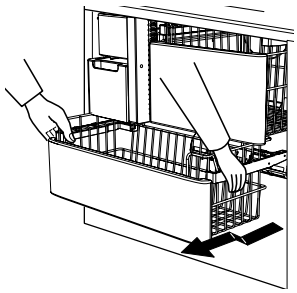
• Vegetable Drawer



• Ice trays

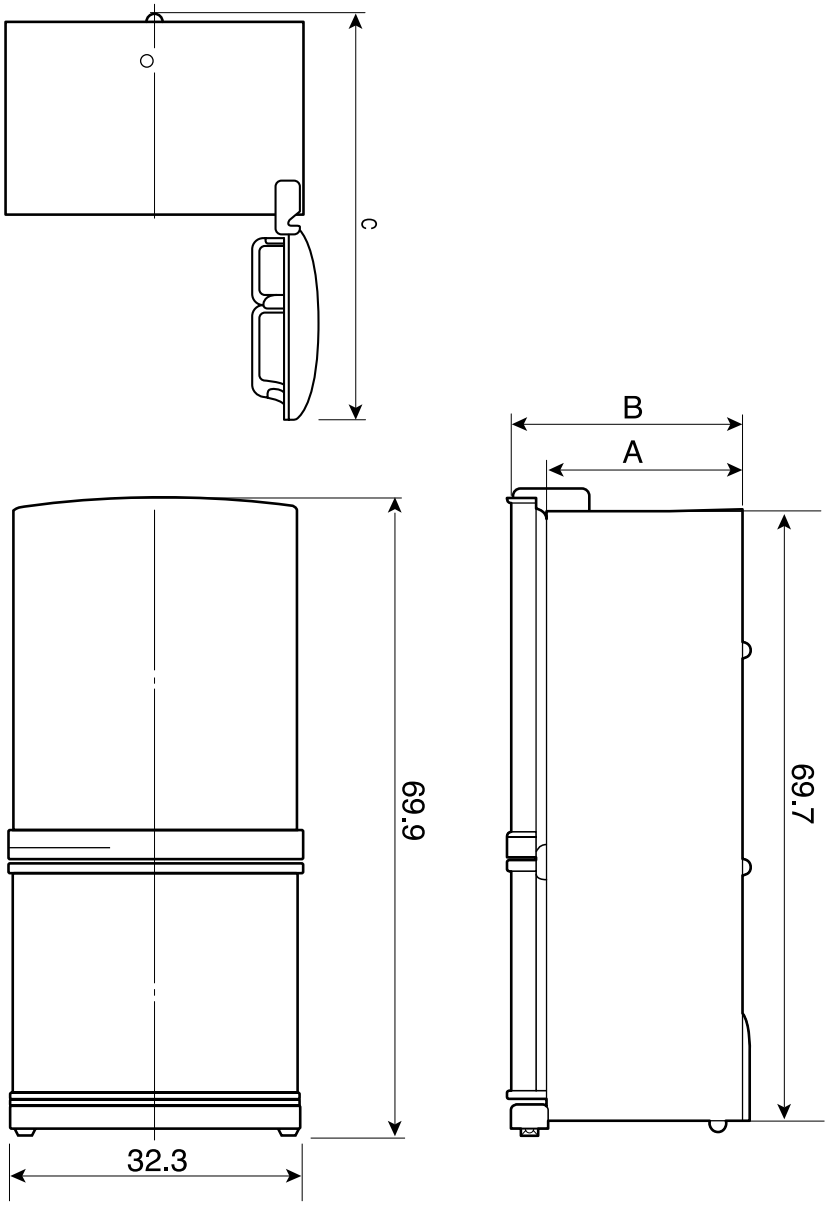


• Freezer Drawer



Interior Views and Dimensions

6-2) Dimensions of Refrigerator (Inches)

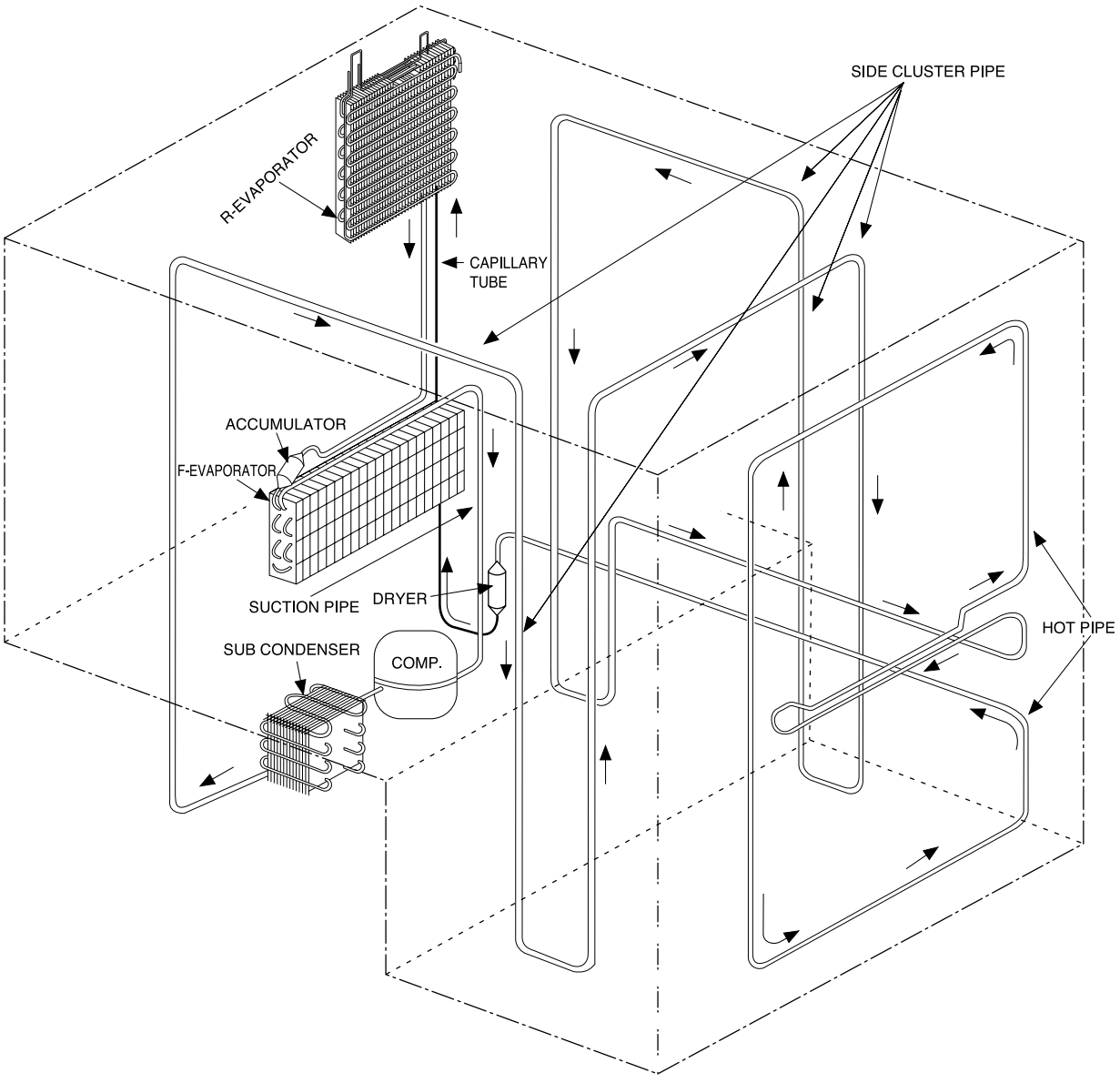


MODEL	A	B	C
RB195	24.3	28.3	57.8
RB215	26.3	30.3	59.8

7. Refrigeration Cycle and Cool Air Circulation Route

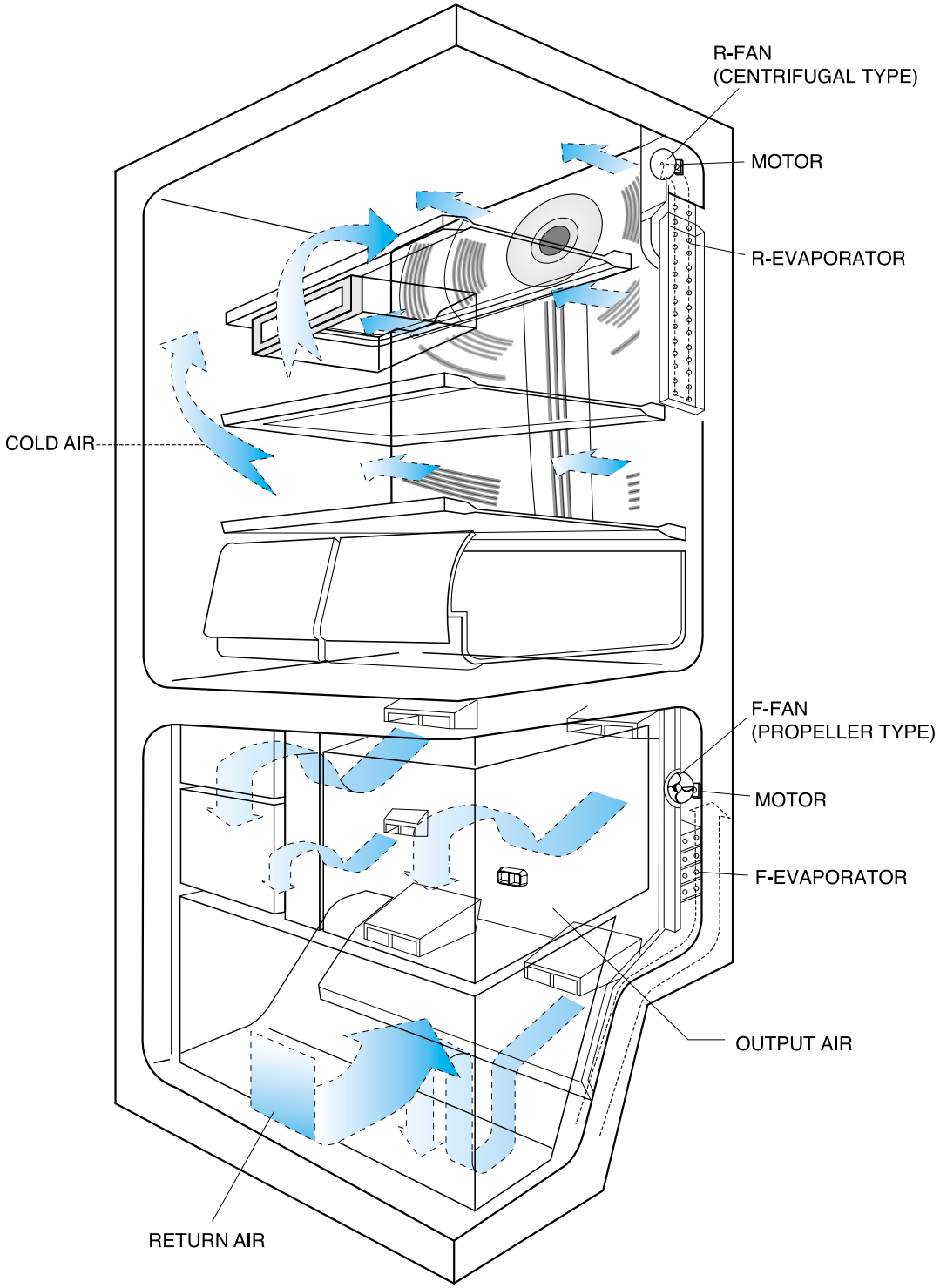
7-1) Refrigerant Route in Refrigeration cycle

Compressor → Sub condenser → Cluster pipe → Hot pipe → Dryer → Capillary tube → R-Evaporator → F-Evaporator → Accumulator → Suction pipe → Compressor



Refrigeration Cycle and Cool Air Circulation Route

7-2) Cool Air Circulation



8. Mechanical Disassembly

Refrigerator Disassembly

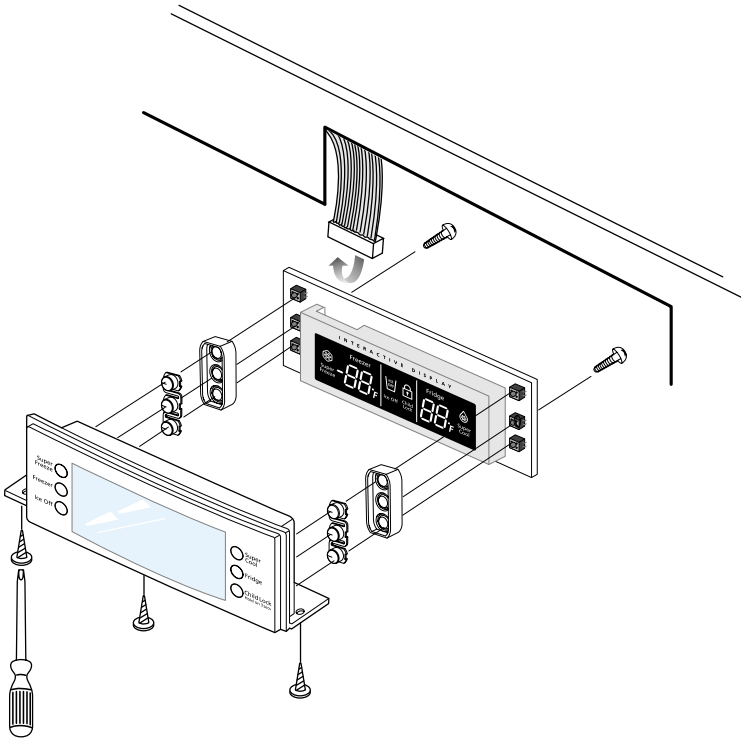
Mechanical Disassembly

Control Panel

1. Remove the screws.

2. Pull out the control panel.

3. Disconnect the wire connector.



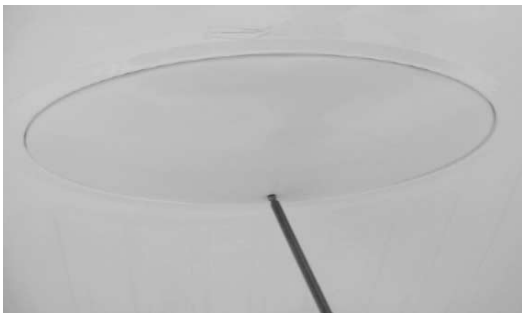
Mechanical Disassembly

Warning

Always unplug the power cord before replacing the refrigerator lamp.
There is the danger of electric shock.

Refrigerator Light

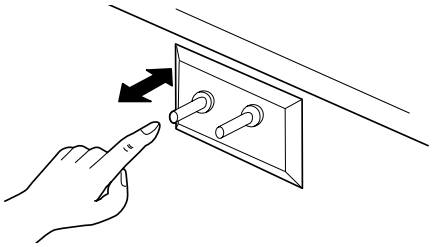
1. Remove the screw.



2. Remove the lamp cover by unlocking the tabs and pulling the cover down.

3. Replace the lightbulb by turning it counter-clockwise.

4. After replacing the bulb, reattach the cover and the screw it again.
5. Plug the power cord in and check the lamp by pressing the R-door switch.

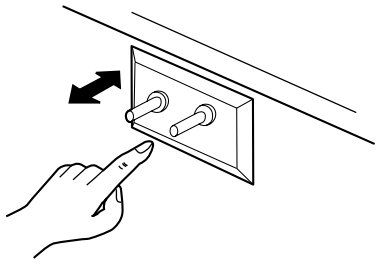


Freezer Light

1. Remove the cover by pressing the bottom tab.

2. Replace the two bulb by turning it counter-clock wise.

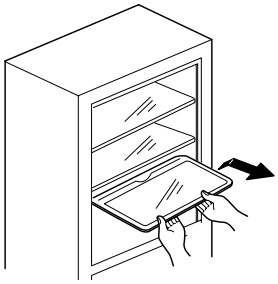
3. Reattach the cover and check the lamp by pressing door switch.



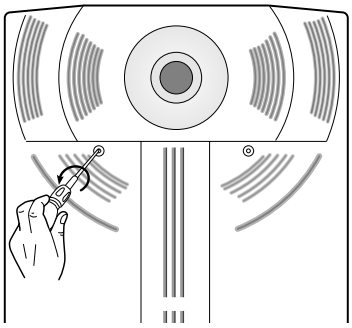
Mechanical Disassembly

Evaporator Cover in the Refrigerator

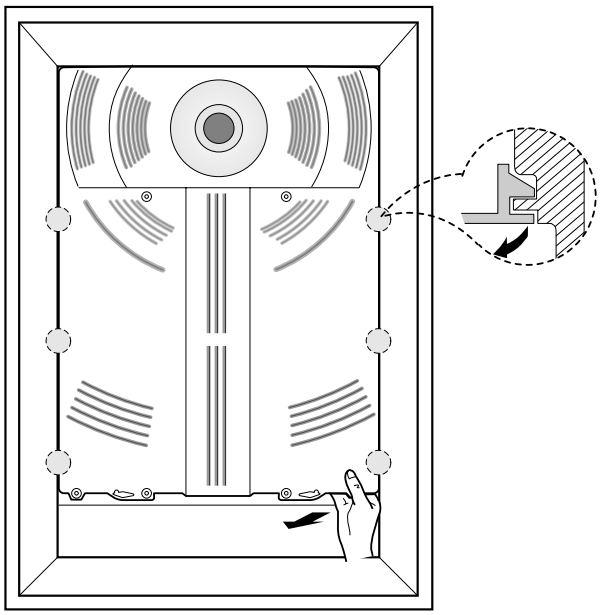
1. Remove all shelves and drawers from the refrigerator.



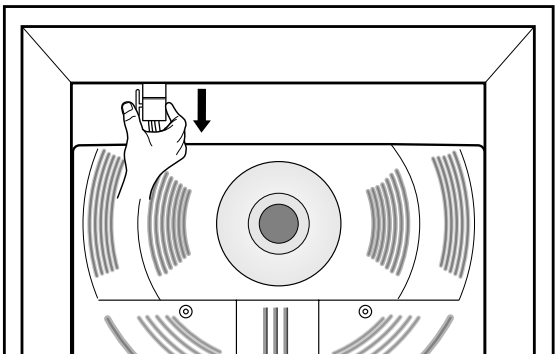
2. Pull out the screw caps with a small flat-blade screwdriver.
3. Remove 6 Phillps screws from the cover.



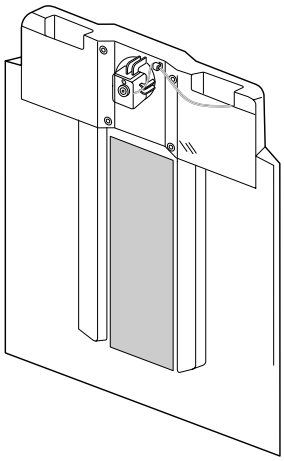
4. Unlock the 2 tabs with a flat-blade screwdriver on each side of the bottom cover.
5. Remove the evaporator cover by pulling out from the bottom of the evaporator cover.



6. Disconnect the wire connector.



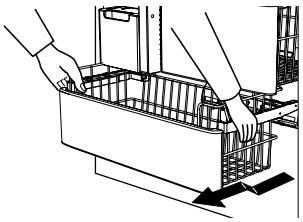
■ Ductwork of the evaporator fan assembly.



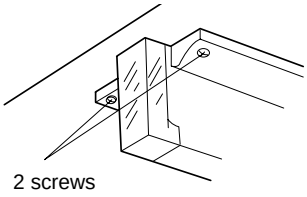
Mechanical Disassembly

Evaporator Cover in Freezer

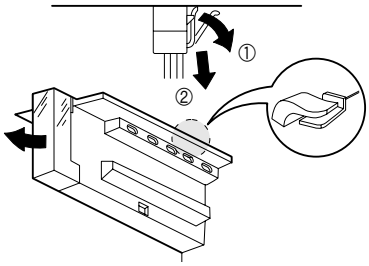
1. Remove all drawers from the freezer.



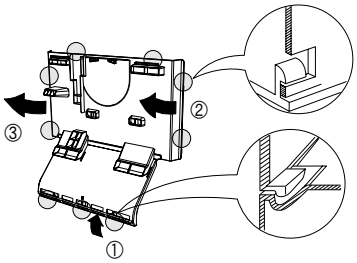
2. Remove screws (2) from the support rail.



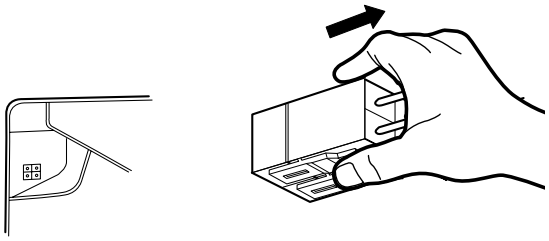
3. Pull down the holder of the support rail and disconnect the wire connector to remove it.



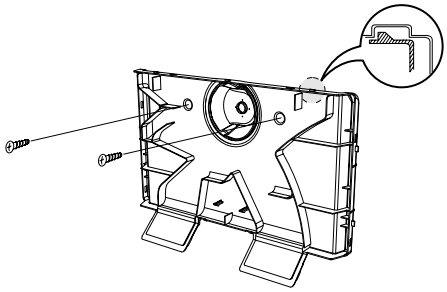
4. Unlock the tabs around the evaporator cover from the buttom.



5. Disconnect wire connector from the top-left corner.



6. Remove 2 screws from the rear cover of the freezer evaporator and unlock the tabs to remove it.

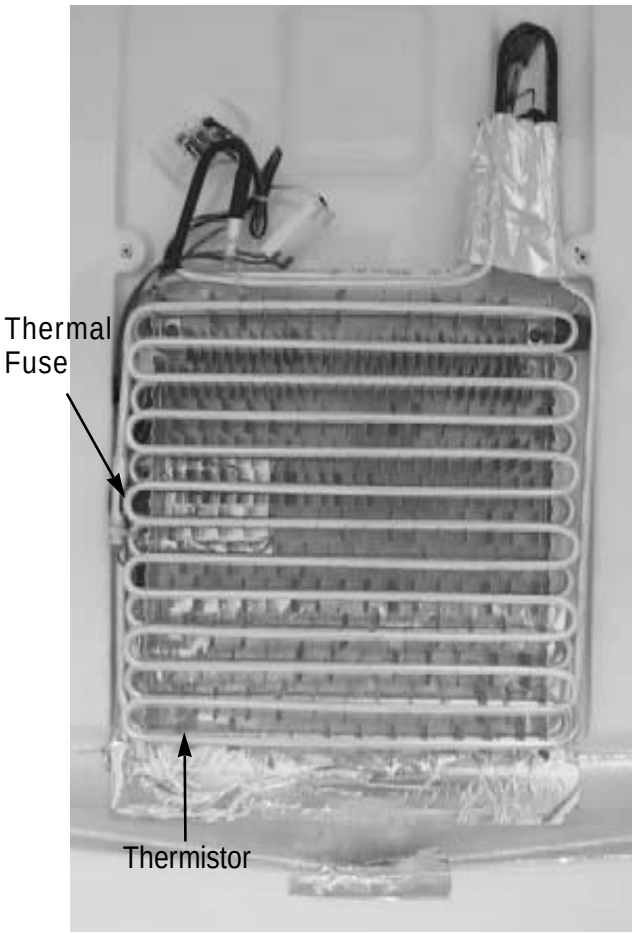


Mechanical Disassembly

Evaporator in Refrigerator

Evaporator is located in the bottom of refrigerator.

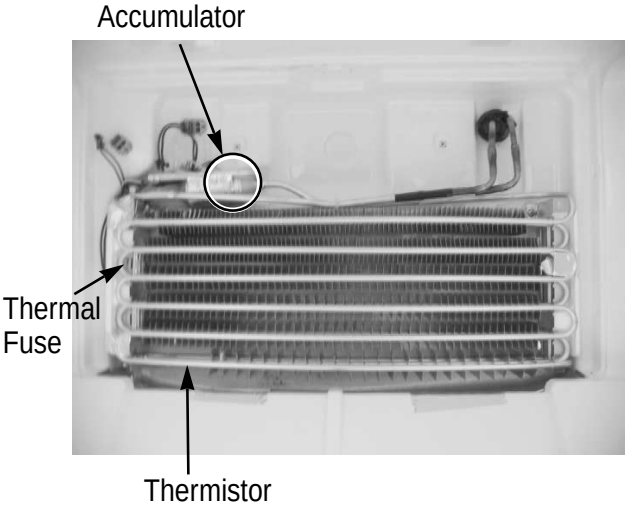
1. Take off the ductwork in refrigerator.
2. Disconnect the wire connector.(Heater and Thermistor)
3. Desolder the capillary tube and the suction line from the evaporator.
4. Remove the evaporator.
5. With a file, score the capillary tube just upstream of the soldered point. Break off the soldered section to help prevent solder from plugging the tube during soldering.
6. Place a new evaporator and braze the suction and capillary tube to evaporator using silver solder.
7. Install a replacement dryer.
8. Evacuate and recharge the system using reasonable procedures.



Evaporator in Freezer

Evaporator is located in the bottom of freezer to produce cold air driven across the evaporator coils.

1. Take off the ductwork in Freezer.
2. Disconnect the wire connector (Heater, Bimental, and Thermistor).
3. Desolder the inlet and outlet tubes.
4. Remove the evaporator.
5. Take the same steps to seal the system as mentioned earlier.

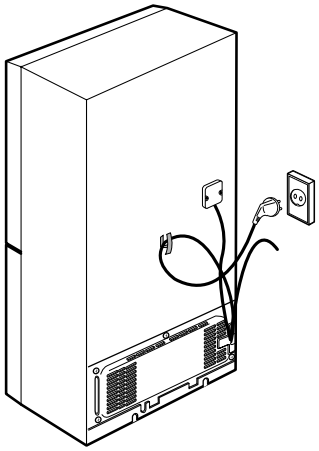


Mechanical Disassembly

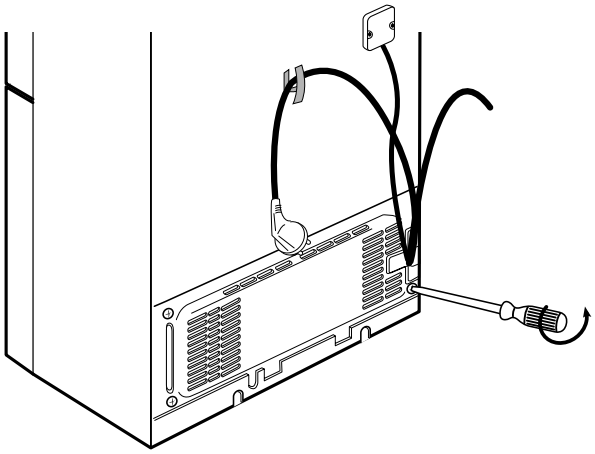
Machine Compartment & Electric Box

Warning Make sure the power cord is unplugged before replacing any electric components.

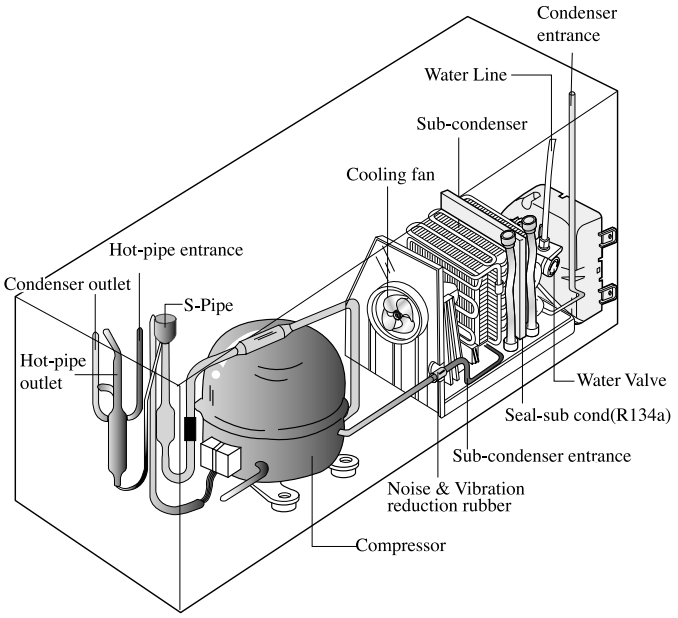
1. Unplug the power cord.



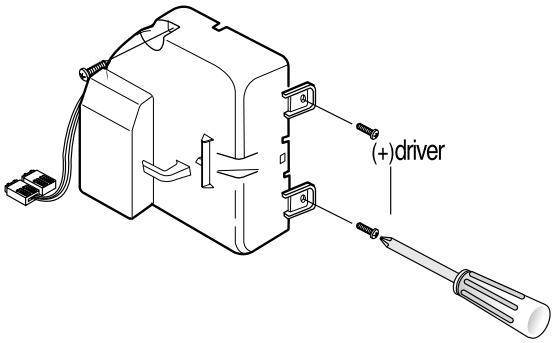
2. Remove the screws of the compartment cover. Slide it up and take out from the refrigerator.



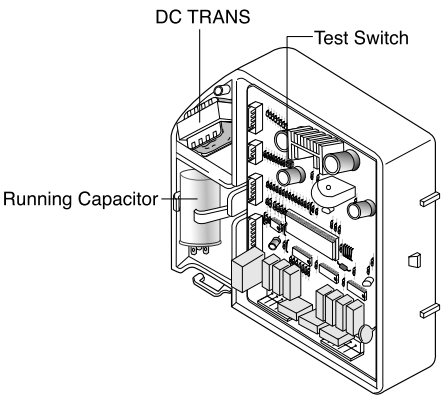
3. Mechine compartment assembly



4. Disassemble the electric box cover after removing the screws with a Phillips screwdriver.



5. Electric box assembly



9. REVERSING THE DOOR SWING Read these instructions completely and carefully

- IMPORTANT NOTES

Warning

Unplug the refrigerator from its electrical outlet.
Empty all door guards / racks.

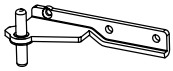
1. If you want to change the door direction, call 1-800-SAMSUNG.
2. Read the instructions carefully before starting.
3. Handle parts carefully to avoid scratching paint.
4. Set screws down by their related parts to avoid using them in the wrong places.
5. Provide a non-scratching work surface for the doors. (ex : blanket)
6. During door reversing, refrigerator should not be stained with oil.

