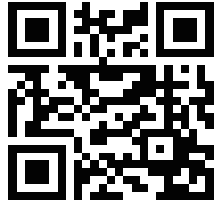


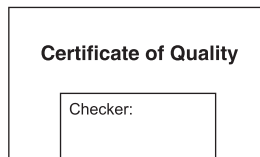
# Haier



Cryogenic Freezer

Operation Manual

DW-150W200



Manufacturer: Qingdao Haier Biomedical Co., Ltd.  
Address: Haier Industrial Park, Economic Technology Development  
Zone, Qingdao P.R. China

Web: [www.haiermedical.com](http://www.haiermedical.com)  
Version: 1st, 2018  
Dedicated code: 0070507520A  
V13026



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

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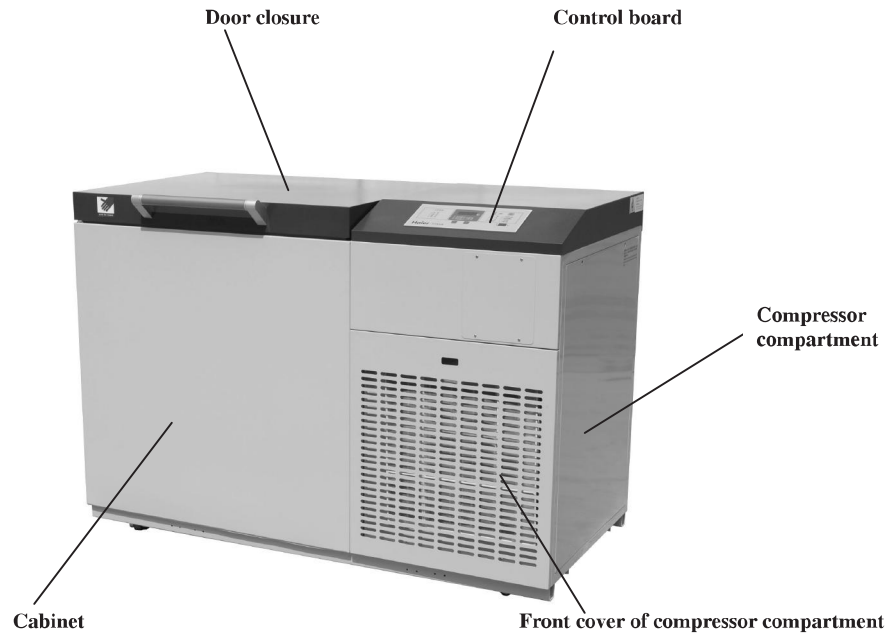
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## Product Features

- Relying on unique cascade refrigeration system and its stable/reliable running, the freezer achieves better refrigeration effect and may be used in a wider range of ambient temperature compared with counterparts, greatly reducing maintenance cost.
- The freezer is featured with computer control, digital temperature display and adjustable internal temperature in the range of  $-126^{\circ}\text{C}$ ~ $-150^{\circ}\text{C}$ . The password protection function ensures no unauthorized modification on parameter settings.
- The freezer is set with test holes to facilitate the experimental use.
- With rapid cooling speed due to super-powerful refrigeration design,, the freezer may cool samples stored in it down to required temperature in a shorter time, ensuring samples safety; super-fast refrigeration may also ensure much faster temperature recovery after door opening to prevent samples from accidental damage or necrosis. This advantage is especially important for those users preserving stem cells.
- Even internal temperature allows 100% space to be used efficiently.
- Designed with self-locking castors, the heavy-duty freezer may be moved easily.
- The freezer is provided with functions of network monitoring, remote alarm and automatic low-voltage compensation; in addition, functions of alarm and control via mobile phone short messages for your option.

