DAEWOO

Service Manual
Refrigerator
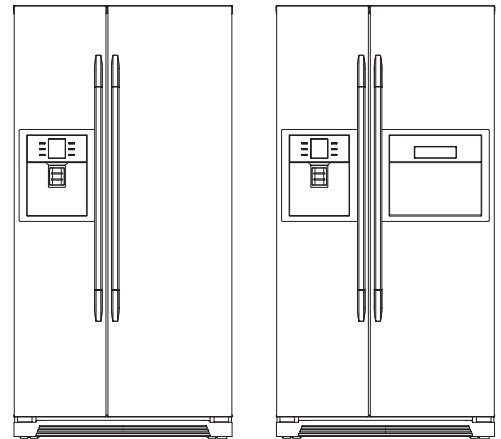
Refrigerant Type (R-134a)	FRS-U20DD.	FRS-U20FD.
	FRS-U20ED.	FRS-U20GD.
Refrigerant Type (R-600a)	FRN-U20DD.	FRN-U20FD.
	FRN-U20ED.	FRN-U20GD.
Compressor Type (Inverter)	FRN-U20DD.I	FRN-U20FD.I
	FRN-U20ED.I	FRN-U20GD.I
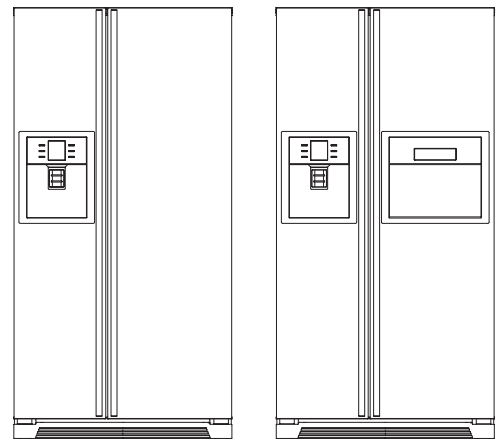
Refrigerant Type (R-134a)	FRS-U20DF.	FRS-U20FF.
	FRS-U20EF.	FRS-U20GF.
Refrigerant Type (R-600a)	FRN-U20DF.	FRN-U20FF.
	FRN-U20EF.	FRN-U20GF.
Compressor Type (Inverter)	FRN-U20DF.I	FRN-U20FF.I
	FRN-U20EF.I	FRN-U20GF.I

✔ Caution

In this manual, some parts can be changed for improving their performance without notice. So, If you need the latest parts information, please visit and refer to PPL (Parts Price List)] in Service Infromation Center. (http://svc.dwe.co.kr)

SEP. 2008.

1. WARNINGS AND PRECAUTIONS FOR SAFETY

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

1. Be care of an electric shock. Disconnect power cord from wall outlet and wait for more than three minutes before replacing PCB parts.
   Shut off the power whenever replacing and repairing electric components.

2. When connecting power cord, please wait for more than five minutes after power cord was disconnected from the wall outlet.

3. Please check if the power plug is pressed down by the refrigerator against the wall.
   If the power plug was damaged, it may cause fire or electric shock.

4. If the wall outlet is over loaded, it may cause fire.
   Please use its own individual electrical outlet for the refrigerator.

5. Please make sure the outlet is properly earthed, particularly in wet or damp area.

6. Use standard electrical components when replacing them.

7. Make sure the hook is correctly engaged.
   Remove dust and foreign materials from the housing and connecting parts.

8. Do not fray, damage, machine, heavily bend, pull out or twist the power cord.

9. Please check the evidence of moisture intrusion in the electrical components.
   Replace the parts or mask it with insulation tapes if moisture intrusion was confirmed.

10. Do not touch the icemaker with hands or tools to confirm the operation of geared motor.

11. Do not let the customers repair, disassemble and reconstruct the refrigerator for themselves.
    It may cause accident, electric shock, or fire.

12. Do not store flammable materials such as ether, benzene, alcohol, chemicals, gas, or medicine in the refrigerator.

13. Do not put flower vase, cup, cosmetics, chemicals, etc., or container with full of water on the top of the refrigerator.

14. Do not put glass bottles with full of water into the freezer.
    The contents shall freeze and break the glass bottles.

15. When you scrap the refrigerator, please disconnect the door gasket first and scrap it where children are not accessible.

2. EXTERNAL VIEWS

2-1. External Size (U20DF./U20DG.. Series)
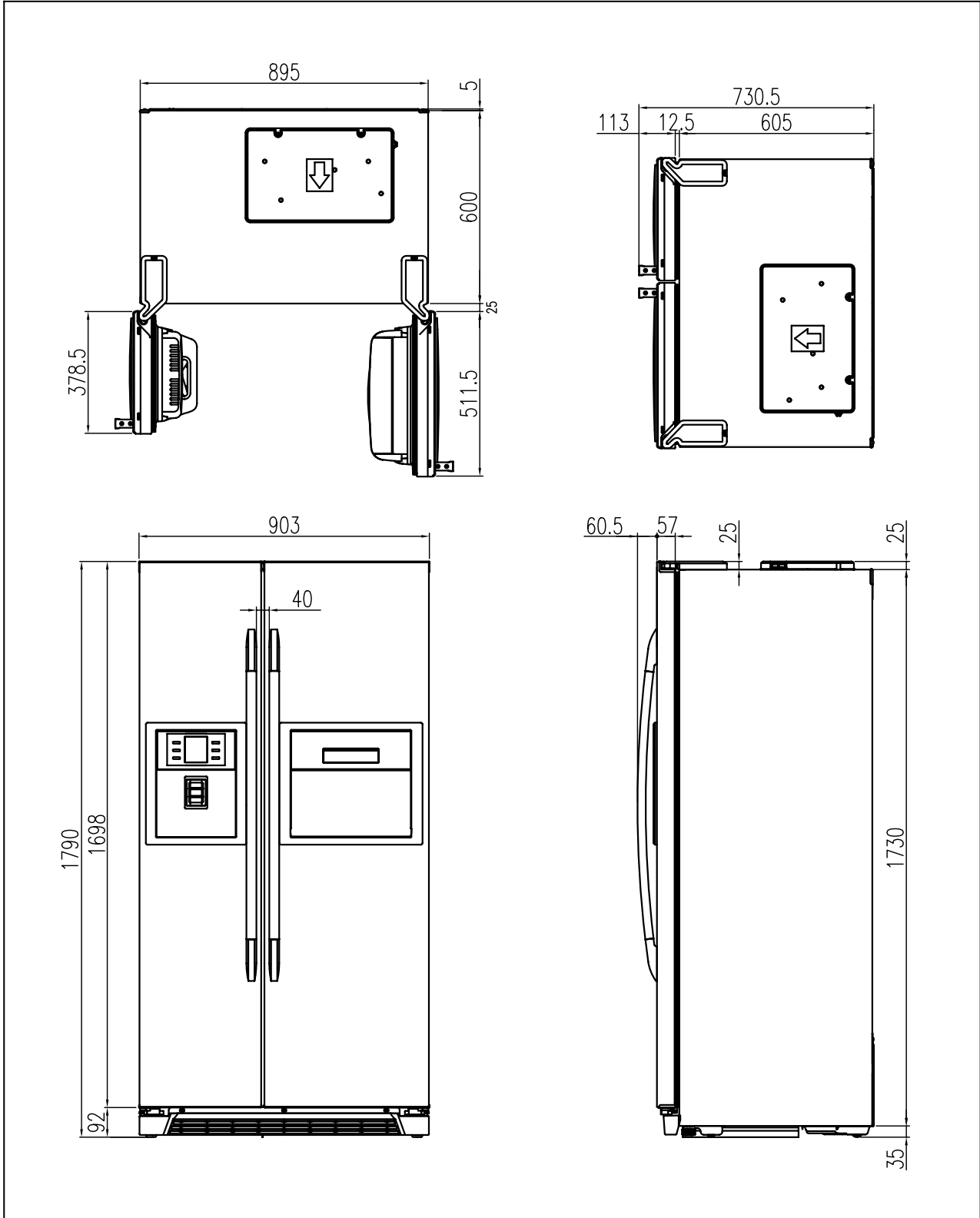
2-2. External Size (U20FF./U20FG. Series)
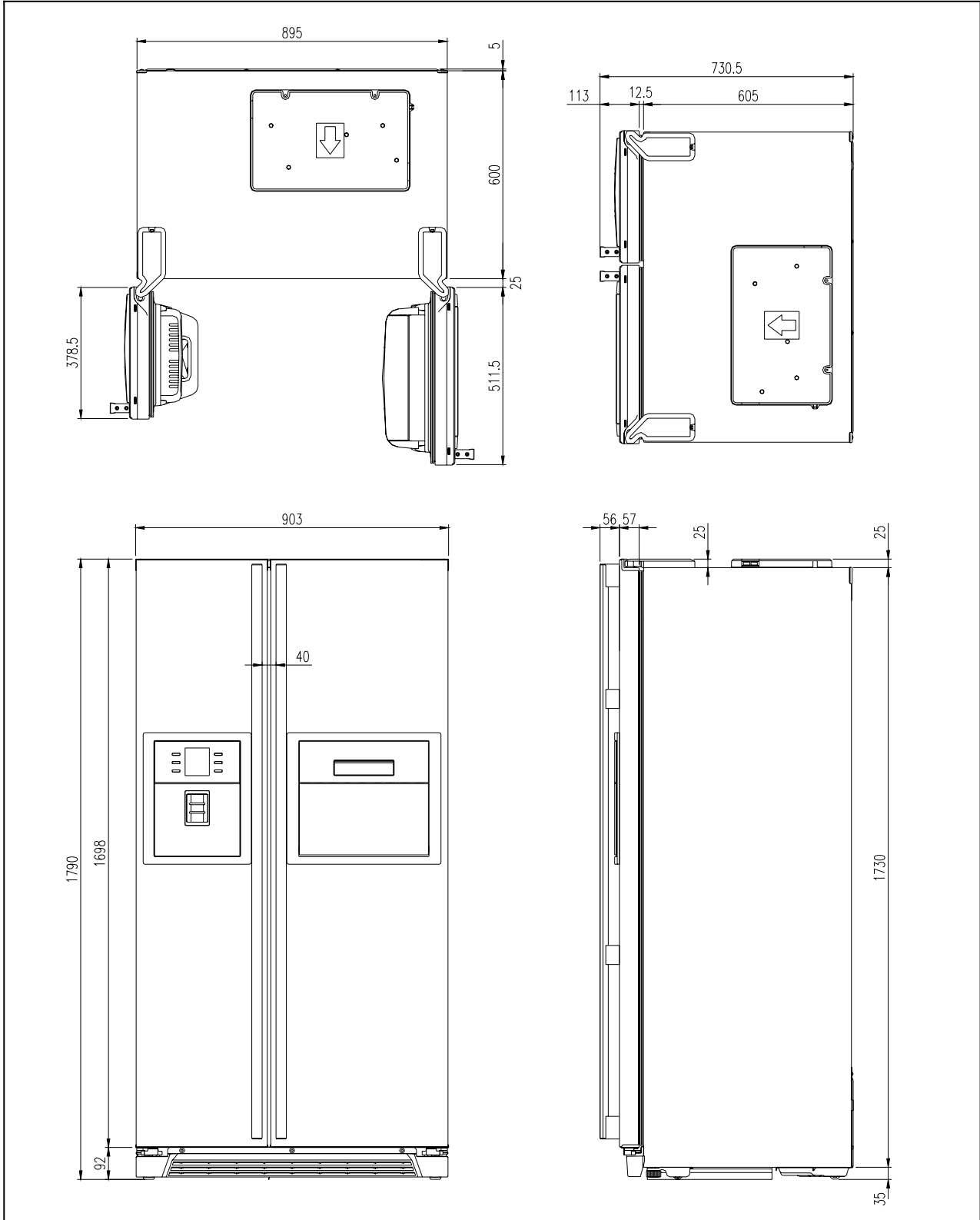
2-3. Name of Each Parts
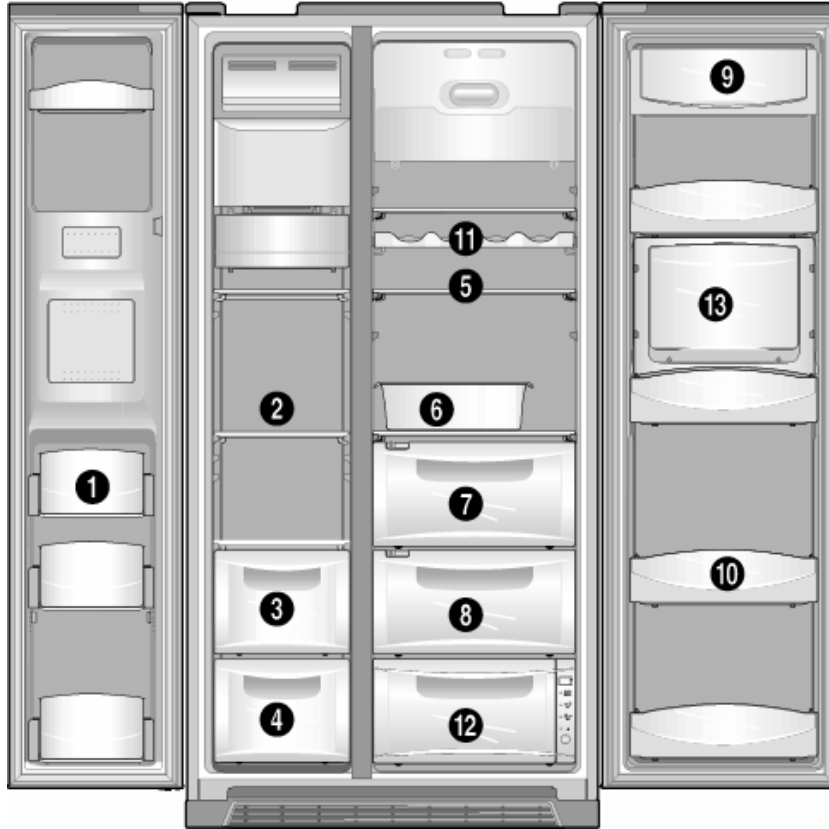
Full option models illustrated, features are model dependent.
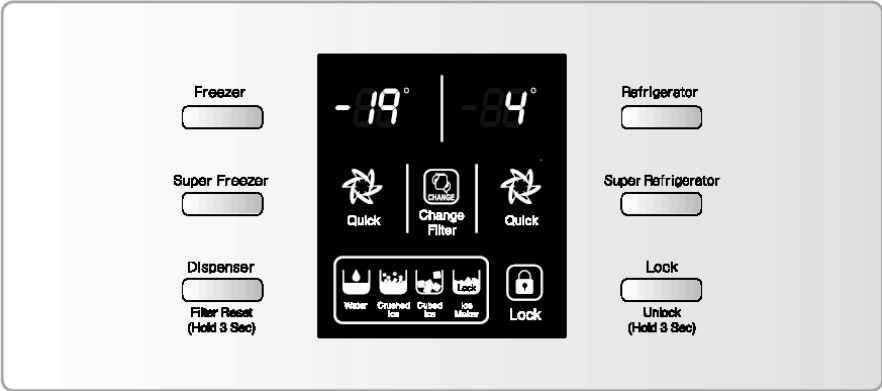
Freezer Compartment	Refrigerator Compartment
1. Freezer Pocket	6. Egg Case
2. Freezer Shelf	7. Vegetable Case 1
3. Freezer Case 1	8. Vegetable Case 2
4. Freezer Case 2	9. Dairy Pocket
	10. Refrigerator pocket
	11. Wine rack (option)
	12. Magic Cool Zone (option)
	13. Refreshment Pocket (option)

3. SPECIFICATION

Item		Specification	
Model Name		U20DD./U20DF. / U20FD./U20FF.	U20DE./U20DG. / U20FE./U20FG.
ISO 15502 Gross Volume (Li)	Total	604 Li	604 Li
	Freezer	227 Li	227 Li
	Refrigerator	377 Li	377 Li
ISO 15502 Storage Volume (Li)	Total	531 Li	518 Li
	Freezer	175 Li	175 Li
	Refrigerator	356 Li	324 Li
Weight (Kg)		113 / 115 / 113 / 115	115 / 117 / 115 / 117
COOLING CYCLE	Refrigerant	R-600a or R-134a (Look for your rating label)	
	Quantity	R-600a (76g)	R-134a (190g)
	Evaporator	Fin Type	
	Condenser	Fan Cooling System	
	Dryer	Molecular Sieve XH-9	
	Capillary Tube	IDΦ0.7 × T0.55 × L2200	
HEATER	Defrost Heater	AC 220V / 192W	
	Dispenser Heater	AC 220V / 5W	
	Water Pipe Heater	AC 220V / 5W	
	Home Bar Heater	AC 220V / 10W	
SENSOR	Defrost Sensor	PBN-43	
	Freezer Sensor	PT-38	
	Refrigerator Sensor	PBN-43	
ELECTRIC PART	Fuse Temp. (Defrost)	AC 250V, 10A, 77C	
	Freezer Fan Motor	DC 13V / 2050 rpm	
	Refrigerator Fan Motor	DC 13V / 1850 rpm	
	Condenser Fan Motor	DC 13V / 1100 rpm	
	Freezer Lamp	25W x 1EA	
	Refrigerator Lamp	25W x 2EA	

4. OPERATION AND FUNCTION

4-1. Display

INPUT	CONTROL OBJECT
Front PCB button FREEZER SET, REFRIGERATOR SET SUPER FREEZER, SUPER REFRIGERATOR DISPENSER SELECT & FILTER RESET KEY LOCK	FCP C-LED

CONTENTS	REMARKS

1. Display control

FCP-LED	Control
88 DISPLAY (SET TEMP.)	Initial mode : Freezer & Refrigerator set Medium (-19C / 4C)
SUPER FREEZER,SUPER REFRIGERATOR ICON	Dial
WATER / CRUSHED ICE / CUBED ICE / ICE MAKER LOCK	Dial
KEY LOCK ICON	Dial
FILTER CHANGE ICON	After six month, LED ON

2. "Freezer" button
   1) Temperature control of freezer compartment
   2) Initial power input : "Medium(-19C)"

   - Every time you press the "Freezer" button, the setting temperature changes in
     a circulating order of -19C(Medium) / -20C / -21C / -22C (Max) / -16C(Min)
     / -17C / -18C / -19C (Medium)

3. "Refrigerator" button
   1) Temperature control of refrigerator compartment
   2) Initial power input : "Medium (4C)"

   - Every time you press the "Refrigerator" button, the setting temperature changes in
     a circulating order of 4C(Medium) / 3C / 2C(coldest) / 8C(warmest) / 7C
     6C / 5C / 4C(Medium)

CONTENTS	REMARKS

4. "Super Freezer" button
 	
   When this button is pressed, the "QUICK" icon of freezer compartment is ON.
   (Yon can stop this function manually by pressing the button one more time.)
 	
5. "Super Refrigerator" button
 	
   When this button is pressed, the "QUICK" icon of refrigerator compartment is ON.
   (Yon can stop this function manually by pressing the button one more time.)
 	
6. "Dispenser" button
 	
 1) Dispenser select function
   You can select water, crushed ice or cubed ice by pressing the "Dispenser" button
 2) Ice maker lock function
   If you don't want to produce ice cubes, press the "Dispenser" button till the "ICE MAKER LOCK" icon is turn on.
 	
   - Every time you press the "Dispenser" button, the icon changes in a circulating order of WATER - CRUSHED ICE - CUBED ICE - ICE MAKER LOCK - WATER
   - The dispenser doesn't operate while door is open.
 	
 3) Filter reset function
   - After 6-months from the power is connected to the refrigerator, the "FILTER CHANGE" icon is light up.
   - If you have changed the filter after 6-months of use or want to reset the filter display, press and hold the "Dispenser (Filter Reset)" button 3 seconds or more and the "FILTER CHANGE" icon will be turn off.
 	
6. "Lock" button
 	
 1) If you want to lock other buttons, press the "Lock" button and "LOCK" icon will be turn on. No buttons other than "Lock" button will be work.
 2) To disable the lock function, press and hold the "Lock" button for 3 seconds or more.
 	
- The actual inner temperature varies depending on the food status, as the indicated setting temperature is a target temperature, not actual temperature within refrigerator.
- Refrigeration function is weak in the initial time.
  Please adjust temperature as above after using refrigerator for minimum2~3 days.
	REFERENCE : Please wait for 2-3 seconds in order to take final ice or drops of water when taking out cup from the pressing switches after taking ice or water.

4-2. Defrost Mode (None Inverter Compressor Models)

INPUT	CONTROL OBJECT
1. Defrosting Cycle	1. Comp 2. F-Fan 3. R-Fan 4. D-Heater

CONTENTS	REMARKS

1. Defrost Mode

Pre-Cool

Pre-Cool
; Compressor runs (to sub-cool the freezer compartment prior to
the defrost heater switch on) for 50 minutes or until F-sensor tem-
perature reaches -27C whichever comes first.
(Refrigerator compartment is controlled normal condition)

Heater Defrosting

Heater
Defrosting
1) Defrost heater is switch on until D-sensor temperature
reaches 13C.
(Compressor, F-Fan, R-Fan is off)
2) Defrost heater on time.
- 30 seconds : Heater is ON regardless of D-sensor
temperature the moment when heater is on.
- 30 minutes : In case of "D1" error (D-sensor malfunction)
- 80 minutes : in normal control state, the maximum on time.

Pause

Pause
After the defrost heater is switched off, Compressor does not run
within 7 minutes.
(F-fan, R-fan, Heater etc. : OFF)

Fan-Delay

Fan-Delay
After defrost, when the first compressor turn on, F-Fan start to run
after 5 minutes from compressor turn on.

2. The defrost mode start with the following conditions

1) Total operation time of compressor becomes : 6, 8, 10, ..., 24 hours.
a. Compressor operating rate (If RT-sensor temperature is below 35 C) : more 85% by 2 hours.
b. Total door open time : 2 minutes
(Any door, F or R open time is over 2 minutes.)
c. Any error mode (R1, F1, D1, F3, RT/S, Door-switch etc.)

2) Defrosting mode starts unconditionally as long as total comp. work time is
24 hours, even if the above conditions 1) are not satisfied.

3) Defrosting mode starts immediately as long as total time of [comp. ON +
comp. OFF] is over 60 hours, even if the above 1) and 2) conditions are not
satisfied.

3. In case of initially power connected (or power reset)

If D-sensor temperature below 3.5 degree, defrosting mode starts .

CONTENTS	REMARKS

4. Flow Chart of Defrosting Start

```
                          ( Start )
                              |
                              v
                      < Comp. operating time
                        is over 2 hours? >--- NO --->
                              |
                             YES
                              |
                              v
        <--- YES --- < Total time is
                        over 60 hours? >
                              |
                             NO
                              |
                              v
        <--- YES --- < Comp. operating time
                        is over 24 hours? >
                              |
                             NO
                              |
                              v
                      < Comp. operating time
                        is over 6 hours? >--- NO --->
                              |
                             YES
                              |
                              v
        <--- YES --- < Is there
                        any error code? >
                              |
                              v
                      < Room Temp is over 35C ? >--- YES --->
                              |
                             NO
                              |
                              v
        <--- YES --- < Comp. operating rate
                        is more 85%? >
                              |
                             NO
                              |
                              v
        <--- YES --- < Total door open
                        time is over 2 min? >
                              |
                             NO
                              |
                              v
    [ Defrosting start ]   [ End ]
```

4-3. Defrost Mode (Inverter Compressor Models)

INPUT	CONTROL OBJECT
1. Defrosting Cycle	1. Comp 2. F-Fan 3. R-Fan 4. D-Heater

CONTENTS	REMARKS

1. Defrost Mode

Pre-Cool

Pre-Cool
; Compressor runs (to sub-cool the freezer compartment prior to
  the defrost heater switch on) for 50 minutes or until F-sensor tem-
  temperature reaches -27C whichever comes first.
  (Refrigerator compartment is controlled normal condition)

Heater Defrosting

Heater
Defrosting
1) Defrost heater is switch on until D-sensor temperature
   reaches 13C.
   (Compressor, F-Fan, R-Fan is off)
2) Defrost heater on time.
   - 30 seconds : Heater is ON regardless of D-sensor
                  temperature the moment when heater is on.
   - 30 minutes : In case of "D1" error (D-sensor malfunction)
   - 50 minutes : in normal control state, the maximum on time.

Pause

Pause
After the defrost heater is switched off, Compressor does not run
within 7 minutes.
(F-fan, R-fan, Heater etc. : OFF)

Fan-Delay

Fan-Delay
After defrost, when the first compressor turn on, F-Fan start to run
after 5 minutes from compressor turn on.

2.The defrost mode start with the following conditions

   1) Total operation time of compressor becomes : 10, 12, 14, ……… , 24 hours.
      a. Compressor operating rate (If RT-sensor temperature is below 35 C) : more 85% by 2 hours.
      b. Total door open time : 2 minutes
         (Any door, F or R open time is over 2 minutes.)
      c. Any error mode (R1, F1, D1, F3, RT/S, Door-switch etc.)

   2) Defrosting mode starts unconditionally as long as total comp. work time is
      24 hours, even if the above conditions 1) are not satisfied.

   3) Defrosting mode starts immediately as long as total time of [comp. ON +
      comp. OFF] is over 60 hours, even if the above 1) and 2) conditions are not
      satisfied.

3. In case of initially power connected (or power reset)

   If D-sensor temperature below 3.5 degree, defrosting mode starts .

