



Operations Manual

Temperature Humidity Test Chamber

TH-100A

Xi'an LIB Environmental Simulation Industry



Dear User:

Thank you for choosing our temperature and humidity test chamber. Before using the test chamber, please read this operation manual carefully. We hope it can help you operate and maintain the test chamber. After reading this operation manual, please keep it properly so that you can read it when needed.

Please operate the test chamber according to the instructions in the manual and keep in mind the precautions mentioned in this manual to avoid malfunctions due to operator errors. Proper maintenance procedures can extend the service life of the test chamber. If you have any questions, please contact us immediately.

Please be sure to read the instruction manual before use.

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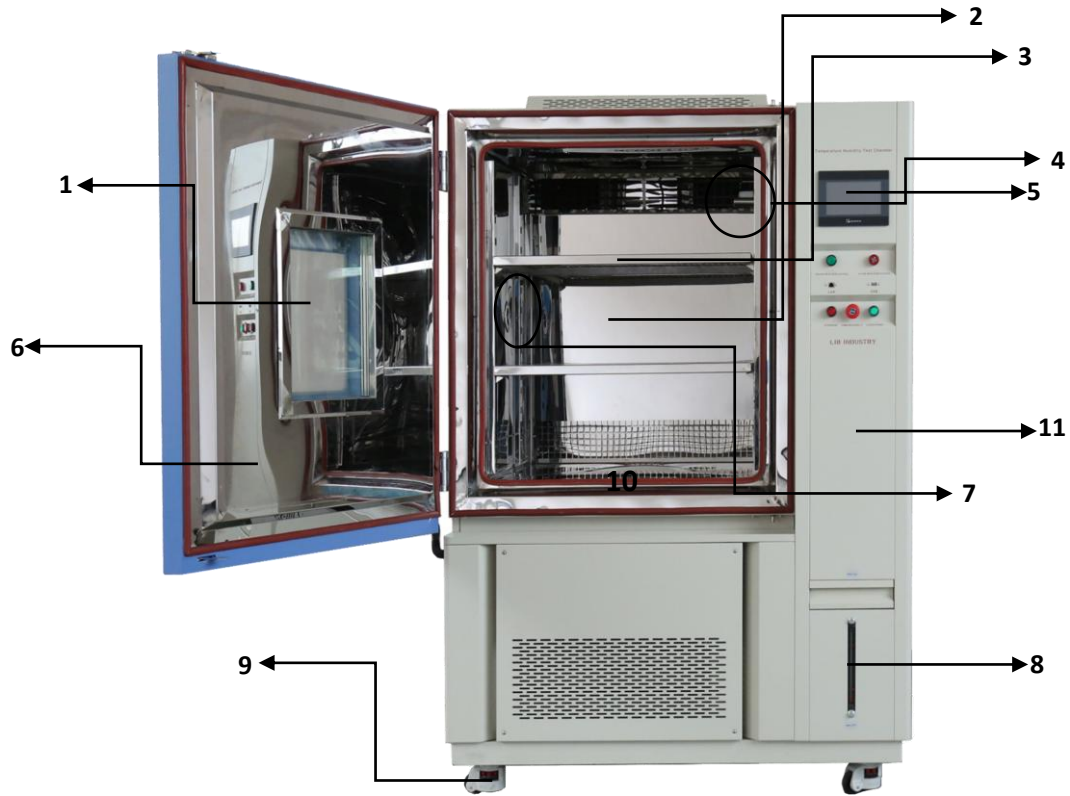
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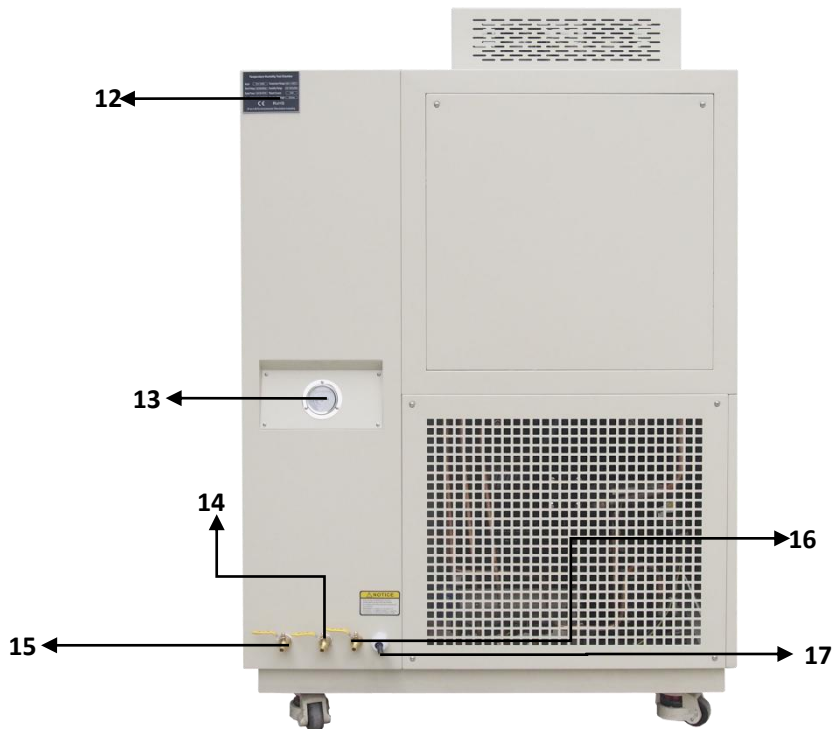
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1 Product Introduction

1.1 Structure diagram



[Figure 1-1] Front structure



[Figure 1-2] Back structure

1. Observation window: The built-in LED light can clearly observe the status of the test sample, and the conductive film on the internal glass can prevent the window from frosting.
2. Workroom: The internal material is SUS304 stainless steel plate with mirror finish, which is rust-resistant to high and low temperatures and humidity corrosion, and is durable and has a long service life.
3. Sample rack: Two punched sample racks are standardly equipped to facilitate air circulation. They are made of SUS304 stainless steel plate. Each rack has a standard load-bearing capacity of 50KGS and is height-adjustable. The sample rack can also be removed to facilitate the testing of large-sized test samples.
4. Temperature and humidity sensor: Using the dry-wet bulb comparison method, a wet gauze and a real-time temperature, the real-time relative humidity is displayed through temperature difference conversion; PT-100A sensor is selected.
5. Controller: PID programmable color touch screen controller, can create 120 programs 100 segments, or can customize the controller program according to customer testing requirements, with multiple languages available.
6. Door: Equipped with manual two-way locks at the top and bottom, and sealed with silicone rubber to ensure good sealing of the equipment.
7. Test hole: used to energize the test sample. The standard inner hole diameter is 50mm and can also be customized.
8. Liquid level meter: convenient for observing the water level in the water tank.
9. Casters: convenient for moving or fixing the test chamber, height adjustable.

10. Insulation layer: Use polyurethane foam and thermal insulation cotton, which have better insulation performance, are biodegradable, environmentally friendly and noise-reducing.
11. External material: A3 steel plate with protective coating, which not only looks neat and beautiful but also prevents static electricity.
12. Nameplate: includes information such as equipment model, power, voltage, rated current, etc.
13. Pressure gauge: can directly read the refrigerant pressure.
14. Automatic water inlet: directly connect the water source to supply water to the equipment, keep it open, and directly turn on and off the water source each time.
15. Sewage outlet: discharge the residue filtered by the filter, open it once every three months for sewage discharge.
16. Water tank drain port: The water in the water tank is discharged from here. It is normally closed and should be opened when the water in the tank needs to be replaced.
17. Power cord: to power up the equipment.

1.2 Performance parameters

Internal Dimensions:	400*500*500mm
Dimensions:	900*1050*1620mm
Volume:	100L
Temperature range:	-20 °C ~ +150 °C
Temperature Fluctuations:	±0.5 °C
Temperature deviation:	±2.0 °C
Heating rate:	3 °C /min
Cooling rate:	1 °C /min
Heating system:	Nichrome Heater
Temperature Sensor:	PT100Ω/MVA level, accuracy 0.001°C
Refrigeration system:	French TECUMSEH compressor refrigeration system
refrigerant:	R449A
Humidity range:	20%~98%RH
Humidity deviation:	±2.5%RH
Humidity Sensor:	Wet and dry bulb
Dehumidification:	Humidifier; Evaporator
External Material:	A3 steel plate electrostatic spraying
Internal Material:	SUS304 stainless steel
Insulation Material:	Polyurethane foam and insulation
Controller:	Programmable color touch controller, USB interface, Ethernet
Air Circulation:	Centrifugal fans
Window material	Observation window with built-in lighting , double-layer heat-stable silicone rubber seal
Standard Configuration:	1 test hole with soft plug , 2 sample holders
power supply:	AC380V 50Hz 3P

1.3 Product Features

The temperature humidity test chamber is used to test the performance and reliability of products under different temperature and humidity conditions. Its internal structure includes a control system, a heating system, a humidification system, a refrigeration system, an air circulation system, and a protection system. It can simulate various environmental conditions, such as high temperature, low temperature, high humidity, low humidity, etc., and perform temperature and humidity tests, cold resistance tests, thermal cycle tests, ultra-low temperature tests, and high temperature tests to evaluate the working ability and life of products under these conditions. It can also be used for calibration functions.

There are various sizes, including reach-in, desktop and walk-in types. You can choose the appropriate model according to the size and performance of the test samples. There are standard test chambers available and customized models are also supported. It is used in automobile, aerospace, materials, electronics, military, coatings, batteries, cables, photovoltaic panels, medicine, shipping, daily necessities and other industries.

2 Product Information

2.1 Notes

Before connecting the power supply, first make sure that the pre-installed power supply of the power distribution cabinet matches the test chamber according to the information on the chamber nameplate, and then connect the power supply correctly according to the corresponding label of the terminal. In this process, the test chamber must be well grounded. Be careful not to use one power supply for multiple machines at the same time, so as to avoid voltage drop affecting machine performance or even causing malfunction and shutdown. Please use a dedicated circuit.

2.2 Installation conditions

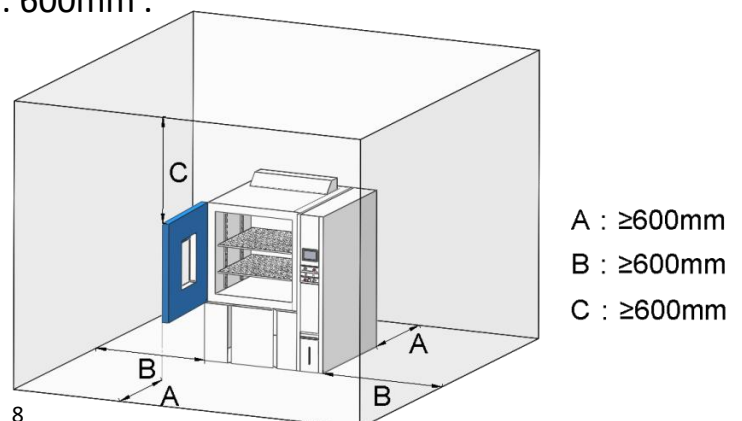
Installation space: Distance from the front: 600mm ;

Distance from the back: 600mm ;

Distance from left side: 600mm ;

Distance from right side: 600mm ;

Distance from top: 600mm .