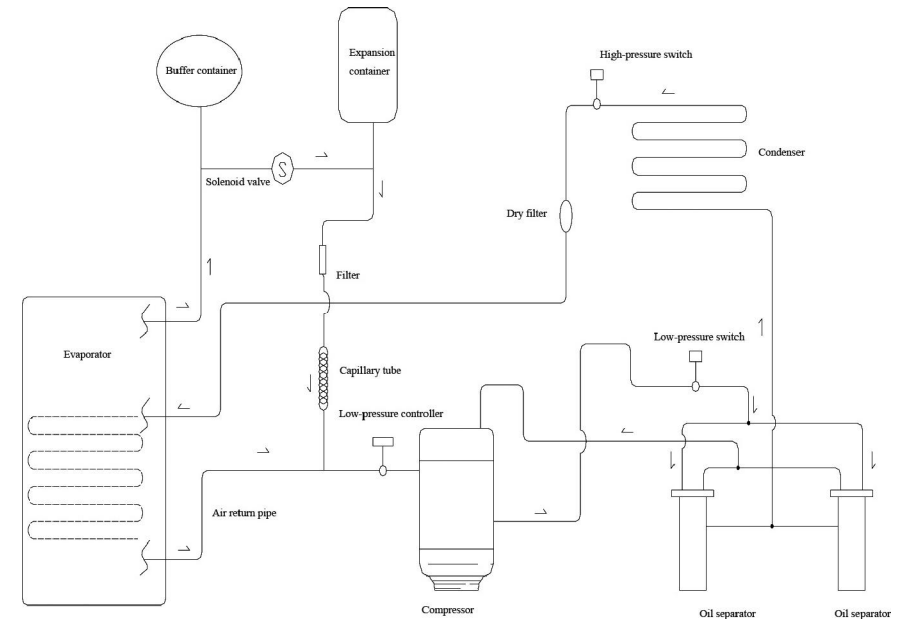
We hereby make an apology to you for incomplete consistency between the product you received and that shown in the picture of manual due to product improvement.

## Parts Name



**Note:** The product is suitable for applications in special laboratories. Please see actual product for its appearance, color or pattern.

## Schematic Refrigeration Diagram



Meaning of crossed out wheeled dustbin:

1. Do not dispose of electrical appliances as unsorted municipal waste, use separate collection facilities.

Contact your local government for information regarding the collection systems available.

If electrical appliances are disposed of in landfills or dumps, hazardous substances can leak into the groundwater and get into the food chain, damaging your health and well-being.

When replacing old appliances with new ones, the retailer is legally obligated to take back your old appliance for disposal at least free of charge.

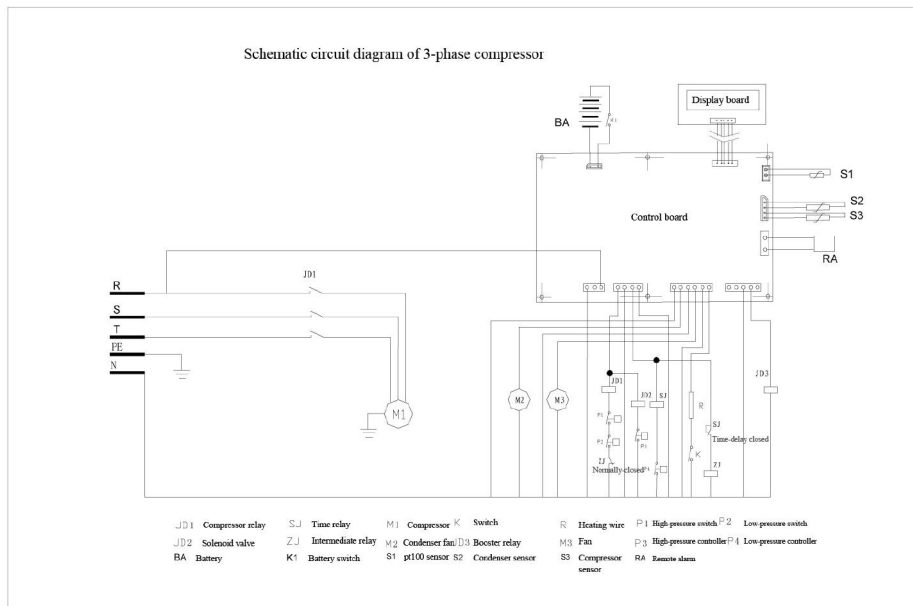
2. This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.

Children should be supervised to ensure that they do not play with the appliance.

## Packing List

Qty.	Description	Operation Manual	Frost scraper	Plastic bag
Model				
DW-150W200		1	1	1

## Schematic Circuit Diagram



## Safety Precautions

Please read all the installation and operation instructions carefully, and strictly follow them when installing and operating, otherwise the user shall be solely liable for any resultant damages (including part damage).

### Precautions for installation location

1. Installation site of the equipment should ensure a well-ventilated circumstance, avoid direct sunlight.
2. The freezer must not be installed close to heat sources and no heater is permitted to close it.
3. The freezer must not be installed in an enclosed or narrow space.
4. The room temperature should be kept below 25°C (if above 30°C, the refrigeration efficiency would lower rapidly and the compressor would be damaged easily).
5. To be installed, the freezer should be kept at least 30cm away from any wall.
6. The site where the freezer is used must be provided with a special air switch with leakage protector of proper specification (3-phase 16A ); the wiring must be in the form of crimp connection and any socket/plug is strictly forbidden to use for connection.
7. In case of frequent occurrence of unstable voltage or below rated voltage, a voltage stabilizer should be installed.