CONTENTS	REMARKS

4. Flow Chart of Defrosting Start

```
                        ( Start )
                            |
                            v
            NO  <----  Comp. operating time
                       is over 2 hours?
                            | YES
                            v
  YES  <----          Total time is
                      over 60 hours?
                            | NO
                            v
  YES  <----          Comp. operating time
                      is over 24 hours?
                            | NO
                            v
            NO  <----  Comp. operating time
                       is over 10 hours?
                            | YES
                            v
  YES  <----          Is there
                      any error code?
                            |
                            v
            YES  --->  Room Temp is over 35C ?
                            | NO
                            v
  YES  <----          Comp. operating rate
                      is more 85%?
                            | NO
                            v
  YES  <----          Total door open
                      time is over 2 min?
                            | NO
                            v
  Defrosting start              End
```

4-4. Forced Defrosting Mode

INPUT	CONTROL OBJECT
1. Defrosting Cycle	1. Comp 2. F-Fan 3. R-Fan 4. D-Heater

CONTENTS	REMARKS

1. A/S Defrosting Mode (Heater defrost - Pause - Fan Delay)

Heater Defrosting

Heater Defrosting
1) Defrost heater is switch on until D-sensor temperature reaches 13C.
   (Compressor, F-Fan, R-Fan is off)
2) Defrost heater on time.
   ● 30 seconds : Heater is ON regardless of D-sensor temperature the moment when heater is on.
   ● 30 minutes : In case of "D1" error (D-sensor malfunction)
   ● 50 minutes (Inverter Compressor Models)
      : in normal control state, the maximum on time.
   ● 80 minutes (None Inverter Compressor Models)
      : in normal control state, the maximum on time.

Pause

Pause
After the defrost heater is switched off, Compressor does not run within 7 minutes.
(F-fan, R-fan, Heater etc. : OFF)

Fan-Delay

Fan-Delay
After defrost, when the first compressor turn on, F-Fan start to run after 5 minutes from compressor turn on.

2. How to start
   1) Under "Lock" condition,
   press and hold "Freezer" button and press "Refrigerator" button 5 times simultaneously.

3. How to proceed
   1) Skip the pre-cool mode. (Others are same as normal defrosting)
   2) Heater is ON for 30 seconds, regardless of D-sensor temp. the moment when the defrost heater is switch on.
   (Check of defrosting current)

4-5. Fan Motor Voltage of Control Mode

INPUT	CONTROL OBJECT
1. F-Sensor 2. R-Sensor	1. F-FAN, R-FAN, C-FAN

CONTENTS	REMARKS

1. Fan voltage of control mode

	F-FAN (Freezer compartment)	R-FAN (Refrigerator compartment)	C-FAN (Condenser)
Voltage	13 V	13 V	13 V

※ Refer to the 5-4. (Fan Function)

4-6. Buzzer or Alarm Control

INPUT	CONTROL OBJECT
1. Control buttons 2. Door Switch 3. Initial Power Input	Buzzer

CONTENTS	REMARKS
1. Buzzer sounds 3 times after initial power input. 2. Buzzer sounds 1 times, in case of A/S forced defrost mode. 3. Buzzer sounds 1 time, in case of pull down mode. 4. If door is left open, buzzer sounds after every 1 minutes for 5 minutes (Door open alarm)	
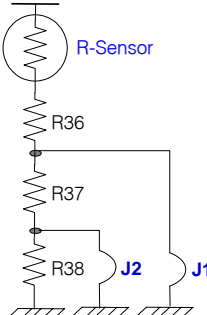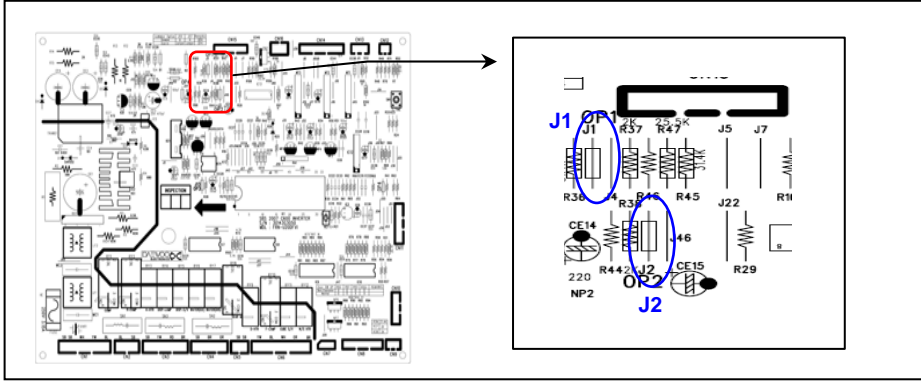
4-7. Control of Interior Lights

INPUT	CONTROL OBJECT
1. Refrigerator door switch 2. Freezer door switch 3. Home bar door switch 4. Dispenser switch	Lamp

CONTENTS	REMARKS

1. Control refrigerator compartment lights
  R-Lights turn ON/OFF by R-door switch ON/OFF
(For 10 minutes after sensing door open, the lights turn off automatically
  through door close is not sensed.)
 	
2. Control of freezer compartment lights.
  F-Light turn ON/OFF by F-door switch ON/OFF
(For 10 minutes after sensing door open, the lights turn off automatically
  through door close is not sensed.)
 	
3. R-lights ON/OFF by home bar door switch ON/OFF. (for only model with home bar)
  R-lights turn ON for 10 minutes after sensing home bar door switch open.
 	
4. Dispenser lamp control (for only model with water/ice dispenser)
  Dispenser lamp turns ON/OFF by Dispenser switch.
  Dispenser lamp turns ON for 4 seconds after sensing switch close.	

4-8. Demonstration

INPUT		CONTROL OBJECT	
1. "Refrigerator" & "Dispenser" Button		Comp F/R-Fan Heater	
CONTENTS			**REMARKS**

1. How to start
  1) Under "Lock" condition,
    Press and hold "Refrigerator" button and press "Dispenser" button 5 times simultaneously.
 	
2. How to control
  1) All other electrical components are OFF except for F-Fan & R-Fan
  2) Fan Control
    Door opened - Fan ON
    Door closed - Fan OFF.
 	
3. How to exit
  1) Under "Demonstration" mode,
   Press and hold "REF Set" button and press "Dispenser" button 5 times simultaneously.
  2) or power reset.			
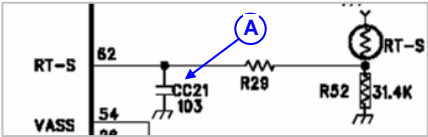
4-9. Temperature compensation (Refrigeration compartment)

INPUT	CONTROL OBJECT
Main PCB	Resistance of R-sensor

CONTENTS	REMARKS
- If the temperature of refrigerator compartment is weak or insufficient, you can compensate the on/off temperature by cutting jump wire of main PCB. (temperature down) - If need to compensate	Refer to the 5-2. (Function of each sensor)

	Normal condition	Compensation (weak-cool)	
		1.5C down	3C down
J1	-	cut	cut
J2	-	-	cut
Resistance	R36	R36 + R37	R36 + R37 + R38

< Circuit diagram of R-sensor>

< Location of R-sensor at Main-PCB >

4-10. Error Display

INPUT	CONTROL OBJECT
Temperature Control Buttons	88 Display CLED

CONTENTS	REMARKS

1. How to start
 1) Under "Lock" condition,
  Press and hold "Freezer" button and press "Super Freezer" button 5 times simultaneously.
 2) The front CLED displays as the right diagram shows
  ([Ex.] Time Display of 00 03 signifies 3 minutes of power on time.)
 3) Every time you press "Freezer" button, the following value is displayed successively.
  ① Refrigerator operating time. (From power is connected)
  ② F-Sensor temperature.
  ③ D-Sensor temperature.
  ④ R-Sensor temperature.
  ⑤ RT-Sensor temperature.
  ⑥ P Factor display (Refer to water supply mode of automatic icemaker)
  ⑦ Filter remaining time until change (First check ; 4,320Hr)
   Refer to Filter Information Reset of CLED of front control panel.
 4) Error is displayed only if there is any ; it is skipped if no error.
 	
2. How to exit
 1) Press "Lock" button 1 time.
 2) It exit automatically in 4 minutes after from the start.
 	
3. All the error Codes are reset if they turn to be normal.
 	
4. Error code	

4. Error code

ERROR CODE	CONTENTS
F1	F-sensor : disconnection ("Lo"), short ("Hi")
r1	R-sensor : disconnection ("Lo"), short ("Hi")
rt	RT-sensor : disconnection ("Lo"), short ("Hi")
d1	D-sensor : disconnection ("Lo"), short ("Hi")
dr	R-Door switch : defective
dF	F-Door switch : defective
dH	Homebar door switch : defective
EI	I-sensor : disconnection ("Lo"), short ("Hi")
EF	Flow sensor : defective
Et	Horizontal switch : error
Eg	Water supply : error
ES	Micro switch : error
EA	Drop the ice while Et
Eu	Full ice switch : error
C1	Cycle : abnormal or defective
F3	Return after defrosting : abnormal or defective
Co	Full-Down mode display
D2	Forced defrost mode display

CONTENTS	REMARKS

5. Control way of Error (if any)

1) "F1" error
   Cause : F-sensor disconnection or short
   Check point : Measure the resistance between both terminals after separating CN15
             of the Main PCB. (Refer to the 5-2.)
     If F-sensor is disconnected or shorted , change the F-sensor in the freezer compartment.
   How to reset : If F-sensor is normal, the error is terminated automatically.

2) "R1" error
   Cause : R-sensor disconnection or short
   Check point : Measure the resistance between both terminals after separating CN14
             of the Main PCB. (Refer to the 5-2.)
   If R-sensor is disconnected or shorted , change the F-sensor in the refrigerator compartment.
   How to reset : If F-sensor is normal, the error is terminated automatically.

3) "rt" error
   Cause : RT-sensor disconnection or short (full down)
   Check point : Measure the voltage of "A" part on the Main PCB.
     If the voltage is 0.5V~4.5V, it is normal.
     If the voltage is 0V (short) or 5V (disconnected), change the RT-sensor on the Main PCB
   How to reset : If F-sensor is normal, the error is terminated automatically.

4) "d1" error
   Cause : D-sensor disconnection or short (full down)
   Check point : Measure the resistance between both terminals after separating CN15
             of the Main PCB. (Refer to the 5-2.)
     If D-sensor is disconnected or shorted , change the D-sensor on the evaporator.
   How to reset : If D-sensor is normal, the error is terminated automatically.

5) Door error ("dF" "dR" "dH" on display)
   Cause : in case it senses that door is open for more than 1 hour.
   Check point : F/R door is opened or not.

6) "C1" error
   Cause : in case comp. works for over 3 hours when D-sensor temp. is over -5C
   Check point : Refrigerant leakage.

7) "F3" error
   Cause : in case defrosting return is done by time limit of 50 min
   Check point : Measure the resistance between both terminals of the defrost heater.
               (Assembled with evaporator)
     If the resistance is ∞ ohm (disconnected) or 0 ohm (short) change the

8) "d2" mode (A/S forced defrosting mode)
   Push "REFRIGERATOR SET" button 5 times while pushing "FREEZER SET" button
    simultaneously.
   Control : A/S forced defrosting control (Pre-cool is deleted)
   If D-sensor temp. is over 13C, the mode is terminated automatically.
   Refer to the 4-3. .

CONTENTS	REMARKS

9) "EI"ERROR

 Cause : I-SENSOR disconnection / short

Check point : Measure the resistance between both terminals after separating CN11
                of the Main PCB. (Refer to the 5-2.)
  If F-sensor is disconnected or shorted , change the I-sensor in the automatic ice maker.

10) "EF" ERROR

 Cause : When Flow-sensor ERROR (There is no Pulse during some time)
          The number of pulse signal is below 10 by 1 sec during water supply.

 Check point : Water supply line

11) "Eg" ERROR

 Cause : I-sensor temp (5min after water supply) doesn't go up.

 Check the I-sensor or water supply line.

12) "ES" error (MICRO switch error)

 Cause : When it senses 1min continuously

 Check the MICRO switch of the dispenser.

13) "Ea" error

 Cause : Malfunction of ice drop motor.

 Check the motor by pushing test switch.

14) "Eu" error

 Cause : Switch (which senses if the ice is full or not) is in error.

 Control : When dropping the ice, the motor just rotates 90 degree.

 Termination : When the switch is in normal.

15)"EA" ERROR

 Cause : When sensing Ice dropping by time 3 times in level sensor SW Error.

 Control : Stop of Ice Maker

 Termination : With normal level switch.

 Re-input of power or push if icemaker test switch.

16)"Et" ERROR

 Cause : Level switch error (No pulse is sensed for some time)

 Control : By time (Supply mode is skipped)

 Termination : Normal condition.

 * When all ERROR CODE is normal, the Refrigerator reset

4-11. Summary of Function and additional information

<table>
<tr><td colspan="2" align="center">CONTENTS</td></tr>
</table>

1. Dial Function Summary
- All the modes are started "Lock" condition (except "Reset water filter" mode)

Forced Defrosting	"Freezer" + "Refrigerator" 5 times
Reset water filter	Press "Dispenser" button for 3 seconds
Demonstration function	"Refrigerator" + "Dispenser" 5 times
Pull-Down	"Refrigerator" + "Freezer" + "Dispenser" 5 times
Error display	"Freezer"+ "Super Freezer" 5 times
Temperature Value (CELSIUS <-> FAHRENHEIT)	Push the ''Super Freezer'' for 15 seconds

2. Filter Information Check

1) Filter exchange information : Record a real time from the date of power input.
 - The filter is normal for 6 months after the first plug in.
 - When the time comes to change or reset, press the 'Dispenser' button for 3 seconds.

2) How to check the filter running time
 [Step 1]Press the 'Lock' button.
 [Step 2] Press 'Super Freezer' 5 times while pushing the 'Freezer' button.
 [Step 3] Push 'Freezer' button 6times. (Fi-Lt display)
 [Step 4] Remaining time is display if dispenser button pressed.
   (ex, 40 : 12 means that 4012 minutes remains until the exchange.
 [Step 5] Reset : Push 'Lock' button or it is automatically reset after 4 minutes.

Dispenser button

3. Adjust the amount of water
 ; Function to adjust the amount of water supply.
   (Step 1 and Step 2 is the same above 'How to check the Filter running time.'

 [Step 1] Press the 'Lock' button.
 [Step 2] Press 'Super Freezer' 5 times while pushing the 'Freezer' button.
 [Step 3] Press 'Freezer' button 5 times until display P100 on front LED.
 [Step 4] Adjust the amount of water. (Default setting is P100, it means 86cc water supply.)

 When need more water supply : Press 'Super Refrigerator' button
  - P101 (87cc), P102 (88cc), P103 (89cc) ……………

 When need less water supply : Press 'Refrigerator' button
  - P99 (85cc), P98 (84cc), P97 (83cc) ………………..

 [Step 5] Reset : Push 'Lock' button or automatically reset after 4 minutes.

4-12. Automatic Icemaker

INPUT	CONTROL OBJECT
Full ice sensing switch Ice Maker Lock Sensors	Ice separating motor

CONTENTS	REMARKS

1. Flow of ice making

```
        ( START )
            │
            ▼
  ┌───────────────────┐
  │  Ice making mode  │ ─   Ice is being made
  └───────────────────┘
            │
            │  (water supply stand by)
            ◄──────────────
            ▼
  ┌───────────────────┐
  │ Ice separating    │ ─   Ice tray is twisted to separate
  │ mode              │        ice cubes
  └───────────────────┘
            │
            ▼
  ┌───────────────────┐
  │ Water supply mode │ ─   Water is supplied to ice tray
  └───────────────────┘
            │
            ▼
  ┌───────────────────┐
  │ Water supply      │ ─   Check is water is supplied OK.
  │ check mode        │
  └───────────────────┘
            │
            ▼
        ( RETURN )
```

1) Press TEST switch under the Icemaker for more than 1 second and test starts.
   - Test mode starts from ice separating mode.
   - In case test switch has an error of short, test is done only once.
2) With the initial power input, Ice tray turns to be horizontal and ice making
   mode starts.
3) Control of water hose heater
   - Heater is always ON if RT-sensor has an error or RT is below 15 degree.
   - Heater is always ON for 60 minutes (max. Limit time) if Flow-sensor has
     an error
4) Water supply stand-by
   Condition : if ice is sensed full
   Operation : proceeds to Ice making mode (Ice separating and water supply Modes stop)
5) Crusher Function
   It stops operation when freezer door is open
   It operates if freezer door is closed.

CONTENTS	REMARKS

2. Ice making mode

```
                    ┌─────────────┐
                    │    START     │
                    └──────┬──────┘
                           │
         ┌─────────────────┼──────────────────────────────────────┐
         │                 │                                        │
         │            ◇─────────◇                        ◇─────────◇
    NO   │           / 130 min    \           NO        / I-S < -9.5C \   NO
    ◄────┼──────────<  passed?     >          ◄────────<              > ────►
         │           \           /                      \           /
         │            ◇─────────◇                        ◇─────────◇
         │                 │ YES                              │ YES
         │            ◇─────────◇         NO            ◇─────────◇
         │           / I-S is over \ ──────────►       / 15 min     \   NO
         │          <   -12.5C      >                 <  passed?      > ────►
         │           \             /                   \            /
         │            ◇───────────◇                     ◇──────────◇
         │                 │ YES                              │ YES
         │            ┌──────────────┐ ◄────────────────────────┘
         └───────────►│ Ice saparating│
                      │     mode      │
                      └──────────────┘
```

1) Ice making stops if ice-sensor is below -12.5C after 130 minutes.

2) Ice making also stops if ice-sensor is below -9.5C for 15 minutes, though ice-sensor is not below -12.5C after 130 minutes.

3) In case of ice sensor, ice making stops after 4.8 hours.

3. Ice separating (drop) mode

status of ice tray	Ice separation start		Horizontal position
level SW			
normal level SW	8~11sec	MAX 1.1sec	8.5~12.2sec	0.2sec
motor revolution	CW	CCW	CW	STOP
level SW error	12 sec	11 sec	1.1 sec	

1) Time of each zone used to verify level switch error

2) The rotation of motor is sensed at each zone

3) In case of level switch error, ice separation is done by time.

4) If ice separating motor has error, the mode stop.

CONTENTS	REMARKS

4. Water supply mode

```
          ┌─────────────────┐
          │      START       │
          └────────┬─────────┘
                   │
          ┌────────▼─────────┐
          │ Water supply valve ON │
          └────────┬─────────┘
                   │
          ┌────────▼─────────────┐
          │ Water flow Pulse Count = 0 │
          └────────┬─────────────┘
                   │
                   ▼          N
          ╱───────────────────╲──────┐
          ╲ 1sec passed after   ╱     │
          ╲  water valve ON ?   ╱──────┘
                   │ Y
                   ▼          N
          ╱───────────────────╲
          ╲ Water flow Pulse > 10 ╱──────────┐
                   │ Y                        ▼
                   │              ┌────────────────────────┐
                   │              │ Flow-Sensor Error mode operation │
                   │              └────────────┬───────────┘
                   ▼                           │
          ╱───────────────────╲  Y             │
     ┌────╲ Water flow Pulse spec ╱────────────▶
     │     ╲   > Pulse spec     ╱
     │          │ N
     │          ▼
     │ N ╱───────────────────╲
     └──╲ water supply time > time spec ╱
                   │ Y
                   │◀──────────────────────────┘
                   ▼
          ┌─────────────────┐
          │ water supply valve OFF │
          └────────┬─────────┘
                   │
          ┌────────▼─────────┐
          │       END        │
          └─────────────────┘
```
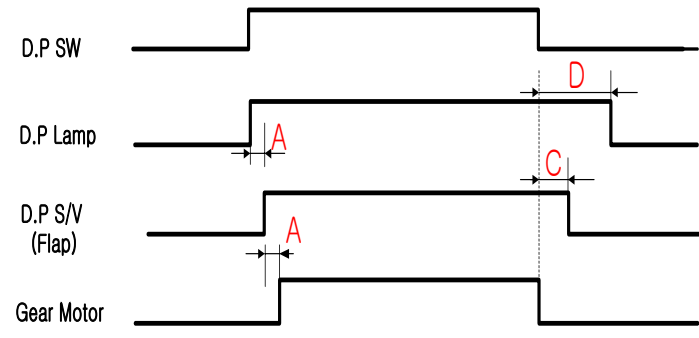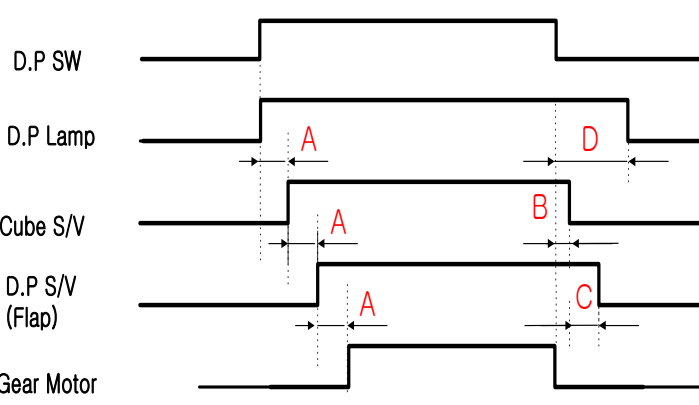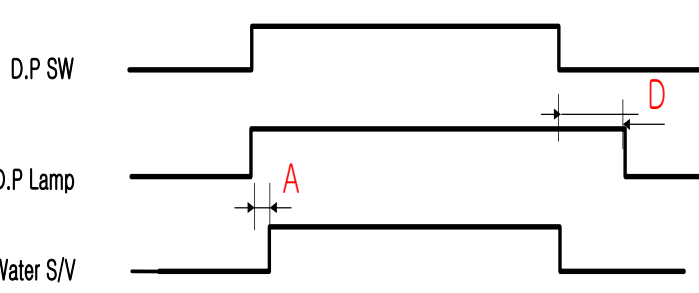
CONTENTS	REMARKS
1) Water supply valve is open when water supply mode starts after separation of ices. 2) Water is supplied by time in case sensor has error. 3) Factor valve is variable which can be useful in AS action ① Water flow pulse is set to 238 if flow sensor is in normal condition. (If water is supplied by time, maximum water supply time 165 seconds) ② In case water flow sensor has error, water time is 5.5 seconds. 5. Water supply check mode 5 minutes after water supply the status can be checked by RT-sensor and increase of temp. Ice sensor.	

RT-S	Below 9C	~15C	~21C	~31C	~41C	Over 41C
I-S	-10C	-9C	-8C	-7C	-6C	-5C

4-13. Dispenser Control Function
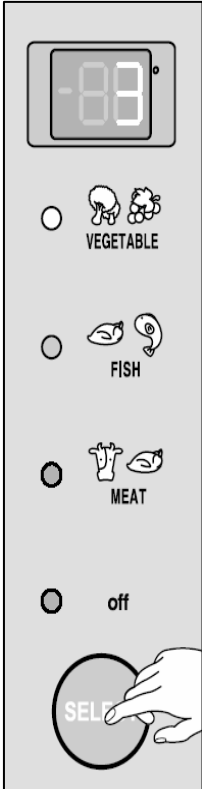
INPUT	CONTROL OBJECT
Dispenser switch "Dispenser" button ICE MAKER LOCK Button Freezer Door Switch	Dispenser Lamp Crusher Motor Flap Solenoid Crusher Solenoid Dispenser Water Valve

CONTENTS	REMARKS
1) Initial mode : water (Mode change : Water - Crushed ice - Cubed ice - Ice maker Lock) - Selected icon LED turns ON and others are OFF. 2) Display - Water icon turns ON as default mode - The ICON of each mode turns ON by pressing its button. (If display switch makes error during operation of a mode, its ICON turns OFF) - When Icemaker Lock ICON turns ON. - ICE MAKER LOCK ICON turns ON - If it is in the mode of Cubed Ice or Crushed Ice, the mode is changed to Water and Water ICON turns ON	

CONTENTS	REMARKS

3) Control Flow & Timing Chart
  - Crushed Ice

- Cubed Ice

- Water

Delay time : A = 500ms, B = 500ms, C = 2.0s, D = 5.0s

4-15. 'Magic Cool Zone' Compartment Function

INPUT	CONTROL OBJECT
1. R-Fan 2. Magic Cool Zone sensor 3. Select button	1.'Magic Cool Zone' damper 2. Damper Heater

CONTENTS

1. 'Select' button
 1) Control the 'Magic Cool zone' temperature.
 2) 4 Step mode.
    Initial mode when plug in : OFF
    (OFF – Vegetable – Fish – Meat – OFF)

Mode		Display	Damper Open / Close	
			Open	Close
			Degree	Degree
Power Input	OFF	-	-	-
1st Step	Vegetable	3	9	8
2nd Step	Fish	-1	3	2
3rd Step	Meat	-3	1	0

 2. Normal Stepping motor Control (Link with Refrigerator Fan)

Refrigerator Fan	Magic Cool Zone Damper
On	Always Close
Off	Control by each mode/step

3. Damper heater control
 1) Damper Open : Damper Heater OFF
 2) Damper Close : Damper Heater ON

4. How to Check Error Mode
 1) How to start : Push 'Select' button for 2 seconds.
    - Initial display : Sensor temperature display (when sensor is normal)
              : 'Er' display (in case sensor is abnormal)
    - Press 'Select' button 1 time : "OP" display. (Let the damper open)
    - Press 'Select' button 1 time again : "CL" display (Let the damper close)
 2) How to stop : It stops automatically in 20 sec. from the start.

