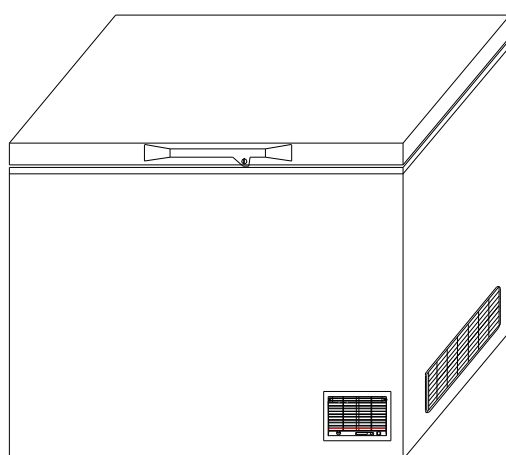


HBC-70/200

Ice-lined refrigerator

Service Manual



Features

- Ice-lined refrigerator,
- Temperature indicator
- Door lock for safety storage
- High pressure foam cover for efficient Temperature preservation.
- Adjustable thermostat.
- Superior insulation.

Haier Group

Manual No.:HBC-70/200(India)

Edition:20040728

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PRODUCT CODE ILLUMINATION AND SERIES INTRODUCTION

Product Code Illumination and Series Introduction

H B C -- □

A B C D

A: The first letter of “haier” in Chinese spelling.

B: The first letter of “Refrigerator” in Chinese spelling.

C: The first letter of “Refrigerator” in Chinese spelling

D: Capacity. (Unit: litre).

Examples:

HBC-200

-It represents haier refrigerator with capacity 339 litre,

HBC-70

-It represents haier refrigerator with capacity 529 litre,

FEATURES

Features

- Door lock for safety storage
- High pressure foam cover for efficient Temperature preservation.
- Adjustable thermostat.
- Superior insulation.
- Temperature stability 24 hours after the refrigerator is initiated,
The temperature inside the refrigerator will be kept between 0°C and 8 °C even if the power supply is interrupted for 16 hours(not less than 8 hours between every 2 power failure).
- Designed for storage of vaccines
- Low power consumption 20% less than the other similar refrigerator
- Imported high quality compressor and cooling system.

SPECIFICATIONS

Specifications

Model	HBC-70	HBC-200	
Capacity (L)	70	200	
Power Supply (V/Hz)	220V/50Hz	220V/50Hz	
Unit Dimension (W*D*H)	673*633*810	1243*633*810	
Unit Weight (Kg)	69	100	
Box Dimensions (W*D*H)	755*760*880	1325*760*880	
Box Weight (Kg)	95	112	
Container Quantity (40HC')			

SAFETY PRECAUTIONS

Safety Precautions

Read all of the instructions before using this appliance. When using this appliance, always exercise basic safety precautions, including the following:

- 1. Use this appliance only for its intended purpose as described in this uses and care guide.**
- 2. This refrigerator must be properly installed in accordance with the installation section. Instructions before it is used, See grounding instructions in the installation section.**
- 3. Never unplug your refrigerator by pulling on the power cord, Always grasp the plug firmly and pull straight out from the outlet.**
- 4. Repair or replace immediately, all electric service cords that have become frayed or otherwise damaged, Do not use a cord that shows cracks or abrasion damage along its length, the plug or the connector end.**
- 5. Unplug your refrigerator before cleaning or before making any repairs, Note: If for any reason this product requires service, we strongly, recommend that a certified technician perform the service.**
- 6. If your old refrigerator is not being used, we recommend that you remove the door and leave the shelves in place; this will reduce the possibility of danger to children.**

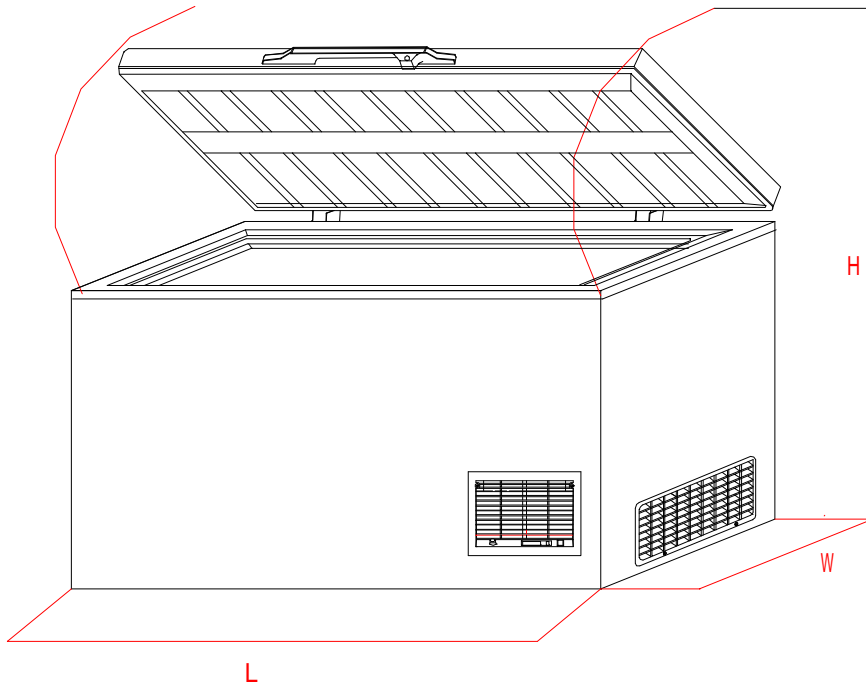
SAFETY PRECAUTIONS

Safety Precautions

- 7. This refrigerator should not be recessed or built-in an enclosed Cabinet. It is designed for freestanding installation only**
- 8. Do not operate your refrigerator in the presence of explosive fumes.**
- 9. Do not refreeze foods, which have been thawed completely.**

NET DIMENSION

Net Dimension



Model	HBC-70	HBC-200	
Unit Dimension (W*D*H)	673*630*810	1243*633*810	
Dimension (Door open)	673*630*1435	1243*630*1435	

INSTALLATION AND ACCESSORY PARTS

Installation and Accessory Parts

Unpacking Your Ice-lined refrigerator

- 1.Remove all packaging material; this includes the foam base and all adhesive tape holding the refrigerator accessories inside and outside.
- 2.Inspect and remove any remains of packing, tape or printed materials before powering on the refrigerator

Adjusting Your Refrigerator

- 1.Your refrigerator is designed for freestanding installation only. It should not be recessed or built-in.
- 2.Place the refrigerator on a floor strong enough to support it fully loaded.
- 3.When moving the refrigerator, never tilt it more than a 45-degree angle. This could damage the compressor and the sealed system.
- 4.If the refrigerator is tilted let it stand in an upright position for at least 24 hours prior to plugging. This is to allow the refrigerant to settle.

• Proper Air Circulation

- I To assure your refrigerator works at the maximum efficiency it was designed for, you should install it in a location where there is proper air circulation,
- I Plumbing and electrical connections.
- I The following are recommended clearances around the refrigerator:

Sides.....2”(50mm)

Top.2”(50mm)

Back.....2”(50mm)

INSTALLATION AND ACCESSORY PARTS

Installation and Accessory Parts

- I Do not over fill refrigerator for proper internal air circulation.

Electrical Requirement

- I Make sure there is a suitable power Outlet (220V) with proper grounding to power the refrigerator.
- I Avoid the use of cutting off the third grounding , this is a dangerous practice since it provides no effective grounding for the refrigerator and may result in shock hazard.

Install Limitations

- I Do not install your refrigerator in any location not properly insulated or heated e.g. garage etc,
- I Select a suitable location for the refrigerator on a hard even surfaces away from direct sunlight or heat source e.g. radiators, baseboard heaters, cooking appliances etc, Any floor unevenness should be corrected.

Operating Your Refrigerator

INSTALLATION AND ACCESSORY PARTS

Installation and Accessory Parts

Once the refrigerator is in its proper place, plug it in an electrical outlet having 220 volts.

Set the temperature, on the temperature contrail knob."1"being the warmest and "6"being the coldest. Initially set the temperature on"4". Place vaccines inside the refrigerator After using the refrigerator for 24 hours set the refrigerator to your desired setting.

In case you unplug your refrigerator or experience an electrical outage, allow 5 Minutes before plugging it back in.

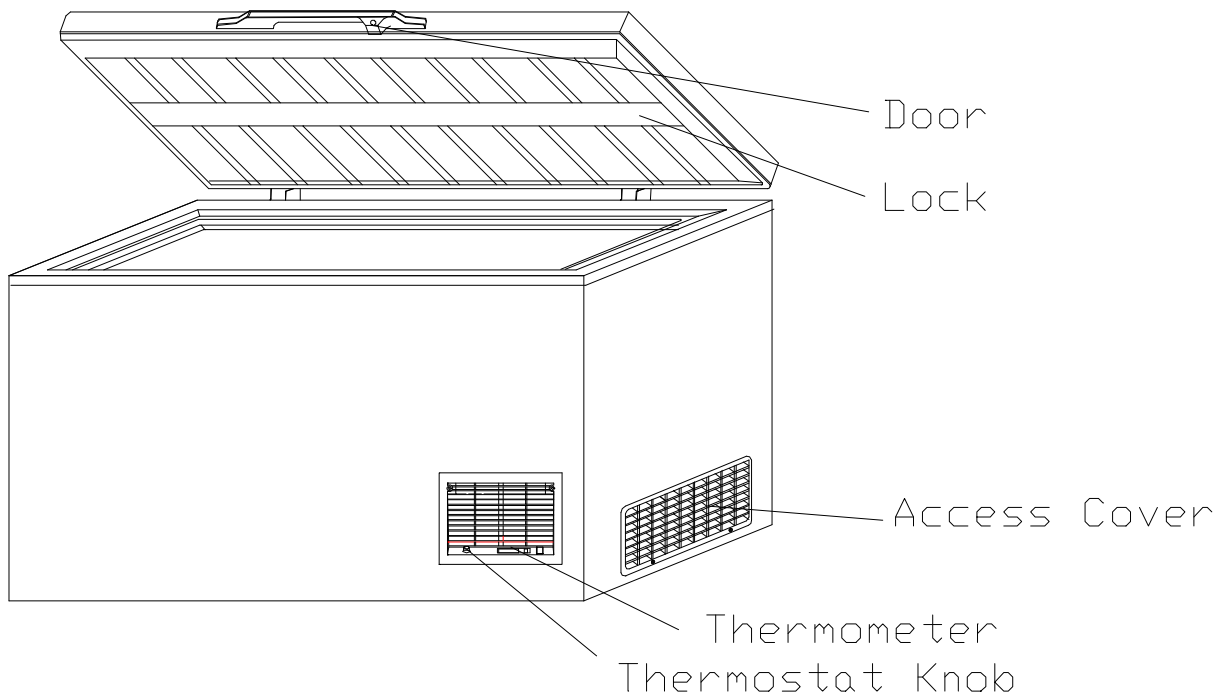
(Note: If the refrigerator has been placed in a horizontal or tilted position for any period of time wait 24 hours before plugging the unit in.)