### Precautions for operation

1. After its installation or handling, the freezer must be left still at least 24 hours before being energized.
2. The freezer must operate at initial temperature setting (-126°C) for over 24 hours.
3. After the freezer operates for 24 hours stably at initial temperature setting, set the operating temperature at -135°C and have the freezer stably operate at this temperature for at least 7 hours.
4. If the freezer works normally at the second temperature setting, set target operating temperature.
5. Normal range of internal temperature: -126°C to -150°C.
6. Set alarm temperature as required (recommended alarm temperature: operating temperature plus 15°C~25°C).

Both refrigerant and foaming agent used by the freezer are flammable and explosive substances. Therefore, be sure that the site where the freezer is used is well ventilated and fire fighting equipment is provided near the installation location.

Do not put too many or too hot samples into the freezer at a time, otherwise result in the increase of system load, prolonged running of the freezer and further burn-out of compressor. It is advisable to put samples into the freezer in batches and pre-cool those hot samples fully before putting them into the freezer.

## Safety Precautions

In case of handling or moving, only after the freezer is left still for over 24 hours can it be energized to operate, otherwise result in serious damage to the freezer, even compressor burn-out.

For any equipment may go wrong or fail to work, the user must ensure that reserve equipment or reserve devices are available in the vicinity so that samples can be moved into safe reserve equipment or system for preservation in an emergency.

It is required to have special equipment in-progress checked (at least 2 hours/time) by a full-time technician so that protective measures would be taken immediately in case of any fault. The manufacturer shall not be liable for compensation for any loss incurred by samples damage resulting from the user's failure to find a fault and move stored samples into reserve equipment in time.

In the case of ambient temperature above 27°C, it is required to open doors and windows, or turn on the air-conditioning system; while in the case of ambient temperature above 32°C, it is forbidden to use the freezer, otherwise that may result in compressor burn-out.

### Warning

1. Do not load the freezer with samples over 1/5 of its capacity at a time.
2. Do not put large-volume liquid samples or hot articles into the freezer.
3. Do not leave the door open for over 1 minute.
4. **Note:** The freezer is not for quick freezing and production, but for super low temperature reservation. Therefore, it must not be forcibly used for the quick freezing of a large amount of hotter (relative to -140°C) samples.

### Exclusions:

Equipment failure or samples damage resulting from the user's failure to follow the above-mentioned operation instructions is not covered by the scope of warranty and compensation.

Equipment failure or samples damage resulting from such reasons as artificial destroy and misoperation of the user, etc. is not covered by the scope of warranty and compensation.

Equipment failure or samples damage not resulting from the manufacturer's fault, but from fire hazard, war and earthquake, etc. is not covered by the scope of warranty and compensation.

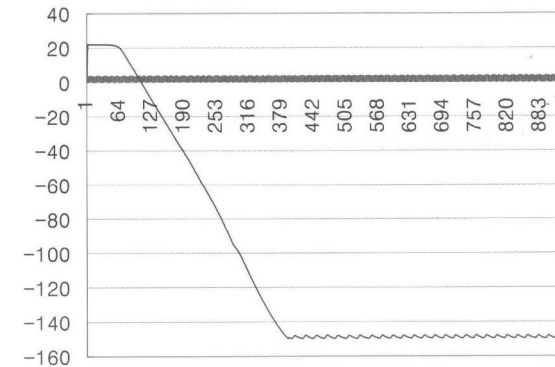
## Technical Parameter

Model	DW-150W200	Overall dimensions (W×D×H)	1570×850×1060
Net volume	200L	Internal dimensions (W×D×H)	667×462×650
Cooling performance	-150°C	Rated input power	3.5HP
Temperature control range	-126~-150°C	Rated current	11A
Power source	380V/50Hz	Weight	315kg

**NOTE:** The chamber temp. can be reached at -150°C at ambint temp. 25°C with no load.

### Temperature decreasing curve reference

DW-150W-200 curve [it is required to check the temperature decrease time (not including pre-cooling delay time) according to the ex-factory inspection requirements]



## Troubleshooting

compressor may stop running in 50 minutes; have the freezer operate at this temperature for 6~8 hours, and then decrease the temperature by  $-10^{\circ}\text{C}$ ; have the freezer operate at this temperature for 8 hours, and then decrease the temperature by  $-5\sim-10^{\circ}\text{C}$ ; in a word, decrease the temperature setting step by step until reaching the required temperature.

