

Climatic chamber

RHP-23BT

Operating

Manual

Contents

| | |
|---|-----------|
| 1. Climatic chamber Installation..... | 3 |
| 1.1. Check random files and accessories..... | 3 |
| 2. Basic parameters..... | 15 |
| 2.1. Performance: Air cooled at room temperature of 20℃, or water cooled at 25℃ (no load)..... | 15 |
| 2.2. Structure and Material..... | 16 |
| 2.3. Refrigeration system..... | 17 |
| 2.4. Control system..... | 17 |
| 2.5. Safety device..... | 18 |
| 3. Preparation before operation..... | 19 |
| 3.1. Hazard type..... | 19 |
| 3.2. Use plan processing..... | 20 |
| 3.3. Temperature and humidity control..... | 21 |
| 3.4. Description of equipment parts and functions..... | 24 |
| 3.5. Set the temperature and humidity limits..... | 25 |
| 3.6. Installation of guide rail and rack..... | 28 |
| 3.7. Placement of test pieces in the test chamber..... | 29 |
| 3.8. Connection of test piece power cord..... | 30 |
| 3.9. Power supply of test piece..... | 31 |
| 3.10. Checking the water level of the water tank (when operating with temperature and humidity).... | 32 |
| 3.11. Check the drain..... | 32 |
| 3.12. Test wet cloth installation and inspection..... | 32 |
| 3.13. Check and adjust wet bulb water level..... | 33 |
| 4. Operation of the test chamber..... | 34 |
| 4.1. Precautions..... | 34 |
| 4.2. 2. Matters needing attention during operation | 35 |
| 4.3. Device deactivation..... | 36 |
| 5. Maintenance and care..... | 37 |
| 5.1. Maintenance card..... | 37 |
| 5.2. Maintenance..... | 38 |
| 6. Troubleshooting..... | 44 |

1. Climatic chamber Installation

1.1. Check random files and accessories

- ◆After unpacking the equipment, check the number and model of all random accessories and accessories according to the list.
- ◆If the equipment ordered has optional accessories, please check according to the list of optional accessories.
- ◆If the equipment ordered is damaged or missing, please contact us immediately.

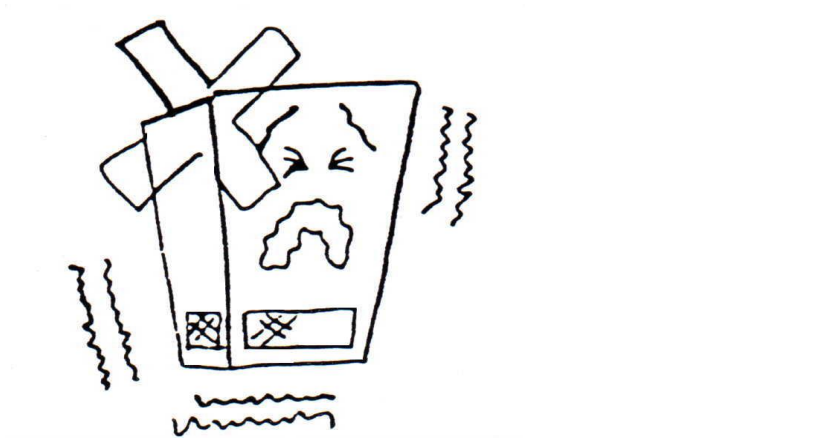
List of accessories and file (standard model)

| | No | Name | Description | Quantity | Check |
|-------------|----|---------------------|---|------------|-------|
| Accessories | ① | Silicone plug | Seal threading hole | 2 | |
| | ② | Manual | operation Manual | 1 | |
| | ③ | Test report | Calibration value of the machine at the factory | 1 | |
| | ④ | Guide rail, rack | To place test sample | 2 for each | |
| File | ① | Test wet cloth | 1 pack total 5 pieces of wet cloth | 1 pack | |
| | ② | Fuse 2A/3A/5A/8A | Electrical protection (according to the electrical schematic diagram of each model) | 2 for each | |

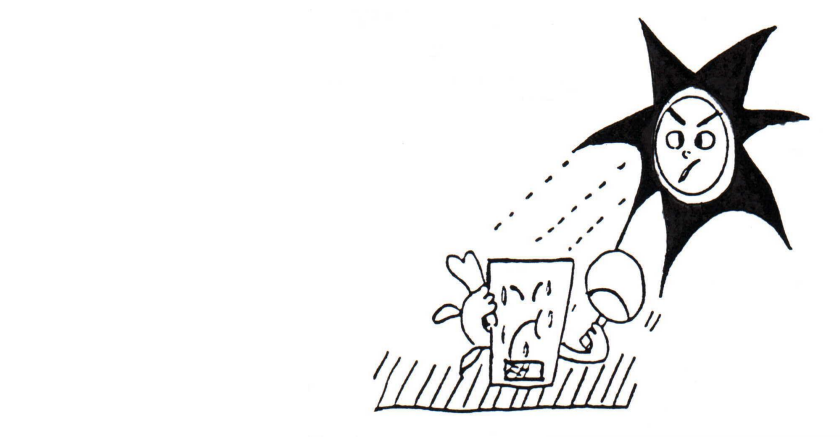
Note: It is recommended to use an ambient temperature of 26 degrees

1.1.1. The equipment installation shall meet the following conditions

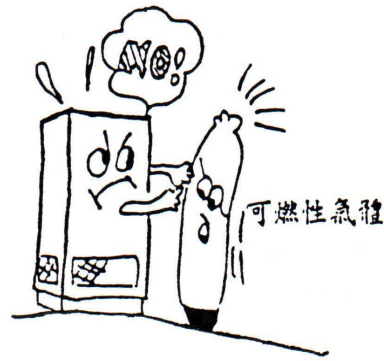
1) should be set on a flat, vibration-free ground. (Please check with the level)



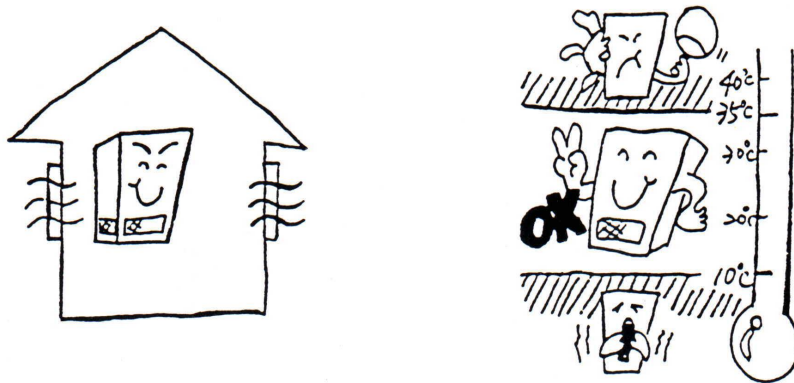
2) Well ventilated and free from direct sunlight



3) Keep away from heat and inflammable and explosive materials

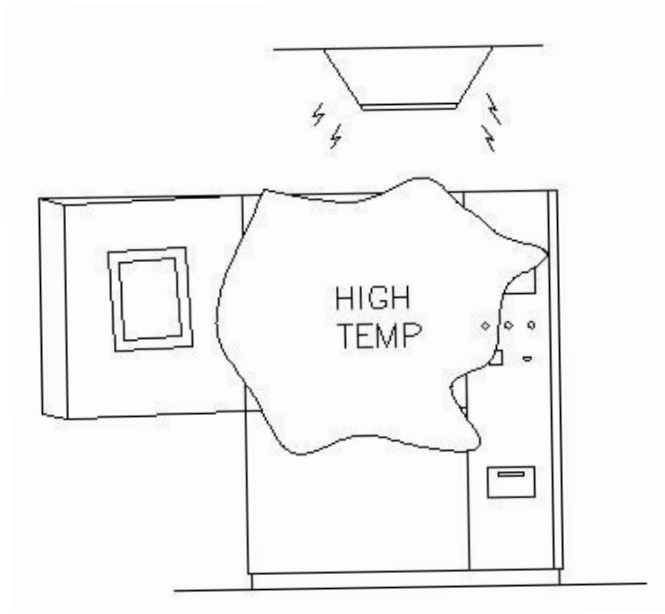


4) Please choose a place with less dust and moisture and good ventilation. For example, if it is placed in a poorly ventilated room or used in an environment with a room temperature above 30°C, the cooling rate may slow down or the required low temperature may not be reached.



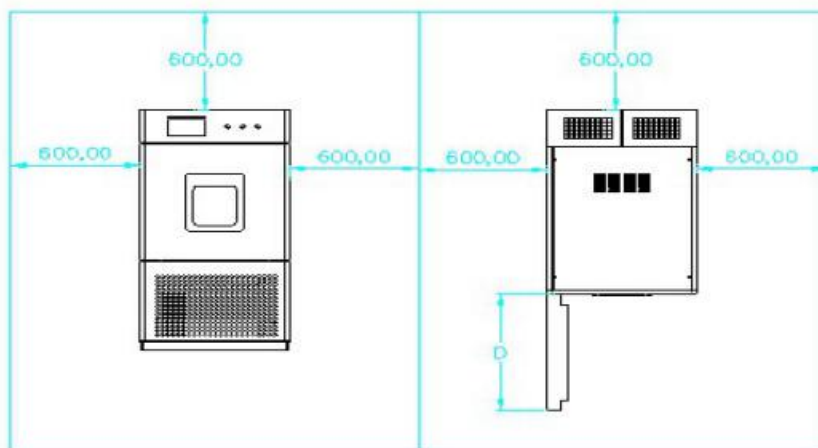
5) Power supply lines and water supply and drainage pipes should be shortened and the water supply and drainage should be smooth.

