			重 要 度		

		产 品 名称:	冷藏冷冻箱
		产 品 型号:	BCD-409WY/HC1(H)
		文 件 名称:	售后服务技术资料
		文 件 编号:	**BSSJ00003087**
		编 制 日期:	**2021 年 3 月 17 日**
借(通)用件登记			

						家电开发中心
旧底图总号						
底图总号	A					售后服务技术资料
	版本	更改单编号	签字	日期	重 量 / 比例	
出图审查	设计		审核			
	标准化				共 张 / 第 张	BSSJ00003087
日 期	批准					

Hisense

Refrigerator

Service Manual

Model： RM-53WC1SHAUVE -001(BCD-409WY/HC1(H))

Contain

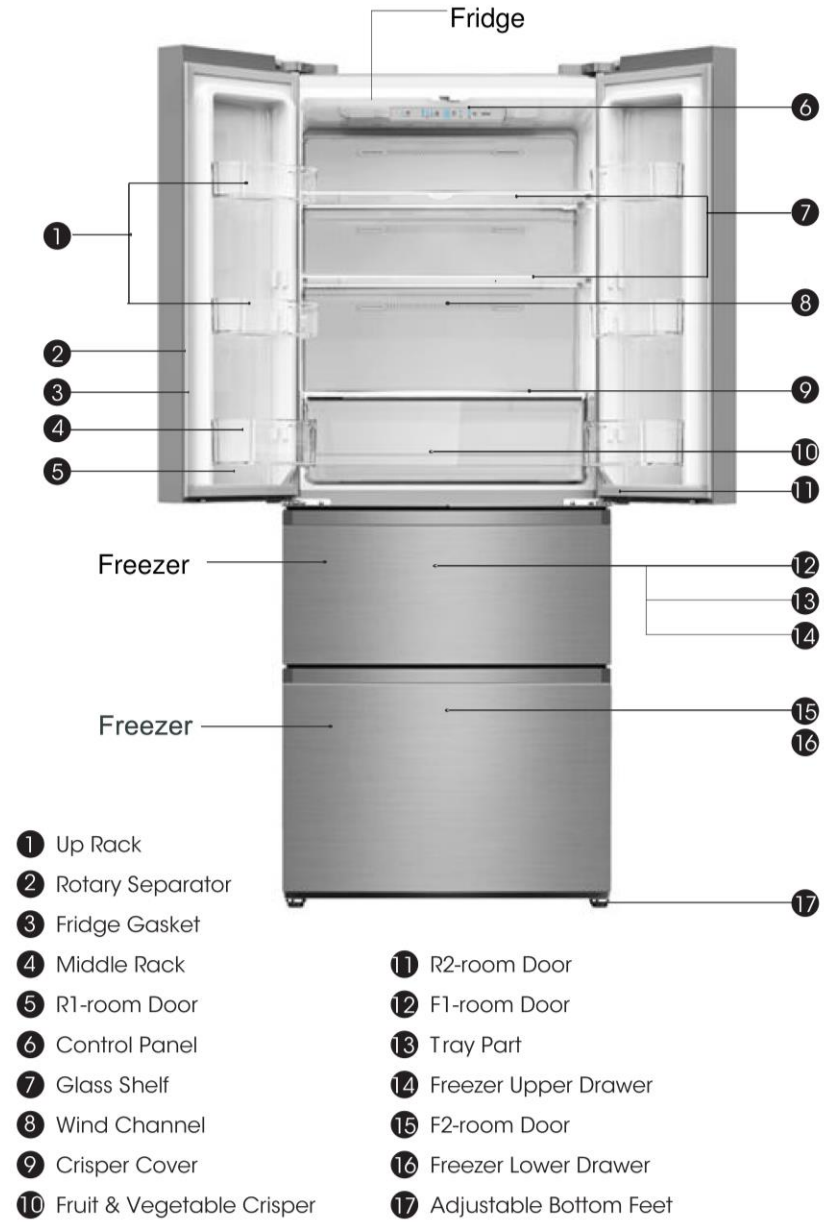
1. Warning and precautions for safety

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 ice maker 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.

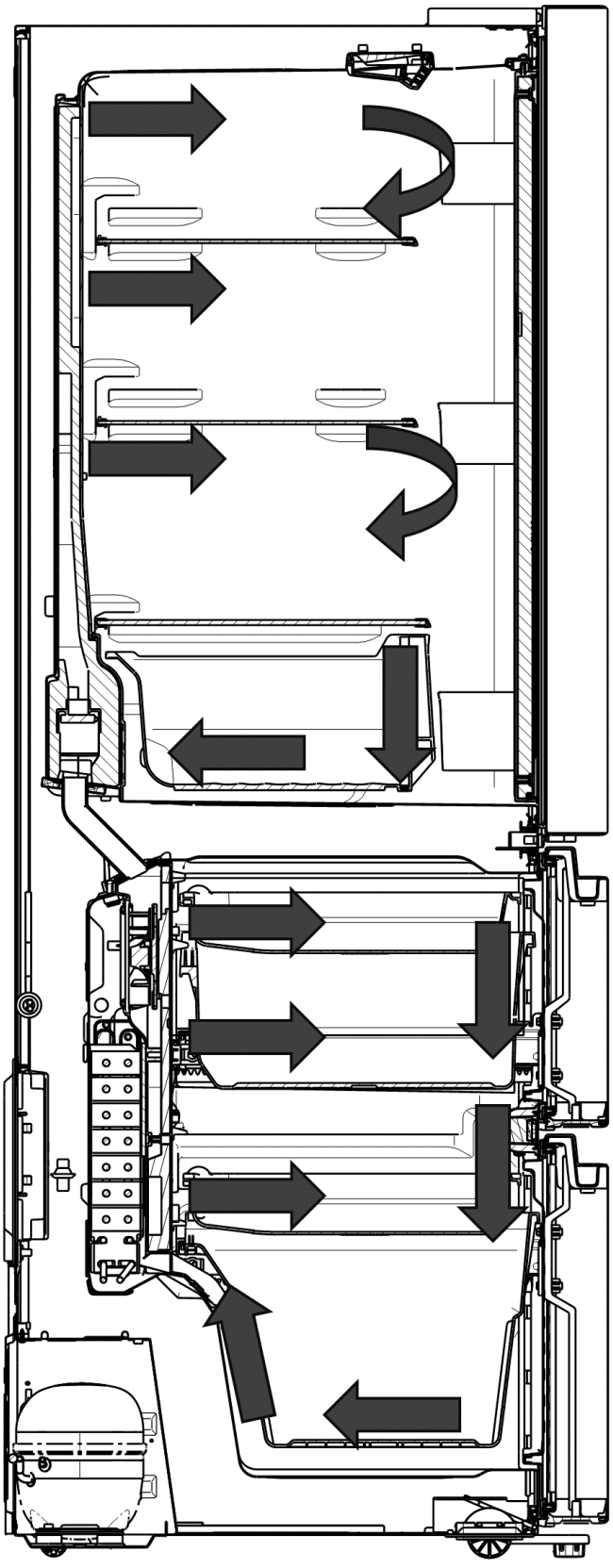
2. Appearance and structure

2.1 View of the appliance

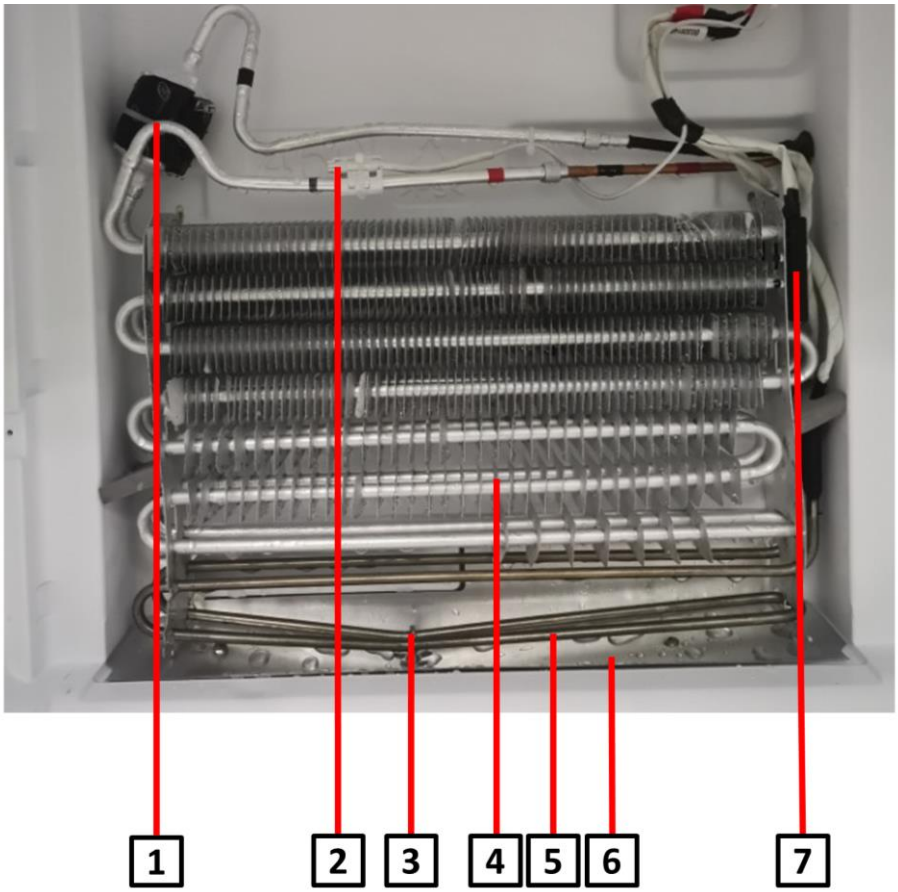


Note: Due to unceasing modification of our products, your refrigerator may be slightly different from this instruction manual, but its functions and using methods remain the same.

2.2 Wind channel structure



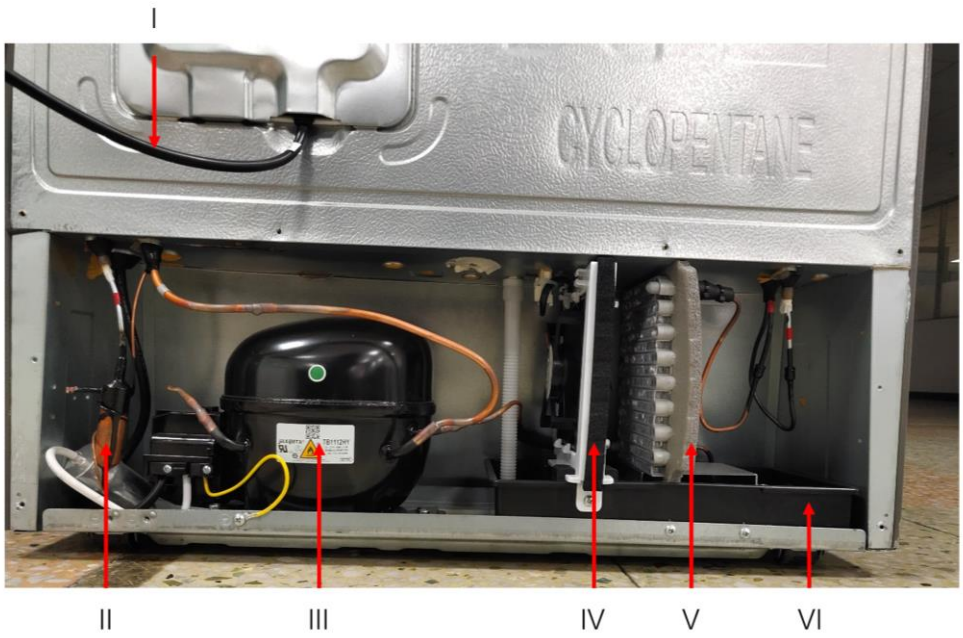
2.3 Freezer evaporator structure



1. Accumulator
2. Temperature sensor part
3. Defrost stick
4. Wing slice evaporator part
5. Heater
6. Water drain
7. Temperature fuse

2.4 Compressor room structure

BCD-409WY/HC1(H)---RM-53WC1SHAUVE-001



Ⅰ——Power Cord
Ⅱ——Dry filter
Ⅲ——Compressor
Ⅳ——Fan Motor
Ⅴ——Bottom Condenser
Ⅵ——Evaporation Dish

3. Basic parameters

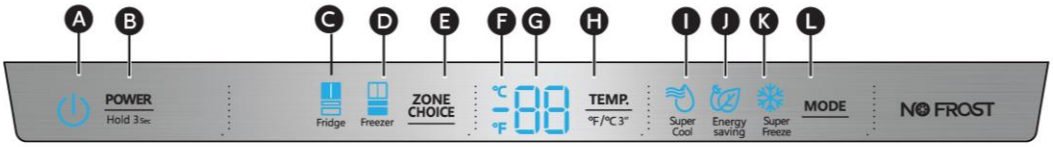
BCD-409WY/HC1(H)---RM-53WC1SHAUVE-001

Content	Unit	Value
Voltage/frequency	/	115V / 60Hz
capacity (fridge/freezer)	L	418(268/150)
Climate class (SN=10~32℃,N=16~32℃,ST=16~38℃,T=16~43℃)	/	12.8-43.3℃
Energy consumption / year	kWh/year	483
Energy consumption (EN153) per 24 h	kWh/24h	1.323
Kind of coolant /Charge(R134a/R600a)/grammes	R / g	R600a/63g
Certifications (CE / ISO 9001/2 / LGA etc.)	/	CSA
Max noise level	dB(A)	41

4. Operation and functions

4.1 Display controls

Use your appliance according to the following control regulations, your appliance has the corresponding functions and modes as the display panels showed in the pictures below. When the appliance is powered on for the first time, the backlighting of the icons on display panel starts working. If no buttons have been pressed and the doors are closed, the backlighting will turn off.



