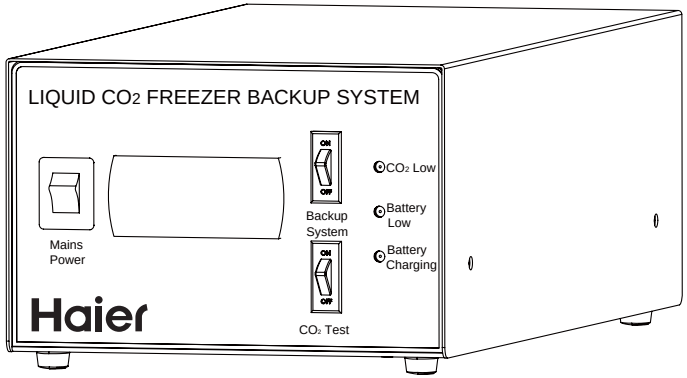
Haier

ULT Backup Refrigerator System

Operation Manual

HBX-IC
HBX-IIC



- Read the Operation Manual carefully before using your appliance.
- Keep the Operation Manual in a safe place.
- Appearance, color and layout of the door may vary.
- Translation of the original instruction

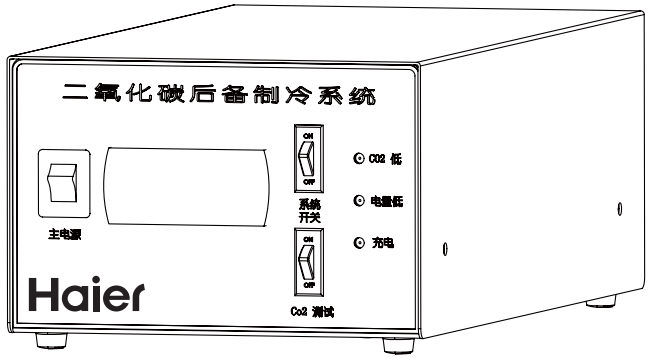
Certificate of Quality

Checker:

Haier

后备制冷系统
使用说明书

扫描二维码 智享科技魅力



型号:
HBX-IC
HBX-IIC

使用前请仔细阅读本说明书
本公司保留说明书解释权
产品外观请以实物为准
阅后请与发票一并妥善保存
如遇产品技术或软件升级，恕不另行通知

合格证
Certificate of Quality

检验员：

Haier 海尔

后备制冷系统 使用说明书

（适用CO_2和LN_2）

目录 ——————————1

使用前请仔细阅读本说明书
请注意妥善保存

Contents

The actual design and color of the unit you received may vary as a result of continuous improvements.

Product introduction

Free standing CO2 and LN2 backup refrigeration systems are designed to provide emergency refrigeration for ultra low temperature freezers. The backup system includes a control system and a feeding system.
The control system modulates a liquid feeding solenoid valve to provide the freezer with a certain amount of liquid CO2 or liquid LN2 to cycle the freezer's temperature within a range. The backup system is equipped with a rechargeable battery which powers the system to sustain the refrigeration.

Description of components

Fig.1

Due to continuous improvement, the product that you receive may not resemble what is depicted in the picture.We apologize for this inconvenience.

产品特点

CO_2 和 LN_2 独立式后备制冷系统是用于低温保存箱的应急制冷装置。其工作原理是通过温度控制装置控制安装在供冷回路的电磁阀，定量向低温保存箱供给 CO_2 或 LN_2 液体，保持保存箱内的温度在一定范围内波动。后备系统自带充电电池，当出现断电可由电池供电维持正常工作。

