Haier

SERVICE MANUAL

Order NO. Ref0907S005V0

Refrigerator

MODEL: HRF10WNDWW
HRF12WNDWW

⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It dose not contain warnings and cautions to advice non-technical individuals of potential dangers in attempting to service a product. Product powered by electricity should by serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

Haier Group

Contents

Chapter 1 General Information

1-1. General Guidelines

When servicing, observe the original lead dress. If a short circuit is found, replace all parts which have been overheated or damaged by the short circuit. After servicing, see to it that all the protective devices such as insulation barriers, insulation papers shields are properly installed. After servicing, make the following leakage current checks to prevent the customer from being exposed to shock hazards.

1) Leakage Current Cold Check

2) Leakage Current Hot Check

3) Prevention of Electro Static Discharge (ESD) to Electrostatic Sensitive

1-2. Insurance Test

1. Check if there is any leak of current.
2. Cut out the power supply before the repair to avoid an electrical shock hazard.
3. In the case of a live-line test, insulating gloves should be worn to avoid potential electrical shock.
4. Confirm the rated current, voltage and capacity before testing with any kinds of instruments.
5. Watch if the upper door is open when we check something at a lower position.
6. Take out every part in the cabinet before moving the machine, especially things like panels (e.g. glass shelf).
7. Please wear intact cotton gloves when repair any parts of the evaporator, so that scratches by the sharp fins can be avoided.
8. If there is a breakdown with the refrigeration system, please surrender the machine to the service center, else the leaked refrigerant may pollute the atmosphere.
9. The refrigerator use AC of 115V with a frequency of 60Hz.
10. A big fluctuation of voltage (exceed the range 100～120V) may cause a start failure of the refrigerator, a burn-out of the control panel and compressor, or an abnormal sound from the compressor in operation.
11. Take care not to damage the supply line. Don’t yank at the line; pull the plug out gently from the receptacle. Don’t press the line under the cabinet or step on it. Take care not to roll on or damage the supply line when moves the machine from the wall.
12. In the case of leakage of inflammable gases like carbon monoxide, open the door and windows.

Don’t pull out or insert the plugs of the appliance.

13. Don’t touch the refrigeration surface of the freezing compartment when the refrigerator is in operation, especially when our hand is wet, else we may be glued to the surface.

14. Pull out the plug of power supply during clearance or power outage. Wait at least five minutes to resume the power supply in order to prevent damage to the compressor caused by continuous restart.

 Photo used in this manual

The illustration and photos used in this Manual may not base on the final design of products, which may differ from the products in some way.

1-3. How to read this Service Manual

1-3-1. Using Icons

Icons are used to attract the attention to specific information. The meaning of each icon is described in the table below:

Note: 

A “note” provides information that is not indispensable.

Caution: 

A “caution” is used when there is danger that the reader, through incorrect manipulation, may damage equipment, loose data, get an unexpected result or has to restart (part of) a procedure.

Warning: 

A “warning” is used when there is danger of personal injury.

Reference: 

A “reference” guides to find additional information on a specific topic.

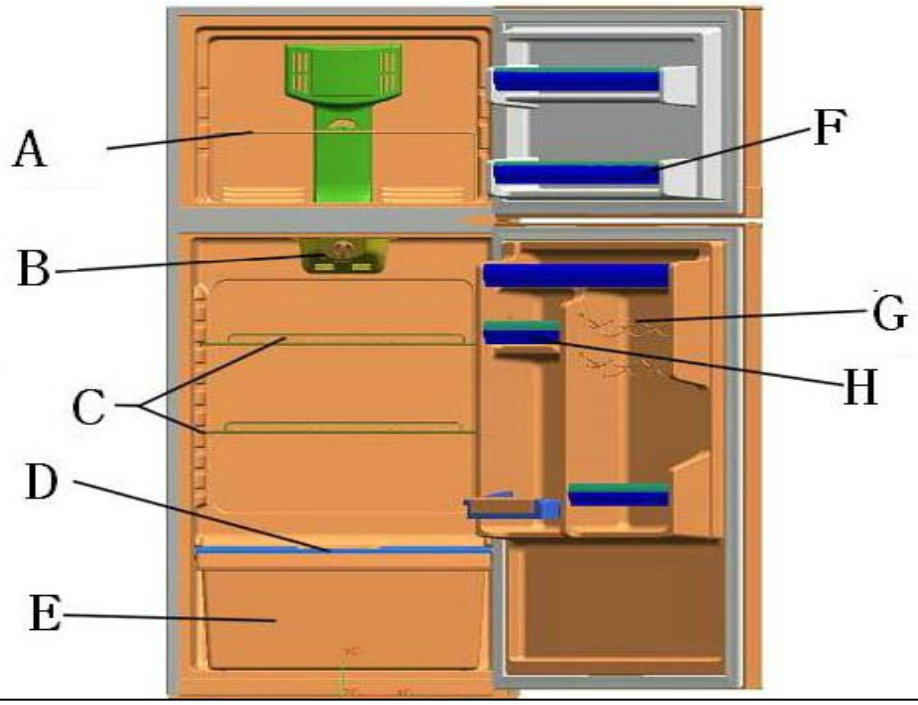
Chapter 2 Product Feature

2-1. SPECIFICATIONS

Photo			
Model		HRF-10WNDWW	HRF-12WNDWW
Commercial brand		Haier	Haier
Product description		Refrigerator	Refrigerator
Type of appliance (FS=free standing / BI= built-in)		FS	FS
Climate class (N=16-32℃ ST=16-38℃ T=18-43℃)		T	T
Key features			
Gross capacity	L	286	343
Total net capacity	L	283	340
Defrosting (Manual-Automatic)		Automatic	Automatic
Defrosting water outlet		Yes	Yes
Air circulating ventilator		Yes	Yes
Kind of coolant (R134a/R600a)		R134a	R134a
Foaming components		CP-IP	CP-IP
Technical data			
Voltage / frequency	V/Hz	115~ / 60	115~ / 60
Input power	W /A	60	
Length of cable / incl. plug	cm	200	200
Temperature range (from>to)	°C	4～ -18	4～ 10
Aesthetics			
Colours			