- A Power Icon
- B Power Control
- C Fridge Compartment Temp Icon
- D Freezer Compartment Temp Icon
- E Zone Choice
- F Celsius and Fahrenheit Indicator
- G Temperature
- H Temp Control
- I Super Cool Icon
- J Energy saving icon
- K Super Freeze Icon
- L Mode Control

Press **POWER** 3 seconds to turn the power on, and press 3 seconds to turn the power off and will display "OF".

Setting Compartment Temperatures

When you set a temperature, you are setting an average temperature for the entire compartment. The actual compartment temperatures may vary from the temperatures displayed depending on the amount and placement of stored food, and the surrounding room temperature.

Recommended Temperature Settings

- Fridge Compartment: 39°F (4°C)
- Freezer Compartment: 0°F (-18°C)

Switching Celsius and Fahrenheit

To toggle between Celsius and Fahrenheit on the display, press and hold the **TEMP.** button for three seconds.

Refrigerator (Fridge) Compartment Temperature

1.Press **ZONE** repeatedly until the Fridge icon appears.

2. When Fridge is on, 

is illuminated and then press **TEMP.** repeatedly to cycle through the available temperature settings, from 8°C to 2°C if you have set temperature type to Celsius.

8°C — 7°C — 6°C — 5°C
2°C — 3°C — 4°C

If you have set temperature type to Fahrenheit,the temperature settings cycle from 46 °F to 36 °F.

46°F — 45°F — ·····
36°F — 37°F

NOTE: Each press of the button advances the setting by one degree.

3.Release the **TEMP.** Control when the desired temperature setting appears.

Freezer Compartment Temperature

1.Press **ZONE** repeatedly until the Freezer Choice appears.

2.When Freezer is on, 

is illuminated and then press **TEMP.** repeatedly to cycle through the available temperature settings, from -14°C to -24°C if you have set temperature type to Celsius.

-14°C — -15°C — ·····
-24°C — -23°C

If you have set temperature type to Fahrenheit,the temperature settings cycle from 7 °F to -11 °F.

7°F — 6°F — ·····
-11°F — -10°F

3.Release the **TEMP.** Control when the desired temperature setting appears.

NOTE: Each press of the button advances the setting by one degree.

Super Cool

The Super Cool feature helps to keep food stored in the refrigerator at the set temperature during periods of high usage, large grocery loads, or temporarily warm room temperatures.The Super Cool feature lowers the temperature in the fridge compartment to 36 °F(2°C) to cool food

1. Press **MODE** repeatedly until the Super Cool icon appears.

NOTE: When Super Cool is on, is illuminated and 36 °F(2°C) appears in the temperature display.

2. Press **MODE** to manually turn off Super Cool and return to the previously set temperature.

NOTE: Super Cool will automatically turn off after 3 hours, and the refrigerator will revert to its previous temperature setting.

Super Freeze

The Super Freeze feature helps to keep the food stored in the freezer at the set temperature during periods of high usage, large grocery loads, or temporarily warm room temperatures.
The Super Freeze feature lowers the temperature in the freezer compartment to -11°F(-24°C) to freeze food faster.

1.Press **MODE** repeatedly until the Super Freeze icon appears.

NOTE: When Super Freeze is on, is illuminated and -11°F(-24°C) appears in the temperature display.

2. Press **TEMP.** to manually turn off Super Freeze and return to the previously set temperature.

NOTE: Super Freeze will automatically turn off after 52 hours, and the freezer will revert to its previous temperature setting.

When selecting the Super Freeze function. ensure there are no bottled in the freezer compartment. Bottles and cans may explode.

Energy Saving

This function makes the freezer worked in a energy saving mode which is useful for reducing energy consumption when you are away.

1.Press **MODE** until Energy saving icon appears. The appliance automatically sets the following temperatures:

- Fridge compartment: 43°F(6°C)
- Freezer compartment: 1°F(-17°C)

2. Press**TEMP.**to turn off Energy saving mode and the refrigerator temperature will revert to its previous temperature setting.

Door Open Alarm

If the fridge door is opened for longer than 2 minutes, the control panel will display "dr", and it will return to the previous set temperature after 8 minutes.

- To turn off the alarm, close the fridge door completely.

NOTE: High temperature setting will accelerate food waste.

Demo Mode

1.Demo Mode is for store displaying only.
2.In this mode, the light and the display operation is normal, but the refrigerator is not cooling.When the refrigerator is in the Demo Mode, if consumers open the door or no keys operation for 30 seconds with the door opened, the temperature control panel will show as follow from A to F.

3.To exit this mode, you could press the leftmost key and the rightmost key at the same time for 3 seconds, then you can see the whole control panel light up for 1 second.

NOTE: The Demo Mode stays on even if the refrigerator powers off. If the consumers enter the mode with unintentional operation,you should exit it as soon as possible, since the refrigerator will not cool in this mode, which will cause the food going bad.

4.2 Defrost mode

4.2.1 Automatic defrost mode

When compressor accumulated running time reach the setting point (depends on the environment temperature), it will enter defrost mode automatically.

4.2.2 Force Defrosting Mode

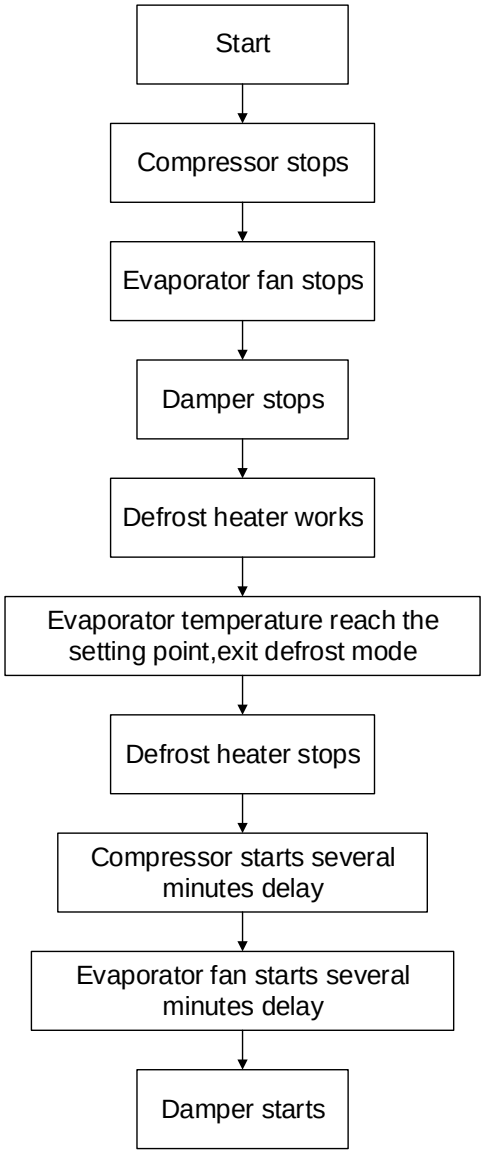
Within 10 minutes since the power on , keep pressing the "zone choice" &" temp" button

at the same time for 3 seconds, all the icons of the display will light up for one second.The unit will come into the Force Defrosting process .

— When into the force defrosting process, the specific operating will follow the way of Automatic Defrosting Mode control.

—Meanwhile the display can not enter the screen saver.The special character ”DF” will be displayed, and the key will be invalid.

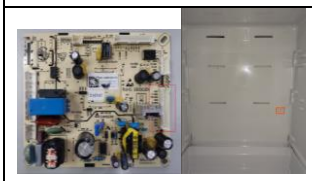
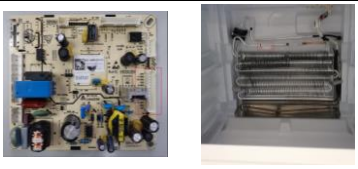
4.2.3 Defrost flow



4.3 Error display

4.3.1 Error Code

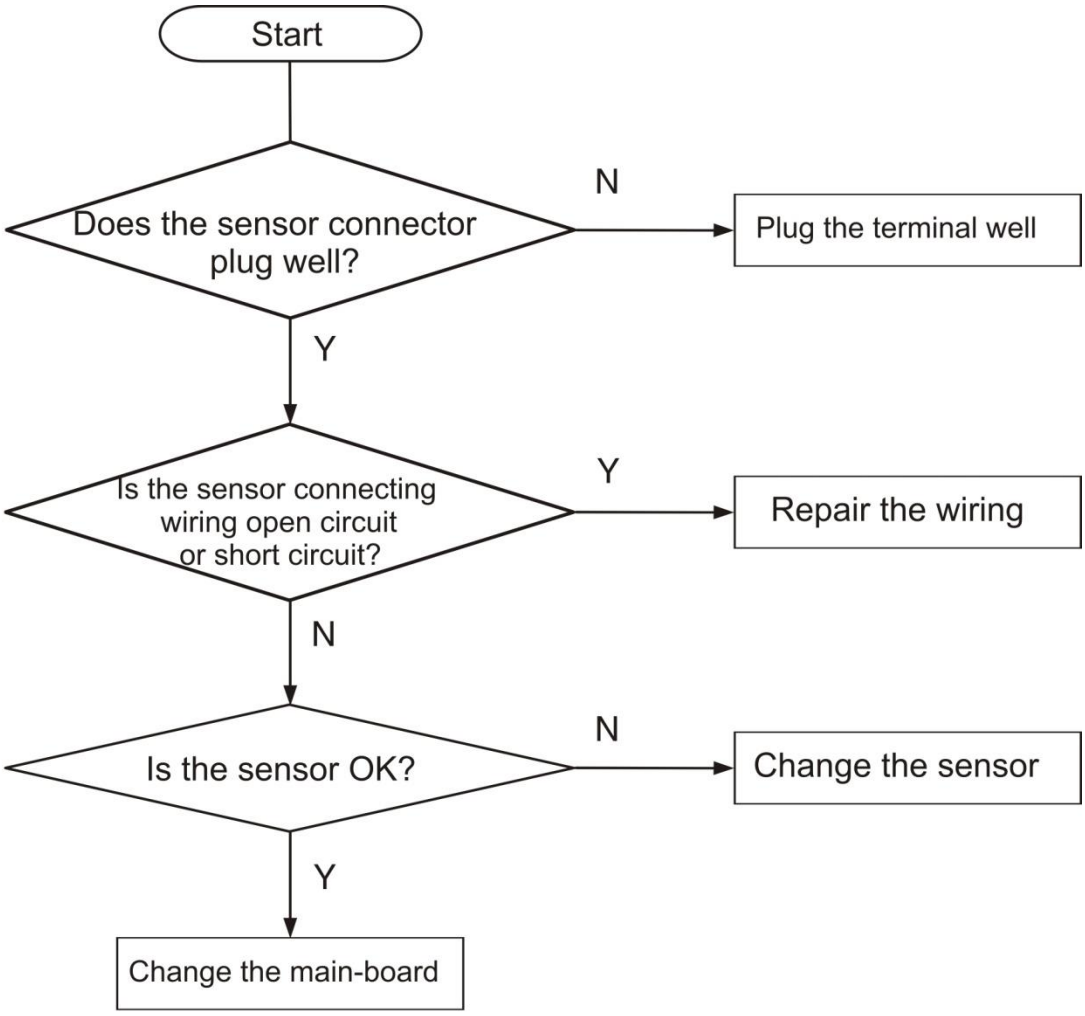
Code	Problem
E0	Environment sensor malfunctions
E1	Refrigerator sensor malfunctions
E3	Freezer sensor malfunctions
E4	Freezer defrost sensor malfunctions
E8	Humidity Sensor malfunctions
Er	Communication receiving malfunctions
Ec	Communication sending malfunctions
F1	Freezer fan malfunctions
F0	Condenser fan malfunctions

