

Haier SERVICE MANUAL

Deep Freezer

MODEL: DW-86L578BPST (100~230V/50/60Hz)
DW-86L728BPST (100~230V/50/60Hz)
DW-86L828BPST (100~230V/50/60Hz)



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WARNING



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

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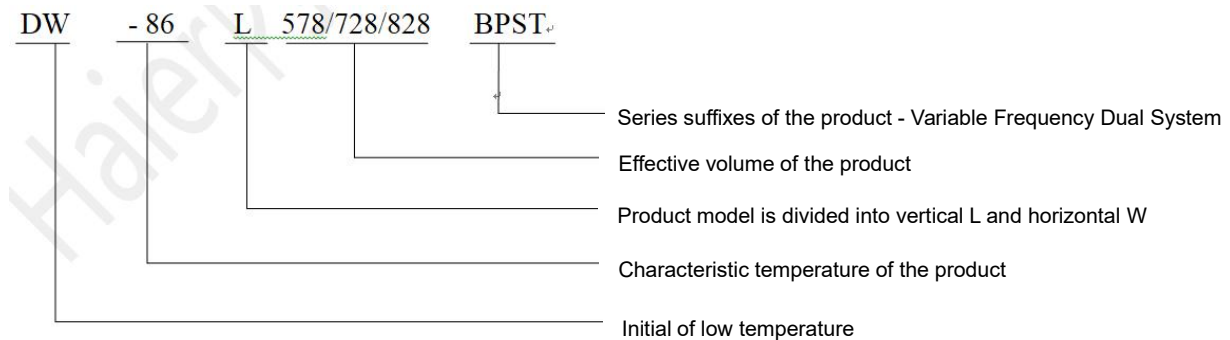
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Chapter 1 General Information

1-1. Main functions and features of the product

- 1.1.1. The application range of the temperature in the ultra-low temperature cabinet is -40°C to -86°C ;
- 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. The display panel is divided into a working area and an alarm area, which can display the startup condition of the machine, whether the network is connected or not and display the locking, and also can set high and low temperature alarm and the temperature inside the cabinet;
- 1.1.4. The digital display screen can simultaneously display the temperature inside the cabinet, the ambient temperature, the input voltage and the like;
- 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. 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. Be provided with network function, have an RS-485 data interface, 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. 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. Be provided with the remote alarm function and can connect the alarm to other rooms to realize the alarm function;
- 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. The product is supplied with 2 standard 25.5mm test holes;
- 1.1.12. Equipped with casters which are flexible, movable, lockable, supported, and can realize fine adjustment as required;
- 1.1.13. The recorder, network monitoring system, electromagnetic lock, card punching module, printfinger module etc.
- 1.1.14. Download the bio link app from your mobile phone, which allows you to monitor and view temperature, alarms, and event records inside the box anytime and anywhere; (Currently applicable to China)
- 1.1.15. The LCD screen comes with a WiFi module, which can be connected to the sample library software through wireless network (optional), making it easy to manage samples, safe and accurate.
- 1.1.16 DW-86L828BPST is a dual frequency conversion compressor.

1-2. Model designation



Chapter 2 Publicity Points and Selling Points of the Product

2-1. Temperature control

Computer controlled, temperature digital display, regulating unit of 1 °C , and the application temperature range of -40 to -86 °C ;

2-2. Safety control

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. 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 All independent components have safe grounding;

2-3. Refrigeration system

2.3.1 Intelligent dual-system self-cascade refrigeration technology, imported brand compressor, strong cooling capacity, single system refrigeration depth of -80 °C (25 °C ambient temperature), environment-friendly fluoride-free refrigerant, and zero pollution discharge;

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

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. Humanized design

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 Adjustable shelf design, facilitating access of goods;

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

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

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

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. Temperature monitoring function

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

2-7. Noise

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.

Chapter 3 Product Appearance and Structural Features

3-1. Energy-saving new structure series

DW-86L578/728/828BPST (100~230V/50/60Hz)



Front View



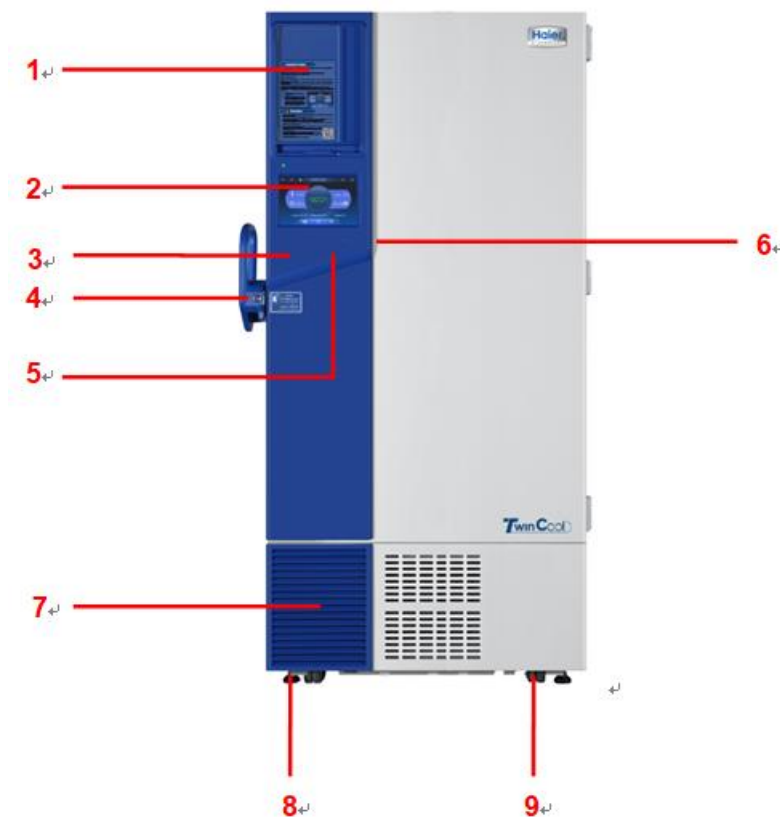
Internal structure diagram



Rear View

Chapter 4 Structure Name of Product Part

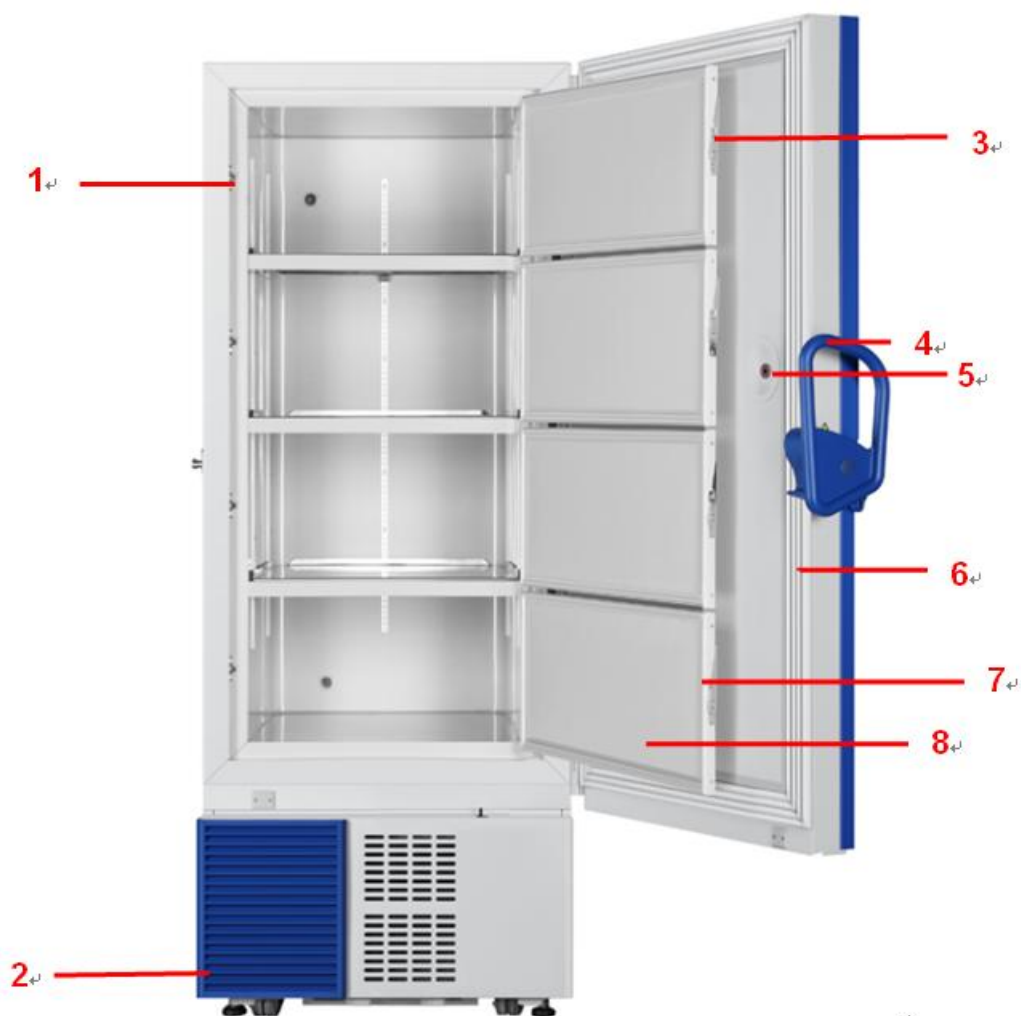
4-1. Display structure of the display panel



Components name:

- 1 Pocket organizer document storage
- 2 LCD board
- 3 Finger print module (optional)
- 4 Door handle (with lock)
- 5 Door card board (optional)
- 6 USB port
- 7 Front protection panel of refrigerator
- 8 Leveling leg
- 9 Caster

4-2. Box structure



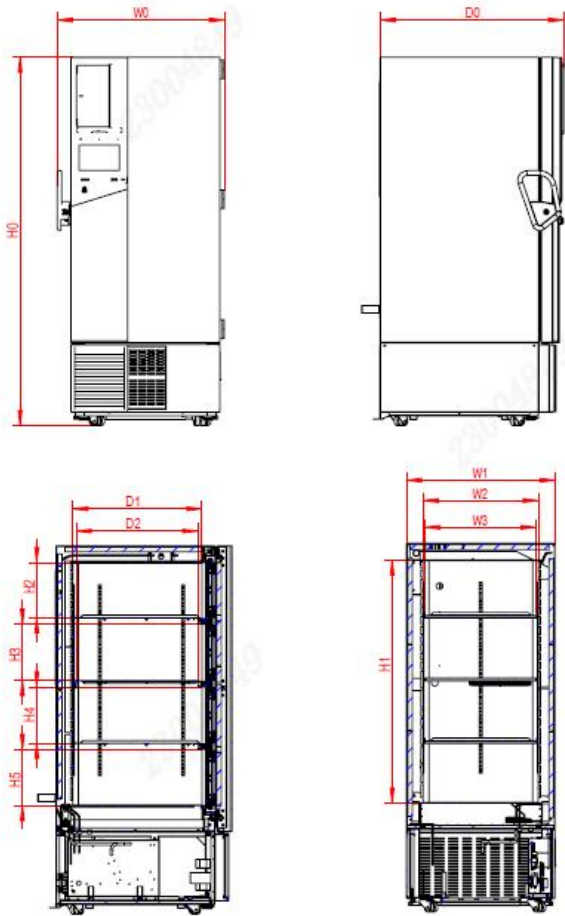
Components name:

- 1 Integrated cabinet opening
- 2 Air-inlet grille
- 3 Inner door handle: When replacing, remove the side screws of the handle
- 4 New outer door handle
- 5 Balanced valve
- 6 Sealing strip of outer door: take out from the retaining groove when replacing

