### User manual Printer cooler machine

Please read carefully before using:

First of all, thank you for your trust in our company and for using our products. In order to enable you to better understand and use our cooling machine and make it work best, please read this manual carefully before use.

- √ Deionized water
- ✓ Purified water
- $\times$  Electrolytic water

#### Preface

Thank you for using our products. Please read the instructions carefully and keep them properly before use.

This instruction manual is not a quality guarantee. The correction of printing errors, the modification of the information and the improvement of the product shall be explained by the company at any time without prior notice. The modified contents will be included in the reprinted instruction manual.

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#### Warning prompt:

In order to ensure your personal safety and avoid property loss, you must pay attention to the tips in this manual. The warning prompt is indicated as follows from high to low according to the hazard level.

Danger: if safety measures are not taken, death or serious personal injury will be caused.

#### Operated by professionals

Handling, installation and piping, electrical, operation, maintenance, overhaul and other operations must be carried out by personnel with professional knowledge.

#### Do not use beyond the specification

It is prohibited to use the equipment beyond the specification of the manual to avoid major accidents such as equipment damage, injury, fire and electric shock.

#### Electrical connection

- a) The power supply system must be selected according to the relevant contents of the nameplate or manual;
  - b) Standard cables must be used, and the wire diameter shall be selected according to the standard;
  - C) Grounding must be installed and reliable connection shall be ensured; Otherwise, electric shock or fire may be caused.

#### Lifting operation



- When lifting, the product's own lifting device must be used;
- Never approach when lifting;
  Otherwise, personnel may die and equipment may be damaged due to overturning and falling.

#### Non-explosive environment

It cannot be installed in hazardous places with combustible gas.

#### Cover needed



There are live parts in the machine. Do not operate without the cover. There is a risk of electric shock.

#### No water



Do not allow the equipment to be drenched or immersed in water, otherwise short circuit and electric shock may occur.

Danger: if safety measures are not taken, death or serious personal injury will be caused.

#### Maintenance and repair

The work can only be carried out after 5 minutes after the power supply is cut off. Because the high-voltage charging part in the equipment is not discharged within 5 minutes, there is a risk of electric shock when working in the live state or immediately after shutdown.

#### High voltage

Contact with live parts may cause serious personal injury or death.

#### Invalid

When the equipment reaches the service life and needs to be scrapped, it must be treated as industrial waste, and professional personnel shall be invited to guide the implementation.

#### Surface high temperature



Any part of the body and heatresistant articles must be kept away from this high-temperature area, otherwise personal injury or property damage may be caused.

Warning: failure to take safety measures may result in death or serious personal injury.

#### Transportation and installation



During the transportation and installation of equipment, the equipment must be firmly fixed, otherwise there is a risk of overturning and falling.

#### Stop operation immediately in case



When the equipment is abnormal, it is prohibited to start as long as the reason is not clear, otherwise there will be damage, electric shock, fire and injury.

#### Electrical protection



The power cable access end must match the leakage and overload protection device according to the rated current indicated on the equipment nameplate.

#### Do not put anything into the gaps



Rotating parts are installed in the equipment. It is forbidden to put fingers or foreign matters into the equipment gap during the operation of the equipment, otherwise personal injury may be caused.

Warning: failure to take safety measures may result in death or serious personal injury.

#### Refrigerant leakage

- a) In case of refrigerant leakage, please be sure to change air and ventilate, otherwise, when a large amount of refrigerant fills the enclosed space, it may cause anesthesia and suffocation to the human body.
- b) Avoid contact with skin, otherwise frostbite may occur.

Note that if safety measures are not taken, minor personal injury and property loss may be caused.



#### transportation

- The equipment shall be fixed before handling to prevent the equipment from moving due to vibration and external force. If there is excessive internal equipment may be damaged;
- b) Inclination angle  $\leq 45^{\circ}$ , otherwise the refrigeration system will fail.

#### Installation

The equipment must be installed horizontally, otherwise the refrigeration system will fail;

D) No articles are allowed to be placed within 1m around the suction and exhaust outlets. If the suction and exhaust air is obstructed, the refrigeration capacity of the equipment cannot be exerted.

#### When don't move the motor impeller for a long time

For equipment that has not been used for a long time, it may be difficult to start the water pump at the initial start. Please gently move the motor impeller before the equipment is powered on.

Note that if safety measures are not taken, minor personal injury and property loss may be caused.