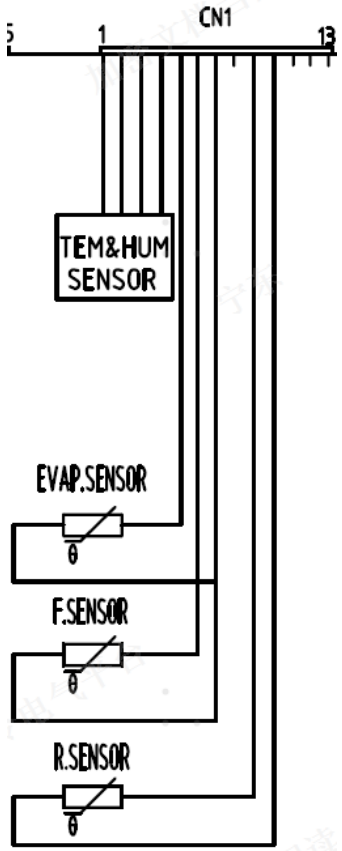
LED	Item	Trouble contents	Diagnostic method	Detection value	image
E0	E-Sensor Error	Display error : separation of sensor housing part, contact error, disconnection, short circuit. Display error of detecting temperature of sensor : more than 65° C or less than -50°C	Measuring the voltage between the Main PCB CN1 2PIN and 4PIN	4.5V~1.0V	
E1	R-Sensor Error		Measuring the voltage between the Main PCB CN1 9PIN and 10PIN		
E3	F-Sensor Error		Measuring the voltage between the Main PCB CN1 6PIN and 7PIN		
E4	F-DEF-Sensor Error		Measuring the voltage between the Main PCB CN1 5PIN and 7PIN		

E8	Humidity-Sensor Error		Replace the Humidity-Sensor	/	/
Er	Display Panel communicating receive failure	The Display Panel is open or short circuit.	1.checking the connecting is well or not. 2.Replace the Display Panel. 3.Replace the control PCB.	/	
Ec	Display Panel communicating send failure	The Display Panel is open or short circuit.	1.checking the connecting is well or not. 2.Replace the Display Panel. 3.Replace the control PCB.	/	
F1	F-Fan Error	The Fan motor is open or short circuit.	1.checking the connecting is well or not. 2、Replace the Fan motor . 3.Replace the control PCB.	/	
F0	Cond -Fan Error	The Fan motor is open or short circuit.	1.checking the connecting is well or not. 2、Replace the Fan motor . 3.Replace the control PCB.	/	

4.3.2 Checking method

4.3.2.1 Sensor error



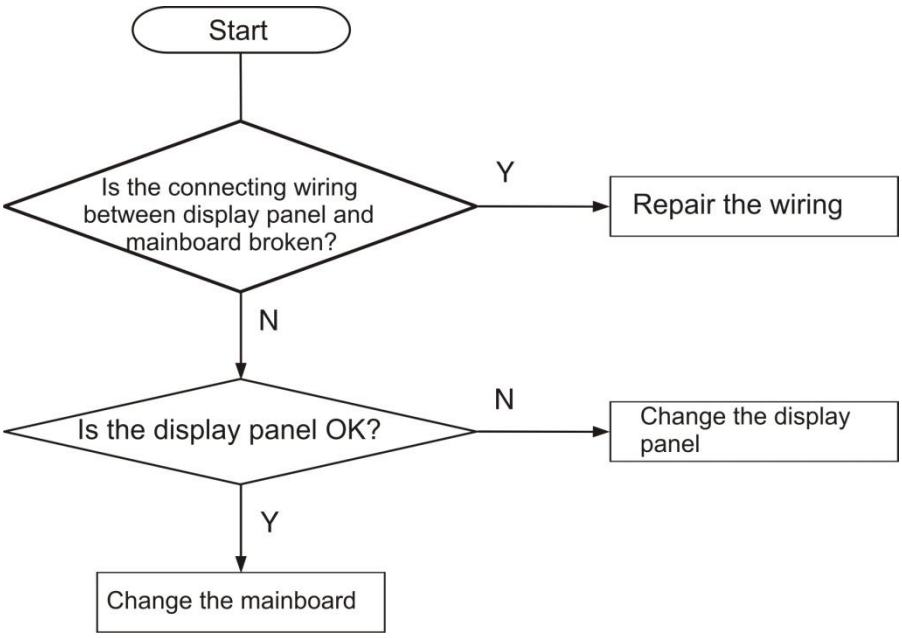


Note:

1. Refrigerator sensor corresponding pin No. 9 and No. 10 on CN1 connector of main-board.
2. Freezer sensor corresponding pin No. 6 and No. 7 on CN1 connector of main-board.
3. Freezer defrost sensor corresponding pin No. 5 and No. 7 on CN1 connector of main-board.
4. Environment sensor corresponding pin No. 2 and No. 4 on CN1 connector of main-board.

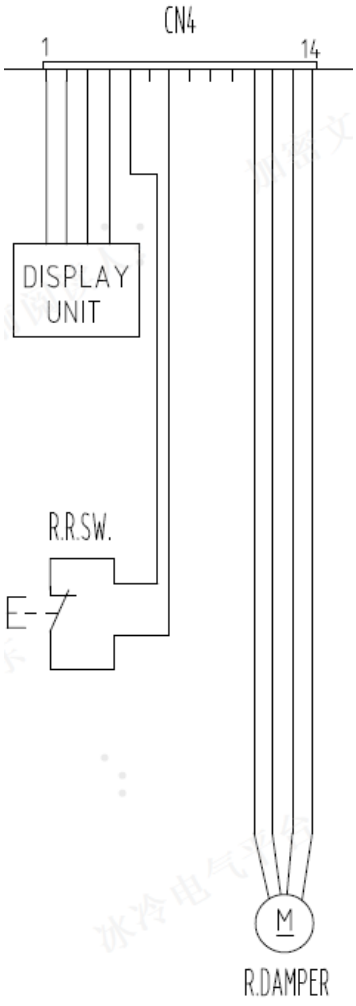
4.3.2.2 Communication error

Ec or Er error:



Note:

The display panel corresponding pin No.1~4 on CN4 connector of the main-board as the drawing below.



4.4 Repair mode

Within 10 minutes since the power on , keep pressing the “power” &” temp” button at the same time for 3 seconds, all the icons of the display will light up for one second.The unit will come into the Repair mode .In this time only  is lighted up .Tens corresponding Part code and units corresponding on-off instructions .When the fridge come into the Repair mode, the display unit will display 00.You can press the “zone choice” button to change the Part code and press the ” temp” button to change on-off instructions so that you can control the on-off state of different component.

Part code	on-off instructions	action	on-off instructions	action
0	0	Turn off refrigeration damper	1	Turn on refrigeration damper
2	0	Turn off freezer fan motor	1	Turn on freezer fan motor
3	0	Turn off compressor	1	Turn on compressor
4	0	Turn off freezer defrost heater	1	Turn on freezer defrost heater

5.Trouble shooting

5.1 Common problem and checking

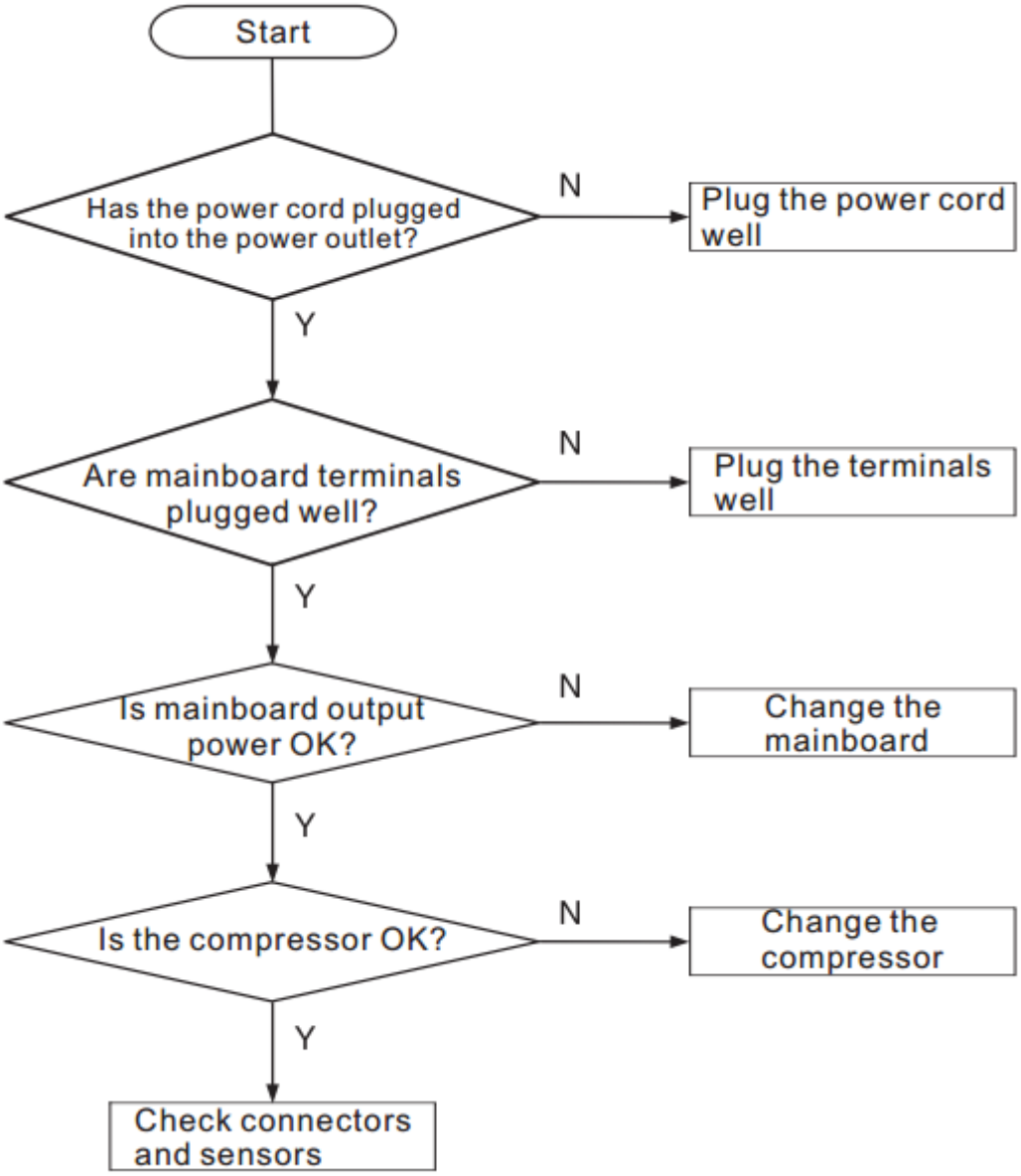
If you experience a problem with your appliance or are concerned that the appliance is not functioning correctly, you can carry out some easy checks before calling for service, please see below.

Warning! Don't try to repair the appliance yourself. If the problem persists after you have made the checks mentioned below, contact a qualified electrician, authorized service engineer or the shop where you purchased the product.