部件名称

前面

后面

图 1

由于产品的改进，您所得到的产品可能与说明书之图示不完全一致，谨此致谦。

基本注意事项

请仔细阅读安装操作说明书，严格按照说明书要求对本装置进行安装和操作。否则，由此造成的一切后果用户自负（包括零件损坏）。

安装位置注意事项

1. 不要将后备制冷系统安装在封闭或狭窄的空间内，虽然CO2或LN2是无毒，但液体蒸发将大量置换空气中的氧，有导致人窒息的危险。因此必须保证安装地点通风良好。

操作注意事项

1. 如果CO2或LN2钢瓶倒地阀被摔坏，钢瓶就象失控的导弹，产生很大的危险，因此用车运输钢瓶时勿必使用绳索固定；当钢瓶与后备系统连接后要将钢瓶与墙柱等固定物固定。
2. 购买钢瓶或罐时要选购带虹吸管的型号。
3. CO2和LN2液体是很冷的，对人体皮肤有伤害，因此移动带液钢瓶和管路必须戴防护眼罩和手套。
4. 当关闭钢瓶阀或罐时，确保给电磁阀通电使管路中的液体流出，否则将导致管路承受很大液压力出现泄压阀动作或损坏；
5. 为了人身安全和无故障工作，装置必须可靠接地；不良接地将导致人员和装置伤害或损坏。不要将装置接在过载电路上。
6. 不要随意更换后备系统零部件，不要使用非厂家授权的零部件，否则将导致严重的人身伤害。生产厂对由此出现的任何伤害均不承担责任。
使用前用户要确认产品是否适用。

运输安装

运输

搬运过程中产品严禁倒立；要轻拿轻放，防止损坏。

安装前

1、请严格按照产品标贴要求安装，设计电源为AC 220-240V, 50/60Hz ，由专业安装人员接线，确保产品接地可靠。

2、严禁将地线与零线相连接！否则，可能导致设备带电，对人体造成伤害。

3、注意不要在低温保存箱内胆上随便打孔，因箱壳内布有制冷管路，若打漏管路将导致制冷剂泄漏，损坏低温保存箱。

压力要求和安全防护

1、CO_2 后备制冷系统推荐的操作压力是 900~1000psi。

当压力超过一定压力值（大约 1300psi），安全阀将泄压。注意安全阀由用户请专业人员在供液系统中设置，厂家不负责提供。

2、LN_2 推荐的操作压力是 35~60psi

当压力超过大约 60psi ，安全阀将泄压。注意安全阀由用户请专业人员在供液系统中设置，厂家不负责提供。

Precautions

Please read the manual carefully. Follow the instructions provided in the manual to install and operate the backup system. Haier cannot be held responsible for any damage as a result of improper action with the backup system.

Precautions for Installation Location

Do not install a backup system in an enclosed or narrow space. Although CO2 and LN2 are non-toxic, evaporation of large amounts of such liquids displaces oxygen gas which can cause deadly suffocation. Please be sure that the installation area is sufficiently ventilated.

Precautions during Operations

1.If a CO2 or LN2 cylinder falls to the floor, its control valve can be knocked off causing tremendous danger to the surroundings. During transit, be sure to fasten the cylinder properly to prevent accidental falling. After the cylinder is connected to the backup system, make sure that the cylinder is fastened securely to a fixture.

2.Be sure to use cylinders with siphon tube .

3.Expanded CO2 liquid and LN2 liquid are extremely cold. They can cause skin damage if exposed. When these cryogen-containing cylinders and tubing systems are moved, operators must wear safety glasses and gloves.

4.When the main valve on the cylinder is being turned off, be sure to turn on the solenoid valve to let the liquid out of the valve. A sudden stop of liquid movement can cause a pressure surge if the solenoid valve is closed which could trip the safety relief valve or cause damage.

5.For the safety of operators and trouble-free operations, the apparatus must be grounded properly. Poor grounding connection can cause injury to operators or damage to property. Do not install the unit to a circuit that is already overloaded.

6.Do not modify or change system components. Do not use any spare parts that are not approved by the manufacturer. Unapproved parts can cause the system to malfunction which, in turn, can cause severe injury to operators. Haier cannot assume any liability resulting from this.

Users must confirm the backup system is suitable for the application.

7.The plug on the power supply cord can be used as disconnect device which shall be easily accessible.

Transportation and Installation

Transportation

The system must be in an upright position during transportation. Handle it with care to avoid damage.

Before installation

1.Please strictly follow the instructions on the product label to install the unit. The design voltage is AC 220-240V, 50/60Hz.
Wiring must be done by qualified technical personnel. The product must be grounded properly.

2.Never connect the ground wire and neutral wire together. Otherwise, the equipment may be electrified causing severe injury and harm to operators.