Adjustable temperature dial:

Your refrigerator will automatically maintain the temperature level you select. The temperature level you select. The temperature control dial has 6 settings plus 0."1"is the warmest,"6"is the coldest.. Set the dial to "4"and allow 24 hours to pass before adjusting the temperature to your needs.

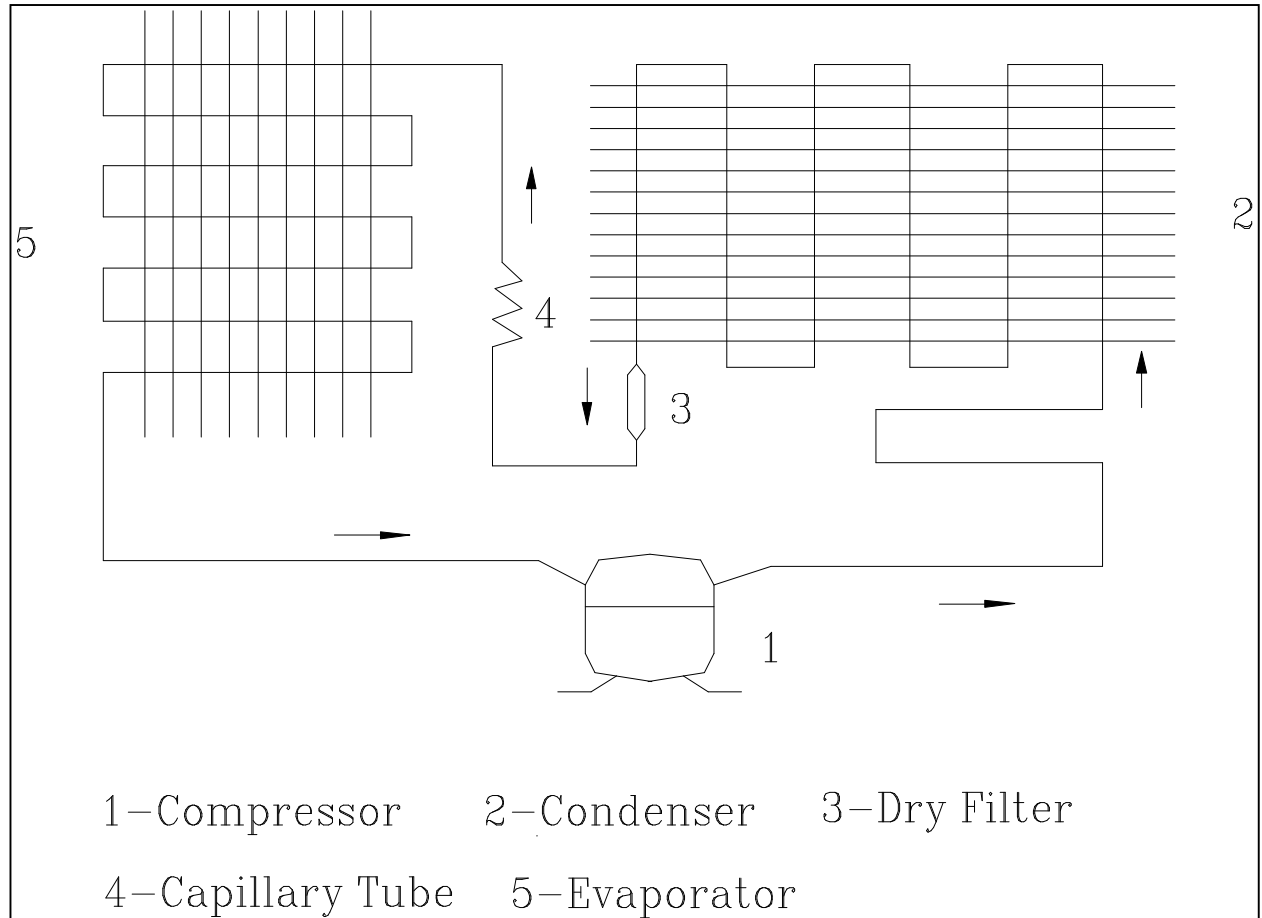
PARTS AND FUNCTIONS

Parts and Functions



SYSTEM FLOW CHART

System Flow Chart



The refrigeration system of direct cooling single-system refrigerators belongs to the category of a single-temperature and single-control refrigerating system with only one evaporator and is controlled by a single temperature control.

FUNCTION SCHEDULE

Function Schedule

Set the temperature, on the temperature contrail knob."1"being the warmest and "6"being the coldest. Initially set the temperature on"3~5". Place vaccines inside the refrigerator .After using the refrigerator for 24 hours set the refrigerator to your desired setting.

In case you unplug your refrigerator or experience an electrical outage, allow 5 minutes before plugging it back in.

(Note: If the refrigerator has been placed in a horizontal or tilted position for any period of time wait 24 hours before plugging the unit in.)

Adjustable temperature dial:

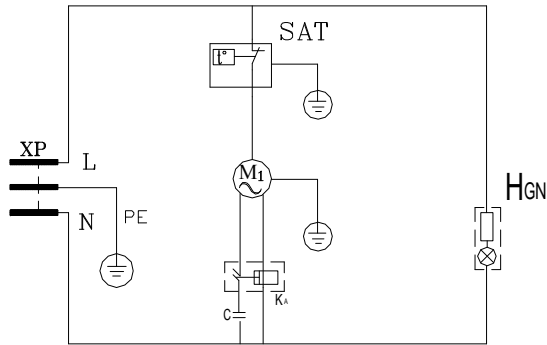
Your refrigerator will automatically maintain the temperature level you select. The temperature level you select. The temperature control dial has 6 settings plus . "1" is the warmest, "6" is the coldest. . Set the dial to "4" and allow 24 hours to pass before adjusting the temperature to your needs.

CIRCUIT DIAGRAM

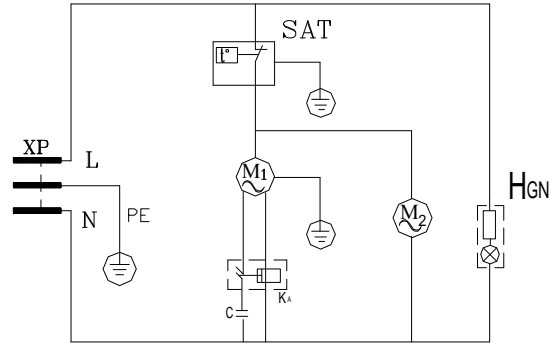
Circuit Diagram

Brief description of principle about HBC-70 and HBC-200

HBC-70 Circuit Diagram



HBC-200 Circuit Diagram



XP-plug

SAT-thermostat

HGN -Green Lamp

M1-compressor

C- Capacitor

KA-starter

M2-cooling fan

Brief description of principle about Thermostat:

When the temperature in the refrigerator is higher and reaches the value for starting the machine, the thermostat will be closed, the compressor will run; When the temperature in the refrigerator is lower and reaches the value for closing the machine, the thermostat will be open, thus the compressor will be stop running.

MAINTENANCE SERVICE AND TROUBLE SHOOTING

12.1 System Trouble shooting

12.1.1 Servicing refrigerator

(1) Check the whole circuit of refrigerator, if there are wire connections came off, any wires broken, or a short circuit.

(2) Check the insulation of the whole refrigerator. At normal situation, the resistance is greater than 2 mebohms; if it is less than 2 mebohms, please make a further check of the refrigerator resistance. Set the voltmeter to R1 Ohm position, put the two voltmeter leads pencils into L and N terminals respectively, watch the indication of odometer. The normal value is several Ohm to tens of ohm. If the resistance is zero, means that there is a short in the refrigerator circuit or there is a short caused by a bad compressor or fan motor. The reason should be found out and repaired. If the resistance is too big or infinite, this means that there is broken circuit, please check and solve it.

After the above checks, the refrigerator will not have any electrical problem and you can switch power on for further completely check.

MAINTENANCE SERVICE AND TROUBLE SHOOTING

12.1.2 Reasons of electricity leakage of refrigerator

(1) Leakage of compressor: mainly because of serious vibration, the motor coil of compressor contacts with the shell, the coat of enameled wire will come off some where and connect with shell. Other reasons may be over voltage, insufficient of voltage, adverse circumstances (temperature too high, ventilation and heat radiation to bad) for refrigerator, thermal protection unit out of order, etc. They will make the motor coil over temperature, insulation material loose, insulation is damaged then electricity will occur.

(2) Leakage of motor connection terminals: the connection terminals of fully enclosed compressor are made from high temperature soda glass sintered ceramics, around the terminals are filled with a high polymer. The terminals and insulation material must have the same linear expansion coefficient, the for requirement between terminals and the shell is more than 0.5 million ohm. The reason of terminal leakage is that soda glass is broken or there are conductive materials such as water, dirt, etc., adhered to terminals.