5. How to control when sensor is abnormal
   - Damper open/close follow below table.

Condition		Select			
		OFF	Vegetable	Fish	Meat
Refrigerator Fan	ON	Close	Close	Close	Close
	OFF	Close	Close	2 min open when R-Fan is off	Open

5. CIRCUIT OPERATION

5-1. Power Circuit Diagram
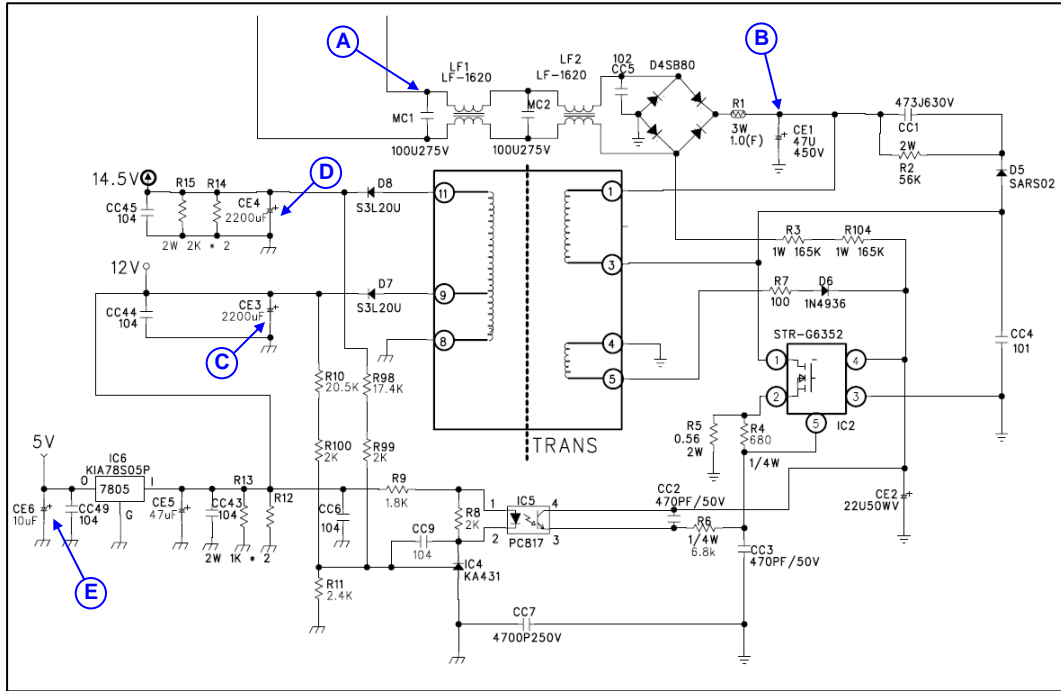
Voltage of every part

Parts	A	B	C	D	E
	MC1	CE1	CE3	CE4	CE6
Voltage	230Vac	310Vdc	12Vdc	14.5Vdc	5Vdc

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

5-2. Function of Each Sensor

CONTENTS	REMARKS

[F-sensor (A)]
  1) It senses the temperature of freezer compartment and control Comp., F-fan ON/OFF
  2) How it works;

Working Point	Low ON	Mid OFF	High OFF
Working Temp.	-11C	-16C	-19C
Resistance	9.32 k ohm	15.19 k ohm	15.58 k ohm
Sensing Voltage	3.24V	2.93V	2.73V

[R-sensor (B)]
  1) It senses the temperature of refrigerator compartment and control R-fan ON/OFF
  2) How it works;

Working Point	Low ON	Mid OFF	High OFF
Working Temp.	7.7C	5.2C	3.2C
Resistance	23.33 k ohm	24.05 k ohm	24.76 k ohm
Sensing Voltage	2.96V	2.83V	2.72V

[D-sensor (C)]
  1) It senses return point of defrosting heater.
  2) How it works;

Working Point	Return point of defrosting heater
Working Temp.	13C
Resistance	22.56 k ohm
Sensing Voltage	3.08V

  - In case temperature of refrigerator compartment is weak or insufficient,
    though comp. and R-fan operate in normal way;
    1) Cut J1 on the M-PCB, then temp. is lowered 1.5C than [Mid OFF point]
    2) Cut J1 and J2 on the M-PCB, then the temp, is lowered 3C

5-3. Relay Function

CONTENTS	REMARKS

1. Circuit Diagram

2. How it works;

Control	Control Mode Method	ON Condition		OFF Condition	
		MICOM Port	IC ULN2004 Output pin	MICOM Port	IC ULN2004 Output pin
-	-	#1≒5.0V	#10≒0.7V	#1≒0V	#10≒12V
R-Lamp	Relay 2	#2≒5.0V	#11≒0.7V	#2≒0V	#11≒12V
H/B Heater	Relay 3	#3≒5.0V	#12≒0.7V	#3≒0V	#12≒12V
-	-	#4≒5.0V	#13≒0.7V	#4≒0V	#13≒12V
Dispenser-Solenoid	Relay 5	#5≒5.0V	#14≒0.7V	#5≒0V	#14≒12V
Water valve (Ice)	Relay 6	#6≒5.0V	#15≒0.7V	#6≒0V	#15≒12V
Water valve (Dispenser)	Relay 7	#7≒5.0V	#10≒0.7V	#7≒0V	#10≒12V
Geared-Motor	Relay 8	#8≒5.0V	#11≒0.7V	#8≒0V	#11≒12V
Defrost-Heater	Relay 9	#9≒5.0V	#12≒0.7V	#9≒0V	#12≒12V
F-Lamp	Relay 10	#10≒5.0V	#13≒0.7V	#10≒0V	#13≒12V
Cube-Solenoid	Relay 11	#11≒5.0V	#14≒0.7V	#11≒0V	#14≒12V
Water Pipe Heater	Relay 12	#12≒5.0V	#15≒0.7V	#12≒0V	#15≒12V

5-4. Fan Function

1. Circuit Diagram
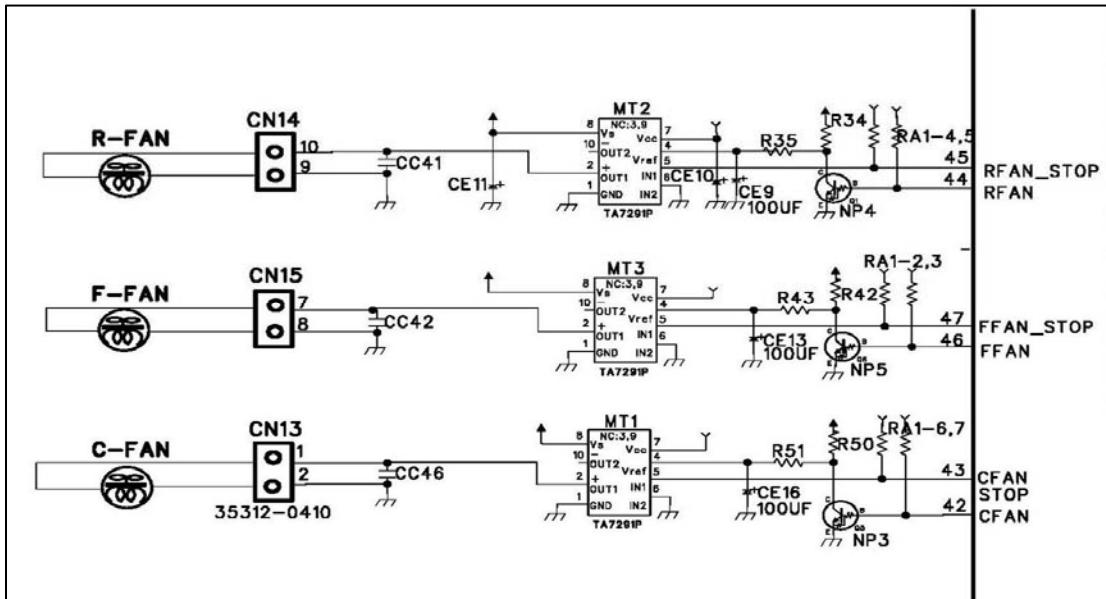
2. Explanation for the operation
   - TA7291P is the drive IC for the only DC motor, and used for control of the fan motor
   - One input and output is used for the control of the fan motor

Input Motor IC No.5 Pin (R:MT2/F:MT3/C:MT1)	Output Motor IC No.2 Pin (R:MT2/F:MT3/C:MT1)	Remark
High	High	13V
Low	Low	Stop

   - Vref is the reference voltage for the adjustment of the output voltage by the voltage distribution of Vs (Maximum output voltage), and the output voltage applied to the fan is determined by the PWM control using the software.

5-5. Compressor speed control (Inverter comp. models only – FRN-U20***I)

1. Circuit Diagram
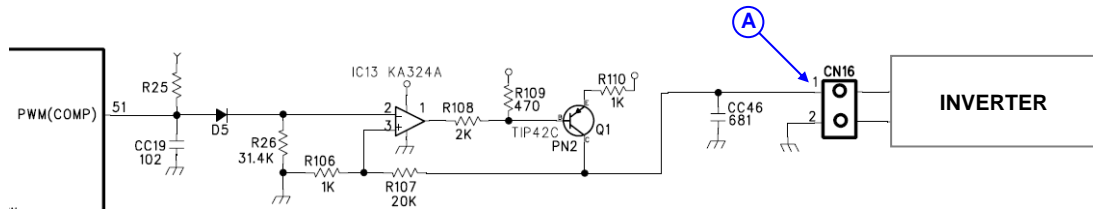
2. Measure the Frequency Output Signal from Main-PCB.

Condition	Frequency Output Signal (CN 16 of Main-PCB)	Signal Image
Normal operation (RT-Sensor 35℃↑)	122 Hz	
Normal operation (RT-Sensor 35℃↓)	85 Hz	
Initial Power connected Super FRZ Super REF Weak-Cool	122 Hz	

6. Wiring Diagram

None Inverter Models Diagram
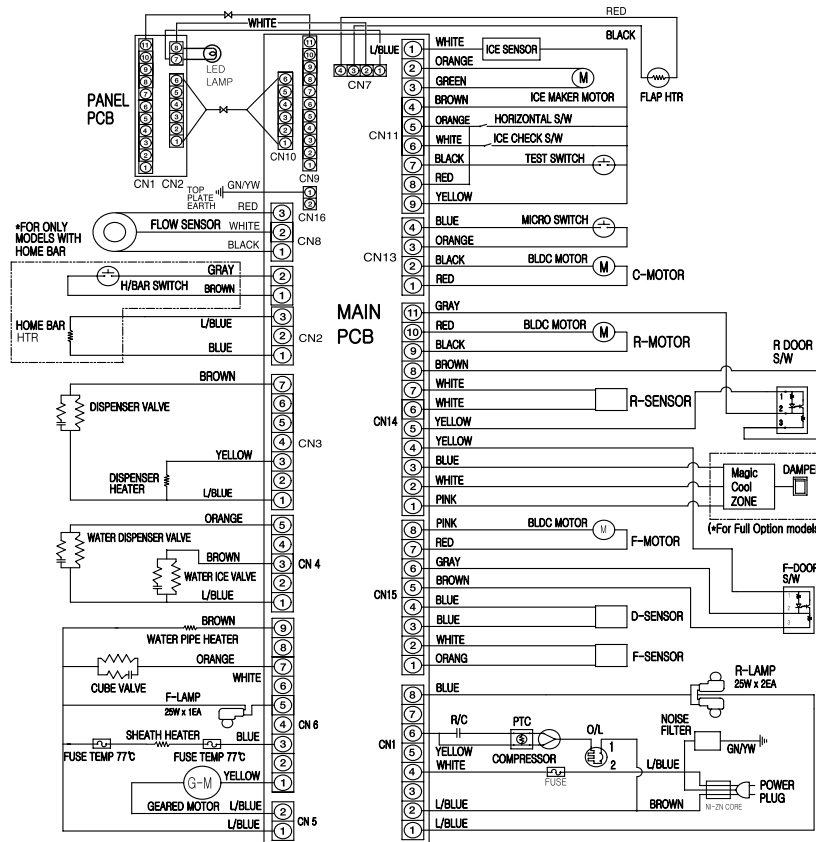
Inverter Models Diagram
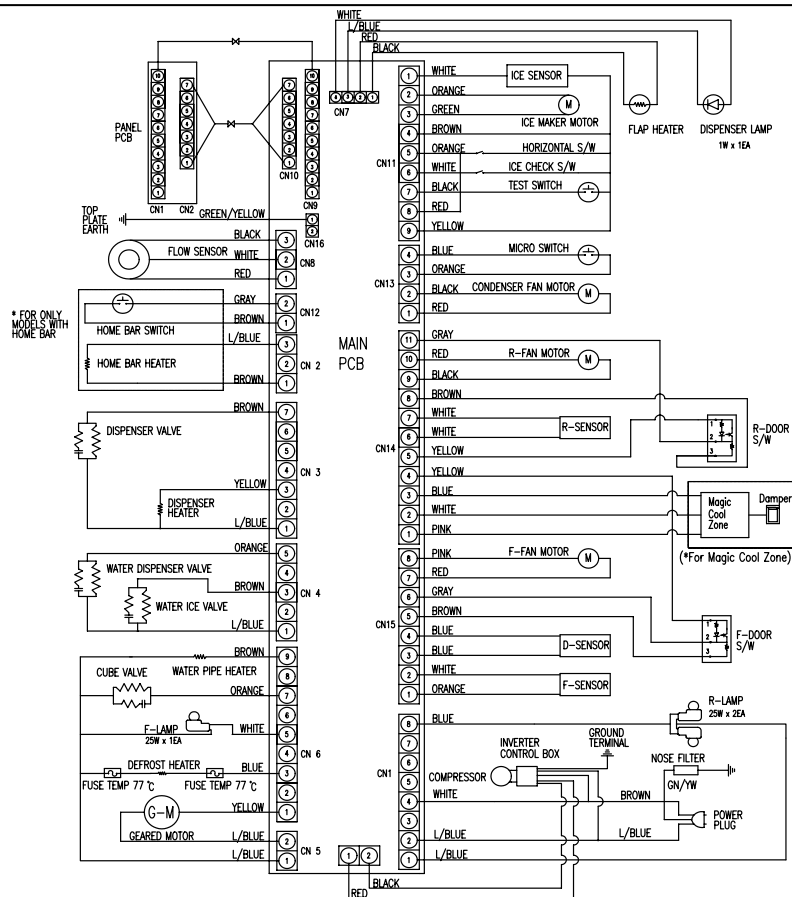
7. COMPONENT LOCATION

7-1. Front View (Features are model dependent.)

Front PCB

Home bar Door

Dispenser Button

7-2. Inner View

Automatic Ice Maker **F-Fan Motor** **Geared Motor**

F-Door Switch **F-Sensor** **F-Lamp**

Freezer Compartment

R-Fan Motor **R-Sensor** **R-Lamp**

R-Door Switch

Refrigerator Compartment

7-3. Evaporator
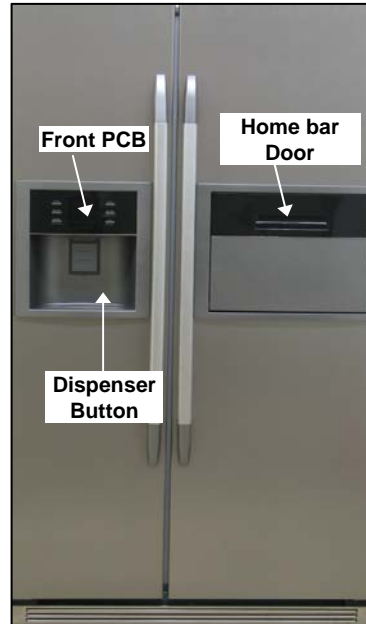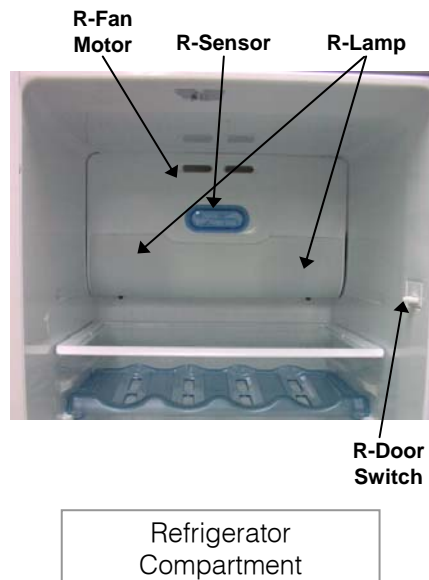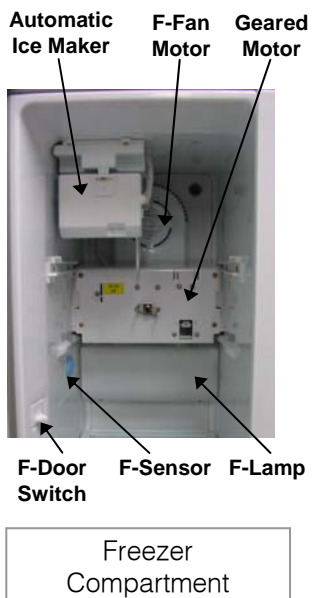
- **D-Sensor**
- **Temp Fuse**
- **Temp Fuse**
- **Evaporator**
- **Defrost Heater**
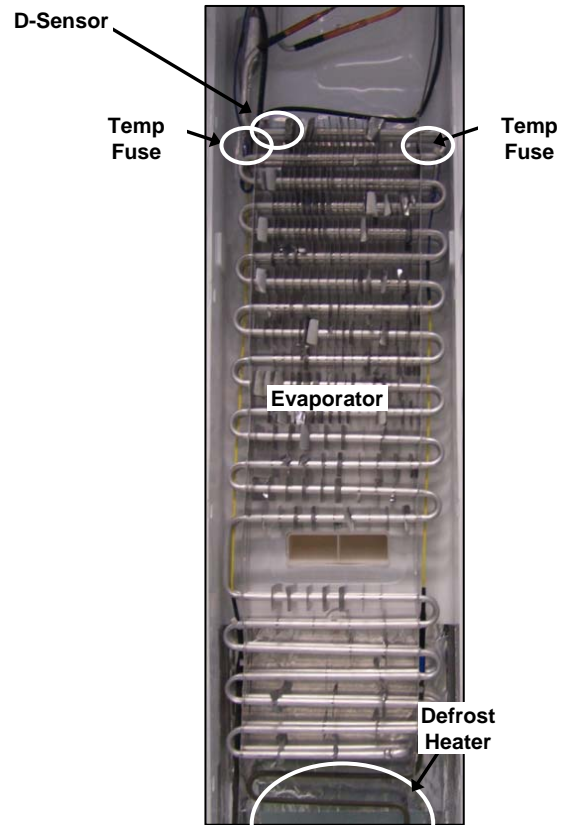
7-4. Machine Compartment
(Below is the inverter compressor models)

- **Power cord**
- **Compressor**
- **Condenser**
- **Inverter controller**
- **Dryer**
- **Condenser Fan-Motor**
- **Tray Drip**
- **Water Valve**
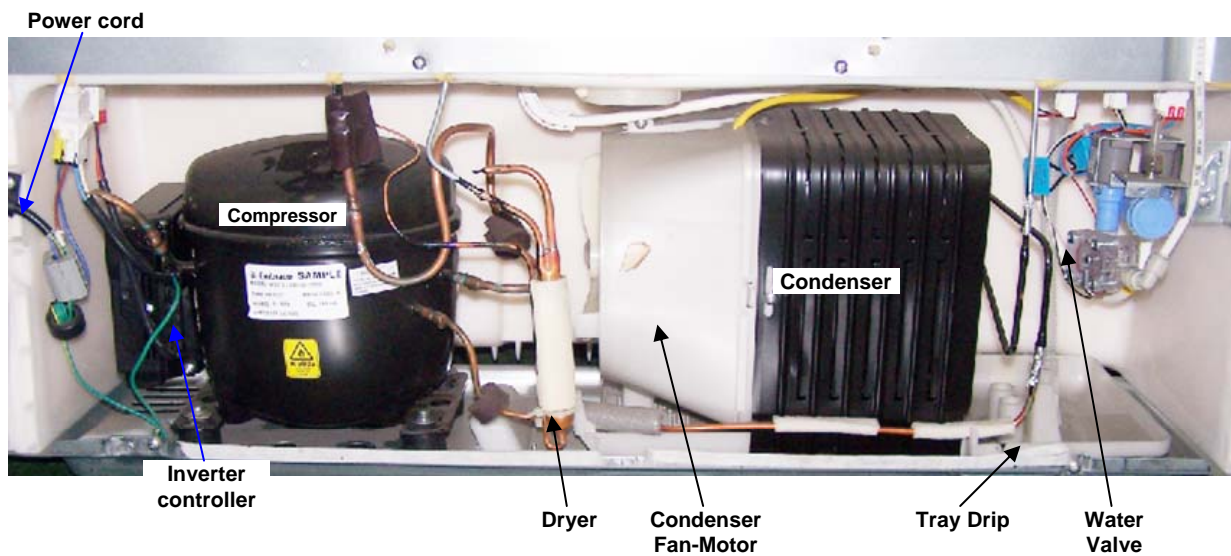
8. HOW TO CHECK EACH PARTS

8-1. Hose Ice Maker Tube Assembly
1) Disassembling Procedure
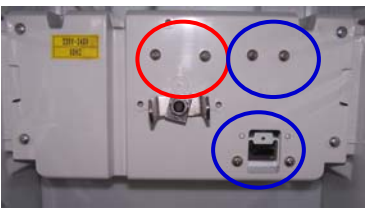
NO	DISASSEMBLING PROCEDURE	NO	DISASSEMBLING PROCEDURE
1	 - Pull forward Ice Storage Case	5	 - Remove 2 screws at the Cove Guide Cab W/Tube A.
2	 - Remove 2 screws.	6	 - Disassemble Cover Guide Cab W/Tube A
3	 - Pull forward Ice Maker.	7	 - Pull forward Hose Ice Maker Tube As.
4	 - Remove Water Hose Heater's 2P housing.	8	 - Check Hose Ice Maker Tube As.

2) How to check Hose Ice Maker Tube As.

How to check	CRITERION
- Measure the resistance of two wire	- Good: 9680 ohm(+- 8%) (8900 ~ 10456 ohm) - If defective, change

8-2. Bracket Geared Motor Assembly

1) Disassembling Procedure

NO	DISASSEMBLING PROCEDURE	NO	DISASSEMBLING PROCEDURE
1	- Remove 2 screws.	4	- Pull forward Bracket Geared Motor.
2	- Unscrew (4 points).	5	⭕ Unscrew (red 2 screws). 🔵 Unscrew (blue 4 screws).
3	- Separate 6 pin housing of Bracket Geared Motor from the top connector.		- Check Solenoid Valve and Geared Motor.

2) How to Check Hose Ice Maker Tube Assembly

PARTS	SPEC.	HOW TO CHECK	CRITERION

Geared Motor	- SPEC. NAME
	  :DAG-6502DEC
	
	- VOLTAGE
	  :220/240V,50Hz
		- Check resistance value of
		  2 terminals with a Multi Tester.
			- GOOD : 11.3 ohm(+- 10%)
			  (10.8 ~ 12.7 ohm)
			
			- DEFECTIVE ;
			  Change the Geared Motor.

Cube Sol Valve	- SPEC. NAME
	  :Cube SN8
	
	- VOLTAGE
	  :220/240V,50Hz
		- Check resistance value of
		  2 terminals with a Multi Tester.
			- GOOD : 145 ohm(+- 8%)
			  (133 ~ 156 ohm)
			
			- DEFECTIVE ;
			  Change the Cube Sol Valve.

8-3. Dispenser Micro Switch

1) Disassembling Procedure
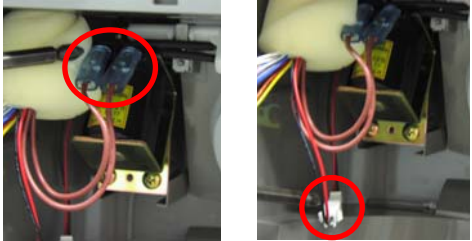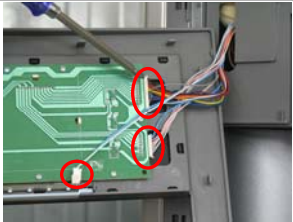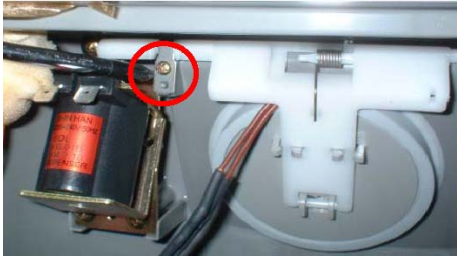
NO	DISASSEMBLING PROCEDURE	NO	DISASSEMBLING PROCEDURE
1	 - Insert (-) screw driver into bottom hole of dispenser button guide. Pull up forward to remove the guide. (Be careful not to damage guide surface.)	3	 - Separate wire connectors from Micro Switch.
2	 - Remove Micro switch.	4	 - Check Micro Switch.

2) How to Check Micro Switch

PARTS	HOW TO CHECK	CRITERION		
SPEC. NAME : VP333A-OD-8 VOLTAGE :125V,3A	 - Check both terminals (red circle) with a Multi Tester (Tester Mode : Resistance.	- GOOD :		
		Tact Switch (Blue Circle)	Terminals (Red circle)	Tester Result (Resistance Mode)
		ON (Close)	Connected	Some Value
		OFF (Open)	Disconnected	No value (0)
		- DEFECTIVE : Change Micro Switch.		