Problem	Possible cause & Solution
Appliance is not working correctly	Check whether the power cord is plugged into the power outlet properly.
	Check the fuse or circuit of your power supply, replace if necessary.
	It is normal that the freezer is not operating during the defrost cycle, or for a short time after the appliance is switched on to protect the compressor.
Odours from the compartments	The interior may need to be cleaned
	Some food, containers or wrapping cause odours.
Noise from the appliance	The sounds below are quite normal: •Compressor running noises. •Air movement noise from the small fan motor in the freezer compartment or other compartments. •Gurgling sound similar to water boiling. •Popping noise during automatic defrosting. •Clicking noise before the compressor starts.
	Other unusual noises are due to the reasons below and may need you to check and take action: •The cabinet is not level. •The back of appliance touches the wall. •Bottles or containers fallen or rolling.
A layer of frost occurs in the compartment	Check that the air outlets are not blocked by food and ensure food is placed within the appliance to allow sufficient ventilation. Ensure that door is fully closed. To remove the frost, please refer to the"Cleaning and care" chapter.
Temperature inside is too warm	You may have left the doors open too long or too frequently; or the doors are kept open by some obstacle; or the appliance is located with insufficient clearance at the sides, back and top

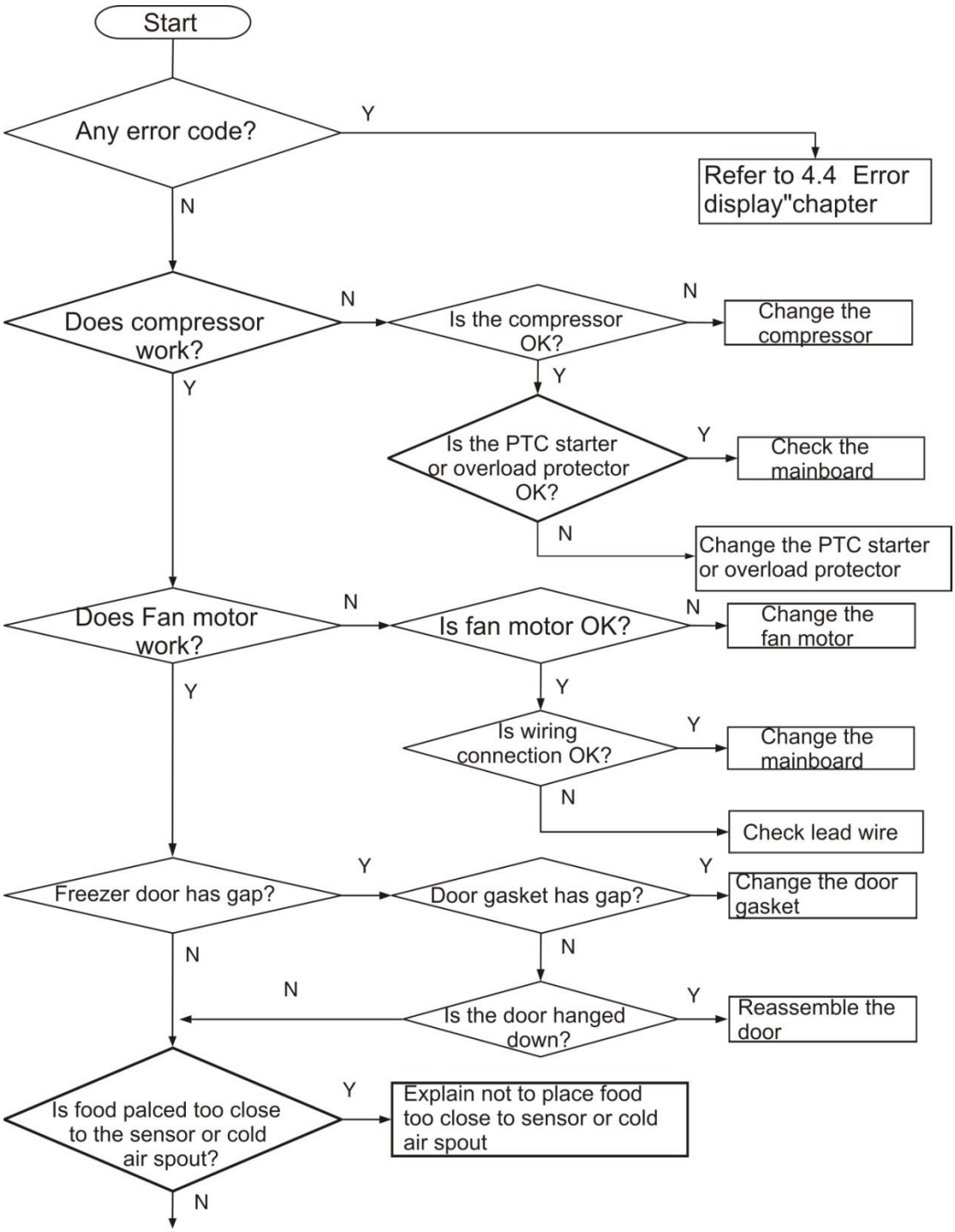
Temperature inside is too cold	Increase the temperature by following the “Display controls” chapter.
Doors can’t be closed easily	Check whether the top of the refrigerator is tilted back by 10-15mm to allow the doors to self close, or if something inside is preventing the doors from closing.
The light is not working	•The LED light may be damaged. Refer to replace LED lights in “ Cleaning and Care” chapter of manual. •The control system has disabled the lights due to the door being kept open too long. Close and reopen the door to reactivate the lights.

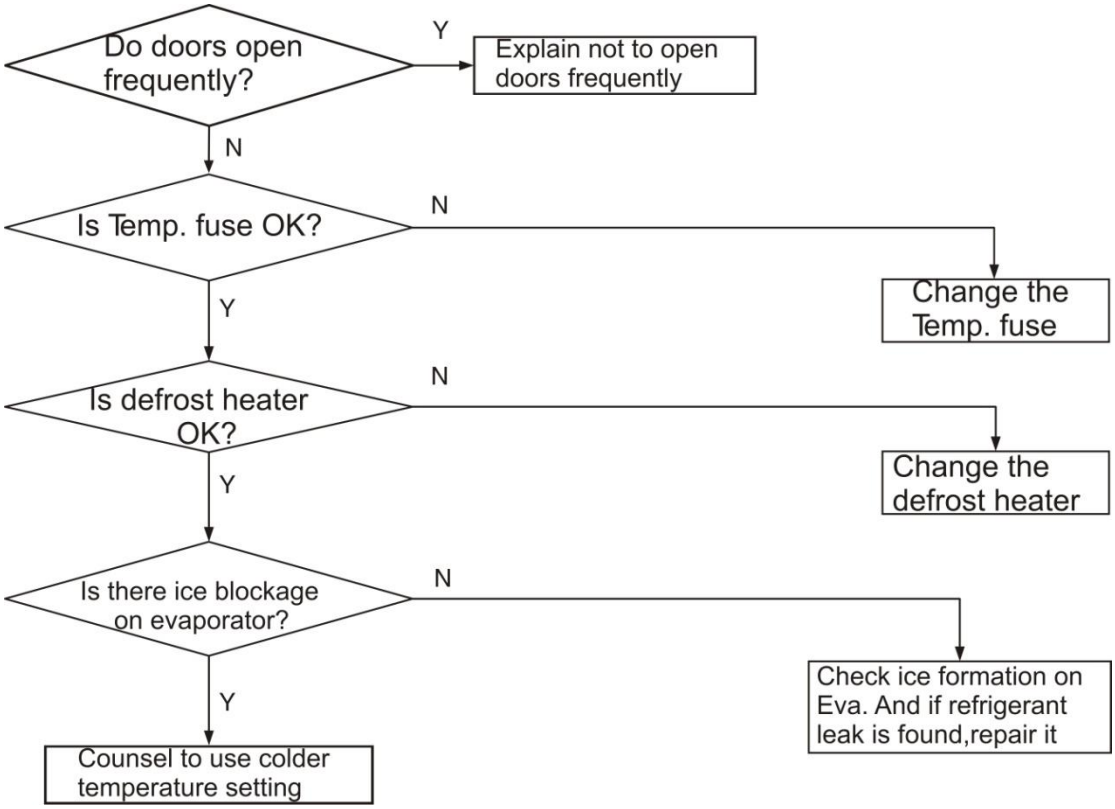
5.2 Faulty start



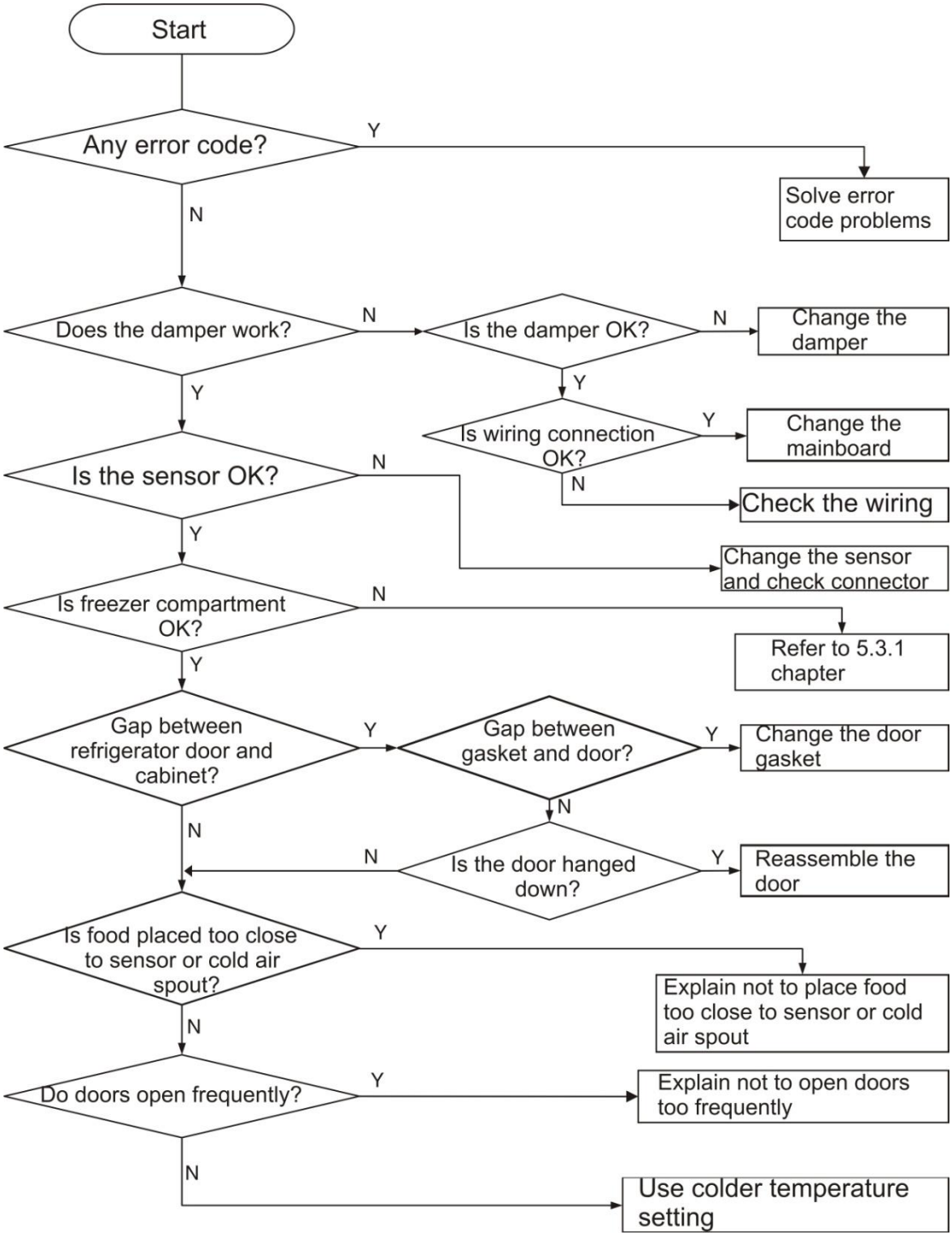
5.3 Refrigeration failure

5.3.1Freezer compartment(BCD-409WY)