MAINTENANCE SERVICE AND TROUBLE SHOOTING

If electricity leakage occurs outside the compressor, please use tetra chloromethane or alcohol to clean it. If the leakage occurs in the inner of compressor, it needs to be changed.

(3) Leakage of temperature controller: because of too long a period of service or too high temperature, or too much dirt, or too high humidity, there may be electricity leakage. If it has been defined that there is leakage of temperature controller, please change.

(4) Leakage of starting relay: during mounting and repairing, screw of relay lead is easy to contact the shell and leakage will then occur. If you suspect the relay is bad, check it. If there is leakage, please make the connections again and leave a piece of insulation paper under the screw.

(5) Leakage of fan: because of too high humidity of refrigerator environment or a bad fan controlling unit, the fan is burned after long time operation and thus causes leakage. Using voltammeter to measure the insulation resistance between each respective connection terminal and the refrigerator body, if the resistance is too little, means there is leakage caused by humidity; if the resistance

Is zero, means the fan coil is burned or short-circuited. Please change the fan.

MAINTENANCE SERVICE AND TROUBLE SHOOTING

12.1.3 Troubleshooting observation

(1) At normal operation conditions, the temperature around the surface of refrigerator evaporator is nearly the same; the thickness of frost layer is similar. If there is no frost at the surface of evaporator (bed type refrigerator at all of its inner wall), or only a small part at the upper, conclusion can be made that the operation of refrigeration system is not normal, the refrigerant is insufficient or there is leakage.

(2) Check the system tubing and make sure there is no leakage, especially at the joint connections. Refrigerant has good permeability, and it also contains a little refrigerant oil. If there is leak, there will be traces of oil at the leak points.

12.1.4 Troubleshooting by sounds

(1) When the refrigerator is working normal, high-pressure liquid refrigerant flows into the low-pressure evaporator via a capillary tube, a gas flowing sound and water flowing sound can be heard. Open the refrigerator door and access to the evaporator, you can hear the sound. If there is no sound or there is sound a little now and then, there must be leakage of system refrigerant or insufficient charge

MAINTENANCE SERVICE AND TROUBLE SHOOTING

(2) After switching on power, Listen to the running sound of the compressor whether it is normal or not. Whether or not hear normal running sounds. If there is heavy buzz that means the motor has not been started normally. If there is bump sound, this means that the suspended spring in the compressor is broken and the compressor is running in tilt. When these matters occur, please change compressor.

12.1.5 troubleshooting by touch

(1) Touch the cover of condenser, after continuous operation, the upper part of the cover is the warmest; the temperature of lower part is similar to room temperature. Its temperature is relative to environment temperature. The temperature in winter is low and the condenser's temperature is low too, and there is only a small part warm. In summer, the temperature is high and the temperature of condenser cover is high too, and the whole condenser is warm.

(2) The temperature of high-pressure exhaust pipe is high, when touching with your hand, in summer it is hot; in winter it is also hot. The temperature of low-pressure gas inlet pipe is low. In summer there is dew at the pipe wall and it will feel cool when touching; when touching in winter, it will feel cooler.

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(3) The cover temperature of The evaporator can be as low as -30℃ it will feel sticky when touching. If you'd like to touch, please move your hand over it quickly, otherwise your hand will be stuck.

(4) At normal operation of refrigerator, the temperature of filter dryer cover is similar to room temperature, only a little warmer. If the cover temperature is much higher or lower than that of environment, and there is frost, there must be problem with the refrigeration system.

Touching the above mentioned parts, if there is big temperature difference compared with normal, there must be problem and further decision should be made.

12.1.6 System noise repair

Normally there are two kinds of refrigerator noise, one is the natural noise of compressor and fan, and the other is the resonance noise or structural noise. The natural noise of compressor and fan is controlled within a standard range, if the range is exceeded, the compressor or fan needs to be repaired or changed. The resonance or structural noise can be handled as follows:

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- (1) If the refrigerator is not level, or if the floor is loose, please adjust the base cover or fasten the floor.**
- (2) If noise is caused by tighten loose of screw between the base cover and refrigerator body, please make it tight.**
- (3) If the reason for noise is the aging rubber cushion of compressor or a loose fastening clip, please change rubber cushion, or secure clip.**
- (4) If tubing bumps against refrigerator body, or against each other, make adjustments accordingly to remove noise.**
- (5) If fan blade is blocked and thus causes noise, please clear the obstacles around the fan, or adjust fan blades.**
- (6) If the fan supporter is loose and noise is caused, please tighten.**

12.1.7 Poor freezing effect analysis and solutions

- (1) Check the position of temperature control dial, if it is set at “weak” position, please change to “middle” or close to strong position.**

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(2) Check the rear side and the top of refrigerator, if it is too close to the wall or not; if the refrigerator is under sunlight directly or if it is near thermal source or not; if the room temperature is too high or not; if the condenser is blocked by cloth pieces or paper or dirt or not. Any one of these matters will affect heat radiation of condenser and refrigeration ability will be reduced.

(3) Check if there are too much vaccines stored in the refrigerator, if hot f vaccines has been put in or not, Too full of vaccines is not good for cold air circulation. Hot vaccines can only be put in when it gets cool.

(4) Check if the refrigerator door has been closed well, if the door seal bar is too dirty and the door cannot be sealed well. Remove dirt and put on a little talcum powder.

(5) Frequent opening and extended opening of refrigerator door will reduce refrigeration ability.

12.1.8 How to handle the seal bar for poor sealing

If there is too much dirt and the sealing effect is not well, please take a rag and dip in warm water and clean the seal bar. After

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cleaned, put on a little talcum powder. If there is still seam, you can put an electrical blower outside the seal bar and make it warm, keep the temperature at 50-60°C, press the bar to make it recover, and press the bar around by hand, so that it can recover. If this is not effective, take a piece of sponge with about 10mm wide, 5mm thick, a little longer than the seam and put it inside the seal bar, i.e., the place between the bottom of seal bar and the door cushion. This will make the seam place higher and adhere to refrigerator body the same as other places.

12.1.9 Why refrigerator cannot be used at low temperature environment

When environment temperature is below zero, the lubrication ability of freezing oil in refrigerator compressor will decrease, the compressor will be difficult to start or cannot be started, or Compressor damage may occur.

12.1.10 How to know there is problem with compressor motor

It is easy to find out motor problem by checking the resistance of coil. The method is to connect the terminals of “common” and “run” using ohm- meter, the coil resistance can then be determined. Using terminals “common” and “start” can measure the resistance of starting coil. If the value is infinite, the coil must

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be open. If the resistance is much less than the value the motor has, there must be short circuit problem inside the motor or the windings are burned.

MAINTENANCE SERVICE AND TROUBLE SHOOTING

12.1.11 Refrigerator problem analysis and service

Problems	Reasons	Removing methods
Compressor can not be started	<ol style="list-style-type: none"> 1. Fuse is broken 2. The contact of plug, socket, and cable is not good. Cable broken. 3. The voltage is too low, 10-15% less than rated voltage 4. The knob of temperature controller is at "rest" position. 5. The temperature controller is out of order. 6. Starting relay or thermal protection unit is out of order or broken. 7. Wire broken of motor starting coil or operation coil. 8. The compressor motor is burned or rotator and stator are blocked to dead. 9. There is leakage of high-pressure gas valve or the shaft is embraced to dead. 	<ol style="list-style-type: none"> 1. Check if there is short circuit and solve it, if not, change capable fuse 2. Check and connect tightly, or change. 3. Use till voltage rises to rated value or attach a stabilizer. 4. Rotate the knob to wanted position for suitable temperature. 5. Change the controller. 6. Change starting relay or thermal protection unit. 7. Measure using $R \times 1$ position of avometer, if there is wire broken, change compressor. 8. Change compressor. 9. Change compressor.
Compressor starts too frequent, operation time too long, but temperature drop in refrigerator is too slow	<ol style="list-style-type: none"> 1. The distance between temperatures sensing tube of temp. Controller and evaporator are too big. 2. The temperature controller is out of order. 3. Food stuffs in the refrigerator too much, door opens too frequent and open time too long. 4. The environment temperature is too high, humidity too high, airflow is impeded. 5. The frost layer at the evaporator is too thick. 6. The refrigerant is insufficient or leakage. 7. Compressor efficiency is reduced. 8. The drying filter is blocked. 	<ol style="list-style-type: none"> 1 Adjust and make it close to evaporator cover. 2.Change the temperature controller. 3.Reduce them. 4.Put the refrigerator to suitable place and make air circulate well. 5.Remove frost regularly. 6.Check or supplement refrigerant. 7.Change compressor. 8.Change new drying filter.
Compressor runs without stop, temperature in refrigerator is too low	<ol style="list-style-type: none"> 1.The knob of temperature controller has been set to "over cooling" position. 2.The contacting point of temperature controller is adhered. 3.The temperature sensing probe of controller is not placed well, and causes maladjustment 4.Compressor efficiency reduced. 	<ol style="list-style-type: none"> 1. Change the position to moderate. 2. Repair or change. 3. Adjust to suitable position, normally contact tightly with evaporator cover. 4.Change compressor.

