

Haier

特种电器售后服务手册 Service Manual for Special Electrical Equipment

产品类型：超低温保存箱

Product type: Ultra-low temperature storage cabinet

产品型号：DW-86L579BPT/729BPT/829BPT/959BPT

Product model: DW-86L579BPT/729BPT/829BPT/959BPT

产品图示：

Product Diagram:



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一. 产品的特点与型号含义

1. Features and Model Implication of the Product

1.1. 产品的主要功能和特点

1.1. Main functions and features of the product

1.1.1. 超低温柜箱内温度适用范围为-40~-86℃；

1.1.1. The application range of the temperature in the ultra-low temperature cabinet is -40℃ to -86℃；

1.1.2. 箱内外压力平衡设计，开关门容易；

1.1.2. The balance design is applied to the internal and external pressure of the cabinet, which is easy to open and close the door.

1.1.3. 微电脑控制，十寸液晶显示屏，主页可同时显示箱内温度、设定温度、环境温度、输入电压等；

1.1.3. microprocessor, 10-inch LCD screen, the digital display screen can simultaneously display the temperature inside the cabinet, the setting temperature, the ambient temperature, the input voltage.

1.1.4. 显示屏可设定高低温报警、箱内温度、环温报警温度、用户注册等。可查看、下载温度曲线、事件记录和报警记录、机器运行状态等；

1.1.4. User can set high and low temperature alarm, temperature inside the cabinet, ambient temperature alarm, user login, inquiry and download data of temperature curve, event record, alarm record, and running status.

1.1.5. 多种故障报警（高低温报警、传感器报警、冷凝器脏报警、环温过高报警、开门报警、电池电量低报警、断电报警）；

1.1.5. Multiple fault alarms (high and low temperature alarm, sensor alarm, condenser dirty alarm, excess ambient temperature alarm, door opening alarm, low battery power alarm, power outage alarm);

1.1.6. 两种报警方式（声音蜂鸣报警、灯光闪烁和提示框报警），开机延时保护（开机延迟时间可以用户需求进行设定）；

1.1.6. Two alarm modes (beep alarm, light flashing alarm), start-up delay protection (start-up delay time can be set by user's requirement);

1.1.7. 具有网络功能，具有 RS-485 数据接口，可与计算机连接，通过计算机显示箱内温度，显示报警信息，可通过操纵计算机控制温度，监控设备是否正常；

1.1.7. Provided with network function as well as an RS-485 data interface, it can be connected with a computer, display the temperature inside the cabinet and the alarm information through the computer, and can control the temperature and monitor whether the equipment is normal by controlling the computer ;

1.1.8. 具有 5V 供电输出功能，方便用户使用此电源直接给冷链模块供电；

1.1.8. Be provided with 5V power supply output function, which is convenient for the user to directly supply power to the cold chain module by using the power supply;

1.1.9. 具有远程报警功能，可连接报警器到其他房间实现报警功能；

1.1.9. Be provided with the remote alarm function and can connect the alarm to other rooms to realize the alarm function;

1.1.10. 产品标配 USB 数据存储模块，可以存储箱内高低温设定温度、实际温度、环境温度和电压，可存储数据 10 年以上。

1.1.10. The standard USB data storage module supplied with the product can store high and low temperature set, actual temperature, ambient temperature and voltage inside the cabinet for more than 10 years.

1.1.11. 产品标配 2 个 25.5mm 测试孔；

1. 1.11. The product is supplied with 2 standard 25.5mm test holes;

1.1.12. 配备脚轮，灵活，可移动、可锁定、可支撑，并根据要求实现微调节；

1.1.12. Equipped with casters which are flexible, movable, lockable, supported, and can realize fine adjustment as required;

1.1.13.可配置记录仪、网络监控系统、电磁锁、打卡模块等。

1.1.13. The recorder, network monitoring system, electromagnetic lock, card punching module, etc.

1.1.14 手机下载bio-link APP，可随时随地对箱内温度、报警和事件记录进行监控查看；(目前适用于中国)

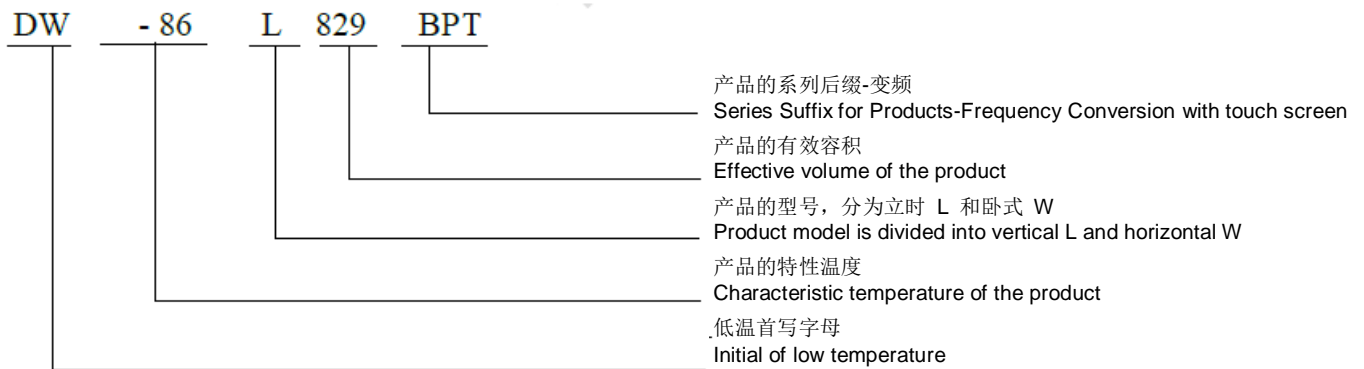
Download bio-link APP to smart phone, can view and monitor temperature inside the cabinet, alarm record, event record(only applicable for china)

1.1.15.液晶屏自带wifi模块，可通过无线网络连接样本库软件（选配），轻松管理样本，安全、准确。

The LCD screen comes with wifi module, can connect wireless network to entry sample library function (optional) to manage sample easily.

1.2 型号含义

1.2 Model designation



二 产品宣传点、卖点

2. Publicity Points and Selling Points of the Product

2.1 温度控制:

2.1 Temperature control:

电脑控制，温度数字显示，调节单位为 0.1℃，温度适用范围为-40~-86℃；

Computer controlled, temperature digital display, regulating unit of 0.1 ℃, and the application temperature range of -40 to -86 ℃;

2.2 安全控制:

2.2 Safety control:

2.2.1 多种故障报警（高低温报警、传感器报警、冷凝器脏报警、环温超标报警、电池电量低报警、断电报警、开门报警）；

2.2.1. Multiple fault alarms (high and low temperature alarm, sensor alarm, condenser dirty alarm, excess ambient temperature alarm, door opening alarm, low battery power alarm, power outage alarm);

2.2.2 两种报警方式（声音蜂鸣报警、灯光闪烁报警和提示框报警），开机延时保护（开机延迟时间可以用户需求进行设定）；

2.2.2. Two alarm modes (buzzing alarm, light flashing alarm), start-up delay protection (start-up delay time can be set by user's requirement);

2.2.3 所有独立部件安全接地；

2.2.3 All independent components have safe grounding;

2.3 制冷系统:

2.3 Refrigeration system:

2.3.1 智能变频制冷技术，进口品牌压缩机，制冷能力强，耗电量低，冷媒环保无氟，对环境污染0排放；

2.3.1 Intelligent frequency conversion cascade refrigeration technology, imported brand compressor, strong

refrigerating capacity, environment-friendly refrigerant , no fluorine, zero emission;

2.3.2 高密度保温层和 VIP 特殊保温材料的组合箱体设计, 保温效果好;

2.3.2 High-density insulated combined cabinet body design, made of VIP special thermal insulation material, with good thermal insulation effect;

2.3.3 独立的多层密封结构加隔热系统设计, 有效消除结霜现象;

2.3.3 Independent multi-layer sealing structure and thermal insulation system design, which can effectively eliminate frosting phenomenon;

2.3.4 特殊设计的电脑控制, 根据设定温度及使用环境, 自动选择最优压缩机启停方案, 降低噪音, 提高效率;

2.3.4 Specially designed computer control, which can automatically select the optimal compressor start-stop scheme according to the set temperature and the use environment to reduce the noise and improve the efficiency;

2.4 人性化设计:

2.4 Humanized design:

2.4.1 LCD 显示屏, 可显示箱内温度、设定温度、环境温度、输入电压, 可设定高低温报警和箱内温度, 具有故障提示预警功能;

2.4.1 LCD display screen, which can display the temperature inside the cabinet, set temperature, ambient temperature, input voltage, can set high and low temperature alarm and the temperature inside the cabinet, and have the function of fault prompt and early warning;

2.4.2 可调搁架设计, 便于物品存取;

2.4.2 Adjustable shelf design to facilitate access of goods;

2.4.3 安全门锁, 双锁设计(一个挂锁和一个钥匙暗锁), 防止随意开启;

2.4.3 Safety door lock, designed with double locks (one padlock and one key built-in lock), to prevent the opening without permission;

2.4.4 一体式手把创新设计和紧凑式脚轮设计, 灵活更方便;

2.4.4 Integrated innovative handle design and compact caster design, flexible and convenient;

2.4.5 具有网络和远程报警功能, 先进实用;

2.4.5 With the function of network and remote alarm, advanced and practical;

2.4.6 独特的 5V 供电模块解决用户单独拉电源的麻烦, 直接由整机输出 5V 供电;

2.4.6 Unique 5V power supply module, which solves the user's trouble in pulling-down the power supply separately and is directly powered by 5V output of the whole machine;

2.5 VIP

采用 PU 发泡层+VIP 真空保温材料, 在保温隔热同时最大限度降低设备占地面积;

PU foaming layer + VIP vacuum thermal insulation material is adopted, which reduces the floor area of equipment to the maximum extent at the time of thermal insulation;

2.6 温度监控功能

2.6 Temperature monitoring function

2.6.1 能将设备上的报警信息以短信的形式发给注册手机用户;

2.6.1 The alarm information of the equipment can be sent to the registered mobile phone users in the form of short messages;

2.6.2 可以通过 USB 数据存储模块下载箱内的实际运行温度;

2.6.2 The actual operating temperature inside the cabinet can be downloaded through the USB data storage module;

2.7 噪声

2.7 Noise

独有的智能压机启停控制，噪音更低，世界领先，工作环境舒适，使用者不烦躁。
Unique intelligent compressor start-stop control, enabling lower noise, leading in the world and comfortable working environment and the user is not anxious any more.

三. 产品外观结构特征

3. Product Appearance and Structural Features

3.1 变频系列新结构系列:

3.1 Series of new structure of variable frequency series:



正视图
Front View



内部结构图
Internal structure diagram



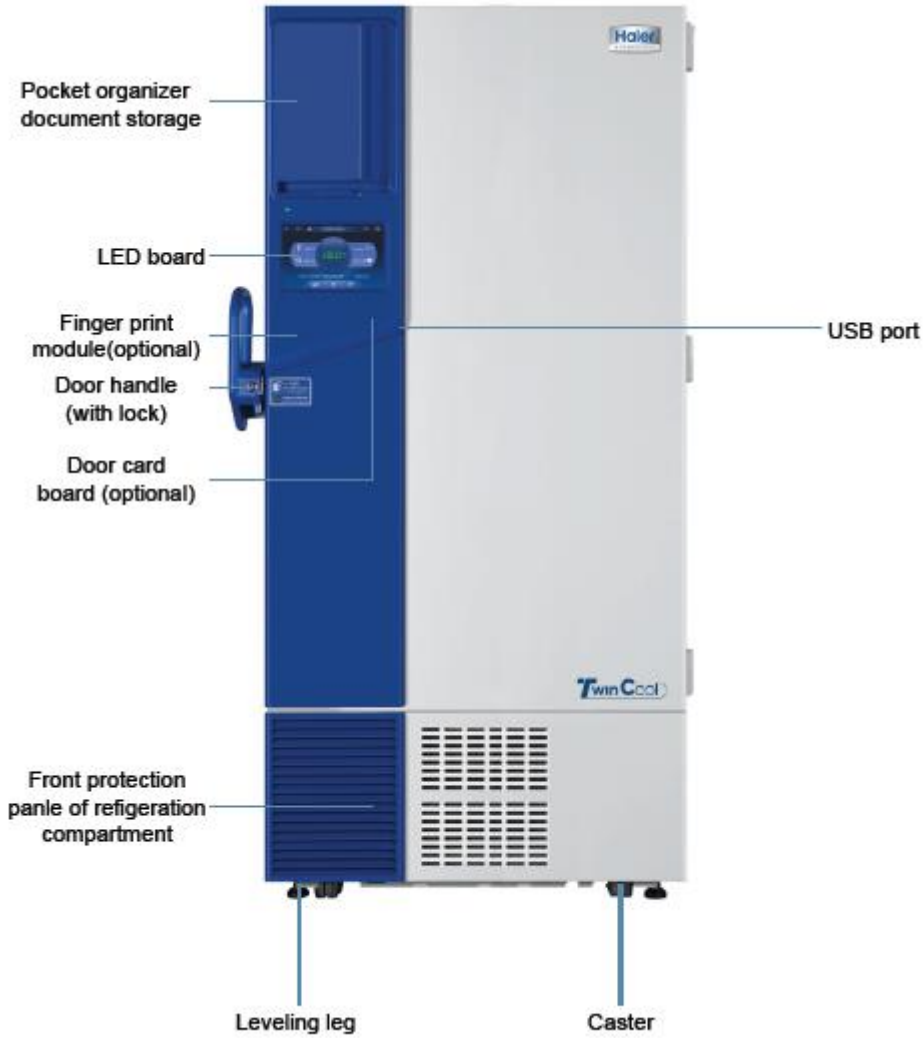
后视图
Rear View

四. 产品部件结构名称

4. Structure Name of Product Part

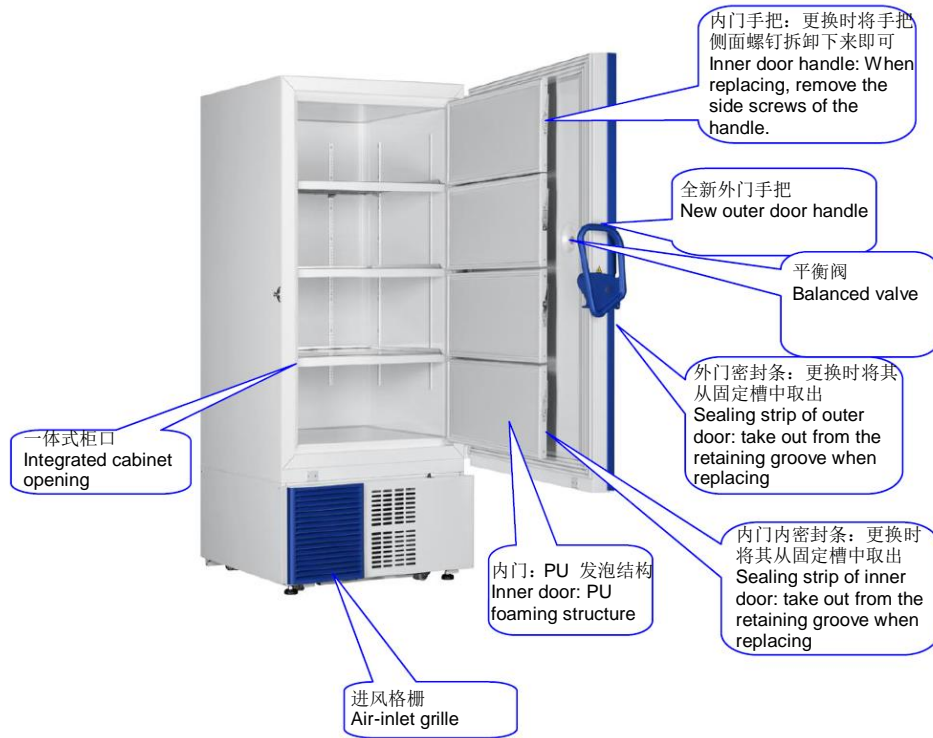
4.1 显示板显示结构

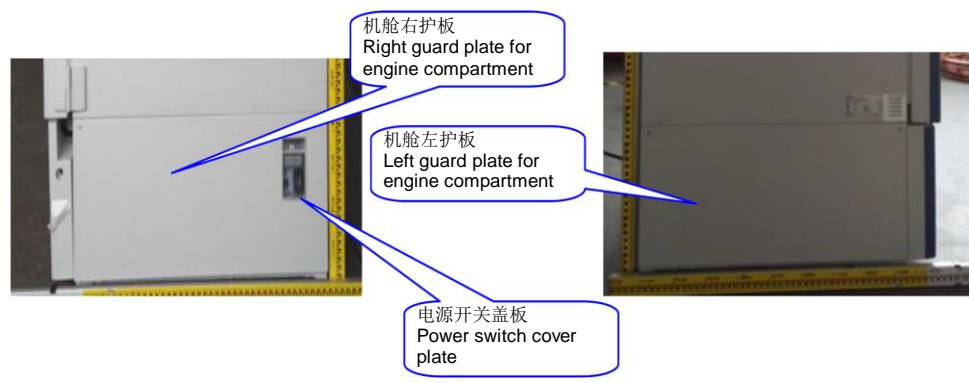
4.1 Display structure of the display panel

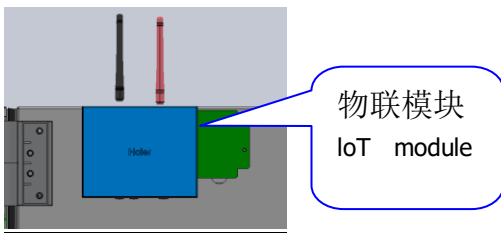
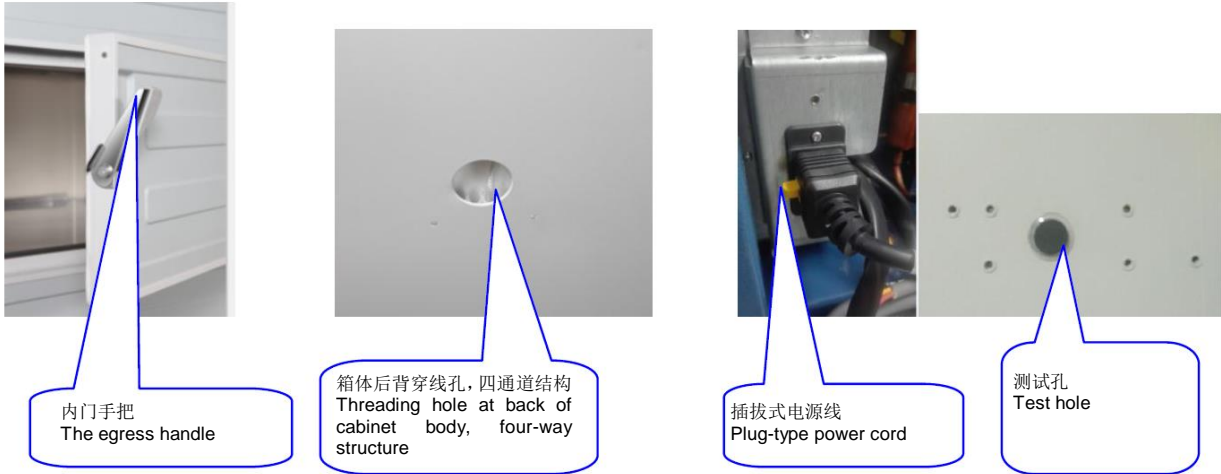