8-4. Dispenser Solenoid Valve

1) Disassembling Procedure

NO	DISASSEMBLING PROCEDURE	NO	DISASSEMBLING PROCEDURE
1	- Insert (-) screw driver into bottom left groove of Cover Dispenser Box. Pull forward with a snap.(Be careful not to damage cover and door surface.)	4	- Separate 2 terminals from Sol Valve and 2P Housings from Cover Ice Flap.
2	- Separate 2 housings of 10P / 7P from Front PCB. (Do not hold only wires to pull out.)	5	- Unscrew (3 points) to remove Sol Valve.
3	- Unscrew (2 points) to remove Box Dispenser Shut.	6	- Unscrew (1 point) to remove Cover Ice Flap.

2) How to Check Micro Switch

PARTS	SPEC.	HOW TO CHECK	CRITERION
Dispenser Sol Valve	- SPEC. NAME :SOL2003-01B - VOLTAGE :220/240V,50Hz	- Check resistance value of both terminals with a tester.	- Good : 215 ohm(+-10%) (193 ~ 236 ohm) - DEFECTIVE : 0 Change Sol Valve.
Flap Heater Assembly	- VOLTAGE :DC 12V,1.5W	- Check resistance value of both terminals with a tester.	- GOOD : 96Ω(±8%) (88 ~ 104Ω) - DEFECTIVE ; Change Flap Heater AS.

8-5. Main PCB (None Inverter Compressor models)

No	Item	Check Point
1	Make refrigerator cooler	•When consumer claim about the refrigerator's temperature follow this. Change the resistance (cutting jumper) |	FRS-U20**	Remark
Cutting of	J18	down by 1.5℃
Cutting of	J18 & J19	down by 3℃	
2	Relay Power Controller	• Receive signal (5V) from the MICOM. Deliver signal (12V) each electric device. ▷Check input & output voltage of MICOM and IC7
3	Fan Power Controller	•To check input & output voltage of Fan ▷#2 : Input ▷#5 : Output
4	Electric Current Fuse	* To check when each device does not work (250V,3.15A)
5	Time Shortening Switch	* To shorten time in PCB checkup (1 time pushing is 1 minute.)
6	Regulator IC(5V)	* Make voltage (12V → 5V) to MICOM. Voltage check of IC#6 (Input :12V,Output : 5V)

8-6. Main PCB (Inverter Compressor Models)

No	Item	Check Point
1	Make refrigerator cooler	•When consumer claim about the refrigerator's temperature follow this. Change the resistance (cutting jumper) |	FRS-U20**	Remark
Cutting of	J18	down by 1.5℃
Cutting of	J18 & J19	down by 3℃	
2	Relay Power Controller	• Receive signal (5V) from the MICOM. Deliver signal (12V) each electric device. ▷Check input & output voltage of MICOM and IC7
3	Fan Power Controller	•To check input & output voltage of Fan ▷#2 : Input ▷#5 : Output
4	Electric Current Fuse	* To check when each device does not work (250V,3.15A)
5	Time Shortening Switch	* To shorten time in PCB checkup (1 time pushing is 1 minute.)
6	Regulator IC(5V)	* Make voltage (12V → 5V) to MICOM. Voltage check of IC#6 (Input :12V,Output : 5V)
7	CN16 (Inverter Models Only)	•Make signal to control inverter compressor RPM. Output : DC 5 ~ 15V (85 Hz / 2550 rpm or 122 Hz / 3660 rpm) -Compressor RPM is up to each condition (Ambient Temperature, FCP Button etc.)
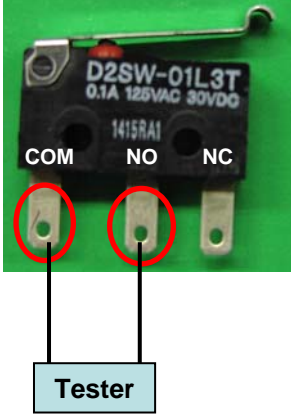
8-7. Ice Maker

1) Disassembling Procedure

NO	DISASSEMBLING PROCEDURE	NO	DISASSEMBLING PROCEDURE
1	Remove 2 screws on top front of ice maker.	6	Level switch / Full ice sensing switch. Remove full ice sensing switch and level switch.
2	Pull forward ice maker.	7	Unscrew (3 points) Plate Gear Fixture.
3	Unscrew Fixture of Frame Ice Maker.	8	Ice dropping motor. Check if ice dropping motor is normal.
4	Separate Ice Maker Assembly from Frame Ice Maker.	9	Remove 2 pin housing (ice sensor)
5	Separate Cover I/M (A) from Cover I/M (B) with a (-) screw driver.	10	Remove I-sensor (ice sensor) from Case Icing assembly.

Follow the reverse order when assembling.

2) How to Check Ice Maker

PARTS	HOW TO CHECK	CRITERION
Ice dropping motor	 Check resistance between 2 wires with tester.	GOOD : RS-360RH-14250 : 6 ~ 14 ohm DEFECTIVE : Change the motor.
I-Sensor (Ice Sensor)	 Check resistance between 2 terminals with tester.	GOOD : 4.4 ~ 50 k ohm (It depends on ambient temperature) DEFECTIVE : Change the sensor.

Full ice sensing switch		GOOD :		

		Tact Switch (Lever)	Terminals (COM~NO)	Tester Result (Resistance Mode)
		Push	Connected (Close)	0 ohm
		Normal	Disconnected (Open)	∞ ohm
Level Switch	Check the resistance between 2 terminals (COM ~ NO) with tester.	DEFECTIVE : Change the switch.		

8-8. Inverter Box As (Inverter compressor models only)

8-8-1. Connections & Cables
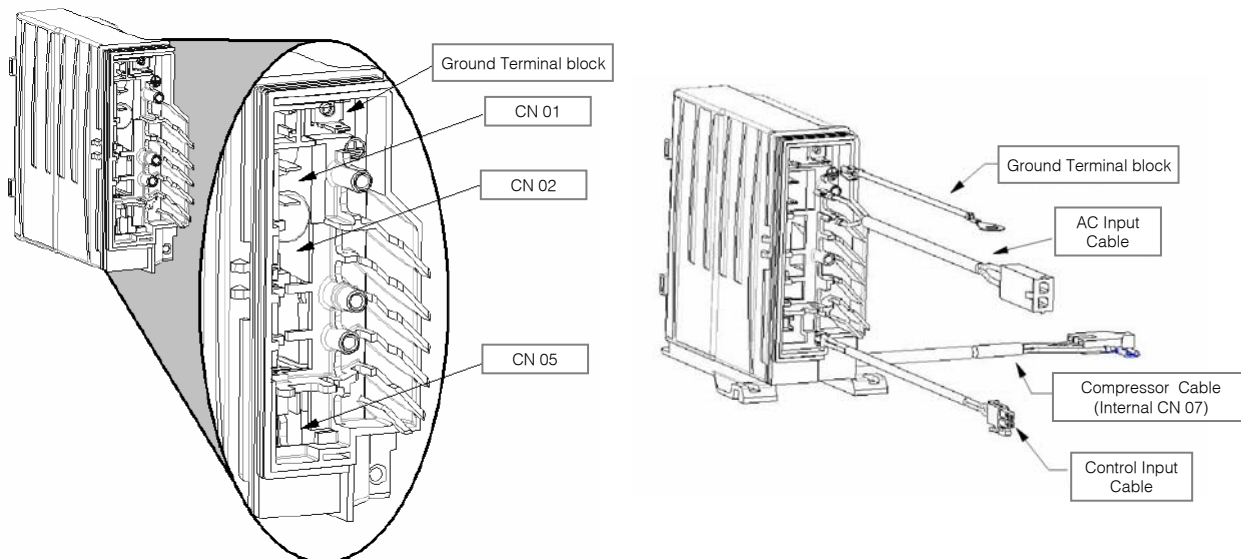
CONNECTION	DESCRIPTION	PIN	DESCRIPTION	
CN 01	**AC Input Connection** The AC power supply must be connected on this connection.	N	Neutral	
		P	Phase (Live)	
CN 02	**Auxiliary AC Connection** It provides an auxiliary AC power connection that supplies energy for other devices, like a lamp or other facilities.	N	Neutral	Not applied
		N	Neutral	
		P	Phase	
Ground Terminal Block	**EMI & Safety Ground Connection** External Ground Terminal Block.	-	-	
CN 05	**Control Input Connection** The Inverter has different types of control signal, depending on the mode. (This refrigerator use the frequency signal mode)	GND	Ground	
		IN	Data In	
CN 07	**Compressor Connection (internal)** It is internal on Inverter Box. It is connected to the compressor using the compressor cable. This connection provides the power supply to the compressor.	-	-	

8-8-2. Inverter Control Mode

1) Frequency Mode

Controls the compressor speed through a frequency signal sent to the Inverter.

The frequency signal is a digital square wave, with 0 to +5V voltage amplitude and defined range as described ahead.

The duty cycle must be from 30% to 70%.
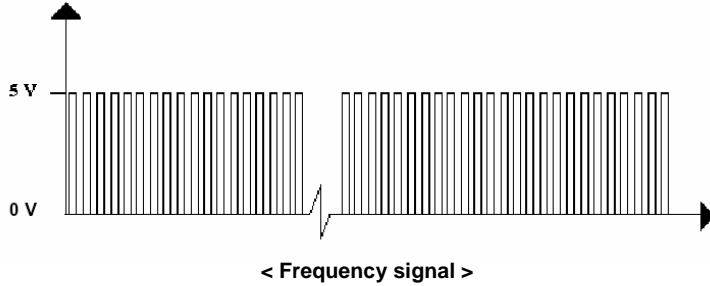
< Frequency signal >

2) Compressor speed

Compressor speed will follow the frequency signal, according to the relation described bellow.

Input Signal (Hz)	Comp Speed (rpm)
0 to 50	0
50.1 to 53.3	1,600
53.4 to 150	**30 x Hz**
105 to 111	hysteresis
130 to 132	hysteresis
136.6 to 138.6	hysteresis
> 150	4,500
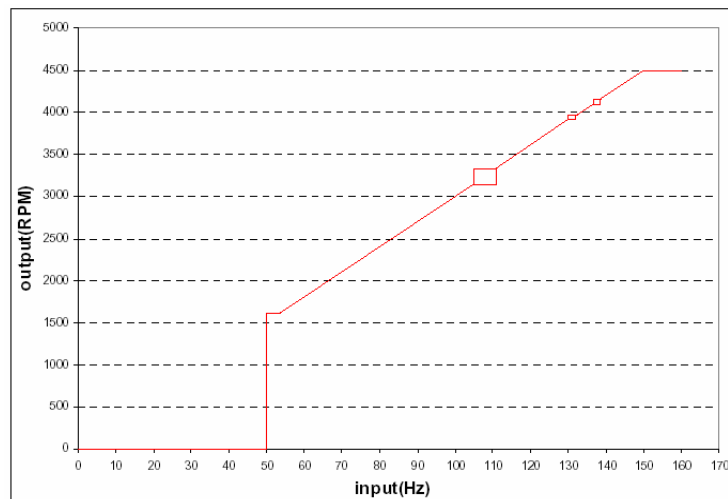
< Relation between Inverter frequency and compressor rotation >

3) In this refrigerator, input frequency signals are used as below.

Condition		Input Frequency	Comp Speed
Ambient Temperature	Other conditions		
over 35℃	-	122 Hz	3660 rpm
below 35℃	Normal condition	85 Hz	2550 rpm
	Initial Power connected Weak-Cool Super FRZ Super REF	122 Hz	3660 rpm

4) Troubleshooting

- No Start

PROBLEM	ACTION
No Compressor Trial	
Compressor disconnected from the Inverter	Verify the Compressor Cable connection.
No AC power supply ; or wrong voltage/wrong Terminals connected to the Inverter.	Verify the AC Input Cable connection and measure the AC Input voltage.
No control signal input or bad connection.	Verify the Control Input Cable connection and measure the signal from the Main-PCB.
Blown fuse (due to previous major failure).	Return the unit to manufacturer, replacing it by a new one.
Open compressor motor winding.	Measure winding for open circuit between all pair of pins on the hermetic terminal. If one winding is open, replace it by a new one.
Compressor with locked rotor. (due to mechanical damage).	Replace compressor by a new one and test for confirmation.
Dropped, damaged, burnt Inverter.	Replace by a new one and test for confirmation.
Inverter on Waiting Time after failed start.	Wait the necessary time or reset the Inverter disconnecting it from the AC power supply. The reset time is about 15s.
Demagnetized rotor (only if compressor was previously connected directly to the AC power supply).	Replace compressor by a new one and test for confirmation.
Compressor positions rotor, But fails to start	
Unequaled pressures between discharge and suction pressures in the refrigerating system.	Allow the Inverter to equalize pressure between suction and discharge sides.
Open compressor motor winding.	Measure winding for open circuit between all pair of pins on the hermetic terminal. If one winding is open, replace it by a new one.
Too low AC voltage supplied to the Inverter.	Measure AC voltage to confirm; correct the voltage or change the Inverter to the correct voltage range (115V or 220V model).
Demagnetized rotor (only if compressor was previously connected directly to the AC power supply).	Replace compressor by a new one and test for confirmation.

- Malfunction during operation

PROBLEM	ACTION
Compressor does not run at the speed selected by the Inverter.	Too high compression load, with compressor being subjected to a stall condition. (lower suction and/or discharge pressures for correction).
	Too low AC voltage. Check the AC voltage supplied to the Inverter and set it to the required level or change the Inverter to the correct voltage range. (115V or 220V model).
	No or incorrect control signal. (check if the correct control signal is arriving at the control Input Connection).

5) Frequency mode connection & Check point

The main-PCB is connected to the Inverter through the Control Input Connection, using the Control Input Cable.
Frequency signal to the IN pin and the 0V to the GND pin (see below Figure)

- Inverter AC Input & Input & Output Signal
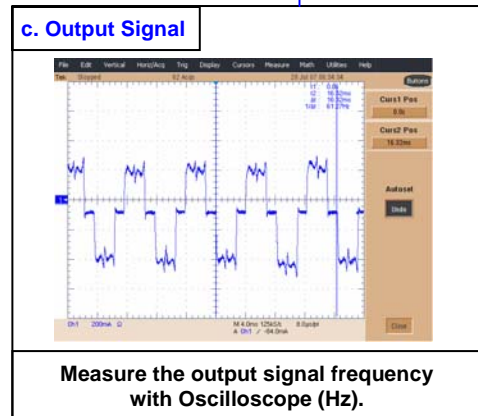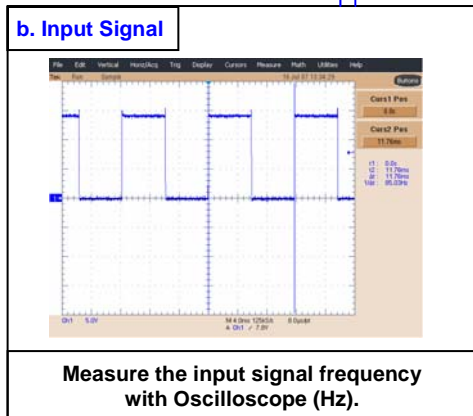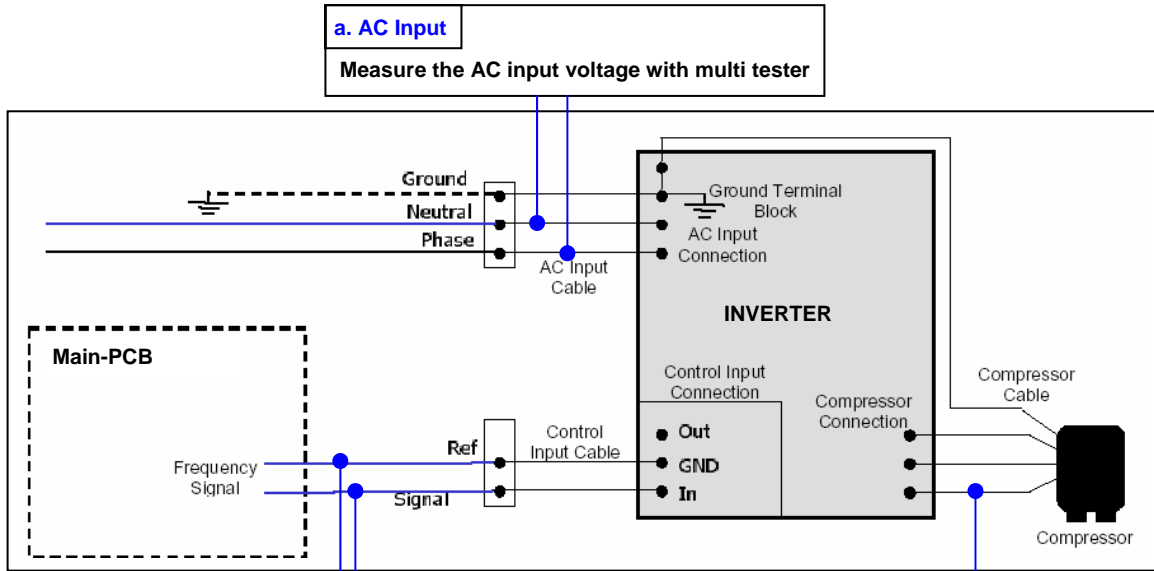
a. AC Input

Measure the AC input voltage with multi tester

b. Input Signal

Measure the input signal frequency with Oscilloscope (Hz).

c. Output Signal

Measure the output signal frequency with Oscilloscope (Hz).

- Compressor Motor Winding

Measure winding for open circuit between all pair of pins on the hermetic terminal.

1) **R1 = R2 = R3**
   - Compressor Motor Winding is OK.
2) **R1, R2, R3** are not same
   - Compressor Motor Winding is OPEN.

9. TROUBLE DIAGNOSIS

9-1. Faulty Start (F/R lights OFF , F-PCB Power OFF)

```
                    ┌─────────────┐
                    │    Start    │
                    └─────────────┘
                           │
                           ▼
              ◇ Power cord or Fuse ◇────Y────►┌──────────────────────┐
              ◇ is disconnected ?  ◇          │ Change the Main Fuse  │
                           │                  │    (AC250V 15A)        │
                           N                  │ (In the left side of   │
                           │                  │ machine compartment)   │
                           ▼                  └──────────────────────┘
              ◇  1'st power of SMPS ◇───N────►┌──────────────────────┐
              ◇       is on?        ◇         │ Check power Cord      │
                           │                  │ connection from       │
                           Y                  │ machine compartment   │
                           │                  │ and to CN1 of M-PCB.  │
                           ▼                  └──────────────────────┘
              ◇  Main PCB Fuse is  ◇────Y────►┌──────────────────────┐
              ◇   disconnected?    ◇          │  Change the Fuse      │
                           │                  │   (AC250V 3.15A)       │
                           N                  │  (on the Main PCB)     │
                           │                  └──────────────────────┘
                           ▼
              ◇      Voltage       ◇───N────►┌──────────────────────┐
              ◇ (DC12V/14.5V/5V) on ◇         │  Change Main PCB      │
              ◇  Main PCB is OK?   ◇          └──────────────────────┘
                           │
                           Y   ※ Refer to the 5-1.
                           │   (Power circuit diagram)
                           ▼
              ◇  Wire connection  ◇────Y────►┌──────────────────────┐
              ◇  of F-PCB is OK?  ◇           │   Change F-PCB AS.    │
                           │                  └──────────────────────┘
                           N
                           │
                           ▼
              ┌──────────────────┐
              │ Checkup and connect│
              │   F-PCB wires.     │
              └──────────────────┘
```

- How to replace Front PCB

<Backside of Front PCB>

1) Insert a flat tip driver into the left down groove of panel frame and snap it out smoothly.
2) Separate 3 connector from Front PCB. (Do not hold only wires to pull out.)
3) Unscrew (7 points) to remove Front PCB.
  - Follow the reverse order when assembling.

9-2. Freezer Compartment

9-2-1. Freezing failure . (Foods are not frozen / cold.)

```
                    ┌──────────┐
                    │  Start   │
                    └──────────┘
                         │
                         ▼
              ◇ Any Error code ──────Y──────────────────────────────────┐
                on F-PCB?                                                │
                    │                                                    ▼
                    │N            ┌─────────────────────┐   ┌────────────────────────┐
                    │             │ - Refer to the 4-9. │   │  Refer to error display│
                    │             │  (Error Display)    │   │  in operation and      │
                    │             └─────────────────────┘   │  function              │
                    ▼                                        └────────────────────────┘
              ◇ Does Comp. ──N──→ ◇ Inverter ──Y──────────────────┐
                work?              is OK?                           │
                    │                 │N                           ▼
                    │Y                ▼                    ┌───────────────┐
                    │          ┌──────────────┐            │  Change the   │
                    │          │Change the    │            │    Comp.      │
                    │          │  inverter    │            └───────────────┘
                    │          └──────────────┘
                    ▼
              ◇ F/C-Motor ──N──→ ◇ F/C-Motor ──N──→ ┌──────────────┐
                works OK?          is OK?            │ Change F/C-Motor│
                    │                 │Y             └──────────────┘
                    │Y                ▼
                    │          ◇ Wiring connection ──Y──→ ┌──────────────┐
                    │            Is OK?                    │ Change M-PCB │
                    │                 │N                  └──────────────┘
                    │                 ▼
                    │          ┌──────────────┐
                    │          │Check lead wire│
                    │          └──────────────┘
                    ▼
              ◇ Temp. Fuse ──N──────────────────────────┐
                Is OK?                                   ▼
                    │                          ┌──────────────────┐
                    │Y                         │ Change Fuse. Temp│
                    │                          └──────────────────┘
                    │                          - Left-up side of Evaporator
                    ▼
              ◇ Defrost Heater ──N──────────────────────┐
                Is Ok?                                   │
                    │        ┌─────────────────────────┐│
                    │        │Defrost Heater :192W (252 ohm)
                    │        └─────────────────────────┘▼
                    │Y                         ┌──────────────────┐
                    │                          │  Change the      │
                    │                          │  Defrost Heater  │
                    ▼                          └──────────────────┘
              ◇ Ice formation on Eva. ──N─────┐
                Is OK?                         ▼
                    │                ┌────────────────────────┐
                    │Y               │Check ice formation on Eva.│
                    │                │And if refrigerant leak    │
                    │                │is found, repair it.       │
                    └──────back to Start loop
```

48

Removing and replacing Freezer parts

(1)

1) Remove foods.
2) Remove Ice Bucket,
   shelves and cases in
   Freezer compartment.

(2)

* Remove 2 screws
  of Ice Maker.

(3)

* Remove the Housing
  of Ice Maker AS.
  (Right side)

(4)

* Remove 4 screws
  of Geared Motor.

(5)

* Remove the Housing
  of Geared Motor AS.
  (Center)

Removing and replacing Freezer parts

(6)

Remove light cover screws.

(7)

Pull down smoothly the bottom of light cover to remove.

(8)

Remove the left housing.

(9)

Hold the end of F-Fan cover and pull forward slowly.

(10)

Remove the screw cap on the F-Louver A with a flat tip driver.

(11)

Remove 3 screws of F-Louver A.

(12)

Hold the end of F-Louver A and pull forward slowly.

(13)

Remove the housing.

(14)

Remove the screw of F-Return cover and pull out cover.

(15)

Hold the end of F-Louver B and pull forward slowly.

Removing and replacing Freezer parts

Temp. Fuse connector

F-Fan Motor connector

D-Sensor connector

Defrost Heater connector

D-Sensor

Temp. Fuse

Defrost Heater
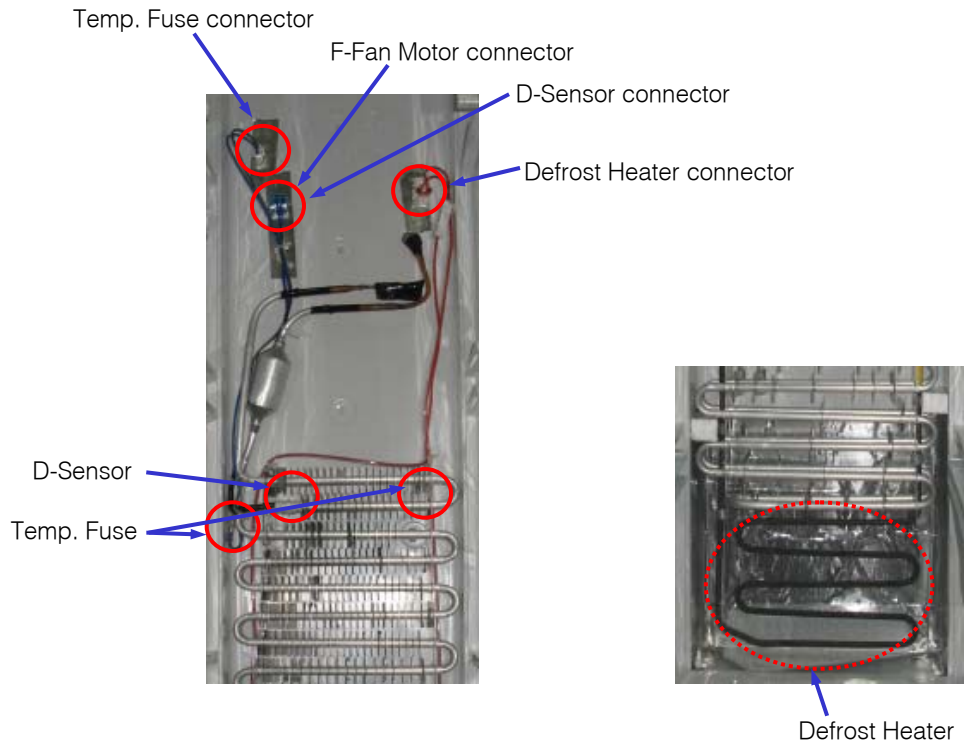
9-2-2. Ice Formation on F-Louver

```
                    ┌─────────────────┐
                    │      Start      │
                    └─────────────────┘
                             │
                             ▼
        ◇ Dews are formed on the          ◇ Gasket has a gap        ┌──────────────────┐
          gasket surface inside F   ──Y──→   between cabinet ?  ─Y─→ │ Remove the gap.  │
          compartment ?                                              └──────────────────┘
                    │                              │
                    N                              N
                    │                              ▼
                    │                    ◇ Door is hanged            ┌──────────────────┐
                    │                      down ?            ──Y──→  │ Reassemble the   │
                    │                                                │ door.            │
                    │                              │                 └──────────────────┘
                    │                              N
                    ▼
        ◇ Door is open and closed ──Y──────────────────────┐
          too frequently ?                                  │
                    │                                       ▼
                    N                          ┌──────────────────────┐
                    │                          │ Explain not to open  │
                    │                          │ doors too frequently.│
                    ▼                          └──────────────────────┘
        ◇ Heat appliances are too ──Y──────────────────────┐
          close to the refrigerator ?                       │
                    │                                       ▼
                    N                          ┌──────────────────────┐
                    │                          │ Make enough distance │
                    │                          │ between heat         │
                    │                          │ appliances and       │
                    ▼                          │ refrigerator.        │
        ◇ Watery or hot foods are  ──Y─────────┐  └──────────────────────┘
          stored in refrigerator              │
          compartment ?                       ▼
                    │                 ┌──────────────────────┐
                    N                 │ Wipe out dews on the │
                                      │ louver surface and   │
                                      │ run the refrigerator │
                                      │ again.               │
                                      └──────────────────────┘
```

9-2-3. Disconnection / breaking of Freezer Lights Wires

Start

Freezer light filament is
disconnected or breaking ?