Compressor buzzes and cannot be started, thermal protection unit jump repeatedly	<ol style="list-style-type: none"> 1. Voltage is too low. 2. Starting relay out of order. 3. The starting coil of starting motor is broken. 4. Compressor does not run. 	<ol style="list-style-type: none"> 1. Supplement a stabilizer, adjust to rated value. 1. Change starting relay. 2. Change compressor. 4. The shaft and piston in the compressor is blocked, please change.
After short time of operation, over load protection unit cuts off	<ol style="list-style-type: none"> 1. The voltage is too high. 2. Over load protection unit is not good, it jumps earlier. 3. Starter contacting point is adhered. 4. There is short circuit in compressor. 5. There is mechanical problem in the compressor. 6. Temperature around compressor is too high. 	<ol style="list-style-type: none"> 1. Supplement a stabilizer and adjust its value to rated. 2. Change over load protection unit. 3. Change starting relay. 4. Change compressor. 5. Change compressor. 6. Increase heat radiation space.
Too much noise when compressor runs	<ol style="list-style-type: none"> 1. The floor is loose. 2. The refrigerator body is not stable and in level. 3. When compressor runs, friction between tubes and refrigerator body causes resonance. 4. Compressor fixing screw is loose. 5. The vibration absorption cushion for compressor fixing is too tight, or too loose or ageing. 6. Compressor inside noise is too big or vibration absorption suspending spring is broken. 	<ol style="list-style-type: none"> 1. Reinforce the floor. 2. Make the refrigerator body stable. 3. Move the tube a little away to avoid friction. 4. Make the screw tight. 5. Adjust the degree of tight or loose of vibration absorption cushion, or change cushion. 6. Change compressor.
There is no frost at evaporator	<ol style="list-style-type: none"> 1. There is serious leakage of refrigerant. 2. There is dirt blocked the capillary or system. 	<ol style="list-style-type: none"> 1. Check leakage, make welding repair, and fill refrigerant again. 2. Clean the capillary or change filter.
Frost at evaporator is not full	<ol style="list-style-type: none"> 1. There is some leakage of refrigerant. 2. There is dirt block, but not serious. 3. Refrigeration quantity of compressor is reduced. 	<ol style="list-style-type: none"> 1. Check leakage, make welding repair, and fill refrigerant again. 2. Clean the capillary and filter. 3. Change compressor.
Evaporator frosts too rapid, frost layer too thick or frozen to ice	<ol style="list-style-type: none"> 1. Vaccines put into refrigerator contains water. 2. Too much vaccines has been stored. 	<ol style="list-style-type: none"> 1. Please let or make vaccines dry after cleaning, then store it. 2. Store only corrects quantity of vaccines.
Electricity leakage of	<ol style="list-style-type: none"> 1. Refrigerator body has not been connected to the ground. 	<ol style="list-style-type: none"> 1. Make the ground connection as stipulated.

refrigerator body, you will feel tingle when touching by hand	2. The compressor terminal contacts body shell and causes short circuit. 3. When the components of electrical system get wet, insulation ability is dropped, electricity leaks.	2. Change compressor. 3. Check carefully step by step, if insulation is seriously damaged, please change; remove wet parts and put them into drying box to make them dry.
Electricity leakage of fan	1. Environment temperature too high or insulation ability of insulator is dropped. 2. There is short circuit between fan coils or the fan coil is burned.	1. Change fan. 2. Change fan.
Fan too noisy	1. The blade of fan is blocked or fan supporter is loose. 2. The clearance of fan axle is too big.	1. Clear obstacles around the fan or tighten the supporter. 2. Change the fan.
The fan doesn't run	1. Check if any connection has come off. 2. Check if the fan is burned.	1. Change the fan. 2. Change the fan.
Electricity leakage of temperature controller	1. The service time is too long. 2. The environment is too dirty. 3. Humidity is too high.	1. Change temperature controller. 2. Use brush to remove dust. 3. Make the temperature dry and control the environment humidity.
Temperature controller out of order	1. There is leakage of temperature sensing medium. 2. Damage of cam of contacting point spring, etc.	Change temperature controller.
The probe of temperature sensing tube doesn't contact evaporator well	It has not been mounted to position or changed during transportation.	Mount it again.

12.1.12 Procedure for fan change

- (1) Switch off power and open the fan protection cover.**
- (2) Remove the fan bolts by using fork wrench or universal tool.**
- (3) Loose the fan blade and take it out.**
- (4) Take the fan out from the space between compressor and tubes.**
- (5) Mount new fan from the space between the compressor and tubes, put blade onto position and secure it by using a fork wrench or universal tool.**
- (6) Make a test run; check if the operation is normal, if there is any blocking**

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of blade.

(7) Make sure not to bend or damage tubing during removal and installation.

12.1.13 Procedure for temperature controller change

(1) Switch off power.

(2) Remove side protection cover.

(3) Unscrew fastening nut.

(4) Hold the base end of temperature sensing tube and the controller, pull out downward.

(5) Change with new temperature controller.

12.2 Common refrigerator problems

12.2.1 Refrigerator cannot be started

When switching on power, the refrigerator cannot be started. Determine first that the failure is caused by inside or outside factors. The factors may be:

(1) Outside factors

① The fuse is burned, or the contact of plug and socket is not well, or the voltage is too low.

② The knob of temperature controller is set to off position.

(2) In side factors

① Electrical problem of refrigerator (normally caused by connection terminals coming off or not in good contact).

② Temperature controller out of order (contact point are burned or switch

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element is damaged, etc.).

- ③ The start capacitor is bad.
- ④ The starter relay or overload protector is bad. A bad starter normally is caused by a burn a contact points or the welded point has come off; a bad thermal protection unit is normally caused by burn contact points or a bad heating wire.
- ⑤ The motor winding are burned.
- ⑥ The compressor shaft is broken and blocking the cylinder.

12.2.2 Operation of refrigerator is not normal

Refrigerator starts when power is switched on, but after a few seconds or 1-2 minutes, it stops automatically and will start again in several minutes. It stops again within a very short time period after starting. If it runs like this

Continuity and can not work normally; there are several reasons for this matter:

(1) Big fluctuation of voltage

The voltage required for proper operation is 220V olts. If the voltage is too high, the current flowing through the starter will increase accordingly. When it exceeds the permissible value, the starting contact point will keep in connection state for a long time and cannot be released in time (at normal situation, the motor starting coil will cut off in about 1s after starting). This will make the coil temperature rising rapidly, and then the thermal protection unit cuts off the circuit and stop operation. When power is cut off, the temperature of thermal protection unit reduces quickly and will switch power on when reaching the reset temperature. At this time, if the contact point has not been released, the starting contact point could not contact tightly and it is in false connection. This will make the compressor tremble; thermal protection unit will open after a short time.

(2) Operating amperage too high

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Refrigerator operation current is too big and will not operate normally. There are two reasons way:

First, the refrigerator stops automatically after a few seconds after starting, several minutes later it starts again and stops automatically again. With in cycles like this and the motor, or starter, and thermal protection unit will burn up after a long time. The main reason is: the motor coil is shorted at some parts.

Second, the refrigerator operates a certain time after starting, but it will stop automatically before the temperature reduces before the desired temperature is reached. After several minutes, it will start again, and the electricity consumption increases bad. The reason is that the insulation around the motor windings bad.

12.3 Service and technical requirements of a R134a refrigerator

12.3.1 Refrigeration equipment requirements

The compressor, condenser, evaporator, drying filter must be special for R134a refrigerator and not be confused.

12.3.2 Repair equipment Requirements

- (1) The evacuation and fill machine is special only for R134a use.
- (2) Other equipment (such as pressure gauge) has no special requirements,

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but once it is used for R134a refrigerator, it can be no longer for other use.

12.3.3 Service procedure

(1) Operation method of repairing equipment (please see instruction manual).

(2) Special requirements

① The time interval from opening of compressor to the beginning of evacuation can not exceed 10 minutes.

② The evacuation time shall not be less than 45 min.

③ In case there is leakage of refrigerator, if leakage occurs at high-pressure end, it is repairable. Please blow high purity N₂ before welding. If leakage occurs at low-pressure end, Check system pressure, if the system has no pressure, the refrigerator has to be scrapped and change with new one, if there is pressure, it is repairable.

12.3.4 Changing procedure of R134a compressor

(1) Switch power off: Open the protection cover by using cross screwdriver or universal

(2) Screwdriver.

(3) Remove electrical parts of compressor.

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- (4) Remove the four mounting bolts of compressor by using fork wrench or universal tool.**
- (5) Remove the compressor.**
- (6) Install new compressor and new filter dryer and weld them. The open time of system shall not be more than 10 min.**
- (7) Connect the R134a recovery unit to the low sideline of the compressor, and then evacuate. The evacuation time shall not be less than 45 min.**
- (8) Fill system with R134a according to its original quantity.**
- (9) Check if there is any leakage at welded point by using soapsuds.**
- (10) Use clean gauze to wipe away welding powder and flux.**
- (11) Connect the electrical controlling unit of compressor.**
- (12) Mount and adjust temperature controller.**
- (13) Switch on power for test run, check unit operation.**

12.3.5 Compressor installation and brazing procedures

- (1) Install new compressor.**
- (2) Compressor is not allowed to suck in air directly for check or other test.**

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- (3) When changing with new compressor during service, the seal plug shall be opened last and make the brazing and evacuation immediately.
- (4) When seal plug of compressor is removed, if there is no gas flowing sound (no pressure), the compressor shall not be used.
- (5) Compressor has no seal plug it cannot be used.
- (6) There should be no grease adhered to service operator's hands.
- (7) The unpacking of the filter dryer of refrigerator should be opened right before use.

12.4 Application and maintenance of refrigerator

12.4.1 Product characters

- (1) Completely green environmental bed type refrigerator uses R134a as the refrigerant, which is recognized internationally. It has an ozonosphere depletion coefficient ODP=0.

New climate type design: commercial refrigerator uses wide temperature zone design. At 38°C(100° F) high temperature, the refrigerator can start and stop freely.

- (2) New refrigeration system design: it takes dual direction refrigeration system, thus increases refrigeration speed and prolongs compressor life.

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12.4.2 Notice for use

- (1) The refrigerator should level, the tilting angle when moving shall not be greater than 45° , so that the sliding door could not move out from its guiding slot and other accident will not happen.
- (2) The clearance between refrigerator and other objects should be more than 30 cm for ventilation and heat radiation.
- (3) Please don't leave the refrigerator at humid or corrosive gas area.
- (4) Refrigerator should be placed at a place with proper ventilation, away from heat source, and avoiding direct sunlight.