4.2 箱体结构

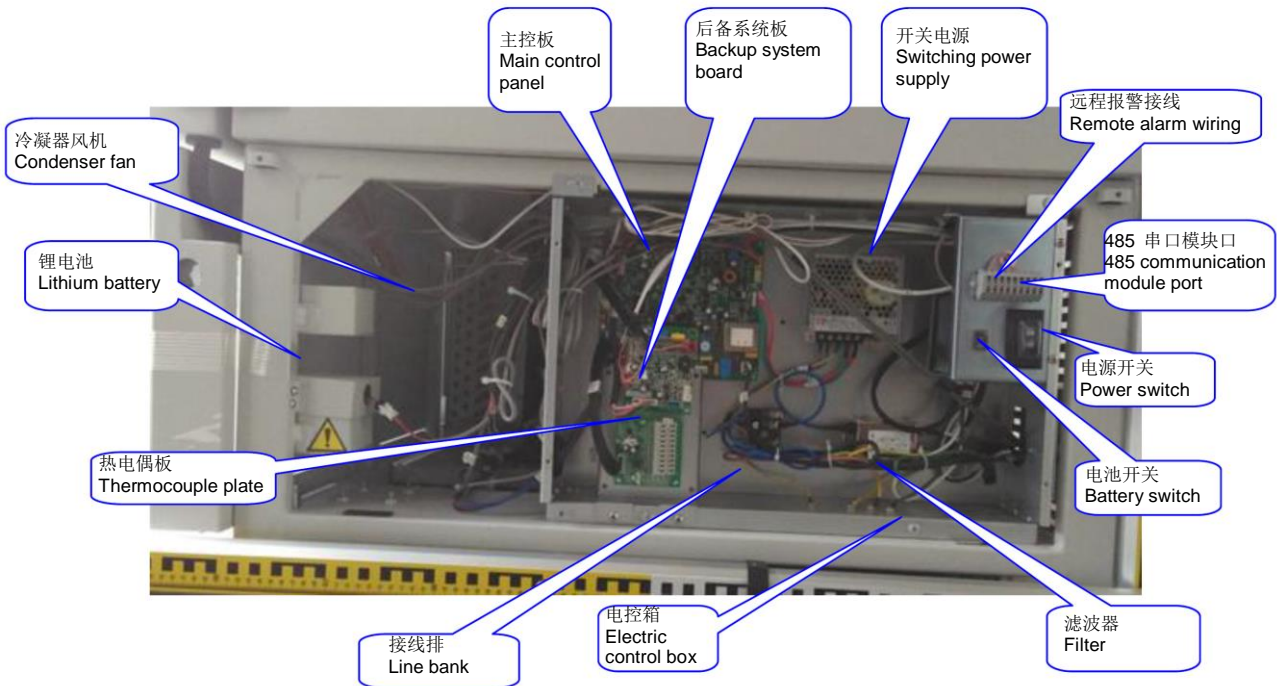
4.2 Box structure





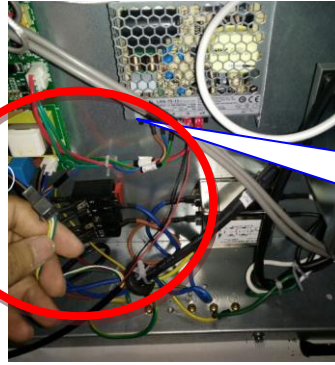


4.3 电控结构 4.3 Electric control structure



物联模块通讯线，连接到主控板通讯线分出的端子上

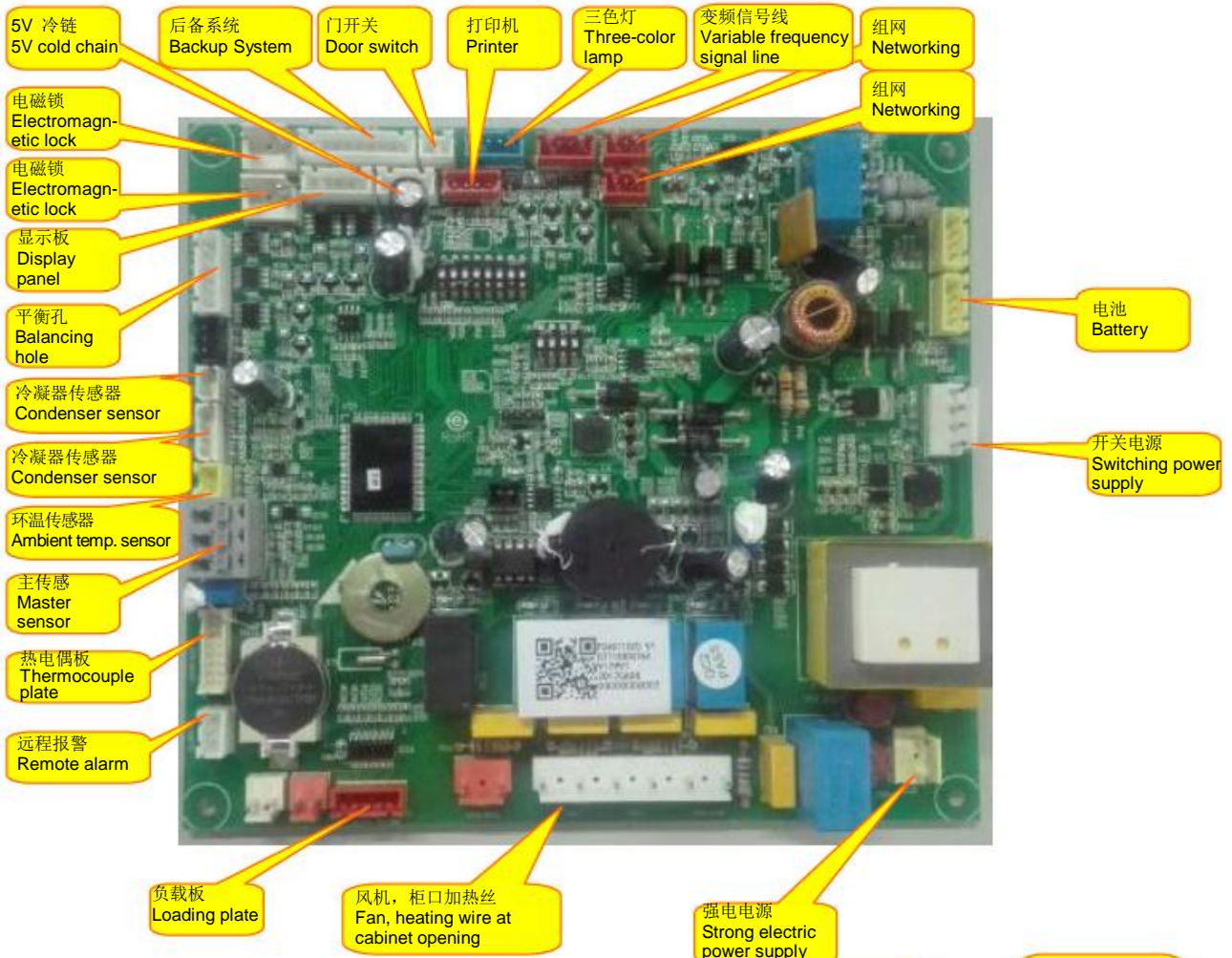
Signal wire of IOT module, connected to signal wire terminal of control board



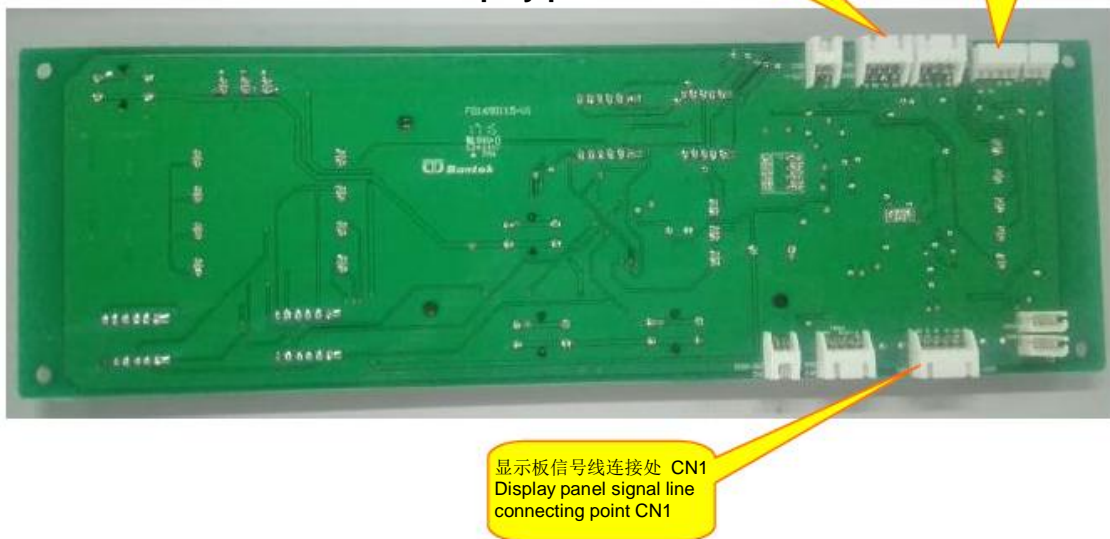
物联模块供电线连接到开关电源上，红线接+V，黑线接-V

Power supply cable of IOT module, connected with switching power supply, red wire connect with +V, black wire connect with -V

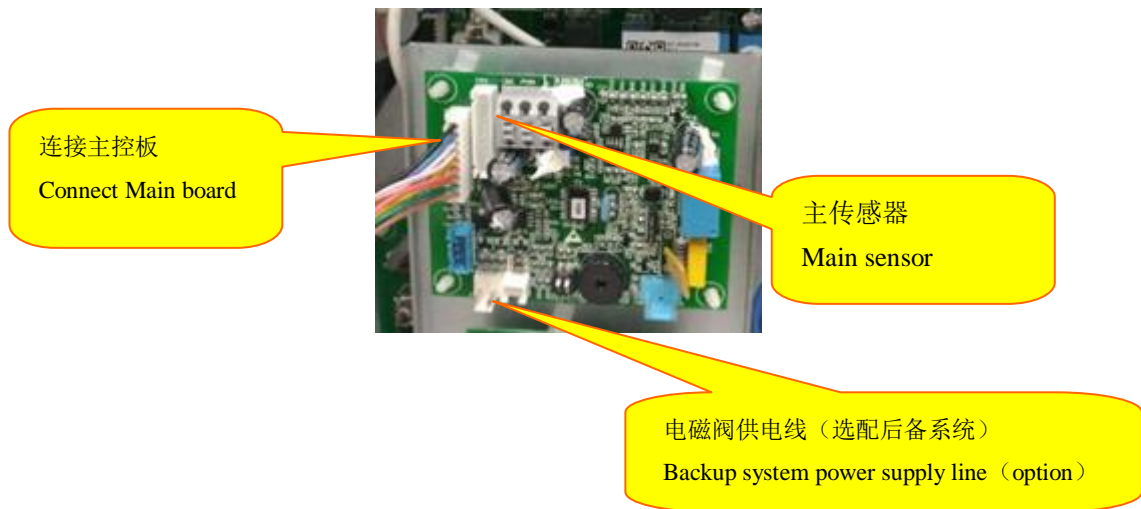
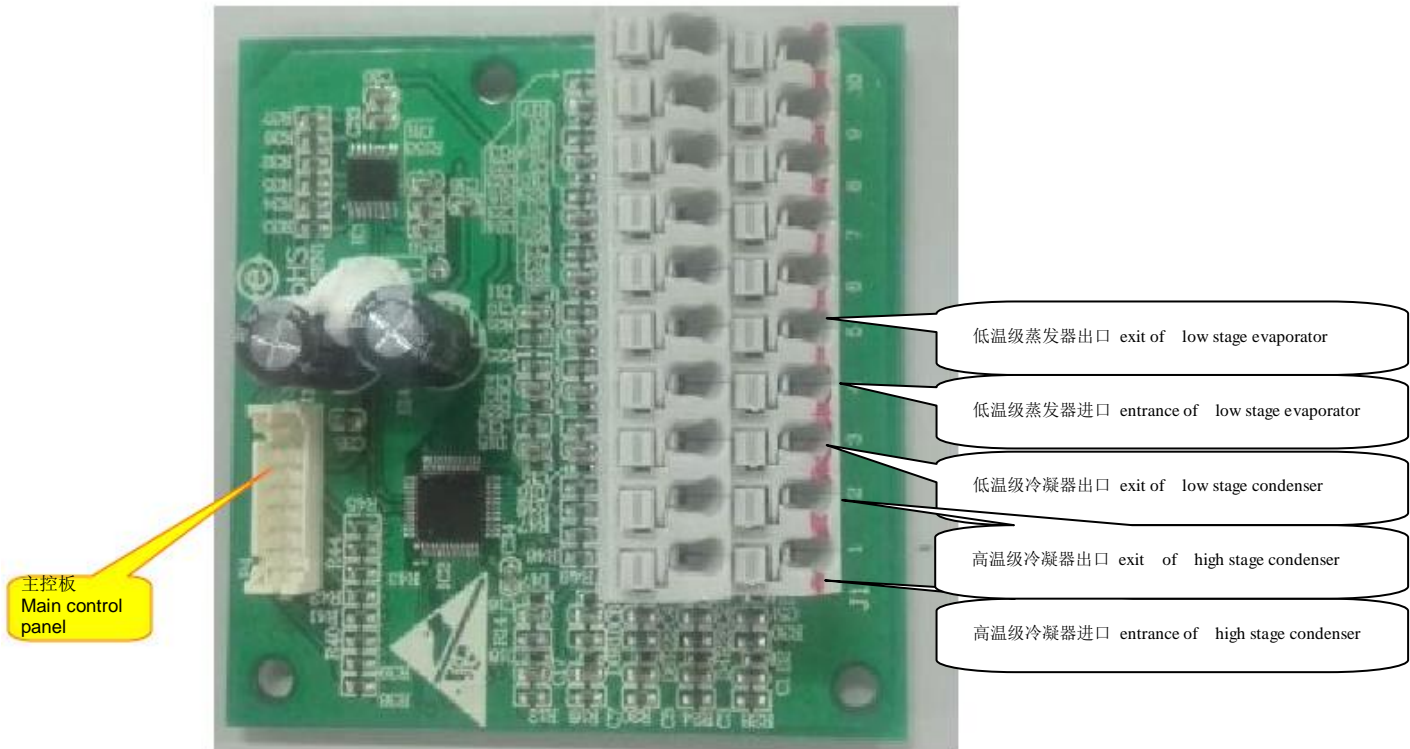
主控板 Main control panel