### Serious compressor noise

Cause 1: It is normal that the noise level is higher than that of general home appliances and ultra-low temperature (ULT) freezers.

Check: It is normal only if the system noise is not higher than 75dB.

Solution: Do not use it in offices or laboratories where people stay for long.

Cause 2: Fan motor

Check: Check whether the noise is from compressor or fan motor.

The noise from compressor is for the fan motor's efficiency reduces and fails to cool the compressor effectively.

Solution: Replace the fan motor

Cause 3: The compressor pressure increases due to dirty or clogged condenser lowering refrigeration effect.

Solution: Clean the condenser, and replace the compressor if necessary (serious damage).

Cause 4: Over-high room temperature

Over-high ambient temperature causes steep drop of refrigeration effect.

Solution: Adjust room temperature and check noise level. Over-high noise level indicates serious compressor damage, in which case the compressor must be replaced.

## Ambient Conditions

The freezer is designed in consideration of following conditions and can be used in a safe way at least under the following conditions (on the basis of IEC 1010-1):

1. The freezer must be installed in a well-ventilated place where the room temperature is below  $27^{\circ}\text{C}$ .
2. The freezer must not be placed in the site that under direct sunlight or close to heat sources.
3. If ambient temperature is controlled by an air-conditioner, be sure to keep the air-conditioner working around the clock (24h).  
For good ventilation, the freezer should be at least 30cm away from a wall or other objects; otherwise the heat produced by its compressor may not be dispersed in time, resulting in the reduction of condenser's cooling effect, even compressor burn-out in case of overload.
4. The supply voltage should be within the range of  $380\text{V}\pm 50\text{Hz } 10\%$ . In case of frequent occurrence of unstable voltage, a voltage stabilizer (7.5 kW or above) must be installed.
5. The freezer should not be installed in a humid place or a place to which water is easily splashed. The splashed water and dirt on the freezer should be wiped off with a soft cloth. It is recommended to use fire prevention system or dehumidification system.
6. Altitude not higher than 2000m.
7. Ambient temperature within the range of  $10^{\circ}\text{C}\sim 30^{\circ}\text{C}$ .
8. The voltage fluctuation of main power supply is not over  $\pm 10\%$  of its rated voltage.
9. Additional fluctuation range of power supply voltage specified by the manufacturer.
10. Up to the transient voltage of Equipment Installation Category (Over-voltage Category) II; for main power supply, the minimum and general category is Category II.
11. Up to Pollution Class II specified in the Standard IEC664.

## Preparations and Operation Procedures

When handling, it is strictly forbidden to overturn (upside down) the freezer; never allow its angle of inclination over 45° to avoid oil spill onto the system pipeline.

Note: If the freezer is excessively inclined or upside down, compressor oil would spill onto the system pipeline, resulting in inadequate compressor oil. Further, inadequate compressor oil leads to insufficient lubrication, which results in noise from compressor, even agglutination of piston and cylinder inner wall, damage to compressor motor.

### Preparations before use

When unpacking, all the packing materials (including base) should be removed.

All the packing materials removed should be kept in a safe place and not thrown away before completing the commissioning. Only when the freezer is accepted after commissioning can you throw them away or destroy them to avoid inconvenience in commissioning or fault handling.

Unpack the freezer with even force to prevent damage to the freezer or personal injury.

After unpacking, first clean the freezer as described in the Section “Care and Maintenance”.

The freezer should be installed horizontally in a well-ventilated place where the room temperature is below 27°C. The castors should be leveled and locked; otherwise noise and vibration may occur.

To ensure no noise and vibration during running, please check:

1. Whether the ground of installation location is flat.
2. Whether all the castors are leveled and closely contact with the ground.

Please install 380V/50Hz (3-phase live wire, single-phase null line, single-phase earth wire) power supply strictly following the requirements specified in the product's label, and have qualified installation personnel carry out wiring. Note: the capacity of distribution system must be higher than the rated capacity of freezer and the freezer must be reliably grounded.

It is strictly forbidden to connect earth wire and null line; otherwise the freezer may be electrified and cause personal injury.

To prevent the freezer from being affected by voltage fluctuation, please install a voltage stabilizer, the capacity of which should be higher than the rated capacity of freezer.