7 Sealing strip of inner door: take out from the retaining groove when replacing

8 Inner door: PU foaming structure

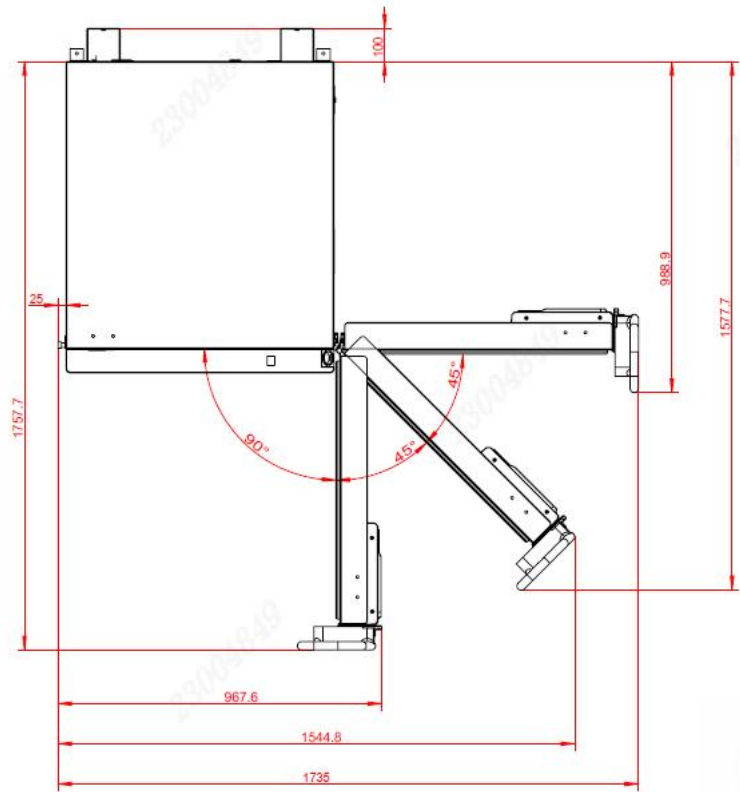
4-3. Space requirement



W0	W1	W2	W3	H0
901.5mm	800mm	620mm	602mm	1987mm

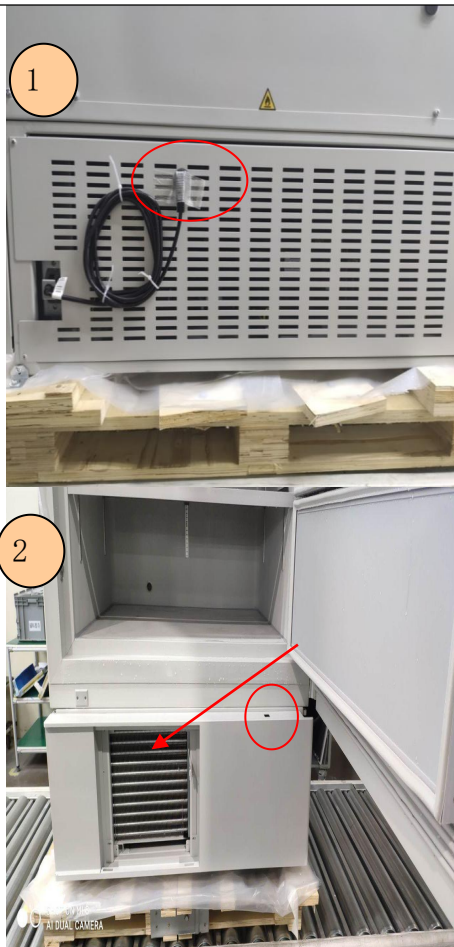
H1	H2	H3	H4	H5
1310mm	298mm	303mm	303mm	301mm

D0	D1	D2
990mm	695.5mm	657mm



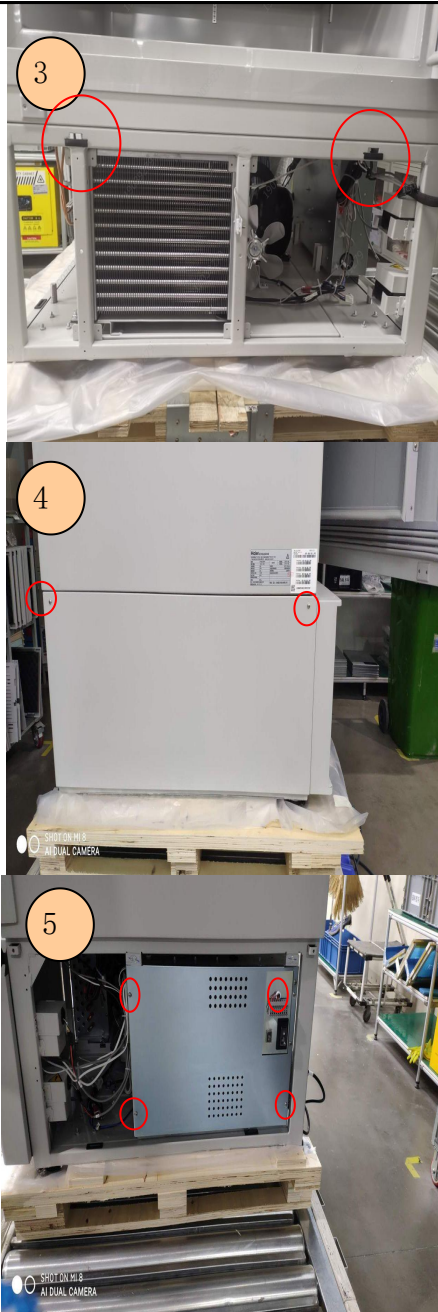
4.4 Disassembly and Installation

Remove grille

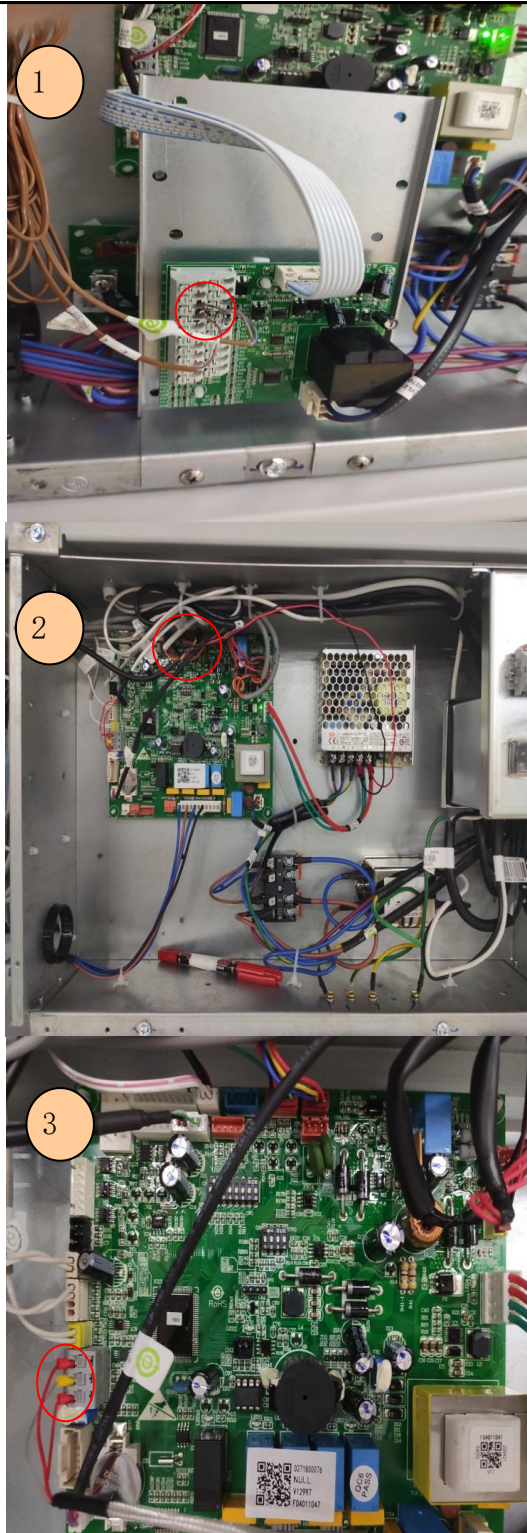


- ① Pull out the plug of the power cable from the hole in the grille, and remove the fiber tape .(Picture 1);
- ② Remove the two self-tapping screws from the front cover of the engine room, and pay attention to threading the sheath during the removal process. (Picture 2)
- ③ Remove the damping pad from the front guard card slot .(Picture3)
- ④ Remove the two self-tapping screws from the side guard .(Picture4)
- ⑤ Remove the four screws from the lid of the electric cabinet. (Picture5)

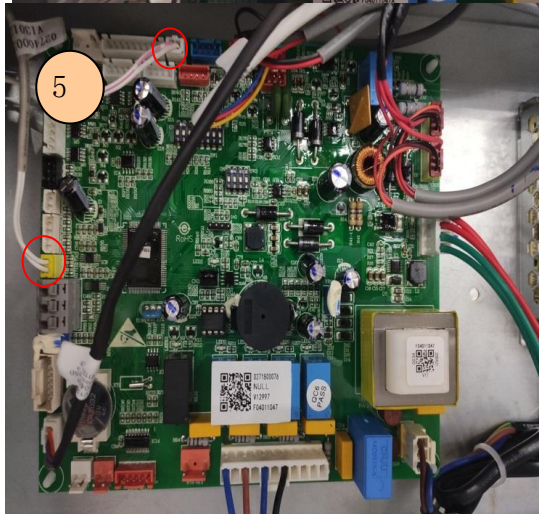
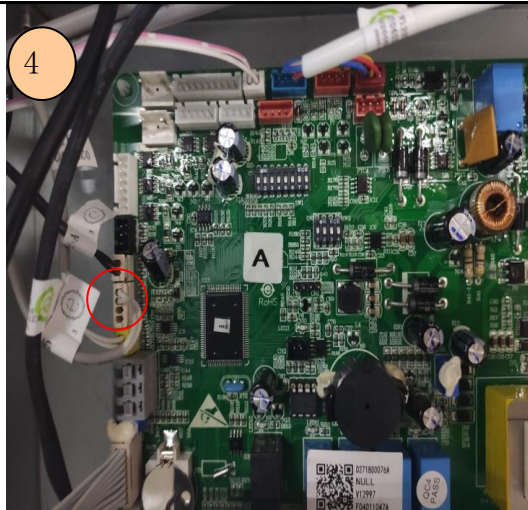
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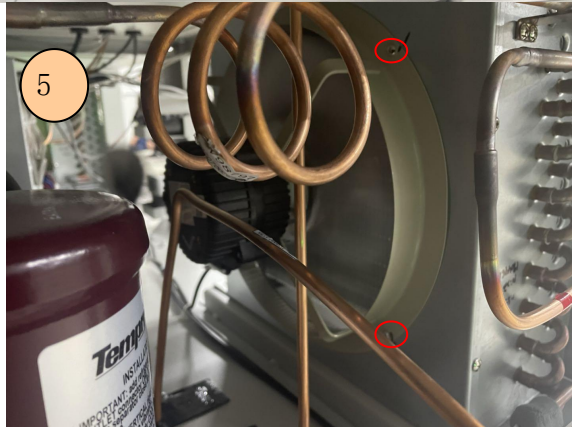
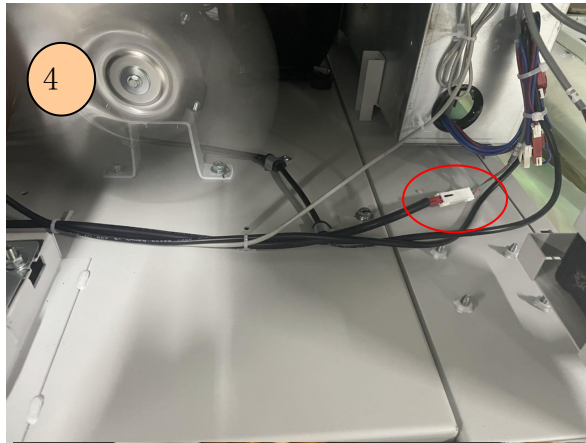
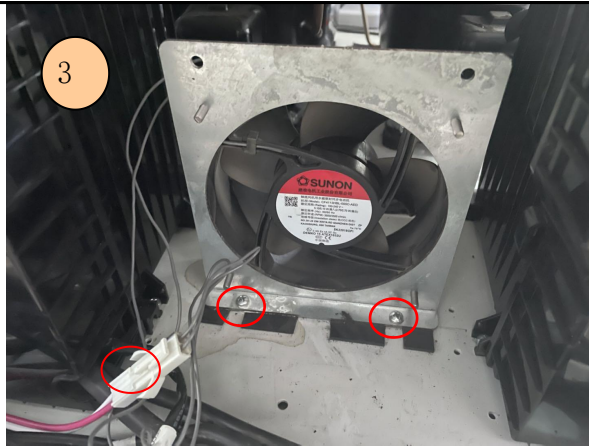
Remove
electrical
assembly



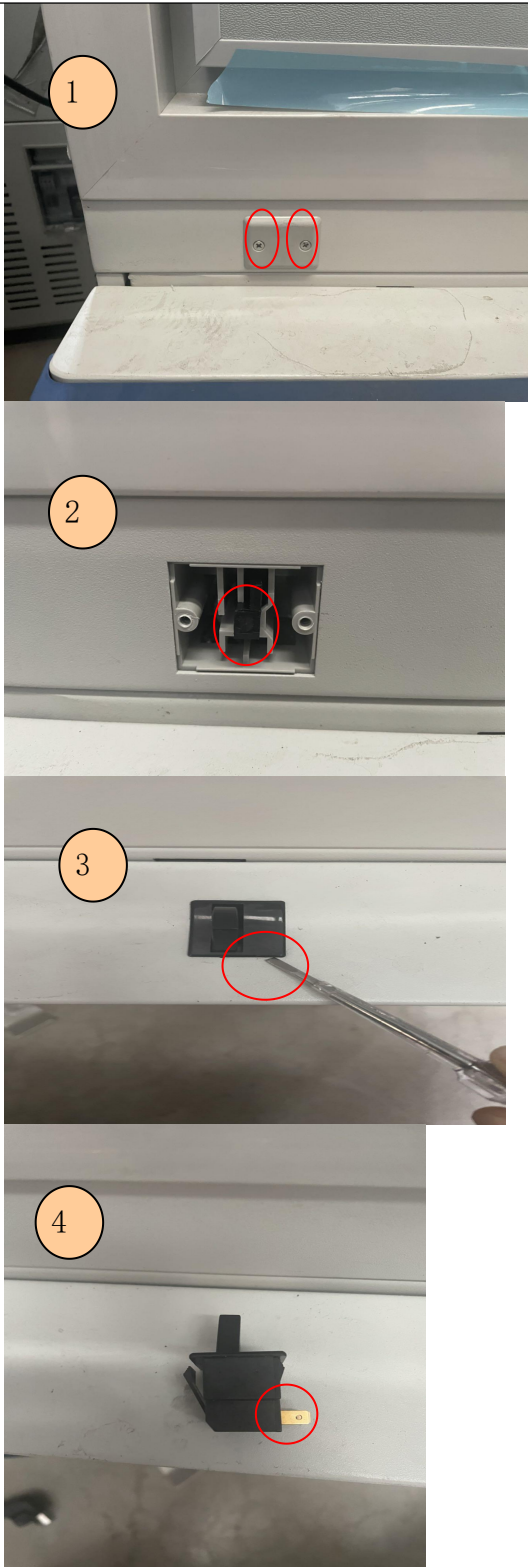
- ① Remove the wiring harness connected to the sensor. Connect the red wiring harness to the left and the blue wiring harness to the right. (Picture 1)
- ② Remove the red power supply line of the iot module corresponding to the switching power supply +v black corresponding to -v, and remove the wiring harness from the electric cabinet .(Picture 2)
- ③ Unplug the 0270400121B signal cable from the main control board CN7, and unplug the main sensor from the card slot according to red, yellow and red from top to bottom .(Picture 3)
- ④ The 0074090885A sensor is removed from CN14 of the main control board. The 0074091225 sensor is sensed by the condenser.
- ⑤ Remove CN15 from the main control board. (Picture4)
 Plug the 0274000228 stroke switch into CN4 end of the main control board, plug the 0274000256 ring temperature sensor into CN13 end of the main control board .(Picture5)



