REFRIGERATOR

FRENCH DOOR REFRIGERATOR
BOTTOM MOUNTED FREEZER TYPE

BASIC : RF221*/RF220*/RL225*/RL220*

MODEL NAME :			
RF221NCTASR	RF221NCTASP	RF221NCTABC	RF221NCTAWW
RF221NCTASL	RF220NCTASR	RF220NCTASP	RF220NCTABC
RF220NCTAWW	RF220NCTASL	RL225NCTASR	RL225NCTASP
RL225NCTABC	RL225NCTAWW	RL220NCTASR	RL220NCTASP
RL220NCTABC	RL220NCTAWW	RL220NCTASL	

MODEL CODE :			
RF221NCTASR/AA	RF221NCTASP/AA	RF221NCTABC/AA	RF221NCTAWW/AA
RF221NCTASL/AA	RF220NCTASR/AA	RF220NCTASP/AA	RF220NCTABC/AA
RF220NCTAWW/AA	RF220NCTASL/AA	RL225NCTASR/AA	RL225NCTASP/AA
RL225NCTABC/AA	RL225NCTAWW/AA	RL220NCTASR/AA	RL220NCTASP/AA
RL220NCTABC/AA	RL220NCTAWW/AA	RL220NCTASL/AA	

SERVICE *Manual*

REFRIGERATOR

RL225N*/RL220N*

RF221N*/RF220N*

CONTENTS

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

Contents

1. PRECAUTIONS (SAFETY WARNINGS)

- Unplug the appliance before replacing or repairing electrical parts.
  ···› Be careful to avoid electric shock.

- Always use only the correct replacement parts.
  ···› Check the model, rated voltage, rated current and running temperature rating.

- When troubleshooting, verify that wiring harnesses are connected securely.
  ···› Make sure the connectors are not separated when power is supplied.

- Check for visible traces of water on electrical parts.
  ···› Replace or secure any part that may have come in contact with water.

- Check the status of parts after replacement or troubleshooting.
  ···› All parts must be reinstalled properly.

- Check the location where the refrigerator will be used.
  ···› If the refrigerator will be used in a damp or wet space, or if installation will be unstable, the unit should be relocated.

- The refrigerator must be grounded properly.
  ···› An earth ground should be used if there is a risk of high humidity or wetness.

- The refrigerator should be plugged into a dedicated outlet.
  Make sure the power cord is not damaged, crushed, squeezed or burned.

- If the plug is damaged it should be replaced.
  If the socket is damaged, it should not be used.

- Consumers must not try to repair the refrigerator.

- Nothing should be stored in the refrigerator except food.
  ···› Drugs requiring precise temperatures should not be stored in the refrigerator.
  ···› Flammable substances (alcohol, benzene, ether, LP gas, etc.) carry risk of explosion and should not be stored in the refrigerator.

PRECAUTIONS (SAFETY WARNINGS)

Read all instructions before repairing the product and follow the instructions in order to prevent danger or property damage.
Plug out and remove all the items in regrigerator prior to repair.

CAUTION/WARNING SYMBOLS DISPLAYED

Warning	Indicates that a danger of death or serious injury exists.
Caution	Indicates that a risk of personal injury or material damage exists.

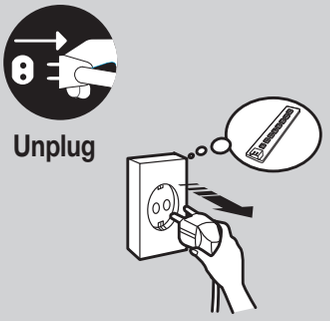
SYMBOLS

means "Prohibited".
means "Do not disassemble".
means "No contact".
means "Warning or Caution".
means "Unplug the unit before preforming service"
means "Earth or Ground".

Warning & Caution

Unplug to exchange the interior lamp.

- ***It may cause electric shock.***



Use the rated components on the replacement.

- ***Check the correct model, rated voltage, rated current, operating temperature and so on.***

On repair, make sure that the all wiring harnesses are reconnected.

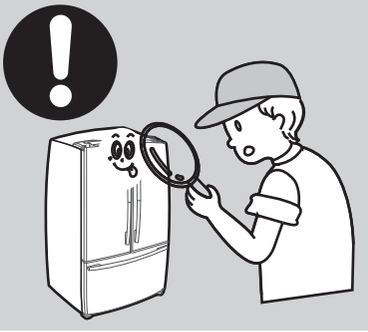
- ***Wiring harnesses should be connected tightly and kept dry.***
- ***Bundle tightly wires in order not to be detached by the external force and then not to be wetted.***

On repair, Make sure that all parts and wires are free of dust and debris.

- ***Cleaning parts could help prevent fire or shorting.***

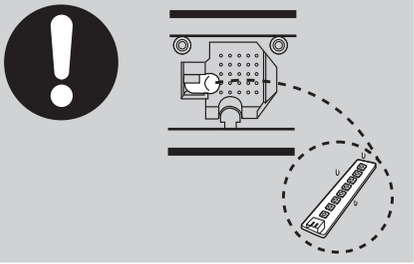
Check the status of parts after replacement or troubleshooting.

- ***All parts must be reinstalled properly.***



Check for visible traces of water on electrical parts.

- ***Replace or secure any part that may have come in contact with water.***



PRECAUTIONS (SAFETY WARNINGS)

❊ ***Please let users know following warnings & cautions in detail.***

Warning & Caution

Customers should not store glass bottles of liquid in the freezer section.

- ***Frozen bottles could explode and cause injury.***

Customers should not store narrow or long bottles or food in a small door shelf.

- ***These items could fall when the door is opened, causing injury tot he customer.***

Drugs requiring precise temperatures should not be stored in the refrigerator.

The refrigerator should be plugged into a dedicated outlet.

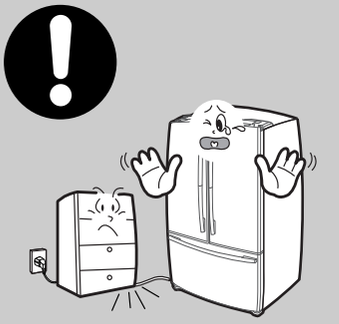
- ***Multiple plugs in the outlet could cause excessive heat or fire.***

Consumers must not try to repair the refrigerator.

- ***Electrical and mechanical parts could injure the consumer.***

Make sure the power cord is not damaged or crushed.

- ***A damaged cord could cause excessive heat or fire.***

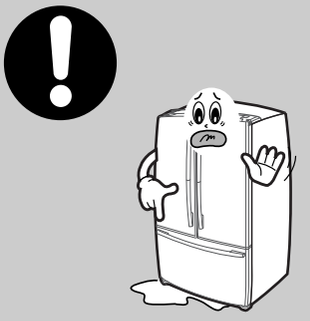


Customers should not store articles on the product.

- ***Opening or closing the door may cause things to fall down, which may cause injury.***

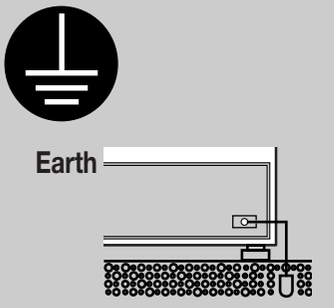
Check the location where the refrigerator will be used.

- ***If the refrigerator will be used in a damp or wet space, or if installation will be unstable, the unit should be relocated.***



The refrigerator must be grounded properly.

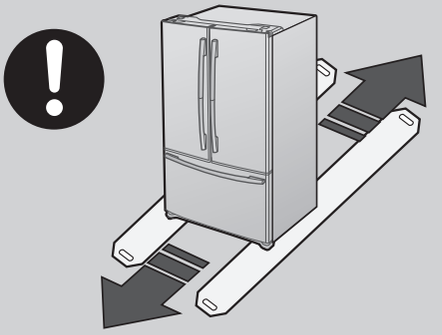
- ***An earth ground should be used if there is a risk of high humidity or wetness.***



PRECAUTIONS (SAFETY WARNINGS)

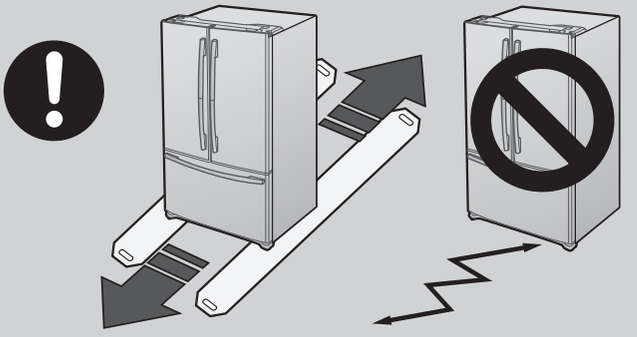
FLOORING

For proper installation, this refrigerator must be placed on a level surface of hard material that is the same height as the rest of the flooring. This surface should be strong enough to support a fully loaded refrigerator, or approximately 286.6 lbs (130 kg).



MOVING

Protect the finish of the flooring. Cut a large section of the cardboard carton and place under the refrigerator where you are working. When moving, be sure to pull the unit straight out and push back in straight.



2. PRODUCT SPECIFICATIONS

PRODUCT SPECIFICATIONS

2–1) Specifications

ELECTRICAL SPECIFICATIONS

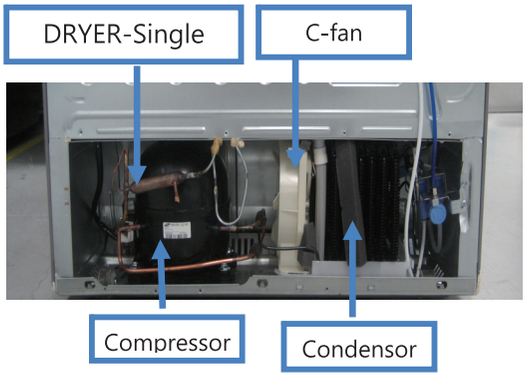
Defrost Control ····· From 12 to 30hrs(comp. run time)
Thermo Bimetal Protector·····140°F(60°C)(off) 104°F(40°C)(on)
Defrost Thermistor(502AT) ····· 50°F(10°C)(off)
Electrical Rating ····· AC115V 60Hz 11.6 Amps
Maximum Current Leakage ····· 0.25 mA
Maximum Ground Path Resistance ····· 0.1 Ohm

NO LOAD PERFORMANCE

Refrigerator,°F ····· 44°F(7°C) ~ 34°F(1°C)
Freezer,°F ····· 5°F(-15°C) ~ -8°F(-23°C)
Run Time,% ····· < 40 ····· < 80

REFRIGERATION SYSTEM

Refrigerant Charge (R134a)····· 4.94oz(140g)
Compressor(MKV172C-L2J)·····1314 Btu/hr(0.385kw)
Compressor oil ····· Freol 5 ∝ 15c
R Capillary tube(Dia, Length) ····· 0.030 " x 138 " (0.75 mm x 3,500 mm)

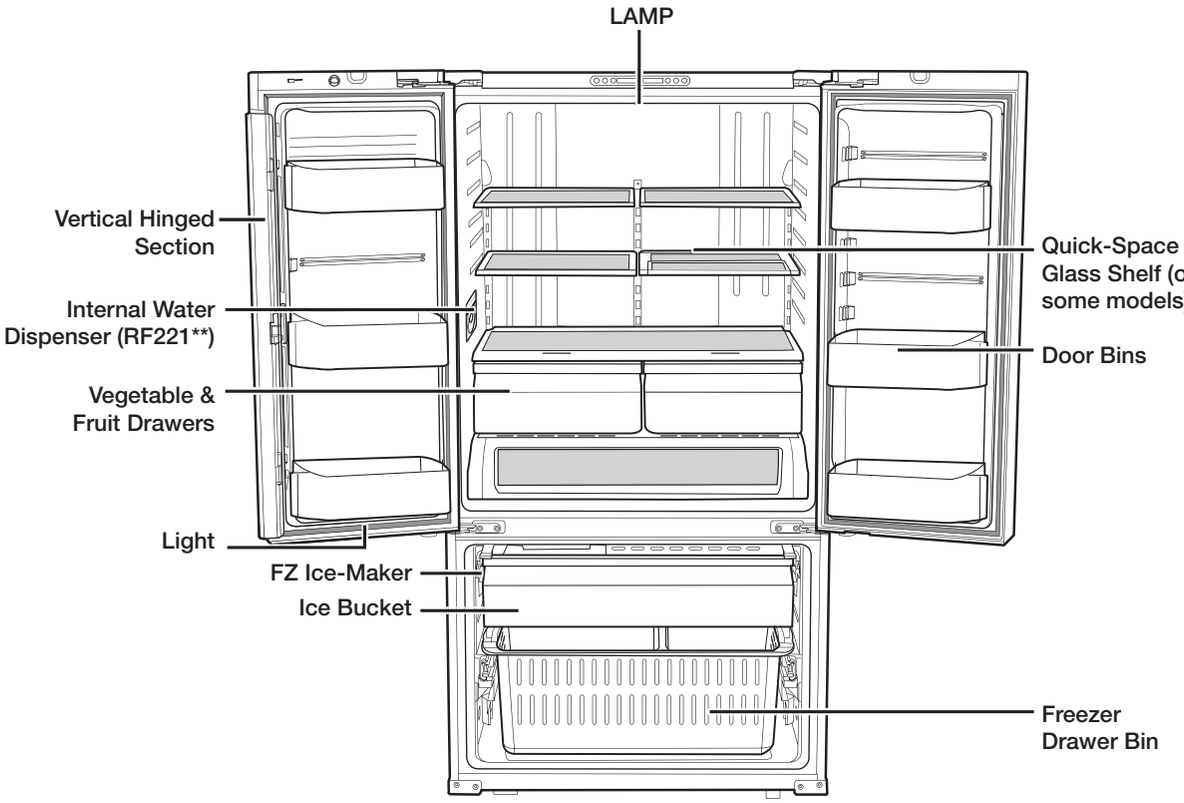


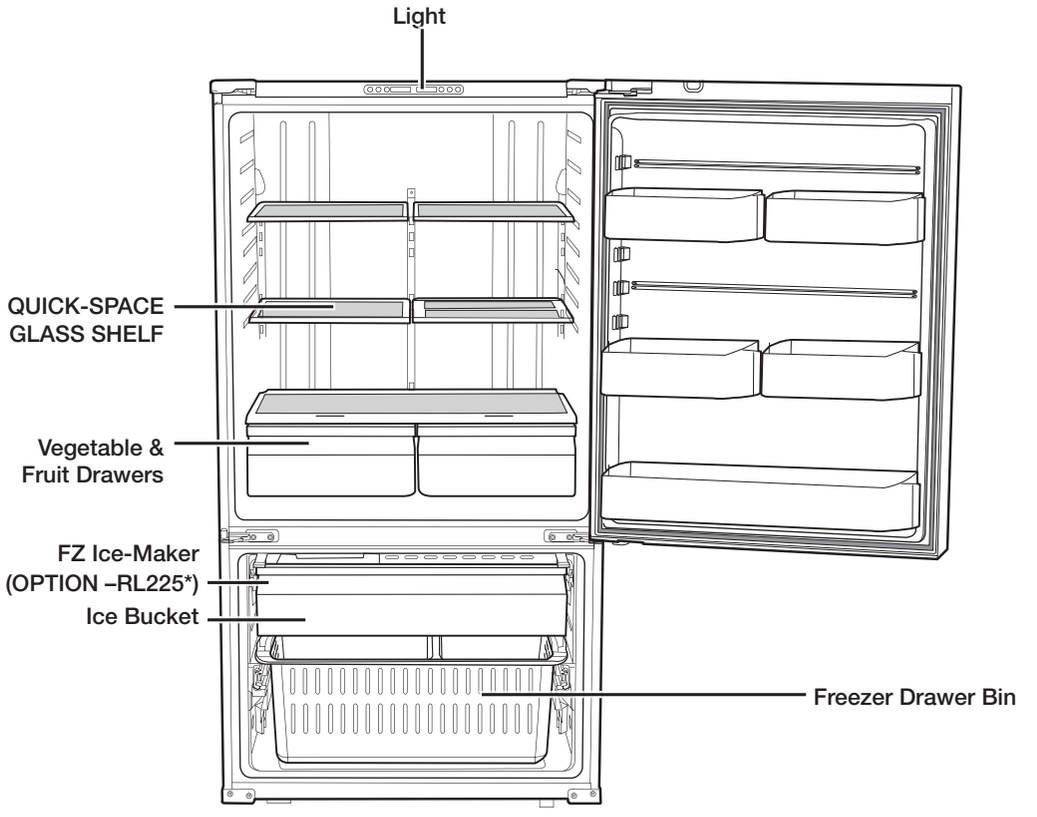
INSTALLATION

Clearance must be provided for air circulation.
AT TOP····· 1"**(25mm)**
AT SIDES····· 1"**(25mm)**
AT REAR····· 2"**(50mm)**

PRODUCT SPECIFICATIONS

2–2) Interior Views





PRODUCT SPECIFICATIONS

ITEM			RF221	RF220	RL225	RL220
	Model		PANTRY, DISPENSER, AUTO ICE MAKER	PANTRY, AUTO ICE MAKER	AUTO ICE MAKER	BASIC
	IMAGE					
External size	W		29 3/4" (756mm)	29 3/4" (756mm)	29 3/4" (756mm)	29 3/4" (756mm)
	D	On Cabinet	30 1/2" (774mm)	30 1/2" (774mm)	30 1/2" (774mm)	30 1/2" (774mm)
		W/O Handle	34 1/4" (872mm)	34 1/4" (872mm)	34 1/4" (872mm)	34 1/4" (872mm)
		With Handle	36 3/4" (934mm)	36 3/4" (934mm)	36 3/4" (934mm)	36 3/4" (934mm)
	H	W/O Hinge Cap	66 3/8" (1686mm)	66 3/8" (1686mm)	66 3/8" (1686mm)	66 3/8" (1686mm)
		With Hinge Cap	66 3/4" (1697mm)	66 3/4" (1697mm)	66 3/4" (1697mm)	66 3/4" (1697mm)
Net Capacity	Total		21.85	21.85	22.05	22.05
	Freezer		6.82	6.82	6.82	6.82
	Refrigerator		15.03	15.03	15.23	15.23
Efficiency of Volume			53.35%	53.35%	53.35%	53.35%
Compressor			RECIPROCATE	RECIPROCATE	RECIPROCATE	RECIPROCATE
Rated Voltage And Frequency			AC 115V/60Hz	AC 115V/60Hz	AC 115V/60Hz	AC 115V/60Hz
Refrigerant			R134a	R134a	R134a	R134a
Foaming Agent			C-PENTANE	C-PENTANE	C-PENTANE	C-PENTANE
Refrigerant Input Amount			4.94oz(140g)	4.94oz(140g)	4.94oz(140g)	4.94oz(140g)
Type Refrigerator			INDIRECT COOLING METHOD REFRIGERATOR	INDIRECT COOLING METHOD REFRIGERATOR	INDIRECT COOLING METHOD REFRIGERATOR	INDIRECT COOLING METHOD REFRIGERATOR
Comp Rated Consumption Power			120W	120W	120W	120W
Electric Heater Rated Consumption Power			212W	212W	212W	212W

PRODUCT SPECIFICATIONS

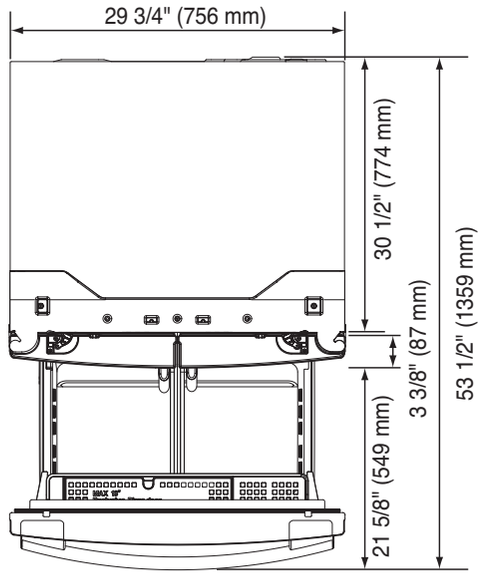
Items				Specification	
Model				RF22*	RL22*
Components for Freezer	Compressor		Model	MKV172CL2J	
			Starting type	INVERTER	
			Oil Charge	FREOL – 15	
	Evaporator		Freezer	SPLIT FIN TYPE	
	Condenser			Forced and natural convection type	
	Dryer			Molecular sieve XH–9	
	Capillary tube (Dia x Length)			0.030 ” x 138 ” (0.75 mm x 3,500 mm)	
	Refrigerant			R134a	
Room Temperature Sensor Components	Freezer	Model	Temperature Selection	ON (°F)	OFF (°F)
		THERMISTOR (F–SENSOR) 502AT	–9°F (–23°C)	–6°F (–21°C)	–13°F (–25°C)
			–1°F (–18.5°C)	2°F (–16.5°C)	–5°F (–20.5°C)
			5°F (–15°C)	9°F (–13°C)	1°F (–17°C)
	Refrigerator	Model	Temperature Selection	ON (°F)	OFF (°F)
		THERMISTOR (R–SENSOR) 502AT	35°F (1.5°C)	40°F (4.5°C)	29°F (–1.5°C)
			37°F (3°C)	43°F (6°C)	32°F (0°C)
			43°F (6°C)	48°F (9°C)	37°F (3°C)
Defrost Related Components	Defrost Cycle	First Defrost Cycle (Concurrent defrost of F and R)		6hr ± 46min	
		Defrost Cycle (FRE)		12~23hr(vary according to the conditions used)	
		Pause Time		12 ± 1min	
	Defrost Sensor	F Defrost–Sensor	Model	THERMISTOR (502AT)	
			SPEC	5.0 kΩ at 77°F (25°C)	
	Bimetal	F Bimetal–thermo Protector	Rated	AC 125V 10A / AC 250V 3A	
			Operating temperature	Off : 140°F (60°C) / On : 104°F (40°C)	

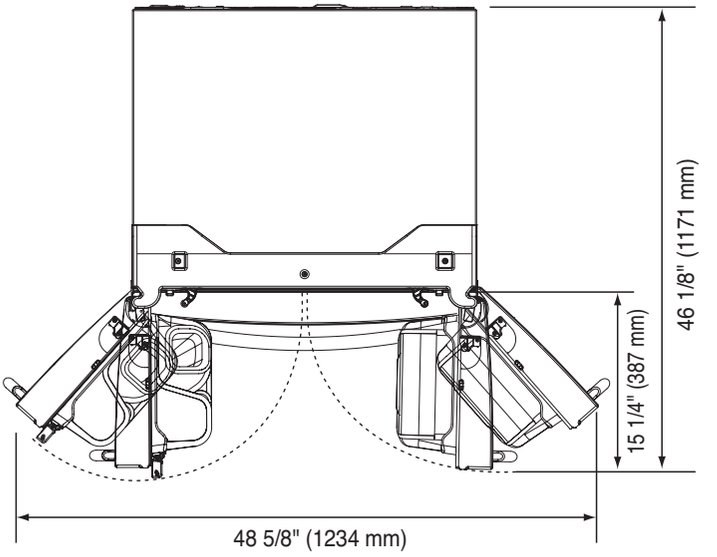
PRODUCT SPECIFICATIONS

Items			Specification			
Model			RF221*	RF220*	RL225*	RL220*
Electric Components	Defrost Heater(FRE)	Heated at F Defrost	120V, 200W	120V, 200W	120V, 200W	120V, 200W
	FRENCH Heater	–	120V, 10W	120V, 10W	–	–
	HEATER ICE PIPE	–	12V, 2W	12V, 2W	12V, 2W	12V, 2W
	Bimetal thermo For Preventing Overheating of Refrigerator Lamp		40℃ on, 60℃ off	40℃ on, 60℃ off	40℃ on, 60℃ off	40℃ on, 60℃ off
	Over Load Relay	Model	4TM435RFBYY–53	4TM435RFBYY–53	4TM435RFBYY–53	4TM435RFBYY–53
		Temp.ON	266 ± 41°F (130 ± 5°C)	266 ± 41°F (130 ± 5°C)	266 ± 41°F (130 ± 5°C)	266 ± 41°F (130 ± 5°C)
		Temp.OFF	141.8 ± 48.2°F (61 ± 9° C)	141.8 ± 48.2°F (61 ± 9° C)	141.8 ± 48.2°F (61 ± 9° C)	141.8 ± 48.2°F (61 ± 9° C)
	Rated Voltage		AC 115V/60Hz	AC 115V/60Hz	AC 115V/60Hz	AC 115V/60Hz
	MOTOR–BLDC(FRE)		12V, 2.5W	12V, 2.5W	12V, 2.5W	12V, 2.5W
	MOTOR–BLDC(Circuit)		12V, 1.7W	12V, 1.7W	12V, 1.7W	12V, 1.7W
	MOTOR–DAMPER(PANTRY)		12V, 60mA	12V, 60mA	12V, 60mA	12V, 60mA
	Lamp(FRE)		12V (Max 130 mA)	12V (Max 130 mA)	12V (Max 130 mA)	12V (Max 130 mA)
	Lamp(REF)		12V (Max 390 mA)	12V (Max 390 mA)	12V (Max 390 mA)	12V (Max 390 mA)
	Door Switch	FRE	250VAC, 0.5A	250VAC, 0.5A	250VAC, 0.5A	250VAC, 0.5A
		REF	MDCG–SPSD 200VDC, 0.5A	MDCG–SPSD 200VDC, 0.5A	MDCG–SPSD 200VDC, 0.5A	MDCG–SPSD 200VDC, 0.5A
	Power cord		US3, 2000mm	US3, 2000mm	US3, 2000mm	US3, 2000mm
	Earth Screw		BSBN (BRASS SCREW)	BSBN (BRASS SCREW)	BSBN (BRASS SCREW)	BSBN (BRASS SCREW)