- TOOLS YOU WILL NEED

screwdriver

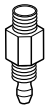
10 inch wrench

- ADDITIONAL PARTS



Hinge Mid

Screw

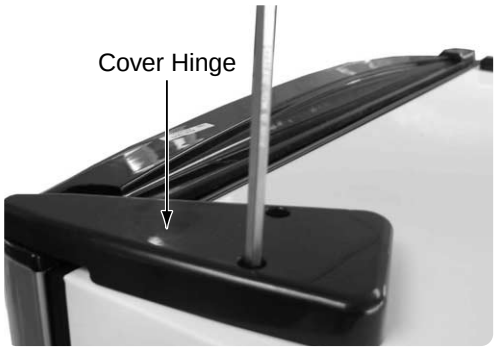


Compression Fitting

Compression Nut

- DISASSEMBLY THE FRIDGE DOOR

1. After removing the screw, disassemble the Upper Right Cover Hinge.



2. Disconnect electric wire on the top of the refrigerator.

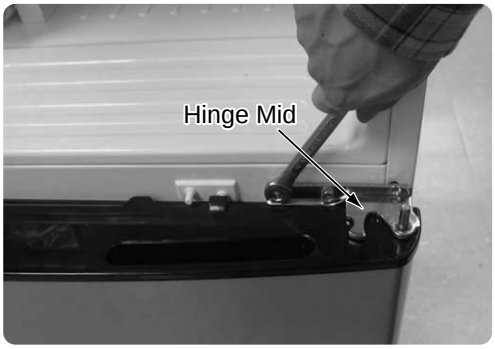
3. With the 10 inch wrench, remove the four bolts that hold the top of the refrigerator.

4. Apart Hinge from electric wire as below picture.

5. Disassemble the fridge door by lifting it upward. Be careful not to drop and scratch the fridge door.

- DISASSEMBLY OF FREEZER DOOR

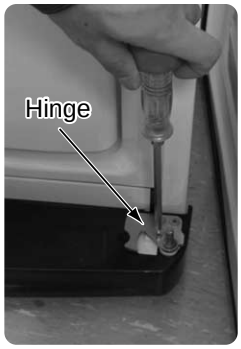
6. After removing the screw and two bolts, disassemble Hinge Mid.



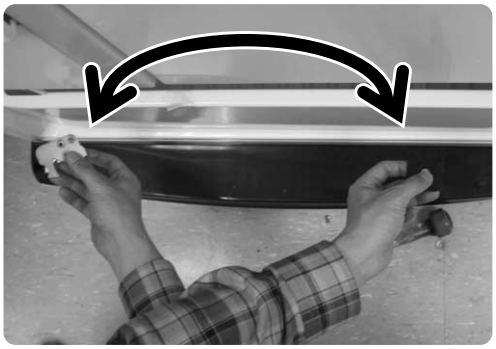
7. Disassemble the Freezer Door by lifting it upward. Be careful not to drop and scratch the Freezer door.

- ASSEMBLY OF FREEZER DOOR

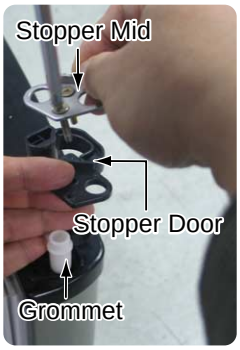
8. After removing the screw, disassemble the Cover Hinge(left) and the Hinge(right).



9. Move the hardware found on the right side of the cabinet to the left and vice-versa.

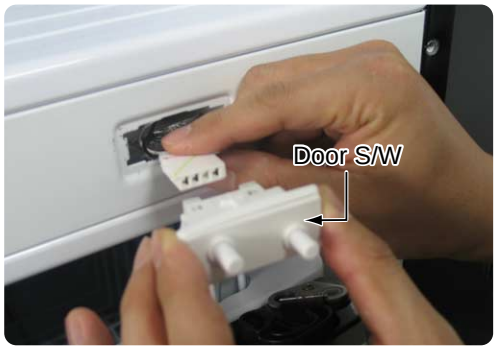


10. After removing the left and right side screws, disassemble the Grommet, Stopper Door and Stopper-Mid of the right bottom of freezer-door.



11. Move the hardware found on the right side of the door to the left and vice-versa.

12. Disassemble the Door S/W with tools. Be careful not to scratch.

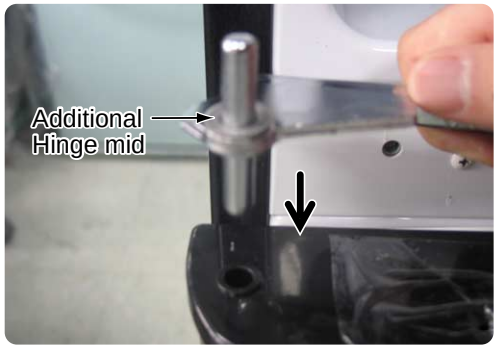


13. Disassemble the Cap Door S/W, Sleeve and the screws.

14. Re-install parts in their opposing sides. Assemble the Door S/W as it is. (Make sure not to insert it upside down)

15. Assemble Freezer Door by fitting the lower hinge into the hinge grommet hole. Don't forget to insert washer with grease.

16. Fix the additional Hinge mid into the door hole.

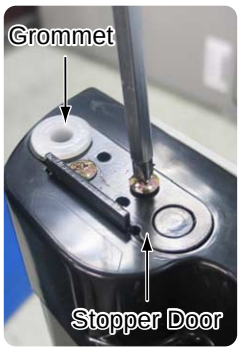


17. Reinstall the middle hinge on the left side of the cabinet. (Use the alternative hinge supplied) Don't forget to insert washer with grease.

18. Confirm opening and closing of the door.

- ASSEMBLY OF FRIDGE DOOR

19. After removing the screws, disassemble the Stopper Door and Grommet.



20. Move the hardware from left side of door to the right side and vice-versa.

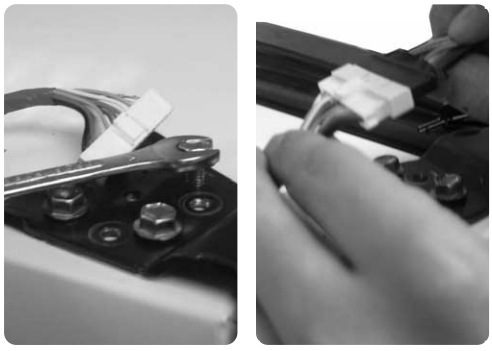
21. Fit the fridge door into the middle hinge.

22. After removing the screw, dissemble the Cover-Cap Door and Cover Hinge.

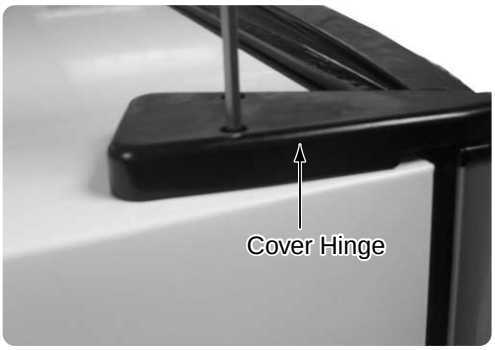
23. Place the Grommet and Cap wire taken from the left connector on the right connector.

24. Re-install parts in their opposing sides. Electric wires must be sealed in covers.

25. After securing the top hinge with the screws, connect the electric wire.



26. Assemble the Cover Hinge with the screws.



27. Finally, confirm opening and closing of the fridge door.

28. Make any necessary adjustments to insure proper sealing of the doors.

10. INSTALLATION OF THE WATER LINE

10-1) Before You Install the water line

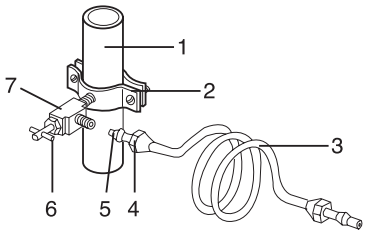
- This water line installation is not warranted by the refrigerator or icemaker manufacturer. Follow these instructions carefully to minimize the risk of expensive water damage.
- Banging pipes (water banging in the pipes) in house plumbing can cause damage to refrigerator parts and lead to water leakage or flooding. Call a qualified plumber to correct the problem before installing the water supply line to the refrigerator.
- To prevent burns and product damage, do not hook up the water line to the hot water line.
- Do not install the icemaker tubing in areas where temperatures fall below freezing.
- When using any electrical device (such as a power drill) during installation, be sure the device is insulated or wired in a manner to prevent electric shock.
- All installations must be in a accordance with local plumbing code requirements.

NOTE

- Water line Kit and water filter are not covered by Samsung Warranty and manufacturer(or dealer, installer) of them should be responsible for the defect and all the loss caused by water filter & water line kit .
- Filter should be replaced according to manufacturer (or dealer)'s instruction.
- To order additional water filters, please contact the manufacturer (or dealer) of the filter.

10-2) Connecting to water supply line

- Shut off the main water supply line and turn the Ice maker to the off position.
- Locate the nearest cold drinking water line.
- Follow the instructions in the ice maker installation kit.
- After connecting the water supply with water filter, turn on water supply and flush 4 or more gallons into a bucket to clear the water filter



1. Cold Water line
2. Pipe Clamp.
3.Copper (or Plastic) line
4.Compression Nut
5.Compression Sleeve
6.Shut Off Valve
7.Packing Nut.

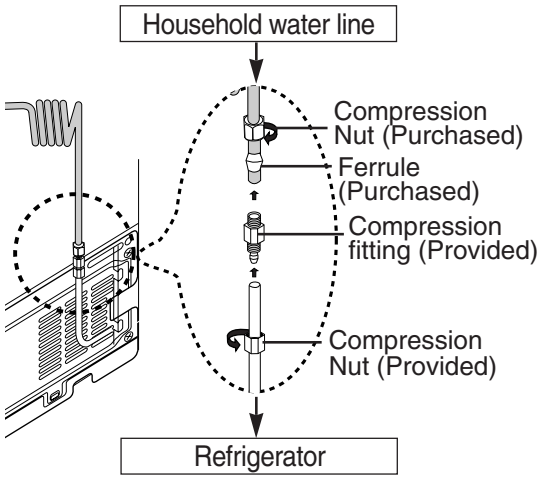
10-3) Connect the water line to the refrigerator

- Slip the compression nut through the plastic tube.
- After inserting the compression nut into plastic tube, tighten the compression nut onto 1/4" compression fitting.

NOTE

Do not overtighten the compression nut.

- Slip the compression ferrule and nut on copper(or plastic) tubing as shown.
  Tighten the compression nut onto the compression fitting.
- Turn water on and check for any leakege.



NOTE

- You can purchase the necessary parts through BEST BUY.
- Waterline must be connected to drinkable water only
- Compression fitting and nut will be given inside of ice bucket.

11. Temp Control &Operation Functions

Temp Control &Operation Functions

11-1) DISPLAY DESIGN

11-2) Temp Control Function

1) Freezer Temperature Control

※ When the Freezer button is pressed,the current set temp will be displayed.And, when the button is pressed again within 5 seconds,it will carry out the following 1-2)and when there is no button press,it will go back to the previous display.

1-1) The temperature will be selected between 8 ˚F and -14 ˚F at an interval of 2 ˚F by pressing one button.

1-2) The temperature will be selected in the following order.
(-2 ˚F→-4 ˚F→-6 ˚F→-8 ˚F→-10 ˚F→-12 ˚F→-14 ˚F→8 ˚F→6 ˚F→4 ˚F→2 ˚F→0 ˚F)

1-3) When power is on or there is a power failure,it will display the real temperature.
(It displays the real temperature when a function button is pressed)

1-4) The STD temperature for each step is as follows.(Based on 1/3H copper bar)

Step	1	2	3	4	5	6	7	8	9	10	11	12
Temp	8˚F	6˚F	4˚F	2˚F	0˚F	-2˚F	-4˚F	-6˚F	-8˚F	-10˚F	-12˚F	-14˚F

1-5) When the Freezer button is pressed,7-SEG will be changed immediately.But, its function will go into operation in 10 seconds.

Temp Control &Operation Functions

2) Fridge Temperature Control

2-1) The temperature will be selected between 46 °F and 34 °F at an interval of 2 °F by pressing one button.
2-2) When the Fridge button is pressed, the current set temp will be displayed.And, when the button is pressed again within 5 seconds, it will carry out the following 2 -3) and when there is no button press for 10 seconds, it will display the finally selected temperature.
2-3) The temperature will be selected in the following order.
(38 °F→36 °F→34 °F→46 °F→44 °F→42 °F→40 °F)
2-4) When power is on or there is a power failure,it will display the real temperature.
(It displays the real temperature when a function button is pressed)
2-5) The STD temperature for each step is as follows.(Based on 1/3H copper bar)

Step	1	2	3	4	5	6	7
Temp	45°F	44°F	42°F	40°F	38°F	36°F	34°F

2-6) When the Fridge button is pressed, 7-SEG will be changed immediately. But, its function will go into operation in 10 seconds.

11-3) Super Freeze Function and Super Cool Functions

1) Super Freeze Function

1-1) It is selected by pressing the Super Freeze button.
1-2) When the Super Freeze button is pressed once,Super Freeze will be turned on.And then, it will repeat Off and On each time you press the button after the above
1-3) With the initial Power On,the LED is off. (When the F-Room temperature is over 41°F (5 ℃))

Category	Initial Power On	Pressed Once	Pressed Again	Other
Display Change	OFF	Super Freeze	OFF	

A. When it goes into Super Freeze with the Super Freeze button pressed, the LED will be changed immediately. But, its function will go into operation in 10 seconds.
(Comp and Fan will operate continuously for 2 and a half hours.)
B. When Super Freeze is selected,it goes into operation regardless of the compartment temperature.
C. During the operation of Super Freeze,the fridge compartment will be controlled according to the Fridge Notch setting.
D. The Freezer display will show the real temperature.

Temp Control &Operation Functions

2) Super Cool Function

2-1) It is selected by pressing the Super Cool button.
2-2) When the Super Cool button is pressed once, Super Cool will be turned on. And then, it will repeat Off and On each time you press the button.
2-3) With the initial Power On, the LED is off. (When the F-Room temperature is over 41°F (5 ℃))

Category	Initial Power On	Pressed Once	Pressed Again	Other
Display Change	OFF	Super Cool	OFF	

A. When it goes into Super Cool with the Super Cool button pressed, the LED will be changed immediately. But, its function will go into operation in 10 seconds.
(Comp and Fan will operate continuously until it reaches to 28 °F.)
B. Comp and R-Fan will operate continuously until it reaches to 28 °F. But, the operation time will not exceed 2 and a half hours.
C. During the operation of Super Cool, the freezer compartment will be controlled according to the Freezer Notch setting.

※ Super Freeze and Super Cool Functions
Each function will go into operation independently. With Super Freeze, Comp and F-Fan will operate continuously for 2 and a half hours regardless of the Fridge compartment and with Super Cool, Comp and R-Fan will operate continuously until the Fridge compartment reaches to 28 °F.

Note

When Super Freezer or Super Cool is selected with the Freezer temperature over 14 °F and the Fridge temperature over 50 ¢™F,it will operate differently. But, it is not a normal case.So, the explanation will be skipped.

Temp Control &Operation Functions

11-4) Ice Off Function

1) Ice Off Function

1-1) Year 2005 W2 Model is one with Auto Ice Maker and Ice Water Valve.
1-2) When the Ice Off button is pressed,the Auto Ice Maker does not operate.
1-3) Ice stored in the ice bin is available with the Ice Off button selected.
1-4) The Auto Ice Maker function is introduced in the Ice Maker function.

11-5) Child Lock Function

1) Child Lock Function

It operates with the Child Lock button pressed for 3 seconds.

1-1) When the Child Lock is selected,the Child Lock LED will light up.Press the button one more time to cancel its function. When t he Chi l d Lock i s sel ect ed,al l of t he f unct i on but t ons do not operate.So, temperature control ,Super and Ice Off functions wi l l keep their current settings.It is devised to prevent children from changing the settings.
1-2) When the Child Lock button is pressed,the Child Lock LED will light up and when its function is cancelled,the Child Lock LED will go off and other buttons will work.

- Select the function if necessary. But, keep it in mind that this function can bring up consumer calls. So, have a better understanding of it.

11-6) Buzzer Alarm Function

1) Button Touch Tone ("DING-DONG")
1-1) When each button on the control panel is pressed,it will send out an input signaling "DING-DONG"sound.
1-2) When buttons are not pressed correctly,it won't send out the "DING-DONG"sound.
1-3) Buttons are recognized within 0.2 sec and when buttons are pressed continuously, it sends out only a "DING"sound.
1-4) This Button Touch sound has priority over other alarm sounds.

2) Door-Open Alarm Sound
2-1) With either of the doors open for more than 2 minutes continuously, it sends out a " Ding Dong" sound.
2-2) When the door keeps being opened, it will send out the "DING-DONG"sound every minute.
2-3) The alarm sound will stop immediately when both of the doors are closed.

3) Alarm Sound for Forced Operation &Forced Defrost ("BEEP" Sound)
3-1) When Forced Operation or Forced Defrost is selected, it will send out a "BEEP"sound.
3-2) When the Forced Operation button is pressed once,the "BEEP"sound (0.25Sec ON/0.75Sec OFF) will keep on until it is cancelled automatically (24 Hr)or forcefully.
3-3) During Forced Operation, it will send out a "BEEP"sound until the Defrost is completed (idling time included)or the cancellation is selected.)
3-4) With Forced R-Defrost,it will send out a "BEEP"sound (0.1sec ON/0.75sec OFF)and with Forced F/R-Defrost,it will send out a "BEEP"sound (0.5sec ON/0.5sec OFF).

11-7) Machine Compartment F-Fan Motor Delay Function

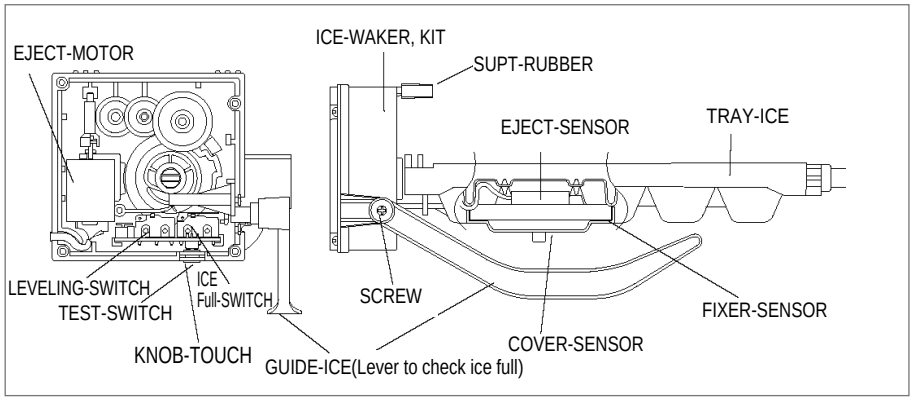
1) The refrigerator is automatically controlled by temperature control programs according to the ambient temperature. The machine compartment fan is controlled as follows according t o t he a mbi ent temperature. The fan does operate or does not operate according to operating conditions with Comp on. So, make sure to take it into consideration during service.

	Temp Range	Load Operation Status
Machine Compartment Fan Delay Function	Ambient Temp 71.6°F(22℃)or over	Machine Compartment Fan On with Comp On
	Ambient Temp 62.6°F(17℃)~69.8°F(21℃)	Machine Compartment Fan On in 3 minutes after Comp On
	Ambient Temp 53.6 °F(12 ℃)~60.8°F(16℃)	Machine Compartment Fan On in 6 minutes after Comp On
	Ambient Temp 44.6°F(7℃)~51.8°F(11℃)	Machine Compartment Fan On in 9 minutes after Comp On
	Ambient Temp 42.8°F(6℃)or under	Machine Compartment Fan Off regardless of Comp

Temp Control &Operation Functions

11-8) Ice Maker Function (Only applicable to Model with the Auto Ice Maker function)

- This Ice Maker function is an option.So,the following can be applied only to Model mentioned.
- Ice Maker has an automatic ice production function without extra controlling by users.
  It is a kit performing a series of automatic ice producing operation that it supplies water and stores ice in the ice bin upon the completion of ice production.



1) Initial Operation Function

1-1) When the initial power is applied,the ice tray will stand by for 2 hours.

1-2) After the 2-hour standby time,the Ice Maker Sensor will check the temperature and when it is lower than 5°F(-15℃)for more than 5 minutes,it will separate the ice from the ice tray into the ice bin by rotating and twisting the ice tray.At this time,it carries out the ice separation whether there is ice in the ice tray or not.

2) Water Supply Function

2-1) Upon the completion of ice separating operation (initial ice separating operation, normal ice separating operation,ice separating operation by Test funct i on) and t he horizontal leveling of the ice tray, when it is evaluated that the ice tray is horizontally leveled, water will be supplied to the ice tray by turning on the Water Solenoid in the machine compartment. (When it is detected as no water supply with low water pressure taken into consideration, it will perform water supply operation up to 4 times.)

2-2) Water Supply Operation

- The Water Supply Valve opens after the completion of normal ice ejection, water is supplied for the previously set option time (Factory set value:5.0 sec)and the Water Supply Valve is shut off.
- Water is to be supplied regardless of F/R-Door Open.
- The Ice Test S/W does not operate during water supply.
- After the water supply is completed, it will evaluate Water Supply or No Water Supply one and a half minutes later.
- When it becomes water supply condition due to no water supply, water supply time will be 1.5 sec,1 sec and 2 sec.
- When it is judged to do water supply after the 4-time water supply attempts, water supply operation will stop. In this case,the ice eject will standby for 58 minutes.
- To prevent additional water supply due to the remaining ice in the ice tray slot with the ice maker sensor on the bottom of it,it will stop water supply operation when there are no water supply signals keep on after the water supply attempts for the number of previous water supply.For the first time water supply after the power on,it will perform water supply once and if it is sensed as no water supply,it will stop water supply operation.If the number of previous water supply is 3 times,it will try to supply water for 3 times. And, if it is sensed as no water supply,it will stop water supply operation, In this case, the ice eject standby time is 70~110 minutes.
- When it is sensed as no water suppl y conti nuousl y,it wi l l carry out water suppl y operation for the number of previous water supply +1 times.

2-3) Water Supply/No Water Supply Evaluation by Ice Maker Sensor

- When it passes one and a half minutes after the completion of water supply, it will evaluate Water Supply/No Water Supply by comparing the temp changes of the Ice Maker Sensor on the bottom of the Ice Tray. If the temperature of the Ice Maker Sensor is 35.6 °F(2 ℃) (5 COUNT)higher when it is measured in one and a half minutes after the completion of water supply operation than when it is measured upon the completion of water supply,it will be evaluated as Water Supply.And, if it is increased by lower than 35.6 °F(2℃)or decreased,it will be evaluated as No Water Supply.

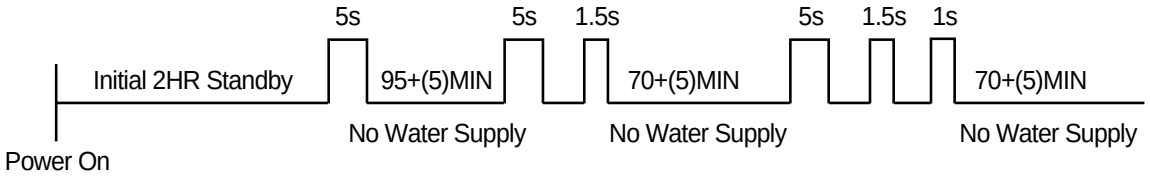
2-4) Water Supply Operation Spec with Ice Test S/W Input

- It will carry out water supply for once regardless of the previous water supply status.
- The ice eject standby time after the completion of water supply is the same as that after the completion of the previous water supply regardless of the recognition of Water Supply/No Water Supply.
- The number of the previous water supply does not change.In other words, if the number of water supply before the Ice Test S/W is pressed is 3 times, the number of previous water supply after the completion of water supply by the Ice Test S/W is 3 times.

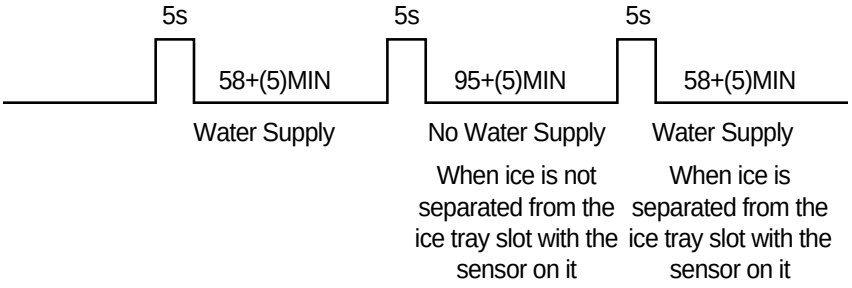
※ Example of Water Supply according to Water Pressure

On the Assumption of Room Temp over 18 ℃

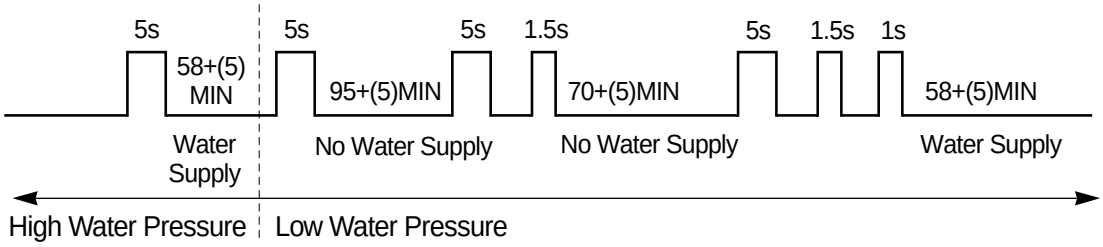
Low Water Pressure



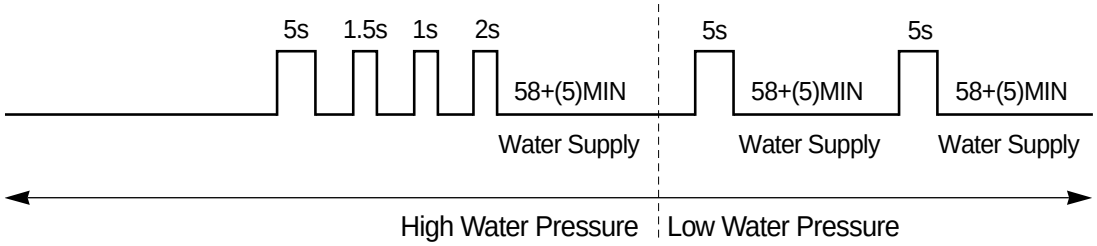
High Water Pressure



High Water Pressure→ Low Water Pressure



Low Water Pressure → High Water Pressure



3) Ice Making Function

- It is until the water in the Ice Tray is judged as completely frozen after the completion of water supply operation. And, it is judged by the sensor temperature (can be set to other values).

3-1) When it passes 58 minutes after water is supplied to the Ice Tray,the Ice Maker Sensor temperature will be.

3-2) When the Ice Maker Sensor maintains lower than 5°F (-15℃)for 5 minutes,it will be evaluated as the completion of ice making.

3-3) Standby for One Cycle:After the completion of the initialization with the power on, it will standby for a cycle (2 hours)and carry out the ice ejecting operation even if the temperature conditions of the Ice Maker Sensor are satisfied.

4) Ice Ejection Function

- After the completion of the ice making operation, the operation of ice separation from the ice tray will be carried out as follows.Ice ejection will be performed by checking the status and the time of the Horizontal S/W (if available)and the Lever S/W. When it is sensed as No Water Supply,it will carry out ice ejection for twice in case ice is not seperated from the ice tray.

※ Motor Rotating Directions

- CW Rotation:The motor rotates in clockwise direction.
- CCW Rotation:The motor rotates in counter clockwise direction.

4-1) 1) Detailed movements by step during Ejection.

-1st step : Ejection Temp Check

Check whether the temp sensor is below -15 ℃ and whether the Ejection Standby time after Water Supply has passed. At this time,the Ejection Standby time will be reset when it goes into F-Defrost during the standby and it will be recounted from the beginning after the completion of Defrost.Then, it checks if 58(58~110)minutes has passed.If the Ice Maker Sensor temp gets 5 °F(-15℃)or lower and maintains it for 5 minutes,it will carry on the next step.

- 2nd step : Full Ice Bin Check

To check if the ice bin is full,it will check whether the Ice Full S/W is ON/OFF (Low/High).
If the Ice Full S/W is ON (Low),it means the ice bin is full and it will standby without ejection.And as the Ice Full S/W signal is changed to OFF and it will carry out the ejection in 40 minutes.

- 3rd step : Ice Tray Rotation (clockwise)

The Eject Motor rotates clockwise for a certain time and turns over the ice tray.At this point, the Feeler Arm will be raised up to prevent ice from contacting it The ice tray will rotate for up to one minute or until the Leveling S/W is ON(Low)after 5 sec.from the beginning of the third step when referring to the Leveling S/W.If F-Door is open,it will stop rotating and resume the operation when the door is closed.During the pause, clockwise rotation will is not counted.

- 4th step : Ice Ejection (Standby for 2 sec.at the maximum twist point)

It is operation twisting the ice tray one more time with its reversed state to separate ice from the ice tray completely.The ice tray will standby for 2 seconds at the maximum twist point.

- 5th step:Restoration to Horizontal State (counter clockwise)
  The ice tray restores to its horizontal position by rotating the Ice Eject Motor counter clockwise When the Leveling S/W is ON (Low)after 5 seconds, it will stop rotating. At this point, the raised Feeler Arm will get lowered again and set on the highest point of stored ice to check the ice level.
- 6th step:Initialization of motor (clockwise)
  Upon the completion of ice ejection, it will carry out 2)Water Supply to fill the ice tray.

5) Test Function

- It is to operate forcefully for the purpose of operation tests,A/S,maintenance,etc. And, it operates when the Ice Test S/W (refer to Ice Maker Kit)is pressed for more than one and a half seconds.

5-1) This test button is not selected during water supply or ice ejection. It will carry out the test function when being selected with water supply or ice ejection being completed. When the test button is selected, the Ice Eject Motor will rotate ejecting ice regardless of the ice making temperature.And then, it will be restored to the horizontal level and supply water to the ice tray.

5-2) It operates normally regardless of the F,R-Door opening

5-3) The other functions are the same as the ice ejection and the water supply operation.

5-4) Even when it stops ice-maki ng due to errors more than 3 times during normal operation,the Test S/W shall work.At this time,when it performs normal ice ejection and water supply by pressing the Test S/W,it will send out a “Ding Dong” sound before supplying water and carry out normal ice production by canceling the 3-time error mode.

6) Ice Making Stop (Ice Off Function)

- When there is no demand for ice,turn off the Ice Off button on the display and stop ice making.

6-1) Whenever the Ice Off button is pressed on the display,the Ice Off LED will repeat On (light up)and Off (go off).

6-2) When power comes on,it will check the previously setting and display it.(The F-Room temperature should be lower than 50 °F.)

6-3) If necessary,turn off the ice maker by pressing the Ice Off button.Then, the ice maker will not produce ice.

6-4) When the function is selected,the indicator will be off immediately. But, when the ice maker is supplying water,ejecting ice or performing horizontal leveling,it will stop operating after the completion of the next water supply.

6-5) When the ice making function is selected again,it will accumulate time from the point of the selection and carry out the normal ice making and ejection functions after checking the Ice Maker Sensor temperature in 90 minutes.

7) Function according to F-Door Open

- When F-Door is open,it will stop the operation to minimize the noise.

7-1) When F-Door is open during the ice ejection or horizontal leveling,it will stop operating and resume its operation right after the door is closed again.

7-2) During water supply,it will carry on the water supply regardless of the state of the doors.