### Commissioning

After finishing installation, be sure to leave the freezer still for over 24 hours before turning it on in order to ensure complete oil return.

If the freezer is moved, only after leaving it still for 24 hours can perform any operation.

In case of handling, if the freezer is energized before reaching stable state, the following problems may occur:

1. It causes the symptom of compressor being lack of oil, resulting in noise produced by metal friction or knock;
2. It causes the symptom of agglutination between piston and cylinder inner wall, resulting in damage to compressor.

Before turning on the freezer, check the power supply for input voltage/power 380V/50Hz with a test pencil or a voltmeter, and check the earth wire for reliable grounding.

Turn on the freezer, cool down in the sequence of -126°C, -135°C and minimum (target) operating temperature as described in the Section “Temperature Setting”, and the commissioning is completed once it works normally at minimum operating temperature. It is required to record the time of commissioning and corresponding temperature in details in the process of test.

After completing commissioning, the results must be mutually confirmed by commissioning engineers and the user, and then put on file.

## Troubleshooting

### Unstable temperature

Internal temperature does not reduce, but rises, e.g. rises to -80°C from -140°C.

Cause 1: Dirty condenser or clogged air vent

Solution: Clean the condenser

Cause 2: Slowdown of fan speed

Solution: Replace the fan

Cause 3: The freezer is extremely close to a wall

Solution: Move it far away from the wall for good ventilation

Cause 4: The freezer is placed in a closed narrow space

Solution: Install an air-conditioning system and improve ventilation condition

Cause 5: The freezer is not left still for a sufficient time and is energized before its system reaches stable state, resulting in the problem of “oil beating” taken place in the compressor.

Solution: Turn off the freezer, leave it still over 24 hours, and then turn it on, gradually reduce the temperature setting from -126°C by following corresponding operating instructions.

Cause 6: The samples loaded at a time are over 1/5 of the freezer's effective capacity, or the samples loaded are too hot (20°C higher than the temperature setting, e.g. the samples temperature is -106°C or above and the temperature setting is -126°C). In this case, the load of freezer greatly increases, so the compressor works for a prolonged time, and thus causes the temperature rise of compressor, steep reduction of refrigeration effect as well as imbalance between the cold energy provided by the refrigeration system and the loss of cold energy for the entry of ambient air, finally resulting in the rise of internal temperature.

In this case, it is the fault of user for he/she uses the freezer as a quick freezer. However, the appliance is a SLT freezer for maintaining the low temperature of articles with only a little refrigeration and requires all the articles to be cooled down to basically equal temperature before being put into it. If the user fails to follow instructions described in this manual, the continuous running of compressor may be likely to cause compressor burn-out.

Solution: Immediately have the compressor stop running; one hour later, i.e. after the compressor is moderately cooled down, adjust the temperature setting to a higher level to ensure that the



## Troubleshooting

### Analysis on FAQ (frequently asked questions):

If the condenser is dirty or clogged, it could not cool the compressed gas produced by the work of refrigerant compressor. When it is overheated, the compressor may be damaged. Therefore, the condenser must be cleaned on a regular basis to keep clean.

If the freezer is installed close to a wall, it may lead to bad ventilation. In this case, once ambient temperature reaches 32°C, the condenser temperature would rise rapidly, seriously affecting the refrigeration system. Therefore, such measures must be taken as reinstallation, ventilation improvement or installation of air-conditioning system to ensure that ambient temperature is kept below 27°C (especially in hot summer or tropical zone).

Unstable voltage or under-voltage may result in abnormal running of compressor. The rated voltage of compressor is 380V±10% , beyond which it is recommended to install a voltage stabilizer.

If the freezer is installed in a closed room with air-conditioning system, it may be damaged due to a steep rise of ambient temperature in case of air-conditioner failure, especially on festivals and holidays or at night, so a monitoring system should be installed.

### Emergency measures

In case of any fault or any other emergency,

1. immediately move the samples stored in the freezer into a safe freezer in the vicinity.
2. turn off power switch.
3. contact and report the fault to local Haier After-Sales Service Center to have it clear soon.

### Common troubles and solutions

#### The freezer does not work

At first, check whether the air switch is tripped and whether power failure of external power network occurs, if the fault is not caused by the two reasons, check whether the AC contactor coil of compressor control board is energized; if energized, there is nothing wrong with the control board, and then check the circuit to compressor or compressor condition; if not, there is something wrong with the control board.

Solutions: If the problem lies in control board, replace it; if lies in compressor itself, replace it or its accessories.