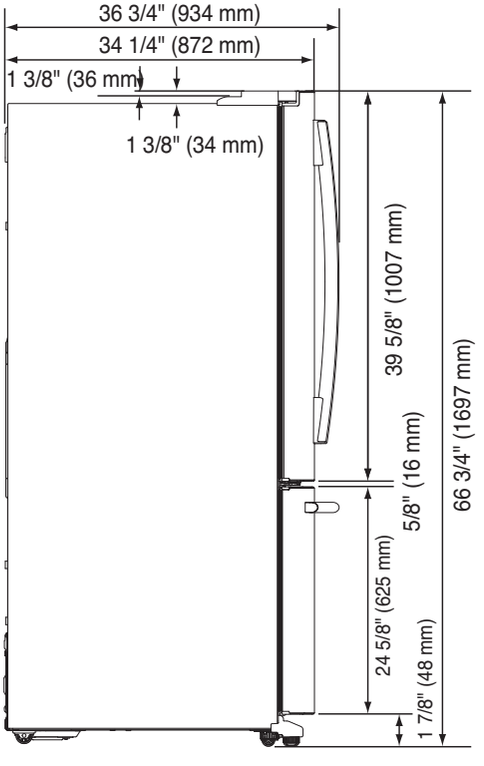
PRODUCT SPECIFICATIONS

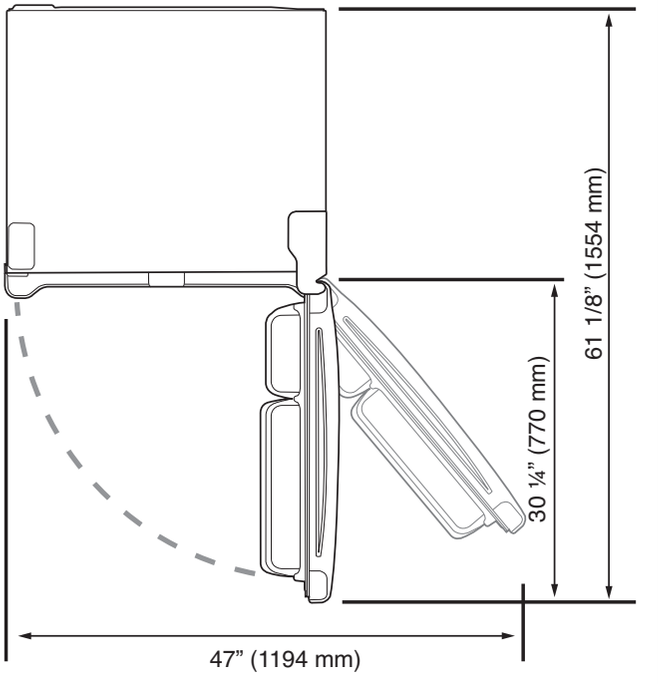
2–3) Dimensions of Refrigerator(RF22*) (Inches)





RF22*





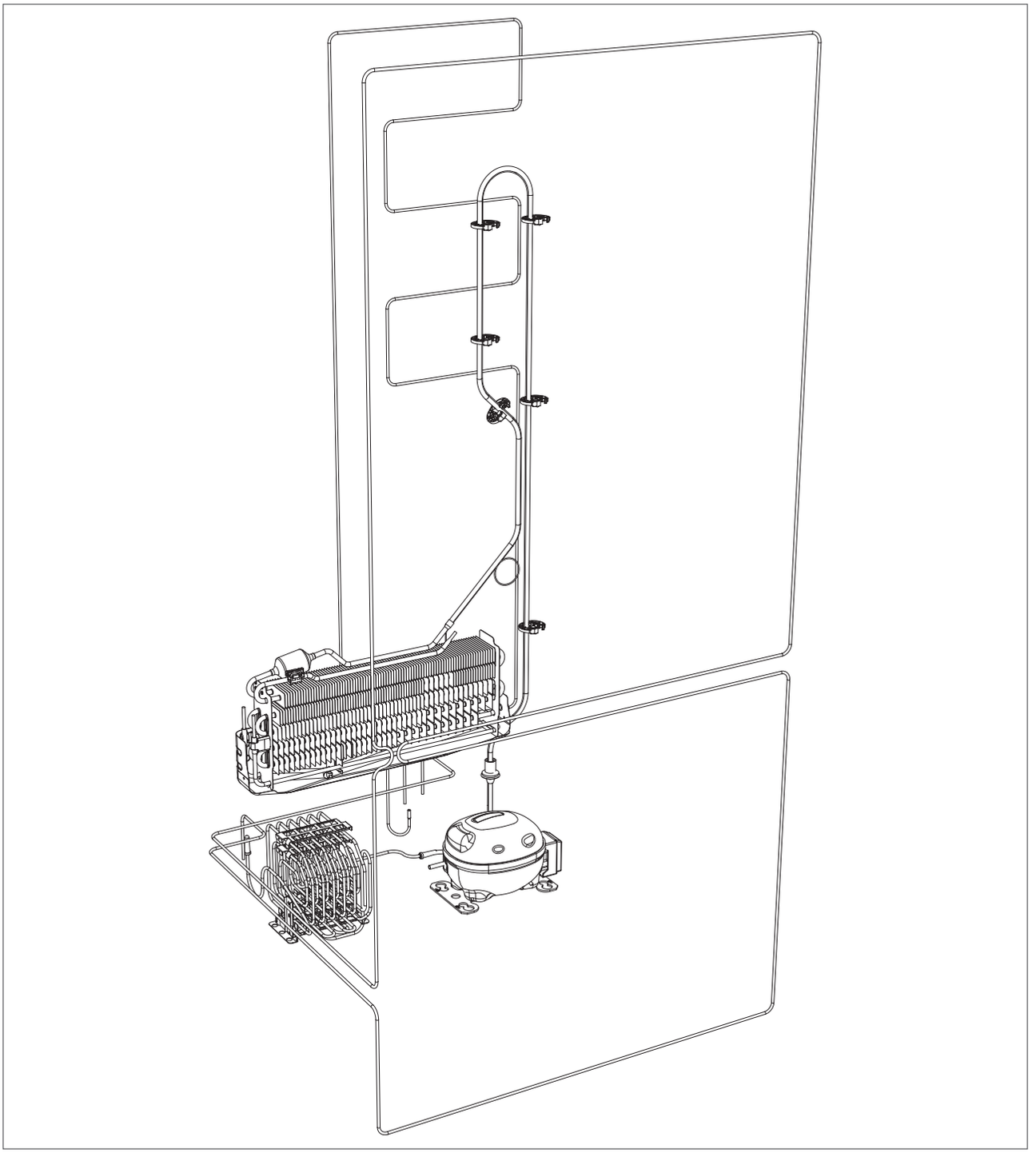
RL22*

2-4) Optional Material Specification

	Part Name	Part Code	AMOUNT
	ASSY-PACKING SUB	DA99-03490L	1
	LED LAMP REF	DA41-00676G	3
	LED LAMP FRE	DA41-00676G	1

2-5) Refrigerant Route in Refrigeration cycle

Compressor → Condenser → Hot pipe → Pipe cluster rear → Dryer →
Capillary tube → Freezer Evaporator → Suction pipe → Compressor



2–5–1. Operation theory of refrigeration cycle components

■ Condenser

1) Role: A device which radiates heat to the outside of the refrigerator. As this heat is dispersed, the high temperature/ high pressure vapor refrigerant changes to a liquid state.

2) Types

A. Air-cooling Type : Condense air by circulating naturally or manually.

1) Natural Convection Type : Used for the household refrigerator which has small condensing capacity. (No Fan)

2) Manual Convection Type : Circulate air manually by FAN-Motor (Large capacity)

B. Water-cooling Type : Make cooling water pass through the pipe in the condenser (Large capacity)

※ Location

① CLUSTER heat-radiating type : All Pipes effective for radiating heat are formed in the right/ left, and front side of refrigerator with hard urethanes and radiate heat through the whole surfaces of cabinet to ambient air.

② Install the condenser on the outside of the product. (An old model)

③ Make them cluster at the lower part of product and radiate heat manually by fan.

※ Radiate condensed potential heat up to liquefy completely and make change the state without changing the gas temperature itself.

※ Pipe thickness

① Low pressure: 6.3mm ② High pressure : 4.7mm ③ Capillary : About 0.4-0.8mm

※ Condenser length (Based on 300ℓ): 21.3 M

① Sub Condenser : 8.8 M ② HOT-PIPE: 8 M ③ CLUSTER-PIPE: 4.5 M

■ Capillary

1. Role: A device which makes low temperature and pressure refrigerant by reducing the pressure the normal temperature / high pressure liquid refrigerant condensed from condenser, and supply it to the evaporator.

A. To evaporate more lower temperature in case of evaporation.

B. It flows to the evaporator without back flowing to condenser, if compressor stops, and the difference of pressure between high pressure and low pressure is small so it is easy to operate the compressor again.

2. Outline

A. Thickness : About 0.4-0.8ßÆ

B. Length : It is changeable to low temperature and pressure (10->5ß∏/ß≤) depends on the 2M of thin and long copper pipe wall resistance.

■ Evaporator

1. Role: As the low pressure liquid refrigerant flowed from capillary absorbs heat inside of the refrigerator, it becomes low pressure gas and refrigerate the foods.
2. Theory: The low pressure refrigerant flowed to evaporator operates cooling which takes ambient evaporated potential heat with maintaining the evaporation up to evaporate completely.
3. Types of Evaporator

   A. ROLL-BOND Evaporator ⋯› Direct Cooling ONE-DOOR Type

   ☞ Rolled and adhere the 2 aluminum plate and then make refrigerant passage.

   B. PIN-PIPE Type ⋯› Indirect cooling TWO-DOOR Type

   ☞ a small aluminum plate on the aluminum pipe to increase the cooling effect.

■ Compressor

1. Role: It operates same as pump which pull out the subterranean water. It inhales the low temperature and pressure refrigerant gas (flowed out) from evaporator and make high temperature and pressure refrigerant liquid in the compressor and send it to the condenser.
2. Type of Condenser
   a. Back-and-forth motion type: A method that pistol makes back-and-forth motion through shaft and cylinder of motor rotation and compresses. ※ Used for household refrigerant
   b. Rotary Type: A method that inhales the refrigerant gas through the gap between the outside of rotor electric attached on the shaft and the inside of cylinder and compresses.
   c. Centrifugal Type
3. Please insert the explanation of inverter comp operation theory.

■ Dryer

1. Role: Absorb the moisture from the refrigerant that refrigeration cycle circulates and eliminate the foreign substance.
2. Structure: If even some moisture is included refrigerant is impossible to circulate by freezing the small capillary outlet, so silica gel or molecular sieve is (included and) sealed to absorb the internal moisture, and install a minute net to eliminate the foreign substance.

※. Influence of moisture

① Moisture precipitation - Blocked by ice

② Refrigerant and reaction

③ Life reduction of oil

④ Acceleration of oxidization

⑤ Copper plating phenomenon

⑥ Gas dissolution by the interaction of synthetic insulating material (insulator)

※. Influence of foreign substance

① Increase of condensed temperature.

② Increase of temperature.

③ Decrease of cooling efficiency

④ Shorten the life by friction between oil and foreign substance in the compressor.

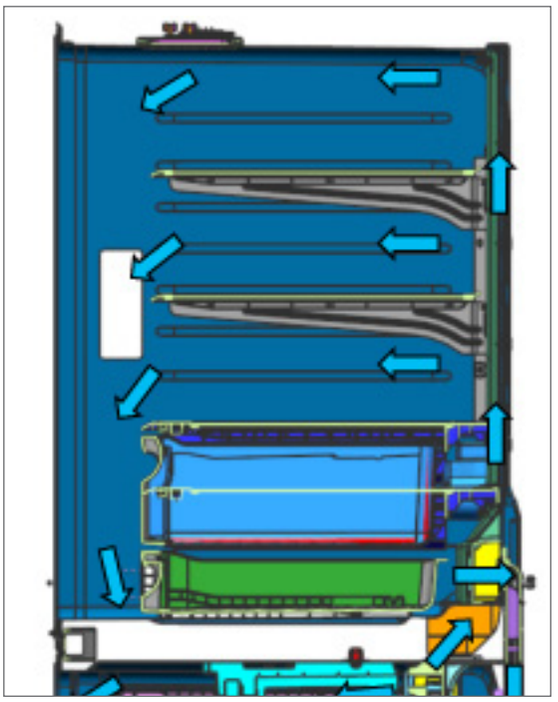
■ Accumulator

1. Role : To send a pure refrigerant gas to compressor by removing completely the refrigerant liquid from evaporator.

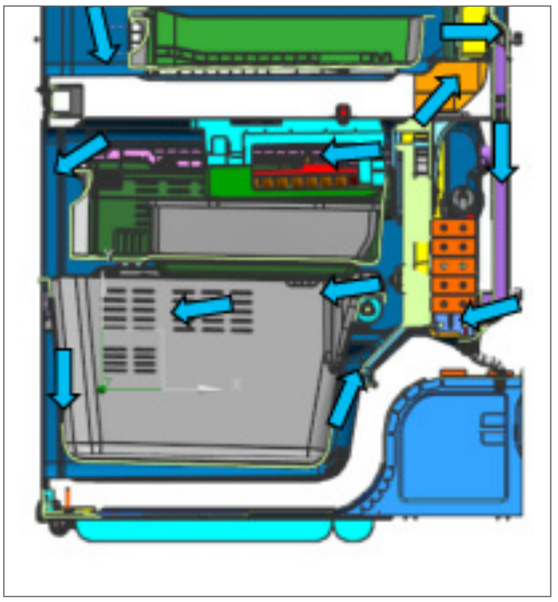
※ If a refrigerant liquid go into the compressor, overload is occurred.

2-6) Cooling Air Circulation

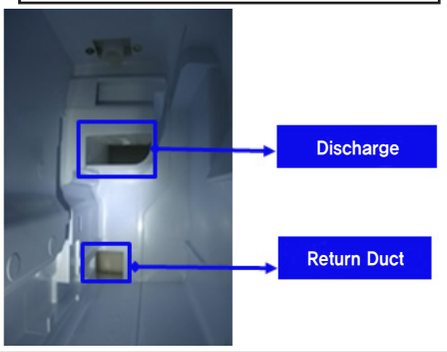
Refrigerator



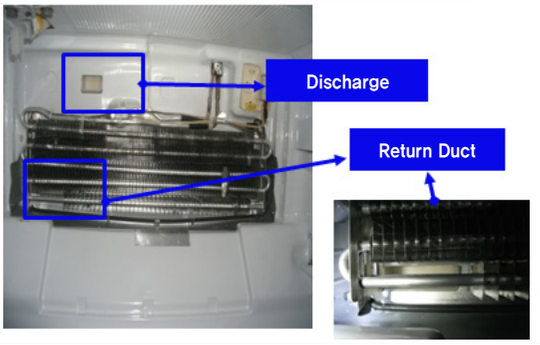
Freezer



Ice Maker Duct in Fridge



Duct in Freezer



In some cases, frost blocks the return hole in freezer and it may cause weak cooling or No ice making.

3. DISASSEMBLY AND REASSEMBLY

DISASSEMBLY AND REASSEMBLY

3–1) PRECAUTION

- Unplug the refrigerator before cleaning and making repairs.
- Remove any foreign matter or dust from the power plug pins.
  - Otherwise there is a risk of fire.
- Do not use a cord that shows cracks or abrasion damage along its length or at either end.
- Do not plug several appliances into the same multiple power board. The refrigerator should always be plugged into its own individual electrical which has a voltage rating that matched the rating plate.
  - This provides the best performance and also prevents overloading house wiring circuits, which could cause a fire hazard from overheated wires.
- Do not install the refrigerator in a damp place or place where it may come in contact with water.
  - Deteriorated insulation of electrical parts may cause an electric shock or fire.
- The refrigerator must be grounded.
  - You must ground the refrigerator to prevent any power leakages or electric shocks caused by current leakage from the refrigerator.
- Do not put bottles or glass containers in the freezer.
  - When the contents freeze, the glass may break and cause personal injury.
- Do not store volatile or flammable substances in the refrigerator.
  - The storage of benzene, thinner, alcohol, ether, LP gas and other such products may cause explosions.

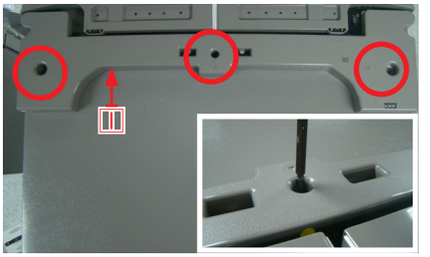
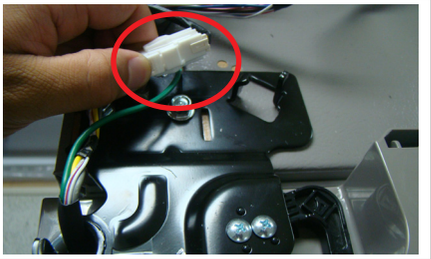
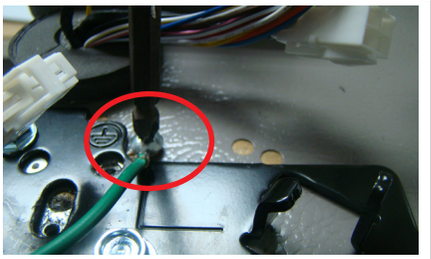
- Required Tools

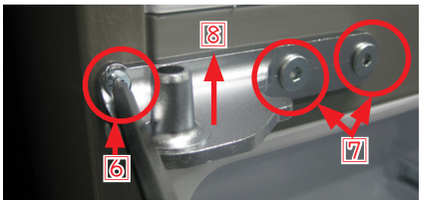
IMAGE	ITEM	USE
	Phillips Head Driver	Use for assembling and disassembling of screw
	Flat Head Driver	Use for assembling and disassembling of HomeBar, Dispenser, Deli Cartessen Box, Main PBA etc...
	Hex Wrench ∮ 2mm	Use for assembling and disassembling of Handle
	Socket Wrench ∮ 10mm	Use for assembling and disassembling of Door Hinge

- Water whitening phenomenon

All water provided to refrigerators flows through the core filter which is an alkaline water filter. In this process, the pressure in the water that has flowed out of the filter gets increased, and massive oxygen and nitrogen become saturated. When this water flows out in the air, the pressure plummets and the oxygen and nitrogen get supersaturated so that they turn into gas bubbles. The water could look misty due to these oxygen bubbles. It is not because dust or chemicals, just a few seconds later, it will be clean again.

3–2) Refrigerator Door

Part Name	How To Do	Descriptive Picture
Refrigerator Door	1. Remove the 3 screws holding down the Top Table and remove the Top Table (1)	
	2. Disconect wire.	
	3. Remove the 1 earth screw holding down the earth wire	
	4. Remove hinge screws (4)by turning to counterclockwise, and take off the upper hinge (5) along the arrow. CAUTION Take care when removing the door to ensure that it does not fall on you.	  

Part Name	How To Do	Descriptive Picture
Refrigerator Door	5. Lift the door straightly up to remove. CAUTION Be careful not to drop the door.	(RF22*)  (RL22*) 
	6. Lift the grommet hinge straightly up to remove.	
	7. With a Philips head screwdriver, remove the screw (6) attatched to the lower left and right door hinges. With a 0.4in Hex wrench, remove the 2 flat head screws (7) Remove the lower left and right door hinges (8).	

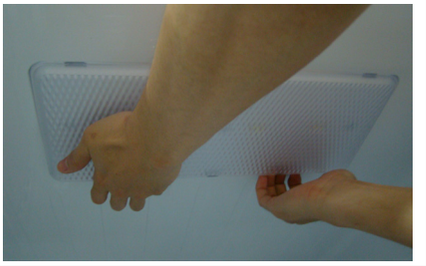
3–3) Door Handle Refrigerator

Part Name	How To Do	Descriptive Picture
Door Handle Fridge	1. Loosen the Set Screw situated at the end of the inner part of handle about 0.1in by using Hex wrench.	
	2. Pull the Set handle out by moving it straight up. CAUTION Be careful not to scratch or break the parts.	

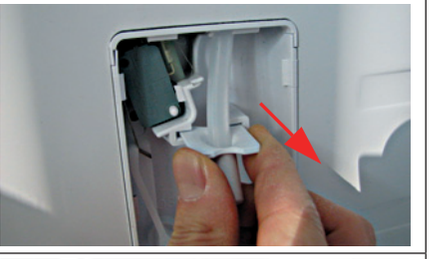
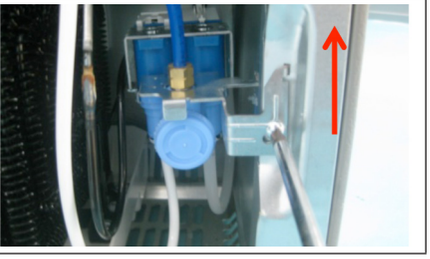
3–4) Door Handle Freezer

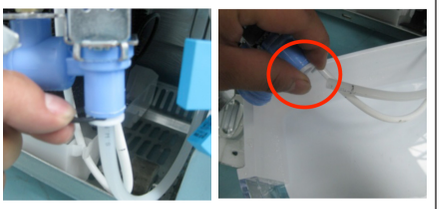
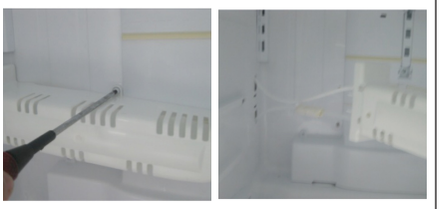
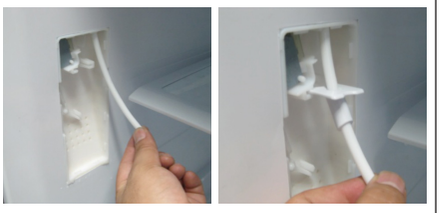
Part Name	How To Do	Descriptive Picture
Door Handle Freezer	1. Loosen the Set Screw situated at the bottom right of the appliance about 0.1in by using Hex wrench.	
	2. Pull the Set handle out by moving it to the right side. CAUTION Be careful not to scratch or break the parts.	

3–5) Refrigerator Light

Part Name	How To Do	Descriptive Picture
Refrigerator Light	1. Press the tabs on the back of the Lamp Cover and take it off.	
	2. Remove the 3 screws And separate the LED panel.	

3–6) Internal Water Dispenser

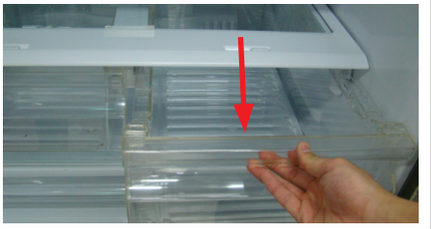
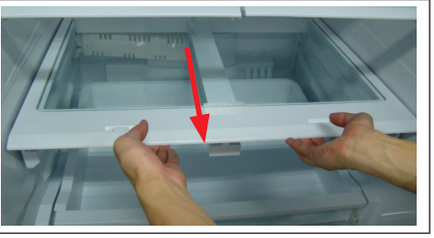
Part Name	How To Do	Descriptive Picture
Internal Water Dispenser Cover	1. Remove the internal water dispenser cover by inserting a flat–blade(–) screwdriver to the gap of dispenser with pulling the cover.	
Water Hose Cap	2. Remove the water hose cap by pulling it out. (Refer to the picture)	
Water Valve	Gently lift up to disconnect SCREW Disconnect.	

Part Name	How To Do	Descriptive Picture
Water Valve Hose	After removal Cap hose by holding down the white portion is removed.	
Water Tank	After removing the screw pull the Water Tank is back.	
Water Tank	New Water Tank of the hose and push the screw in position will conclude.	
Water Valve Hose(Dispenser)	Part hose Water Dispenser Cap puts in the appropriate places.	
Internal Water Dispenser Cover	After assembling Cover Dispenser cut extruded hose.	

3-7) Glass Shelf

Part Name	How To Do	Descriptive Picture
Glass Shelf	Remove the shelf by lifting the front part of the shelf up and pulling it out.	

3–8) Vegetable & Fruit Drawers Shelf

Part Name	How To Do	Descriptive Picture
Vegetable & Fruit Drawers Shelf	1. Remove the vegetable & fruit drawer.	
	2. Remove the vegetable & fruit drawer shelf by pulling it out. (Refer to the picture)	

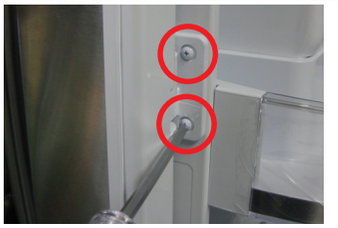
3–9) Cool Select Pantry

Part Name	How To Do	Descriptive Picture
Cool Select Pantry	1. Remove the cool select pantry by pulling the roller part and lifting it up.	
Cool Select Pantry Shelf	1. Remove the cool select pantry shelf by lifting the front part of the shelf while pulling it.	

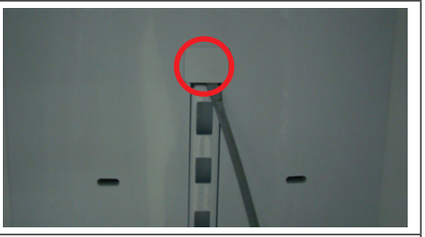
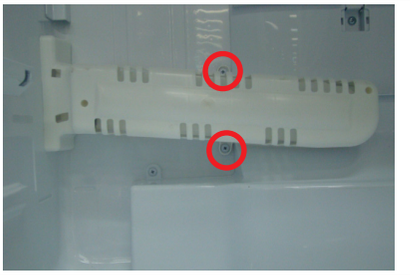
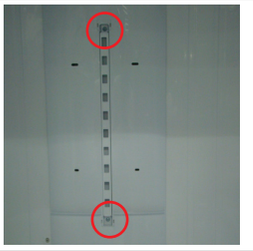
3–10) Gallon Door Bin

Part Name	How To Do	Descriptive Picture
Gallon Door Bin (Right)	1. Remove the door bin by moving straight up.	

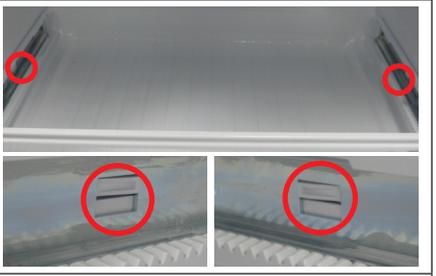
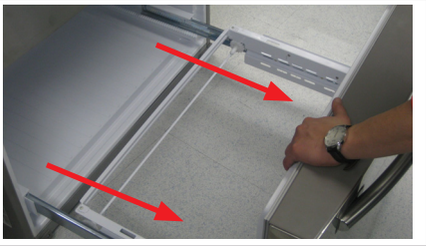
3–11) Vertical Hinged Section (RF22* MODEL ONLY.)