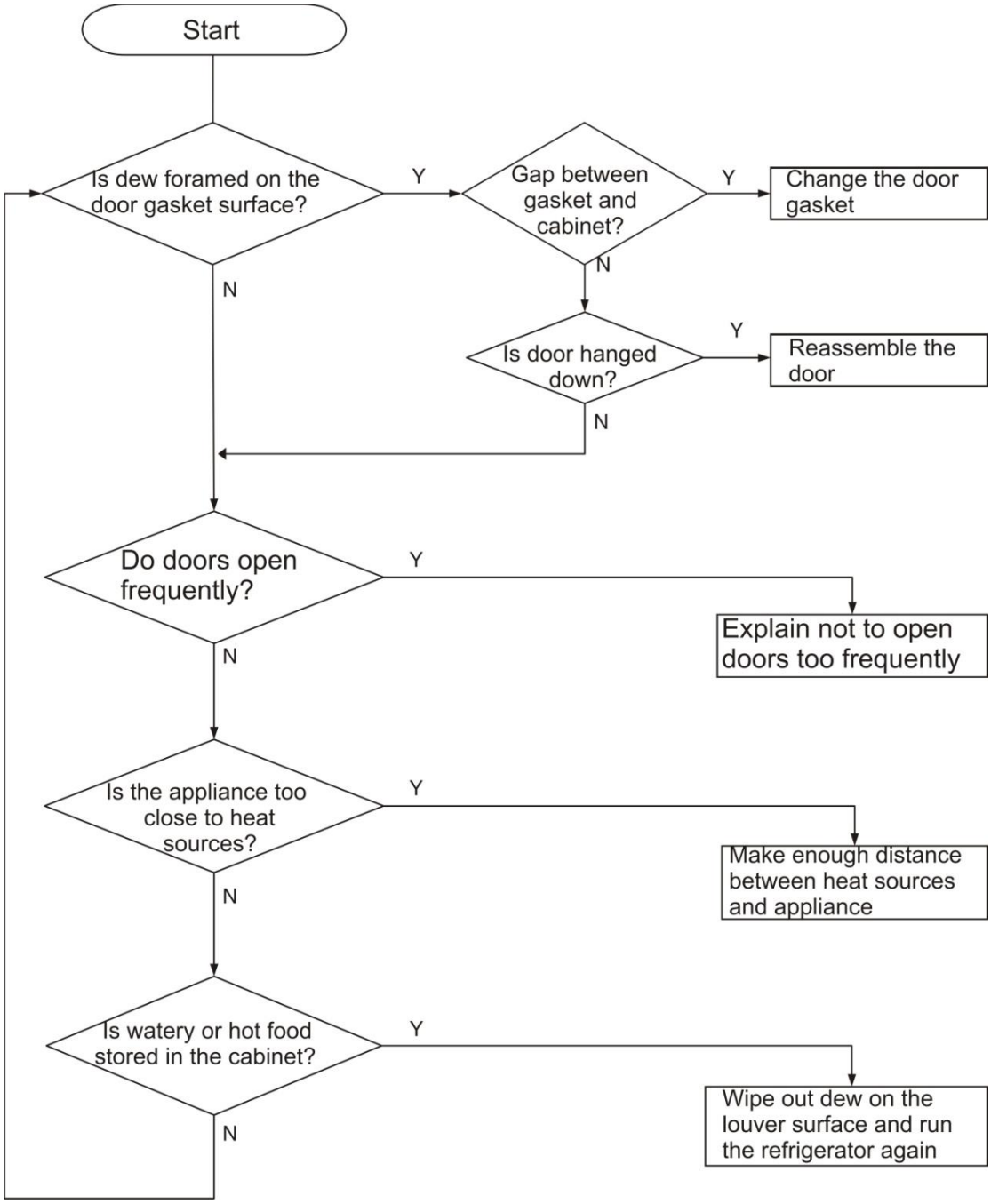



Do doors open frequently?
Y
Explain not to open doors frequently
N
Is Temp. fuse OK?
N
Change the Temp. fuse
Y
Is defrost heater OK?
N
Change the defrost heater
Y
Is there ice blockage on evaporator?
N
Check ice formation on Eva. And if refrigerant leak is found,repair it
Y
Counsel to use colder temperature setting