## Preparations and Operation Procedures

### Samples storage and instructions

Only after the freezer operates stably after commissioning and making sure that internal temperature meets storage requirements can samples be put into the freezer in batches.

The freezer must not be loaded with samples over 1/5 of its effective capacity at a time. If samples are too hot, they should be pre-cooled down to required temperature by other equipment before being put into the freezer. After loading the freezer with samples, set internal temperature 5°C higher than the temperature of samples, keep it running until 8 hours after normal starting/stopping, and then decrease the temperature setting by -5~-10°C; continue such a cycle until reaching required temperature, and 12 hours later put the 2<sup>nd</sup> batch of samples into the freezer.

The freezer is not used for quick freezing, but for storage and preservation. Therefore, do not try to freeze relatively hot samples, or that may result in damage to samples and the freezer. What's worse, that may result in destroy of samples and compressor burn-out. Furthermore, it is advisable to put fewer samples into the freezer at a time.

### Note:

1. Do not put all the samples into the freezer at a time, but put 1/5 each time at an interval of 24 hours.
2. Be sure to wear special gloves in handling samples to avoid frostbite.

### Preparations required by safe samples storage

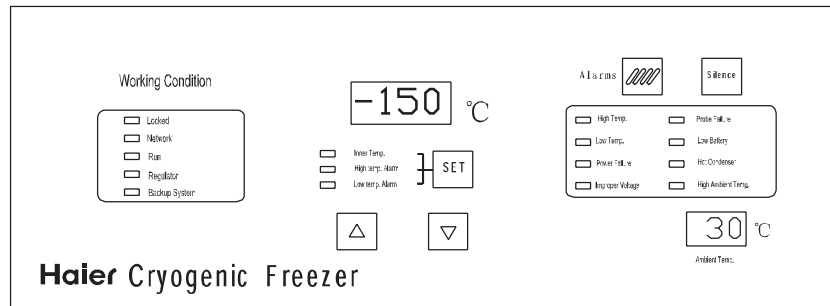
For safe samples storage, the following preparations must be made to deal with emergencies such as power supply failure and equipment damage:

1. Install a backup LN<sub>2</sub> (liquid nitrogen) system.
2. Provide a LN<sub>2</sub> tank (can be preserved for 3~4 hours).

### Safe samples storage

1. In an emergency, immediately move the samples stored in the freezer to a safe place and keep them well. The manufacturer shall not be liable for any sample damage resulting from the user's failure to follow the instructions at any time.
2. Ensure that a standby super low temperature freezer or LN<sub>2</sub> tank is available in the vicinity for emergencies. The possible emergencies include equipment damage or fault due to its defects, or equipment damage for external factors such as fire hazard, power failure, etc.

## Control board Adjustment



### Functions and operating instructions of the SLT freezer control board

#### • Temperature display

A large display screen indicates actual internal temperature.

A small display screen indicates current ambient temperature.

#### • Prompt for working state:

“Locked” indicator light “on” indicates all the settings are locked to prevent misoperations.

“Network” indicator light “on” indicates the network system is in working state.

“Run” indicator light “on” indicates the compressor is running.

“Regulator” indicator light “on” indicates the voltage stabilizer is boosting voltage.

“Backup system” indicator light “on” indicates the backup system has been connected.

#### • Alarm indication:

In case of any fault required alarm, alarm is carried out by flashing light alarm signals and audible buzzer alarm. The former can not be cancelled until the fault clearance, while the latter can be silenced by pressing the “Cancel buzz” key.

- A. “High Temp.” indicator light “on” as an alarm indicates internal temperature is higher than the high-temperature set point.
- B. “Low Temp.” indicator light “on” as an alarm indicates internal temperature is lower than the low-temperature set point.
- C. “Improper Voltage” indicator light “on” indicates the voltage is lower or higher than the lower limit or higher limit of normal voltage range.
- D. “High Ambient Temp.” indicator light “on” indicates ambient temperature is above 30°C.
- E. “Probe Failure” indicator light “on” indicates a sensor fault.
- F. “Power failure” indicator light “on” indicates the power failure of power circuit.
- G. “Hot Condenser” indicator light “on” indicates the condenser is blocked up by dirt and must be cleaned.
- H. “Low Battery” indicator light “on” indicates the battery is at low charge and must be recharged; when connected to AC power supply, the SLT freezer charges the battery automatically.

## Cleaning

### Cleaning and maintenance

The freezer should be cleaned after unpacking but before initial startup for commissioning, during normal use or before non-use.

For safety, be sure to turn off the power switch before cleaning.