Part Name	How To Do	Descriptive Picture
Vertical Hinged Section (center mullion attached to left side refrigerator door)	1. Unscrew 2 screws.	
	2. Disengage the internal housing connector of the vertical hinge. CAUTION Before doing the above, make sure that the unit is unplugged out.	
	3. Remove the vertical hinged section by lifting the vertical hinge up. (Refer to the picture)	

3–12) Evaporator Cover In Refrigerator

Part Name	How To Do	Descriptive Picture
Evaporator Cover In Refrigerator	1. Remove the angle cap with a flat–blade screwdriver. (Refer to the picture) CAUTION Be careful not to scratch or break the parts	
	2. Loosen the 2 screws, which fix the Water tank cover.	
	3. Loosen the 2 screws and remove the angle–shelf mid.	
	4. Loosen the 2 screws, which fix the Damper cover	
	5. Lift up the evaporator cover.	
	6. Disconnect the 2 housing connectors. (Refer to the picture) CAUTION Before doing the above, make sure that the unit is unplugged.	

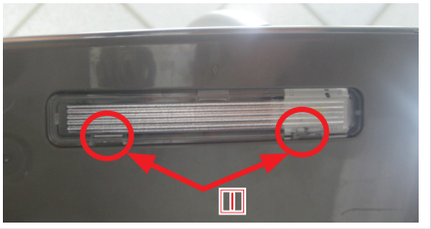
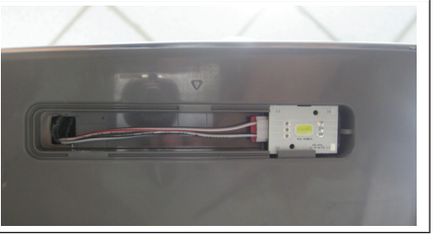
3–13) Freezer Door

Part Name	How To Do	Descriptive Picture
Freezer Door	1. Pull out the Pull Out Drawer by maximum.	
	2. After lifting the Pull Out Drawer up holding both sides, remove it at the rail system.	
	3. Remove the Tilting Pocket(Ⅰ) by lifting it up	
	4. After lifting the Freezer Guard up holding both sides, remove it at the rail system.	
	5. Press the fixing hook of rail system.	
	6. After holding and pulling out the top of Freezer Door, remove it at the rail system.	
	CAUTION Make sure there is no scratch at the end of Sliding Rail by being dented from the floor .	

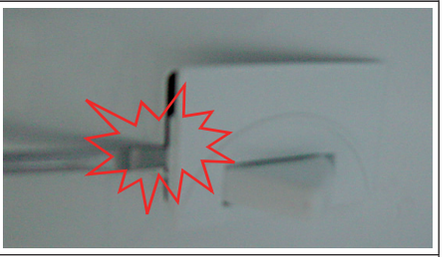
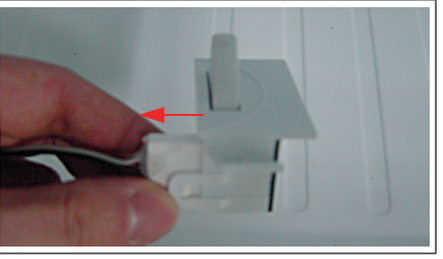
3–14) Ice Maker

Part Name	How To Do	Descriptive Picture
Ice Maker	1. Remove the ice maker by pulling it out.	
	2. Loosen the 1 screws, which fix the Ice maker	
	3. Disconnect the housing connector part.	

3-15) Freezer Light

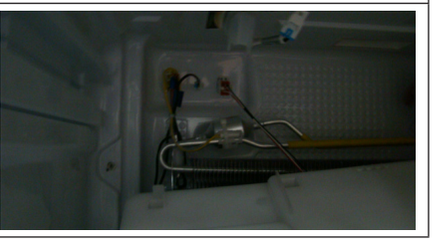
Part Name	How To Do	Descriptive Picture
Freezer Light	1. Remove the cover Freezer lamp (I) using a flat-blade screwdriver.	
	2. Disengage the housing. CAUTION Before doing the above, make sure that the unit is unplugged.	

3–16) Door Switch In Freezer

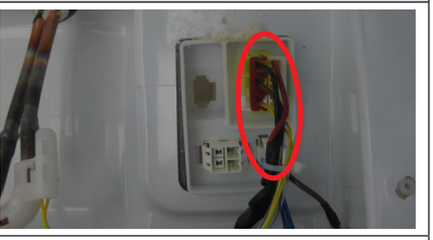
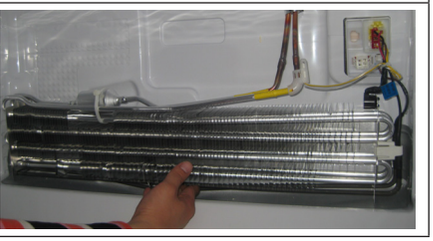
Part Name	How To Do	Descriptive Picture
Door Switch In Freezer	1. Remove the freezer drawer bin by using a flat–blade(–) screwdriver. (Refer to Section 3–19 Freezer Door). Then remove the freezer light switch.	
	2. Disconnect the housing connector part. CAUTION Before doing the above, make sure that the unit is unplugged.	

3–17) Evaporator Cover In Freezer

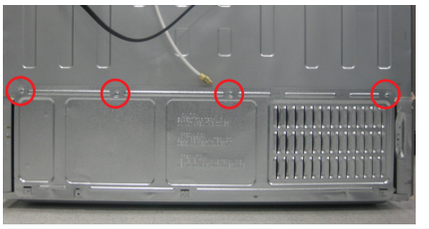
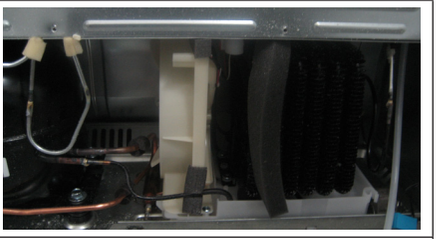
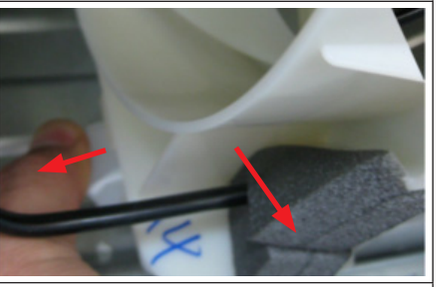
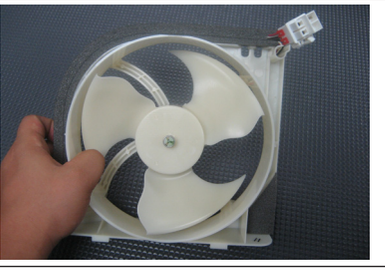
Part Name	How To Do	Descriptive Picture
Evaporator Cover In Freezer	1. Remove the ice maker by pulling it out.	
	2. Loosen the 1 screws, which fix the Ice maker	
	3. Disconnect the housing connector part.	

Part Name	How To Do	Descriptive Picture
Evaporator Cover In Freezer	4. Loosen the 2 screws, which fix the Cover Evap.	
	5. Lift up the evaporator cover.	
	6. Disconnect the housing connector on right and remove the evaporator cover. CAUTION Before doing the above, make sure that the unit is unplugged	

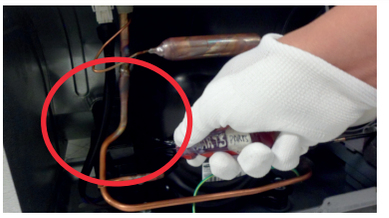
3-18) Evaporator In Freezer

Part Name	How To Do	Descriptive Picture
Evaporator In Freezer	1. Disconnect the 2 housing connectors on right side. CAUTION Before doing the above, make sure that the unit is unplugged	
	2. Remove the evaporator by pulling the lower part of the evaporator while lifting it up.	

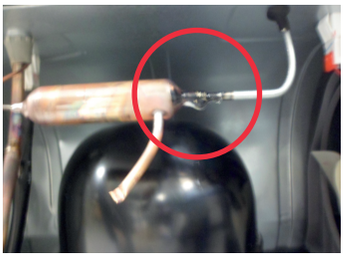
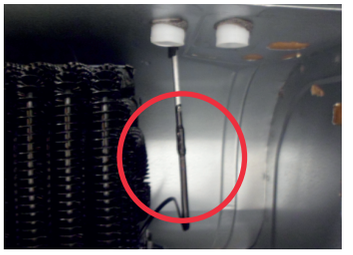
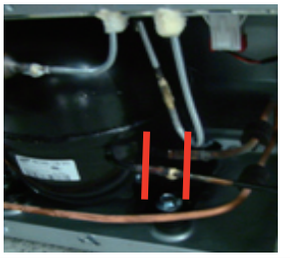
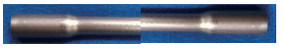
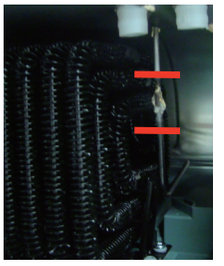
3–19) Machine Compartment

Part Name	How To Do	Descriptive Picture
Motor Fan	1. Unscrew 4 screws of cover compressor.	
	2. Disengage the housing connector. (Refer to the picture) CAUTION Before doing the above, make sure that the unit is unplugged.	
	3. Unscrew 1 screw fixed Support Circuit Motor and Tray drain.	
	4. Remove the hooker of support circuit motor by lifting the hooker up and pulling it out.	
	5. Bend the pipe to avoid to stuck the pipe and Support Circuit Motor. Turning the Support Circuit motor as picture shown and pulling it out.	
	6. Remove the hook of the motor cover with a flat–blade (–) screwdriver and then remove the motor.	

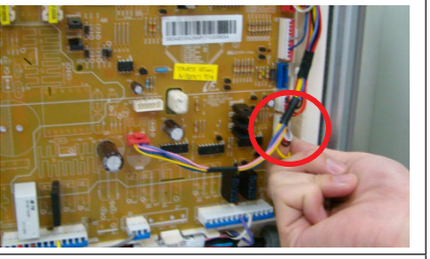
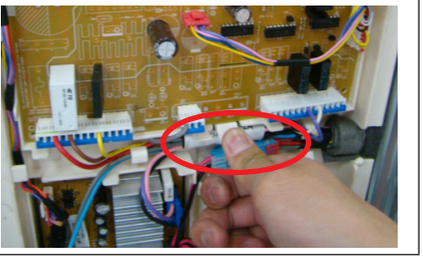
DISASSEMBLY AND REASSEMBLY

Part Name	How To Do	Descriptive Picture
Relay O/L	1. Disengage the housing connector.	
	2. Remove Cover Relay.	
	3. Remove the relay O/L with your fingers. (Refer to the picture)	

3–20) COMPRESSOR

Part Name	How To Do	Descriptive Picture
COMPRESSOR	1. Cut off the SOLDER connecting the COMP and the CONDENSER with a Pipe Cutter. (Red-line marking points)	
	2. Cut off the SOLDER connecting the CONDENSER and the HOT PIPE with a Pipe Cutter. (Red-line marking points)	
	3. Link the COMP and the CONDENSER with a PIPE-CONNECTOR (DA81-05659A) by brazing the joint areas.  	
	4. Link the CONDENSER and the HOT PIPE with a PIPE-CONNECTOR (DA81-05659B) by brazing the joint areas. 	

3-21) Electric Box

Part Name	How To Do	Descriptive Picture
PBA Main	1. Remove the 3 screw attached to the upper left and right Case PCB Panel with a phillips screwdriver(+).	
	2. Disengage all housing connectors from the main PCB. CAUTION Before doing the above, make sure that the unit is unplugged.	
	3. Press the lower locking hook down and remove the Main PBA by pulling it out. (Refer to the picture)	
PBA INVERTER	1. Remove the INVERTER PBA by lifting the upper part of the hook up.	

4. TROUBLESHOOTING

TROUBLESHOOTING

4–1) Function for failure diagnosis

4–1–1. Test mode (manual operation / manual defrost function)

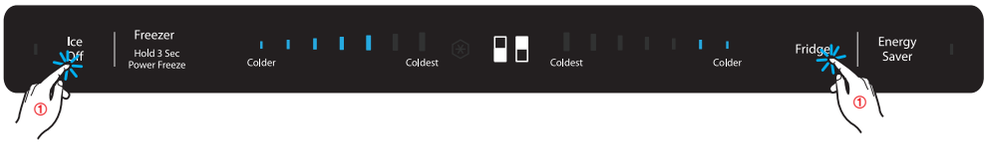
※ TEST MODE KEY

-. RF221, RF220, RL225 Model : Ice Off + Fridge Key
-. RL220 Model : Power Freeze + Fridge Key

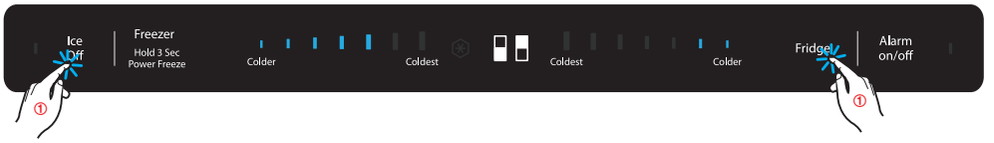
- If “TEST MODE KEY” on the front of panel are pressed simultaneously for 8 seconds , it will be changed to the test mode and all displays on the front of panel will be off.
- If any key on the front of panel is pressed within 15 seconds after the test mode, it will be operated as below sequence :
  Manual operation(F,R Panel LED ALL ON) -> Manual defrost(F,R Panel LED 1~4 ON) -> Cancel (Panel LED ALL OFF)
- If any key on the front of panel is not pressed within 15 seconds after the test mode, the test mode will be canceled and it will be returned to previous mode.

1) Manual operation function

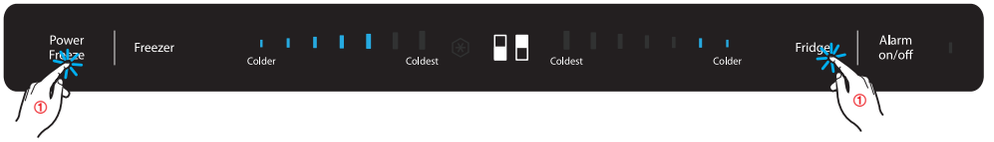
[RF221, RF220]



[RL225]



[RL220]



※ TEST MODE KEY

-. RF221, RF220, RL225 Model : Ice Off + Fridge Key
-. RL220 Model : Power Freeze + Fridge Key

① TEST MODE KEY are pressed simultaneously for 8 seconds(Displays are all off), It will be changed to the test mode (manual operation) by pressing any key

※ TEST MODE KEY

-. RF221, RF220, RL225 Model : Ice Off + Fridge Key
-. RL220 Model : Power Freeze + Fridge Key

1-1) If any key is pressed once in test mode, F/R Panel LED ALL ON and it indicates the refrigerator has entered the manual operation. At this moment, buzzer beeps as an alarm.

1-2) If manual operation is selected, compressor will run at once without 7 minutes delay in any mode. If the refrigerator is on the defrost cycle at the moment, defrost will be finished and manual operation will begin. (Be careful if manual operation get started at the moment of compressor off, over load could be occurred)

Compulsion working : 3600RPM

※ TEST MODE KEY

-. RF221, RF220, RL225 Model : Ice Off + Fridge Key

-. RL220 Model : Power Freeze + Fridge Key

1-3) If manual operation works, compressor & f-fan operate continuously for 24 hours and fresh food compartment will be controlled by the setting temperature.

1-4) When the manual operation runs, setting temperature will be selected automatically as below: freezer compartment **7-degree**, fresh food compartment **7-degree**.

1-5) During manual operation, **Power Freezer function** will not be work. If a function is selected, the power function icon of the selected function will be off automatically after 10 Seconds.

1-6) Manual operation can be canceled by removing power from the unit, then resupplying power.

1-7) Alarm(0.25 sec ON/ 0.75 sec OFF) will beep continuously until manual operation is completed and there is no function to make the sound stop.

2) Forced Defrost

2-1) When you press any key one more time at **Forced Operation , F/R Panel LED 1~4 ON**. At this time, the Force Operation stops immediately and **F-Defrost** will be performed at the same time.

2-2) At this time, it will send out “Beep” sound for 2 seconds and then it will perform Forced F Defrost while sending out “0.5 sec On and 0.5 sec Off” sound.

3) Test cancel mode

3-1) During the simultaneous defrosting of freezer compartments, if the display panel change to the test mode and test button is pressed one more time, defrosting of freezer compartments will be canceled and the unit will return to the normal operation. Or, all test functions will be canceled by turning main power ON and OFF.

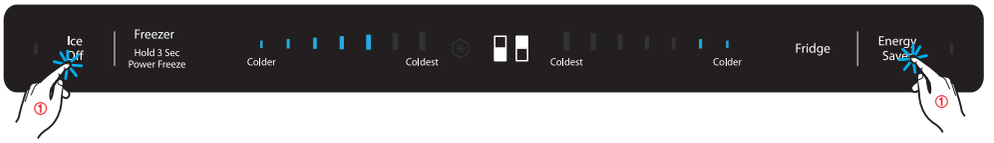
TROUBLESHOOTING

4–1–2. Self–diagnostic function

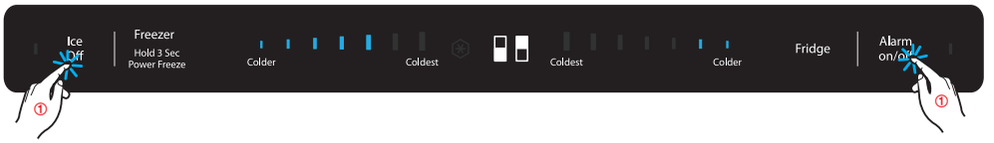
1) Self-diagnostic function in the Initial power ON

1-1) Micom operates self-diagnostic function to check the temperature sensor condition within 1 second when the refrigerator turned On initially.
1-2) If bad sensor is detected by the self-diagnostic function, the applicable display LED will blink for 0.5 sec. At this moment, there is no beep sound.(Refer to self-diagnostic CHECK LIST)
1-3) Self-diagnostic button is recognized only when the error is displayed by the bad sensor. Display does not operate normally but temperature control will be controlled by the emergency operation.
1-4) When the error is detected by self-diagnosis, the error can be canceled automatically if all troubled sensors are corrected or “Self-diagnostic function key” are pressed simultaneously for 8 seconds. (Return to normal display mode)

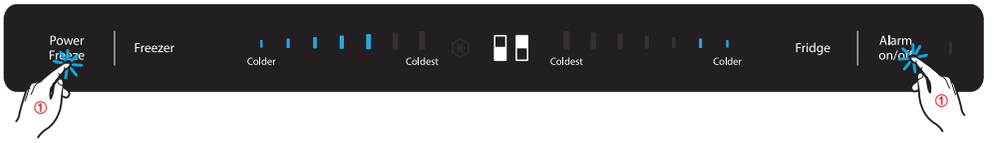
[RF221, RF220]



[RL225]



[RL220]



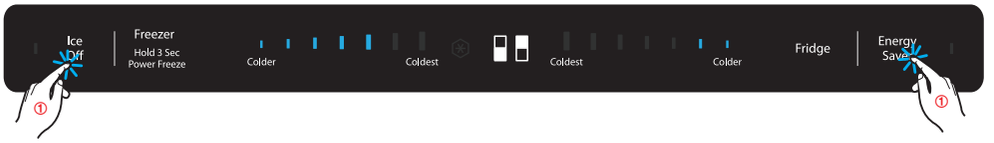
※ Self-diagnostic function KEY

-. RF221, RF220 Model : Ice Off + Energy Saver Key
-. RL225 Model : Ice Off + Alram on/off
-. RL220 Model : Power Freeze + Alram on/off

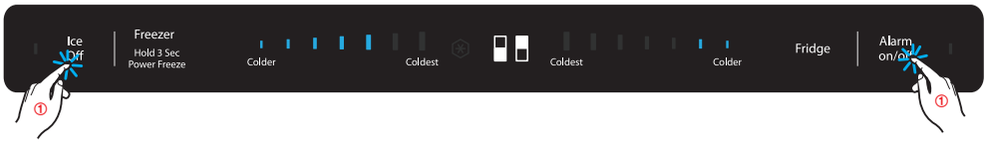
① If “Self–diagnostic function key” are pressed simultaneously for 8 seconds, the error mode by self–diagnosis will be canceled.

2) Self-diagnostic function during normal operation

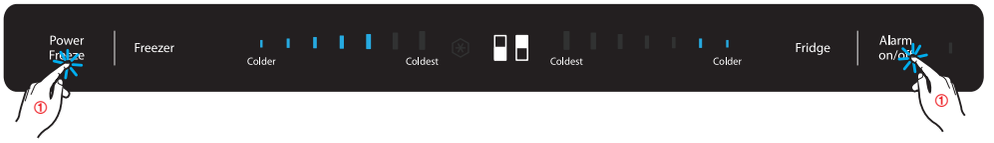
[RF221, RF220]



[RL225]



[RL220]



※ Self-diagnostic function KEY

-. RF221, RF220 Model : Ice Off + Energy Saver Key
-. RL225 Model : Ice Off + Alram on/off
-. RL220 Model : Power Freeze + Alram on/off

TROUBLESHOOTING

① If **“Self-diagnostic function key”** are pressed simultaneously for 8 seconds, **self-diagnosis will be selected**.

2-1) If “Self-diagnostic function key” are pressed simultaneously for 6 seconds during normal operation, the temperature setting display will operate for 2 seconds (ON/OFF 0.5sec each). If “Self-diagnostic function key” are pressed simultaneously for 8 seconds (including above 2 seconds), self-diagnostic function will be selected.

2-2) At this moment, self-diagnostic function will be returned with buzzer sound 'ding-dong'.
If there is an error, display of error will be operated for 30 seconds and then return to normal condition whether problem is corrected or not.
(Refer to self-diagnosis CHECK LIST)

2-3) Input by button is not accepted during self-diagnostic function.

TROUBLESHOOTING

※ Self-diagnostics check list

LED		Item		Trouble contents	Diagnostic method
R1		Ice Maker(F) Sensor Error		Display error : separation of sensor housing part, contact error, disconnection, short circuit Display error of detecting temperature of sensor: more than 149°F (+65°C) or less than −58°F(−50°C)	The Voltage of MAIN PCB CN90 #8 〈−〉#9: Shall be between 4.5v ~ 1.0v
R3		Compressor Error	Comp starting Failure Error	When the Compressor fails starting	Check if there is a short between compressor terminals. Check if there is a short between IPM Pins. Check the Compressor and the Cycle Turn Off the Ref. , after 5minutes, Turn on the Ref.
			IPM Fanlt Error	When there is a IPM Fault error	
			Comp Abnormal current Detection Error	When there is abnormal current detected at the Compressor	Check the Compressor connections Check the Compressor and the Cycle Turn Off the Ref. , after 5minutes, Turn on the Ref.
			Motor Locked Over RPM Error	When there is a Compressor restriction error	Check the condition of R1[Shunt Resistance] Check the Compressor and the Cycle Turn Off the Ref. , after 5minutes, Turn on the Ref.
			Comp under voltage Error	When there is a low voltage error	Check the input Voltage Turn Off the Ref. , after 5minutes, Turn on the Ref.
			Comp over voltage Eroor	When there is a over voltage	Check the input Voltage Turn Off the Ref. , after 5minutes, Turn on the Ref.
R4		FF−Sensor Error		Display error : separation of sensor housing part, contact error, disconnection, short circuit. Display error of detecting temperature of sensor : more than 149°F(+65°C) or less than −58°F(−50°C)	When measuring the voltage between the Main PCB CN30−"6" ↔ CN76−"1", it should read between 4.5V~1.0V.
R6		FZ−Ice Pipe Heater Error		The error occurs when there is a wire connector slip−out of the Water Supply Pipe Heater, a contact error or a breakage in the wiring.	When measuring the resistance of the Main PCB CN79 Yellow−Pink wires, it should be within 102Ω ±7%. 0Ω : heater short, ∞Ω : Check for Wire Open or Connector Slip−out
R7		Ice Maker(FZ)Function Error		When the Freezer Ice Maker error occurs more than 3 times, the error will be displayed.	After replacing the Ice Maker, check if it operates normal.
F1		Ambient−Sensor Error		Display error : separation of sensor housing part, contact error, disconnection, short circuit. Display error of detecting temperature of sensor : more than 149°F(+65°C) or less than −58°F(−50°C)	The voltage of MAIN PCB CN78−"8"↔ CN78−"12": shall be between 4.5V~1.0V
F2		FZ−Sensor Error			When measuring the voltage between the Main PCB CN30−"4" ↔ CN76−"1", it should read between 4.5V~1.0V.