Environmental conditions:

Temperature: 5 °C ~30 °C (average temperature within 24 hours ≤30 °C)

Relative humidity: ≤85%HR (air conditioning should be turned on in summer)

Air pressure: 86~106kpa

Space conditions:

The ground is flat, there is little mechanical vibration around, and the ventilation is good;

Close to power supply, water source, and drainage channel;

Avoid direct sunlight and no sudden changes in ambient temperature;

Keep away from flammables, explosives, corrosive substances and dust;

There are no fire alarms directly above the equipment.

2.3 Usage Guidelines

1. The test chamber needs to be inspected before the operation begins. See [3.1 Pre-operation inspection] for details.
2. It is recommended to let the test chamber stand for 6 hours after arrival before use.
3. It is prohibited to test the following materials: explosives, flammable materials, self-igniting substances, oxide recombination, flammable gases.
4. Lights should be turned off at all times except when necessary.
5. Placement of test samples: In order to ensure sufficient circulation of air in the workroom, there should be some space between each test sample to prevent large deviations in the uniformity of temperature and humidity in the workroom, which

would affect the test results.

6. For test samples that need to be powered, you can connect an external power supply through the test hole on the side of the chamber for power supply. Do not directly use the power supply in the test chamber; when the test sample does not need to be powered, be sure to plug the test hole with the matching rubber plug.
7. During the test process with humidity requirements, make sure that the wet-bulb gauze covers the sensor and confirm its water absorption, otherwise the measurement value will be inaccurate. When only doing temperature testing, be sure to remove the wet-bulb gauze to prevent it from becoming difficult to absorb water due to drying.
8. If the test chamber is running below 0 °C , please try to avoid opening the door, because opening the door of the test chamber at a lower temperature is likely to cause ice formation of the internal evaporator and other parts, thus causing the test chamber to malfunction, and the lower the temperature, the more serious the situation. If it must be opened, the door opening time should be shortened as much as possible.
9. During the test, please do not open the door or get close to the chamber, otherwise it will lead to the following adverse consequences:
 - ① High temperature or high humidity in the workroom will cause shock to operators and cause personal safety issues;
 - ② The inside of the door remains hot and can cause injury if touched by mistake;

③ High temperature air may trigger a fire alarm or even cause equipment failure.

10. Attention should be paid when opening the door after the test: When opening the door, the operator must move backwards in the direction of the door opening to prevent a large amount of hot air from gushing out of the working room and causing injury.

11. After the low temperature test, set the temperature to 60 °C , dry the room for about half an hour, and then turn off the equipment to prevent ice from forming inside the room and affecting the next test.

12. Please wear heat-resistant or cold-resistant gloves when removing the test sample after the test to avoid personal injury to the operator.

13. After the test, remember to turn off the main power, clean the water in the chamber and under the door, and clean the workroom. If the test chamber is not used for a long time, the water in the water tank must be drained.

14. Non-professionals are not allowed to repair or inspect this equipment, and disassembly, inspection or repair must be carried out under power off to avoid other accidents such as electric shock and fire.

2.4 Regular Calibration

The test chamber will inevitably cause some wear and tear during use, which will cause deviations in temperature and humidity points. Therefore, in order not to affect the accuracy and stability of the test data, the calibration cycle of the test chamber should be determined based on factors such as the frequency of equipment use, environmental conditions, and maintenance conditions, and generally does not exceed one year. The calibration items include temperature and humidity fluctuation and temperature and humidity uniformity.

It is recommended to select a calibration laboratory with ISO17025 qualifications and perform calibration once a year.

Debugging after calibration: Before the first test after the test chamber is calibrated, debugging and trial operation must be carried out to ensure that the calibration is correct and the data in the subsequent test process is accurate.

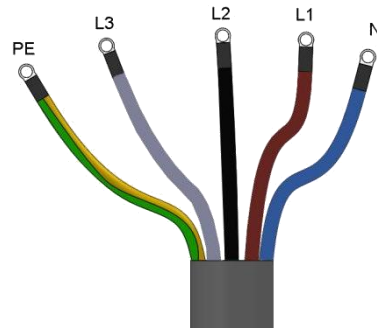
3 Operation Process

3.1 Pre-operation Inspection

3.1.1 Power Supply

Make sure the power cord is properly connected according to specifications and confirm grounding.

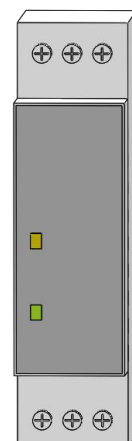
Voltage: AC380V 50HZ, 3P



Grounding method: Three-phase power supply: L1, L2, L3 are connected to the fire wire; N is the neutral wire; PE is the ground wire.

Note: The voltage between L1 and L2, L2 and L3, L3 and L1 is $380V \pm 10\%$, and the voltage between L1 and N, L2 and N, L3 and N is $220V \pm 10\%$, then the test chamber can be connected.

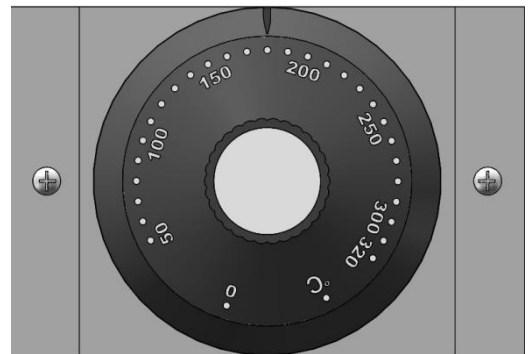
☞ When the yellow and green lights of the phase sequence relay are on at the same time, it means that the phase sequence connection is correct.



3.1.2 Overheat protector

Check whether the overheat protector is set to the maximum temperature plus 20 °C ~30 °C . (It has been adjusted at the factory and generally does not need to be adjusted)

☞ For example, when the maximum temperature is 150 °C , the adjustment range of the overheat protector is 170 °C ~ 180 °C .



3.1.3 Water supply

1.Check whether the water quality of the water supply meets the requirements of the test chamber.

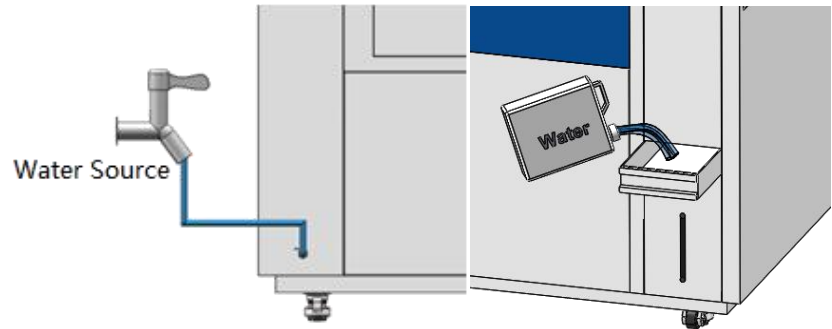
(1)The water tank and workroom may contain impurities or iron filings after long-term transportation. Please clean the water tank and workroom before use.

(2)It is recommended to use purified water, distilled water or demineralized water when supplying water.

2.Check that the water tank is filled until the high water level light comes on.

Water adding method:

- (1) Automatic water inlet connected to water supply
- (2) Manually add water to the water tank



3.1.4 Valves

1. Check whether the water tank drain valve is closed.

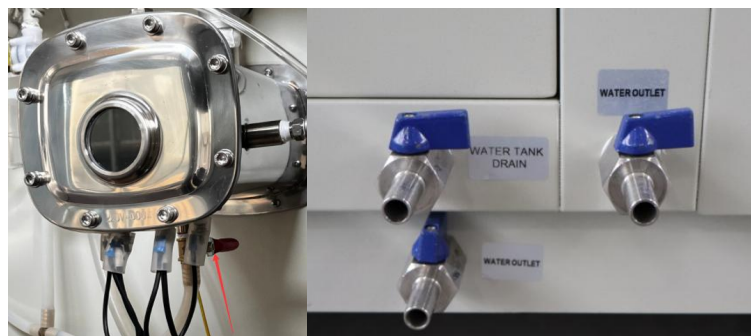
☞ Close the water tank drain valve during the test. Open it when draining is required at the end of the test or when the test chamber is not used for a long time. Check and close it before each new round of testing.

2. Check whether the drain valve is closed.

☞ Close the drain valve during the test and open it when draining regularly.

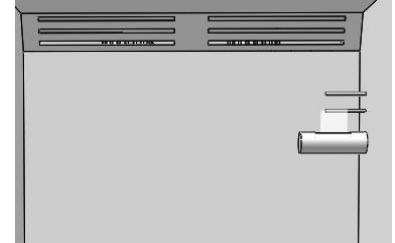
3. Check that the humidifier valve is closed.

☞ Close the humidifier drain valve during the test. When the test is completed and the water needs to be drained or the test chamber is not used for a long time, open it and drain it together with the water in the tank. Check and close it before each new round of testing.



3.1.5 Wet-bulb gauze

1. Make sure the wet bulb gauze is hung correctly, covering the top of the sensor and with the bottom immersed in the water tank.



2. Check whether the wet-bulb gauze is moist (when there is water in the water supply tank and the water level is normal, but the wet-bulb gauze cannot be moistened, please replace it with a new gauze).
3. The wet-bulb gauze should be removed only when performing temperature tests; if the wet-bulb gauze is not removed when performing high-temperature tests on the test sample, a new wet-bulb gauze must be replaced before the next operation, otherwise it may affect the measured value because it cannot absorb water.

3.1.6 Others

1. Check to ensure all items in the workroom are removed;
2. Check to make sure the castors are secure;
3. Make sure the test chamber is well grounded;
4. Check whether the pressure gauge values displayed at the compressor inlet and exhaust ports are normal; the pressure gauge display value should be the static equilibrium pressure before starting the machine, and this pressure value is an important basis for judging whether the refrigerant is leaking.

3.2 Operation steps

3.2.1 Place the test sample

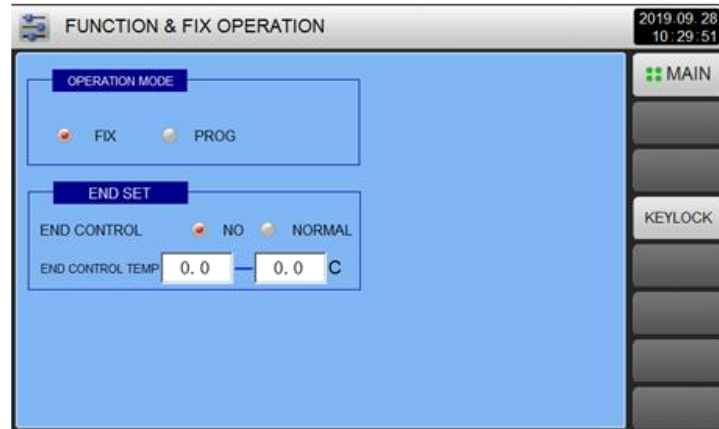
Place the test samples on the sample rack in the workroom, making sure there is a certain amount of space between the samples to ensure smooth air circulation in the workroom.