Top cover		White	White
Cabinet		White	White
Door glass		White	White
Door frame		White	White
Fascia panel/handle		White	White
Door			
F=Flat/R=Rounded/S=Streamline		S	S
Hinge (r=right/l=left/reversible)		r/reversible	r/reversible
Shelves			
Number		4	4
Tape		grill	grill
Colour		White	White
Adjustable		Yes	Yes
Drawer numbers		1	1
Crisper		Transparent	Transparent
Equipment & accessories			
Control panel			
Control panel (interior/exterior)		interior	interior
Thermometer (interior/exterior)		interior	interior
Adjustable thermostat		Yes	Yes
Interior light	W	10	10
Adjust feet		Front	Front
Castors		Rear	Rear
Product net dimensions			
Unit dimensions (H / W / D)	mm	1540/600/651	1540/600/726
Depth of open door	mm	1245	1320
Net weight	Kg	62	68
Packing dimensions & load ability			
Packing dimensions (H / W / D)	mm	1570/655/737	1570/655/812
Gross weight	kg	69	75

2-2. External views



A= freezer shelf B= thermostat C= shelf D= crisper cover E= crisper F= door shelf
G= coke shelf H= butter tray

2-3. Function Schedule

1. Air-cooling and automatic defrosting
2. Round door design and fashion handles
3. Energy-saving
4. Adjustable humidity crisper
5. Isolated food shelf
6. Crisper with adjustable moisture

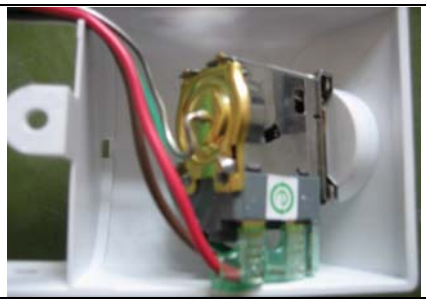
Moisture in the crisper can be adjusted for satisfaction of vegetables and fruits storage.

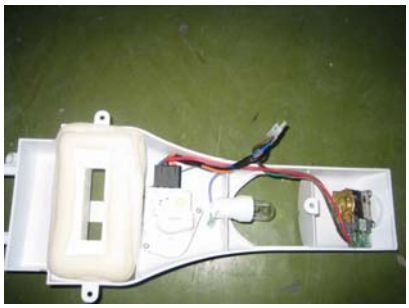
Chapter 3 Disassembly

3-1. Air passage disassembly

1	Use the Cruciform screwdriver to remove the four screws which fixed the air passage cover.	
2	Hold the protruding part of the air passage cover with our hands, Shake it slightly to loose it, and then take off the air passage cover.	
3	In the disassembly process, pay an attention to the cable behind the air passage cover, disconnect the cable terminals, and then we could disassemble the cover.	
4	We assemble it according to reverse order.	

3-2. Thermostat disassembly

1	Use the Cruciform screwdriver to take off the three screws which fixed the thermostat house.	
2.	Pay an attention to cable connection part in disassembly process, disconnect the cable terminals and then we could take off the thermostat house.	
3	Removed the original thermostat ,take the new thermostat probe to the zone for Feeling temperature of the thermostat house	
4	Then use the Aluminum foil tape to seal the temperature probe	
5	The connection of the thermostat :C connect to brown cable, L connect to red cable and green cable connect to grounding	

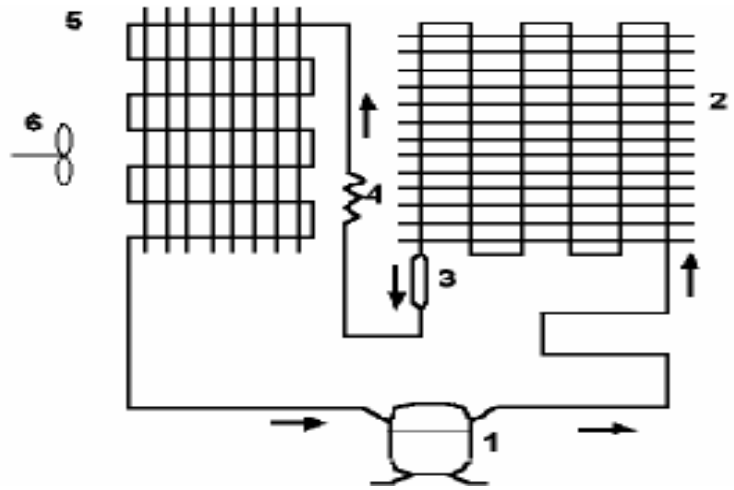
6	The insert terminals of the Thermostat cable connect to the defrost timer and Purple cable connect to the lamp seat .It must be fixed the defrost timer to the thermostat house with screws.	
7	Make sure to seal the sponge of the thermostat openings to prevent the cold air leaking.	
8.	We assemble it according to reverse order.	

3-3.Door disassembly

1	Use the cruciform screwdriver to take off the screws which fixed the top hinge cover, and remove the hinge cover.	
2.	Remove the screws which fixed the top hinge, And take off the top hinge.	
3	Take off the screws which fixed the central hinge	
4	Hold the REF and FRZ door with our hands and drag it slightly, and then we could take off the door.	