#### No stepping

Please do not climb on the equipment or sit on it, otherwise it may cause injury accidents such as falling and overturning.

#### Equipment surface cleaning

a)

:

!

- Please use cleaners that do not corrode metals and plastics;
- b) After cleaning, please keep the detergent properly to prevent the liquid from leaking anywhere in the equipment;
- C) Containers for storing cleaning agents should be completely sealed to avoid danger.

#### Clean the air filter regularly

Clean the air filter screen at least once a week. If the air filter screen is blocked, the cooling capacity will be reduced, the power consumption will be increased, and the alarm will not work normally.

#### Gloves on



The sharp edge of the condenser fin may cut the skin;

The temperature of the internal compressor and refrigerant piping is very high, and there is a risk of scalding in direct contact with the skin.

#### Antifreeze control logic of refrigerator in winter (this function is not available for special models)

When the refrigerator is powered on for standby, in order to prevent pipeline icing, it will operate as follows:

- a) Antifreeze starting condition: ambient temperature < 10  $^\circ\!{\rm C}$  .
- When the antifreeze water temperature is less than 5 °C, the refrigerator will automatically start the circulating water pump:
  - $\bullet$  When the antifreeze water temperature is less than 3 °C, the refrigerator will automatically start the electric heater of the water tank.
  - b) Antifreeze end conditions:
  - Stop the circulating water pump and electric heater when the detected antifreeze water temperature is > 10 °C;
  - When the ambient temperature is ≥ 11 °C, exit the antifreeze logic.

When the ambient temperature is lower than 0  $^{\circ}$ C and the machine is shut down for a long time, it is necessary to drain the liquid and blow the water in the system with compressed air, otherwise there is a risk of freezing and cracking the components and pipelines.

#### Environmental protection

- a) It is recommended to use environment-friendly cleaner for cleaning equipment surface.
- b) The refrigeration system is filled with refrigerant5Once the refrigerant leaks, it will have an impact on the environment. The refrigerant needs to be recovered and treated by professionals. It is prohibited to discharge it into the atmosphere at will.



#### 1 Overview

#### Main purpose, working principle and system composition

This machine is an industrial refrigeration equipment designed and manufactured for laser marking, laser engraving, laser cutting, laser welding and other laser processing equipment. It can provide stable and accurate cooling medium for the above applications.





#### **Refrigeration working principle and system composition** (see Figure 1)

• The refrigerant (i.e. refrigerant) absorbs the heat of the object to be cooled in the evaporator and vaporizes into steam. The compressor continuously extracts the generated steam from the evaporator and compresses it. The compressed high-temperature and high-pressure steam is sent to the condenser, and then releases heat to the cooling medium (such as water and air) to condense into high-pressure liquid. After being depressurized by the throttling mechanism, it enters the evaporator and is vaporized again to absorb the heat of the object to be cooled, this cycle is repeated to realize the refrigeration function.

• Compressor: the compressor is the core component of the whole refrigeration system and the power source of refrigerant compression. Its function is to convert the input electrical energy into mechanical energy.

• Condenser: in the refrigeration process, the condenser plays the role of outputting heat energy and condensing the refrigerant.

• Evaporator: the evaporator is a heat exchange device that absorbs the heat of the cooled medium by the evaporation (actually boiling) of the refrigerant liquid.

• Throttling and pressure reducing device (expansion valve or capillary): the throttling and pressure reducing device is not only a flow regulating valve in the refrigeration system, but also a throttling valve in the refrigeration equipment. Its main function is to make the high-pressure refrigerant liquid flow and depressurize when flowing through the throttling and pressure reducing device.

• Refrigerant: refrigerant is the flowing working medium in the refrigeration system. Its main function is to carry heat and realize heat absorption and release through phase change.

• Other: the system will also be equipped with a liquid reservoir (for small refrigeration systems, it is often not equipped with a liquid reservoir) and a drying filter.



#### 2 Medium requirements

- 2. 2. 1 Allowed media
  - ★ Demineralized water (purified water, distilled water and high-purity water);
  - ★ It is allowed to add antifreeze (volume ratio  $\leq$  30% ethylene glycol, volume ratio  $\leq$  20% ethanol);
  - $\star$  Preservatives and algaecides approved by the manufacturer are allowed to be added.

