ChiuVention®

www.chiuventionclimatechamber.com

ATMOEXPLORER TEMPERATURE AND HUMIDITY CHAMBER

INSTRUCTION MANUAL

SAFETY INSTRUCTIONS

Due to the potential hazards associated with any electrical instrument it is important that the user is familiar with the instructions covering the capabilities, and the operation of the instrument. The user should ensure that all reasonable safety precautions are followed and if any doubt should seek professional advice before proceeding.
The instrument is designed for use by suitably trained, competent personnel in a controlled working environment and is intended for use as an AtmoExplorer Heat and Humidity Chamber TMOEXPLORER HEAT AND only.
The instrument can be used in residential, commercial and light industrial environments as specified in EN 50081-1.
Chiuvention cannot be held responsible for any unauthorised modifications to this unit.

WARNING

This unit contains hazardous live voltages. Under no circumstance should the user try to prevent or restrict the movement of parts or gain access to the internal circuitry, either personally or with the aid of foreign bodies. All ventilation slots must be kept clear.

PROVISION FOR LIFTING AND CARRYING

When unpacking or moving this unit extreme care is required, owing to its physical construction and weight.
It is recommended that accepted lifting and carrying procedures are employed and that personnel wear the appropriate protective equipment e.g. safety shoes.
If the unit is to be move an appreciable distance/height it is recommended that it is moved via a suitable vehicle e.g. a fork lift truck.

OPERATING ENVIRONMENT

This unit is intended to be used in a residential, commercial and light industrial environment as laid down in BSEN 50081-1 and BSEN 50082-1.
The following list gives examples of locations in which the instrument might be located; workshops, laboratories and service centres. Locations which are considered to be commercial or light industrial.

CLIMATIC ENVIRONMENT

The unit is intended to operate within the following conditions

i) Temp 25+/-5 deg Celsius
ii) Humidity 30-65% RH
iii) Altitude <2000m above sea level.

And it is intended to be stored in a temp range of –25 - +25 deg Celsius.

ELECTRICAL INFORMATION

This unit complies with BSEN 61010-1 safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use.

INSTALLATION CATEGORY AND POLLUTION DEGREE

Installation category III
Pollution Degree 2

ELECTRICAL / AIR SUPPLY

Voltage： ☐110V; ☐127V; ☐220V; ☐230V; ☐240V; ☑380V; ☐415V; ☐V
Frequency： ☑50Hz; ☐60Hz
Phase sequence： ☐1 Phase; ☑3 Phase;
Air pressure： ☐0.4-0.6Mpa

WARNING LABELS

Number	Symbole	Publication	Description
1		IEC 417, No. 5031	Direct current
2		IEC 417, No. 5032	Alternating current
3		IEC 417, No. 5033	Both direct and alternating current
4		IEC 617-2, No. 02–02–06	Three–phase alternating current
5		IEC 417, No. 5017	Earth (ground) TERMINAL
6		IEC 417, No. 5019	PROTECTIVE CONDUCTOR TERMINAL
7		IEC 417, No. 5020	Frame or chassis TERMINAL
8		IEC 417, No. 5021	Equipotentiality
9		IEC 417, No. 5007	On (Supply)
10		IEC 417, No. 5008	Off (Supply)
11		IEC 417, No. 5172	Equipment protected throughout by DOUBLE INSULATION or REINFORCED INSULATION (equivalent to Class II of IEC 536 –see annex H)
12 (see note)	 Background colour – yellow; symbol and outline – black	ISO 3864, No. B.3.6	Caution, risk of electric shock
13	Symbol under consideration		Easily–touched higher temperature parts
14 (see note)	 Background colour – yellow; symbol and outline – black	ISO 3864, No. B.3.1	Caution (refer to accompanying documents)

目 录

Section I Introduction

1.1Purpose

Heat and humidity requirements are met by a high flow rate passing through 100 samples(cotton or other natural fiber samples) in the laboratory condition chamber in several minutes. The specimens can accommodate 4-6 layers of discs.

Stainless steel, shaped like quadrilateral semi-circular, is easy cleaning with adjustable box grid plate. Microcomputer heat controller controls heat and humidity accurately and reliably. Double-layer glass door observation window works for easy observation. Cases such as extreme heat, compressor overheating, water shortage are prevented.

1.2 Specification

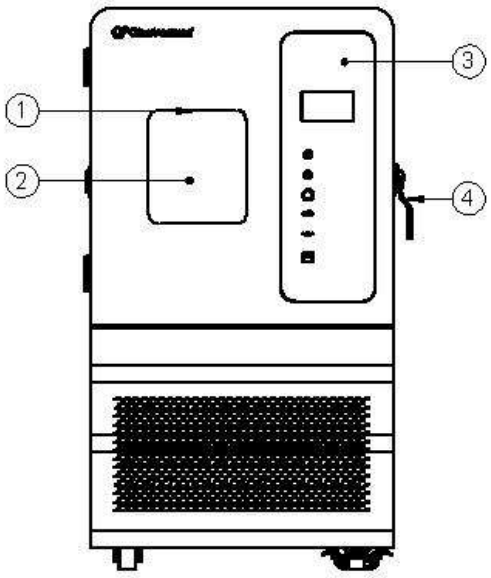
Chamber size and mode (optional)： **CV340-80/150/225/408/800/1000 L**(D×H×W).

80L：400×500×400 mm
150L：500×600×500mm
225L：500×750×600mm
408L：600×850×800mm
800L：1000×1000×800mm
1000L：1000×1000×1000mm

1．Heat range (optional): -20 ~+150℃
2．Humidity range：20%~98%RH
**Note: Please refer to the humidity range chart
3．Heat and humidity control accuracy:：±0.5℃;±3% RH
* Measure the heat for 30 minutes to ensure its stability!
4．Uniform heat and humidity distribution：±2℃;±3% RH。
* Note: measure at the 1/6 position of the test wall until the heat gets stably in 30 minutes so as to guarantee the 5 items above.
5. Heating time: from room heat to 100℃ within 30 minutes (loaded)
6. Cooling time: from room heat down to minus 20℃, within 60 minutes (unloaded)
7. Inner box size: 500×750×600mm (D×H×W).
8. Outer box size: subject to the actual size
9. Power supply: AC 380V 50HZ 3 ∮ 5 wire 20A

1.3 Machine Pictures

1.3.1 Front View



Front View

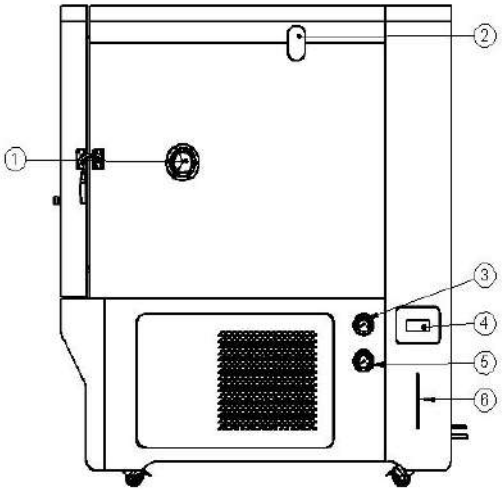
1. Interior lights

2. Tempered glass windows

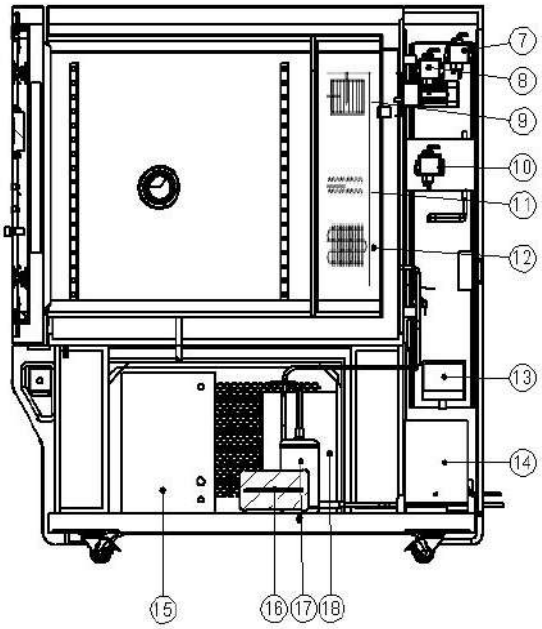
3. Control panel

4. Door handle

1.3.2 Left view



Left view



Left cross-sectional view (Please refer to the actual machine for each apparatus on the front and side of the machine)

1. Test hole
2. Wet bulb water box
3. High pressure gauge
4. Water filling box handle
5. Low pressure gauge
6. Water level meter

7. Upper water-refilling box

8. Wet bulb water box

9. Multi-wing

10. Humidification and hydration box

11. Heater

12. Evaporator

13. Water filling box handle

14. Water tank

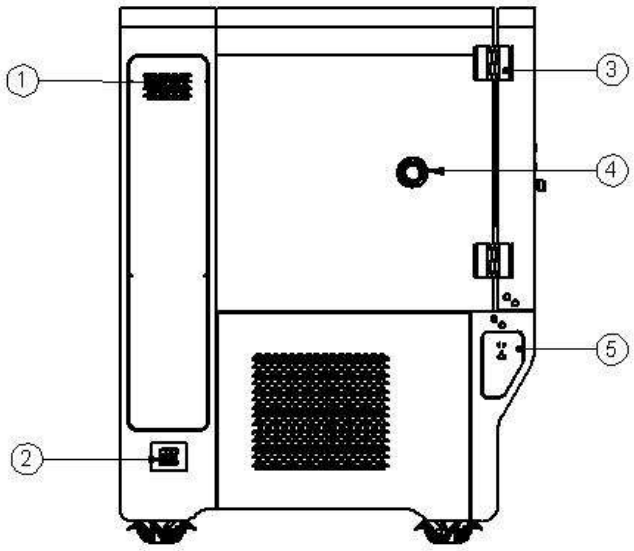
15. Condenser

16. Dryer

17. Oil separator

18. Compressor

1.3.3 Right view



Right view

1. Power distribution board

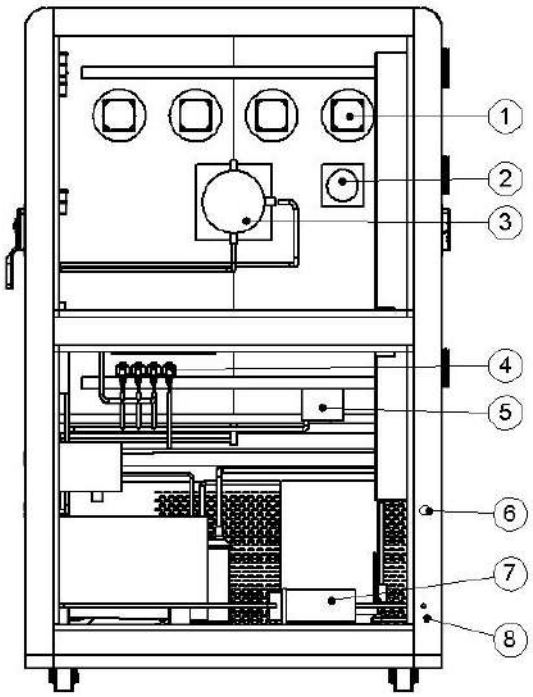
2. Air switch

3. Hinge

4. Test holes

5. Switch socket

1.3.4 Rear view



Rear view

1.Motor
2. Over-heat protector
3. Humidification cylinder
4. Solenoid valve
5. Overpressure protector
6. Power socket
7. Water pump
8. Drain switch