- ① Use a cross screwdriver to remove the four screws on the back of the freezer, which are for retaining the rear hood of the engine compartment. (Picture 1)
- ② Take down the hood. If necessary, change the compressor with an electric screw driver. (Picture 2)
- ③ After removing the power cord of the cooling fan and removing the two screws on the cooling fan, replace the cooling fan (Picture 3)
- ④ Remove the terminal of the power cable of the condensing fan, remove the four screws on the condensing fan, and replace the condensing fan (Picture 4 5)



Remove door magnet switch and gate switch



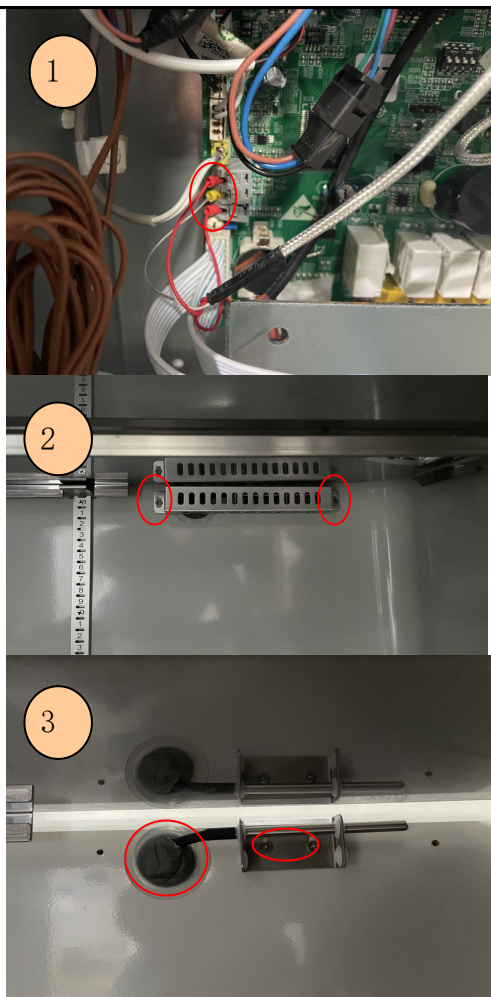
Door magnetic switch removal:

- ① Unscrew the two screws on the door magnetic switch (Picture 1)
- ② Remove the sensor of the door magnetic switch and replace it (Picture 2)

Gating switch removal:

- ③ Remove the gate switch with a screwdriver (Picture 3)
- ④ Insert the interface of the new gate switch (Picture 4)

Main sensor replacement



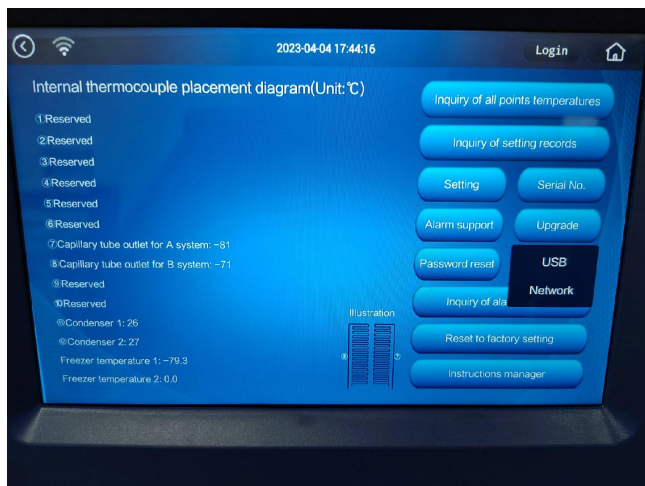
- ① Unplug the three terminals of the main sensor from the control board (Picture 1)
- ② Remove the two screws on the protective housing of the main sensor and remove the protective housing (Picture 2)
- ③ Remove the two screws on the sensor fixing clamp, and take out the insulation plug, and remove the main sensor (Picture 3)

Chapter 5 Product

5-1.Product Introduction and Product Improvement Introduction

See the instruction manual

How to enter: On the main page, click Query - Local Information in turn, click the version number 10 times in a row, and enter "8888888888" in the pop-up password input box to enter the after-sales mode



Connect the corresponding thermocouple wire in the engine room to the corresponding position on the thermocouple board in the electric control box. ① Corresponding to the No. 1 position on the thermocouple board, the temperature value corresponding to the thermocouple wire can be displayed, which is convenient for searching when the machine is faulty and repaired. reason. Among them, the points ①-⑤ are the layout points of the inverter model, and the points ⑦-⑧ are the layout points of the dual-system model.

Inquiry about the temperature history of each distribution point

A system capillary outlet	B system capillary outlet	Condenser 1	Condenser 2	Ambient temp.	Voltage
-70℃	-74℃	26℃	27℃	25℃	232V
-95℃	-94℃	28℃	31℃	23℃	232V
-95℃	-94℃	28℃	31℃	23℃	232V
-95℃	-95℃	28℃	31℃	23℃	232V
-95℃	-95℃	28℃	31℃	23℃	232V
-95℃	-95℃	28℃	31℃	23℃	235V
-95℃	-95℃	28℃	31℃	23℃	235V
-95℃	-94℃	28℃	31℃	23℃	234V

Enter the start time-end time, click query to view the temperature records at each point in the time period; click download to download the temperature data, click download without inputting time, and download all time period data by default.

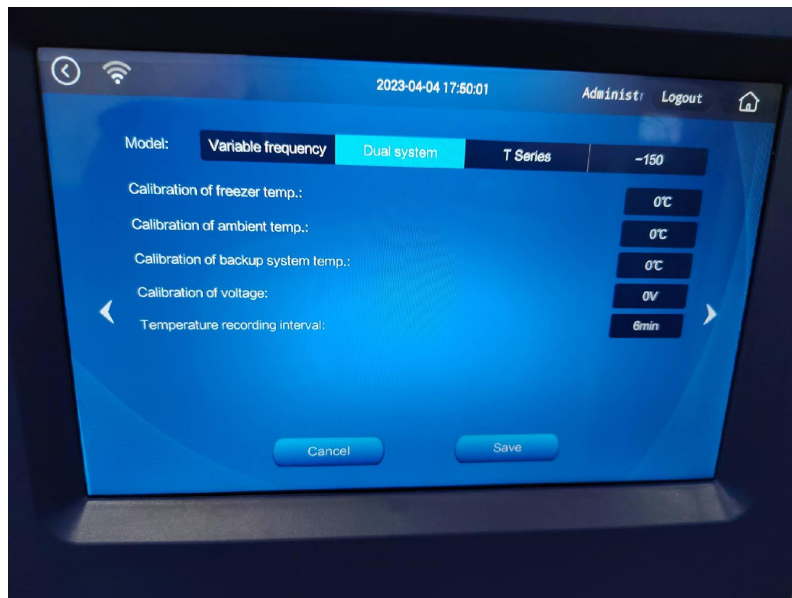
Set record query

All	Login	Door ajar	Power	Battery	Sensor fault
2023-04-28 13:29:29	High ambient temp. alarm				
2023-04-28 13:28:38	High ambient temp. alarm				
2023-04-28 13:27:53	High ambient temp. alarm				
2023-04-28 13:27:19	High ambient temp. alarm				
2023-04-28 13:26:30	High ambient temp. alarm				
2023-04-28 13:24:21	High ambient temp. alarm				
2023-04-28 13:23:29	High ambient temp. alarm				

Enter the start time-end time and click Query to display the setting change records in this time period.

Click Download to download the setting change records; without inputting the time, click to download the data, and all the setting change records will be downloaded by default.

Setting



Model: the model corresponding to the machine, the system will determine by itself.

Temperature calibration in the box: When the actual temperature in the box is different from the displayed temperature, the temperature sensor in the box can be calibrated. The default is 0, adjustable from -10°C to 10°C , and the displayed temperature remains unchanged after calibration. The display temperature in the example box is -80°C , the measured temperature is -78°C , and $+2^{\circ}\text{C}$ is selected to make the measured temperature and the displayed temperature consistent.

Ambient temperature calibration: When there is a difference between the displayed ambient temperature and the measured ambient temperature, the display can be calibrated. The default is 0, and it is adjustable from -10°C to 10°C . The displayed temperature changes after calibration. For example, the displayed temperature of the Ambient temperature is 30°C , and the measured temperature is 35°C . If $+5^{\circ}\text{C}$ is selected, the displayed temperature of the Ambient temperature can be adjusted to 35°C .

Voltage calibration: When there is a difference between the displayed voltage and the measured voltage, the display can be calibrated. The default is 0, and it is adjustable from -9V to 9V . After calibration, the displayed voltage changes. For example, the display voltage is 215V , and the actual voltage is 220V . Select $+5^{\circ}\text{C}$ to adjust the display voltage to 220V .

Temperature fetching cycle: USB fetching cycle, default 6min, adjustable from 1 to 30min.

Backup system temperature calibration: When there is a difference between the backup system PT100 and the main control board PT100, the backup system sensor can be calibrated. The default is 0,

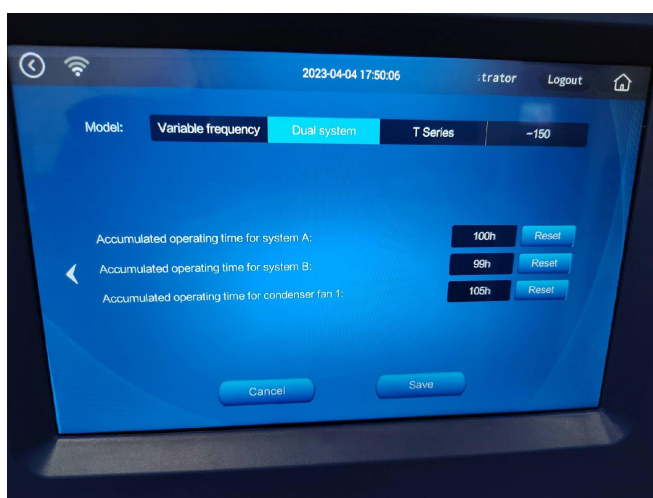
adjustable from -10°C to 10°C, and the temperature value of the backup system changes after calibration.

Sample library function: When the sample library software needs to be used, the sample library function needs to be enabled before it can be used;

Fingerprint function: When you need to use the fingerprint lock, you need to turn on the fingerprint function before you can use it, otherwise click on the fingerprint LCD screen to prompt that the fingerprint is unavailable;

Card reading function: When an electromagnetic lock is required, the card reading function must be turned on before it can be used;

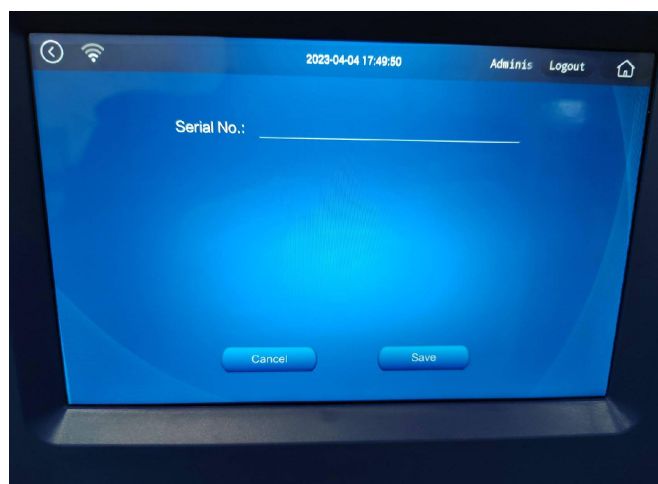
Next page:



It can display the compressor life protection temperature, compressor/fan running time and design life of the storage box, which is only for reference during maintenance.

Machine editing

If the user replaces the display screen, he can manually input the machine number to generate a one-dimensional code, so as to scan with the scanner gun or query the machine code.



Shield

The alarm can be shielded. When the system has the alarm after shielding, the display screen will no longer prompt.



