

**SO-LOW**



ENVIRONMENTAL  
EQUIPMENT COMPANY



# **FREEZER MV & DHK SERIES INSTRUCTIONS**

## **WARNING: READ BEFORE CONTINUING**

To reduce the risk of fire, electric shock or injury to persons using this freezer, read all instructions and follow basic safety precautions before using the unit, including the following:



Do not modify the plug provided with the unit. If it will not fit the outlet, have a proper outlet installed by a qualified electrician.



Do not position equipment so it is difficult to disconnect from the power supply.



While under warranty, do not attempt to repair or replace any part of the freezer for servicing without first contacting the So-Low Service Department.



**BEFORE CALLING THE MANUFACTURER'S TECHNICAL SUPPORT DEPARTMENT**  
Please have the model number of the unit, box identification number, and serial number ready as well as the problem description. The model, serial number and box id number can be found on the serial tag, which is located on the interior left upper wall, or back of the unit.

## **SAVE THESE INSTRUCTIONS**

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



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	Do not place the equipment in areas exposed to the sun or rain, to prevent danger such as short circuit or overheating.
	Do not tilt or lay the equipment sideways, and do not impact the equipment body; Refrigeration systems are installed in the equipment, which is easy to be damaged by tilt or impact.
	Please place the equipment in a dry and dust-free environment to avoid risks such as overheating, and short circuit.
	In case of unexpected sound, smell, smoke, etc. when the power is turned on, please unplug the power in time and contact the manufacturer or supplier.
	Please place the equipment in a dry and ventilated environment and ensure that the equipment vents and instrument surfaces are not blocked or shielded by walls or other objects; Do not use it in a poorly ventilated environment to prevent damage caused by heat released by equipment.
	It is forbidden to disassemble and modify this equipment without authorization, to avoid potential safety hazards. In this case, So-Low will not bear any responsibility for quality accidents.
	It is forbidden to put flammable and explosive dangerous goods, strong corrosive acids, alkalis and other items unsuitable for the equipment in the equipment.
	When storing toxic, harmful, or radioactive materials, please use the equipment in safe areas. Improper use may cause harm to human health or the environment.
	Metal objects such as nails or iron wires shall not be inserted into any aperture and gap or any outlet of the equipment, otherwise electric shock or injury may be caused due to accidental contact between the above objects and moving parts.
	To ensure the normal operation and ventilation and heat dissipation of the equipment, the back, left and right sides of the cabinet shall be at least 1-2 inches away from the wall, and the air inlet and air outlet must not be blocked by obstacles!
	This equipment must be connected to a ground wire.

	<b>Note:</b> Failure to observe the precautions may result in personal injury or equipment failure and related property losses.
	It is forbidden to store living animals, flowers, or other items with strict temperature requirements in the equipment.
	When the equipment is running, do not touch the inner surface of the cabinet without wearing protective gear.
	Hold the handle and close the door to avoid pinching your fingers; When the equipment is not used for a long time, please unplug it and pack it for storage.
	When restarting the equipment after power failure or power off, please check the equipment settings first, otherwise the stored items may be damaged due to the change of settings.
	The equipment can be used for item preservation, not as production equipment!
	Keep the keys in a safe location.
	When handling the equipment, please be careful not to tip over the equipment, to prevent equipment damage or personal injury.
	When handling, it shall be lifted from the bottom, with the inclined plane is not greater than 45°, and it shall be handled with care. Please use the equipment in safe areas. Improper use may cause harm to human health or the environment.



### 4.3 Preparation before Use:

1. Remove the outer packaging of all products (including the protective foam in the packaging box)
2. Inventory of accessories: Please check the accessories and materials according to the packing list.
3. Cleaning: Clean the product once before use.