7-3) Therefore,when the freezer door is opened,the Ice Tray will stop operating.So you can find that the Ice Tray is slanted or rotated partially with the door open.So,shut off the freezer door and wait for more than 30 seconds.Then,check if the Ice Tray is leveled horizontally.If not,it can be regarded as product failure.When the ice ejection stops upon the opening of the freezer door,the Test function does not work because it is normal operation and it will operate upon the completion of the water supply.

Temp Control &Operation Functions

11-9) Defrost Function

1) The F/R-Room defrost depends on the accumulated comp-on time.
2) With the initial power on,defrost starts at the both rooms after 4 hour accumulated comp-on time.
3) The defrost cycle can be changed from Min 6 hours to Max 7 hours according to various conditions.
4) The defrost cycle depends on the ambient temperature,the frequency of F/R-Door open and the duration of the F/R-Door open.
5) The Defrost Heater Off temperatures are compared using the temperature values of R-Defrost Sensor and F-Defrost Sensor and they are as follows.

	R-Room	F-Room	E t c
Defrost Start	Lower than 50°F(10℃)	Lower than 23°F(-5℃)	
Defrost Restoration Temp	62.6°F(17℃)	53.6°F(12℃)	

Note

Defrost restoration temperatures could be changed without notice for the purpose of performance improvements.

11-10) Test Function

- This function is for PCB,Product and Process Test, and SVC.
- After checking the product functions by selecting Test S/W,turn on the power again.

1) Forced Operation Function

Display for Forced Operation

Display for Forced Operation and How to Turn it On
① (Press for 8 seconds simultaneously) +
② All LEDs Off, Press one of the following buttons (Super Freeze, Super Cool,Freezer, Fridge Key)

1-1) When the Super Cool button and the Fridge button on the display panel are pressed for 8 seconds simultaneously,the display panel will be shifted to the Test Setting Mode and all the LEDs will be off.
1-2) When any of Super Freeze,Super Cool,Freezer and Fridge buttons is pressed within 15 seconds with the display panel shifted to the Test Setting Mode, it will be selected in the order of Forced Operation → Forced R-Defrost → Forced F/R-Defrost → Cancel.
1-3) When there is no button press within 15 seconds after the display panel is shifted to the Test Setting Mode,it will go back to the previous display mode.
1-4) When the Test Setting Mode is selected or cancelled,it will send out a "BEEP"sound.
1-5) When Forced Operation is selected,the F-Room LED will display "FF"and the R-Room LED will display its real compartment temperature.
But, when it passes more than a minute with Forced Operation selected,and then Forced Defrost or Test Cancellation is selected,the temperature setting will not be changed (maintaining -14 °Fand 34°F)
When Forced Defrost or Test Cancellation is selected within a minute after Forced Operation is selected,the Notch will go back to the previous notch setting.
1-6) During Forced Operation,the Full-Down function will be maintained only for 24 hour s.Af t er t hat, it will go in to normal operation after carrying out F/R-Defrost automatically.

1-7) To cancel For ced Oper at i on,t ur n of f and on t he power or select the Test Cancellation Mode.
1-8) It will send out an alarm sound (0.25sec ON/0.75sec OFF)during Forced Operation until it is completed. It will keep on alarming regardless of the selection or cancellation of the alarm button.
1-9) When Forced Operation is selected, Super Freeze and Super Cool won't operate.

2) Forced Defrost Function

2-1) When the Test button is pressed one more time during Forced Operation, it will go into R-Room Forced Defrost.

Display for Forced R-Defrost
-. Press one of Super Freeze, Super Cool, Freezer, Fridge buttons once during Forced Operation

2-2) When it is selected once more, it will go into F/R-Defrost.

Display for Forced F/R-Defrost

Display for Forced F/R-Defrost
-.Press one of Super Freeze, Super Cool,Freezer,Fridge buttons once during Forced R-Defrost Operation

2-3) When it goes into Forced Defrost,Forced Operation will be cancelled automatically. And then, it will carry out normal operation after completing Forced Defrost.

3) Test Cancellation Mode
3-1) When the Test button is pressed once more during F/R-Forced Defrost, it will go back to normal operation.
3-2) When the Test Cancellation Mode is selected, it will stop alarming.

11-11) Function when the power is applied for the first time.

1) When power is applied,it will carry out the initial self diagnosis. And, if there is no error, all the LEDs on the display panel will light up for 2 seconds.
2) When there is any error found during the initial self diagnosis,relevant LEDs will blink at an interval of 0.5 sec.
3) After lighting up all the LEDs for 2 seconds,the display panel will display the real temperatures of the F-Room and the R-Room.
4) It will turn on R-Defrost Heater and F-Defrost Heater at an interval of 0.5 sec and keep them being turned on for 3 seconds.
5) When the initial F/R-Defrost is completed,COMP, C-FAN,F-FAN and R-FAN will be on at an interval of 0.5 sec and t hey wi l l operat e for 5 mi nut es regardless of the compartment temperatures.
6) When the Test S/W is pressed during 4)and 5),the functions related to 4)and 5)will stop immediately and it will go into the Test function.

Temp Control &Operation Functions

11-12) Power Compensation Function

1) Notch Save Function

1-1) Whenever the Super Freeze, Super Cool, Fridge or Freezer button is pressed, it will save the current display setting. And, when the power goes off and comes back on, it will display the stored setting. (But, the Test Mode will not be saved.)

1-2) Upon the initial power on,the above 1-1)will be performed when the F-Room temperature is lower than 41°F(5℃)and it will operate on the initial mode regardless of the saved setting when the temperature is over 41°F(5℃).

1-3) When the power goes off during Super Freeze and comes back on, it will carry out Super Freeze when the F-Room temperature is lower than 41°F(5℃). But, the previously accumulated operating time will be reset and it will count from the start.

1-4) When the power goes off during Super Cool and comes back on, it will carry out Super Cool when the F-Room temperature is lower than 41°F(5℃). But, the previously accumulated operating time will be reset and it will count from the start.

1-5) When the power is off with various functions in operation, it will light up the entire display for about 3 seconds from the power-on point regardless of the notch save if the F-Room temperature is lower than 41°F(5℃).

※ Exhibition Mode

- When the Super Freeze and the Freezer buttons are pressed for 5 s econds simultaneously, it will go into the Exhibition Mode with a “Ding-Dong” sound.
- With the Exhibition Mode selected, the compressor will be off immediately and there will be no defrost.
- Press the Super Freeze and the Freezer buttons for 5 seconds simultaneously to cancel the Exhibition Mode. Then, it will carry out the normal operation.

11-13) Self Diagnosis Function

1) Self-diagnosis with initial power on

1-1) With power on, MICOM checks the temperature sensors for errors in a second.

1-2) If inferior sensor is found by self-diagnosis, relevant display LEDs will be all on and off at the interval of 0.5 sec. (There will be no beep sound with at this time.)

1-3) When display LEDs are blinking with inferior sensors found, it only recognizes the self-diagnosis buttons and normal temp control will be on hold.

1-4) Upon self-diagnosis error, when the faulty sensor is repaired or when the Super Freeze button and the Super Cool button are pressed for 5 sec simultaneously, the initial self diagnosis will be canceled automatically. (Below, How to Select)

Temp Control &Operation Functions

2) Self-diagnosis with initial power on

2-1) When pressing the Super Freeze button and the Super Cool button simultaneously for 6 sec during normal operation, the entire temperature setting display will blink for 2 sec at the interval of 0.5 sec and when pressing the Super Cool button and the Super Cool button si mul taneousl y for 8 sec including 2 sec blinking, self-diagnosis will be selected.

2-2) It goes into the Self Diagnosis function with a “Ding-Dong” sound and it shows error codes on the LED display.And then,it will be restored to the normal operation.

2-3) During self-diagnosis,button inputs will not be recognized but only the canceling buttons.

- Self Diagnosis Check List

No	Error	LED Display	Description	Others
1	F-SENSOR ERROR		Fault rated F-SENSOR?	
2	R-SENSOR ERROR		Fault rated R-SENSOR?	
3	F-DEFROST SENSOR ERROR		Fault rated F-DEFROST SENSOR?	
4	R-DEFROST SENSOR ERROR		Fault rated R-DEFROST SENSOR?	
5	ICE MAKER SENSOR ERROR		Fault rated ICE MAKER SENSOR?	
6	AMBIENT SENSOR ERROR		Fault rated AMBIENT SENSOR?	
7	F-DEFROST HEATER ERROR		Fault rated F-DEFROST?	
8	R-DEFROST HEATER ERROR		Fault rated R-DEFROST?	
9	ICE MAKER FUNCTION ERROR		Fault ICE MAKER OPERATION?	
10	UART COMMUNICATION ERROR (PLC)		Communication error with PLC modem	

Temp Control &Operation Functions

- Descriptions for each Self Diagnosis Lamp

No	Item	Error	Self Diagnosis
1	F-SENSOR	SENSOR HOUSING SLIP-OUT, CONTACT DEFECT,WIRE CUT, WIRE SHORT, SENSOR TEMP MORE THAN 122°F (+50℃) OR LOWER THAN 122°F(-50℃)	VOLTAGE BETWEEN MAIN PCB CN30 2↔3 SHALL BE WITHIN 4.5V~1.0V.
2	R-SENSOR	SENSOR HOUSING SLIP-OUT, CONTACT DEFECT, WIRE CUT, WIRE SHORT, SENSOR TEMP MORE THAN 122°F(+50℃)OR LOWER THAN 122°F(-50℃)	VOLTAGE BETWEEN MAIN PCB CN30 6↔7 SHALL BE WITHIN 4.5V~1.0V.
3	F-DEFROST SENSOR	SENSOR HOUSING SLIP-OUT, CONTACT DEFECT, WIRE CUT, WIRE SHORT, SENSOR TEMP MORE THAN 122°F(+50℃)OR LOWER THAN 122°F(-50℃)	VOLTAGE BETWEEN MAIN PCB CN30 2↔4 SHALL BE WITHIN 4.5V~1.0V.
4	R-DEFROST SENSOR	SENSOR HOUSING SLIP-OUT, CONTACT DEFECT, WIRE CUT, WIRE SHORT, SENSOR TEMP MORE THAN 122°F (+50℃)OR LOWER THAN 122°F(-50℃)	VOLTAGE BETWEEN MAIN PCB CN30 6↔8 SHALL BE WITHIN 4.5V~1.0V.
5	I/M-SENSOR	SENSOR HOUSING SLIP-OUT, CONTACT DEFECT, WIRE CUT, WIRE SHORT, SENSOR TEMP MORE THAN 122°F(+50℃)OR LOWER THAN 122°F(-50℃)	VOLTAGE BETWEEN MAIN PCB CN90 3↔4 SHALL BE WITHIN 4.5V~1.0V.
6	AMBIENT SENSOR	SENSOR HOUSING SLIP-OUT, CONTACT DEFECT, WIRE CUT, WIRE SHORT, SENSOR TEMP MORE THAN 122°F(+50℃)OR LOWER THAN 122°F(-50℃)	VOLTAGE BETWEEN MAIN PCB CN31 1↔4 SHALL BE WITHIN 4.5V~1.0V.
7	F-DEFROST ERROR	F-ROOM HEATER (SENSOR HOUSING SLIP-OUT, CONTACT DEFECT, WIRE CUT, WIRE SHORT OR TEMP FUSE DEFECT) WHEN DEFROST DOES NOT FINISH EVEN AFTER A 70-MINUTE CONTINUOUS HEATING, IT DISPLAYS THE ERROR.	AFTER SEPARATING THE MAIN PCB CN70 WIRE FROM PCB, CHECK THE RESISTANCE BETWEEN BROWN ↔ ORANGE. IT SHALL BE WITHIN ***OHM. (THE RESISTANCE VARIES ACCORDING TO THE INPUT POWER.) WHEN THE RESISTANCE IS 0 OHM,CHECK IF THE HEATER IS SHORT AND WHEN IT IS ∞OHM, CHECK IF THE WIRE/TEMP FUSE IS OPEN
8	R-DEFROST ERROR	R-ROOM HEATER (SENSOR HOUSING SLIP-OUT, CONTACT DEFECT, WIRE CUT, WIRE SHORT OR TEMP FUSE DEFECT) WHEN DEFROST DOES NOT FINISH EVEN AFTER A 80-MINUTE CONTINUOUS HEATING, IT DISPLAYS THE ERROR.	AFTER SEPARATING THE MAIN PCB CN70 WIRE FROM PCB,CHECK THE RESISTANCE BETWEEN WHITE ↔ ORANGE.IT SHALL BE WITHIN ***OHM. (THE RESISTANCE VARIES ACCORDING TO THE INPUT POWER.) WHEN THE RESISTANCE IS 0 OHM,CHECK IF THE HEATER IS SHORT AND WHEN IT IS ∞OHM,CHECK IF THE WIRE/TEMP FUSE IS OPEN
9	I/M FUNCTION ERROR	MORE THAN 3 TIMES OF ICE MAKER KIT ICE EJECTION OR HORIZONTAL LEVELING ERROR	ONLY APPLIED TO MODEL WITH ICE MAKER
10	Uart Communication Error (PLC)	Communication error with PLC modem	When it is not connected with PLC modem
		Note) PLC Communication modem will be applied optionally. So even if the appliance which does not apply PLC displays this error digit, It is not defect.	

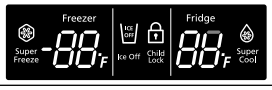
Temp Control &Operation Functions

11-14) Power Compensation Function

It is the initial Sensor Error Display. Hold on the Super Freeze and the Super Cool buttons for 3 seconds and take off the fingers. Then, press the Fridge button.

1) During the normal operation,when the Super Freeze and the Super Cool buttons are pressed for 3 seconds at the same time, the Freezer and the Fridge temp LEDs will blink for 2 seconds at the interval of 0.5 second.
2) At this time, when pressing the Fridge button (“Ding-Dong “ goes off)after taking off the fingers from the Super Freeze and the Super Cool buttons, it will be changed to the Load Status Display Mode.
3) The Load Status Display Mode only shows the status of the load operation command from MICOM. MICOM sends out command signals. So, it does not mean the related components are in operation. For example, even though it shows that a load is operating,it is not operating due to the load defect or the PCB relay defect.It can be applied to A/S.
4) The Load Status Display function maintains for 30 seconds and it goes back to the normal operation.

- Self Diagnosis Check List

LOAD	DISPLAY	OTHERS
R-FAN	R-Room second digit "a"	
R-DEFROST HEATER	R-Room second digit "c"	
COMPRESSOR	F-Room second digit "a"	
F-FAN	F-Room second digit "b"	
F-DEFROST HEATER	F-Room second digit "b"	
INITIAL START MODE	R-Room second digit "b"	
OVERLOAD MODE	R-Room second digit "e"	
LOW TEMP MODE	R-Room second digit "f"	
R-LAMP	F-Room first digit "b"	
F-LAMP	F-Room first digit "a"	
EXIHIBITION MODE	R-Room second digit "g"	

Temp Control &Operation Functions

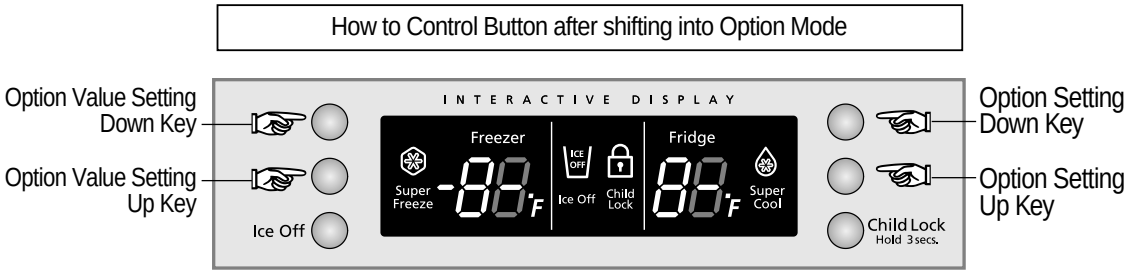
11-15) Option Setting Function (EEPROM)

- During the normal operation,when the Super Cool and the Freezer buttons are pressed for 12 seconds,the Fridge or Freezer temp setting display will be shifted to the Option Setting Mode.

How to Control Option Mode Shift Button by Model

When the Super Cool and the Freezer buttons are pressed for 12 seconds at the same time, the Fridge/Freezer display will be shifted to the Option Setting Mode.

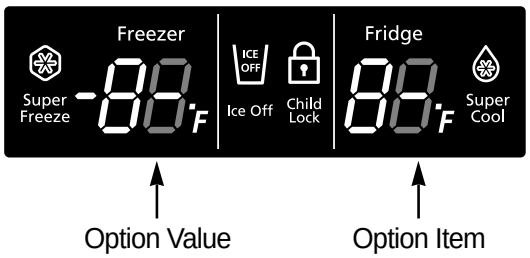
How to Control Button after shifting into Option Mode



※ Button Press at Option Mode

Press Super Freeze	Option Value Down (Decrease)
Press Freezer	Option Value Up (Increase)
Press Super Cool	Option Moving Down
Press Fridge	Option Moving Up

- When the display is shifted to the Option Setting Mode, all the LEDs will be turned off except Freezer and Fridge. (All the options operate according to the Option Table. So, only Fridge and Freezer will be introduced.)



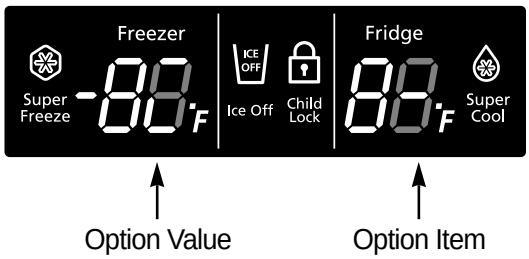
1) For example,if you want to change option and shift the standard temp of R-Room to 28.4°F(-2℃),follow the directions below. This function is to change the standard temp and if the current standard temp of F-Room is -2°F(-19℃), it can be lowered by 28.4°F(-2℃)using the options and the standard temp will be controlled at -6°F(-21℃). That is, in the case of changing temp options, although you set it to -2°F(-19℃)on the display panel, the fridge will operate to -6°F(-21℃)internally. Therefore, the temp will be controlled by lowering 28.4 ¢µ(-2℃)compared to that set on the display panel.

Temp Control &Operation Functions

Note

Basically,when sending out products,their option will be all cleared. That is,their set values are all **“0”**. However, for the purpose of quality improvement, set values could be changed. Therefore, make sure to check quality information

2) After changing to the Option Mode,the display panel will blink "0"(ALL OFF)for R-Room and "0"(ALL OFF)for F-Room. (When sending out products, there shall be "0"set for R-Room and "0"set for F-Room. But,for the purpose of quality improvement,the standard set values can be changed.)
   - If only "0"for R-Room blinks,F-Room temp option item will be set and the current F-Room temp set value will be shown on the temp display of F-Room.
3) After setting "0"for R-Room and selecting "6"as in the option table of F-Room below, the standard temp of F-Room will be lowered by 28.4°F(-2.0℃). (Refer to F-Room temp change figure)



: In 20 seconds after the completion of the adjustment,MICOM will store the set value in EEPROM and it will be restored to the normal display and the option setting mode will be cancelled.

4) The above option setting method is the same for all models whether they have Ice Maker or not.
5) With the same as the above method,R-Room Temp,Water Supply Qty, Ice Maker Eject Temp/Time,Defrost Restoration Temp, Hysteresis & Notch Gap for each temperature can be controlled.
6) Since option is already set in EEPROM while sending out products at the factory, do not change it randomly except for special occasions and do not turn off power before restoring to the normal display because option will be completed when it is restored to the normal display in 20 seconds.

Note

There are other options including the functions mentioned above. But, they are related to the refrigerator controlling.They are dropped here since they are not relevant to A/S.
(Do not set other options except for those in this A/S manual.)

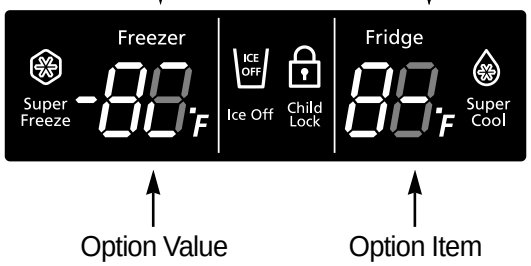
Temp Control &Operation Functions

11-16) Option Table

1) F-Room Temp Shift Table

Set Item	F-Room Temp Shift
Model	Common (All Models)
Option Item	Fridge LED
	0

Set Value Freezer LED	Option Value
0	0
1	31.1°F(-0.5℃)
2	30.2°F(-1.0℃)
3	29.3°F(-1.5℃)
4	28.4°F(-2.0℃)
5	27.5°F(-2.5℃)
6	26.6°F(-3.0℃)
7	25.7°F(-3.5℃)
8	32.9°F(+0.5℃)
9	33.8°F(+1.0℃)
10	34.7°F(+1.5℃)
11	35.6°F(+2.0℃)
12	36.5°F(+2.5℃)
13	37.4°F(+3.0℃)
14	38.3°F(+3.5℃)
15	39.2°F(+4.0℃)



Option Value　　Option Item

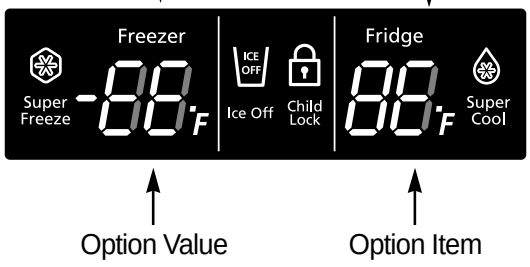
Ex) When raising the Freezer standard temperature by 28.4°F(-2℃)

Temp Control &Operation Functions

2) R-Room Temp Shift Table

Set Item	R-Room Temp Shift
Model	Common (All Models)
Option Item	Fridge LED
	1

Set Value Fridge LED	Option Value
0	0
1	31.1°F(-0.5℃)
2	30.2°F(-1.0℃)
3	29.3°F(-1.5℃)
4	28.4°F(-2.0℃)
5	27.5°F(-2.5℃)
6	26.6°F(-3.0℃)
7	25.7°F(-3.5℃)
8	32.9°F(+0.5℃)
9	33.8°F(+1.0℃)
10	34.7°F(+1.5℃)
11	35.6°F(+2.0℃)
12	36.5°F(+2.5℃)
13	37.4°F(+3.0℃)
14	38.3°F(+3.5℃)
15	39.2°F(+4.0℃)



Option Value Option Item

Ex) When raising the fridge standard temperature by 35.6°F(+2℃)

Temp Control &Operation Functions

- The following options are only applicable to the models with Ice Maker.
  The following can not be set to the models without Ice Maker

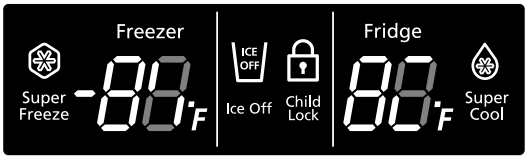
3) Ice Maker Sensor Temp Shift

This is the standard temperature checking if ice in the ice tray is frozen completely.

Set Item	LED (Fridge)
Ice Maker Sensor Standard Temp Control	4

Set Value F-Room Temp Set Value	Option Value
0	5.0°F(-15℃)
1	3.2°F(-16℃)
2	1.4°F-17℃)
3	7.8°F(-14℃)
4	8.6°F(-13℃)
5	10.4°F(-12℃)
6	12.2°F(-11℃)
7	14.0°F(-10℃)

Ex) When changing the Defrost Sensor temperature to 1.4°F(-17℃)



Option Value Option Item

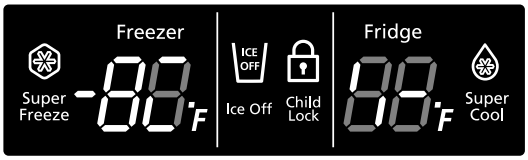
4) Ice Maker Water Supply Time Control Function

It is an option for Water Supply Time and it may be deleted when the time is confirmed at the factory.

Set Item	LED (Fridge)
Ice Maker Water Supply Time Control	20

Set Value F-Room Temp Set Value	Option Value
0	5 sec
1	6 sec
2	7 sec
3	8 sec
4	9 sec
5	10 sec
6	11 sec
7	12 sec

Ex) When changing the water supply time to 9 seconds

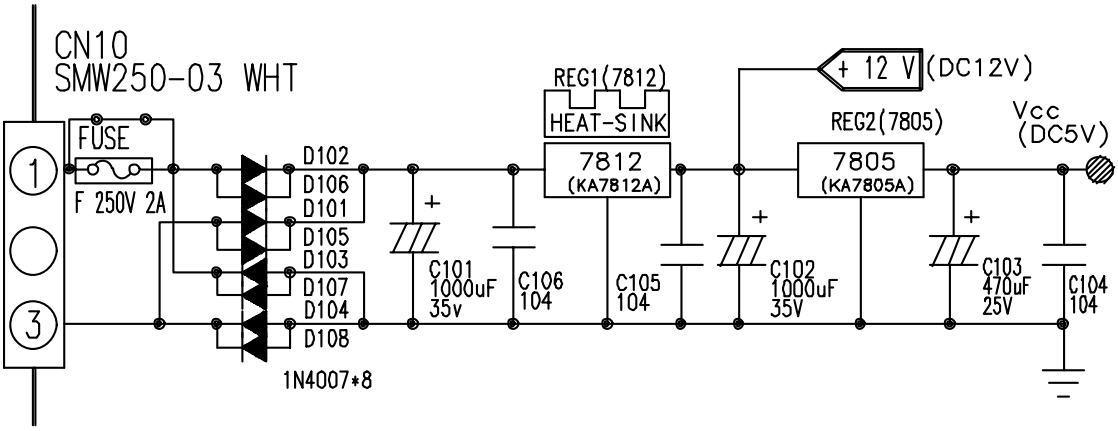


Option Value Option Item

12. OPERATION PRINCIPLES BY PARTS OF CIRCUIT

OPERATION PRINCIPLES BY PARTS OF CIRCUIT

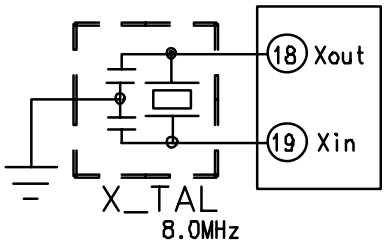
12-1) SOURCE POWER CIRCUIT



Power	Circuit
Vcc(DC 5V)	MICOM POWER AND SENSORS
+12 +12V(DC 12V)	RELAY,PANEL DRIVING CIRCUIT

1) When the power is supplied,AC voltage stepped down on the 2nd transformer flows between ①and ③at about AC 16V and changes to DC voltage when it goes through the diode D101 and D108,and constant 12V will be output via regulator REG1(7812).And,it will supply DC5V to MICOM and power to other circuits via regulator REG2 (MC7805ACT),and make entire PCB operate.

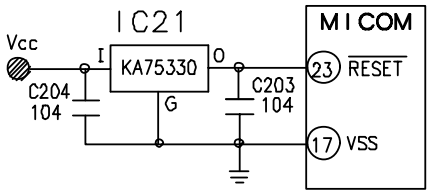
12-2) OSCILLATION CIRCUIT



Terminal	Oscillation Freq.
Xin(#19)	8MHz
Xout(#18)	8MHz

1) It is an Oscillation Circuit for synchronism clock generation and time calculation on the information sending &receiving of the MICOM internal logic elements and when specifications for Resonator change,the timing system of MICOM changes resulting in errors. (Rated parts must be used)

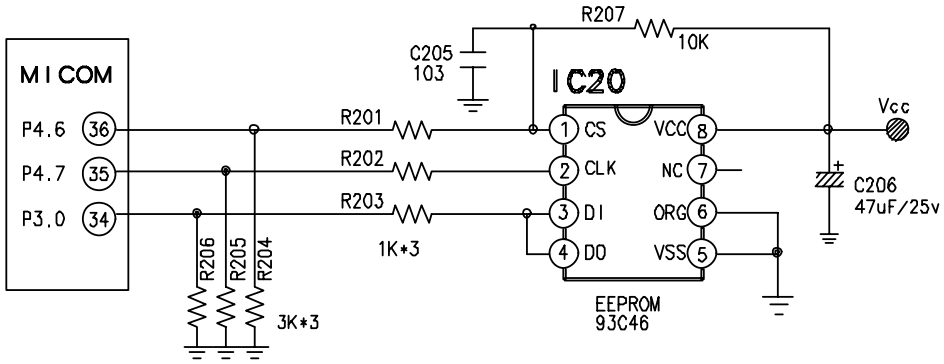
12-3) RESET CIRCUIT



Terminal	Power
Vcc	DC 5V
Reset	DC 5V

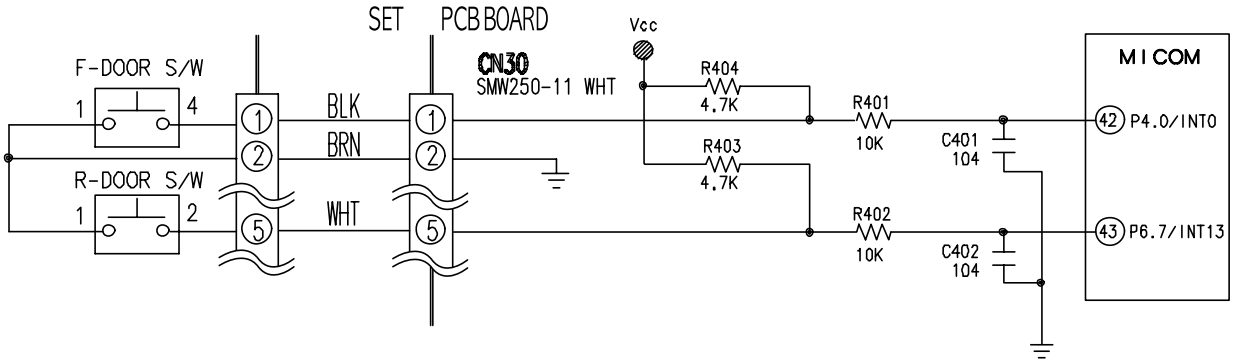
1) RESET Circuit allows the whole program to go back to the initial setting by initializing parts such as the RAM in MICOM with the power supply into MICOM or with an instant power failure.
Upon the power supply,the reset terminal voltage becomes "LOW" for several tens of μs compared to Vcc voltage(DC 5V)at MICOM,and it maintains "HIGH"(Vcc Voltage)during normal operation.
But, when Vcc drops down to 3.4~3.7V, the reset terminal voltage becomes "LOW".

12-4) EEPROM DETECTION CIRCUIT



1) A semiconductor memory EEPROM stores data remembering previous settings regardless of power-off,which are indispensable especially in power fluctuating areas.Also,EEPROM sets and uses other options in principle.