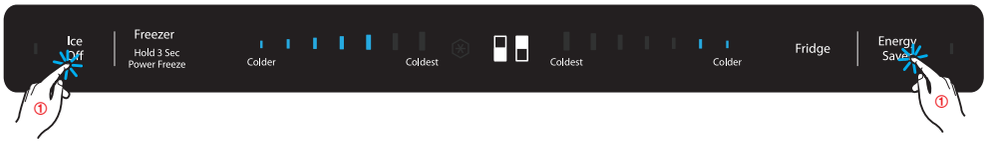
TROUBLESHOOTING

LED		Item	Trouble contents	Diagnostic method
F3		FZ–DEF–Sensor Error	Display error : separation of sensor housing part, contact error, disconnection, short circuit. Display error of detecting temperature of sensor : more than 149˚F(+65˚C) or less than –58˚F(–50˚C)	The voltage of MAIN PCB CN30– “5”↔ N76–”1”:shall be between 4.5V∼
F4		FZ–FAN Error	Display error during operation of applicable fan motor : Feed back signal line contact error, motor wire separation, motor error	The voltage of MAIN PCB CN76– “3” (Yellow) ↔CN76–”1”(Gray): shall be between 7V∼12V
F5		C–FAN Error	Display error during operation of applicable fan motor : Feed back signal line contact error, motor wire separation, motor error	The voltage of MAIN PCB CN76– “5” (Sky–blue) ↔ CN76–”1”(Gray): shall be between 7V∼12V
F6		Humidity–Sensor Error	Separation of sensor housing part, contact error, disconnection, short circuit	When measuring the voltage between the Main PCB CN30–"3" ↔ CN76–"1", it should read between 4.5V∼1.0V.
F7		FZ–DEF Error	Separation of freezer compartment defrost heater housing part, contact error, disconnection, short circuit or temperature fuse error. Display error : the defrosting does not finish though freezer compartment defrost is heating continuously for more than 80 minutes.	After separating MAIN PCB CN70 wire from PCB, resistance value between CN70 Brown ↔ CN70 Gray shall be 63(230) ohm ± 7%.(Resistance value is varied by input power) 0 ohm : heater short, ∞ ohm : wire/ bimetal open (Must power off)

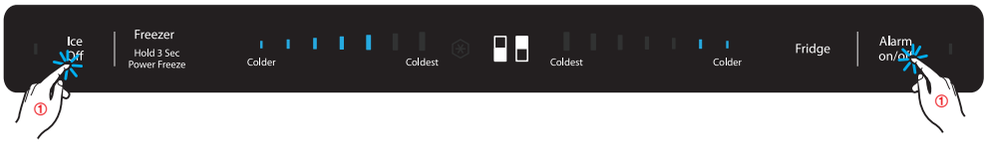
TROUBLESHOOTING

4–1–3. Display function of Load condition

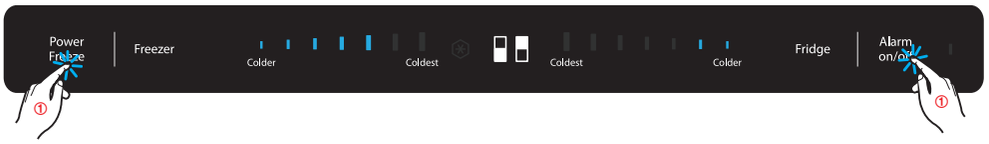
[RF221, RF220]



[RL225]



[RL220]



※ Self-diagnostic function KEY

-. RF221, RF220 Model : Ice Off + Energy Saver Key

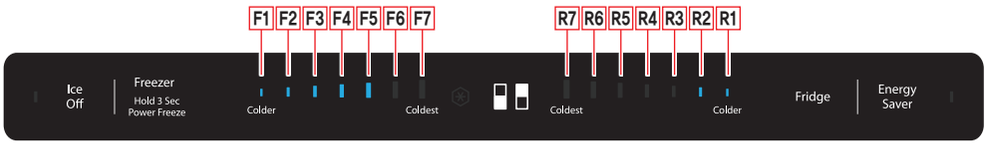
-. RL225 Model : Ice Off + Alram on/off

-. RL220 Model : Power Freeze + Alram on/off

① If **"Self-diagnostic function KEY"** are pressed simultaneously for 6 seconds, ALL ON/OFF will blink with 0.5interval for 2 seconds.

② If take the finger off from above keys and press Fridge, load condition mode will be started.

1) If **"Self-diagnostic function KEY"** are pressed simultaneously for 6 seconds during normal operation, the temperature setting display of fresh food and freezer compartments will blink ALL ON/OFF with 0.5 for 2 seconds.
2) At this moment, If Fridge Key after **"Self-diagnostic function KEY"** is pressed, load condition display mode will be returned with alarm. At LED all on state, only load condition display will blink ON/OFF with 0.5seconds interval.
3) Load condition display mode shows the load that micom signal is outputting.
   However, It means that micom signal is outputting, it does not mean whether load is operating or not. That is to say that though load operation is displayed, load could not be operated by actual load error or PCB relay error etc. (This function would be applied at A/S.)
4) Load condition display function will maintain for 30 seconds and then normal condition will be returned automatically.
5) Load condition display is as below.



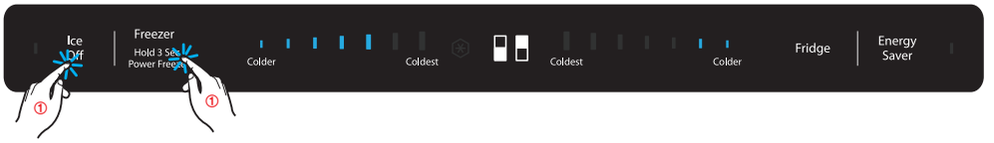
TROUBLESHOOTING

※ R Load mode Check list

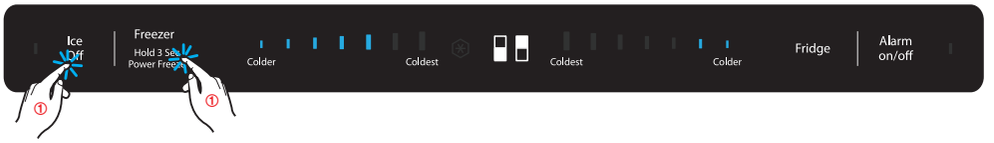
Display LED	Display contents	Operation contents
R1	Fridge Room Damper Open	When damper open, applicable LED ON
R5	Overload condition	When ambient temperature is more than 93˚F (34˚C), LED ON
R6	Low temperature condition	When ambient temperature is less than 72˚F (22˚C), LED ON
R7	Exhibition Mode	LED ON at the display mode.
F1	COMP.	When COMP operates, applicable LED ON.
F2	F–FAN High	When FZ compartment FAN operates with high speed, applicable LED ON.
F3	F–FAN Low	When FZ compartment FAN operates with low speed, applicable LED ON.
F4	F–DEF Heater	When FZ compartment defrost heater operates, LED ON
F5	C–FAN High	When compressor FAN operates with high speed, applicable LED ON.
F6	C–FAN Low	When compressor FAN operates with low speed, applicable LED ON.
F7	French Heater	When French heater operates, applicable LED ON
ICE OFF	Ice maker full	When the Ice Maker's Bucket is full, applicable LED ON.

4–1–4. Exhibition mode setting function (Default option "℃" model)

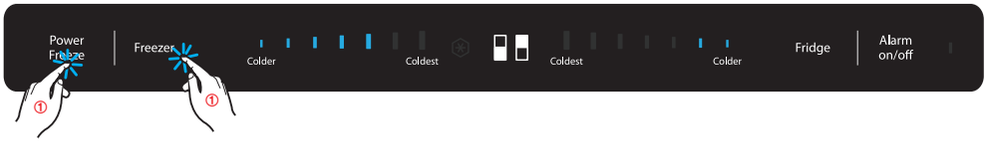
[RF221, RF220]



[RL225]



[RL220]



※ EXHIBITION MODE KEY

-. RF221, RF220, RL225 Model : Ice Off + Freezer Key

-. RL220 Model : Power Freeze + Freezer Key

① If **"EXHIBITION MODE KEY"** are pressed for 5 seconds, Exhibition mode will be started.

※ EXHIBITION MODE KEY

-. RF221, RF220, RL225 Model : Ice Off + Freezer Key

-. RL220 Model : Power Freeze + Freezer Key

1) If "EXHIBITION MODE KEY" are pressed simultaneously for 5 seconds during normal operation, Exhibition mode will be started with buzzer sound(ding-dong).
2) If above "EXHIBITION MODE KEY" are pressed one more time, Exhibitoin mode will be canceled.
3) If Exhibition mode is selected, the temperature setting LED will light up sequentially(F7 → F6 → F5 → F4 → F3 → F2 → F1, R7 → R6 → R5 → R4 → R3 → R2 → R1). The panel and it indicates the refrigerator has entered the Cooling Off mode.
4) During Exhibition mode, if fresh food and freezer compartments sensors are higher than 149℉(65℃).
   Exhibition will be canceled automatically and freezing operation will be returned.
   (There is no buzzer sound when the Exhibition mode is canceled by the temperature.)
5) Operation contents of Exhibition Mode
   - Display, Fan motor and etc operate normally, not to operate compressor only.
   - Defrost is not operated. (including french heater)
   - Display function of the initial real temperature is finished.
   - Under the condition of Exhibition mode, Exhibition mode will be operated when Power On after Power OFF.
   - Display function of the initial real temperature is finished.
   - Under the condition of Exhibition mode, Exhibition mode will be canceled when Power On after Power OFF.

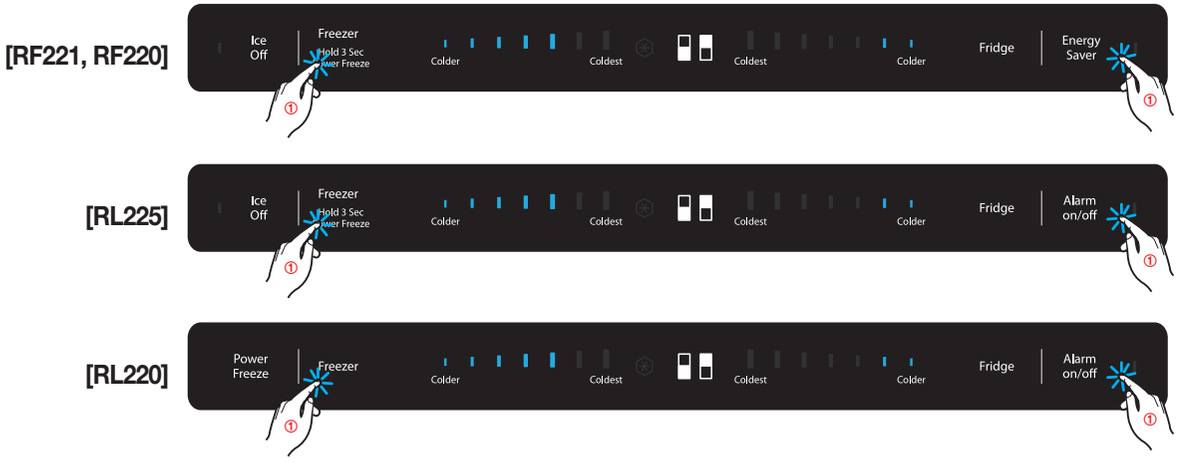
〈 Reference Bar Display Binary Table〉

LED / CODE	Display on (R1, F1)	Display on (R2, F2)	Display on (R3, F3)	Display on (R4, F4)	Display on (R5, F5)	Display on (R6, F6)	Display on (R7, F7)
0	X	X	X	X	X	X	X
1	O	X	X	X	X	X	X
2	X	O	X	X	X	X	X
3	O	O	X	X	X	X	X
4	X	X	O	X	X	X	X
5	O	X	O	X	X	X	X
6	X	O	O	X	X	X	X
7	O	O	O	X	X	X	X
8	X	X	X	O	X	X	X
9	O	X	X	O	X	X	X
10	X	O	X	O	X	X	X
11	O	O	X	O	X	X	X
12	X	X	O	O	X	X	X
13	O	X	O	O	X	X	X
14	X	O	O	O	X	X	X
15	O	O	O	O	X	X	X
16	X	X	X	X	O	X	X
17	O	X	X	X	O	X	X
18	X	O	X	X	O	X	X
19	O	O	X	X	O	X	X
20	X	X	O	X	O	X	X
21	O	X	O	X	O	X	X
22	X	O	O	X	O	X	X
23	O	O	O	X	O	X	X
24	X	X	X	O	O	X	X
25	O	X	X	O	O	X	X
26	X	O	X	O	O	X	X
27	O	O	X	O	O	X	X
28	X	X	O	O	O	X	X
29	O	X	O	O	O	X	X
30	X	O	O	O	O	X	X
31	O	O	O	O	O	X	X
32	X	X	X	X	X	O	X
33	O	X	X	X	X	O	X
34	X	O	X	X	X	O	X
35	O	O	X	X	X	O	X
36	X	X	O	X	X	O	X

4–1–5. Option setting function

- If "OPTION SETTING KEY" are pressed simultaneously for 12 seconds during normal operation, fresh food and freezer compartments temperature display will be changed to option setting mode.

KEY operation method for changing to option mode

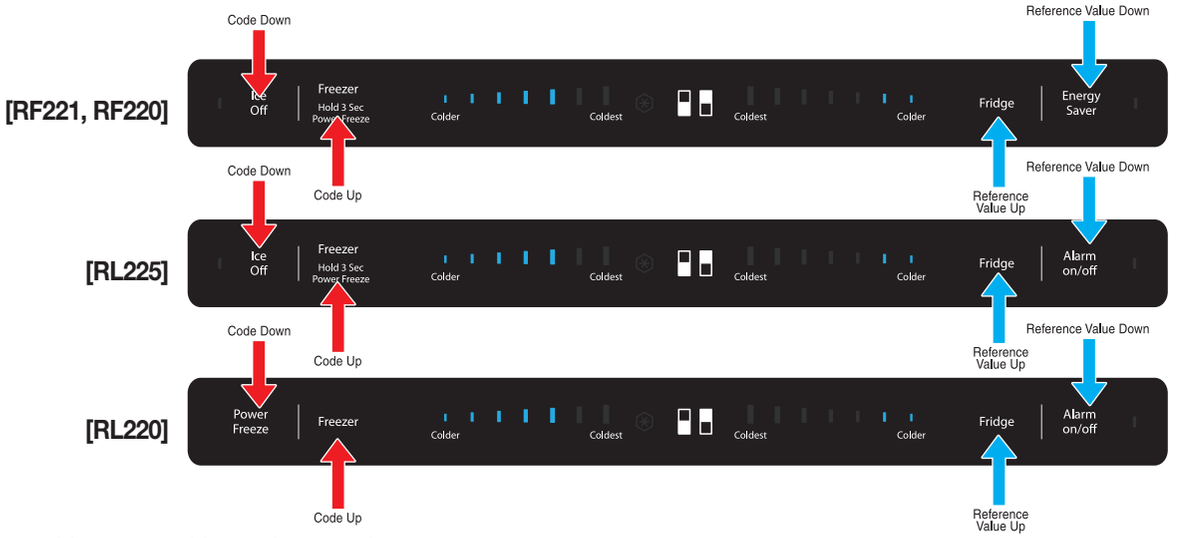


※ EOPTION SETTING KEY

-. RF221, RF220 Model : Freezer + Energy Saver Key

-. RL220, RL225 Model : Freezer + Alram on/off Key

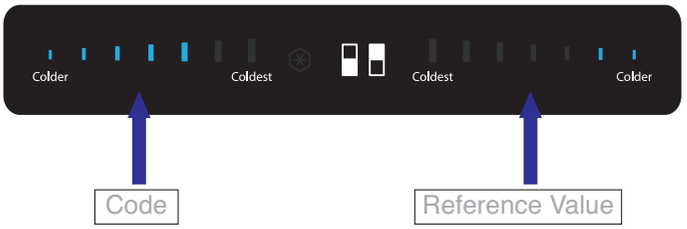
① If **"OPTION SETTING KEY"** are pressed simultaneously for 12 seconds, option setting mode will be started.



※ Key control in option mode

	RF221, RF220	RL225	RL220
Code Down key	Ice Off	Ice Off	Power Freeze
Code Up key	Freezer	Freezer	Freezer
Reference Value down key	Energy Saver	Alarm on/off	Alarm on/off
Reference Value Up key	Fridge	Fridge	Fridge

- If the display changes to option setting mode, all displays will be off except freezer and fridge compartments temperature display as below.
  (Fresh food and freezer compartments case will be explained only because all options are operated with the same method according to the option table.)



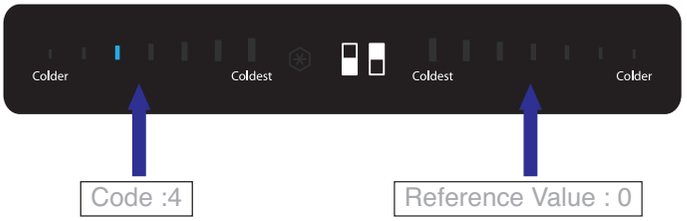
1) For example, if you want to change freezer compartment standard temperature to -4℉(-2°C) by operating option, do as below. This function is for changing the standard temperature.
In -2℉(-19°C) of current temperature of freezer compartment, if you make the temperature lower to -4℉(-2°C) by the option, the standard temperature would be controlled -6℉(-21°C)
Therefore, if you change the setting of temperature option to -2℉(-19°C) on the panel, the appliance will be operated with -6℉(-21°C). It means that standard temperature is controlled -4℉(-2°C) less than setting temperature in the display.

NOTE

Basically, all the data in option has cleared from the factory.
Therefore, almost all setting value are "0".
But, some setting values could be changed for the purpose of improving performmance.
You need to check the product manual and/or specification.

2) After changing to the option mode, fresh food compartment "0" , freezer compartment "0" will be displayed.
(Basically fresh food compartment "0", freezer "0" would be set at shipping process, but setting value could be changed for the purpose of improving product at mass producing process.)
- If fresh food compartment "0" shows only, temperature reference value of freezer compartment will be set and current freezer compartment temperature code will be displayed on the freezer temperature display.

3) If freezer compartment "4" is set as below freezer compartment code after fresh food compartment "0 is set, standard temperature of freezer compartment will be lower than -4℉(-2.0°C).
(Refer to the picture "changing the freezer compartment temperature")



: If you wait for 20 seconds after completing the setting, MICOM will save the setting value to the EEPROM and normal display will be returned and the option setting mode will be canceled.

4) Option changing method as above is the same.
5) By the same method as above, it is possible to control the fresh food compartment temperature, water supply, ice-maker harvest temperature/time, defrost return time, hysteresis by temperature, notch gap by temperature etc.
6) Option function is set in the EEPROM at shipping process in the factory.
You would better not to change the option of your own.
Completing the setting is that option function return to normal display after 20 seconds.
Do not turn off the appliance before returning to the normal display mode.

NOTE

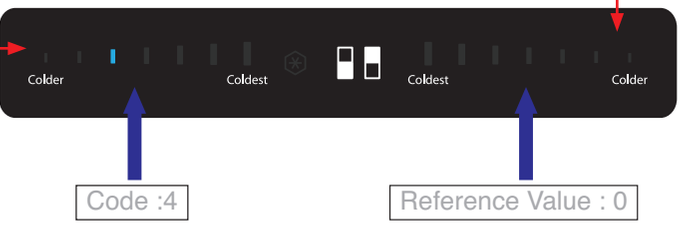
Option setting function exists in the other items.
We will skip the explanation of the other functions by the option because it is associated with refrigerator control function and is not needed at SERVICE.
(Please do not set the other options except above SERVICE Manual.)

4-1-6. Option TABLE

1) Temperature changing table of freezer compartment

Set item	Freezer Temp Shift
MODEL	RF221, RF220, RL225, RL220
Reference Value	Fridge Room
	0

FZ Compartment Code	Temp. compensation
0	0℉(0.0℃)
1	-1℉(-0.5℃)
2	-2℉(-1.0℃)
3	-3℉(-1.5℃)
4	-4℉(-2.0℃)
5	-5℉(-2.5℃)
6	-6℉(-3.0℃)
7	-7℉(-3.5℃)
8	+1℉(+0.5℃)
9	+2℉(+1.0℃)
10	+3℉(+1.5℃)
11	+4℉(+2.0℃)
12	+5℉(+2.5℃)
13	+6℉(+3.0℃)
14	+7℉(+3.5℃)
15	+8℉(+4.0℃)



Code :4

Reference Value : 0

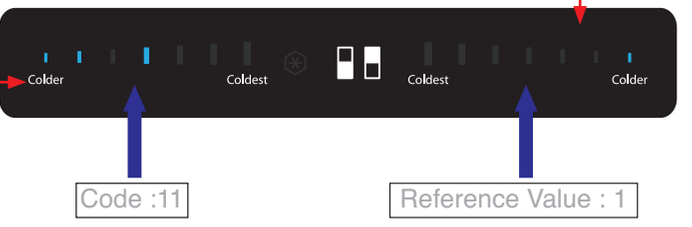
ex) If you want to change the freezer standard temperature to -4℉(-2°C)

2) Temperature changing table of fresh food compartment

Set item	Freezer Temp Shift
MODEL	RF221, RF220, RL225, RL220
Reference Value	Fridge Room
	1

FZ Compartment Code	Temp. compensation
0	0℉(0.0℃)
1	-1℉(-0.5℃)
2	-2℉(-1.0℃)
3	-3℉(-1.5℃)
4	-4℉(-2.0℃)
5	-5℉(-2.5℃)
6	-6℉(-3.0℃)
7	-7℉(-3.5℃)
8	+1℉(+0.5℃)
9	+2℉(+1.0℃)
10	+3℉(+1.5℃)
11	+4℉(+2.0℃)
12	+5℉(+2.5℃)
13	+6℉(+3.0℃)
14	+7℉(+3.5℃)
15	+8℉(+4.0℃)

ex) If you want to change the freezer compartment standard temperature to 4℉(2°C)



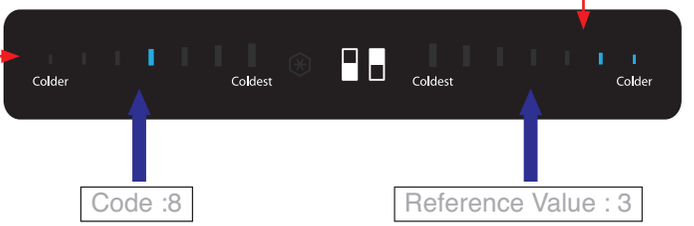
Code :11

Reference Value : 1

3) Temperature changing table of Ice maker dropping ice standby time

Set item	Ice Maker Dropping Ice stanby Time
MODEL	RF221, RF220, RL225
Reference Value	Fridge Room
	3

FZ Compartment Code	Temp. compensation
0	58
1	57
2	56
3	55
4	54
5	53
6	52
7	51
8	50
9	49
10	48
11	47
12	46
13	45
14	59
15	60

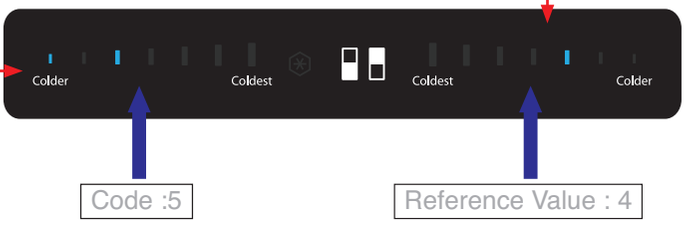


ex) If you want to change the freezer standard temperature to -4℉(-2°C)

4) Temperature changing table of Ice Maker Dropping Temperature

Set item	Ice Maker Dropping Temperature
MODEL	RF221, RF220, RL225
Reference Value	Fridge Room
	4

FZ Compartment Code	Temp. compensation
0	–17.0℃
1	–16.0℃
2	–15.0℃
3	–14.0℃
4	–13.0℃
5	–12.0℃
6	–18.0℃
7	–19.0℃



ex) If you want to change the freezer compartment standard temperature to 4℉(2°C)

4–2) Diagnostic method according to the trouble symptom(Flow Chart)

DATA1.Temperature table
Resistance value and MICOM port voltage of sensor according to the temperature
SENSOR CHIP : based on PX41C, PX41C, 502AT/ 103**(ICE MAKER SENSOR(MOLD)/FULL UP, 20Kohm
(Actual measurement = value of the table below X 2)

℃	℉	Voltage	Resistance	℃	℉	Voltage	Resistance	℃	℉	Voltage	Resistance
-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

DATA2. Humidity Sensor table
- Voltage output table @23°…, 5Vdc --- HTG3515CH/HTG3535CH
RH(Temperature compensate) = RH (Relative Humidity) + (Temp(°C) °© 23°C) x 0.05

℃	℉	Voltage	Resistance	℃	℉	Voltage	Resistance	℃	℉	Voltage	Resistance
0	909	186	744	46	2246	460	1839	92	3452	706	2827
1	943	193	772	47	2272	465	1861	93	3478	712	2848
2	977	200	800	48	2298	470	1882	94	3504	717	2870
3	1010	207	827	49	2324	475	1903	95	3530	722	2891
4	1043	213	854	50	2350	481	1925	96	3566	730	2920
5	1076	220	881	51	2376	486	1946	97	3595	735	2944
6	1109	227	908	52	2402	491	1967	98	3624	741	2968
7	1141	233	935	53	2428	497	1989	99	3653	747	2992
8	1173	240	961	54	2454	502	2010	100	3683	754	3016
9	1205	247	987	55	2480	507	2031				
10	1235	253	1011	56	2505	513	2052				
11	1266	259	1037	57	2530	518	2072				
12	1297	265	1062	58	2555	523	2093				
13	1328	272	1088	59	2580	528	2113				
14	1359	278	1113	60	2605	533	2133				
15	1390	284	1138	61	2630	538	2154				
16	1420	291	1163	62	2655	543	2174				
17	1450	297	1188	63	2680	548	2195				
18	1480	303	1212	64	2705	553	2215				
19	1510	309	1237	65	2730	559	2236				
20	1540	315	1261	66	2756	564	2257				
21	1569	321	1285	67	2782	569	2278				
22	1598	327	1309	68	2808	575	2300				
23	1627	333	1333	69	2834	580	2321				
24	1656	339	1356	70	2860	585	2342				
25	1685	345	1380	71	2886	590	2364				
26	1713	350	1403	72	2912	596	2385				
27	1741	356	1426	73	2938	601	2406				
28	1769	362	1449	74	2964	606	2428				
29	1797	368	1472	75	2990	612	2449				
30	1825	373	1495	76	3017	617	2471				
31	1852	379	1517	77	3044	623	2493				
32	1879	384	1539	78	3071	628	2515				
33	1906	390	1561	79	3098	634	2537				
34	1933	395	1583	80	3125	639	2559				
35	1960	401	1605	81	3152	645	2581				
36	1986	406	1627	82	3179	650	2604				
37	2012	412	1648	83	3206	656	2626				
38	2038	417	1669	84	3233	661	2648				
39	2064	422	1690	85	3260	667	2670				
40	2090	428	1712	86	3288	673	2693				
41	2116	433	1733	87	3316	678	2716				
42	2142	438	1754	88	3344	684	2739				
43	2168	444	1776	89	3372	690	2762				
44	2194	449	1797	90	3400	696	2785				
45	2220	454	1818	91	3426	701	2806				

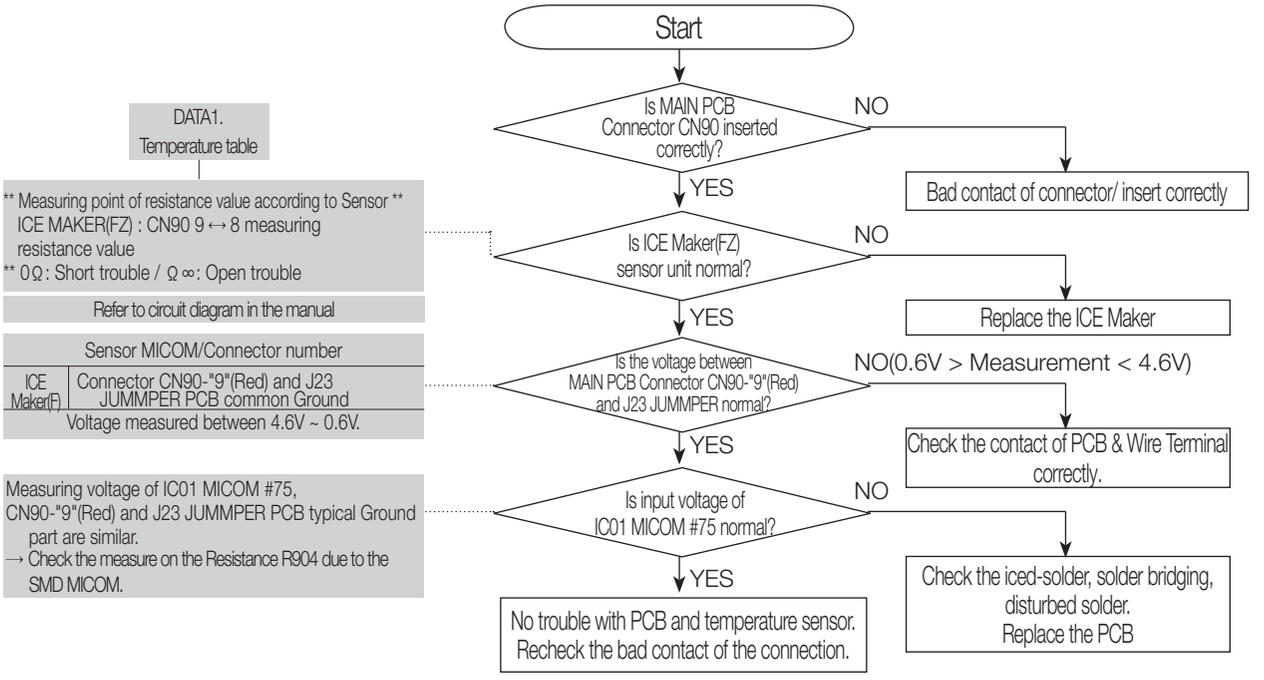
TROUBLESHOOTING

4–2–1. If the trouble is detected by self–diagnosis

1) ICE Maker(FZ) Sensor has troubled

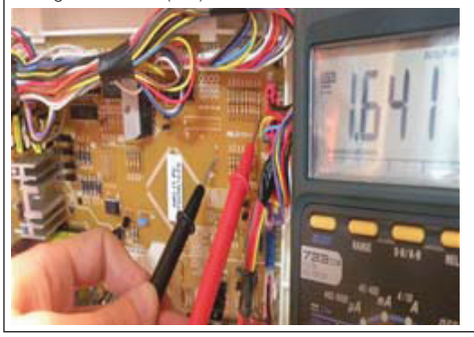
ERROR Code

This refrigerator has Dual Ice Maker, so controlled two Ice Makers.



