				重 要 度		
		产 品 名称:	冷藏冷冻箱			
		产 品 型号:	BD-590WY/HC1(H)			
		文 件 名称:	售后服务技术资料			
		文 件 编号:	BSSJ00002548			
		编 制 日期:	2021 年 1 月 3 日			
借(通)用件登记						

						家电研发中心
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	刘阳	审核: 许泽红 李腾昌 宋志红			
	标准化	谭小平			共 张 / 第 张	BSSJ00002548
日 期	批准	翟会杰				

Hisense

Refrigerator

Service Manual

Model：RS-77WC1SQD/UPE-001

Contents

1. Warning and precautions for safety

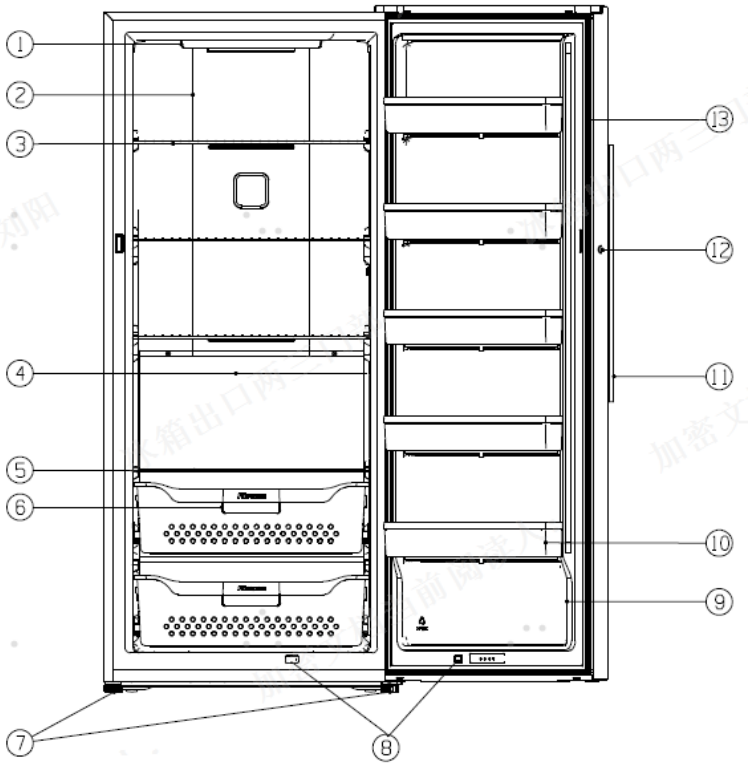
Please observe the following safety precautions in order to use safely and correctly the refrigerator and to prevent accident and danger during repair.

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.

2.1 View of the appliance

BD-590WY/HC1(H) - RS-77WC1SQD/UPE-001:

View of the appliance

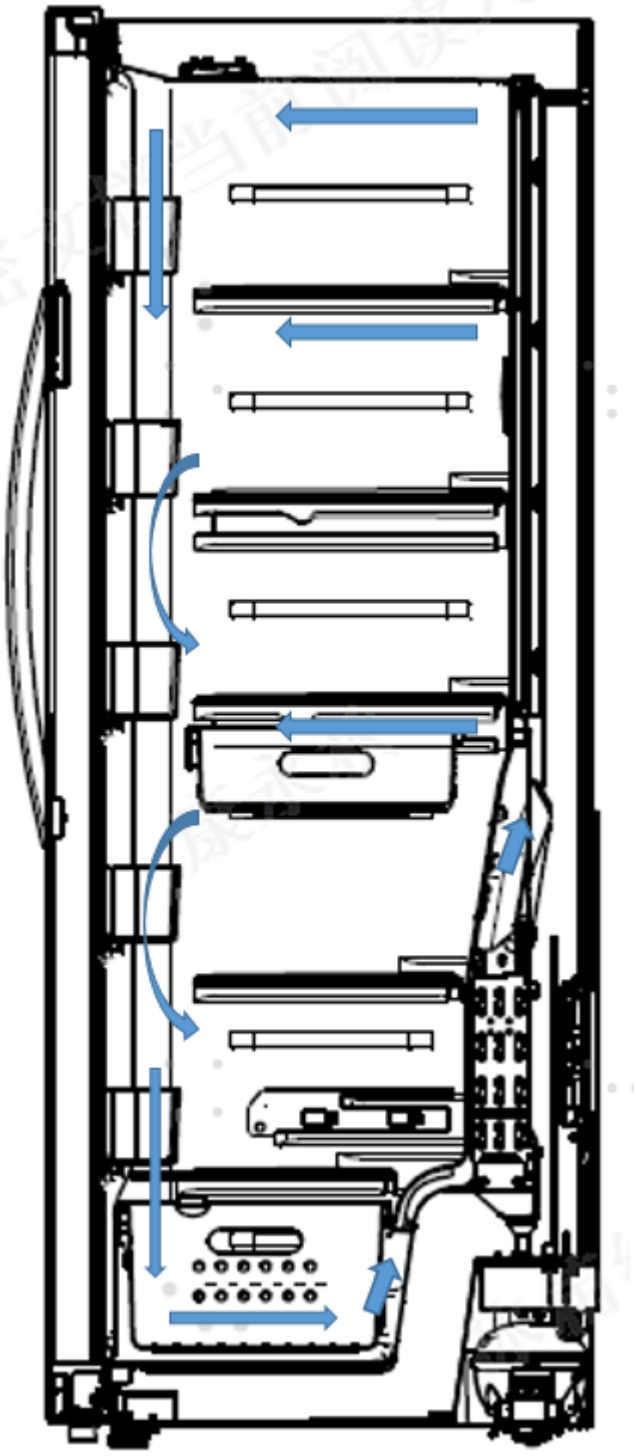


1. Display panel
2. Upper air duct
3. Upper shelf
4. Lower air duct
5. Lower shelf
6. Drawer
7. Adjustable bottom feet
8. Door switch
9. Door
10. Door bin
11. Handle
12. Door lock
13. Door gasket

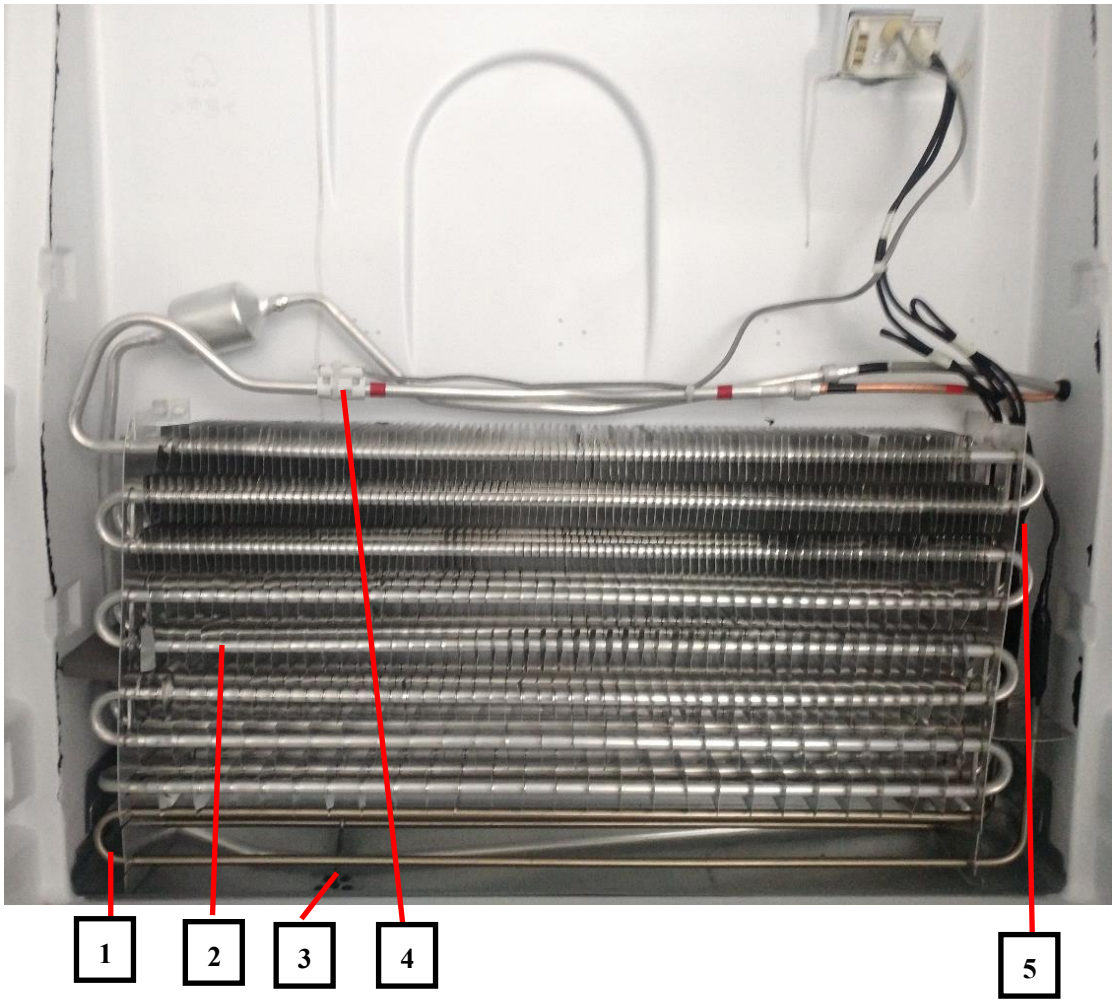
Note!