12-5) DOOR SWITCH DETECTON CIRCUIT



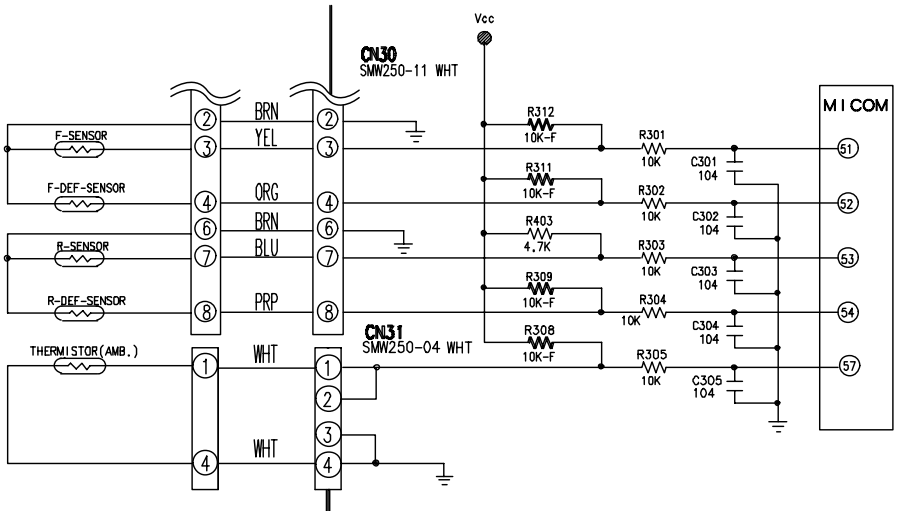
OPERATION PRINCIPLES BY PARTS OF CIRCUIT

ITEM	DOOR OPEN/CLOSE	DOOR S/W CONTACT POINT	MICOM PIN NO	MICOM INPUT
F	CLOSE	OPEN	# 42	“HIGH”
	OPEN	CLOSE		“LOW”
R	CLOSE	OPEN	# 43	“HIGH”
	OPEN	CLOSE		“LOW”

1) If F-Door is opened,the contact point of the door switch (4-1)becomes closed.Then,the power of the PCB line flows to the door switch through R404 and 0V is applied to the MICOM terminal.And, when the door is closed,the contact point of the door switch (4-1)becomes open.Then,the power of the PCB line supplies 5V to MICOM via R404 and R401,which recognize the door as closed,turn on the fan at the extra load terminal and control the Room Lamp Relay (K73)turning off the lamp.

2) If R-Door is opened,the contact point of the door switch (2-1)becomes closed.Then,the power of the PCB line flows to the door switch through R403 and 0V is applied to the MICOM terminal.And, when the door is closed,the contact point of the door switch (2-1)becomes open.Then,the power of the PCB line supplies 5V to MICOM via R403 and R402,which recognize the door as closed,turn on the fan at the extra load terminal and control the Room Lamp Relay (K75)turning off the lamp.

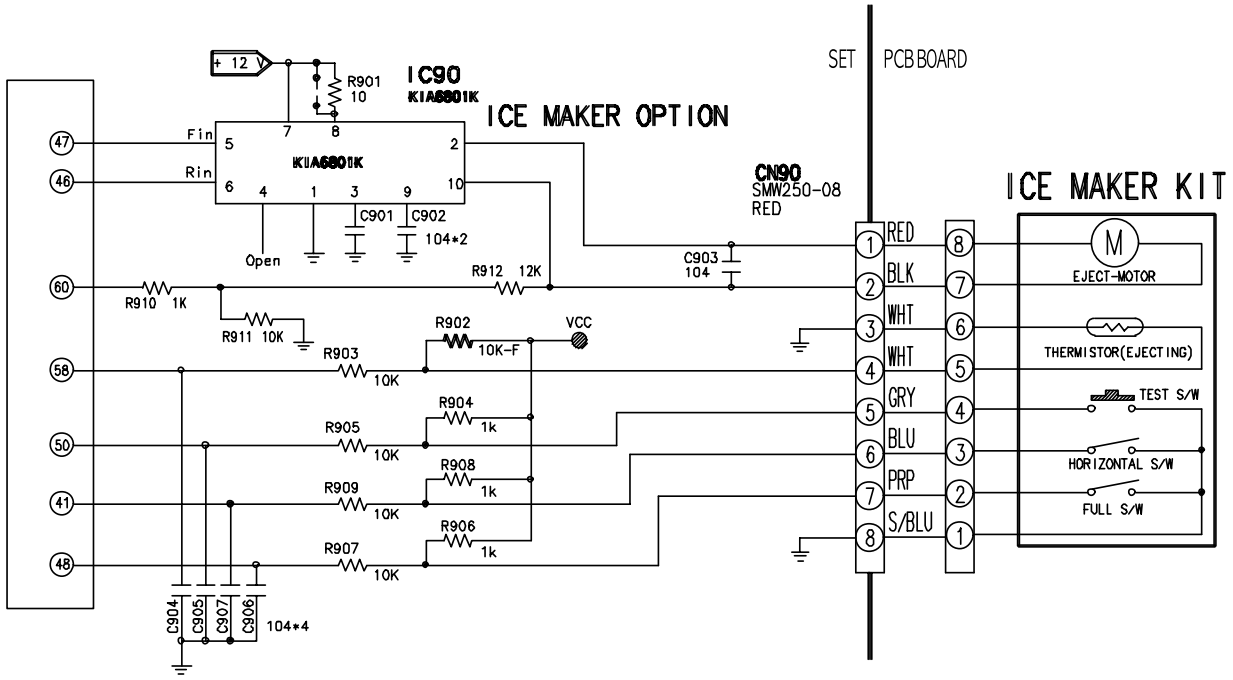
12-6) TEMP SENSING CIRCUIT



1) Sensor uses a thermistor which has a temp coefficient of negative resistance and controls resistance.When the heat goes up,the resistance gets down and vice versa.R301~R305and C301~C303 are parts for noise prevention but they are not related to temp sensing characteristics.

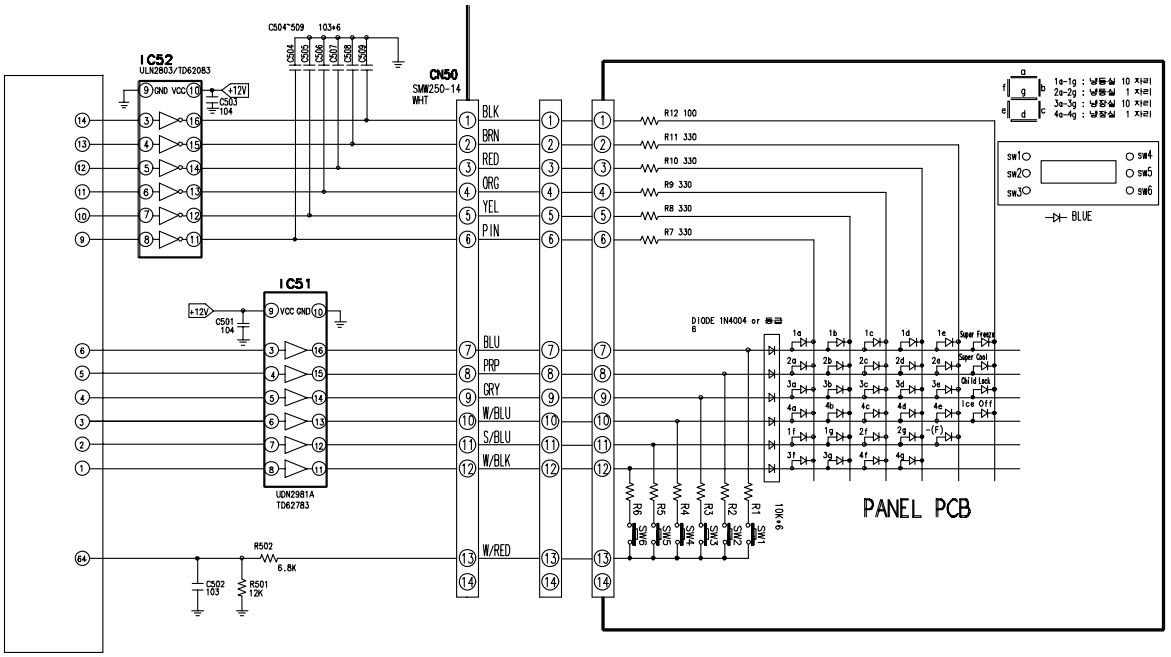
2) If Vf is the incoming voltage to MICOM in case of F-Sensor,Vf equals (Rth *Vcc)/((R312 +Rth). Where Rth is resistance of THERMISTOR corresponding to Temp.Please refer to the Appendix Temp-to-Sensor Resistance/Voltage conversion table(Temp-to-MICOM Terminal Voltage included)on A/S. (89page)

12-7) ICE MAKER OPERATION CIRCUIT



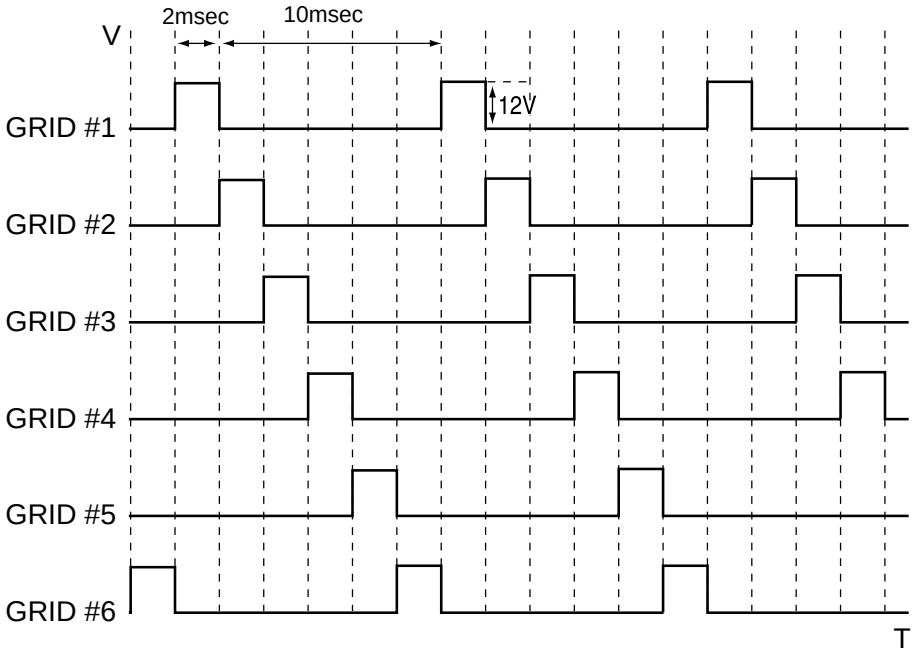
1) The ice maker circuit above is to control the ice maker kit installed on the F room.
This circuit is the hardware to control ejection and horizontal positioning,ice making temperature detection and full icing detection. Temperature detection circuit is the same as temperature detection circuit on 4-6 and the explanation will be skipped and only the ejection circuit will be explained. If MICOM PORT NO #7 is outputted with High to rotate motor in ejection direction and the pin #5 of IC90 is inputted,12V is outputted on pin #2 of IC90,goes to motor and supplied to pin #10 of IC90. The current flows to the pin #10 of IC90 making motor rotates.This motor rotates the gear and rotates the ejection tray.The tray twists to separate the ice from the tray and return to the horizontal state. For restoration,motor stops for 2 seconds when the ejection is completed and to rotate in opposite direction,output horizontal MICOM PORT NO #46 with high and perform horizontal positioning. Motor rotation for ejection operates for 8.3 seconds and stays for 2 seconds.Horizontal positioning rotates motor in opposite direction and it stops when the horizontal switch becomes ON (Low)or when the voltage of the motor voltage sensing part (MICOM PORT #60)is over 0.55V. The test S/W is off in normal cases and MICOM PORT 50 stays high.When necessary,press the switch for more than 1.5 seconds executing forced ejection.Full S/W has a lever that detects the amount of ice in the ice-maker kit and based on the status of MICRO S/W connected to the lever, if ice is full in the container,ejection is not executed,and only if it is off (MICOM PORT 48 is high), the ejection is executed.

12-8) DISPLAY DRIVING CIRCUIT



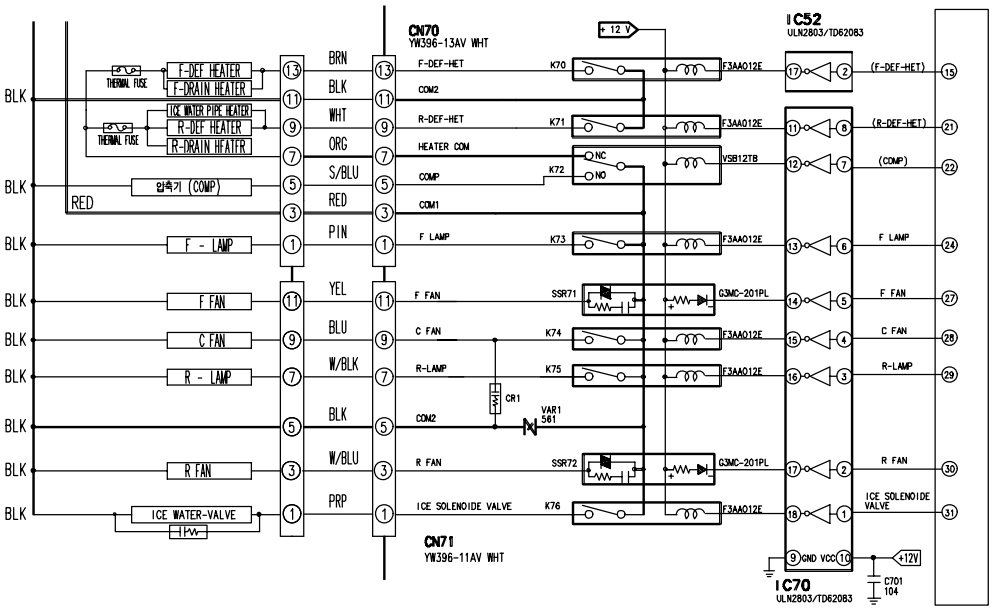
1) KEY SCAN &DISPLAY DRIVING PRINCIPLE

As shown in the wave diagram below,Micom sends out “high ”signals through the MICOM 6 terminals of NO #1→2→3→4→5→6 for 2ms each every 12ms.This signal goes to output terminal via input terminal of IC51 (TD62783AP or KID65783AP). Here, the peak to peak voltage of the square wave is 11~12V DC and each output wave is as follows.



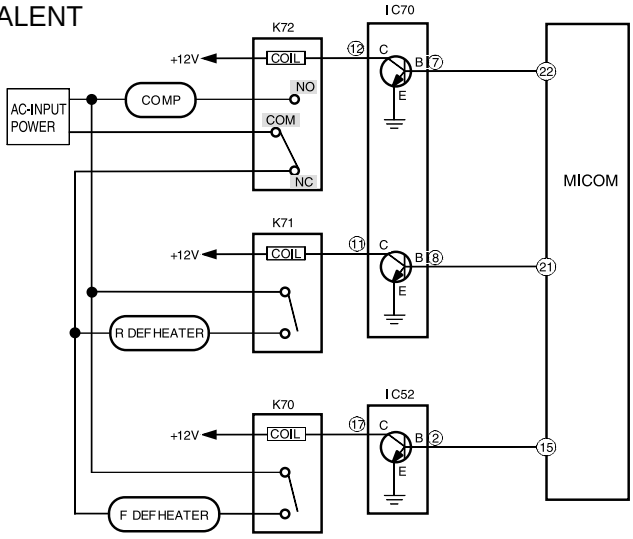
OPERATION PRINCIPLES BY PARTS OF CIRCUIT

12-9) LOAD DRIVING CIRCUIT

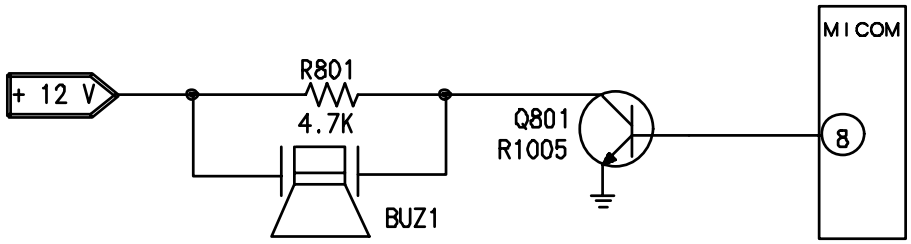


1) The main PCB processes most of the load control for electronic refrigerators.
2) Compressor,F-Room,defrost heater,and other functions are controlled by relays.
3) For example,to operate the compressor,MICOM Pin #22 outputs high (5V)signals which go into IC70 Pin #7.The IC70 Pin #7 plays the same role as the base of NPN TR.The Pin #12 works as the collector of TR. So,if 5V is supplied to the Pin #7 of IC70,the Pin #12 will be turned on and connected to the ground.Then,the relay K72 and the coil connected to the Pin #12 of IC70 becomes low (OV)and +12V (opposite side of coil)flows to the Pin #12 of IC70 via the coil and goes into the ground.
While current flows to the coil,the magnetic power arise,it turns on the secondary contact point inside K72,and operates when the AC power is supplied to the both sides of the compressor.
When MICOM Pin #22 becomes Low(0V),IC70 Pin #7 becomes Low which cut out the power and the current of RY75 RELAY.So,the secondary contact becomes off due to the magnetic field cut,which turns off the compressor.
All other loads work based on the same principle.The defrost heater operates only if the compressor is turned off like the circuit above and it is connected like the equivalent circuit below.

- COMP & DEFROST HEATER EQUIVALENT CIRCUIT AC~INPUT POWER



12-10) Buzzer Circuit Diagram



1) The circuit is composed of like the above and MICOM controls the alarm function with 2KHz.12V is always applied to the circuit.So,when MICOM sends alarm signals to Q801 Transistor Bass,the transistor is turned on applying 12V to the buzzer,which operates the buzzer. 4.7Kohm of R801 is a resistance for the production of quality buzzer sound.

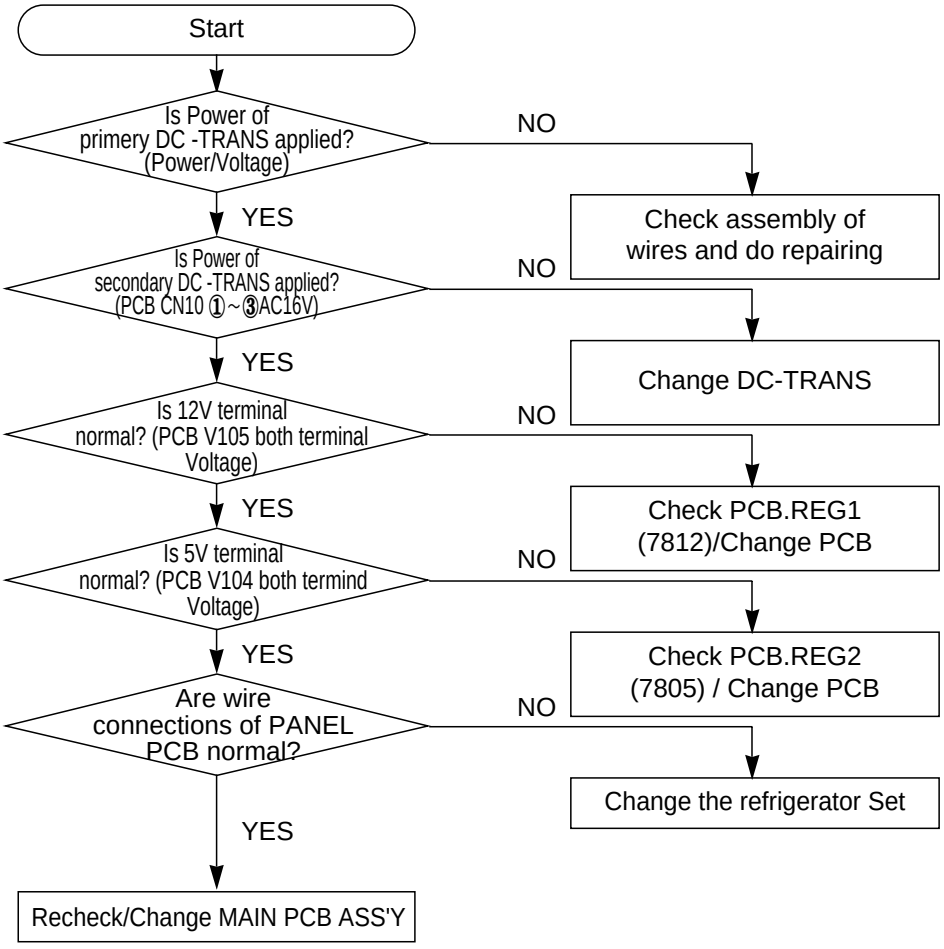
13. DIAGNOSTICS

Diagnostics

13-1) When power is not supplied

Pre-Check

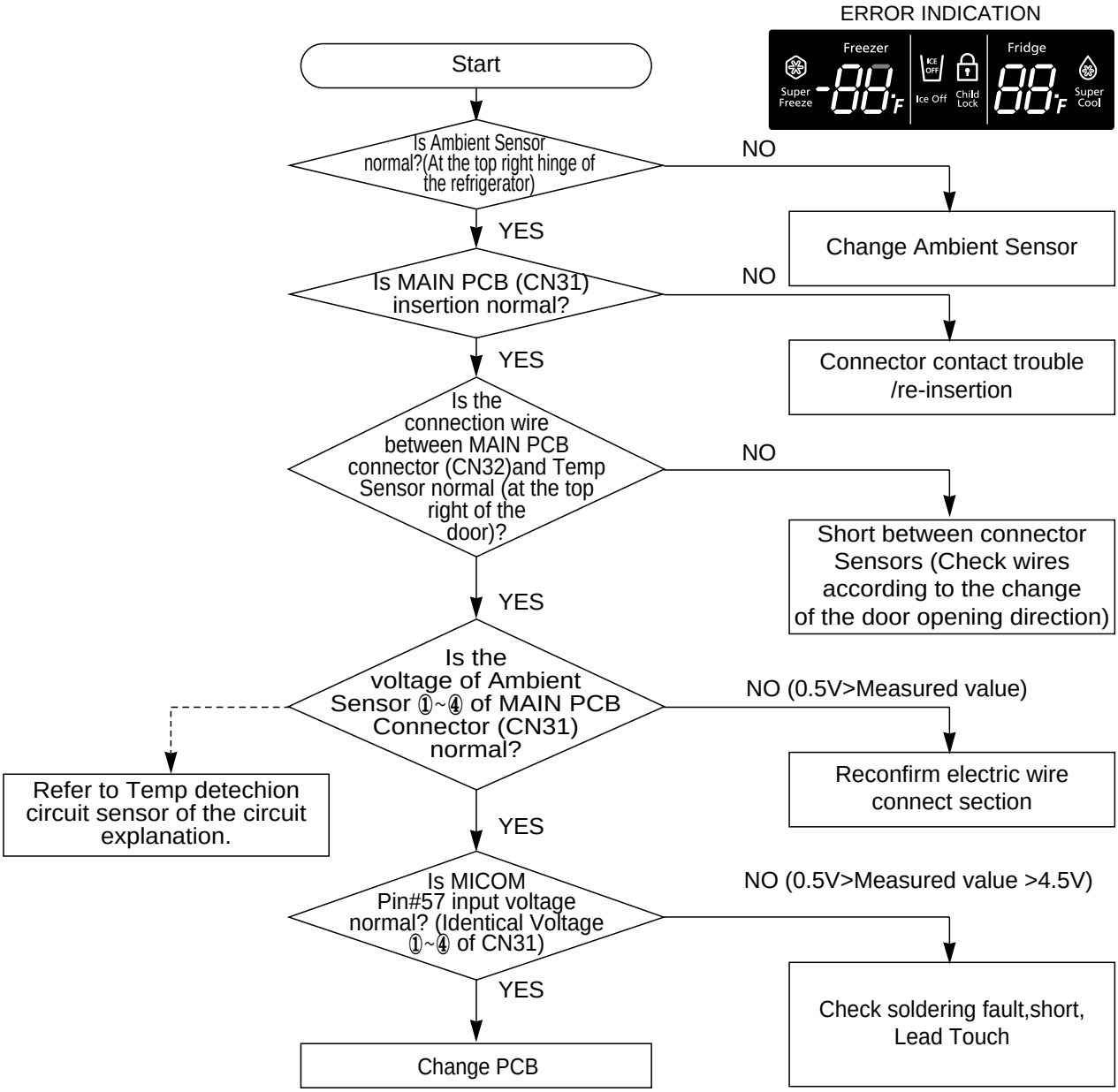
1.Check if power is supplied at Concent and Power Cord is connected properly before repair
2.Check by referring to the followings.



Diagnostics

13-2) If there is a trouble with self-diagnosis

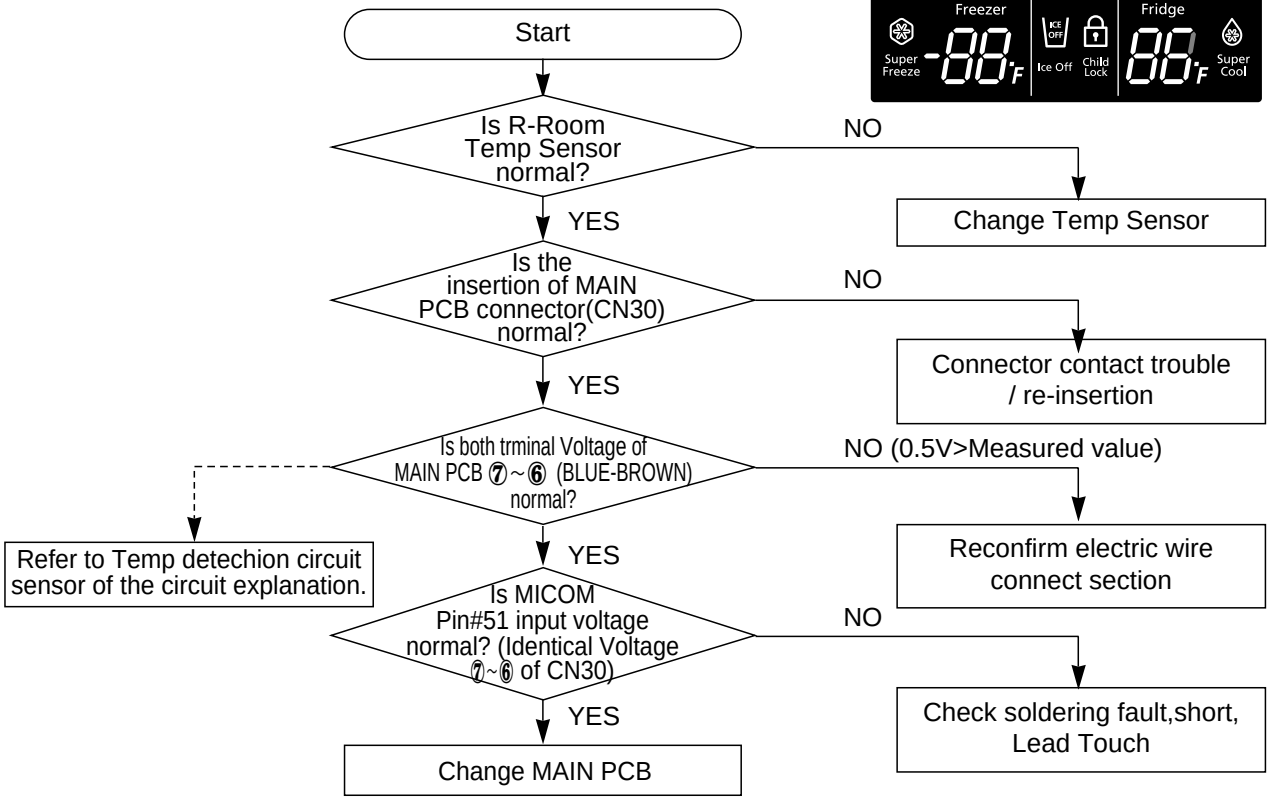
1) Ambient Sensor trouble =>(applied to Ambient Sensor Temp type)