### 4.4 First Power-on

When using the equipment for the first time, please follow these steps:

1. After the equipment is placed, leveled, and cleaned, it shall stand for more than 24 hours, and then power it on to ensure the normal operation of the equipment.
2. Under no-load condition, connect the power cord to a dedicated outlet with appropriate specifications.
3. After plugging in, turn on the power switch of the equipment.
4. Check whether the operating temperature of the equipment reaches the required value, observe the normal start and stop of the equipment for 24 hours, and put a small amount of items in the freezer after confirming the normal performance.
5. Please store items in batches, with the items not exceeding 1/3 of the freezer volume each time.
6. Try not to open the door during cooling, otherwise the temperature will rise.

### 4.5 Operation after PowerFailure

1. The equipment has a memory function for the set value. When the power is restored after power failure, the equipment will continue to operate before power failure.
2. Once the equipment is powered off, it requires 5 minutes before it can be switched on again, so as to avoid damaging the compressor.
3. We guarantee the normal operation of this equipment under certain conditions, but we are not responsible for any loss or damage of stored items after a power failure.

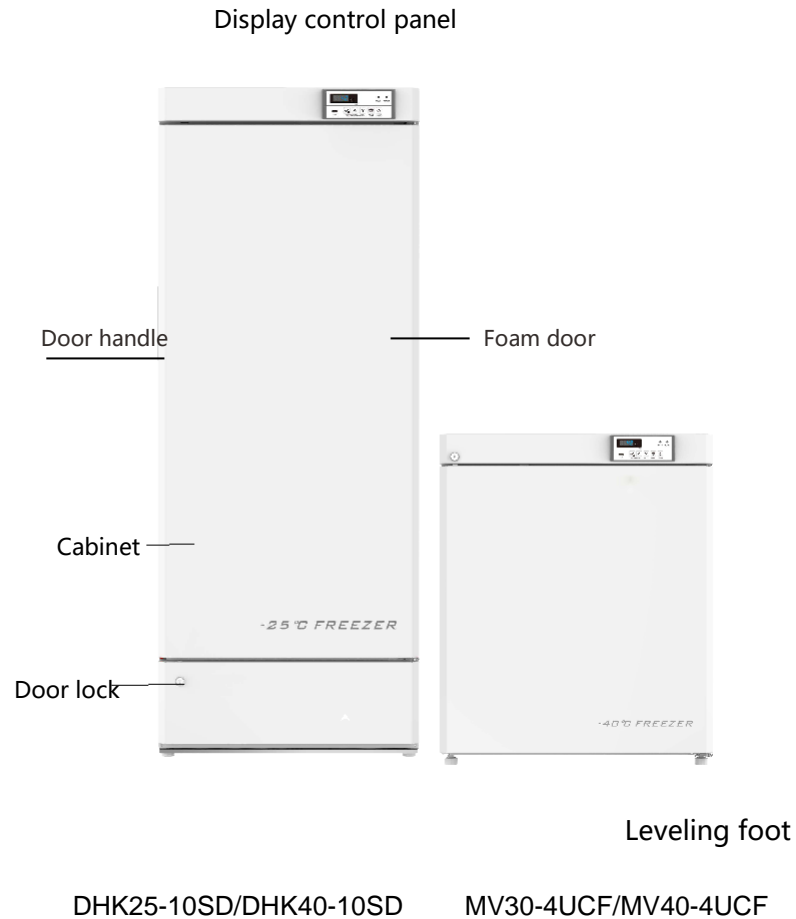


#### Notes:

- ◆ A special person shall be responsible for checking and recording the running status of the equipment every day (record and check once every 2-4 hours). In case of failure or shutdown, the temperature in the freezer will rise. If it cannot be repaired in a short time, please take out the stored items and transfer them to a place that meets the temperature requirements for storage to avoid damage to the items.
- ◆ Before putting items into the equipment, it shall be confirmed in advance whether the temperature range of the equipment meets the temperature requirement of the items, so as to avoid damage to stored items due to the difference between the settable temperature of the equipment and the required temperature of the items. Please pay attention not to block the air outlet and air inlet when putting items into the equipment.
- ◆ Due to the refrigeration inertia, there is a certain difference between the actual display temperature and the set temperature of the equipment, which is a normal phenomenon.
- ◆ The equipment is an item storage equipment, which cannot be used for routine production operations. It is strictly forbidden to put too many items which are relatively hot into the equipment at one time, otherwise the compressor will run for a long time, and be burned due to high temperature. Items must be put in batches, so as to ensure that the freezer is cooled step by step until the temperature required for storing items is reached.
- ◆ Electrical appliances without production license shall not be used inside the equipment.
- ◆ Do not change the set temperature frequently in a short time, otherwise the expected setting effect may not be achieved due to the large temperature inertia; Ensure that there is a certain air circulation space around the cabinet when putting in items, especially do not block the temperature sensor in the cabinet (for collecting the temperature of the cabinet), otherwise it will affect the stability and accurate control of the temperature in the freezer body!
- ◆ Items shall not be placed directly at the bottom of the freezer, but on the bottom shelf, otherwise the refrigeration effect of the equipment will be affected.