3.Do not drill a hole in the liner of ULT freezer. Refrigeration tubing behind the liner can be damaged and refrigerant leaks could occur if punctured. The ULT freezer would not be repairable if this occurs.

Pressure Requirement and Safety Protection

1.The operating pressure for the liquid CO2 backup system is 900 ~ 1000 psig. If the pressure exceeds 1300 psig, a safety valve on the liquid feed line is activated to relieve the pressure. Please be aware that the relief valve should be installed by qualified technical personnel. Haier does not provide the safety valve for the backup system.

2.The recommended operating pressure for the LN2 system is 35 psig. When the pressure in the feed line exceeds 50 psig, a safety valve on the liquid feed line is activated to relieve the pressure. Please be aware that the customers are responsible for hiring a qualified technical personnel to install the relief valve. Haier does not provide the safety valve for the backup system.

Installation

1.Place the backup system on top of the ULT freezer or next to it. The LN2 dewar or CO2 cylinder should be placed behind the backup system. Fasten the cylinders securely to a fixture.

2.Install the door switch in the location as illustrated in Fig 2. Connect the door switch with a harness to the connector in the back of the backup system.

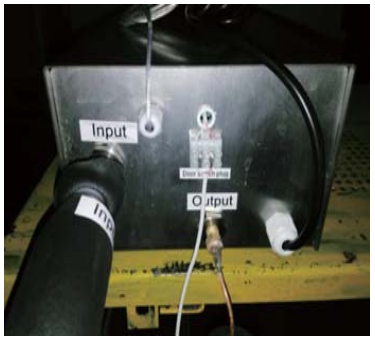
3.Sensor installation from backup system. Pick up the sensor from the back of the backup system and insert this sensor into the freezer through the access port located at the back top of the freezer. Locate the probe inside the freezer and tie the sensor from backup system together with the probe in close contact. After this is done, seal up the access port with black spongy material provided with the backup system.

4.Follow Figures 3 and 4 to install the liquid feed line and distribution system.

安装

注意：此设备需由专业人员安装操作。

1.将后备系统的输入管、输出毛细管、门开关线安装到后备系统箱体上；



2.将后备系统整机放置到保存箱顶部；打开保存箱后背右上方的测试孔盖；

3.将保存箱内部上面两层的隔板取出；然后将输出毛细管和温度传感器穿过测试孔，进入到保存箱内部；

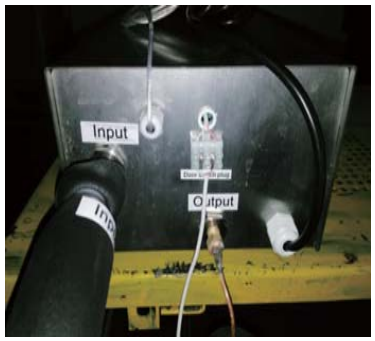
4.将铝制夹子夹在毛细管输出管末端，距离约150mm；用自攻螺钉（st3.5）将输出管固定在保存箱内部左上部（已预留螺钉孔）；输出管靠近箱体内壁，喷射方向向下；

Installation

Installation Procedure

It is recommended that this installation is carried out by a qualified technician.

1.Install the liquid supply line onto the inlet port following the instruction label;
Install the output capillary tube and the harness for the door switch switch on the backup control box.



2.Place the backup system control box on top of the freezer. Remove the cap for the port hole on the back of the freezer unit.

3.Remove the two inner shelves inside the freezer.
Run the capillary tube and temperature sensor across the port hole tunnel into the freezer.

4.Use aluminum clip provided to fasten the capillary tube roughly 150 mm from the tip of the injector.
Use a self tapping screw 3.5 to fasten the clip to a prepunched hole locatde in the upper left of the unit.
The injector capillary tube is located near the inerior wall, pointing downwards

5.打开保存箱传感器罩子，用扎带将后备系统传感器和保存箱传感器捆绑在一起，然后将传感器罩子固定牢固；

6.使用后备系统输出管自带的保温棉将测试孔两端密封好，避免冷气泄露；然后将隔板安装到原位置；

7.打开前护罩侧面的开关堵头，将后备系统的门开关插头与前护罩上的开关插头对接；




8.将输入管连接到供液管路；

5.Remove the fasteners for the sensor bracket.
Use tie wraps to secure the backup control sensor and the freezer sensor together.
Install the sensor bracket in place.