At the first application, please wait some time for operation (in summer 6 hours, in winter, 4 hours), when the temperature inside the refrigerator has

- (5) reached to -15°C and below, then you can put vaccines in. If vaccines is put in too early, it may get damaged, as the temperature is still high.
- (6) Do not over pack refrigerator.
- (7) Place vaccines by reasonable sorts, try to power open door frequency and time so as to reduce the loss of refrigeration and reduce consumption.
- (8) There are four wheels at the bottom of refrigerator, but it can only be used for short distance and on level road movement. If it is required to move frequently, please put the refrigerator onto a strong trolley base.

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As this type refrigerator is often used outdoors, please make sure that the plug is firm, so that unnecessary loss caused by infirm plug can be avoided.

- (9) Cold drinks and snacks, which contain much milk and needs to be stored at low temperature, please try to put them at lower part of refrigerator.
- (10) When the refrigerator is used outdoors, please keep unit away from direct sun light. Frequently clean the inside and outside of refrigerator especially the cabin part including condenser, compressor, etc.

12.4.3 Safety notice of product

- (1) The refrigerator needs to be on a separate ground circuit with a 5A minimum carrying capacity.
- (2) If the electrical cable needs to be extended, the cross section of extending wire should not be less than 1.5mm².
- (3) **There must be reliable ground connection for the refrigerator; ground line is not allowed to connect to water pipe, gas pipe, etc.**
- (4) Once the refrigerator is cut off, at least 5 minute must be waited for starting again, otherwise the compressor or refrigeration system will be damaged.
- (5) Explosive, flammable and volatile substance, liquid filled glass containers, alkalis or corrosive acids are not or be stored in refrigerator.
- (6) Do not let children play in refrigerator compartment so as to avoid suffocation or damage to refrigerator.
- (7)

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12.4.4 Maintenance

Frost removal: At the inner container, there will be frost layer after using some time. If the layer is too thick, it will affect refrigeration and increase electricity consumption.

- (1) At a regular period, when the frost layer reaches about 5mm, please remove it by plastic shovel.**
- (2) When removing frost, switch power off, take out stored vaccines and place in a cool place. In order to accelerate frost-removing speed, containers with warm water can be put into compartment.**
- (3) When frost buildup has melted, pull out the drainage plug wipe refrigerator so water can drain out. Compartment down with a dry cloth.**
- (4) Cleaning:** For safety reason, please disconnect before cleaning so as to avoid electrical shock or damage to unit.
- (5) When cleaning the refrigerator, please use soft cloth or sponge and dip in water or soap water (non-corrosive neutral detergent is available). After cleaning please make it dry by using cloth so as to avoid rust.**
- (6) Please clean the condenser, compressor in the cabin and dust proof element by using soft brush regularly, so as to keep good refrigeration effect. (Dust proof element 2-3 days)**
- (7) Down time:** If the refrigerator has extended down time, please disconnect power supply, and wipe unit clean according to the above-mentioned methods. Open the door, till it is dry and then seal for storage.

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12.4.5 Standard procedure of maintenance

- (1) **Cleaning unit cabinet:** Take a cross screwdriver, remove the cabinet board and rear protection cover. Take a brush and wipe away dust from condenser, fan, compressor and temperature controller. Wipe clean and avoid damaging pipes and electrical parts.
- (2) **Switch on power and check the refrigerator operation.** If not normal, check and repair.
- (3) **Check all brazing connections.** If the black paint has peeled off and there is rust, please grind the surface slightly using No.0 grinding paper. When the rust is removed, wipe it with clean towel. Then take a brush and dip in alcoholic paint and paint the welded points and pipes.
- (4) **Check the casters and change if there is any damage.**
- (5) **Check the power cord, if there is any wear or damage, please change.**
- (6) **Take an avometer and check if the resistance of ground resistor is normal.**
- (7) **Check the insulation by using, if it is abnormal; please check the circuit and various components.**
- (8) **If the trademark is damaged or lost, please change with new Haier trademark.**
- (9) **Wipe the inside and outside of refrigerator clean.** If refrigerator will be off for a long time, wipe water away, and put the refrigerator into a plastic bag and leave it at a dry warehouse with good air convection and a level floor.

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12.5

12.5.1 Refrigerator repair tool and equipment

(1) Recovery machine

(2) N₂ container, O₂ container, acetylene container and torch kit.

(3) Thermometer.

(4) Voltmeter.

(5) Test pencil.

(6) Manifold gauges

(7) Flathead screw driver.

(8) Philip screwdriver.

(9) Needle nose pliers, notch pliers, sealing pliers.

(10) Hansen valve.

(11) Tube cutters.

12.5.2 Notice for use

R134a filling equipment can only be used specially for R134a refrigerant,

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(1) It is not allowed to fill R134a by R12 filling equipment.

(2) Please keep the pliers, pipe cutting unit and Hansen valve clean, and keep them away from grease dirt.

12.5.3 Procedure for filling equipment

(1) Preparation before use

- ① Visually inspect recovery machine for abnormalities, etc.**
- ② Keep all valves closed to equipment until really to proceed.**

(2) Evacuation

- ① Connect recovery machine hoses to system fittings**
- ② Switch on power.**
- ③ Switch on motor.**
- ④ Open all related valves.**
- ⑤ Observe the pointer of vacuum meter when it is accessing the mark -1.**
- ⑥ Evacuation time shall not be less than 45 min.**
- ⑦ After evacuation close valves.**

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- ⑧ Switch off motor.

(3) Filling

- ① Determine the filling quantity first according to the refrigerator being repaired. (Each small mark of the liquid tube is 25g, each big mark is 100g).
- ② Open all related valves.
- ③ When the liquid level has reached filling quantity, close valves.

(4) Test run

- ① After filling, turn on power to refrigerator for test run. Observe the unit operation.
- ② Switch off power.

12.6 Refrigerator noise

12.6.1 Refrigerator noise sources

Refrigerator noise comes from the expanding with heat and contracting with cold of compressor, evaporator or condenser; from the contacting or resonance of pipes; from the flowing of refrigerant; or from the vibration of refrigerator because the floor is not level, etc.

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12.6.2 Compressor

Refrigerator noise mainly comes from the compressor. The Compressor generates various sounds. There are continuous and not continuous, periodic and not periodic. Their frequencies may be from tens of Hertz to thousands of Hertz. Reasons for compressor noise are:

- (1) There are two pieces thin elastic steel slice inside the compressor (gas in valve and gas out valve), when the refrigerator starts, each steel slice will open and close about 47 times per second, this will cause vibration sound. At the same time, the open and close of steel slice will contacts other parts and also make sound. The continuous buzz we heard is this kind of sound.
- (2) When compressor is produced, there must be clearance between components. When refrigerator is running, the existing of clearance will make some components touch and gives out sound. Especially, at starting and stopping, the forces acted on compressor components changes greatly and bigger sound will be generated.
- (3) Noise of flowing liquid

The running process of compressor is a continuous gas in and out process.

If the pressure of refrigerant gas breathed in or exhausted out changes suddenly, vibration sound will be generated.

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(4) Resonance sound of compressor components

Compressor parts, such as compressor body, exhaust tube, noise eliminator in compressor, supporting spring, etc., will cause resonance sometimes and give out sound.

(5) Collision between body and shell

Compressor body is suspended by three pieces of spring or supported by spring in the shell. At starting or stopping, forces acted on compressor changes greatly and sometimes make the body contact its shell and makes sound. This situation is of short duration.

(6) The electromagnetic sound of a hermetically sealed motor, is relatively small

12.6.3 How is the sound of water flowing generated?

Answer: When liquid refrigerant is flowing especially through the evaporator, there will sound like water flowing. This sound is different, for the evaporator used and assembly technologies during producing are different. If there is not this sound at refrigerator operation, and evaporator cannot make refrigeration, condenser is not hot, this means there is restriction or there is a refrigerant leak.

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12.6.4 Gas flowing sound

At operation of compressor, it breathes in and exhausts out gas continuously. When liquid refrigerant flows through capillary, there will be gas jet and makes sound of gas flowing. This is normal sound and may be different for various refrigerators as compressors and evaporators used are different.

12.6.5 Why there is sudden “cluck” sound or “pattering” sound from refrigerator?

Answer: This is the sound of expanding with heat and contracting with cold of condenser and evaporator, or the sound of ice at evaporator surface because of sudden heat or cold. This sound may occur at the following situations:

- (1) Newly bought refrigerator, the internal stress of materials has not been eliminated. With time going on, the stress of materials will disappear and it is less possible to make this sound.
- (2) Temperature in the refrigerator is not uniform just after frost melting.
- (3) When open door and take out vaccines, the evaporator feels hot suddenly.
- (4) Temperature changes greatly of condenser and evaporator several minutes after starting or stopping of refrigerator.

Expand with heat and contract with cold is natural law, and this sound is normal.

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12.6.6 Why the refrigerator's noise increases after using sometime?

Answer: After half a year or one year's use, clearance will increase because of wear of inner components, and compressor's noise will increase accordingly. Then it will get stable till the whole life of refrigerator.

12.6.7 Why refrigerator's noise increases after stop use for sometime?

Answer: After long time stop of refrigerator, the crankshaft of compressor may be blocked by dirt brought in by lubrication oil or blocked by freezing lubrication oil because of low temperature. For this reason, compressor cannot be started, or noise will increase after starting, and the wear of crankshaft will increase too. It is better that refrigerator doesn't stop use. Sometimes newly bought refrigerator also has this characteristic. After a period operation, it will get normal.

12.6.8 How to reduce refrigerator's noise?

At present, all kinds of refrigerators have the problem of noise. Scientists have been seeking a method to solve it but to little effect. The final solution depends on new improvements and developments in technology.

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12.6.9 why refrigerator noise changes greater at night?

Answer: This is because the affection of refrigerator noise to people is relative to the level of environmental sound. In noisy city or shops, people feel the noise is little, while in countryside or quiet living room will feel the same noise greater. This is the reason that people feel the refrigerator gets noisier at home than at shop.