6) The high temperature alarm device cannot be directly installed above the installation equipment.



1.1.2. Installation space requirements

When installing the equipment, ensure that there is sufficient detection space and heat dissipation space for the equipment. The distance between this machine and the wall and any other machine should be at least 60



The size of D is based on the size of the door

Top view

Front view

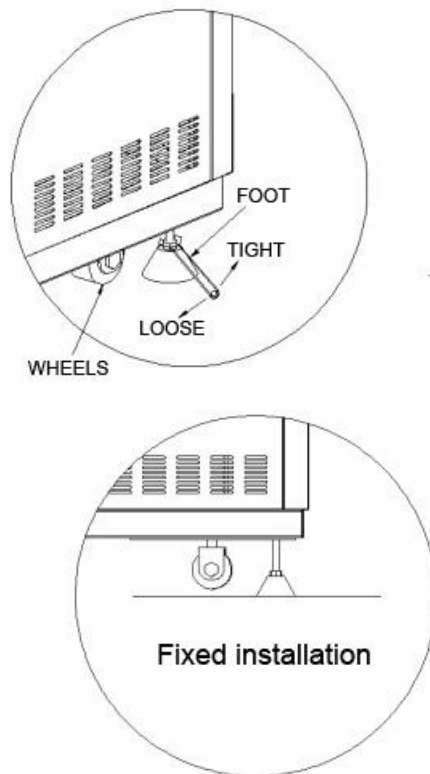
1.1.3. Open space:

| MODEL | Preset door opening size | Remark |
|----------------|-----------------------------|--|
| RHP-80BT | 90 | Custom chamber is 1.5 times the width of the door |
| RHP-150B T | 104.25 | |
| RHP-225B T | 104.25 | |
| RHP-408B T | 119.25 | |
| RHP-800B T | 179.25 | |
| RHP-1000B T | 179.25 | |

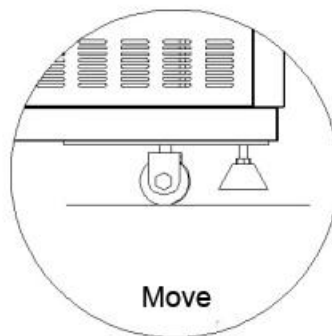
1.1.4. Install or shift

There are fixed foot cups and rollers at the four corners of the equipment. When installing the equipment, you can use a wrench to adjust the surrounding foot cups to ensure the level of the equipment. When adjusting, use a spirit level to check the level of the equipment. When shifting, loosen the surrounding foot cups with a wrench to move. As follow:

◆The chamber can be raised or lowered by rotating the fixed foot cup. When positioning, the device should be lifted by the foot to support the weight of the device. Before rotating the foot cup, loosen the lock nut with a wrench. As follow:



◆Before moving to the chamber, adjust the foot cup to make the foot cup leave the floor, and then move it .As follow:

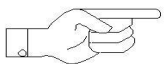
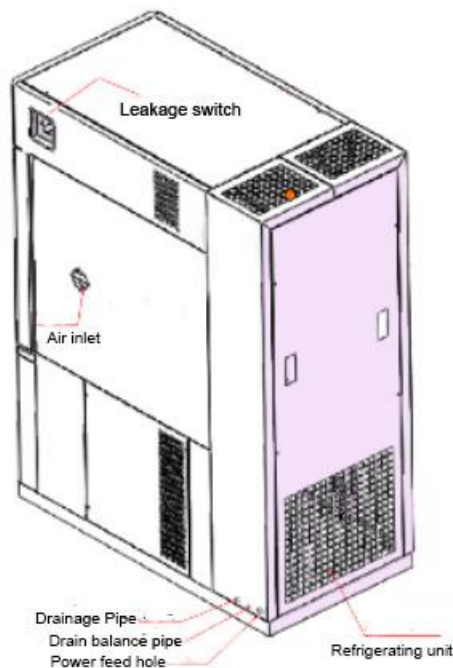


1.1.5. Install waterway and drainage pipeline

A. Sewage pipe connection:

◆ The drain pipe must be connected to discharge the sewage when the equipment is tested for humidity

- ① Take out the accessory silicone tube 3/8 and connect it to the manual water hole and drain hole respectively.
- ② Check whether the manual drain pipe is closed when doing humidity.
- ③ Connect the sewage pipe to the sewage outlet. (Pictured)



Tip: Sewage should not be directly discharged to the outside. Sewage pipes generally discharge the sewage on the sewage main, or use a sewage collection container (the outer edge of the sewage container is lower than the

sewage outlet of the equipment, and the collected sewage is dumped in time).

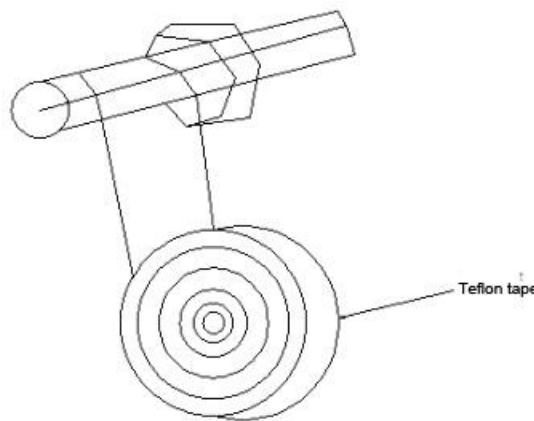
1.1.6. Waterway installation and sewage system (water-cooled)

◆ Choose different pump valves according to the flow rate and water pressure. The inlet and outlet are generally installed on the left side of the rear of the equipment. Use standard water pipes as much as possible.

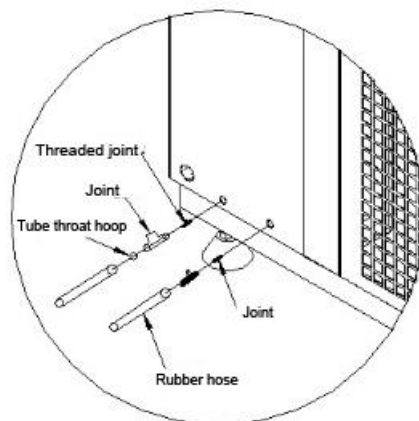
① The water source and the inlet and outlet pipes of the equipment have the same specifications

② The tube connection and the tube connection must be sealed with PTFE tape .

As follow:



③ Use a wrench to tighten the pipe connection, the drain valve screening procedure, and the water pipe. As follow:



◆ Use rubber water pipes to prepare gaskets, pipe joints, pipe hoops and other accessories.

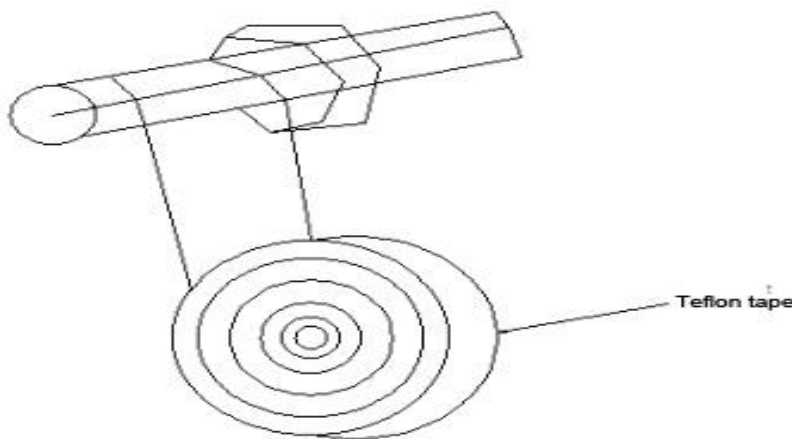
① When using rubber water pipes as the equipment inlet and outlet pipes, the water pressure must be less than 10kg/cm². The same specification material should be used between the water source and the equipment inlet and outlet ports. Rubber hose specifications (size: mm)

② Fix the pipe joints, screening procedures, pipe joints at the water inlet of the equipment with a wrench.

③ Put the rubber hose on the pipe joint and fix the hose with a pipe hoop.

④ Lock the pipe joint on the equipment, and then fix the water outlet rubber hose on the pipe joint, and tighten it with a pipe hoop

⑤ Teflon sealing tape should be wrapped around the joint of the pipe joint .As follow:



1.1.7. Electrical installation

Please distribute power according to the following methods and pay attention to the power supply capacity. Do not use multiple power supplies at the same time to avoid voltage drop, affect the performance of the machine, or even cause failure and shutdown. Please use a dedicated circuit.