Y

Change the light bulb.

N

Connection of F door
switch is OK ?

N

Repair the F-door switch.

Y

Check the F door switch
connection and F-light socket.
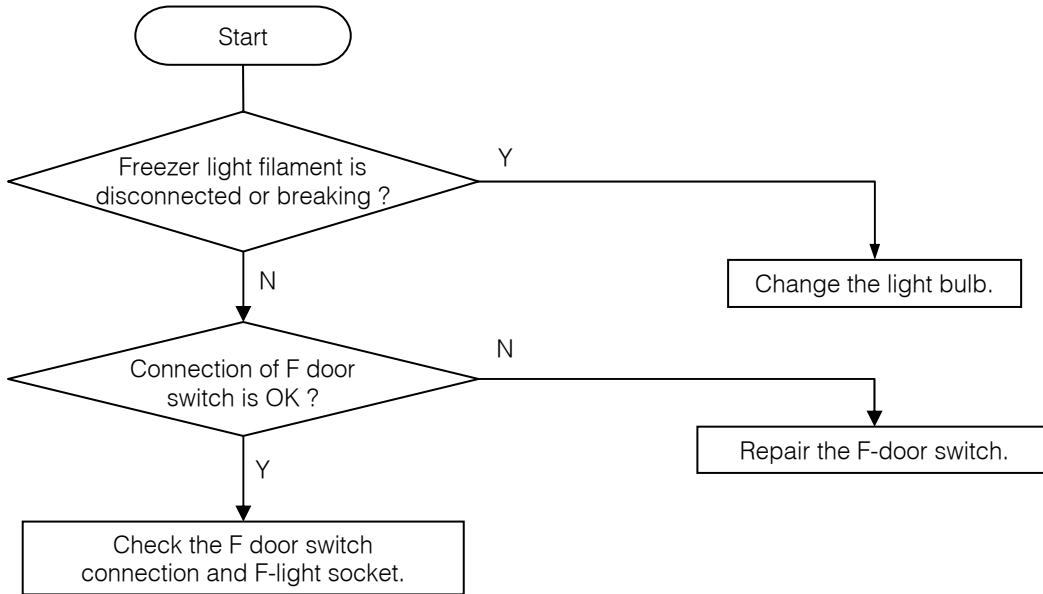
Change of F Lights

① * Remove 2 screws
of light cover.

▼

② * Hold the bottom of light
cover and pull forward
to remove.

▼

③ * Change the light bulb.
(AC240V 25W)

- Follow the reverse order
of disassembling after
changing the light.

Change of F Door Switch

① * Insert a flat tip screw
driver Into a gap of door
switch to pull forward.

▼
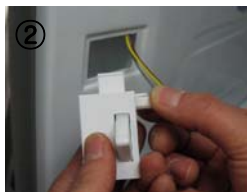
② * Disconnect the housing
and change the switch
for a new one.

Be careful when changing
the switch. F and R door
switch are different in type
and shape.

- Follow the reverse order
of disassembling after
changing the switch.

9-3. Refrigerator Compartment

9-3-1. Refrigeration failure (Foods does not get cool or cold soon.)

```
                          ┌──────────────┐
                          │    Start     │
                          └──────┬───────┘
                                 │
                                 ▼
                  ◇ Any error mode ─── Y ──→  [Refer to the 4-9.
                    on F-PCB?                   (Error Display)]
                        │ N                           │
                        │                             ▼
                        │                    ┌──────────────────┐
                        │                    │ Solve error code │
                        │                    │ problem, if any. │
                        ▼                    └──────────────────┘
          ◇ R-Motor works OK ? ── N ──→ ◇ R-Motor is OK ? ── N ──→ [Change the R-Motor.]
                        │ Y                      │ Y
                        │                        ▼
                        │              ◇ Wiring connection ── Y ──→ [Change the Main PCB.]
                        │                Is OK ?
                        │                        │ N
                        │                        └──────→ [Check the wirings.]
                        ▼
          ◇ R-Sensor is OK ──── N ──────────→ [Change the R-Sensor
            (normal) ?                          and check connector.]
                        │ Y
                        ▼
          ◇ Freezer compartment ── N ──→ [Refer to "Freezing
            Is OK ?                         does not work."]
                        │ Y
                        ▼
          ◇ Refrigerator gasket ── Y ──→ ◇ Gasket have ── Y ──→ [Repair to eliminate
            have gap ?                     any gap ?              the gap of gasket.]
                        │ N                     │ N
                        │                       ▼
                        │            ◇ Door is hanged down ── Y ──→ [Reassemble doors.]
                        │              to make gap between
                        │◄──── N ───── cabinet ?
                        ▼
          ◇ Foods are placed just ── Y ──→ [Explain not to place foods close to
            close to R-Sensor ?             R-sensor or cold air spout.]
                        │ N
                        ▼
          ◇ Refrigerator door ── Y ──→ [Explain not to open doors
            openings are too often ?    unnecessarily or frequently.]
                        │ N
                        ▼
          [* Counsel to use in "strong" setting.
           * Cut the jump wire on the Main PCB
             to compensate weak-cool.
             → Option 1 : cut J1 to down 1.5 C.
             → Option 2 : cut J1 & J2 to down 3 C.]
```

9-3-2. Disconnection / Breaking of Refrigerator Lights Wires
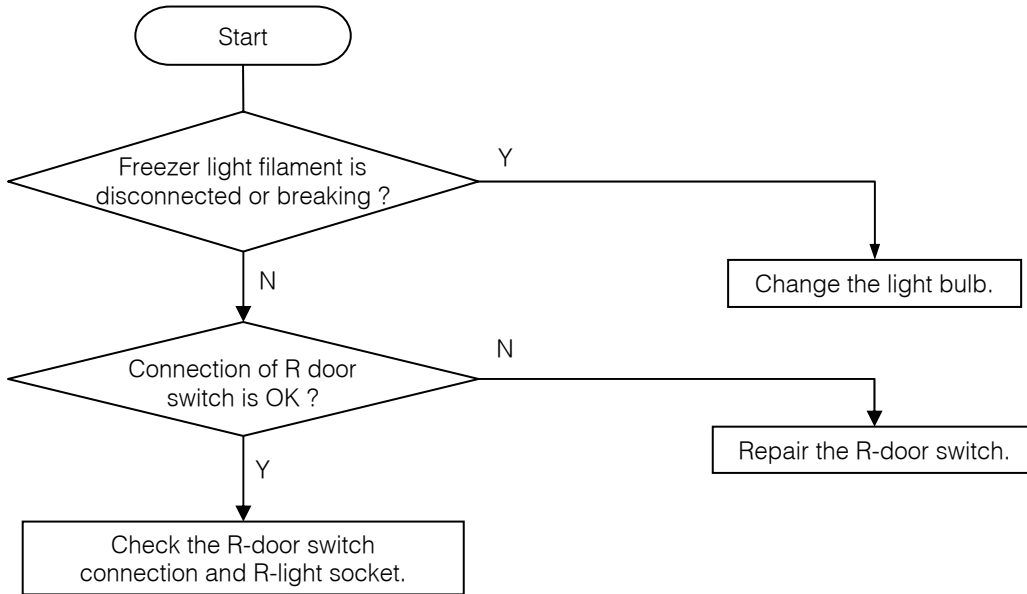
```
                    ┌──────────────┐
                    │    Start     │
                    └──────┬───────┘
                           │
                    ◇──────────────◇
                   ╱  Freezer light   ╲         Y
                  ╱ filament is         ╲──────────────────────┐
                  ╲ disconnected or     ╱                      │
                   ╲  breaking ?       ╱                       ▼
                    ◇──────────────◇              ┌───────────────────────┐
                           │ N                    │  Change the light bulb.│
                           │                      └───────────────────────┘
                    ◇──────────────◇
                   ╱ Connection of R   ╲    N
                  ╱  door switch is OK? ╲──────────────────────┐
                  ╲                     ╱                      │
                   ╲                   ╱                       ▼
                    ◇──────────────◇              ┌───────────────────────┐
                           │ Y                    │ Repair the R-door switch.│
                           ▼                      └───────────────────────┘
            ┌────────────────────────────┐
            │ Check the R-door switch     │
            │ connection and R-light socket.│
            └────────────────────────────┘
```

Change of F Lights

① * Remove screws of light cover.

▼

② * Hold the bottom of cover and pull forward to remove.

▼

③ * Change the light bulbs. (AC240V 25W)

Follow the reverse order of disassembling after changing the light.

Change of F Door Switch

① * Insert a flat tip screw driver into a gap of door switch to pull forward.

▼

② * Disconnect the housing and change the switch for a new one.

Be careful when changing the switch. F and R door switch are different in type and shape.

Follow the reverse order of disassembling after changing the switch.

9-3-3. Dews on Refrigerator Compartment

```
                          ┌─────────────────┐
                          │      Start      │
                          └─────────────────┘
                                   │
                                   ▼
              ◇ Dews are formed              ◇ Gasket has        Y   ┌──────────────────────────┐
                on the gasket inside    ──Y──    Any gap ?     ─────▶│ Repair to eliminate the gap. │
                R-compartment?                                       └──────────────────────────┘
                     │ N                           │ N
                     │                             ▼
                     │            N   ◇ Door is          Y   ┌──────────────────────┐
                     │◀──────────────   hanged down ?  ─────▶│ Reassemble the doors. │
                     │                                       └──────────────────────┘
                     ▼
              ◇ Door is open too long ?  ──Y──────────────────┐
                     │ N                                        ▼
                     │                            ┌──────────────────────────┐
                     │                            │ Explain not to open doors │
                     │                            │        too long.          │
                     │                            └──────────────────────────┘
                     ▼
              ◇ Door is open and closed  ──Y──────────────────┐
                too frequently ?                               ▼
                     │ N                            ┌──────────────────────┐
                     │                              │ Explain not to open   │
                     │                              │ doors unnecessarily.  │
                     │                              └──────────────────────┘
                     ▼
              ◇ Heat appliances are     ──Y──────────────────┐
                used near the refrigerator ?                  ▼
                     │ N                        ┌──────────────────────────────┐
                     │                          │ Make enough distance between  │
                     │                          │ the appliances and refrigerator.│
                     │                          └──────────────────────────────┘
                     ▼
              ◇ Watery or hot foods are  ──Y──────────────────┐
                stored in the R-compartment?                   ▼
                     │ N                      ┌────────────────────────────────┐
                     │                        │ Advise to cool down foods, wrap │
                     │                        │ or cover foods with much water  │
                     │                        │ before storing in the compartment.│
                     │                        └────────────────────────────────┘
                     ▼
              ◇ R-fan works OK ?  ──N──────────────────────────┐
                     │ Y                                         ▼
                     │                              ┌──────────────────────────┐
                     │                              │ Repair and change R-motor. │
                     │                              └──────────────────────────┘
```

9-3-4. Super-cooling of Vegetable Case

```
                        ┌──────────────┐
                        │    Start     │
                        └──────┬───────┘
                               │
                               ▼
                    ╱─────────────────────╲          Y        ┌────────────────────────────────┐
                   ╱  Refrigerator temp.    ╲──────────────────│ Counsel the temperature modes. │
                   ╲  setting is "Strong" ?  ╱                 │   Counsel to set the temp.     │
                    ╲─────────────────────╱                    │   "Middle" or "Weak" mode.     │
                               │ N                             └────────────────────────────────┘
                               ▼
                    ╱─────────────────────╲          N
                   ╱     R-check valve       ╲─────────────────────────────────┐
                   ╲     Works OK ?           ╱                                 ▼
                    ╲─────────────────────╱                      ┌────────────────────────────────┐
                               │ Y                               │      Repair and/or Change      │
                               │                                 │       the R-check valve.       │
                               │                                 └────────────────────────────────┘
                               │
                               │                                  ※ Refer to  "Repair /Change
                               │                                     of Check Valve".
                               ▼
                    ╱─────────────────────╲    N    ╱──────────────╲    N     ┌──────────────────────┐
                   ╱      Is there any       ╲───────╱  R-sensor is   ╲────────│ Change the R-sensor. │
                   ╲   R-sensor error code ? ╱       ╲    OK ?        ╱        └──────────────────────┘
                    ╲─────────────────────╱          ╲──────────────╱
                               │ Y                           │ Y
                               │                             │
                               │                             ▼
                               │              ┌────────────────────────────────┐
                               │              │  Check the R-sensor connection. │
                               │              │ (Check the connector to Main PCB.)│
                               │              └────────────────────────────────┘
```
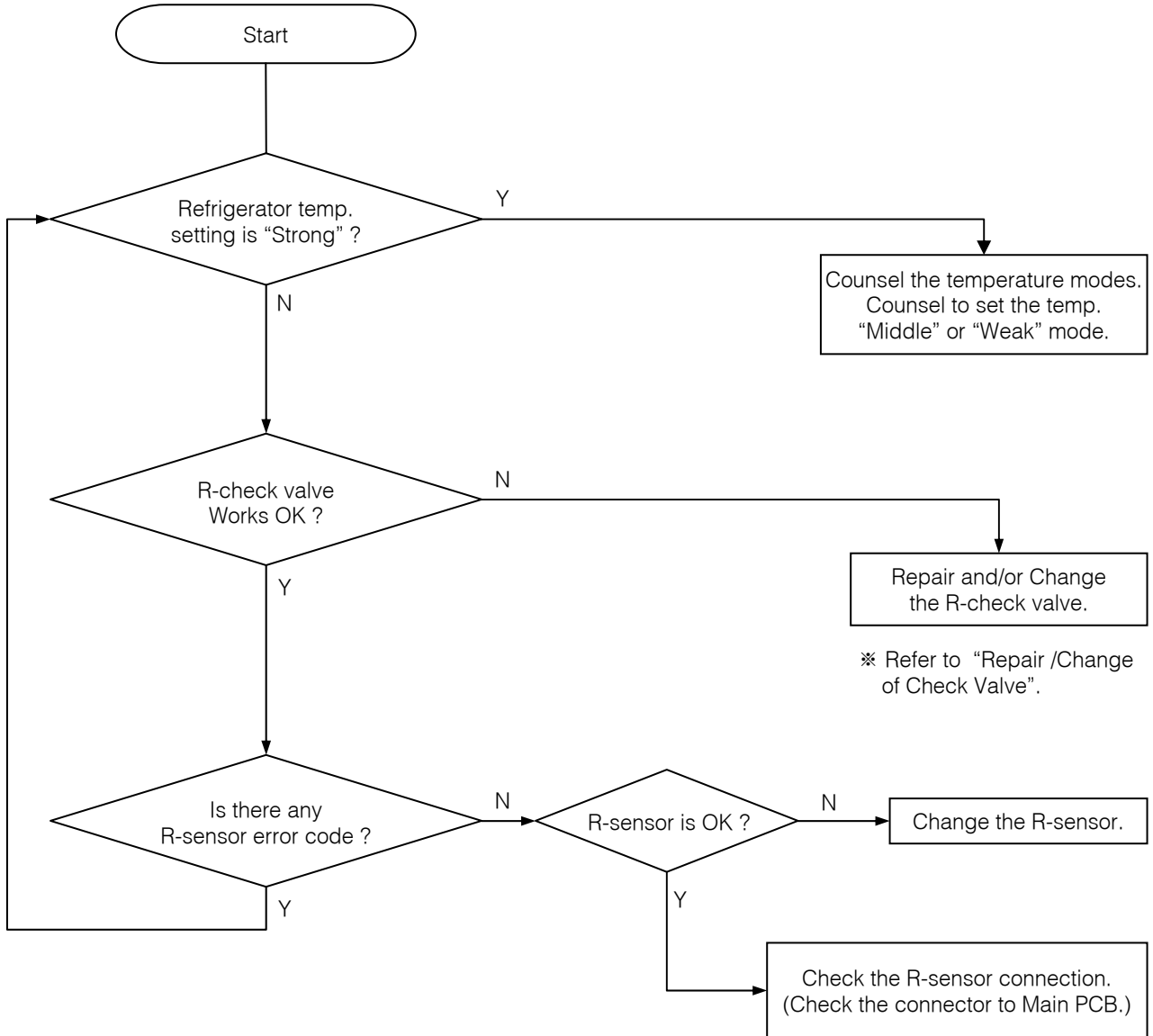
Removing of Check Valve

① * Remove screws of light cover.

▼

② * Hold the bottom of cover and pull forward to remove.

▼

③ * Disconnect light housing.

▼

④ * Remove screws with a (+)screw driver.

⑤ * Hold the bottom and right of damper to pull down to remove.

▼

⑥ * Lift up a piece of Check Valve Flap and insert a finger to the valve frame to hold out.

▼

⑦

⑧

9-4. Operation Noise of Refrigerator

9-4-1. Comp. operation Noise

```
          ┌──────────────────┐
          │      Start       │
          └──────────────────┘
                   │
                   ▼
          ◇ Refrigerator is leveled ? ◇ ──── N ────┐
                   │                                │
                   │ Y                              ▼
                   │                    ┌───────────────────────────┐
                   │                    │ Level the refrigerator by │
                   │                    │     adjusting wheels.      │
                   │                    │ ☞ Refer to User's Guide   │
                   │                    │      and SVC Manual.       │
                   │                    └───────────────────────────┘
                   ▼
          ◇ Front cover or door gasket
            is assembled wrong ? ◇ ──── Y ────┐
                   │                           │
                   │ N                         ▼
                   │                    ┌───────────────┐
                   │                    │  Set it right. │
                   │                    └───────────────┘
                   ▼
          ◇ Rubber absorber comp
            is distorted or aged ? ◇ ──── Y ────┐
                   │                             │
                   │ N                           ▼
                   │                    ┌───────────────────────────┐
                   │                    │  Change the Rubber absorber.│
                   │                    └───────────────────────────┘
                   ▼
          ◇ Sound from Comp itself
            or Vibration ? ◇ ──── N ────┐
                   │                     │
                   │ Y                   ▼
                   │          ┌───────────────────────────┐
                   │          │ Attach a restrainer on the comp.│
                   │          │ head to reduce vibration and    │
                   │          │ high frequency noise.           │
                   │          └───────────────────────────┘
                   ▼
          ┌───────────────────────┐
          │ Change the compressor. │
          └───────────────────────┘
```

Remarks
- Compressor sound is somewhat normal because it works like a heart to circulate the refrigerant in the pipes during the refrigerator operation. - Rattling or metallic touch sound of motor, piston of comp. can be heard when it starts or stops.

9-4-2. Refrigerant Flow Sound

```
                    ┌─────────────────┐
                    │      Start      │
                    └─────────────────┘
                             │
                             ▼
                  ◇ Water flowing or hiss sounds ◇ ──Y──┐
                  ◇   from the refrigerator ?    ◇       │
                             │                           ▼
                             N                  ┌──────────────────────┐
                             │                  │ Attach an absorber gum│
                             ▼                  │  on the capillary tube.│
                  ◇ Refrigerant sound of hiss or ◇      └──────────────────────┘
                  ◇ sizzling sound when comp. starts ? ◇ ──Y──┐
                             │                           ▼
                             N                  ┌──────────────────────┐
                             │                  │  Apply a gum on the  │
                             ▼                  │     accumulator.     │
                  ◇ Refrigerant sound of hiss or ◇      └──────────────────────┘
                  ◇ sizzling when comp. stops ?  ◇ ──Y──┐
                             │                           ▼
                             N                  ┌──────────────────────┐
                             │                  │  Apply a gum on the  │
                             ▼                  │     accumulator.     │
                  ◇   Any shaking sound from    ◇      └──────────────────────┘
                  ◇      F-compartment          ◇ ──Y──┐
                  ◇    when comp. works ?        ◇       │
                             │                           ▼
                             N                  ┌──────────────────────┐
                             │                  │ Fasten the evaporator in F-│
                             ▼                  │ compartment tightly against│
                  ┌──────────────────────┐      │  touching (liner) surfaces.│
                  │ Explain refrigerator work│    └──────────────────────┘
                  │ mechanism and sound to the│
                  │   users or customers.    │
                  └──────────────────────┘
```

Remarks
Water flowing sound, hiss or sizzling sound can make while refrigerant in the pipes is changing from liquid to gas state when comp. starts or stops. It is normal to the refrigerator.

Troubleshooting of Evaporator Sound

1. Hiss Sound from Capillary Tube

"I" tube
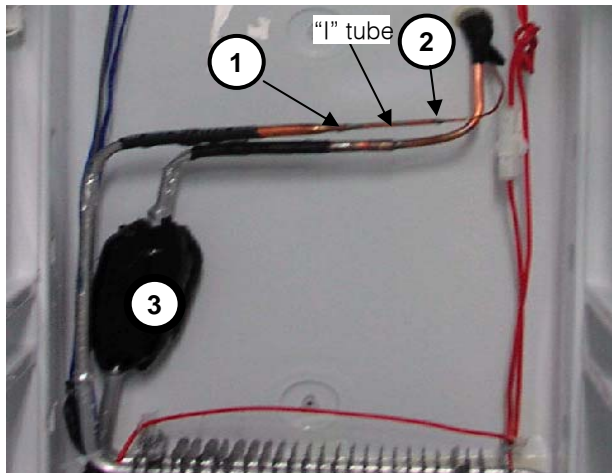
1) "I" tube is used to connect the capillary tube and evaporator.
(2 welding points : 1, 2)

2) When such a sound is made, attach a absorber on the tube including 2 welding points.

2. Sizzling Sound from Accumulator

Attach a absorber on point 3 (accumulator).

3. Shaking or trembling Sound of Evaporator
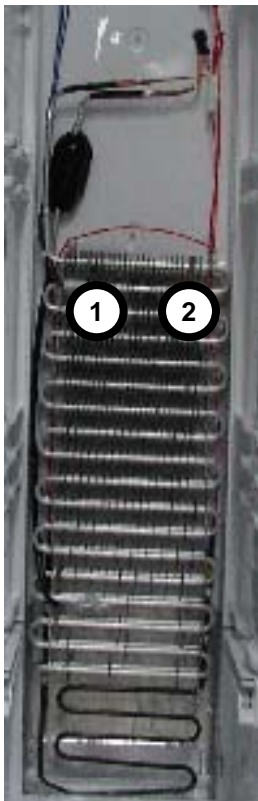
1) Check whether evaporator is fastened tight with the fasteners of 1, 2.

2) Insert a soft spacer (EPS) between left and right wall. Evaporator not to be shaken or trembled during refrigerator operation.