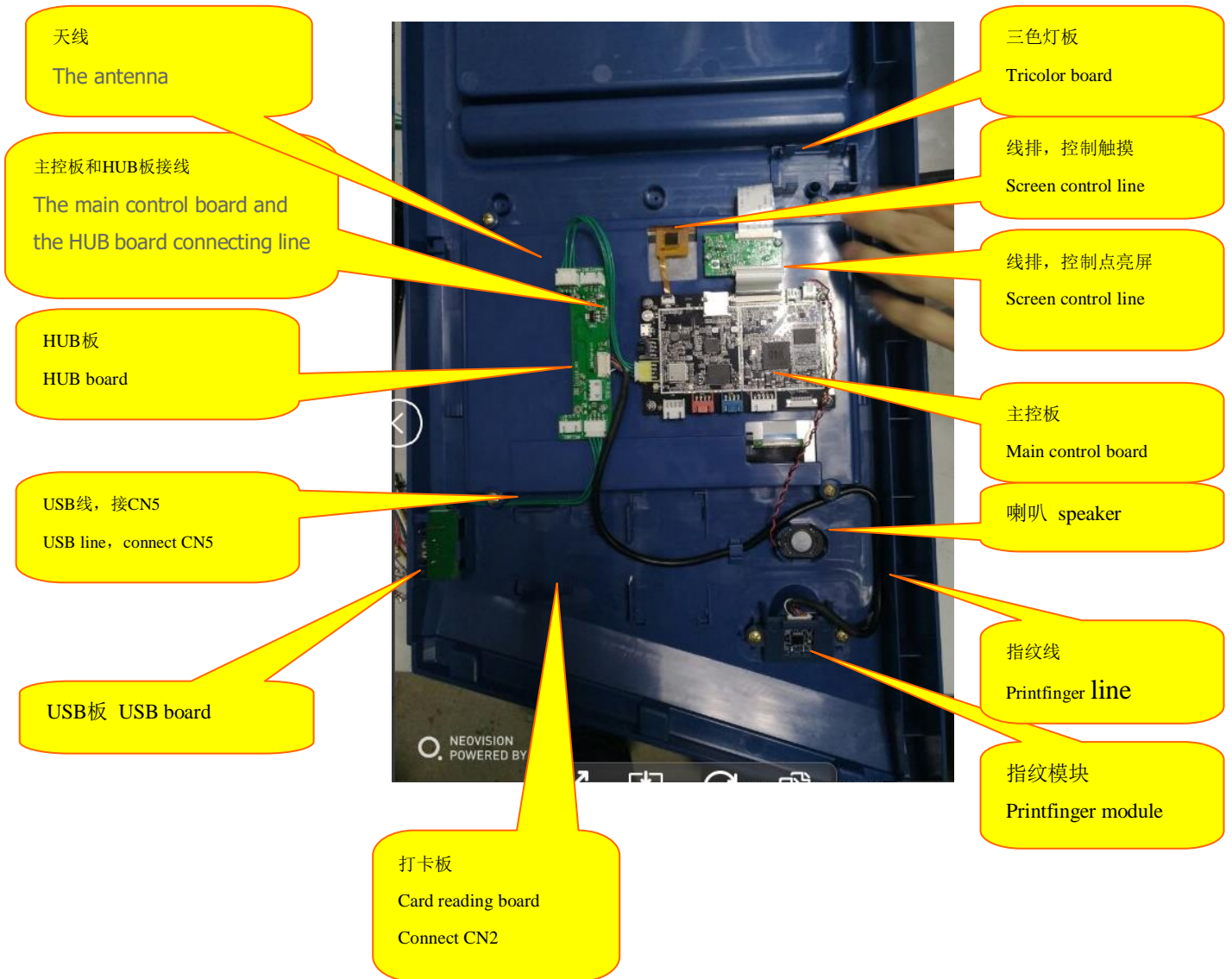


显示板 Display panel



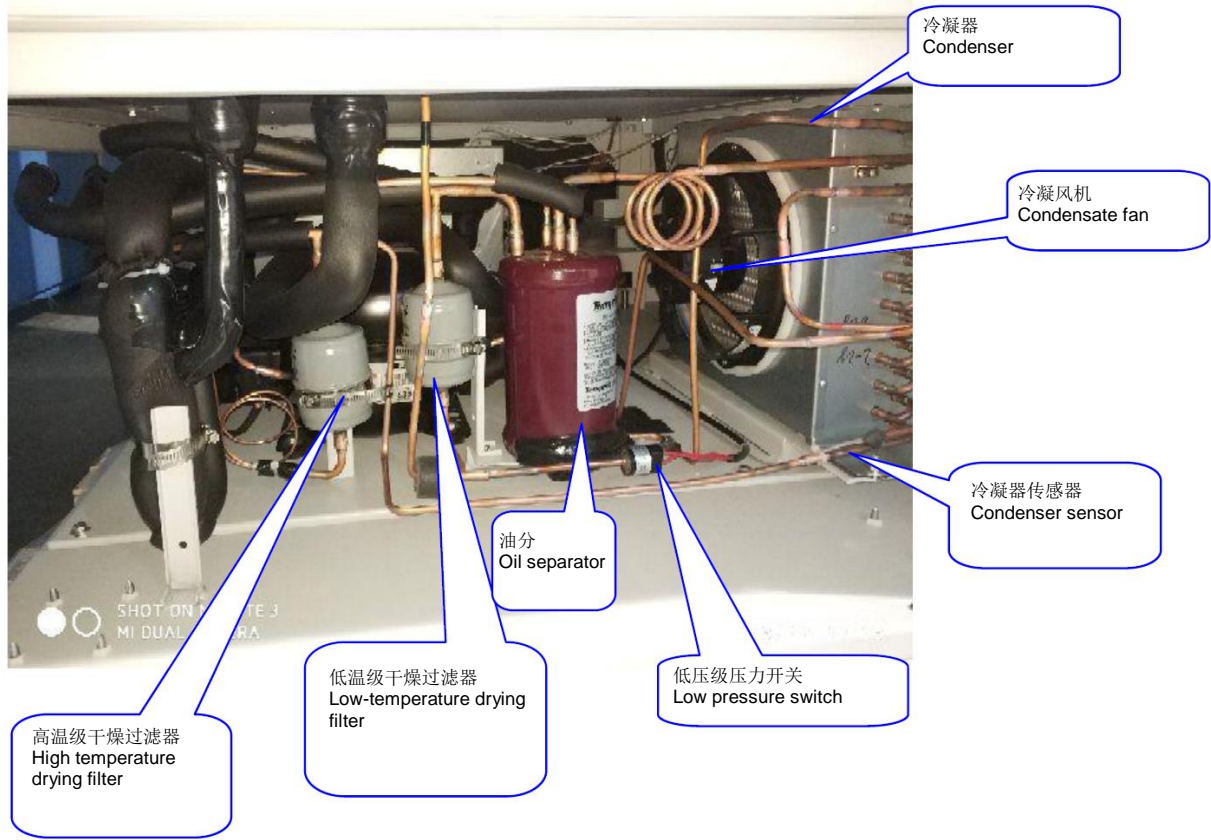
热电偶板 Thermocouple plate

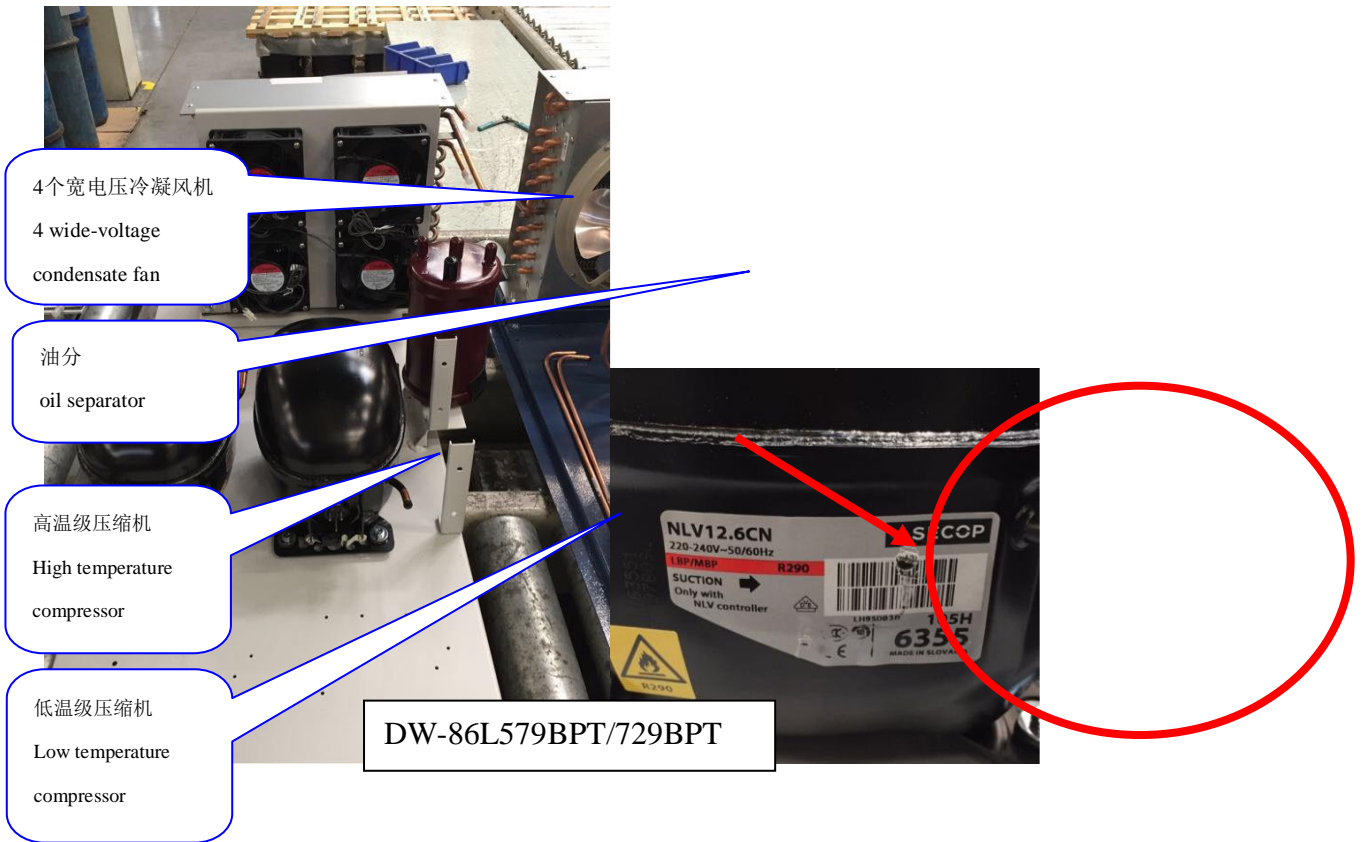




4.4 系统结构
4.4 System structure

DW-86L829BPT/959BPT

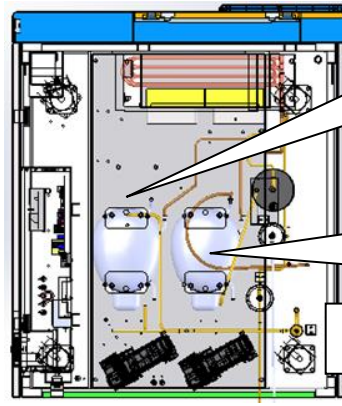






高温级变频器
High-temperature inverter

低温级变频器
Low-temperature inverter



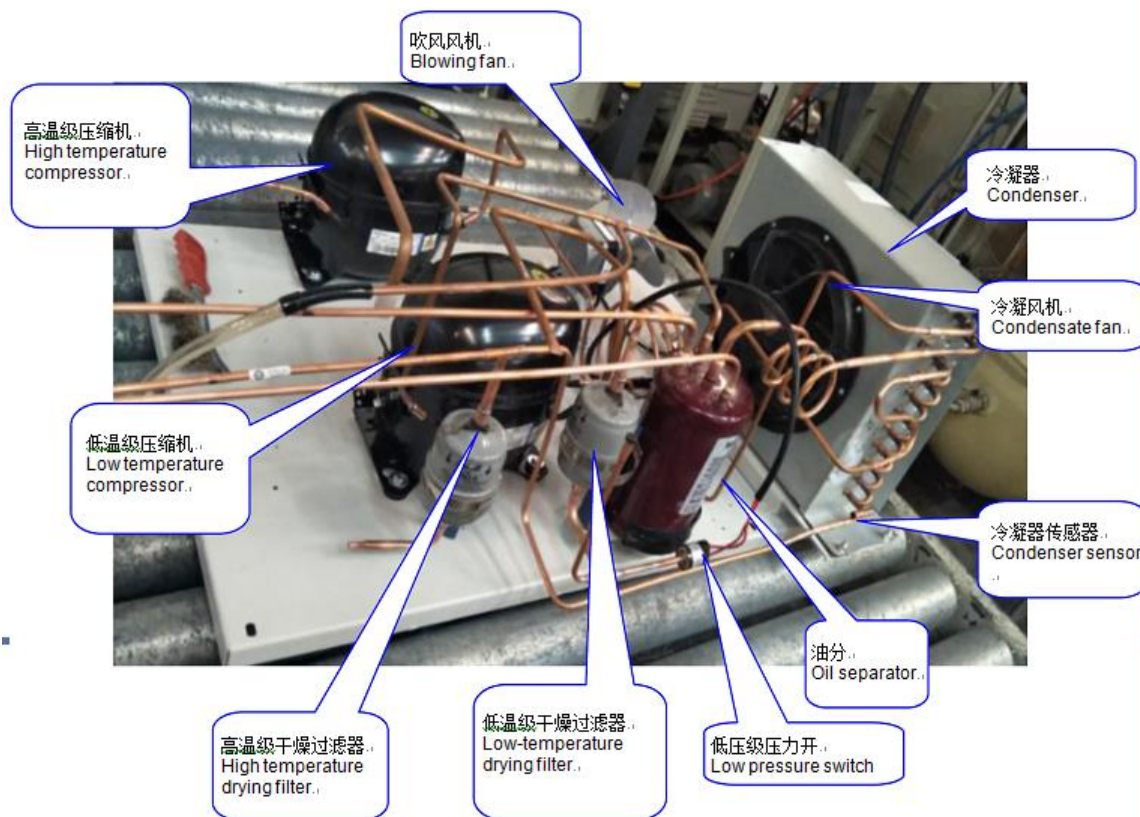
高温级变频器
High-temperature inverter

低温级变频器
Low-temperature inverter

DW-86L579BPT

DW-86L829BP
T/959BPT/729BPT

变频器信号线长线接低温级变频器，短线接高温级变频器
The long line of frequency converter signal line connects to low-temperature frequency converter, with the short-line connected to high-temperature frequency converter



五. 产品使用说明及产品改进介绍

5.1 Product Introduction and Product Improvement Introduction

(详见说明书 See the instruction manual)

5.1.6 超级管理员权限

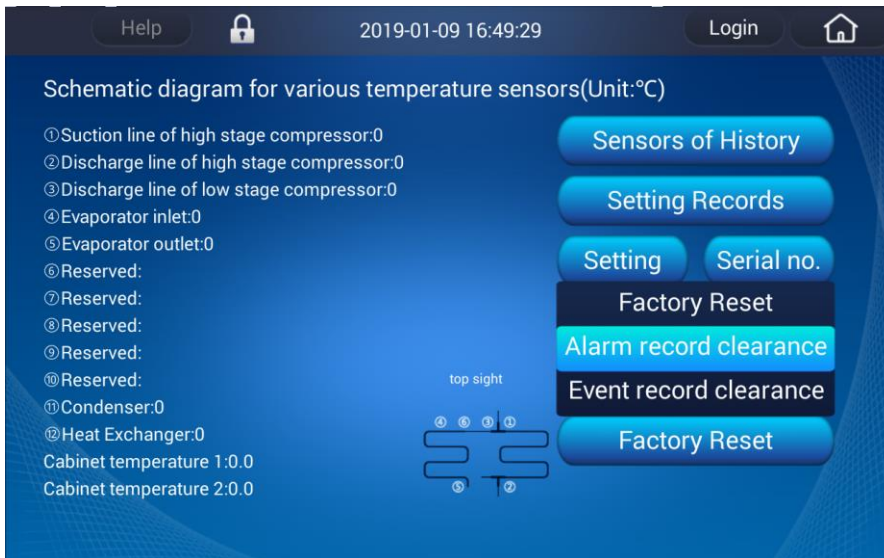
Administrators permission

进入方式：点击登录在密码处输入8888888888进入超级管理员界面

Entry method: press "login", input password 8888888888 to entry administrator interface.

将机舱内对应的热电偶线接到电控箱内热电偶板上对应的位置，①对应热电偶板上1号位置，可显示该热电偶线对应的温度值，以便于机器故障维修时查找原因。其中①-⑤号点是变频型号布点，⑦-⑧号点是双系统型号布点。

Connect the thermocouple sensor to the corresponding position on thermocouple board in electrical box, ①Suction line of high stage compressor: corresponding position is No.1 on thermocouple board, it states temperature of this thermocouple sensor, help to look up cause when fault repair. ①-⑤ is for frequency conversion models, ⑦-⑧ is for dual system models.



【各布点温度历史查询】 Sensors of History

High stage inlet	High stage outlet	Low stage outlet	Evaporator inlet	Evaporator outlet	Level-L capillary inlet	Condenser	Heat exchanger	Ambient	Voltage
-36	-36	-36	-36	-36	0	9	-22	9	221
2019-01-09 13:34:35									
-36	-36	-36	-36	-36	0	10	-29	10	224
2019-01-09 13:28:35									
-36	-36	-36	-36	-36	0	12	-34	10	220
2019-01-09 13:22:35									
-36	-36	-36	-36	-36	0	8	-23	9	222
2019-01-09 13:16:35									
-36	-36	-36	-36	-36	0	13	-29	10	220
2019-01-09 13:10:35									
-36	-36	-36	-36	-36	0	12	-35	10	220
2019-01-09 13:04:35									

Start time - End time Inquiry Download

输入开始时间-结束时间，点击查询可查看该时间段内各点温度记录；点击下载，可对温度数据进行下载，不输入时间点击下载，默认下载全部时间段数据。

Input start time and end time, press “inquiry” to view temperature record of all sensors in this period time; press “download” to download temperature data. If press download without inputting time period, it will download temperature data for all time period.

【设置记录查询】Setting Records

Timestamp	Action
2019-01-09 16:40:41	Modify temperature access cy
2019-01-09 16:40:41	Modify voltage calibration Prio
2019-01-09 16:40:41	Modify the system temperature
2019-01-09 16:40:41	Modify the ambient temperatur
2019-01-09 16:40:41	Modify the temperature calibra
2019-01-09 11:51:18	Modify machine No. Prior valu

Start time - End time Inquiry Download

输入开始时间-结束时间点击查询，可显示该时间段内的设置更改记录，点击下载，可对设置更改记录进行下载；不输入时间点击下载数据，默认下载全部设置更改记录。

Input start time and end time, press “inquiry” to view setting records in this period time, press “download” to download setting record data. If press download without inputting time period, it will download setting

record data for all time period.

【设置】Setting



型号：该机器对应的型号，系统自判定。

Model: the model information for this unit, system self-determination

箱内温度校准：当箱内实测温度与显示温度有差异时，可对箱内温度传感器进行校准，默认0，-10℃~10℃可调，校准后显示温度不变。例箱内显示温度-80℃，实测温度-78℃，选择+2℃，可使实测温度和显示温度一致。

Temperature calibration of tank: when real measured temperature of tank deviates from temperature displayed on display panel, calibrate sensor temperature of tank, default value is 0, adjust range is -10℃~10℃, displayed temperature doesn't change after calibration. Example : -80℃ is displayed on the machine, but the user measures that the temperature in the freezer is just -78℃, In order to lessen the difference, the temperature deviation can be adjusted by +2℃. Thus, the -78℃ is displayed.

环温校准：当显示环温与实测环温有差异时，可对显示屏进行校准，默认0，-10℃~10℃可调，校准后显示温度改变。例环温显示温度30℃，实测温度35℃，选择+5℃，可使环温显示温度调至35℃。

Calibration of ambient temp: when displayed ambient temperature deviates from real measured ambient temperature, calibrate the display panel value, default value is 0, adjust range is -10℃~10℃, displayed ambient temperature changes after calibration. Example : 30℃ is displayed on the machine, but the user measures that the ambient temperature is 35℃, In order to lessen the difference, the temperature deviation can be adjusted by +5℃. Thus, the 35℃ is displayed.

电压校准：当显示电压与实测电压有差异时，可对显示屏进行校准，默认0，-9V~9V可调，校准后显示电压改变。例显示电压215V，实际电压220V，选择+5℃，可使显示电压调至220V。

Calibration if voltage: when displayed voltage value deviates from real measured voltage value, calibrate the display panel value, default value is 0, adjust range is -9V~9V, displayed value changes after calibration.
Example : 215V is displayed on the machine, but the user measures that the voltage is 220V, In order to lessen the difference, the voltage deviation can be adjusted by +5°C. Thus, 220V is displayed.

温度取数周期: USB取数周期, 默认6min, 1~30min可调。

Temperature recording interval: temperature recording interval of U disk, default value is 6min, adjust range is 1~30min

后备系统温度校准: 当后备系统PT100与主控板PT100取数有差异时, 可对后备系统传感器进行校准。默认0, -10°C~10°C可调, 校准后后备系统温度值变化。

Backup system temperature calibration: when temperature value of backup system PT100 sensor deviates from temperature value of main control board PT100 sensor, calibrate the backup system PT100 sensor value, default value is 0, adjust range is -10°C~10°C, temperature value of backup system sensor changes after calibration.

样本库功能: 需使用样本库软件时, 需将样本库功能开启, 才能使用;

Sample library function: if want to use this program, first must enable sample library function

指纹功能: 需使用指纹锁时, 需将指纹功能开启, 才能使用, 否则点击指纹液晶屏提示指纹不可用;

Fingerprint function: if want to use fingerprint lock, first must enable fingerprint function, or it displays fingerprint is not available when press the screen.

读卡功能: 需使用电磁锁时, 需将读卡功能开启, 才能使用, 否则点击打卡液晶屏提示打卡不可用;

Card reading function: if want to use solenoid lock, first must enable card reading function, or it displays card is not available when press the screen.

下一页: Nest page



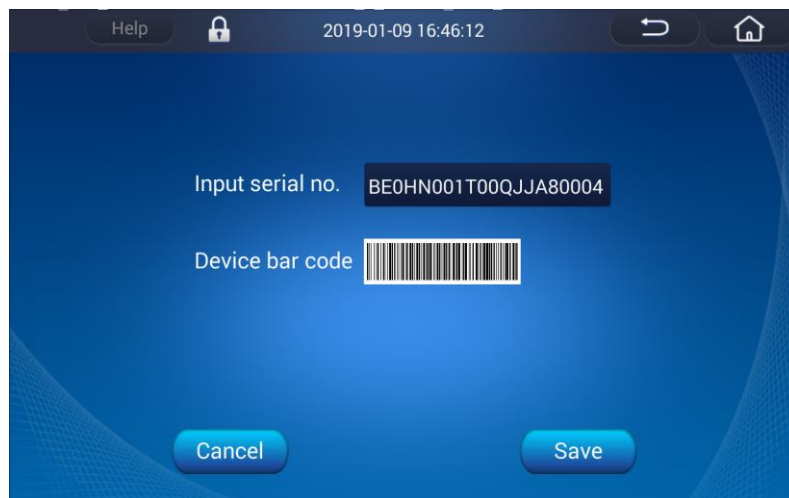
可显示该保存箱压缩机寿命保护温度，压缩机/风机运行时间和设计寿命，仅做维修时参考。

This layer displays compressor protection temperature, compressor run time and design life expectancy, fan motor run time and design life expectancy, reference only for maintenance.

【机编】 Input serial no.

如有用户更换显示屏，可手动输入机编号生成一维码，以便进行扫描枪扫描或查询机编等操作。

If user needs to replace display panel, input the serial no. to produce bar code, in order to scanning gun and serial no. inquiry operation.



【屏蔽】 可对报警进行屏蔽，屏蔽后系统有该报警时，显示屏不再提示。

Shielding function: if select one fault shielding and save, when this alarm occurs, it will not display on the screen.



环温传感器故障屏蔽-屏蔽环温报警

Ambient temperature alarm shielding – shield the ambient temperature alarm

冷凝器传感器故障屏蔽-屏蔽冷凝器脏报警

Condenser sensor error shielding - shield the condenser sensor error

箱内主传感器故障屏蔽-屏蔽传感器故障报警

Cabinet main sensor error shielding - shield the cabinet main sensor error

热交换传感器故障屏蔽-屏蔽传感器故障报警

Heat exchange sensor error shielding - shield the heat exchange sensor error

后备系统传感器故障屏蔽-屏蔽后备系统故障报警

Backup control sensor error shielding - shield the backup control sensor error

电池未连接屏蔽-屏蔽电池电量低报警

Battery disconnected error shielding - shield the battery disconnected error

【升级】Update

点击升级可通过USB导入显示屏程序对现有显示屏程序进行升级。

Press “update” to update program with U disk



【查看报警记录】Alarm record

可查看并删除报警记录，可单条删除也可全部删除。

View and delete alarm record, can delete individual record, or delete all records

【恢复出厂设置】Factory reset

恢复出厂设置：清空所有数据，恢复出厂时系统设置

Factory reset: Clear all data and factory reset

报警记录清空：一键清空所有报警记录，清空后无法恢复。

Alarm record clearance: wipe all alarm record, can't recover

事件记录清空：一键清空所有事件记录，清空后无法恢复。

Event record clearance: wipe all event record, can't recover



5.2 注意事项

5.2 Precautions

5.3.1 初次安装或搬动设备后，请顺时针旋转水平支脚使水平支脚支撑地面，确保保存箱使用时不移动，安装固定到位后需要静置24小时后再通电使用。

5.3.1 After the first installation or moving of the equipment, clockwise rotate the horizontal support to support and fix the storage box on the ground, and then power on the freezer and use it 24h after the its installation and fixing.

5.3.2 室温应尽量保持在28℃以下使用（如果环境温度高于32，冷却效率会迅速下降，且环温长时间高于32将可能导致压缩机损坏或寿命降低，因此，使用该产品的环境建议安装空调）。

5.3.2 Room temperature should be kept below 28 °C (if ambient temperature is higher than 32, cooling efficiency will decrease rapidly, and if the ambient temperature is higher than 32 for a long time, it will likely damage to or reduce service life of the compressor, therefore, it is recommended to install air conditioner in the environment using the product).

5.3.3 单台设备应该独立使用一个插座，且电源插座承受电流应大于16A，并可靠接地。

5.3.3 A single equipment shall use a separate socket, and the power socket shall be able to withstand the current of over 16A and reliably grounded.

5.3.4 通电时先打开机器电控箱上的电池开关，需长时间关机时，电源再关掉此开关。

5.3.4 Firstly turn on the battery switch on the machine electric cabinet when powering on, and power off the switch if it is necessary to shut down for a long time.

5.3.5 低温冰箱每次开门时间尽量不超过1分钟，且关门时需将门封条上的冰水擦拭干净，保证密封效果良好。

5.3.5 The door of cryogenic refrigerator shall be opened for not more than 1 minute each time, and the ice water on the door seal shall be wiped clean before closing the door so as to ensure good sealing effect.

5.3.6 为了延长设备使用寿命和降低能耗，使用时，在保证存储物品安全的前提下，建议将设备的温度设定在-50℃- -80℃之间为最优。

5.3.6 In order to extend the lifetime and reduce the energy of the equipment, provided that the safety of storage items is ensured, it is suggested that the freezer temperature is appropriately to be set within the range of -50℃ ~ -80℃.

5.3.7 本设备的用途是低温保存物品，不宜作为速冻箱使用，不能强制快速冷冻大量较热物品或大体积液态物品。

5.3.7 The equipment is used to store articles at low temperature and should not be used as a quick-freezing box, so it should not force it to quickly freeze large quantities of hot items or large-volume liquid items.

5.3.8 如果在通电2到3个小时后机器不制冷，请拔掉电源，并尽快与当地售后联系。

5.3.8 If the equipment cannot refrigerate after power on for 2~3 hours, please disconnect the power supply and contact with the local after-sales service provider as soon as possible.