- 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.
- To get the best energy efficiency of this product, please place all shelves, drawers and baskets on their original position as the illustration above.

2.2 Wind channel structure

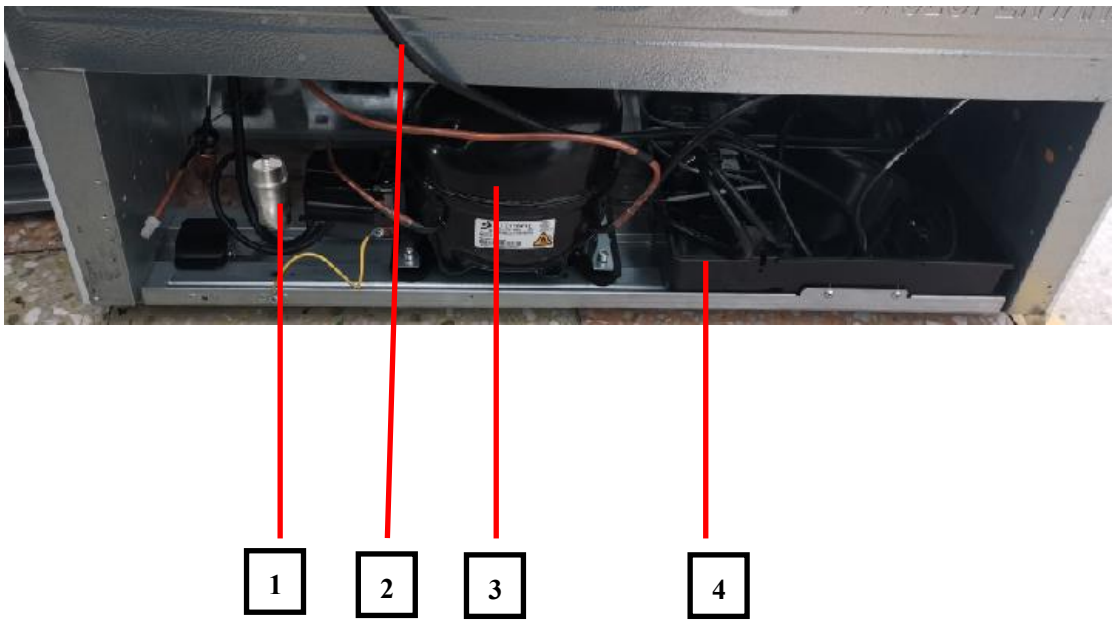


2.3 Freezer evaporator structure



1. Heater
2. Finned-type evaporator parts
3. Water drain
4. Temperature sensor part
5. Temperature fuse

2.4 Compressor room structure



1. Compressor Running Capacitor

2. Power line

3.Compressor

4. Evaporating Dish Part

3. Basic parameters

BD-590WYHC1(H)

Content	Unit	Value
Voltage/frequency		**115 / 60Hz**
Gross capacity (fridge/freezer)	cu.ft/L	**21.2cu.ft/599L**
Climate class(SN=10~32℃,N=16~32℃,ST=16~38℃,T=16~43 ℃)		**12.8～43.3℃**
Energy consumption / year	kWh/year	**549**
Energy consumption (EN153) per 24 h	kWh/24 h	**1.504**
Kind of coolant /Charge (134 /R600a) / grammes	R / g	**R600a/55g**
Foaming components (R141b/C-P）	PU/	**C-P**
Certifications (CE / ISO 9001/2 / LGA etc.)		**CSA/UL**
Max noise level	dB(A)	**45**

4. Operation and functions

4.1 Display controls

Use your appliance according to the following regulations, your appliance has the corresponding functions as the control panels showed in the pictures below.

Controlling the temperature

We recommend that when you start your refrigerator for the first time, the temperature for the refrigerator is set to 0℉（-18℃）. If you want to change the temperature, follow the instructions below.

Caution!

When you set a temperature, you set an average temperature for the whole refrigerator cabinet. Temperatures inside each compartment may vary from the temperatures displayed on the panel, depending on how much food you store and where you place it. High or low room temperature may also affect the actual temperature inside the appliance.

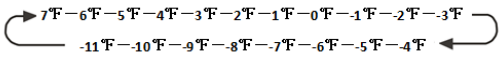
1. °F /°C

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

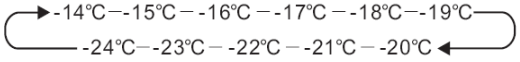
2. TEMP.

Presses the “TEMP.” button select temperature setting.

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



If you have set the temperature type to Celsius, the temperature settings cycle from -14°C to -24°C in one degree decrements.



3. Fast Freeze

Fast Freeze will quickly lower the temperature within the freezer so food will freeze faster than usual. This feature also helps to keep vitamins and nutrition of fresh food fresh for longer period.

- Press the “MODE” button to activate this function. The “Fast Freeze” icon will be illuminated and the temperature for the freezer is set to -11℉(-24℃).
- Fast Freeze will automatically turn off after 52 hours.
- When Fast Freeze function is on you can turn it off by pressing the “MODE” or setting freezer temperature. To manually turn off the Fast Freeze function, the freezer temperature setting will revert back to the previous setting.

NOTE: When you selecting the Fast Freeze function, ensure there are no bottled or canned drinks (especially carbonated drinks) in the freezer compartment. Bottles and cans may explode.

4. Energy Saving

Press the “MODE” button to turn on the Energy saving function. The “Energy Saving” icon will be illuminated.

- When the Energy Saving function is on, the temperature is automatically switched to 1℉（-17°C）.
- When Energy saving function is on you can switch it off by pressing the “MODE” or “TEMP.” button and the refrigerator temperature setting will revert back to the previous setting.

5. POWER

Press and hold the “POWER” button for three seconds to turn the power function on or off.

- When the power function is on, the ⏻ icon lights and the display panel will show “OF”. If no buttons have been pressed, the display board will turn off about 1 minute later.
- IF you want to turn off the power function, make sure the display board is lighting up. IF not, you can press any button to light up the display board.

NOTE:

When the power function is on, the refrigerator stops cooling.

6. Alarm Mute

When the door is open over 2 minutes, the display panel will show “dr” and the “Alarm” icon will light and flicker , the warning sound beeps 3 times per minute. The door alarm will stop about 8 minutes later.

- In case of door alarm, it can be turned off by closing the door.
- In case of door alarm, you can press and hold the “MODE” button for three seconds to clear the door alarm sound, and then the control panel will show “dr” and the “Alarm” icon will light.
- To save energy, do not keep the door open for a long time when using the refrigerator.