Ambient temperature sensor fault shielding - shielding ambient temperature alarm

Condenser Sensor Fault Shield - Shield Dirty Condenser Alarm

Main sensor fault shielding in the box - shielding sensor fault alarm

Heat Exchange Sensor Fault Masking - Masking Sensor Fault Alarm

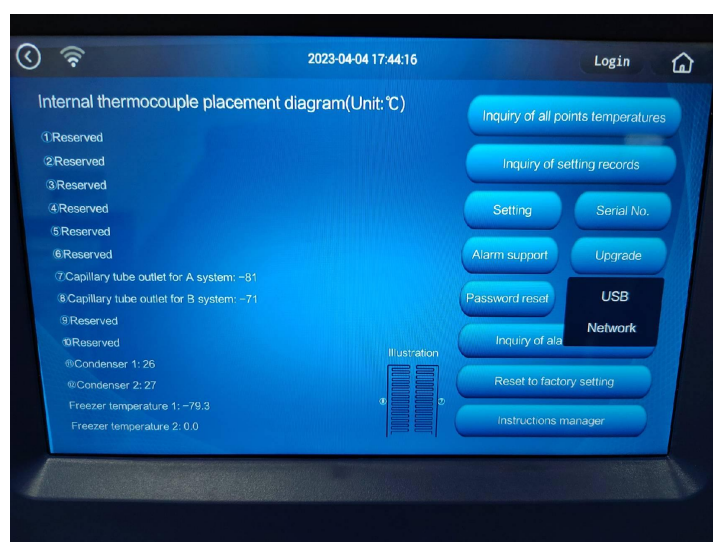
Backup system sensor fault shielding - shielding the backup system fault alarm

Battery Not Connected Shield - Shield Low Battery Alarm

A/B system fault shielding - can shield AB refrigeration system faults (dual system models only)

Upgrade

Click Upgrade to import the display program through USB to upgrade the existing display program.



View alarm record

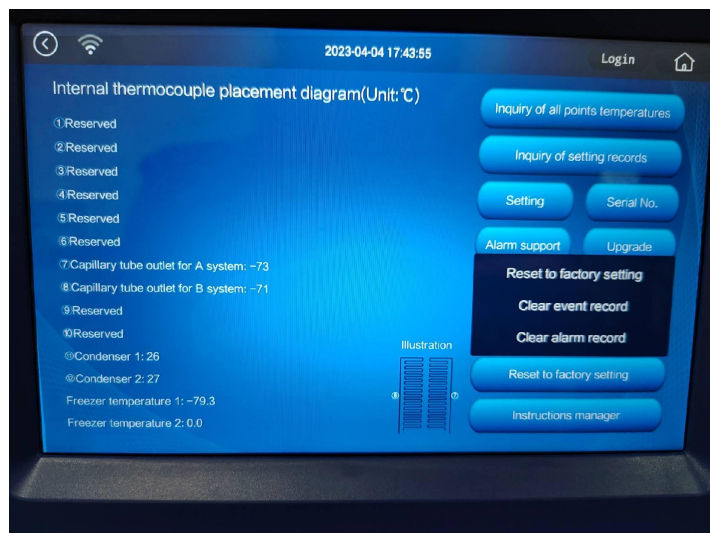
The alarm records can be viewed and deleted, and can be deleted individually or all.

Reset

Factory reset: clear all data, restore system settings from factory

Alarm record clearing: Clear all alarm records with one key, and cannot be restored after clearing.

Time record clearing: Clear all event records with one click, and cannot be restored after clearing.



5-2. Precautions

5.2.1 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.

5.2.2 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).

5.2.3 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.

5.2.4 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.

5.2.5 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.

5.2.6 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°C ~ -80°C.

5.2.7 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.

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

5.2.9 When an 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.

Chapter 6 Main technical parameters of the product

6-1. Table of main technical parameters

Model	Units	DW-86L578BPST	DW-86L728BPST	DW-86L828BPST
Technical Parameters				
Product Attributes	/	Vertical	Vertical	Vertical
Climate type	/	N	N	N
Control mode	/	Microcomputer control	Microcomputer control	Microcomputer control
Display	/	LCD display (minimum display accuracy 0.1 °C)	LCD display (minimum display accuracy 0.1 °C)	LCD display (minimum display accuracy 0.1 °C)
Temperature sensor	EA	PT100	PT100	PT100
Basic Parameters				
Volume	L	578	728	828
Voltage frequency	V/Hz	100~230V/50/60HZ	100~230V/50/60HZ	100~230V/50/60HZ
Power (W)	W	1100	1100	1400
Current (A)	A	11	11	14
Internal dimensions	mm	620*716*1310	766*716*1310	870*716*1310
External dimensions (W*D*H)	mm	895*998*1980	1046*998*1980	1145*998*1980
Net weight/ gross weight	Kg	325/355	350/385	380/410
Material				
Outer material	/	Electric zinc plate layer	Electric zinc plate layer	Electric zinc plate layer
Internal material I	/	Electric zinc plate layer	Electric zinc plate layer	Electric zinc plate layer
Insulating layer	/	VIP + fluoride-free PU foaming layer	VIP + fluoride-free PU foaming layer	VIP + fluoride-free PU foaming layer
Door thickness	/	90mm	90mm	90mm
Box thickness	/	90mm	90mm	90mm
Outer door sealing structure	/	Four-layer silica gel sealing strip	Four-layer silica gel sealing strip	Four-layer silica gel sealing strip
Inner door sealing structure	/	Independent inner door single-layer silica gel sealing strip	Independent inner door single-layer silica gel sealing strip	Independent inner door single-layer silica gel sealing strip
Door lock	/	Y/1	Y/1	Y/1
Product Accessories				
Number of separating plates/ inner doors	/	3/4	3/4	3/4
Size of separator (W*D)	mm	602*706	752*650	854*706

SERVICE MANUAL

Castor/ Test Holes	EA	4/2	4/2	4/2
Brand and type of compressor	/	/SECOP/2 Fully closed /SECOP/2	/SECOP/2 Fully closed /SECOP/2	/SECOP/2 Fully closed /SECOP/2
Compressor	/	NLV12.6CN	NLV12.6CN	NLV12.6CN
Refrigerant type	/	R1150/R600a	R1150/R600a	R1150/R600a

6-2.Product nameplate

Haier		 0197		 			
Ultra Low Temperature(ULT) Freezer							
Model: DW-86L578BPST		A/B Refrigerant	High Stage:		R600a : 95g		
Inner Temperature: -40℃~-86℃			Low Stage:		R1150 : 35g		
Effective Volume: 578L							
Rated Voltage: 100-230V~		Foaming Agent:		HFO-1233zde			
Rated Frequency: 50/60Hz		Manufacture Date and No.:		in the Barcode			
Power Input: 1100W							
Net Weight: 325kg							
A/B PS(High/Low): 2.6MPa/1.4MPa							
Anti-shock Safety Classification: I		  10℃-32℃  2023 					
 Qingdao Haier Biomedical Co.,Ltd. Haier Industrial Park, Economic Technology Development Zone. Qingdao P.R.China <table><tr><td>EC</td><td>REP</td></tr></table> Shanghai International Holding Corp. GmbH(Europe) Eiffestrasse 80, 20537 Hamburg, Germany						EC	REP
EC	REP						
Made in China							

Haier		 0197		 			
Ultra Low Temperature(ULT) Freezer							
Model: DW-86L728BPST		A/B Refrigerant	High Stage:		R600a : 90g		
Inner Temperature: -40℃~-86℃			Low Stage:		R1150 : 35g		
Effective Volume: 728L							
Rated Voltage: 100-230V~		Foaming Agent:		HFO-1233zde			
Rated Frequency: 50/60Hz		Manufacture Date and No.:		in the Barcode			
Power Input: 1100W							
Net Weight: 350kg							
A/B PS(High/Low): 2.6MPa/1.1MPa							
Anti-shock Safety Classification: I		  10℃-32℃  2023 					
 Qingdao Haier Biomedical Co.,Ltd. Haier Industrial Park, Economic Technology Development Zone. Qingdao P.R.China <table><tr><td>EC</td><td>REP</td></tr></table> Shanghai International Holding Corp. GmbH(Europe) Eiffestrasse 80, 20537 Hamburg, Germany						EC	REP
EC	REP						
Made in China							

Haier		 		 	
Ultra Low Temperature(ULT) Freezer					
Model:	DW-86L828BPST	A/B Refrigerant	High Stage:	R600a : 95g	
Inner Temperature:	-40℃~-86℃		Low Stage:	R1150 : 35g	
Effective Volume:	828L				
Rated Voltage:	100-230V~	Foaming Agent:		HFO-1233zde	
Rated Frequency:	50/60Hz	Manufacture Date and No.:		in the Barcode	
Power Input:	1400W				
Net Weight:	380kg				
A/B PS(High/Low):	2.6MPa/1.4MPa				
Anti-shock Safety Classification:	I				
 Qingdao Haier Biomedical Co.,Ltd. Haier Industrial Park, Economic Technology Development Zone. Qingdao P.R.China  Shanghai International Holding Corp. GmbH(Europe) Eiffestrasse 80, 20537 Hamburg, Germany					
					Made in China

Chapter 7 Case Preventive Measures, Product Use and Daily Maintenance

7-1.Principle of ultra-low temperature dual-system refrigeration

Dual-system ultra-low temperature storage box is composed of two same independent refrigerating systems. Each system can provide a cold storage environment for the cabinet separately as a refrigeration unit. The refrigeration mode of each system is a single-machine self-cascade refrigerating system, namely, a compressor is used for compressing the refrigerant at different evaporation temperatures, and then the medium-temperature and the low-temperature refrigerant are separated by a gas-liquid separator; the medium-temperature refrigerant is allowed to cool and condense the low-temperature refrigerant in the intercooler, so that the low-temperature refrigerant reaches the liquid state and achieve the refrigeration effect after throttling.

7-2. Use method of ultra-low temperature cabinet

7-2-1 Use method

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.

7-2-2 Use method of low temperature cabinet

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

2). Make the cabinet empty and do not put any articles in it, power on to start the refrigerator, then cool the refrigerator to $-40\text{ }^{\circ}\text{C}$ in stages, then drop to $-60\text{ }^{\circ}\text{C}$ 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). After confirming that the refrigerator is normal by operation 2, the items can be stored in the refrigerator. In principle, items of $-60\text{ }^{\circ}\text{C}$ shall be stored, not exceeding 1/3 cabinet capacity.

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!!!

7-2-3 Working principle of pressure switch

A. Principle: When the pressure in middle of the pipeline at the pressure switch exceeds 3.5MPa, 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 3.5MPa again, the contact is disconnected again, repeating in such way in sequence.

7-2-4 Characteristics of refrigerant

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). Refrigerant code: R1150, R600a

7-2-5 Filling process of cooling agent

1).Check

Enter the super management interface and observe whether the temperature display of the capillary outlet of the fault system is normal (generally the fault system does not run for a long time, the temperature display at this point is close to the Ambient temperature. If it is normal, it indicates that there is no problem with the electric control, and enter the fourth step. If the abnormal temperature is displayed

and the temperature of the compressor remains unchanged after startup (such as -36°C , -200°C , 168°C , 200°C), it indicates that there is a problem with the electric control. It is necessary to check the power supply of the T thermocouple board, the wiring sequence of the T thermocouple sensor and whether the plug is loose. You can replace another spare T thermocouple wire to check whether the temperature display is normal. After checking the above measures, if the temperature display at the capillary outlet of the faulty system remains abnormal, replace the main control board and T thermocouple board

2). Preparations

Refrigerant (R1150, R600a)

Hanson valve

Standard electronic scale (error $\leq \pm 2\text{g}$)

Vacuum pump ($\geq 4\text{L}$)

Pressure gauge (high voltage and low pressure can be read at the same time) as shown in Figure 1

3).Opening the system

Cut apart the fault system from the end of the process pipe by pipe vice, and drain off the refrigerant in the system.

Weld the opened pipeline and the pressure gauge within 20 minutes of the opening of the system.

[Precautions]

* 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.

*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.

4).Pumping the vacuum

Connect the joint of vacuum pump to the common joint in the middle of the pressure gauge, see Figure 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

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

for one hour under low pressure. See Fig. 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.

[Precautions]

- * The vacuum pumps of over 4L must be pumped for more than 12 hours



Fig. 1



Fig. 2



Fig. 3



Fig. 4

5). Filling the refrigerant

At the time of filling, the machine shall be in the stopped state, the filling sequence is: R600a-R1150-R14, and the perfusing amount shall be carried out by reference to the attached table below!

[Precautions]

- * 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.

The filling process pipe shall be sealed after filling.

[Precautions]

- * Low temperature level filling amount must be accurate, because the slight difference will affect the refrigeration effect.
- * R 1150/ R14 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.
- * R 1150/ R14 refrigerant pressure is too high, and the general steel cylinder cannot withstand high pressure, so the oxygen cylinder is used to contain R1150/ R14 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.

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

* 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.

* 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 the tolerance of 2g before maintenance.