Section 2 System Architecture

1. Inner box: matte stainless-steel plate (SUS#304)

2. Outer box: cold-rolled plate plus powder baking paint

3. Insulation: rigid polyurethane foam plus glass wool.

4. Heater: spring-type nickel-chromium electric heating wire.

5 Humidifier: stainless steel electric steam, UL-shaped humidifier.

6. Air supply circulation system:

a. motors; b. extended axis; c.multi-wing wind wheel; d.louver air circulation system(adjustable).

7. Box door: single piece door. Left to open and right for handle.

a. Large window three-layer vacuum layer.

b. Non-reaction handle when forced.

c. Button: SUS#304...

d. LED window lighting.

e. louver air circulation system(adjustable)

8.Refrigeration system:

a. Compressor: original imported French “Taikang”, fully enclosed and high-efficient.

b. Refrigerant: environmental refrigerant

c. Condenser: air-cooled.

d. Evaporator: fin-type automatic load capacity adjustment.

e. Accessories: desiccant, refrigerant flow window, repair cut, high pressure protection switch.

f. Expansion system: refrigeration system, capillary tube capacity control.

g. Refrigeration auxiliary parts:

Solenoid valve (Japan “Herumiya”); screening program (DANFOSS); pressure controller; oil separator and other imported accessories.

9. Heat controller: the original imported touch screen controls heat via direct buttons; provide Chinese and English and 7-inch large screen for viewing; adjustable large LCD controller with high contrast.

a. Controller specifications:

- Accuracy: Heat ±0.1℃+1digit, Humidity ±1%R.H+1digit.
- Resolution: Heat ±0.1, Humidity ±0.1% R.H.

- Heat slope: 0.1 to 9.9.
- Upper and lower limit standby & Alarming.
- Heat & humidity input signal selection: PT 100Ω×2 (dry & wet bulb).
- Heat & humidity conversion output power: 4-20MA.
- 9 groups P.I.D control parameters setting, P.I.D automatic calculation.

b. Screen display function：

- Conversation style screen, and direct touch without pressing buttons.
- Direct display of SV and PV of heat and humidity.
- Current program number, segment number, remaining time and the number of laps.
- Heat & humidity program setting values are real-time displayed in graphical curves.
- Separate program editing screen, allowing to over 4 sections of heat and time input for each page.
- Switchable English and Chinese language.
- Adjustable backlight can be adjusted.
- The display protection can be timed, or manually turned off.

c.Program capacity and control functions:

- Available program sets: 120 PATTEN max.
- Usable memory capacity: 1200 SEGMENTS in total.
- Repeatable commands: each command can be executed up to 999 times.
- Conversational program with editing, clearing, and inserting functions.
- SEGMENTS time setting 0~99Hour59Min.
- Program memory during power failure, automatically starts and continues to execute program after power is restored.
- RS-232 communication interface (software sold separately).
- Real-time display of graphical curves when the program is executed.
- Scheduled start-up and shutdown.
- Adjustment date & time.
- Keypad and screen lock.

10. Major electrical components：

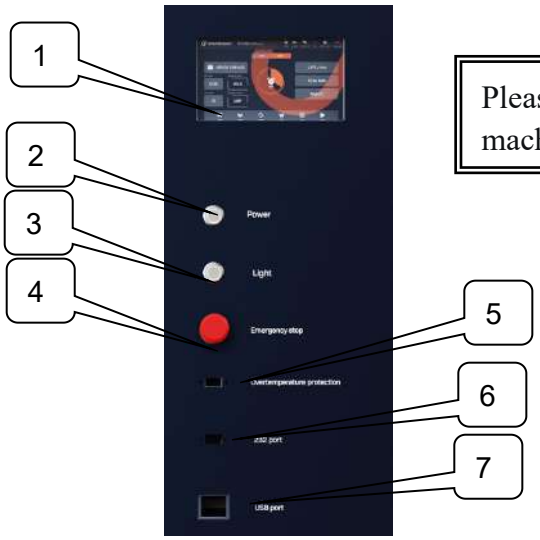
- Contactor: Schneider, France.
- Thermal Relay: Schneider, France.
- AC Relay: OMRON.
- Time Relay: Taiwan.

- Heat and humidity controller: Original imported.
- Over-heat Protector: Taiwan.
- Phase sequence protector: CHNT · China.
- Push button switch: Taiwan.

11. Console：
    - Heat& humidity controller 1 pc.
    - Power button switch 1 pc.
    - Lighting push-button switch 1 pc.
    - Over-heat protection switch 1 pc.
    - R232 computer interface 1pc.
    - USB hole 1pc.
12. Test holes: 2 holes of 100mm on the left, located on the left and right sides of the machine。
13. Safety protection devices：
    a. Over-zero-point gate fluid power controllers in 2 groups (heat and humidity).
    b. A group of air burning prevention switches.
    c. Compressor high pressure protection switch.
    d. Compressor overheating protection switch.
    e. Compressor overcurrent protection switch.
    f. No-fuse protection switch.
    g. Alarm for Short-time water shortage, shutdown for long-time water shortage.
14. Other accessories：
    a. Test objects: Grade A DNA SUS#304L stainless-steel PT 100Ω×3pcs.
    b. Standard test with non-woven cloth 5 pcs.
    c. Rubber power cable of low resistance rubber cable 3.0m*1.
15. Water tank：
    a. A built-in water tank.
    b. An automatic water supply pump (transfer the water from the lower tank to the upper).
    c. Alarm or shutdown for water shortage alarming.
16. Specimen- placing shelf: not more than 20 kg.
    a. Stainless steel SUS#304 grille shelf 2 pcs.
    b. Stainless steel adjustable spacing shelf hooks 8 pcs.
17. Surrounding environment:
    - Allowable use heat range: 0℃～+35℃
    - Performance guarantee range ：+5℃～+30℃（refer 1～6 for cooling time and the lowest reaching heat）.

Section 3: Mechanical Structure

Control Panel



Please refer to the actual machine.

No.	Item	Description
1	Controller	Microcomputer programmable controller
2	Power button	Console power switch
3	Illumination button	For the observation window
4	Emergency stop	Stop working in case of emergency
5	Over-heat protection	Protect machine
6	RS-232	External computer for data copying
7	USB	External computer for data copying

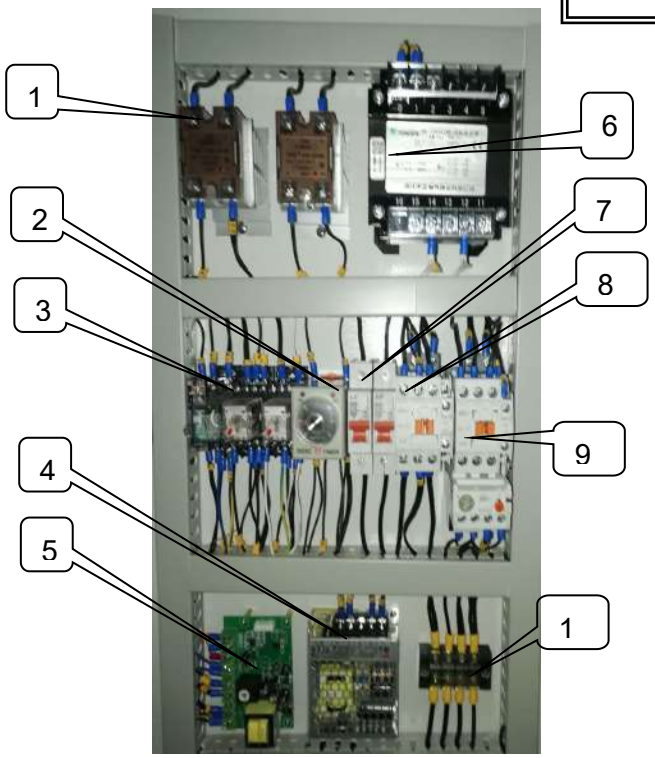
Cooling unit

Please refer to the actual machine.

No.	Item	No.	Item
1	Filter Drier	4	Pressure balancing port
2	Compressor	5	Condenser
3	Oil and gas separator	6	High pressure switch

Please refer to the actual machine.