7. Demo mode

Demo mode is for store display, and it prevents the refrigerator from generating cool air. In this of Cooling off Mode, the refrigerator may seem like it is working but it will not make cool air. The display panel will show special segments as follow.

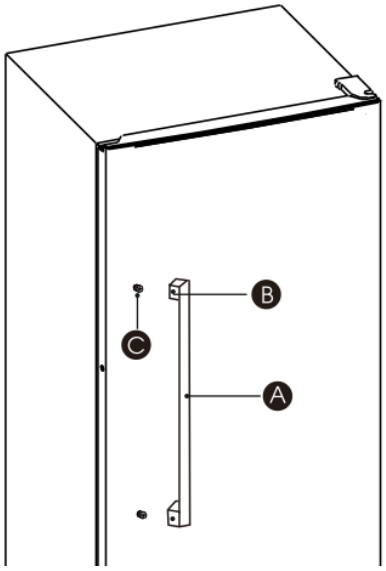
To switch off demo mode, press and hold "POWER" And "MODE" buttons at same time for three seconds and the buzzer gave a long sound.

4.3 Installing handles

Before you use the appliance, you have to install the handles provided in the fridge chamber.

Please follow procedures below to install and reverse the handle.

- Fasten the handle supports (C) to the door by a cross screwdriver (self-provided).
- Place the handle (A) on the door by fitting the handle footprints over the handle supports (C), then fasten the screws (B) with Allen wrench (provided in plastic).



4.4 Defrost mode

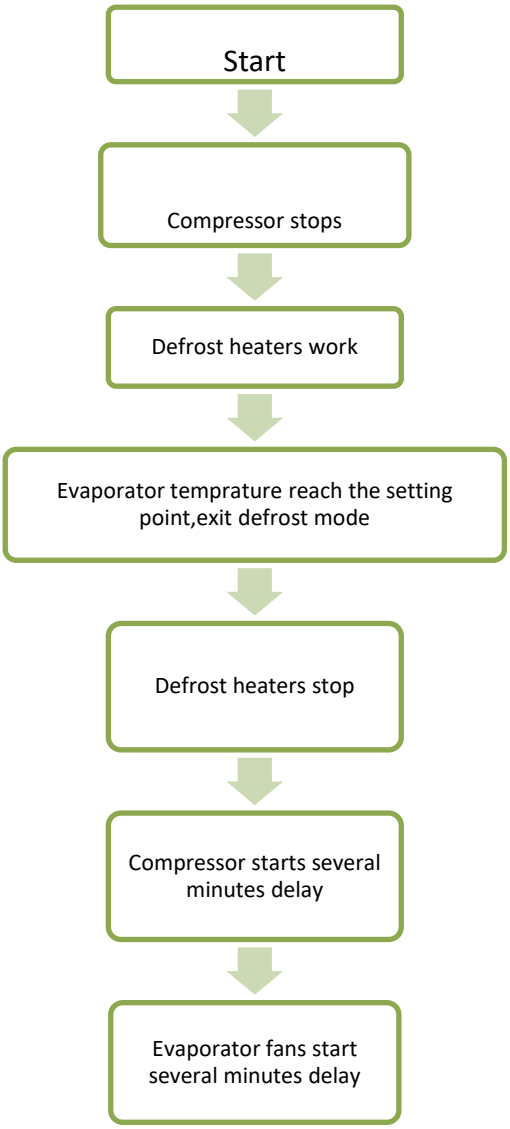
4.4.1 Automatic defrost mode

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

4.4.2 Force Defrosting Mode

Within 10 minutes of power on, press the button " TEMP °F/°C Hold 3sec " and " MODE Alarm Mute Hold 3sec " for exceeds 3 seconds into force defrost mode.

4.4.3 Defrost flow



5.Trouble shooting

5.1 Error Code

Code	Problem
E3	Freezer sensor malfunctions
E4	Freezer defrost sensor malfunctions
F1	Freezer fan malfunctions
Ec	Communication sending malfunctions
Er	Communication receiving malfunctions

5.2 Common problem and checking

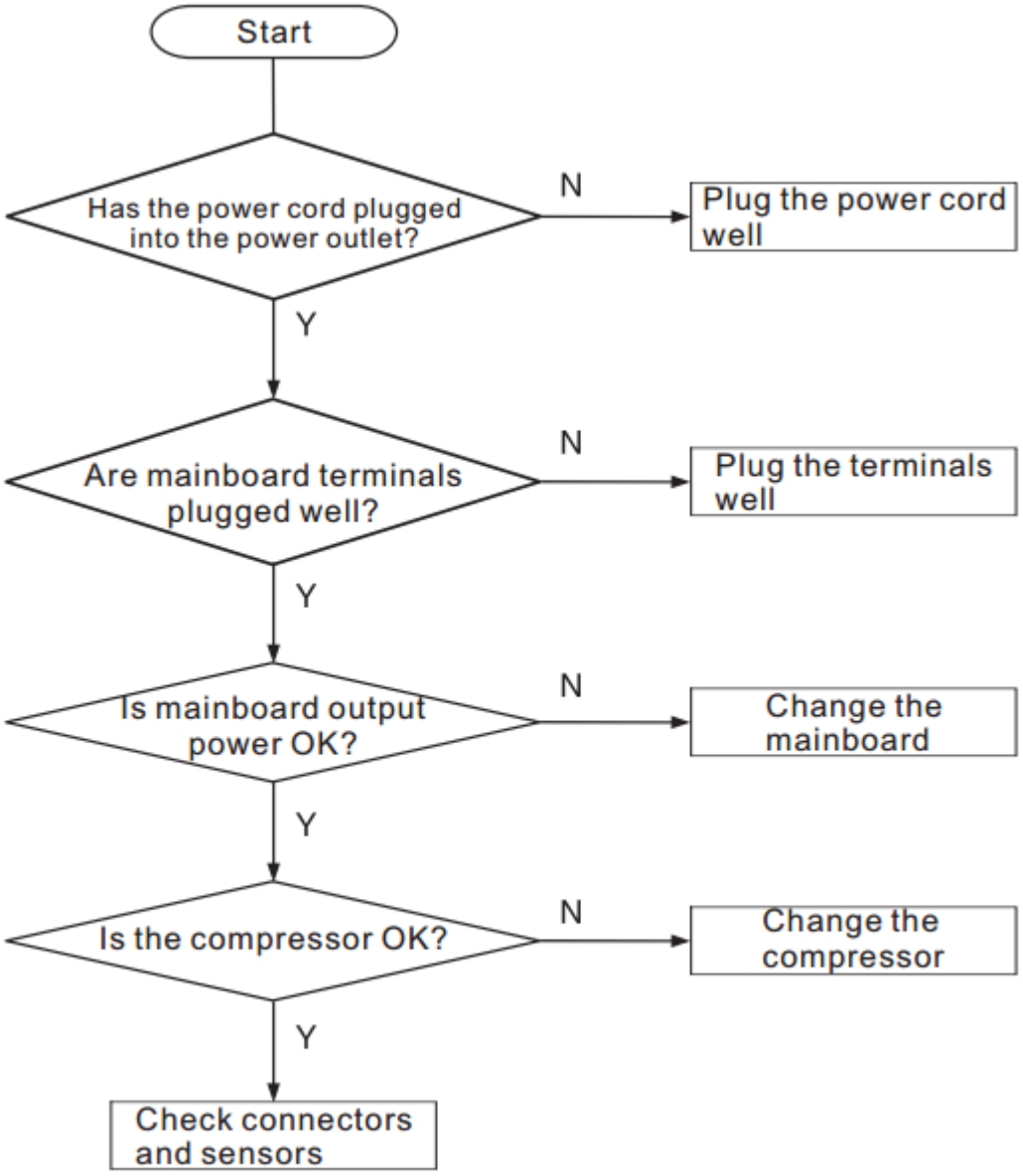
If you experience a problem with your appliance or are concerned that the appliance is not functioning correctly, you can carry out some easy checks before calling for service, please see below.

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.