#### 2. 2. 2 Fobidden media

- ★ Automobile antifreeze, water tank, antifreeze with volume ratio > 30%;
- ★ Flammable liquids such as acetone;
- ★ Oil and oil-based liquids;
- $\star$  Drugs, food and liquids;
- ★ Liquid with pH value exceeding 6.5-7.5;
- $\star$  A liquid containing solid particles;
- $\star$  Other liquids that corrode copper and stainless steel.

#### 2 model description

TFLW -500W D R -01 -1225

(1) (2) (3) (4) (5) (6)

- (1) Type: laser water cooler
- (2) Laser power: suitable for 500W fiber laser
- (3) Structure type: D: double temperature type (single temperature type is not marked)
- (4) Auxiliary function: R: with heating function (without heating and without marking)
- (5) Structure No.: distinguish when the structure changes greatly



- (6) Power supply system: single phase 220V / 50Hz
- This model description only contains the main code description of the company, not all of them are listed. Please confirm the specific model with our company before ordering. Our company has the right of final interpretation.

#### (3) installation and testing

2.1 equipment installation conditions and requirements

1. It must be installed horizontally and fixed firmly with bolts (see Fig. 3).



Figure 3

- 2. There shall be no shelter within 1m of the air inlet and outlet to avoid affecting the cooling effect of the equipment (see Fig. 4).
- 3. It shall not be installed in the harsh environment with corrosive, combustible gas, dust, oil mist, conductive dust (carbon powder, metal powder), humid and high temperature, direct sunlight and so on.



#### 2.2 pipeline connection

1. Determine the pipeline layout according to the equipment inlet and outlet marks, otherwise the equipment cannot operate normally.

2. The internal construction of the pipeline shall be cleaned and impurities shall be strictly avoided. Once impurities enter the system, it is easy to reduce the cooling capacity and may cause the failure of the water pump or the cooling system.

3. Pipeline connection: connection method of refrigerator and machine tool (see Fig. 5).

4. Pipeline resistance: the distance between connecting pipelines between equipment shall be the shortest to avoid right angles and bends, and the total pressure drop shall be  $\leq 0.5$  bar.

5. If metal pipes are used, thermal insulation measures shall be taken to prevent energy loss.

6. The pressure of the pipeline must be more than 1.5 times of the water supply pressure of the pump.



Double temperature laser water cooling machine

Figure 5

#### 2.3 electrical connection

1. Please refer to the wiring identification on the refrigerator when wiring.

2. Recommended standard for power line diameter selection

Power line diameter (mm) <sup>2</sup> (copper wire)	0.75	1	1.5	2.5	4	6	10	16	25	35	50
Current carrying capacity (a)	8.5	10	13.5	18	25	36	50	65	85	105	125

- This number is provided according to IEC 60204-1 standard: B1 laying method at 40 °C for reference only!
- The power cord must use standard cable.
- Refer to nameplate of refrigerator for rated current.

• The main circuit of the power supply must be equipped with appropriate leakage and overload protection devices, and ensure that the refrigerator is well grounded.

- 3. The allowable fluctuation of power supply voltage shall be less than  $\pm 10\%$ , the frequency fluctuation shall be less than  $\pm 1$ Hz, and it shall be far away from the electromagnetic interference source.
- 4. 4. Connection of signal terminals: (applicable to standard models)
  - ★ In case of alarm or shutdown, signal terminal com and NC are closed and com and no are disconnected.
  - $\star$  Logic table of signal terminal:

Signal terminal	working	power down	standby	fault
COM/NC	open	close	close	close
COM/NO	close	open	open	open

★ When the conductivity is normal, the signal terminals S-V and COM1 are closed; When the conductivity alarm occurs, the signal terminals S-V and COM1 are disconnected.



★ External control terminal (j2-1 / j2-5 or j3-1 / j3-7): the refrigerator provides a pair of external control input terminals. When the working mode is set to "off machine" mode, the refrigerator will work automatically after the terminal is short circuited, and the refrigerator will stop when disconnected.

#### Caution

It is forbidden to connect active signals to the external control terminals, otherwise the controller will be damaged!



#### 2.4 water adding and exhaust

#### 4.4.1 Add water

Add water through the water filling port of the equipment to between the high and low liquid levels (see Fig. 6).