5.3.9 在遇到报警故障或者其他故障时，请按照显示板上的提示消除故障，如无提示或者不能自行排除故障，请不要擅自拆卸，及时联系售后，让专业维修人员帮助消除故障。

5.3.9 When a alarm fault or other faults occurs, please read the instruction book and remove the fault according to the prompts on the display screen. Do not dismantle the equipment without approval if there are no prompts or the fault cannot be removed. Please contact with the local after-sales service provider to send professional maintenance personnel to remove it.

六. 产品主要技术参数

VI. Main technical parameters of the product

6.1 技术参数一览表




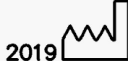


6.1 Table of main technical parameters




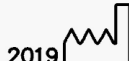


型号 Model	DW-86L829BPT	DW-86L959BPT	DW-86L729BPT	DW-86L579BPT
技术参数 Technical Parameters				
产品属性 Product Attributes	立式 Vertical	立式 Vertical	立式 Vertical	立式 Vertical
气候类型 Climate type	N	N	N	N
控制方式 Control mode	微电脑控制 Microcomputer control	微电脑控制 Microcomputer control	微电脑控制 Microcomputer control	微电脑控制 Microcomputer control
显示 Display	LED 显示(最小显示精度0.1℃) LED display (minimum display accuracy 0.1℃)	LED 显示(最小显示精度0.1℃) LED display (minimum display accuracy 0.1℃)	LED 显示(最小显示精度0.1℃) LED display (minimum display accuracy 0.1℃)	LED 显示(最小显示精度0.1℃) LED display (minimum display accuracy 0.1℃)
温度传感器 Temperature sensor	PT100	PT100	PT100	PT100
基本参数 Basic Parameters				
容积(L) Volume (L)	829	959	729	579
电压频率 Voltage frequency (V/ Hz)	208~230/50/60	208~230/50/60	100~230/50/60	100~230/50/60
功率 (W) Power (W)	1100	1300	1100	1100
电流 (A) Current (A)	7	7	7	7






内部尺寸 Internal dimensions (W*D*H)	870*716*1310 (mm) 870*716*1,310 (mm)	1016*716*1310 (mm) 1016*716*1,310 (mm)	766*716*1310 (mm) 766*716*1,310 (mm)	620*716*1310 (mm) 620*716*1,310 (mm)
外部尺寸 External dimensions (W*D*H)	1145*998*1980(mm) 1,145*998*1,980(mm)	1296*998*1980(mm) 1296*998*1,980(mm)	1046*998*1980(mm) 1046*998*1,980(mm)	895*998*1980(mm) 895*998*1,980(mm)
净重/毛总 Net Weight/ Gross Weight (kg) t	380/415	450/485	350/385	320/350
材料 Material				
外部材料 Outer material	电镀锌板图层 Electric zinc plate layer	电镀锌板图层 Electric zinc plate layer	电镀锌板图层 Electric zinc plate layer	电镀锌板图层 Electric zinc plate layer
内部材料 I Internal material I	电镀锌板图层 Electric zinc plate layer	电镀锌板图层 Electric zinc plate layer	电镀锌板图层 Electric zinc plate layer	电镀锌板图层 Electric zinc plate layer
保温层 Insulating layer	VIP+无氟 PU 发泡层 VIP + fluoride-free PU foaming layer	VIP+无氟 PU 发泡层 VIP + fluoride-free PU foaming layer	VIP+无氟 PU 发泡层 VIP + fluoride-free PU foaming layer	VIP+无氟 PU 发泡层 VIP + fluoride-free PU foaming layer
门体厚度 Door thickness	90mm	90mm	90mm	90mm
箱体厚度 Box thickness	90mm	90mm	90mm	90mm
外门密封结构 Outer door sealing structure	四层硅胶密封条 Four-layer silica gel sealing strip	四层硅胶密封条 Four-layer silica gel sealing strip	四层硅胶密封条 Four-layer silica gel sealing strip	四层硅胶密封条 Four-layer silica gel sealing strip
内门密封结构 Inner door sealing structure contact	独立内门单层硅胶密封条 Independent inner door single-layer silica gel sealing strip	独立内门单层硅胶密封条 Independent inner door single-layer silica gel sealing strip	独立内门单层硅胶密封条 Independent inner door single-layer silica gel sealing strip	独立内门单层硅胶密封条 Independent inner door single-layer silica gel sealing strip
门锁 Door lock	Y/1	Y/1	Y/1	Y/1
Product Accessories				
隔板/内门数量 Number of separating plates/ inner doors	3/4	3/4	3/4	3/4
隔板尺寸 Size of separator (W*D)	854*706	1002*650	752*650	596*657
脚轮/测试孔 Castor/ Test Holes	4/2	4/2	4/2	4/2
压缩机品牌和类型 Compressor brand and type	全封闭 /SECOP/2 Fully closed /SECOP/2	全封闭 /EMBRACO /2 Fully closed /EMBRACO/2	全封闭 /SECOP/2 Fully closed /SECOP/2	全封闭 /SECOP/2 Fully closed /SECOP/2
压缩机	NLV12.6CN	VNEU217U	NLV12.6CN	NLV12.6CN



Compressor				
制冷剂类型 Refrigerant type	HC-Free/R290/R170	HC-Free/R290/R170	HC-Free/R290/R170	HC-Free/R290/R170



6.2 产品铭牌
6.2 Product nameplate



<h1>Haier</h1>		 0197			
Ultra Low Temperature(ULT) Freezer					
Model:	DW-86L729BPT	Refrigerant:	High Stage:	R290:	140g
Inner Temperature:	-40°C~-86°C		Low Stage:	R170:	110g
Effective Volume:	729L				
Rated Voltage:	100-230V~	Foaming Agent:			CP/IP
Rated Frequency:	50/60Hz	Manufacture Date and No.:			in the Barcode
Power Input:	1100W	  			
Climate Type:	4				
Net Weight:	350kg				
Anti-shock Safety Classification:	I				
 Qingdao Haier Biomedical Co.,Ltd. Haier Industrial Park, Economic Technology Development Zone. Qingdao P.R.China Elscolab BV. Tolboomweg 10, 3784 XC Terschuur, the Netherlands 					

<h1>Haier</h1>		 0197			
Ultra Low Temperature(ULT) Freezer					
Model:	DW-86L829BPT	Refrigerant:	High Stage:	R290:	148g
Inner Temperature:	-40°C~-86°C		Low Stage:	R170:	110g
Effective Volume:	829L				
Rated Voltage:	208-230V~	Foaming Agent:			CP/IP
Rated Frequency:	50Hz	Manufacture Date and No.:			in the Barcode
Power Input:	1100W	  			
Climate Type:	4				
Net Weight:	380kg				
Anti-shock Safety Classification:	I				
 Qingdao Haier Biomedical Co.,Ltd. Haier Industrial Park, Economic Technology Development Zone. Qingdao P.R.China Elscolab BV. Tolboomweg 10, 3784 XC Terschuur, the Netherlands 					

Haier		CE 0197		
Ultra Low Temperature(ULT) Freezer				
Model:	DW-86L959BPT	Refrigerant:	High Stage:	R290: 148g
Inner Temperature:	-40°C~-86°C		Low Stage:	R170: 110g
Effective Volume:	959L	Foaming Agent: CP/IP		
Rated Voltage:	208-230V~	Manufacture Date and No.: in the Barcode		
Rated Frequency:	50Hz	  		
Power Input:	1300W			
Climate Type:	4			
Net Weight:	450kg			
Anti-shock Safety Classification:	I			
 Qingdao Haier Biomedical Co.,Ltd. Haier Industrial Park, Economic Technology Development Zone. Qingdao P.R.China Elcolab BV. Tolboomweg 10, 3784 XC Terschuur, the Netherlands 				

Haier		 		
Ultra Low Temperature(ULT) Freezer				
Model:	DW-86L959BPT	Refrigerant:	High Stage:	R290 148g
Inner Temperature:	-40°C~-86°C		Low Stage:	R170 110g
Effective Volume:	959L	Foaming Agent: CP/IP		
Rated Voltage:	AC208V~230V	Manufacture Date and No.: in the Barcode		
Rated Frequency:	50/60Hz			
Power Input:	1300W			
Climate Type:	N			
Net Weight:	450kg			
Anti-shock Safety Classification:	I			
Haier Medical and Laboratory Products Co.,Ltd. Haier Industrial Park,Economic Technology Development Zone, Qingdao 266510,P.R.China				

Haier		 		
Ultra Low Temperature(ULT) Freezer				
Model:	DW-86L829BPT	Refrigerant:	High Stage:	R290 148g
Inner Temperature:	-40°C~-86°C		Low Stage:	R170 110g
Effective Volume:	829L	Foaming Agent: CP/IP		
Rated Voltage:	AC208V~230V	Manufacture Date and No.: in the Barcode		
Rated Frequency:	50/60Hz			
Power Input:	1100W			
Climate Type:	N			
Net Weight:	380kg			
Anti-shock Safety Classification:	I			
Haier Medical and Laboratory Products Co.,Ltd. Haier Industrial Park,Economic Technology Development Zone, Qingdao 266510,P.R.China				

Haier		 		
Ultra Low Temperature(ULT) Freezer				
Model:	DW-86L729BPT	Refrigerant:	High Stage:	R290 140g
Inner Temperature:	-40°C~-86°C		Low Stage:	R170 110g
Effective Volume:	729L	Foaming Agent:		CP/IP
Rated Voltage:	AC100V~230V	Manufacture Date and No.:		in the Barcode
Rated Frequency:	50/60Hz			
Power Input:	1100W			
Climate Type:	N			
Net Weight:	350kg			
Anti-shock Safety Classification:	I			
Haier Medical and Laboratory Products Co.,Ltd. Haier Industrial Park,Economic Technology Development Zone, Qingdao 266510,P.R.China				

七. 案例预防措施、产品使用及日常维护保养知识

7. Case Preventive Measures, Product Use and Daily Maintenance

7.1 超低温变频制冷原理:

7.1 Principle of ultra-low temperature frequency conversion refrigeration:

低温冰箱采用复叠制冷系统，通常由两个或两个以上的制冷系统组成，分别称为高温级和低温级部分。高温级使用中温制冷剂，低温级使用低温制冷剂，每一部分都是一个完整的制冷系统，用一个冷凝蒸发器将两部分联系起来，它既是高温级的蒸发器，又是低温级的冷凝器。低温制冷剂在低温级系统的蒸发器内吸取被冷却对象的热量，并通过冷凝蒸发器将此热量传给高温级系统的制冷剂，然后再由高温级系统的制冷剂将热量在高温级的冷凝器内传给冷却介质。

The low-temperature refrigerator adopts cascade refrigeration system which is usually composed of two or more refrigeration systems, referred to as high-temperature level and low-temperature level respectively. The high temperature level uses the medium-temperature refrigerant and the low-temperature level uses the low-temperature refrigerant, each of them is a complete refrigeration system; these two parts are contacted by a condensing evaporator, so such evaporator is a high-temperature level evaporator and also a low-temperature level condenser. The low temperature refrigerant absorbs heat of the cooled object in the evaporator of the low-temperature level system and transfers such heat to the refrigerant of the high temperature level system by means of a condensing evaporator, and then such heat is transferred to the cooling medium in the high-temperature level condenser by the refrigerant of the high-temperature level system.

使用变频压缩机技术，双压缩机复叠制冷系统设计，系统更可靠。根据箱内温度需求会自动调节压缩机的转速，调整系统制冷量大小。箱内温度波动更小，均匀性更好。在稳定运行阶段，使用低转速低制冷量，从而噪音更低耗电量更低。在开门后自动变到高速提供大制冷量，从而箱内温度快速恢复到开门前温度

It is designed with double compressor cascade refrigeration system using the technology of variable frequency compressor, so the system is more reliable. According to the temperature requirement of the box, the rotating speed of the compressor is automatically adjusted, to adjust the refrigerating capacity of the system. The temperature fluctuation inside the box is smaller, reaching better uniformity. In the stable operation stage, low-speed refrigerating capacity is used, so that the noise is lower and the power consumption is lower. After opening the door, it is automatically changed to high rotating speed to provide large refrigerating capacity, so that the temperature inside the box is quickly restored to the temperature before opening door

7.2 超低温柜使用方法

7.2 Use method of ultra-low temperature cabinet

使用方法:

Use method:

首次使用超低温柜，或超低温柜经搬运后，或超低温柜断电（包括停电）10 个小时以上，必须在使用前（或再次通电使用前）进行验机。验机合格确认。

When the ultra-low temperature cabinet is used for the first time, or the ultra-low temperature cabinet is transported, or the ultra-low temperature cabinet is powered off (including power failure) for more than 10 hours, it is necessary to test the machine before using (or before powering on and reusing). The test is qualified and confirmed.

低温柜的使用方法

Use method of low temperature cabinet

1). 必须静置冷柜至少 24 小时以上才能通电。

1). The refrigerator must be allowed to stand for at least 24 hours before powering on.

2). 空箱不放入物品，通电开机，分阶段使冷柜先降温至-40℃，正常开停后再降到-60 度，正常开停 8 小时后再调到-80 度，观察冷柜有正常开停 24 小时以上。证明冷柜性能正常。

2). Make the cabinet empty and do not put any articles in it, power on to start the refrigerator, then cool the refrigerator to -40 °C in stages, then drop to -60 °C after normal start-stop; adjust to -80 ° after 8 hours of normal start-up, and observe the refrigerator when it is normally opened for more than 24 hours. It is proved that the performance of the refrigerator is normal.

3). 按操作 2 确认冷柜正常后,可以向冷柜内存放物品。原则上应存放-60℃的物品,不超过 1/3 箱体容量。
3). After confirming that the refrigerator is normal by operation 2, the items can be stored in the refrigerator. In principle, items of -60 °C shall be stored, not exceeding 1/ 3 cabinet capacity.

4). 禁止:所有低温保存箱均为低温保存设备,是储存低温物品的,不可用来速冻温度较高的血浆制品,严禁一次性放入过多相对太热的物品,这样会造成压缩机长时间不停机,温度不下降且很容易烧毁压缩机,导致机器箱内物品损坏。物品一定要分批放入,分阶梯温度降温,直至所需要的低温!!!

4). Forbidden matters: all low-temperature storage tanks are of low-temperature storage equipment and used for storing low-temperature articles, and can not store high-freezing high-temperature plasma products; in addition, it is strictly forbidden to put too much relatively hot items, so that the compressor can not stop for a long time, the temperature does not drop, the compressor is easily burnt, and the items in the tank will be damaged. The items must be put in batches, and the temperature shall be reduced in steps until the required low temperature is reached!!!

7.3 压力开关工作原理

7.3 Working principle of pressure switch

A.原理:当压力开关处管路中压力超过 2.6MPa,触点断开,低温柜停机,压力开始下降,当压力降到 1.35MPa 触点接通,低温柜开机,当压力再超过 2.6MPa,触点再断开,依次循环。

A. Principle: When the pressure in middle of the pipeline at the pressure switch exceeds 2.1MPa, the contact is disconnected and the low temperature cabinet stops, the pressure starts to drop; when the pressure drops to 1.35MPa, the contact is connected and the low-temperature cabinet is started; and when the pressure exceeds 2.1MPa again, the contact is disconnected again, repeating in such way in sequence.

B.注意事项:压力开关烧焊时,用湿毛巾置于其上,保持温度不高于 100 度。本压力开关参数不可调节。

B. Precautions: When the pressure switch is burnt, place the wet towel on it to keep the temperature not higher than 100 degrees. This pressure switch parameter is not adjustable.

C.参数:电压 220V、50Hz,触点容量 6A

C. Parameter: Voltage 220V, 50Hz, Contact Capacity 6A

7.4 制冷剂的特点

7.4 Characteristics of refrigerant

1).制冷剂为混合工质,为易燃、易爆制冷剂,灌注场所应通风,一旦泄漏,不能在附近点火或打火花。制冷系统出现问题,由当地售后判断并反馈问题点,由医用事业部技术人员根据具体情况指导当地售后维修。

1). The refrigerant is a mixed working medium, flammable and explosive; so the filling site shall be ventilated; and once the refrigerant is leaked, the igniting or sparking is not allowed nearby. The problem of the refrigerating system shall be determined and report back by the local after-sales service personnel who will then be instructed by the technical personnel of the medical department according to the specific circumstances.

2).制冷剂代码(变频):高温级为 R290;低温级为 R170.

2). Refrigerant code (frequency conversion): R290 for high temperature level, and R170 for low temperature level .

7.5 冷剂灌注流程:

7.5 Filling process of cooling agent:

7.5.1 准备工作

7.5.1 Preparations

- 1) 制冷剂 (R290、R170)
- 1) Refrigerant (R290, R170)
- 2) 汉森阀
- 2) Hanson valve
- 3) 标准电子称 (误差 $\leq\pm 2g$)

- 3) Standard electronic scale (error $\leq \pm 2g$)
- 4) 真空泵 ($\geq 4L$)
- 4) Vacuum pump ($\geq 4L$)
- 5) 压力表 (要求可同时读出高压、低压) 如图 1
- 5) Pressure gauge (high voltage and low pressure can be read at the same time) as shown in Figure 1

7.5.2 开系统

7.5.2 Opening the system

- 1) 将发生故障的系统从工艺管末端, 用管钳割开, 将系统中的制冷剂放掉。
- 1) Cut apart the fault system from the end of the process pipe by pipe vice, and drain off the refrigerant in the system.
- 2) 在系统开口 20 分钟内, 将开口管路与压力表焊接完成
- 2) Weld the opened pipeline and the pressure gauge within 20 minutes of the opening of the system.

【注意事项】

[Precautions]

*维修车间的湿度不能过大, 如遇阴天下雨的天气, 禁止开系统, 对已开系统的机器应马上把各管路焊接完成
* The humidity in the maintenance workshop shall not be too large; in case of rainy days, it is prohibited to open the system, and the pipelines of machine of which the system has been opened shall be immediately welded.

*因机器对系统中的水份要求很严格, 所以机器管路在开口时, 应马上用胶带把各管路口封住, 防止空气进入系统, 并要求在 20 分钟把各开口管路焊接完成

*Because the machine has higher requirement for the water in the system, when the machine pipeline is open, the pipe junctions shall be sealed at once with adhesive tape to prevent the air from entering the system, and all opened pipelines shall be welded in 20 minutes.

7.5.3 抽真空

7.5.3 Pumping the vacuum

- 1) 将真空泵接头与压力表中间公共接头连接, 见图 2
- 1) Connect the joint of vacuum pump to the common joint in the middle of the pressure gauge, see Figure 2
- 2) 开启真空泵抽真空, 要求真空度 $\leq 3Pa$, 抽空时间可参考后附注意事项。见图 3
- 2) Open the vacuum pump to vacuumize, require the vacuum degree to be less than and equal to 3Pa, and the vacuumizing time can refer to the precautions attached below. See Fig. 3
- 3) 当达到真空度要求时, 先停止高压抽空, 并迅速把高温灌注管焊接封口 (因制冷剂压力过高, 机器制冷时高压无法封住口), 低压继续抽空一小时。见图 4
- 3) When the requirement of vacuum degree is reached, the high-pressure vacuumizing is stopped firstly, and the high-temperature filling pipe is welded and sealed quickly (because the pressure of the refrigerant is too high when the machine is refrigerating, it is difficult to be sealed), and the vacuumizing is continued under low pressure. See Fig. 4
- 4) 低压抽空一小时后关闭压力表阀, 这时要求机器保持在负压状态一小时以上, 以检查机器系统是否在真空的状态, 在这期间观察压力表是否有回升的情况, 否则重新抽空一小时以上, 之后继续保持在负压 状态一小时以上, 这样抽空操作直至压力不回升为止方可灌注。
- 4) After the low pressure is evacuated for an hour, the pressure gauge valve is closed, at which time the machine is required to remain in the negative pressure state for more than one hour to check whether the machine system is in a vacuum state, or observe if the pressure gauge has recovered during this period; otherwise, the vacuumizing is conducted for more than one hour and then it should continue to be kept under the negative pressure state for one hour or more, under which the vacuumizing is carried out until the

pressure does not recover, then the filling can be conducted.

【注意事项】
[Precautions]

- *四升以上的真空泵必需抽空 12 个小时
- * The vacuum pumps of over 4L must be pumped for more than 12 hours



图 1
Fig. 1

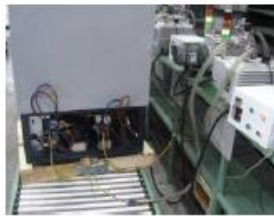


图 2
Fig. 2



图 3
Fig. 3



图 4
Fig. 4

7.5.4 灌注制冷剂
7.5.4 Filling the refrigerant

- 1) 高温级灌注时，机器应处于停止状态，再灌注 R290 制冷剂，灌注量按照后附表格执行！
1) When filling at high temperature, the machine shall be stopped before filling R290 refrigerant, and the filling amount shall be subject to the following table.