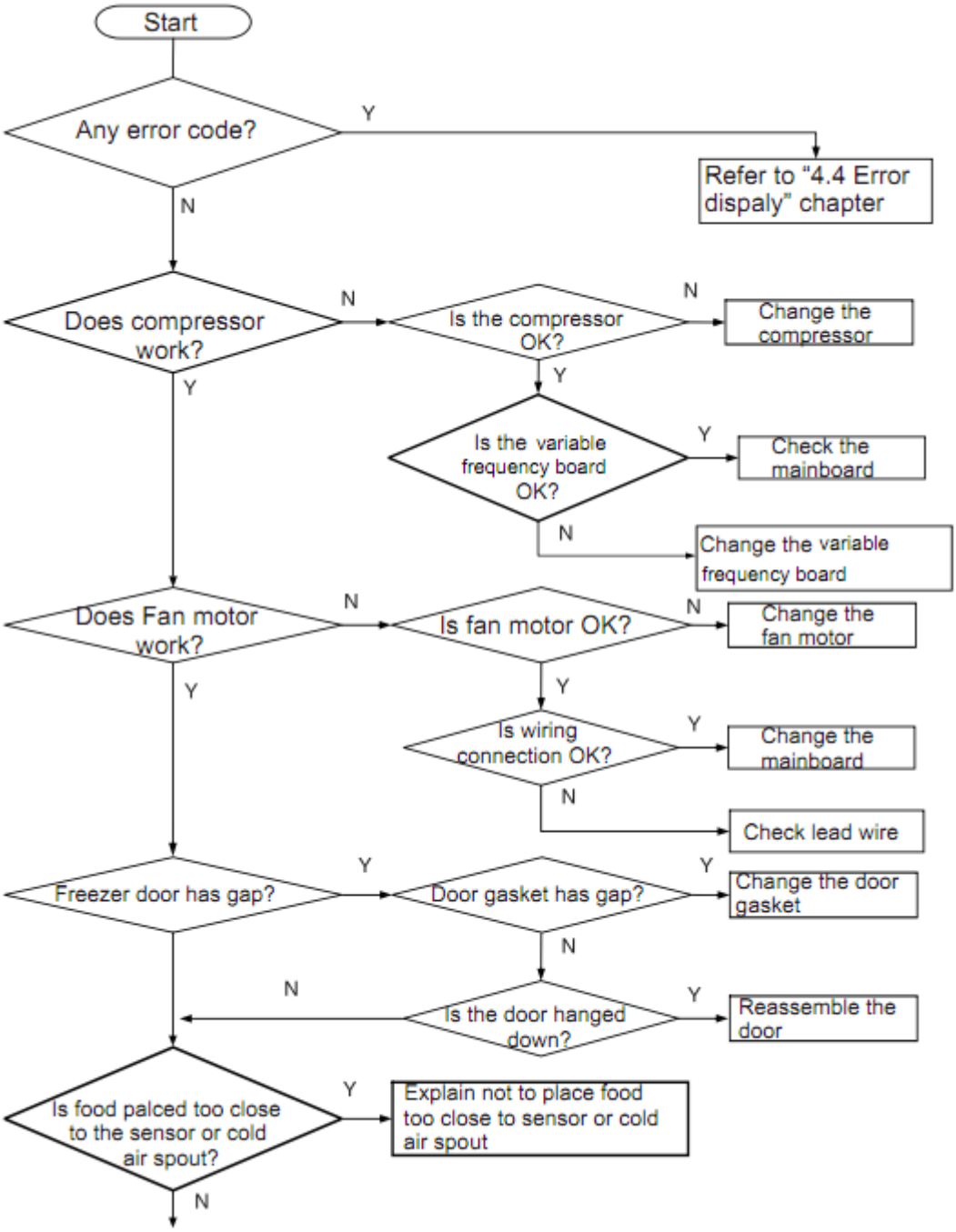
	•Gurgling sound similar to water boiling. •Popping noise during automatic defrosting. •Clicking noise before the compressor starts.
	Other unusual noises are due to the reasons below and may need you to check and take action: •The cabinet is not level. •The back of appliance touches the wall. •Bottles 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

