Hisense

Chest Freezer

Service Manual

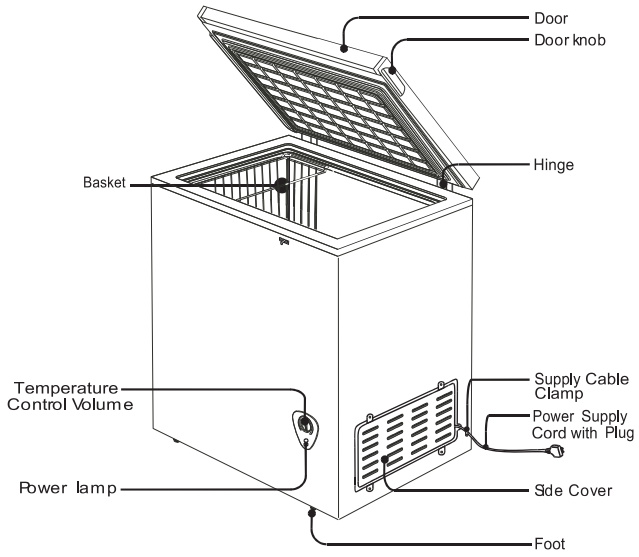
1 Warning and precautions for safety

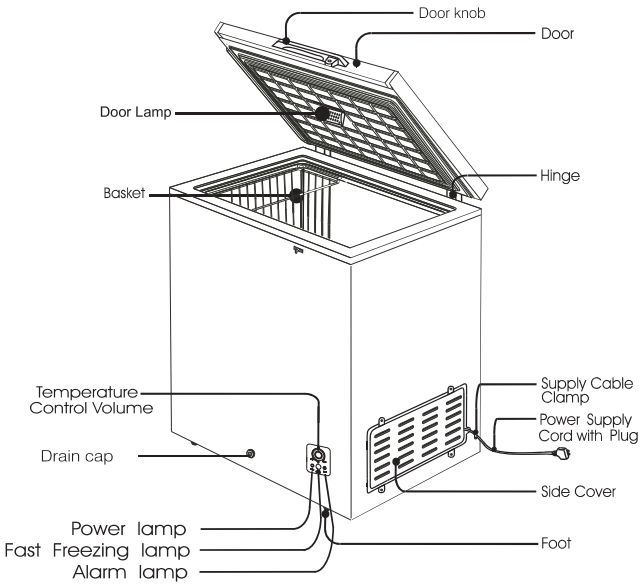
Please observe the following safety precautions in order to use safely and correctly the refrigerator and to prevent accident and danger during repair.

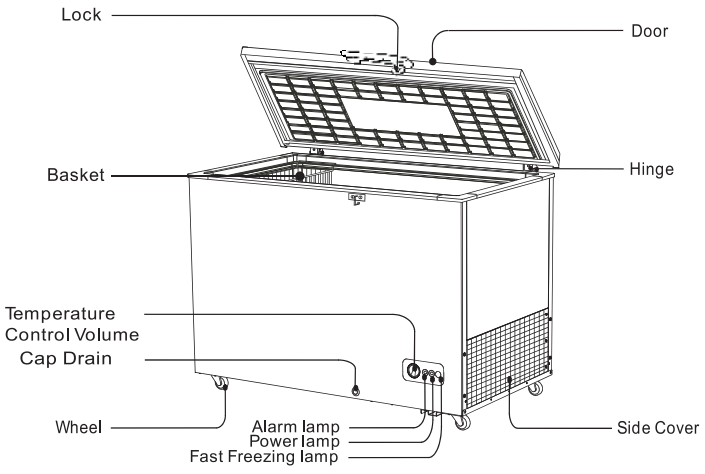
1. Be care of an electric shock. Disconnect power cord from wall outlet and wait for more than three minutes before replacing PCB parts.Shut off the power whenever replacing and repairing electric components.
2. When connecting power cord, please wait for more than five minutes after power cord was disconnected 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 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

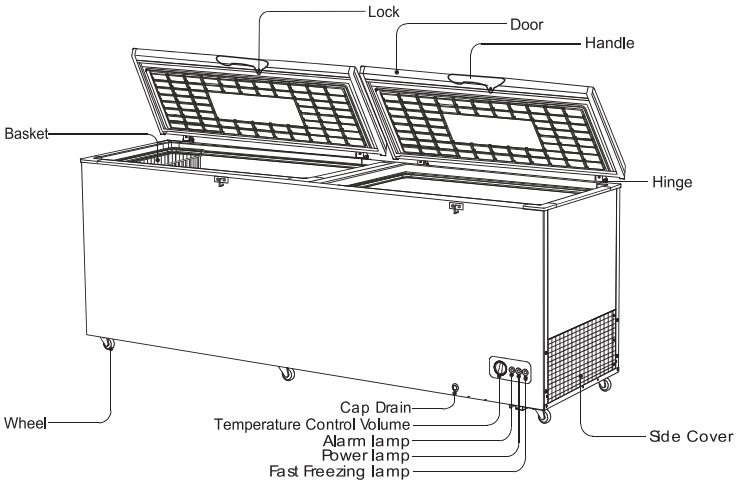
2 Appearance and structure

2.1 View of the appliance





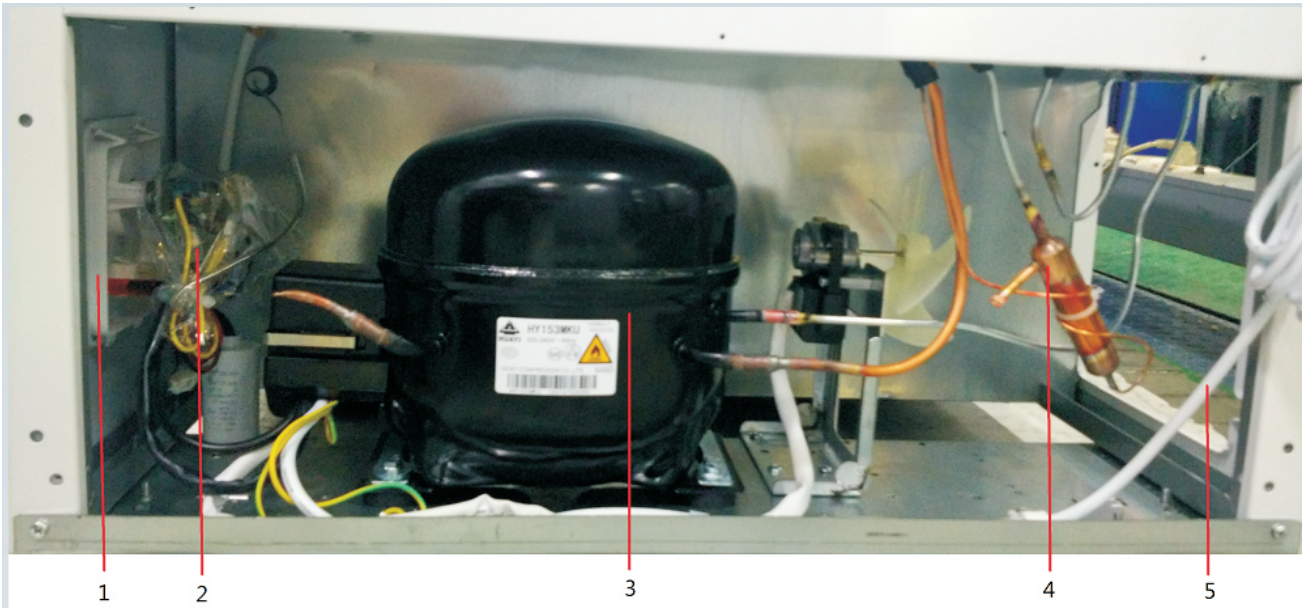




Note:

Due to modification of the products, the refrigerator may be slightly different from this services manual, but its function and using methods remain the same.

2.2 Compressor room structure



1.Control panel

2.Thermostat

3.Compressor

4.Dry filter

5.Power cord

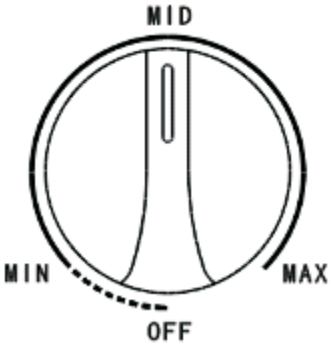
3 Basic parameters

Product parameters according to the instructions and information on the back of the product nameplate shall prevail.

4 Operation and functions

4.1 Starting up and temperature regulation

Insert the plug of the connection lead into the plug socket with protective earth contact. When the refrigerator compartment door is opened, the internal lighting is switched on.

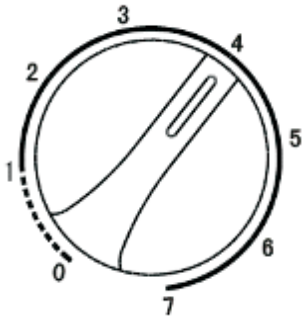


1,To adjust the temperature inside the freezer compartment ,

adjust the temperature control dial on front-bottom side of the chest freezer .Normally use chest freezer with temperature Mid.