3.2.2 Turn on the power

After completing the above series of actions and ensuring that they are correct, connect the power supply, turn on the main switch on the right side of the test chamber (pull it upwards), and press the POWER button on the front to start the controller; first, click Display Settings on the main interface to select language and other settings, see [4.8 Display Settings] for details, check whether the display of the controller is normal, and observe whether the temperature and humidity display values are close to the temperature and humidity of the atmospheric environment. After ensuring that the above are correct, you can perform the following operations to start the test.

3.2.3 Selection Mode

In [Figure 3-1], and select the operation mode according to the test requirements.



[Figure 3-1] Operation mode interface

The operation modes include "fixed value" and "program".

☞ **Fixed value: The test is run according to the set fixed value .**

For example: Temperature 50 °C , humidity 20%RH .

☞ **Program: The test is run according to the programs.**

For example: Temperature 40 °C , humidity 93%RH , heating time 1h ;

Temperature 40 °C , humidity 93%RH , dwell time 1h ;

Temperature -20 °C , cooling time 2h ;

Temperature -20 °C , dwell time 2h ;

The program loops 2 times.

☞ **Once the test chamber starts running, the operation mode cannot be changed unless the test is stopped and reset.**

3.2.4 Setting test parameters

After selecting the operation mode, you need to set parameters. The methods of setting parameters in fixed value mode and program mode are different.

1. Select the "fixed value" mode:

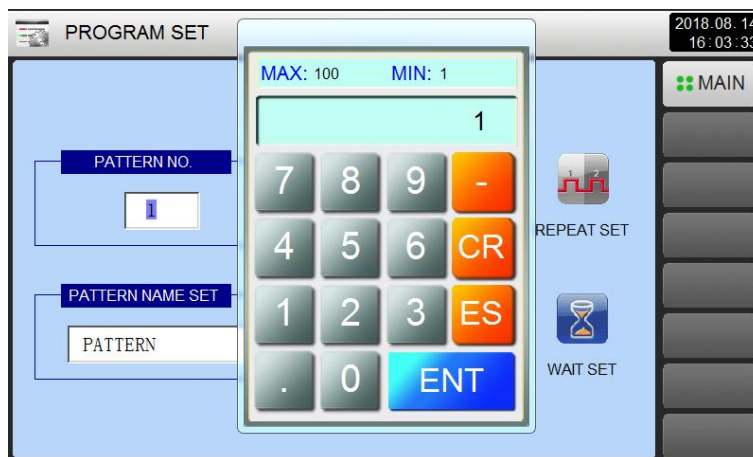
Select "Monitoring Screen" on the main interface to enter the fixed value mode monitoring screen, as shown in [Figure 3-2], and directly set the required temperature and humidity according to the test. After the setting is successful, directly click the [Run] button in the lower right corner to start the test.



[Figure 3-2] Fixed value mode monitoring screen

2. Select "Program" mode:

Select "Program Settings" on the main interface to enter the Program Settings screen, as shown in [Figure 3-4], and set the program and test name.

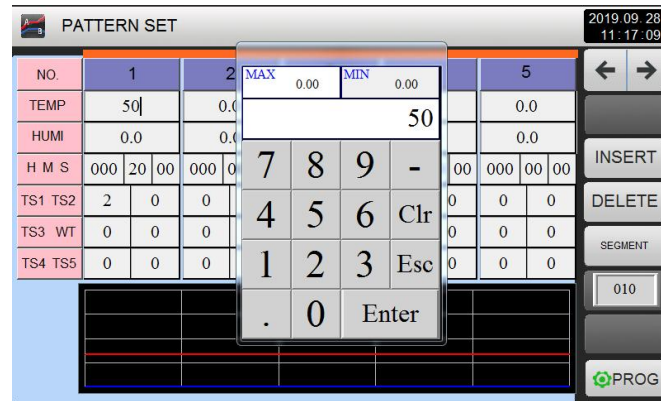


[Figure 3-3] Program setting screen

In the program setting screen [Figure 3-3], click "Program setting" to enter the program editing screen, as shown in [Figure 3-4], and set the temperature, humidity,

hours, minutes, and seconds required for the program group.

☛ [Figure 3-4] In the program group editing, TS1, TS2, TS3 are waiting, TS4, TS5 are 0 by default , and no setting is required.



[Figure 3-4] Program setting screen

the program setting screen [Figure 3-3] , click “Repeat Setting” to enter the loop setting screen, as shown in [Figure 3-5] , and set the loop count required for the program group.

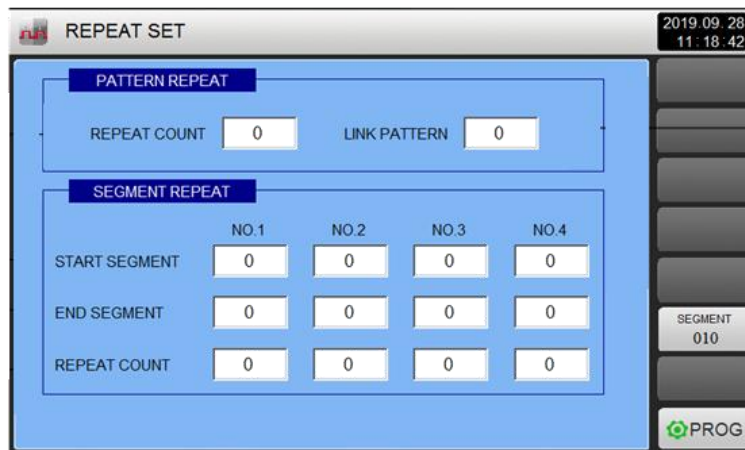
☛ **Group loop:** All programs in the program group are looped.

☛ **Loop count:** Set the number of times the program group will be looped. Note that if you enter " 0 ", it will be repeated infinitely.

☛ **Group connection:** After the set program group is finished running, the program group that will run continuously. The default value is 0, no setting is required.

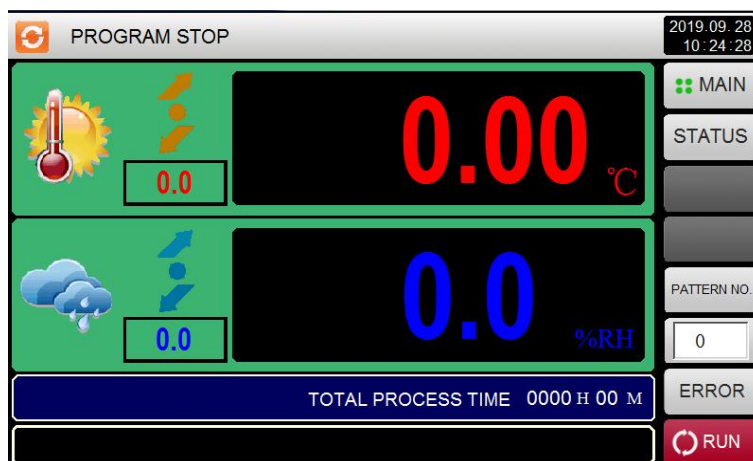
☛ **Segment loop:** loop some segments in the program group. The default is 0, no setting is required.

☛ If you need to set the group connection and segment cycle, please refer to [4.6.2 Cycle Setting] in the controller instructions for details.



[Figure 3-5] Cycle setting screen

Click "Monitoring Screen" on the main interface to enter the program mode monitoring screen, as shown in [Figure 3-6] Program mode monitoring screen. Click "Pattern No. " on the right to select the program group that has been set.



[Figure 3-6] Program mode monitoring screen

3.2.5 Start the Test

After setting the above test parameters, click the [Run] button in the lower right corner of the monitoring screen to start the test.

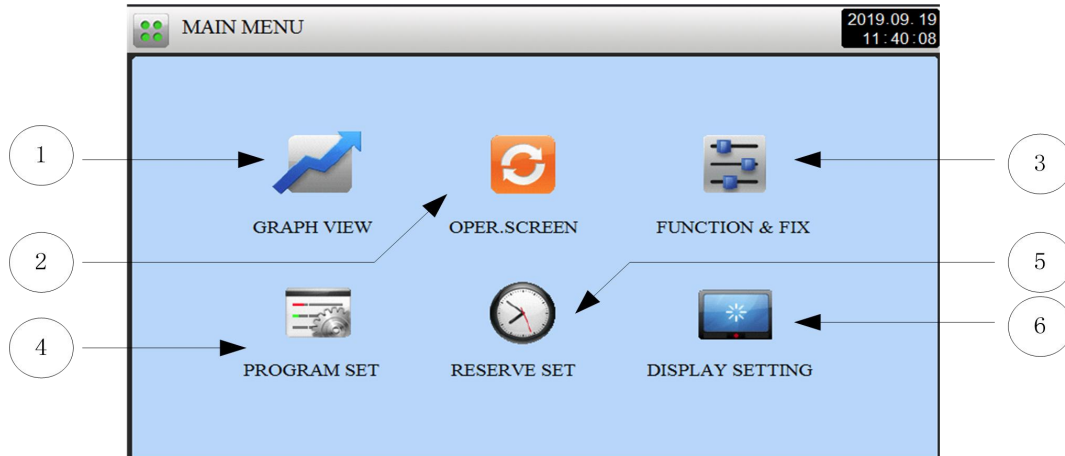
3.2.6 End of the Test

Click [Stop] to terminate the test.

Or after the test is finished, press the POWER switch on the panel to turn off the controller, turn off the main power of the test chamber, take out the test sample, and clean, maintain and inspect the equipment.

4 Controller Description

4.1 Main Screen



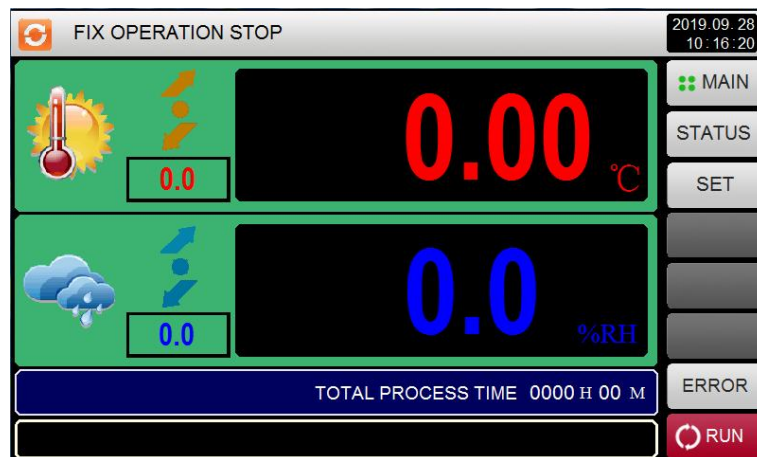
[Figure 4-1] Main screen

No.	Instructions	Contents
①	Graph display	Switch to the temperature and humidity curve screen to view the actual and set values of temperature and humidity at the time and the current state, and view historical curve data. See [4.7 Curve Display] for details .
②	Operation screen	Switch to the operation monitoring screen to view the current operation status, set values and actual values of temperature and humidity, total operation time, real-time fault display, and run or stop the test. See [4.2~4.4 Monitoring Screen] for details .
③	Function and fix settings	Switch to the operation mode screen, you can select the operation mode and make test end settings. See [4.5 Operation Settings] for details .
④	Program settings	Switch to the program setting screen, you can edit different program groups according to different tests, set the program's cycle mode and waiting action. See [4.6 Program Group Setting] for details .
⑤	Reserve settings	Switch to the current time and scheduled time screen to set the current time and scheduled operation time. See [4.9 Schedule Setting] for details .
⑥	Display settings	Switch to the controller display setting screen, where you can switch the language and set the screen protection time for power failure recovery operation, and view the controller version number. See [4.8 Display Setting] for details .