6.Use the insulation tube on the outlet line to seal both sides of the port holes to prevent leak of cold air.
Install the shelves back in place.

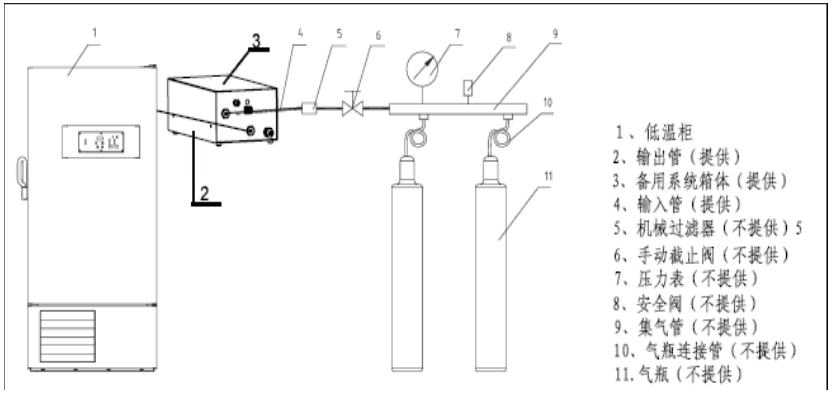


7.Open the door switch terminal cover, which is located on the side of the compressor compartment cover. Connect both door switch terminals with each other.




8.Install the liquid supply line to the liquid feed line.

9.将后备系统的插头和电源相连接，打开主电源开关和系统电池开关，这样确保通电时后备系统可以进行充电，注意后备系统可以独立供电12小时



功能介绍

主电源开关

此开关为系统主开关，后备系统过程中工作时须处于打开状态；

温度显示及指示灯

显示屏显示保存箱内实际温度；

显示屏中 ❇ 灯亮表示电磁阀打开，处于喷射状态；

显示屏中 ◷ 灯亮表示主电源开关未打开；

显示屏中显示 ERR 表示传感器故障；

系统电池开关

此开关在后备系统使用过程中须处于打开状态；在停电状态时蓄电池给系统供电；

后备测试键

测试键为复位开关，按下此开关电磁阀打开，处于喷射状态；用于检测后备系统管路是否正常；

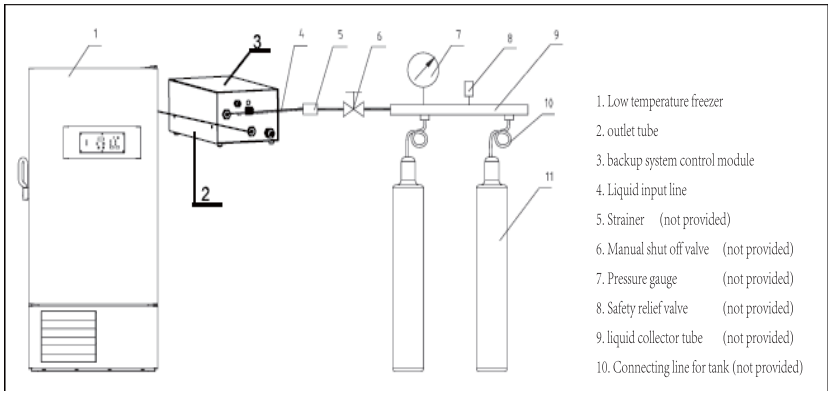
“二氧化碳量低”指示灯

此指示灯亮时，表示二氧化碳罐中压力低于 35bar，液体二氧化碳耗尽，不具备制冷的作用；须及时更换二氧化碳气罐；

“电池电量低”指示灯

此指示灯亮时，表示蓄电池电量低，需进行充电；当接通交流电源时，后备系统自动给蓄电池充电；

9.Plug in the power cord of the backup system to a power outlet. Turn on the main power switch and battery charge switch. The backup unit will keep the battery charged. Please note the backup system can operate independently for up to 12 hours.



Product Features

Master power switch

The main power switch must be turned on for the system to operate properly.