☞ Checking Method of ICE MAKER(R) Senser resistance CN90 "9"(Red) ↔ 8"(White)
- Compare the temperature table after the measure.

☞ Checking method of ICE Maker Seneor
- Measure the voltage of Resistance R904(IC01 MICOM #75) or CN90-"9"(Red) ↔ J23 JUMMPER.
- Compare the temperature table after the measure. Measuring voltage of CN90-"9"(Red) ↔ J23 JUMMPER.



typical PCB Ground
J23 JUMMPER

2) If R Sensor has trouble

ERROR Code

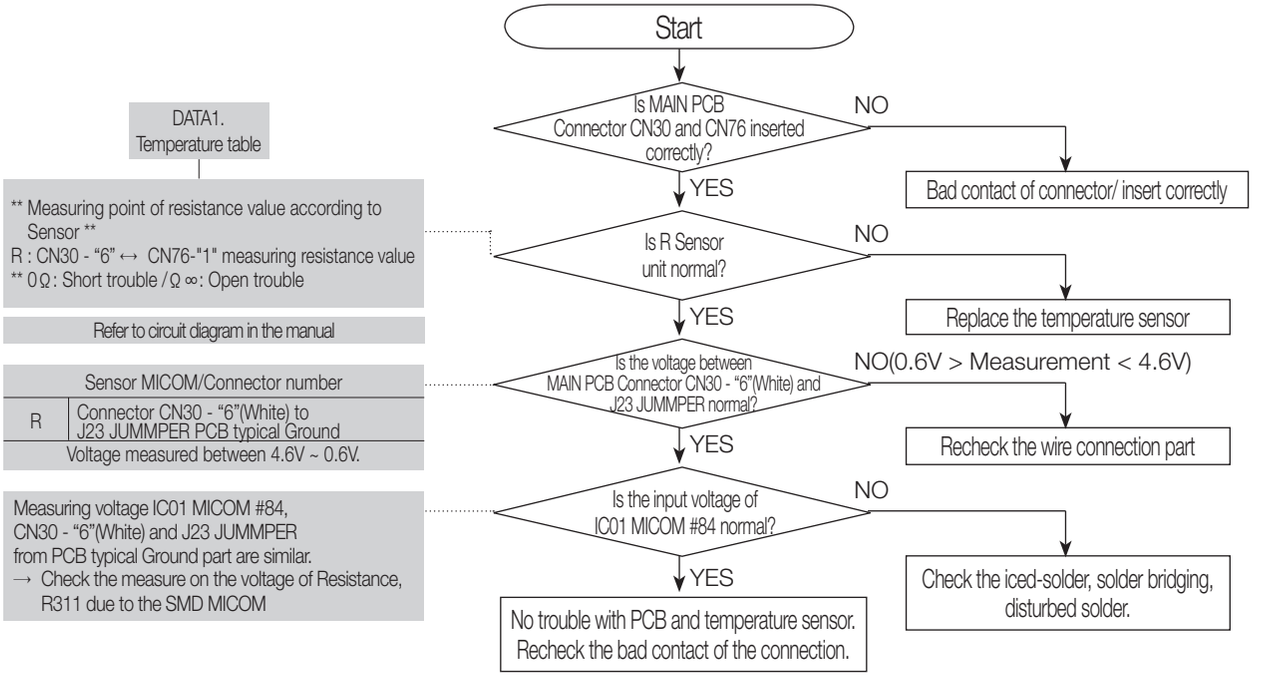
DATA1.
Temperature table

** Measuring point of resistance value according to Sensor **
R : CN30 - "6" ↔ CN76-"1" measuring resistance value
** 0Ω : Short trouble / Ω ∞: Open trouble

Refer to circuit diagram in the manual

Sensor MICOM/Connector number	
R	Connector CN30 - "6"(White) to J23 JUMMPER PCB typical Ground
Voltage measured between 4.6V ~ 0.6V.	

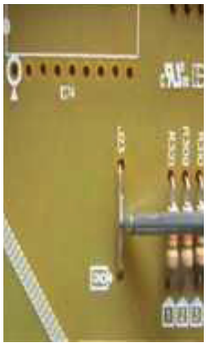
Measuring voltage IC01 MICOM #84, CN30 - "6"(White) and J23 JUMMPER from PCB typical Ground part are similar.
→ Check the measure on the voltage of Resistance, R311 due to the SMD MICOM



☞ Checking method of R Sensor resistance
CN30 - "6"(White) ↔ CN76-"1"(Gray) Compare the temperature table after measurment.

☞ Checking method of R Sensor resistance
- Measure the voltage of Resistance R311(IC01 MICOM #84) on PCB or CN30 - "6"(White) ↔ J23 JUMMPER
- Compare the temperature table after measurement. Measuring voltage of CN30 - "6"(White) ↔ J23 JUMMPER are as below.

PCB Typical Ground
J23 JUMMPER



3) If Ambient Sensor has trouble

ERROR Code

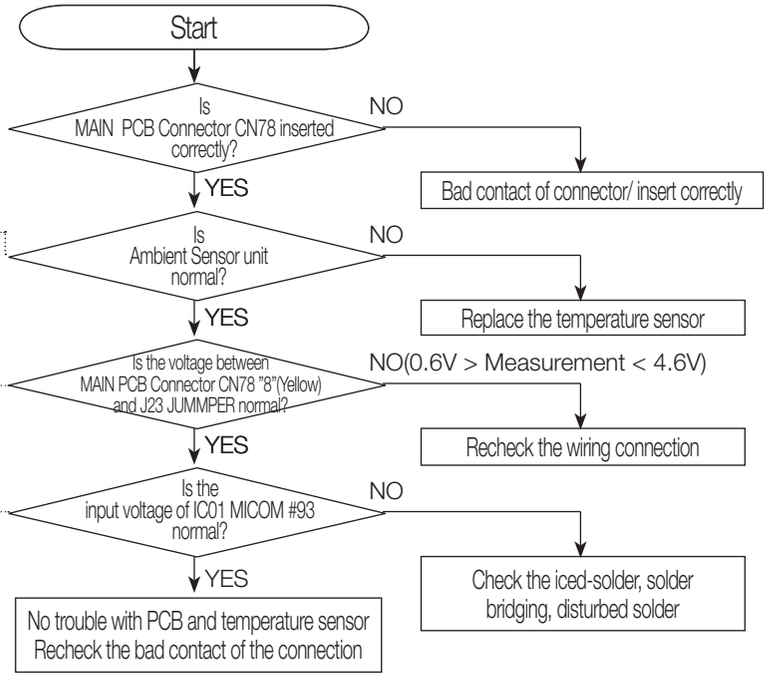
DATA1.
Temperature table

** Measuring point of resistance value according to Sensor **
Ambient : CN78-"8"↔ "12" measuring resistance value
** Placed in the right top table of upper hinge.
** 0Ω: Short trouble / Ω∞: Open trouble

Refer to circuit diagram in the manual

Sensor MICOM/Connector number	
Ambient	Connector CN78-"8"(Yellow) to J23 JUMMPER PCB typical Ground
Voltage measured between 4.6V ~ 0.6V.	

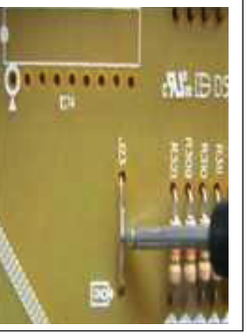
Measuring voltage of IC01 MICOM #93 CN78-"8"(Yellow) and J23 JUMMPER from PCB typical Ground part are similar.
→ Check the measure on the voltage of Resistance, R315 due to the SMD MICOM



☞ Checking method of Ambient Sensor resistance
CN78-"8"(Yellow) ↔ "12"(Yellow)
- Compare the temperature table after measurement.

☞ Checking method of Ambient Sensor voltage
- Measure the voltage of Resistance R315(IC01 MICOM #93) on PCB or CN78-"8"(Yellow) ↔ J23 JUMMPER
- Compare the temperature table after measurement.
Measuring voltage of CN78-"8"(Yellow) ↔ J23 JUMMPER are as below

PCB Typical Ground
J23 JUMMPER



4) If F Sensor has trouble

ERROR Code

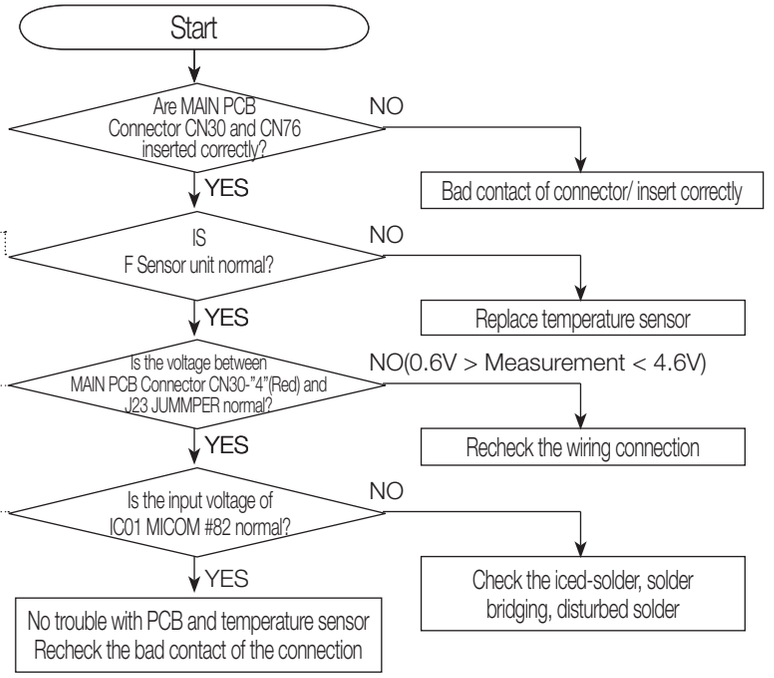
DATA1.
Temperature table

** Measuring point of resistance value according to Sensor **
F : CN30-"4" ↔ CN76-"1" measuring resistance value
** 0Ω : Short trouble / Ω∞ : Open trouble

Refer to circuit diagram in the manual

Sensor MICOM/Connector number	
F	Connector CN30-"4"(Red) to J23 JUMMPER PCB typical Ground
Voltage measured between 4.6V ~ 0.6V.	

Measuring voltage of IC01 MICOM #82, CN30-"4"(Red) and J23 JUMMPER from PCB typical Ground part are similar.
→ Check the measure on the voltage of Resistance, R309 due to the SMD MICOM



☞ Checking method of F Sensor resistance CN30-"4"(Red) ↔ CN76-"1"(Gray)
- Compare the temperature table after measurement.

☞ Checking method of F Sensor voltage
- Measure the voltage of Resistanec, R309(IC01 MICOM #82) on PCB or CN30-"4"(Red) ↔J23 JUMMPER
- Compare the temperature table after measurement.
Measuring voltage of CN30-"4"(Red)↔J23 JUMMPER are as below.

PCB Typical Ground
J23 JUMMPER

5) If F DEF Sensor has trouble

ERROR Code

DATA1.
Temperature table

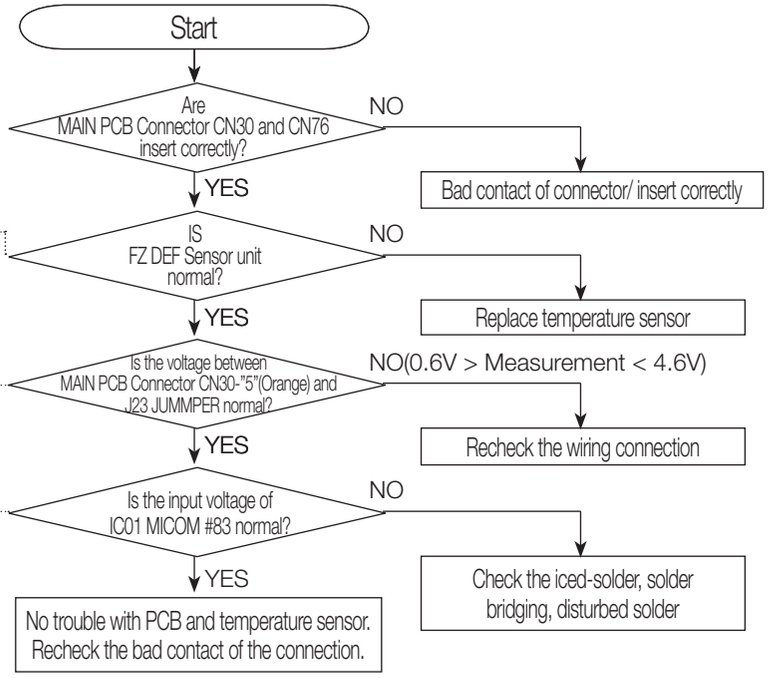
** Measuring point of resistance value according to Sensor **
F-DEF : CCN30-"5" ↔ CN76-"1" measuring resistance value
** 0Ω : Short trouble / Ω∞ : Open trouble

Refer to circuit diagram in the manual

Sensor MICOM/Connector number	
F DEF	Connector CN30-"5"(Orange) to J23 JUMMPER PCB typical Ground

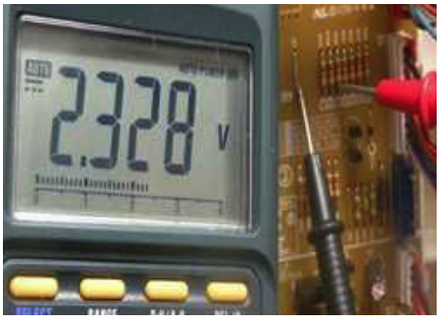
Voltage measured between 4.6V ~ 0.6V.

Measuring voltage of IC01 MICOM #83, CN30-"5"(Orange) and J23 JUMMPER from PCB typical Ground part are similar.
→ Check the measure on the voltage of Resistance, R310 due to the SMD MICOM



☞ Checking method of F DEF Sensor resistance
CN30-"5"(Orange) ↔ CN76-"1"(Gray)
- Compare the temperature table after measurement.

☞ Checking method of F DEF Sensor voltage
- Measure the voltage of Resistance, R310(IC01 MICOM #83) on PCB or CN30-"5"(Orange) ↔ J23 JUMMPER
- Compare the temperature table after measurement.
Measuring voltage of CN30-"5"(Orange) ↔ J23 JUMMPER are as below



PCB Typical Ground
J23 JUMMPER

6) If Humidity Sensor has trouble

ERROR Code

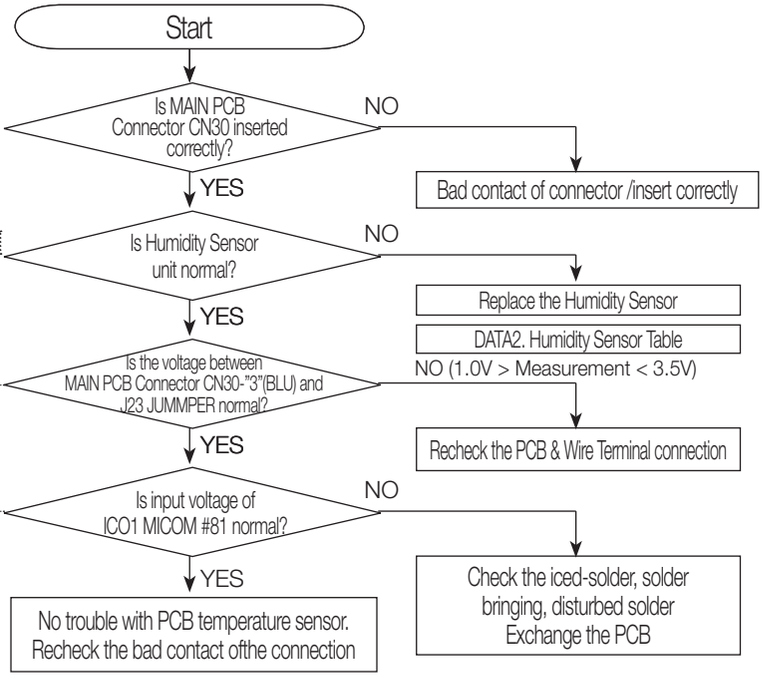
** Measuring point of resistance value according to Sensor"
Humidity : CN30 "1" ↔ "3"
Resistance value with opened : about 50Ω
** 0Ω : Short trouble / Ω ∞ : Open trouble

Refer to circuit diagram in the manual

Sensor MICOM/Connector number	
Humidity	Connector CN30-"3"(BLU) to J23 JUMMPER PCB typical Ground

Voltage measured between 3.5V ~ 1.0V

Measuring voltage of ICO1 MICOM #81, CN30-"3"(BLU) and J23 JUMMPER from PCB typical Ground part are similar.
→ Check the voltage of Resistance, R321



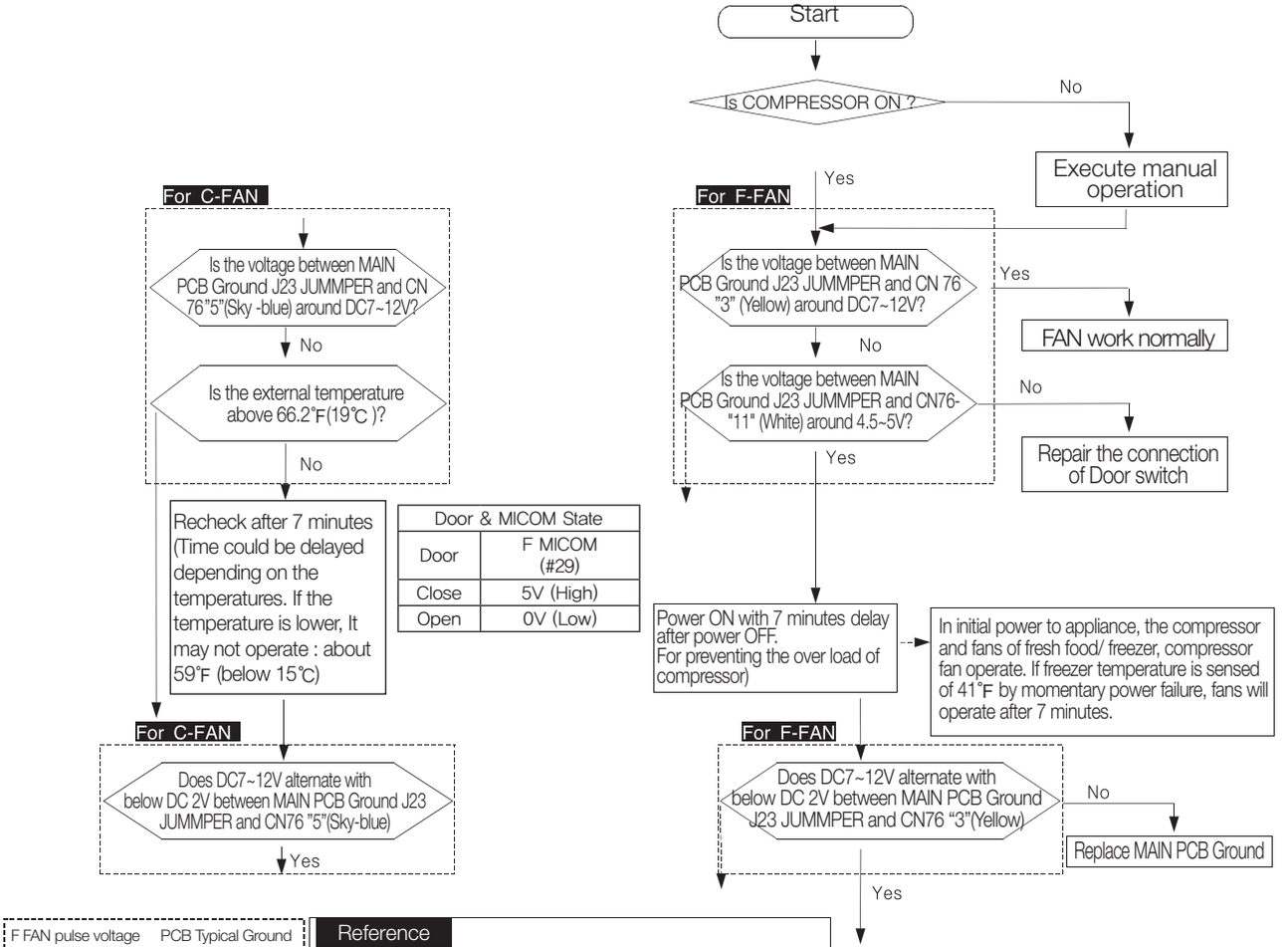
☞ Checking method ofHumidity Sensor resistance
CN30-"3"(BLU) ↔ "1"(Gray)
- Compare the temperature table after the measure.

☞ Checking method ofHumidity Sensor voltage.
- Measure the voltage of Resistance, R321(IC01 MICOM #81) on PCB or CN30-"3"(BLU) ⟷ J23 JUMMPER
- Compare the temperature table after the measure.
Measuring voltage of CN30-"3"(BLU) ⟷ J23 JUMMPER are below

PCB Typical Ground
J23 JUMMPER

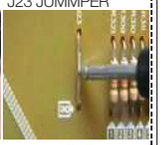
4–2–2. If FAN does not operate

- The refrigerator of this model has BLDC FAN motor. BLDC motor is driven by DC 7~12V.
- On the normal condition of COMP ON, it operates together with F-FAN motor.
  If door is opened and closed once at a high ambient temperature, it will be operated after 1 minute delay.
  Therefore, you are advised not to taken it for an error.
-. If there is a trouble, you should select the self-diagnostic function to check the trouble before power off.



F FAN pulse voltage CN76 "7"(Brown)

PCB Typical Ground J23 JUMMPER



The voltage measured around 2~3V with multi-meter though the voltage is very weak because of pulse signal

Reference

CN76-7(F),9(C)will generate the pulse signal when motor rotates.
These signals will be inputted into MICOM.
Unless signals are not inputted during motor operating, will be ON 10 seconds after fan Off. But if signals are not still entered, the above operation will restart four times more.
If signals are not entered continuously, the motor will be restarted after 10 Minutes. This function is effective when the normal operation of motor would be restrained by foreign matters such as ice.

- Expected causes
  ① Check that if FAN-MOTOR has failure itself.
  ② Check that if wiring connection has bad contact.
  ③ Check the input of the fan motor rotation pulse when motor fan operates.