- ◆ When putting in items, if the moisture content of the items is too much or too little, it will affect the humidity change in the cabinet, so it is best to keep the items sealed; The humidity of the working environment will affect the change of humidity in the cabinet, especially if the door is opened too frequently and the door is not closed properly

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## 5. Component Composition



\* Due to the improvement of products and model differences, the actual products may be different from the diagram. Please refer to the actual products! The diagram is only used for functional parts description.

\* Structure and composition The product consists of freezer body, door (glass door structure or foam door structure), refrigeration system and control system.

### **Intended use:**

\* Scope of application: It is suitable for storing items in hospitals, pharmacies, epidemic prevention stations, research institutions, biopharmaceuticals and other units.

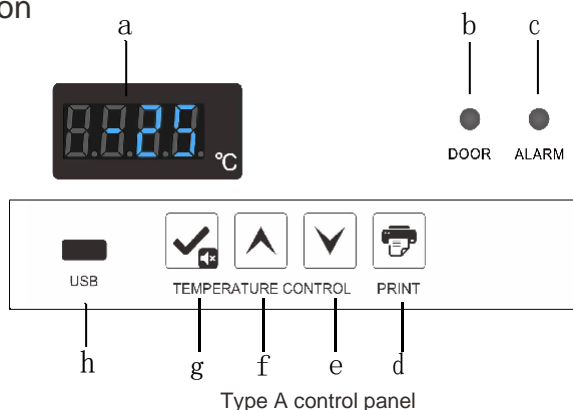
\* The storage temperature inside the box can be adjusted through the temperature button on the control panel, which is convenient to use and reliable in performance.

\* The freezer comes with drawers, each of which can hold 40 pounds.



## 6. Operating Instructions

### 6.1 Function Introduction



Function description of Type A control panel(Applicable to MV40-4UCF,MV30-4UCF,DHK25-10SD,DHK40-10SD)


#### 1.Control board introduction:

- a. [-25] is display window for temperature. Under normal operating conditions, the average temperature of the freezer compartment in the cabinet is displayed in units of °C; Different running status can be displayed in the setup state (see below for details).
- b. Door opening indicator : when the door is opened, the indicator light will be on. when the door is opened more than 1 minute, the indicator lighting with buzzer alarm, display "do".
- c. Fault indicator: The indicator is off when the product is operating normally; the indicator is on when the product is operating abnormally.
- d. "PRINT" : The system can retain 7 days of data for printing. Press the Print key to print the temperature for the set period of time.
- e. In parameter setting mode, move to the previous parameter or decrease the value of the parameter. For example, when adjust the set temperature, press this button to reduce the set temperature. When adjust the parameter value, long press the key to quickly decrease the parameter.
- f. In parameter setting mode, you can move to the next parameter or increase the value of the parameter. For example, when adjust the set temperature, press this button to increase the set temperature value. When adjust the parameter value, press and hold the up button for a long time and the parameter will increase rapidly. Under normal conditions, press and hold the key for 3 seconds to import the U disk for 12 months.
- g. is the button for set/mute, when there is no alarm state and the key is not unlocked, press ,Displaying ambient temperature for 5 seconds and then restores normal display; In the unlockedstate, press for 3 seconds, can enter the user menu. When buzzer alarm (including high temperature alarm, door open alarm, sensor fault alarm, etc.), in the locked state, first time press , Buzzer stops tweeting, 5 seconds after showing ambient temperature, resume normal display (The key mute is only to turn off the buzzer of this abnormal state alarm. If the fault is not eliminated, the buzzer will continue to alarm when the next exception occurs), press again, buzzer alarms, After the ambient temperature is displayed for 5 seconds, the cabinet temperature and alarm status are restored. When the press is under unlocked state, can be used as a set button.