Chapter 4 Disassembly

4-1. Refrigeration flow chart



1 Compressor

2Condenser

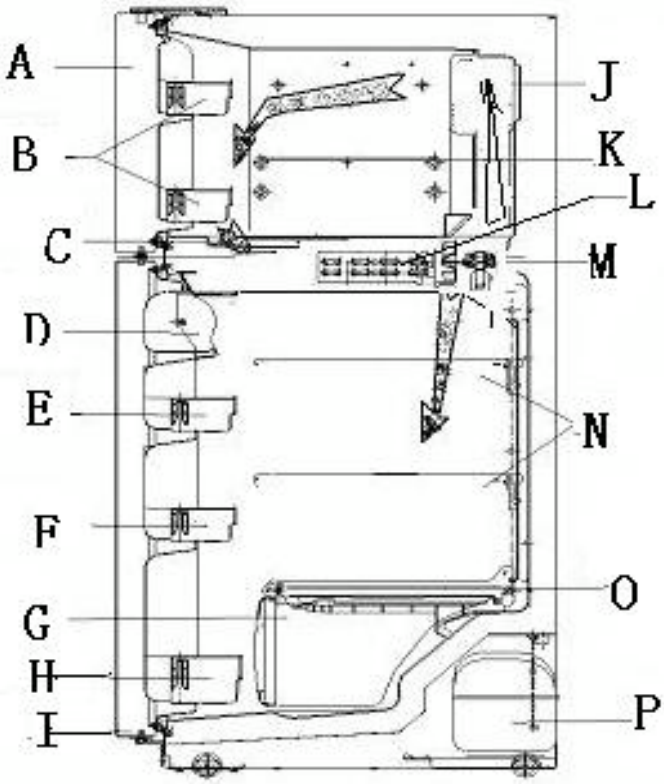
3Filter drier

4Capillary tube

5Evaporator

6Fan motor

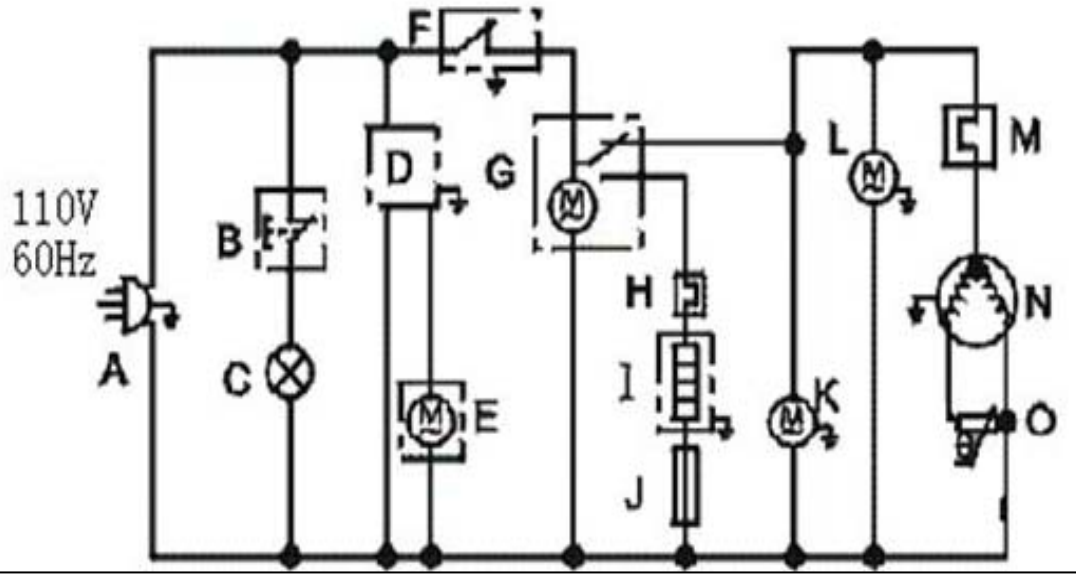
4-2.Flow of cold air



A=freezer door B=bottle shelf C=cold air suction hole D=egg box cover E=bottle shelf F=bottle shelf G=vegetable container H=bottle shelf I=Ref door J=FRZ fan motor K=wire L= evaporator N=Ref air passage O=vegetable container cover P= compressor

Chapter 5 Circuit diagram

5-1. Brief principle diagram



A =plug B=switch C=lamp D=ice maker (preparative) E=valve (preparative)
F=thermostat G=defrost timer H =thermostat I=defrost heater J= fuse
K=fan motor L=fan motor M=overload protector N=compressor O= (PTC)