Fig. 5



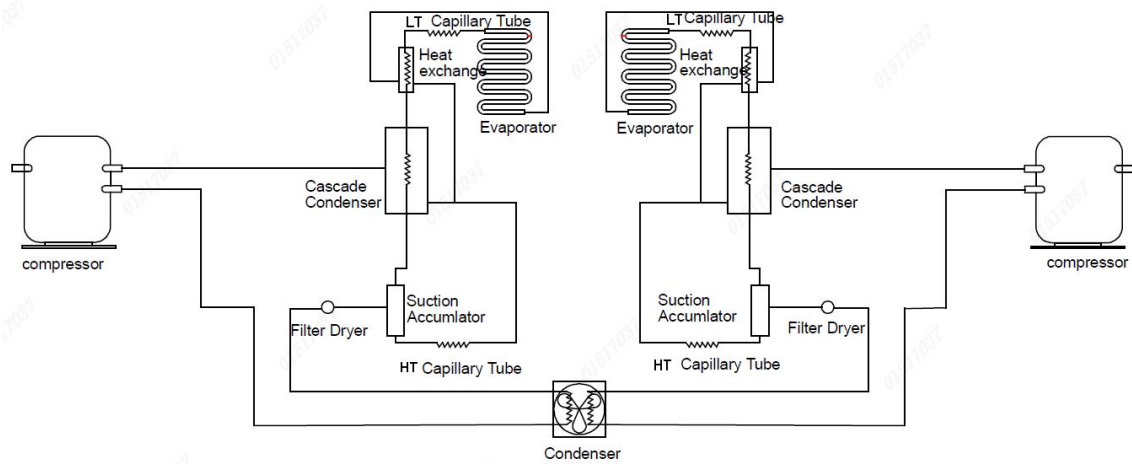
Fig. 6

The filling amount of refrigerant filled in the product shall refer to the nameplate, and the use amount refers to the use amount of a single system.

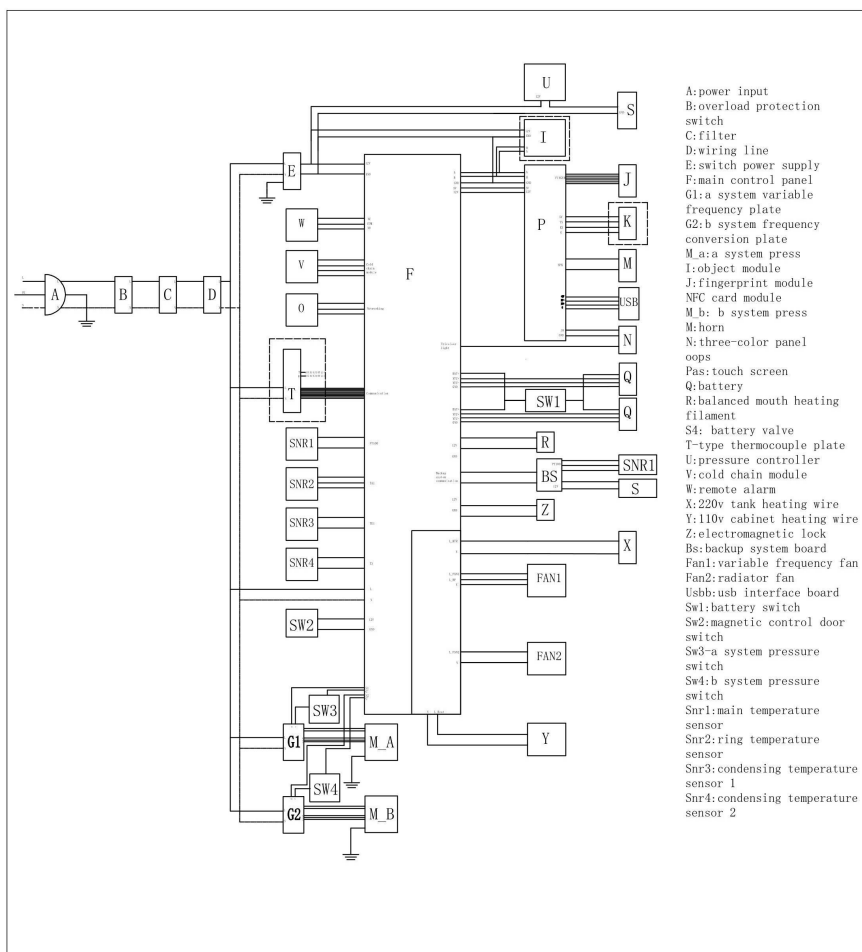
Chapter 8 Schematic diagram and wiring diagram of the system

8-1. Schematic diagram

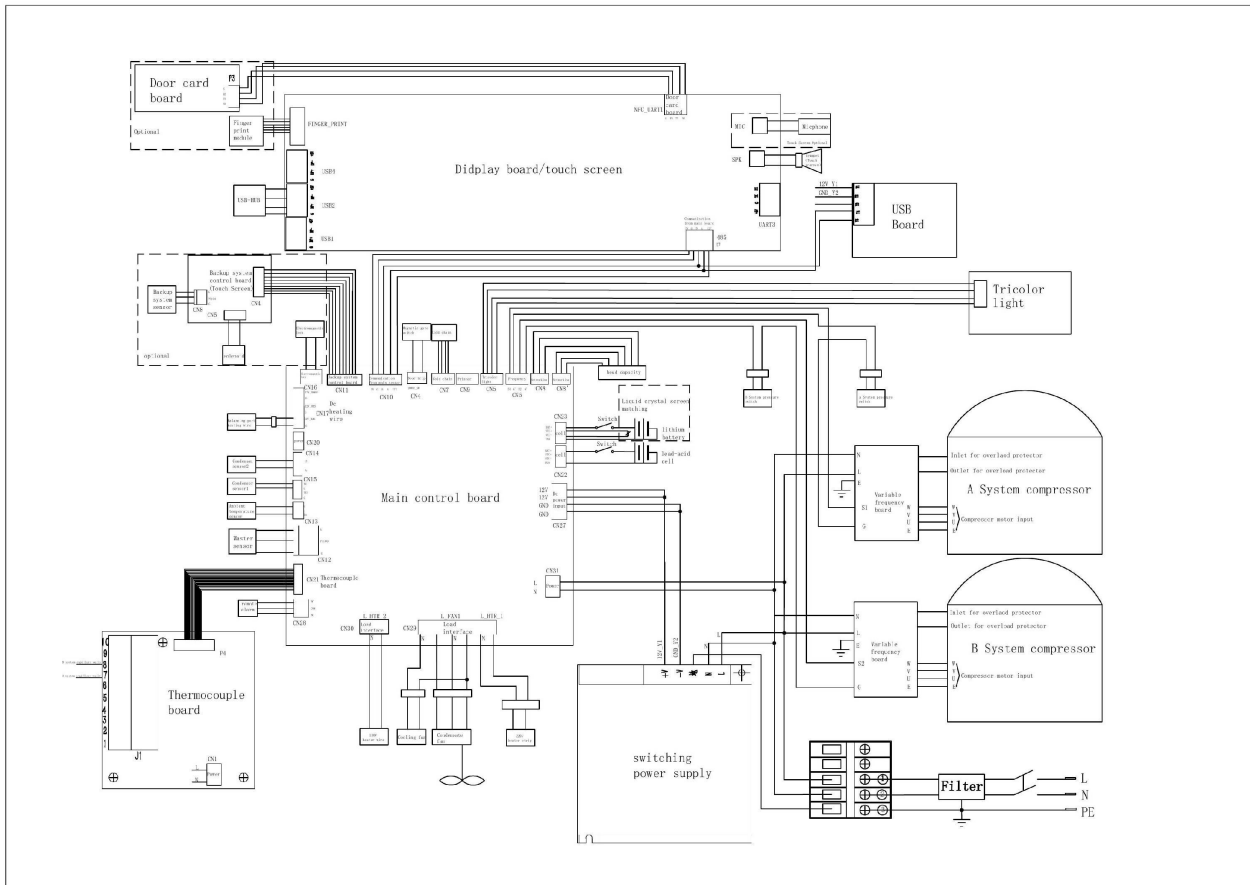
DW-86L758/728/828BPST Schematic diagram

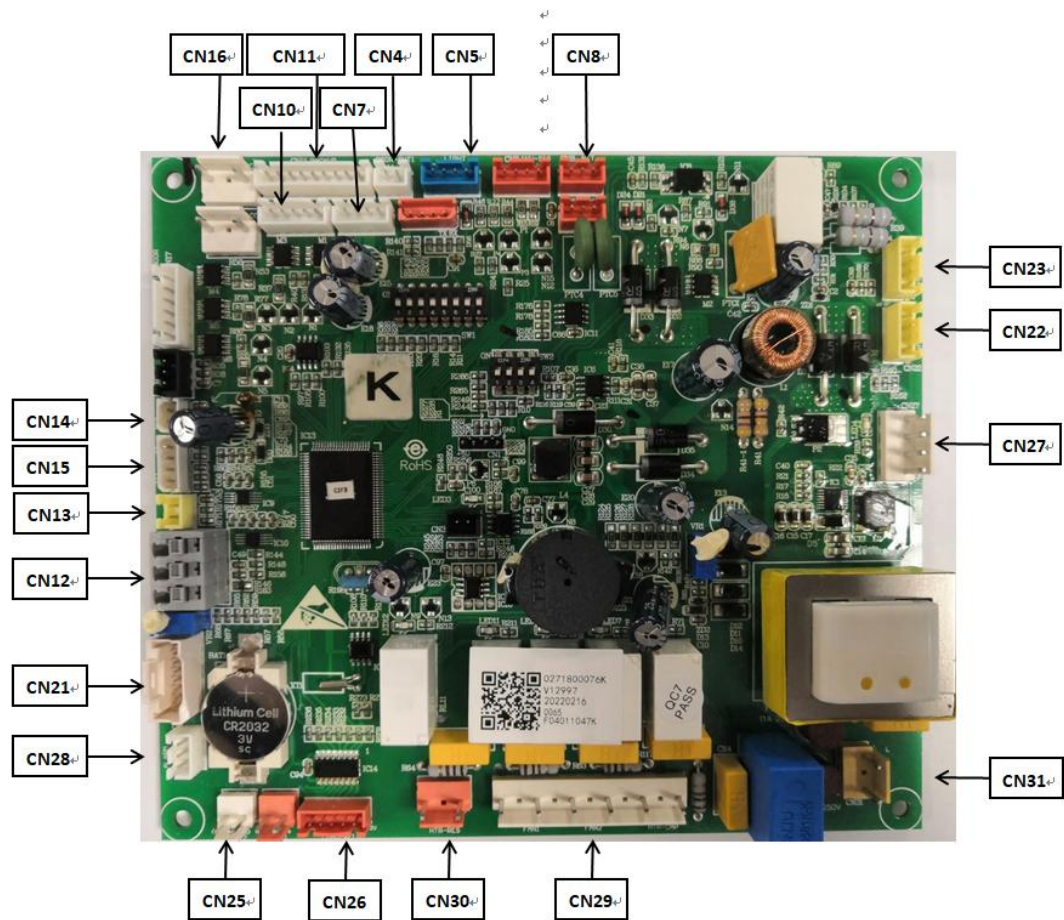


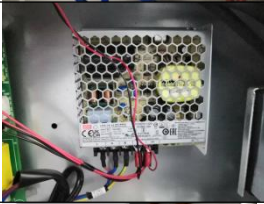
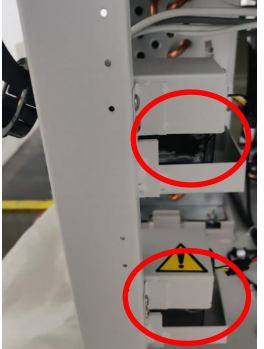
DW-86L578/728/828BPST Brief principal diagram:



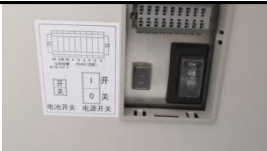
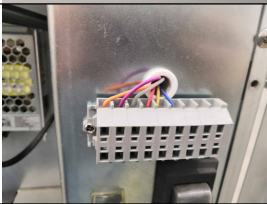
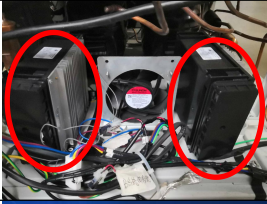
DW-86L578/728/828BPST Wiring diagram:





Connector identification	Connecting wire (color)	Connection position	Part position	Normal operating parameter
CN31	1.Brown L 2.Blue N		Connected to the power bar, located in the electric cabinet	AC220V
CN27	1.Red 12V 2.Red 12V 3.Black GND 4.Black GND		Connects to the 12V output of the switching power supply on the right of the main control board	DC12V/75W
CN22, CN23	1.Red BAT+ 2.Pink NTC+ 3.Purple NTC- 4.Black GND		Connect to the battery and the battery switch, the battery is located in the left side of the electric cabinet, the battery switch is located on the right side of the machine	DC12V/4AH

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CN8	1.Blue GND 2.Yellow B 3.Red A		Connect to the 9-way external socket, located above the power switch	
CN5	1.Yellow R 2.Pink G 3.Red RG 4.Purple B		Connect the three-color light board, located on the back of the touch screen	DC5V
CN6	1.Black S1 2.Red G" 3.Red S2 4.Red G"		Connect the frequency converter to the rear of the compressor	DC5V
CN7	1.Red 2.Black G 3.White 4.Green		It is connected with the cold chain module, which is located at the top of the rear wall of the machine and at the interface of the iot module.	DC5V
CN4	1.White 2.Pink and white G		Connect the magnetic switch and locate it in the middle position on the right side of the box port	
CN10	1.Green 5V 2.Black GND 3.Brown B 4.Blue A 5.Red 12V	 	Connect to the display panel (back of the display panel) and the iot module (top of the rear wall of the machine)	Display screen: DC12V, Lot module: DC12V
CN11	1.Brown 5V 2.Green GND 3.Orange B 4.Red A 5.Yellow GND 6.Pink 12V 7.White 12V 8.Blue GD1 9.Black BM		Connect to the backup system board, which is located on the backup system board below the main control board (CN4 port)	DC5V、 DC12V、 RS485.