12.6.10 What are the national stipulations for refrigerator noise?

Answer: Regarding the side effect of noise to people's health and the technological level refrigerator industry can reach at present, standardized stipulations for refrigerator noise is made in national standard GB8059.1-87: family use refrigerator with the volume below 250L, noise ≤ 52 dB(A) sound power level. The noise at offices we stay everyday or other public places is much higher than this refrigerator noise.

12.6.11 Why refrigerator noise measured at home is incorrect?

Answer: Because at home there is not the environment conditions for refrigerator noise measuring, and the value measured is not effective. The conditions for noise measuring are stipulated in national standard as the followings:

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- (1) In semi-sound eliminating room or in sound eliminating room without sound wave reflection.
- (2) Put refrigerator onto 5-10mm elastic cushion.
- (3) Refrigerator must be empty and running at least 30 minutes before measuring. If normal stop happens, please make the measurement 3 minutes after refrigerator starting again.
- (4) 4 measuring positions are required, they are 1m away from refrigerator at front, back, front left, front right respectively. The height is 1/2 of refrigerator; the instrument is accurate sound level meter (A weighted).

12.6.12 What's the different between national noise standard 52dB(A) and ministry of light industry standard 42dB?

Answer: The noise of 52dB(A) in national standard is the sound power level. Under the measuring conditions stipulated in national standard, measure the refrigerator noise at four points, take the average of indicated reading at greater noise situation, calculate the arithmetic average value of the four points. This value is the average sound pressure level of noise, the calculation formula is:

$$L_w = (L_{PA} - 2) + 10 \lg S$$

where: L_w —sound power level, dB

L_{PA} —average sound pressure level of measuring surface, dB

S —the envelope area of measuring surface, m^2

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The standard 42dB of the ministry of light industry is the noise pressure level measured 1m away from refrigerator door. This value plus 10 is the approximate value of sound power level.

The restriction to noise in national standard is more strict and scientific. At present, refrigerator noise is required to take sound power level stipulated in national standard.

12.6.13 Why the noises of it type refrigerators are different?

Answer: The noise of each qualified refrigerator ex-factory is within the range of national standard. Different types of refrigerators have different powers, compressors used are not the same neither, and so their noises are

different. Even for same type refrigerators, as the noise of compressors are different, their differences to national standard 52dB(A) are not the same, and the noises are different.

12.6.14 Why there are greater noises at starting and stopping of refrigerator?

Answer:

(1) At the starting of refrigerator, starting relay will make sound. The acceleration of motor will cause vibration of compressor and makes sound.

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(2) When refrigerator stops, because of inertial rotation, there will be vibration sound from compressor.

(3) When refrigerator stops, the compressor decelerates, high pressure and low pressure at gas exhausting tube and returning tube will get balance, thus causes sound of compressor.

(4) At the starting of compressor, if the voltage is low, the hammer type-starting relay will make loud sound. Even if stabilizer is equipped with, measurement should be made in time. If it cannot reach the requirement of stabilizing, there must be quality problem with it, please don't use in case the voltage output is low.

For the previous reasons, refrigerator makes sound at starting and stopping.

12.6.15 Why sometimes noise at far distance is greater than at near distance?

Answer: Because the transfer of refrigerator noise has relations with refrigerator position, room space, etc. The sound wave giving out at refrigerator operation will reflect when it touches wall or furniture. So it is possible that at a far distance, it is noisier than near distance. So it is not correct to make decision of big sound just by it can be heard meters away.

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12.6.16 How to determine that the sound is noise or normal?

Answer: Normally speaking, refrigerator noise within the range of national standard is normal. But if there is continuous sound of metal contacting from compressor, please check and solve the problem in time.

12.7 National standard for noise

There are stipulations in Items 6.5.7.1 and 6.3.6.1.of GB/T 8059.3-1995.

12.7.1 When refrigerator is running for freezing, there will be no obvious noise?

The noise of sound power level of refrigerator with the volume 250L and below, measuring according to the stipulations in item 6.3.6.1, will not greater than 52dB(A).

Sound power level noise of freezing refrigerator with fan

300L below $\leq 55\text{dB(A)}$

300-400L(including 400L) $\leq 60\text{dB(A)}$

401-500L(including 500L) $\leq 63\text{dB(A)}$

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12.7.2 Noise test

At the geometrical center of measuring field, put the freezing refrigerator onto an elastic base (5-6mm thick elastic rubber cushion). The refrigerator should be empty. Turn the knob of temperature controller to middle or near to strong position and close the door or cover. Make the measurement at least 30 min. after refrigerator operation.

During test, if the refrigerator reaches the temperature the knob stipulated, and

the refrigerator stops, the measurement must be interrupted and resume 3min.

after the refrigerator starts again.

The test environment is semi-sound-eliminating-room. Other test field must comply with the stipulations in GB4214.

The test of noise is carried out as shown in figure 8. Put sound transfer units to measurement point 1,2,3,4, measure the sound level by sound level meter (A weighted). Take the greater readings and calculate the average value. The arithmetic average value of these four points is taken as the average sound pressure level noise.

According to the testing result, sound power level of the refrigerator being measured can be calculated out.

$$L_W = (L_{PA} - 2) + 10 \lg S$$

Where: L_W —A sound power level, dB (datum value is 1PW);

L_{PA} --average sound pressure level of measuring surface,

dB(datum value is $20 \mu \text{Pa}$);

S —measuring surface enveloped area, m^2

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Assume l_1 , l_2 , l_3 is the length, width, height of refrigerator respectively, unit is m.

$$A=l_1/2 +d \quad b=l_2/2 +d \quad c=l_3/2 +d$$

Take $d=1m$

$$\text{Then } S=4(ab+bc+ac)$$

The positions of measuring points are shown in table 4.

12.8 Measuring technology of refrigerator performance parameter

12.8.1 Measuring content

The measuring technology of refrigerator includes measurement of refrigeration property and measurement of safety requirement of electrical parts. The following items must be done before ex-factory: (1) appearance requirement; (2) cooling speed; (3) leakage of current; (4) insulation resistor (cool state); (5) electrical intensity; (6) starting performance; (7) ground resistor; (8) sealing performance of refrigeration system; (9) documents and accessories.

Spot tests for ex-factory are: (10) store temperature; (11) insulation resistor (wet state and hot state); (12) electrical intensity (wet state and hot state);

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(13) Electricity consumption; (14) noise and vibration; (15) electroplated parts; (16) painting cover; (17) protection of anti-electric shock; (18) cables; (19) door opening force; (20) freezing ability; (21) rising up speed of temperature with load.

Type tests include items (1), (2), (8), (9), (10), (13), (17), (18), (20), (21) and the followings: (22) total effective volume; (23) ice producing ability; (24) frost melting performance; (25) heat insulation performance and anti dew; (26) gas tightness of door seal; (27) duration of door bar and handle; (28) strength of supporting bracket and similar parts; (29) internal refrigerator material and smell; (30) firmness of refrigerator and transportation test.

12.8.2 Test method and instrument

12.8.2.1 Sealing performance test of refrigeration system

In this test, refrigerator is put to positive pressure room, temperature is 16-32°C. Leakage inspection instrument is set to 0.5g of yearly leakage, check every position of refrigeration system. Leakage at any point shall not greater than 0.5g. Leakage inspection instrument normally used includes H-25 of American GE product and Halogen instrument HLD4000 made by a German company.

12.8.2.2 Insulation resistor

This test is to check the insulation performance of refrigerator. The resistance is measured with a voltage of 500V DC added to live parts and accessible metal parts. The resistance must be not less than 2 million ohm.

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12.8.2.3 Electrical intensity

This test is to check the electrical intensity of live parts and all accessible metal parts. The testing equipment is flashover and breakdown unit, voltage is 1650V (50Hz) for 2s. At the test, there will not flashover and breakdown occurring.

12.8.2.4 Ground resistor

Check the voltage drop between refrigerator ground connection point and accessible metal parts, using AC power of load empty voltage not over 12V and 10A current. Calculate the resistance according to the current and voltage drop. Ground connection resistance shall not exceed 0.1 ohm.

12.8.2.5 Leakage of current

When testing, give 1.06 times rated voltage to the refrigerator, and make the test at operation status. The test complies with GB4706.1-84, the leakage current testing instrument is made in accordance with the stipulations. The leakage current measured shall not exceed 1.5mA.

12.8.2.6 Noise test

This test is carried out at semi sound eliminating room. The refrigerator is put to the geometrical center of room, on a 5-10mm thick elastic cushion. The refrigerator should be empty when testing. Turn the knob of temperature controller to middle or near to strong position and close the door. Test after

the refrigerator has running more than 30 minutes. The refrigerator noise power level, 250L and below, $\leq 52\text{dB(A)}$; 250L above $\leq 55\text{dB(A)}$

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12.8.2.7 Test method of refrigeration performance

(1) 4 or 6 refrigerators can be tested simultaneously at the test room. The material of enclosure structure of test room is made up of 10mm thick polyurethane or polystyrene, which has good insulation. There are air re-treatment motor sets in the test room. Air comes into the room from the ceiling of porous plate with uniform pressure, so as to assure airflow speed in the room not over 0.25m/s and thus keep the room temperature uniformly.

The temperature of test room is adjustable within the range of 10-43℃.

(2) Temperature requirements for different climate refrigerators please refer to table 6-1.

Each test point shall keep the stipulated environment temperature, the fluctuation range is $\pm 0.5K$. Within the range of 2m heights away from the test platform, the vertical temperature gradient shall not exceed 2K/m.

Table 6-1 Different climate sorts for refrigerators

Climate types	Symbols	Suitable temperature (℃)	Measuring temperature (℃)
Sub-temperate zone	SN	10-32	25
Temperate zone	N	16-32	25
Sub-tropical zone	ST	18-38	25
Tropical zone	T	18-43	32

(3) Environmental humidity: normally the relative humidity is 45-75%.

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(4) Test pack: Use the rectangle packs of following dimensions as the load of refrigerator.