In the unlock state, in the parameter setting mode, press this key to display the value and the parameter name. If the pressed time is longer than 3 seconds, the setting will be saved and returned to normal interface.

h. USB data ;

Automatic export: when the U disk is connected to the USB interface, the recorder buzzer will chirp once and display "on". PDF files of data that not currently exported will be generated in the U disk. After data transmission, the buzzer will chirp once again and display "End".After 6s, it will return to normal display.

 **Note:** when the data is very little, the digital tube will not display "on" and "End".




Manually export: If the button is under locked state, after connecting U disk well and buzzer alarm for one time, press upper button for 3 seconds, digital tube display "d01" , Press the up button or down button to adjust "d00~d12" , press , The U disk internally generates a PDF file that generates this file (d00) or generates the data recorded in the previous month (1-12).

 **Note:** When the alarm of the digital tube flashes and displays "LoF," the recorder is not started; Meanwhile press  and  key for 3s, and "LoF" disappears, the recorder is started.


## 2.Function settings



a.Power on, open the power switch on the back of the cabinet, the machine can enter the working state;


b.User parameter settings:

Unlock: In the normal running state, press the key  and  for 3 seconds at the same time, the digital tube will display the parameter code "0000", and input the password "0005" (enter the user password, enter "0099" to restore the key lock password to the default "0005"), Unlock at this time. Press the key  for 3 seconds after unlocking, the digital tube displays the parameter code "PS1" and enters the setting adjustment.


c.Use the up or down key to scroll through the parameters. The display order is b1-b2-Set-H-L-n-y-r-S-F-Pt-tH1-P1-PS1.

Press the  key to confirm the category. The first parameter name of this type of parameter will be displayed.


1. Press  or  to scroll through the values


2. Press the  to display the corresponding value

3. Press  or  to increase or decrease the value

4. Press the  to temporarily store the modified value of the lock and return to the display parameter.

5. If you need to modify other parameters, repeat steps 1-4.

6. Press the  for more than 3 seconds to store the modified parameter and return to the display parameter category.

d. Press the  for more than 3 seconds, or if there is no button within 60 seconds, exit the parameter setting program.

#### 4.Parameter display

NO.	Menu item	Parameter Range	Suggested settings	Remarks
1	b1	V1.0-9.9	1.0	Hardware version
2	b2	V1.0-9.9	1.1	Software version
3	Set	-10~-25	-25	Temperature setting
4	H	0.0~10.0	5.0	Set value of high temperature alarm set+H; When H=0, the alarm is deactivated; When the temperature is higher than the high temp alarm set temperature alarm displays H1
5	L	0.0~10.0	5.0	Set value of low temperature alarm set-L; When L=0, the alarm is deactivated; When the temperature is lower than low temp set the low temperature alarm displays L1
6	Pt	0~240min	20	Print interval
7	tH1	20.0~50.0°C	40.0	Upper limit of ambient temperature alarm
8	PS1	0000~9999	0005	User menu password settings
9	MAX	-	-	The highest temperature since last clearance
10	NIN	-	-	The lowest temperature since last clearance
11	CLR	-	-	Clearance of the Max and Min temperature records

Quick setting of time after power on

After the power-on self-test on the display board is completed, the quick setting menu is displayed.