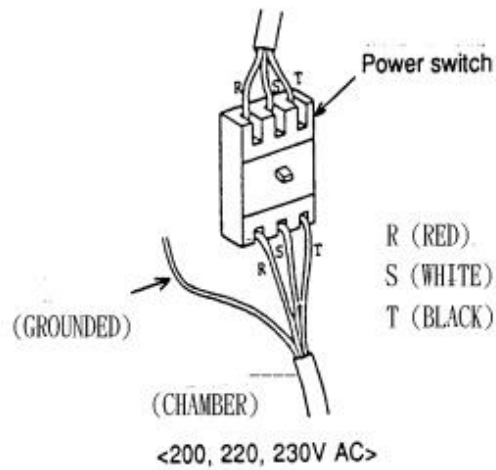
1)The power wiring voltage according to the specification table:

| | | | |
|---|------------|---|------|
| ● | 1ψ3 φ 220V | ● | 50HZ |
| | 3ψ4 φ 380V | | 60HZ |

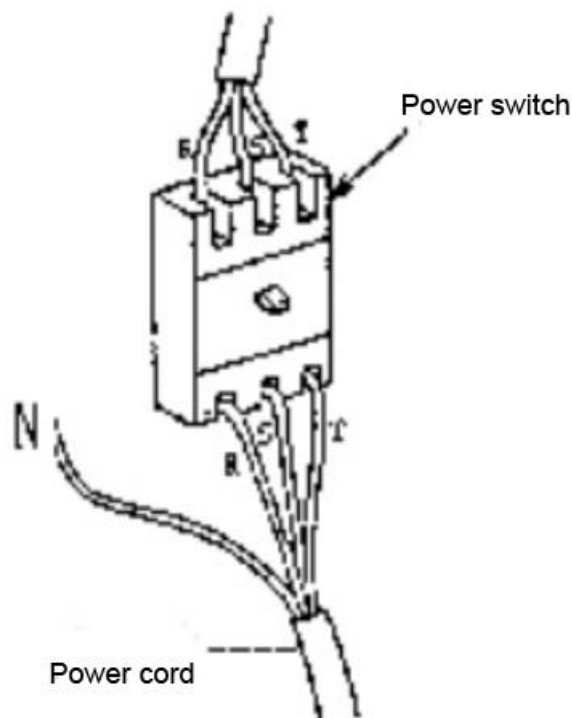
2)The applicable wire diameter : (the cable length is within 10M)

| | | | |
|---|--------------------|--|-------------------|
| | 2.5mm ² | | 10mm ² |
| ● | 4.0mm ² | | 16mm ² |
| | 6.0mm ² | | 25mm ² |

□When the cable is connected to the power supply, the yellow and green two-color wire is the ground wire (GROUNDED) during single-phase power distribution, and the red and black is the power supply.As follow:



- The three-phase distribution is shown in the figure:



3) The fluctuation of the power supply voltage should not exceed $\pm 5\%$ of the rated voltage. (The maximum allowable voltage is $\pm 10\%$ of the rated

voltage).

4) If it is three-phase power supply, please pay attention to the lack of phase protection. (If it is determined that the three-phase power supply has power and the machine is not in operation, the machine may be in reverse phase, and only two adjacent power lines need to be exchanged).

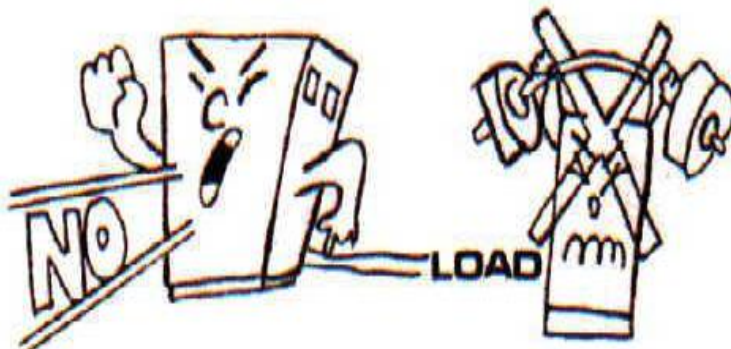
5) Power supply of the machine: ■ 1 ψ 3 ϕ , please ground the grounding terminal on the back of the machine.

6) If you connect the ground wire to the water pipe, the water pipe must be a metal pipe through the ground. (Not all metal tubes can be effectively grounded, and the detection grounding resistance is less than 100 Ω).



7) Do not connect the ground wire to the oil or gas pipe.

8) Do not connect the power supply used for the test product to the power supply of the machine. To avoid overloading



2. Basic parameters

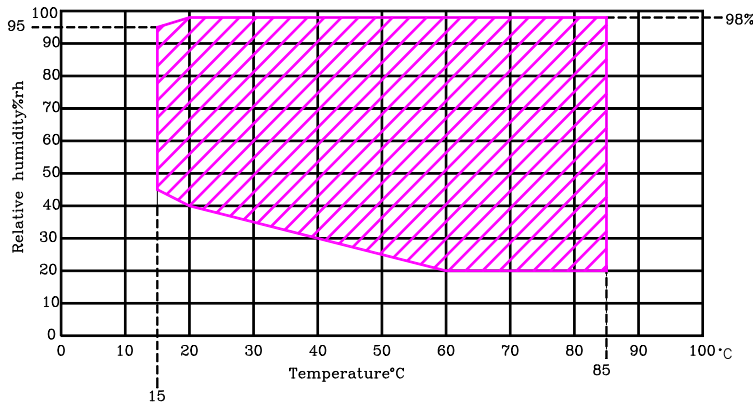
* Control methods and features:

The Balanced Temperature and Humidity Control System (BTHC) controls the SSR in PID mode, so that the heating and humidification amount of the system is equal to the amount of damp and heat loss, so it can be used stably for a long time.

2.1. Performance: Air cooled at room temperature of 20°C, or water cooled at 25°C (no load)

- ① Temperature range: -40°C ~ +150°C
- ② Temperature fluctuation: $\leq \pm 0.5^\circ\text{C}$
- ③ Temperature uniformity: $\leq \pm 2.0^\circ\text{C}$
- ④ Temperature deviation: $\leq \pm 2.0^\circ\text{C}$
- ⑤ Humidity range: 20% ~ 98% R.H.
- ⑥ Humidity fluctuation: $\pm 2.5\%\text{R.H.}$
- ⑦ Humidity deviation: $>75\%\text{R.H.}(\pm 3\%\text{R.H.}), < 75\%\text{R.H.}(\pm 5\%\text{R.H.})$
- ⑧ Heating time: -40°C / 150°C, about 60 minutes (no load)
- ⑨ Cooling time: from +20°C to -40°C for about 60 minutes (no load)
- ⑩ Power source: 1:3 ϕ 220V 50HZ total power: 5.2KW
- ⑪ Humidification water supply condition: not less than 500 M Ω

resistivity/M of water temperature and humidity control



2.2. Structure and Material

| | Model | Internal size | External dimension |
|--|----------|-------------------|--------------------|
| | RHP-23BT | 30x30x25(WxHxD)cm | 50x125x90(WxHxD)cm |

① Internal material: Stainless steel (SUS #304 1.0mm thickness)

② External material: Iron plate

③ Insulation material: high temperature resistant rigid polyurethane foam

④ Supply air circulation system:

High temperature resistant stainless steel long shaft motor dedicated to constant temperature and humidity box made in Taiwan

- Long stainless steel shaft
- Multi-wing fan blades (SIRCCO FAN)
- Two-way adjustable louver to ensure uniform temperature distribution in the test chamber

⑤ Box door: single-piece door, open outside, hinge on the left, handle

on the right

- ⑥ 3-layer vacuum coating anti-frost observation window
- ⑦ With observation window W300xH260mm defogging tempered glass, LED lighting
- ⑧ Door hinge: SUS #304 imported hinge

2.3. Refrigeration system

- Compressor: 1 full-dense compressor imported from France
- Refrigerant: environmentally friendly refrigerant R404A
- Condenser: fin type with heat dissipation motor
- Evaporator: fin-type multi-stage automatic load capacity adjustment
- Other accessories: desiccant, refrigerant flow window, repair valve
- Expansion system: capacity automatic control throttling and pressure reducing refrigeration system

2.4. Control system

- ① Programmable temperature and humidity controller: South Korea imported LCD touch controller
- ② Heating and humidifying system:
 - Heater: Fin-shaped heat pipe nickel-chromium alloy U-shaped high-efficiency heater, automatic calculation of high precision PID+SSR control (calculation cycle: 1~4S can be set), so that its heat loss is equivalent to the heating amount, so the ratio Traditional ON/OFF

control saves about 10%

- Humidifier: Spiral stainless steel electroplating heater, using safe and efficient saturated steam humidification system to automatically calculate high-precision PID+SSR control (calculation period: 1~4S can be set), so that its heat loss is equivalent to the heating amount, so About 10% less power than traditional ON/OFF control
- Waterway system: the waterway and the circuit are completely independent in structure to improve the reliability of the equipment operation; the progressive water-filling float control valve makes the humidity control more accurate and stable; the water level observation window of the water storage tank, the observation window of the water storage tank and the lack of water Alarm prompt function.
- Temperature measuring body : Taiwan-made high-precision DIN standard class A ψ 4.8mm m SUS #304 stainless steel PT 100 Ω platinum temperature sensor 2 pcs.

2.5. Safety device

- ① Zero-crossing gate fluid power controller
- ② Air burning prevention protector
- ③ Compressor high voltage protection switch
- ④ Compressor overheat protection switch
- ⑤ Compressor overcurrent protection switch

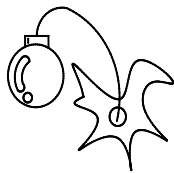
- ⑥ No-fuse switch
- ⑦ Ceramic fast fuse
- ⑧ Line fuses and fully sheathed terminals
- ⑨ Buzzer

3. Preparation before operation

Users need to read before preparing to operate the equipment to understand the relevant precautions that will damage the equipment and samples and human safety during the operation of the equipment.

3.1. Hazard type

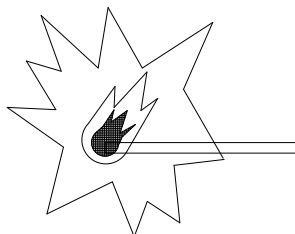
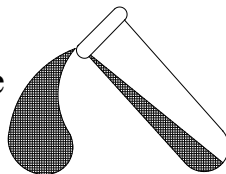
❖ Explosive



❖ Flammable



❖ Oxidizing substance



❖ Incendiary article

❖ Combustibles



The equipment is strictly prohibited to operate in the above states.