The liquid level is between high and low

#### Figure 6

#### 4.4.2 exhaust

After the water is added for the first time and new water is replaced, the air in the water pump can be exhausted before it can be started, otherwise the equipment will be damaged. Exhaust method: slowly loosen the exhaust screw plug of the water pump (do not unscrew it) until there is no air in the discharged water, and then tighten the exhaust screw plug (see Fig. 7. Only the exhaust positions of the vertical pump and the horizontal pump are shown in the figure. According to the customer's requirements and specific models, the pump will be different, and the exhaust positions will also be different. For details, see the external prompt marks of the pump).

#### 4.4.3 special tips

After the equipment is powered on, the pipeline cannot be fully filled with water when the water pump is not running. When the water pump is running, the water pipe can be filled with water, and it needs to replenish water to the tank in time. The water pump needs to continue to exhaust during operation.





#### 2.5 Check before test-run

- 1. Check whether the pipeline connection is correct and there is no leakage;
- 2. Check the liquid level of the water tank;
- 3. Check whether the power supply system is consistent with the product nameplate;
- 4. Confirm that the electrical lines between the equipment are connected correctly.

#### 2.6 Computer board setting and operation

#### 4. 6. 1 Panel features and key description

1. Panel features



#### 2. Button description

NAME	Description
Up button	In the setting mode, it is used to modify the temperature setting parameters of the main circuit and the external optical path (the setting state is 5 seconds before the start-up, the digital tube blinks, and it is effective when pressed). Flashing display LXX X, press the up key to modify the set value of the main circuit; Flashing display hxx X, press the up key to modify the external optical path setting value. After setting the parameter value, delay 5S and enter the working state.
Down button	In the setting mode, it is used to switch the temperature setting parameter screen of the main circuit and the external optical path (the setting state is 5 seconds before startup, the digital tube flashes, and the key is valid). During startup, the setting parameter LXX of the main circuit flashes x. Press the key to flash and display the external optical path setting parameter hxx x. Press the key again to flash LXX x. Cycle display. After setting the parameter value, delay 5S and enter the working state.

#### 3. Description of display and indicator light

name	explanation
Cooling indicator	Operation indication of refrigeration compressor.
Alarm indicator	It indicates that the equipment is faulty and needs maintenance.
Main circuit water temperature	It is used to display the circulating water temperature LXX. X of the main circuit.
Water temperature of external optical path	It is used to display the temperature hxx. X of the circulating water in the external optical path.
ambient temperature	Used to display the ambient temperature AXX. X.

When the equipment works normally, it is displayed on the water supply temperature page of the main circuit by default. When the up or down key is pressed, the display screen will display the water supply temperature of the main circuit "LXX. X"  $^{\circ}$ C, the circulating water temperature of the external optical circuit "hxx. X"  $^{\circ}$ C, the water supply flow of the main circuit "Ifxx" L / min (reference value), the water supply flow of the external optical circuit "HFX. X" L / min (reference value), and the ambient temperature "AXX. X"  $^{\circ}$ C.

#### 4. 6. 2 Version Description

After the unit is powered on, the software version is displayed first. For example, "R1. 0" indicates that the software version is 1.0. After the software version is displayed, it will automatically enter the setting state. As shown in the following figure:



#### 4. 6. 3 Parameter setting

Recommended value of refrigerator setting parameters: (the user can change it according to the actual situation)

name	numerical value	Unit	recommended
Preset temperature of main circuit	Main circuit setting lower limit ~ main circuit setting upper limit	°C	20-25
Preset temperature of external optical path	Outer optical path setting lower limit ~ outer optical path setting upper limit	°C	30

After the controller is powered on, the software version number is displayed for the first 2S, and then it is switched to the setting state of 5S. The digital tube flashes LXX x. Display the temperature setting value of the main circuit. The setting range is 15-27 °C (the default value). Press the up key to set this parameter (addend cycle mode, that is, when the temperature is set to 27 °C, continue to press the up key, and the set temperature will return to 15 °C); Press the key and the nixie tube flashes hxx x. The set value of the external optical path temperature is displayed. The setting range is 20-40 °C (the default value). Press the up key to set this parameter (addend cycle mode, that is, when the temperature is set to 40 °C, continue to press the up operation key, and the set temperature will return to 20 °C).

Note: the setting state of 5 seconds does not require the operator to set the temperature within 5 seconds. It means that if the operator does not modify the parameters in the controller within 5 seconds after startup, the controller will think that the parameters need not be modified, and the parameters cannot be modified after 5 seconds.