Diagnostics

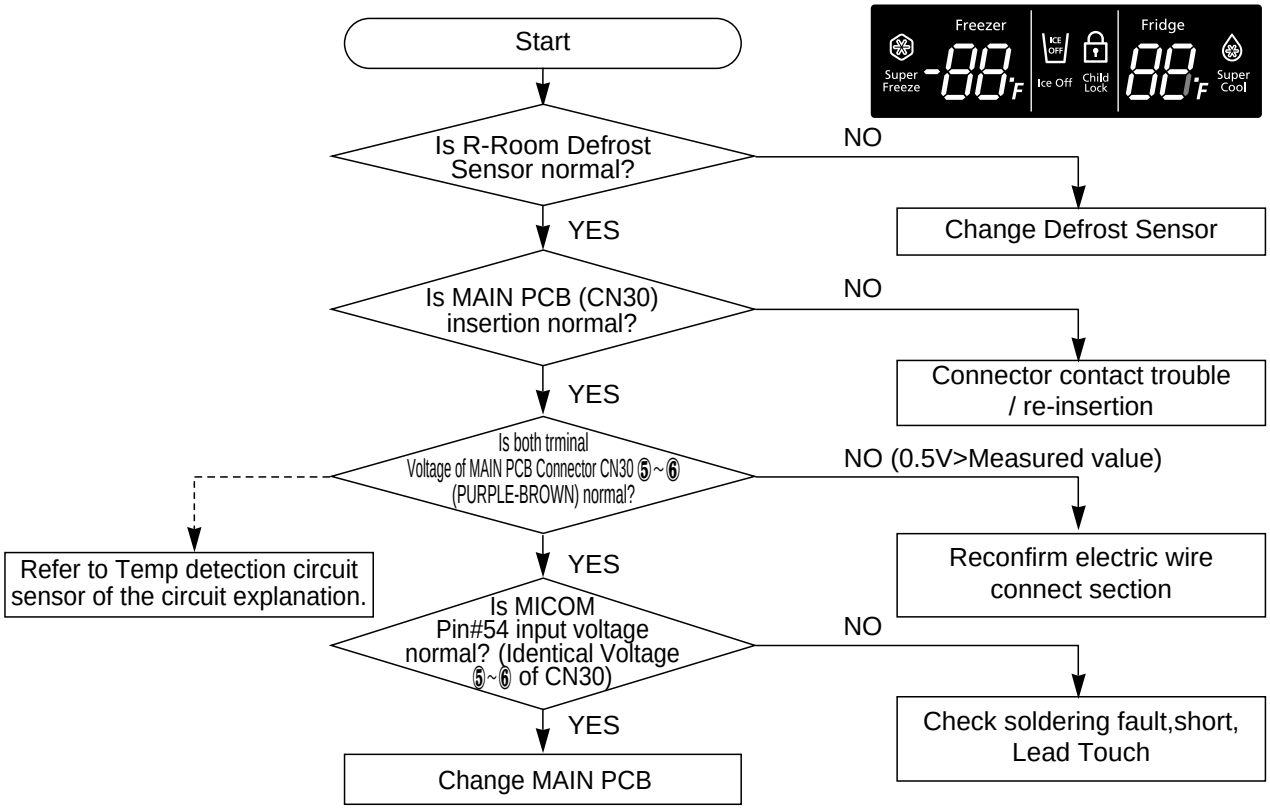
2) R-Room Temp Sensor trouble

ERROR INDICATION



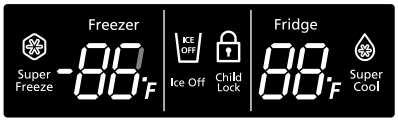
3) R-Room Defrost Sensor trouble

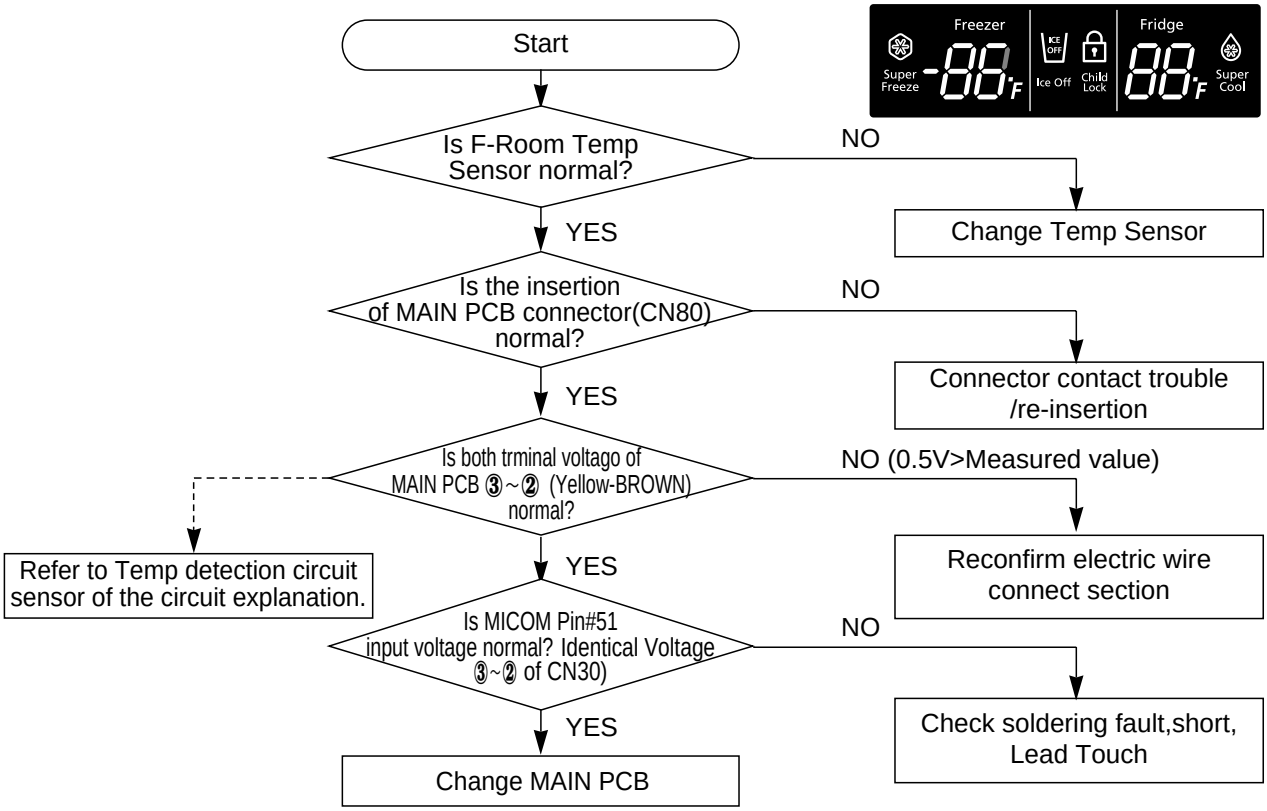
ERROR INDICATION



4) F-Room Temp Sensor trouble

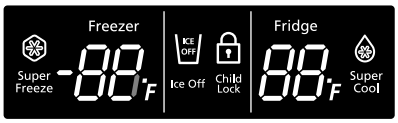
ERROR INDICATION

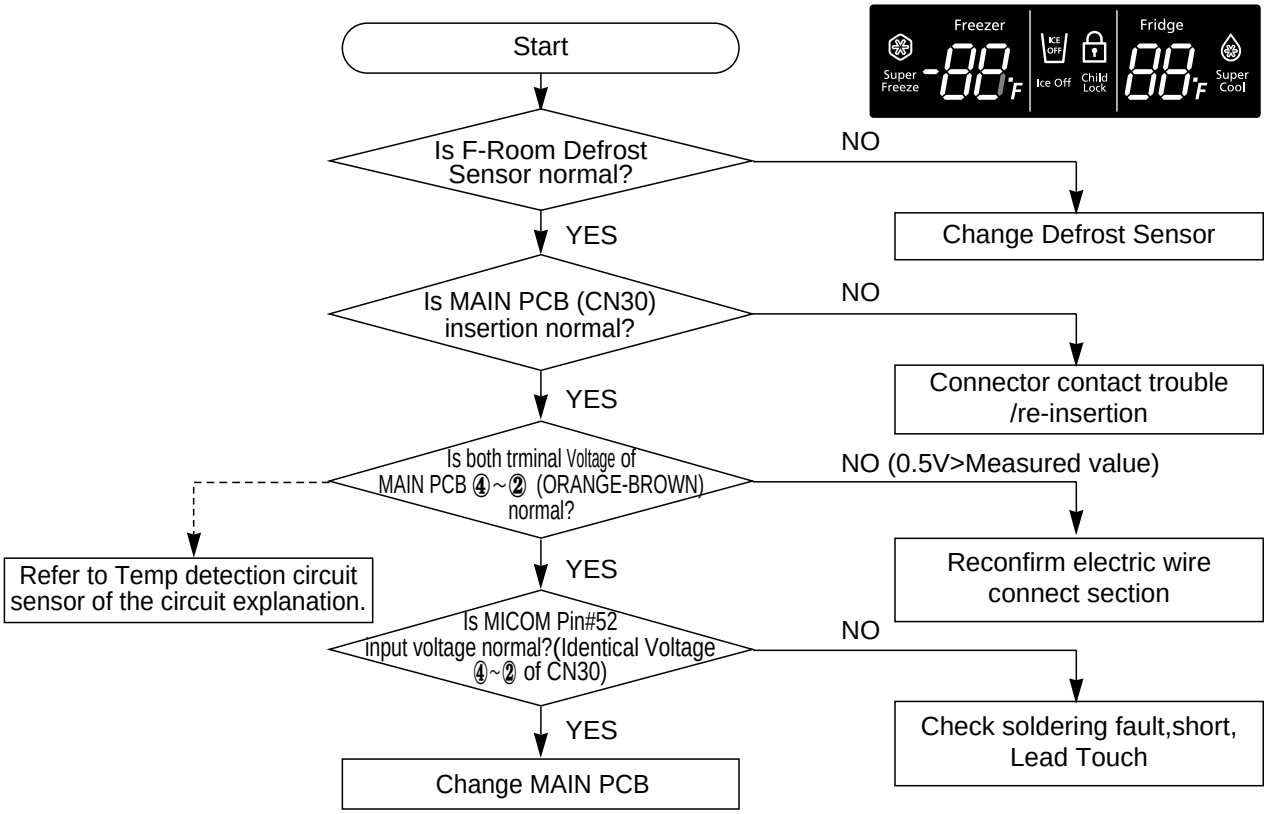




5) F-Room Defrost Sensor trouble

ERROR INDICATION



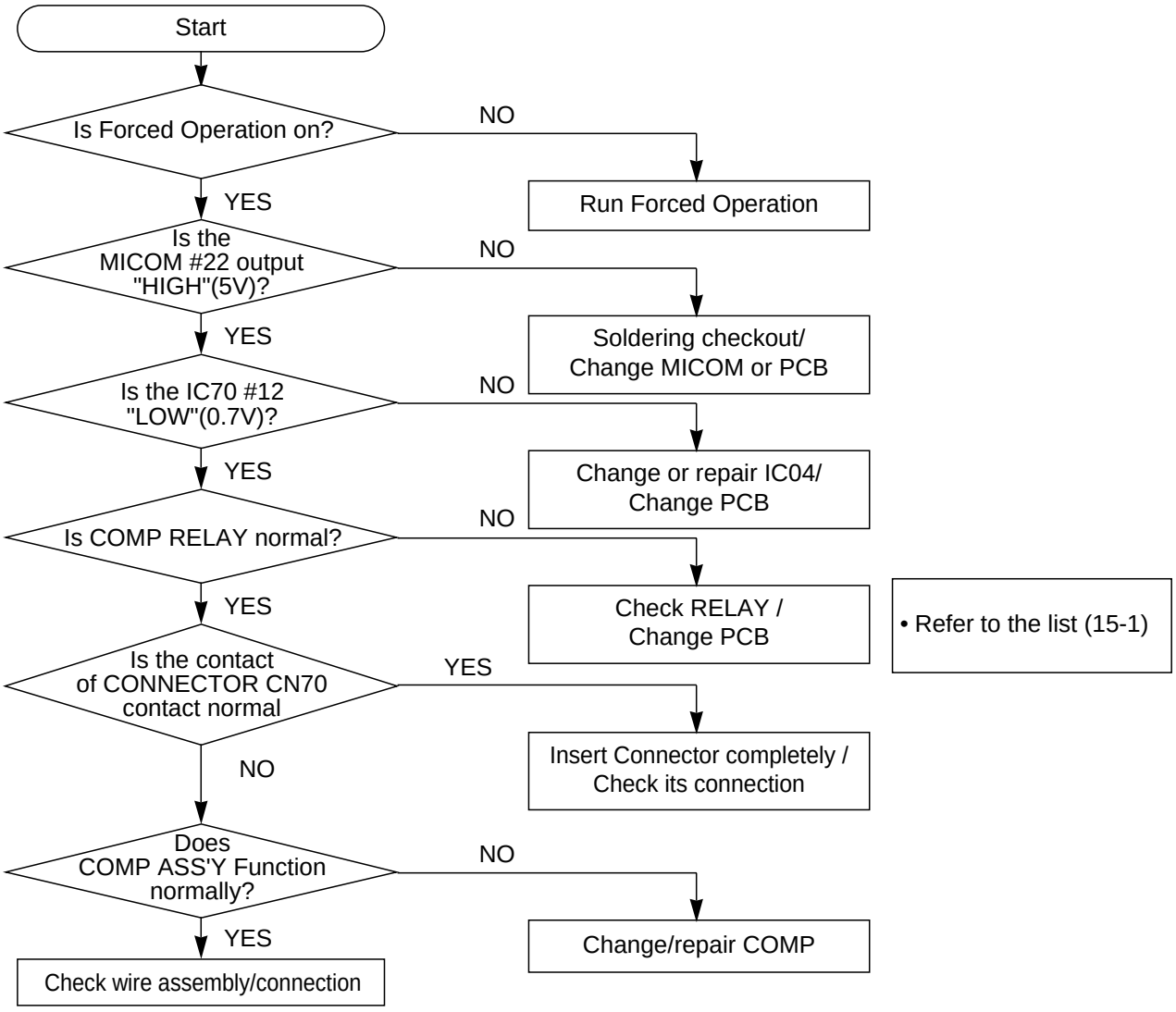


13-3) When COMP does not operate

Pre-Check

"Check out the COMP with the Forced Operation selected"

1. If it does not pass 5 min after a desired Temp reached,COMP does not operate.
2. During Defrost,COMP does not operate.
3. With the disconnected F-Sensor or R-Sensor,COMP does not operate because low temperature is detected.



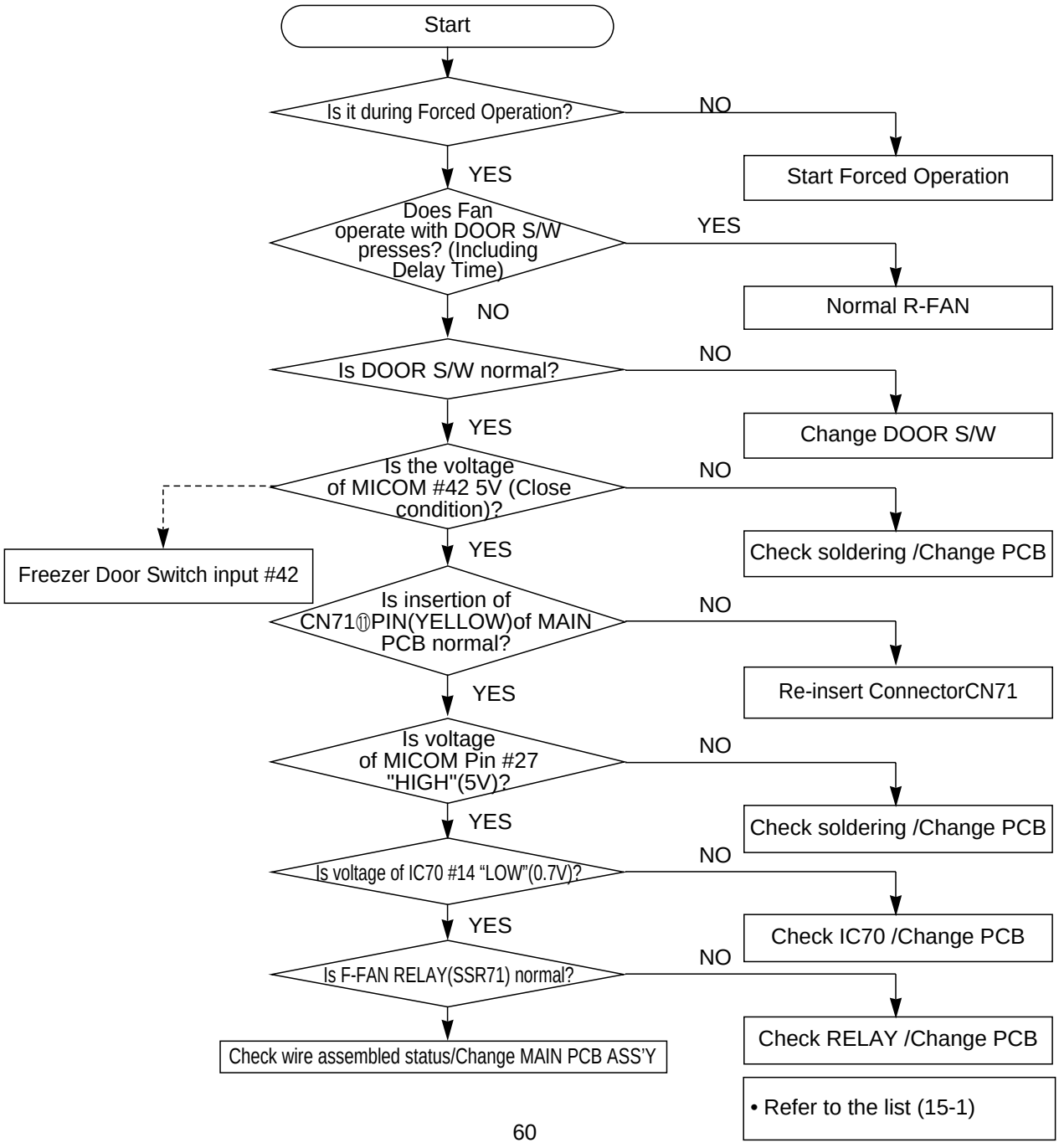
13-4) When FAN does not operate

Note

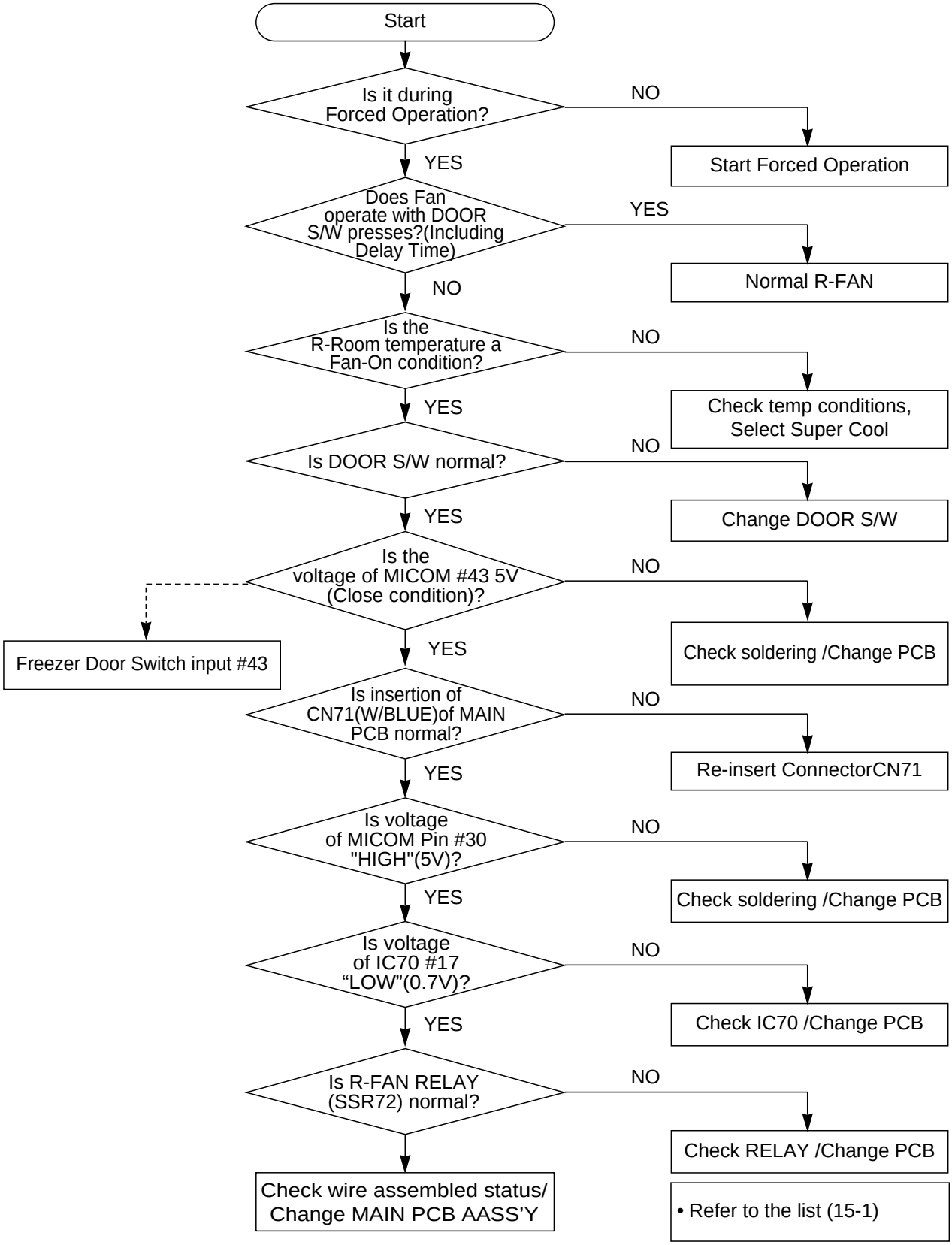
"Check out the F-FAN with the Forced Operation selected"

1. F-Room FAN, R-Room FAN and COMP COOLING FAN remains OFF while COMP is off. (R-FAN can be on with the defrost function.)
2. When Comp is ON,R-FAN does not always remain ON (including Forced Operaation) and when R-Room temp reaches to set temp,R-FAN remains OFF.
3. When R-Room &F-Room are closed after being opened,each FAN starts up with a delay time (5sec ~1min) immediately.(Comp ON condition)

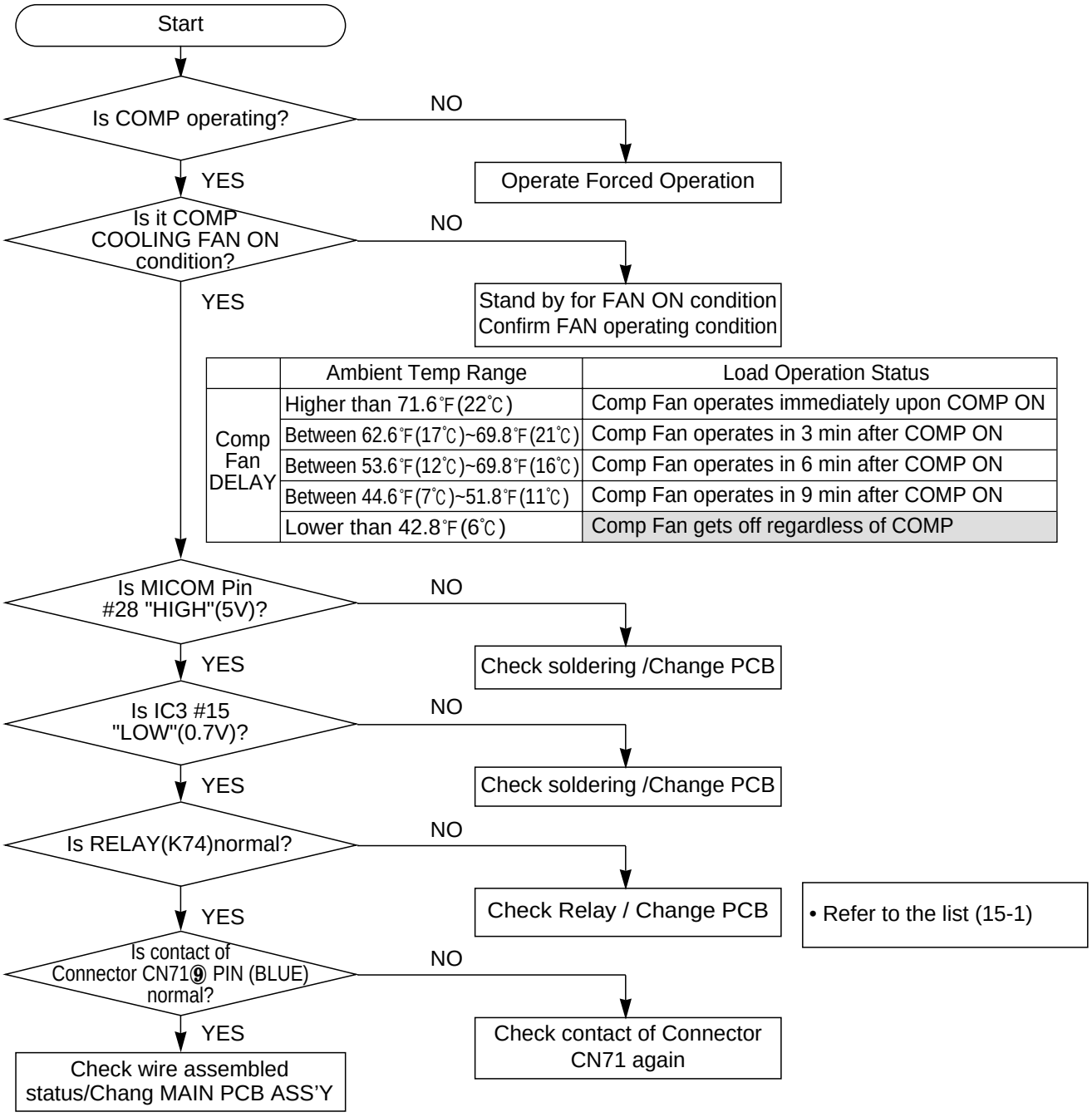
1) When F-Room FAN(F-FAN)does not operate



2) When R-Room FAN(R-FAN)does not operate



3) When COMP COOLING FAN does not operate



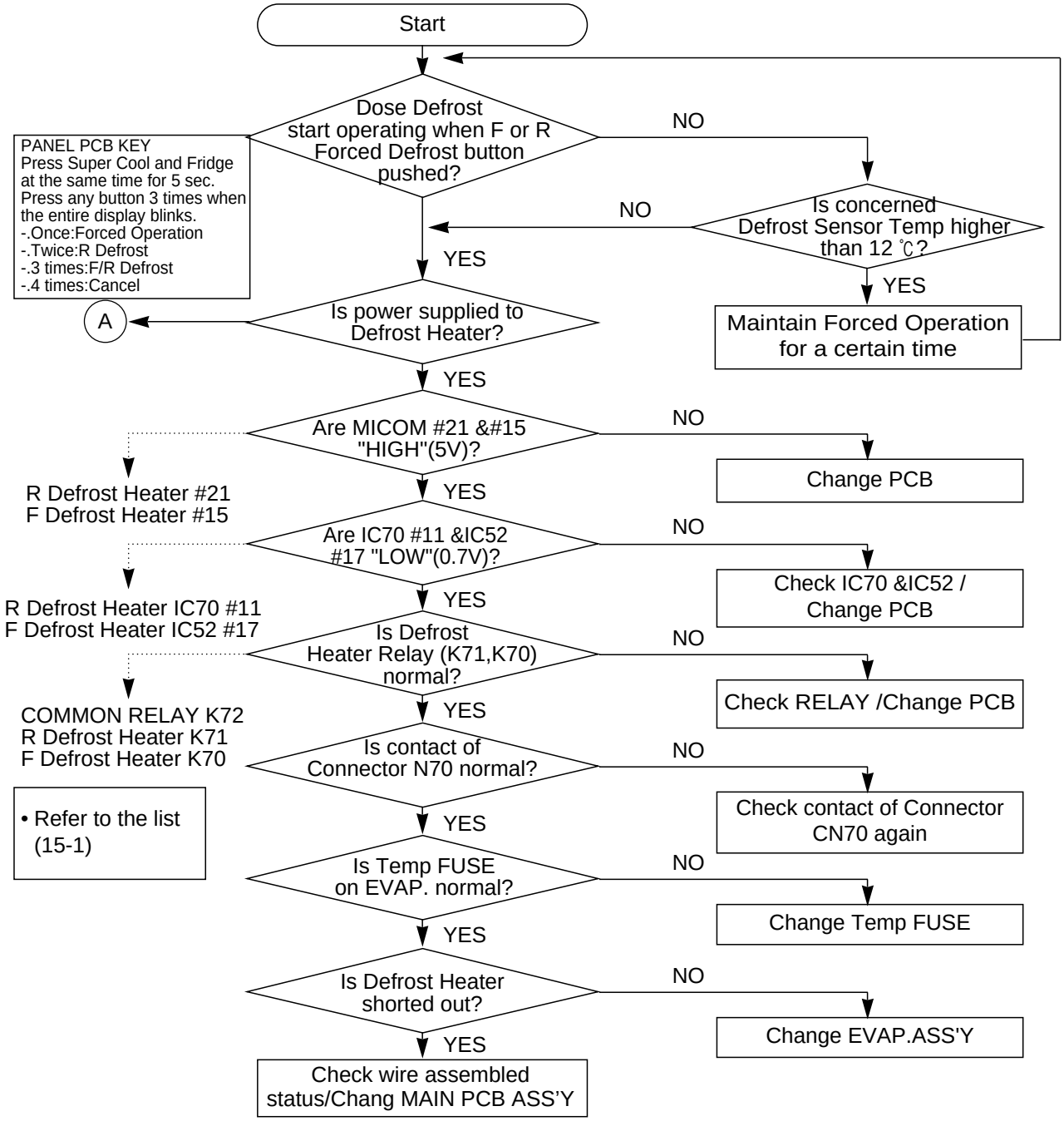
	Ambient Temp Range	Load Operation Status
Comp Fan DELAY	Higher than 71.6℉(22℃)	Comp Fan operates immediately upon COMP ON
	Between 62.6℉(17℃)~69.8℉(21℃)	Comp Fan operates in 3 min after COMP ON
	Between 53.6℉(12℃)~69.8℉(16℃)	Comp Fan operates in 6 min after COMP ON
	Between 44.6℉(7℃)~51.8℉(11℃)	Comp Fan operates in 9 min after COMP ON
	Lower than 42.8℉(6℃)	Comp Fan gets off regardless of COMP

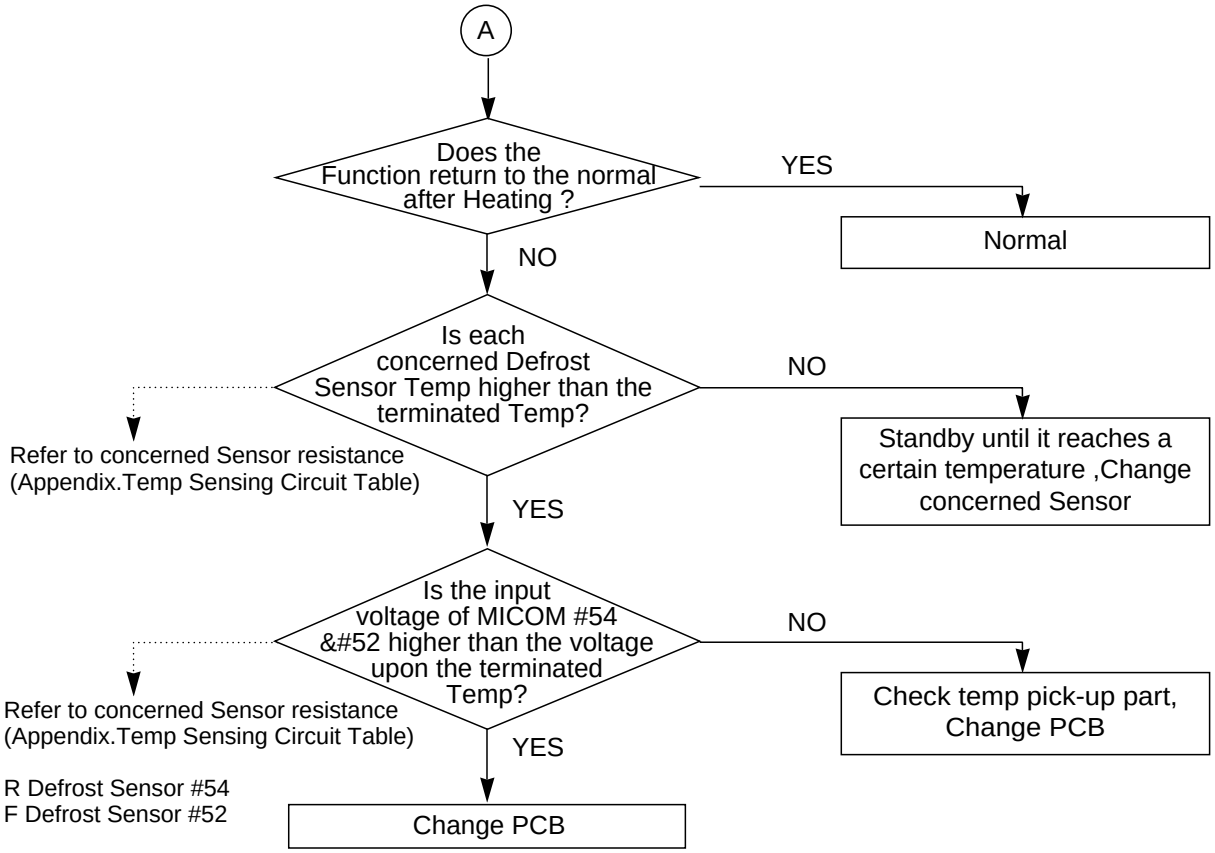
• Refer to the list (15-1)