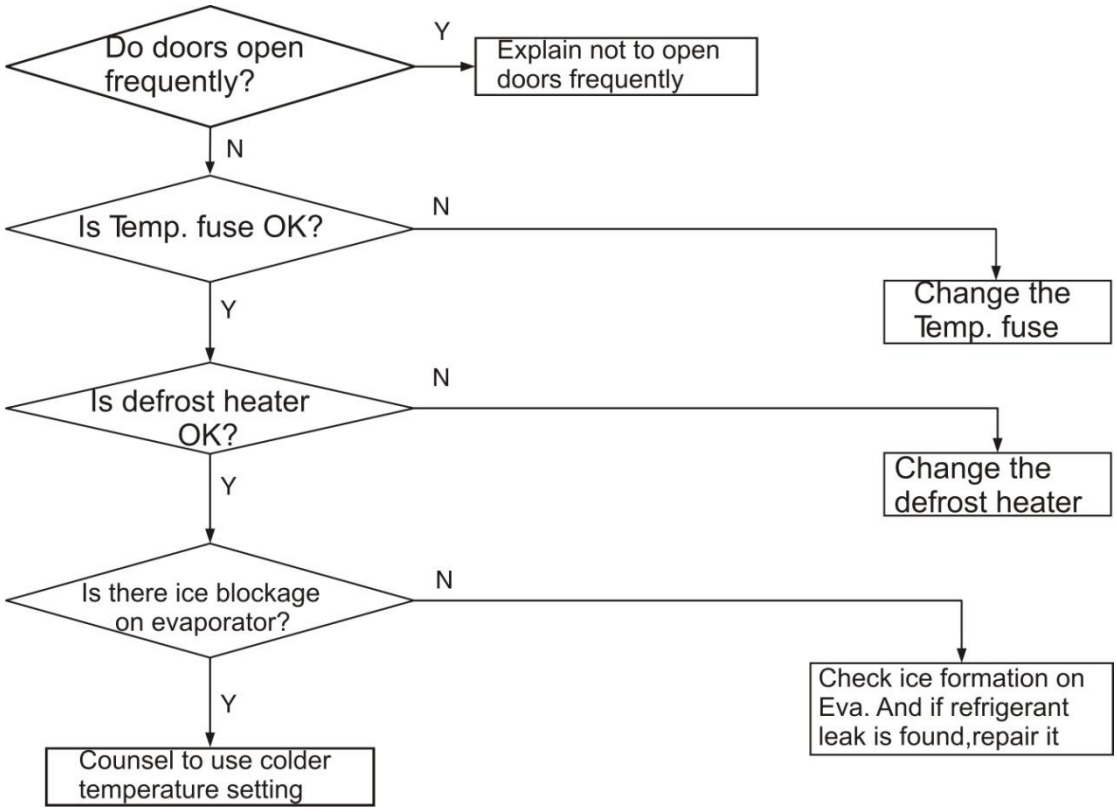


5.3 Refrigeration failure

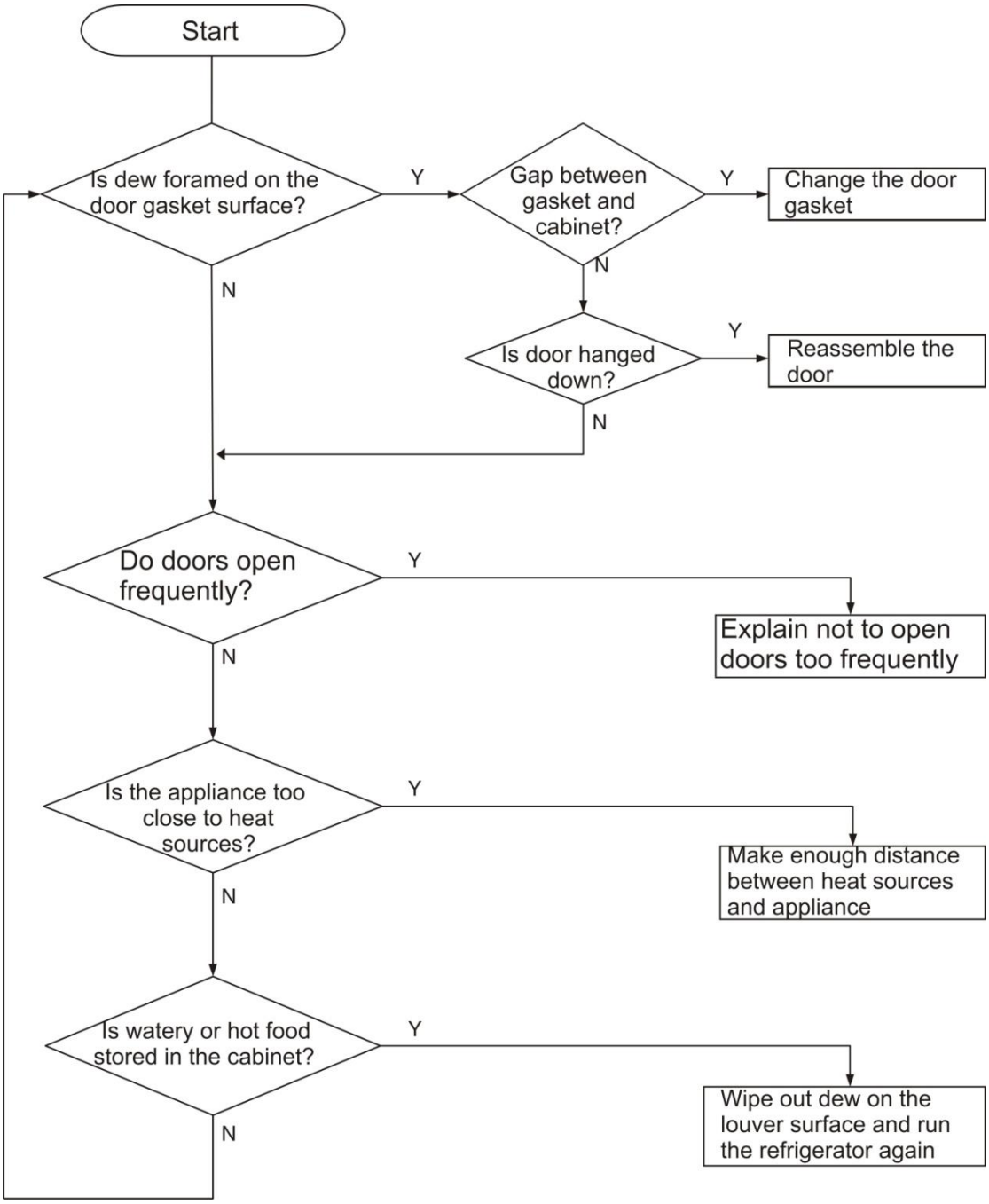
5.3.1 Freezer compartment



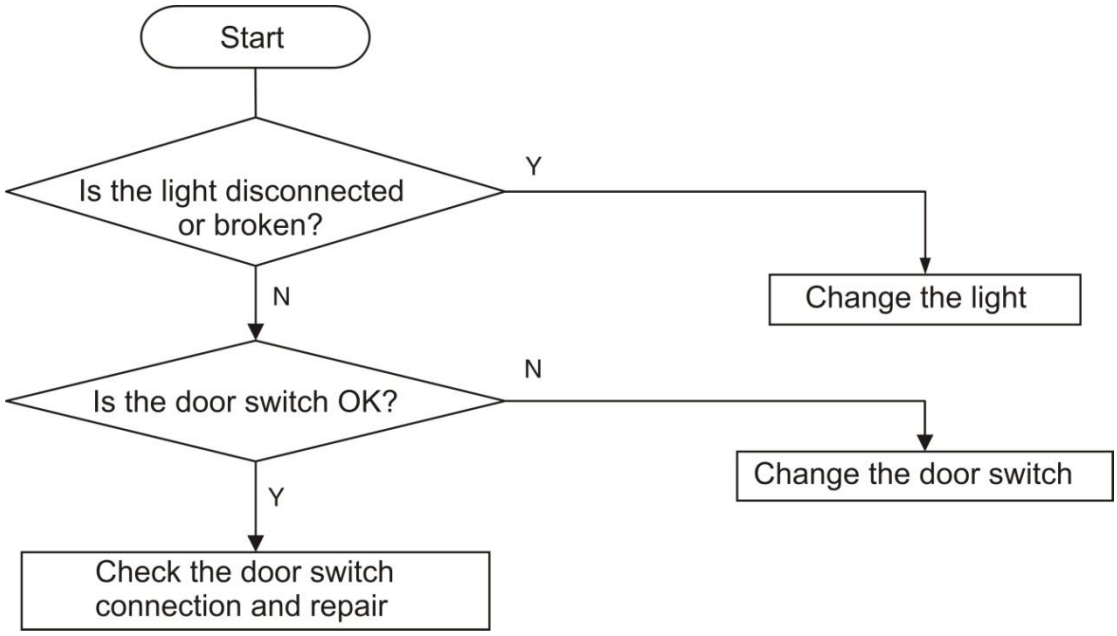
5.3.1 Freezer compartment



5.3 Thick frost in freezer compartment

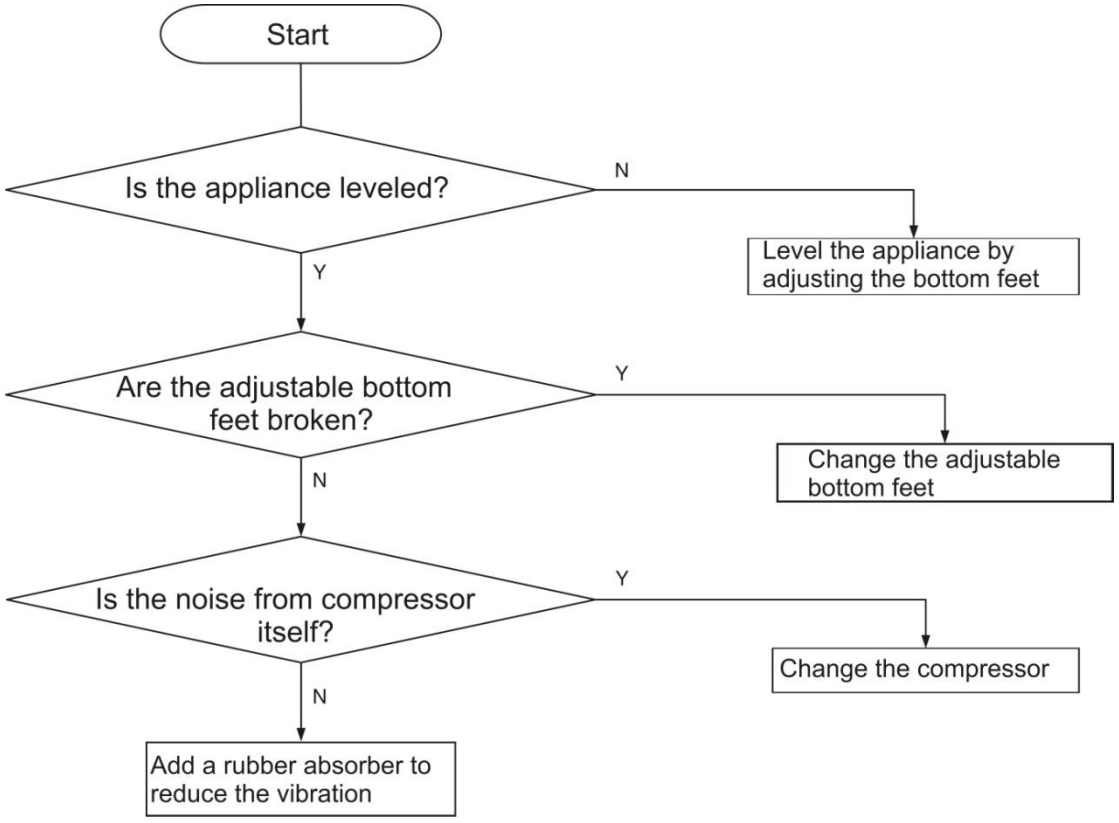


5.4 Breaking of light

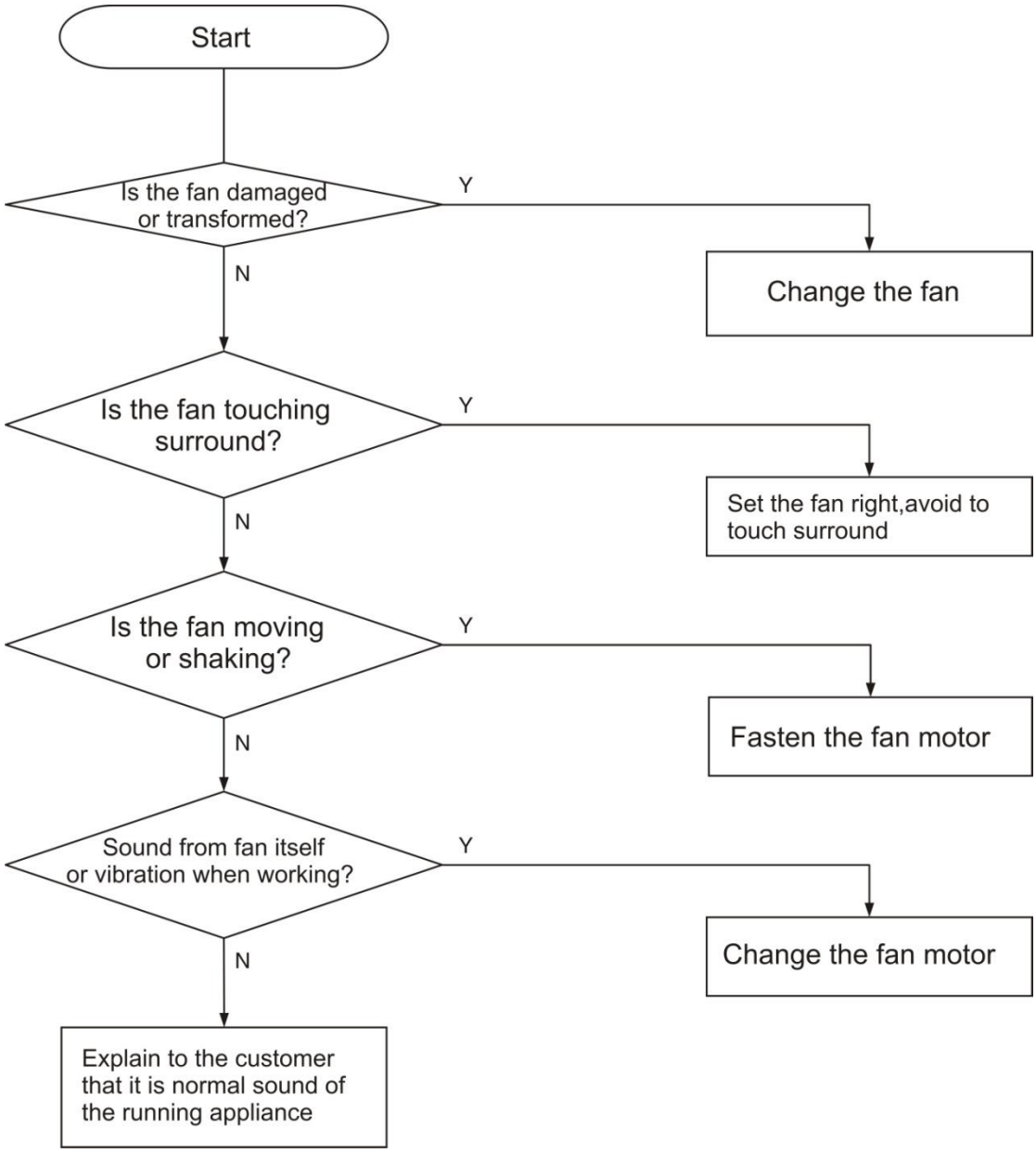