☞ Display for checking the self-diagnostic function

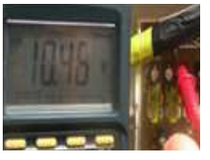
F FAN ERROR

C FAN ERROR

The voltage between PCB typical Ground J23 JUMMPER and
F FAN ; CN76 "3"(Yellow) shall be less than DC 7~12V.
C FAN ; CN76 "5"(Sky-blue) shall be less than DC 7~12V.
- Recheck if resistance values are different after measuring.

PCB Typical Ground J23 JUMMPER

1) F-FAN



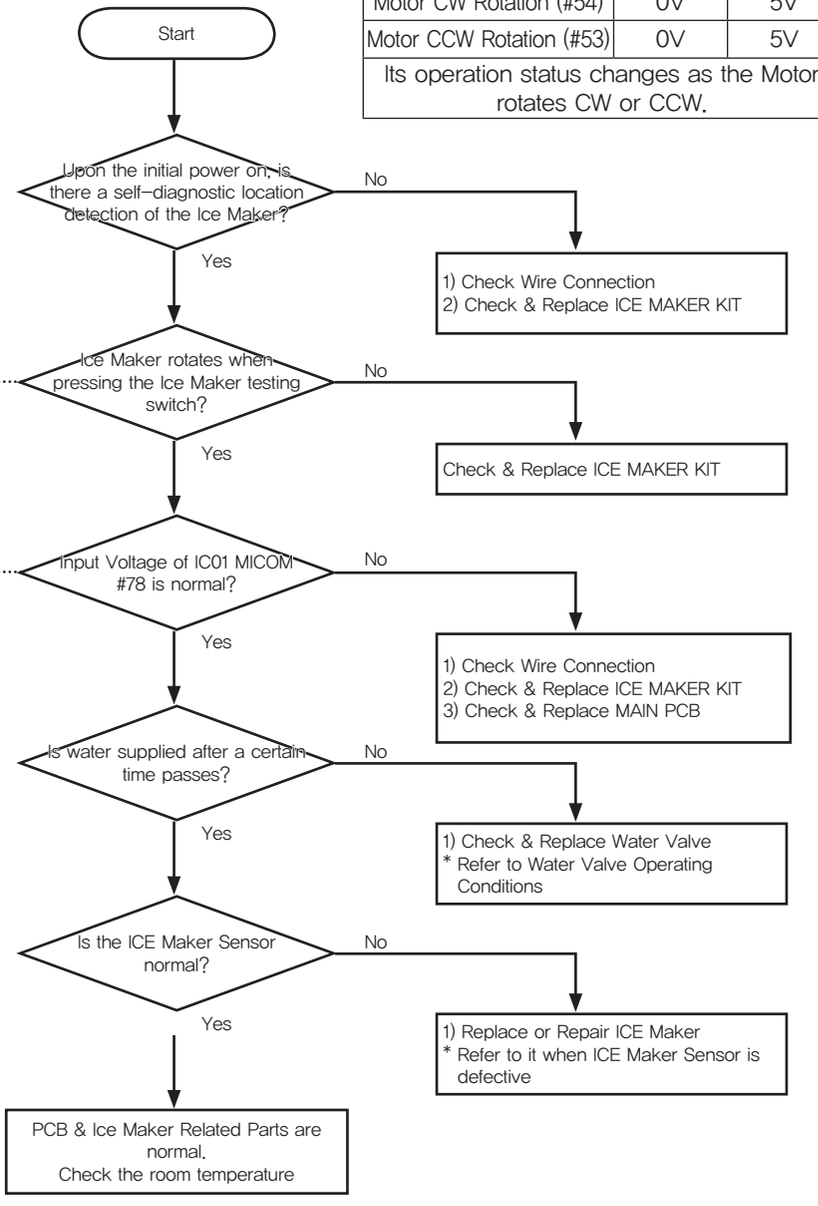
2) C-FAN

4–2–3. When ICE MAKER(FZ) does not operate

1. Water will be automatically supplied to the Ice Maker depending on temperature & time conditions, and ice will be produced to dispense.
2. Power is applied to one end of the wires. So, make sure to refer to its Exploded View whenever doing the disassembly.
3. The operation of the Ice Maker shall be done after pressing the Ice Maker Test Button. (Freezer Ice Maker) It is not possible to check when the power is off.
4. Since both of the PCB and the Ice Maker are located at the front and the back each other, make sure to have two people check them.

ERROR Code

Opration Condition while Motor is rotating Micom(IC01) Operation Status		
	Stand–by	On
Motor CW Rotation (#54)	0V	5V
Motor CCW Rotation (#53)	0V	5V
Its operation status changes as the Motor rotates CW or CCW.		



Micom(IC01) Operation Status		
#76 (Test Switch)	Stand–by	On
	5V	0V

Micom(IC01) Operation Status					
	Stand–by	Rotation	Back Rotation	Return Rotation	Stand–by
#78	5V	0V	5V	0V	5V

4–2–4. If defrost does not operate (F DEF Heater)

F DEF ERROR

Start

Measuring point of resistance value according to heater
F-DEF : CN70 "3"(Brown) ↔ CN72 "3" (Gray) measuring resistance value(63 ohm ± 7%)
** 0Ω : Short trouble / Ω ∞: Open(bimetal, heater) trouble

Are the all deforst heater normal?

No → Check the bimetal, heater disconnection, wiring connection etc.

Yes

Reference to the manual "Self-Diagnostic"

Is defrost sensor by self-diagnostic normal?

No → Refer to self-diagnostic function in the manual → Replace the applicable sensor

Yes

**Measuring point of resistance value according to sensor **
F-DEF : CCN30-"5" ↔ CN76-"1" measuring resistance value
** 0Ω : Short trouble / Ω ∞: Open trouble

Is the temperature of defrost sensor lower than 53.6°F(12°C)?

No → manual operation for a certain time

Yes

Resistance value of sensor according to temperature		
86°F(30°C)	4.22kΩ	If you need the temperature with detail, refer to DATA1. temperature table
68°F(20°C)	6.05kΩ	
50°F(10°C)	8.87kΩ	
32°F(0°C)	13.29kΩ	
14°F-10°C)	20.42kΩ	
-4°F-20°C)	32.23kΩ	
-22°F(-30°C)	52.41kΩ	

Manual defrosting of fresh food and freezer compartments operate simultaneously.

If Energy Saver + Fridge Key are pressed simultaneously for 8 seconds and then select any key, 3rd test mode(manual defrosting) will be operated.

Is power applied to each defrost heaters?

No

Yes

Does the system return to cooling operation after heating for specified time?

No → Recheck the applicable sensor.

Yes → Normal

Reference If defrost sensor temperatures of fresh food and freezer compartments are higher than 50°F(10°C), 53.6°F(12°C) by the heating from heater, heating would be finished and will return to cooling operation after a pause.

Is connection terminal of MAIN PCB part normal?

No → Repair connection terminal

Yes

Check bimetal, heater itself, disconnection etc.

Replace failure Relay or replace PCB ASS'Y

☞ Checking method of F,R DEF Heater resistance value
CN70-"3"(Brown) ↔ CN72 "3"(Gray)
- Recheck if resistance values are different after the test

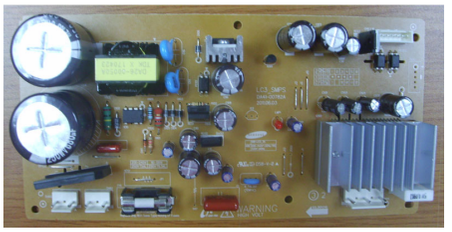
1) F DEF Heater

4–2–5. When Power is not applied

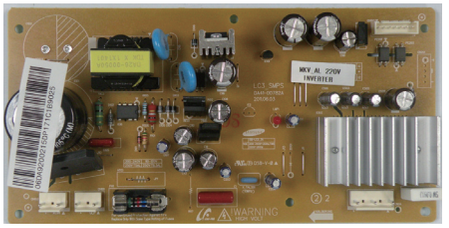
Caution

There is Over AC 115V and DC 310V at the Inverter PCB Power Circuit. So, be cautious when repairing the unit or measuring values..

AC 115V

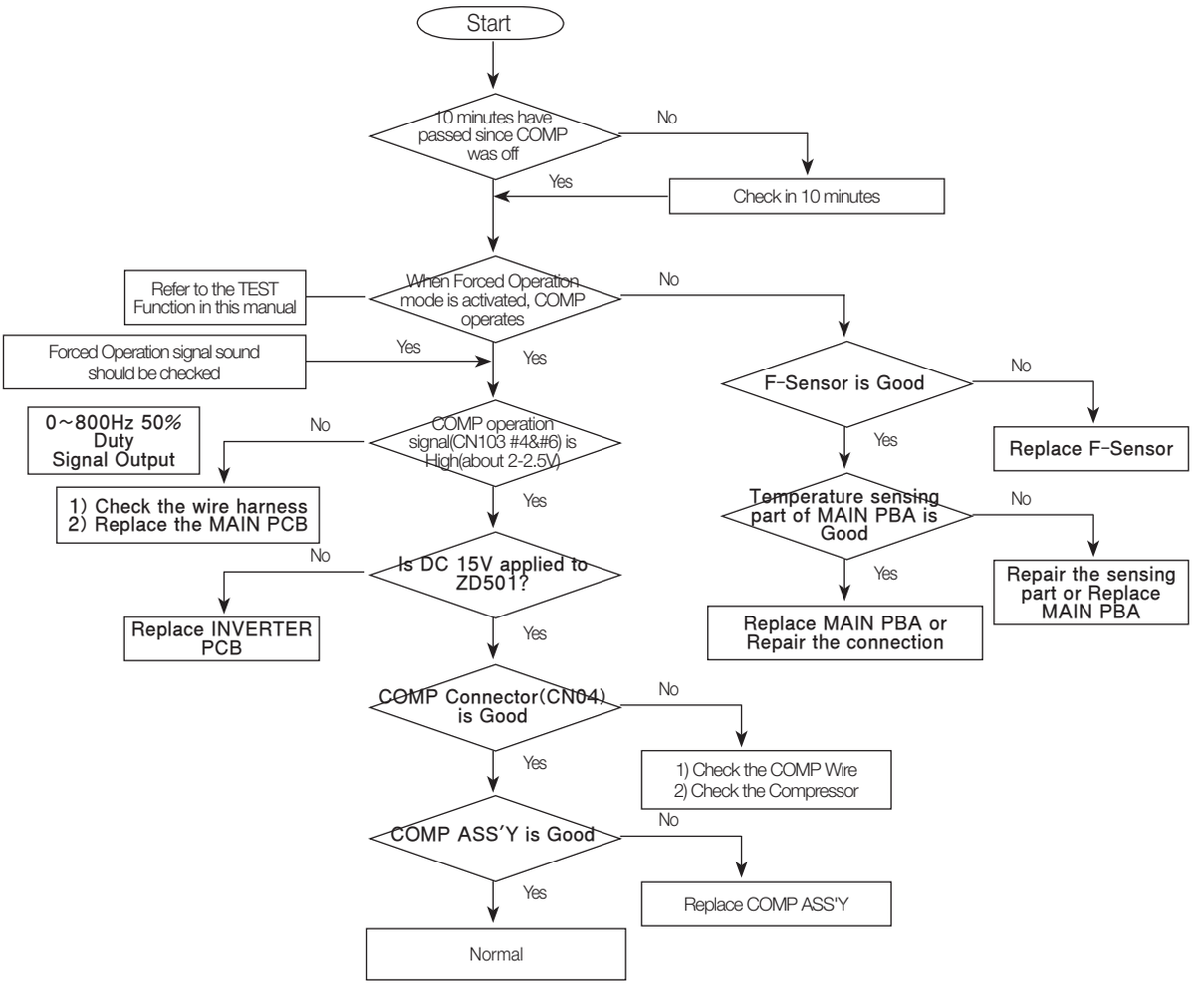


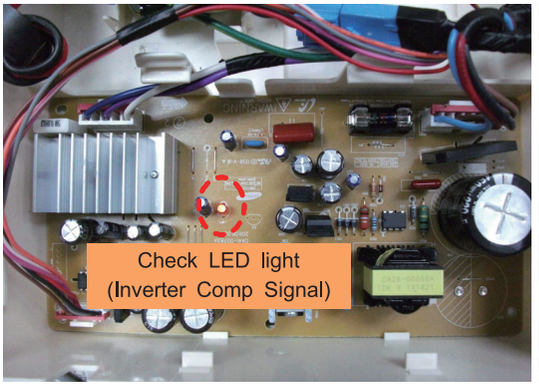
AC 230V

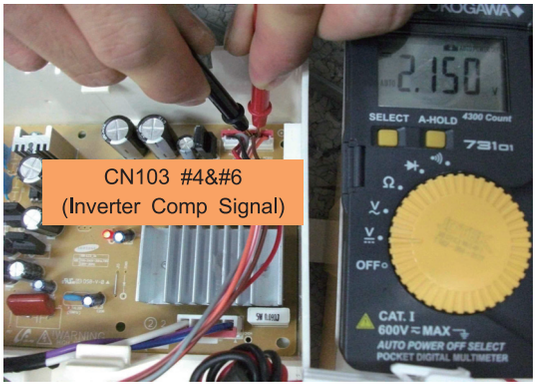


- To check the Inverter PCB, refer to the Operation and 'Refer' sections in this manual

4-2-6. When Compressor does not run (Inverter COMP.)

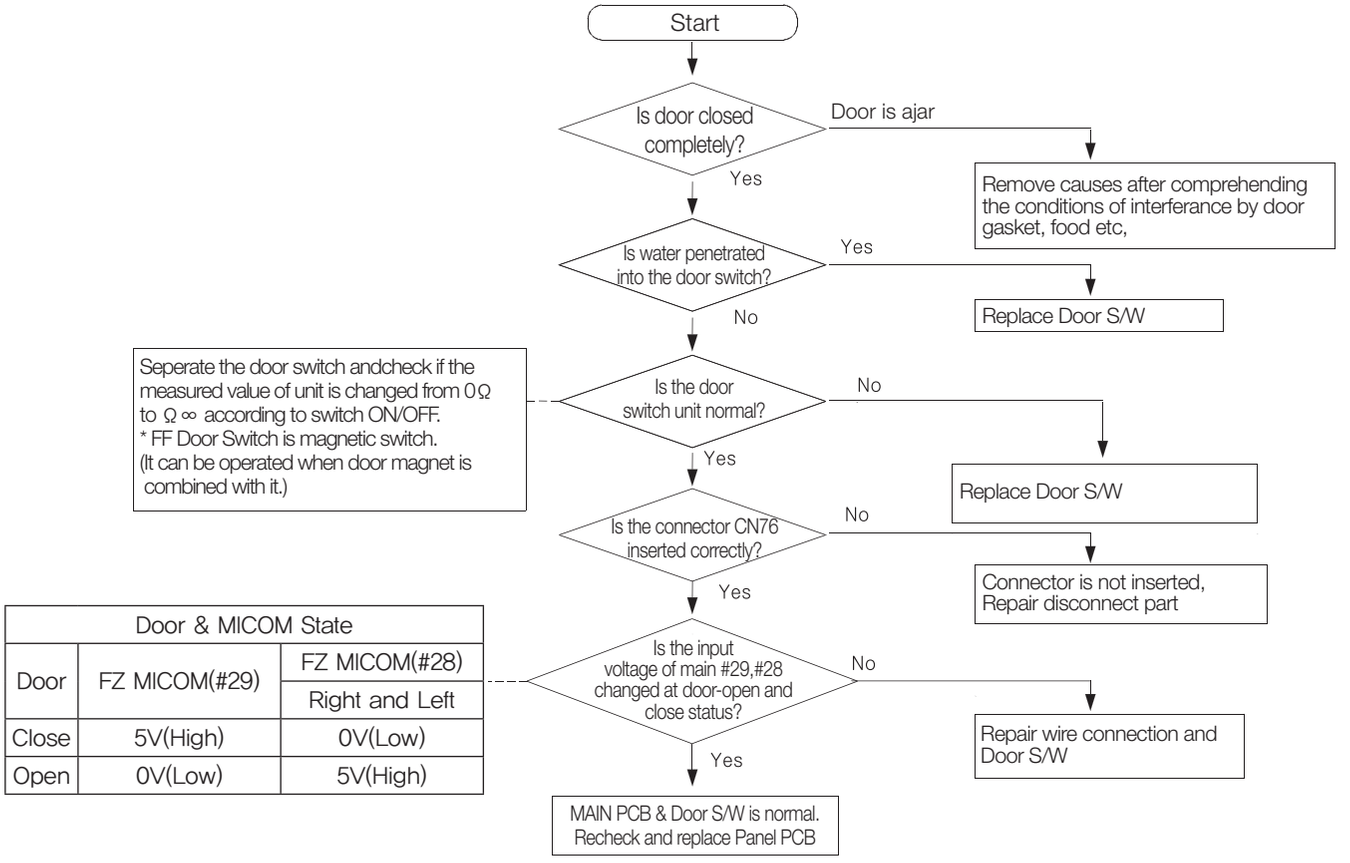






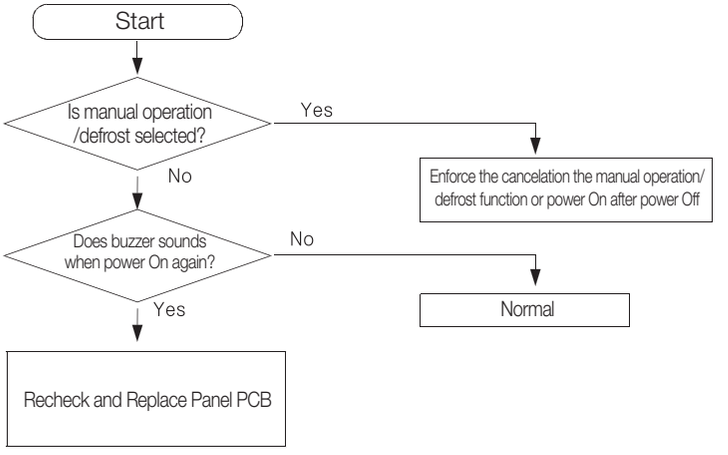
4-2-7. When alarm sounds continuously without stop(related with buzzer sound)

① If 'ding-dong'sound continuously



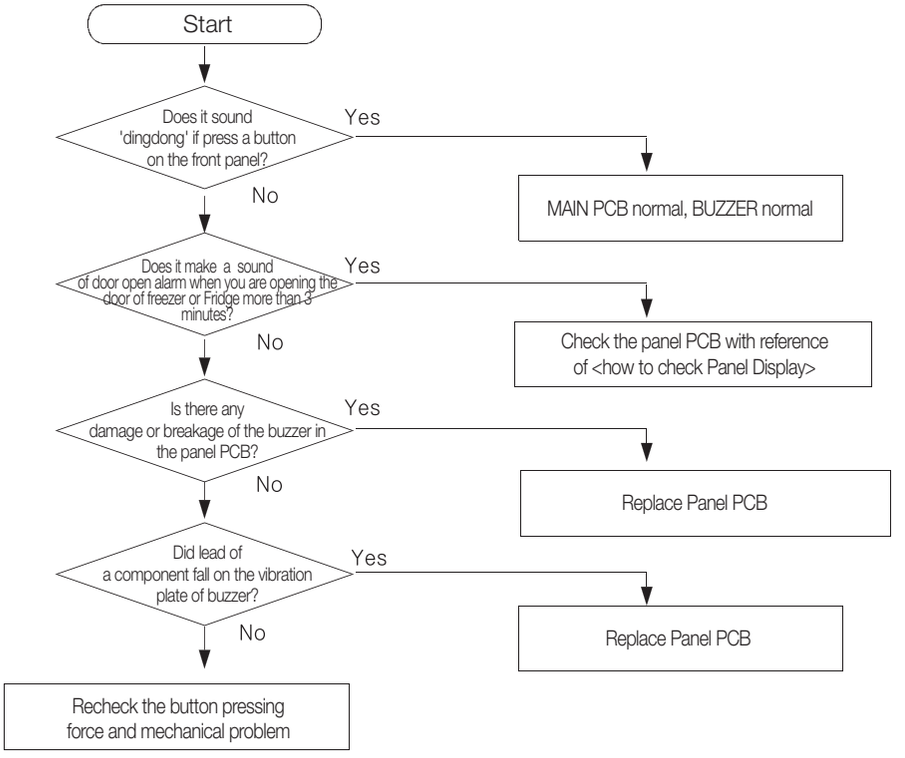
Door & MICOM State		
Door	FZ MICOM(#29)	FZ MICOM(#28)
		Right and Left
Close	5V(High)	0V(Low)
Open	0V(Low)	5V(High)

② If 'beep-beep' sounds continuously



③ If buzzer does not sound

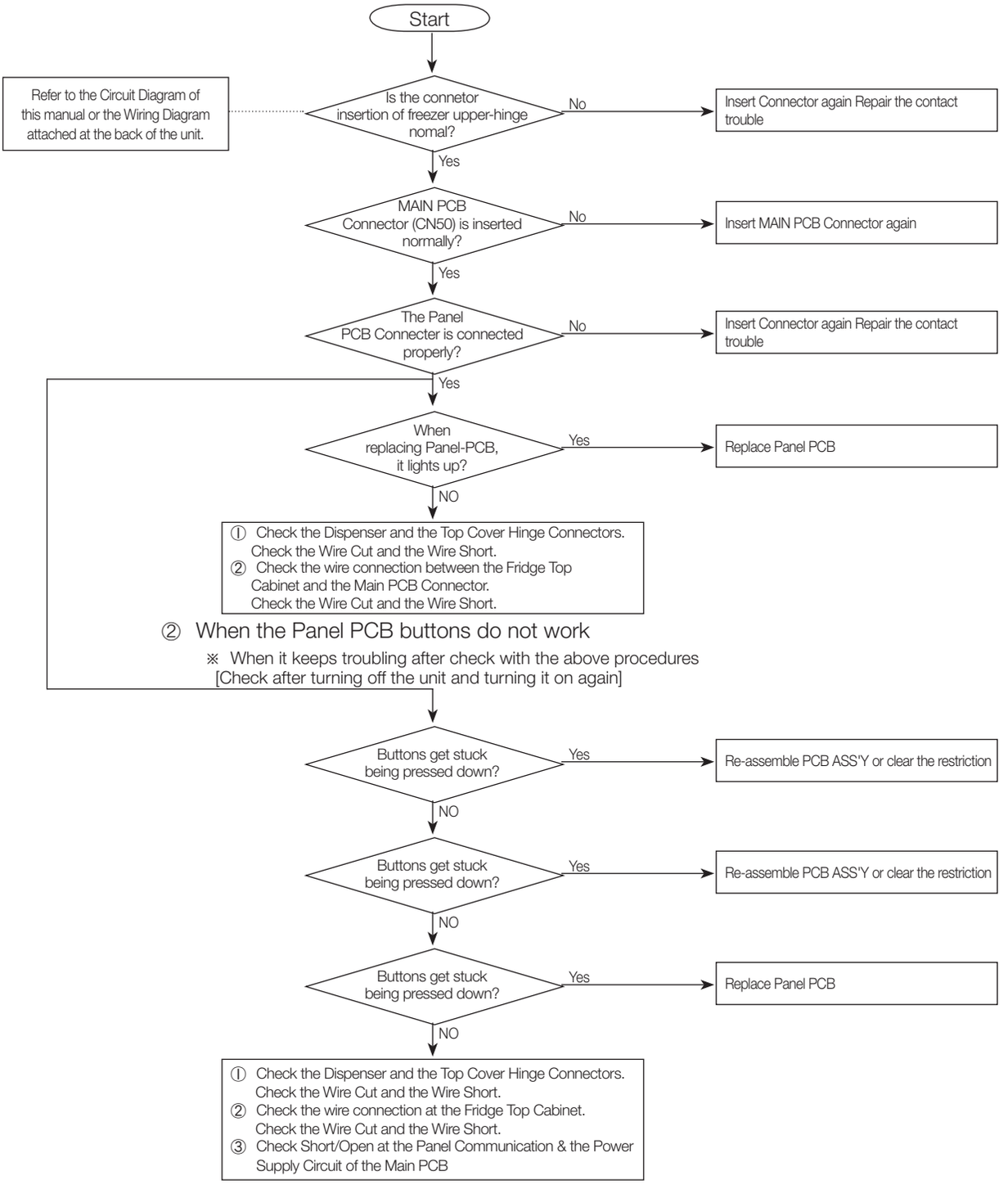
Buzzer is installed on the panel PCB in this model.
If buzzer does not sound even though the button is pressed, manual operation is started and door is opened, it should separate panel PCB and check the breakage of buzzer and bad soldering.
It is very hard to repair the panel PCB because it consists of SMD assemblies.
It is recommended to replace PCB assembly when the failure associated with panel is occurred except the minor error such as switch pressing error, surface peeling off and so on.



4–2–8. When the Panel PCB does not operate normally

① When the entire or a certain section of the Panel PCB does not light up

- There is a MICOM embedded in the Panel PCB. So, take care when doing repairs. And, except the Solder Touch, replace the PCB.



② When the Panel PCB buttons do not work

※ When it keeps troubling after check with the above procedures [Check after turning off the unit and turning it on again]

Since all Touch is used for the Panel PCB Switch, be sure to turn off the unit and turn it on again after doing a repair. [It is to adjust the sensitivity of the Touch Panel.]