3.2. Use plan processing

Read the following plan as you use it:

- **The equipment needs to be grounded. If the equipment is not reliably grounded, the leakage protection switch will not be effective, and the current impact will cause damage to the equipment. Refer to the equipment grounding part of the installation manual**
- **Check whether the leakage protection switch is normal. Before operating the equipment, if the test is incorrect, the leakage protection switch will not operate. For the test method, refer to the relevant content in the leakage protection switch test.**
- **During the high temperature and high humidity testing, it is forbidden to open the equipment box door. In this case, if you open the door, high temperature and high humidity steam will flush out of the device, causing personal injury. It is also not allowed to touch objects inside the cabinet to prevent burns.**

- **Test sample** During the test, if the sample is energized, after the test is completed, the sample power supply must be disconnected. Otherwise, the sample heating may damage the test piece or cause a fire. For related content, refer to the relevant content of the test piece wiring.
- **Do not stop and open the leakage protection switch continuously (the interval between opening and stopping is not less than 5 minutes) otherwise it will shorten the service life of the leakage switch.**

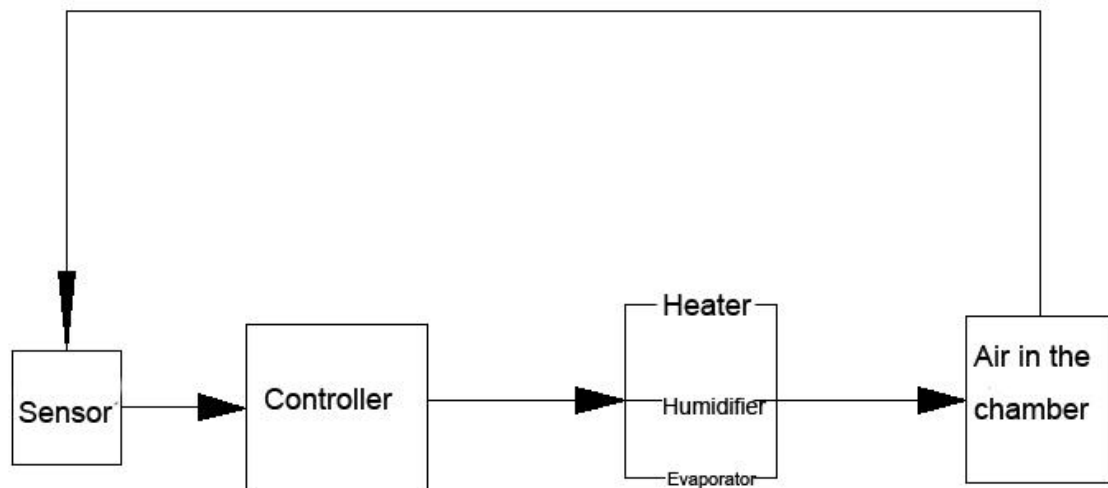
3.3. Temperature and humidity control

① Configuration

This section introduces the configuration of temperature and humidity controllers. RHP series constant temperature and humidity testing machine should be equipped with controller introduction: constant temperature and humidity testing machine is composed of test box and air conditioning system. The air conditioning system and air circulation are completed by multi-blade centrifugal fans. The regulator includes: heater, evaporator, humidifier. The gas state in the test chamber is detected by the temperature and humidity sensor and fed back to the controller for control.

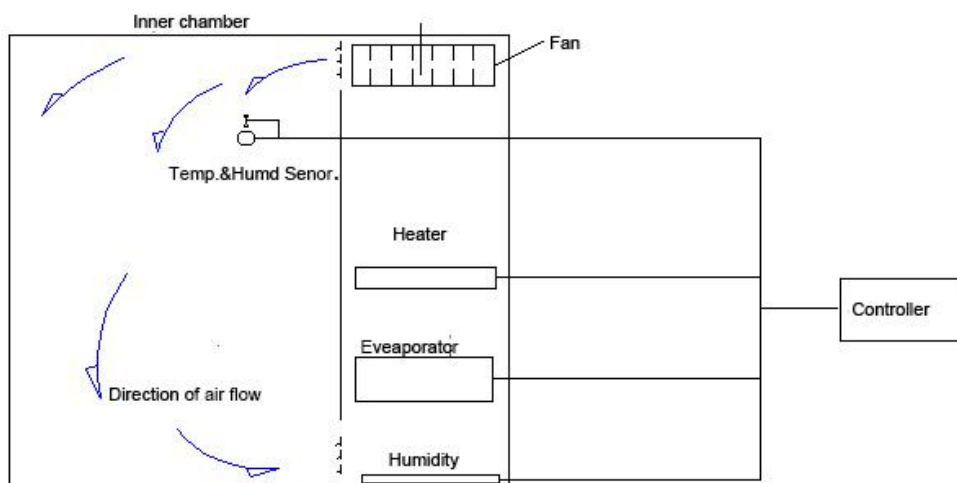
② Temperature and humidity controller

The temperature and humidity controller is installed on the control panel of the device, and the heater and humidifier are controlled by detecting the air condition in the box through the temperature and humidity sensor, so that the heating and humidification amount of the system is equal to the loss of heat and humidity, thereby keeping the air in the chamber constant at a certain setting status.



③ Temperature and humidity control system

The RHP series constant temperature and humidity machine uses the BTHC balance temperature and humidity adjustment principle. According to the cooling and dehumidification load in the test box, the capacity of the heating and humidifier is continuously adjusted, so that the internal heating, heat dissipation, dehumidification and humidification of the box are always in balance. State. Working under the balanced temperature and humidity control mode, the minimum working load can achieve the balance of temperature and humidity in the test box, even if the heat value of the load in the test box changes at any time, it can be constant.

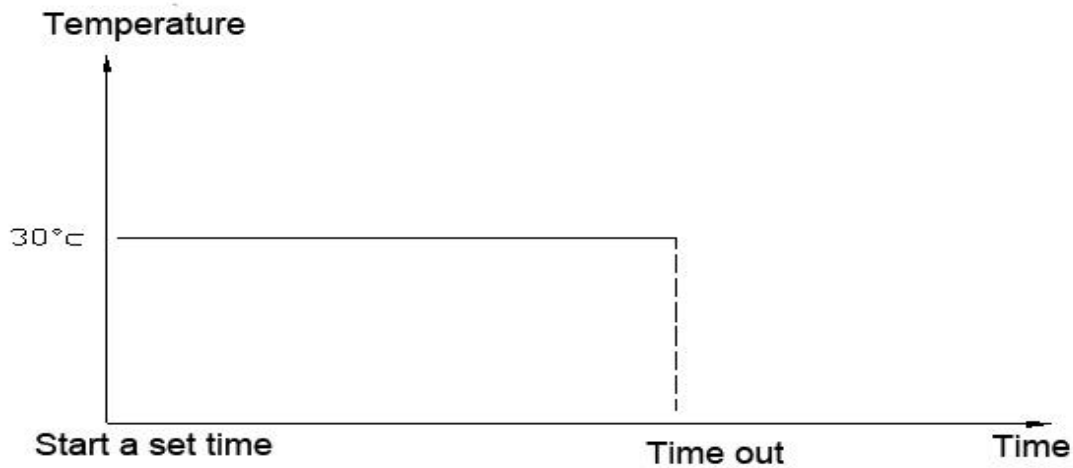


④ Temperature and humidity controller

To control the temperature and humidity inside the test chamber, first enter the controller. The controller has two methods for temperature and humidity control, fixed value control and program control

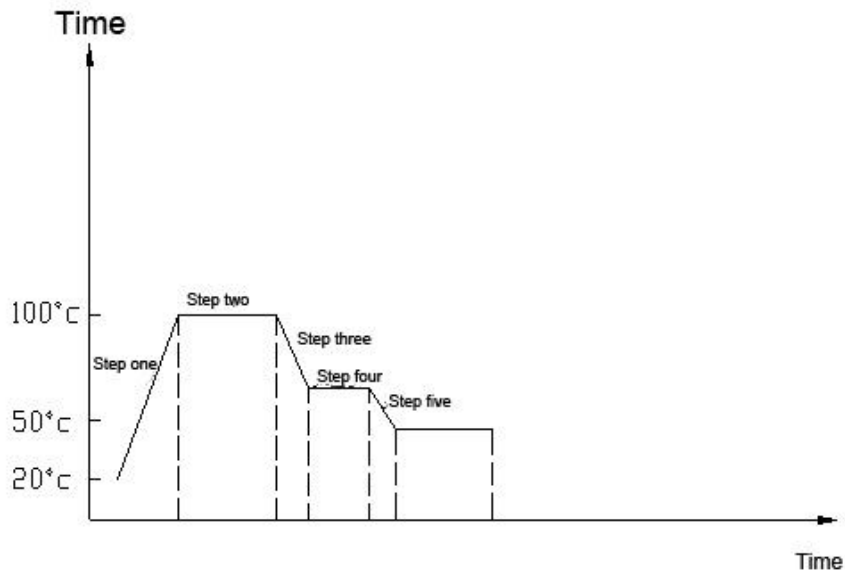
⑤ Fixed value control

In the state of constant value control, the temperature of the test chamber is maintained and the humidity is in a constant state, and the preset value is set by the controller.