13-5) When Defrost does not operate

Pre-Check

1. With a shorted-out F or R Defrost Sensor,the fridge operates normally excepting Defrost (The fault can be picked up with self-diagnosis,POWER ON/OFF).
2. There will be Heating trouble with a shorted-out Temp FUSE,which contributes to Defrost by natural Temp increase resulting in a Temp Control problem stemmed from the increased COMP OFF time.
3. When a F or R Defrost Sensor is faulty as OPEN,Heating will not be terminated,and COMP will remain off following the Temp FUSE short-off.(The fault can be picked up with self-diagnosis, POWER ON/OFF)



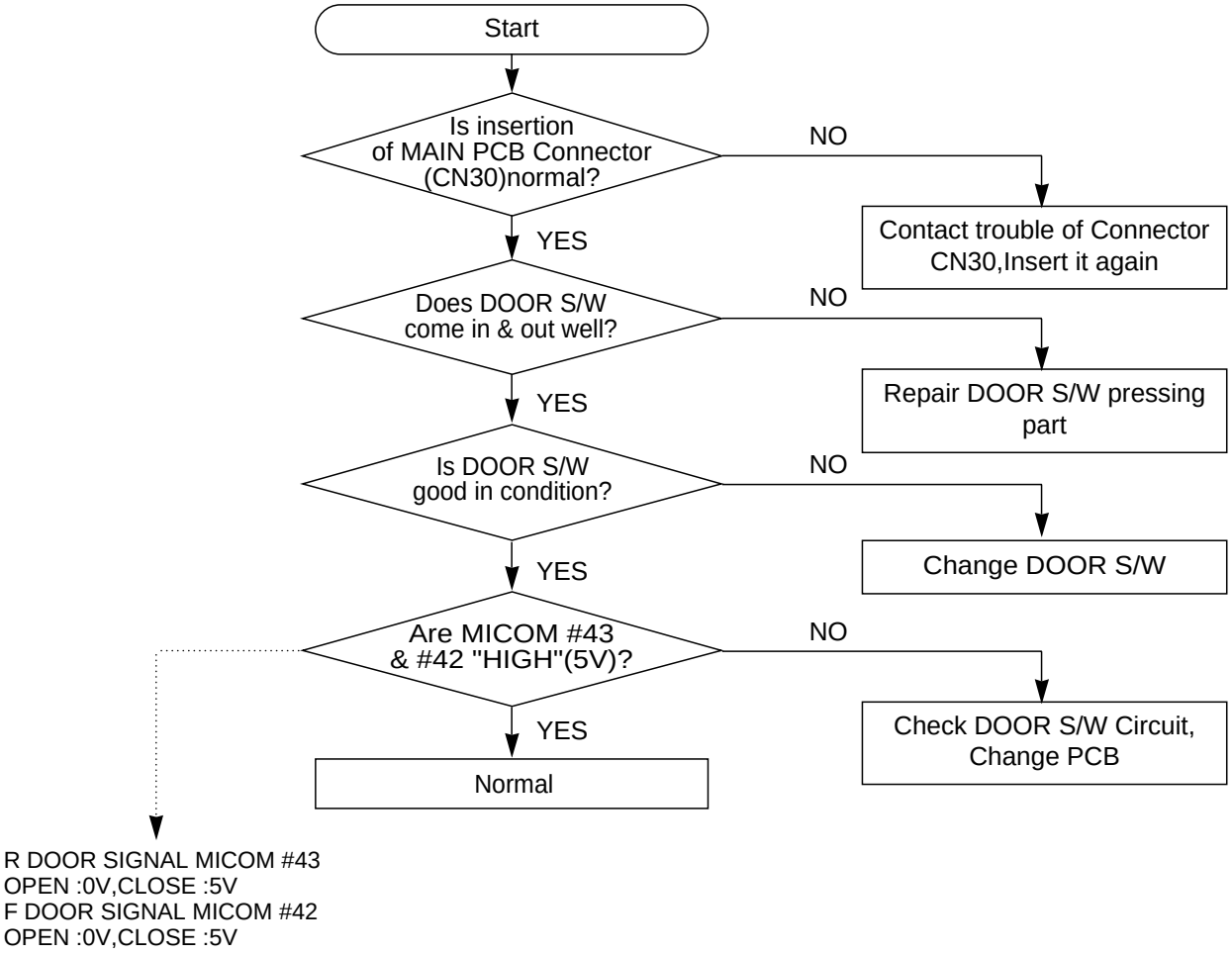

A
Does the Function return to the normal after Heating ?
YES
Normal
NO
Is each concerned Defrost Sensor Temp higher than the terminated Temp?
NO
Standby until it reaches a certain temperature ,Change concerned Sensor
Refer to concerned Sensor resistance (Appendix.Temp Sensing Circuit Table)
YES
Is the input voltage of MICOM #54 &#52 higher than the voltage upon the terminated Temp?
NO
Check temp pick-up part, Change PCB
Refer to concerned Sensor resistance (Appendix.Temp Sensing Circuit Table)
YES
R Defrost Sensor #54
F Defrost Sensor #52
Change PCB

13-6) When Alarm Sound continues without stop

Note

1. When Door gets open,Door Open alarm ("Ding Dong")goes off in 2 minutes with Door opened.When Door remains open after this,the alarm goes off every minute.
2. When Door Switch is not pressed well,MICOM considers it as opened and alarming sound goes off. Room Lamp becomes OFF in 10 minutes since it detects Door Open.In this case, even though Door gets opened, Room Lamp does not comes ON.

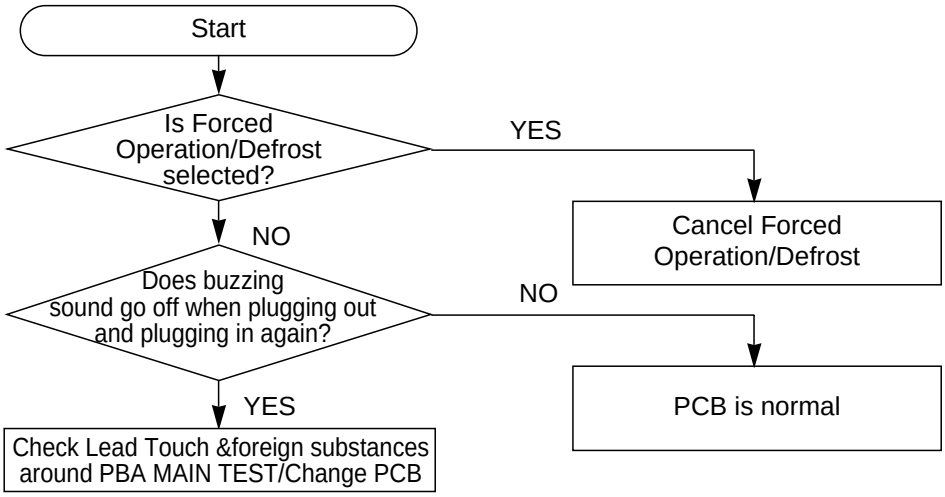
1) If melody sounds continuously



2) When “Beep Beep” sound continues

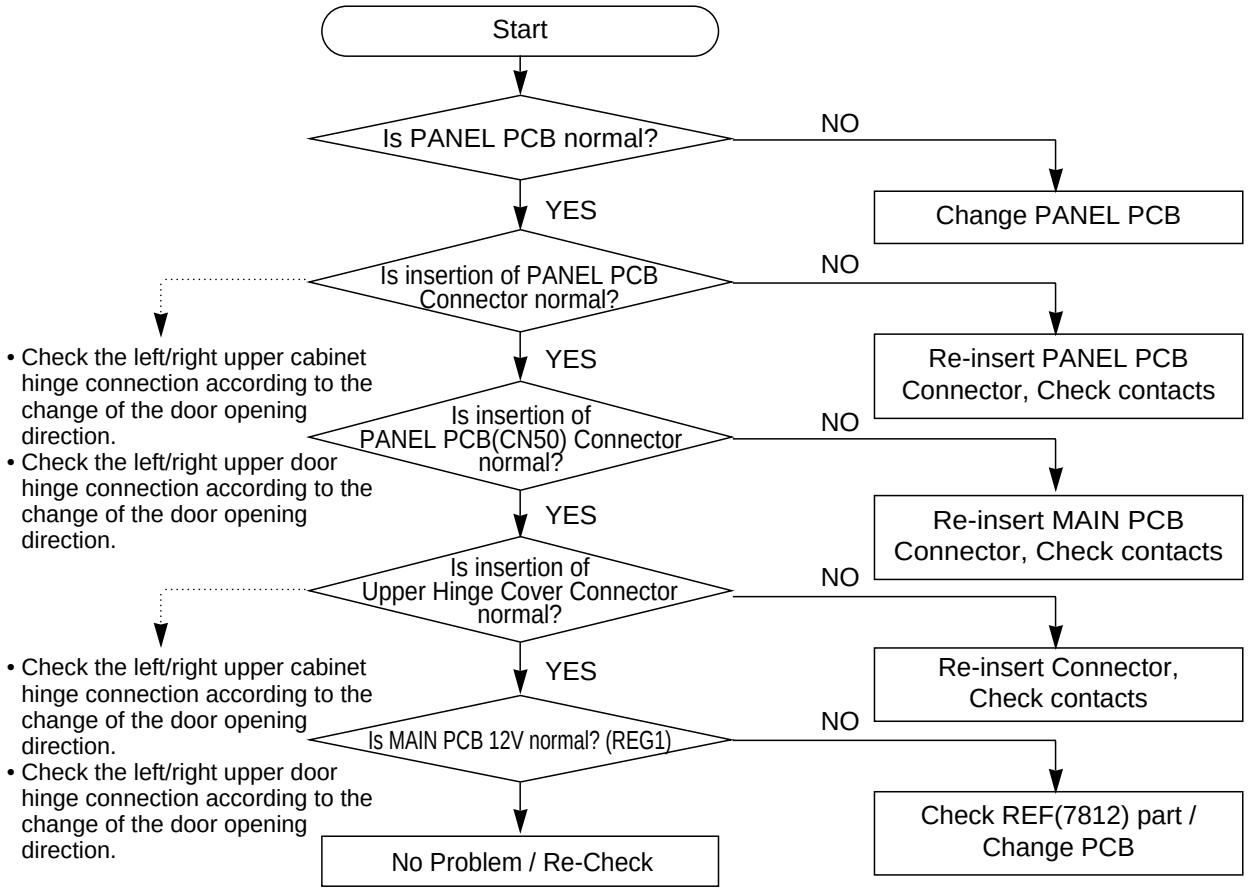
Note

1. "Beep-Beep"sounds do not go off except Forced Operation &Forced Defrost.
2. It is checkable at Panel PCB when Forced Operation or Forced Defrost is selected,so when error occurs, check it and correct the error.

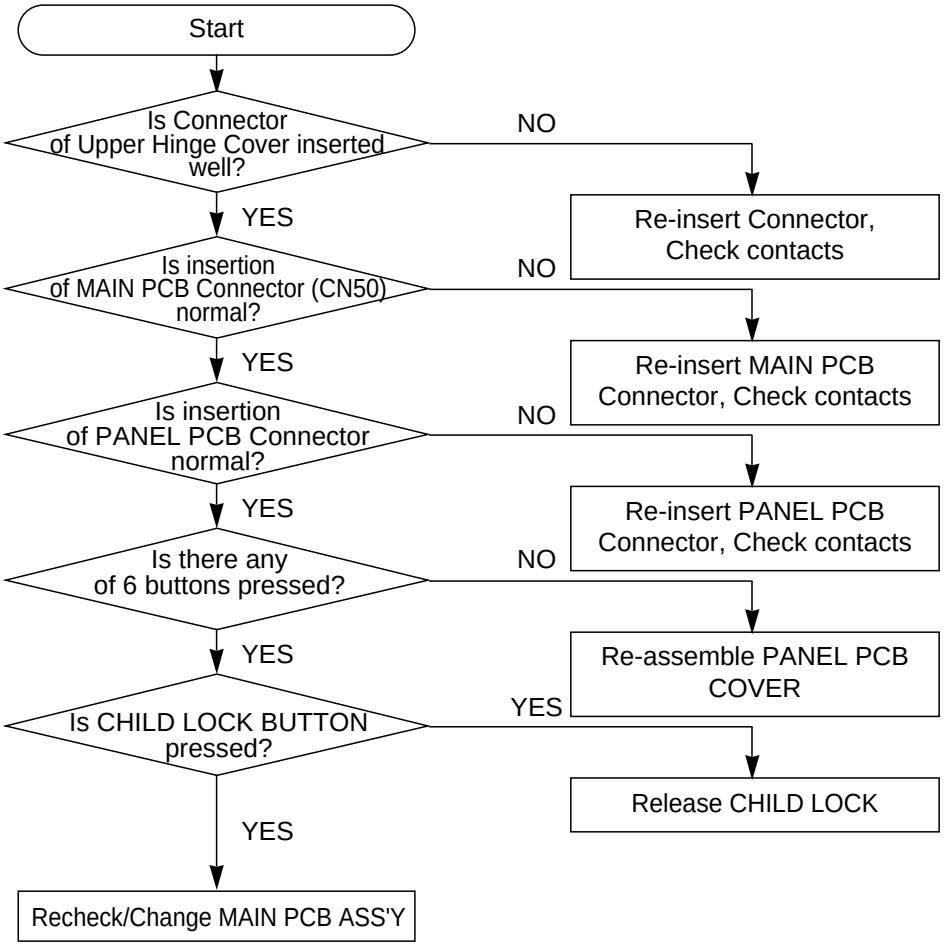


13-7) Panel PCB Defect

1) When PANEL PCB doesn 't light up



2) When PANEL PCB Buttons do not work

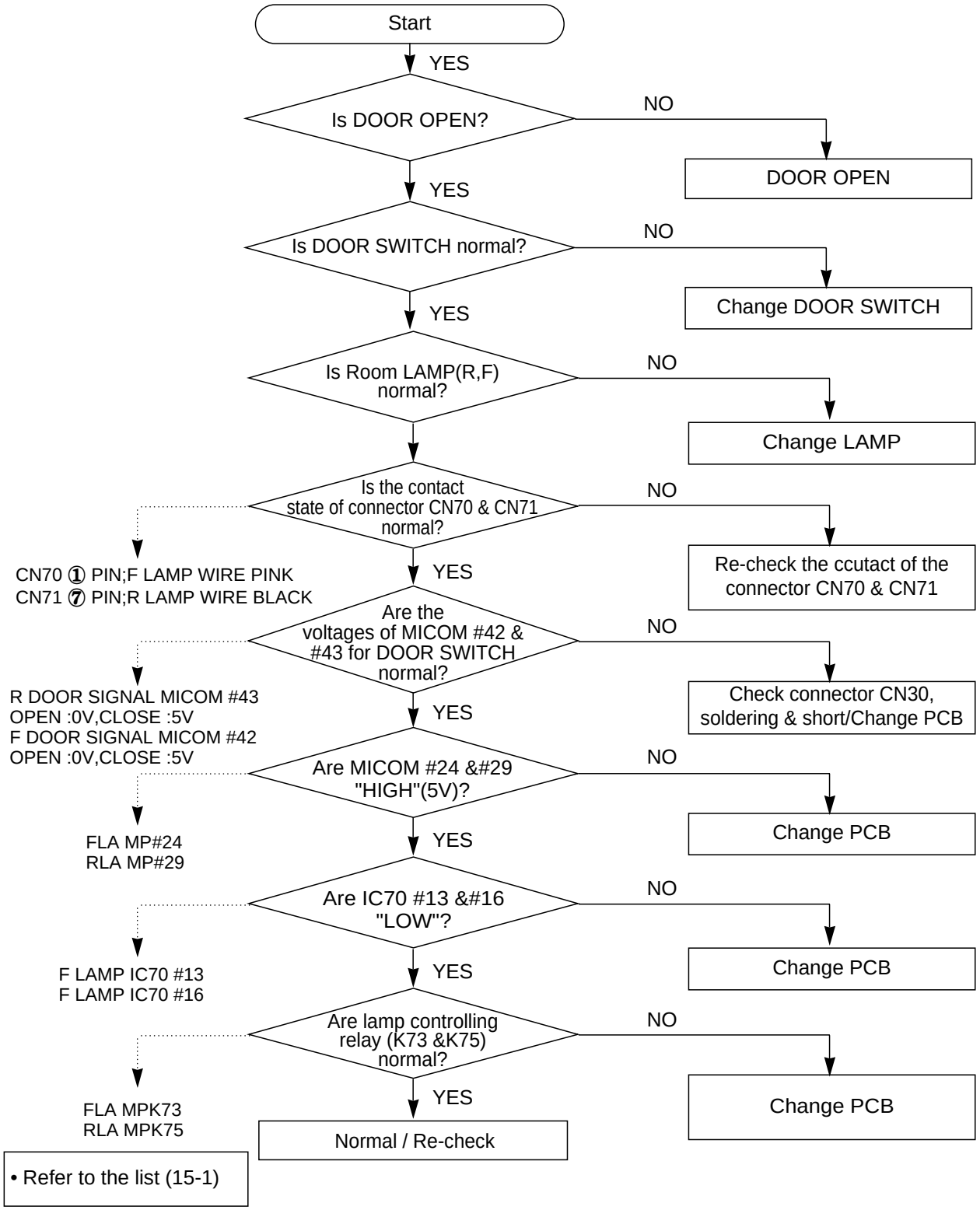


13-8) When Room Lamp does not light up(F &R Rooms are the same)

1) When F &R Room Lamps do not light up

Pre-Check

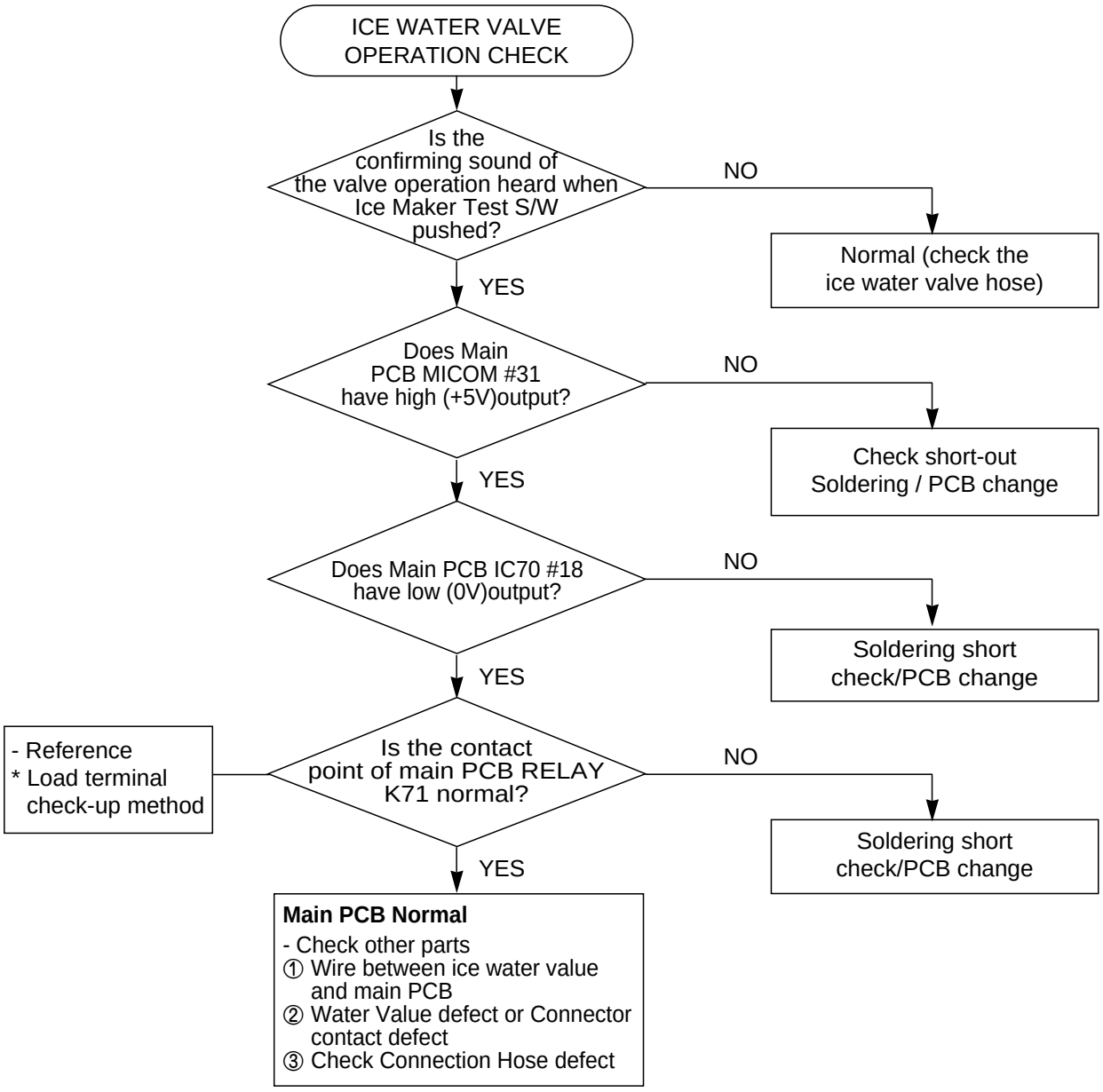
- Room Lamp(F,R)
1. Check F-Room Lamp ON after opening Freezer Door.
2. Check F-Room Lamp OFF by pushing Door S/W.
3. Check R-Room with using the same method ①,② after closing Freezer Door.
4. When it's problems, check Room Lamp and Door S/W (Refer to Door S/W sensor circuit)
5. Check the electric wire connect status.


Start
YES
Is DOOR OPEN?
NO
DOOR OPEN
YES
Is DOOR SWITCH normal?
NO
Change DOOR SWITCH
YES
Is Room LAMP(R,F) normal?
NO
Change LAMP
Is the contact state of connector CN70 & CN71 normal?
NO
Re-check the ccutact of the connector CN70 & CN71
CN70 ① PIN;F LAMP WIRE PINK
CN71 ⑦ PIN;R LAMP WIRE BLACK
YES
Are the voltages of MICOM #42 & #43 for DOOR SWITCH normal?
NO
Check connector CN30, soldering & short/Change PCB
R DOOR SIGNAL MICOM #43
OPEN :0V,CLOSE :5V
F DOOR SIGNAL MICOM #42
OPEN :0V,CLOSE :5V
YES
Are MICOM #24 &#29 "HIGH"(5V)?
NO
Change PCB
FLA MP#24
RLA MP#29
YES
Are IC70 #13 &#16 "LOW"?
NO
Change PCB
F LAMP IC70 #13
F LAMP IC70 #16
YES
Are lamp controlling relay (K73 &K75) normal?
NO
Change PCB
FLA MPK73
RLA MPK75
YES
Normal / Re-check
• Refer to the list (15-1)

13-9) When Ice Water Valve does not operate (Option)

Pre-Check

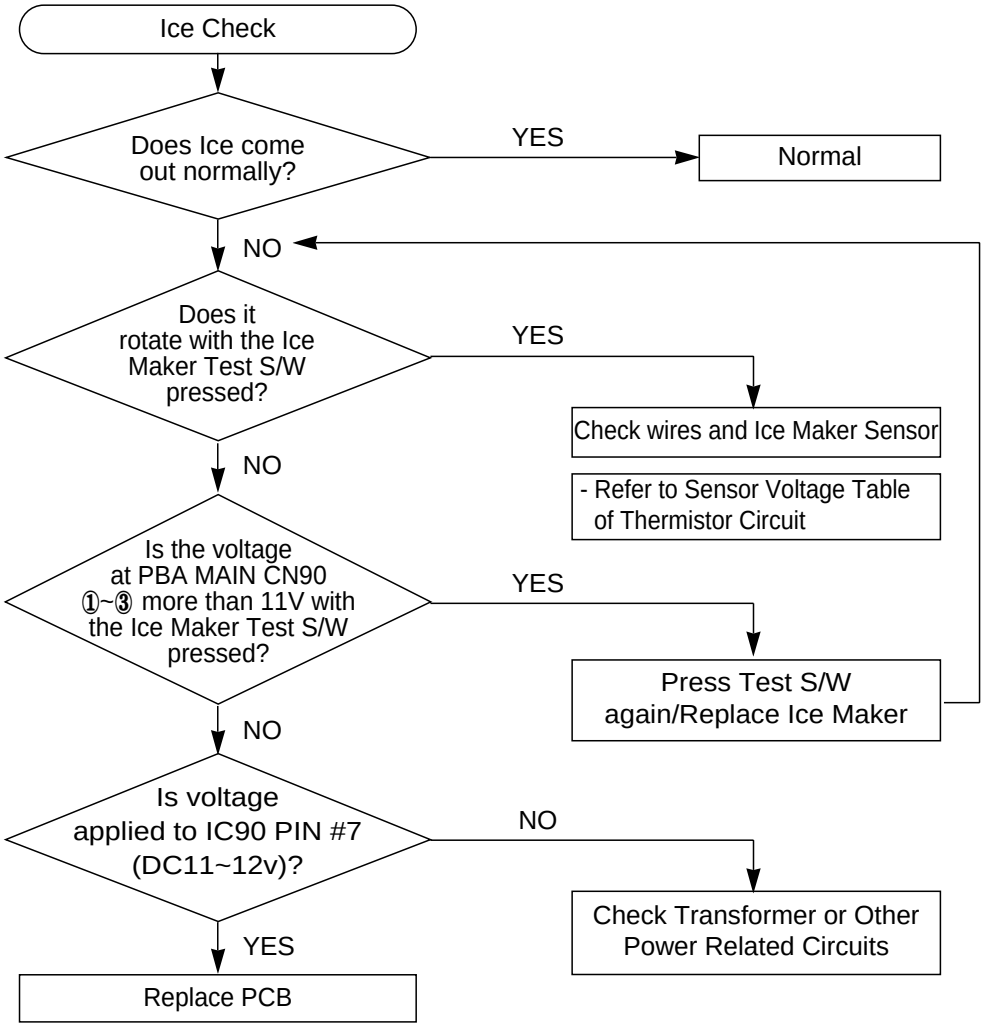
1. While disassembling,make sure to cut off water since the ice water valve is directly connected with water.
2. Make sure to avoid the electric shock while disassembling because one end of wire is applied with power.
3. Check the operation of the ice water valve only after the ice maker test switch is pressed. (F-Room Ice Maker)



13-10) When Ice Maker does not operate (Option:Model installed)

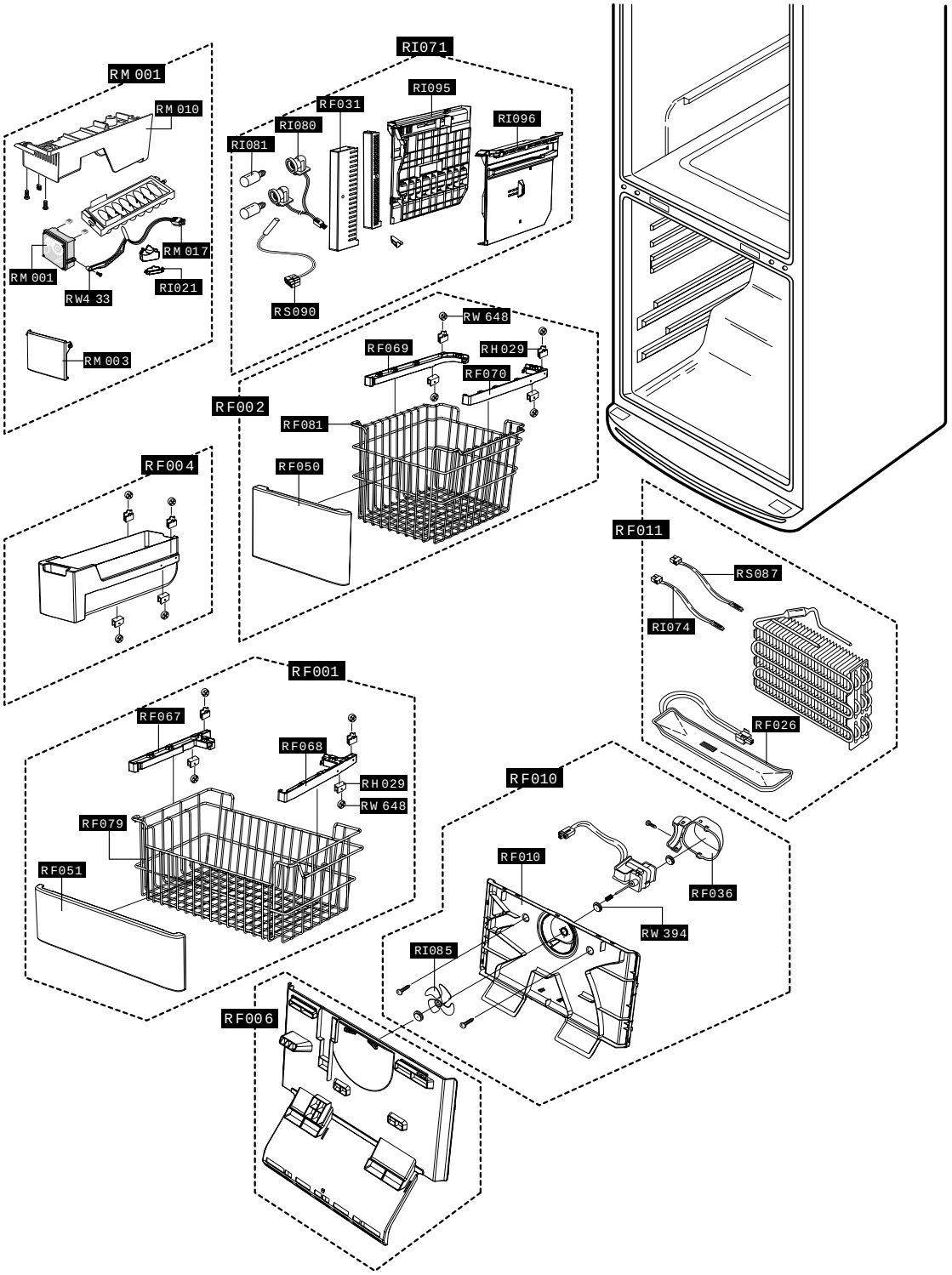
Pre-Check

1. Water is automatically supplied to the Ice Maker and it dispenses cubed or crushed ice according to its setting.
2. Power is applied to one of its wires.So,be sure to refer to its exploded view when disassembling.
3. To check the operation of the Ice Maker,press the Ice Maker Test S/W.(F-Room Ice Maker) It is not possible to check with the power disengaged.



14 . Illustrated Parts Catalog.