【注意事项】
[Precautions]

- *为保证制冷剂一次灌注到位，以上制冷剂灌注时必需把钢瓶倒置灌注液体，如图 5
- * In order to ensure that the refrigerant is filled in place at one time, the cylinder shall be inverted to be filled with the liquid when filling the above refrigerant, as shown in Fig. 5.

- 2) 低温级制冷剂灌注时，同样机器应处于停止状态，灌注 R170 制冷剂，R170 制冷剂压力较高。灌注量按照后附表格执行！

- 2) When filling at low temperature, the machine shall also be stopped before filling R170 refrigerant, and R170 refrigerant pressure is higher. The filling amount shall be subject to the following table!

- 3) 灌注之后将灌注工艺管封口，封口效果如图 6
- 3) The filling process pipe shall be sealed after filling, with the sealing effect as shown in Fig.6

【注意事项】
[Precautions]

- *低温级灌注量必须准确，微小差别就会影响制冷效果
- * Low temperature level filling amount must be accurate, because the slight difference will affect the refrigeration effect.

- * R170 制冷剂压力高，钢瓶内制冷剂相对较少，在灌注时要慢慢开启钢瓶阀门，避免制冷剂浪费。
- * R170 refrigerant pressure is high, the refrigerant in the cylinder is relatively less, so the steel cylinder valve is slowly opened at the time of filling, so as to avoid the waste of refrigerant.

- * R170 制冷剂压力过高，一般的钢瓶无法承受过高的压力，所以采用氧气瓶盛灌 R170 制冷剂，使用时必需把钢瓶下面的出口用螺丝堵住，以防止制冷剂泄露，用上面出口进行灌注，以上在灌注制冷剂时钢瓶可直立灌注，灌注气体。

- * R170 refrigerant pressure is too high, and the general steel cylinder cannot withstand high pressure, so the oxygen cylinder is used to contain R170 refrigerant. When using, it is necessary to block the outlet below the steel cylinder to prevent the leakage of the refrigerant and fill the refrigerant from the upper outlet; when filling the refrigerant as stated above, the steel cylinder can be upright for filling gas.

*为保证制冷剂灌注的准确性，所有制冷剂灌注时必需用电子秤称重灌注。

* In order to ensure the accuracy of refrigerant filling, all refrigerant must be weighed with electronic scales before filling.

*抽空和制冷剂灌注没有按照以上的要求和操作流程执行导致机器制冷差或不制冷以及退换机的，一经总部查实，凡重新维修的按此机的双倍维修费索赔，造成退换机的由网点买单。

* The evacuation and refrigerant filling are not performed in accordance with the above requirements so that the machine has a poor refrigerating effect or does not refrigerate and is required to be replaced; in such case, once verified by the head office, the expenses twice as the maintenance costs of the machine will be claimed if re-repair is required, and the branch shall pay for any return and replacement of the machine.

*超低温柜产品系统的灌注制冷剂的数量精度（克度）要求很严格，网点在维修之前必须准备一台误差在 2g 的标准电子称。

* The requirements for quantity accuracy (g) of the refrigerant filling of the ultra-low temperature cabinet product system is very strict, so the branch must prepare a standard electronic scale with an error of 2g before maintenance.



图 6
Fig. 6

型号 Model	制冷剂（种类/量） Refrigerant (type/ quantity)	制冷剂（种类/量）2 Refrigerant (type/ quantity) 2
	高温级(g) High temperature level (g)	低温级(g) Low temperature level(g)
	R290	R170
DW-86L829BP	148	110
DW-86L959BP	148	110
DW-86L729BP	140	110

产品制冷剂灌注量

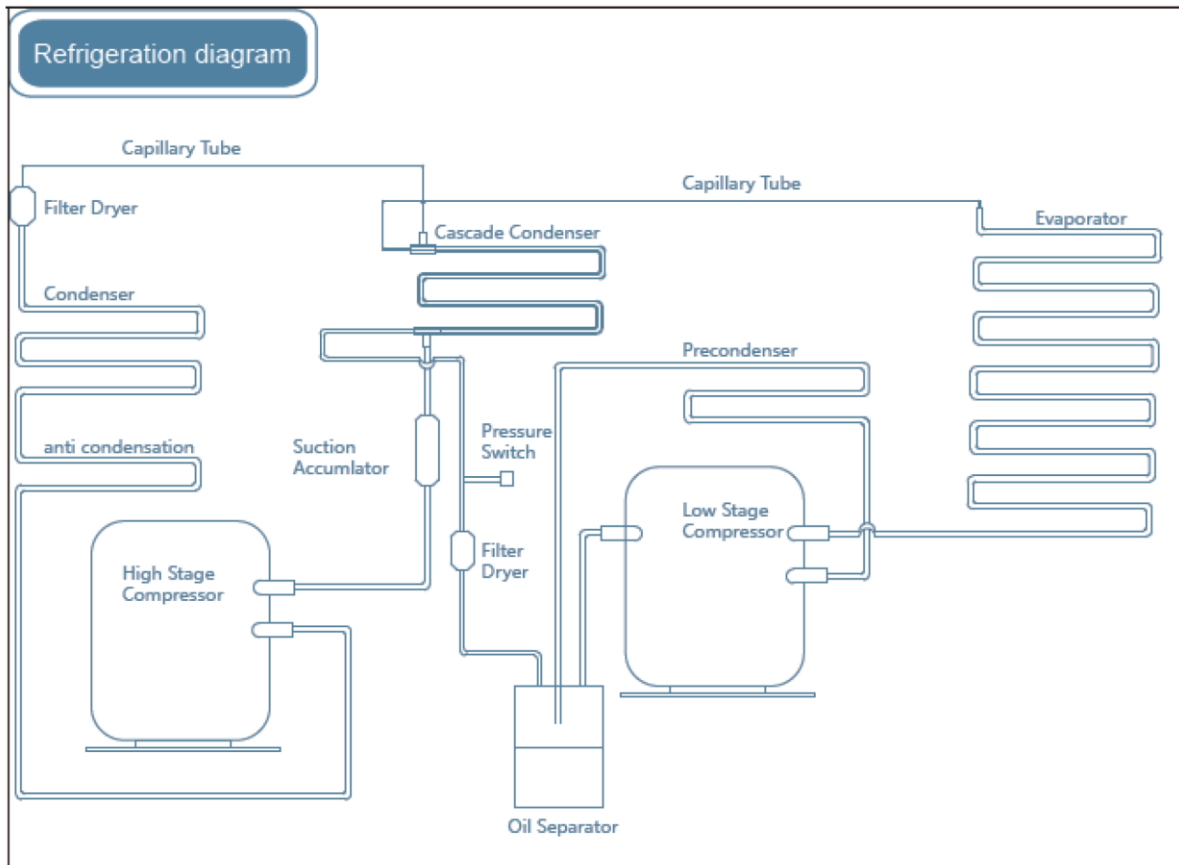
Filling amount of product refrigerant

八. 系统原理图及接线图

VIII. Schematic diagram and wiring diagram of the system

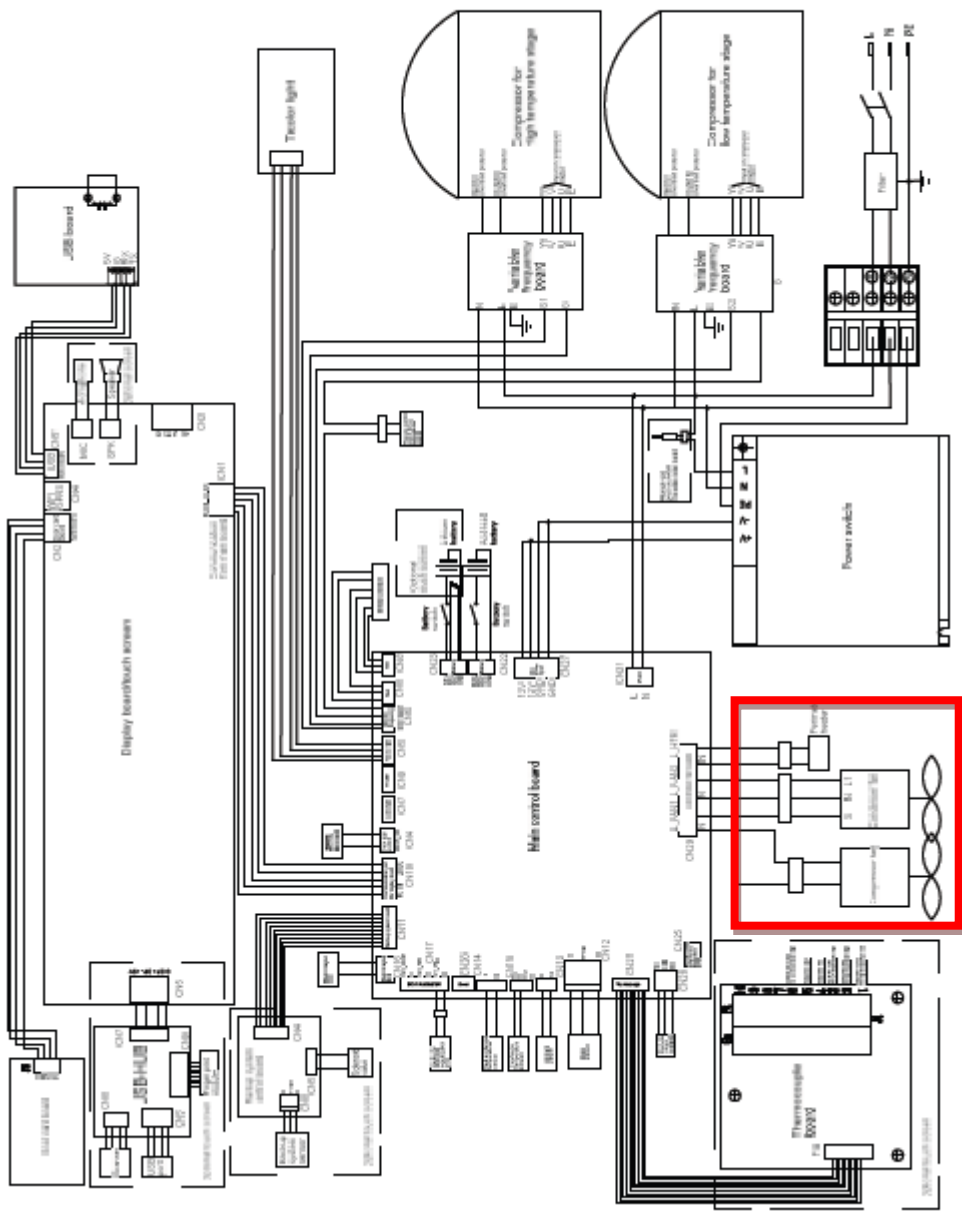
原理图:

Schematic diagram:



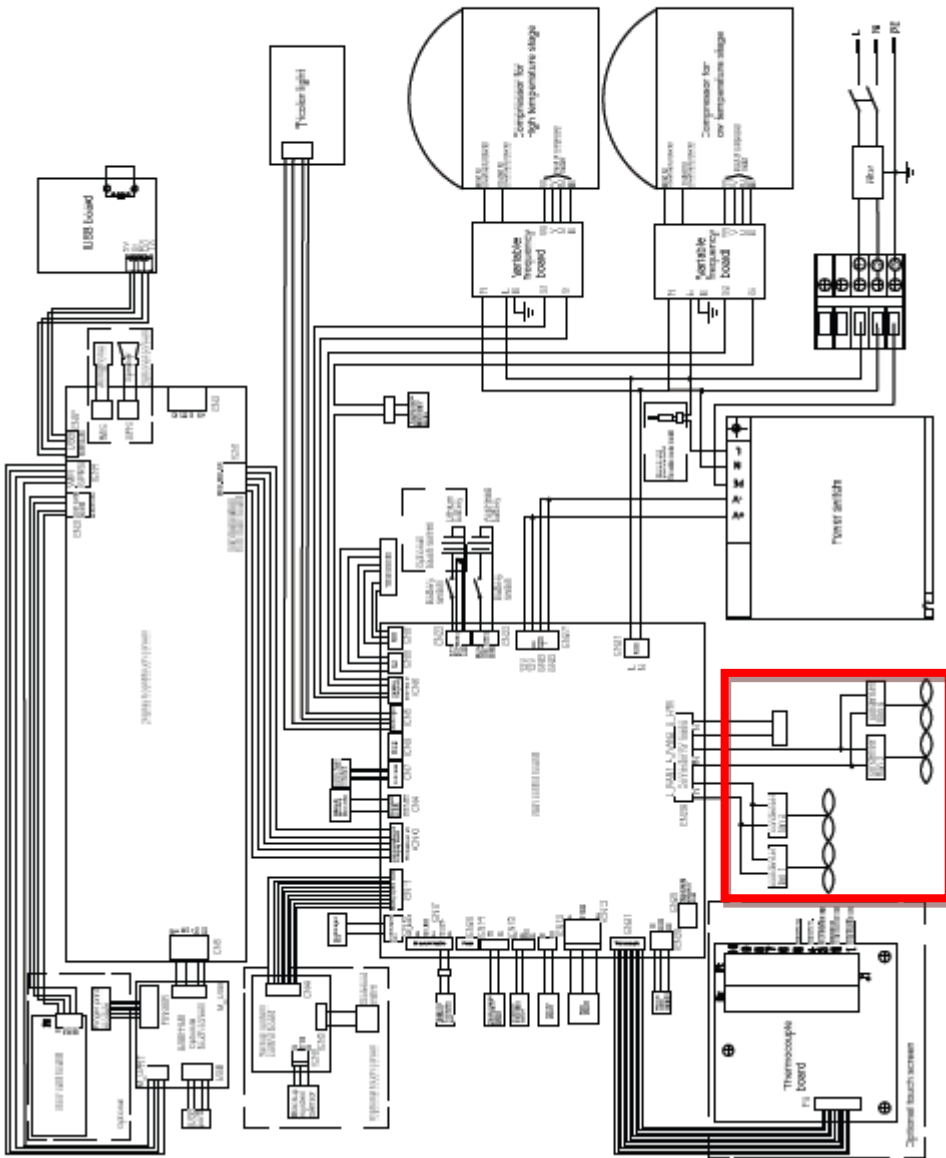
接线图:
Wiring diagram:

DW-86L829BP/829BPT/959BP/959BPT/959W



Wiring diagram

DW-86L579BP/579BPT/729BP/729BPT



九 控制系统 九 control system

9.1 压缩机的控制 9.1 Control of compressor

9.1.1 开停控制 9.1.1 Start-stop control

9.1.1.1 正常控制 9.1.1.1 Normal control

1) 开机条件: 箱内温度 \geq 设定温度+P20 (默认 5), 持续 30 秒 (EEP);

1) Start-up condition: the temperature inside the box is more than and equal to the set temperature + P20 (default 5), which lasts for 30s (EEP);

停机条件: 箱内温度 \leq 设定温度+P21 (默认 0), 持续 30 秒 (EEP);

Stop condition: the temperature inside the box is less than and equal to the set temperature + P21 (default 0), which lasts for 30s (EEP);

备注: P20, P21 范围可调, P20 默认值 5 (即 0.5 $^{\circ}$ C), P21 默认值 0

Note: P20 and P21 range is adjustable, P20 default value is 5 (i.e. 0.5 $^{\circ}$ C), P21 default value is 0

2)控制过程 2) Control process

(1) 初始上电时, 延时 1 分钟 (默认 1min, 1~15min 可调) (EEP) 后判断:

(1) At the time of initial powering on, delay for 1 minute (default 1 min, adjustable at 1-15 min) (EEP), then judge:

a) 如果满足开机条件, 则开高温压缩机;

a) If the starting condition is satisfied, the high-temperature compressor is started;

b) 高温压缩机开机 10 分钟 (EEP) 后, 如果热交换器传感器温度低于-30 $^{\circ}$ C (EEP) (包含-30 $^{\circ}$ C), 则低温压机开;

b) After the high temperature compressor has been started for 10 min (EEP), if the temperature of the heat exchanger sensor is lower than -30 $^{\circ}$ C (EEP) (including -30 $^{\circ}$ C), start the low-temperature compressor;

c) 如果满足关机条件, 则关压缩机。

c) If the shutdown condition is satisfied, stop the compressor.

(2) 其他时间:

(2) Other time:

a) 如果满足开机条件, 则开高温压缩机;

a) If the starting condition is satisfied, the high-temperature compressor is started;

b) 高温压缩机开机 1 分钟 (EEP) 后, 如果热交换器传感器温度低于-30 $^{\circ}$ C (EEP) (包含-30 $^{\circ}$ C), 则低温压机开;

b) After the high temperature compressor has been started for 1 min (EEP), if the temperature of the heat exchanger sensor is lower than -30 $^{\circ}$ C (EEP) (including -30 $^{\circ}$ C), start the low-temperature compressor;

c) 如果满足关机条件, 则关压缩机。

c) If the shutdown condition is satisfied, stop the compressor.

9.1.1.2 开关机时间的控制 9.1.1.2 Control of starting/stopping time

1)正常控制时, 高低温压缩机开机时间大于 3 分钟 (P26) 才可以停机, 停机时间大于 3 分钟 (P23) 才可以开机;

1) During normal control, the machine can be stopped only if the startup time of high and low temperature compressor is greater than 3 min (P26), and can be started only if the shutdown time is greater than 3 min (P23).

2)首次上电时, 高低温压缩机不停机连续开机 16 小时 (EEP), 强制停机 10 分钟 (EEP), 之后恢复正常控制;

2) At the time of powering on for the first time, the high and low temperature compressor does not stop for 16 hours (EEP), and is forced to stop for 10 min (EEP), and then restore normal control;

其它时间时, 高低温压缩机不停机连续开机 5 小时 (EEP), 强制停机 10 分钟 (EEP), 之后恢复正常控制。

At other times, the high and low temperature compressor does not stop for 5 hours (EEP), and is forced to stop for 10 min (EEP), and then restore normal control.

9.1.1.3 传感器故障时压缩机的控制

9.1.1.3 Control of compressor during sensor failure

1)主传感器故障, 高低温压缩机开 30 分钟 (EEP), 关 10 分钟 (EEP) 循环进行, 高低温压缩机启动顺序遵循正常控制;

1) If the main sensor fails, high and low temperature compressor starts for 30 min(EEP), and closes for 10 min (EEP), repeating in such way; and high and low temperature compressor starts in sequence following normal control;

主传感器正常, 高低温压缩机正常控制。

The main sensor is normal and the high and low temperature compressor is under normal control.

2)热交换器传感器故障

2) Heat exchanger sensor failure

初始上电时, 高温压缩机开机 10 分钟 (EEP) 后, 低温压缩机开机;

At the time of powering on initially, the high-temperature compressor starts for 10 min (EEP), then the low-temperature compressor starts;

其它时间时, 高温压缩机开机 1 分钟 (EEP) 后, 低温压缩机开机。

At other times, the high temperature compressor starts for 1 min (EEP), then the low-temperature compressor starts.

热交换器传感器正常, 低温压缩机正常控制。

The heat exchanger sensor is normal and the low temperature compressor is under normal control.

9.1.1.4 电压超标时压缩机的控制 (控制优先级最高)

9.1.1.4 Control of the compressor when the voltage exceeds the standard (highest control priority)

1)220V 电源时

1) 220V power supply

当电源电压 $\leq 184V$ (EEP) 持续 10 秒 (EEP) 时, 则高低温压缩机长开机不停机;

When the power supply is less than and equal to 184V (EEP) which lasts for 10s (EEP), the high and low-temperature compressor keeps start-up and does not stop;

当电源电压 $\geq 253V$ (EEP) 持续 10 秒 (EEP) 时, 则高低温压缩机正常控制。

When the power supply is more than and equal to 253V (EEP) which lasts for 10s (EEP), the high and low-temperature compressor is under normal control.

2)115V 电源时

2) 115V power supply

当电源电压 $\leq 93V$ (EEP) 持续 10 秒 (EEP) 时, 则高低温压缩机长开机不停机;

When the power supply is less than and equal to 93V(EEP) which lasts for 10s (EEP), the high and low-temperature compressor keeps start-up and does not stop;

当电源电压 $\geq 136V$ (EEP) 持续 10 秒 (EEP) 时, 则高低温压缩机正常控制。

When the power supply is more than and equal to 136V(EEP) which lasts for 10s (EEP), the high and low-temperature compressor is under normal control.

9.1.1.5 电源断电控制

9.1.1.5 Power-off control of power supply

1) 电源断电后压机控制端口都停止输出;

1) After powering off, control ports of the compressor stops the output;

2) 断电再次上电后, 若达到高温压机的启动条件, 高温压机延时 1min 后以 4500 转启动;

2) If the power is switched on again, and the start-up condition of the high-temperature compressor is reached, the high-temperature compressor starts up at 4,500 rpm after delaying for 1min.