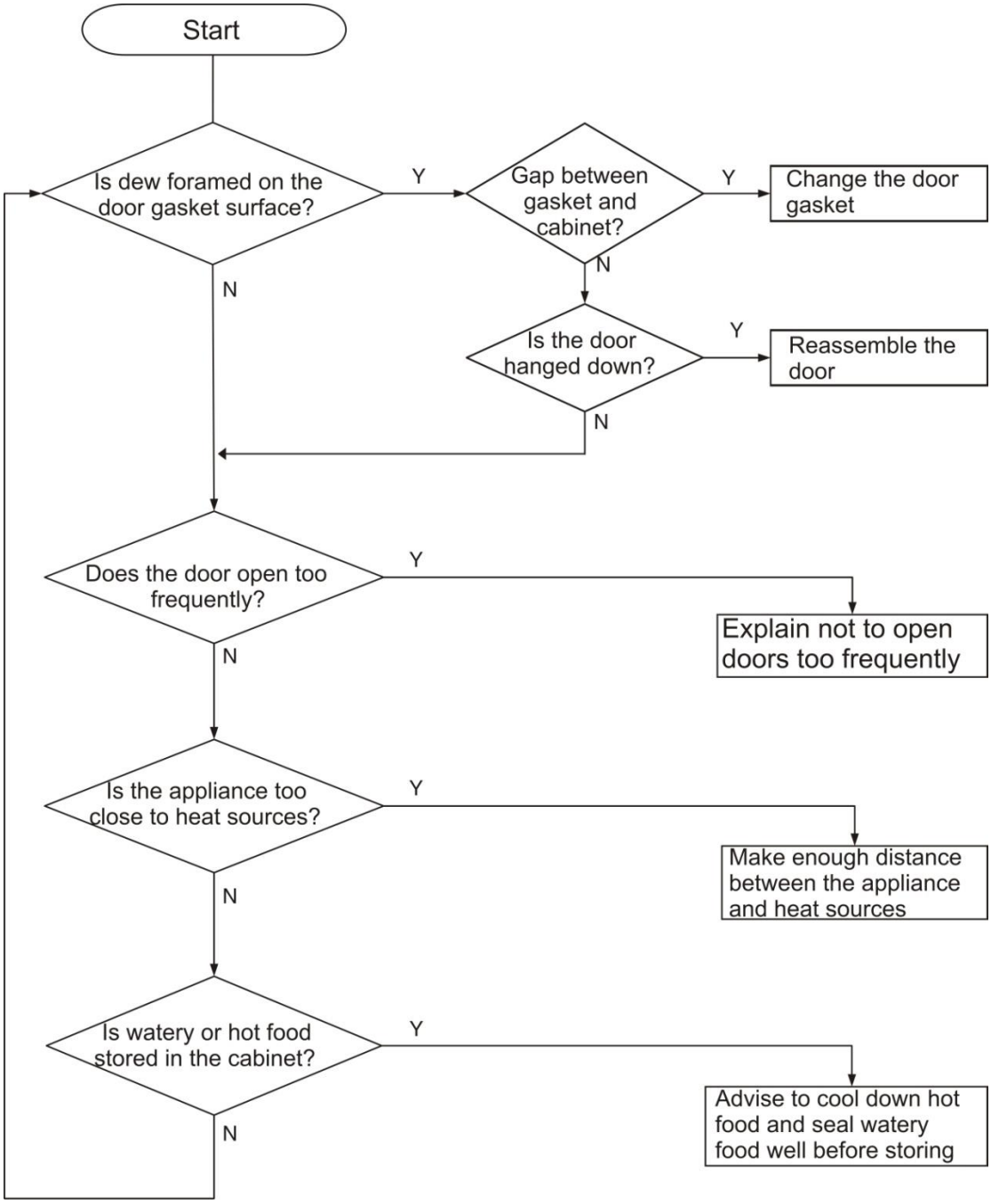
5.3.2 Refrigerator compartment



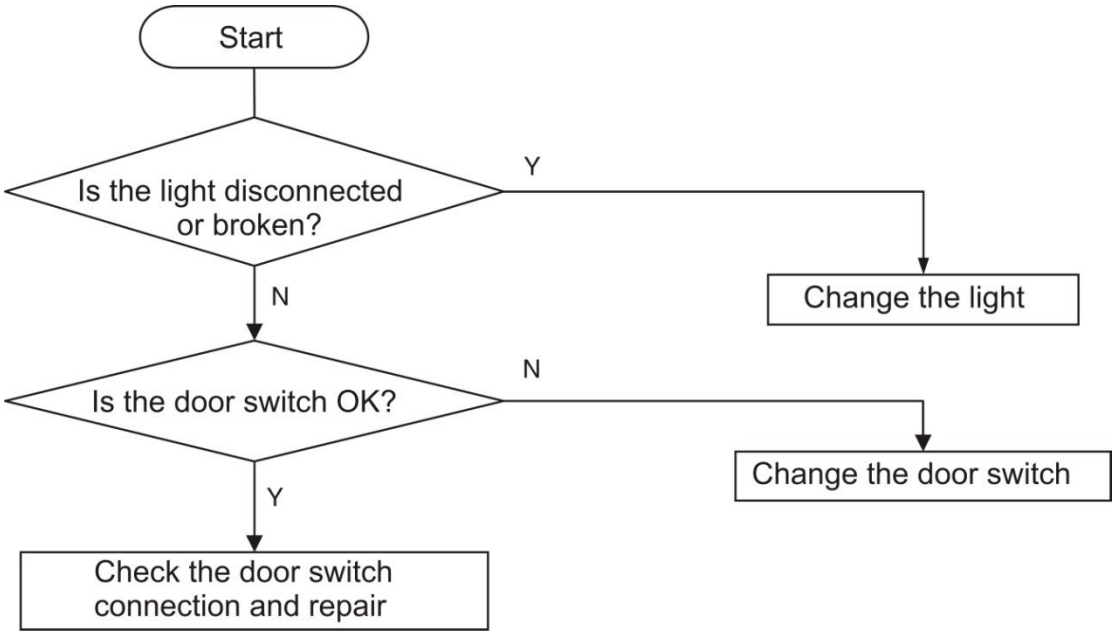
5.4 Thick frost in freezer compartment



5.5 Dew in refrigerator compartment

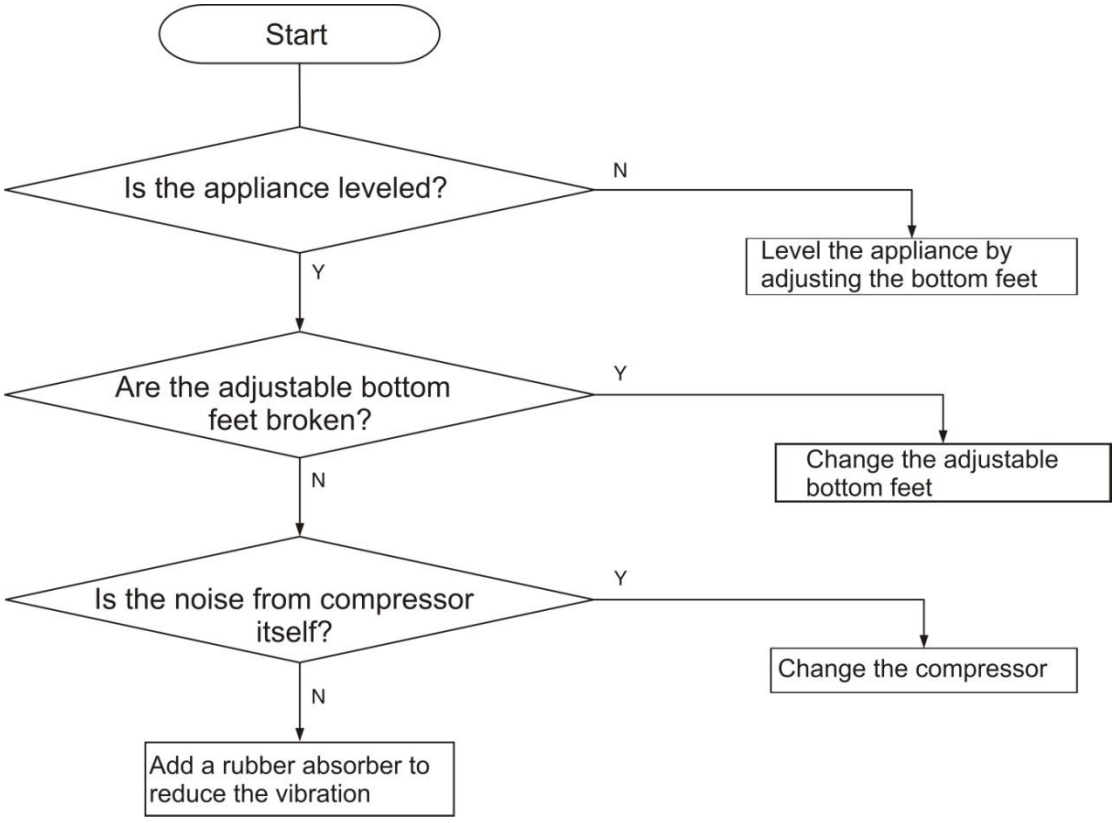


5.6 Breaking of light

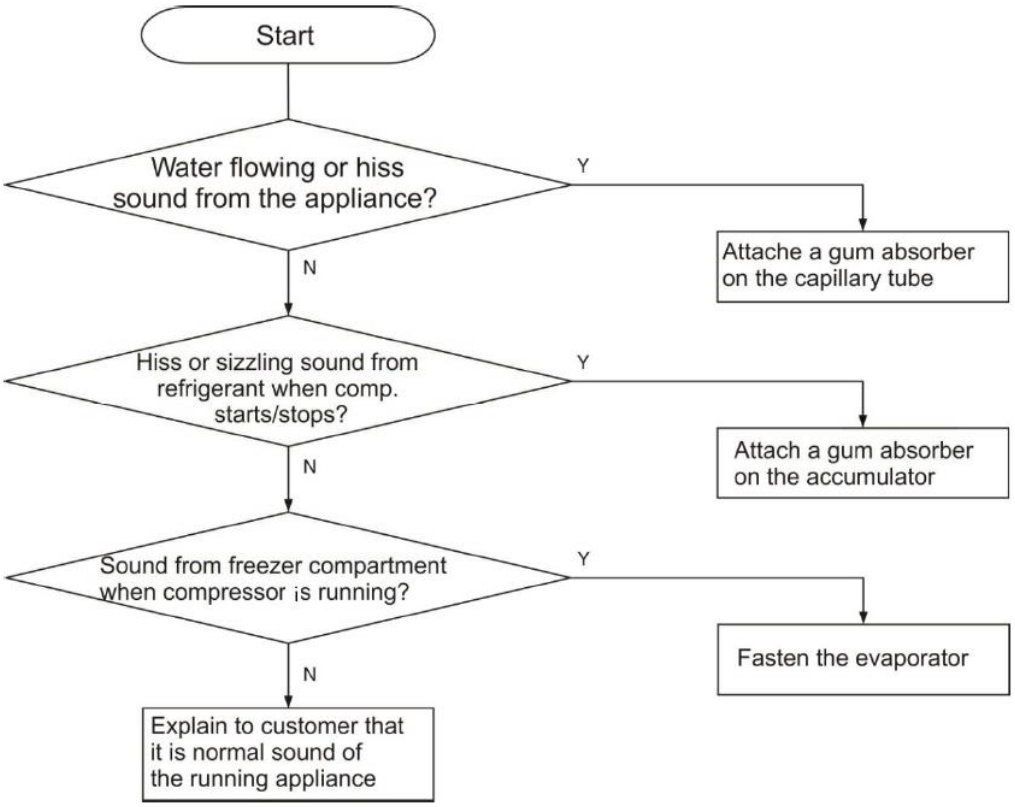


5.7 Noise

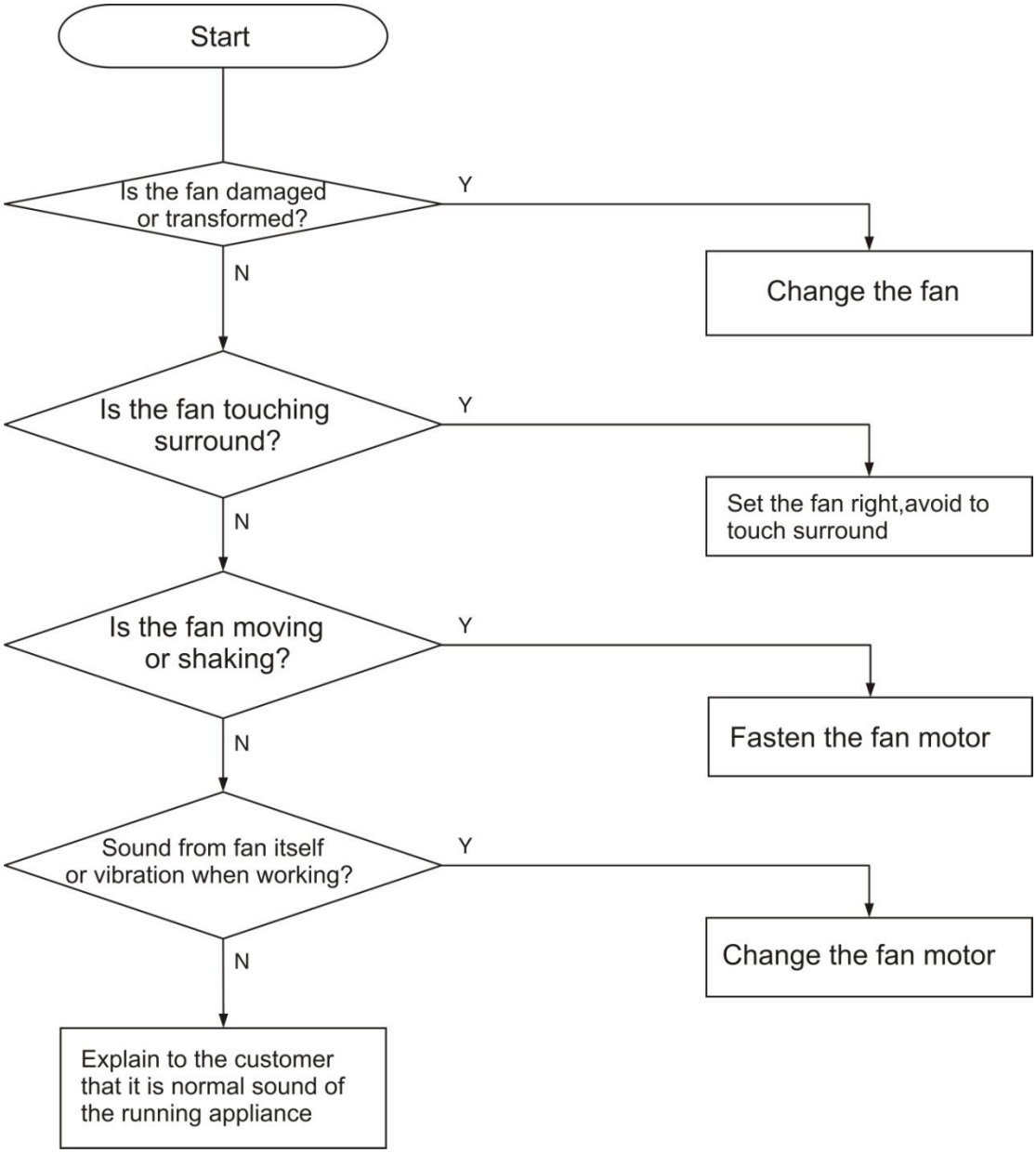
5.7.1 Compressor noise



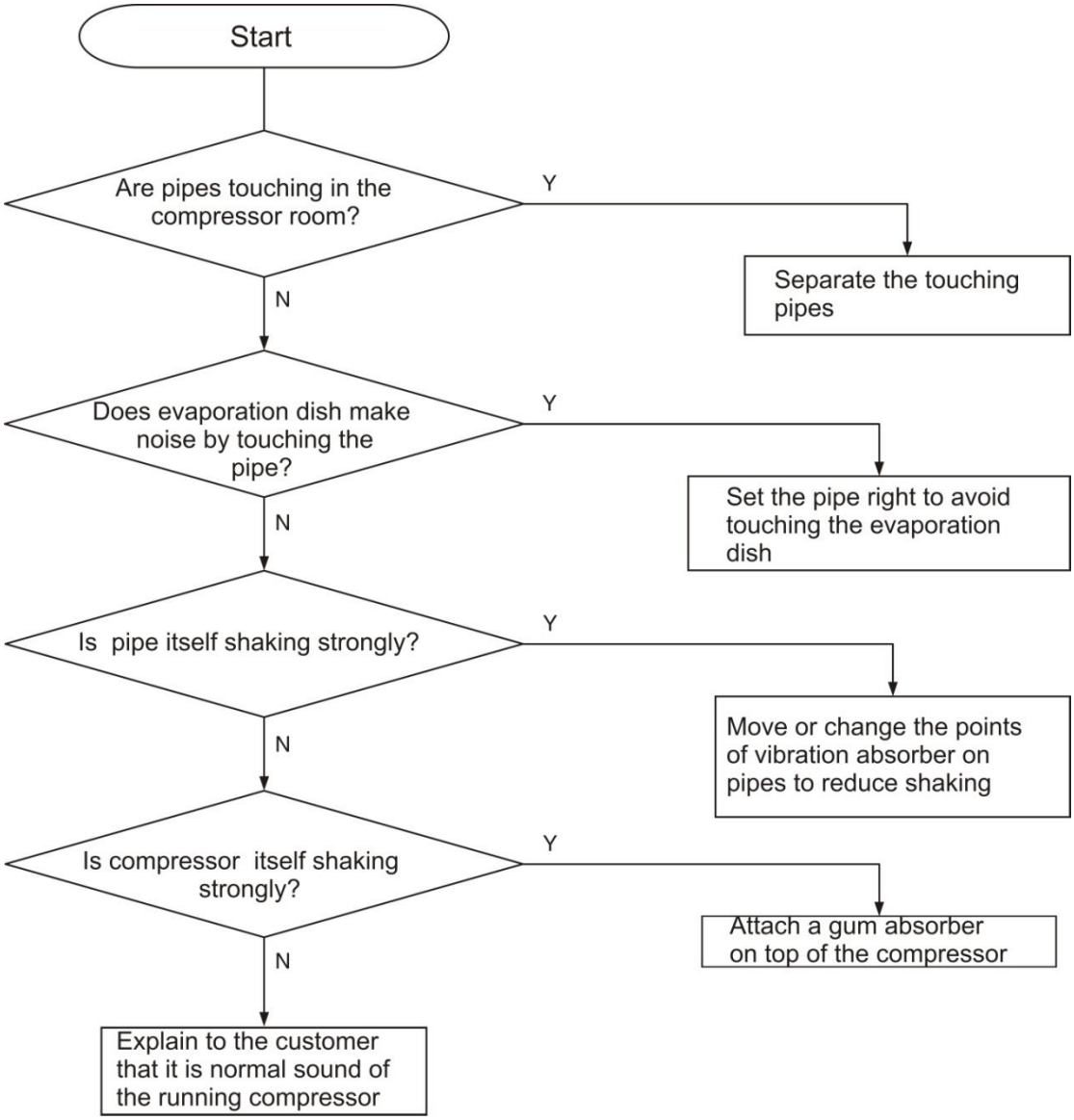
5.7.2 Refrigerator flowing noise



5.7.3 Fan motor noise



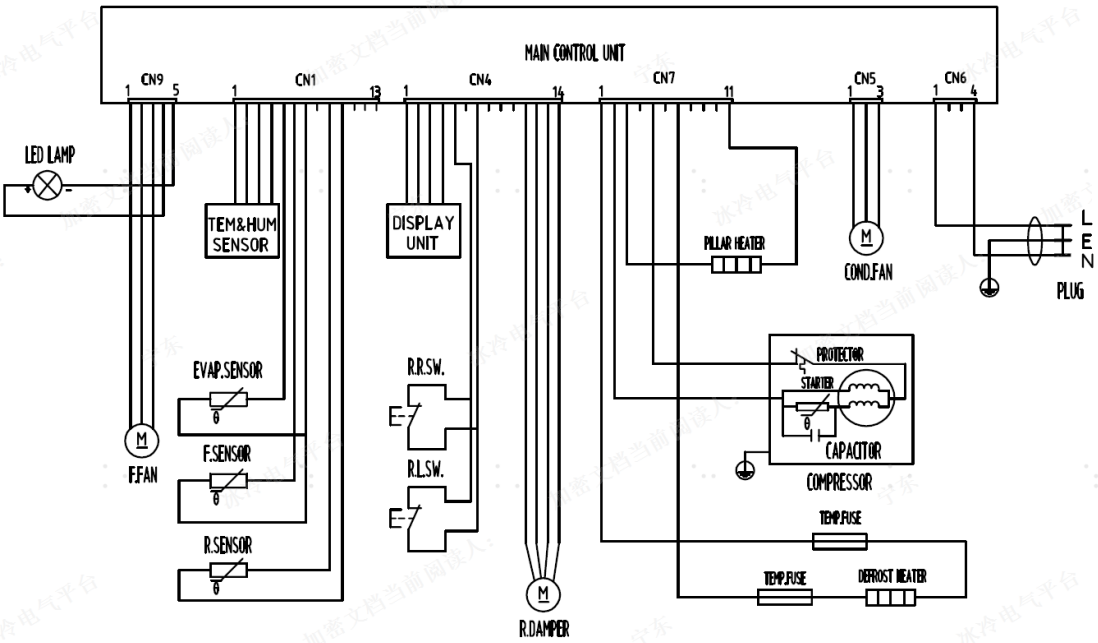
5.7.4 Pipe noise

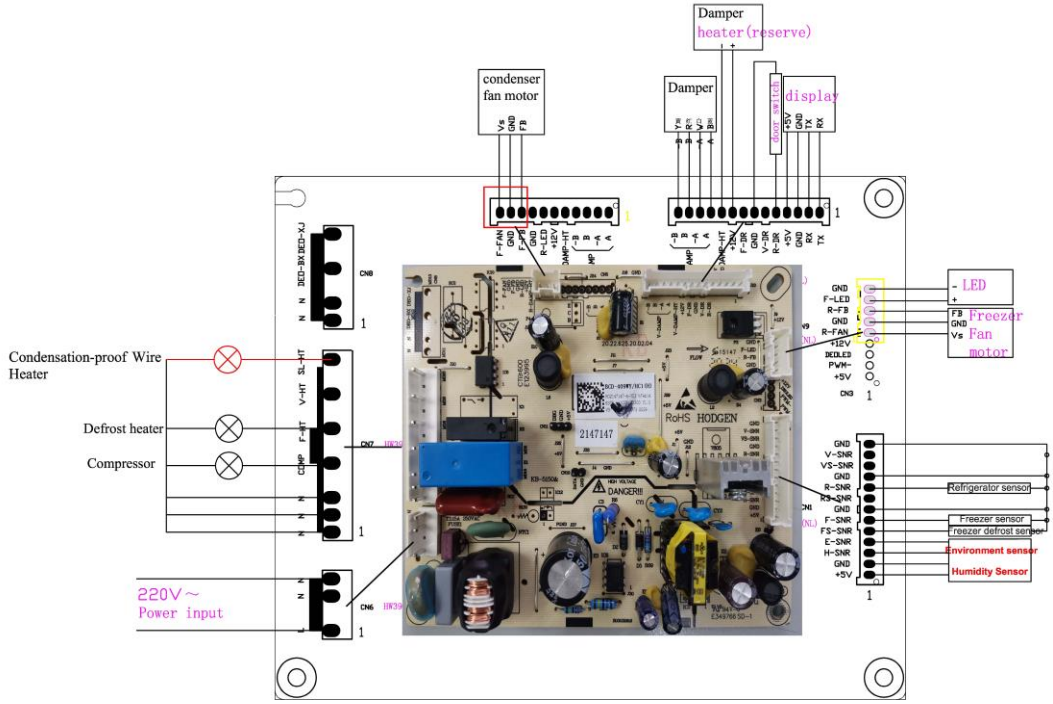


6. Circuit and checking

6.1 Circuit diagram

6.1.1 BCD-409WY/HC1(H)





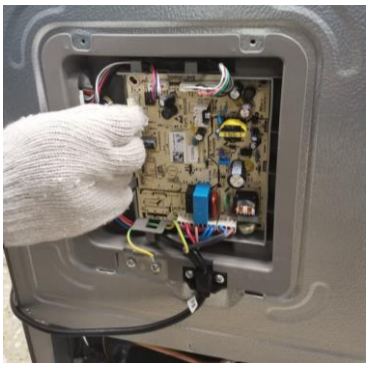
6.2 Main control board

6.2.1 Checking method

If the problem is probably caused by main control board, change it directly to confirm.

6.2.2 Removing the main control board

1. Unplug the appliance
2. Remove the screws by screwdriver and remove the electric box cover, as picture 1 and picture 2.
3. Remove the screws by screwdriver as picture 3
3. Unplug the terminals on the main control board as picture 4.
4. Press the two snap-fits and remove the main control board as picture 5 and picture 6.

	
Picture1	**Picture2**
	
Picture3	**Picture4**
	
Picture5	**Picture6**

6.3 Compressor

6.3.1 Basic parameters

Input voltage:115~127V

Input frequency:60Hz

6.3.2 Checking method

1.Compressor will start 10 seconds after power-on, if it starts unsuccessfully, remove the electric box cover and check.

2.Check the connecting wiring between compressor and main control board and repair if it is broken.

3.Use a multimeter to measure voltage between pin No.2 and No.5 on CN7 connector of main control board. If the voltage equal to electric supply power, it means the main control board is OK, to change the Compressor or change the main control board.

6.3.2.1 Compressor checking

Use a multi-meter to test the resistance between C & S, M&S and M&C;

The ambient temperature is 25℃ resistance as below:

the range of

Normal range of C&S : About 6.42±7%Ω

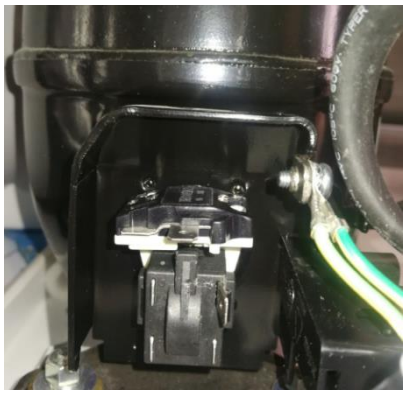
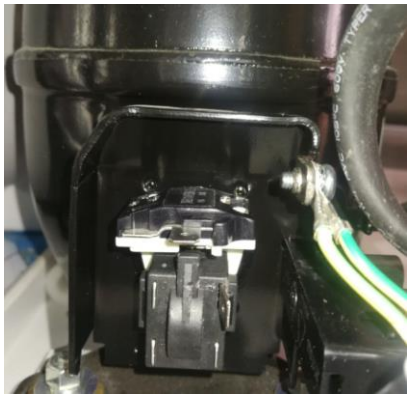
Normal range of M&S : About 13.03±7%Ω

Normal range of M&C : About 6.61±7%Ω

If the test result is not in this range then it means the inner coil has some problem and the compressor cannot work properly.

6.3.3 Removing the overload protector and PTC starter

1. Unplug the appliance
2. Remove the screws of protector box by screwdriver, as picture 1.
3. Pry up the protector box from top by screwdriver, as picture 2.
4. Unplug the overload protector, as picture 3.
5. Unplug the PTC starter, as picture 4.

	
Picture1	**Picture2**
	
Picture3	**Picture4**

6.4 Fan motor

6.4.1 Basic parameters

6.4.1.1 Freezer Fan motor(F. Fan motor)

Rated voltage: DC 12V

Rated input power: ＜2.5W

6.4.1.2 Condenser Fan motor(cond. Fan motor)

Rated voltage: DC12V

Rated input power: ＜1W

6.4.2 Checking method [Fan motor(F. Fan motor)]

6.4.2.1 Fan motor(F. Fan motor)

1. Check the connecting wiring of fan motor is well or not, repair if it is broken. The freezer fan motor corresponding pin No.1~3 on CN9 connector of main control board.

2. Pin No.1 connect 12V power and pin No.2 connect GND. If the freezer fan motor works normally, change the main control board; If not, change the fan motor.

6.4.2.2 Fan motor (cond. Fan motor)

1.Check the connecting wiring of cond.fan motor is well or not, repair if it is broken. The cond. fan motor corresponding pin No.1~3 on CN5 connector of main control board.

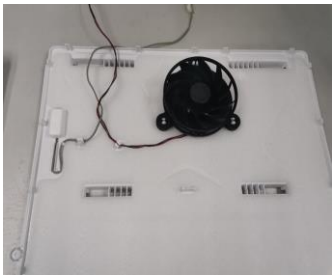
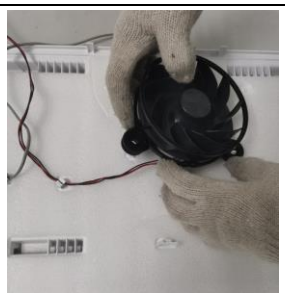
2. Pin No.3 connect 12V power and pin No.2 connect GND. If the cond. fan motor works normally, change the main control board; If not, change the cond. fan motor.