4–2–9. When refrigerator ROOM Lamp does not light up

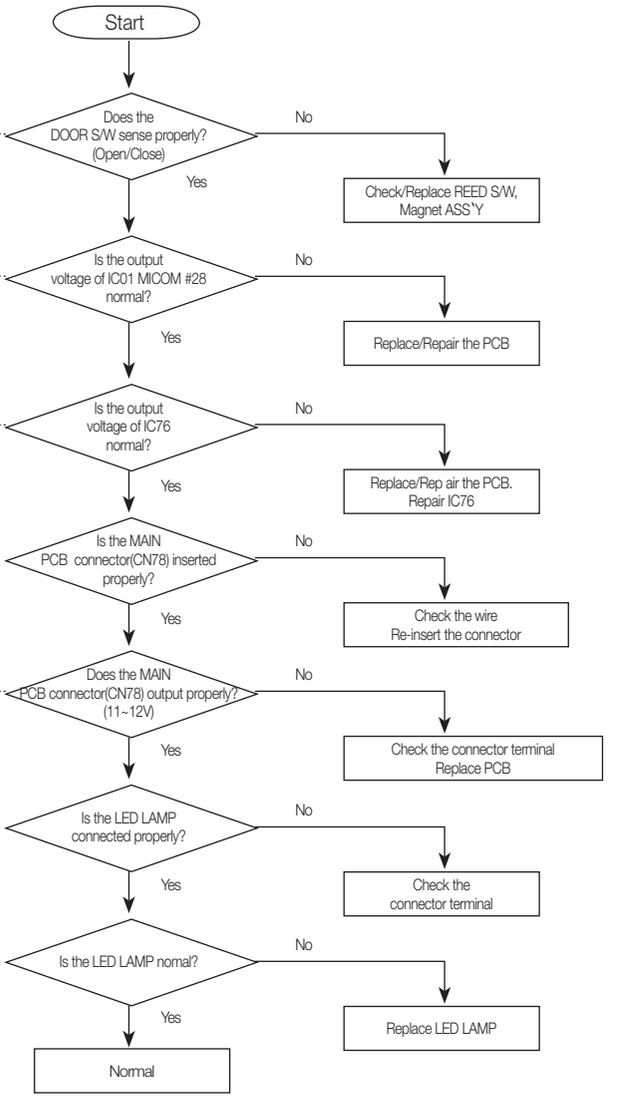
When controlling the regrigerator light with Regulator(12V) : LED LAMP
⟶ Applying to the F/R Room compartment (Option)

* If the Vegetable Lamp does not work properly, check the R compartment LED Lamp because it is connected with the R compartment LED Lamp in parallel. Refer to the circuit diagram to repair.

Door & MICOM State	
Door	MICOM(#28)
	Right and Left
Close	0V(Low)
Open	5V(High)

MICOM State		
Door (Right and Left)	R	F
	#28	#29
Close	0V (Low)	5V (High)
Open	5V (High)	0V (Low)

IC76(R)/IC77(F) State	
Micom	IC76(R) / IC77(F)
0V(Low)	0V(Low)
5V(High)	11~12V(High)



1) Measuring output voltage
- Measuring the voltage of PCB typical Ground J23 JUMMPER and IC76 voltage(CN78-"3"(Red)/R LED), IC77 voltage (CN78-"1"(Brown)/F LED)

R LED Lamp ON

R LED Lamp OF

Checking method of Door switch voltage.
- Measuring voltage of CN76-"12"(Purple) ⟷ PCB typical Ground J23 JUMMPER

Close

Open

PCB Typical Ground J23 JUMMPER

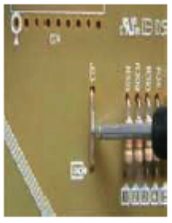
TROUBLESHOOTING

4–2–10. If ICE Water is not supplied

1. Please shut the water supplying prior to repair.
2. Power is applied to the one end of wires. Be careful when disassembling not to get an electric shock.

1) Ice Water(R) Valve

PCB Typical Ground J23 JUMMPER



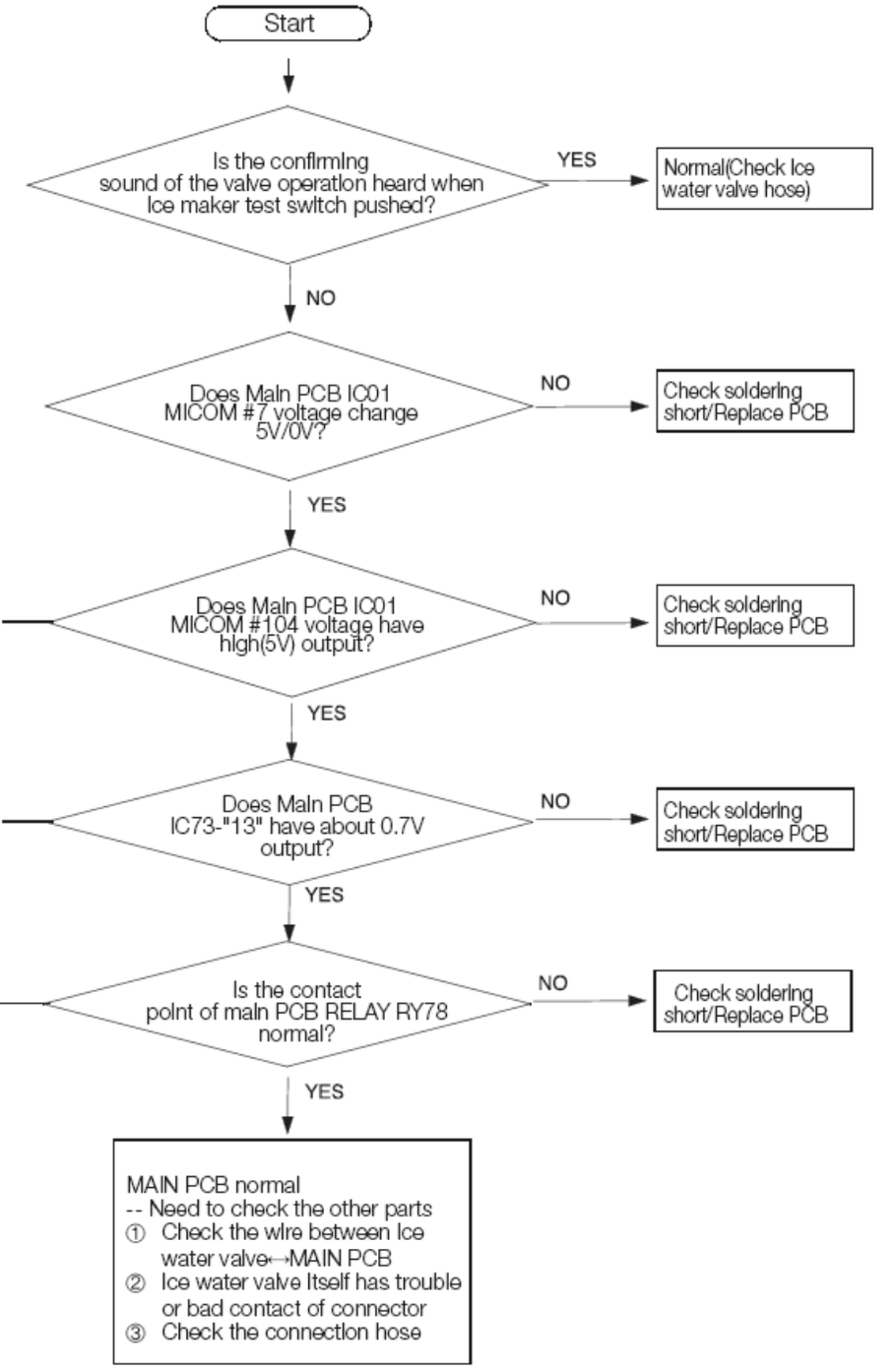
☞ Checking method of voltage Based on PCB typical Ground J23 JUMMPER

1) Check the voltage of IC73-"4"(same voltage as IC01 "104")
- ICE Water valve waiting (about 0V)

Based on PCB typical Ground J23 JUMMPER

2) IC73-"13" voltage
- ICE Water valve Waiting (about 12V±0.8V)
- ICE Water valve operating (about 0.7V±0.5V)

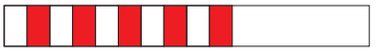
3) Check the voltage of Water Valve operating (AC voltage)
=> For checking the Relay RY78 operating.
CN70-"5"(Red)↔ CN73_1-"1"(Purple)
- ICE Water valve waiting (about AC 0V)



4–2–11. LED blinking frequency depending on protecting functions

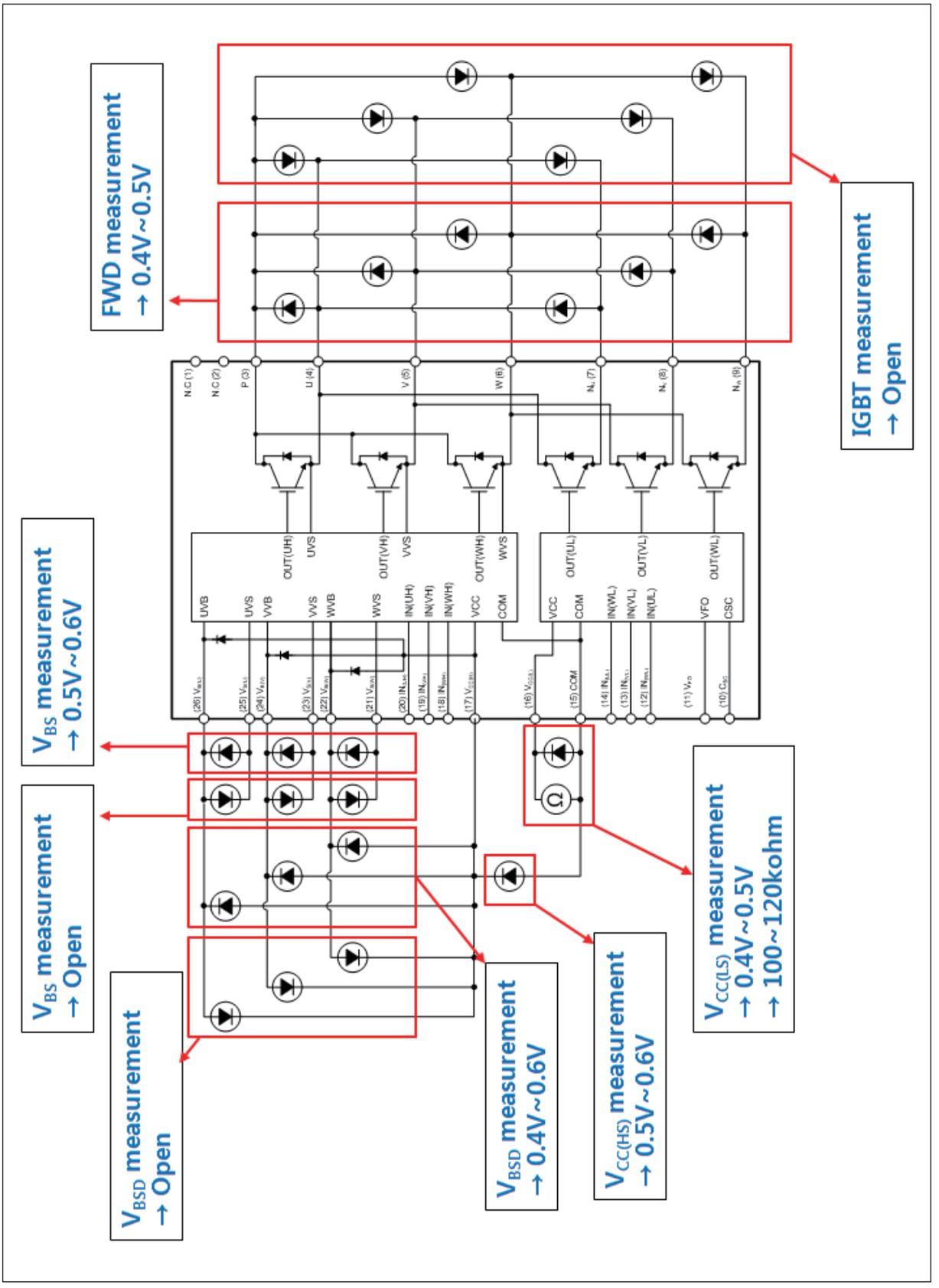
If Failure Condition is detected during compressor is operating, immediately stop Compressor operating and stand by 5 minutes. During this 5 minutes, RPM command signal is not available. It means, even if available RPM command signal is applied to the compressor, it does not work and keep standing by.

Blinking time is 1 second and dwell time is 2 seconds.

LED Blinking Frequency	Protecting Functions	Remarks
	Normal Operation	N/A
	Starting Failure	1. Short between COMP U,V, and W phase(CN04) 2. Short among IPM Pins(No. #1 ~ 26) 3. Drop the IPM operating Voltage under DC 13.5V 4. Other cases, check the COMP, cycle, etc.
	SPM Fault	
	Abnormal Current Detection	1. Open the COMP wire(CN04) 2. Bad condition of R1(ex. Bad soldering.) 3. Other cases, check the COMP, cycle, etc.
	Motor Locked / Over RPM	1. Operating the locked rotor COMP within 5 second. 2. Operating the COMP under 1000 RPM more than 5 second. 3. Occur the huge change of input voltage in a moment. 4. Other cases, check the COMP, cycle, etc.
	Under Voltage	1. Drop the input voltage under AC 53V 2. Short resistor R312 (DC link resistor)
	Over Voltage	1. Increase the input voltage over AC 155V 2. Short resistor among R309, R310 and R311 (DC link resistor)

LED blinking frequency depending on protecting functions
If the same blinking, After 5 minutes, Follow the Remarks

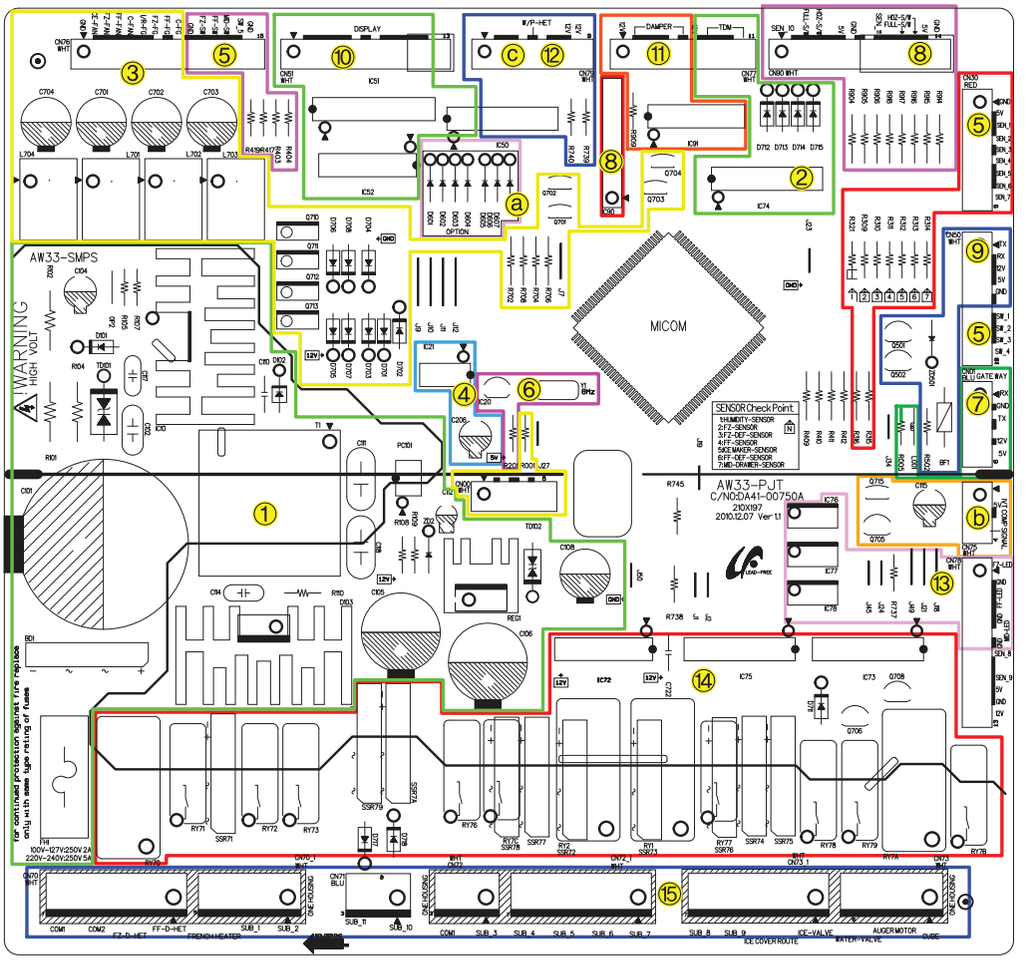
SPM FREEWHEELING DIODE VOLTAGE VALUE



5. PCB DIAGRAM

PCB DIAGRAM

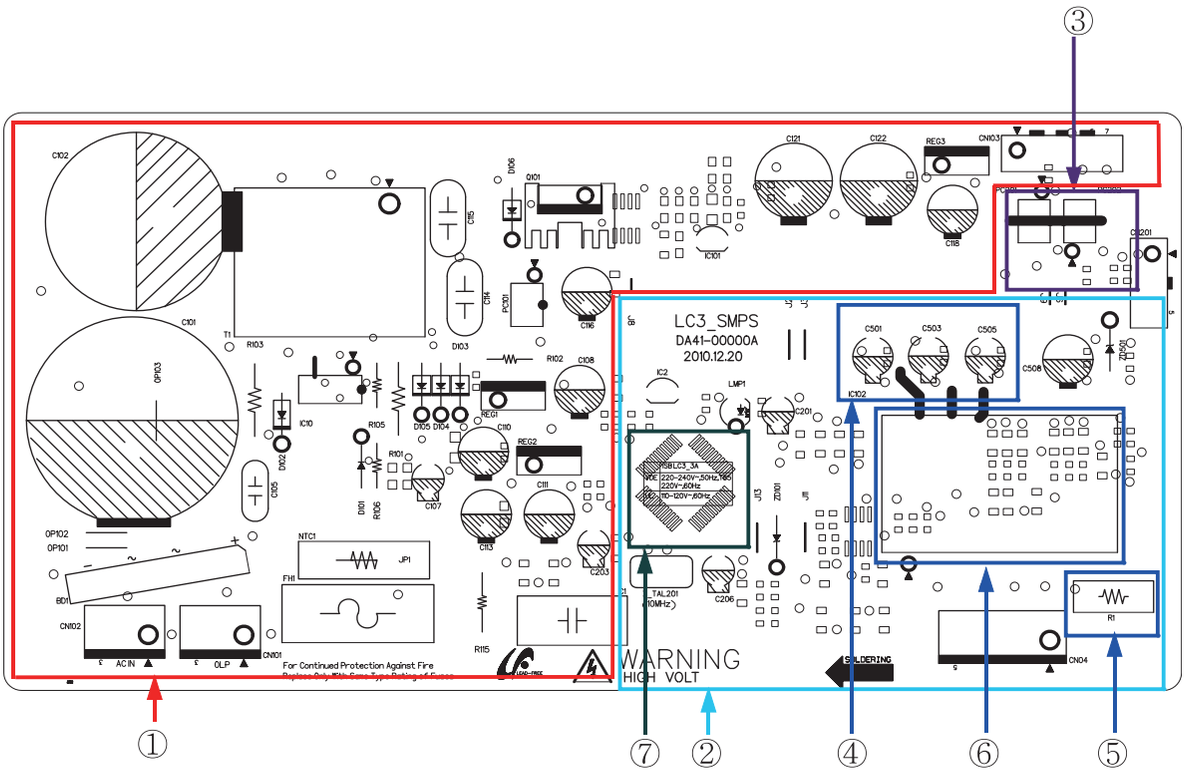
5-1) PCB Layout with part position



1. DC12V, 5V, GND supplied from SMPS PCB (Not Used)
2. Circuit for controlling Step-Valve (3-Way Valve) * Option
3. FAN MOTOR control part : To supply the power from 8.3V ~ 12V according to the motor types. (F,R,C,ICE)
4. EEPROM : Save and record every kinds of data.
5. Transmit inputted signals from every sensor into MICOM after eliminate the noise.
6. Micom : control the regrigerator Ceramic resonator : generate the basic frequency of Micom operation. Reset IC : make Micom reset if input voltage of Micom is detected less than the specified voltage
7. PLC input/output
   - PLC (Power Line communication) * Option (PLC module is not inserted unless specified occasion)
8. Operate ICE-MAKER, supply power to MOTOR, and sense the variation of switch.
9. Main Micom ↔ Panel Micom serial communication circuit - Dispenser option input part (Water & Cover Ice route switch)
10. PANTRY Room display control part : display LED, detect KEY state.
11. Control PANTRY Room damper & Damper heater
12. Water Tank Heater Controls (also controls other options)
13. LED LAMP Control Circuit (F,R room Lamp)
14. Relay parts that controls AC load and receives Micom operating signal through Sink IC.
15. Connector with AC load
    a. Diode option setting area
    b. Inverter COMP controlling signal
    c. Flow Sensor controlling signal

PCB DIAGRAM

5-2) PCB Layout with part position (Inverter Board)

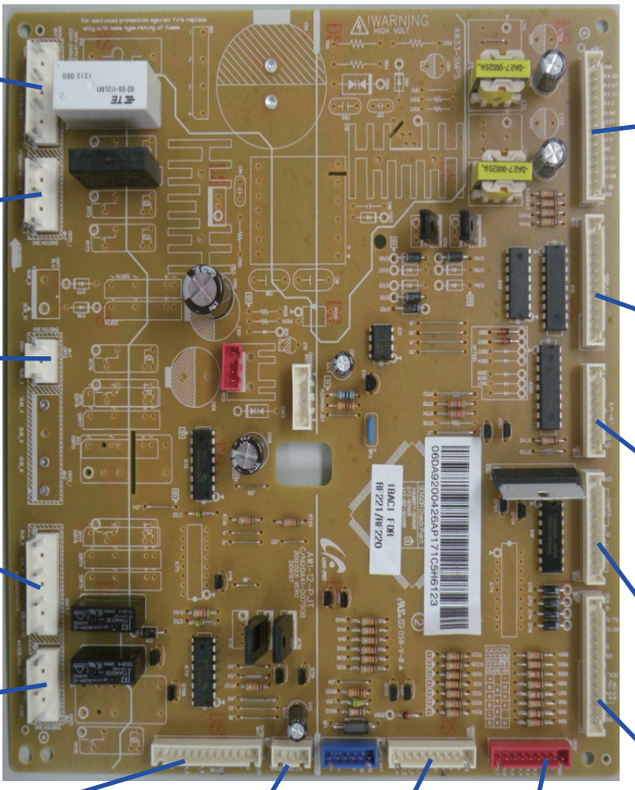


1. PCB Power Supply : From the SMPS circuit, it supplies 13.2V and 5V for the Main PBA control and supplies 15V and 5V to the Inverter circuit for the Compressor control.
2. Inverter Control Circuit : Fridge Compressor Control Circuit.
3. COMP Driving / Feedback Circuit
   It receives the COMP operation signals from the Main PBA and feedbacks the inverter errors to the Main PBA.
4. BOOTSTRAP Charger : It is an independent power circuit for the driving of the IMP High-Phase IGBT.
5. Current Pickup Circuit : It pickups the currents taken by the Shunt resistance and does the PWM DUTY control.
6. IPM (FNE41060)
7. Micom (MN103SFC2D)

PCB DIAGRAM

5–3) Connector Layout with part position (Main Board)

5-3-1. RF22*, RL22*



CN70 – AC LOAD
① : FF–DEF–HEATER
③ : FZ–DEF–HEATER
ICE DUCT HEATER
⑤ : COMMON2 LINE(L)
⑦ : COMMON1 LINE(N)

CN70_1 – AC LOAD
① : Open
③ : Open
⑤ : FRENCH–HEATER
DISPENSER HEATER

CN72 – AC LOAD
① : ICE WATER
SOLENOIDE VALVE (FZ)
③ : COMMON1 LINE(N)

CN73_1 – AC LOAD
① : OPEN
③ : OPEN
⑤ : OPEN
⑦ : OPEN

CN73 – AC LOAD
① : OPEN
③ : OPEN
⑤ : WATER SOLENOIDE VALVE

CN78 – LAMP(LED)/SENSOR
① : FZ LAMP (LED)
② : GND
③ : FF LAMP (LED)
④ : OPEN
⑤ : GND
⑥ : OPEN
⑦ : OPEN
⑧ : AMBIENT SENSOR
⑨ : OPEN
⑩ : OPEN
⑪ : +5V
⑫ : GND
⑬ : +12V (Option : 13.2V)

CN75 – Inverter
① : COMP. SIGNAL INPUT
② : +5V
③ : GND
⑤ : COMP. SIGNAL OUTPUT

CN50
① : LED PANEL TX
② : LED PANEL RX
③ : +12V (Option : 13.2V)
④ : +5V
⑤, ⑥ : GND
⑦ : WATER SWITCH
⑧ : OPEN
⑨ : OPEN
⑩ : OPEN

CN30 – SENSOR
① : GND
② : +5V
③ : HUMIDITY
④ : FZ–SENSOR
⑤ : FZ–DEF–SEOSOR
⑥ : FF–SENSOR
⑦ : IR–SENSOR
⑧ : FF–DEF–SENSOR
⑨ : PANTRY ROOM SENSOR

CN76 – BLDC MOTOR & DOOR SWITCH
① : GND
② : OPEN
③ : FZ–FAN OPERATION SIGANL
④ : FF–FAN OPERATION SIGNAL
⑤ : C–FAN OPERATION SIGANL
⑥ : OPEN
⑦ : FZ–FAN SIGNAL INPUT VOLT
⑧ : FF–FAN SIGNAL INPUT VOLT
⑨ : C–FAN SIGNAL INPUT VOLT
⑩ : GND
⑪ : FZ–DOOR SWITCH
⑫ : FF–DOOR SWITCH
⑬ : OPEN
⑭ : OPEN
⑮ : OPEN

CN51 – PANTRY ROOM DISPLAY
① : OPEN
② : OPEN
③~⑦ : PANTRY ROOM LED DRIVER
⑧~⑩ : OPEN
⑪ : PANTRY ROOM SWITCH
⑫ : ICE MAKER(FZ) MOTOR CCW
⑬ : ICE MAKER(FZ) MOTOR CW

CN79
① : +5V
② : GND
③ : FLOW SENSOR OUT
④ : OPEN
⑤ : ICE WATER PIPE HEATER (FZ)
⑥ : OPEN
⑦ : OPEN
⑧ : +12V (Option : 13.2V)
⑨ : +12V (Option : 13.2V)

CN77 – DAMPER & VALVE
①~② : DAMPER HEATER
③~⑥ : DAMPER MOTOR
⑦ : +12V (Option : 13.2V)
⑧~⑪ : STEP VALVE

CN90 – ICE MAKER
① : OPEN
② : OPEN
③ : OPEN
④ : OPEN
⑤ : +5V
⑥ : OPEN
⑦ : GND
⑧ : GND
⑨ : SENSOR (FZ)
⑩ : TEST SWITCH (FZ)
⑪ : OPEN
⑫ : HALL IC OUTPUT
⑬ : +5V
⑭ : GND