Temperature display and indicator light

The display screen shows the actual temperature in the storage cabinet;

When the snow flake light is lit on the display, the feed solenoid valve is activated and the injection is in process.

When the " ◷ " light is lit on the display, the man power switch is in off mode.
ERR on the display indicates a sensor failure.

System battery switch

The system's battery switch must be turned on. During a power outage, the battery can then supply the power to run the backup system.

Standby test key

The test key is to allow a temporary activation of the solenoid valve. This is to ensure the flow of cryogen is available to the freezer when called by the controller.

Indicator light for 'Low Carbon Dioxide'

When the indicator is turned on, the pressure in the carbon dioxide tank is lower than 35 bar. The tank must be replaced to ensure a proper cooling is available from the backup system.

Indicator light for 'Low Battery'

When the indicator is turned on, the battery power is low and it needs to be charged. Connect the AC power to a power outlet to charge the system.

Indicator light for 'Battery Charging'

When the indicator light is on, it indicates the battery is being charged;

"电池充电"指示灯

此指示灯亮时，表示蓄电池处于充电状态；

温度调节

1.上电初始状态

后备系统接通电源，打开主电源开关，电池开关，即进入开机状态，所有参数均保持为上次断电时的设置，显示屏显示低温柜中实际温度；出厂时温度设为-70 ℃；

2. 温度设定值及参数的调整

三个按键：用以设置参数，设置SET、▼和▲三个按键

正常模式下，

按压SET大于1S，显示设定温度值，温度显示闪烁，按压▼或▲键来调节需要的温度设定值，按下SET则保存设置。温度设定范围为-40~ -99 ℃；

按压SET大于3s，可以访问参数的菜单。按 SET 键交替显示参数值，其中 Rd 表示温差，可以通过按压▼或▲键来调节温差，调节范围 1-10℃；按压SET键大于 3s，存储修改的参数并且推出参数设置程序；当温度传感器检测到的温度高于设定值+温差 Rd 时，温控器控制接通电磁阀，二氧化碳压力罐中的液体二氧化碳喷射到低温冰箱中；当温度传感器检测到的温度低于设定值时，温控器停止给电磁阀供电；

3. 当后备系统停用时，应将系统开关关闭，否则电池电量耗尽后，导致电池报废，不能再次充电；

开机调试

1、操作低温保存箱，直到箱内温度达到所需温度。

2、打开供液开关；

3、进行试验程序。设定温度至少比低温保存箱低 10 度，此时液体开始喷入保存箱内。打开保存箱门应停止喷液，关闭门则恢复供液，若不正常请检查门开关线是否插好，门关闭时是否碰到开关动臂。注意该程序也做为预防性维护程序，经常用作验证后备系统是否正常。