4.2 Monitoring screen - Fixed value operation

4.2.1 Fixed value operation -first stop screen

- ▶ Select "Monitoring Screen" in [4.1 Main Screen] to switch to [Figure 4-2] Fixed value (FIX) operation 1st stop screen.
- ▶ In [4.5 Operation Settings], select "Fixed value (FIX) " as the operation mode.
- ▶ Directly set the temperature and humidity setting values in the [Figure 4-2] interface.
- ▶ After entering the set value, select the [Run] button on the lower right side of the monitoring screen to execute the fixed value operation.

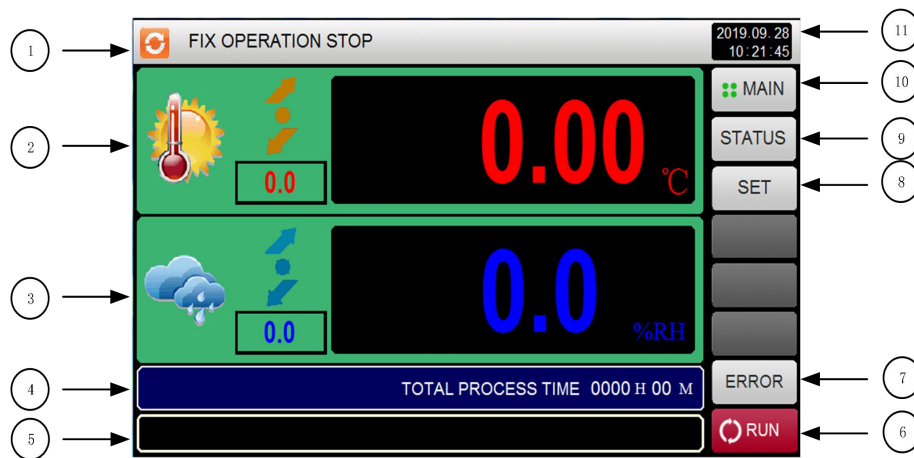


[Figure 4-2] Fixed value -operation first stop screen

Table 4-1 Temperature and humidity SP parameters

Parameter	Setting range	Unit	Initial Value
Temperature SP	-200.00~300.00	°C	25.00
Humidity SP	0.0~100.0	%	50.0

4.2.2 Fixed value operation -first operation screen

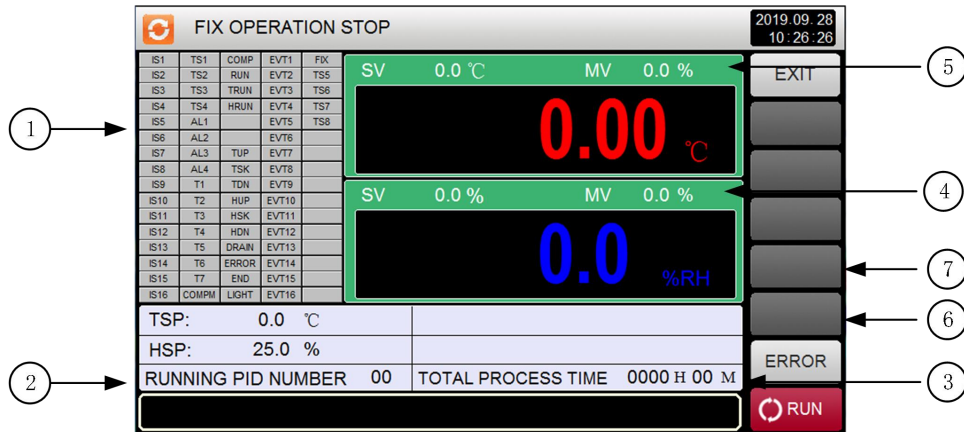


[Figure 4-3] Fixed value operation -first operation screen

- ① Indicates the current running status.
- ② Indicates the current temperature setting value and current value.
- ③ Indicates the current humidity setting value and current value.
- ④ Indicates the total running time display.
- ⑤ Indicates real-time fault information display.
- ⑥ Key to stop fixed value operation.
- ☞ The [Run] key is displayed on the fixed value stop screen.
- ⑦ Switch to the fault query screen.
- ⑧ Sets the screen button.
- ⑨ Switch to "Fixed value operation 2nd operation screen".
- ⑩ Switch to the Home screen.
- ⑪ Indicates the current time/date.

4.2.3 Fixed value operation -second operation screen

►The display screen of command value, set value, control output value and lamp operation status.



[Figure 4-4] Fixed value operation -second operation screen

- ① The ON state is indicated by red, and the OFF state is indicated by dark gray.
 - ② Indicates the current PID number.
 - ③ Indicates the total running time.
 - ④ Indicates the current humidity control output.
 - ⑤ Indicates the current temperature control output.
 - ⑥ [HUMI-AT] Humidity self-tuning button (hidden when stopped).
 - ⑦ [TEMP-AT] Temperature self-tuning button (hidden when stopped).
- ※ In the fixed value operation stop screen, the ⑥ and ⑦ keys are inactive.

4.3 Monitoring screen - Program running

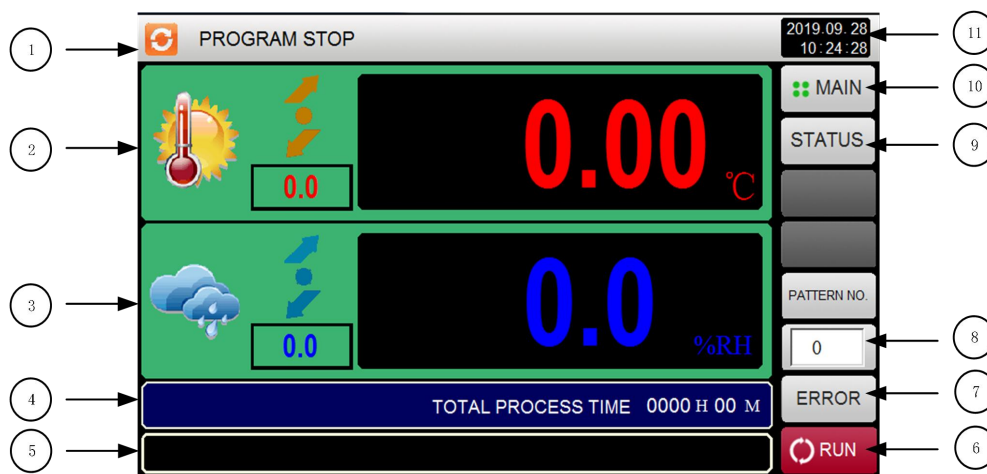
4.3.1 Program stop -1st stop screen

- ▶When "Monitoring Screen" is selected on [4.1 Main Screen], the screen will be switched to [Figure 4-5] PROGRAM 1st stop screen.
- ▶In [4.5 Operation Settings], select "Program" as the operation mode.
- ▶Please refer to [4.6 Program Setting] for program setting method.



[Figure 4-5] Program -1st stop screen

4.3.2 Program operation -first operation screen

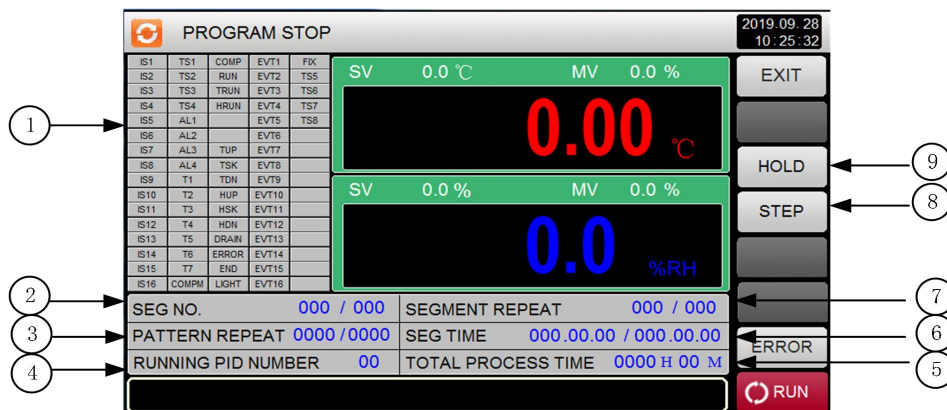


[Figure 4-6] Program- first running screen

- ① Indicates the current running status.
- ② Indicates the current running segment temperature and temperature setting value.
- ③ Indicates the current humidity and humidity setting value.
- ④ Indicates the total running time display.
- ⑤ Indicates real-time fault information display.
- ⑥ Key to stop program execution.
- ☞ The [Run] key is displayed on the program stop screen.
- ⑦ Switch to the fault query screen.
- ⑧ Displays the current program group.
- ⑨ Switch to "Program operation 2nd operation screen".
- ⑩ Switch to the Home screen.
- ⑪ Indicates the current time/date.

4.3.3 Program operation -second operation screen

►Screen showing command value, set value, control output value and lamp operation status



[Figure 4-7] Program (PROGRAM) second operation screen

① The ON state is indicated by red, and the OFF state is indicated by dark gray.

② Indicates the current running program segment number.

☞ [Program segment: 000/000] The number in front indicates the executed segment, and the number behind indicates the set segment.

③ Indicates the mode repetition state.

☞ [Pattern repetition times: 000/000] The number in front indicates the number of repetitions that have been executed, and the number behind indicates the number of repetitions that are set.

④ Indicates the running PID number.

⑤ Indicates the total time of the current program.

⑥ Indicates the segment time.

☞ [Segment time: 000.00/000.00] The number in front indicates the current segment running time, and the number behind indicates the segment setting time.

⑦ Indicates a partial repetitive state.

☞ [SEG repetitions: 000/000] The number in front indicates the number of repetitions that have been executed, and the number behind indicates the number of repetitions that are set.

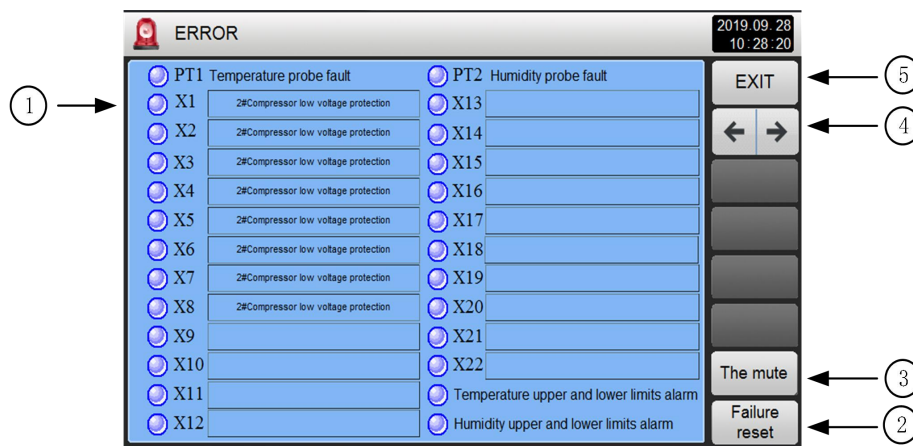
⑧ End the current segment and move to the next segment.