The freezer should be cleaned with a soft cloth or sponge moistened with water or soap water (non-corrosive neutral detergents permitted), and then wiped with a dry cloth to prevent rust.

During use, the dust on compressor compartment condenser, compressor and other pipelines should be removed with a soft cloth or a banister brush (soft hair brush) to keep optimal refrigeration effect. When cleaning, be careful not to damage pipelines and circuits.

The condenser should be dusted out at least every 3 months.

Do not clean the freezer with organic solvent, boiling water, detergent powder or acid, etc.

Do not flush the freezer by directly spraying water onto it; do not use a scrub brush (hard hair brush) or steel wire brush for cleaning.

If the freezer is not to be used for a long time, please turn it off, clean, dry and store it following the above instructions.

### Q & A

#### The following phenomena are not faults:

In case of first use or startup, the freezer may work for a long time or give out loud noise, etc. That is not a fault but normal phenomenon.

It is normal that the condenser fan starts and stops automatically according to ambient temperature.

It is normal that there is fluid flow noise from the freezer arising from the cycle flow of refrigerant in its pipeline.

## Defrosting • Non-use

### Defrosting

1. After the SLT freezer is used for some time, a layer of frost may be formed; if too thick, it would influence the refrigeration effect and increase power consumption. Therefore, the freezer must be defrosted at certain interval, that is, upon the thickness reaching approximately 10mm.
2. Before defrosting, take out all the articles stored in the freezer and move them into another freezer for preservation. For defrosting, open the door and place the freezer in a well-ventilated place.
3. After defrosting, remove the resultant water with a soft cloth or sponge, wipe it with a dry cloth, and then turn it on, and finally load it with articles upon reaching the temperature setting.
4. To speed up defrosting, a flat-bottom container filled with warm water below 50°C may be put inside of the cabinet.

### Non-use

If the freezer is not to be used for a long time, power supply should be cut off and the freezer should be cleaned as described in previous sections. Open the door to have internal components dry, and then store it. The discarded freezer should be far away from fire sources and sent to dedicated place for disposal.

### Warning

Do not defrost with an electric heater, a metal tool or an edged tool.

## Control board Adjustment

### • Key definition:

There are 4 keys on the temperature control board. With the “Locked” indicator light on, all the keys are locked to prevent misoperations.

- “SET”: In unlock mode, press this key to select the desired function from “Inner Temp.”, “High temp. Alarm” and “Low temp. Alarm” and the corresponding indicator light will be on.
- “Silence”: In lock mode, when an alarm occurs, press this key to silence the buzz for one hour, but the alarm by flashing light signals is not cancelled.
- The “△” or “▽” key is for the increase or decrease of values.

### Starting and temperature setting

The freezer’s control system is provided with functions of password protection and keyboard locking.

The freezer must be unlocked before use: first press the “△” key, the digits in the internal temperature display area will flash, and then press the “△” or “▽” key to set the value as “06”, and finally press and hold the “Function selection” key for 8s to unlock the freezer.

After installation, the freezer must be left still for over 24 hours before being energized.

#### 1. Initial state upon power-on:

Turn on the battery switch at rear upper of compressor compartment. the SLT freezer is energized and enters into the “power-on” state, and all the parameters are the data before last power failure, and the display indicates actual temperature. The temperature setting is -126°C when the freezer leaves factory.

If actual temperature is higher than temperature setting, delay for one minute, and then the compressor starts running. Meanwhile, if actual temperature is in the range of alarm temperature, light signals flash accompanied with audible buzz.

#### 2. Adjustment of set values

##### 2.1 Unlock

2.2 “SET”: in unlock mode, press this key to select the desired function from “Inner Temp.”, “High temp. Alarm” and “Low temp. Alarm”.

“Inner Temp.”: press the “SET” key continuously until the “Inner Temp.” indicator light is on, at which time the display screen will indicate temperature setting and the digits flash, and then change temperature setting by pressing “△” or “▽” to increase or decrease the value, specifically speaking, the value would increase or decrease by 1 if press “△” or “▽” intermittently, while the value would increase or decrease rapidly and continuously by 1 if press and hold “△” or “▽”. After finishing the setting, if no key is pressed in 5s, the temperature value stops flashing, indicating that the value has been stored in the computer, otherwise the setting is invalid. The range of temperature setting is -126 ~ -150°C.

## Control board Adjustment

In case of ambient temperature above 30°C (excluding 30°C), if the temperature setting is below -140°C, please adjust the internal temperature setting to -140°C; in case of ambient temperature below 28°C (including 28°C), please adjust the internal temperature setting to original set value.