6.4.3 Removing the fan motor

6.4.3.1 Removing the freezer fan motor

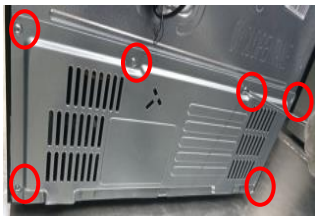
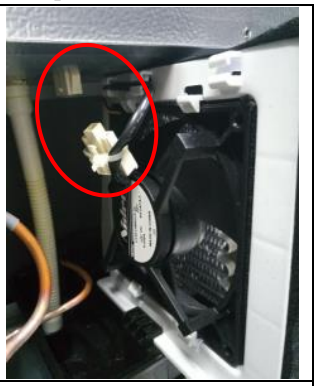
1. Unplug the appliance.
2. Open the freezer door and remove the drawers.
3. Remove the three screws by screwdriver as picture 1.
4. Catch the below of the wind channel component and pull down it as picture 2
5. Unplug the terminal as picture 3 and remove the wind channel component as picture 4.
6. Loosen the cable as picture 5.
7. Open buckles then separate two part of the wind channel component as picture 6 and 7
8. Pull out the fan motor as picture 8.

		
	Picture1	**Picture2**

		
Picture3	**Picture4**	**Picture5**
		
Picture6	**Picture7**	**Picture8**

6.4.3.2 Removing the condenser fan motor

1. Unplug the appliance.
2. Remove the 6 screws by screwdriver then remove the cover as picture 1.
3. Remove the 1 screws by screwdriver as picture 2.
4. Unplug the terminal as picture 3.
5. Pull out the fan motor as the picture 4, then remove the fan motor as picture 5.

		
Picture1	**Picture2**	**Picture3**
		
Picture4	**Picture5**	

6.5 Light

6.5.1 Basic parameters

Rated voltage:DC12V

Rated power:3W

6.5.2 Checking method

1. Check the connecting wiring between light and main control board is well or not, repair if it is broken. Refrigerator light corresponding pin No.4 and No.5 on CN9 connector of mainboard.

2. Check output voltage corresponding light of the main control board, if it is 12V,it means the mainboard is OK, change the light; If not, it means the main control board is broken, change it.

6.5.3 Removing the light

1. Unplug the appliance
2. Catch the light cover with two hands and pull down it as picture 1.
3. Unplug the terminal of the display panel as picture 2.
4. Take the LED light out and unplug the terminal as picture 3 and 4

	
Picture1	**Picture2**
	
Picture3	**Picture4**

6.6 Display panel

6.6.1 Basic parameters

Input voltage:5V

6.6.2 Checking method

1.Display panel will lighten as soon as power-on, if it light unsuccessful, remove the display panel box cover and check.

2.Check the connecting wiring between display panel and main control board and repair if it is broken.

3.Use a multimeter to measure voltage between pin No 3 and No 4 on CN4 connector of main control board, If the voltage equal to 5V,it means the display panel is broken, change it; If not, change the main control board.

6.6.3 Removing the display panel

1. Unplug the appliance.

2. After unplugging the terminal of the display panel, remove the screws of the display panel by screwdriver as picture 1.

3. Take the display panel out as picture 2.

	
Picture1	**Picture2**

6.7 Defrost heater & Fuse

6.7.1 Basic parameters

Input voltage:100V-127V

Rated power:200W

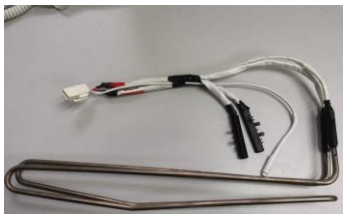
6.7.2 Checking method

1.Enter compulsory defrost mode, use a multimeter to measure the voltage between pin No.1 and No.7 on CN7 connector of the main control board, if the voltage doesn't equal to electric supply power, it means the main control board is broken, change it.

2. Unplug the appliance ,then use a multimeter to measure resistance of the heater, if the value isn't 66Ω ± 5%, it is broken, change the heater.

6.7.3 Removing the defrost heater and fuse

1. Unplug the appliance.
2. After removing the freezer wind channel component, unplug the terminals as picture 1.
3. Cut the cable tie as picture 2.
4. Pull out the temperature part to the right direction as picture 3.
5. Take out the evaporator as picture 4 and be careful of the connected wires.
6. Pry up the buckles located on the evaporator and remove the heater as picture 5 and 6.
7. Remove the defrost steak from the defrost heater, leaving the defrost heater as picture 7 and 8.