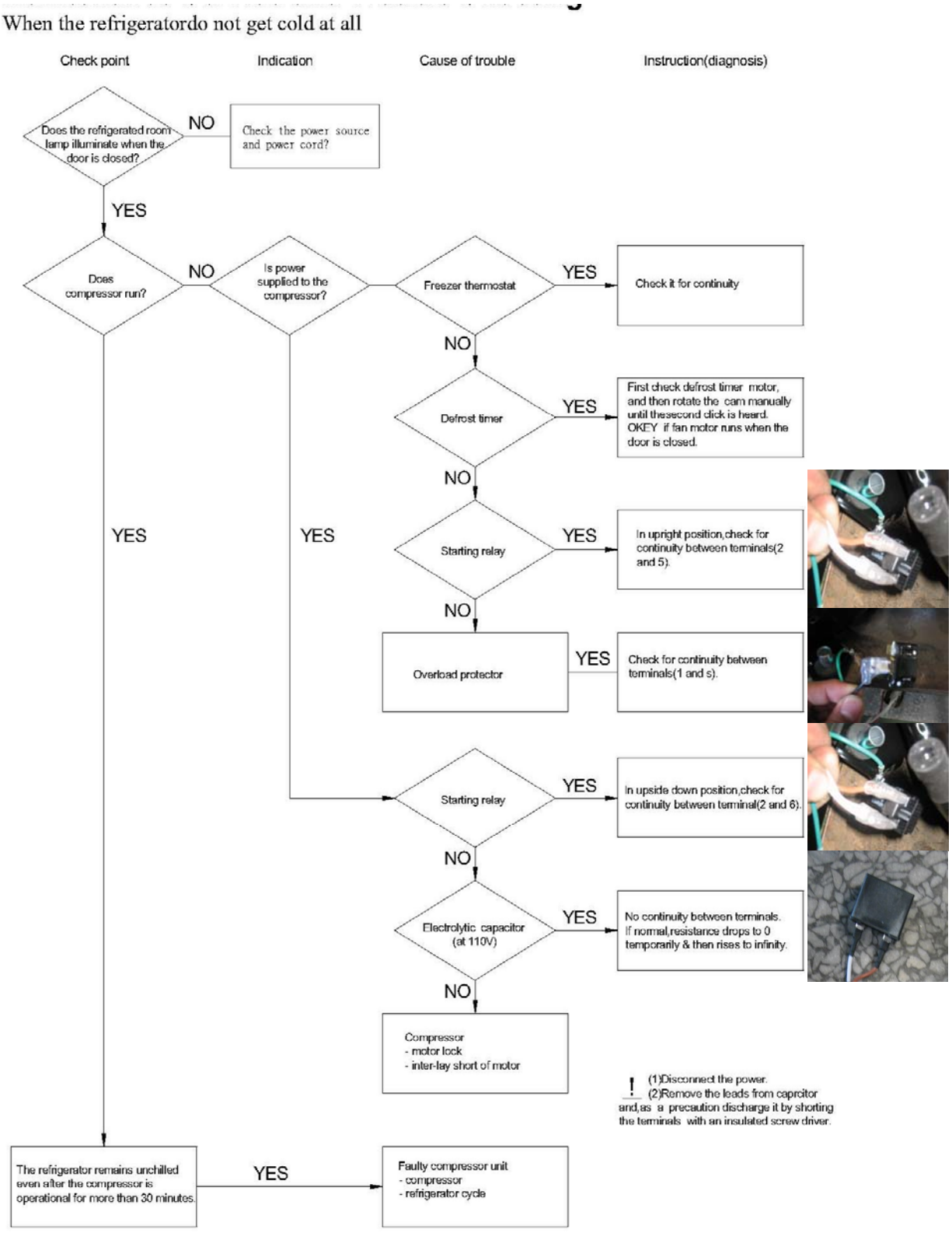
Brief Description of Control Principle

HRF12 is the forced air cooling refrigerator with two doors. A mechanical type of all the control is generally adopted. The thermostat directly controls the start and stop of compressor, and hence the refrigerator temperature.

Low Temperature Compensation in the above schematic diagram, When the ambient is below the set temperature, the switch will be closed and the heating will work, thus ensuring the normal start, and operation of refrigerator at lower ambient temperature, in such case, the freezer compartment temperature can reach a good point.

Chapter 6 Trouble shooting

6-1. Poor cooling



6-2. No defrosting

NO Defrosting

Check point
Instruction (diagnosis)

Indication

Cause of trouble

Dose defrost timer operate?

Defrost Timer

Check for the continuity between terminals (1 and 3).

Does compressor stop running when shaft of defrost of defrost timer is turned clockwise until its first click is heard?

Thermal Fuse

Check for the continuity between WHITE and WHITE lead wires.
At room temperature, it should be closed.

Bimetal Thermostat

Check for the continuity between BROWN and WHITE lead wires.
At room temperature, it should be closed.

Defrost timer

Check contacts of switch blade
(See page 12)

Defrost heater and p-Cold Heater

Check for the continuity between RED and WHITE lead wires.

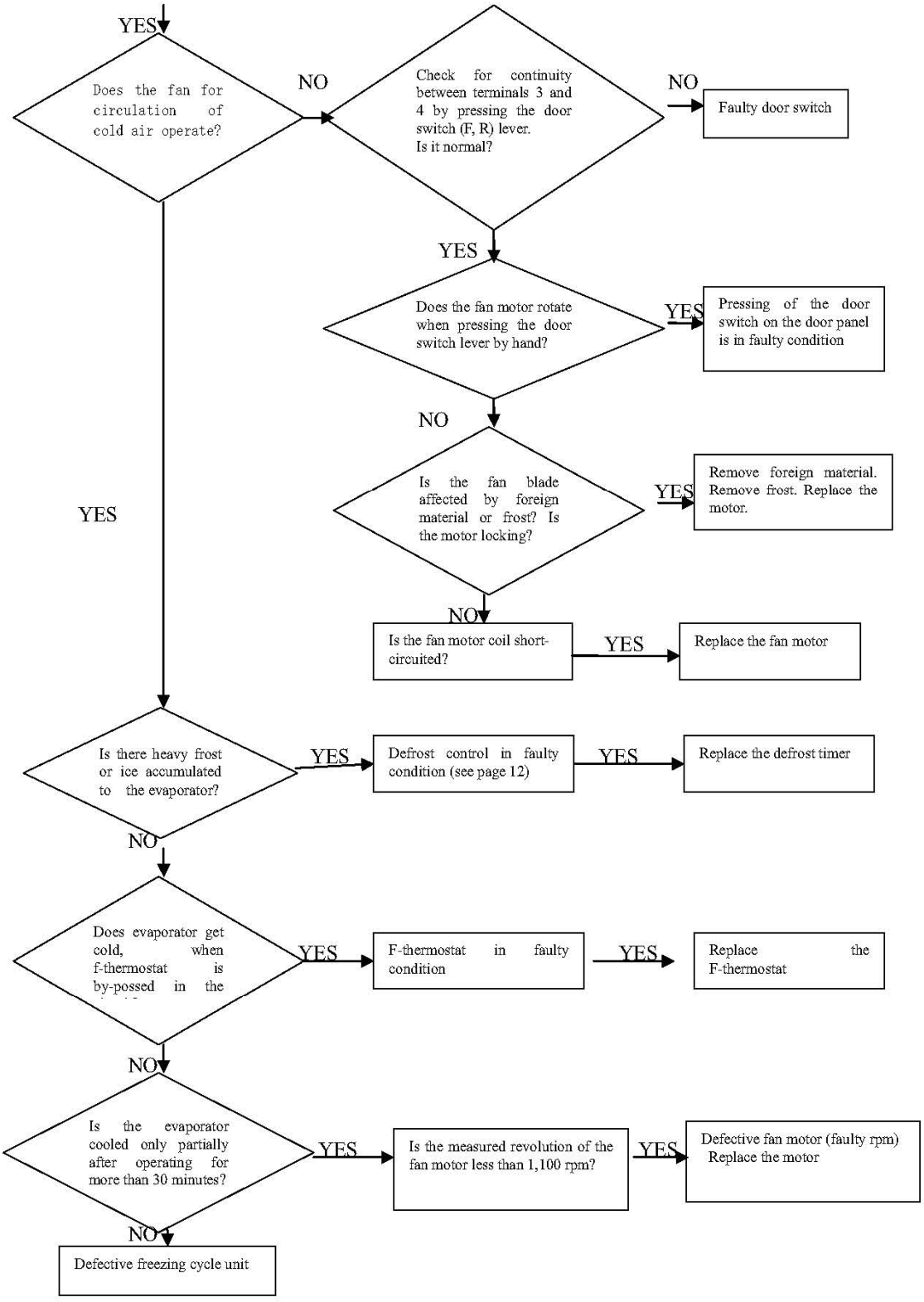
The Freezer and Refrigerated Rooms are not Sufficiently Cold.