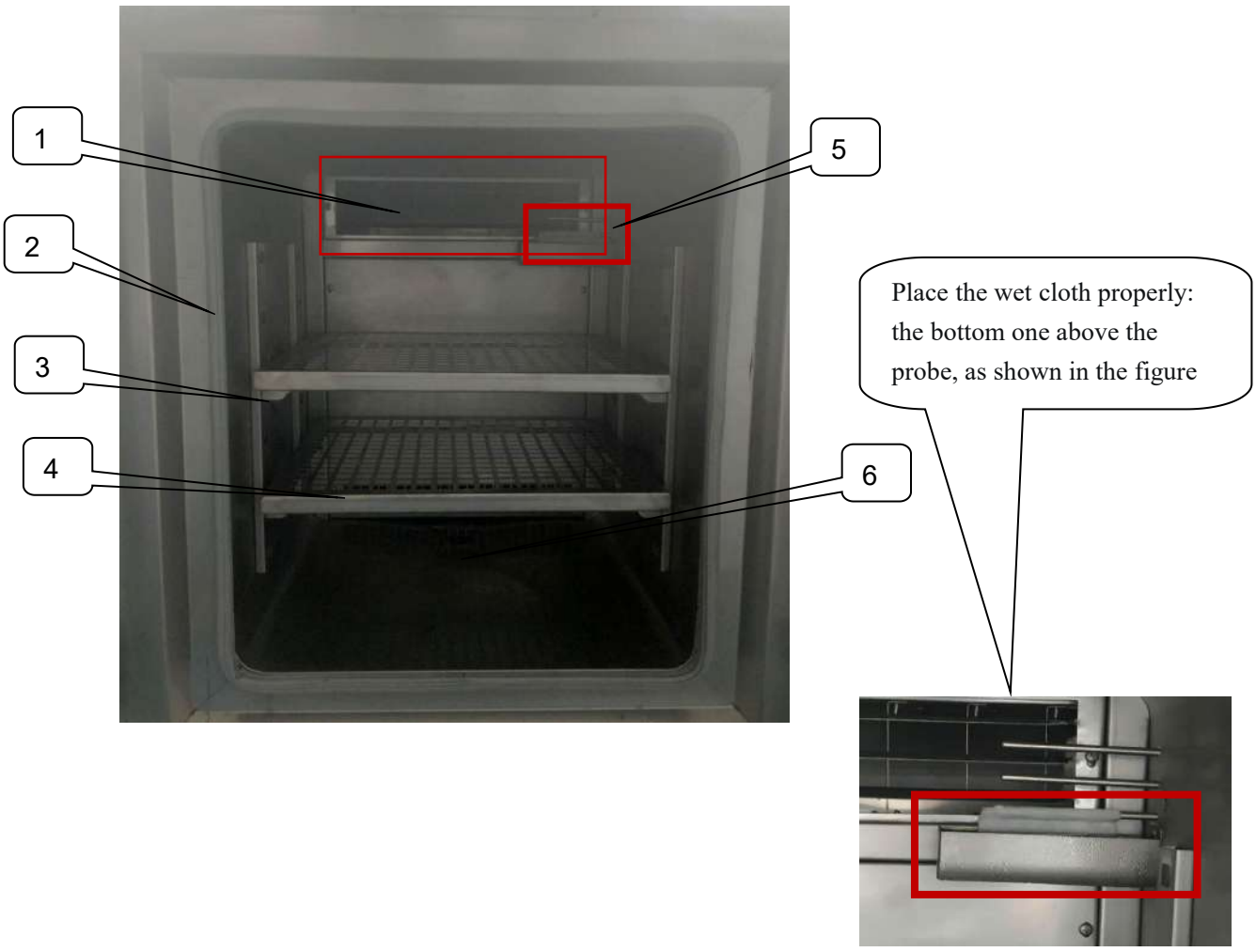
Power Distribution Panel



No.	Item	No.	Item
1	Solid state relays	6	Transformer
2	Time Relays	7	Heating/Humidifying switches
3	Intermediate Relay	8	Heating/Humidifying contactors
4	24V DC Power Supply	9	Compressor contactors
5	Over-heat Protector	10	Wiring Block

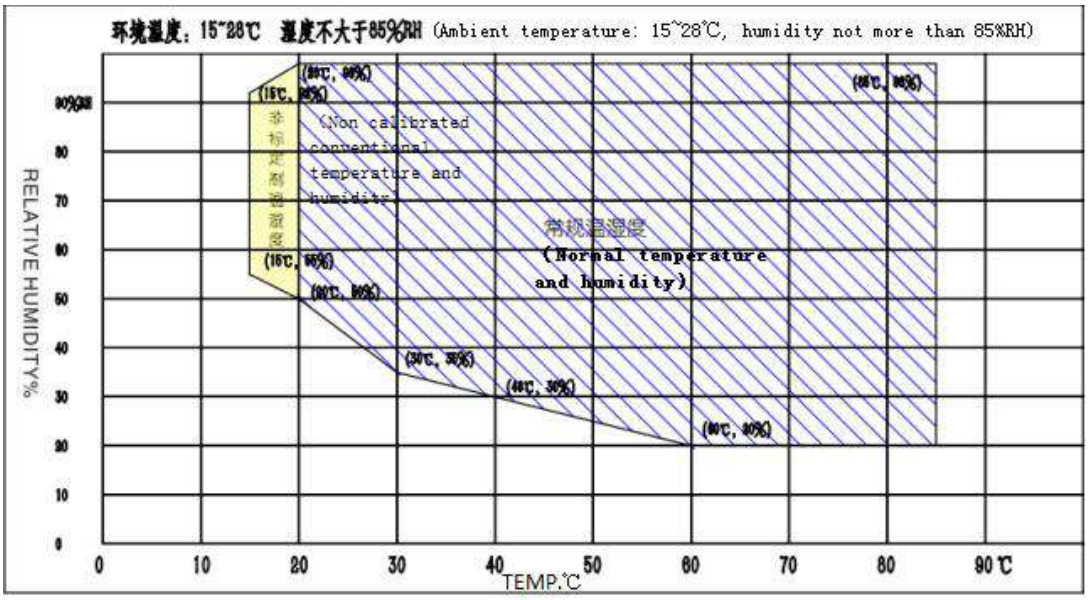
Inner Box

Please refer to the actual machine.



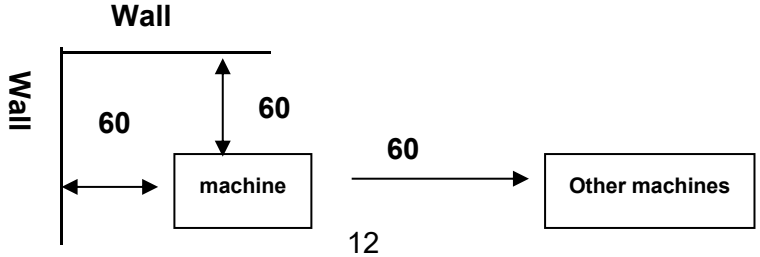
No.	Item	No.	Item
1	Air outlet	4	Compartment rack
2	Inner sealing strip	5	Heat and humidity sensor
3	Compartment shelf hook	6	Internal drainage hole

3.1： Temperature and humidity control range diagram：



3.2： Installation place and installation method：

1. Consider the machine’s heat dissipation efficiency for placement to make easy inspection and maintenance convenient.
2. Cooling system at the bottom, relatively large in heat, so the machine body should be at least 60 centimeters away from the wall and any other machines, so that the ventilation is smooth.



3. Install the four-levelling foot on a flat, vibration-free surface for positioning, and adjustment, balancing the machine body for inner water drainage and abnormal noise prevention (check with a level).

4. Do not expose the machine to direct sunlight and maintain indoor air circulation.

5. Place the machine in a separate space, not in a public place or near flammable, explosive or corrosive chemicals, to avoid fire and personal injury in case of failure.

6. Shorten the power supply and drainage pipes as much as possible.

7. No dirty and dusty places. Maintain the surrounding heat 10℃~30℃ and humidity 70±10%RH for best operation; otherwise causing the slow cooling, the failure of meeting low heat requirements as well as unstable heat and humidity control.

8. Do not place any miscellaneous objects on the top of the machine to avoid falling heavy objects causing human injury and property damage.

9. Do not hold the electric box, wire, motor as a propulsion pivot point when handling, to prevent the electric box electrical damaged or loosening or causing accidental failure.

10. The maximum tilt of the machine body should be below 30 ° angle, while the body must be firmly prevented from falling down, crushing damage or hitting the human body and damage to property.

11. If the positioned machine needs shifting, retract the four-levelling foot, and then adjust the balance to avoid damage to the machine.

3.3： Power configuration and installation method：

Follow the methods of power distribution, and care for the power capacity. Do not use the same external power supply for more than one machine at the same time in case of voltage drop affecting the performance, or a breakdown. The dedicated circuit is a must.

1. Power supply wiring according to the specification sheet：

	1¢2W220VAC	√	50HZ
	1¢3W220VAC		60HZ
	3¢4W220VAC		
√	3¢5W380VAC		

2. Applicable power cord diameter: (cable length within 10m)

	2.0~2.5m m²		8.0~10.0m m²
	3.5~4.0 m m²		14~16 m m²
√	5.5~6.0m m²		22~25m m²

3. Pay attention to the under-phase protection in case of three-phase power supply. (If the three-phase power supply has power but the machine does not operate, the machine may be in reverse phase. Exchange the two adjacent power lines with each other).
4. Water pipe, if connected to grounding wire, must be a metal pipe through the ground (not all metal pipes are effectively grounded).
5. Connect the power supply for test material to the TS signal port on the left side of the machine (load <MAX 5 A). If the load exceeds this, connect another power supply. Otherwise, we will not be responsible for any malfunction caused by this!
6. Be careful to damage the wiring during installation! Please do not connect the ground wire to the gas pipe.
7. Before configuring the power supply, Whether the machine is damaged during transportation, whether the power cord is broken, whether the body is deformed, whether the air supply return ring is intact, and whether the inner box is kept clean.
8. The fluctuation of the power supply voltage must not exceed the allowable range, and the grounding wire must be good, otherwise it will affect the performance of the machine.
9. Please make sure that the machine is equipped with proper fuse according to the power of the machine, so that the power can be cut off safely in case of machine failure to avoid fire and injury.
10. Be sure to position the machine in a safe space before wiring, and ensure that the wiring is consistent with the rated current and machine voltage, otherwise there will be electric shock and accidents.
11. The wiring operator should be professional for wiring and power input to avoid machine damage or burned components.
12. Make sure that the input power is disconnected before wiring to avoid electric shock.
13. Check the correct steering when connecting to the power supply when the machine has a three-phase motor. For a single-phase motor adjusted to its steering, determine whether its steering is right before replacement, so as not to affect the machine performance.
14. After the wiring is completed, ensure that the machine control appliances are fault-free and then input the matching power supply. At the same time, install all electrical box covers before power is applied, otherwise there is a risk of electric shock and fire.
15. No maintenance and inspection of the machine should be carried out by anyone other than the professional personnels, and dissemble and inspect the machine under power failure to avoid electric shock and fire.

16. The electric box, electric box door, the side panel and some safety protection devices cannot be removed, otherwise operating will dangerous.

17. Operate the main power switch on the control panel as little as possible, and turn off the heat & humidity meter switches and the user power switch when the machine shuts down.

3.4 Precautions for use：

a. Confirmation of the power cord and grounding wire：

● Is the power cord properly connected according to the specifications, and are the grounding confirmed?

b. Confirmation of wet and dry bulb over-heat protector：

● The heat-setting point of over-heat protector = heat-setting point + (20~30℃).

c. Confirmation of water supply：

●* Note: Standard voltage & frequency variation range: voltage ± 10%; frequency ± 1%!