⑨ Maintain (Hold on) or release (Hold off) the current temperature and humidity setting values.

4.4 Monitoring screen -Error display screen

4.4.1 Real-time fault display screen

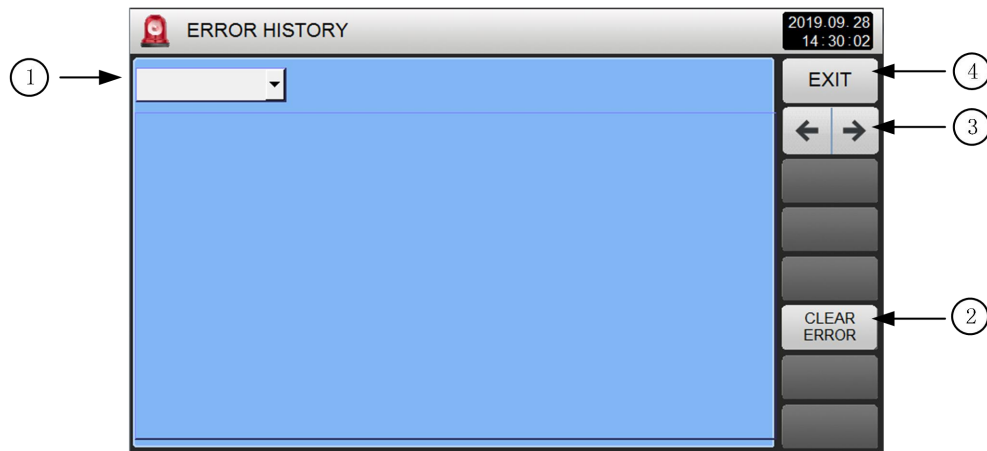
- Select "Monitoring Screen" in [4.1 Main Screen] and click the [Error] button in the lower right corner to switch to the real-time error display screen [Figure 4-8].



[Figure 4-8] Real-time fault display screen

- ① Fault content display: when the corresponding green light on the left is on, it means the corresponding fault has occurred.
- ② Fault reset button.
- ③ Fault mute button.
- ④ Switch to the historical fault query screen.
- ⑤ Return to the monitoring screen.

4.4.2 Historical error screen

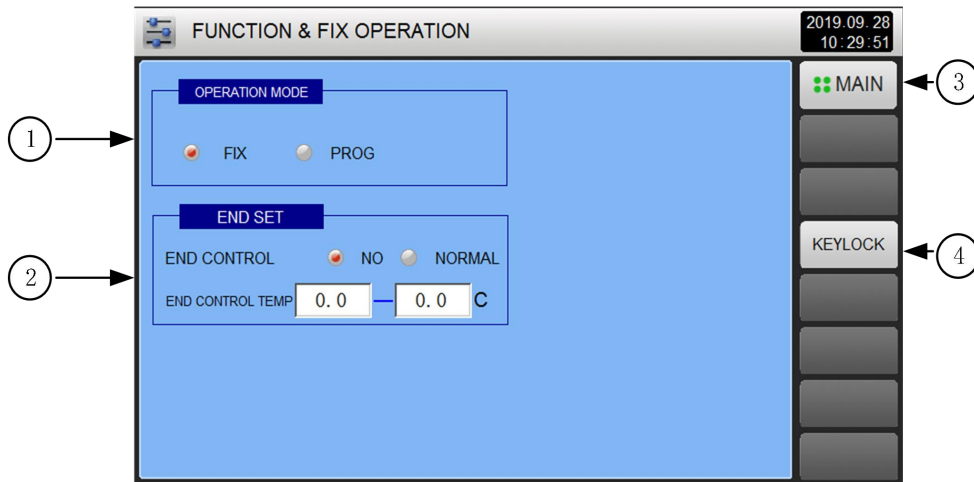


[Figure 4-9] Historical fault display screen

- ① Select historical date query.
- ② Clear fault (long press is effective).
- ③ Switch to the historical fault query screen.
- ④ Return to the monitoring screen.

4.5 Function and Fix Operation Settings

- ▶ Select “Operation Settings” in [4.1 Main Screen] to switch to the [Figure 4-10] Operation Settings screen.
- ▶ Screens related to additional functions of general machines and additional settings during fixed value operation.



[Figure 4-10] Operation setting screen

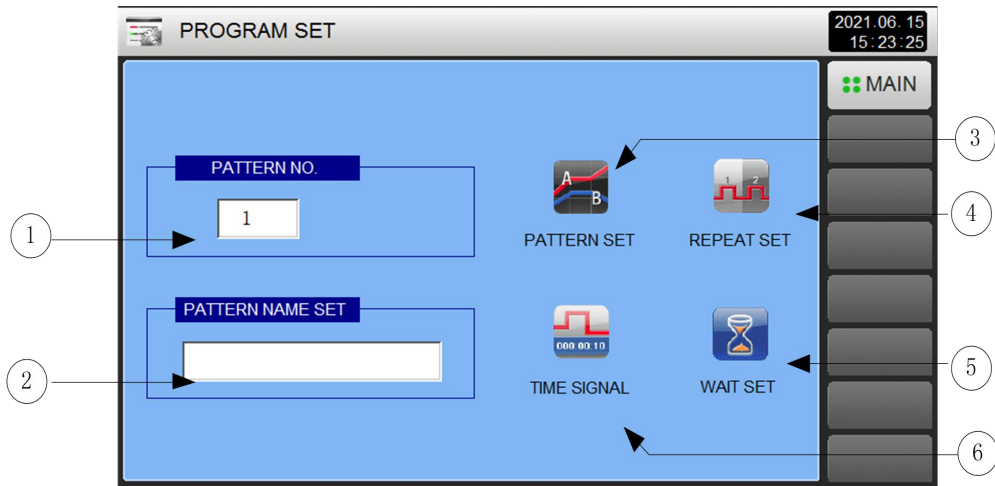
- ① Select a setting from Program and Fixed Value Operation.
- ② Test end settings.
- ③ Return to main screen.
- ④ Keyboard lock.

Table 4-2 Program stop screen parameters

Parameter	Setting range	Initial Value	Illustrate
Operation Mode	Fixed value, program	Fixed value	Cannot be changed during operation

4.6 Program Settings

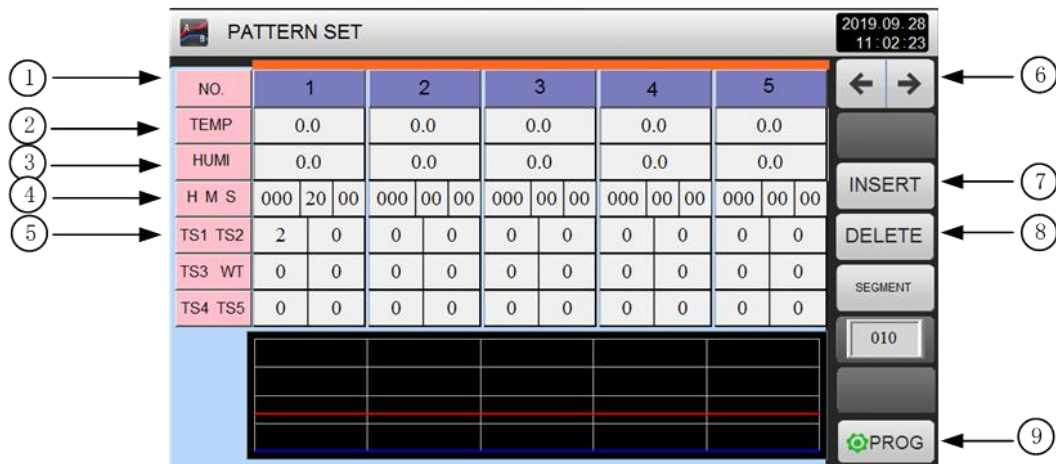
- ▶ Click "Program Settings" in [4.1 Main Screen], and the screen will switch to [Figure 4-11] Program Group Settings screen.



[Figure 4-11] Program settings screen

No.	Instructions	Contents
①	Pattern Number	100 sets of programs can be set (1~100)
②	Test Name	20 bytes can be set
③	Program Editing	Switch to the program editing screen
④	Repeat Settings	Switch to the loop setting screen
⑤	Waiting for setting	Switch to the waiting setting screen
⑥	Time signal	Switch to the time setting screen, optional function, no setting by default

4.6.1 Program Group Editing



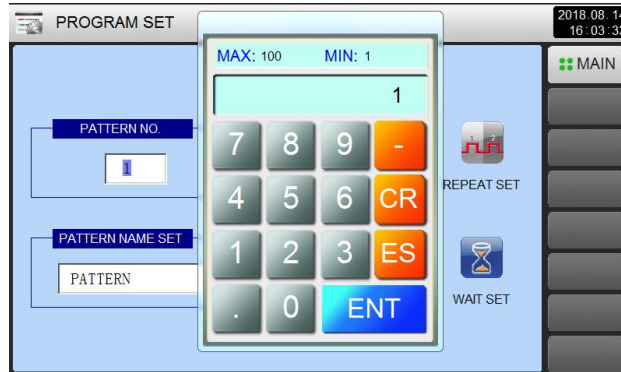
[Figure 4-12] Program editing screen

- ① Indicates the segment sequence number.
- ② Set the temperature for the program segment to be run.
- ③ Set the humidity of the program segment to be run.
- ④ Set the time for the program segment to be executed.
- ⑤ Set the time signal of the program segment to be run. It is an optional function.

The default value is 0 and no setting is performed.

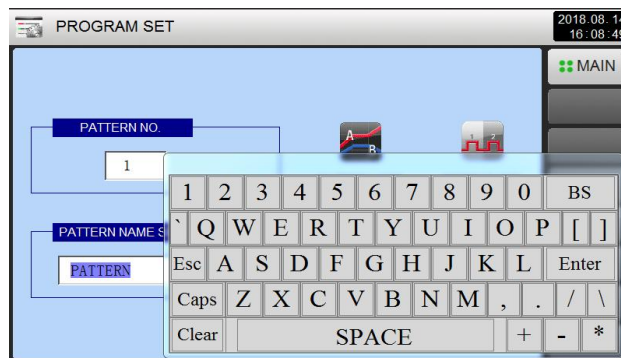
- ⑥ Switch to the next program group editing screen.
- ⑦ Insert program segment. Click this button to increase the number of segments by 1.
- ⑧ Delete program segment. Click this button to delete 1 segment.
- ⑨ Click the [Program] button to switch to the [Figure 4-11] program group setting screen.

- ▶ Click the [Program] button to display the input box for setting the program number.