5.5 Noise

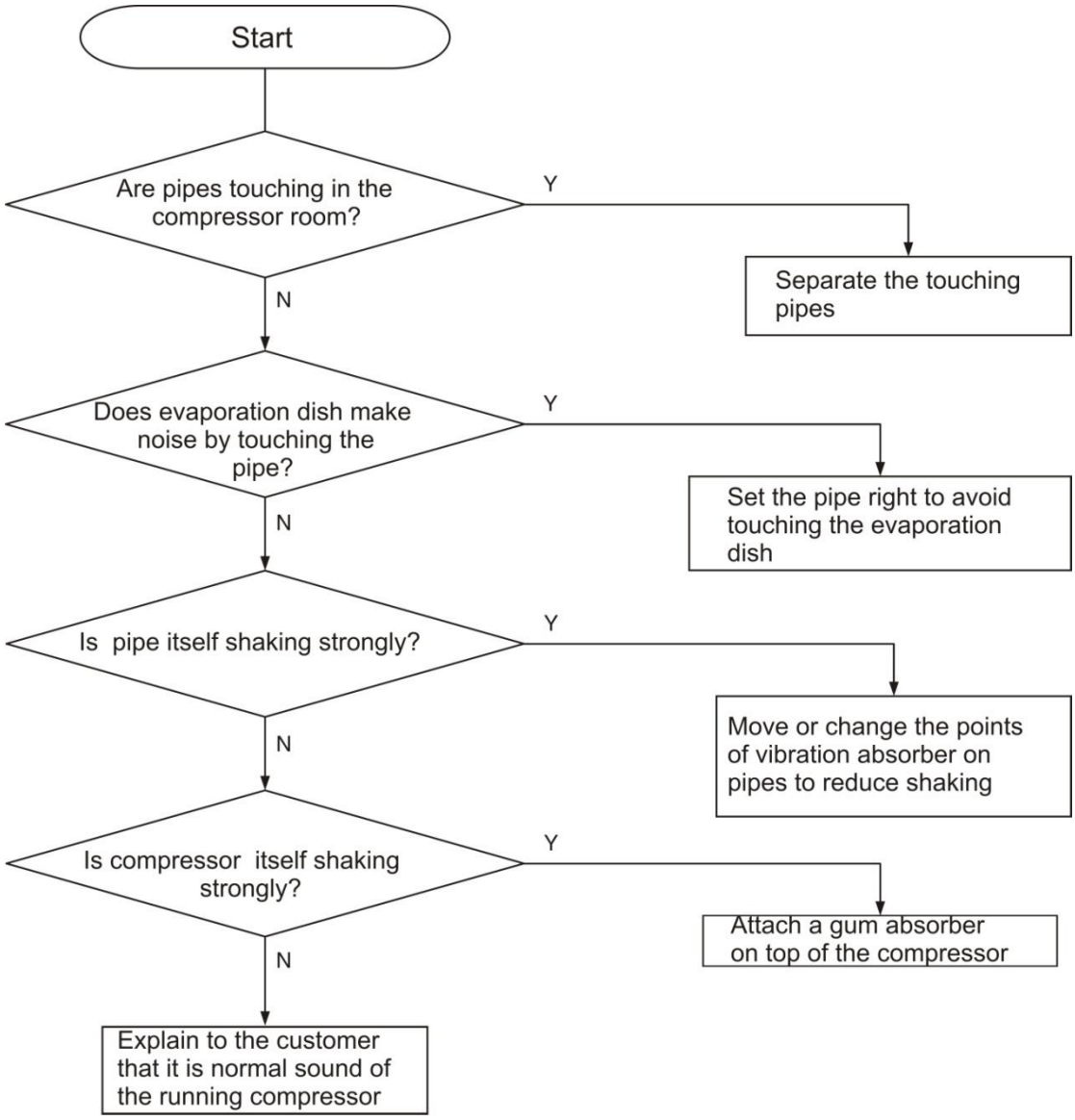
5.5.1 Compressor noise



5.5.2 Fan motor noise

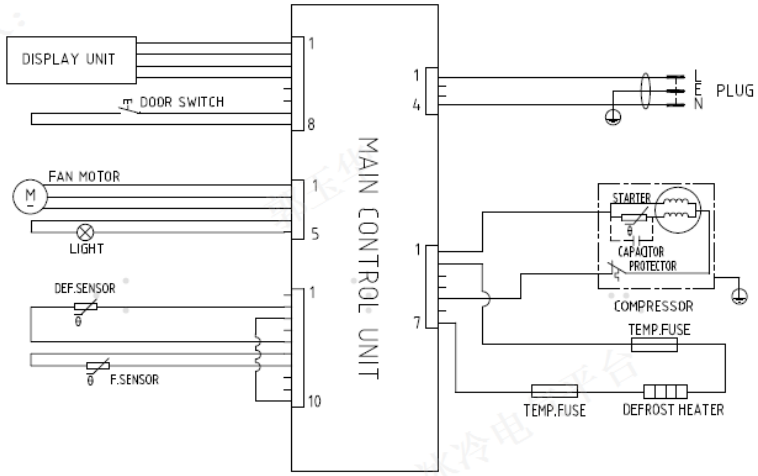


5.5.3 Pipe noise



6. Circuit and checking

6.1 Circuit diagram



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. Unplug the terminals on the main control board as picture 3.