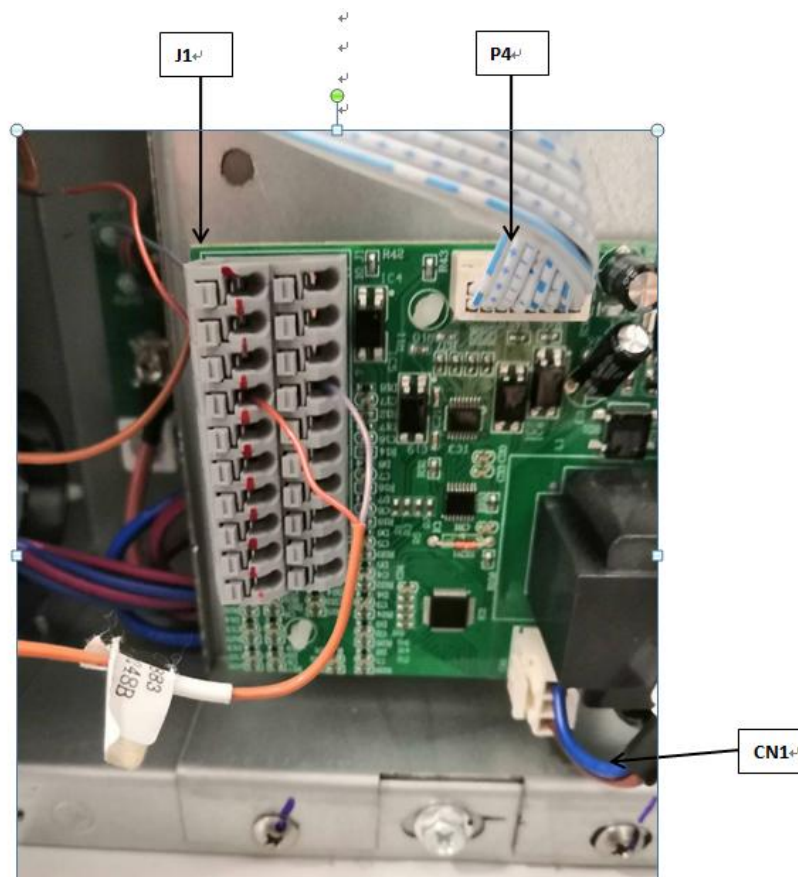
SERVICE MANUAL

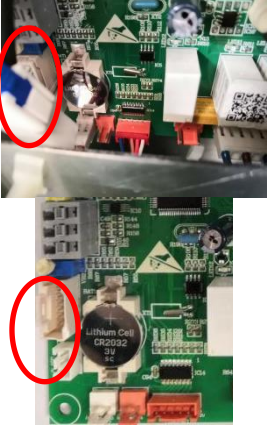
CN17	1.Black G 2.Red 12V 3.No connecting NC 4.No connecting NC 5.No connecting NC 6.No connecting NC		Connect PTC heating block, foam inside door head,	DC12V, Measuring resistance
CN14	1.White G 2.White TE2		Connect the condensate sensor 2 on the condensate pipe	
CN15	3.White G 4.White TC		Connect the condensate sensor 1 on the condensate pipe	
CN13	1.White TA 2.White GND		Connect the ring temperature sensor to the front air filter of the whole machine	
CN12	1.Red GND 2.Transparent T100 3.Red GND		Connect the main PT100 sensor, located in the right corner of the refrigerator	-196~200℃
CN21	1.White (Long and short) 2.White (+) 3.White (-) 4.White (●) 5.White (Short) 6.White (X) 7.White (Long) 8.White (None) 9.White (Long and short) 10.White (+) 11.White (-) 12.White (●) 13.White (Short)		Connect the thermocouple board, which is located under the main control board	

SERVICE MANUAL

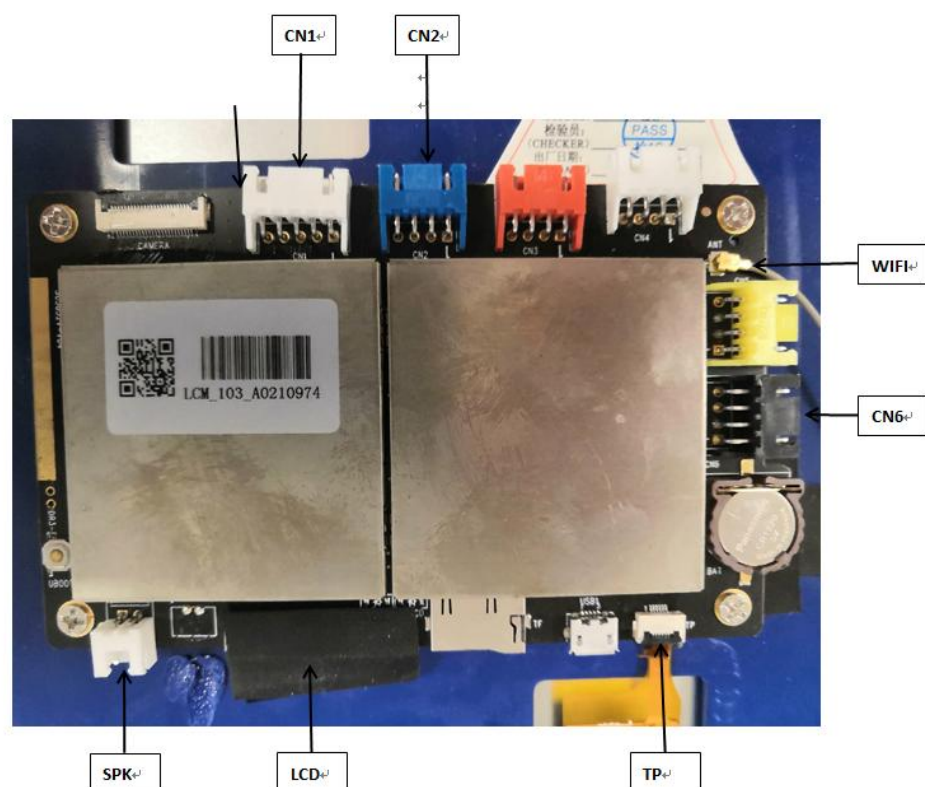
	14.White (X) 15.White (Long) 16.White (None)			
CN28	1.White NO 2.Purple 3.Orange NC		Connect the 9-way external socket above the power switch	
CN30	1.Transparent L 3.Transparent N		Connect the heating wire of the 110V cabinet mouth, which is located in the box	AC110V
CN29	1.Brown L_HTR 2.Blue N 3.Brown L-FAN2 4.Blue N 5.Brown LFAN-1 6.Blue N		1. Connect the heating wire of the cabinet mouth, located at the box mouth; 2. Connect the condensate fan, which is located on the left middle partition of the electric cabinet.	AC220V

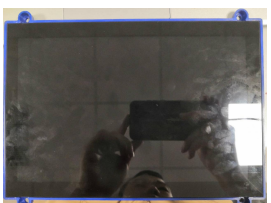
Thermocouple board



Connect or identification	Connecting wire (color)	Connection position	Part position	Normal operating parameter
CN1	1.Brown L 2.Blue N		Connected to the power bar, located in the electric cabinet	AC220V
P4	1.White (Long and short) GND2 2.White (+) NC 3.White (-) +5V_3 4.White (●) A0 5.White (Short) A1 6.White (X) A2 7.White (Long) A3 8.White (None) CSA 9.White (Long and short) CSB 10.White (+) WR 11.White (-) EN 12.White (●) DOUT 13.White (Short) DIN 14.White (X) CS 15.White (Long) CLK 16.White (None) SCLK		It is connected to the main control board (CN21) behind the hot spot couple board	DC5V
J1	7.Brown, Blue B capillary outlet 8.Brown, Blue A capillary export		Foam in the box, system A/B system capillary outlet position	Screen temperature value

Display board

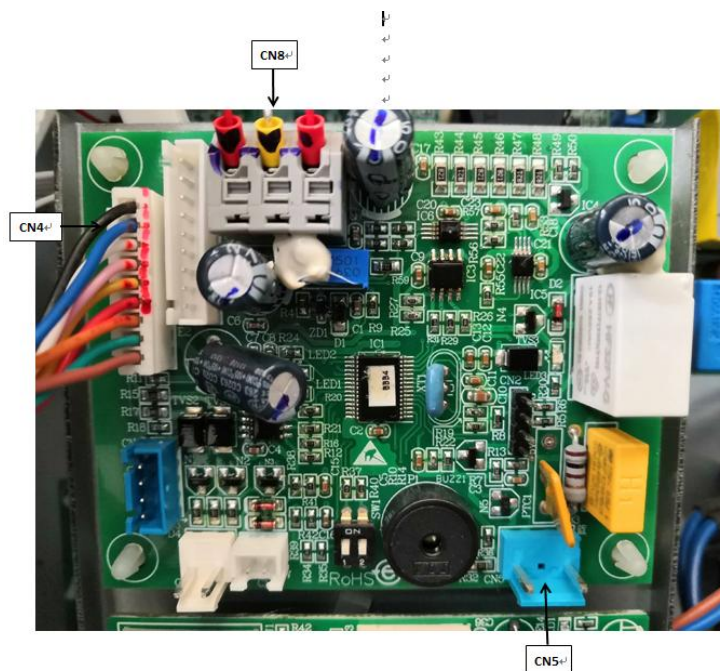


Connector identification	Connecting wire (color)	Connection position	Part position	Normal operating parameter
CN1	1.Green 5V 2.Black GND 3.Brown B 4.Blue A 5.Red 12V		Connected to the main control board, located in the electric cabinet	DC12V, DC5V RS485 waveform
CN2	1.Red 5V 2.Orange TX 3.Black RX 4.Purple GND		Connect the punch board, located in the display mask (optional)	/
TP	FPC cables are routed		It is connected to the inner touch film of the display screen. It is integrated with the display screen and cannot be separated	/
LCD	FPC cables are routed		Connected to the display screen, and display plate is an integral component	/

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SPK	1.Red + 2.Black G		Connect the horn, located in the plastic case below the touch screen	/
WiFi	Grey radio frequency line		Connect the antenna next to the display	/
CN6	1.Black 5V 2.Green D- 3.White D+ 4.Red G		Connect the USB spot next to the display	DC5V

Backup system board

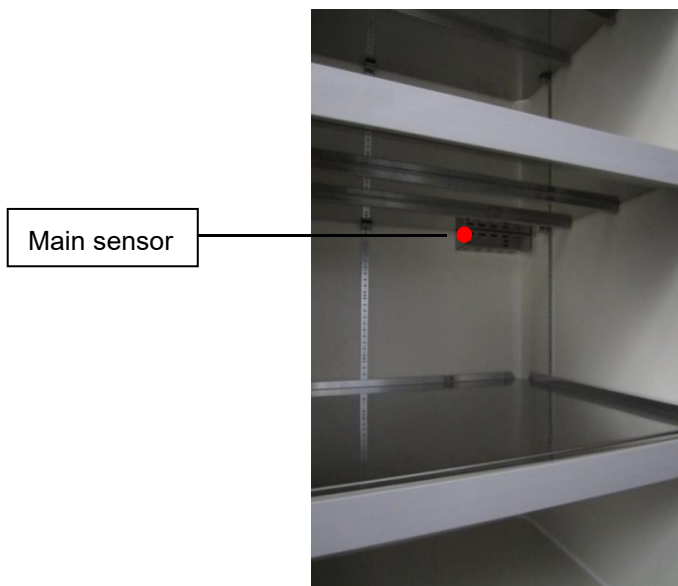


Connector identification	Connecting wire (color)	Connection position	Part position	Normal operating parameter
CN4	1.Brown 5V 2.Green GND 3.Orange B 4.Red A 5.Yellow GND 6.Pink 12V 7.White 12V 8.Blue GD1 9.Black BM		Connected to the main control board, located in the electric cabinet	DC12V, DC5V

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CN5	1.Yellow 12V 2.Black GND		Connect to the backup system solenoid valve, located above the back of the machine	DC12V
CN8	1.Red GND 2.Transparent PT100 3.Red GND		Connect the spare main sensor of PT100 and foam it in the right corner of the refrigerator	/

PT100 Value of the sensors



Temperature (°C)	Resistance (Ω)	Temperature (°C)	Resistance (Ω)	Temperature (°C)	Resistance (Ω)
-140	43.9	-70	72.3	0	100
-130	48	-60	76.3	10	103.9
-120	52.1	-50	80.3	20	107.8
-110	56.2	-40	84.3	30	111.7
-100	60.3	-30	88.2	40	115.5
-90	64.3	-20	92.2	50	119.4
-80	68.3	-10	96.1	60	123.2