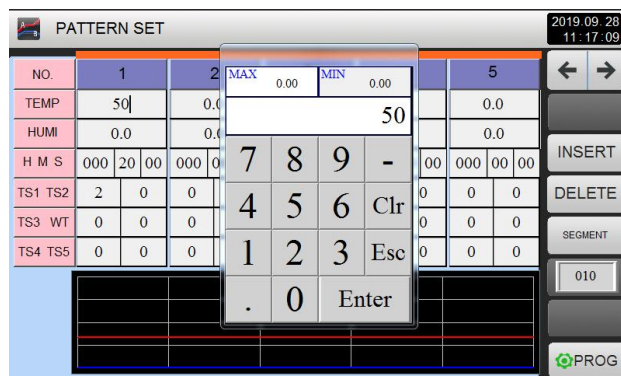
[Figure 4-13] Program number input box screen

- ▶ Click the [Test name setting] button to display the test name setting input box.



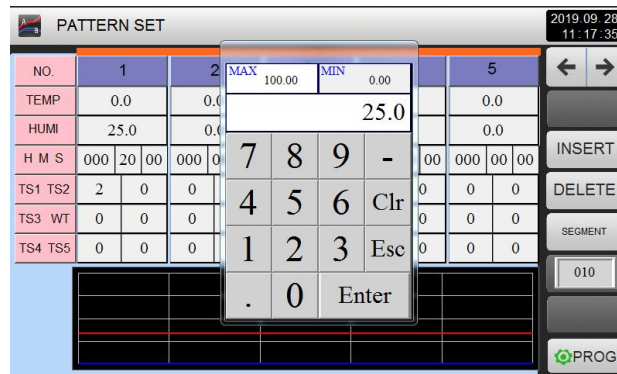
[Figure 4-14] Test name setting input box screen

- ▶ Enter the program group editing page, click the [Temperature] button to enter the test program temperature setting input box.



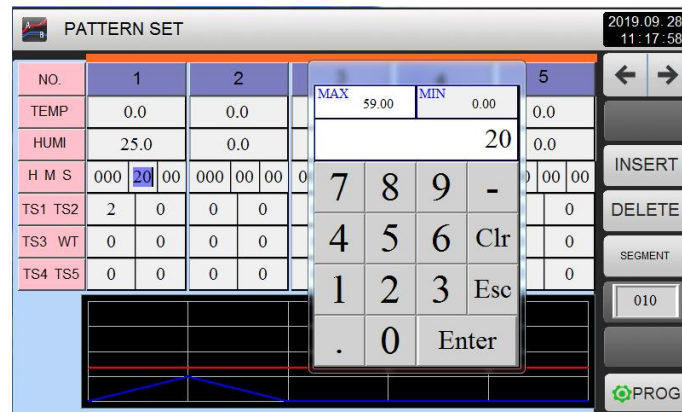
[Figure 4-15] Program temperature setting screen

- ▶ Enter the program group editing page, click the [Humidity] button to enter the test program humidity setting input box.



[Figure 4-16] Program humidity setting screen

- ▶ Enter the program group editing page, click the [Time] button to enter the test program time setting input box.



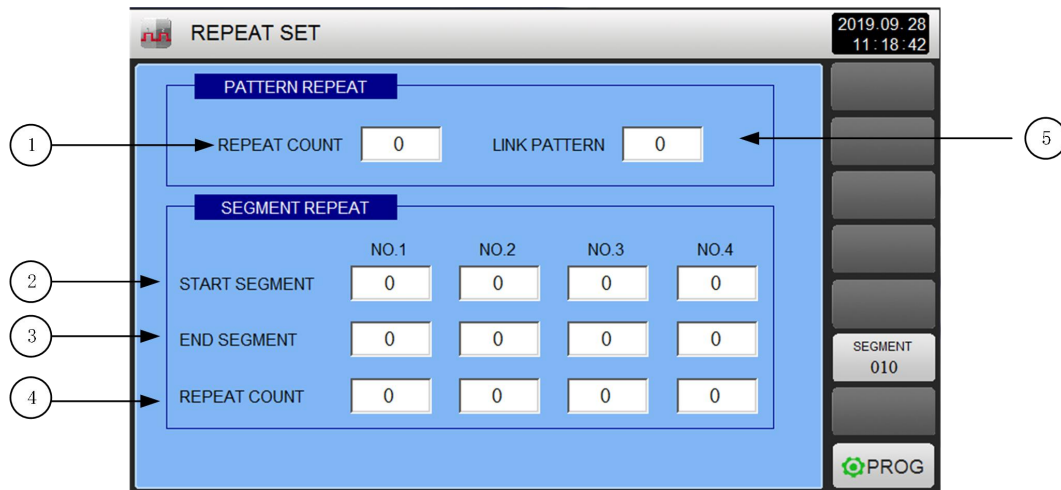
[Figure 4-17] Program time setting screen

Table 4-3 Program editing parameters

Parameter	Setting range	Unit	Initial Value	Illustrate
Program number	1~100	--	1	Set the program number to be programmed.
Program temperature	-100.00~200.00	°C	0.00	Set the segment temperature to be run.
Program Humidity	0.0~100.0	%	0.0	Set the humidity of the segment to be operated.
Program time	0.00~100.00	H. M	0.00	Set the time period to run.
Program segment time signal	0~7	--	0	Set the time signal to be run. Optional, default is 0 , no setting.

4.6.2 Repeat Setting

► This is the screen for setting all or part of the cycle functions of the programmed program.



[Figure 4-18] Cycle setting screen

- ① Set the number of times the programmed program will be run.
- ② Set the program block that starts the partial cycle operation in the set program.
- ③ Set the program segment that terminates the partial cycle operation in the set program.
- ④ Set the number of times a part of a programmed program is repeated.
- ⑤ Set the program number to be run continuously when the set program ends.

Table 4-4 Repeated setting parameters

parameter	Setting range	Initial Value	Illustrate
Cycle Count	0 (infinite repetition) ~ 999	1	Enter the number of repetitions for the set program group number ☛If you enter " 0 ", it will repeat infinitely.
Group Connection	0~100	0	When the current program group number ends, the program number that continues to run.
Start segment	0~100	0	In the set program group number, set the program segment where some repeated operations start.
End segment	0~100	0	In the set program group number, set the program segment where some repeated operations end.

4.6.2.1 Example of program group loop setting

Table 4-5 Example of program group cycle setting

Group cycle setpoint	Program sequence
<p>REPEAT SET (2018.08.14 16:46:53)</p> <p>PATTERN REPEAT: REPEAT COUNT 2, LINK PATTERN 3</p> <p>SEGMENT REPEAT: NO.1-4 (START, END, REPEAT COUNT) all 0</p>	<p>► Repeat "Program Group 1 " twice and then execute "Program Group 3 ".</p> <p>① PATTERN1→PATTERN1</p>
<p>REPEAT SET (2018.08.14 16:49:58)</p> <p>PATTERN REPEAT: REPEAT COUNT 5, LINK PATTERN 3</p> <p>SEGMENT REPEAT: NO.1-4 (START, END, REPEAT COUNT) all 0</p>	<p>► Repeat "Program Group 3 " 5 times and then execute "Program Group 2 ".</p> <p>② PATTERN3→PATTERN3→PATTERN3→PATTERN3→PATTERN3</p>

REPEAT SET
2021.02.24
17:24:18

PATTERN REPEAT

REPEAT COUNT LINK PATTERN

SEGMENT REPEAT

	NO.1	NO.2	NO.3	NO.4
START SEGMENT	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
END SEGMENT	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
REPEAT COUNT	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>

▶ Repeat "Program Group 2 " twice and then end because there is no connected program group PATTERN

③ PATTERN2 →End

4.6.2.2 Example of setting the program group segment cycle

▶ If Program Group 1 is set with 8 segments (01→02→03→04→05→06→07→08) , the following example is the order of operation when some segments in Program Group 1 are set to repeat.

Table 4-6 Example of setting the program group segment cycle

Example No.	Partially repeated set value	Segment running order												
Example 1	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th style="text-align: center;">NO.1</th> <th style="text-align: center;">NO.2</th> </tr> </thead> <tbody> <tr> <td>START SEGMENT</td> <td style="text-align: center;"><input type="text" value="2"/></td> <td style="text-align: center;"><input type="text" value="3"/></td> </tr> <tr> <td>END SEGMENT</td> <td style="text-align: center;"><input type="text" value="4"/></td> <td style="text-align: center;"><input type="text" value="5"/></td> </tr> <tr> <td>REPEAT COUNT</td> <td style="text-align: center;"><input type="text" value="2"/></td> <td style="text-align: center;"><input type="text" value="2"/></td> </tr> </tbody> </table>		NO.1	NO.2	START SEGMENT	<input type="text" value="2"/>	<input type="text" value="3"/>	END SEGMENT	<input type="text" value="4"/>	<input type="text" value="5"/>	REPEAT COUNT	<input type="text" value="2"/>	<input type="text" value="2"/>	<p>① 01→02→03→04</p> <p>② →02→03→04→05</p> <p>③ →03→04→05→06→07→08</p>
	NO.1	NO.2												
START SEGMENT	<input type="text" value="2"/>	<input type="text" value="3"/>												
END SEGMENT	<input type="text" value="4"/>	<input type="text" value="5"/>												
REPEAT COUNT	<input type="text" value="2"/>	<input type="text" value="2"/>												
Example 2	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th style="text-align: center;">NO.1</th> <th style="text-align: center;">NO.2</th> </tr> </thead> <tbody> <tr> <td>START SEGMENT</td> <td style="text-align: center;"><input type="text" value="3"/></td> <td style="text-align: center;"><input type="text" value="2"/></td> </tr> <tr> <td>END SEGMENT</td> <td style="text-align: center;"><input type="text" value="5"/></td> <td style="text-align: center;"><input type="text" value="4"/></td> </tr> <tr> <td>REPEAT COUNT</td> <td style="text-align: center;"><input type="text" value="2"/></td> <td style="text-align: center;"><input type="text" value="2"/></td> </tr> </tbody> </table>		NO.1	NO.2	START SEGMENT	<input type="text" value="3"/>	<input type="text" value="2"/>	END SEGMENT	<input type="text" value="5"/>	<input type="text" value="4"/>	REPEAT COUNT	<input type="text" value="2"/>	<input type="text" value="2"/>	<p>① 01→02→03→04→05</p> <p>② →03→04→05</p> <p>③ → 02→03→04</p> <p>④ →02→03→04→05→06→07→08</p>
	NO.1	NO.2												
START SEGMENT	<input type="text" value="3"/>	<input type="text" value="2"/>												
END SEGMENT	<input type="text" value="5"/>	<input type="text" value="4"/>												
REPEAT COUNT	<input type="text" value="2"/>	<input type="text" value="2"/>												
Example 3	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th style="text-align: center;">NO.1</th> <th style="text-align: center;">NO.2</th> </tr> </thead> <tbody> <tr> <td>START SEGMENT</td> <td style="text-align: center;"><input type="text" value="3"/></td> <td style="text-align: center;"><input type="text" value="5"/></td> </tr> <tr> <td>END SEGMENT</td> <td style="text-align: center;"><input type="text" value="3"/></td> <td style="text-align: center;"><input type="text" value="6"/></td> </tr> <tr> <td>REPEAT COUNT</td> <td style="text-align: center;"><input type="text" value="2"/></td> <td style="text-align: center;"><input type="text" value="2"/></td> </tr> </tbody> </table>		NO.1	NO.2	START SEGMENT	<input type="text" value="3"/>	<input type="text" value="5"/>	END SEGMENT	<input type="text" value="3"/>	<input type="text" value="6"/>	REPEAT COUNT	<input type="text" value="2"/>	<input type="text" value="2"/>	<p>① 01→02→03</p> <p>② →02→03→04→05→06</p> <p>③ →05→06→07→08</p>
	NO.1	NO.2												
START SEGMENT	<input type="text" value="3"/>	<input type="text" value="5"/>												
END SEGMENT	<input type="text" value="3"/>	<input type="text" value="6"/>												
REPEAT COUNT	<input type="text" value="2"/>	<input type="text" value="2"/>												