Humidification water: pure water or distilled water required (more than 20L first) or water quality conductivity below 10μs/cm.

* Note: The purer the water source is, the better! Groundwater is prohibited!

● Is there enough water in the tank memory?

● Is the drain switch restored?

d. Confirmation of wet bulb test cloth：

●Is it clean? [Clean once a month, and replace every three months.]

●Is it placed correctly? [Place in front of the humidity sensor! The bottom one is the humidity probe.]

●Is the water level in the water supply tank normal?

●Is it wet? [replace the cloth immediately as water in the tank is normal, but the test cloth is not wet.]

e. Confirmation of water level of humidifier：

● Is the water level normal? [After three to five minutes, Whether the water level of its control box is normal.

● Is the water in the humidifier clean? [Drain the water tray regularly and clean with a brush.]

f. Whether the gas protection switch of over-heat ball is set correctly. [Subject to the physical label.]

g. Confirmation of discharge pipe:

* When testing heat only, exclude high heat. Before next operation, change the test cloth, otherwise it may not be able to absorb water. Wash hands before replacing the new one, otherwise the test cloth will not function well and fail to absorb water. (The test cloths are sterilized when packed.)

※ After confirming the above matters, put down the flat water foot and fix it properly。

3.5 Operation program：

1．Power on and off

a. Power on: gradually turn on the power source switch to the machine’s switch

b. Power off: turn off the switch of the console switch in a short-term of not using; turn off the circuit breaker for a long term.

2． As the machine is powered, carry out the pre-programmed program setting curve only when the heat and humidity meters are in normal display, performing the setting smoothly.

3. Heat & humidity and time SV are in line with the product requirements to be measured.

4． Dedicated personnels set the heat and humidity meters’ functions or make reference to the instruction manual.

5. After that, close the door tightly, and the machine works normally.

6. To run the machine initially, take care the direction of the running motor and the three-phase motor.

7. Press the controller operation switch and then the machine operates under the set heat and humidity.

8. When the heat and humidity have reached the product requirements and the machine should stop, turn off the switches of the heat and humidity meters before removing the product.

9． Refer to the instruction manual of the controller for program setting and constant value control. For the specific operation of the heat and humidity meters, refer to the manual.

10. If any faults, the display screen will immediately show the fault location accompanying the buzzer sound. Press [REST] after the fault is cleared, and then restart the tester.

3.6 Operating Precautions：

1. Heating or testing explosive, combustible and highly corrosive substances is absolutely prohibited. Otherwise, unnecessary losses, or testing failure may occur.

2. The number of test objects placed cannot affect airflow return circle in the test box, otherwise the test performance is not good.

3. Close the door tightly, to prevent the heat and humidity leakage, or failing to reach the performance area.

4． Only designated personnels are allowed to operate the machine to avoid early damage.

5. If the machine is running below 0℃, try not to open the door, because it is easy to cause the internal evaporator and other parts of the ice sealing phenomenon under such heat. The lower the heat, the more serious the situation. If the door must be opened, the time should be as short as possible.

6． When the low-heat operation is completed, be sure to implement the drying process under 60 ℃ heat for about half an hour whih the door open, not affecting the measurement time of the next operation or causing the evaporator icing or test object damage. (The heat not at 60 ℃, will lead to machine failure, which, although the machine is still in the warranty period, is also is not beard by the company due to human error.)

7． Do not open the door during operation unless absolutely necessary. The following adverse consequences may result:

High-heat moisture rushing out of the box ..... very dangerous!

High-heat inside the door ..... cause injury!

High-heat air may trigger the fire alarm, resulting in false operation!

Door opening: move it backwards along its direction to prevent a large amount of hot air from gushing out of the machine and injuring people.

8． Note that the machine must be safely and securely grounded to avoid electrostatic induction!

9. Circuit breaker and over-heat protector provide safety protection for the test samples and the operator, so please check them regularly.

10. Correctly install the wet bulb test cloth to get the correct relative humidity.

11. Do not touch the fan with hands during operation to avoid electric shock or human injury, so stop the operation and turn off the electricity before repair.

12. The maintenance and inspection should be carried out only by the dedicated personnels supervised by guardians. Prevent the uninformed personnel from powering on and closing the gate, causing electric shock and injury.

13. Read the controller manual and related manuals in detail before operating the machine.

3.7 Maintenance precautions and methods：

1. Regularly maintain the heat sink (condenser) of the cooling unit and keep it clean for Dust dusty condenser causes a false alarm produced by high-voltage switch tripping. Regularly

maintain the condenser monthly, vacuuming the dust on the heat sink, brushing it with a stiff brush or blowing it with a high-pressure air nozzle after the machine is turned on.

2. When opening and closing the door or taking the test object from the furnace, do not let the items and the rubber edge of the gate touch to prevent the rubber edge from being damaged and shorten its life.
3. Keep the ground around and at the bottom of the machine clean at all times, not producing accidents and not reducing performance by large amounts of dust sucked into the machine.
4. Cooling system is the core of the machine, so inspect all copper pipes once a year for leakage. Notify the company or deal with it directly in case of any leaky oil of loudspeaker joints, and welding ports.
5. Clean and repair the high current contacts of the switchboard at least once a year. Loose contacts make the machine in a dangerous working condition, burning the components, or even leading to fire, alarm, personal injury. Use the vacuum cleaner to suck out the dust inside.
6. Clean humidifier and water trays frequently, so as not to produce scale affecting the steam distribution. Generally, clean after each test. Remove scale timely extends humidification tube life, and ensures smooth water flow. Use copper brushes with water.
7. Clean wet cloth frequently. Hold on when the test cloth surface is not clean or hardened, or under the high heat above 85 ℃ control. Replace the cloth not absorbing water once every three months, improving moisture measurement accuracy. Use clean cloth to wipe the heat measuring body using clean hands, and then clean the sink.
8. Inspect and adjust wet bulb's water level. Keep the accumulation cylinder in proper water level, avoiding water overflowing or water lacking resulting in the abnormal absorption of wet ball test cloth, hence affecting the wet ball's accuracy. Keep the water level at about sixth scale. Adjust the screws in two side of the water accumulation box to adjust its water level.
9. Do not randomly debug the set values of two over-heat protectors in distribution box, since the values have been adjusted before factory. A switch is to protect the heating and humidification tube from empty burning and water shortage. Set point = heat set point +20 ℃ ~ 30 ℃
10. When the machine is running, the set point of the over-heat protector on the panel = heat set point +15℃～20℃. As the heat inside the test chamber rises to the set point, the heater stops and 【OVER HEAT】 is on for alarm with a running fan. If it runs long and

unattended, make sure that the over-heat protector is properly set before operation.

11. Water line inspection and maintenance. Water pipe is easy to plug and leak, so check it regularly whether there is water leakage and plugging. If any, promptly eliminate or notify the company. Replace humidifier's water storage once a month to ensure water quality and smooth water flow.
12. To take out the product upon the test time completed, be sure the machine is unpowered and the operators shall wear dry, electric, temperature-resistant gloves
13. Internal and external cleaning and maintenance. Operate the machine only when the internal impurities are removed.
14. Clean the distribution room at least once a year using a vacuum cleaner to remove the dust inside. Wipe externally at least once a year with soapy water.
15. We will not be responsible for any damage caused by the machine modification without our consent during the use of the machine. We will not be accountable for any consequences caused by any operation not as required in the users manual.

3.8 Fault examples：

Fault	Cause	Solution
No power supply	The external power supply and voltage	Reconnect
	Whether power incoming or connecting line is in good contact	Reconnect
	Whether power insurance contact is good or burned	Reinstall/replace fuse core (holder)
The machine cannot work	Whether power connecting line is in good contact	Reconnect
	Whether the main command switch is in good contact or burned	Repair/replace
	Whether contactor or relay contact is in good contact or burned	Repair/replace
	Whether over-heat setting is proper or damaged	Reset/replace
	Whether power incoming line (phase sequence relay) is connected correctly or burned	Reconnect/replace
	Whether pressure controller is properly adjusted or burned	Readjust/ replace

EGO1 Empty burning of heating tube	Heater air burner is set too small	Readjust the heating tube empty burner setting
	Heating air burner is damaged	Replace with new preventers
	Motor doesn't run	Check the motor to find the cause
EGO2 Empty burning of humidification tube	Humidifier air burner is set too small	Readjust the humidifier tube burner setting. recommend 160C° or so
	Humidification empty burner is damaged	Replace new preventers
	No water in humidification tank	Check the water circuit to find the cause
OL1 Group 1 current-overload compressors	The compressor radiates heat poorly	Improve the environment around the compressor
	Over-heat compressor causes current overload	Measure compressor surface temperature and operating current
	High AC voltage causes current overload	Measure supply voltage
	Excessive compressor refrigerant causes current overload	Measure operating pressure and current
OL2 Group 2 current-overload compressors	The compressor radiates heat poorly in surrounding environment	Improve the environment around the compressor
	Over-heat compressor causes current overload	Measure compressor surface temperature and operating current
	High AC voltage causes current overload	Measure machine supply voltage
	Excessive compressor refrigerant causes current overload	Measure operating pressure and current
	Group 1 compressor refrigerant may be insufficient	Check if the compressor is working properly
PS1 Group 1 pressure overload compressors	Surrounding environment is too high (above 30 C°)	Improve the environment around the machine
	Dirty wind condenser fins cause poor heat radiation	Clean the condenser
	Cooling water tower too dirty, and lacks water	Solve the problems of water tower and insufficient cooling water
	Condenser fan or water tower unit fails	Replace fan for troubleshooting