Menu item	Menu	Menu description	Set range	Default	Unit
Quick Settings menu	n	Set logger module time - year	10~50		/
	y	Set logger module time - month	1~12	--	/
	r	Set logger module time - day	01~31	--	/
	S	Set logger module time - hour	00~23	--	/
	F	Set logger module time - minute	00~59	--	/
	Pt	Print interval	0~240	20	min
	SCY	Temperature data recording period	0~240 0: shielded recorder	10	min

If there is no operation for 60 seconds under the quick setting menu, it will automatically exit the quick setting menu and return to normal display.

#### 5.Alarm display

Alarm Code	Fault description
H1	High temperature alarm
L1	Low temperature alarm
H2	High ambient temperature alarm
door	Door open alarm
PF	Power failure alarm
bL	Low battery alarm
Er	Data Logging not connected
LoF	Data Logging not started
EE	Communication error

## 6.2 Functional fittings

### 1. Printer

Automatic printing:

When the printing interval  $P_t$  is not 0, the printer prints the current data every  $P_t$  minutes.



**Note:** When the printing interval  $P_t$  is less than the recording interval  $S_{Cy}$ , it is printed according to the recording interval; the remaining printing intervals are printed as an integral multiple of the recording interval  $S_{Cy}$ , that is: the printing interval  $P_t$  should be set as an integral multiple of the recording interval.

Manual printing:

When the key is unlocked and the working voltage is normal, press the print key to display "P01" by the digital tube, press the up key or down key to adjust "P00~P07." Press the set/mute multiplexing key or print key, and the printer will cancel the manual printing (P00) or print the data recorded in the previous days (1 ~ 7), with the data interval same as the automatic printing interval. Printing paper installation:

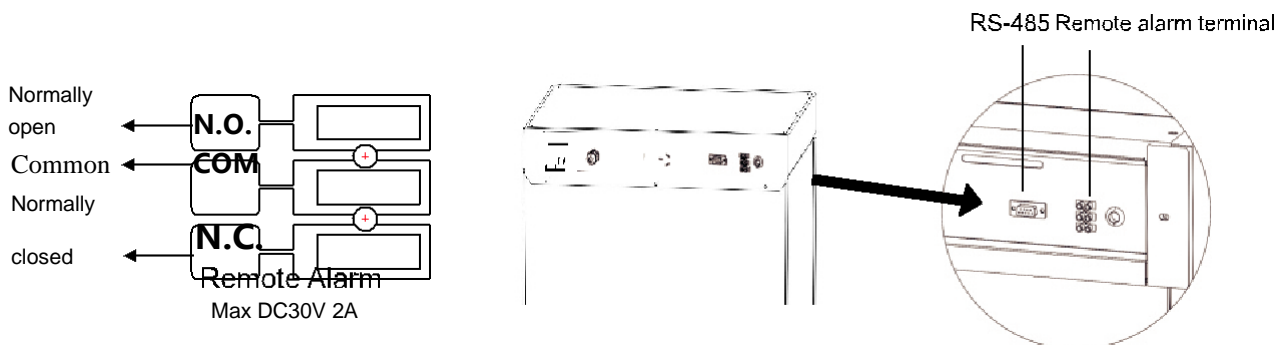
The printing paper has been installed at the factory. When the paper is used up after a long time, you may purchase the same paper for installation. The installation steps are as follows:

- ① Click the cylindrical button on the printer to open the cover of the printer;
- ② Put the printing paper into the printer box and pull the paper head of the roll so that the paper slightly exposes from the upper port of the box cover after the box cover of the printer is closed.
- ③ Close the box cover.

### 2. Remote alarm terminal and RS485 interface

The remote alarm terminal is installed in the back of refrigerator and the alarm signal is output by the terminal.

The terminal bearing capacity is SELV DC 30V, 2A.