2.3 “High temp. Alarm”: press the “SET” key continuously until the “High temp. Alarm” indicator light is “on”, at which time the display screen will indicate temperature setting and the digits flash, and then change temperature setting by pressing “△” or “▽” to increase or decrease the value, specifically speaking, the value will increase or decrease by 1 if press “△” or “▽” intermittently, while the value will increase or decrease rapidly and continuously by 1 if press and hold “△” or “▽”. Once internal temperature is above high-temperature alarm setting, the alarm of SLT freezer sounds and the “High-temperature alarm” indicator light is on. The high-temperature alarm setting must not be above maximum temperature limit and +5°C lower than temperature setting.

2.4 “Low temp. Alarm”: press the “SET” key continuously until the “Low temp. Alarm” indicator light is “on”, at which time the display screen will indicate temperature setting and the digits flash, and then change temperature setting by pressing “△” or “▽” to increase or decrease the value, specifically speaking, the value will increase or decrease by 1 if press “△” or “▽” intermittently, while the value will increase or decrease rapidly and continuously by 1 if press and hold “△” or “▽”. Once internal temperature is below low-temperature alarm setting, the alarm of SLT freezer sounds and the “Low-temperature alarm” indicator light is on. The low-temperature alarm setting must not be below minimum temperature limit and -5°C higher than temperature setting, otherwise the setting can not be performed.

2.5 After finishing all the settings, if no operation is made in 5 minutes, the control board will be locked automatically, and these settings are valid.

2.6 If any alarm condition occurs, all audible alarms will sound in such a way that it sounds for 15 seconds and then pause for 1 minute until the condition is cleared.

2.7 The setting of operating temperature should be as follows: first set the temperature at -126°C, and 24 hours later, change to -135°C, and 7 hours later, change to required temperature, e.g. -140°C. When the freezer works normally in successive 3 days at temperature setting value, the 1<sup>st</sup> batch of samples may be loaded, but the volume of samples must not exceed 1/5 of the freezer’s effective capacity.

2.8 If the freezer is required to reach its minimum temperature, e.g. -150°C, please do as follows: make sure that ambient temperature is below 25°C, and then set the temperature at -145°C and observe for 5~7 days for stable working state and starting/stopping. If stable, change the temperature to -150°C.

## Control board Adjustment

**Note: Unless especially required** (operating temperature -150°C), it is advisable to set the operating temperature above -145°C, otherwise that may have a negative influence on both efficiency and service life of the freezer.

3. Condensate removal:

In case of high ambient humidity, the anti-condensation switch at the rear of compressor compartment should be turned on to prevent condensate forming at the top opening of cabinet.

4. Alarm test and low battery test: When the ULT unit is powered up, simultaneously press the "Up" arrow and "Alarm Cancel" buttons for 5 seconds. The buzzer alarm should sound and the alarm indicator should flash. At this condition, the 6 second test procedure starts. If the battery capacity is low, the low battery light indicator will flash 6 times. If the battery is at full capacity, the low battery light does not light up or flash. After 6 seconds, start the unit up. All indicators will light up for 6 seconds without flashing. All electronic display windows will indicate a digit of 8 for 6 seconds. When this is done, all display functions work properly.

If the SLT freezer is not to be used for a relatively long time, the battery switch at rear upper of compressor compartment should be turned off, otherwise the battery charge would be used up, and thus the battery could not be used any longer and recharged again.

### Tips:

For any product may go wrong or fail to work, please follow the instructions below in order to avoid any loss resulting from faults of the freezer:

1. The freezer must not be installed in a narrow space, and the door of room where it is installed must not be smaller than the freezer, but at least ensure normal handling to avoid such problems as difficult servicing, failure to repair it in time and damage of articles stored in the freezer, etc.
2. The freezer should be attended by a qualified person and its operating status must be checked and recorded every day (check and record once every 2-4 hours). In case of any fault or power failure, the internal temperature would rise; if the fault may not be cleared in a short time, please take out stored articles and move them into other devices meeting the temperature requirement of these articles to prevent degeneration or damage.
3. Before putting articles into the freezer, please make sure their temperature requirement is consistent with the freezer’s temperature range in order to prevent them from degeneration or damage due to the freezer’s failure to reach the temperature required by them.
4. Due to refrigeration inertia, it is normal that there is certain difference between the temperature actually indicated and temperature setting (the lower temperature setting, the smaller temperature difference, whereas the larger temperature difference).