4、当低温保存箱正常工作时，设定后备控制系统温度比保存箱温度高 10 度。注意 C02 系统若设定温度低于-75 度将导致连续喷液。

5、如果你想停用低温保存箱，请从后备制冷装置后面拔下门开关连接线，这样做可避免电磁阀喷液并继续维持内装电池充电。

6、使用过程中应保持后备制冷系统电源线通电，如果电池长时间处于放电状态，将导致电池不能充满电，严重将导致电池失效。

7、CO_2或LN_2液体消耗量根据低温保存箱内容积和箱内存放物品的多少不同，一般为 2 ~ 4 Kg/h。

保养与维护

后备制冷系统在新开包装后首次通电调试前、正常使用过程中或停止使用前，都应进行清扫。

为了保证安全，请在清扫前将电源插头拔掉。

清洗设备时请使用软布或海棉蘸水或肥皂（无腐蚀性的中性清洗剂均可）。清洗后用干布擦干，以防生锈。

请勿用有机溶剂、沸水、洗衣粉或酸等物质清洗设备。

请勿用水冲洗设备；勿用硬毛刷、钢丝刷清洗设备。

设备如果长时间停用，请按照上述要求断电清洗、凉干后封存。

任何设备都可能出现问题，使用单位应要求专职人员定期检查设备是否正常，若发现问题及时维护避免造成损失。

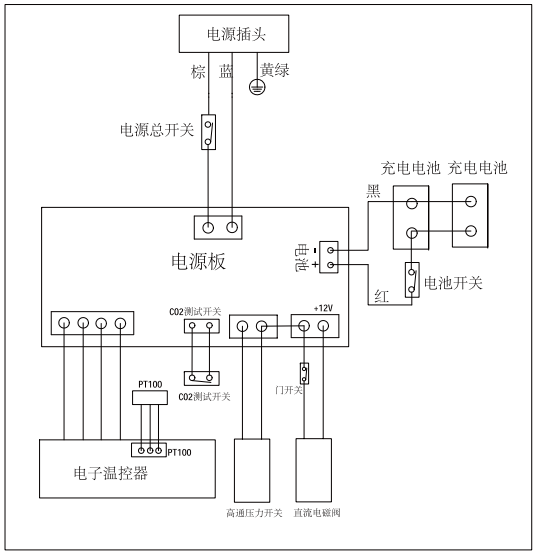
责任免除：

凡是不按照上述操作规定进行操作，造成的设备故障或样本损毁不在保修和赔偿范围内。

凡因为使用者人为破坏，误操作等原因导致的设备或样本损毁不在保修和赔偿范围内。

因为火灾、战争、地震等非厂家原因造成的设备损坏或样本损毁不在保修和赔偿范围内。

电器原理图



Temperature adjustment

1. Initial status of power on

When installation of a backup system is completed, plug in the power cord to a power supply. Turn on the main power switch and the battery charge switch. The backup system is in the standby state. All control parameters are the same as from the last power down. The display shows the current freezer temperature. The default factory setting for the temperature control is -70℃.

2. Adjustment for temperature settings and parameters

Three buttons, set, up arrow and down arrow, are used to make an adjustment of the temperature setting and parameters.

In normal mode:

Press and hold Set for 1 second and more. The flashing display will show the set temperature value. Press Up or Down arrow to adjust the set point temperature. Press Set again to save the change. The temperature range is -40 ℃ to -99 ℃.

Press and hold Set button for more than 3 seconds to access the parameter menu. Press Set button again, control parameter Rd appears. Use Up or Down arrow to adjust the value from 1 to 10℃. Press and hold the Set button for 3 seconds to save the new parameter. The Rd parameter represents the temperature differential that the controller operates the injection solenoid valve. When the actual freezer temperature warms up backup temperature setting plus the differential, the controller will activate the injection solenoid valve. Coolant will be injected to the freezer, attempting to bring the temperature down. When the actual temperature reaches the set point in the backup system, the injection will stop. The cycle will repeat until the freezer temperature becomes colder than the set point in the backup system.

3. If a backup system is not used and disconnected off a freezer, make sure to turn off the main switch and the battery charge switch. Otherwise, the drained battery may not be chargeable again.

Unit Start-up and Tuning

1.Power up the ULT freezer. Let it run to the set freezer temperature.
2.Turn on the main power switch and the battery charge switch on the backup system.
3.Start the test procedure. Set the backup system's set point temperature 10 C colder than the actual freezer temperature. The backup system will start injecting coolant into the freezer. Open the freezer door, the injection should stop. Close the door, the injection will continue as long as the backup system's set temperature is not satisfied. The door switch directly controls the action of injection solenoid valve for safety reason. A Preventive Maintenance procedure should always include checking the contact integrity and the function of the door switch.
4.When the freezer is at stable temperature, set the backup system's set point temperature 10℃ warmer than the freezer temperature to avoid unnecessary coolant injection. A user should decide the set point value based on the critical nature of the stored products. For a CO2 backup system, the system will inject continuously if the set point is lower than -75℃.
5.If the freezer is turned off, unplug the door switch harness from the back of the backup system. This will stop any unnecessary coolant injection while the battery is charged.
6.Keep the backup system connected to a power supply. If the battery runs the system for a long period of time, the battery may not be rechargeable.
7.The consumption rate of LCO2 and LN2 depends on the size of the freezer and product load. The average consumption rate is between 2 and 4 kg/hr.

Maintenance

A backup system should be cleaned regularly. For safety, disconnect its power before cleaning. Use a soft cloth and mild detergent solution for cleaning if necessary. Use a dry cloth to dry it off after cleaning.