④ Program control

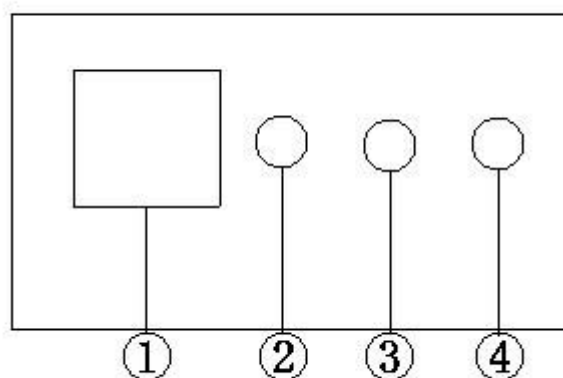
Under the state of program control, the temperature and humidity in the test chamber operate according to the set temperature and humidity. The program control is divided into several steps, each step is composed of temperature, humidity and time. In each step, the temperature and humidity changes according to the set slope.



3.4. Description of equipment parts and functions

This section describes the name and function of each part of the test chamber.

●Operation panel:



① Programmable controller

② Buzzer

③ Switch of light

④ Power switch

3.5. Set the temperature and humidity limits

In order to avoid the damage of the RHP series constant temperature and humidity machine during the test, the high and low temperature limits in the test box can be set.

① High and low temperature limits

The test box provides high and low temperature setting protectors:

② Automatic overheat protection:

Automatic overheat protection is one of the functions of the controller. If the temperature in the test chamber is higher than the set temperature. When the temperature is above 10°C, the controller will automatically cut off the heater power, and when the temperature drops back to the set value automatically.

Below 8°C, the heater continues to work.

③ Setting of high and low temperature and humidity

A. High temperature limit

The internal setting of the controller, the high temperature limit can be set to any of the following values:

◆ It can be set to any value of over temperature controller maximum setting value above 10°C.

- ◆ Below the temperature resistance of the test piece

B. Low temperature limit

Control internal settings, the low temperature value can be set to any of the following values:

Note: The high temperature limit has been set at the factory to set the maximum temperature of the machine plus 10°C.

C. High humidity limit

Internal setting of the controller, high humidity can be set to any of the following values:

- ◆ Exceed any value set by the controller with a maximum humidity of 10% or more

- ◆ Below the humidity resistance of the test piece

D. Low humidity limit

The internal setting of the controller, the low humidity setting must meet the following conditions:

- ◆ Less than 10% below the minimum set humidity value of the controller

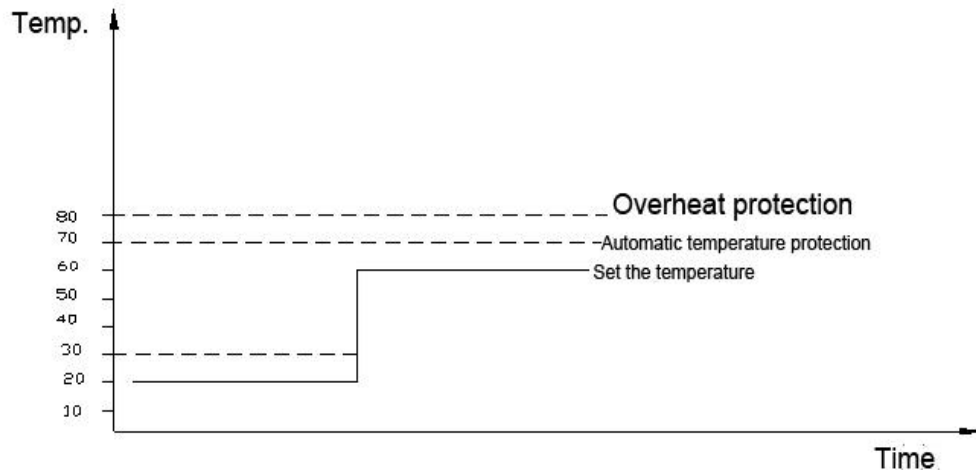
- ◆ Higher than the minimum tolerance humidity value of the test piece

Warning: If the temperature and humidity limits are not good, the test piece may be damaged during the test, and the test must be reset every time.

E. Example of High &Low Limit Setting :

◆ High and low temperature limit setting

In this example, the test temperature of the test piece increased from 20°C to 60°C.

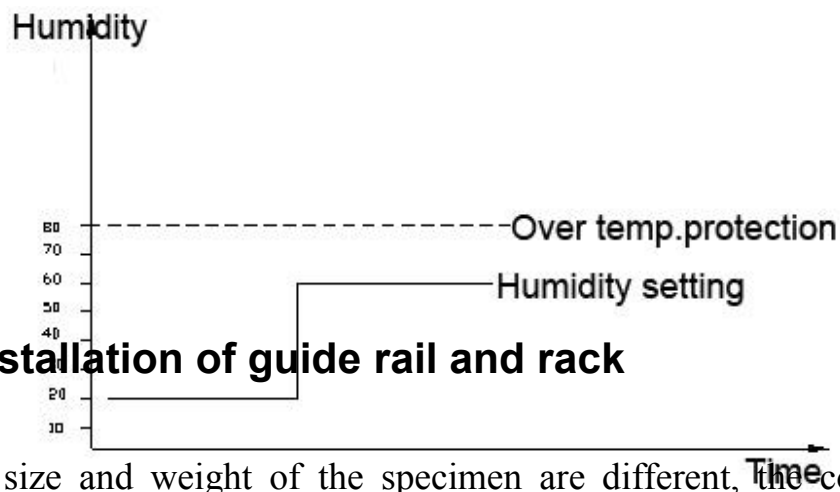


④ The procedure for setting the test piece is: hold at 20°C for a period of time, and then rise to 60°C for a period of time. The maximum temperature in the program setting is 60°C, and the over-temperature protector is set to 70°C (60°C+10°C). During the test of the test piece, when the temperature is maintained at 20°C, the automatic temperature protection of the controller is: 28°C (20°C+8°C), and when the temperature is maintained at 60°C, the automatic temperature protection is 68°C (60°C+8°C).

⑤ If the temperature exceeds 28 °C, the heater is powered off, the controller has no heating signal output (other heating signal is related to PID parameter setting, the factory setting is OK), the alarm resets when the temperature drops below 28 °C, The heater is only allowed to run again.

⑥ If the temperature exceeds 68 °C, the controller cuts off the heater power and the compressor starts to work. When the temperature drops to 67.9°C, the heater is allowed to run again, and the compressor stops working.

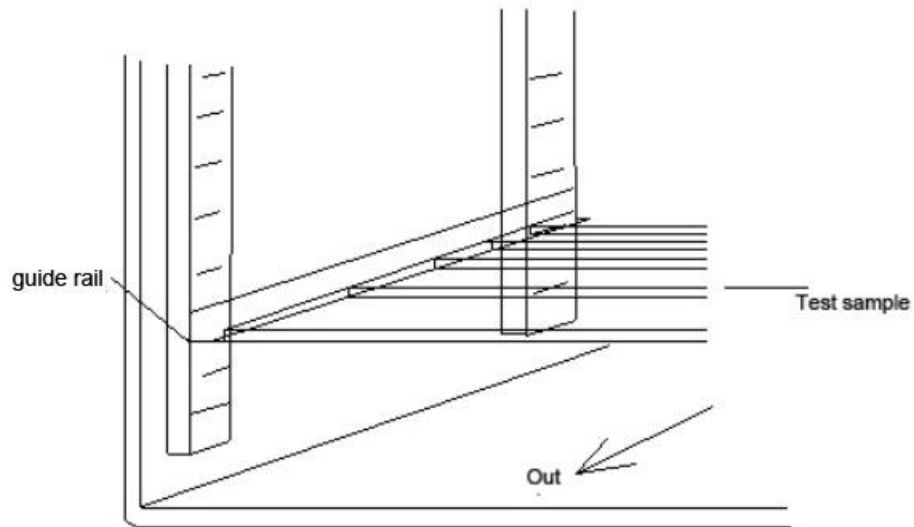
⑦ If the automatic temperature protection fails, when the temperature rises to 70°C, the over-temperature protector will cut off the control power of the device and the device will stop working. In this case, manual reset is required before the equipment can continue to operate.



3.6. Installation of guide rail and rack

As the size and weight of the specimen are different, the corresponding frame should be adjusted.:

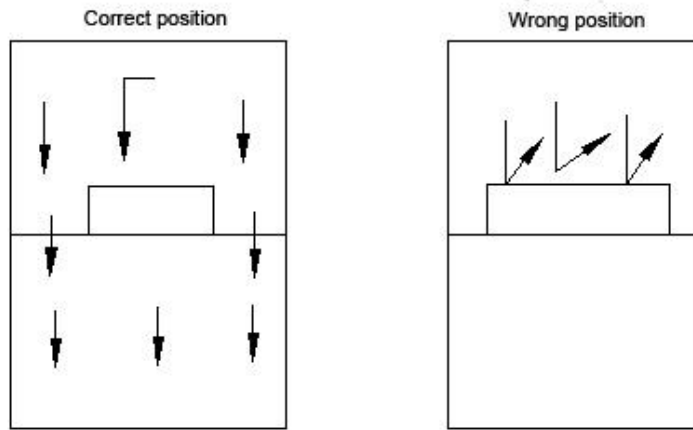
- Pull out the rack from the rail



- Take the guide rail out of the support frame hole
- Adjust the height of the guide rail according to the weight and size of the test piece
- Push the rack into the test box

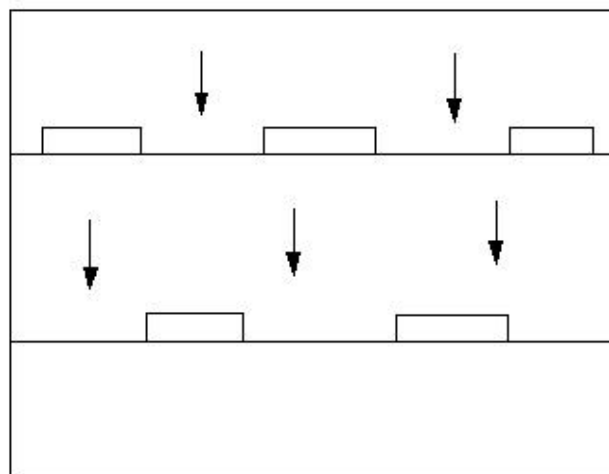
3.7. Placement of test pieces in the test chamber

After the test piece is placed in the test box, the air circulation in the test box must be ensured. If the placement of the test piece is in a wrong location, it will affect the temperature uniformity in the test chamber.