PS2 Group 2 pressure overload compressors	Surrounding environment is too high (above 30 C°)	Improve the environment around the machine
	Dirty wind condenser fins cause poor heat radiation	Clean the condenser
	Cooling water tower too dirty, and lacks water	Solve the problems of water tower and insufficient cooling water
	Group 1 refrigerant lacks or compressor fails	Exclude the compressor failure
OH Over-hat protection alarm	Temperature setting too small	Reset, recommended 10 degrees greater than the maximum temperature
	Over-heat protection switch is damaged	Replace with new product
	Sensor fails	Replace with new product
FS Low water level	Tank water level is too low	Add water
	Float switch is damaged	Replace with new product
No heating	Whether power connecting line is in good contact	Reconnect
	Whether the meter displays normally or has output	Repair/replace
	Whether the meter set correctly	Reset
	Whether the blower switch turns on, damaged or whether the contactor is powered on or burned	Restart/Replace
	Whether the heating switch turns on / contact is good or damaged	Start / Repair / Replace
	Whether the actuating element (contactor, relay, controllable silicon, solid state relay) has output	Replace
	Whether the executive element (heating tube, heating wire) is burned and damaged	Replace
	Whether controller, regulator, and electric contact thermometer are under good control or burnt	Repair/Replace
Uncontrolled high temperature	Whether the meter displays or controls normally	Repair/Replace
	Whether the meter setting is correct or with	Reset

	manual output	
	Heated solid state relay is damaged	Replace with new product
	Motor doesn't run	Find out the cause and fix it
	Whether the actuating element contactor, relay have sticky contact or burnt and whether the controllable silicon and solid state relay break down	Replace
	Whether the executive element heating tube, heating wire are grounded	Repair/Replace
	Whether the controller, regulator, and electric contact thermometer are well controlled or burnt	Repair/Replace
No humidification	Whether power connecting line is in good contact	Reconnect
	Whether the meter displays normally or has output	Repair/replace
	Whether the meter set correctly	Reset
	Whether the humidification switch is on, in good contact or burnt	Start /Repair/Replace
	Whether the actuating element (contactor, relay, controllable silicon, solid state relay) has output	Replace
	Whether the heating tube of the actuator is burnt	Replace
	Whether the water supply system works normally or indicates wated shortage	Adjust / Repair
Un controlled humidification	Whether the meter displays or controls normally	Repair/Replace
	Whether the meter displays normally or has output	Reset
	Whether the actuating element contactor, relay have sticky contact or burnt and whether the	Replace
	Whether the executive element heating tube are grounded	Repair/Replace
Temperature does not	Compressor doesn't run	Check if the compressor contactor

drop		has sucked
	Compressor failure or insufficient refrigerant	Check system leakage, and add refrigerant
Temperature does not rise	Damaged heater tube	Replace with new product
	Damaged heating solid state relay	Replace with new product
	Damaged heating contactor	Replace with new product
Humidity does not rise	Damaged humidification tube	Replace with new product
	Damaged humidification solid state relay	Replace with new product
	Damaged humidifying contactor	Replace with new product
	Inadequate humidifying water tank water level is not enough	Find the reason for not adding water and add water
Humidity keeps showing high humidity and cannot be lowered	Wet cloth aging does not absorb water	Replace with wet cloth
Refrigeration work abnormally	Whether the connection line is contacted well	Reconnect
	Whether the meter displays or outputs normally	Repair/replace
	Whether the instrument setting is correct	Reset
	Whether the refrigeration switch is on / contacted well or burnt	Start/repair/replace
	Whether the actuator is in good contact, damaged, or has output	Replace
	Whether the pressure controller and temperature controller are adjustment correctly or burned	Realign/replace
	Whether the insurance is in good contact or burned	Reinstall/replace fuse core (seat)
	Whether the compressor works normally or burned	Repair/replace
	Whether the solenoid valve controls normally or burned	Repair/replace
	Whether the air-cooling system operates or steers normally	Realign/repair
	Whether the water pressure and temperature of	

	cool normally	
Abnormal dehumidification work	Whether power connecting line is in good contact	Reconnect
	Whether the meter displays normally or has output	Repair/replace
	Whether the meter sets correctly	Reset
	Whether the humidification switch is on, in good contact or burnt	Start /repair/replace
	Whether the actuator is in good contact, damaged or has output	Replace
	Whether the compressor works properly or burned	Repair/replace
	Whether the pump operates or steers normally	Adjust/ repair
Abnormal blower system	The motor does not turn	
	Whether power connecting line is in good contact	Reconnect
	Whether the blower switch is on or burned	Restart /replace
	Whether the actuator is in good contact, damaged or has output	Replace
	Whether the starting capacitor (single-phase) is burned	Replace
	Whether the voltage is normal or lack phase (three-phase)	Reconnect
	Whether the motor rotates inflexibly, is rusted or stuck and whether the carbon brushes are worn	Repair/replace
	Whether the thermal relay set correctly or burned	Repair/replace
	2 motors have strange noise	
	Whether the wind blade is loose/whether rubbing	Repair
	Bearing rust / oil dry	Repair/Replace
Soundless alarm	Whether power connecting line is in good contact	Reconnect
	Whether the switch is on or burned	Reopen/replace
	Whether the component indicator, buzzer or bell works well or burned	Repair/replace
	Whether the actuator is in good contact, damaged or has output	Repair/replace
Others	Indicator lamp and illumination light do not light up	

	Whether power connecting line is in good contact	Reconnect
	Whether the switch is on or burned	Reopen/replace
	Whether component lights work well or burned	Repair/replace
	Whether the actuator is in good contact, damaged or has output	Repair/replace
	Whether electronic ballast or transformer works well or burned	Repair/replace
	No anti-frost heating	
	Whether power connecting line is in good contact	Reconnect
	Whether component transformer, heating tape or coated insulating glass works well or burned	Repair/replace
	Whether the actuator is in good contact, damaged or has output	Repair/replace

3.9 Internal test report

Description

1. Technical basis and calibration method:

GB/T 2423.1-2008 Test A: Low temperature.
GB/T 2423.2-2008 Test B: high temperature.
GB/T 2423.3-2006 Test Ca: constant damp heat.
GB/T 2423.4-2008 Test Db: alternating damp heat.
GB/T 2423.22-2012 Test method Test N: temperature change
GB/T2423.34-2012 test method test Z/AD: temperature / humidity combined cycle test
GB/T2423.50-2012 test method test Cy: constant damp heat mainly for the accelerated test of components
GJB150.3A-2009 high temperature test
GJB150.4A-2009 low temperature test
GJB150.9A-2009 damp heat test

2. Calibration of the main measuring instruments

Equipment Name	Model.	No.	Certificate No.	Technical Features
Roving detector	Hydra collector	C4AB00022	RZD20025466	0.3°C
Hygrometer	HMI-41/HMP46	X3610007/X3930012	2016/25/014 1	- 2%RH

3. Calibration site & environmental conditions

Location: Our factory laboratory Temperature: -40~150 ℃ Relative humidity: 20%~98%R.H

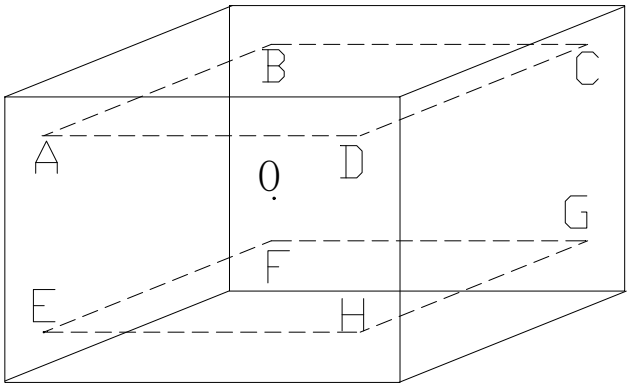
4.Placement of each temperature-sensitive probe:

Upper layer: A.B.C.D

Middle layer: O

Lower layer: E.F.G.H

Humidity measurement point: geometric centre point of the working space



Test Results

Table 1 Measured temperature values of maximum and minimum temperature detection points in each space

Temperature setting: -40.0℃ Indication: -40.0℃ - Temperature setting: 150℃ Indication: 150.0℃

Location		Measured value	Upper deviation	Lower deviation	Location		Measured value	Upper deviation	Lower deviation
Upper	A	-40.0	+0.3	+0.1	Upper	A	149.2	+0.3	+0.2
	B	-39.4	+0.2	+0.3		B	149.8	+0.1	+0.3
	C	-39.0	-0.1	-0.3		C	150.3	-0.2	-0.1
	D	-40.6	+0.1	+0.3		D	151.2	+0.3	+0.1
Middle	O	-39.3	-0.1	-0.3	Middle	O	149.0	-0.1	-0.3
Lower	E	-39.3	+0.1	+0.2	Lower	E	149.3	+0.3	+0.1
	F	-40.0	-0.2	-0.1		F	148.8	-0.1	-0.3
	G	-39.8	+0.2	+0.4		G	151.1	+0.2	+0.3
	H	-39.0	-0.3	-0.2		H	148.7	-0.3	-0.2
Conclusion of this test point: Temperature uniformity: ± 1.2℃ O-point temperature fluctuation: ± 0.3℃					**Conclusion of this test point: Temperature uniformity: ± 1.9 ℃ O-point temperature fluctuation: ± 0.5 ℃**				

Table 2 Measured temperature and humidity values for each space temperature detection point

Temperature setting: 60 ℃ Indication： 60.2℃ 59.8 ℃

Humidity setting((1) 20 %RH Indication： 19.3 %RH 21.0 %RH

Humidity setting((2) 90 %RH Indication： 89.7 %RH 90.5 %RH

Location		Measured value	Upper deviation	Lower deviation	Humidity value	Measured value	Upper deviation	Lower deviation
Upper	A	+60.2	+0.3	+0.2	88.5%RH	91.5%RH	+1.5	-1.5
	B	+59.2	-0.1	-0.2	19.6%RH	18.3%RH	+1.7	-2.3
	C	+60.3	+0.2	-0.1				
	D	+60.4	+0.2	+0.1				
Middle	O	+59.8	-0.2	-0.3				
Lower	E	+60.3	+0.1	+0.2				
	F	+59.3	-0.3	-0.2				
	G	+60.1	+0.1	+0.3				
	H	+59.7	-0.3	-0.1				

Note: Measured value: the median value of 15 consecutive measurements

Upper deviation: the highest value of the 15 measurements

Lower deviation is the lowest value of 15 measurements

Conclusion of the test point:

Temperature uniformity: ± 0.8 ℃, humidity fluctuation: ± 2.1 %RH

O point temperature fluctuation: ± 0.4 ℃

Overall conclusion:

This equipment, whose main technical indicators meet the corresponding technical requirements as well as the technical standards of the factory, is allowed to leave the factory.

Additional Description:

1. There is wind in the box when measuring, and the machine runs normally when unloaded.

2. Location of temperature detection points: the upper test point is 10cm from the top wall, the lower test point is 10cm from the bottom wall, and the upper and lower points are 10cm from the perimeter wall of the box. The centre point and humidity measurement point is the geometric centre of the working space of the box.