Check point
Instruction (diagnosis)

Indication

Cause of trouble

. Does the compressor operate?
. Is the refrigerator installed a sufficient from and direct heat source?
. Is the condition of the condensers radiation satisfactory?
. Are there any hot foodstuffs in the refrigerator?
. Are there excessive storage foods inside the refrigerator, causing interference with the circulation of cold air.
. Is the temperature control knob in a suitable position?
. Is the sealing of the door gasket in good condition?


YES
Does the fan for circulation of cold air operate?
NO
Check for continuity between terminals 3 and 4 by pressing the door switch (F, R) lever. Is it normal?
NO
Faulty door switch
YES
Does the fan motor rotate when pressing the door switch lever by hand?
YES
Pressing of the door switch on the door panel is in faulty condition
NO
Is the fan blade affected by foreign material or frost? Is the motor locking?
YES
Remove foreign material. Remove frost. Replace the motor.
NO
Is the fan motor coil short-circuited?
YES
Replace the fan motor
YES
Is there heavy frost or ice accumulated to the evaporator?
YES
Defrost control in faulty condition (see page 12)
YES
Replace the defrost timer
NO
Does evaporator get cold, when f-thermostat is by-possed in the
YES
F-thermostat in faulty condition
YES
Replace the F-thermostat
NO
Is the evaporator cooled only partially after operating for more than 30 minutes?
YES
Is the measured revolution of the fan motor less than 1,100 rpm?
YES
Defective fan motor (faulty rpm) Replace the motor
NO
Defective freezing cycle unit

Chapter 7 Quick check

7-1. Normal phenomena

In a domestic refrigerator, there is not only a complicated electric control system, but also a refrigerating system that is difficult to discern whether it is in a good working condition. Both the systems are related and affect each other. If a certain part of a refrigerator works abnormally .Its refrigerating efficiency will decrease, operation properties will become unstable, or even it cannot be used normally for those serious cases. Refrigerators are generally of larger volume ,once troubles appear ,to send them to a service department is really a tough thing ,if such is the case ,the user will always be in suspense ,sometimes ,normal phenomena will be erroneously regarded as troubles .Therefore ,before we deal with the topics of frequently occurring troubles of refrigerators and their remedies ,we should firstly give a brief account of some normal phenomena which are not troubles .In case any one of such phenomena occurs ,there is no need to worry about it ,and the user can use it at total ease .

1). When the compressor of a refrigerator has just stopped running, a rumbling sound can be heard from inside its evaporator .This is a sound caused by the flowing of refrigerant in the evaporator tubing .Because the pressure difference is still greater after the compressor has just stopped running, the refrigerant will flow for a certain time, therefore, this sound is a normal phenomenon.

2). A click sound can often be heard from the refrigerator .This is a normal sound produced by the pull-in or release of the armature of a current deadweight start relay when starting the compressor .The compressor motor will produce a slight and uniform sound while it is running .This sound is not easy to be heard in the daytime, but of course it can be heard distinctly at night.

3). The compressor consists of an electric motor and a compressing apparatus .During its normal operation ,the motor's stator core and windings will rise to a temperature in the range of 100℃~110℃ ,and the temperature of the piston and cylinder of the compressing mechanism can also reach as above 100℃ due to the heat produced when compressing refrigerant .Most of the heat radiates to the air through the compressor casing ,therefore ,its casing is generally at a temperature between 85℃~90℃ ,it is very hot ,particularly in summer when the ambient temperature is higher .All these are normal phenomena .

4). For the direct cooling refrigerator ,a kind of irregular crack sound can be often heard when the compressor is running for a certain period of time or has just stopped its running .This sound is caused by the stress relief due to expansion and contraction when temperature changes ,and will not affect the normal application of refrigerator .

7-2 Common Troubles in Refrigerators and Their Remedies

Causes for troubles occurring in refrigerators are closely related to the quality of components and workmanship in assembling by manufacturers as whether refrigerators are properly used and maintained .The parameters generally used to express the working conditions of a refrigerator include the temperature inside the refrigerator ,operation rate ,electric power consumption ,noise level ,and other functional indexes .If any one of these parameters is beyond its permissible range ,this indicates that there is a fault or trouble in the refrigerator . During the whole service life of a refrigerator ,the probability of troubles occurring within a union time is called its failure rate .Making a comparison between the control circuit system of a refrigerator and its refrigerating system ,we can find that the failure rate of the former is higher ,and that of the thermostat is the highest . In troubleshooting ,the first thing you must do is to determine where the trouble comes from --- the control system or the refrigerating system .There is general no trouble indicating instrument mounted on the domestic refrigerator ,locations and natures of troubles should be determined according to their respective features ,therefore ,experience in servicing is very important to troubleshooting .Service technicians with rich experience can correctly locate them and take reasonable remedy measures based on their comprehensive analysis of trouble characteristics as well as operating conditions for various kinds of refrigerators .