2,If the cooling performance is inadequate ,turn the temperature control dial in the direction of Colder .If too cold ,turn dial indirection of Cold.

3,When you stop running temporally ,please turn the temperature control dial in the direction of Off.



1,To adjust the temperature inside the freezer compartment ,adjust the temperature control dial on front-bottom side of the chest freezer .Normally use chest freezer with temperature 4.

2,If the cooling performance is inadequate ,turn the temperature control dial in the direction of 7 .If too cold ,turn dial indirection of 1.

3,When you stop running temporally ,please turn the temperature control dial in the direction of 0.

4.2Indicator functions

Power Lamp

The indicator remains on normally if the power is on

Alarm Lamp

Turn on the button and the light will be on, the freezer will be in the state of fast freezing, finally please turn off the button or the compressor will be keep running and the food will be damaged.

Fast Freezing Lamp

Normally, the indicator remains dark unless there is any error, including system breakdowns, unsealed closing, food overloading. etc. Meanwhile the inner temperature is 4-6? higher than the setting temperature.. (Note: the indicator will be on with electricity for the first time)

Fast Freeze

Turn on the fast freeze switch on the control panel, the power light is on, the compressor is still running until the temperature up to the lowest degree that is designed in the cabinet. Otherwise turn off the switch, the power light is off.

The principle of operation is compressor not controlled by thermostat but keeps continuous running so that the food in the cabinet will be fast freezed .It is suggested that fast freeze function should not operate in a long time because the compressor will be Shorten its life.

5 Troubleshooting

5.1Common problem and checking

5.1.1Common default tests method

Check the problem by observing	
Request	detail
a) Checking the temperature of the using condition is according with the specification or not.	temperature between 18-43 degrees
b)Good ventilation, with at least enough room for heat dissipation around the Freezer	The appropriate space for running unit will be below: Freezer back ≧10MM Freezer two sides ≧20MM Freezer≧30MM
C) Whether the voltage range meet the requirement of the nameplate	On normal conditions, voltage fluctuation is allowed to be between 10% of rated voltage, whilst if it exceeds a lot or sometimes high sometimes low, the compressor would be effected and even burned down. When voltage is too high, the motor coil will be burnt down, whilst if it is too low, the compressor would be difficult to start and the frequent starting will lead to burning down the motor.
Check if the Freezer's appearance and internal parts are in good condition.	
a)check the gasket	Through switching the Freezer door to see whether the gasket is tight and if there's gap between the cabinet and seal.
b)check the door switch	If the lamp is in good condition but it doesn't work when opening the door, we should check the door switch.
c)Check the thermostat knob	Checking the location of thermostat knob is directly connected with the Freezer’s cooling.
Observe all parts of the Freezer	
a)Check the cooling speed	To check the cooling speed of freezing cabinet with electronic Thermometers so as to check if the Freezer is able to lock the cooling and in good cooling condition.
b)Check the outside tube	Checking the Freezer's pipeline system mainly exists in checking whether there is leakage: for example as the seal of Process tube, the suction pipe, the exhaust pipe welding and the connection of drying filter are prone to leak, we should carefully examine. The checking method is to wipe the connection of the tube with a piece of white cloth and see if there’s oil, if does, there's leakage.
Discriminate default by temperature	
a)To check the default by measuring compressor's temperature	When the compressor is in normal operation and it will obviously hot.

b)To check the default by measuring dry filter′s temperature	When the dry filter is in normal condition and it will obviously a little hot.
c)To check the default by measuring suction tube 's temperature	When the suction tube is in normal condition and it will obviously cool.
d)To check the default by measuring discharge tube's temperature	When the discharge tube is in normal condition and it will obviously a little warm.
e)To check the default by measuring condenser's temperature	When the condenser is in normal operation and by testing its temperature, we can assure that the temperature from the entrance to the exit is regressive (the entrance is hotter than the exit).
f)To check the default b y touching evaporator′s frosting	When in normal operation and we touching the evaporator's frosting , it shall not easy to erase.
Discriminate default by running noises	
a)Checking the compressor's noise	When compressor is run ning ,it shall go with rhythmic low -frequency sound;
b)Checking the Freezer flow noise	If there's "sisi" sound between capillary and evaporator′? transition, the Freezer works normally

5.1. 2The common problem judgement method

Problem	Cause
Freezer can't start	1.1 Is the power cord connecting well？ 1.2 Is the power voltage too low？ 1.3 Is the thermosta t irrational setting? 1.4 Is the ambient temperature too low ? 1.5 Is the circuit on power? 1.6 Is there some default in compressor 1.7 Is the refrigeration system blocked by ice or dirty ,please stop the unit and restart after 10 minutes to see if the compressor can start.
Weak cooling effects	2.1 Is there any heat source around the Freezer ? 2.2 Is there enough space around the Freezer for rejection of heat? 2.3 Is the setting of the thermostat appropriate ? 2.4 Is there too much food or overheating food in it? 2.5 Does there open the door frequently ? 2.6 Is the door completely closed? 2.7 Does the gasket destroyed or distort? 2.8 Does the refrigeration leak?
The unit cannot stop running	3.1 Is there any heat source around the Freez er? 3.2 Is there enough space around the Freezer for rejection of heat? 3.3 Is the setting of the thermostat appropriate ? 3.4 Is there too much food or overheating food in it? 3.5 Does there open the door frequently ?

	3.6 Is the door completely closed? 3.7 Does the gasket destroyed or distort? 3.8 Is the thermostat good operation? 3.9 Does the refrigeration leak?
Ice up in the freezing chamber	4.1 Is the setting of the t hermostat appropriate? 4.2 Is there multi-moisture food and too close to the back wall of the Freezer? 4.3 Is the a mbient temperature too low ? 4.4 Is the electric parts on good condition specially the thermostat which will cause the unit non -stopping.
Abnormal noise	5.1 Is the Freezer stably placed? 5.2 Does the Freezer bump other objects? 5.3 Whether the internal accessory of the Freezeris in the right place. 5.4Whether the water plate of compressor is fall from the unit 5.5 Does the tube of the refrigeration system bump each other? 5.6 The noise sound likes Water flow inside the Freezer, in fact ,it is normal, which is caused both when Freezer start and shut-down; in addition, frost-dissolving causes this sound too, which is a normal phenomenon. 5.7 There will be a cracking sound in the cabinet ,when the cabinet or cabinet accessory contracting or expanding, this sound will be made, which is normal. 5.8 The motor operation sound in the compressor is appears to be louder at night or begin starting , which is a normal phenomenon; also the uneven placing would lead to too much running noise.
There is a peculiar smell in the units	6.1 Is the food with special smell sealed tight? 6.2 Does it have long time storing food or degenerated food? 6.3 Whether the internal cabinet needs cleaning.
the forefront or the middle cabinet heats	7.1 As fridge Anti-condensation tube is placed here and caused the above phenomenon, which is normal.
Freezer's two sides or the back heat	8.1 As condensation tube is placed here and caused the above phenomenon, which is normal.
the cabinet surface condensation	9.1 Air humidity is too large.

5.1.3The solution for the common problem

1.Cooling is not enough good(Many reasons might cause that cooling not enough good, as blow:)		
reason	analysis	resolvent
1) Leakage of Gas	If some Gas leaked unit will work not well. Phenomenon of failure: a, lower pressure of liquid cycle system b, high temperature of copper tube of discharging gas, hand feels very hot C, much noise, sounds like " ZZZZZ", comes from outlet of capillary. d, there is no or less ice on the evaporator.	Solutions :First find out the point of leaking on tube, and then sealed it, acuuming it, finally recharge with Gas. Attention please on that below: If you find oil on somewhere, it is possible That leakage point is there.
2) The quantity of Gas is too much	If too much Gas was charged into the cycle system, the extra Gas will occupy some space of evaporator, so that the area of	Solutions: First stop unit for several minutes, and then open charging tube, discharge all of Gas. Change a new filter, and then

	heat exchange becomes less, unit will work not well .Phenomenon of failure: a ,higher pressure of liquid cycle system than norm. b, higher temperature of condenser. c, larger electric current of compressor d, there is less ice on evaporator, but there is ice on the absorbing tube. e, when Gas is too much, some Gas liquid might goes back into compressor, compressor will be damaged by liquid.	recharge Gas, finally sealed the system.
3) There is air in the liquid cycle system	The air in system will cause lower efficiency of cooling .Phenomenon of failure: a ,higher pressure of liquid cycle system than norm, but the pressure is not over the limit. b ,higher temperature of discharging tube. c , much noise	Solutions:First stop unit for several minutes, and then open charging tube, discharge all of Gas. Change a new filter, and then recharge Gas, finally sealed the system.
4)Low working efficiency of compressor	General when a compressor works for many years some parts of compressor were wear, so that compressor discharge less gas out, unit does not work strongly. Phenomenon of failure: a, lower pressure of discharging, check the pressure of system with pressure meter to see if it is normal. b ,higher temperature of compressor surface. C, cut off the discharging tube, to see if you can block the gas coming out of the tube when compressor is working.	Solutions: Change a new compressor.
5)There is thick ice on the evaporator	For defrost Freezer you need to defrost ice termly	Solutions: Turn off the unit and working, open doors for defrosting
6) There is something that blocked the liquid cycle system	Some time there is something blocked the filter of liquid cycle system, so that unit is not cold Phenomenon of failure: a, lower pressure of discharging b, lower temperature of discharging.	Solutions: Change a new filter
2.NO COOL(Popular failure reasons are below):		
reason	analysis	resolvent
1) Leakage of Gas	Phenomenon of failure: a, leaking fast	Solution: First find out the point of leaking on tube,