Chapter 9 Specific control, working principle and parameters

9-1. Control of compressor

9.1.1. Compressor start-stop control

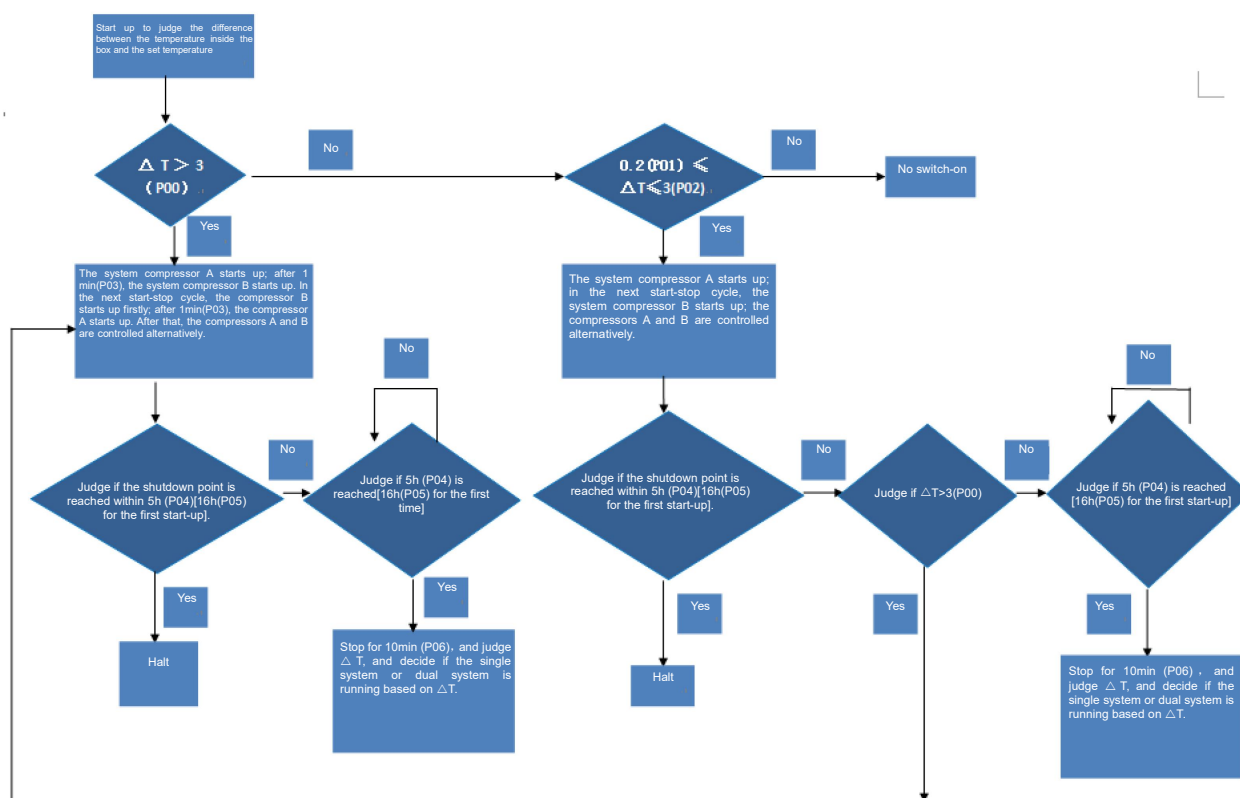
(1) Normal control Start-stop point:

Temperature inside the box is not less than set temperature + 0.2 °C (P09), if lasting for 30s (EEP) and satisfying the condition, start up;

Temperature inside the box is not more than set temperature-0.4 °C (P10), if lasting for 30s (EEP) and satisfying the condition, stop;

(2) Control process

At the time of initial powering on, delay for 1 minute (default 1 min, adjustable at 1-10 min) (EEP), then judge if the starting condition is satisfied, the compressor starts, of which the control flow chart is as follows:



Note: ΔT : difference between the temperature inside the box and the setting temperature ($\Delta T =$ the temperature inside the box - setting temperature)

(3) Only when the startup time of the compressor is longer than 5 minutes (P11), you can stop it, and when the shutdown time is longer than 5 minutes (P12), you can start up it.

9.1.2 Control of compressor during sensor failure

If the main sensor fails, the double system operation is followed, that is, the compressor starts up for 30 minutes (EEP) and stops for 10 minutes (EEP), repeating in such way;

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

220V power supply

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

When the power supply is more than and equal to 253V (EEP) for 10s (EEP), the compressor is controlled normally.

115V power supply

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

When the power supply is more than and equal to 136V (EEP) for 10s (EEP), the compressor is controlled normally.

9.1.4 Power-off control of power supply

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

2) If the power is powered on again, and the start-up condition of the compressor is reached, the compressor starts up normally.

9.1.5 Failure control of systems A and B

The sensor of the systems A and B sensor is T thermocouple sensor, and the point location remains at the system evaporator inlet (capillary outlet). The point 7 of the T thermocouple board is arranged on the capillary outlet of the system A, and the point 8 of the T thermocouple board is arranged on the capillary outlet of the system B.

If the sensor temperature of the system A is higher than -40°C (P08) within 5min (P07) after the compressor starts up, it is judged that the system A is damaged. The operation indicator light of the system A flashes;

If the sensor temperature of the system B is higher than -40°C (P08) after 5min (P07) upon start-up of the compressor, it is judged that the system B is damaged. The operation indicator light of the system b flashes;

The operation rule for judging the single system is damaged: the other normal system compressor carries out the start-stop action according to the start-stop point setting scheme, if the shutdown point

cannot be reached after the single system runs for 5h (P04)[16h (P05) for the first start-up], stop the compressor for 10min (P06), and then start for 5h (P04), repeating in such way.

When it is determined that both systems are damaged, the systems A and B run as a dual system. If, at 5h(P04)[16h(P05) for the first start-up], the shutdown point cannot be reached, stop for 10min(P06), and then starts for 5h(P04), repeating in such way. The operation indicator light of the systems A and B flashes;

Remarks:

1.If the system A is judged to be failed, the system B starts up, and if the system A is judged to be normal, it is necessary to continue to maintain the operation of the system B , and then operate the system A again in the next start-stop cycle; If the B system continues to run for 5min (P07) which is also judged as failure, it is necessary to switch back to the system A to run.

2.Logic judgement of inversely inserted thermocouples of systems A and B : When strong electricity is applied every time (only one time), if it is judged that the temperature of the non-corresponding thermocouple point is being decreased within 1min that the single system operates, it is indicated that the thermocouple is actually inserted reversely; and if, after the compressor of the system A starts for 1 min, it is detected that the temperature at the thermocouple point 7 is not decreased, while the temperature at the thermocouple point 8 is decreased by 10℃ , it is indicted that the thermocouple is reversely inserted and needs to be corrected. When it is judged as reverse-inserted, please give an alarm as follows: the operation indicator lights of the systems A and B are flashing (cannot be shielded by Pb) at the same time, the buzzer alarms, and meanwhile the compressors A and B do not start up.

9-2. Control of fans

1. If the compressor starts up, the fan starts up; if the compressor stops, the fan is delayed by 1 (P13) minute and stops.

2. Power-off control of power supply

2.1 Control ports of the fan stop the output after powering off;

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

2.3 Scope of system debugging parameters

9-3. Battery control requirements

Battery type judgement:

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 Lead-acid battery

Lead-acid battery charging

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

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

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

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

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

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

If the charging current is less than 590mA (EEP), the duty ratio is increased by 1% (EEP);

2. When the battery voltage is more than and equal to 13.5 V (EEP) but less than 14.3 (EEP) V,

If the charging current is more than 270mA (EEP), the duty ratio is decreased by 1% (EEP);

If the charging current is less than 250mA (EEP), the duty ratio is increased by 1% (EEP);

3. When the battery voltage is more than and equal to 14.3 V (EEP),

If the charging voltage is more than 13.9V (EEP), the duty ratio is decreased by 1% (EEP);

If the charging voltage is less than 13.7 V (EEP), the duty ratio is increased by 1% (EEP);

4. After the charging time is accumulated for 36 hours (EEP), the charging ends and the charging relay opens.

Lead-acid battery discharge

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

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) 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 Lithium battery

Lithium battery charging

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

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

3. Battery voltage is less than 11.2V(EEP);

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

1. When the battery voltage is less than 12.0V (EEP),

If the charging current is more than 710mA (EEP), the duty ratio is decreased by 1% (EEP);

If the charging current is less than 690mA (EEP), the duty ratio is increased by 1% (EEP);

2. When the battery voltage is more than and equal to 12.0V (EEP) but less than 12.4(EEP) V,

If the charging current is more than 330mA (EEP), the duty ratio is decreased by 1% (EEP);

If the charging current is less than 310mA (EEP), the duty ratio is increased by 1% (EEP);

3. When the battery voltage is more than and equal to 12.4 V (EEP),

If the charging voltage is more than 12.9V (EEP), the duty ratio is decreased by 1% (EEP);

If the charging voltage is less than 12.7 V (EEP), the duty ratio is increased by 1% (EEP);

4. After the charging time is accumulated for 7 hours (EEP), the charging ends and the charging relay opens.

Lithium battery discharge

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) 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) 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) 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)

Lithium battery charge/ discharge temperature protection

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

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

9-4. Heating wire control

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

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

9.4.2 Door heating wire control (+ 12V control)

1) Opening condition of door heating wire :

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) Closing condition of door heating wire :

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;

9.4.3 Heating wire control at cabinet port (220v/ 110V, relay RL5 control)

1) If the temperature inside the box is less than -60°C, begin heating; if more than -60 °C, do not heat;

The heating wire can open or close by parameter; the default factory of heating wire is open.

2) Power-off control of power supply

1. After powering off, control port of heating wire of the cabinet outlet stops the output;

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

Chapter 10 Installation and disassembly process

10-1. Installation position:

10.1.1. Avoid direct sunlight

10.1.2. The surrounding air circulation is good

10.1.3. Avoid large quantities of dust

10.1.4. Avoid mechanical sway or vibration

10.1.5. 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.

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

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

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

* 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.

10-2. Handling and packaging removal of products

10.2.1 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.

10.2.2 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.

The packaging scheme is shown as below figure.



Removal of wooden tray:

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.

Finally, the maintainers are required to push the engine room to pull out the wooden tray in a crossed way.

10-3. The product enters the placing chamber

10.3.1 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.

10.3.2

- ① Remove the air-inlet grille.
- ② Remove two screws under the front cover of the engine room.
- ③ Remove the front cover.



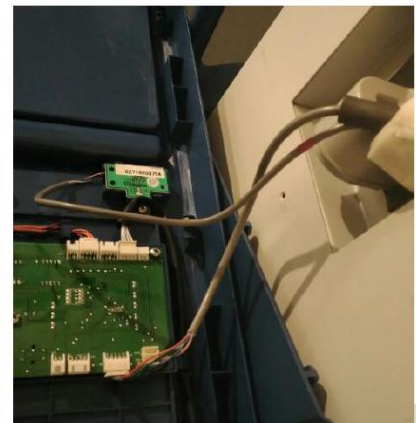
After the product enters the door, install the front guard of the engine room as it is.

Note: Be sure to install in place, otherwise it will cause safety and performance problems!

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.

10-4. Removal of display mask

- ① Remove two screws at the top of the plastic mask
- 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 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 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



Chapter 11 Typical Failure and Solutions, Frequently Asked Questions

11-1.Type failure and solutions

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

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

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

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

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

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

There are two cases:

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;

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.

11-2.Troubleshooting common problems

Problems	Cause analysis	Maintenance measures
1. High-temperature compressor does not start (Frequency conversion) 2. The system compressors A and B do not start (dual system)	1. Power switch or fuse failure	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. Connecting plug of the engine room connector is damaged.	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
	3. Poor contact of wires	Check that the patch cord is connected poorly or not connected, and repair to normal connection
	4. Display board and control board connection failure	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. Relay, starting capacitor or thermal protector fails	Check whether the relay, capacitor or thermal protector has signs of burnt and charred etc., if yes, replace the electric device
	6.Compressor failure	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. The user voltage is too low	Check whether the product display panel voltage is within the rated range ($220 \pm 10\%$), 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.Double system pressure switch is not short-circuited	Check whether the pressure switch is short-circuited or not, and the dual system model is not provided with pressure switch.
2. Low-temperature compressor does not start	1. The reason is the same as the high-temperature compressor	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.