9-4-3. Fan Noise

```
                    ┌─────────────────────┐
                    │        Start        │
                    └─────────────────────┘
                               │
                               ▼
                     ╱─────────────────╲                      ┌──────────────────────┐
                    ╱   Fan is damaged   ╲        Y           │                      │
                    ╲   or transformed ?  ╱───────────────────│    Change the fan.   │
                     ╲─────────────────╱                      └──────────────────────┘
                               │ N
                               ▼
                     ╱─────────────────╲                      ┌──────────────────────┐
                    ╱   Fan is touching  ╲        Y           │                      │
                    ╲   the surround ?    ╱───────────────────│ Set it right not to  │
                     ╲─────────────────╱                      │       touch.         │
                               │ N                            └──────────────────────┘
                               ▼
                     ╱─────────────────╲                      ┌──────────────────────┐
                    ╱ Fan-motor assembly ╲       Y            │                      │
                    ╲ is moving or shaking?╱──────────────────│ Set it right not to  │
                     ╲─────────────────╱                      │        move.         │
                               │ N                            └──────────────────────┘
                               ▼
                     ╱─────────────────╲                      ┌──────────────────────┐
                    ╱  Motor has its own  ╲      Y            │                      │
                    ╲ noise or vibration   ╱──────────────────│   Change the motor   │
                    ╱   when working ?    ╲                   │      assembly.       │
                     ╲─────────────────╱                      └──────────────────────┘
                               │ N
                               ▼
                    ┌──────────────────────┐
                    │ Explain to the       │
                    │ customers how fan is │
                    │ working to circulate │
                    │ cold air in the      │
                    │ compartments.        │
                    └──────────────────────┘
```
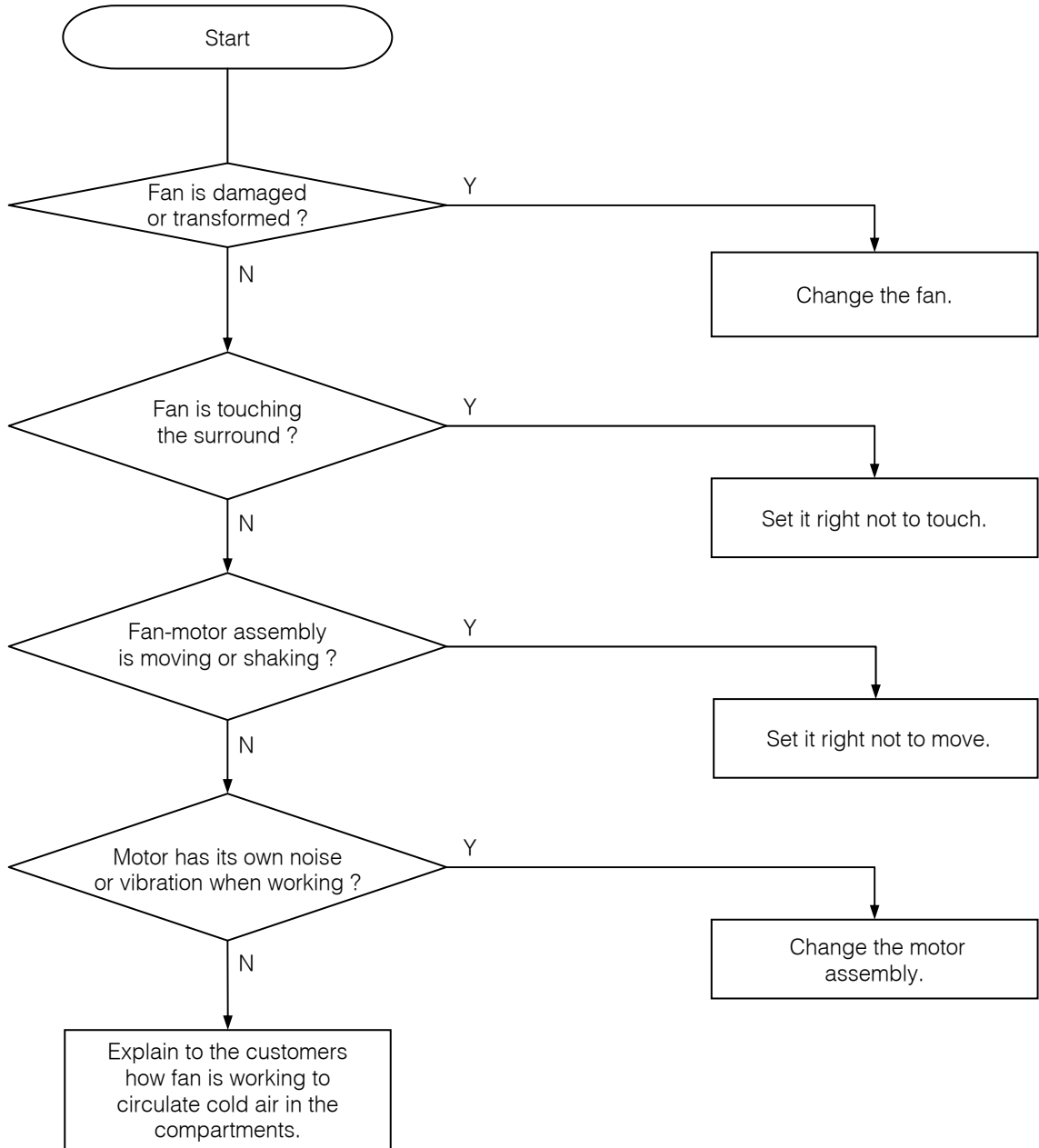
Remarks
The fan is sending out cold air to circulate it through the compartments. When the air is touching the surface of louver or liner wall, such sound can make.

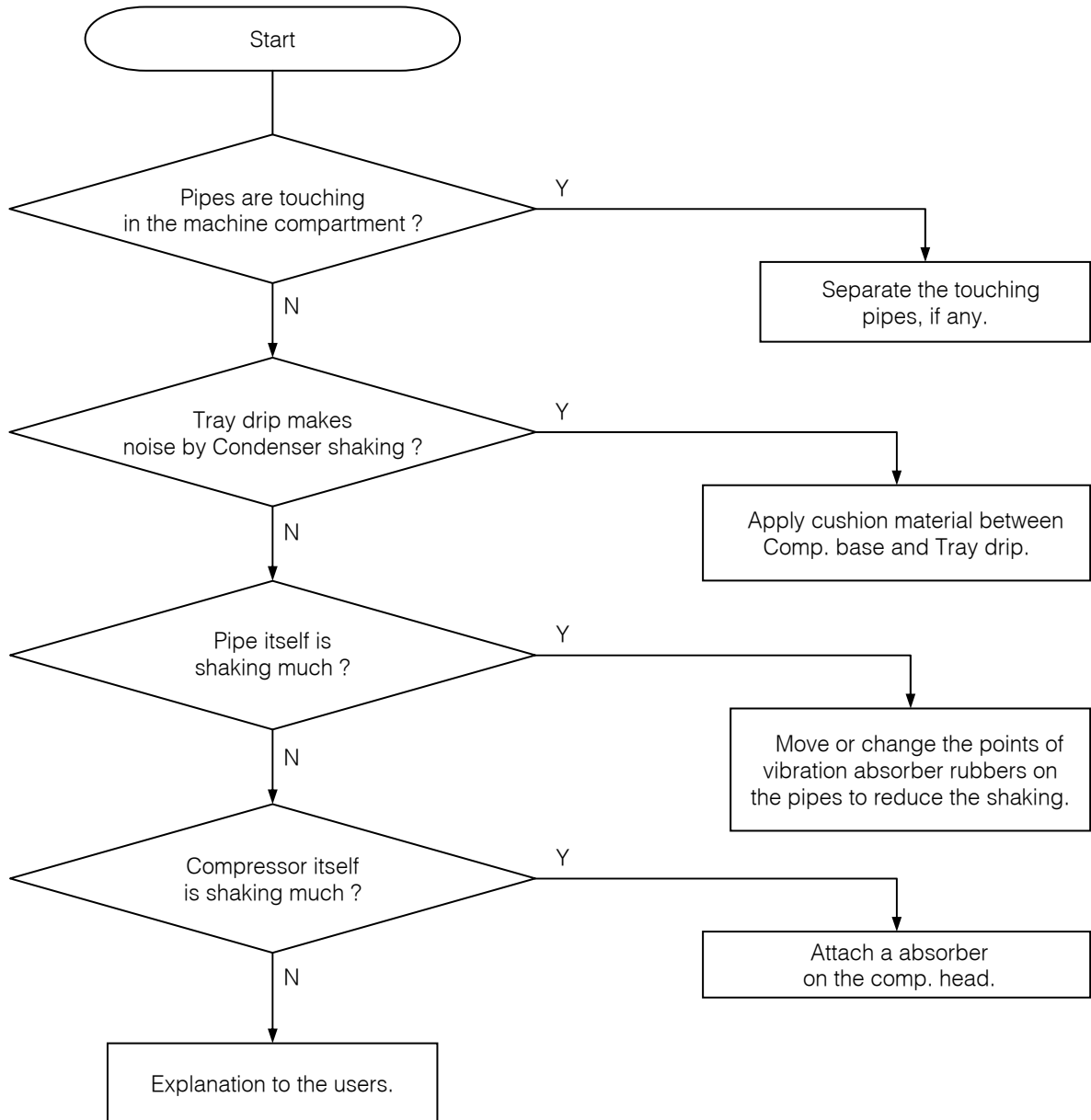## Troubleshooting of Fan Noise

1. Fixing or Fastening of Fan Motor

1) Check if fan motor frame of the assembly is fastened tightly with screws to the liner wall. Unless it is tight, vibration of shaking can make.

2) Check if fan motor and fan are hanged down. Fan working sound can be louder if they are not set right.

2. Any Touch Sound from Fan

1) Check if sealing sponge on the insulator touches the fan. If so, set it again not to touch it.

2) If any damage on the insulator around the fan rotation is found, set the fan motor assembly right not to touch it.
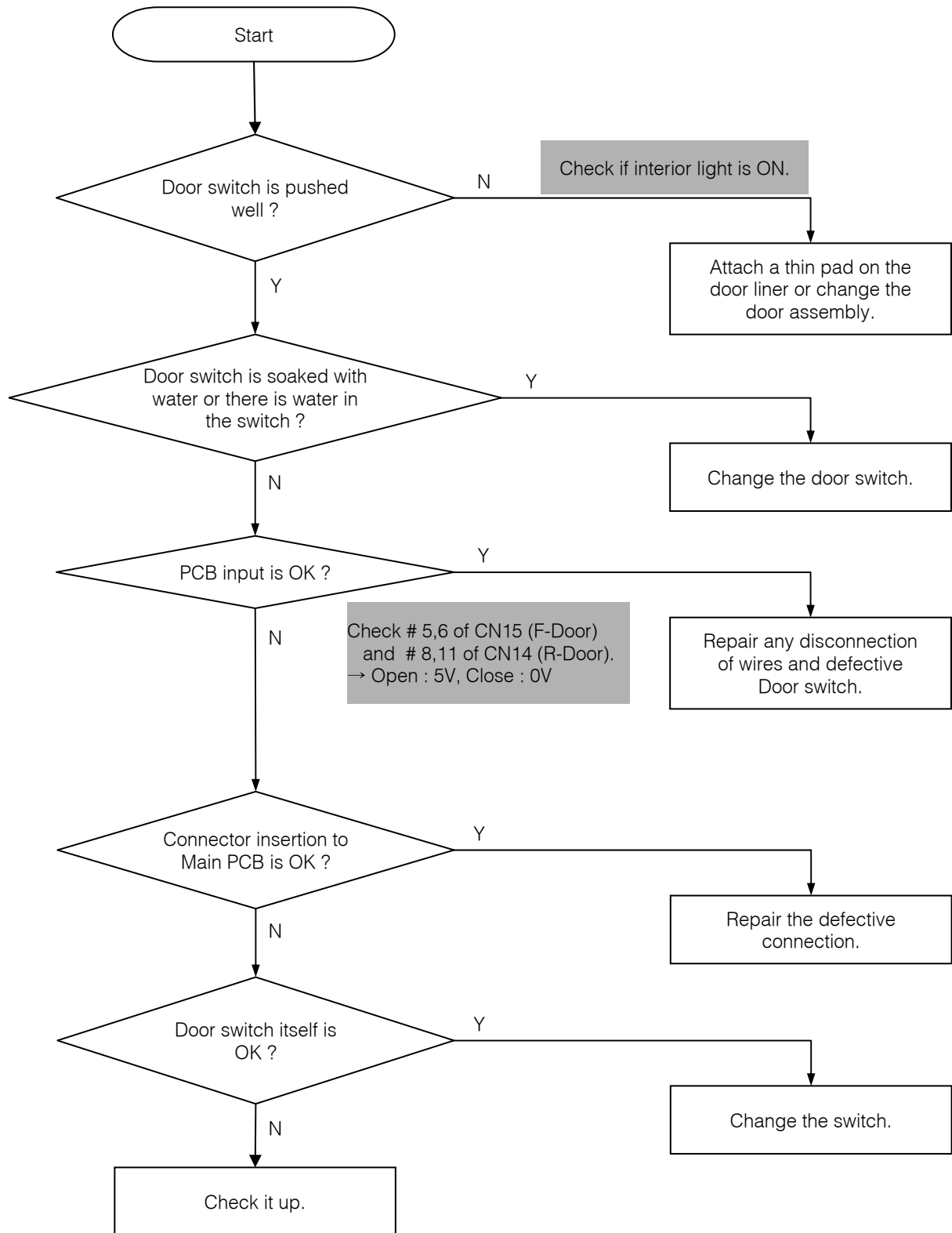
9-4-4. Pipe Noise

```
                        ┌─────────────────────┐
                        │        Start        │
                        └─────────────────────┘
                                   │
                                   ▼
                    ╱─────────────────────────╲
                   ╱    Pipes are touching      ╲      Y        ┌──────────────────────┐
                   ╲  in the machine compartment? ╱─────────────▶│ Separate the touching │
                    ╲─────────────────────────╱                 │     pipes, if any.    │
                                 │ N                             └──────────────────────┘
                                 ▼
                    ╱─────────────────────────╲
                   ╱      Tray drip makes       ╲     Y         ┌──────────────────────────┐
                   ╲  noise by Condenser shaking? ╱─────────────▶│ Apply cushion material   │
                    ╲─────────────────────────╱                 │ between Comp. base and    │
                                 │ N                            │        Tray drip.         │
                                 ▼                              └──────────────────────────┘
                    ╱─────────────────────────╲
                   ╱        Pipe itself is       ╲    Y         ┌──────────────────────────┐
                   ╲       shaking much?          ╱─────────────▶│ Move or change the points│
                    ╲─────────────────────────╱                 │ of vibration absorber    │
                                 │ N                            │ rubbers on the pipes to  │
                                 ▼                              │ reduce the shaking.      │
                    ╱─────────────────────────╲                 └──────────────────────────┘
                   ╱     Compressor itself       ╲    Y         ┌──────────────────────┐
                   ╲     is shaking much?         ╱─────────────▶│ Attach a absorber     │
                    ╲─────────────────────────╱                 │ on the comp. head.    │
                                 │ N                            └──────────────────────┘
                                 ▼
                        ┌─────────────────────┐
                        │ Explanation to the  │
                        │      users.         │
                        └─────────────────────┘
```

Remarks
- Refrigerant is erupting rapidly from the compressor to circulate pipes, so pipe shaking noise can make to some degree.   - In case compressor vibration is sent to a pipe directly, apply vibration absorber rubbers to welding points of the pipe and comp. or to a much bent point on the pipe.

9-5. Door

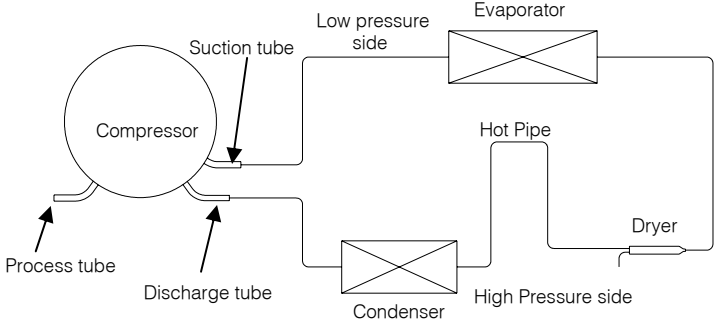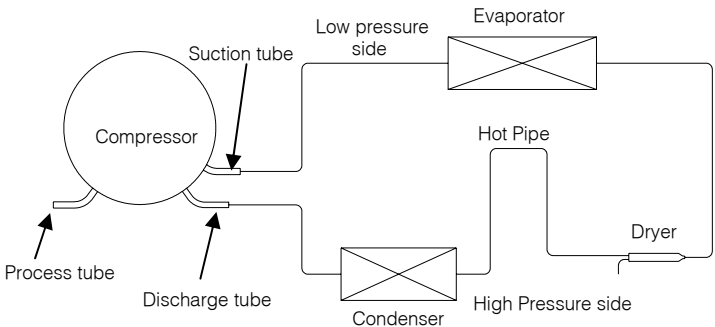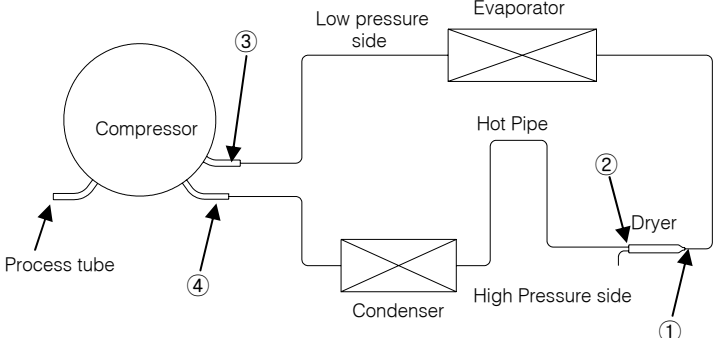9-5-1. Door Opening Alarm Continues though the door is closed.

```
                    ┌─────────────────┐
                    │      Start      │
                    └─────────────────┘
                            │
                            ▼
                     ╱──────────────╲                    ┌────────────────────────────┐
                    ╱  Door switch is ╲        N         │  Check if interior light is ON. │
                    ╲   pushed well ?  ╱ ────────────▶   └────────────────────────────┘
                     ╲──────────────╱                                  │
                            │                                          ▼
                            │ Y                         ┌────────────────────────────┐
                            ▼                           │  Attach a thin pad on the   │
                     ╱──────────────╲                   │  door liner or change the   │
                    ╱ Door switch is  ╲        Y         │  door assembly.             │
                   ╱ soaked with water ╲ ──────────▶    └────────────────────────────┘
                   ╲ or there is water  ╱
                    ╲ in the switch ?  ╱                 ┌────────────────────────────┐
                     ╲──────────────╱                    │   Change the door switch.   │
                            │ N                          └────────────────────────────┘
                            ▼
                     ╱──────────────╲        Y
                    ╱ PCB input is OK ?╲ ──────────────▶
                     ╲──────────────╱
                            │ N
          ┌──────────────────────────────┐              ┌────────────────────────────┐
          │ Check # 5,6 of CN15 (F-Door)  │              │  Repair any disconnection   │
          │  and # 8,11 of CN14 (R-Door). │              │  of wires and defective     │
          │ → Open : 5V, Close : 0V       │              │  Door switch.               │
          └──────────────────────────────┘              └────────────────────────────┘
                            │
                            ▼
                     ╱──────────────╲        Y
                    ╱ Connector inser-╲ ──────────────▶
                    ╲ tion to Main PCB ╱
                    ╲    is OK ?      ╱                   ┌────────────────────────────┐
                     ╲──────────────╱                    │   Repair the defective      │
                            │ N                          │   connection.               │
                            ▼                            └────────────────────────────┘
                     ╱──────────────╲        Y
                    ╱ Door switch     ╲ ──────────────▶
                    ╲ itself is OK ?  ╱
                     ╲──────────────╱                    ┌────────────────────────────┐
                            │ N                          │   Change the switch.        │
                            ▼                            └────────────────────────────┘
                    ┌─────────────────┐
                    │  Check it up.   │
                    └─────────────────┘
```

10. COOLING CYCLE HEAVY REPAIR

10-1. Summary of Heavy Repair
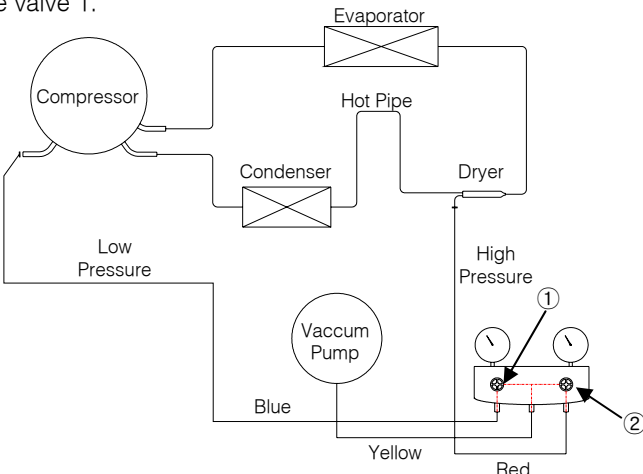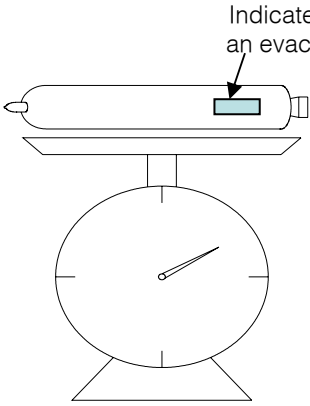
Process	Contents	Tools
Remove refrigerant Residuals	* Cut charging pipe ends (Comp. & Dryer) and discharge refrigerant from drier and compressor.	* Nipper, side cutters
Parts replacement and welding	* Confirm refrigerant (R-134a or R-600a) and oil for compressor and drier. * Confirm N2 sealing and packing conditions before use. Use good one for welding and assembly. * Weld under nitrogen gas atmosphere. * Repair in a clean and dry place.	* Pipe Cutter, Gas welder, N2 gas
Vacuum	* Evacuate for more than forty minutes after connecting manifold gauge hose and vacuum pump to high (drier) and low (compressor) pressure sides.	* Vacuum pump , Manifold gauge.
Refrigerant charging and charging inlet welding	* Weigh and control the bombe in a vacuum conditions with electronic scales and charge through compressor inlet (Process tube). * Charge while refrigerator operates). * Weld carefully after inlet pinching.	* Bombe (mass cylinder), refrigerant manifold gauge, electronic scales, punching off flier, gas welding machine
Check refrigerant leak and cooling capacity	* Check leak at weld joints. Note :Do not use soapy water for check. * Check cooling capacity → Check condenser manually to see if warm. → Check hot pipe manually to see if warm. → Check frost formation on the whole surface of the evaporator.	* Electronic Leak Detector, Driver.
Compressor compartment and tools arrangement	* Remove flux from the silver weld joints with soft brusher wet rag. (Flux may be the cause of corrosion and leaks.) *Clean tools and store them in a clean tool box or in their place.	* Copper brush, Rag, Tool box
Transportation and installation	* Installation should be conducted in accordance with the standard installation procedure. (Leave space of more than 5 cm from the wall for compressor compartment cooling fan mounted model.)	
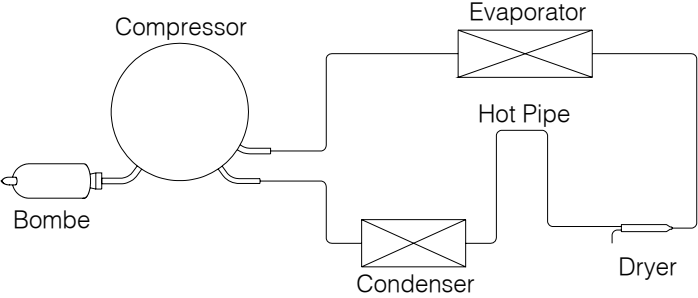
10-2. Precautions During Heavy Repair

Items	Precautions
Use of tools.	1) Use special parts and tools for R-134a or R-600a
Removal of retained refrigerant.	1) Remove retained refrigerant more than 5 minutes after turning off a refrigerator. (If not, oil will leak inside.) 2) Remove retained refrigerant by cutting first high pressure side (drier part) with a nipper and then cut low pressure side. (If the order is not observed, oil leak will happen.) Suction tube, Low pressure side, Evaporator, Compressor, Hot Pipe, Dryer, Process tube, Discharge tube, Condenser, High Pressure side
Replacement of drier.	1) Be sure to replace drier when repairing pipes and injecting refrigerant.
Nitrogen blowing welding.	1) Weld under nitrogen atmosphere in order to prevent oxidation inside a pipe. (Nitrogen pressure : 0.1~0.2 kg/cm2.)
Others.	1) Nitrogen only should be used when cleaning inside of cycle pipes inside and sealing. 2) Check leakage with an electronic leakage tester. 3) Be sure to use a pipe cutter when cutting pipes. 4) Be careful not the water let intrude into the inside of the cycle.

10-3. Practical Work for Heavy Repair

Items	Precautions
1. Removal of residual refrigerant.	1) Remove residual refrigerant more than 5 minutes later after turning off the refrigerator. (If not, compressor oil may leak inside.) 2) Remove retained refrigerant slowly by cutting first high pressure side (drier part) with a nipper and then cut low pressure side.

2. Nitrogen blowing welding.	
	
	* **When replacing a drier:**
	  Weld 1 and 2 parts by blowing nitrogen (0.1~0.2kg/cm2) to high pressure side after assembling a drier.
	* **When replacing a compressor:**
	  Weld 3 and 4 parts by blowing nitrogen to the low pressure side.
	  Note) For other parts, nitrogen blowing is not necessary because it does not produce oxidized scales inside pipe because of its short welding time.
	
	- **KEYPOINTING**
	  Welding without nitrogen blowing produces oxidized scales inside a pipe, Which affect on performance and reliability of a product.

Items	Precautions

3.Vacuum degassing.	*** Pipe Connection**
	  Connect a red hose to the high pressure side and a blue hose
	  to the low pressure side.
	* Vacuum Sequence
	  Open 1,2 valves and evacuate for 40 minutes.
	  Close valve 1.
	
	※ KEYPOINTING
	  1) If power is applied during vacuum degassing, vacuum degassing
	    shall be more effective.
	  2) Operate compressor while charging refrigerant. (It is easier and
	    more certain to do like this.)

4.Refrigerant charging.	*** Charging sequence**
	1) Check the amount of refrigerant supplied to each model after
	  completing vacuum degassing.
	2) Evacuate bombe with a vacuum pump.
	3) Measure the amount of refrigerant charged.
	  - Measure the weight of an evacuated bombe with an electronic scale.
	  - Charge refrigerant into a bombe and measure the weight. Calculate
	    the weight of refrigerant charged into the bombe by subtracting the
	    weight of an evacuated bombe.
	
	Indicate the weight of an evacuated bombe
	
	- **KEYPOINTING**
	  1) Be sure to charge
	    the refrigerant at
	    around 25C.
	  2) Be sure to keep
	    -5g in the winter
	    and +5g in summer.
	