3) 断电再次上电后, 若达到低温压机的启动条件, 则低温压机仅首次以 4500 转启动, 其他时间按正常控制;

3) If the power is switched on again, and the start-up condition of the low-temperature compressor is reached, the low-temperature compressor starts up at 4,500 rpm at the first time, and is under normal control at other times.

9.1.2 频率控制

9.1.2 Frequency control

9.1.2.1 高温压缩机频率控制

9.1.2.1 High-temperature compressor frequency control

1) 初次上电高温压机以 4500rpm(P08)运行;

1) At the first time of powering on, the high-temperature compressor runs at 4,500 rpm (P08);

2) 正常开停机时启动以 2000rpm (P00) 运行, 但当环温高于 30℃时, 以 4500rpm 运行, 60 秒(P01)后进入低温压机未运行自动控制;

2) If normal start-up, start at 2,000rpm (P00), but when the ambient temperature is higher than 30 °C, run at 4,500 rpm, and enter into automatic control of the low-temperature compressor in an idle state after 60 s (P01);

3) 低温压机未启动自动控制 (每 80 秒(P02)判断一次)

3) The automatic control of the low-temperature press is not started (judge once per 80s (P02).)

$$F = F' + K * (T1 - (-27^{\circ}\text{C}(P03)))$$

F: 本次计算频率值 F': 上次计算频率值 K: 50(P04)

F: This frequency value F calculated: Last frequency value K calculated : 50 (P04)

T1: 热交换器温度

T1: heat exchanger temperature

$K * (T1 - (-27^{\circ}\text{C}(P03)))$ 的范围为: -20(P05)~20(P06)

The range of $K * (T1 - (-27^{\circ}\text{C}(P03)))$ is: -20 (P05) - 20 (P06)

F 的范围为: 2000(P07)~4500(P08)

F range is: 2000 (P07) ~ 4500 (P08)

4) 低温压机启动自动控制 (每 80 秒(P02)判断一次)

4) The automatic control of the low-temperature press is not started (judge once per 80s (P02).)

$$F = F' + K * (T1 - (-25^{\circ}\text{C}(P09)))$$

F: 本次计算频率值
F: This frequency value calculated

F': 上次计算频率值
F ': Last frequency value calculated

K: 50(P04)

T1: 热交换器温度
T1: heat exchanger temperature

$K * (T1 - (-27^{\circ}\text{C} (P03)))$ 的范围为: $-20(P05) \sim 20(P06)$
The range of $K * (T1 - (-27^{\circ}\text{C} (P03)))$ is: $-20 (P05) - 20 (P06)$

F 的范围为: $2000(P07) \sim 4500(P08)$
F range is: $2000 (P07) \sim 4500 (P08)$

4) 低温压机启动自动控制 (每 80 秒(P02)判断一次)
4) The automatic control of the low-temperature press is not started (judge once per 80s (P02).)

$$F = F' + K * (T1 - (-25^{\circ}\text{C} (P09)))$$

F: 本次计算频率值
F: This frequency value calculated

F': 上次计算频率值
F ': Last frequency value calculated

K: 50(P10)

T1: 热交换器温度
T1: heat exchanger temperature

$K * (T1 - (-25^{\circ}\text{C} (P09)))$ 的范围为: $-20(P05) \sim 20(P06)$
The range of $K * (T1 - (-25^{\circ}\text{C} (P09)))$: $-20 (P05) - 20 (P06)$

F 的范围为: $2000(P07) \sim 4500(P08)$
F range is: $2000 (P07) \sim 4500 (P08)$

9.1.2.2 低温压缩机频率控制 9.1.2.2 Low-temperature compressor frequency control

1) 启动以 2000rpm(P11)运行, 但当环温高于 30°C 时, 低温级起机转速变为 3500rpm 运行, 60 秒(P12)后进入自动控制;

2) Start at 2,000rpm (P11) for running , but when the ambient temperature is higher than 30°C , the rotating speed of the low-temperature compressor becomes 3,500 rpm for running and enters into automatic control after 60s (P12);

2) 自动控制 (每 80 秒(P13)判断一次)
2) The automatic control (judge once per 80s (P13).)

$$F = F' + K * (PT100 - Tset + 0^{\circ}\text{C} (P19))$$

F: 本次计算频率值 (即转速)
F: This frequency value calculated (i.e. rotating speed)

F': 上次计算频率值 (即转速)
F ': Last frequency value calculated (i.e. rotating speed)

K: 50(P14)

PT100: 箱内温度

PT100: Temperature inside the box

Tset: 箱内设定温度

Tset: setting temperature inside the box

$K * (PT100 - Tset + 0^{\circ}C (P19))$ 的范围为: $-20(P15) \sim 20(P16)$

The range of $K * (PT100 - Tset + 0^{\circ}C (P19))$ is: $-20 (P15) - 20 (P16)$

F 的范围为: 2000(P17)~4500(P18)

F range is: 2000 (P17) - 4500 (P18)

9.1.3 开门事件

9.1.3 Door-opening event

1) 当门开关检测到开门, 箱内温度-设定温度 $<5.0^{\circ}C (P24)$

1) When the door switch detects the door opening, the temperature inside the box less set temperature is less than $5.0^{\circ}C (P24)$

如果高低温压缩机频率 $<3500rpm(P25)$, 则升至 $3500rpm(P25)$, 然后正常控制。

If the high and low temperature compressor frequency is less than $3,500 rpm (P25)$, it is raised to $3,500 rpm (P25)$ and then normally controlled.

2) 当门开关检测到开门, 箱内温度-设定温度 $\geq 5.0^{\circ}C (P24)$

2) When the door switch detects the door opening, the temperature inside the box less set temperature is more than and equal to $5.0^{\circ}C (P24)$

如果高低温压缩机频率 $<4500rpm(P08)$, 则升至 $4500rpm(P08)$, 然后正常控制。

If the high and low temperature compressor frequency is less than $4,500 rpm (P08)$, it is raised to $4,500 rpm (P08)$ and then normally controlled.

9.2 风机的控制

9.2 Control of fans

1) 冷凝器传感器正常, 采用冷凝器传感器进行控制:

1) The condenser sensor is normal, and the condenser sensor is used for control:

1.当持续检测 1min 均满足冷凝器传感器温度 $\geq 35^{\circ}C (EEP)$ (默认 $35^{\circ}C$, $20 \sim 45^{\circ}C$ 范围可调), 采用两风机高速运行, RL6 继电器吸合;

1. When the continuous detection of 1min meets the condenser sensor temperature of more than and equal to $35^{\circ}C (EEP)$ (default $35^{\circ}C$, adjustable at $20 - 45^{\circ}C$ is), two fans are used for running at high speed, and the relay R6 closes.

2.当持续检测 1min 均满足冷凝器传感器温度 $< 35^{\circ}C (EEP)$ (默认 $35^{\circ}C$, $20 \sim 45^{\circ}C$ 范围可调), 采用两风机低速运行, RL6 和 RL7 继电器均吸合;

2. When the continuous detection of 1min meets the condenser sensor temperature of more than and equal to $35^{\circ}C (EEP)$ (default $35^{\circ}C$, adjustable at $20 - 45^{\circ}C$ is), two fans are used for running at low speed, and the relays RL6 and RL7 close.

2) 冷凝器传感器故障时, 无法取温度。采用调速风机转速随变频压机转速随动的控制:

2) When the condenser sensor fails, the temperature cannot be taken. The control method that the speed-regulating fan varies with the rotating speed of the variable frequency compressor is taken:

1.当低温压机转速持续 1min 均满足 $\geq 3500rad/min (EEP)$ (默认 3500 , $2000 \sim 4500$ 范围可调), 采用两风机高速运行, RL6 继电器吸合;

1. When the rotating speed of the low-temperature compressor meets the requirement of more than and equal to $3,500 rad/min (EEP)$ (default 3500 , adjustable at $2,000-4,500$) within 1 min, two fans are used for

high-speed running, and the relay RL6 closes;

2. 当低温压机转速持续 1min 均满足 $<3500\text{rad/min}$ (EEP) (默认 3500, 2000~4500 范围可调), 采用两风机低速运行, RL6 和 RL7 继电器均吸合;

2. When the rotating speed of the low-temperature compressor meets the requirement of less than 3,500 rad/min (EEP) (default 3500, adjustable at 2,000-4,500) within 1 min, two fans are used for low-speed running, and the relays RL6 and RL7 close;

3) 电源断电控制

3) Power-off control of power supply

1. 电源断电后风机控制端口都停止输出;

1. After powering off, control ports of the fan stops the output;

2. 断电再次上电后, 按照正常程序控制

2. After being powered on again, control according to the normal procedures.

9.3 电池控制要求:

9.3 Battery control requirements:

电池类型判定:

Battery type judgement:

电池连接到主板的接口时, 主板会根据电池中是否带有温度传感器自动判定电池是铅酸电池还是锂电池: 铅酸电池无温度传感器、锂电池有温度传感器;

When the battery is connected to the interface of the main board, the main board automatically judges whether the battery is a lead-acid battery or a lithium battery according to the presence or absence of a temperature sensor in the battery: the lead-acid battery has no temperature sensor while the lithium battery has a temperature sensor;

9.3.1 铅酸电池

9.3.1 Lead-acid battery

铅酸电池充电

Lead-acid battery charging

1) 充电启动条件: (无电池插反报警, 无电源板故障报警及无电池未连接报警时, 下面三个条件满足其一, 充电继电器吸合)

1) Charging start condition: (without battery reversely-inserted alarm, power board fault alarm and unconnected battery alarm, if one of the following three conditions is satisfied, the charging relay is closed)

1. 主控板首次上强电;

1. The main control board is supplied with strong electricity for the first time;

2. 上次充电结束 30 天 (EEP) 时间到;

2. 30 days (EEP) from last charging are up;

3. 电池电压 $<12.4\text{V}$ (EEP);

3. Battery voltage is less than 12.4V(EEP);

2) 充电过程控制 (每 10 秒 (EEP) 判断一次)

2) Charging process control (judge once per 10s (EEP))

1. 当电池电压 $<13.5\text{V}$ (EEP) 时,

1. When the battery voltage is less than 13.5V (EEP),

如果充电电流 $>610\text{mA}$ (EEP), 则占空比减 1% (EEP);

If the charging current is more than 610mA (EEP), the duty ratio is decreased by 1% (EEP);

如果充电电流 $<590\text{mA}$ (EEP), 则占空比加 1% (EEP);
If the charging current is less than 590mA (EEP), the duty ratio is increased by 1% (EEP);

2.当 13.5V (EEP) \leq 电池电压 <14.3 (EEP) V 时,
2. When the battery voltage is more than and equal to 13.5V (EEP) but less than 14.3 (EEP) V,

如果充电电流 $>270\text{mA}$ (EEP), 则占空比减 1% (EEP);
If the charging current is more than 270mA (EEP), the duty ratio is decreased by 1% (EEP);

如果充电电流 $<250\text{mA}$ (EEP), 则占空比加 1% (EEP);
If the charging current is less than 250mA (EEP), the duty ratio is increased by 1% (EEP);

3.当 14.3V (EEP) \leq 电池电压后,
3. When the battery voltage is more than and equal to 14.3V (EEP),

如果充电电压 $>13.9\text{V}$ (EEP), 则占空比减 1% (EEP);
If the charging voltage is more than 13.9V (EEP), the duty ratio is decreased by 1% (EEP);

如果充电电压 $<13.7\text{V}$ (EEP), 则占空比加 1% (EEP);
If the charging voltage is less than 13.7V (EEP), the duty ratio is increased by 1% (EEP);

4.充电时间累积 36 小时 (EEP) 后, 充电结束, 充电继电器断开。
4. After the charging time is accumulated for 36 hours (EEP), the charging ends and the charging relay opens.

铅酸电池放电

The lead-acid battery discharges:

1) 主控板首次上强电, 检测电池未插反, 电池放电控制端导通;

1) When the main control board is supplied with strong electricity for the first time, it should detect the battery is not inserted reversely, and the battery discharging control end is connected;

2) 主控板断电, 电池电压 $\leq 10.5\text{V}$ (EEP) 时, 电池放电控制端断开;

2) When the main control board is powered off and the battery voltage is less than and equal to 10.5V (EEP), the battery discharging control end is disconnected;

3) 断强电后, 电池不需要给平衡口加热丝及门体加热丝供电, 也不需要控制强电负载继电器吸合。其他功能正常;

3) After the strong electricity is switched off, the battery does not need to supply power to the balance port heating wire and the door body heating wire, nor does it need to control the strong electric load relay to close. Other functions are normal;

4) 断强电后, 冷链口 CN7 需给无线冷链模块发出强电断电指令。

4) After the strong electricity is powered off, the cold chain port CN7 needs to send strong electricity power-off instruction to the wireless cold chain module.

9.3.2 锂电池

9.3.2 Lithium battery

锂电池充电

Lithium battery charging

1) 充电启动条件: (无电池插反报警, 无电源板故障报警及无电池未连接报警时, 下面三个条件满足其一, 充电继电器吸合)

1) Charging start condition: (without battery reversely-inserted alarm, power board fault alarm and unconnected battery alarm, if one of the following three conditions is satisfied, the charging relay is closed)

1. 主控板首次上强电;

1. The main control board is supplied with strong electricity for the first time;

- 2.上次充电结束 30 天 (EEP) 时间到;
2. 30 days (EEP) from last charging are up;

- 3.电池电压 $<11.2V$ (EEP) ;
3. Battery voltage is less than $11.2V$ (EEP);

- 2)充电过程控制 (每 10 秒 (EEP) 判断一次)
- 2) Charging process control (judge once per 10s (EEP))

- 1.当电池电压 $<12.0V$ (EEP) 时,
1. When the battery voltage is less than $12.0V$ (EEP),

如果充电电流 $>710mA$ (EEP) , 则占空比减 1% (EEP) ;
If the charging current is more than $710mA$ (EEP), the duty ratio is decreased by 1% (EEP);

如果充电电流 $<690mA$ (EEP) , 则占空比加 1% (EEP) ;
If the charging current is less than $690mA$ (EEP), the duty ratio is increased by 1% (EEP);

- 2.当 $12.0V$ (EEP) \leq 电池电压 <12.4 (EEP) V 时,
2. When the battery voltage is more than and equal to $12.0V$ (EEP) but less than 12.4 (EEP) V,

如果充电电流 $>330mA$ (EEP) , 则占空比减 1% (EEP) ;
If the charging current is more than $330mA$ (EEP), the duty ratio is decreased by 1% (EEP);

如果充电电流 $<310mA$ (EEP) , 则占空比加 1% (EEP) ;
If the charging current is less than $310mA$ (EEP), the duty ratio is increased by 1% (EEP);

- 3.当 $12.4V$ (EEP) \leq 电池电压时,
3. When the battery voltage is more than and equal to $12.4 V$ (EEP),

如果充电电压 $>12.9V$ (EEP) , 则占空比减 1% (EEP) ;
If the charging voltage is more than $12.9V$ (EEP), the duty ratio is decreased by 1% (EEP);

如果充电电压 $<12.7V$ (EEP) , 则占空比加 1% (EEP) ;
If the charging voltage is less than $12.7 V$ (EEP), the duty ratio is increased by 1% (EEP);

- 4.充电时间累积 7 小时 (EEP) 后, 充电结束, 充电继电器断开。
4. After the charging time is accumulated for 7 hours (EEP), the charging ends and the charging relay opens.

锂电池放电 Lithium battery discharge

- 1)主控板首次上强电, 检测电池未插反, 电池放电控制端导通;
- 1)When the main control board is supplied with strong electricity for the first time, it should detect the battery is not inserted reversely, and the battery discharging control end is connected;

- 2)主控板断电, 电池电压 $\leq 9.0V$ (EEP) 时, 电池放电控制端断开;
- 2) When the main control board is powered off and the battery voltage is less than and equal to $9.0V$ (EEP), the battery discharging control end is disconnected;

- 3) 断强电后, 电池不需要给平衡口加热丝及门体加热丝供电, 也不需要控制强电负载继电器吸合。其他功能正常;

- 3) After the strong electricity is switched off, the battery does not need to supply power to the balance port heating wire and the door body heating wire, nor does it need to control the strong electric load relay to close. Other functions are normal;

- 4) 断强电后, 冷链口 CN7 需给无线冷链模块发出强电断电指令 (预留未实施)。

- 4) After the strong electricity is powered off, the cold chain port CN7 needs to send strong electricity power-off instruction to the wireless cold chain module.(reservation not implemented)

锂电池充放电温度保护

Lithium battery charge/ discharge temperature protection

当电池温度 $\geq 65^{\circ}\text{C}$ (EEP) 时, 停止电池充放电;

When the battery temperature is higher than and equal to 65°C (EEP), the charge and discharge of the battery are stopped;

当电池温度 $< 55^{\circ}\text{C}$ (EEP) 时, 恢复电池充放电。

When the battery temperature is lower than 55°C (EEP), the charge and discharge of the battery are restored.

9.4 加热丝控制

9.4 Heating wire control

9.7.1 平衡口加热丝控制 (+12V 控制)

9.7.1 Heating wire control at balance port (+ 12V control)

1) 当主传感器温度 $\leq -35.0^{\circ}\text{C}$ (EEP) 持续 5 秒 (EEP) 时, 平衡口加热丝加热;

1) When the main sensor temperature is lower than and equal to -35.0°C (EEP) for 5s (EEP), the heating wire at balance port is heated;

2) 当主传感器温度 $> -35.0^{\circ}\text{C}$ (EEP) 持续 5 秒 (EEP) 时, 平衡口加热丝停止加热。

2) When the main sensor temperature is higher than -35.0°C (EEP) for 5s (EEP), the heating wire at balance port stops heating.

9.7.2 门体加热丝控制 (+12V 控制)

9.7.2 Door heating wire control (+ 12V control)

1) 门体加热丝开启条件:

1) Opening condition of door heating wire :

压缩机开机且主传感器温度 $\leq -35.0^{\circ}\text{C}$ (EEP) 持续 5 秒 (EEP) 时, 门体加热丝加热;

When the compressor starts up and the main sensor temperature is lower than and equal to -35.0°C (EEP) for 5s (EEP), the door heating wire is heated;

2) 门体加热丝关闭条件:

2) Closing condition of door heating wire :

压缩机关机或主传感器温度 $> -35.0^{\circ}\text{C}$ (EEP) 持续 5 秒 (EEP) 时, 门体加热丝停止加热;

When the compressor stops and the main sensor temperature is more than -35.0°C (EEP) for 5s (EEP), the door heating wire stops heating;

9.5 USB 数据下载

9.5 USB data download

插上 U 盘自动导出机器的温度、报警、事件记录。开始导数时, 显示板显示温度最右数码管右下角的小数点闪烁, 当数据导完后, 小数点保持常亮, 不闪烁。拔下 U 盘, 小数点熄灭。

Insert U disk, the temperature, alarm and event record of the machine can be exported automatically. When beginning to export, the display panel displays a flashing decimal point at the lower right corner of the most right Nixie tube of the temperature; when the exporting is finished, the decimal point keeps bright and does not flash. Pull out U disk, and the decimal point goes out.