#### 3 Maintenance

Equipment maintenance must be stopped first, and the power supply must be cut off. The operation can only be carried out after 5 minutes, otherwise there is a risk of electric shock. When the ambient temperature is lower than 0  $^{\circ}$ C, the internal water must be drained when the machine is shut down for a long time.

#### Weekly inspection

Weekly inspection is the main content of daily maintenance of refrigerator. Daily maintenance shall analyze whether the equipment has potential safety hazards from the equipment operation status, vibration, noise, operation data, etc., so as to find out the problems in advance. It mainly includes the following contents:

Check the filter screen and clean the dust and foreign matters on it (see Fig. 8).

- 1. Check the liquid level of the water tank and replenish water in time when the liquid level is low.
- 2. Dust removal and decontamination outside the equipment.



Figure 8



#### 3.1 Monthly inspection

Monthly inspection is generally added in the last week of each month as follows:

- 1. Check the noise and interface connection of the circulating pump, and contact the manufacturer in time in case of abnormal noise and water seepage.
- 2. Check the operation of fan and compressor, and contact the manufacturer if there is abnormal noise.
- 3. Check the filter inside the refrigerator. If there is any foreign matter, please clean it in time (see Figure 9, schematic diagram of several types of filters used in the refrigerator).





#### 3.2 Half-yearly inspection

inspection shall be conducted every six months, and the following contents shall be added during the last week of the six months:

- 1. Replace the medium.
- 2. Check and clean the dirt in the liquid tank to ensure good refrigeration effect.

#### 3.3 Annual inspection

The annual inspection is generally carried out when the system is shut down. For matters that cannot be solved online in daily operation, it is carried out during the annual inspection and maintenance.

- 1. Check and clean the condenser.
- 2. Check whether the pipeline connection and water pump leak.
- 3. Dust removal and decontamination inside and outside the equipment.
- 4. Check the water tank and clean the dirt inside the water tank.
- 5. Replace the medium.
- 6. Test the insulation resistance, and the insulation resistance is  $\geq 5 \text{ m } \Omega$ .
- 7. Check the grounding resistance, and the grounding resistance is  $\leq 4 \Omega$ .
- 8. Carry out capacitance value test on the capacitance used by the motor parts. If the capacitance value decays more than 10%, replace the capacitance.



### 4 Fault analysis and troubleshooting

Fault	fault analysis	Exclusion method:
phenomenon		
Er01 main	a) Connection of inlet and	a) Correctly connect the inlet and outlet water
circuit flow	outlet is reversed	pipes
alarm: the	b) Dirty and blocked	b) Clear the waterway
whole machine	waterways	of croat the water way
stops and the		
alarm light is	c) Air leakage in suction	c) Check and fasten the suction pipe
on. (power on	pipenne	
reset)	d) Water flow switch	d) Replacing the flow switch may require
	damaged	cleaning the water system
Er02	a) The ambient temperature	a) Ventilation and heat dissipation: clean the
condensate high	is too high	filter screen and fan
pressure alarm		
The whole	b) Too much dust and dirt on	b) Clean the sundries around the machine to
machine is	the filter screen	ensure that there is enough heat dissipation
stopped and the		space around the machine
alarm light is		
on. (power on		
reset)		
	c) Air inlet blocked	c) Load reduction
	d) The load is too heavy and	d) Replace the fan
	the water temperature is too	
	high	
	e) Fan fault	e) Replace the pressure switch
	f) Pressure switch fault	f) Reconnect the pressure switch wiring
	g) The pressure switch	
	wiring is falsely connected	
	or falls off	
Er05 high	a) Small refrigerating	a) Re selection
liquid	capacity, unreasonable type	, , , , , , , , , , , , , , , , , , ,
temperature	selection	
alarm		

	ſ	ton®
The whole machine is stopped and the alarm light is on. (power on reset)	b) Insufficient water flow	b) Clean the water pipe
	c) Poor ventilation	c) Clean the sundries around the filter screen of the condenser and the whole machine to leave enough heat dissipation space for the machine
	d) Refrigerant leakage	d) Check the leakage point and charge the refrigerant
Er06 external light path flow alarm: the whole machine	a) Connection of inlet and outlet is reversed	a) Correctly connect the inlet and outlet water pipes
stops and the alarm light is on. (power on	b) Dirty and blocked waterways	b) Clear the waterway
reset)	c) Air leakage in suction pipeline	c) Check and fasten the suction pipe
	d) Water flow switch damaged	d) Replace the flow switch and clean the water system
A0 temperature sensing probe fault alarm: the whole machine stops and the alarm light is on. (power on reset)	a) L A0 main circuit temperature sensing probe short circuit	a) Check whether there is a short circuit at the wiring or the connection with the terminal
	b) H A0 external optical path temperature sensing probe short circuit	b) Replace the temperature probe
	c) C A0 condenser temperature sensing probe short circuit	