The location of samples in internal chamber

If multiple test pieces are placed in the test chamber, please place them according to the following placement methods to make the air flow smooth.



The location of sample in the internal chamber

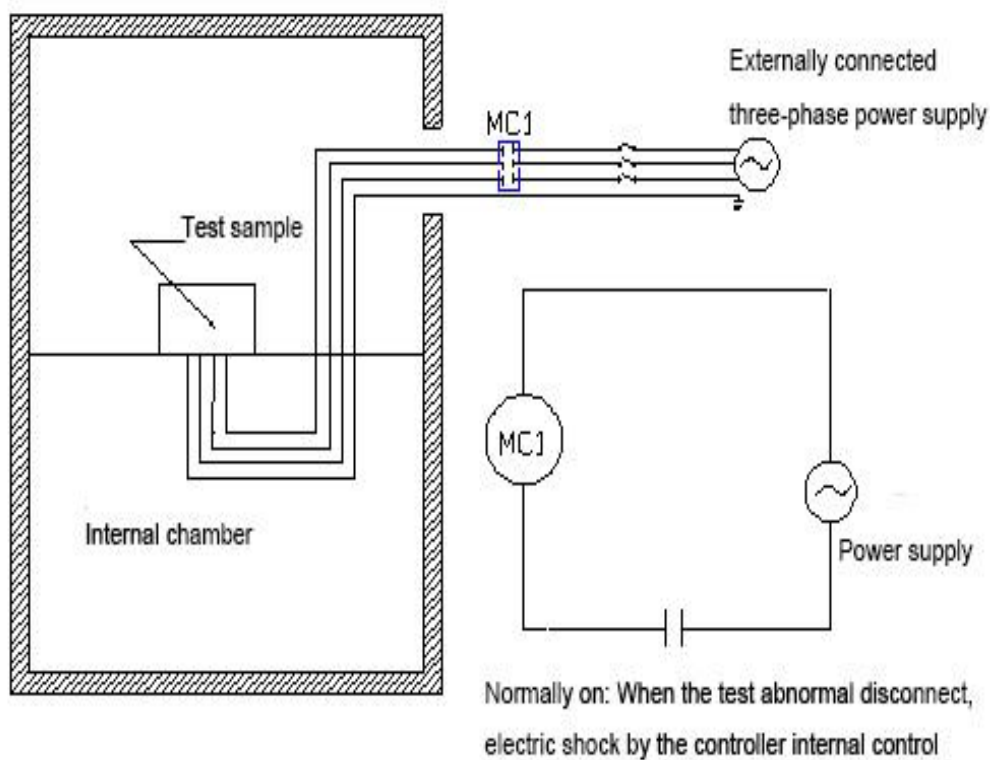
3.8. Connection of test piece power cord

- A.** If the test box stops running, the power supply of the test piece must be disconnected.
- B.** If the test box is stopped and the test piece is still energized, the test piece will generate heat and heat will accumulate and damage the test piece, or even cause a fire. The power port capacity of the test piece is 250VAC/3A.

Note: When placing the power cord of the test piece, keep the power cord of

the test piece in the "u" shape. When the test piece and the connecting terminal are slightly offset, it will not affect the power supply of the test piece or may damage the test piece.

C. If the power supply capacity of the test piece is greater than or equal to 3A and it is a three-phase power supply, the power connection of the test piece is as follows:



3.9. Power supply of test piece

Warning: U-shaped connection is used for the connection of the test piece. If the connection is too tight, any movement of the connection can cause damage to the test piece or other damage. The power supply of the test piece must be grounded, and the ground wire must not be connected to the device shell.

3.10. Checking the water level of the water tank (when operating with temperature and humidity)

Before operating with temperature and humidity, the water level in the water tank must be checked first. Check the water level of the water tank through the sight hole of the water level. If the water level of the water tank is sufficient, you can operate it, otherwise you need to add water manually.

3.11. Check the drain

Check the drain pipe and drain valve of the waterway system. The drain valve should be closed. Sewage discharge pipes are clean, and the sewage volume is emptied, (see relevant content in the installation manual)

3.12. Test wet cloth installation and inspection

If the test wet cloth is not installed, please install the test wet cloth. If the test wet cloth has been installed, it must be checked. If the test wet cloth is dry, please do as follows:

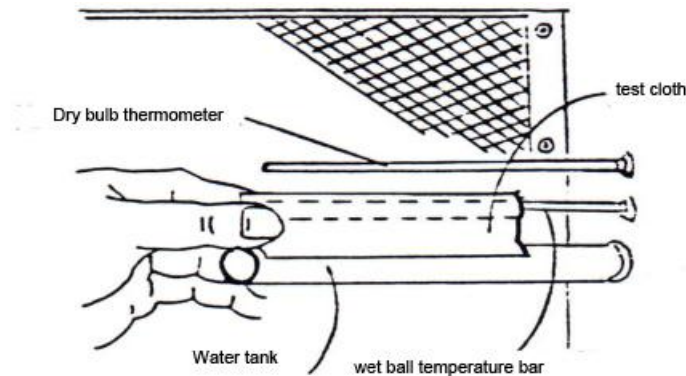
1) Remove the moisture measuring cloth from the moisture measuring sensor.

Note: Before removing the moisture measurement cloth, wash your hands first. If the moisture measurement cloth is contaminated, the moisture measurement cloth needs to be replaced.

2) When the moisture measuring cloth is put into the moisture measuring sensor from the end of the humidity sensor for installation, fold the moisture measuring cloth for installation.

Note: Put the moisture measurement cloth hole into the moisture measurement sensor, otherwise it will affect the humidity measurement accuracy of the sensor.

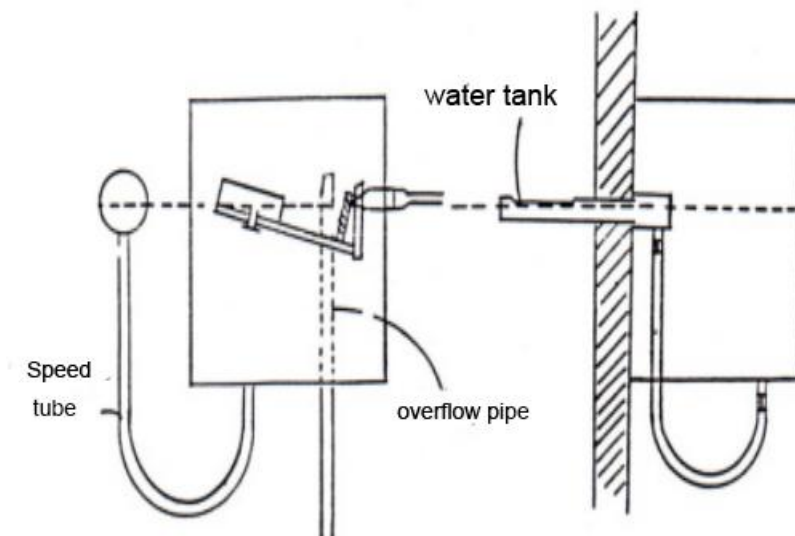
3) The bottom of the wet cloth should be immersed in the humidifying water tank, so that the water can wet the wet cloth. Carefully observe the wet cloth has water and absorb it.



3.13. Check and adjust wet bulb water level

A. The water level of the accumulator should not be too high, so that the water overflows the accumulator or is too low to make the wet ball test cloth absorb water abnormally, affecting the accuracy of the wet ball. Keep the water level about six points full.

B. The adjustment of the water level of the accumulator can adjust the height of the accumulator (adjust the screws on both sides).



4. Operation of the test chamber

4.1. Precautions

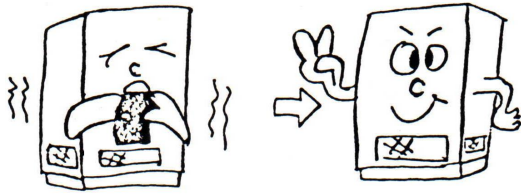
- 1) During the operation, unless absolutely necessary, please do not open the door, otherwise it may cause the following undesirable consequences.
 - . High temperature and humidity rushed out of the chamber~~ Dangerous
 - . The inside of the door still maintains a high temperature of ~~Resulting in burns
 - . High-temperature air may trigger a fire alarm and cause a malfunction.
- 2) Please note that the machine must be grounded safely to avoid static induction.
- 3) Avoid turning off and on the refrigeration unit within three minutes.
- 4) When humidifying water supply, please use pure water or water quality electrical conductivity below 0.02US Ω /CM to keep the water supply
- 5) If the heating sample is placed in the box, please use the external power supply for the sample power control, and do not directly use the power supply of the machine.
- 6) There is no fuse switch (circuit breaker) and temperature over-temperature protector, which provides the safety protection of the test product of the machine and the operator, so please check it regularly.
- 7) The correct device for testing the wet bulb can ensure that the correct relative humidity is measured.
- 8) It is absolutely forbidden to test explosive, flammable and highly corrosive substances.
- 9) When the equipment is out of service, the water must be emptied
 - a. Temperature and humidity test, if water accumulates in the humidification tray, the water must be drained.
 - b. Turn off the leakage switch and the controller, and open the drain valve. After about 15 minutes, the drain valve will empty the waterway system.
- 10) Please read the manual carefully before operating the machine.