9.10 远程报警功能

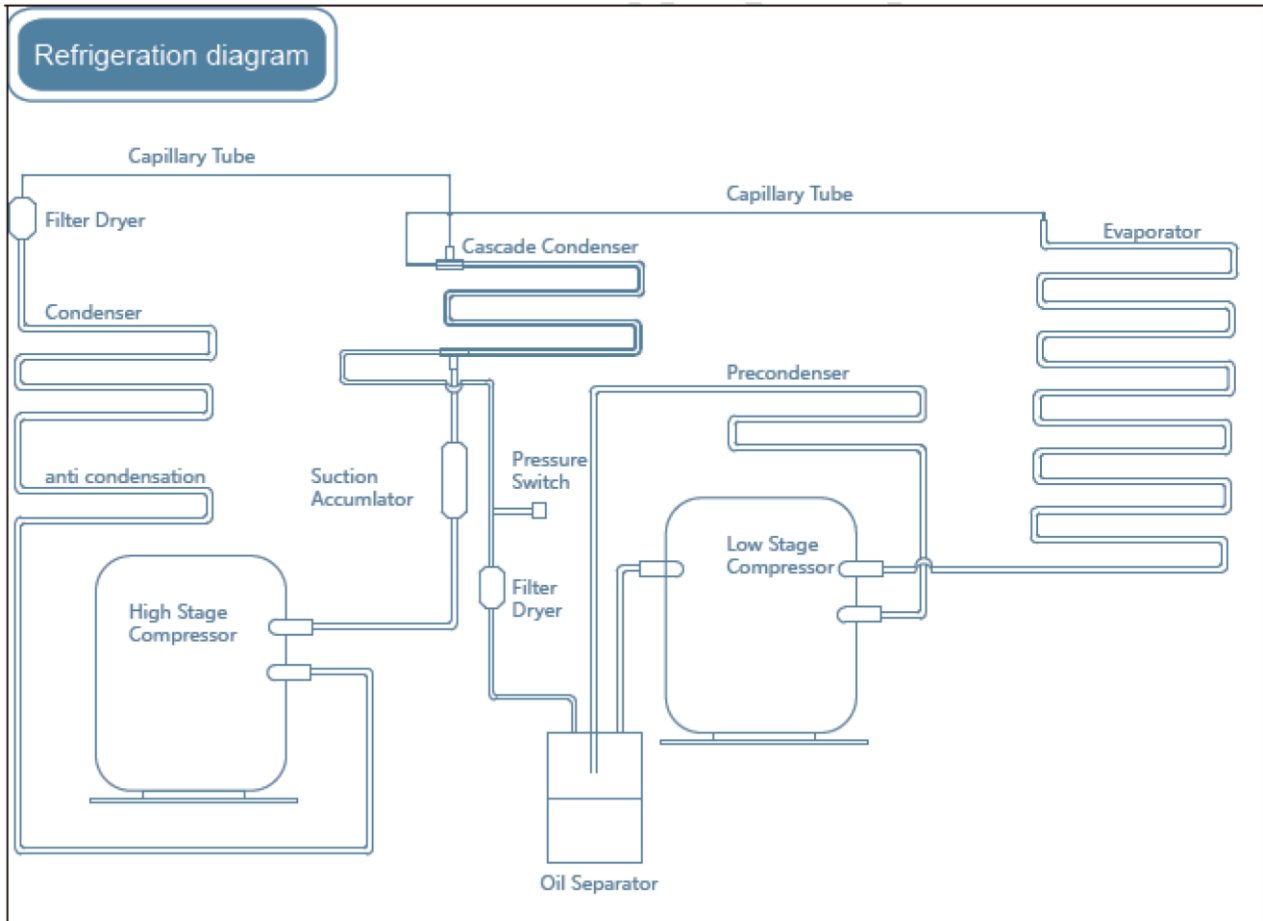
9.10 Remote alarm function

远程报警功能要求具有常开报警和常闭报警功能, 可根据需要进行选择。当出现高温、低温及外界断电 (无论后备电池开关是否打开) 时均启动远程报警功能。

The remote alarm function requires a normally-opened alarm function and a normally-closed alarm function which can be selected as required. **In case of high temperature, low temperature and external power outage (whether the backup battery switch is opened or not), the remote alarm function is started.**

十. 制冷循环透视图与平面图

X. Cooling cycle perspective and plan view



十一. 安装和拆卸工艺

XI. Installation and disassembly process

11.1 安装位置:

11.1 Installation position:

11.1.1.避免阳光直射

11.1.1. Avoid direct sunlight

11.1.2.周围空气流通良好

11.1.2. The surrounding air circulation is good

11.1.3.避免大量灰尘

11.1.3. Avoid large quantities of dust

11.1.4.避免机械摇摆或震动

11.1.4. Avoid mechanical sway or vibration

11.1.5.环境温度：5℃到 28℃，最高不超过 32℃，最理想的温度为 18℃到 25℃，必要时应使用空调系统。

11.1.5. Ambient temperature: 5 °C to 28 °C, max. 32 °C, the most ideal temperature is 18 °C to 25 °C, and air conditioning system should be used when necessary.

11.1.6.设备工作位置高度：低于 2000m

11.1.6. Height of operating position of equipment: below 2,000m.

11.1.7.工作湿度：低于 80%RH。如果最大工作温度在 32℃，湿度应低于 57%RH。

11.1.7. Operating humidity: less than 80% RH. If the maximum operating temperature is 32 °C, the humidity shall be less than 57% RH.

11.1.8.输入电压：220±10%以内。

11.1.8. Input voltage: within the range of 220V±10%.

*注意：由于超低温设备对环境温度较为敏感。如果安装在上述以外的其它环境下，机器不能正常运行。请改善环境后使用该设备。

* Note: Because ultra-low temperature equipment is more sensitive to ambient temperature. The equipment can not operate normally if it is installed in an environment other than the above. Please use the equipment after improving your environment.

11.2产品的搬运及包装拆除

11.2 Handling and packaging removal of products

11.2.1.搬运：产品重量很重，搬运时要求使用叉车或液压车，以免对人员及产品造成损害。

11.2.1 Handling: Due to heavy weight of the product, the forklift or hydraulic vehicle is required in handling, so as not to cause damage to personnel and products.

11.2.2 包装拆除：产品的包装方法采用木底托+蜂窝瓦楞缠膜包装+纸箱而成。搬运过程要求采用叉车或液压车插入底托底部进行搬运。

11.2.2 Package removal: The product is packaged by the wooden tray + wrapped by honeycomb corrugated film + carton. In handling process, the forklift or a hydraulic truck is required to insert at the bottom of the forklift for carrying.

包装方案如下图。

The packaging scheme is shown as below figure.



木底托拆除:

Removal of wooden tray:

首先将整机机舱后背与木底托两个固定连接件 A 使用十字花螺钉拆除；如图 A 其次使用活动大扳手将木底托两部分固定连接件的大螺栓 B 拆除；如图 B 最后由维修人员推柜子交叉将木底托按照图 C 和图 D 的方式抽拉出来。

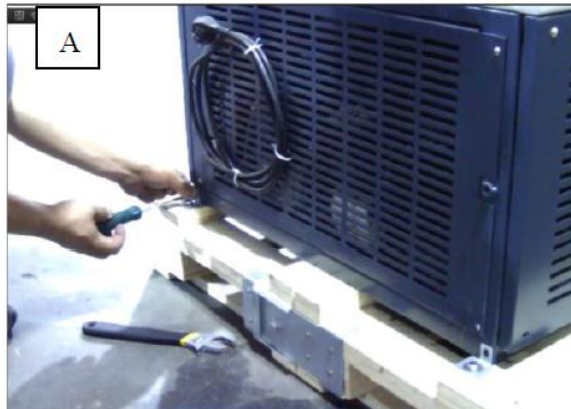
Firstly, remove two fixed connecting pieces A between the back of the whole engine room and the wooden tray by cross recessed screw; secondly, remove the big bolt B of fixed connecting pieces between two parts of the wooden tray by big adjustable spanner, as shown in figure A; finally, the maintainers are required to push the engine room to pull out the wooden tray in a crossed way, as shown in figures C and D.



固定螺钉 A
Fixed bolt
A

固定螺栓 B
Fixed bolt
B

固定螺钉 A
Fixed bolt
A



11.3 产品进入放置室

11.3 The product enters the placing chamber

11.3.1 进门困难: 客户要求放置的房间门高度如果不带底托都无法进入也没有别的办法时，可以考虑拆卸机舱前罩并将外门打开 180 度的方式。机舱前罩的拆卸及注意事项如下。注：一般情况不建议采用拆卸机舱前罩的方案。

11.3.1 Difficulty in entering the door: If the door height of the room door that the customer requests to be placed cannot be accessed without bottom tray and there is no other way, it should consider to dismantle the front cover of the engine room and open the outer door by 180 degrees. The removal and precautions of the front cover of the engine room are as follows. Note: Generally, it is not recommended to adopt the plan of removing the front cover of the engine room.

11.3.2①拆卸进风格栅。

11.3.2 ① Remove the air-inlet grille.

- ②拆卸机舱前罩下面两个螺钉。
② Remove two screws under the front cover of the engine room.

- ③将前罩卸下。
③ Remove the front cover.



- ③将外门打开 180 度。
③ Open the outer door by 180 degrees.

产品进门后，将机舱前护罩按原样安装好。
After the product enters the door, install the front guard of the engine room as it is.

注意：一定要安装到位，否则会引起安全及性能的问题！
Note: Be sure to install in place, otherwise it will cause safety and performance problems!

避免搬运过程中碰伤、划伤保存箱。搬运时，最大倾斜角度不能超过 45°(与水平方向之间的夹角)，以免
造成制冷系统故障，影响正常使用。

Avoid damaging to and scratching the storage box during handling. During handling, the maximum angle of inclination shall not exceed 45 ° (included angle with the horizontal direction) so as to avoid the failure of refrigeration system and hence affect normal use.

11.4 拆卸显示面罩 11.4 Removal of display mask

- ①将塑料面罩顶部两个螺钉拆掉
① Remove two screws at the top of the plastic mask
- ②两只手分别把住主塑料面罩两侧，将塑料面罩竖直从铝面罩中抽出，注意抽出距离不要太大
② Both hands hold the two sides of the main plastic mask and draw the plastic mask vertically from the aluminum mask, during which it should note that the drawing distance shall not be too far
- ③塑料罩抽出后拔掉三色灯板线和显示板通讯线，塑料面罩拆下
③ Remove the tricolor lamp panel line and display panel communication line after the plastic cover is drawn out, and also remove the plastic mask
- ④安装塑料面罩时，将塑料面罩放在铝面罩正上方 15mm~30mm，紧贴门壳，竖直插入铝面罩中
④ When installing the plastic mask, place the plastic mask at 15mm - 30mm above the aluminum mask, and vertically insert the aluminum mask clinging to the door shell



十二.典型故障及解决措施、常见问题咨询

XII. Typical Failure and Solutions, Frequently Asked Questions

12.1型故障及解决措施

12.1 Type failure and solutions

A、显示温度与机器实际的测试温度不一致：

A. The display temperature is inconsistent with the actual test temperature of the machine:

因我们的显示温度是在箱内某一个点的温度，用户检测的温度是箱内另一个点的温度，因位置不一致温度肯定是有差异的，同时用户的检测工具与我们的感温探头也有一定的误差；

Because our display temperature is the temperature of a certain point inside the box, the temperature detected by the user is the temperature of another point inside the box, and the inconsistent position must cause different temperature, and meanwhile, there is certain error between the test tools of the users and our temperature sensing probe;

B、机器箱内上下温差过大：

B. The temperature difference between the upper and lower part of the machine box is too large:

因我们的机器是从上往下开始制冷的，所以上面的温度比下面的温度低，同时上下的温差也大，国际上同类产品的温差在 5~8 度，我们的基本上也在 6 度以内；再就是用户开关门频繁也会造成上下温差大的现象；

Since our machine starts to cool from top to bottom, the upper temperature is lower than the temperature below, and the temperature difference between the upper and lower parts is large; and the temperature difference of the similar products in the world is at 5-8 degrees, and ours is basically within 6 degrees; in addition, the frequent opening and closing door by the user will also the big temperature difference between the upper and lower parts;

C、用户设定-86 度，怎么回升到-82 度？

C. How does -86 °C set by user rise to -82°C?

为保证机器的使用寿命，我们的产品在设计上当环境温度高于 35℃，如果设定温度低于-82℃，则调回到-82℃，如果环温低于 30℃(包括 30℃)，则返回到原设定值；

In order to guarantee the service life of the machine, our products are designed so that when the ambient temperature is higher than 35 °C, and if the set temperature is lower than -82 °C, the product is adjusted to -82 °C, and if the ambient temperature is lower than 30 °C (inclusive), the product returns to the original set value;

D、开门时温度回升过快是什么原因？为什么别的品牌回温慢？

D. What's the reason for the fast temperature rising at the time of opening the door? Why the temperature rising of other brands is slow?

(1) 超低温柜的温度较低，与环境温度温差较大，我们的感温探头比较敏感，所以开门时温度回升较快；

(1) The temperature of the ultra-low temperature cabinet is relatively low, which has a big temperature difference with the ambient temperature, and our temperature sensing probe is more sensitive, so the temperature rises rapidly when the door is opened;

(2) 别的品牌在电脑板和感温探头设计上增加了回温较慢的功能，所以用户在开门时回温较慢或长时间显示 开门前的温度一致（例如美菱的产品）。

(2) The other brands add the function of slow temperature rising in the design of the computer board and the temperature sensing probe, so the temperature rises slowly or the temperature before opening door is displayed consistent for a long time when the user opens the door (for example, the product of Meiling).

F、显示 E10 及其它符号是什么原因？

F. What are the reasons of displaying E10 and other symbols?

主传感器故障显示 E10，冷凝器传感器故障显示 E12，环境温度传感器故障显示 E11，检查以上接线是否正常，否则由售后进行维修更换。

The main sensor fault display E10, the condenser sensor fault display E12, the ambient temperature sensor fault display E11, check whether the above wiring is normal or not, otherwise it will be repaired and replaced by after-sales service.

G、开门时机器移动怎样处理？

G. How to handle the machine displacement occurred at the time of opening the door?

机器配备脚轮，灵活，可移动、可锁定、可支撑，并根据要求实现微调节。在机器安装到用户制定位子后，应把前面两个脚轮进行固定，以防止开门时机器移动。

The machine is equipped with casters which are flexible, movable, lockable, supported, and can realize fine adjustment as required; After the machine is installed to the designated position by the user, the front two casters shall be fixed to prevent the machine from moving when the door is opened.

H、低温柜门打不开是怎么回事？

H. What's the matter that the low temperature cabinet door cannot be opened?

有两种情况：

There are two cases:

第一种是内外温度差大，导致门体处于负压。处理方法是，用户一个细铁片沿门密封条和门体之间塞进去，让空气进到行内；

The first reason is that the internal and external temperature difference is large, causing the door body to be under negative pressure. The processing method is: the user inserts a fine iron sheet between the door sealing strip and the door body, to make the air is fed into the line;

另一种是用户在存放物品时有水分，导致水流到密封条处结冰门体无法打开。处理方法是，用工具把门体打开。
The other reason is that there is moisture inside when the user stores the items, causing that the water flows to the sealing strip and freezes so that the door cannot be opened. The processing method is: to open the door by means of a tool.

12.2 常见问题故障排查

12.2 Troubleshooting common problems

问题点 Problems	原因分析 Cause analysis	维修措施 Maintenance measures
1. 高温级压机不启动（变频） 1. High-temperature compressor does not start (frequency conversion)	1. 电源开关或保险丝故障 1. Power switch or fuse failure	使用万用表测量开关或保险丝的电阻，确认开关坏，更换保险丝或电源开关 Use a multimeter to measure the resistance of the switch or fuse; if the switch is confirmed damaged, replace the fuse or power switch
2. A/B 系统压机不启动（双系统） 2. The system	2. 机仓连线接插件接插损坏 2. Connecting plug of the engine room connector is damaged. 3. 线接触不良 3. Poor contact of	检查机舱连接线的接插口是否损坏或线束掉落，更换对应的接插线 Check whether the connecting plug of the connecting wire of engine room is damaged or the wire harness thereof falls, and replace the patch cord 检查接插线是否连接不良或没有连接，修复至连接正常 Check that the patch cord is connected poorly or not connected, and

compressors A and B do not start (dual system)	wires	repair to normal connection
	4. 显示板、控制板连线故障 4. Display board and control board connection failure	使用万用表测量连接线的电阻判定线束短路或断路故障, 然后无法维修的更换线束 Use a multimeter to measure the resistance of the connecting wire to determine that the harness is short-circuited or open-circuited, and then replace the wire harness that cannot be repaired
	5. 继电器、启动电容或热保护器 坏了 5. Relay, starting capacitor or thermal protector fails.	检查继电器、电容或热保护器, 是否有电器件备烧黑、烧焦等迹象, 如果有更换电器件 Check whether the relay, capacitor or thermal protector has signs of burnt and charred etc., if yes, replace the electric device
	6. 压机故障 6. Compressor failure	在其他通电正常的情况下, 检查压缩机的接线插头是否正常, 同时观察压缩机的表面温度、压缩机的异常噪声等情况, 如果压机不热或噪声不正常, 则压缩机坏, 更换压缩机; 更换压机时候, 需同时更换油分离器及干燥过滤器 In other normal power-on cases, check whether the connection plug of compressor is normal, and observe the surface temperature, abnormal noise etc. of compressor. if the compressor does not heat or the noise is abnormal, etc., the compressor is damaged and needs to be replaced. When replacing the compressor, the oil separator and the dry filter shall be replaced at the same time
	7. 用户电压太低 7. The user voltage is too low	检查产品显示板电压是否在额定范围内 (220±10%), 同时用万用表测量通电运转情况下的电压是否超压, 如果出现电压过低或过高现象, 请客户配备稳压增减压器 Check whether the product display panel voltage is within the rated range (220 ± 10%), and use a multimeter to measure whether the voltage in the case of power-on operation is over-voltage or not, and if the voltage is too low or too high, the customer shall be required to equip with a pressure-stabilizing booster or pressure reducer
8. 双系统压力开关未短接 8. Dual system pressure switch is not short-circuited	检查压力开关是否短接, 双系统型号无压力开关 Check whether the pressure switch is short-circuited or not, and the dual system model is not provided with pressure switch.	
2. 低温级压机不启动 2. Low-temperature compressor does not start	1. 同高温级压机不启动原因 1. The reason is the same as the high-temperature compressor	在其他通电正常的情况下, 检查压缩机的接线插头是否正常, 同时观察压缩机的表面温度、压缩机的异常噪声等情况, 如果压机不热或噪声不正常, 则压缩机坏, 更换压缩机, 更换压机时候, 需同时更换油分离器及干燥过滤器 In other normal power-on cases, check whether the connection plug of compressor is normal, and observe the surface temperature, abnormal noise etc. of compressor. if the compressor does not heat or the noise is abnormal, etc., the compressor is damaged and needs to be replaced. When replacing the compressor, the oil separator and the dry filter shall be replaced at the same time
	2. 压力开关坏 2. Broken pressure switch	使用万用表测量压力开关的线束是否短路和断路, 同时检查压力开关铜管部分是否损坏, 如果故障更换压力开关 Use a multimeter to measure whether the wire harness of the pressure switch is short-circuited or open-circuited, and also inspect whether the copper tube section of pressure switch is damaged or not, if yes, replace the pressure switch
	3. 高温级制冷差 3. High-temperature compressor has a poor refrigerating effect	如果高温级启动后低温压缩机在 10min 之后没有启动, 则表示高温及制冷差, 检查高温级系统电路和管路焊接是否良好 (堵漏现象), 并处理故障 If the high-temperature compressor does not start after the low-temperature compressor has been started for 10min, it indicates that the high-temperature compressor has a poor refrigerating effect; therefore, check whether the system circuit and pipeline welding of the high-temperature compressor are good (leakage stopped) or not, and