(5) Table 6-2 Test packs for refrigerator performance

	Dimensions (mm)	Mass (g)	Note
Small	25×50×100	125	In the geometrical center of 500g pack, there is a thermal element; this pack is called M pack.
Middle	50×100×100	500	
Big	50×100×200	1000	

The contents of test packs are (take 1000g pack as the datum): hydroxyethylmethylcellulose 230g; water 764.2g; sodium chloride 5g; parachlorometacresol 0.8g. The freezing point of filling of pack is -1℃, its thermal property is similar to lean beef.

(5) Temperature measuring gauge: The measuring of temperature normally use platinum resistor. There are two types:

Put the platinum resistor directly into test pack (M pack) when measuring

a. Its temperature;

b. Insert the platinum resistor into the center of four tin electroplated copper columns, the diameter and height of column is the same 15.2mm.

The measuring equipment is temperature-measuring bridge with the accuracy of ±0.3K.

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(6) Humidity measuring instrument: the measurement of relative humidity is wet and dry bulb method. Put the dry bulb thermometer and wet bulb thermometer (enclose 1.5-2 layers of degreased gauze at the temperature sensing parts of thermometers, and put the bottom end of gauze into distilled water) under the blowing of wind with the speed of 2.5-3m/s. Record the temperature of dry bulb thermometer, and calculate the relative humidity using the <<Relative humidity referring table for environment test>> GB6999-86.

(7) Cooling speed

Leave the refrigerator at test room, room temperature is 32°C, the inner temperature of refrigerator gets balance with room temperature (temperature difference +1K). Close refrigerator door and let the refrigerator running continuously. Record the time needed for storage temperature t_m to reach

$t_m(\text{max})$ in accordance with table 13-3, cooling temperature t_m to reach +14 °C, and the time the freezing temperature reaches the corresponding star level. According to standard, 250L below refrigerator will not exceed 2h; 250L-500L refrigerators will not exceed 3h.

(8) Freezing ability

The freezing ability of refrigerator shall not be less than 90% of rated ability.

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(9) Electricity consumption

Leave the refrigerator at test room, climate temperatures are: SN, N, and ST types 25°C; T type 32°C.

Test time is 24h. The consumption of storage refrigerator and storage and freezing refrigerator shall be less than 115% of rated; freezing refrigerator is less than 110% of rated.

Other tests to be done: the measurement of temperature of storage

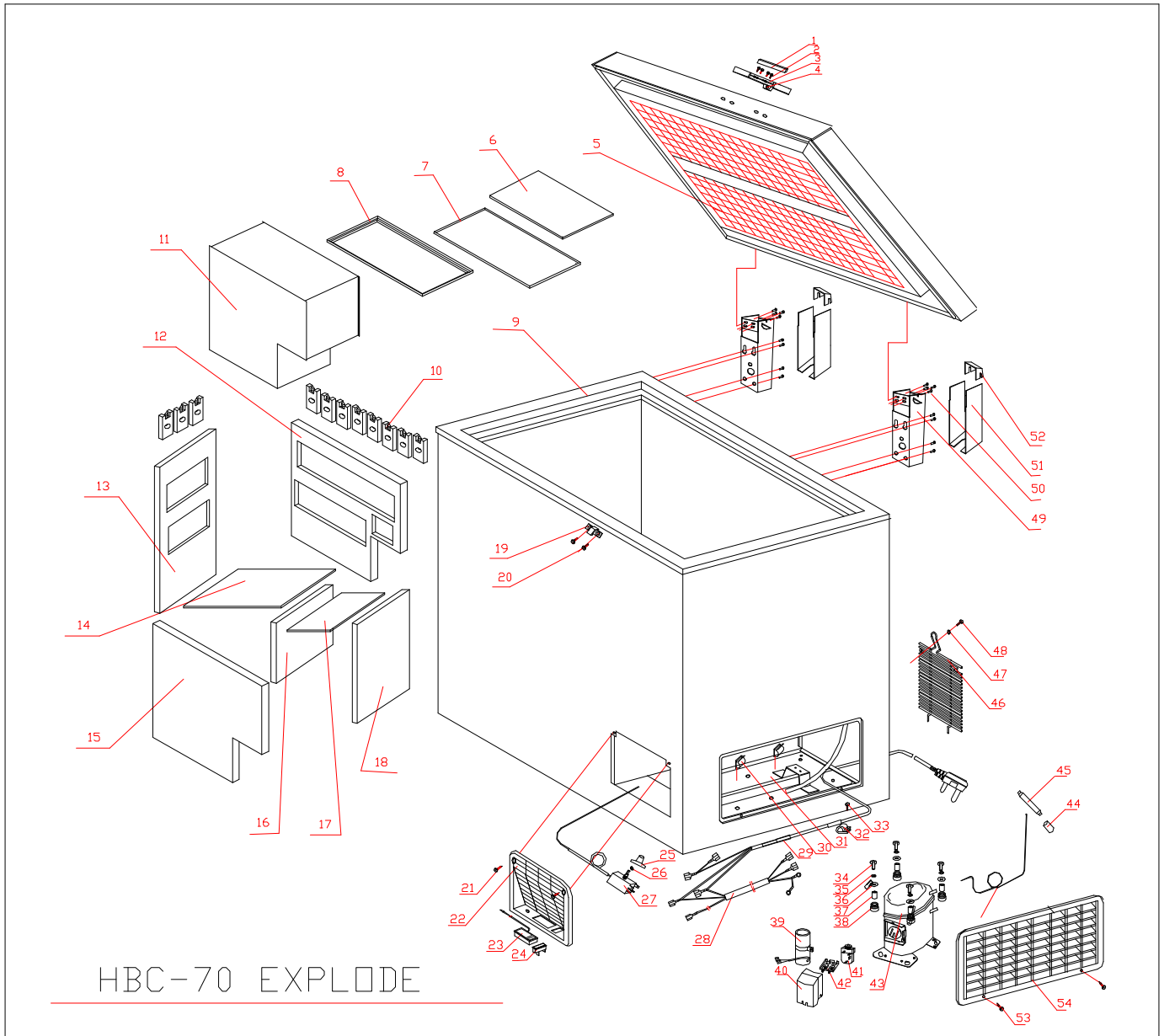
(10) Refrigerator and freezing refrigerator; test of storage temperature, ice producing ability, etc.

Table 6-3 Storage temperature of refrigerator

Climate type	Climate type	Environment temp(°C)	Storage Cabin		Cooling cabin	Freezing cabin
			t_1, t_2, t_3	$t_m \text{ max}$		
Sub-temperate	SN	10	$-1 \leq t_1, t_2, t_3 \leq 10$	7		Complies with
		32				
Temperate	N	16	$0 \leq t_1, t_2, t_3 \leq 10$	5	$8 \leq t_{cm} \leq 14$	One star ≤ -6 Two stars ≤ -12 three stars ≤ -18
		32				
Sub-tropical	ST	18	$0 \leq t_1, t_2, t_3 \leq 12$	7		
		38				
Tropical	T	18				
		43				