		
Picture1	**Picture2**	**Picture3**

6.3 Compressor

6.3.1 Basic parameters

Input voltage:115V

Input frequency:60Hz

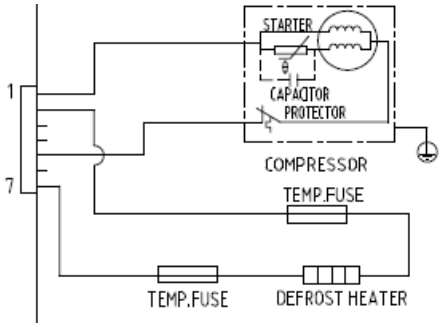
6.3.2 Checking method

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.1 and No.5 on 7pins connector of main control board. If the voltage equal to electric supply power, it means the main control board is OK, to change t 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 15.1±5%

Normal range of M&S : About 15.1±5%

Normal range of M&C : About 15.1±5%

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

6.4 Fan motor

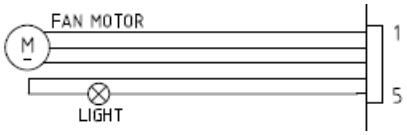
6.4.1 Basic parameters

6.4.1.1 Fan motor

Rated voltage:DC12V

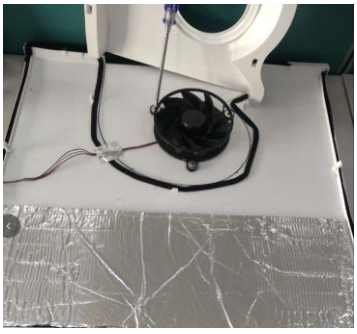
6.4.2 Checking method

1. Check the connecting wiring of fan motor is well or not, repair if it is broken.
The fan motor corresponding pin No.1~3 on 5pins connector of main control board.
2. Pin No.1 connect 12V power and pin No.2 connect GND. Check output voltage corresponding fan motor, if the voltage range between DC 8V and 12V when working conditions are met, it means the mainboard is OK, change the fan motor. If not, change the mainboard.



6.4.3Removing the fan motor

1. Open the door and remove the shelf part ,remove the two screws by screwdriver as picture 1.
2.Open the Wind channel part.
3.Unplug the connecting terminal and remove Wind channel part.
2.Open the freezer door and remove the shelf part as picture 1
3. Remove the two screws by screwdriver as picture 2.
4.Catch the below of the wind channel component and pull down it as picture 4.
5. Open the back fan motor cover picture 5.
6. remove the three screws by screwdriver as picture 6.

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

6.5 Light

6.5.1 Basic parameters

Rated voltage:DC12V

Rated power:5W

6.5.2 Checking method

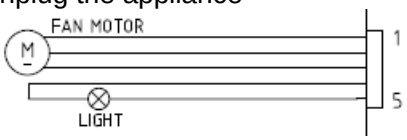
1.Check the connecting wiring between light and main control board is well or not, repair if it is broken.

The light corresponding pin No.4 and No.5 on 5 pins connector of mainboard.

2.Check output voltage corresponding light of the main control board, if it is 12V when working conditions are met, 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. Pry up the light cover with a pin or other spikers as picture 1.

2. Catch the light cover with one hand and pull down it as picture 2.

3. Take the LED light out and unplug the terminal as picture 3 and 4

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

6.6 Door switch

6.6.1 Basic parameters

Load voltage: DC 5V

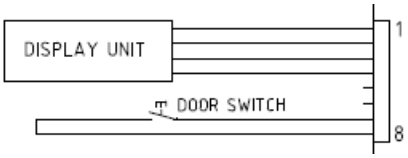
6.6.2 Checking method

1. Check the connecting wiring of door switch is well or not, repair if it is broken.

Door switch corresponding pin No.7 and No.8 on 8pins connector of the mainboard.

2. Check the magnet on the door is dropped out or not.

3. Normally, when the door is closed, the two pins of door switch should be short circuit; when the door is open, the two pins should be open circuit. If the result is not normal, change the door switch.



6.7 Display part

6.7.1 Basic parameters

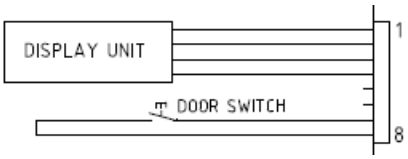
Input voltage: DC 5V

6.7.2 Checking method

1. Check the connecting wiring of the display component and the connecting on top of refrigerator is well or not, repair if it is broken.

The display panel corresponding pin No.1、No.2、No.3 and No. 4 on 8 pins connector of the main-board as the drawing below.

2、Check output voltage corresponding display between No.3 and No.4 on 8 pins connector of mainboard. If the voltage equal to DC 5V, it means the mainboard is OK, change display component; if not, it means the main control board is broken, change it.



6.7.3 Changing the display part

1.Unplug the appliance.

2.Pry up the display part with a pin or other spikes as picture 1.

3.Unplug the linked wire as picture 2.

4. Replace a new display part.

	
Picture1	**Picture2**

6.8 Defrost heater

6.8.1 Basic parameters

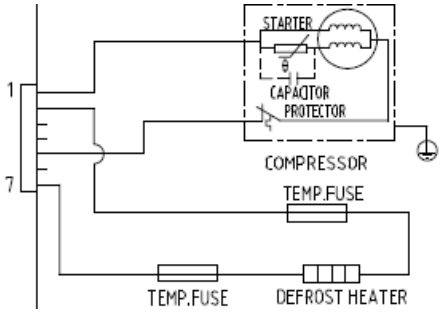
Input voltage: 115V

Rated power: 230W

6.8.2 Checking method

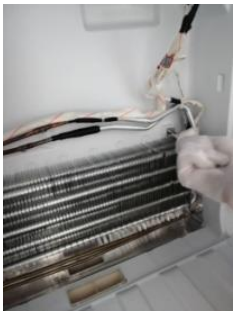
1.Enter force defrost mode, use a multimeter to measure the voltage between pin No.2 and No.7 on 7pins connector of the main control board, if the voltage doesn't equal to electric supply power, it means the main control board is broken, change it.

2. Unplug the appliance ,then use a multimeter to measure resistance of the heater, if the value isn't 57.5 Ω ± 10%, it is broken, change the heater.



6.7.3 Removing the defrost heater

1. Unplug the appliance.
2. After removing the freezer wind channel component, unplug the terminals as picture 1.
3. Remove the two screws of evaporator by screwdriver as picture 2.
4. Take out the evaporator as picture 3 and be careful of the connected wires.
5. Pry up the buckles located on the evaporator and remove the heater as picture 4 and 5.
6. Remove the defrost steak from the defrost heater, leaving the defrost heater as picture 6.