4.2. 2. Matters needing attention during operation

- 1) If the machine is operated below 0°C , try to avoid opening the box door, because when the temperature is low, if the box door is opened, it will cause internal evaporation and ice sealing of other parts, especially the lower the temperature, the more serious it is. If it must be opened, the opening time should be shortened as much as possible.

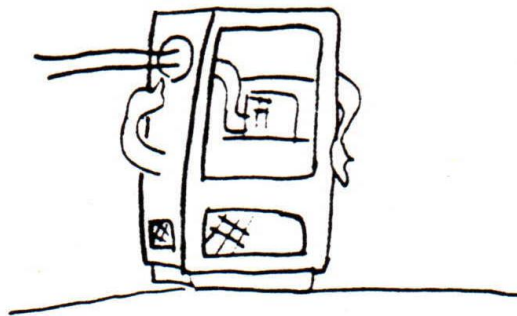


- 2) When the low temperature operation or the temperature and humidity operation is completed, be sure to set the temperature condition at 60°C to perform drying treatment for about half an hour, and open the box door, so as not to affect the measurement time of the next operation or the evaporator freezing phenomenon or test object damage. (If there is no actual drying treatment at 60°C , the machine will malfunction. Although it is a human error during the warranty period, our company will not provide free service)



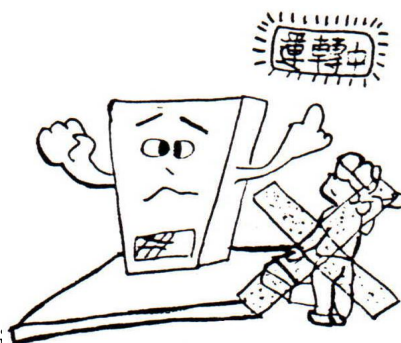
If you will not use it for a long time, please clean the water in the water tank and turn off the power, then follow the second step.

3) There is a test hole on the side of the machine, which can be used to



connect the power supply to the inner box test line.

4) During operation, please do not check with your hands to avoid danger of electric shock or injury to the fan, so please stop the operation and turn off the power before repairing.。



4.3. Device deactivation

1) Drainage

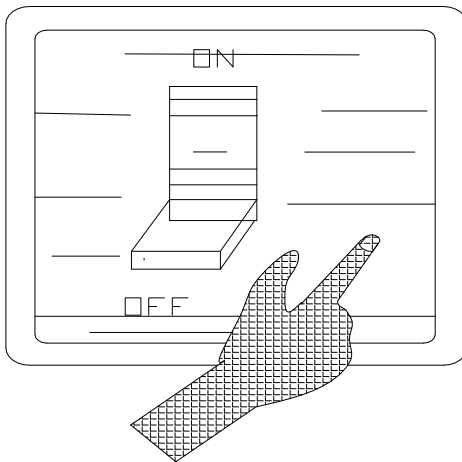
◆ Temperature and humidity test, if water accumulates in the humidification tray, the water must be emptied.

- ◆ Turn off the leakage switch and the controller and open the drain valve. After about 15 minutes, the drain valve will empty the waterway system.

2) Drying operation

The test box can be operated at 63°C/0%RH for 1 hour to dry the inside of the test box

- 3) Power off and switch off
- 4) Turn off the leakage protection switch and cut off the power of the testing machine.



Tip: Run the test box again two days or more after turning off the leakage switch. Please turn on the power switch one hour before starting the test box to warm up the power switch.

5. Maintenance and care

5.1. Maintenance card

Detection card:

| project | inspection cycle | content |
|--------------------|--|---------|
| Leakage switch | Once a month | P33 |
| Overheat protector | Before long-term operation or unattended monitoring | P33 |

| | | |
|---|--------------|------------------------|
| Humidity measuring cloth, humidifying sink/water level box | Once a month | Installation Manual |
|---|--------------|------------------------|

Maintenance card:

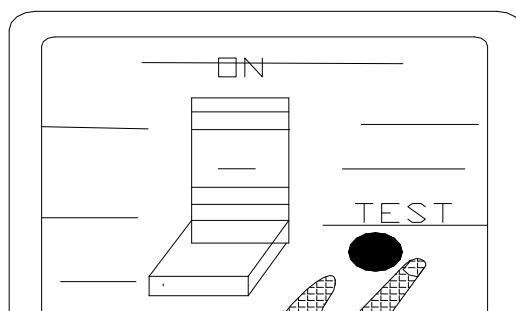
| project | inspection cycle | content |
|-------------------------------------|--|--------------------------------|
| Filter cleaning | Once a month | P34 |
| Water tank cleaning | Once a month | P34 |
| Humidifying disc cleaning | Once a month | P34 |
| Humidification cloth replacement | When the humidity in the test chamber is too high or the wet cloth does not absorb water | P27 |
| Lamp replacement | LED bad | P35 |
| Insurance replacement | Insurance is broken | P35 |
| Controller setting adjustment | The displayed value is too low | P35 |
| Test chamber cleaning | Before operation | Scrub with a cleaning cloth |
| Cabinet compartment and waterway | Once every 12 months | Vacuum cleaner |

5.2. Maintenance

Maintain the equipment according to the content in the maintenance card

➤ Leakage protection switch test

Turn on the leakage holding switch, press the red "Test" button, the leakage protection switch will be cut off, indicating that the leakage protection switch is working properly.



Tips: If the leakage protection switch is in the middle between "ON" and "OFF", it needs to be turned to the "ON" state, please first turn the leakage position to the "OFF" position, and then to the "ON" position

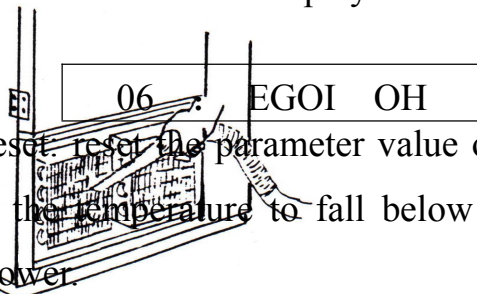
➤ Overheat protection test

A. Set the temperature value of the over-temperature protector to be less than the temperature inside the box, the controller will alarm, and the buzzer will sound, indicating that the over-temperature protector is working normally.

B. The alarm code will be displayed on the controller screen.

Such as:

C. Alarm reset: reset the parameter value of the over-temperature protector or wait for the temperature to fall below the set value, then turn off the controller power.



➤ Clean the condenser

The condenser should be maintained regularly on a monthly basis. Use a vacuum cleaner to absorb the dust adhering to the heat sink of the condenser or use high-pressure air to remove the dust.

➤ Clean the water tank filter

A filter is installed in the water tank to prevent impurities from entering the water tank. The filter should be cleaned once a month. The filter should be cleaned with purified or distilled water.

➤ Clean the humidifying water tray

Impurities entering the humidification water tray will affect the humidification effect and the humidifier. Therefore, a brush must be prepared to clean up and remove impurities

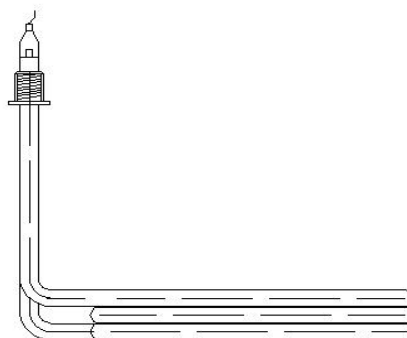
A. Open the door of the test chamber

B. Open the air duct cover

Tip: For safety, wear safety gloves when working in the test box, and be careful of protrusions and sharp edges when working in the test box

C. Use a brush to clean the dirt on the humidifier and humidifying water tray

D. Replace the cover and close the door of the test chamber

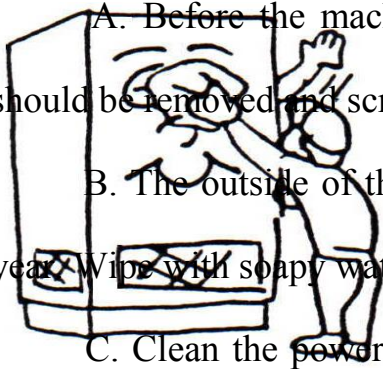


➤ Cleaning and maintenance of the inside and outside of the cabinet

A. Before the machine is operated, the internal impurities (objects) should be removed and scrubbed with a cleaning cloth.

B. The outside of the cabinet must also be cleaned more than once a year. Wipe with soapy water first.

C. Clean the power distribution room at least once a year, and use a vacuum cleaner to remove the dust in the room.



7) Replacement of LED tube

When replacing the LED tube, first prepare a new LED tube and a Phillips screwdriver.

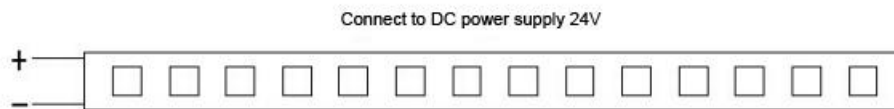
A. Turn off the power

B. Use a Phillips screwdriver to remove the screws

C. Remove the window frame

D. Replace the LED tube

E. Install the window frame and fix it



Remove the LED tube

➤ Replace insurance

Before replacing the insurance, first prepare the appropriate insurance

- A. Close the leakage switch
- B. Open the cover of the electric control box
- C. Take out insurance and check if it is broken
- D. If broken, replace with new insurance
- E. Close the cover of the electric control box

Warning: If the new insurance is installed and the insurance is broken, please contact our company.