	b, leaking slowly c, no voice of liquid flowing d, cut off charging tube, no gas goes out.	and then sealed it, vacuuming it, finally recharge with Gas Attention please on that below: If you find oil on somewhere, it is possible That leakage point is there.
2)There is something that blocked the liquid cycle system	A, Ice blocking Sometime because unknown reason water comes into liquid cycle system, the capillary will be blocked by water after unit runs for period of time. Phenomenon of failure :The unit works well in the inception, after period of time the ice appears in the capillary and becomes more and more, till blocks the hole of capillary completely. In the moment you can find the ice on the evaporator defrosts. The noise of liquid flow disappears. The pressure of absorbing becomes negative The phenomenon above will appear again and again .The way to check ice blocking: Warm the capillary with a hot towel, after a while the ice in the capillary melt, you can hear a sound of gas flow comes from the capillary abruptly. The pressure of absorbing becomes higher. It is Ice blocking.	Solution: First stop unit for several minutes, and then open charging tube, discharge all of Gas. Blow the cycle system with gas of nitrogen, and then recharge Gas, finally sealed the system.
	B , there is offal block the capillary Phenomenon of failure: If the capillary is blocked by something such as offal etc., the sound of liquid flow disappears. The ice on the evaporator defrosts .The pressure of absorbing becomes negative .Higher temperature of discharging tube .The way to check offal blocking :If you warm capillary with the way of checking ice blocking, there is no change. It must be offal	Solution: First stop unit for several minutes, and then open charging tube ,discharge all of Gas. Blow the cycle system with gas of nitrogen. Change a new capillary and filter, and then recharge Gas, finally sealed the system.

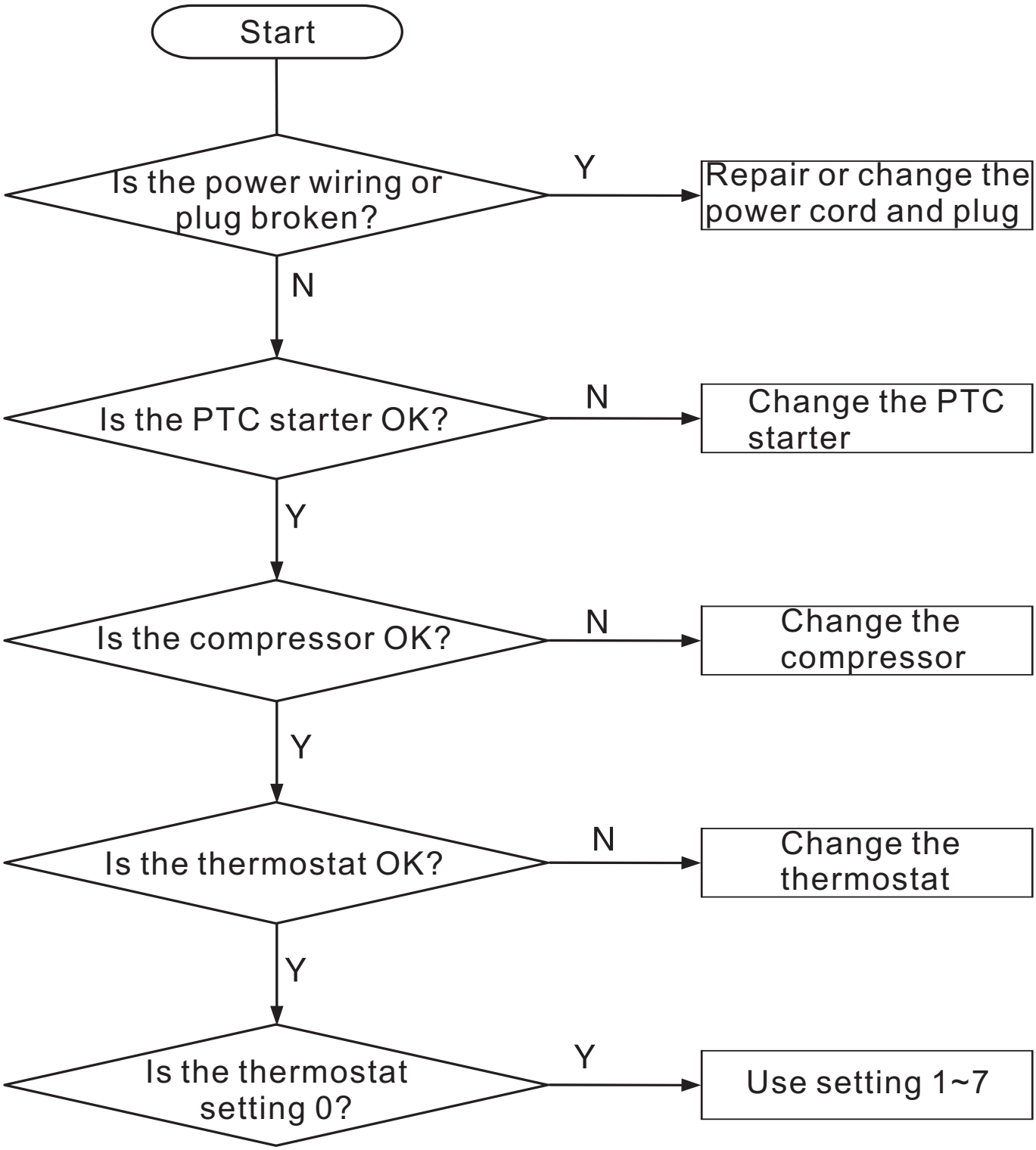
COMPRESSOR NEVER STOPS	
Reason	resolvent
1)The setting temperature is not reasonable.	Readjust the Thermostat
2)Thermostat is broken.	Replace the Thermostat
3)Seal of door is damaged.	Replace the gasket
4)Too much food in the Freezer	Please put the food properly.
5)Wind door is broken.	Replace wind door.

Note:

- Before doing these operations above, disconnect the main power supply. Failure to do so could result in electrical shock or personal injury
- In case of any detailed technical information ple ase check with the technical specifications.