Three Essentials for Checkup

1) Look

a) Check the tubing of refrigerating system for cracks and various welding points for leaks ;if leakage occurs ,an oil stain can be seen definitely .

b) Check the suction and exhaust pressure values (high pressure and low pressure) of compressor to see whether they are normal.

c) Check the conditions of frost attached to its evaporator and gas return tube .It is abnormal if frost

has formed on part of the evaporator or there is no frost attached to it.

d) Pay attention to the speed of temperature drop inside freezer compartment .It is abnormal if the speed of temperature drop is obviously slower than the corresponding normal speed.

e) Check the environment to see whether it is suitable for placing a refrigerator.

f) Check refrigerator door seal, case, table surface and heat insulation layer.

g) Look at the main control board to ascertain if various indication states are normal.

2) Listen

a) Listen to the noises produced when the compressor is running Hums from a fully enclosed aggregate unit is the sound caused by overload indicating that the motor cannot be started normally ,meanwhile ,a clattering sound can be heard from inside the start relay ,which is produced because the start contacts cannot be released normally .A whistling sound is caused by the high pressure gas flowing out of the crack of the pressure tube inside the compressor ,and clucks are the sound of striking after the suspended spring inside the compressor has broken . During the normal operation of compressor ,a slight and uniform hum sound due to undulation of electric current can be heard generally ,this is a normal phenomenon .However ,if it sounds like “tong ,tong …”,i.e., an impact sound inside the compressor ,this means that a large quantity of wet vapour of refrigerant or refrigerating oil has come into the compressor cylinder ;if it sounds like “dang ,dang…”, a striking sound of metal parts inside the compressor ,this means that some moving parts have loosened (note to differentiate this sound from those formed during starting or stopping the compressor).

b) Listen to the sound caused by the flowing of gas in the evaporator Open the refrigerator door while the compressor is in operation ,incline your ear and listen attentively the gas flow sound inside the evaporator .If it sounds like gentle whistling accompanied by a sound similar to water flowing ,this is the sound produced by the normal circulation of refrigerant within the evaporator .In case only the gas flowing sound can be heard and there is no water flowing sound ,this indicates that the refrigerant has already percolated .If neither the flowing sound nor the gas sounds from the evaporator can be heard ,this means that the filter or capillary has been clogged .

3) Touch and Feel

a) Feel the compressor when running, its temperature should be generally less than 90℃ in the normal state (it may exceed 90℃ in case of running for a longer period of time).

b) After the compressor has operated normally for 5~10 minutes, ouch and feel the condenser, the

temperature of its upper part should be higher than that of its lower part (or its right part is hotter than its left part, depending on the type of condenser coil), this indicates that the refrigerant is circulating. If the condenser is not hot, this means the leakage of refrigerant .In case the condenser radiates heat for only several minutes and then cools down, this means that the filter and capillary have been clogged .As for the forced air cooling condenser, hot air will be blown out of it; this means that the system is out of order.

c) Feel the filter's temperature .During the normal operation of refrigerating system ,the temperature on the filter's surface should be a little higher than the ambient temperature ;if you touch it with your hand ,you will have a sense of slight heat .In case dew condensation appears due to the fact that its temperature is obviously lower than the ambient temperature ,this means that most meshes of its screen has been clogged ,resulting in an obstructed flowing of refrigerant ,thus causing a drop in temperature due to throttling .

d) Feel the temperature of exhaust gas from the refrigerating system .the exhaust gas should be very hot and this is the normal working state .For those refrigerator with enclosed type of compressor refrigerating system, no frost or dew drop will from on the gas suction tube, otherwise, there is something wrong in the system (Frosting and dew condensation may appear for a very short time period when just starting the machine, this is a normal phenomenon). Because a refrigerator is a combination of several components ,they are related and have influence on each other .In case an abnormal phenomenon has been found through the above-mentioned checkups ,you need not to make a hasty conclusion based on only one abnormal phenomenon .It is advisable to find out two or more abnormal phenomenon ,or conduct troubleshooting comprehensively with the aid of instruments or other ways ,because several kinds of troubles may share a common abnormal phenomenon ,and two or more abnormal phenomena may occur simultaneously due to a certain trouble .With this method ,you can reject some suspicious troubles and finally make a correct judgment .

7-3 Analysis of Troubles

7-3-1 Sudden stop of Compressor during Its running

The cause of sudden stop of a compressor during its running is mostly that the gas suction pressure and/or discharge pressure exceed their respective prescribed ranges, thus making a pressure-operated protective relay shut off the power to the compressor and stop it. In the following we discuss mainly the reasons for causing excessively high gas discharge pressure and low suction pressure.

1) Stoppage due to excessively high gas discharge pressure

a) Too much refrigerant charged into the system

Analysis of Trouble

The phenomenon, such as loose frosting and poor refrigerating effect, may occur if excessive refrigerant has been charged into the system. Superfluous refrigerant will occupy a certain space of the evaporator, thus reduce its heat dissipating area, and the phenomenon of “liquid striking” may occur, too. Meanwhile, dew or frost condensation may occur on the gas return tube, and the gas discharge pressure will obviously rise, when it reaches the threshold value, the protective relay will actuate and shut off the power supply to the compressor.

Remedy

Open the tubing, re-evacuate and then charge the system with a proper quantity of refrigerant.

b) Air left in the system

Analysis of Trouble

The residual air in the system will circulate together with the refrigerant in the system. The major symptoms caused by this residual air is higher gas discharge pressure, higher discharged gas temperature (the gas discharge tubing is considerably hot when you feel it with your hand), and poorer refrigerating effect. Furthermore, the gas discharge pressure will exceed its normal value when the compressor has run for a period not too long, thus making the protective relay actuate and bring to a stoppage.

Remedy

Check up how the air has been left in the refrigerating system. Generally, there are two possibilities: one is that the air has been sucked into the system when repairing due to carelessness or it has not

been purged out totally when evacuating the system; the other is that there are leak points at the low pressure end of the refrigerating system. Leak points appear mostly in those low temperature parts or assemblies, because the evaporation temperature is lower for such low temperature devices, especially at the low pressure end, it is easier for the air goes into the system. Once it has been ascertained that air does exist in the system, you have to open the tubing, re-evacuate it and then charge it with refrigerant.