PCB DIAGRAM

5-4) Connector Layout with part position (Inverter Board)

AC 115V

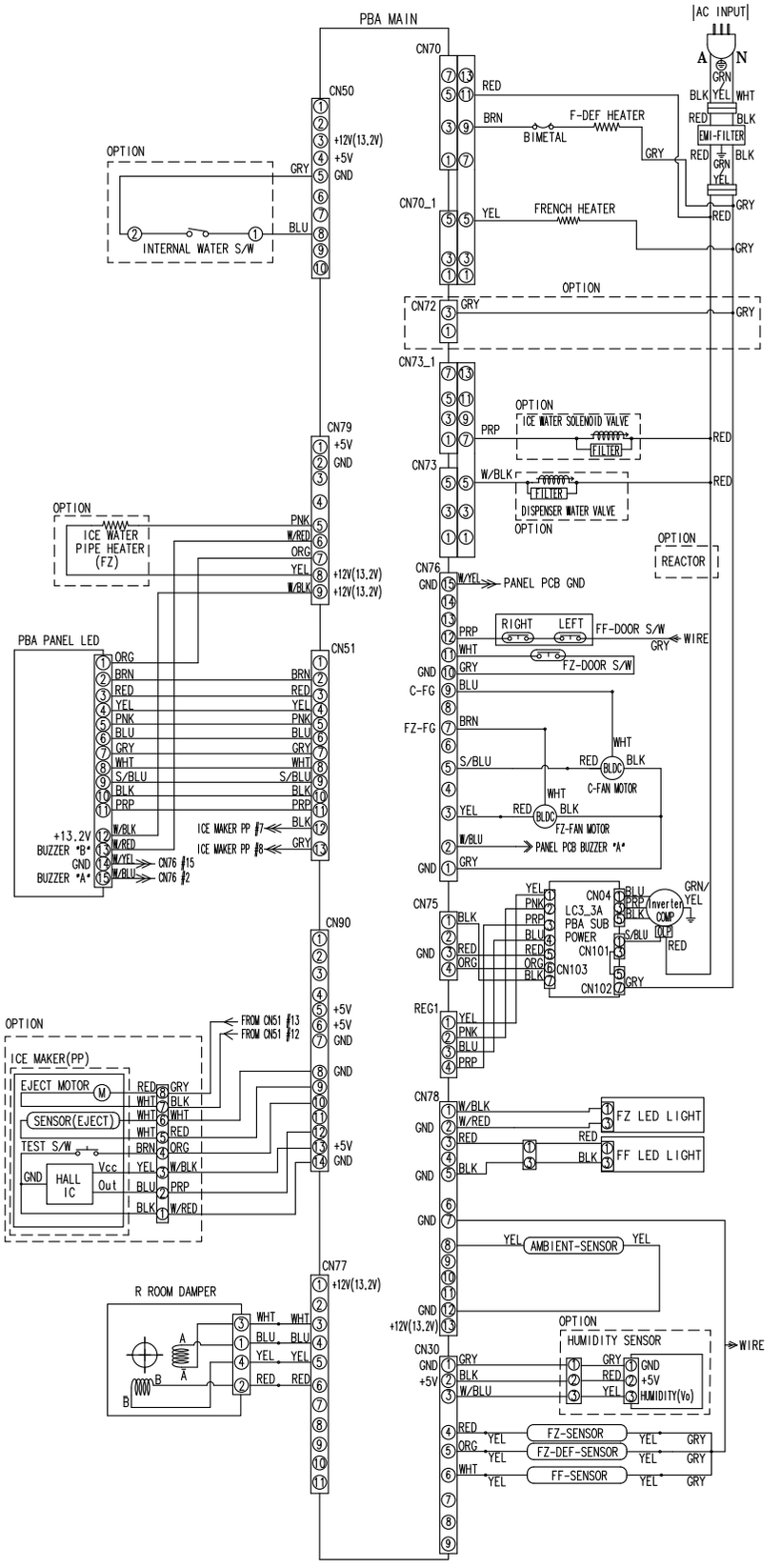
①② 13.2V ③ 5V
④⑤ GND ⑥ RPM ⑦FB

POWER(115V) OLP

⑤W ③V ①U

6. WIRING DIAGRAM

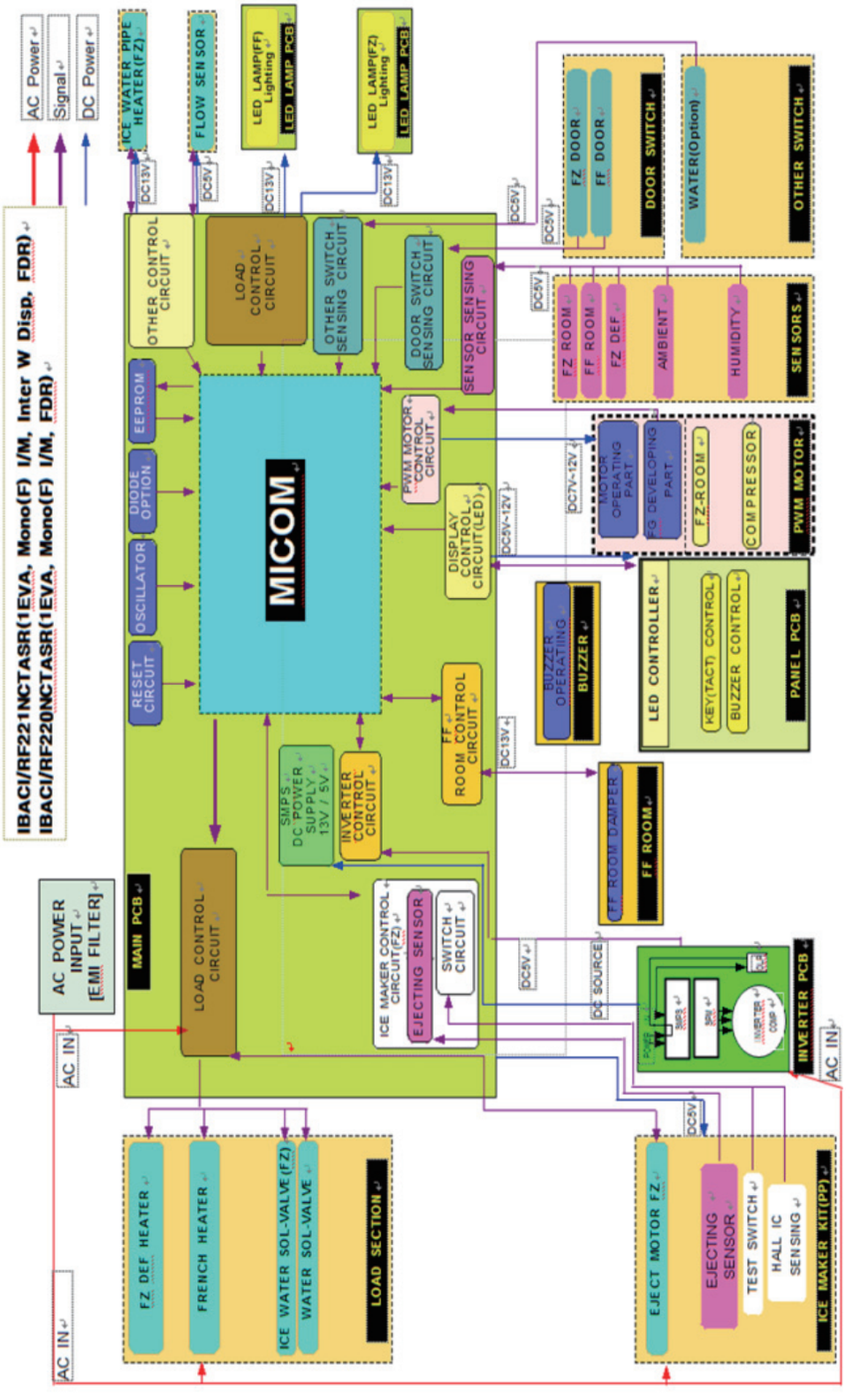
6-1) Model : RF221*, RF220*, RL225*, RL220*



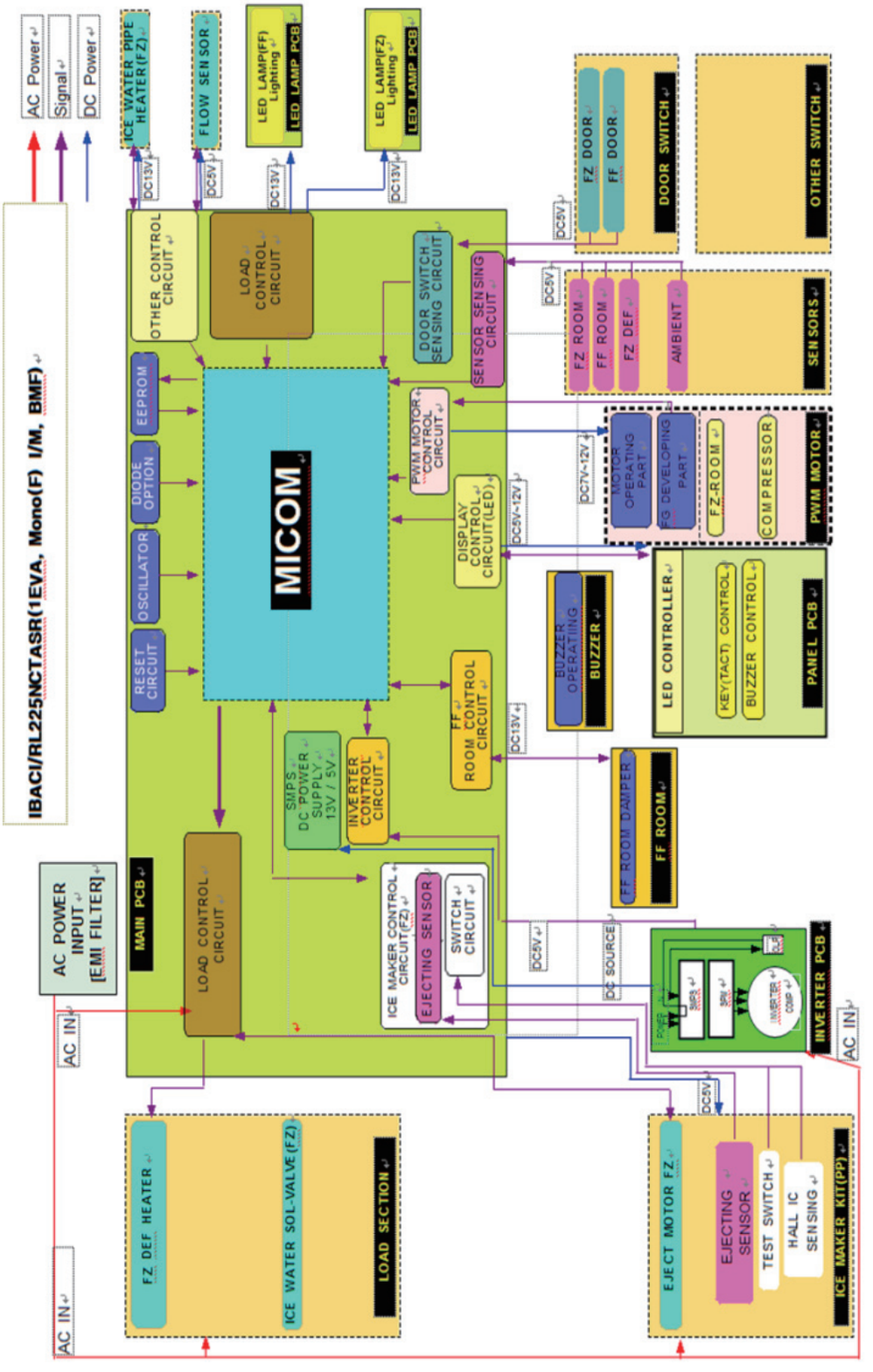
7. SCHEMATIC DIAGRAM

7-1) Whole block diagram

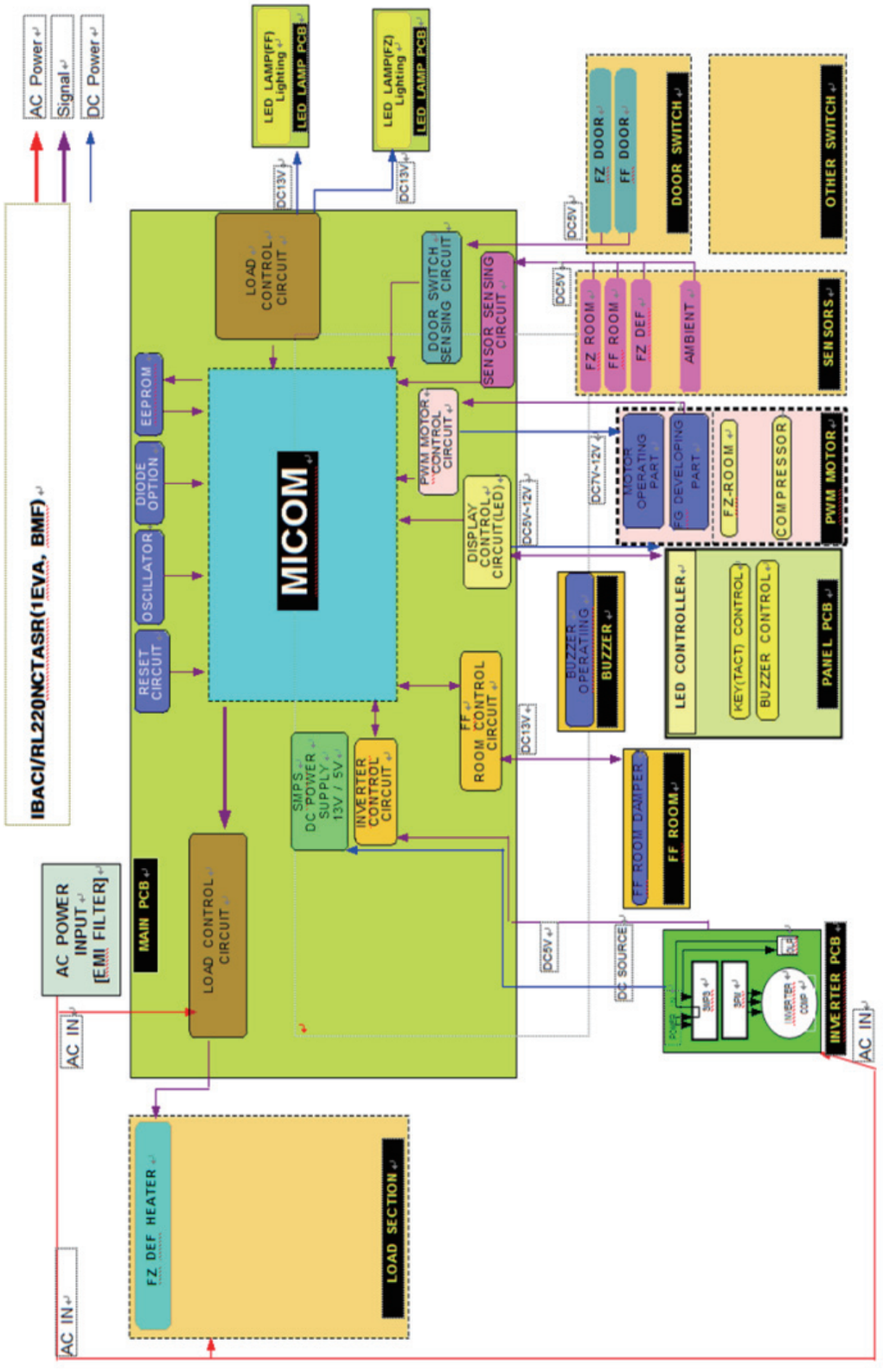
7-1-1. MODEL : RF221NCTASR/RF220NCTASR



7-1-2. MODEL : RL225NCTASR



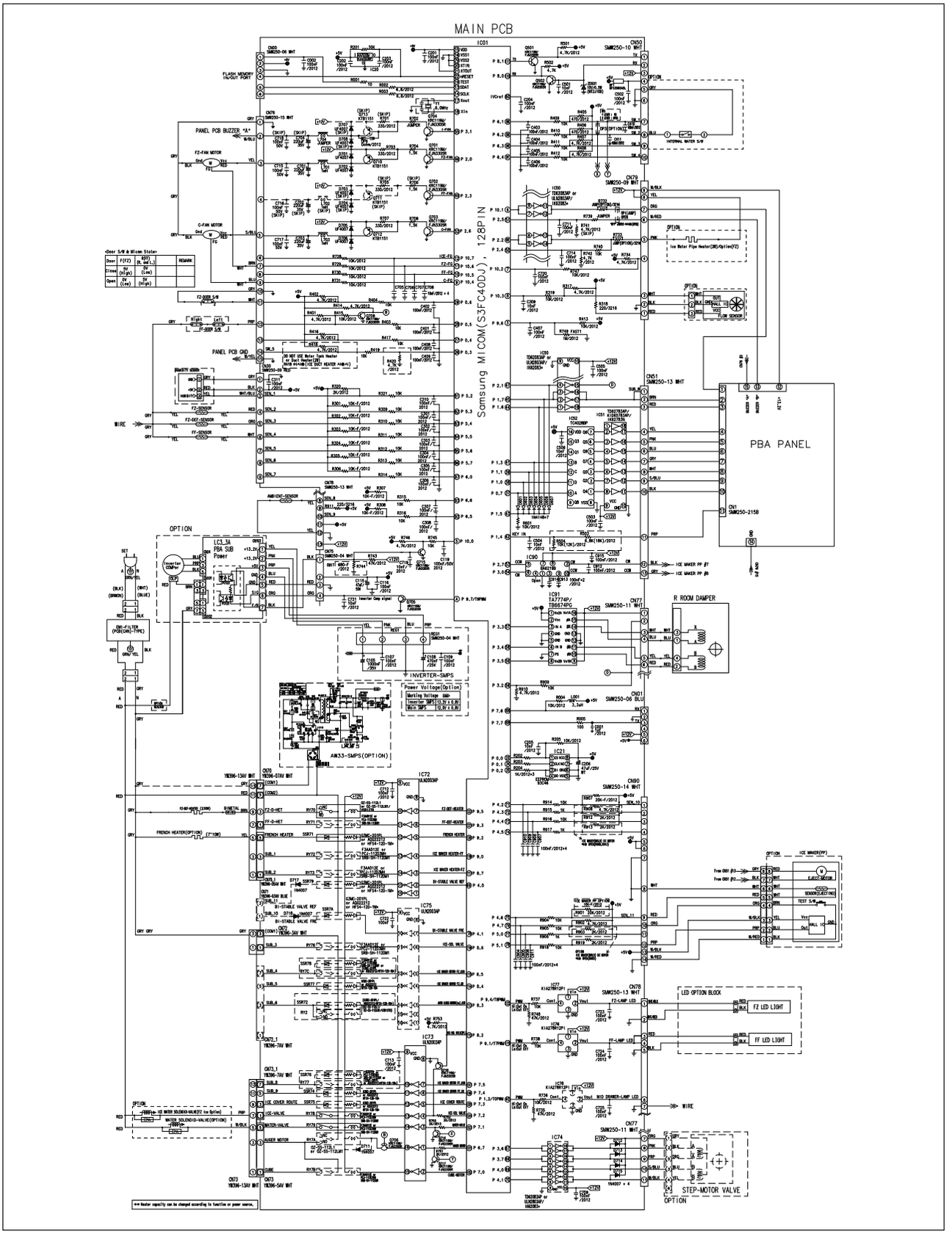
7-1-3. MODEL : RL220NCTASR



SCHEMATIC DIAGRAM

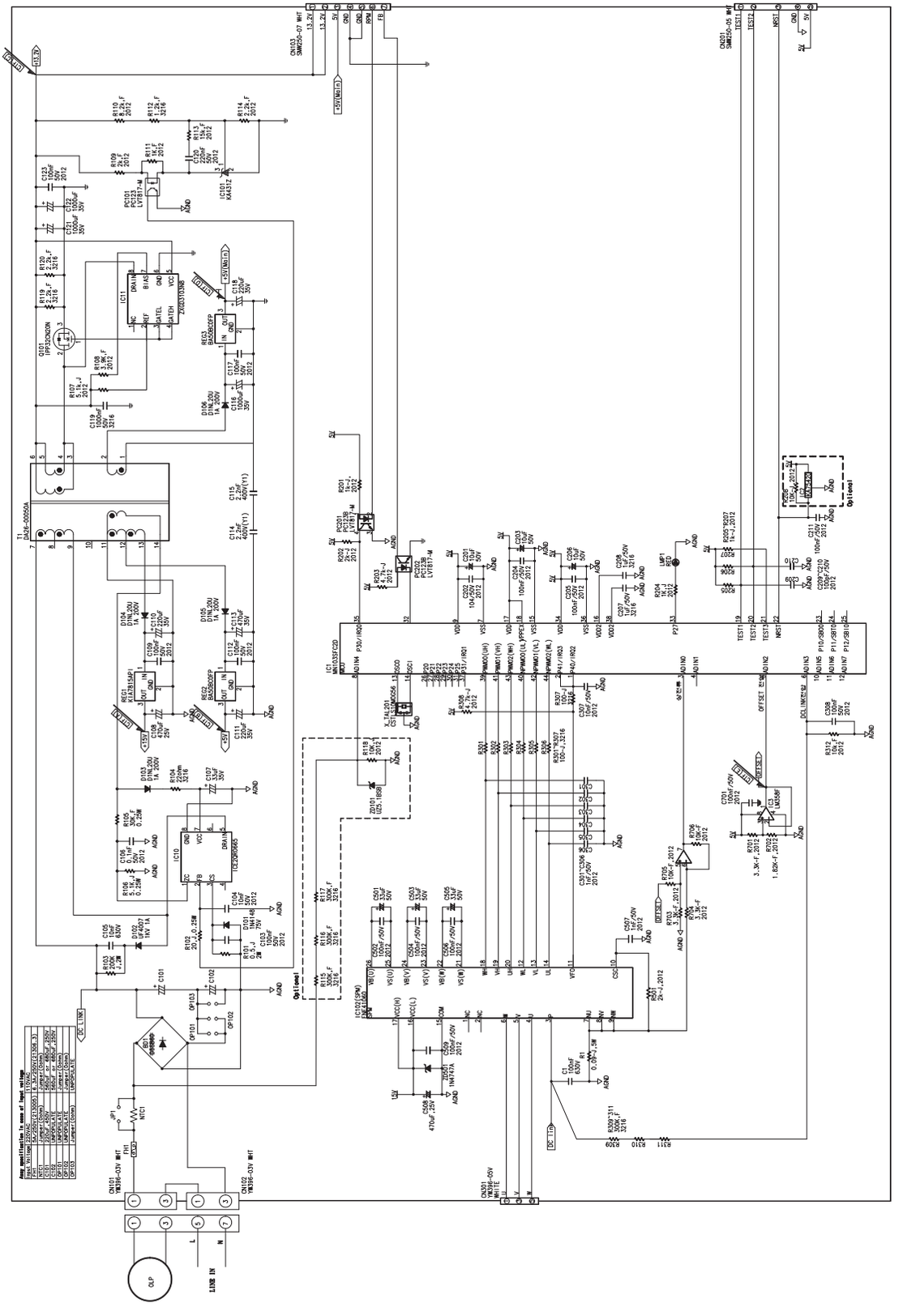
7-2) CIRCUIT DIAGRAM

7-2-1. Main



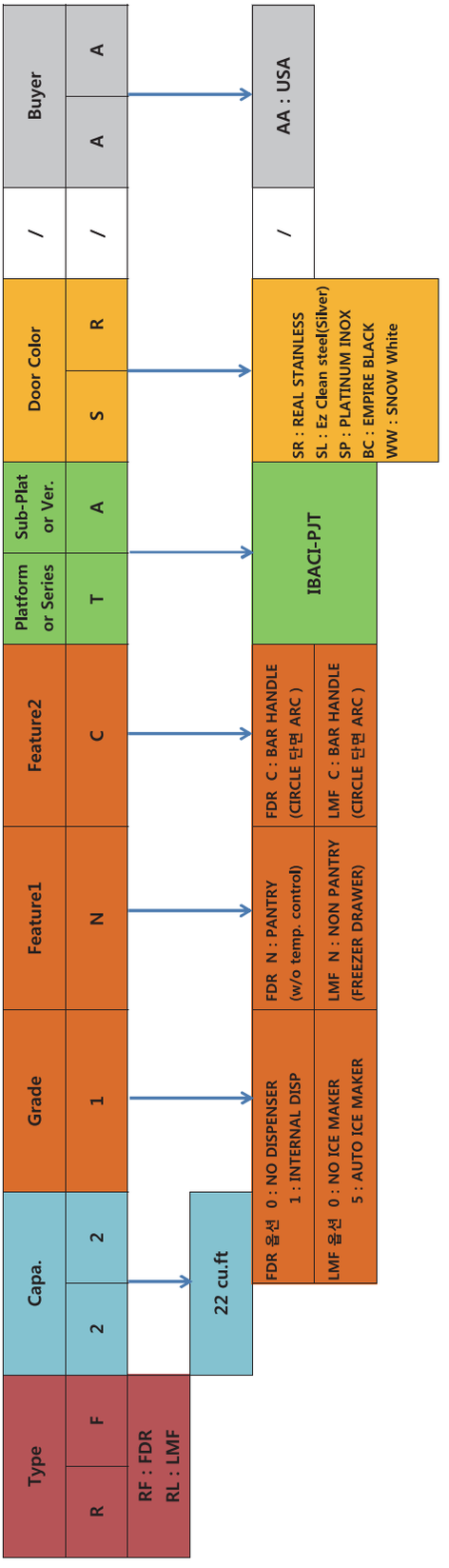
SCHEMATIC DIAGRAM

7-2-2. INVERTER (AC 115V)



SCHEMATIC DIAGRAM

7-3) Model name (nomenclature) – RF221*, RF220*, RL225*, RL220*



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