<p>Example 4</p>	<table border="1"> <thead> <tr> <th></th> <th>NO.1</th> <th>NO.2</th> </tr> </thead> <tbody> <tr> <td>START SEGMENT</td> <td>5</td> <td>2</td> </tr> <tr> <td>END SEGMENT</td> <td>6</td> <td>3</td> </tr> <tr> <td>REPEAT COUNT</td> <td>2</td> <td>2</td> </tr> </tbody> </table>		NO.1	NO.2	START SEGMENT	5	2	END SEGMENT	6	3	REPEAT COUNT	2	2	<p>① 01→02→03→04→05→06 ② →05→06 ③ →02→03 ④ →02→03→04→05→06→07→08</p>
	NO.1	NO.2												
START SEGMENT	5	2												
END SEGMENT	6	3												
REPEAT COUNT	2	2												
<p>Example 5</p>	<table border="1"> <thead> <tr> <th></th> <th>NO.1</th> <th>NO.2</th> </tr> </thead> <tbody> <tr> <td>START SEGMENT</td> <td>2</td> <td>3</td> </tr> <tr> <td>END SEGMENT</td> <td>6</td> <td>4</td> </tr> <tr> <td>REPEAT COUNT</td> <td>2</td> <td>2</td> </tr> </tbody> </table>		NO.1	NO.2	START SEGMENT	2	3	END SEGMENT	6	4	REPEAT COUNT	2	2	<p>① 01→02→03→04→05→06 ② →02→03→04→05→06 ③ →03→04 ④ →03→04→05→06→07→08</p>
	NO.1	NO.2												
START SEGMENT	2	3												
END SEGMENT	6	4												
REPEAT COUNT	2	2												
<p>Example 6</p>	<table border="1"> <thead> <tr> <th></th> <th>NO.1</th> <th>NO.2</th> </tr> </thead> <tbody> <tr> <td>START SEGMENT</td> <td>3</td> <td>2</td> </tr> <tr> <td>END SEGMENT</td> <td>4</td> <td>6</td> </tr> <tr> <td>REPEAT COUNT</td> <td>2</td> <td>2</td> </tr> </tbody> </table>		NO.1	NO.2	START SEGMENT	3	2	END SEGMENT	4	6	REPEAT COUNT	2	2	<p>① 01→02→03→04 ② →03→04 ③ →02→03→04→05→06 ④ →02→03→04→05→06→07→08</p>
	NO.1	NO.2												
START SEGMENT	3	2												
END SEGMENT	4	6												
REPEAT COUNT	2	2												

4.6.3 Waiting for setting

- ▶ Click the [Wait for Setting] button in [4.6 Program Setting], and the screen will switch to the [Figure 4-19] waiting for operation setting screen.
- ▶ During the program group running, it is a screen for waiting action, setting the temperature/humidity waiting range and time.
- ▶ The waiting action set here is applicable to [4.6 Program Settings].

※Wait action definition

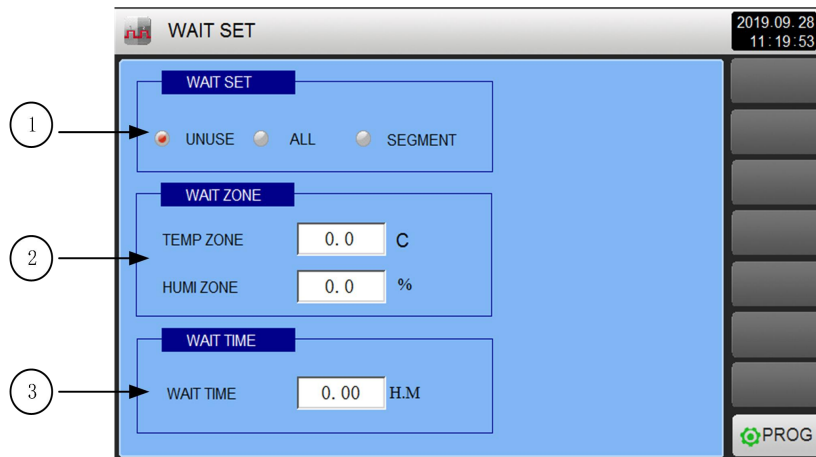
① Wait for action to enter condition (" OR " condition)

☞ **When the temperature or humidity does not enter the waiting action setting range within the set program period**

② Waiting for the action to be released (" AND " condition)

☛The temperature and humidity are both within the waiting action setting range

③If the waiting time (initial value) is not set, the default value of the waiting time is infinite.



[Figure 4-19] Waiting for operation setting screen

- ①Set whether to use the wait action.
- ②Set the temperature range in which the waiting action is applicable.
- ③Set the humidity range for the waiting action.
- ④Set a waiting time.

☛When the waiting working time is set to 00.00 , it will wait indefinitely until it enters the waiting action range.

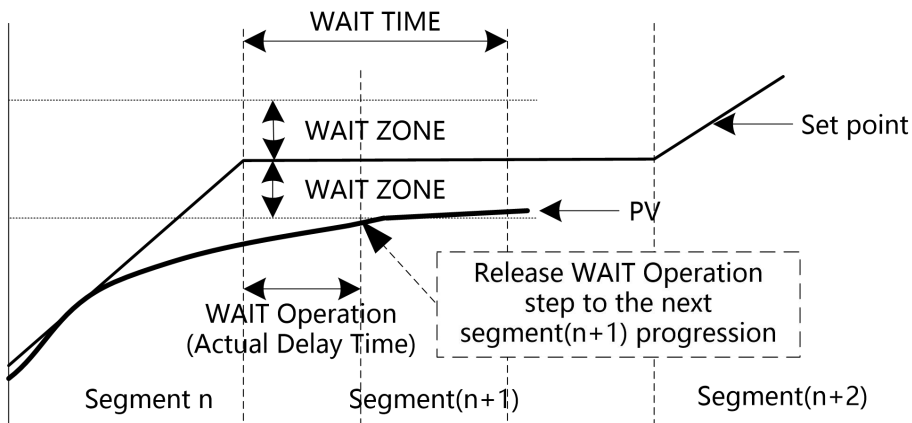
Table 4-7 Waiting action setting parameters

parameter	Setting range	unit	Initial Value
Waiting action setting	Do not use, use	--	Not used
Temperature waiting range	0.00~100.00	℃	0.00
Humidity waiting range	0.0 ~ 100.0	%	0.0
Waiting time for work	00.00~99.59	Hours, minutes	00.00

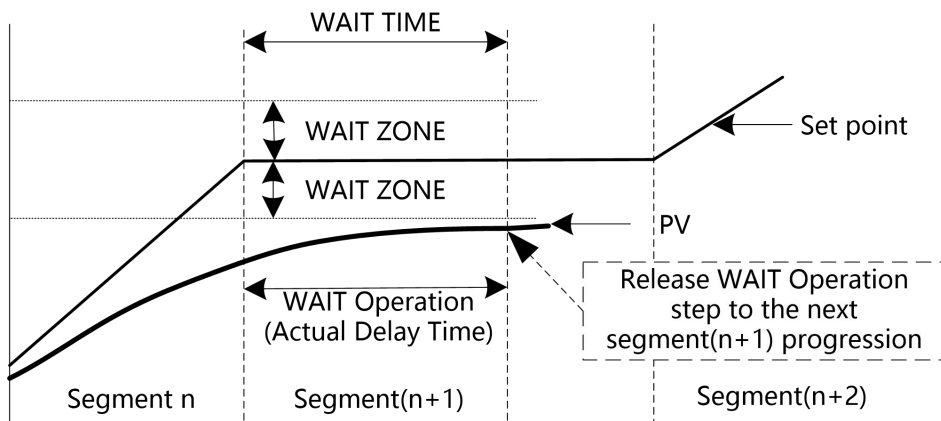
► The relationship between waiting action and waiting time is shown in the figure below.

► Waiting action range: Temperature displays the temperature waiting action range, and humidity displays the humidity waiting action range.

① When the waiting action is canceled within the waiting time (WAITTIME)



The command value fails to enter the waiting action range within the waiting time (WAIT TIME).

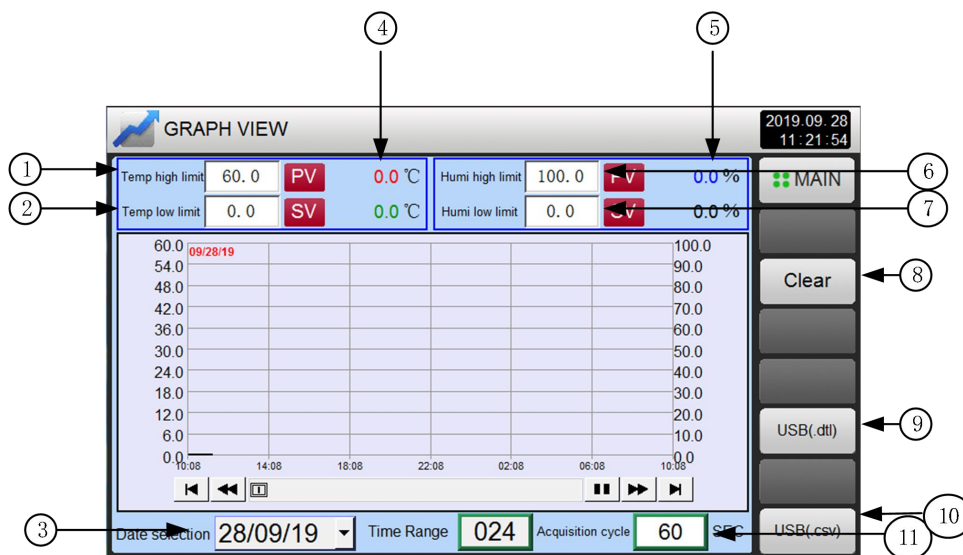


For example: if the temperature setting value SP = 85 °C , the temperature waiting area = 5 °C , the waiting area is 80 °C ~ 90 °C , and the waiting time = 1H ;

- ① If the PV reaches the waiting area before the waiting time ends (within 1 hour), execute the next step;
- ② If the PV has not arrived at the waiting area before the waiting time ends (it has not entered the waiting area after 1 hour), it will continue to wait until the waiting time ends (after 1 hour) or it arrives at the waiting area before executing the next segment. It must meet both the waiting area and waiting time conditions.

4.7 Graph Display

- ▶ Select "Curve Display" in [4.1 Main Screen] to switch to the temperature and humidity curve screen [Figure 4-20].
- ▶ While the curve is being displayed, click on the curve to display the time and the display and setting values at that time.