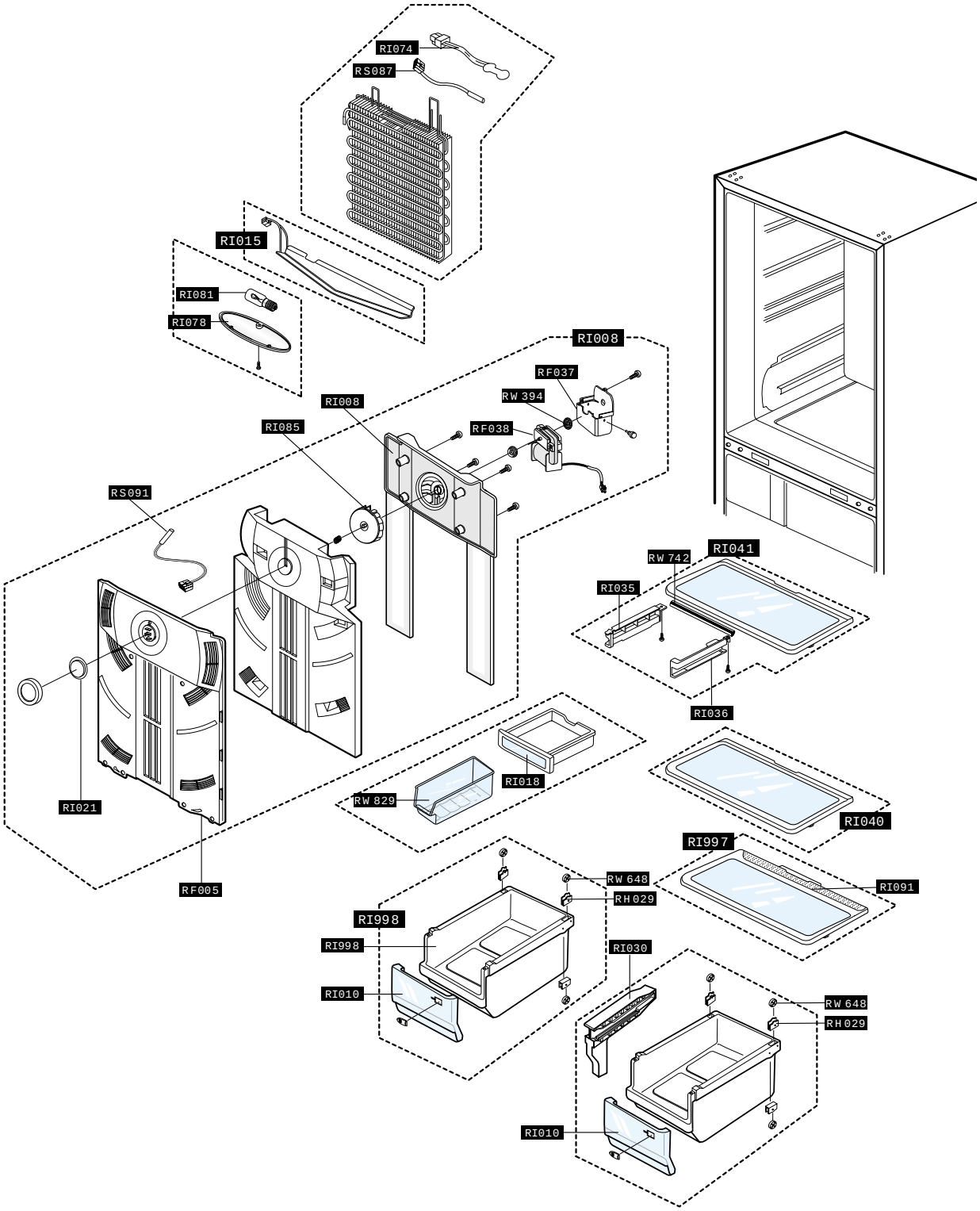
14-1) Freezer



■ Parts List of Freezer

NO	CODE-NO	PART NAME	OPTION								SPEC
			RB195BSSB	RB195BSSW	RB195BSVQ	RB195BSBB	RB215BSSB	RB215BSSW	RB215BSVQ	RB215BSBB	
RF011	DA97-00192F	ASSY-EVAP FRE	●				●				
RS087	DA32-00006C	SENSOR ASSY	●				●				
RI074	DA47-00095E	THERMO FUSE-ASSY	●				●				
RF026	DA97-00195D	ASSY-PLATE DRAIN,FRE	●				●				
RF004	DA97-02790A	ASSY TRAY-ICE CUBE	●				●				
RF002	DA97-02793A	ASSY-WIRE BASKET UPP	●								
	DA97-02793B						●				
RF069	DA61-02165A	GUIDE-BASKET UPP L	●				●				
RF070	DA61-02166A	GUIDE-BASKET UPP R	●				●				
RF050	DA63-02523A	COVER-WIRE BASKET UPP	●				●				
RF002	DA66-00328A	WIRE-BASKET UPP	●								
	DA66-00348A						●				
RW648	DA66-10104A	ROLLER-FRE	●				●				
RH029	DA71-20145A	FIXER-ROLLER	●				●				
RF001	DA97-02797A	ASSY-WIRE BASKET LOW	●								
	DA97-02797B						●				
RF067	DA61-02163A	GUIDE-BASKET LOW L	●				●				
RF068	DA61-02164A	GUIDE-BASKET LOW R	●				●				
RF051	DA63-02524A	COVER-WIRE BASKET LOW	●				●				
RF001	DA66-00329A	WIRE-BASKET LOW	●								
	DA66-00347A						●				
RW648	DA66-10104A	ROLLER-FRE	●				●				
RH029	DA71-20145A	FIXER-ROLLER	●				●				
RF006	DA97-02798A	ASSY COVER EVAP-FRONT FRE	●				●				
RF010	DA97-02799A	ASSY COVER EVAP-REAR FRE	●				●				
RF038	DA31-00002V	MOTOR FAN	●				●				
RI085	DA31-00019A	FAN-PROPELLER	●				●				
RF036	DA61-00081B	CASE-MOTOR	●				●				
RW394	DA63-00771A	GROMMET-FAN MOTOR	●				●				
RF010	DA63-02567A	COVER-EVAP REAR	●				●				
RI071	DA97-02800A	ASSY-SUPT FRE	●								
	DA97-02800B						●				
RI081	4713-001173	LAMP-INCANDESCENT	●				●				
RS090	DA32-10105S	SENSOR ASSY	●				●				
RI080	DA47-00112H	LAMP HOLDER	●				●				
RI095	DA61-02167A	SUPPORT-FRE L	●				●				
RI096	DA61-02168A	SUPPORT-FRE R	●				●				
RF031	DA63-02522A	COVER LAMP-FRE	●								
	DA63-02569A						●				
RW374	DA63-40006A	GROMMET	●				●				
RM001	DA97-02203E	ASSY ICE MAKER-MECH	●				●				
RM017	DA61-01800A	FIXER-SENSOR	●				●				
RW433	DA61-01805A	GUIDE ICE-FULL	●				●				
RM010	DA61-02183A	SUPPORT-ICE MAKER	●				●				
RI021	DA63-02183A	COVER-SENSOR	●				●				
RM012	DA63-02529A	TRAY ICE	●				●				
RM001	DA97-00258E	ASSY ICE MAKER	●				●				
RM003	DA63-02525A	COVER-ICE MAKER	●				●				

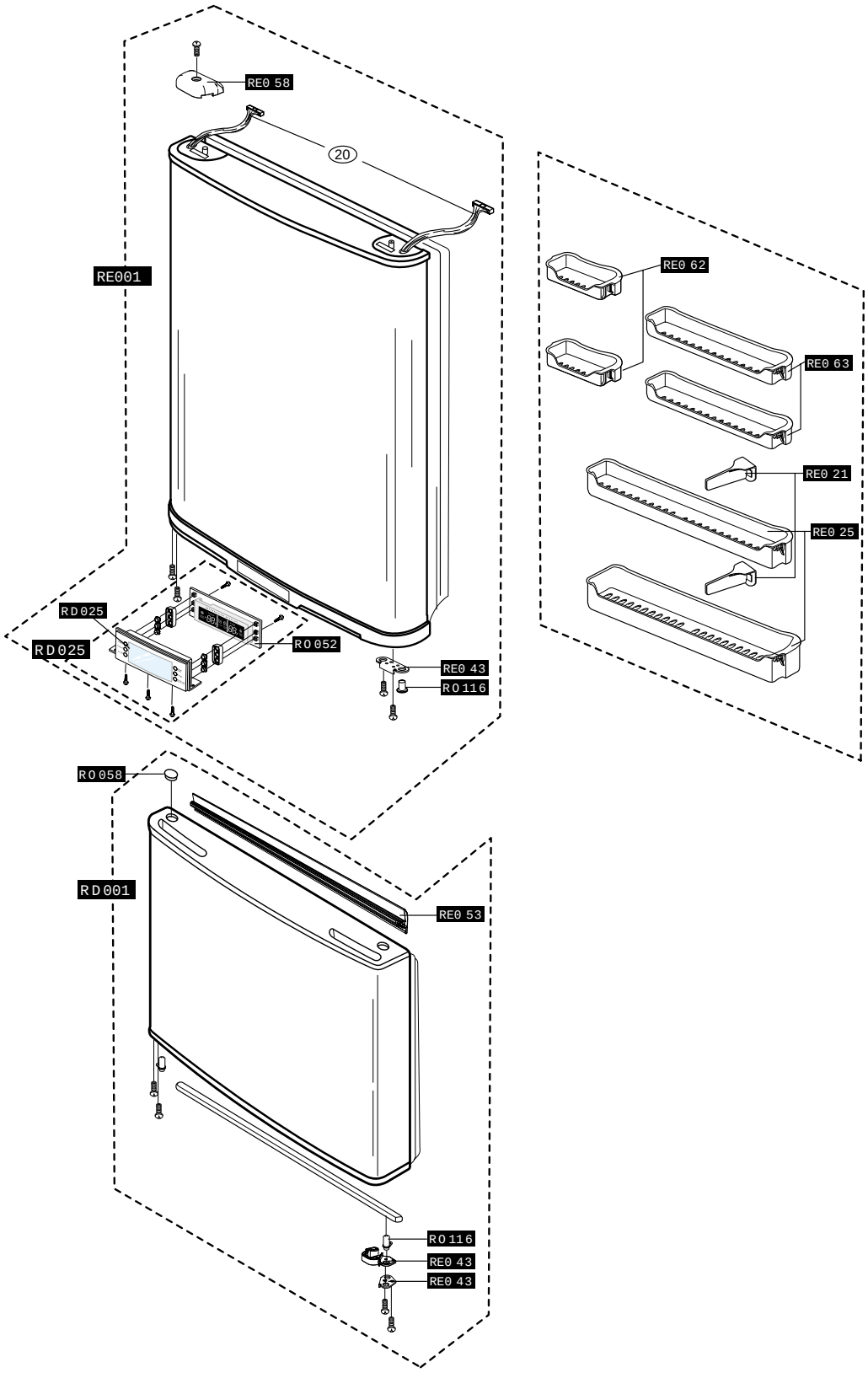
14-2) Fridge


RI074
RS087
RI015
RI081
RI078
RI008
RF037
RW 394
RI008
RF038
RI085
RS091
RW 742
RI041
RI035
RI036
RI021
RW 829
RI018
RI040
RI997
RW 648
RI091
RH 029
RI998
RI998
RI030
RI010
RW 648
RH 029
RI010

■ Parts List of Fridge

NO	CODE-NO	PART NAME	OPTION								SPEC
			RB195BSSB	RB195BSSW	RB195BSVQ	RB195BSBB	RB215BSSB	RB215BSSW	RB215BSVQ	RB215BSBB	
RI081	4713-001197	LAMP-INCANDESCENT	●				●				
RI078	DA63-00925B	COVER-LAMP,REF	●				●				
RI030	DA61-00761B	RAIL-VEG, MID	●								
	DA61-00760B						●				
RW829	DA67-40250E	TRAY-UTILITY	●				●				
RI074	DA47-00095D	THERMO FUSE-ASSY	●				●				
RS087	DA32-00006C	SENSOR ASSY	●				●				
RI018	DA97-00296L	ASSY TRAY-CHILLED ROOM	●								
	DA97-00296M						●				
RI015	DA97-00441B	ASSY DRAIN-PLATE,REF	●				●				
RI008	DA97-00459N	ASSY COVER EVAP-REF	●				●				
RF038	DA31-00003N	MOTOR FAN	●				●				
RI085	DA31-00016A	FAN-CIRCUIT	●				●				
RS091	DA32-10105T	SENSOR ASSY	●				●				
RF037	DA63-00183B	COVER-MOTOR	●				●				
RW394	DA63-00771A	GROMMET-FAN MOTOR	●				●				
RI008	DA63-00932A	COVER-EVAP RE,REF	●				●				
RF005	DA63-00933B	COVER-EVAP FR,FRE	●				●				
RI021	DA63-0093A	COVER-SENSOR	●				●				
RI997	DA97-00663C	ASSY COVER-VEG	●								
	DA97-00663D						●				
RI091	DA64-00449B	TRIM-COVER VEG	●								
	DA64-00448B						●				
RI041	DA97-00664E	ASSY SHELF REF-UPP	●								
	DA97-00664F						●				
RI035	DA61-00368B	RAIL-CHILLED, L	●								
	DA61-00367B						●				
RI036	DA61-00370B	RAIL-CHILLED, R	●								
	DA61-00369B						●				
RW742	DA61-01795B	SUPPORT-CHILLED	●				●				
RI040	DA97-00664G	ASSY SHELF REF-MID	●								
	DA97-00664H						●				
RI998	DA97-00681E	ASSY CASE VEG	●								
	DA97-00681F						●				
RI998	DA61-00759B	CASE-VEG, REF	●								
	DA61-00762B						●				
RI010	DA63-01270B	COVER-VEG REF	●				●				
RW648	DA66-10104A	ROLLER-FRE	●				●				
RH029	DA71-20145A	FIXER-ROLLER	●				●				

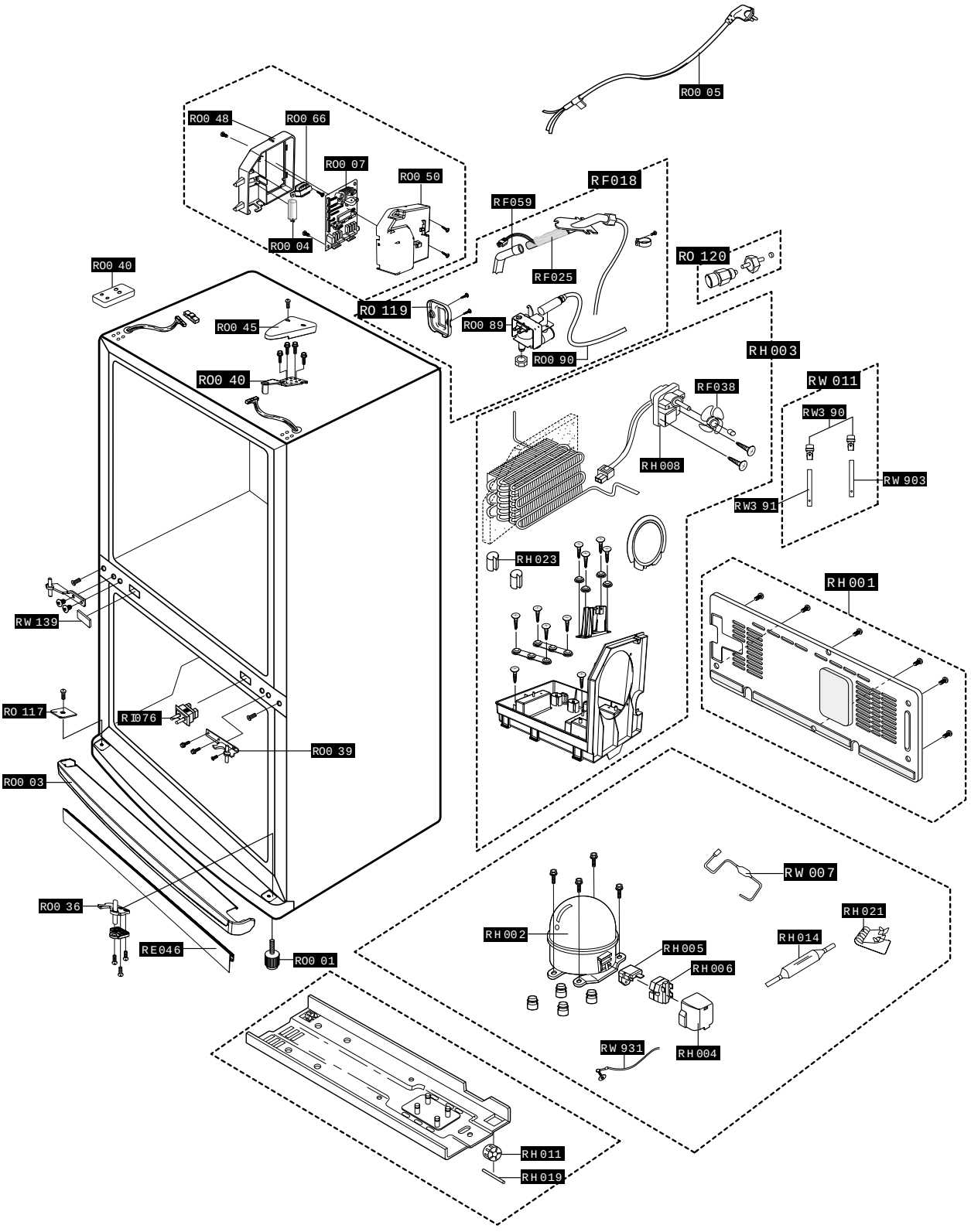
14-3) Door of Refrigerator



■ Parts List of Refrigerator Door

NO	CODE-NO	PART NAME	OPTION								SPEC
			RB195BSSB	RB195BSSW	RB195BSVQ	RB195BSBB	RB215BSSB	RB215BSSW	RB215BSVQ	RB215BSBB	
RE001	DA91-02052A	ASSY DOOR FOAM REF	●				●				
	DA91-02052B			●				●			
	DA90-02052C				●				●		
	DA90-02052D					●				●	
RE043	DA61-02158A	STOPPER-MID	●				●				
RO116	DA63-02516A	GROMMET HINGE	●				●				
RD001	DA91-02051A	ASSY DOOR FOAM FRE	●				●				
	DA91-02051B			●				●			
	DA91-02051C				●				●		
	DA91-02051D					●				●	
RE043	DA61-02157A	STOPPER-DOOR LOW	●				●				
RE043	DA61-02158A	STOPPER-MID	●				●				
RO116	DA63-02516A	GROMMET HINGE	●				●				
RE053	DA63-01052A	GASKET DOOR-SUB,FRE	●				●				
RE021	DA61-00365C	GUIDE BOTTLE	●				●				
RE024	DA63-00926B	GUARD-REF UPP,L	●				●				
RE024	DA63-00927B	GUARD-REF UPP,R	●				●				
RE025	DA63-01263C	GUARD-REF LOW	●				●				
RD025	DA97-02788A	ASSY COVER-CONTROL PANEL	●				●				
	DA97-02788B			●				●			
	DA97-02788C				●				●		
RO052	DA41-00264A	PBA PANEL	●				●				
RD025	DA63-02518A	COVER-CONTROL PANEL	●				●				
	DA63-02518B			●				●			
	DA63-02518C				●				●		
RE058	DA63-02517A	COVER-CAP DOOR REF UPP	●				●				
RO058	DA67-01230A	CAP-HANDLE	●				●				

14-4) Cabinet


RO0 05
RO0 48
RO0 66
RO0 07
RO0 50
RO0 04
RF018
RF059
RF025
RO 120
RO0 40
RO 119
RO0 89
RO0 90
RO0 45
RO0 40
RH003
RW 011
RF038
RW3 90
RH 008
RW 903
RW3 91
RH023
RH001
RW 139
RO 117
RI076
RO0 39
RO0 03
RW 007
RO0 36
RH002
RH005
RH021
RH014
RH006
RE046
RO0 01
RW 931
RH004
RH011
RH019

■ **Parts List of Cabinet**

NO	CODE-NO	PART NAME	OPTION								SPEC
			RB195BSSB	RB195BSSW	RB195BSVQ	RB195BSBB	RB215BSSB	RB215BSSW	RB215BSVQ	RB215BSBB	
RO001	DA61-01051B	FOOT-FRONT	●				●				
RO036	DA61-02162A	HINGE-LOW	●				●				
RE046	DA64-20138B	TRIM-PLATE ABSORBER	●				●				
RO117	DA63-02530B	COVER HINGE-LOW	●			●	●			●	
	DA63-02530A			●				●			
	DA63-02530C				●				●		
RO003	DA63-02531B	COVER LEG-FRONT	●			●	●			●	
	DA63-02531A			●				●			
	DA63-02531C				●				●		
RO044	DA63-02520A	COVER HINGE-UPP L	●			●	●			●	
	DA63-02520B			●				●			
	DA63-02520C				●				●		
RO045	DA63-02521A	COVER HINGE-UPP R	●			●	●			●	
	DA63-02521B			●				●			
	DA63-02521C				●				●		
RW139	DA67-00178A	CAP DOOR-S/W	●				●				
RO040	DA97-02782A	ASSY HINGE UPP	●				●				
RO039	DA97-02783A	ASSY HINGE MID	●				●				
RO090	DA62-00633G	PIPE-WATER LINE	●				●				
RO089	DA62-00930A	VALVE WATER-ONE WAY FITTING	●				●				
RO120	DA99-00240D	ASSY PACKING-SUB	●				●				
RO119	DA97-00979A	ASSY COVER-PIPE WATER	●				●				
RF018	DA97-00209H	ASSY PIPE-WATER	●				●				
RF025	DA63-02469A	GROMMET-PIPE WATER FILL IN	●				●				
RO004	2501-001045	C-OIL	●				●				
RO066	DA26-00022B	TRANS POWER	●				●				
RF038	DA31-00010E	FAN-ASSY	●				●				
RH005	DA34-10003D	RELAY PROTECTOR O/L	●				●				
RI076	DA34-10122D	SWITCH-DOOR	●				●				
RH006	DA35-10013N	RELAY-PTC	●				●				
RW931	DA39-20389E	WIRE HARNESS-EARTH	●				●				
RO007	DA41-00293A	PBA MAIN	●				●				
RO048	DA61-00758A	CASE-PCB PANEL	●				●				
RH021	DA61-01957A	CLIP-DRYER	●				●				
RW903	DA62-20001Q	TUBE PVC	●				●				
RW390	DA63-00951A	GROMMET-DRAIN,HOSE	●				●				
RH004	DA63-01866A	COVER RELAY	●				●				
RO048	DA63-02533A	COVER PCB-PANEL	●				●				
RH023	DA63-40171D	GROMMET-SUCT PIPE	●				●				
RH014	DA73-30102B	DRYER-ASSY	●				●				
RW011	DA97-00278A	ASSY TUBE-DRAIN	●				●				
RW903	DA62-20001Q	TUBE PVC	●				●				
RW391	DA63-00951B	GROMMET-DRAIN,HOSE	●				●				
RH001	DA97-00408D	ASSY COVER-COMP	●				●				
RH019	DA60-90146A	PIN-CASTER	●				●				
RH011	DA61-40126B	CASTER-REAR	●				●				
RW007	DA97-00921A	ASSY PIPE-SUCT	●				●				
RH003	DA97-02792A	ASSY TRAY-DRAIN WATER	●				●				
RH008	DA31-10110G	MOTOR CIRCUIT	●				●				
RH022	DA63-02205A	GROMMET-SUB CONDENSER	●				●				
RH002	MK172CL2U/E08	COMPRESSOR	●				●				

SAFETY PRECAUTIONS FOR AS

- Upon electronic Control system repair/change,make sure the set unplugged.

⇨ Be ware of electric shock.

- Use rated electronic Control equipment.

⇨ Make sure to check out ModeL name,Rated voltage,Rated current,Operation Temp,etc.

- Upon repair,make sure that harnesses are not to be water-penetrated and are bundled tight.

⇨ Should not be detached by a certain amount of external force.

- Upon repair,completely remove dust or other foreign substances from housing,harness, connector,etc.

⇨ To prevent fire by tracking,short,etc.

- Check out whether water has penetrated into the electronic Control system.

⇨ If there is any kind of trace,take necessary measures such as related component change, insulation tapping,etc.

- After repair,check out the assembled state of parts.

⇨ It should be the same as the previous state.

- Check out the surrounding conditions.

⇨ Change the location,if the fridge is located at humid,wet places or the installed state is unstable.

- If needed,ground the fridge.

⇨ Especially,if there is a possibility of electric leakage,ground is indispensable.

- Do not allow consumers to overload a certain outlet.

- Check out whether the power cord or the outlet is broken,squeezed,chopped off or heat-deformed.

⇨ Repair or replace the defective power cord/outlet immediately.

⇨ Make sure the power cord is not punctuated or stomped down.

- Do not allow consumers to keep food unstable or place bottles in the Freezer Room.

- Do not allow consumers to repair the fridge for themselves.

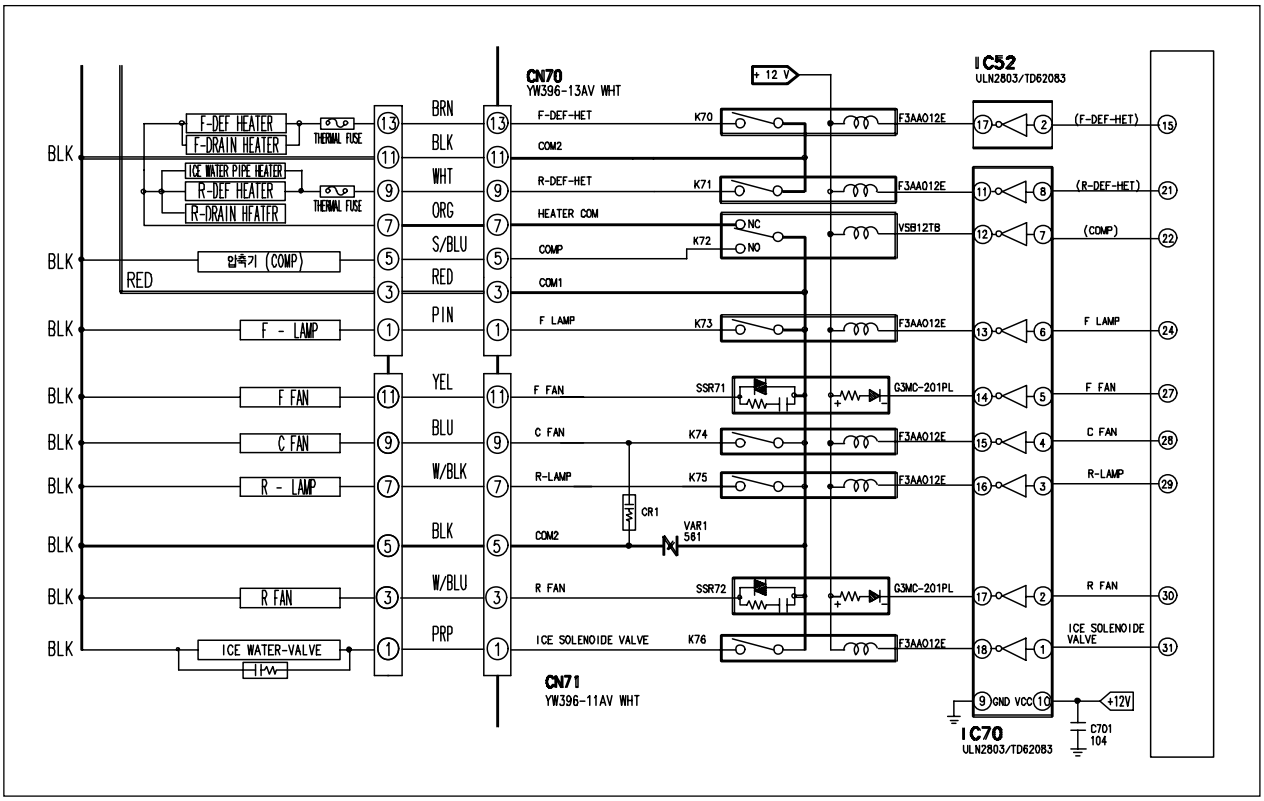
- Do not allow consumers to keep things except for food.

⇨ Pharmaceutical,Chemical substances :These are not possible to be fine-Controlled with a consumer fridge.

⇨ Flammable material (alcohol,benzene,ether,LPG,etc):possibility of explosion.

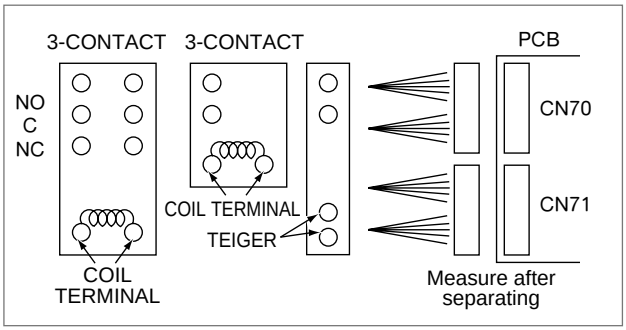
15. REFERENCE

15-1) Reference (Measure Load Terminals)



* Turn off Power, disassemble Housing connected to MAIN PCB CN70,71 and measure followings				
LOAD	MEASURING TERMINALS PCB MAIN	VALUE	DEFECTS	OTHERS
1) F DEFROST HEATER 2) F DRAIN HEATER	CN70 ⑬ & ⑦	0 Ω	THERMAL FUSE,HEATER,WIRE SHORT	VALUE FOR NORMAL HETAER
		∞ Ω	THERMAL FUSE,HEATER,WIRE CUT	
1)R DEFROST HEATER 2)ICE WATER PIPE HEATER	CN71 ⑨ & ⑦	0 Ω	THERMAL FUSE,HEATER,WIRE SHORT	VALUE FOR NORMAL MOTOR
		∞ Ω	THERMAL FUSE,HEATER,WIRE CUT	
ICE WATER VALVE	CN71 ① & ⑤	0 Ω	COIL,WIRE SHORT	VALUE FOR NORMAL MOTOR
		∞ Ω	COIL,WIRE CUT	
F FAN MOTOR	CN71 ⑪ & ⑤	0 Ω	MOTOR,WIRE SHORT MOTOR,WIRE	VALUE FOR NORMAL MOTOR
		∞ Ω	CUT,HOUSING SLIPPED AWAY	
R FAN MOTOR	CN71 ③ & ⑤	0 Ω	MOTOR,WIRE SHORT MOTOR,WIRE	VALUE FOR NORMAL MOTOR
		∞ Ω	CUT,HOUSING SLIPPED AWAY	
COMP. FAN MOTOR	CN71 ⑨ & ⑤	0 Ω	MOTOR,WIRE SHORT MOTOR,WIRE	VALUE FOR NORMAL MOTOR
		∞ Ω	CUT,HOUSING SLIPPED AWAY	
R LAMP	CN71 ⑦ & ⑤	0 Ω	LAMP,WIRE SHORT LAMP,WIRE	VALUE FOR NORMAL MOTOR
		∞ Ω	CUT,HOUSING/LAMP SLIPPED AWAY	
F LAMP	CN70 ① & ⑪	0 Ω	LAMP,WIRE SHORT LAMP,WIRE	VALUE FOR NORMAL MOTOR
		∞ Ω	CUT,HOUSING/LAMP SLIPPED AWAY	

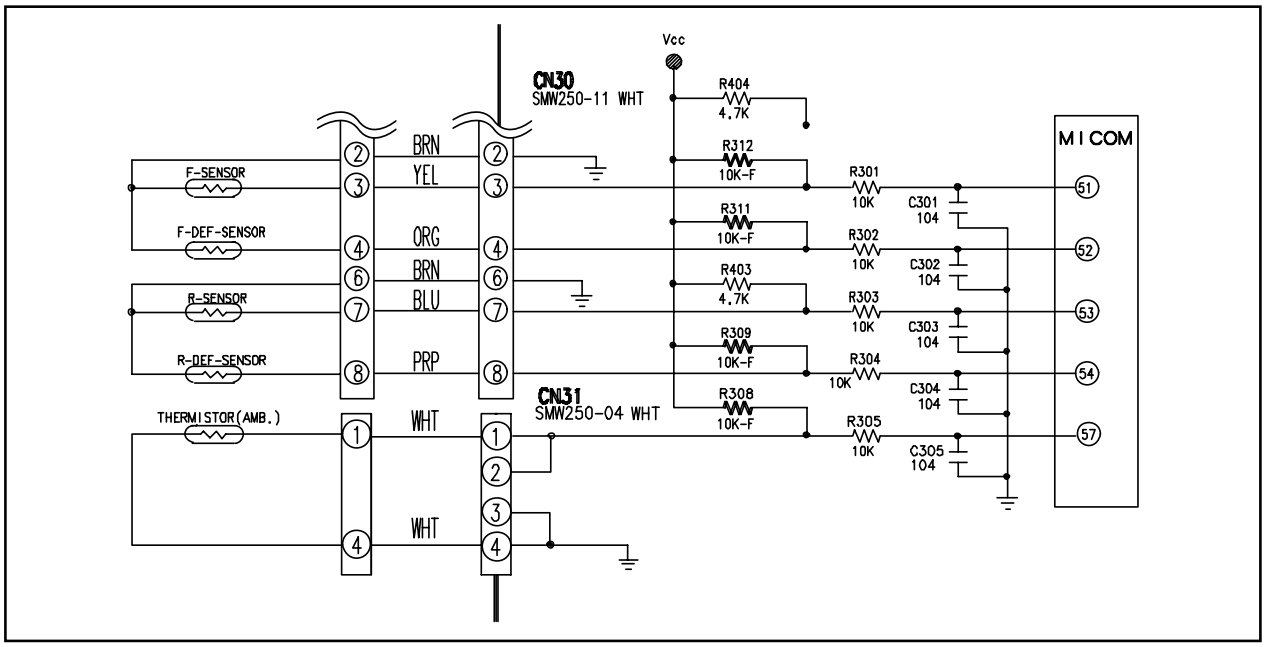
* Turn on Power and check status of Relay &Driving Circuit by checking followings according to load operation .