	Calculation of amount of refrigerant charged
	
	  the amount of refrigerant charged
	    = a weight after charging
	    - a weight before charging
	     (a weight of an evacuated cylinder)

Items	Precautions

4.Refrigerant charging.	4) Refrigerant Charging
	  Charge refrigerant while operating a compressor as shown above.
	5) Pinch a charging pipe with a pinch-off plier after completion of charging.
	6) Braze the end of a pinched charging pipe with copper brazer and take
	  a gas leakage test on the welded parts.

5. Gas-leakage test	* Take a leakage test on the welded or suspicious area with an electronic leakage tester.

6. Pipe arrangement
   in each cycle
	* Check each pipe is placed in its original place before closing
	  a cover back-M/C after completion of work.

10-4. Standard Regulations for Heavy Repair

1) Observe the safety precautions for gas handling.

2) Use JIG (or wet towel) in order to prevent electric wires from burning during welding.

  (In order to prevent insulation break and accident.)

3) The inner case shall be melted and insulation material (polyurethane) shall be burnt

  if not cared during welding inner case parts.

4) The copper pipe shall be oxidized by overheating if not cared during welding.

5) Not allow the aluminum pipes to contact to copper pipes. (In order to prevent corrosion.)

6) Make sure that the inner diameter should not be distorted while cutting a capillary tube.

7) Be sure that a suction pipe and a filling tube should not be substituted each other during welding.

  (High efficiency pump.)

10-5. Brazing Reference Drawings.

- Welding Point

●	Copper Welding (Ag 5%)	7 Points
■	Silver Welding (Ag 35%)	3 Points

- Flow of Refrigeration Cycle
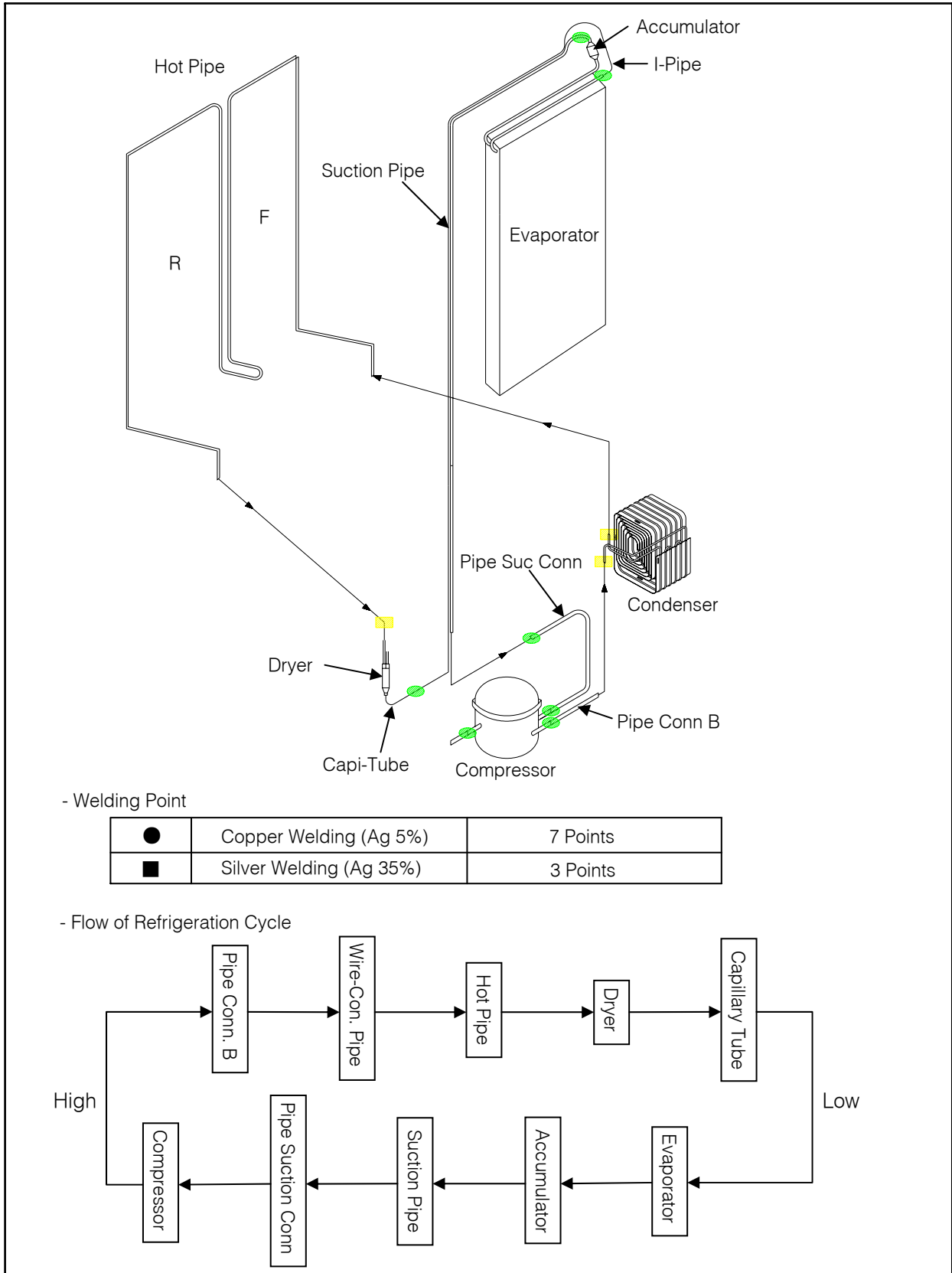
11. INSTALLATION GUIDE

11-1. Installation Preparation

Check if the refrigerator can pass a doorway or enter a door first.

Dimensions(including Door Handles)	
(Width*Depth*Height)	903mm X 730.5mm X 1790mm
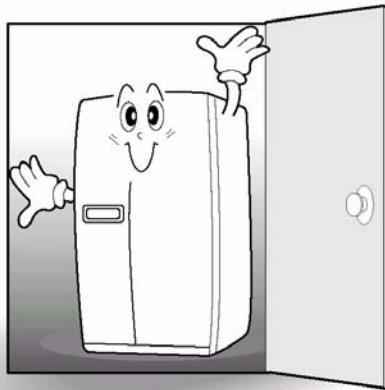
Find a suitable place to install

Sufficient space from refrigerator back to the wall for free air ventilation
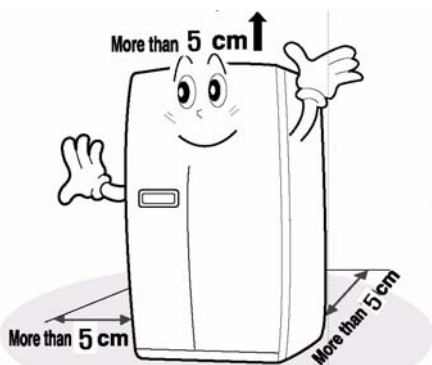
Avoid direct sunlight.
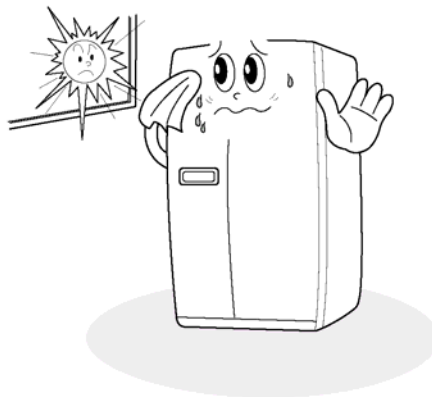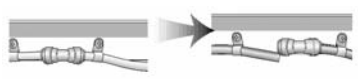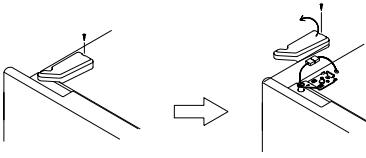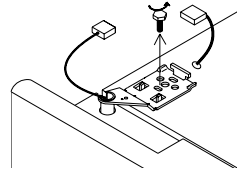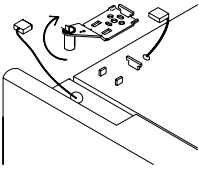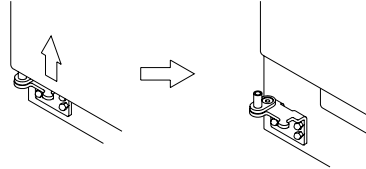
Note Once the installation place is ready follow the installation instructions.
If surround temperature of refrigerator is low (below 10C)),
foods can be frozen or the refrigerator can work in abnormal way.
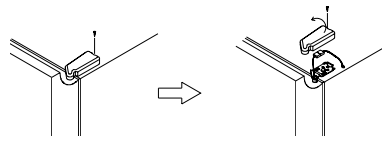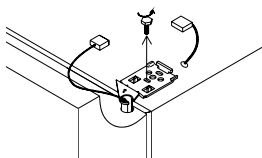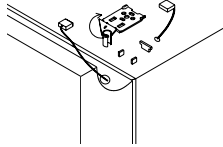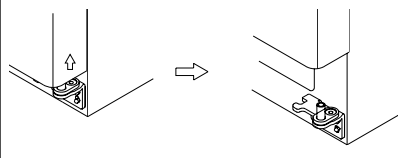
11-2. If the refrigerator can not enter the door

Removing Freezer Door   Remove front bottom cover first, if it is attached.

1 Remove front bottom cover first, Pull out the left collar of the coupling first, then hold the coupling and pull out the left water tube.

2 Unscrew top hinge cover with a screw driver. Remove the hinge cover.

3 Turn top hinge bolt counterclockwise . Disconnect the harness wires.

4 Lift up the front of hinge to remove. (After the hinge is removed the door can fall down forward. Be careful !)

5 Be careful not to damage the water line when removing the door.

Removing Refrigerator Door

1 Unscrew top hinge cover with a screw driver. Remove the hinge cover.

2 Turn top hinge fastener counterclockwise. Disconnect harness wires.

3 Lift up the front of hinge to remove. (After the hinge is removed the door can fall down forward. Be careful !)

4 Lift the door straight up to remove.

Replacing Freezer Door

1 Insert the water tube into the hole Of the bottom hinge pin first, then Insert the bottom of freezer door Into the bottom hinge pin.
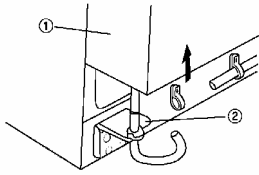
2 Insert the bottom hole of freezer door straight to the bottom hinge pin.
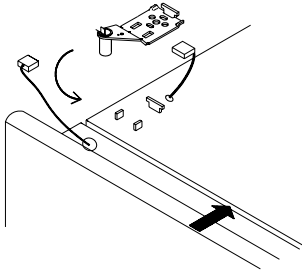
3 Let the top of door close to the cabinet and insert the top hinge pin to the top hole of freezer door. (Insert the back of hinge to the groove of protrusion first, then front to the top hole of door.)
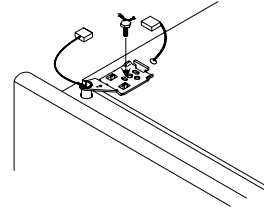
4 Turn the hinge fastener tightly to The end. Connect harness wire and screw ground wire.
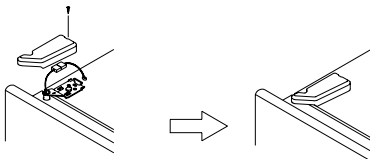
5 Insert the water tube far into the coupling.

Replacing Refrigerator Door

1 Insert the bottom hole of refrigerator door straight to the bottom hinge pin.
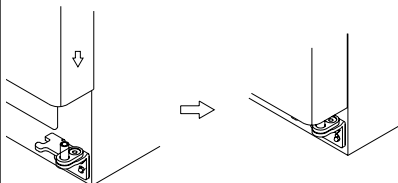
2 Let the top of door close to the cabinet and insert the top hinge pin to the top hole of refrigerator door. (Insert the back of hinge to the groove of protrusion first, then front to the top hole of door.)
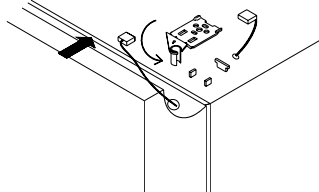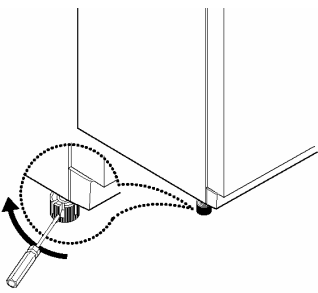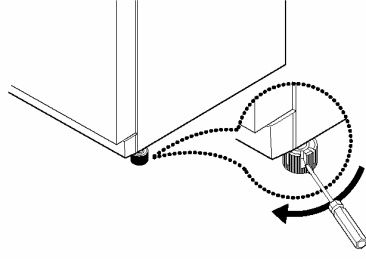
3 Turn the hinge fastener tightly to the end. Connect harness wirings and screw ground wire. Click and screw the top hinge cover.
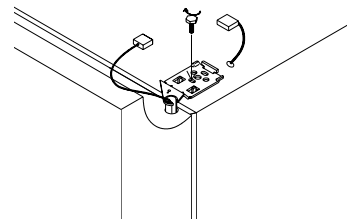
11-3. Refrigerator Leveling & Door Adjustment

Refrigerator must be level in order to maintain optimal performance and desirable front appearance.
(If the floor beneath the refrigerator is uneven, freezer and refrigerator doors look unbalanced.)

In case freezer door is lower than refrigerator door	**In case refrigerator door is lower than refrigerator door**
Insert a screw driver (flat tip) into a groove of the left wheel (bottom of freezer) and turn it clockwise until the door is balanced. (clockwise to raise freezer door ; counterclockwise to lower)	Insert a screw driver (flat tip) into a groove of the right wheel (bottom of refrigerator) and turn it clockwise until the door is balanced. (clockwise to raise refrigerator door ; counterclockwise to lower)

Caution   The front of refrigerator needs to be higher just a little than the back for easy door closing, but if the wheel is raised too much for door balance, i.e. front of refrigerator is too higher than the back, it can be difficult to open the door.

11-4. Water Line Installation

How to install Water Line

1. The water pressure should be 3kgf/cm2 or more to run the automatic icemaker.
   Checkup your tap water pressure ; if a cup of 180cc is full within 10 seconds, the pressure is OK.
2. When installing the water tubes, ensure they are not close to Any hot surface.
3. The water filter only "filters" water ; it does not eliminate any bacteria or microbes.
4. If the water pressure is not so high to run the icemaker, call the local plumber to get an additional water pressure pump.
5. The filter life depends on the amount of use. We recommend you replace the filter at least once every 6 months.
   ※ When attaching the filter, place it for easy access (removing & replacing)
6. After installation of refrigerator and water line system, select "WATER" on your control panel and press it for 2~3 minutes to supply water into the water tank and dispense water.
7. Use sealing tape to every connection of pipes/tubes to ensure there is no water leak.
8. The water tube should be connected to the cold water line.

WATER SUPPLY KIT

※ Check the parts below for installing water supply. Some other necessary parts are available at your local service agents.
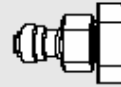
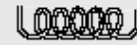Connector (3014454520)

Holder (3012020700)

Screw × 4ea (7112401211)

Fastener A × 3ea (3011202000)
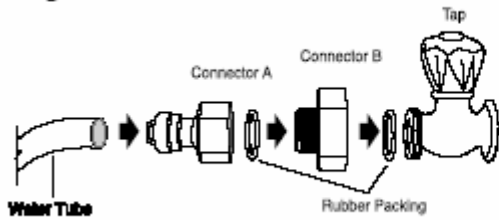
Filter Box (3019974100)

Water tube A/B
(A:3019503200
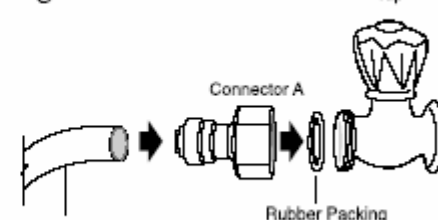B:3019503300)

Installation Procedure

1. Join connector to water tap

<Figure A>

Connector B

Connector A

Tap

Water Tube

Rubber Packing

<Figure B>

Tap

Connector A

Water Tube

Rubber Packing

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

2. Get ready to install water line

1) Measure an approximate distance between the filter and the Water Tube and cut the tube off filter vertically.
2) Connect the tubes to the filter as the figure shows.

Leave a sufficient distance when cutting the tubes.

Tap Side

Water Tube

Filter Box

Keep right angle

Ref Side
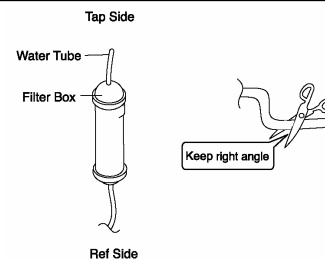
3. Remove any substance from filter

1) Open the main tap water valve and check if water comes out of the Water Tube.
2) Check if the Water Valve is open in case water does not come out.
3) Leave the valve open until clean water is coming out.
   ※ Initial water may contain some substances out of filter (manufacturing process).
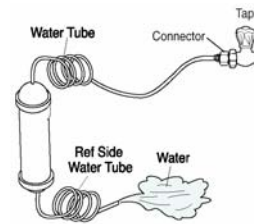
4. Attach the filter box

1) Screw and fasten the filter holder to the left/right side of the back of refrigerator.
   ※ In case the holder is not fastened well, remove the back paper of the tape on the filter holder and attach it.
2) Insert the filter box into the holder.
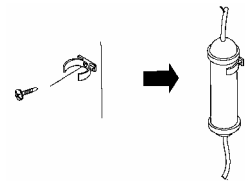
5. Connect water tube

1) Remove the rear cover at the bottom back of the refrigerator.
2) Insert the fastening ring into the Water tube.
   (Be careful to follow the direction of the nut.)
3) Insert the Water Tube into the top of Water Valve, turn the nut clockwise to fasten it. (The Water valve is to the right of the motor.)
4) Check for any bent tubes or water leaks; if so, re-check installation procedure.
5) Replace the rear cover. (The Water Tube should be placed between the groove of the refrigerator back and motor cover.)

Set the tube upright as the figure shows.
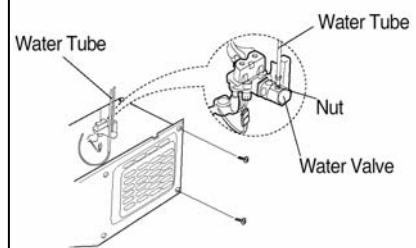
6. Fasten water tube

1) Fasten the Water Tube with the [Fastener A] .
2) Check if the tube is bent or squeezed. If so, set it right to prevent any water leak.
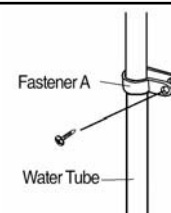
7. After installation

1) Plug the refrigerator, press the [WATER] button on the control panel for 2~3 minutes to remove any air (bubble) in the pipes and drain out the initial water.
2) Check the water leak again through the water supply system (tubes, connectors and pipes) Rearrange the tubes again and do not move the refrigerator.
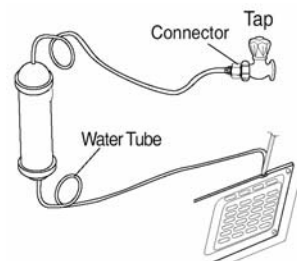
11-5. Dispenser Water Flow

FRS-U20.. : R-134a Models
FRN-U20.. : R-600a Models
FRN-U20..I : R-600a + Inveter compressor Models

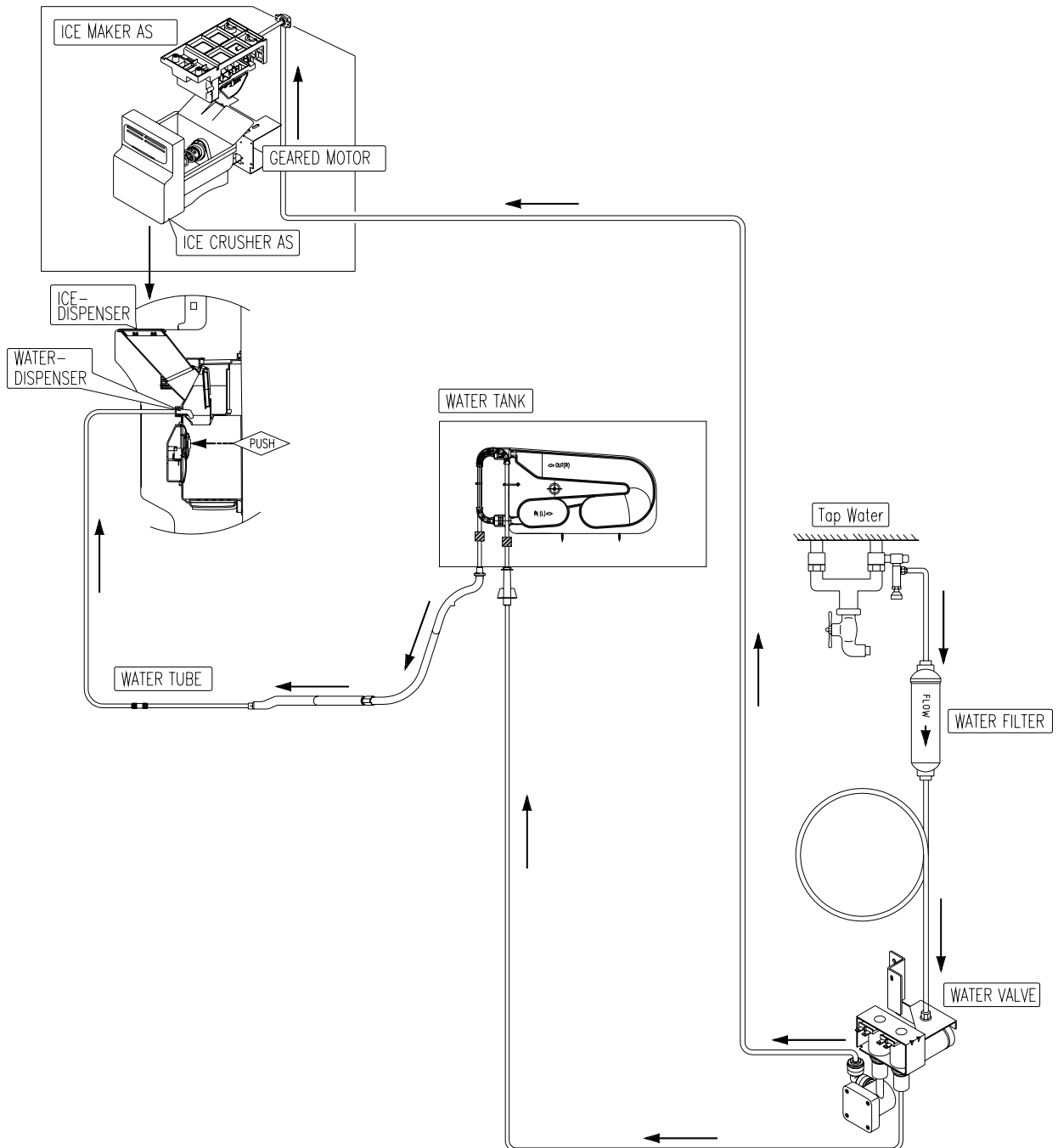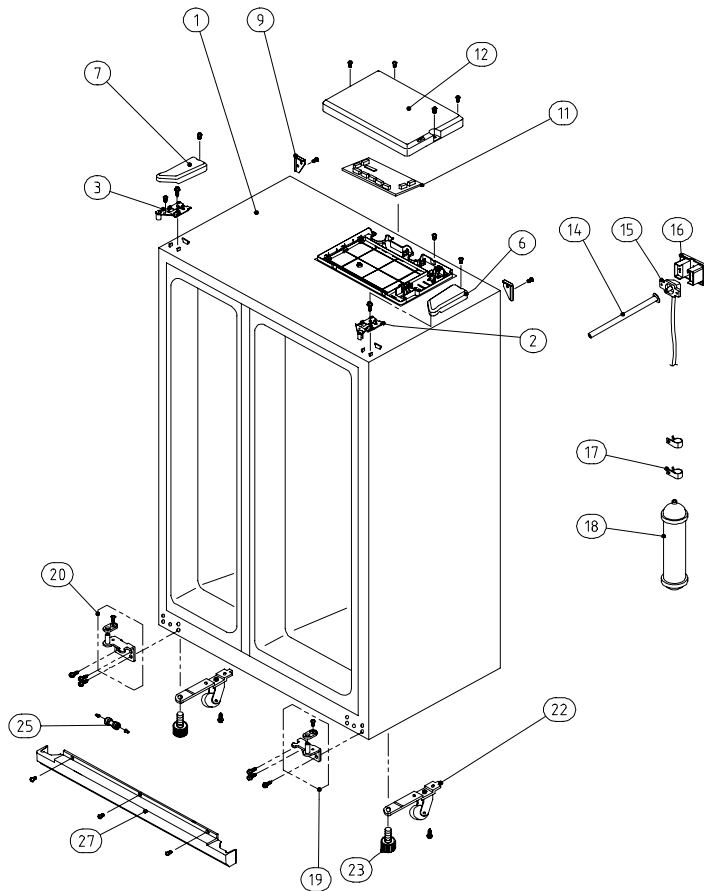| NO	PART-CODE	PART NAME	SPEC.	Q'ty		
				FRS-U20..	FRN-U20..	FRN-U20..I
1		ASSY CAB URT		1	1	1
2	3012924400	HINGE *T *R AS	PO T3.0+PAINT	1	1	1
3	3012924300	HINGE *T *L AS	PO T3.0+PAINT	1	1	1
6	3011446200	COVER *T HI *R	PP	1	1	x
	3011446220		PP(BLACK)	x	x	1
7	3011446100	COVER *T HI *L	PP	1	1	x
	3011446120		PP(BLACK)	x	x	1
9	3010968400	CAP CAB COVER	PP	2	2	2
11	30143H3100	PCB MAIN AS	FRU-54A,C,D,K,M---C (R134A)	1	x	x
	30143H3110		FRU-54A,C,D,K,M---N (R600A)	x	1	x
	30143G3060		FRN-U20DFVI (INVERTER)	x	x	1
12	3011446001	COVER MAIN PCB BOX	PP(V-235)	1	1	x
	3011446060		PP(V-235,BLACK)	x	x	1
14	3013224800	HOSE I/MAKER TUBE AS	FRU-541D	1	1	1
15	3012530210	GUIDE CAB W/TUBE A AS	FRU-541D	1	1	1
16	3011444100	COVER GUIDE CAB W/T A	HIPS	1	1	1
17	3011202000	CLAMP WATER TUBE A	PA-66, 5N	2	2	2
18	3019974800	S/PAER FILTER WATER AS	FR-S660CW	1	1	1
19	3012924003	HINGE *U *R AS	P/O T5.0 + PAINT	1	1	1
20	3012923902	HINGE *U *L AS	P/O T5.0 + PAINT	1	1	1
22	3010657201	BRACKET ADJ FOOT	SPCC T3.0	2	2	2
23	3012105100	FOOT ADJ AS	PP	2	2	2
25	3013064200	HOLDER TUBE A	ACETAL	1	1	1
27	3011447200	COVER CAB BRKT	PP	1	1	1

- Some parts can be chaged for improving their perfomance without notice.