F0 temperature sensing probe fault alarm	a) L F0 main circuit temperature sensing probe open circuit	a) Check whether there is an open circuit at the wiring or the connection with the terminal
The whole machine is stopped and the alarm light is on. (power on reset)	b) H F0 external optical path temperature sensing probe open circuit	b) Replace the temperature probe
	c) C F0 condenser temperature probe open circuit	

Fault phenomenon	fault analysis	Exclusion method:
No response when powered on, no display	a) Abnormal power supply	a) Check the power supply
on the computer board	b) The connecting cable of the computer board falls off	b) Reconnect
	c) Power supply transformer damaged	c) Replace the transformer
The control panel shows that the operation is	a) The control circuit fuse is blown	a) Replace the spare fuse
equipment does not operate	b) Low power supply voltage	b) Specified voltage ±10%
	c) Power supply transformer damaged	c) Replace the transformer
Water pump does not work	a) Water pump thermal relay alarm	a) Check the alarm cause and press the reset button on the thermal relay to reset it
	b) Water pump damaged	b) Replace the water pump
	c) Internal thermal protection action of water pump	c) Clean the sundries around the machine to enhance heat dissipation
	d) Loose wiring	d) Tighten the wiring clip screws
The pump does not operate normally	a) Connection of inlet and outlet is reversed	a) Correctly connect the inlet and outlet water pipes
Insufficient pump flow	b) The liquid return pipeline is loose	b) Test the liquid return pipe and lock the leakage
Pump noise	c) Pipeline or filter blocked	c) Clean the pipeline or filter
Air entering the system	d) The pipeline is too thin or too long, and the pressure loss is too large	d) Increase the pipe diameter and shorten the length
	e) The liquid viscosity is too high or the liquid temperature is too low	e) Change the liquid and raise the temperature



	f) Pump damaged	f) Replace with a new pump
The noise is too loud	a) Liquid temperature too low	a) Adjust the preset temperature appropriately
	b) Improper adjustment of liquid pump	b) Adjust the adjusting bolts of the liquid pump properly
	c) The pipeline is blocked	c) Check the pipeline, valve and filter
	d) Fan blade deformation	d) Replace the fan
	e) Loose cover screws	e) Fastening screws
	f) Pipeline equivalent resonance	f) Find the resonance point and fix it properly
Refrigeration compressor does not work	a) Liquid temperature setting error	a) Reset the liquid temperature
	b) Control fuse blown	b) Replace fuse
	c) Contactor damaged	c) Replace contactor
	d) Control transformer damaged	d) Replace control transformer
Poor cooling effect	a) The ambient temperature is too high	a) Ventilation and heat dissipation
	b) Clogged filter screen	b) Clean the filter screen and fan
	c) Liquid level too low	c) Supplementary media
	d) Insufficient flow	d) Check whether the pipeline is blocked and clean the filter
	e) Refrigerant leakage	e) Refill refrigerant

Fault phenomenon	Fault analysis	Exclusion method:
Warning of low temperature of external optical path, flashing water temperature display, no alarm output	a) The ambient temperature is low, and preheating is required for restart after the equipment is stopped	a) In the case of high ambient temperature and humidity, there is a risk of condensation on the waterway
	b) There is a problem with the water supply of the equipment	b) Contact the manufacturer for maintenance
Low temperature alarm of main circuit, flashing water temperature display, no alarm output	a) The ambient temperature is low, and preheating is required for restart after the equipment is stopped	a) Remind the customer that there is a risk of dew condensation on the waterway when the ambient temperature and humidity are high
	b) There is a problem with the water supply of the equipment	b) Contact the manufacturer for maintenance
The external light path temperature is too high, the water temperature display flashes, and there is no alarm output	a) Small refrigerating capacity, unreasonable type selection	a) Re selection
	b) Insufficient water flow	b) Clean the water pipe
	c) Poor ventilation	c) Clean the sundries around the filter screen of the condenser and the whole machine to leave enough heat dissipation space for the machine
	d) Refrigerant leakage	d) Check the leakage point and charge the refrigerant
High temperature alarm of main circuit, flashing water temperature display, no alarm output	a) Small refrigerating capacity, unreasonable type selection	a) Re selection
	b) Insufficient water flow	b) Clean the water pipe
	c) Poor ventilation	c) Clean the sundries around the filter screen of the condenser and the whole machine to leave enough heat dissipation space for the machine
	d) Refrigerant leakage	d) Check the leakage point and charge the refrigerant
The conductivity display screen flashes	a) Dirty water	a) Change distilled water
	b) Resin failure	b) Replace resin