Note) NC →NORMAL CLOSE
(C-TERMINAL & ON-TERMINAL)
NO →NORMAL OPEN
(C-TERMINAL & OPEN-TERMINAL)
C →COMMON TERMINAL

OPERATION	RELAY	TERMINALS	VALUE	WHEN IT IS DIFFERENT FROM MEASURED VALUE
R,F DEFROST & COMP OFF	K70	CN70 ⑪-⑬	SUPPLY VOLTAGE (SV)	K70 CONTACT SHORT,FAULTY DRIVING CIRCUIT
	K71	CN70 ⑪-⑨	SV	K71 CONTACT SHORT,FAULTY DRIVING CIRCUIT
	K72	CN70 ⑤-③	SV	K72 NO CONTACT SHORT,FAULTY DRIVING CIRCUIT
COMP ON	K70	CN70 ⑪-⑬	5~30V	FAULTY K70 OR K72 NC CONTACT SHORT,FAULTY DRIVING CIRCUIT
	K71	CN70 ⑪-⑨	5~30V	FAULTY K71 OR K72 NC CONTACT SHORT,FAULTY DRIVING CIRCUIT
	K72	CN70 ⑤-③	0V	K72 NO CONTACT OPEN,FAULTY DRIVING CIRCUIT
R DEFROST ON	K71	CN70 ⑪-⑬	0V	FAULTY K71,K72 NC CONTACT OPEN,FAULTY DRIVING CIRCUIT
	K72	CN70 ⑪-⑨	SV	K72 NO CONTACT SHORT,FAULTY DRIVING CIRCUIT
F DEFROST ON	K70	CN70 ⑤-③	0V	K70 CONTACT SHORT,FAULTY DRIVING CIRCUIT
	K72	CN71 ⑬-⑨	SV	K72 NO CONTACT SHORT,FAULTY DRIVING CIRCUIT
F FAN ON R FAN	SSR71	CN71 ⑪-CN70 ③	0V	SSR71 OPEN,FAULTY DRIVING CIRCUIT
ON C FAN ON	SSR72	CN71 ③-CN70 ③	0V	SSR72 OPEN,FAULTY DRIVING CIRCUIT
ICE WATER	K74	CN71 ⑨-CN70 ③	0V	K74 NO CONTACT OPEN,,FAULTY DRIVING CIRCUIT
VALVE ON R	K76	CN71 ①-CN70 ③	0V	K76 NO CONTACT SHORT,FAULTY DRIVING CIRCUIT
LAMP ON	K75	CN70 ①-③	0V	K75 NO CONTACT OPEN,FAULTY DRIVING CIRCUIT(DOOR SWITCH)
F LAMP ON	K73	CN71 ⑦-CN70 ③	0V	K73 NO CONTACT SHORT,FAULTY DRIVING CIRCUIT(DOOR SWITCH)

15-2) Reference (Measure Sensor Terminals)



* Check after disassembling connected to MAIN PCB CN30&CN32

* Because it is NTC TYPE Sensor,risistance decreases as temp increases

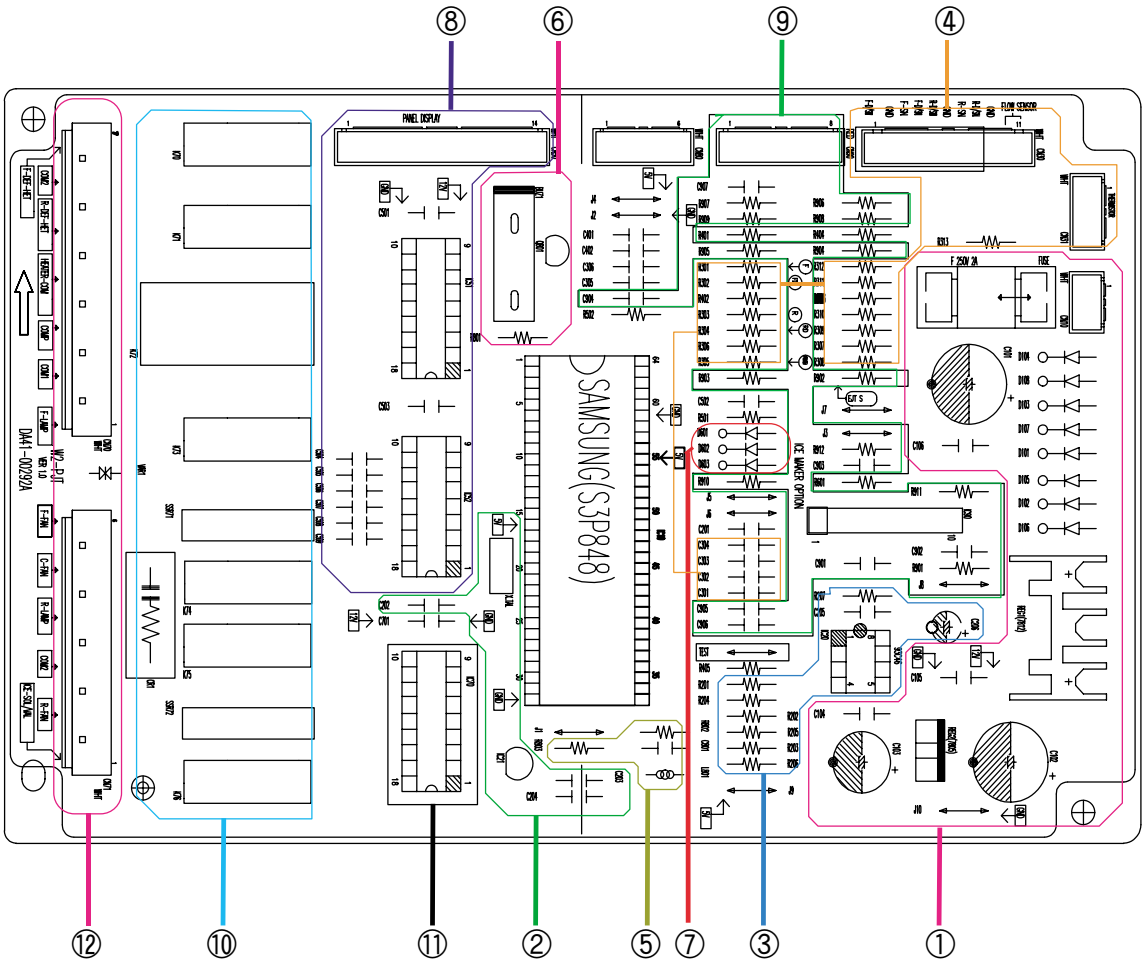
1. Measure resistance between CN30 ⑦ and ⑥ for R-Sensor.
2. Measure resistance between CN30 ② and ③ for F-Sensor.
3. Measure resistance between CN30 ⑧ and ⑥ for R Defrost Sensor.
4. Measure resistance between CN30 ② and ④ for F Defrost Sensor.
5. Measure resistance between CN31 ① and ④ for Ambient Sensor.
6. Compare the above values with current temps of Sensor locations (21.Temp Sensing Circuit Table)and Part Spec in Manual and evaluate them.

15-3) Others (Measure Load Terminals)

NO	ITEM	SPEC	CODE NO	REMARK
1	PBA MAIN	05 W2 PBA MAIN	DA41-00293A	
2	PBA PANEL	05 W2 PBA PANEL,BLUE	DA41-00264A	
3	TRANS DC	115V/60Hz	DA26-00022B	
		220V/50,60Hz	DA26-00022C	
		127V/60Hz	DA26-00022D	
		230V/60Hz	DA26-00022E	
4	SENSOR	F DEFROST SENSOR	DA32-00006C	
		R DEFROST SENSOR	DA32-00006C	
		F SENSOR	DA32-10105S	
		R SENSOR	DA32-10105T	
		AMBIENT SENSOR	DA32-00011L	

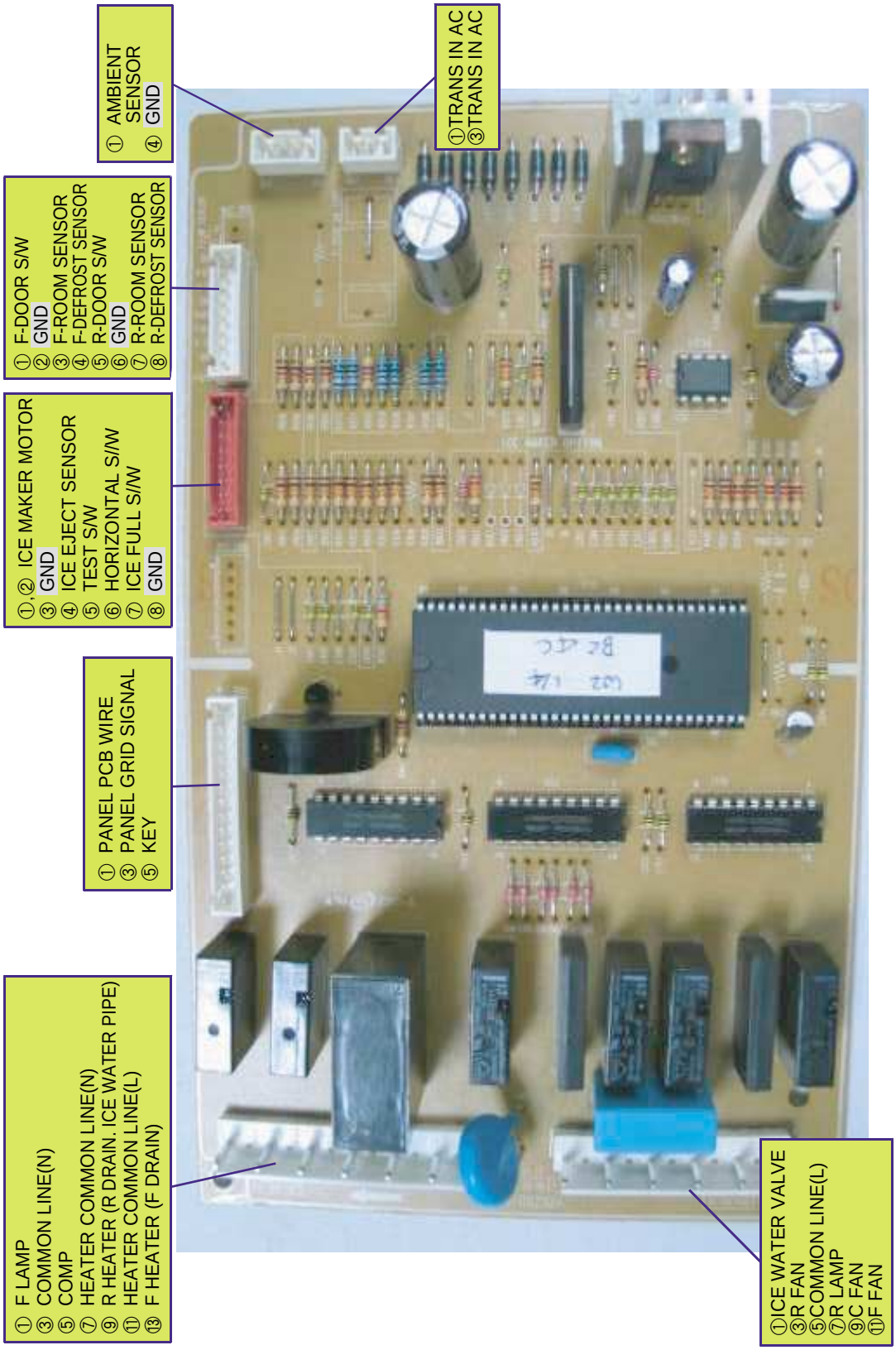
- The second part (DA41-XXXXX?)of CODE for MAIN PCB ASS'Y PART may change according to MICOM or Option change,so check it when asking for parts.

16. PCB DIAGRAM

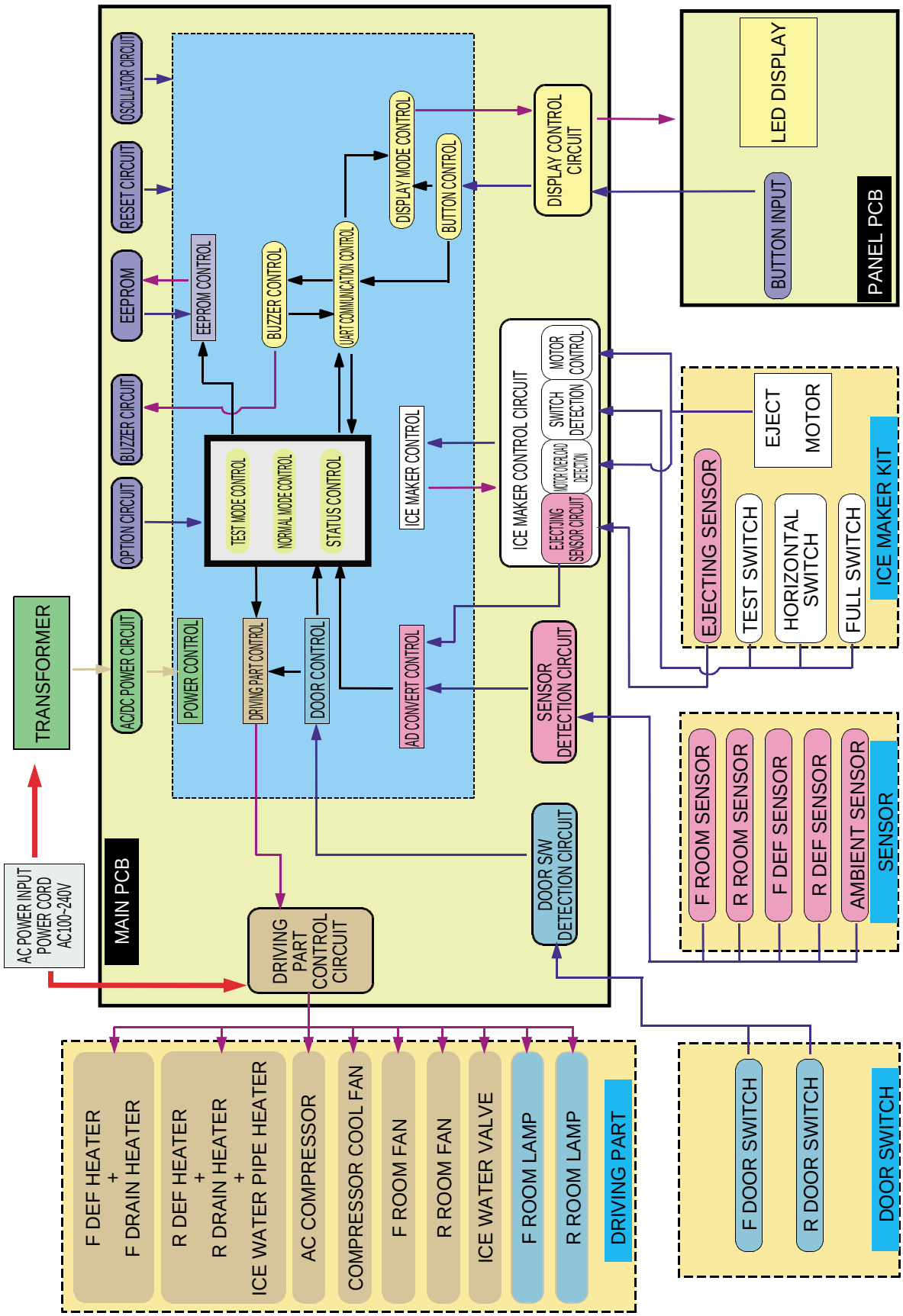


1. AC is input via Connector CN10 and DC12V,5V and GND are supplied via Regulator.
2. Oscillator generating clocks required for the MICOM program control &Reset circuit initializing programs upon power on/off.
3. EEPROM:It stores data.
4. It receives various sensor signals such as F/R Door S/W On/Off and sends them to MICOM after filtering their noises.
5. PLC (Power Line Communication)Circuit
6. Buzzer Circuit
7. Circuit for model classifying options
8. It is the display driving part controlling the LEDs and the button signals.
9. It carries out the Ice Maker operation,supplies power to the motor and detects the S/W on/off.
10. It is Relay controlling AC load and operates by receiving drive signals through IC ⑪.
11. Relay Driver IC
12. AC connector

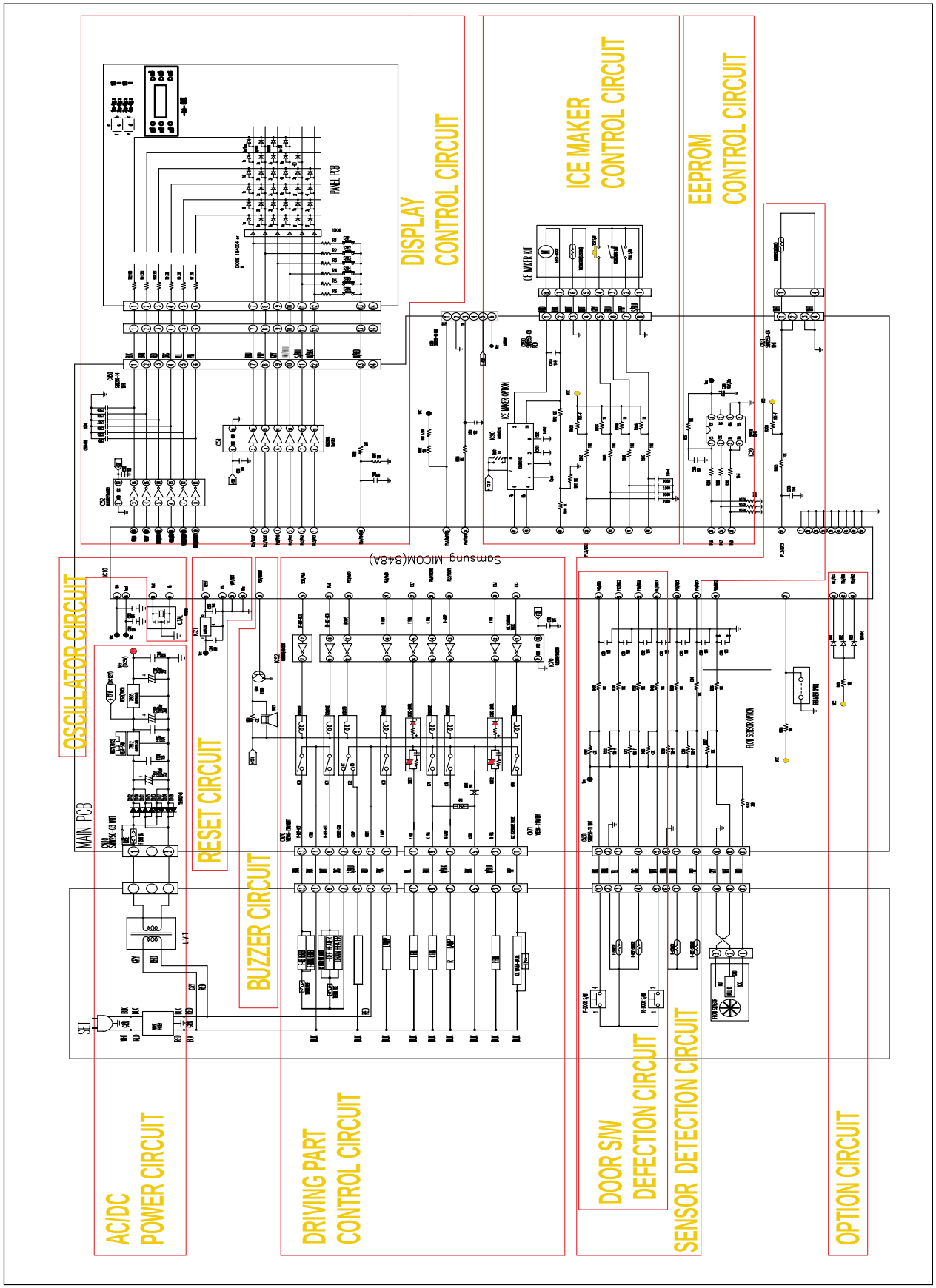
17. CONNECTOR ARRANGEMENT&DESCRIPTIONS



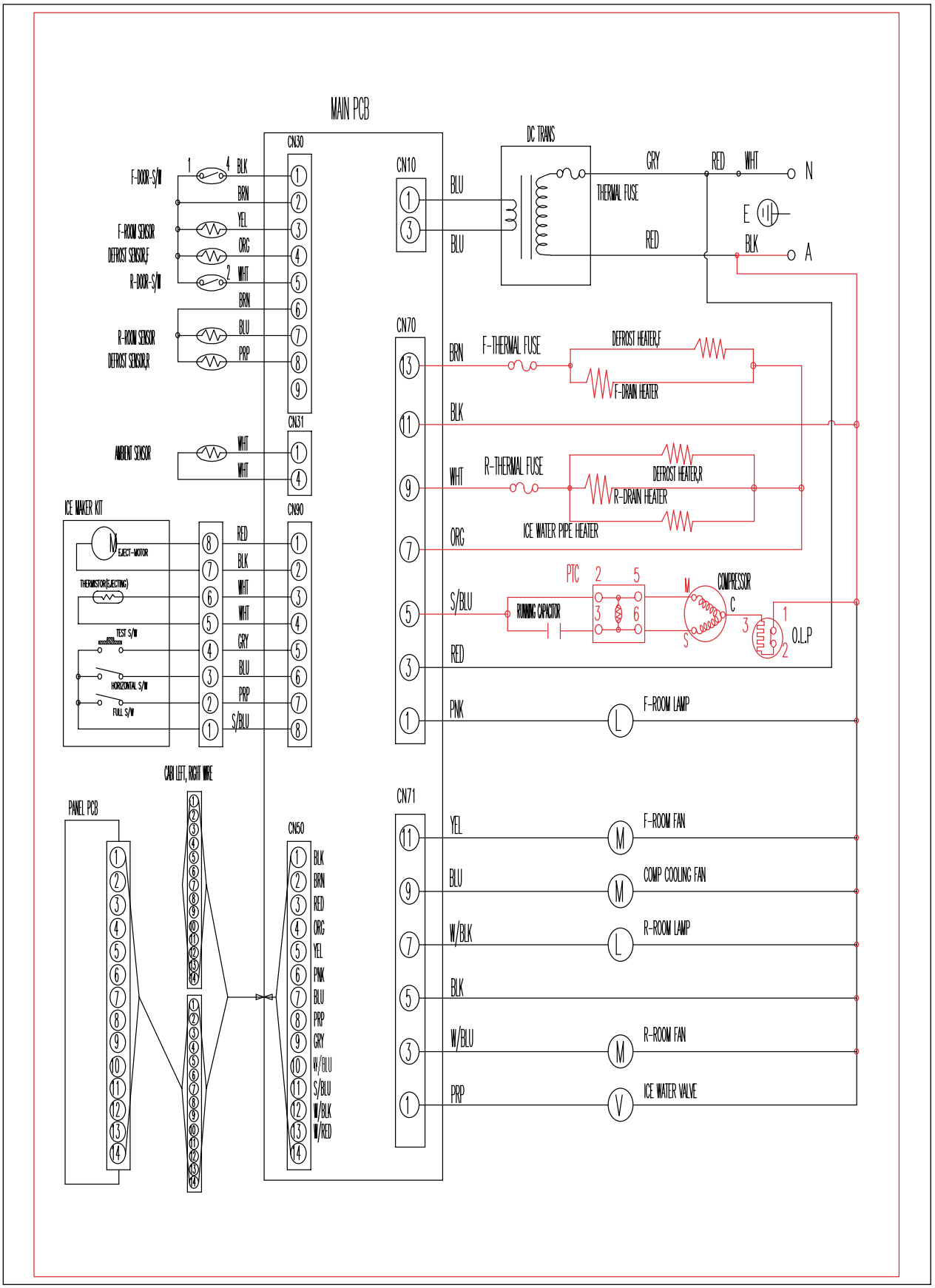
18. BLOCK DIAGRAM



19. CIRCUIT DIAGRAM



20. WIRING SCHEMATIC



21. Temp to Resistance of Sensor &MICOM PORT Voltage

-

Sensor CHIP:PX41C Standard

℃	℉	V	Ω	℃	℉	V	Ω	℃	℉	V	Ω
-50	-58	4.694	153319	-5	23	3.107	16419	40	104	1.153	2997
-49	-56.2	4.677	144794	-4	24.8	3.057	15731	41	105.8	1.124	2899
-48	-54.4	4.659	136798	-3	26.6	3.006	15076	42	107.6	1.095	2805
-47	-52.6	4.641	129294	-2	28.4	2.955	14452	43	109.4	1.068	2714
-46	-50.8	4.622	122248	-1	30.2	2.904	13857	44	111.2	1.040	2627
-45	-49	4.602	115631	0	32	2.853	13290	45	113	1.014	2543
-44	-47.2	4.581	109413	1	33.8	2.802	12749	46	114.8	0.988	2462
-43	-45.4	4.560	103569	2	35.6	2.751	12233	47	116.6	0.963	2384
-42	-43.6	4.537	98073	3	37.4	2.700	11741	48	118.4	0.938	2309
-41	-41.8	4.514	92903	4	39.2	2.649	11271	49	120.2	0.914	2237
-40	-40	4.490	88037	5	41	2.599	10823	50	122	0.891	2167
-39	-38.2	4.465	83456	6	42.8	2.548	10395	51	123.8	0.868	2100
-38	-36.4	4.439	79142	7	44.6	2.498	9986	52	125.6	0.846	2036
-37	-34.6	4.412	75077	8	46.4	2.449	9596	53	127.4	0.824	1973
-36	-32.8	4.385	71246	9	48.2	2.399	9223	54	129.2	0.803	1913
-35	-31	4.356	67634	10	50	2.350	8867	55	131	0.783	1855
-34	-29.2	4.326	64227	11	51.8	2.301	8526	56	132.8	0.762	1799
-33	-27.4	4.296	61012	12	53.6	2.253	8200	57	134.6	0.743	1745
-32	-25.6	4.264	57977	13	55.4	2.205	7888	58	136.4	0.724	1693
-31	-23.8	4.232	55112	14	57.2	2.158	7590	59	138.2	0.706	1642
-30	-22	4.199	52406	15	59	2.111	7305	60	140	0.688	1594
-29	-20.2	4.165	49848	16	60.8	2.064	7032	61	141.8	0.670	1547
-28	-18.4	4.129	47431	17	62.6	2.019	6771	62	143.6	0.653	1502
-27	-16.6	4.093	45146	18	64.4	1.974	6521	63	145.4	0.636	1458
-26	-14.8	4.056	42984	19	66.2	1.929	6281	64	147.2	0.620	1416
-25	-13	4.018	40938	20	68	1.885	6052	65	149	0.604	1375
-24	-11.2	3.980	39002	21	69.8	1.842	5832	66	150.8	0.589	1335
-23	-9.4	3.940	37169	22	71.6	1.799	5621	67	152.6	0.574	1297
-22	-7.6	3.899	35433	23	73.4	1.757	5419	68	154.4	0.560	1260
-21	-5.8	3.858	33788	24	75.2	1.716	5225	69	156.2	0.546	1225
-20	-4	3.816	32230	25	77	1.675	5039	70	158	0.532	1190
-19	-2.2	3.773	30752	26	78.8	1.636	4861	71	159.8	0.519	1157
-18	-0.4	3.729	29350	27	80.6	1.596	4690	72	161.6	0.506	1125
-17	1.4	3.685	28021	28	82.4	1.558	4526	73	163.4	0.493	1093
-16	3.2	3.640	26760	29	84.2	1.520	4369	74	165.2	0.481	1063
-15	5	3.594	25562	30	86	1.483	4218	75	167	0.469	1034
-14	6.8	3.548	24425	31	87.8	1.447	4072	76	168.8	0.457	1006
-13	8.6	3.501	23345	32	89.6	1.412	3933	77	170.6	0.446	978
-12	10.4	3.453	22320	33	91.4	1.377	3799	78	172.4	0.435	952
-11	12.2	3.405	21345	34	93.2	1.343	3670	79	174.2	0.424	926
-10	14	3.356	20418	35	95	1.309	3547	80	176	0.414	902
-9	15.8	3.307	19537	36	96.8	1.277	3428	81	177.8	0.404	877
-8	17.6	3.258	18698	37	98.6	1.253	3344	82	179.6	0.394	854
-7	19.4	3.208	17901	38	100.4	1.213	3204	83	181.4	0.384	832
-6	21.2	3.158	17142	39	102.2	1.183	3098	84	183.2	0.375	810

272, Oseon-Dong, Kwangsan-Gu,
Kwangju-City, Korea, 506-253
TEL : 82-62-950-6810, 6811
FAX : 82-62-950-6829

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