Date	*A mendment Note*

Machine Room

NO	PART-CODE	PART NAME	SPEC.	Q'ty		
				FRS-U20..	FRN-U20..	FRN-U20..I
29	3010340400	BASE COMP AS	FRU-571I	1	1	1
31	3011346701	CORD POWER AS	AC 250V 16A(VDE)	1	1	1
35	3956183D50	COMPRESSOR	MK183Q-L2U 220-240V-50HZ	1	x	x
	3956112250		DG125E11RAW5 220/240V 50HZ	x	1	x
	3956111M50		VEGZ11C 220-240V 50-60HZ	x	x	1
36	3016002500	SPECIAL WASHER	SK-5, T0.8	3	3	3
37	3010101600	ABSORBER COMP	NBR	4	x	4
	3010101480	ABSORBER COMP AS	SPRING	x	4	x
38	3016401170	CAPACITOR RUN	350VAC 5UF(EUROPEAN)	1	x	x
	3016401160		350VAC 4UF(EUROPEAN)	x	1	x
39	3018129600	SWITCH P RELAY AS	265RHB S330	1	x	x
	3018129650		232NFB,330M	x	1	x
	3010566500	BOX INVERTER AS	FRN-U20FAV1	x	x	1
40	3811402100	COVER RELAY	DS3-3NORYL S/S	1	x	x
	3001410010		DG125E11RAW5(A/S)	x	1	x
41	3011181300	CASE VAPORI AS	PP	1	1	1
42	3013201710	HOSE DRN B	PE FRB-5350NT	1	1	1
43	3015402300	VALVE WATER AS	220~240V 50,60Hz	1	1	1
44	3014461510	PIPE WICON AS	TSW OD4.76XT0.7	1	1	1
45	3018500510	M/BELL AS	FRU-571I PP(NATURAL)	1	1	1
45-1	3015916100	MOTOR C FAN	D4612AAA22	1	1	1
45-2	3011834710	FAN	PP OD3.17XD150	1	1	1
46	3016808100	DRYER AS	C1220T	1	1	1
47	3011497000	COVER MACH ROOM AS	SBHG T0.35	1	1	1

Eva Part

NO	PART-CODE	PART NAME	SPEC.	Q'ty		
				FRS-U20..	FRN-U20..	FRN-U20..I
95	3017053500	EVA AS	FRU-571I	1	1	1
95-1	3012818310	HEATER SHEATH AS	AC220V/ 192W	1	1	1
95-2	3014806900	SENSOR D AS	PBN-43	1	1	1
95-3	3017202010	FUSE TEMP AS	AC250V 10A 77C	1	1	1

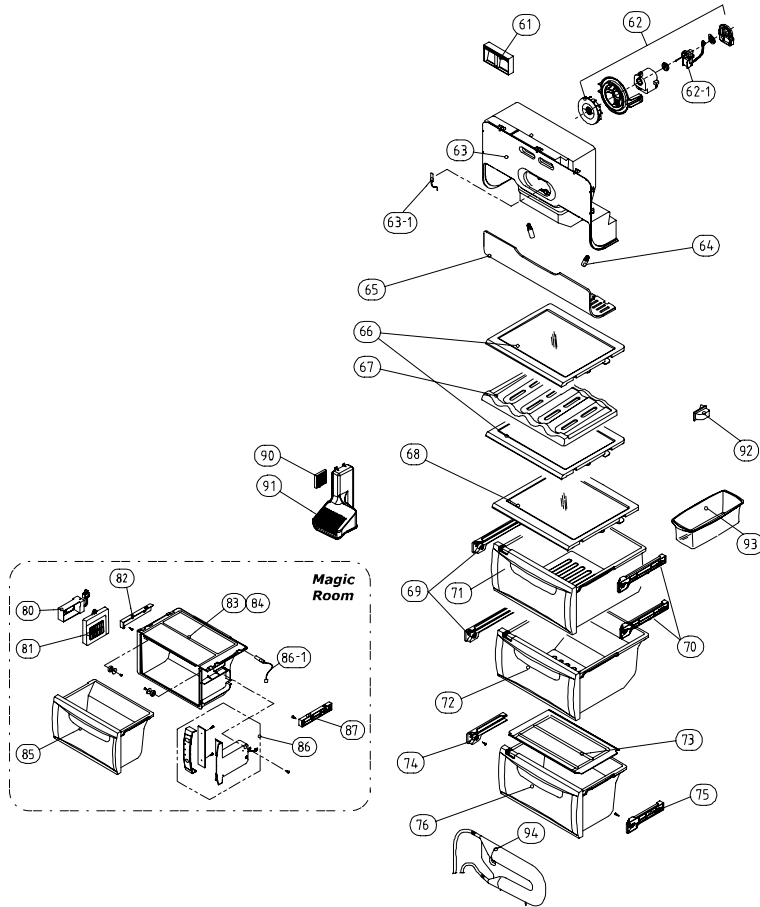*- Some parts can be chaged for improving their perfomance without notice.*

Date	Amendment Note

NO	PART-CODE	PART NAME	SPEC.	Q'ty			
				FRS-U20D(F)	FRN-U20D(F)	FRS-U20E(G)	FRN-U20E(G)
61	3012214100	FRAME CHECK VALVE AS	FRU-571I	1	1	1	1
62	3012024200	FIXTURE MOTR AS		1	1	1	1
62-1	3015916000	MOTOR R FAN	D4612AAA20	1	1	1	1
63	3001415400	COVER DAMP AS	FRU-54AD	1	1	1	1
63-1	3014807100	SENSOR R AS	PBN-43B	1	1	1	1
64	3013602500	LAMP F/R	AC 240V 25W(S)	2	2	2	2
65	3015510800	WINDOW R LAMP	MIPS	1	1	1	1
66	3017842820	SHELF INMOLDING R A AS	FRAME+PRINTED GLASS	2	2	2	2
67	3017842510	SHELF WINE	GPPS(MILKY)	Option			
68	3017842920	SHELF INMOLDING R B AS	FRAME+PRINTED GLASS	1	1	1	1
69	3012514511	GUIDE CASE A *L AS	HIPS	2	2	2	2
70	3012514611	GUDIE CASE A *R AS	HIPS	2	2	2	2
71	3011109260	CASE VEGETB A AS	FRU-54AD	1	1	1	1
72	3011114680	CASE VEGETB B AS	FRU-54AD	1	1	1	1
73	3011446700	COVER V/CASE B	GPPS	1	1	x	x
74	3012529711	GUIDE CASE C *L AS	HIPS	1	1	x	x
75	3012529811	GUIDE CASE C *R AS	HIPS	1	1	x	x
76	3011114780	CASE VEGETB C AS	FRU-54AD	1	1	x	x
80	3016767100	DAMPER AS	DU24-013	x	x	1	1
81	3011450901	COVER DUCT CHANGE RM AS	FRU-541E	x	x	1	1
82	3012529500	GUIDE CHANGE RM *L	ABS SCRAP	x	x	1	1
83	3011446800	COVER CHANGE RM	GPPS	x	x	1	1
84	3010548200	BOX CHANGE RM	HIPS	x	x	1	1
85	3011115050	CASE CHANGE RM AS	FRU-54AE	x	x	1	1
86	3010551000	BOX CONTL CHANGE RM AS	FRU-541E/G	x	x	1	1
86-1	3014806800	SENSOR M AS	PBN-43B	x	x	1	1
87	3012529600	GUIDE CHANGE RM *R	ABS SCRAP	x	x	1	1
90	3018701800	DEO ANTI AS		1	1	1	1
91	3011445900	COVER RETURN DUCT	PP	1	1	1	1
92	3018124000	SWITCH DR	SP201R-7DR(R-134a)	1	x	1	x
92	3018128500	SWITCH DR	SPF101B-2D(R-600a)	x	1	x	1
93	3011171310	CASE EGG AS	CASE+VINYL	1	1	1	1
94	3018201000	TANK WATER AS	FRU-541D	1	1	1	1

- Some parts can be chaged for improving their perfomance without notice.

Date	**A** mendment Note

FRS-U20.. : R-134a Models
FRN-U20.. : R-600a Models
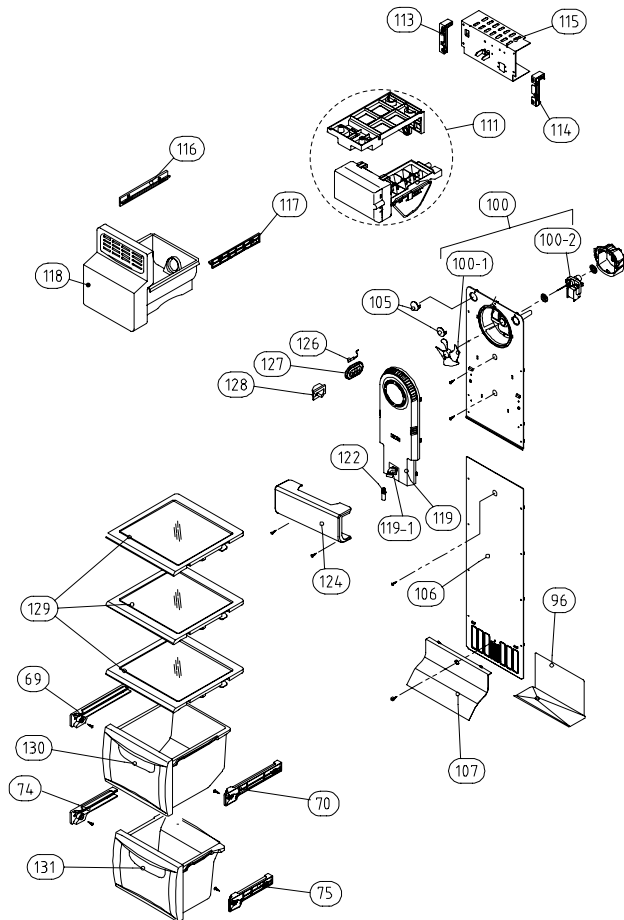
NO	PART-CODE	PART NAME	SPEC.	Q'ty	
				FRS-U20..	FRN-U20..
69	3012514511	GUIDE CASE A *L AS	HIPS	1	1
70	3012514611	GUDIE CASE A *R AS	HIPS	1	1
74	3012529711	GUIDE CASE C *L AS	HIPS	1	1
75	3012529811	GUIDE CASE C *R AS	HIPS	1	1
96	3012529000	GUIDE DRN	GA	1	1
100	3018921710	LOUVER F A AS	FRU-571I	1	1
100-1	3011834520	FAN	PP OD130	1	1
100-2	3015915900	MOTOR F FAN	D4612AAA21	1	1
105	3010968600	CAP F LOUVER B	HIPS	2	2
106	3018921501	LOUVER F B AS	HIPS	1	1
107	3011443200	COVER F RETURN	HIPS	1	1
111	3012205810	FRAME ICE MAKER AS	FRU-541D(R-134a)	1	x
	3012205820		FRU-541D(R-600a)	x	1
113	3012517800	GUIDE G/MOTR BRKT *L	ABS	1	1
114	3012517900	GUIDE G/MOTR BRKT *R	ABS	1	1
115	3010658110	BRACKET GEARED MOTR AS	(MOLD/DY) 220~240V/50Hz	1	1
116	3012520510	GUIDE ICE CRUSHER *L	ABS	1	1
117	3012517710	GUIDE ICE CRUSHER *R	ABS	1	1
118	3011115202	CASE I/CRUSHER AS	FRU-541D	1	1
119	3001401760	COVER F FAN AS	FRU-541/547/549/54B	1	1
119-1	3017906610	SOCKET F LAMP AS	FR-S570FRB	1	1
122	3013602500	LAMP F	AC 240V 25W(S)	1	1
124	3015510700	WINDOW F LAMP	MIPS	1	1
126	3014807000	SENSOR F AS	PT-38	1	1
127	3011442600	COVER F SENS	ABS	1	1
128	3018124010	SWITCH DR	SP201R-7DR (R-134a)	1	x
	3018128500		SPF101B-1D (R-600a)	x	1
129	3017842600	SHELF F AS	PRINTED GLASS	3	3
130	3011114880	CASE F A AS	FRU-54AD	1	1
131	3011114980	CASE F B AS	FRU-54AD	1	1

- Some parts can be chaged for improving their perfomance without notice.

Date	**A**mendment Note

U20D(E)D.. : None H/Bar Models
U20F(G)D.. : With H/Bar Models
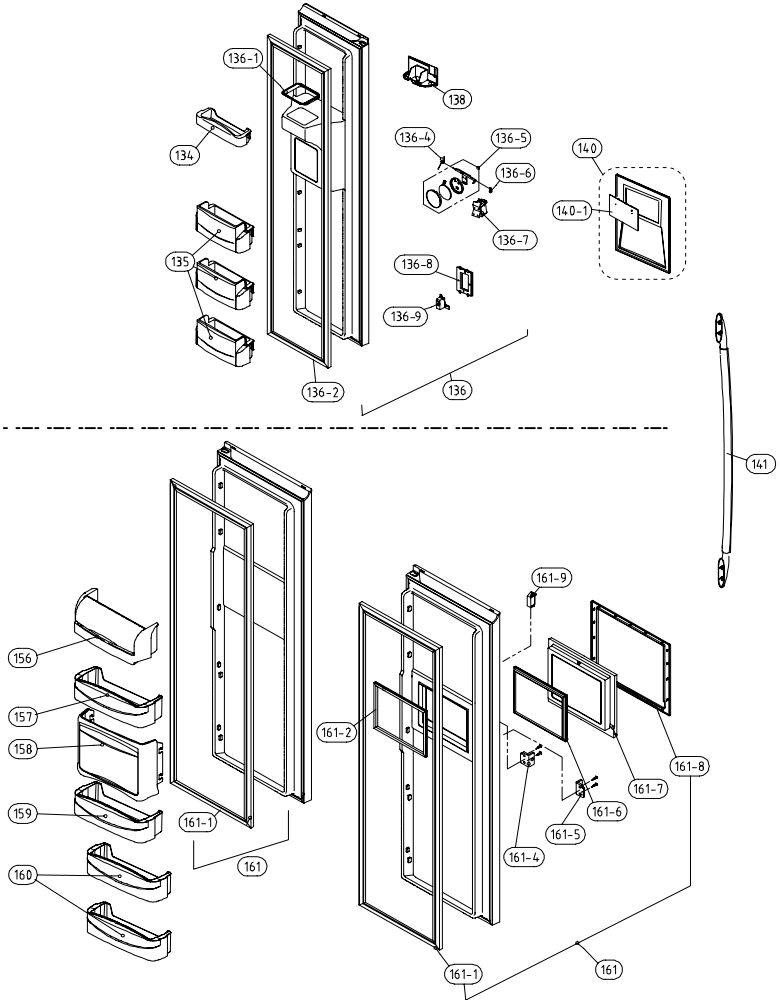
NO	PART-CODE	PART NAME	SPEC.	Q'ty U20D(E)D..	Q'ty U20F(G)D..
134	3019026700	POCKET F *T	HIPS	1	1
135	3019027450	POCKET F AS	FRU-54AD	3	3
136	3000079130	ASSY F DR	FRU-54AF (SUS430)		
	3000095310		FRU-54AF (TITANIUM PCM)		
	3000079700		FRU-54AF (03 SIVER)	1	
	3000079750		FRU-54AF (TITANIUM VCM)		
	3000079120		FRU-54AF (BLACK)		
136-1	3010964601	CAP ICE PATH FRAME	PP(FRS-551F)	x	1
136-2	3012318810	GASKET F DR AS	PVC+MAGNET	1	x
	3012318820	GASKET F DR AS	PVC+MAGNET(BK)	x	1
136-4	3015102200	SPRING ICE D LEVR	SUS	1	1
136-5	3011495300	COVER I/FLAP AS	FRU-541D	1	1
136-6	3012019700	FIXTURE I/SHUT LUVR	FR-S650CD	1	1
136-7	3015403000	VALVE SOL DISP	220~240V/50Hz	1	1
136-8	3016306500	BUTTON DISPNS AS	FRU-54AD	1	1
136-9	3018125800	SWITCH MICRO	VP333A-2D	1	1
138	3010563100	BOX DISPNS I/SHUT	ABS FRU-54AF	1	1
140	3001413800	COVER DISPNS BOX AS	FRU-54AD	1	x
	3001413810		FRU-54AF	x	1
140-1	30143G2160	PCB FRONT AS	FRU-54AD (FR-1 180X98.5-1.6T)	1	1
141	3012648701	HANDLE AS	ARC HANDLE(SANDING)	2	2
156	3019027530	POCKET DAIRY AS	FRU-54AD	1	1
157	3019027230	POCKET R *M AS	FRU-54AD	2	1
158	3019027720	POCKET R H/BAR AS	FRU-54AF	x	1
159	3011187020	CASE H/BAR AS	FRU-54AF	x	1
160	3019027330	POCKET R *S AS	FRU-54AD	2	2
161	3000079910	ASSY R DR	FRU-54AD/54MD (SUS 430)	1	x
	3000095410		FRU-54AD (TITANIUM PCM)		
	3000095420		FRU-54AF (TITANIUM PCM)		
	3000079870		FRU-54AF/KF/MF (BLACK)		
	3000079860		FRU-54AF (TITANIUM VCM)	x	1
	3000079880		FRU-54AF (SUS430)		
	3000079800		FRU-54AF (03 SIVER)		
161-1	3012318910	GASKET R DR AS	PVC+MAGNET	1	
	3012318910		PVC+MAGNET(BK)		
161-2	3012321400	GASKET H/BAR B AS	PVC	x	1
161-4	3015204500	STOPPER H/BAR DR *R	PO T4.0	x	1
161-5	3015204400	STOPPER H/BAR DR *L	PO T4.0	x	1
161-6	3012321300	GASKET R H/BAR A AS	PPV	x	1
	3012321310		PPV (BLACK)		
161-7	3011785800	DOOR H/BAR AS	FRU-54AF	x	1
161-8	3001411400	COVER H/BAR FRAME SAS	ABS+SPRAY	x	1
161-9	3018125400	SWITCH H/BAR DR AS	SP101B-2D1	x	1

- Some parts can be chaged for improving their perfomance without notice.

U20D(E)F.. : *None H/Bar Models*
U20F(G)F.. : *With H/Bar Models*
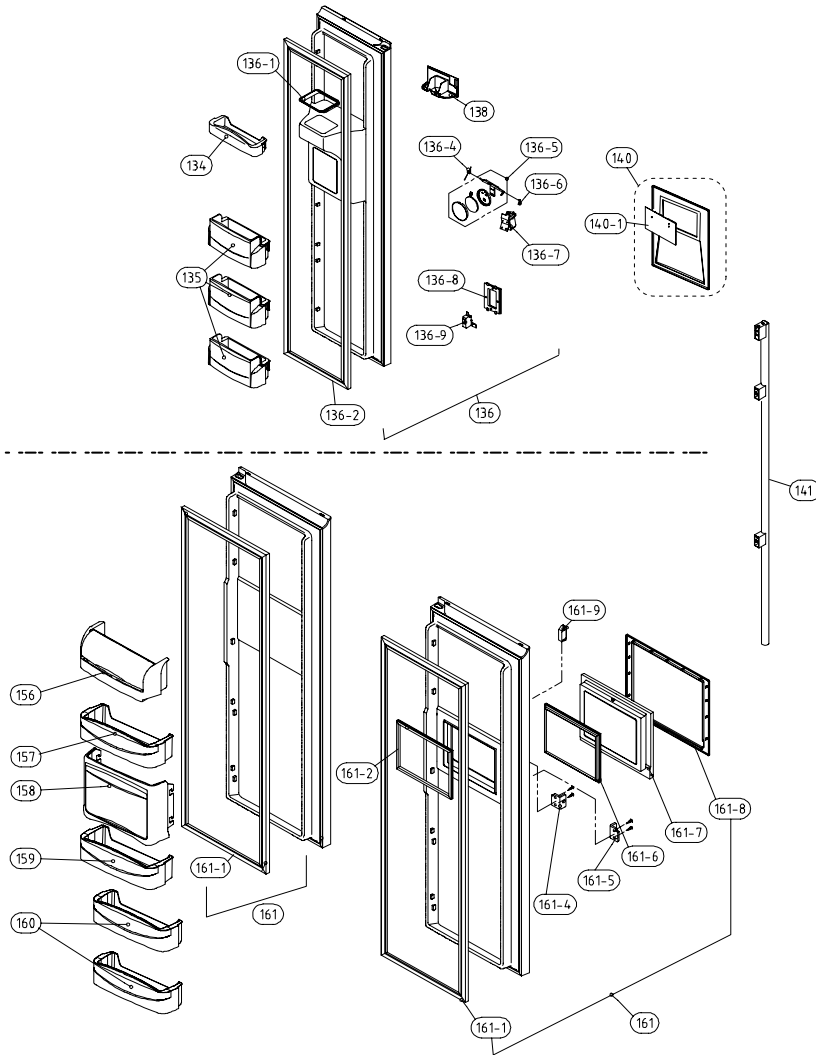
NO	PART-CODE	PART NAME	SPEC.	Q'ty	
				U20D(E)F..	U20F(G)F..
134	3019026700	POCKET F *T	HIPS	1	1
135	3019027450	POCKET F AS	FRU-54AD	3	3
136	3000079710	ASSY F DR	FRU-54C (TITANIUM VCM)	1	
	3000079740		FRU-54C (BLACK)		
	3000079780		FRU-54C (TITNIUM PCM)		
	30000797A0		FRU-54C (SUS430)		
136-1	3010964601	CAP ICE PATH FRAME	PP(FRS-551F)	x	1
136-2	3012318810	GASKET F DR AS	PVC+MAGNET	1	x
	3012318820	GASKET F DR AS	PVC+MAGNET(BK)	x	1
136-4	3015102200	SPRING ICE D LEVR	SUS	1	1
136-5	3011495300	COVER I/FLAP AS	FRU-541D	1	1
136-6	3012019700	FIXTURE I/SHUT LUVR	FR-S650CD	1	1
136-7	3015403000	VALVE SOL DISP	220~240V/50Hz	1	1
136-8	3016306500	BUTTON DISPNS AS	FRU-54AD	1	1
136-9	3018125800	SWITCH MICRO	VP333A-2D	1	1
138	3010563100	BOX DISPNS I/SHUT	ABS FRU-54AF	1	1
140	3001413800	COVER DISPNS BOX AS	FRU-54AD	1	x
	3001413810		FRU-54AF	x	1
140-1	30143G2160	PCB FRONT AS	FRU-54AD (FR-1 180X98.5-1.6T)	1	1
141	3012645300	HANDLE BAR AS	FRU-547F	2	2
156	3019027530	POCKET DAIRY AS	FRU-54AD	1	1
157	3019027230	POCKET R *M AS	FRU-54AD	2	1
158	3019027720	POCKET R H/BAR AS	FRU-54AF	x	1
159	3011187020	CASE H/BAR AS	FRU-54AF	x	1
160	3019027330	POCKET R *S AS	FRU-54AD	2	2
161	3000079850	ASSY R DR	FRU-54CD (BLACK)	1	x
	3000079810		FRU-54CF (TITANIUM VCM)	x	1
	30000798C0		FRU-54CF (SUS430)		
	3000079840		FRU-54CF (BLACK)		
161-1	3012318910	GASKET R DR AS	PVC+MAGNET	1	
	3012318910		PVC+MAGNET(BK)		
161-2	3012321400	GASKET H/BAR B AS	PVC	x	1
161-4	3015204500	STOPPER H/BAR DR *R	PO T4.0	x	1
161-5	3015204400	STOPPER H/BAR DR *L	PO T4.0	x	1
161-6	3012321300	GASKET R H/BAR A AS	PPV	x	1
	3012321310		PPV (BLACK)		
161-7	3011785800	DOOR H/BAR AS	FRU-54AF	x	1
161-8	3001411400	COVER H/BAR FRAME SAS	ABS+SPRAY	x	1
161-9	3018125400	SWITCH H/BAR DR AS	SP101B-2D1	x	1

- Some parts can be chaged for improving their perfomance without notice.