2) Stoppage due to electric troubles

a) Thermostat is out of control

Analysis of Trouble

In case the thermostat does not work in its good order or its temperature sensor has not been installed properly, frequent stoppage is also likely to occur.

Remedy

Try to adjust the temperature sensor's position until the compressor can be started and stopped normally. If this cannot be achieved, and the stoppage still occurs repeatedly, it is most likely that the mechanical parts or contacts are out of order, disassemble the thermostat, make a thorough checkup and repair it.

b) Overload of electric motor

Analysis of Trouble

Probably, too many things have been put into the refrigerator, and hence the thermal load exceeds its refrigerating capacity ; or in case the power supply voltage drops considerably, the current flowing through the motor will increase drastically making the thermal protector actuate and the fuse blown , and hence the motor stops running. If the motor is still running continuously in such a case, its windings will be burned out.

Remedy

Reduce the thermal load, pay attention to the variation in voltage of the power supply.

c) Abnormal thermal protection

Analysis of Trouble

The compressor current is within its normal range, but the thermal protector actuates repeatedly.

Remedy

Replace the thermal protector with a new one.

3) Sudden stoppage due to other causes

Normal Stoppage

Start and stop of the compressor is generally controlled by a thermostat. When the temperature in the refrigerator reaches its desired value, the thermostat will shut down the compressor automatically. Never take this normal operation as a trouble; care should be taken to differentiate it from other real troubles in servicing.

7-3-2. Compressor won't start

In case the compressor cannot be started, you must find out the origins of this trouble through checkup step by step, because probably there are many causes, including those electrical and mechanical.

1) Inspect the power supply to see whether it is connected to the compressor circuit.

Analysis of Trouble

In case the compressor cannot be started, this will generally exhibit in the power supply circuit, for instance, power failure, poor contact of switch, and blown fuse. Make a comprehensive analysis of these phenomena, fine out its real cause and take correct measures to remove this trouble.

Remedy

a) Check the input power circuit to see whether where is voltage of the power supply, namely, the circuit which is connected to the knife switch. This can be determined with an avometer or a test pencil. If a blown fuse is found, ascertain and remove its cause, then replace it with a new one of the same specifications.

b) Check the compressor accessories, including its thermal protector and relay. In case the thermal protector is damaged, the compressor cannot be powered on. If the relay is out of order, the motor will not run and hum sound can be heard from it after the compressor is turned on, in that case, shut it down immediately, otherwise, the motor windings will be burned out in case this condition lasts longer.

c) Check the relay contacts and plugs to see if they are perfect and work reliably. Poor contact may cause the motor not running or humming.

2) Check the circuit voltage to see whether it is normal.

Analysis of trouble

If the circuit voltage is obviously lower than its rated value, it will be difficult to start the motor, and a hum sound can be heard from it.

Remedy

Measure the voltage with a voltmeter, if it is really too low, give directions to the user for buying a stabilizer so as to step up the voltage, thus normal operation can be achieved.

3) Check the thermal relay to see whether its contacts are closed.

Analysis of Trouble

The contacts of thermal relay sometimes may be open due to the leakage of temperature sensing agent from the temperature sensor.

Remedy

Remove the relay cover to check up its contacts, if they are open, this means that the original setting is not properly set or temperature sensing agent has leaked out of the temperature sensor. Try to turn the adjusting stem of this value in the direction of the lower temperature graduation, and then check the contacts to see whether they are closed. If they are still not closed, dismantle the temperature sensing disc and then immerse it into warm water to see whether the contacts actuate, if not, it can be preliminarily determine that temperature sensing agent has leaked out, and it must be replaced with a new thermostat.

4) Motor troubles and other electric faults

a) Motor windings have been burned or short-circuited between turns

Analysis of Trouble

When motor windings have been burned or short-circuited between turns, the fuse will be blown repeatedly, and the blowout occurs particularly at the instant when you close the knife switch.

Remedy

Check the terminals and the outer casing to see whether they are short-circuited, and measure the resistance of each phase with an avometer. If short circuit occurs or the resistance of a certain phase is low, this means that short circuit does exist in the windings and/or between turns, and insulation layers have been burned or deteriorated. A megameter can be used in this inspection, too. If the insulation resistance is lower than 2 MΩ, this means that the insulation layer is already breakdown. If the motor has been burned, repair it or replaced it with a new one.

b) Fault of control relay

Analysis of Trouble

Overheat burnout or wear of control relay contacts may occur generally. All these will cause poor contact in electricity.

Remedy

Dismantle it to repair, or replace it with a new one.

c) Poor electric contactor in thermostat

Analysis of Trouble

Burnout of contactor and leakage of temperature sensing agent may occur generally.

Remedy

Replace the old with a new one.

d) Check the terminals for loose connection and electric circuits for other abnormal phenomena.

5) Mechanical faults of compressor

a) Seizing of shaft

This phenomenon is caused mostly by poor lubrication, such ad insufficient quantity of lubricant, clogging in the lubricant oil line, or intermittent lubricant oil supply. Dirt and other impurities in the lubricant oil will increase its viscosity and cause the shaft to be seized. Copper plating may also result in seizing of shaft.

b) Seizing of piston

This is caused by too small fit clearance between the piston and cylinder or expansion due to heat.

Judgment of seizing shaft and piston After the refrigerator has been powered on, the compressor will not start and run, but a slight hum sound can be heard, and several seconds later, thermal protective relay will actuate and make the contacts open; this process will occur repeatedly, but the compressor cannot be started.

7-3-3. Compressor won't stop

Sometimes, the compressor will run continuously (for several hours or run without end), If the food placed in the refrigerator is not too much, there may be the following two situations: i) the refrigerator very low, this means that the control system is probably out of order; ii) the control system works normally, and there are troubles in the refrigerating system or other parts.

1) Temperature is set improperly

a) The temperature control knob is set to the "coldest" position. This position is to be used for fast freezing or continuous running, its temperature for power off is too low, therefore, the compressor won't stop and the temperature in the refrigerator becomes lower and lower.

b) Inspection method: check the temperature control knob to see whether it is set in the position

"coldest".