➤ Overpressure protection switch reset

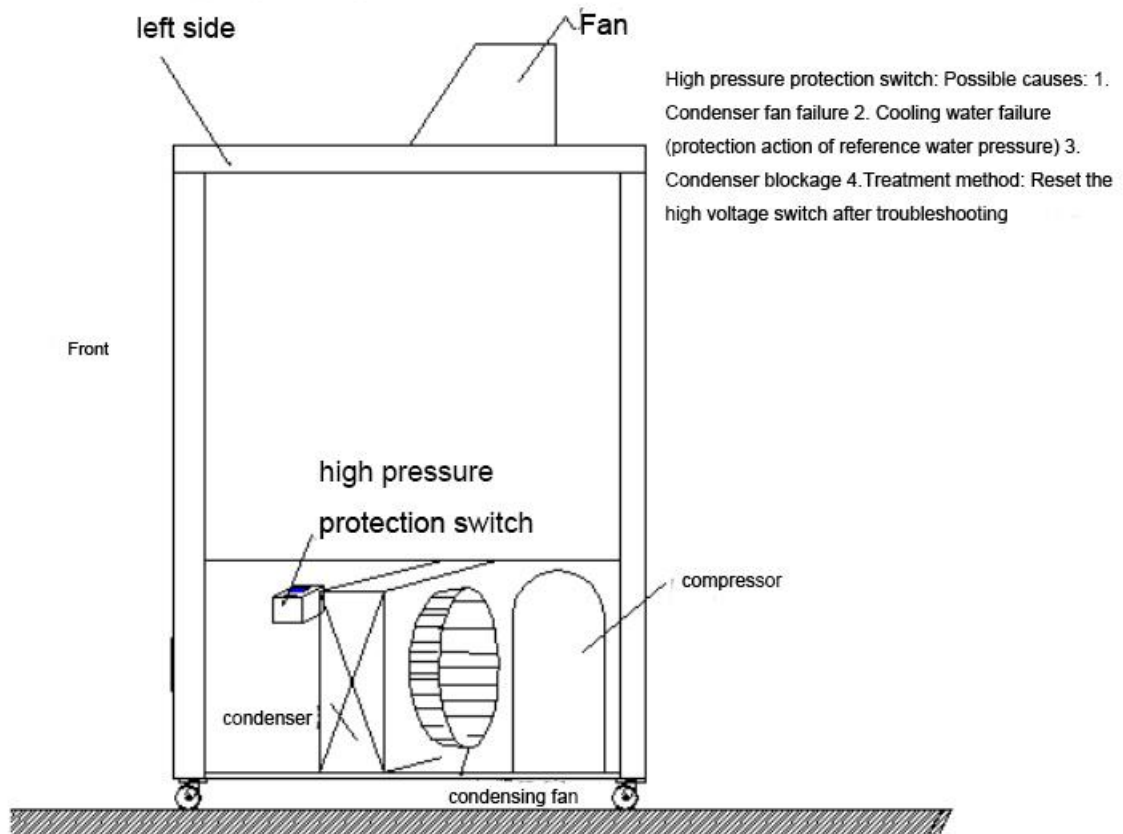
When the high-voltage protection is activated, first find the cause of the fault, and then reset the high-voltage protection switch.

- A. Cut off the main power supply (leakage protection switch)
- B. Open the cover of the electric control and waterway system
- C. Press the reset button of the high-voltage protection switch, you will hear a slight sound

If the refrigeration circuit pressure does not fall back, the high-pressure protection switch cannot be reset. When the refrigeration circuit

pressure returns, press the reset button again.

Close the electric control and water system cover



Warning: If the high-voltage protection switch is reset and the device starts to operate again soon, please contact our company.

10) Thermal relay protection reset

After the protection of the thermal relay is activated, you must first find the cause and then reset it according to the following procedure:

- A. Turn off the main circuit switch (leakage protection switch)
- B. Open the circuit control system cover
- C. Press the blue button on the thermal relay, you will hear a slight sound
- D. Close the cover of the electronic control system

Warning: If the thermal relay protection is activated again after the device is started, please contact our company.

6. Troubleshooting

The laboratory can diagnose the main fault content and cause by itself. This section explains the main fault display, causes and treatment methods:

If you can't handle it according to the following methods, please contact Huanrui Test Equipment Company in time .

Danger

When handling faults, the following rules must be strictly observed:

- When handling faults in the electric control box, the power supply in the electric control box (including the test power supply inside the laboratory) must be completely disconnected.
- When the fault is handled outside the control box of the laboratory, the main power supply of the electric control box and the power supply of the test circuit must be disconnected.

Otherwise, our company will not be liable for personal injury.

When the power is turned on, handling the fault induced current can still cause great harm to the person.

◆ Water tank water shortage protection [01]
cause of issue:

A water tank lacks water

B. There is debris in the water tank

C. Water level switch failure

Approach:



- A. Add water to the water tank
- B. Cleaning the water tank
- C. Replace the water level switch

◆ High and low voltage protection switch failure [02]



Cause of failure:

- A condenser fan is damaged, the fan stops running (air cooling)
- B. The condenser is clogged
- C. The water volume of the cooling water channel is small or the water supply is stopped
- D. The ambient temperature is too high
- E. The flow of the high-pressure protection switch is wrong or damaged
- F. Insufficient refrigerant and malfunction of oil separator
- G. Blocked air return pipe, compressor failure
- I. Incorrect or damaged low voltage switch setting

Treatment method:

- A. Replace the condenser fan
- B. Clean the condenser
- C. Check the water circuit of the cooling water tower, clean the filter and cooling pool, check the water pump, motor and pipeline valve
- D. Reduce the ambient temperature
- E. It is recommended to reset the high and low voltage protection switch values or replace the high voltage protection switch
- F. Notify the company of maintenance

◆ Alarm burner alarm [03]



Cause of failure:

- A. Failure of over-temperature air incinerator protector
- B. Fan failure
- C. The solid state relay is damaged
- D. Incorrect setting of air-burning protection switch

Treatment method:

- A. Replacement of over-temperature air incinerator
- B. Replace the fan
- C. Replace solid state relay
- D. Re-adjust the setting value of the air incinerator.

◆ Protection action of humidifier empty burning [04]



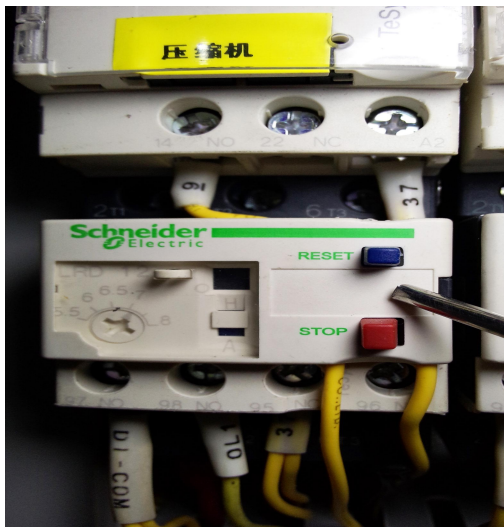
Cause of failure:

- A. Failure of humidification air incinerator
- B. Water shortage in the water tank
- C. No water in the water tray

- D. The water level box is adjusted too high
- E. Air plug in water pipe
- F. Contamination in water pipes
- G. Water level box float damaged
- H. The pump is damaged

Treatment method:

- A. Replace the humidified air-burning gas switch
 - B. Replenish the water in the water tank
 - C. Tighten the inlet water level box
 - D. Notify the company to deal with
 - E. Clean up the dirt in the water pipe
 - F. Replace the float in the water tank
 - G. Replace the water pump
 - H. Discharge the air in the water pipe, add pressure balance port
- ◆The compressor overload protector trips [05]



Cause of failure:

- A. Too much compressor refrigerant
- B. Compressor malfunction
- C. Incorrect setting or failure of overload protector
- D. Compressor pressure is too high

Treatment method: A. Discharge part of the refrigerant

- B. Set overload protector value or replace overload protector
- C. According to the processing method of high-voltage protection action

D. Notify the company to deal with

◆The compressor cannot start [06]

Cause of failure:

A. High and low voltage protection switch is not reset

B. The flow switch is not closed

C. The compressor overcurrent protection is not reset

D. Insurance burnt

E. Compressor malfunction

Treatment method:

A. Reset high and low voltage switch and overcurrent protection switch

B. Check whether the water flow switch is damaged or the cooling water system is operating normally

C. Replacement insurance

D. Notify the company to deal with

◆Temperature cannot be reduced [07]

Cause of failure: A. Refrigerant leakage

B. The cooling effect of the compressor condenser is not good

C. Broken condenser fan (air-cooled type)

D. Insufficient cooling water (water-cooled)

E. Damaged circulation motor fan

F. Inaccurate temperature display

G. Other failures

Treatment method: A. Replace the condenser fan

B. Replace the circulation fan (air-cooled type)

C. Testing the cooling water system

D. Descaling treatment of cooling water system and condenser

E. Contact our company to deal with it.

Warning: Pay attention to the following points during the test box inspection and troubleshooting:

The most important thing when working is to turn off the power. When the power is on, the inspection is likely to receive electric shock, which will cause quite serious consequences.

Before opening the cover of the circuit and water control box, the main power supply must be turned off.