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

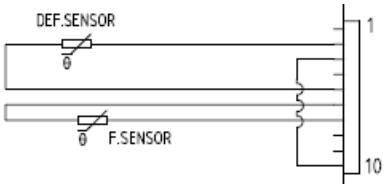
6.8 Sensor

6.8.1 Measuring the sensor resistance

Use a multimeter with the ohm switch to measure the resistor of sensor. Every with the

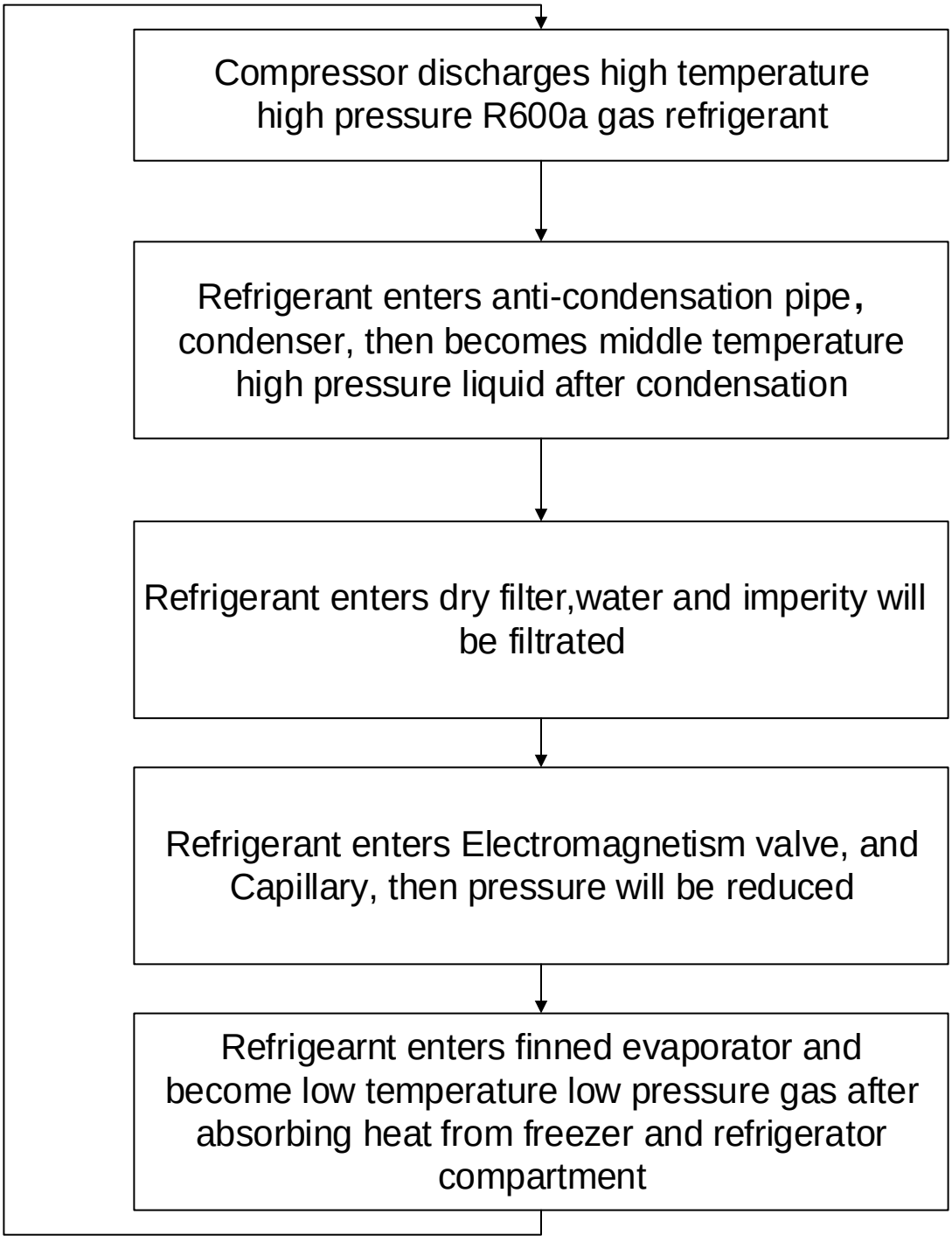
temperature decreases 1℃ the corresponding resistor value would increase about 100ohm. But it is not linear relationship between resistance and temperature, so it's just an estimation algorithm.

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.



7. Cooling system repairing

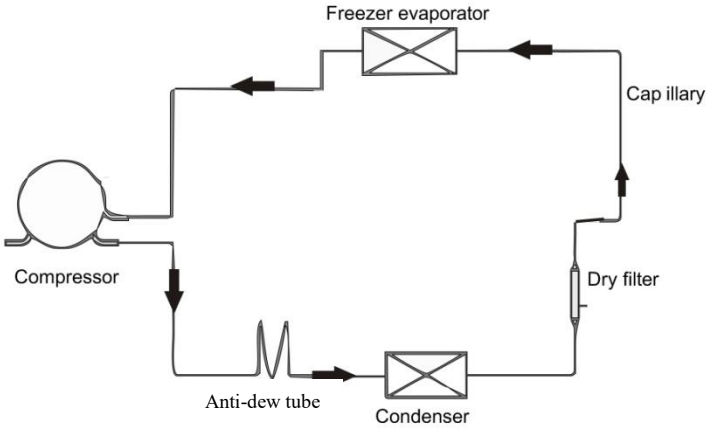
7.1 Refrigeration system



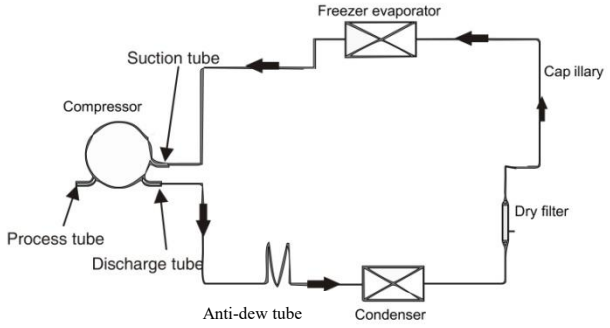
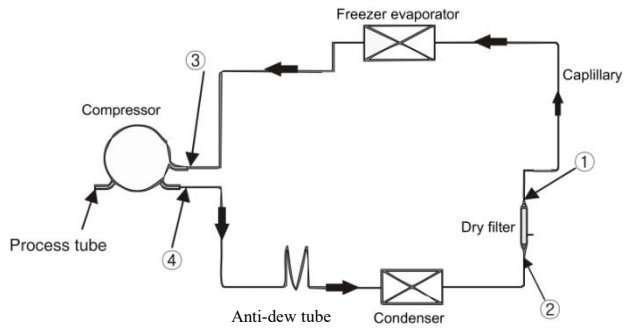
7.2 Summary of repair

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.)	

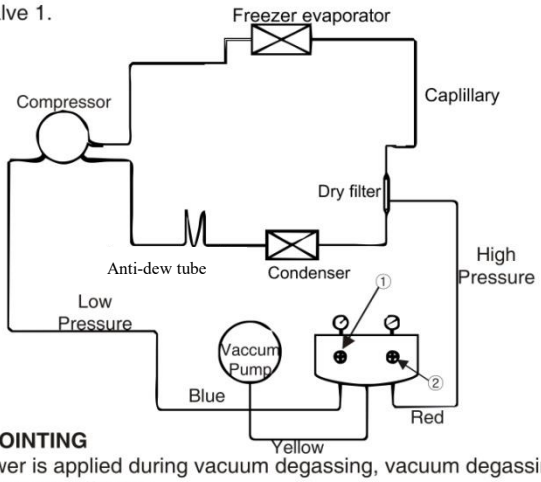
7.3 Regulation of repair

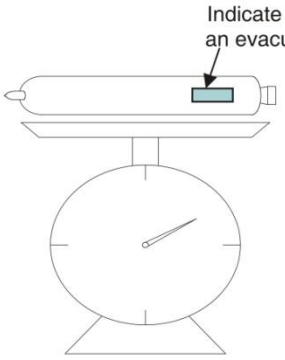
Items	Precautions
Use of tools.	1) Use special parts and tools for R-134a or R-600a
Removal of retained refrigerant.	1) Remove retained refrigerant more than 5 minutes after turning off a refrigerator. (If not, oil will leak inside.) 2) Remove retained refrigerant by cutting first high pressure side (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.

7.4 Practical work of repair

<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