2) Thermostat is malfunctioning and makes the compressor running continuously

Analysis of Trouble

When the thermostat doesn't work normally, it will make the compressor run continuously, and hence very low temperature will be achieved in the refrigerator. The fault is generally due to the fact that the contacts of the thermostat cannot be released.

Remedy

Dismantle the thermostat and make a through checkup, if it is totally out of functioning, replace it with a new one.

3) Evaporation temperature is too high in refrigerating system, resulting in lower refrigerating capacity and hence continuous running of compressor

Analysis of Trouble

Leakage of refrigerant and clogging in a refrigerating system will directly affect its refrigerating capacity. Due to the reduction in its refrigerating capacity, the refrigerator temperature cannot reach its rated value, the thermostat won't work, and thus the compressor runs continuously. When the evaporation temperature in the system is too high, the temperature sensing agent in the temperature sensor is also hotter, therefore, the thermostat is unable to cut off the power supply to the compressor and stop it.

Remedy

If it has been found that the refrigerant in the system is insufficient in quantity, recharge it with refrigerant. In case clogging occurs, disassemble the part where it is blocked. If the evaporation temperature is too high, settle this problem with an appropriate quantity of refrigerant.

4) No stoppage of compressor due to damaged heat-insulation layer inside case body and/or door seal

Analysis of Trouble

When the heat-insulation layer inside the case body deteriorates or the door seal is not closely touches the door frame, the temperature in the refrigerator will rise and makes the compressor running continuously.

Remedy

Check the heat-insulation layer for its damaged parts; repair it to improve its heat-insulation property. If the door has deformed or the door seal is not tightly sealed against the case body, repair them,

respectively.

5) Too much food is placed in the refrigerator, or is placed too densely, resulting in poor ventilation or poor conditions for temperature sensing, and hence no stoppage of the compressor.

6) Too high ambient temperature, poorer ventilation and heat dissipation make the compressor running without stop.

7-3-4. Electric leakage of refrigerator

1) Slight electric leakage

Electric insulation has deteriorated due to being affected with damp, thus resulting in slight electric leakage.

2) Serious electric leakage

Refrigerator case has become live due to faults occurred in some electric devices or the erroneous wiring in installing power cord plug or outlet by the user. This is very dangerous.

3) Electric leakage test

a) Slight electric leakage

A tingle sense will be experienced as soon as you touch the metal parts of the refrigerator with your hand .When you test them with a test pencil ,its neon lamp will come on .In that case ,the first thing you need to do is to determine whether the grounding is perfect .If the grounding is no problem ,turn off the refrigerator immediately ,then check the insulation of electric circuits with an avometer .

b) Serious electric leakage

Never touch the case body of the refrigerator ,its door handle or other metal parts with your hand .Test the refrigerator with a test pencil ,it will light up intensively ;measure the resistance between the power cord plug and the case body with an avometer ,the reading will be zero (0Ω); in the worst case ,the fuse will be blown .Check the 3-prong outlet to see whether the live wire and the null line are inversely connected ,this makes the ground protection lead-out from the power cord plug being connected to the live wire .Another possibility is that the live wire and null line of the outdoor power supply circuit have been inversely connected accordingly ,this makes the null line become a live wire .

7-3-5.Stronger vibration and loader noise

1) Refrigerator placed improperly

a) Uneven ground

Uneven ground will cause the refrigerator to be placed unsteadily, causing stronger vibration and noise during its operation.

b) Leveling screws not properly adjusted

If the leveling screws on refrigerator legs have not been adjusted properly, vibration and noise will still occur even if the refrigerator has been placed on a level ground.

2) Abnormal noise from compressor

Three suspended spring inside the compressor case are out of balance, and strike against the case, moreover, the wear of compressor parts may cause noise sometimes.

3) Resonance of tubing and loosening of parts

Improper and compact lying of tubes or the loosening of parts may cause vibration and noise.

4) Inspection method

To find the sources of noise ,press the vibration spot with your hand while the refrigerator is in operation and listen attentively whether the vibration becomes weaker or vanishes .If the refrigerator has not been levelly placed ,put a level meter on its top table and adjust the leveling screws on its legs .In case noise occurs from the compressor ,strike different locations on the side surface of its case using a rubber hammer or hand hammer with a wood block in-between so as to determine whether the suspended springs are out of balance or being seized .

7-3-6.Clogging in filter

Analysis of Trouble

Total clogging of a filter is rarely to occur. This trouble is mostly caused by the paste-like matter formed from the substances filled into the system or other dust after the refrigerator has been used for a longer time, or by the dirt accumulated gradually inside the filter. Sometimes, tapping the filter may cause a passage for flowing. Touching it with your hand, you will feel that it is cooler compared with its temperature in the normal state.

Remedy

The same as described in the capillary clogging with dirt.

3) Troubles of Compressor

a) Breakage of gas suction and discharge valve blocks

Analysis of Trouble

The compressor works by means of the opening and closing of gas suction valve and discharge valve

to suck and discharge the refrigerant. If the valve block is broken, the refrigerant can not be discharged, and hence no refrigerating can be achieved.

Method for making judgment

It is quite difficult to differentiate this trouble from others because they often have similar symptoms. In repairing, firstly, hear attentively if there is some abnormal sound coming from the compressor (sometimes , the broken pieces of valve block may strike against the cylinder), and feel the compressor casing with your hand to ascertain whether it is too hot, this is also helpful to the troubleshooting; secondly, measure the pressures at the high and low pressure ports of the compressor with pressure gauges, if the gas suction valve block is broken, the suction pressure gauge pointer will swing violently and the suction pressure is very high, whereas when the gas discharge valve block is broken , the discharge pressure gauge pointer will swing drastically and the discharge pressure is very high. In the both cases, stop the compressor at once, and if technique is available, open the cylinder cover and check up the valve block, repair it, or replace it with a new one.

Sincere forever

Haier Group

Haier Industrial Park, No.1, Haier Road

266101, Qingdao, China

http://www.haier.com