3. Each test point for the highest temperature point, and the performance is tested at the middle temperature point and the lowest temperature point. Humidity measurement for the middle temperature humidity

4. The above measured data is gained in the first time the temperature reaches the set value and stable 30 minutes 15 times continuously. That is, every 2 minutes for a measurement, a total of 15 times.

4. fixed value (FIX) experiment

4.1 Introduction of main picture of the system

Boot into the main picture of the system as shown [2-1]。

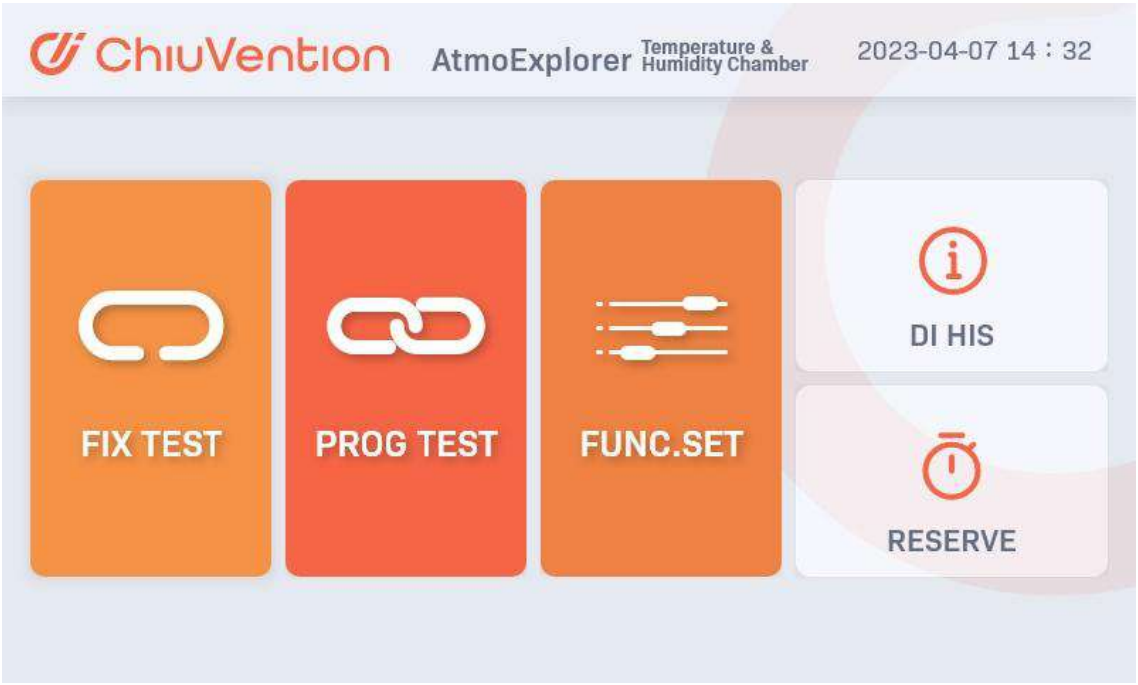


Fig. [2-1] main picture of system

The main screen of the system has five operations:

1. Setting experiment in this mode, the heat and humidity can be set according to a certain time or proportion. Click on the fixed value experiment picture as shown in figure [2-2]

2. Program experiment this mode allows people to edit specific programs by themselves and adjust the heat and humidity according to the program. Click enter the program experiment picture as shown in figure [3-1]

3. This function is set up by the operator to allow the operator to do the relevant settings. Click enter the operation settings screen as shown in figure [5-1]

4. The fault recording function allows the staff to view the DI fault record. Click enter the fault recording screen as shown in figure [7-1]

5. Setting up this function makes it convenient for the staff to start the fixed value task or program task at once. Click on the appointment settings screen as shown in figure [8-1]

4.2 Main picture of fixed value experiment

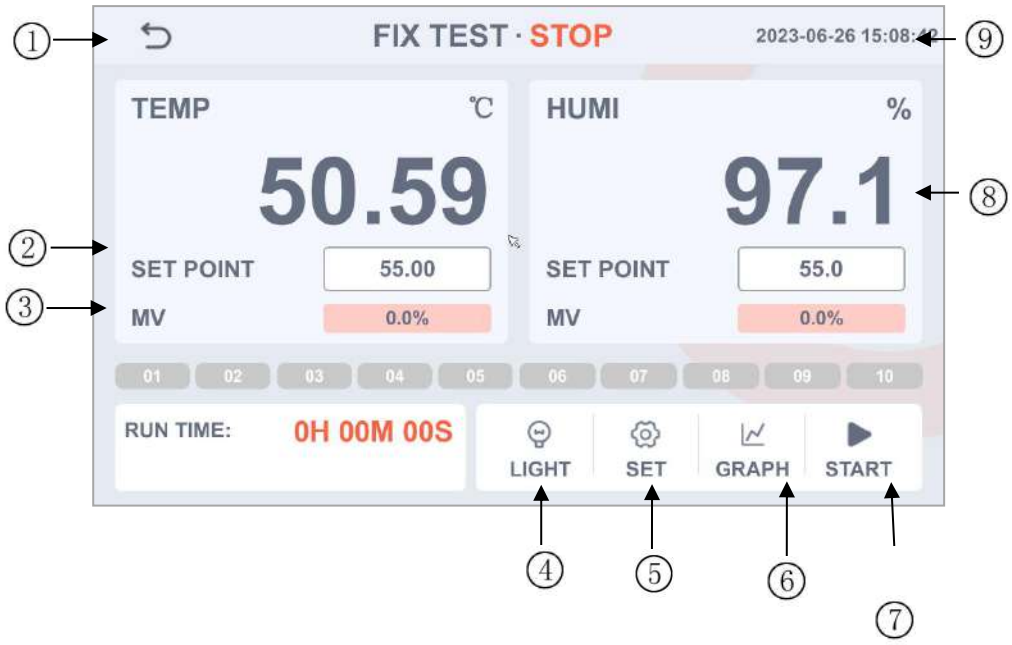


Fig. [2-2] main picture of fixed value experiment

① Represents the current heat
② Representing the current heat setting value
③Represents the current heat control output power value
④ Lighting buttons

☞ Click on the "light" button, the set of relay will act. Relay pointing to lighting

⑤ Please open the settings button. Please refer to figure [2-3] for specific settings
⑥ Switch to the curve display screen
⑦ Run the button. Refer to figure [2-4] for details
⑧ Represents the current humidity output.
⑨ Said the current humidity setting.
⑩ Said the current humidity.
⑪ Displays the current state
⑫ Displays the current position

4.3 Set value setting screen

Setting value of graph [2-3]

① The timing switch is ON and the OFF is switched on
② Setting the heat slope. Increasing or decreasing the heat according to a certain proportion (setting range 0.00-600.00)
③ Humidity slope setting. According to a certain proportion of humidity increase or decrease (set range 0.0-100.0)
④ Setting the running time of fixed value
⑤ Enter the standby settings screen. Refer to figure [2-4] for specific settings

4.4 Standby settings

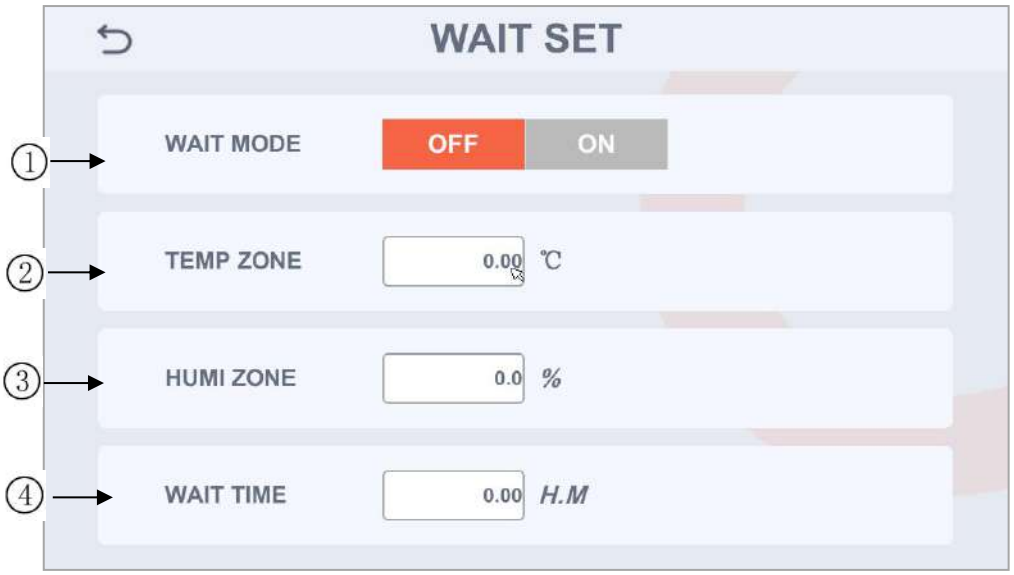


Figure [2-4] standby settings

① Standby setting switch
② Setting heat range (range 0.00-600.00)
③ Set the humidity area (range 0.0-100.0)
④ Set the standby time. (Factory default is 0.00)

4.5 Fixed value experiment running picture

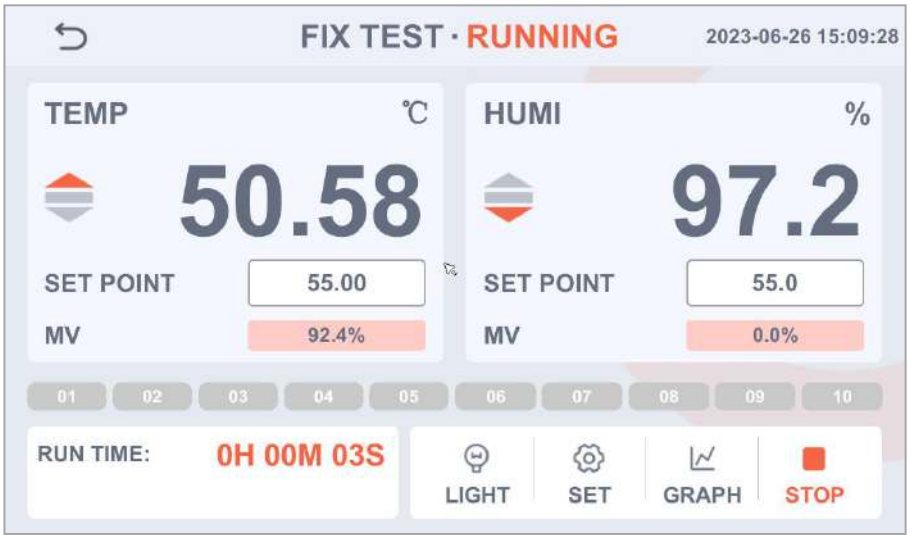


Fig. [2-4] fixed value running picture

Operation:

1. Set the value in the setting (Figure [2-3]), set the time, the heat and humidity slope
2. Click the run button on the main screen of the fixed value experiment (Figure [2-3])

☞No running, you can see the picture information has been updated. In the upper right corner of the state for the experimental operation, the lower left corner shows the running time and the time remaining.