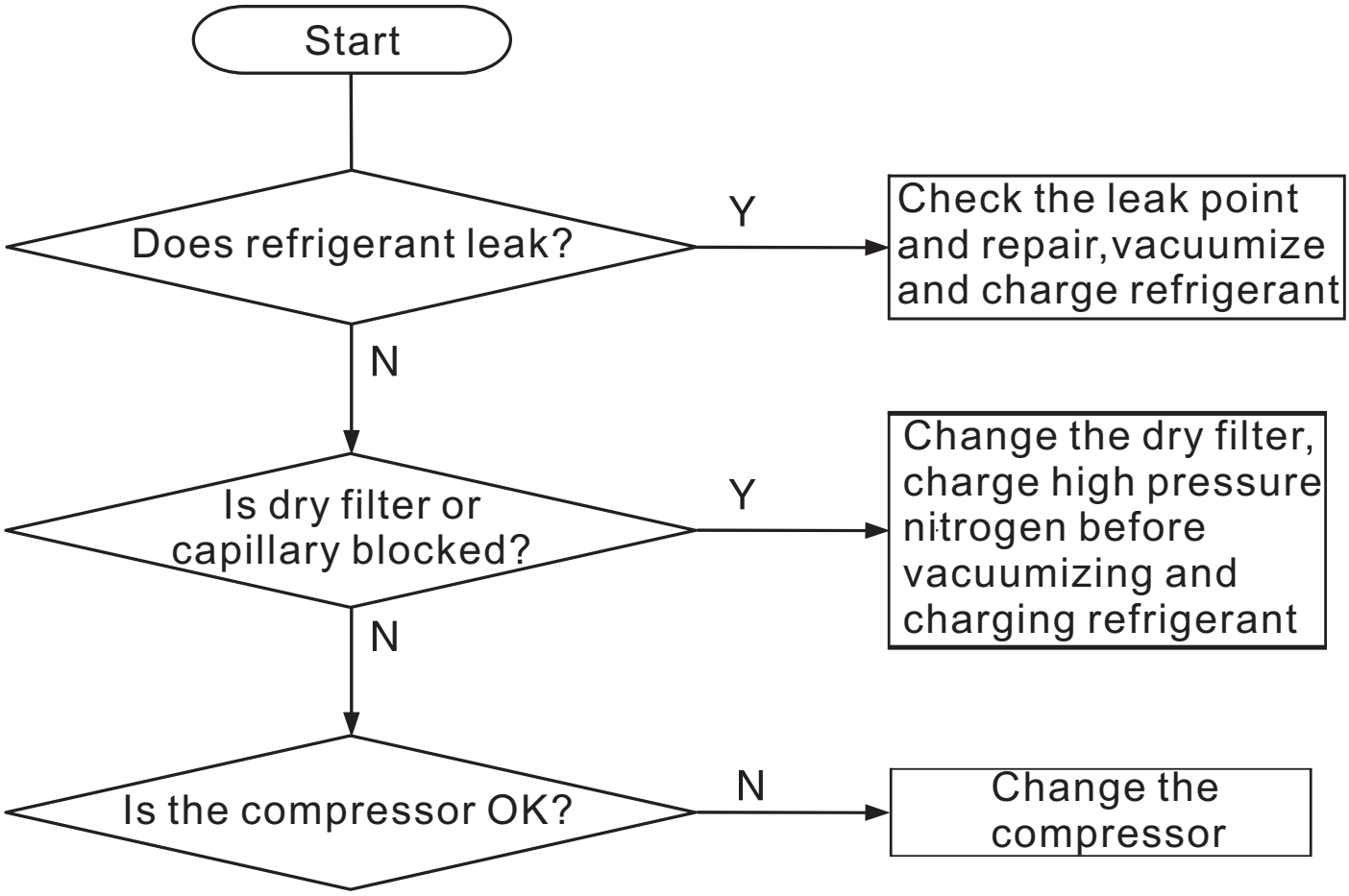
5.2Refrigeration failure

5.2.1 Compressor doesn't work

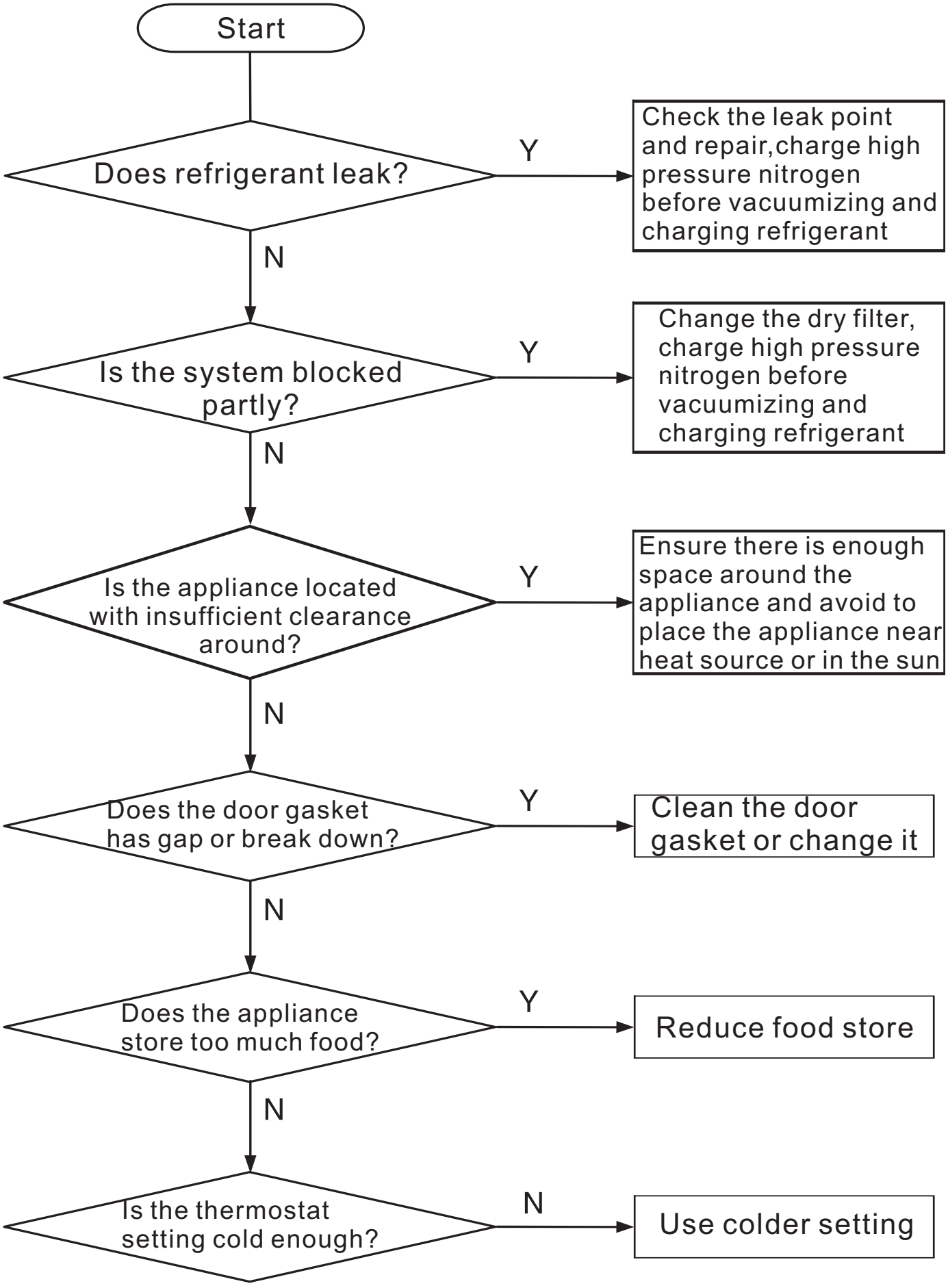


5.2 Refrigeration failure

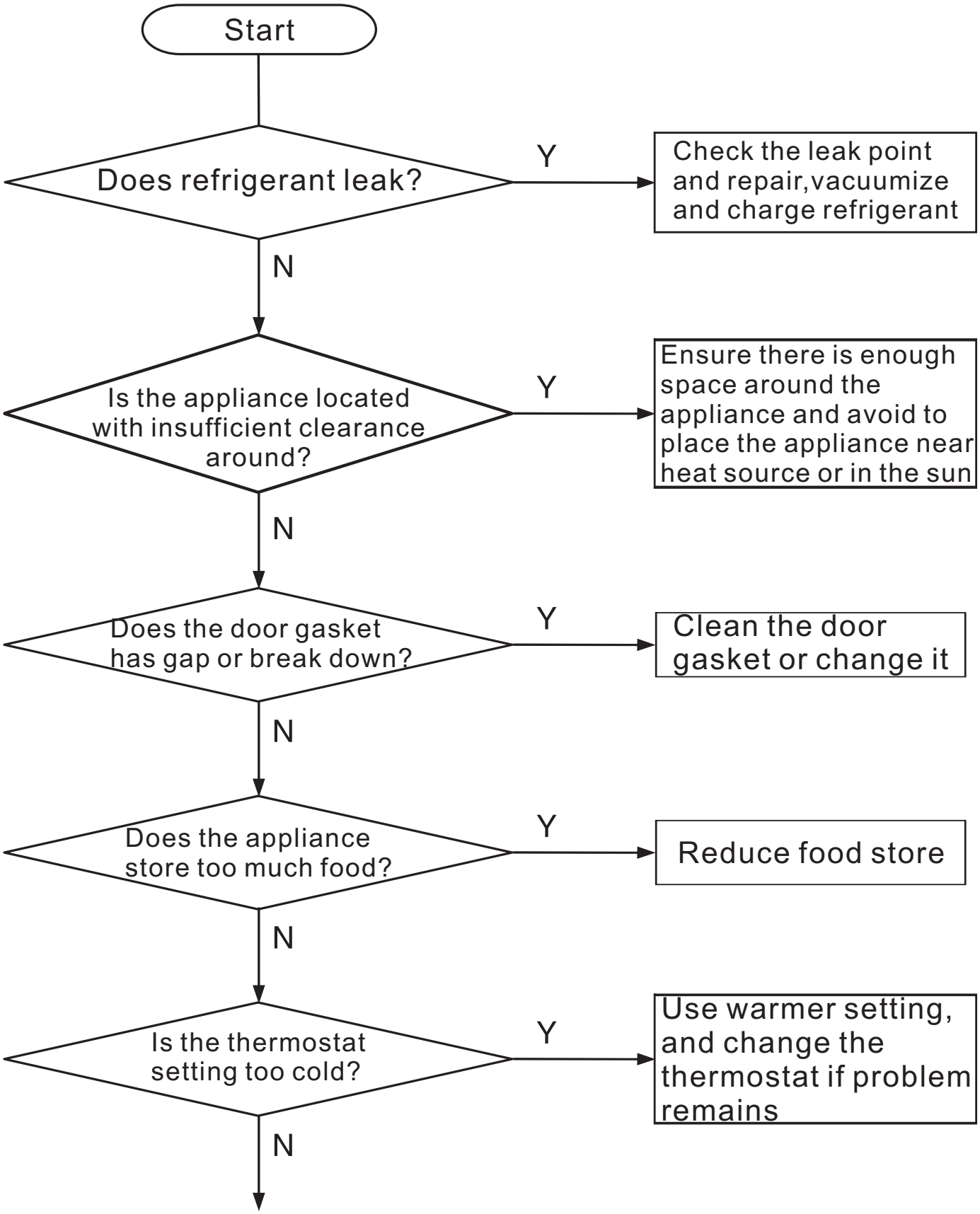
5.2.2 Compressor works



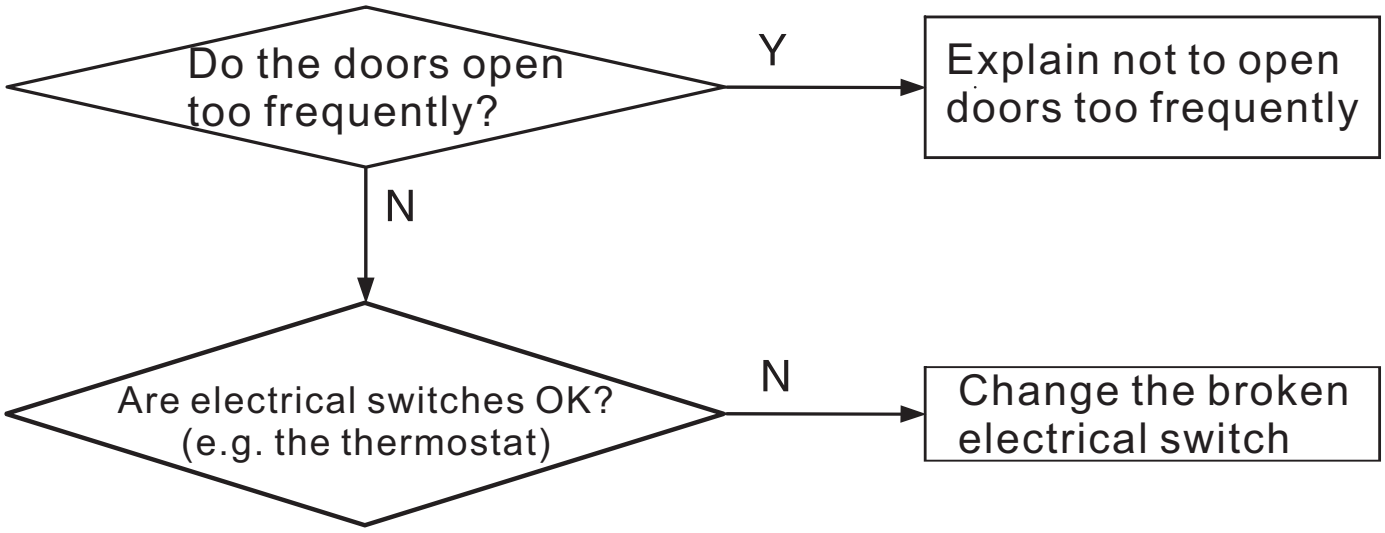
5.3 Bad refrigeration effect



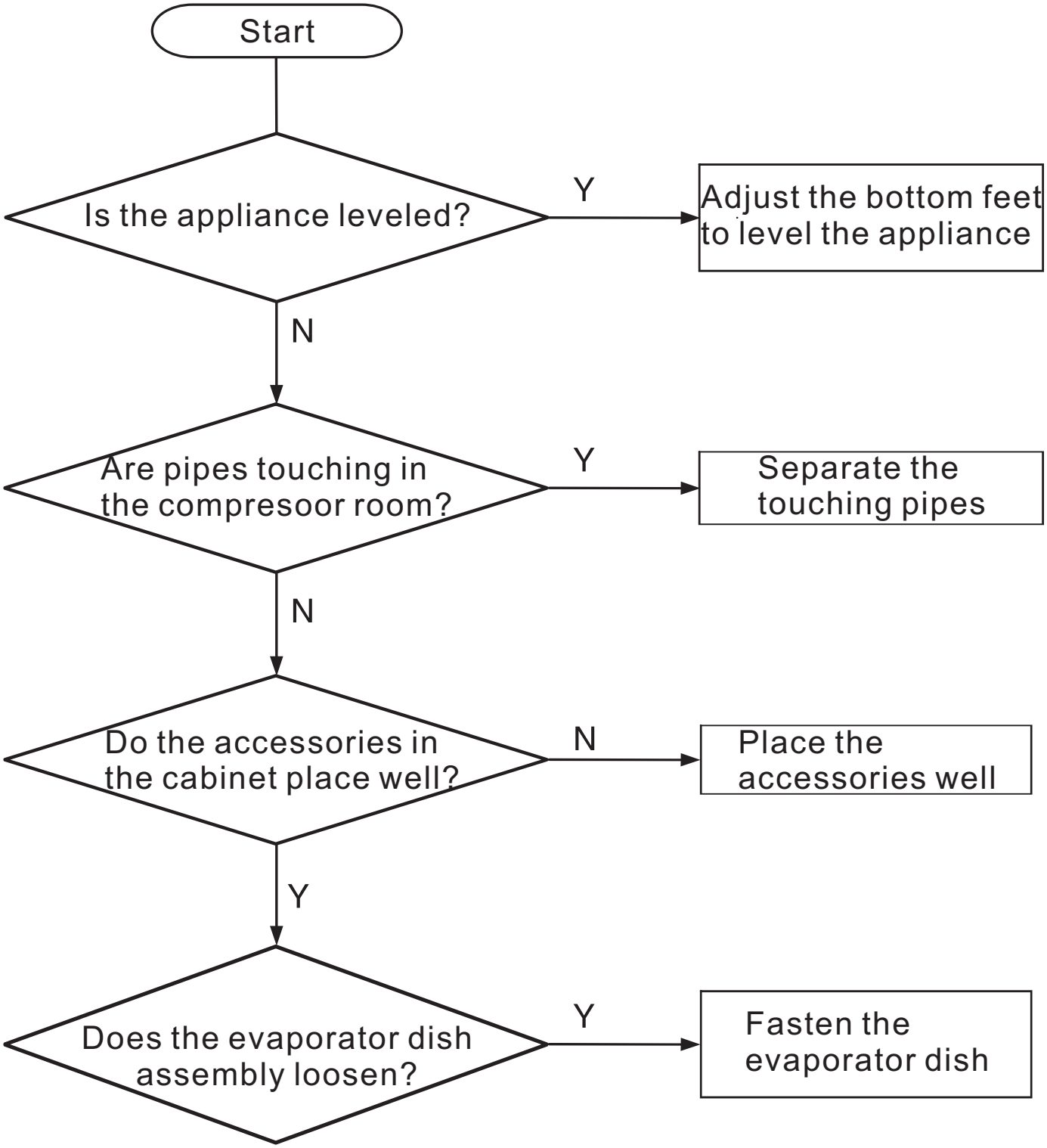
5.4 Non-stop or high running rate



5.4 Non-stop or high running rate



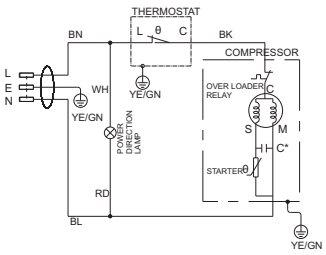
5.5 Noise

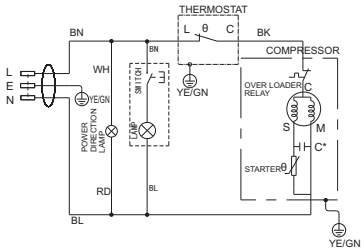

Start
Is the appliance leveled?
Y
Adjust the bottom feet to level the appliance
N
Are pipes touching in the compresoor room?
Y
Separate the touching pipes
N
Do the accessories in the cabinet place well?
N
Place the accessories well
Y
Does the evaporator dish assembly loosen?
Y
Fasten the evaporator dish