## 7. Defrost, Discontinuation and Maintenance



### Warning:

- ◆ In order to prevent people from getting electric shock or injury, please cut off the power supply of the equipment before any repairs and maintenance
- ◆ Make sure you don't inhale drugs or suspended particles around it when maintaining the equipment, otherwise it will harm your health

### 7.1. Equipment Maintenance

Defrosting: The equipment will automatically defrost during the working process for the convenience of use. Cleaning and maintenance: The equipment should be cleaned and maintained regularly (for safety, please remove the power plug), and the inner and outer surfaces of the freezer should be wiped with a warm, damp soft cloth.



## Notes:

- ◆ Do not use sharp metal appliances during defrosting to avoid damage to the freezer.
- ◆ Do not position the equipment so that it is difficult to operate the disconnecting device of separable plug.
- ◆ Protection impairment if used in a manner not specified by the manufacturer.
- ◆ The power relay switch on the back of the case can not only contact and open the power circuit, but also provide immediate protection in the event of short-circuit faults, severe loads and undervoltage in the power circuit, and it can also be used to start the compressor infrequently to protect the equipment.

## 7.2. Equipment Discontinuation

**Deactivation:** If the equipment is stored in an unsupervised area for a long time and not used, the power supply should be cut off and the inner and outer surfaces of the freezer should be cleaned with a warm, damp soft cloth, aired and sealed. The equipment must be locked to ensure that children cannot open the freezer door.

**Scrapping:** When the equipment reaches the end of its service life, it should be scrapped and must be handed over to a qualified professional recycling agency for disposal per local regulations. Non-professionals are not allowed to disassemble and break down the equipment without authorization. The scrapped equipment should be placed in a designated area inaccessible to children to avoid danger.

## 7.3 Maintenance, Replacement, and Recovery of Rechargeable Batteries

**Battery installation position:** top of the freezer body and bottom inside the electrical box.

### 1. Battery maintenance

- ① In order to prolong the service life of the battery and avoid the product being left unused for a long time, the product must be operated for more than 24 hours every month to facilitate charging.
- ② When the equipment is not used for a long time, it should be connected to the working power regularly (generally once a month), and the power lock switch should be turned on so that the equipment can run for a period of time to complete charging, and each charging time should be no less than 24 hours;
- ③ When the working power supply is interrupted, the power lock switch of the equipment shall be turned off in time, otherwise it will cause power loss in battery and even permanent damage to the battery in severe cases;
- ④ The main power switch must be turned off during a long-term power outage or during transportation, otherwise long-term discharge causes power loss in battery and even permanent damage to the battery, and the display is abnormal after re-energizing;
- ⑤ The battery is a consumable, with a service life of about 2-3 years. If the battery is used improperly, such as power loss or reaching the end of battery life, it will cause a low battery alarm (refrigeration is not affected, but there is an alarm failure and influence to the use function of the printer, please contact our local distributor after-sales staff for replacement).

### 2. Battery replacement and recovery

- ① Turn off the power switch and pull out the power plug from the outlet;
- ② Remove the screws on the electrical box with a screwdriver. (Note: There are high-voltage electrical components in the electrical box, therefore before opening, turn off the power supply, unplug the power plug and turn off the power lock switch of the freezer, and the electrical box can only be opened by qualified engineers or maintenance personnel).
- ③ Pull out the battery connecting cable; (Before unplugging the battery fixing cable, pay attention to the cathode/anode of the battery and the sequence of the connecting cables, so as to prevent burning down the control system due to installation of the new battery with cathode/anode reversed. Generally, the red wire is connected to the cathode, and the black wire is connected to the anode.
- ④ Use a screwdriver to remove the fastening screws on the battery fixing plate and take out the battery;
- ⑤ The battery model is BT-12M4.0AC(12V4.0AH);
- ⑥ For a replaced battery that can be recycled, please contact the local battery recycling agency.

**Tips:** In order to effectively ensure that the battery replacement meets the requirements of the control system and avoid the influence of improper operation on the system, please contact our after-sales personnel for replacement or guidance.





# Circuit diagram