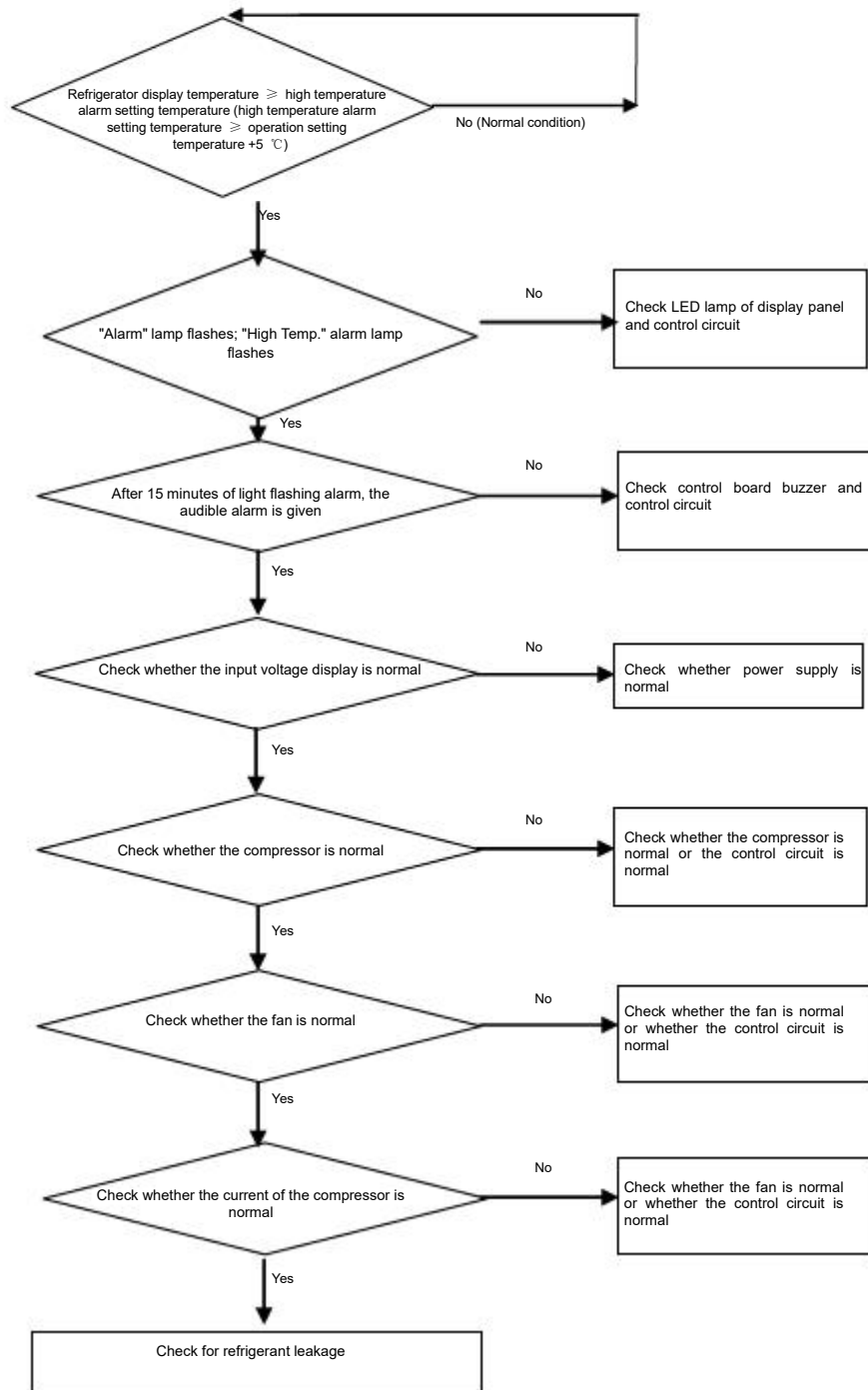
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		When replacing the compressor, the oil separator and the dry filter shall be replaced at the same time
	2.Broken pressure switch	Use a multimeter to measure whether the wire harness of the pressure switch is short-circuited or open-circuited, and also inspect whether the copper tube section of pressure switch is damaged or not, if yes, replace the pressure switch
	3.High-temperature compressor has a poor refrigerating effect	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. Fan does not turn	1. Wiring of fan fails	Check whether the patch cord of fan fails or is not plugged, and reprocess the thread ends and realign for installation
	2.Fan blade is blocked by foreign body	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. The fan fails	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. Temperature in cabinet High	1.The temperature at the shutdown point set is high	Check whether the temperature set point of the product is set as required by customers, if not, re-set the temperature
	2.Refrigerant leakage	Check all welding joints of the engine rooms, find leaked points and repair welding. Re-fill refrigerant
	3.The temperature sensing probe fails	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.Capillary or system is dirty, blocked and oil-blocked	Open the system to clean capillary or replace filter
	5.High ambient temperature	If the ambient temperature is high, please add the air conditioners to reduce the room temperature
	6.Condenser blockage	In case of condenser dirty alarm, please clean the filter screen in time.
5.E11 Alarm	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. Check whether the terminal of the ambient temperature sensor is plugged poorly or dropped, and whether the sensor is damaged
		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 alarm	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	1. Check whether the terminal of the ambient temperature sensor is plugged poorly or dropped, and whether the sensor is damaged
		2. Check whether the sensor plug-in terminal on the display panel is loose or poor contact; and whether the display panel is damaged

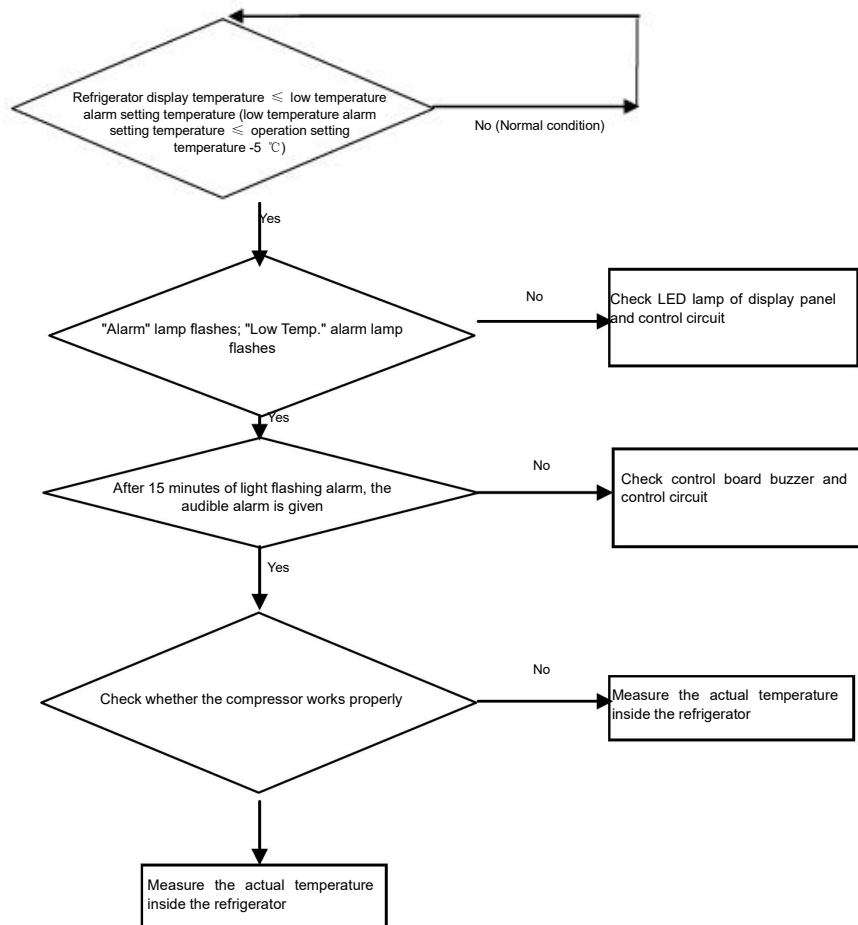
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	to 0.1V, short-circuited	
7. Condenser dirty alarm	If the difference between the temperature perceived by the condenser probe less the ambient temperature is more than and equal to 13 °C (after lasting for 5 minutes), the alarm has been given	1. Open the front grille to clean the filter screen 2. Check if the condenser probe is too close to the condenser outlet 3. Wrap the condenser probe with adhesive tape.
8. Low battery alarm	Low battery alarm goes off when the battery capacity $\leq 10.5V$	1. Check whether the battery has exceeded the service life 2. Check whether the wiring terminal on the battery switch is in good connection or whether the switch is damaged. 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
9. The temperature inside the box is nonuniform	Temperature difference inside the machine box is too big	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; 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. Display panel shows EEE	Control panel power transformer fails	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.

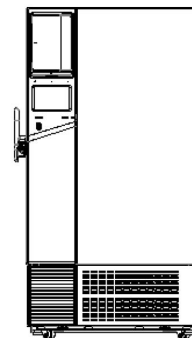
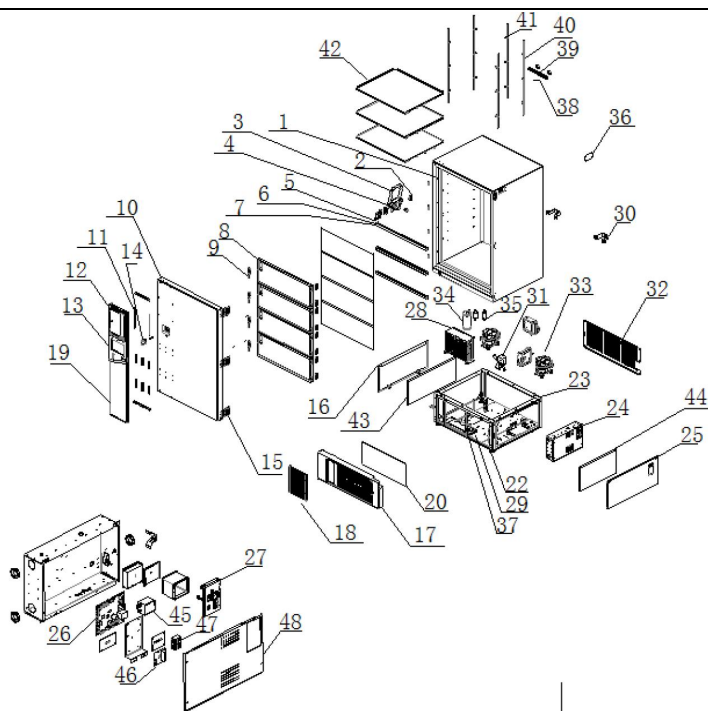
Processing method of high temperature alarm :



Low-temperature alarm handling method:



Chapter 12 Explosion diagram and spare parts details



No	DW-86L578BPST	DW-86L728BPST	DW-86L828BPST	Component	usage	Unit
1	0270807867	0270812643	0270807811	Cabinet assembly	1	EA
2	0270103284A	0270103284A	0270103284A	Fixer for door lock	1	EA
3	0270100327G	0270100327G	0270100327G	Outer door handle	1	EA
4	0270101174B	0270101174B	0270101174B	Lock	1	EA
5	0270103284DT	0270103284DT	0270103284DT	Fixer for outer door handle	1	EA
6	0270101680	0270101572	0270102128	Cabinet bar	3	EA
7	0270200682	0270200660	0270200660A	Cabinet bar trimming strip, PVC gray	3	EA
8	0270803150	0270801321	0270804069	Inner door assembly	4	EA
9	0270103558	0270103558	0270103558	Inner door handle	4	EA
10	0270807865	0270807868	0270804444	Outer foaming door assembly	1	EA
11	0270103367A	0270103367A	0270103367A	Fixer of display panel holder	2	EA
12	0270201004	0270201004	0270201004	Front cover	1	EA
13	0271800034AB	0271800034AB	0271800034AB	10' TFT touch screen	1	EA
14	0270202967	0270202967	0270202967	Pressure equalization port	1	EA
15	0070107087A	0070107087A	0070107087A	Door hinge (common use)	3	EA
16	0270103137B	0270103137B	0270103137B	Right side guard plate assembly	1	EA
17	0270103376A	0270103734	0270103377A	Front shelter assembly (Temperature recorder)	1	EA
17	0270103376	0270103734A	0270103377	Front shelter assembly	1	EA
18	0270200991	0270200991	0270200991	Air-inlet grille assembly	1	EA
19	0270103236A	0270103236A	0270103236A	Aluminum shelter	1	EA
20	0270102159	0270102159	0270102159	Air filter	1	EA
21	0074090520C	0074090520C	0074090520C	Chart recorder	1	EA
22	0070101872C	0070101872C	0070101872C	Duplex all-round caster	4	EA
23	0270103125A	0270103737	0270806613	Bottom frame assembly, dot welding	1	EA
24	0270813937	0270812647	0270812040	Electric chamber assembly	1	EA
25	0270103138B	0270103138B	0270103138B	Left side guard plate assembly	1	EA
26	0271801435	0271801435	0271801435	Control board	1	EA
27	0270200218A	0270200218A	0270200218A	Switch cover	1	EA
28	0270700439A	0270700439A	0270700439A	Condenser	1	EA
29	0270103124	0270103124	0270103124	Compressor fixer	1	EA

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30	0270103228	0270103228	0270103228	Thrust frame	2	EA
31	0274000542A	0274000542A	0274000542A	Condenser fan	1	EA
32	0270103123A	0270101574B	0270103140A	Cabin back guard plate	1	EA
33	0274000436A	0274000436A	0274000436A	Compress	2	EA
35	0270700900A	0270700900A	0270700900A	Drier filter	2	EA
36	0270103121	0270103121	0270103121	5 v cold chain cover	1	EA
37	0074091225	0074091225	0074091225	Condenser sensor	1	EA
38	0274000256	0274000256	0274000256	Temperature sensor	1	EA
39	0270104006	0270101337	0270101337	Fixer for temperature sensor	1	EA
40	0270100174A	0270100174A	0270100174A	Shelf strip	5	EA
41	0270100175	0270100175	0270100175	Resilient clip	15	EA
42	0270103149	0270101535	0270100590	Shelf	3	EA
45	0074600001A	0074600001A	0074600001A	Filter	1	EA
46	0271800188	0271800188	0271800188	Thermocouple board	1	EA
47	0274300007A	0274300007A	0274300007A	Terminal row	1	EA
48	0270100619	0270100619	0270100619	Electric control box cover	1	EA
50	0271800080A	0271800080A	0271800080A	Backup system board	1	EA
51	0271800093	0271800093	0271800093	Print finger module	1	EA
52	0271800094	0271800094	0271800094	USB board	1	EA
53	0271800095	0271800095	0271800095	HUB board	1	EA
54	0271800096	0271800096	0271800096	Speaker	1	EA
55	0270400458	0270400458	0270400458	USB line	1	EA
56	0270201015	0270201015	0270201015	Screen protector board	1	EA
58	0274000238	0274000238	0274000238	Lithium battery	1	EA
59	0270400014	0270400014	0270400014	PT100	2	EA

Sincere forever

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