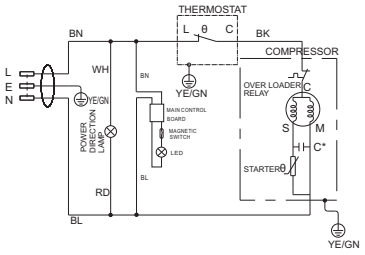
6 Circuit and checking

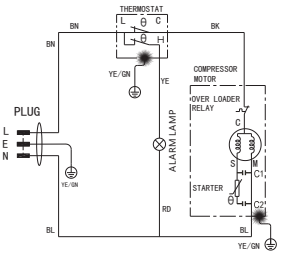
6.1 Circuit diagram

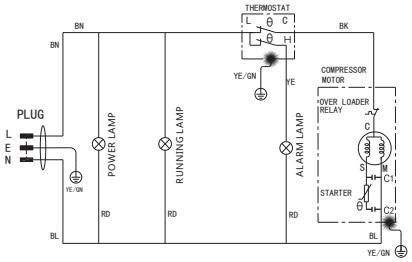
C*:CAPACITOR IS OPTIONAL

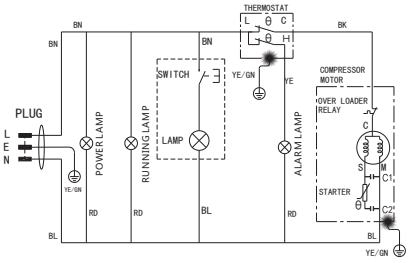


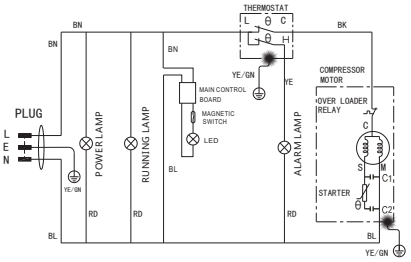


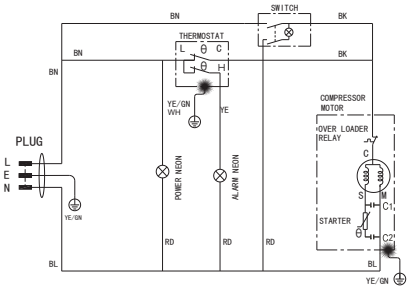


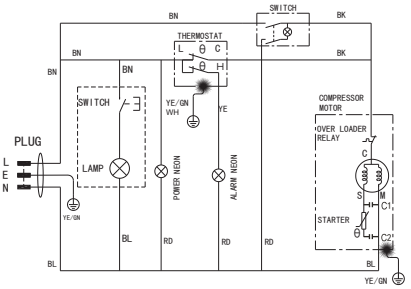


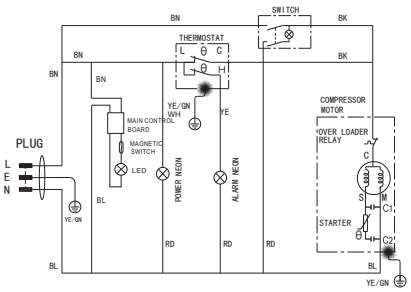


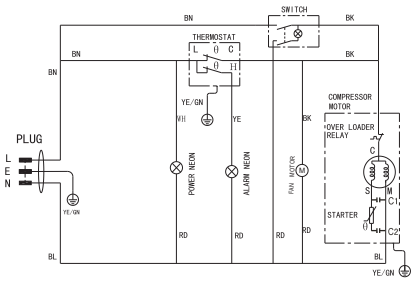


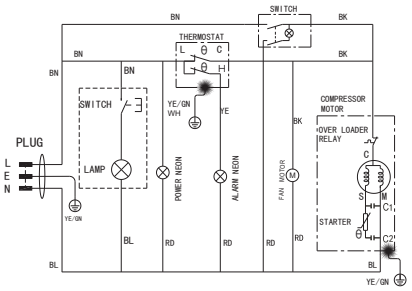


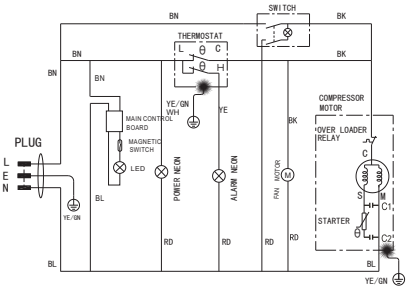










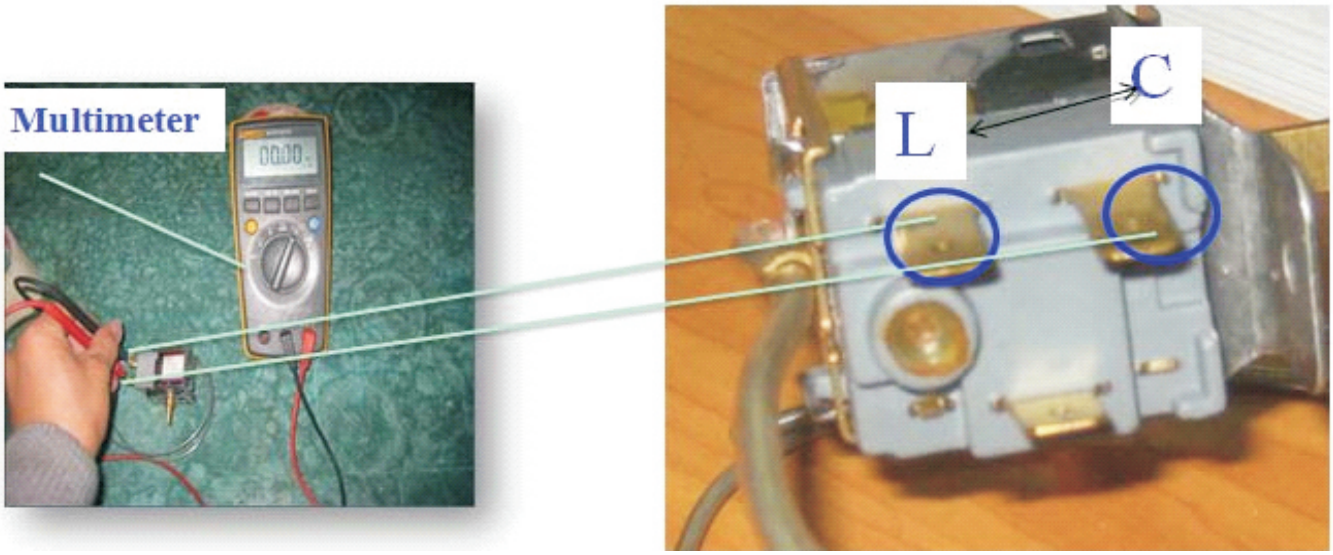


6.2 Thermostat

6.2.1 Basic parameters

	Cold point	Normal point	Warm point
On（℃）	-	(-18.5)	-12.5±2
Off（℃）	<-32	-25±1	-
DIEF（℃）		6.5±1	

6.2.2 Checking method



Use a multi-meter to test the resistance between L&C when the thermostat is at normal position such as"1,2,3...7":
If there shows "000" then the thermostat is OK
If there shows anything but "000" then the thermostat is always at OFF Position and compressor will not start ever
Put the thermostat at Max7 position and let it keep this position for 20 minutes.
Turn the knob from 7 to 1 slowly.
If you can feel a stop signal like kind of noise of "da" the thermostat is ok.
If there is no stop signal then the thermostat is always at ON position and the compressor will keep on working and will not stop.

6.2.3The instruction of replacing the thermostat.

1. Shut off the power 2. the location of the thermostat		
3. Remove the screws of Side cover with screwdriver		
4. loose the fixing buckle of Thermostat panel with screwdriver		
5. Cut off the lace and remove the screws of the thermostat panel		
6.Unplug the connecting wire		

6.3 Light

6.3.1 Basic parameters

Input voltage:AC220-240V

Rated power:1.5W

6.3.2 Checking method

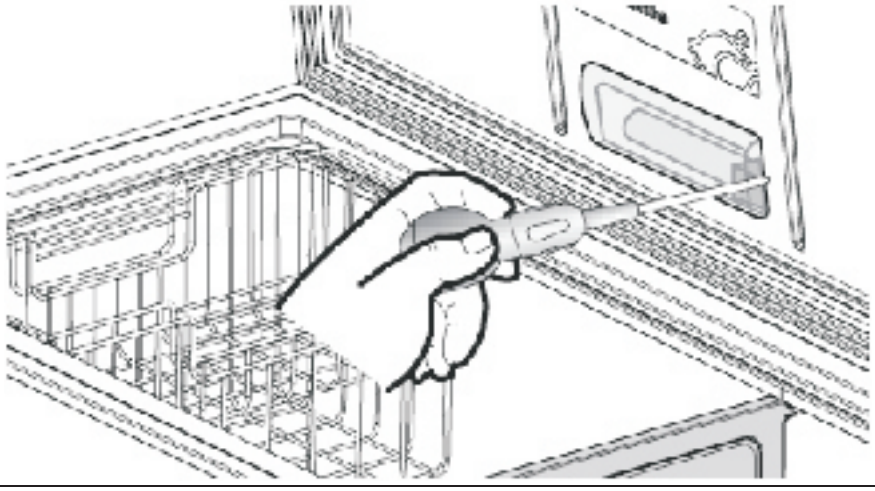
1.Check the power connection is well or not.

2.Check the supply voltage is 220V or not.

3.When power-on and door switch is connected, use a mutimeter measure the voltage between the two ends A&B， as circuit diagram below, if the value is 220V,it is OK.

4.If all above are OK, problem reamins, change the thermostat.

6.3.3 The instruction of replacing the lamp

<table>
<tr>
<td>The lamp data: 220-240 v,max.10w.</td>
<td> 
</td>
<td>  </td>
</tr>
<tr>
<td>1. Shut off the power
2.Use a screwdriver to remove the shade
3.Remove the lamp cover, remove the lamp</td>
<td colspan="2">  </td>
</tr>
</table>

6.4 Compressor

6.4.1 Basic parameters

Input voltage/frequency:220-240V/50Hz

Input power:≤100*115% W

6.4.2 Checking method

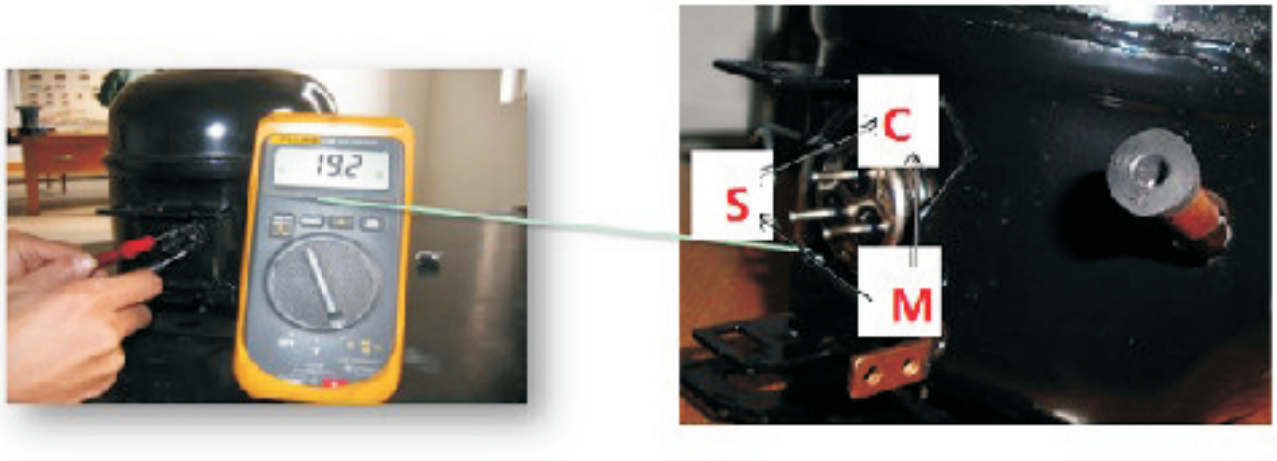
Use a multi-meter to test the resistance between C&M, C&S and S&M :