		
Picture1	Picture2	Picture3
		
Picture4	Picture5	Picture6
		
Picture7	Picture8	

6.8 Sensor

6.8.1 Measuring the sensor resistance

Use a multimeter with the ohm switch to measure the resistor of sensor. Every with the temperature decreases 1℃ the corresponding resistor value would increase about 100ohm. But it is not linear relationship between resistance and temperature, so it's just an estimation algorithm.

You'd better measure the following temperature resistance is more accurate, and more likely to get the temperature. Normally at surrounding -18℃,5℃,25℃, the corresponding resistance is about 17kohm,5kohm,2kohm. If the measured value is not within the normal scope, the sensor is bad and needs to repair or change. You can find the measuring position of sensors from 4.3.2.1 sensor error.

6.9 Door switch

6.9.1 Checking method

1.Check the connecting wiring of door switch is well or not, repair if it is broken.
Door switch corresponding pin No.5 and No.7 on CN4 connector of main control board.
2.Normally, when the door is closed , the two pins of door switch should be open circuit; When the door is open, the two pins should be short circuit. If the result is abnormal, change the door switch.
3.If all above is OK, change the main control board.

6.9.2 Removing the door switch

1. Remove the screw of hinge cover by screwdriver and take out hinge cover as picture 1 and picture 2.
2. Unplug the terminal as picture 3.
3.Remove the door switch as picture 4.

	
Picture1	**Picture2**
	
Picture3	**Picture4**

6.10 Damper

6.10.1 Basic parameters

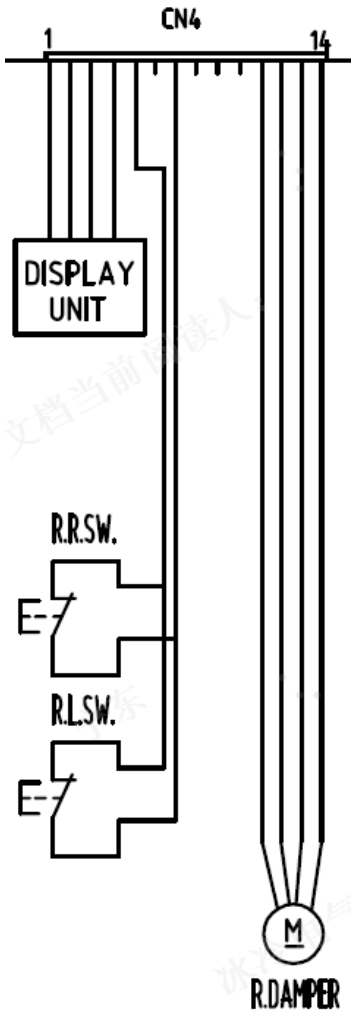
Rated voltage: DC12V

Rated current: <60mA

6.10.2 Checking method

1. Check the connecting wiring of the damper is well or not, repair if it is broken. The damper corresponding pin No.11~14 on CN4 connector of mainboard, as the drawing below.

2. The damper will turn on and off for one time after power-on, if not, change the mainboard first and change the damper if problem remains

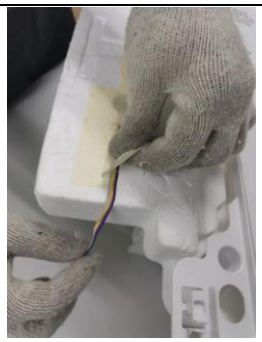
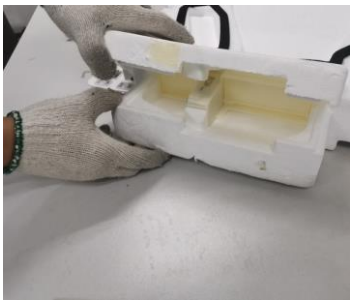


6.10.3 Removing the damper

After you have removed the freezer fan motors, you can remove the damper in the following steps:

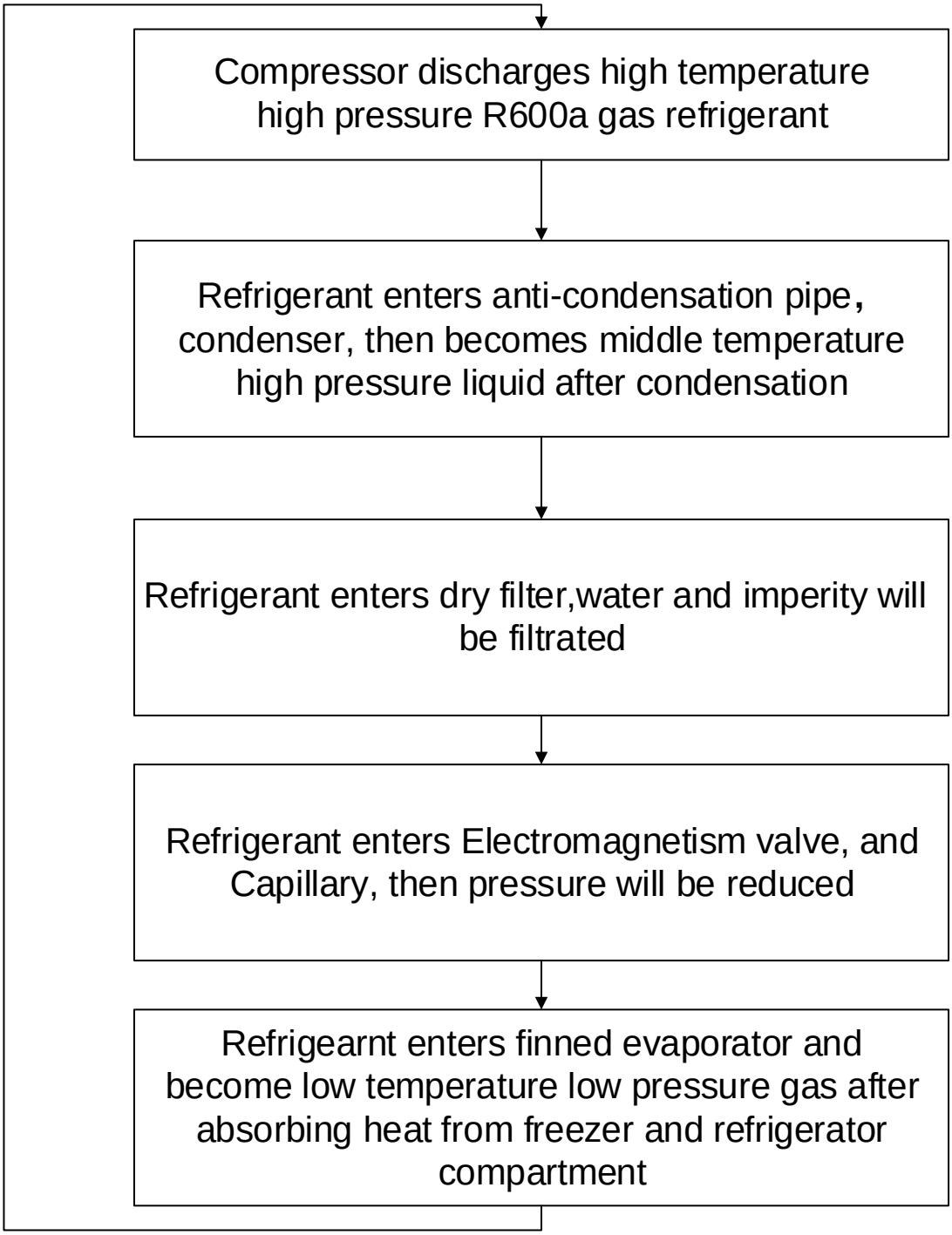
1. Remove the drawer and wine rack from the refrigerator as picture 1.
2. Remove the two screws by screwdriver as picture 2 and take out the cover as picture 3.
3. Unplug the terminal as picture 4 and take out the wind channel component as picture 5 .
4. Remove the sponge and crepe paper as picture 6~8.

5. Open the bubble as picture 9 and remove the damper as picture 10.

		
Picture1	**Picture2**	**Picture3**
		
Picture4	**Picture5**	**Picture6**
		
Picture7	**Picture8**	**Picture9**
		
Picture10		

7. Cooling system repairing

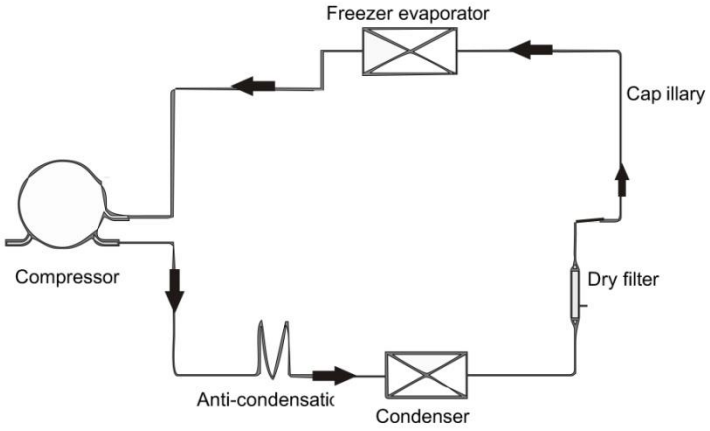
7.1 Refrigeration system



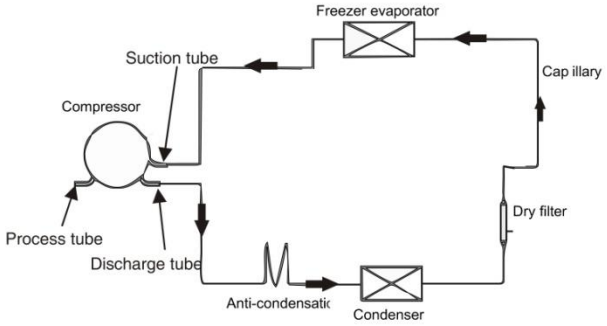
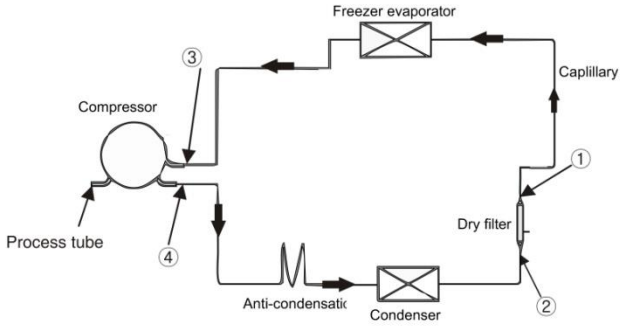
7.2 Summary of repair

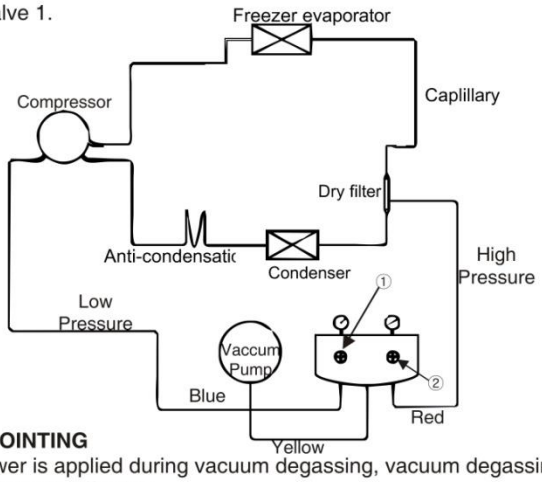
Process	Contents	Tools
Remove refrigerant Residuals	* Cut charging pipe ends (Comp. & Dryer) and discharge refrigerant from drier and compressor.	* Nipper, side cutters
Parts replacement and welding	* Confirm refrigerant (R-134a or R-600a) and oil for compressor and drier. * Confirm N2 sealing and packing conditions before use. Use good one for welding and assembly. * 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.)	

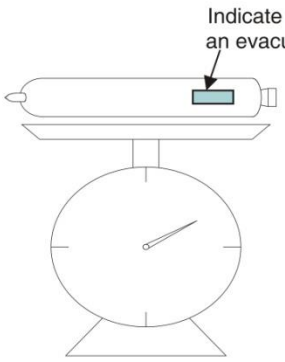
7.3 Regulation of repair

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.) 
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.

7.4 Practical work of 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.

<table>
<tr><th>Items</th><th>Precautions</th></tr>
<tr><td>3.Vacuum degassing.</td><td>
* 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.)
</td></tr>
<tr><td>4.Refrigerant charging.</td><td>
* 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.


- 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)
</td></tr>
</table>

7.5 Brazing reference drawing