Never use a strong solution such as organic chemicals, boiling water, detergent, acid or a hardwire brush to clean the equipment. Do not use a water hose to flush the system. If the system is out of service for a while and it needs to be cleaned, follow the instruction above.
The equipment should be inspected by qualified personnel on a regular basis. Should there be any issues, consult with the factory or your representative.

技术参数

型号	HBX-IC	HBX-IIC
外形尺寸（WxDxH）	200×400×160	200×400×160
额定电流	0.25A	0.25A
额定电压	AC 220-240V, 50/60Hz	AC 220-240V, 50/60Hz
重量	14kg	14kg
电压波动范围	±10%	±10%
制冷剂	液态二氧化碳	液氮

装箱单

数量 / 名称 / 产品型号	使用说明书	塑料袋	输入管	输出管	扇形开关	ST3.5 不锈钢螺钉	线夹
后备制冷装置	1	1	1	1	1	1	1

售后服务

设备一旦出现故障应首先将样本转移到安全的地方妥善保存，然后将故障设备断电，并通知海尔公司总部或当地售后部门，以便得到及时快捷的服务。

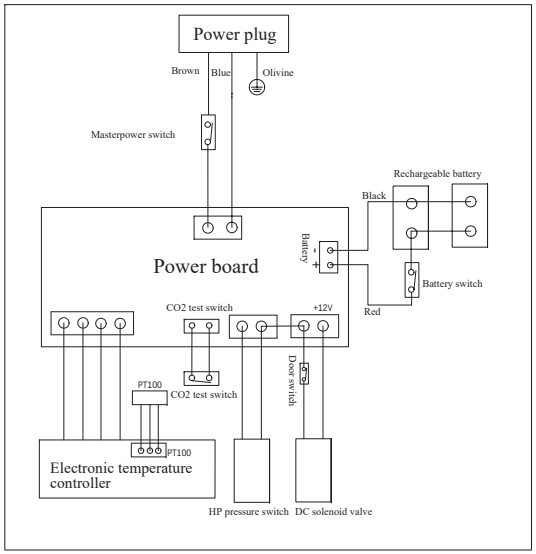
产品包修条款

该系列产品包修期 1 年，从购机之日起开始计时（以发票日期为准；对于通过经销商采购的产品按照产品安装调试单的日期开始计时）。

过了包修期的产品，按照海尔统一服务标准收费，更换部件只收取成本费和运费，不收取服务费。该产品享受海尔星级服务，出现问题 24 小时内上门。

以下为粘贴发票或安装调试单处

CIRCUIT DIAGRAM



Technical Specification

Model	HBX-IC	HBX-IIC
Dimensions(WxDxH)(mm)	200×400×160	200×400×160
Rated Current	0.25A	0.25A
Rated Voltage	AC 220-240V, 50/60Hz	AC 220-240V, 50/60Hz
Scope range of the fluctuation of voltage	±10%	±10%
Net Weight	14kg	14kg

Package

Description	Discharge pipe	User manual	Plastic bag	Output pipe	Input pipe	Cableclip
Backup System	1	1	1	1	1	1

Meaning of crossed out wheeled dustbin:
Do not dispose of electrical appliances as unsorted municipal waste, use separate collection facilities.
Contact your local government for information regarding the collection systems available.
If electrical appliances are disposed of in landfills or dumps, hazardous substances can leak into the groundwater and get into the food chain, damaging your health and well-being.
When replacing old appliances with new ones, the retailer is legally obligated to take back your old appliance for disposals at least free of charge.

以下为粘贴发票或安装调试单处

扫描二维码，关注微信平台，智享科技魅力

合格证

Certificate of Quality

检验员：

Certificate of Quality

checker:

海尔生物医疗
智护生命科学

注册人、生产企业名称及售后服务单位：**青岛海尔生物医疗股份有限公司**
注册人、生产企业住所及生产地址：青岛经济技术开发区海尔工业园内
在线报修地址：http://service.haier.com
售后服务热线：4006 99 2017
网址：www.haierbiomedical.com
说明书修订日期：2018 年09月
版次：2018 年第 1 版
专用号：0270501125
厂家代码：V13026

Manufacturer: Qingdao Haier Biomedical Co.,Ltd.
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