Normal range of C&M : About 10-30Ω

Normal range of C&S : About 10-32Ω

Normal range of S&M : About 20-60Ω

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

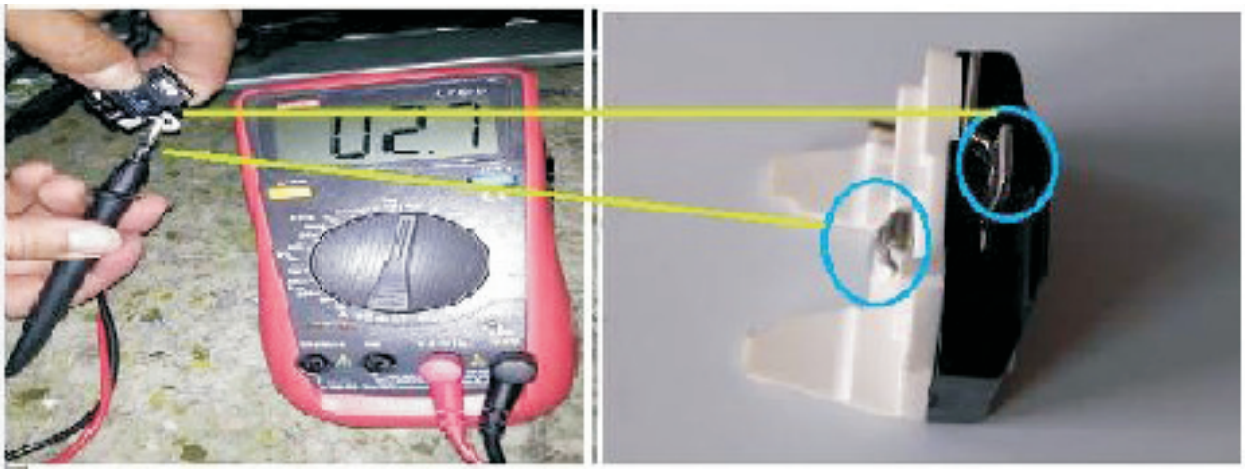


Compressor Protector test

Use a multi-meter to test the resistance between the two end as the pic show :

If there show ooo or almost o then it is OK.

If there is no response then it is broken.



Compressor PTC starter test

Use a multi-meter to test the resistance between the two end as the pic show :

If there show the number is between About 9-25Ω then it is OK.

If there show ooo or no response then it is broken.

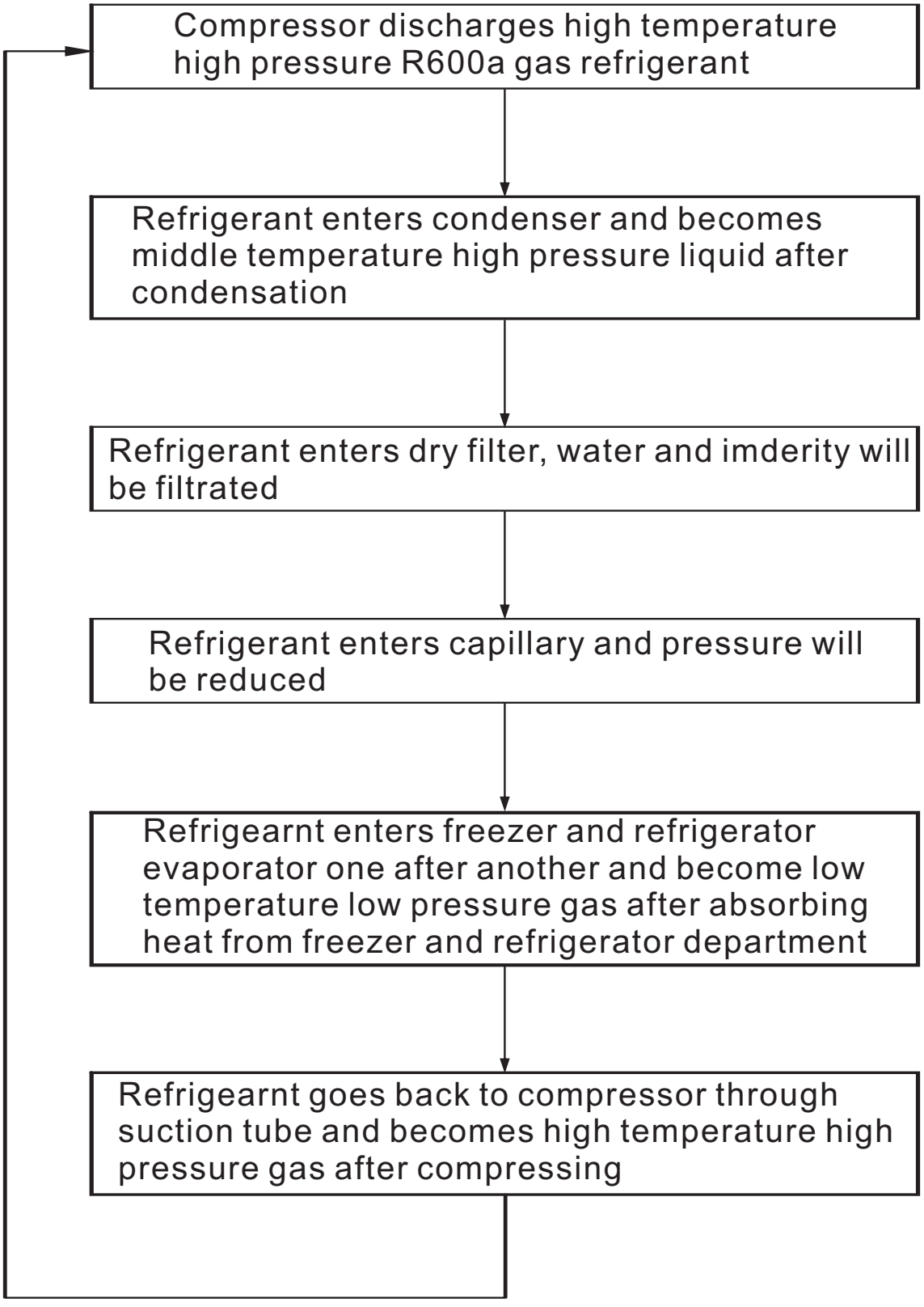
6.4.3The instruction of replacing PTC Starting relay and Overload protector.

1、Using a slotted Screwdriver, snatch the PTC Starting relay and overload protector		
2、Unplug the connecting wire of the PTC Starting relay and overload protector		

7 Refrigeration system repair

7.1 Refrigeration system

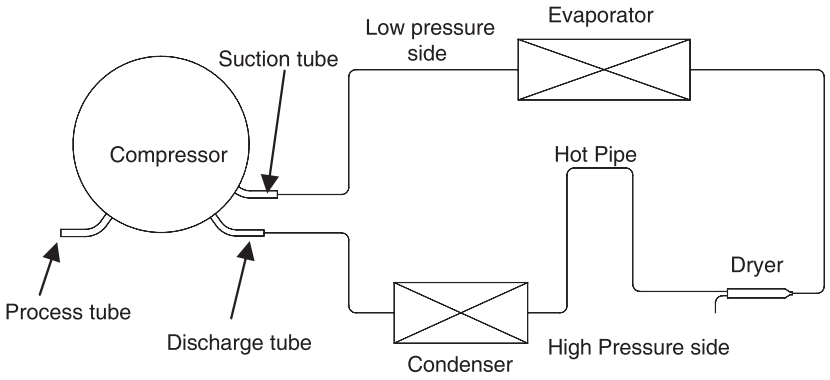
The refrigeration system is single cycle direct cooling system:



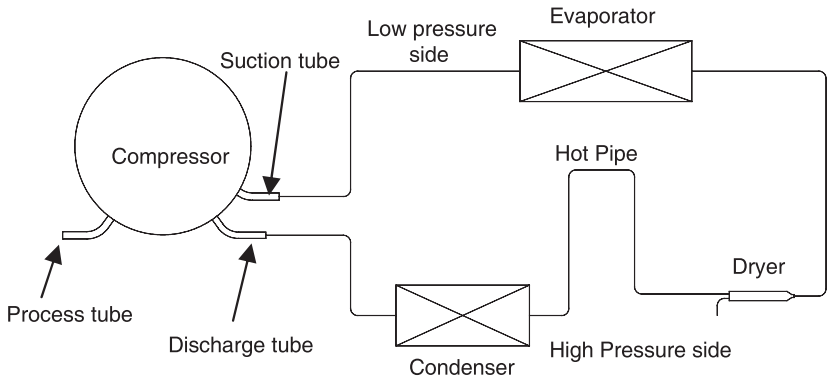
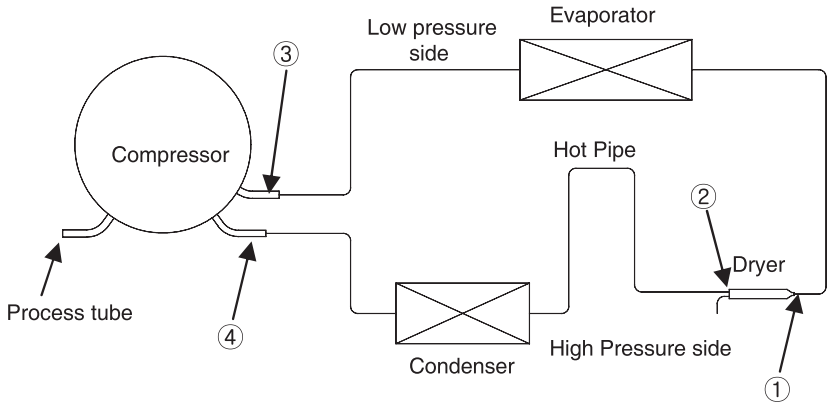
7.2 Summary of repair

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.)	

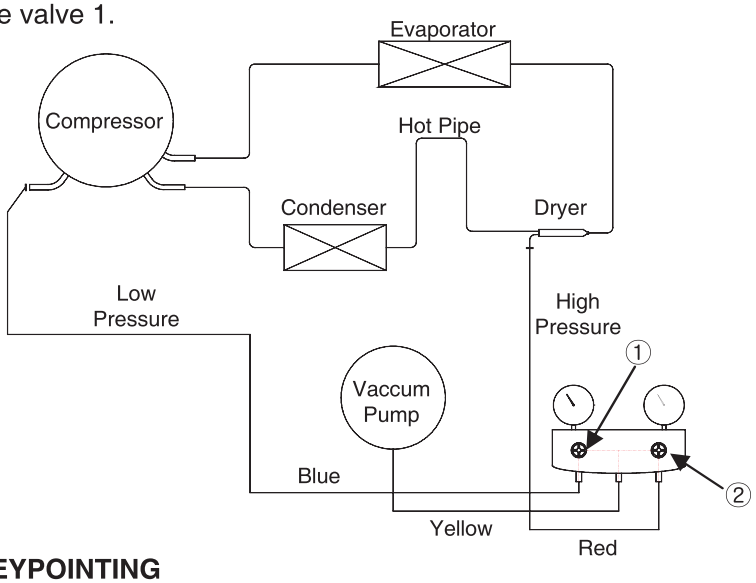
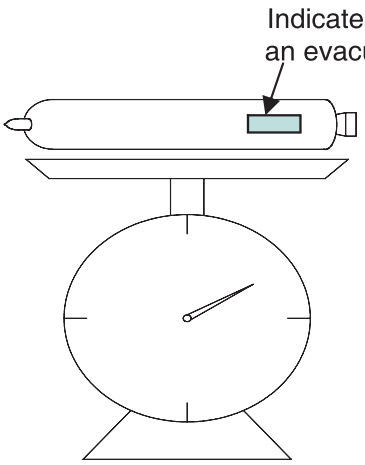
7.3 Regulation for repair

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.

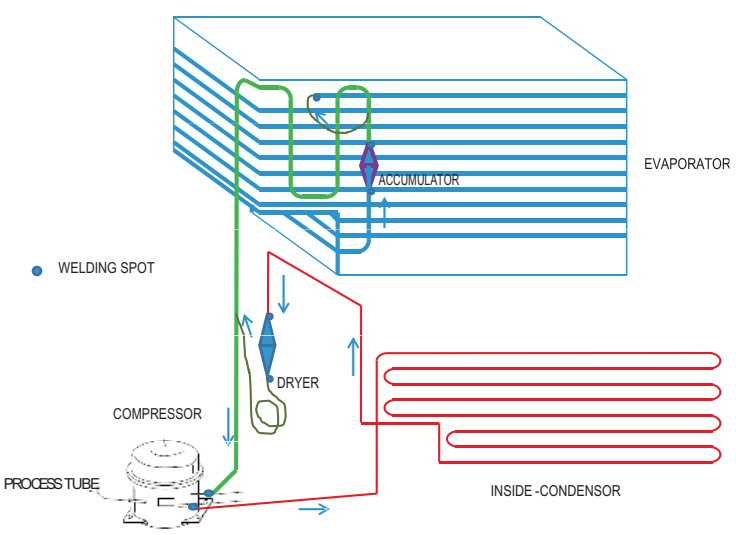
7.4 Practical work for repair

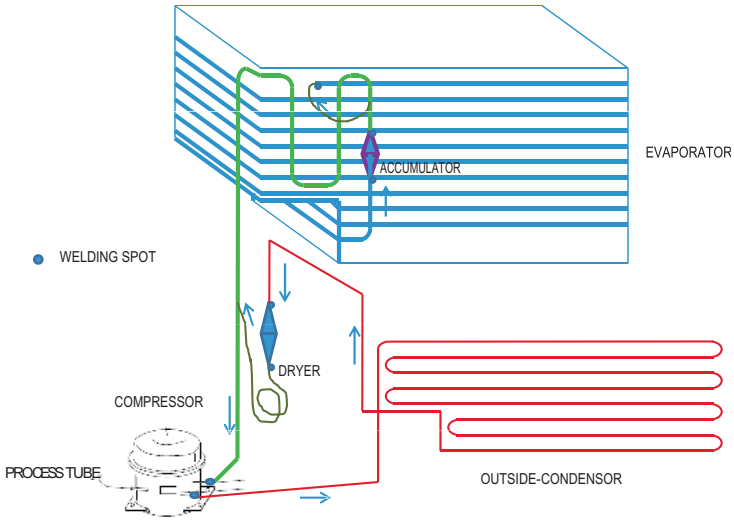
Items	Precautions
1. Removal of residual refrigerant.	1) Remove residual refrigerant more than 5 minutes later after turning off the refrigerator. (If not, compressor oil may leak inside.) 2) Remove retained refrigerant slowly by cutting first high pressure side (drier part) with a nipper and then cut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

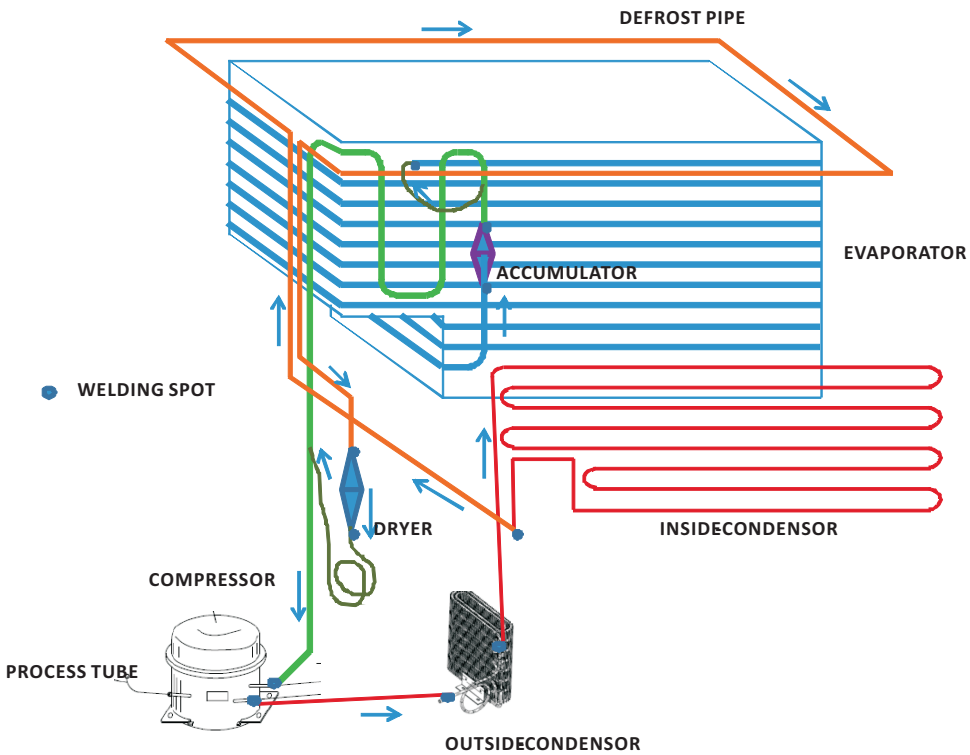
7.4 Practical work for repair

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.  **- 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)

7.5 Cooling diagram







COMPRESSOR → CONDENSOR→ DRYER→CAPILLARY TUBE
→EVAPORATOR →ACCUMULATOR →SUCTION PIPE →COMPRESSOR