#### **5** Transportation requirements

- 1. During equipment handling, do not bump up and down or tilt excessively to avoid collision and impact.
- 2. When transporting or moving the equipment, please use the correct tools (such as forklift or crown block), and do not carry the equipment empty handed.
- 3. Before moving the equipment, please remove the power cord and drain the cooling liquid inside the system. Do not move or transport the equipment with liquid.
- 4. When using a forklift to move the equipment, ensure that the equipment is in a balanced state and the height is not more than 200mm above the ground (see Fig. 10).
- 5. When using a forklift to move equipment with casters, the casters must be removed or avoided.
- 6. When the crown block moves the equipment (see Fig. 11):

(1) When moving equipment, all personnel must keep a safe distance from the crown block, and the angle of the hoisting rope should be  ${\leqslant}45^\circ$  .

(1) The equipment is designed with a lifting device. Please use the lifting device of the equipment.



Figure 10

#### 6 **Storage requirements**

Please pay attention to protect the inside of the machine and the condenser from dust and moisture when it is stopped for a long time. Please drain the water in the equipment and use compressed air to drain the water in the pump, filter and pipeline.

#### Operation steps:

- 1. First shut down and cut off the power supply, and then operate after 5 minutes;
- 2. Close the inlet and outlet ball valves and remove the connecting pipes between the equipment;
- 3. Drain the water in the water tank, water pump, filter, resin tank, plate exchanger and pipeline in turn;
- 4. Use compressed air to blow out the residual liquid inside through each interface. It is better to blow it several times at intervals. When no water flows out from the interface, it is proved that it has been blown out:
- Close the inlet and outlet ball valves and all drain valves. 5.

#### Storage

- 1. Please place the machine away from dust;
- 2. Please wipe the surface of the machine body clean, and blow the dust and oil stain inside with an air pump;
- 3. Put a protective cover on the outside of the equipment to prevent dust and moisture from adhering;
- 4. Store the machine on a flat ground, in a dry, ventilated and rain proof place to avoid direct sunlight;
- 5. If the equipment is equipped with casters, please ensure that the casters are fixed or locked to avoid injury caused by caster sliding;
- Ambient temperature requirement:  $0 \sim 55$  °C, ambient humidity requirement:  $\leq 90\%$  RH. 6.



#### Discard

When the equipment reaches the service life, it shall be treated as industrial waste, and professional personnel shall be invited for guidance. The metal parts, plastic parts, electrical parts and refrigerants in the equipment shall be classified and treated according to the local environmental protection requirements.

#### 7 Others

- 7.1 Customer service
  - 1. The equipment shall be guaranteed for 12 months from the date of delivery (unless otherwise agreed).
  - 2. If the equipment is damaged due to improper transportation, installation and use, or force majeure, it is not covered by the manufacturer's warranty.
  - 3. Beyond the warranty period, the manufacturer provides paid services.
  - 4. The manufacturer can provide accessories for the equipment within 10 years.

A spare safety tube is reserved in the electric box of the refrigerator. This safety tube is used for the control circuit (AC220V, AC24V). When this safety tube is blown, the refrigerating machine stops working. At this time, it is necessary to check the electrical circuit and replace it after confirming that there is no error.

★ If the user replaces the fuse tube by himself, please note that it is consistent with the original fuse model.

#### 7.2 Special Notes

- 1. The equipment exporter must confirm that the exported products comply with the requirements of local laws and regulations in terms of refrigerant use regulations and product safety regulations. The equipment manufacturer shall not be responsible for all consequences caused by failure to confirm.
- 2. For products that cannot reach the protection level as required by the customer, the customer shall take protective measures and use them only after reaching the protection level.
- 3. For products whose control system is not perfect and cannot be used as independent equipment, the customer needs to provide relevant devices to meet the requirements of safety standards (CE standards).