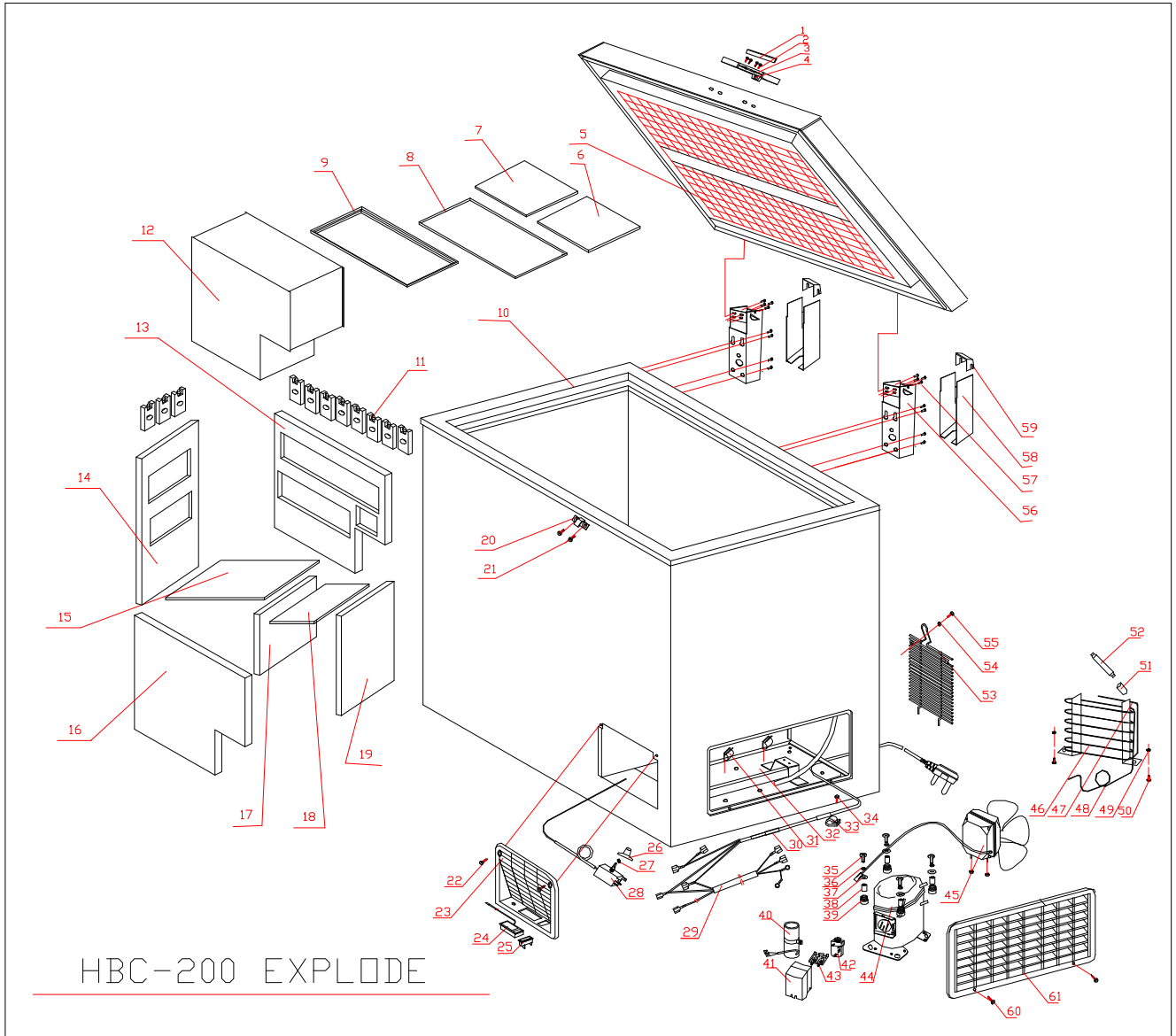
EXPLODED VIEW

Exploded View



EXPLODED VIEW

Exploded View



LIST OF PARTS

HBC-70 List of Parts

No. in exploded view	Spare parts number	Spare parts description in english	Model	Qty	Failure rate	The proportion of the spare part stock	Remark
1	0070401045	Cover board of handle	HBC-70	1	0.168%	0.200%	*
2	0077050002	Screw	HBC-70	4	0	0	x
3	0070804793	handle group	HBC-70	1	0	0	x
4	0070804244	Lock	HBC-70	1	0	0	*
5	0070808545	Foaming Lid	HBC-70	1	0.490%	0.500%	x
6	0070504285	inner foam-lid	HBC-70	1	0	0	x
7	0070202879	inner-seal	HBC-70	1	0	0	x
8	0070202696	inner-frame	HBC-70	1	0	0	x
9	0070808486	Outer cabinet	HBC-70	1	0	0	x
10	0070202851	ice_packs	HBC-70	25	0	0	x
11	0070808728	inner-tank	HBC-70	1	0	0	x
12	0070504234	foam-frame(back)	HBC-70	1	0	0	x
13	0070504230	foam-frame(left)	HBC-70	1	0	0	x
14	0070504235	foam-frame(bottom)	HBC-70	1	0	0	x
15	0070504233	foam-frame(front)	HBC-70	1	0	0	x
16	0070504237	foam-frame(stand)	HBC-70	1	0	0	x
17	0070504238	foam-frame(mid)	HBC-70	1	0	0	x
18	0070504229	foam-frame(right)	HBC-70	1	0	0	x
19	0070103231	Lock nose	HBC-70	1	0	0	*
20	0077050051	Screw	HBC-70	2	0	0	x
21	0077010049	Screw	HBC-70	2	0	0	x
22	0070202720	Control panel	HBC-70	1	0	0	x
23	0074090718	thermometer	HBC-70	1	0.392%	0.600%	*
24	0075050008	indicate light green	HBC-70	1	0.800%	1.200%	*
25	0072040122	Thermostat knob	HBC-70	1	0	0	*
26		Screw	HBC-70	1	0	0	accessories
27	0070701364	Thermostat	HBC-70	1	0.392%	0.600%	*
28	0070401609	Control panel wire	HBC-70	1	0	0	x

LIST OF PARTS

29	0071250271	Wire clip	HBC-70	2	0	0	X
30	0070401590	wire	HBC-70	1	0	0	X
31	0070802854	Compressor supporter	HBC-70	1	0	0	X
32	0072060002	Wire clip	HBC-70	1	0	0	x
33	0077010004	Screw	HBC-70	1	0	0	x
34	0075020010	Ground screw	HBC-70	4	0	0	x
35	0075020136	Compressor spring washer	HBC-70	4	0	0	X
36	0075020137	Compressor washer	HBC-70	4	0	0	X
37	0075020305	Compressor sleeve	HBC-70	4	0	0	X
38	0075020001	Rubber spacer	HBC-70	4	0	0	X
39	0070301331	starting capacitor	HBC-70	1	0	0	Compressor accessories
40		cover	HBC-70	1	0.056%	0.056%	
41		starting relay	HBC-70	1	0	0	
42		cord relief	HBC-70	1	0	0	
43		compressor	HBC-70	1	0.777%	0.116%	*
44	0079020006	Hot shorten tube	HBC-70	1	0	0	x
45	0074180002	Filter drier	HBC-70	1	0.140%	0.280%	*
46	0071210004	Engine room cover	HBC-70	1	0	0	x
47	0072130038	Washer	HBC-70	1	0	0	x
48	0077010036	Screw	HBC-70	1	0	0	x
49	0078090002	Hinges	HBC-70	2	0	0	x
50	0077050002	Screw	HBC-70	16	0	0	*
51	0072040011	Bottom hinge cover	HBC-70	2	0	0	*
52	0072040003	Top hinge cover	HBC-70	2	0	0	*
53	72220007	Compartment grill	HBC-70	1	0.035%	0.035%	*
54	0077050058	Screw	HBC-70	2	0	0	x

1,The failer rate and the proportion of the spare-part stock are regarded as the reference of the stock for spare-parts;The first time should be stocked accroded with the proportion of the spare-parts,and it should be adjusted with the actual quantity 3 months later.
2,easy-damaged;The spare-part which is often damaged and the customer must stock in the spare-parts warehouse,and should be marked with "**"
3,possible damaged:The spare-part which is not often damaged like the easy damaged one and the customer may stock in the spare-part warehouse accord with the actual case,should be marked with " " .
4,not need provided :The spare-part which is seldom damaged or the maintenance man could not maitmains.The spare parts may be air freighted by the factory if they were damaged.The customer nees not stock in the spare-part warehouse,should be marked with " x " .
5,Above should be improved accord with the reply of the market half a year per time.

LIST OF PARTS

HBC-200 List of Parts

No. in exploded view	Spare parts number	Spare parts description in english	Model	Qty	Failure rate	The proportion of the spare part stock	Remark
1	0070401045	Cover board of handle	HBC-200	1	0.168%	0.200%	*
2	0077050002	Screw	HBC-200	4	0	0	x
3	0070804793	handle group	HBC-200	1	0	0	x
4	0070804244	Lock	HBC-200	1	0	0	*
5	0070808546	Foaming Lid	HBC-200	1	0.490%	0.500%	x
6	0070504284	inner foam-lid(big)	HBC-200	1	0	0	x
7	0070504285	inner foam-lid(little)	HBC-200	1	0	0	x
8	0070202880	inner-seal	HBC-200	1	0	0	x
9	0070202695	inner-frame	HBC-200	1	0	0	x
10	0070808485	Outer cabinet	HBC-200	1	0	0	x
11	0070202851	ice_packs	HBC-200	49	0	0	x
12	0070808729	inner-tank	HBC-200	1	0	0	x
13	0070504232	foam-frame(back)	HBC-200	1	0	0	x
14	0070504230	foam-frame(left)	HBC-200	1	0	0	x
15	0070504236	foam-frame(bottom)	HBC-200	1	0	0	x
16	0070504231	foam-frame(front)	HBC-200	1	0	0	x
17	0070504237	foam-frame(stand)	HBC-200	1	0	0	x
18	0070504238	foam-frame(mid)	HBC-200	1	0	0	x
19	0070504229	foam-frame(right)	HBC-200	1	0	0	x
20	0070103231	Lock nose	HBC-200	1	0	0	*
21	0077050051	Screw	HBC-200	2	0	0	x
22	0077010049	Screw	HBC-200	2	0	0	x
23	0070202720	Control panel	HBC-200	1	0	0	x
24	0074090718	thermometer	HBC-200	1	0.392%	0.600%	*
25	0075050008	indicate light green	HBC-200	1	0.800%	1.200%	*
26	0072040122	Thermostat knob	HBC-200	1	0	0	*
27		Screw	HBC-200	1	0	0	x
28	0070701364	Thermostat	HBC-200	1	0.392%	0.600%	*
29	0070401609	Control panel wire	HBC-200	1	0	0	x

LIST OF PARTS

30	0071250271	Wire clip	HBC-200	2	0	0	X
31	0070401590	wire	HBC-200	1	0	0	X
32	0070802854	Compressor supporter	HBC-200	1	0	0	X
33	0072060002	Wire clip	HBC-200	1	0	0	x
34	0077010004	Screw	HBC-200	1	0	0	x
35	0075020010	Ground screw	HBC-200	4	0	0	x
36	0075020136	Compressor spring washer	HBC-200	4	0	0	X
37	0075020137	Compressor washer	HBC-200	4	0	0	X
38	0075020305	Compressor sleeve	HBC-200	4	0	0	X
39	0075020001	Rubber spacer	HBC-200	4	0	0	X
40	0070301332	starting capacitor	HBC-200	1	0	0	Compressor accessories
41		cover	HBC-200	1	0.056%	0.056%	
42		starting relay	HBC-200	1	0	0	
43		cord relief	HBC-200	1	0	0	
44		compressor	HBC-200	1	0.777%	0.116%	*
45	0075030020	Fan	HBC-200	1	0.050%	0.100%	*
46	0070701369	Condensor	HBC-200	1	0.063%	0.100%	*
47	0074090030	connector tube	HBC-200	1	0.056%	0.056%	X
48	0070701365	Discharge tube	HBC-200	1	0.056%	0.056%	X
49	0077050021	Screw	HBC-200	2	0	0	x
50	0077050003	nut	HBC-200	2	0	0	x
51	0079020006	Hot shorten tube	HBC-200	1	0	0	x
52	0074180002	Filter drier	HBC-200	1	0.140%	0.280%	*
53	0071210004	Engine room cover	HBC-200	1	0	0	x
54	0072130038	Washer	HBC-200	1	0	0	x
55	0077010036	Screw	HBC-200	1	0	0	x
56	0078090002	Hinges	HBC-200	2	0	0	x
57	0077050002	Screw	HBC-200	16	0	0	*
58	0072040011	Bottom hinge cover	HBC-200	2	0	0	*
59	0072040003	Top hinge cover	HBC-200	2	0	0	*
60	72220007	Compartment grill	HBC-200	1	0.035%	0.035%	*
61	0077050058	Screw	HBC-200	2	0	0	x

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|---|
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Sincere Forever



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