☞No to stop midway can click on the lower right corner of the stop button to terminate operations.

Section 5 Program (PROGRAM) experiment

5.1 program experiment main picture

Click the program experiment in the main picture of the system to enter

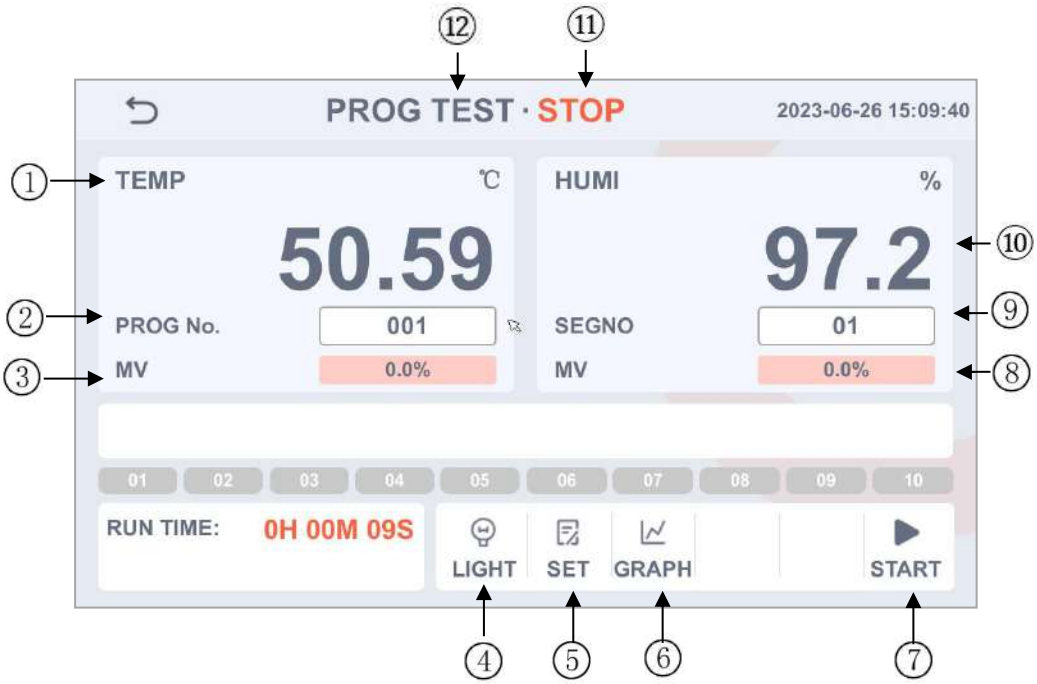


Fig. [3-1] program experiment

① Display the current heat
② The current selected program number
③ Represents the current heat control output power value
④ Lighting buttons

☞ Click on the "light" button, the set of relay will act. Relay pointing to the lighting

⑤ Program editor. Please refer to figure [3-2] for specific editing methods
⑥ Switch to the curve display screen.
⑦ Start the run button.
⑧ Represents the current humidity control output power value.
⑨ The total number of segments of the currently selected program.
⑩ Displays the current humidity value
⑪ Displays the current state
⑫ Displays the current location.

5.2 Program edit screen

Figure [3-2] program editing

① Edit program number
② Edit the name of the program
③ The display program code.
④ The heat of the current section
⑤ The humidity of the current section.
⑥ The current period of time.
⑦ Page up and down
⑧Set the time signal of the program segment that needs to be run
⑨ Program connection. (range 0-120)
⑩ Set cycle times.
⑪ Into standby settings. Please refer to the specific set of figure [2-4]

5.3 Partial loop setting

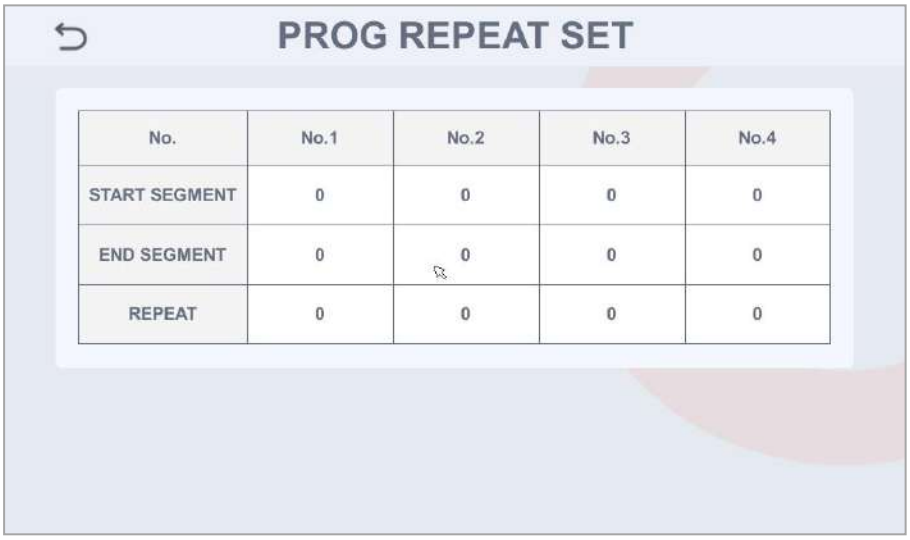


Fig. [4-4] Partial loop setting

content	Content description
Setup program number	Sets the program number to execute the loop.
The Numbers of segments	Sets the segment of the configured program that begins part of the loop.
Closing paragraph number	Sets a section of a configured program that terminates part of the loop.
cycles	Sets the number of cycles that a portion of the program is set to run repeatedly.

5.4 Program running screen

Procedure for the program running：

Procedure for running the program:

1. Edit a program in the Program Editing screen (Figure [3-2]).
2. Select the program number in the main Program Experiment screen (Figure [3-1]).
3. Click [Run].

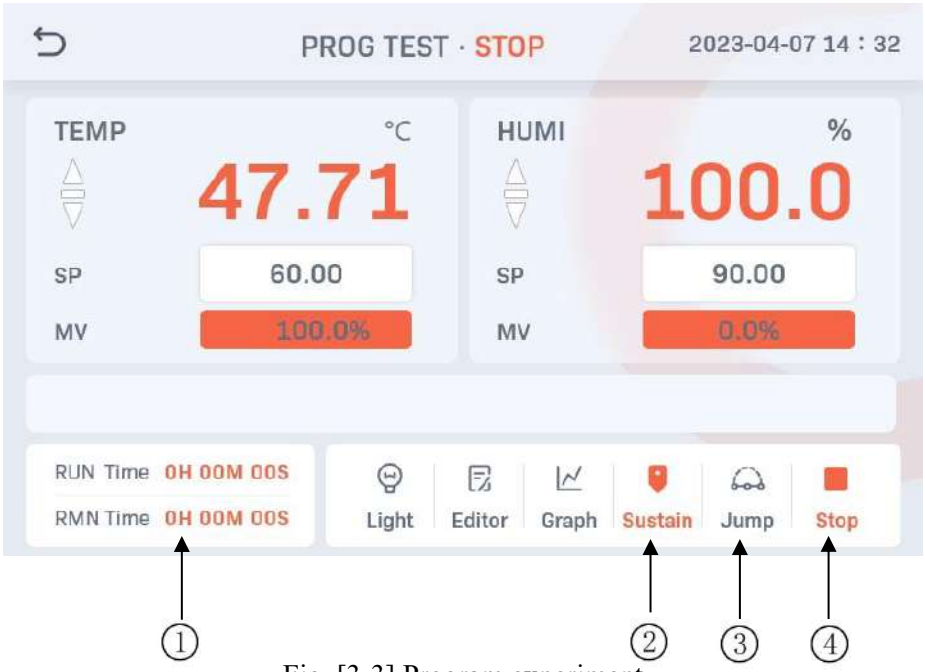


Fig. [3-3] Program experiment

① Running time and the remaining time.
② When the program is running, click [Hold] to keep the temperature and humidity unchanged, and click it again to stop.
③ When the program is running, click [Skip] to go directly to the next run.
④ Press [Stop] to stop the present run.

Section 6 Curve display

6.1 Curve display instant screen

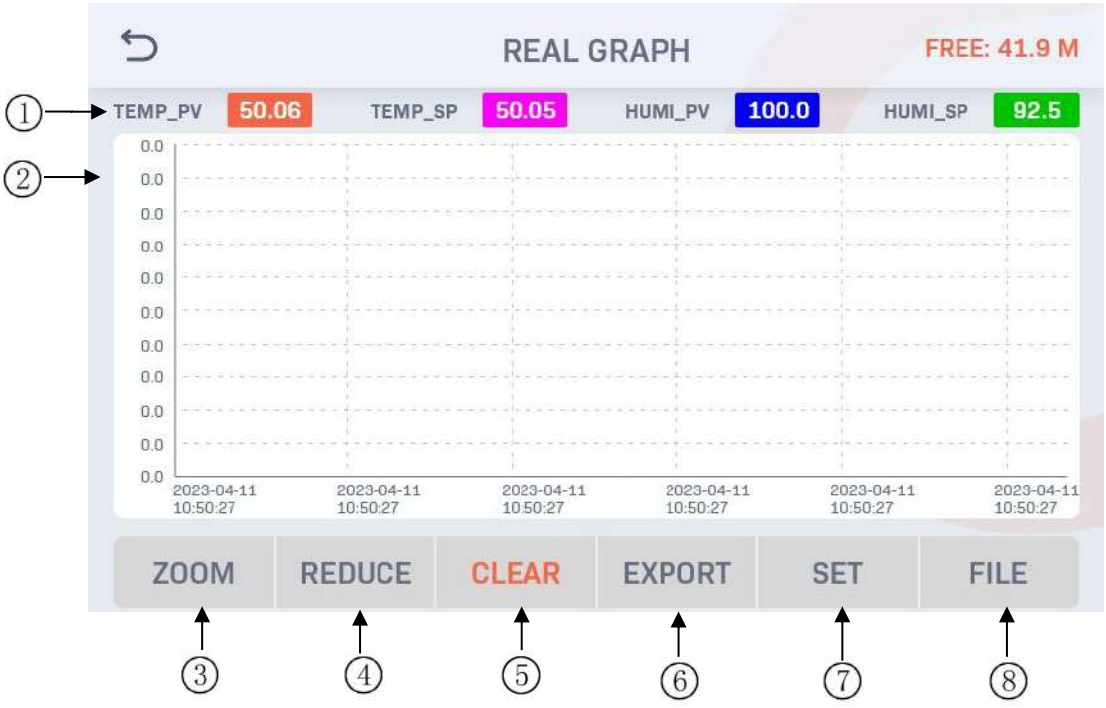


Fig. [4-1] Instant Curve

① Indicate the current and set values of temperature and humidity in four different color curves. (Click the corresponding box to show and hide the settings)
② Display area.
③ Zoom in.
④ Zoom out.
⑤ Clear.
⑤ Export the current curve screen. (Connect the U disk before operation)
⑥ Curve display settings. Refer to Figure [4-2] for specific settings
⑧ Enter the history file screen.