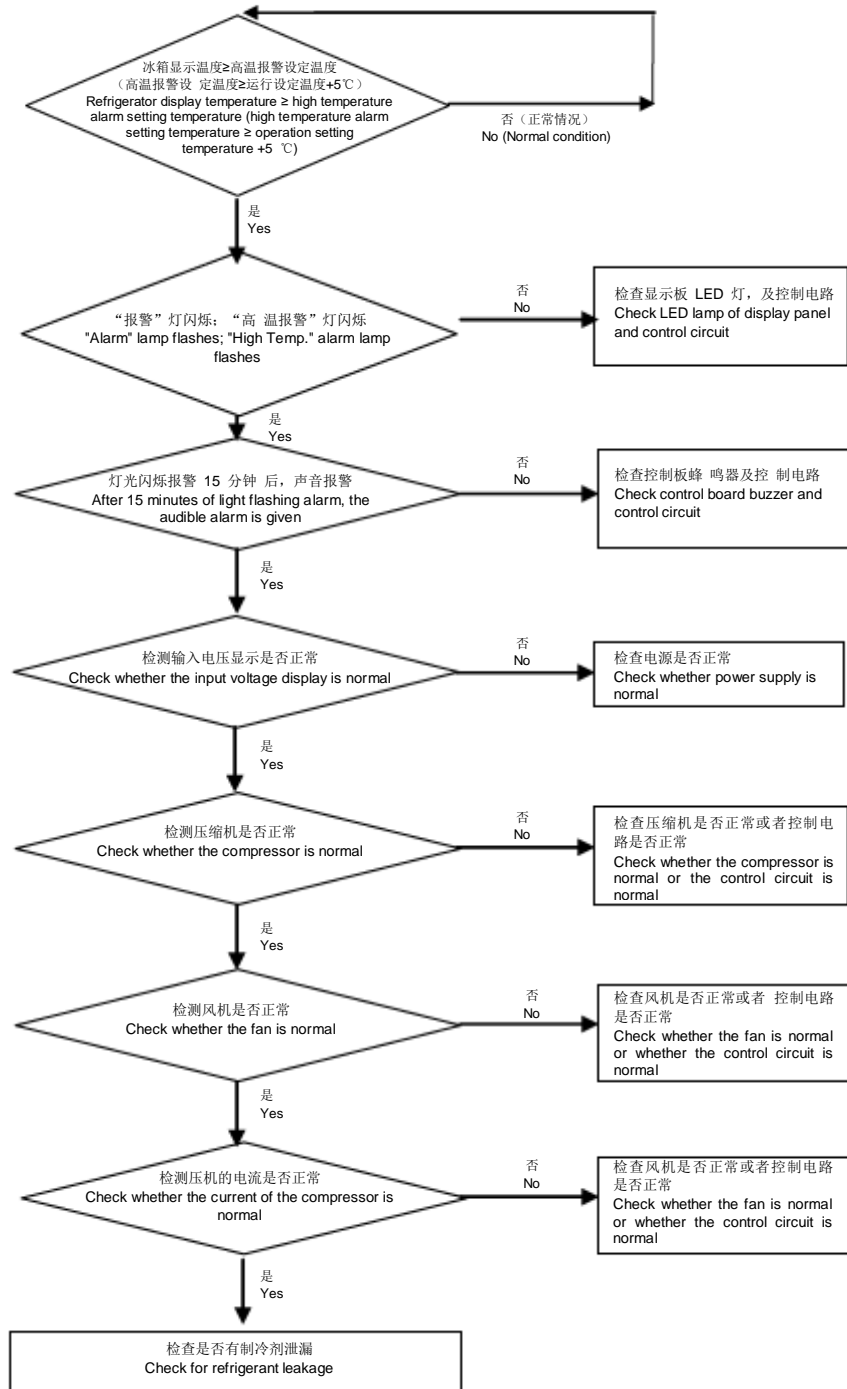
		handle the fault
3. 风机不转 3. Fan does not turn	1、风机接线掉 1. Wiring of fan falls	检查风机接插线是否掉落或没有插接,并重新处理线头和对接安装 Check whether the patch cord of fan falls or is not plugged, and reprocess the thread ends and realign for installation
	2、风机叶片被异物堵住 2. Fan blade is blocked by foreign body	检查风机叶片旋转是否有碰壁噪声和不选装,处理叶片和周围的异物,保持叶片运行正常 Check whether the fan blade produces the noise of touching wall during rotating or does not rotate, handle the foreign matters on and around the blade, and keep the blade running normally
	3、风机坏 3. The fan fails	使用万用表测量检查风机接线两头的电阻是否短路或开路,同时观察转轴是否旋转,如果以上请更换风机 Use a multimeter to measure whether the resistance of the two ends of the fan wiring is short-circuited or open-circuited, and observe whether the rotating shaft rotates, if yes, please replace the fan.
4. 柜内温度高 4. The temperature inside the cabinet is high	1、设置停机点温度高 1. The temperature at the shutdown point set is high	检查产品温度设定点是否按照客户要求设定,如果不符合要求,重新设定温度 Check whether the temperature set point of the product is set as required by customers, if not, re-set the temperature
	2、制冷剂泄漏 2. Refrigerant leakage	检查所有机舱焊接焊点,找漏点,补焊。重灌制冷剂 Check all welding joints of the engine rooms, find leaked points and repair welding. Re-fill refrigerant
	3、感温探头坏 3. The temperature sensing probe fails	如果显示板显示异常代码报警,如: E0/E1/E2E/E3,则表示产品感温探头故障,同时检查接插线是否正常,如果正常表示感温线坏,更换对应的感温线 If the display panel displays an abnormal code alarm, e.g., E0/ E1/ E2E/ E3, it is indicated that the product temperature sensing probe fails while checking whether the patch cord is normal, if yes, it indicates that the temperature sensing line is bad, then replace the corresponding temperature sensing line
	4、毛细管或系统脏堵、油堵 4. Capillary or system is dirty, blocked and oil-blocked	打开系统清洁毛细管或更换过滤器 Open the system to clean capillary or replace filter
	5、环境温度高 5. High ambient temperature	如果出现环温高现象,请增加空调,降低室温 If the ambient temperature is high, please add the air conditioners to reduce the room temperature
	6、冷凝器堵塞 6. Condenser blockage	出果冷凝器脏报警,请及时清理过滤网 In case of condenser dirty alarm, please clean the filter screen in time.
5.E11 报警 5.E11 Alarm	环温传感器的输入电压 $\geq 4.9V$ 时,传感器开路; $\leq 0.1V$ 时,短路 When the input voltage of the ambient temperature sensor is more than and equal to 4.9V, the sensor is open-circuited; if less than and equal to 0.1V, short-circuited	1.检查环温传感器端子是否插接不良或者掉落;传感器是否有损坏 1. Check whether the terminal of the ambient temperature sensor is plugged poorly or dropped, and whether the sensor is damaged 2.检查显示板上的传感器插接端子是否松动或接触不良;显示板是否损坏 2. Check whether the sensor plug-in terminal on the display panel is loose or poor contact; and whether the display panel is damaged
6.E12 报警 6. E12 alarm	冷凝器传感器的输入	1.检查环温传感器端子是否插接不良或者掉落;传感器是否有损坏 1. Check whether the terminal of the ambient temperature sensor is

	<p>入电压$\geq 4.9V$ 时, 传感器开路; $\leq 0.1V$ 时, 短路</p> <p>When the input voltage of the condenser sensor is more than and equal to $4.9V$, the sensor is open-circuited; if less than and equal to $0.1V$, short-circuited</p>	<p>plugged poorly or dropped, and whether the sensor is damaged</p> <p>2. 检查显示板上的传感器插接端子是否松动或接触不良; 显示板是否损坏</p> <p>2. Check whether the sensor plug-in terminal on the display panel is loose or poor contact; and whether the display panel is damaged</p>
<p>7.E10 报警</p> <p>7. E10 alarm</p>	<p>主传感器的输入电压$\geq 4.9V$ 时, 传感器开路; $\leq 0.1V$ 时, 短路</p> <p>When the input voltage of the main sensor is more than and equal to $4.9V$, the sensor is open-circuited; if less than and equal to $0.1V$, short-circuited</p>	<p>1. 检查主传感器端子是否插接不良或者掉落; 传感器是否有损坏</p> <p>1. Check whether the terminal of the main sensor is plugged poorly or dropped, and whether the sensor is damaged</p> <p>2. 检查主控板上的传感器插接端子是否松动或接触不良; 主控板是否损坏</p> <p>2. Check whether the sensor plug-in terminal on the main control panel is loose or poor contact; and whether the main control panel is damaged</p>
<p>8. 冷凝器脏 报警</p> <p>8. Condenser dirty alarm</p>	<p>冷凝器探头感知的冷凝器温度减去环境温度差值$\geq 13^\circ C$ (持续五分钟后)时, 报警 发生</p> <p>If the difference between the temperature perceived by the condenser probe less the ambient temperature is more than and equal to $13^\circ C$ (after lasting for 5 minutes), the alarm is given</p>	<p>1. 打开前格栅, 清洗过滤网</p> <p>1. Open the front grille to clean the filter screen</p> <p>2. 检查是否冷凝器探头离冷凝器出口太近</p> <p>2. Check if the condenser probe is too close to the condenser outlet</p> <p>3. 用胶带将冷凝器探头采取缠裹处理</p> <p>3. Wrap the condenser probe with adhesive tape.</p>
<p>9. 电池电量低报警</p> <p>9. Low battery alarm</p>	<p>当 蓄 电 池 电 量 $\leq 10.5V$ 时, 出现 电 池 电 量 低 报 警</p> <p>Low battery alarm goes off when the battery capacity $\leq 10.5V$</p>	<p>1. 排查蓄电池是否已经超过使用期限</p> <p>1. Check whether the battery has exceeded the service life</p> <p>2. 排查电池开关上接线端子是否接插良好, 或者开关损坏</p> <p>2. Check whether the wiring terminal on the battery switch is in good connection or whether the switch is damaged.</p> <p>3. 排查充电电路是否正常: 冰箱上强电 5 分钟之后, 测试主控 板上的蓄电池端子是否有电压输出, 输出电压应$\leq 5V$</p> <p>3. Check whether the charging circuit is normal: after the refrigerator is powered strongly for 5min, test whether the battery terminal on the main control board outputs the voltage, and the output voltage shall be less than and equal to $5V$</p>
<p>10. 箱内温度 不均匀</p> <p>10. The temperature inside the box is</p>	<p>机器箱内温度差距太大</p> <p>Temperature difference inside the machine box is</p>	<p>1. 顶层温度偏高, 处理门封, 更换内门保证密封的良好性;</p> <p>1. If the temperature of the top layer is too high, handle the door seal and replace the inner door to ensure the good sealing property;</p> <p>2. 底层温度偏高, 重新开系统, 增加低温制冷剂 R508B (或者直接 使用 针阀增加冷媒)</p>

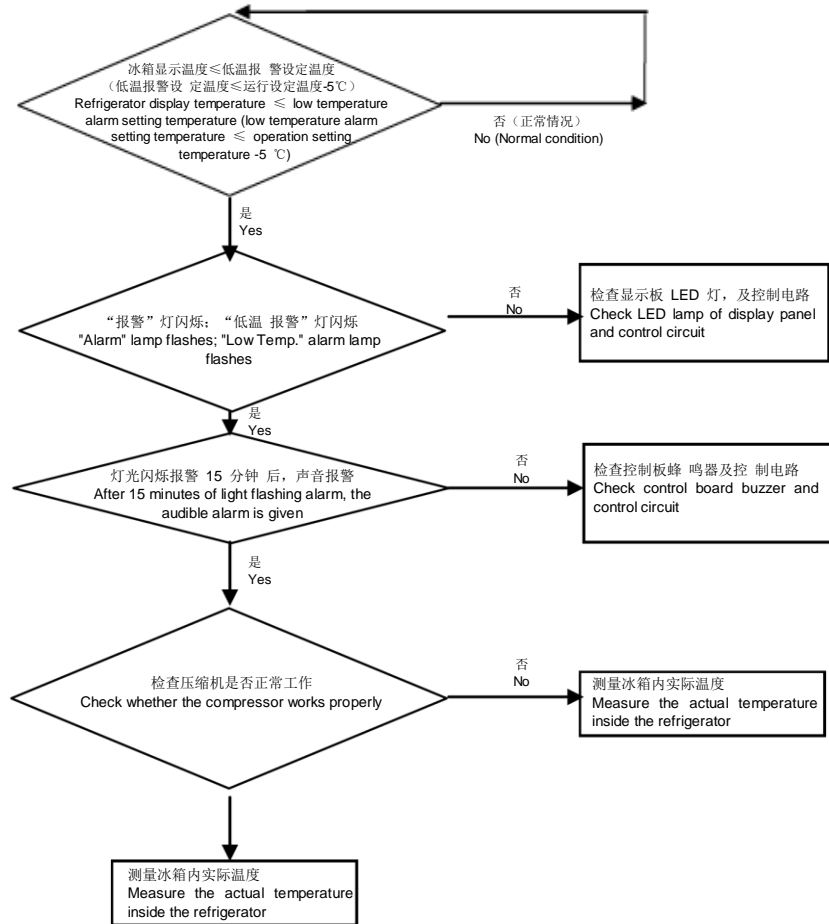
nonuniform	too big	2. If the temperature of the bottom layer is too high, re-open the system to add the low-temperature refrigerant R508B (or directly use the needle valve to add the refrigerant)
11. 显示板显示 EEE 11. Display panel shows EEE	控制板电源变压器故障 Control panel power transformer fails	当由于开关电源隔离变压器绕组输出短路等原因造成开关电源损坏, 无 +12V 输出时, 箱内温度显示区立刻闪烁显示 EEE, 报警指示灯同步闪烁, 并进行蜂鸣报警。 When the switching power supply is damaged due to short circuit of the isolation transformer winding output of the switching power supply, and there is no + 12V output, the temperature display area inside the box immediately flashes to display EEE, the alarm indicator lamp flashes synchronously and gives the buzzing alarm.

高温报警处理方法:

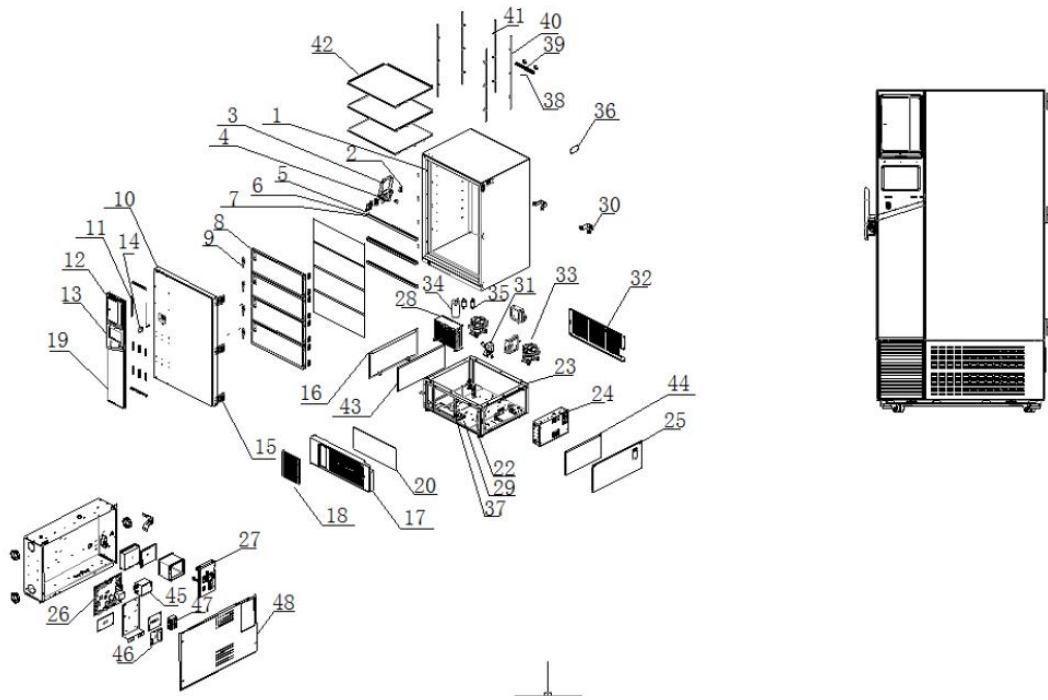
Processing method of high temperature alarm:



低温报警处理方法：
Low-temperature alarm handling method:



十三.爆炸图和备件明细 XIII. Explosion diagram and spare parts details



变频爆炸图部件明细

序号 S/N	DW-86L959B PT	DW-86L829 BPT	DW-86L579 BPT	DW-86L729BPT	零部件名称Spare Part Name	单台用量 QTY for 1 unit	单位 unit
专用号 Spare Part No.							
1	0270804446	0270804915	0270806634	0270806173	箱体组装 /cabinet assemblage	1	EA
2	0270103284 A	0270103284 A	0270103284 A	0270103284A	锁鼻固定板组件 fixer for door lock	1	EA
3	0270100327 G	0270100327 G	0270100327 G	0270100327G	手把/outer door handle	1	EA
4	0270101174 B	0270101174 B	0270101174 B	0270101174B	转锁/Lock	1	EA
5	0270103284 B	0270103284 B	0270103284 B	0270103284B	手把安装板/fixer for outer door handle	1	EA
6	0270101322	0270102128	0270101680	0270101572	箱体横梁/cabinet bar	3	EA
7	0270200575	0270200660 A	0270200682	0270200660	箱体横梁装饰条 PVC 灰色/cabinet bar trimming strip, PVC gray	3	EA
8	0270804067	0270804069	0270803150	0270801321	内门总成/inner door assembly	4	EA
9	0270101508	0270101508	0270101508	0270101508	内门把手/ inner door handle	4	EA
10	0270804925	0270804444	0270805111	0270806156	外门/outer foaming door assemblage	1	EA
11	0270103367	0270103367	0270103367	0270103367	显示板罩固定铁/ fixer of display panel holder	2	EA
12	0270201004	0270201004	0270201004	0270201004	LED显示板罩/ display panel holder	1	EA
12	0270200989	0270200989	0270200989	0270200989	LCD显示板罩/ display panel holder	1	EA
13	0271800034 A	0271800034 A	0271800034 A	0271800034A	10寸触摸屏/10' TFT touch screen 组件	1	EA

13	0271800074 B	0271800074 B	0271800074 B	0271800074B	LED显示板/ display panel	1	EA
14	0270200599	0270200599	0270200599	0270200599	平衡阀/pressure equalization port	1	EA
15	0070107087 A	0070107087 A	0070107087 A	0070107087A	门铰链（通用）/door hinge (common use)	4	EA
16	0270103133	0270103137 B	0270103137 B	0270103137B	右侧护板组装/right side guard plate assemblage	1	EA
17	0270103378 A	0270103377 A	0270103376 A	0270103734	前护罩装配体/ front shelter assamblage (Temperature recorder)	1	EA
17	0270103378	0270103377	0270103376	0270103734A	前护罩装配体/ front shelter assamblage	1	EA
18	0270200991	0270200991	0270200991	0270200991	进风格栅装配/air-inlet grille assemblage	2	EA
19	0270103236 A	0270103236 A	0270103236 A	0270103236A	铝护罩/Aluminum shelter	1	EA
20	0270102159	0270102159	0270102159	0270102159	防尘网/air filter	1	EA
21	0074090520 C	0074090520 C	0074090520 C	0074090520C	温度记录仪/chart recorder	1	EA
22	0070101872 C	0070101872 C	0070101872 C	0070101872C	双联方向自锁脚轮/ duplex all-round caster	4	EA
23	0270103136	0270103139	0270103125	0270103737	底架点焊组装 / bottom frame assemblage, dot welding	1	EA
24	0270803989	0270803989	0270806630	0270806167	电控箱总成/electric chamber assembly	1	EA
25	0270103133	0270103138 B	0270103138 B	0270103138B	左侧护板组装/left side guard plate assemblage	1	EA
26	0271800076	0271800076	0271800076 F	0271800076F	主控板/control board	1	EA
27	0270200218	0270200218	0270200218	0270200218	开关盖/switch cover	1	EA
28	0270700349 A	0270700349 A	0270700349 B	0270700439B	冷凝器/condensor	1	EA
29	0270103132	0270103132	0270103124	0270103736	压机底板 /compressor fixer	1	EA
30	0270103228	0270103228	0270103228	0270103228	止推架/Thrust frame	1	EA
31	0074090857 AA	0074090857 AA	/	/	吸风式风机 iQ3612 /fan for compressor	1 (579: 4)	EA
32	0270103135	0270103140	0270103123	0270101574A	机仓后护板/cabin back guard plate	1	EA
33	0274000371	0274000436	0274000436 A	0274000436A	压缩机/compress	2	EA
34	0070700552	0070700552	0070700552	/	BD-370LT 油分离器/BD-370LT oil seperator	1	EA
35	0070701749	0070701749	0070701061	0070701061	干燥过滤器/drier filter	2	EA
36	0270103121	0270103121	0270103121	0270103121	5V冷链盖板/5 v cold chain cover	1	EA
37	0074091225	0074091225	0074091225	0074091225	冷凝器传感器/condensor sensor	1	EA
38	0274000256	0274000256	0274000256	0274000256	温度传感器/temperature sensor	1	EA
39	0270101337	0270101337	0270100585	0270101337	感温控头固定条/ fixer for temperature sensor	1	EA

40	0270100174 A	0270100174 A	0270100174 A	0270100174A	搁架条/ shelf strip	5	EA
41	0270100175	0270100175	0270100175	0270100175	弹性卡/resilient clip	15	EA
42	0270101332 C	0270100590	0270103149	0270101535	搁板/shelf	3	EA
43	0270300174 A	0270300174 A	0270300174 A	0270300174A	右侧板隔音棉被/right sound insulation cotton	1	EA
44	0270300174 B	0270300174 B	0270300174 B	0270300174B	左侧板隔音棉被/left sound insulation cotton	1	EA
45	0274000337	0274000337	0274000337	0274000337	滤波器/filter 15A	1	EA
	/	/	0074600001 A	0074600001A	滤波器/filter 20A		
46	0271800081 A	0271800081 A	0271800081 A	0271800081A	热电偶板/Thermocouple board	1	EA
47	0274300007 A	0274300007 A	0274300007 A	0274300007A	端子排/Terminal row	1	EA
48	0270100619	0270100619	0270100619	0270100619	电控箱体盖/Electric control box cover	1	EA
49	0271800116	0271800116	0271800116	0271800116	物联模块 IoT module	1	EA
50	0271800080 A	0271800080 A	0271800080 A	0271800080A	后备系统板 backup system board	1	EA
51	0271800093	0271800093	0271800093	0271800093	指纹模块 printfinger module	1	EA
52	0271800094	0271800094	0271800094	0271800094	USB转接头 USB board	1	EA
53	0271800095	0271800095	0271800095	0271800095	HUB板 HUB board	1	EA
54	0271800096	0271800096	0271800096	0271800096	喇叭 speaker	1	EA
55	0270400458	0270400458	0270400458	0270400458	USB线 USB line	1	EA
56	0270201015	0270201015	0270201015	0270201015	液晶屏后护板 screen board	1	EA
57	0074091430 A	0074091430 A	0074091430 A	0074091430A	铅酸电池 acid battery	1	EA
58	0274000238	0274000238	0274000238	0274000238	锂电池 lithium battery	1	EA