6.2 Curve settings

Fig. [4-2] Curve settings

② Set the display range. (-200-400)
② Set the time of the sampling cycle.

Section 7 Operation settings

7.1 Operation sets the first screen

Fig. [7-1] operation settings

①Language choice
②Setting up power supply operation after power cut

☞Stop: after the interruption of operation, the state will be restored to the stop state when the power is restored

☞Cold start: after the interruption of operation, restart the operation when the power is restored

☞ Hot start: after the interruption of operation, restore the power to restore the state to the state before the operation

③Backlight time setting, which is set to 0 for never extinguished

④When the lock is on, all the parameters (PARAMETER) are not available

7.2 Set second screen

Fig. [7-2] operation settings

① Set user password
② Touch screen calibration

Fig. [7-3] operation settings

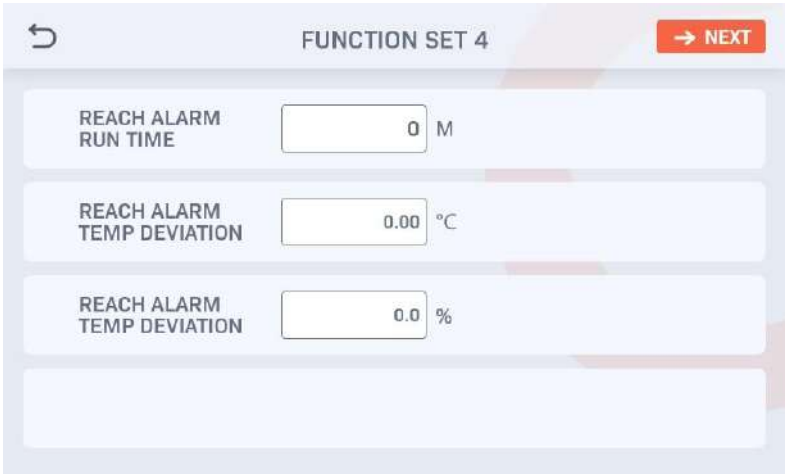


Fig. [7-4] operation settings

Section 8 Historical files

8.1 Main screen

Fig. [8-1] Main screen

① History files' number
② View the history file in the form of a curve. (Check the file number before viewing)
③ View the history file in the form of a table.
④ Export data. (Connect the U disk before exporting)
⑤ Delete the selected history files.
⑥ Next page.
⑦ Last page.

8.2 History curve

Fig. [8-2] History curve

① Indicate the current and set values of temperature and humidity in four different color curves. (Click the corresponding box to show and hide the settings)
② Display area.
③ Zoom in and out.
④ Left-right movement operation
⑤ Display settings of the curve. Refer to Figure [6-2] for the specific settings.
⑥ Export the current curve screen. (Connect the U disk before operation)
⑦ Enter the history file screen.

Section 9 Fault record

Click the fault record in the main picture to arrive at the secondary screen and view the history of DI

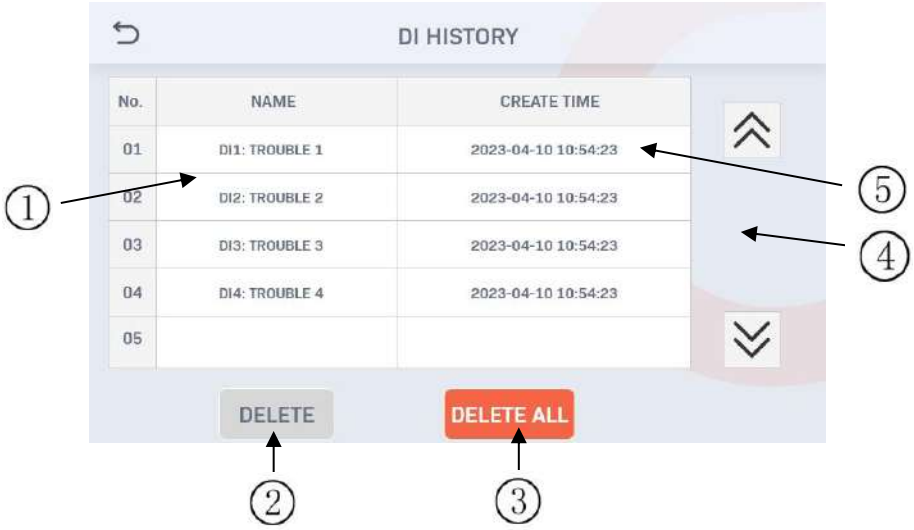


Fig. [9-1] DI fault record

① This area displays the name of the fault
② Delete a single historical record
③ Delete all historical records
④ Turn the page up and down
⑤ The time of DI fault occurrence
。

Section 10 Reservation settings

Figure [10-1] appointment settings

① Set the system time
② Second, click (reservation) key, you can set the appointment time to run
③ Third, whether to use reservation function settings

☞No appointment after setting in the experimental setting will have the corresponding time display the red check.

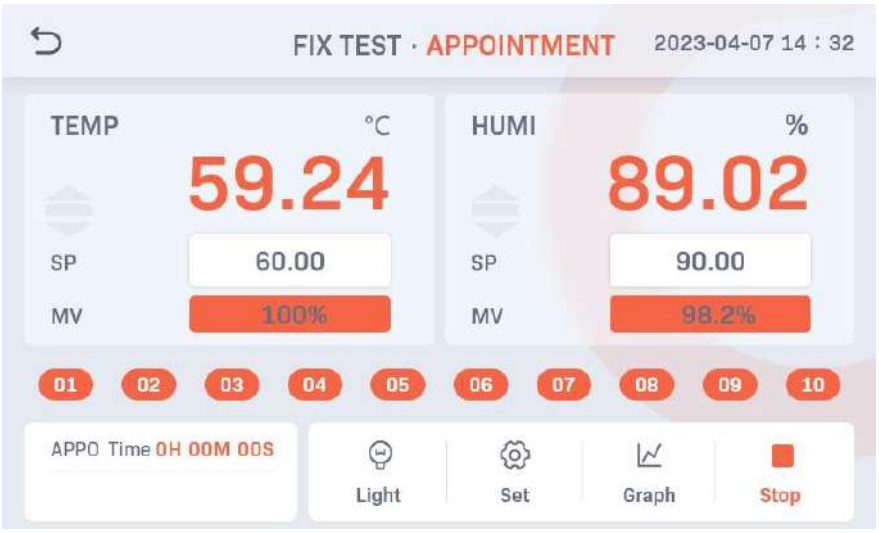
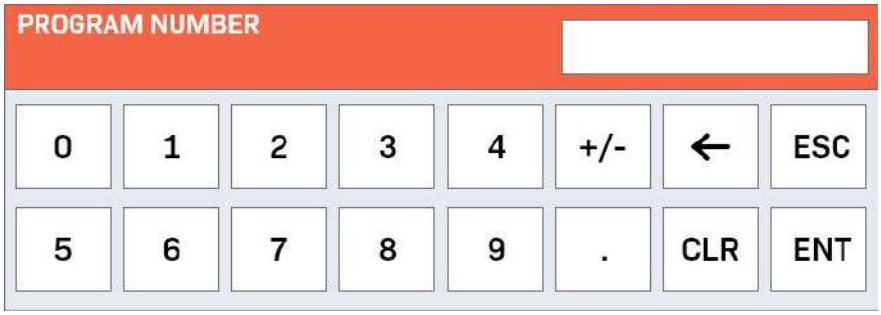


Fig. [10-2] experiment of reservation and setting

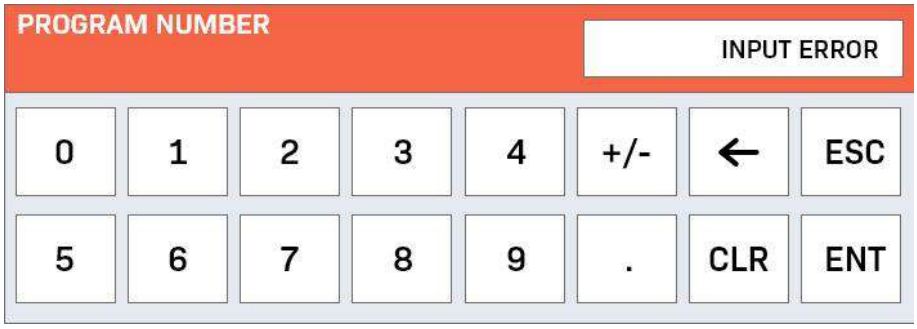
Section 11 Appendix

① Special box for digital input

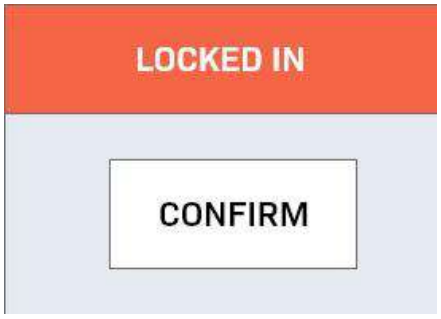


② Set the input frame of the program experiment name and the DI fault name

③ Marking beyond the set range



④ Lock the prompt screen of the button



If further calibration or maintenance information is required, please call Chiuvention Engineering