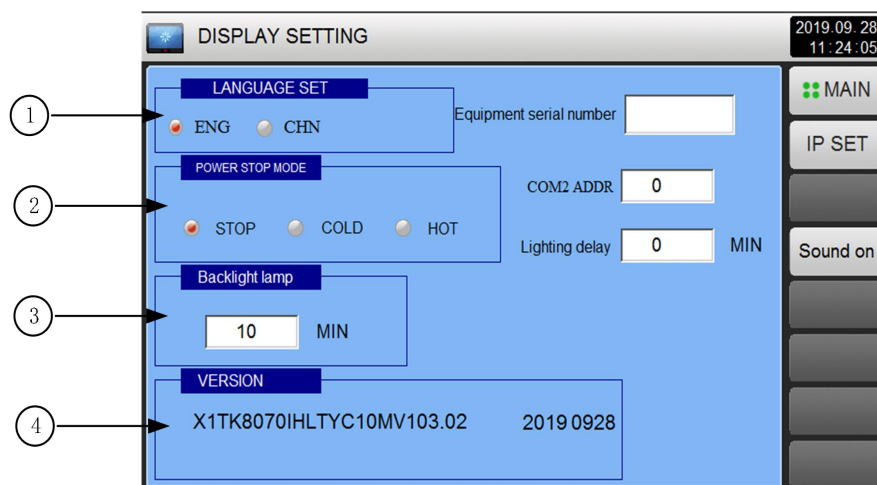


[Figure 4-20] Temperature and humidity curve screen

- ① The temperature curve shows the upper limit value.
- ② The temperature curve shows the lower limit value.
- ③ Historical data time selection.
- ④ Current temperature display and set temperature display.
- ⑤ Current humidity display and set humidity display.
- ⑥ Humidity curve display upper limit
- ⑦ Humidity curve shows lower limit
- ⑧ Clear history records (press and hold for 5 seconds to work) [Note: after clearing, all historical data will be deleted and cannot be restored].
- ⑨ Download the historical data of the curve to a USB drive (dlt format file)
- ⑩ Download the historical data of the curve to a USB drive (csv format file)
- ⑪ Time axis settings.

4.8 Display Settings

- Select "Display Settings" in [4.1 Main Screen] to switch to the screen display settings screen [Figure 4-21].



[Figure 4-21] Screen display setting screen

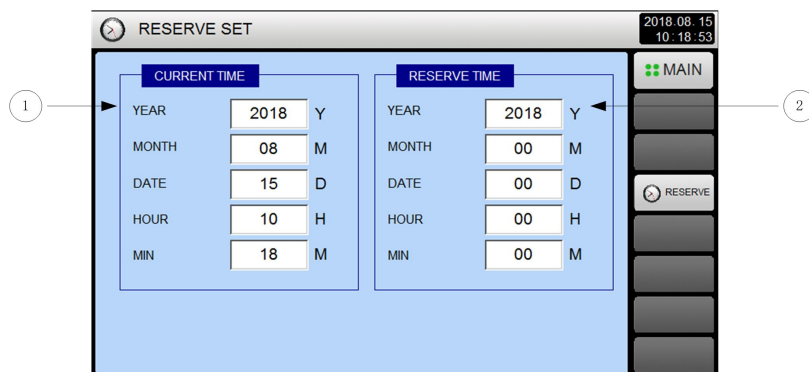
- ① Language settings (switch between Chinese and English).
- ② Set the power restoration operation during power outage.
- ③ Screen saver time setting (initial value 10 minutes)
- ④ Controller version number.

Power-off mode:

- ☞ Stop: After a power outage during operation, the state is restored to the operation stop state when the power is restored.
- ☞ Cold start: After a power outage during operation, the operation is restarted from the first stage and restarted when the power is restored.
- ☞ Hot start: After a power outage during operation, the operation continues at the same level as before the power outage, and when the power is restored, the state is restored to the state before the power outage.

4.9 Reserve Settings

- ▶ Select "Appointment Settings" in [4.1 Main Screen] to switch to the appointment setting screen [Figure 4-22].
- ▶ The screen for setting the current time and scheduled operation time.

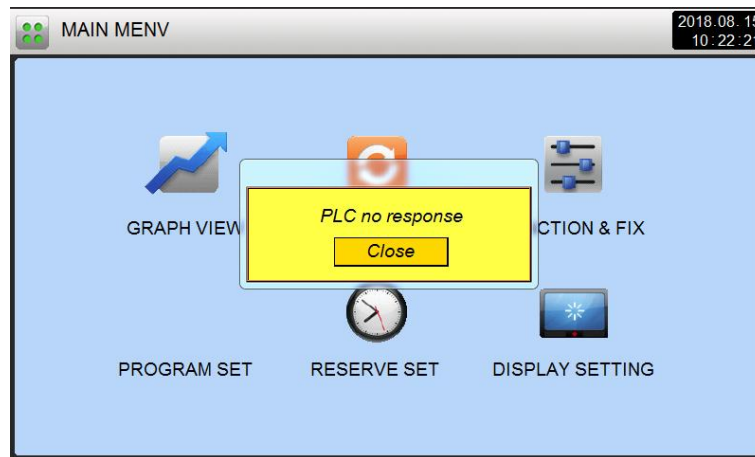


[Figure 4-22] Appointment setting screen

- ① Set the date and time (the year and month are fixed and cannot be set). They can be modified to the local date and time.
- ② Set the reservation year, month, day and time, and click the [Reserve] button to run at the set time.

4.10 Communication Failure

- ▶ When a communication failure occurs, the words "PLC no response" will appear on the screen.



[Figure 4-23] Communication fault screen

※Communication interruption phenomenon

- ① Poor communication connection.
- ② The signal connection status is poor.

4.11 Program Group Programming Examples

Test requirements:

Temperature 40 °C , humidity 93%RH , heating time 1h

Temperature 40 °C , humidity 93%RH , dwell time 1h

Temperature -20 °C , cooling time 2h

Temperature -20 °C , dwell time 2h

The program is cycled 2 times

Diagram	Program settings
	<p>Section 1 : Temperature 40 °C , humidity 93%RH , heating time 1h</p> <p>Section 2 : Temperature 40 °C , humidity 93%RH , dwell time 1h</p> <p>Section 3 : Temperature -20 °C , cooling time 2h</p> <p>Section 4 : Temperature -20 °C , dwell time 2h</p>
	<p>The program is cycled 2 times</p>

5 Fault Description

5.1 Abnormal temperature rise

1. Check whether the wires are loose and whether the circuit breaker for heating in the circuit area is in the disconnected state. If they are loose or disconnected, connect the wires and turn on the circuit breaker switch.
2. Check if the solid state relay is damaged, if damaged, replace it. The solid state relay light remains on during normal heating.

5.2 Abnormal temperature drop

1. Check whether the centrifugal fan is operating normally. If there is any problem, replace it in time.
2. Check whether the compressor is started. If the temperature is higher than 56 °C, the compressor cannot start.
3. Check the pressure gauge to see if there is any refrigerant leakage. The pressure of the compressor is 15-25 bar when it is operating normally. If the pressure is lower than 5 bar, there is a risk of leakage and the corresponding refrigerant needs to be added.

5.3 Abnormal humidity rise

1. Check whether the wet-bulb gauze is hung properly and is moist. When hanging, the gauze should exceed the top of the humidity sensor and the water in the sink

should exceed 1/2 of the sink .

2. Check whether the water level of the humidifier is normal. If the water level is too low, you need to raise the height of the water cup.
3. Check whether the float ball of the water cup is stuck. If it is stuck, the humidity cannot rise normally and the position of the float ball needs to be adjusted.
4. Check if the humidifier float is damaged. If damaged, replace it.

5.4 Abnormal humidity reduction

1. Check whether the wet bulb gauze is hung correctly and is moist. When hanging, the gauze should exceed the top of the humidity sensor and the water in the water tank should exceed 1/2 of the water tank.
2. Check whether the water level of the humidifier is normal. If the water level is too low, you need to raise the height of the water cup.
3. Check whether the compressor is started. The high temperature (temperature above 56°C) and low humidity compressor will not start by default.

5.5 Abnormal temperature and humidity fluctuations

Use the instrument's built-in TEMP-AT function to adjust the temperature PID parameters. After the temperature stabilizes, use the HUMI-AT function to adjust the humidity PID parameters. If it still cannot stabilize, please contact after-sales service.

5.6 Overheat alarm

1. Check whether the temperature setting of the temperature control switch

is correct. If the setting value is too low, adjust it higher.

2. Check whether the fan is working properly. If it is not working properly, the fan needs to be replaced.

5.7 PT1, PT2 alarm

1. Check whether the connection terminals of the temperature and humidity sensor are loose. If so, reconnect them.
2. Check whether the sensor is damaged. If damaged, replace it in time.

5.8 Compressor overpressure alarm

1. Check the refrigerant pressure gauge. When the compressor is operating normally, the pressure is 15-25 bar. If the pressure is lower than 5 bar, there is a risk of refrigerant leakage, which will affect the normal operation of the compressor. At this time, the corresponding refrigerant needs to be added.
2. Check whether the ambient temperature is too high. Too high temperature (> 40°C) will affect the normal operation of the compressor. The ideal ambient temperature is 25°C .
3. Check whether the equipment is too close to the wall. If it is too close to the wall, the compressor will not dissipate heat well, affecting its normal operation. It is best to keep a distance of at least 1m.
4. Check whether the cooling solenoid valve is closed. The solenoid valve is to prevent the high-pressure liquid refrigerant from impacting the compressor after

the compressor is shut down. Therefore, during the normal operation of the compressor, the solenoid valve should remain open.

5. If none of the above situations occur, please contact after-sales service team.

5.9 Thermal overload alarm

1. Check whether the compressor is overheating. Insufficient compressor lubricating oil and excessive internal dirt causing blockage will trigger the thermal overload alarm. Therefore, it is necessary to regularly check the amount of lubricating oil in the compressor, replenish it to ensure it is sufficient, and regularly clear the internal blockage and dirt to ensure the normal operation of the compressor.

2. Check whether the compressor is missing a phase, whether the power cord is in poor contact or damaged, and replace or repair the power cord in time to deal with the missing phase fault. Thermal overload must be manually reset to continue working.

5.10 Water supply shortage alarm

1. Check whether the water supply solenoid valve is blocked. Impurities in the water may cause the solenoid valve to be blocked, resulting in insufficient water supply. At this time, the water in the water tank needs to be replaced with water of better quality, and the pipes and solenoid valves need to be cleaned.

2. Check whether the water supply relay coil is burned out. If damaged, it will

also lead to insufficient water supply, so just replace it.

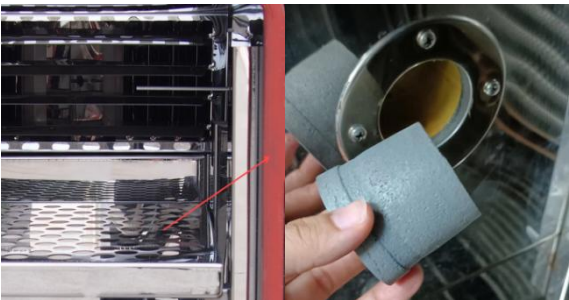
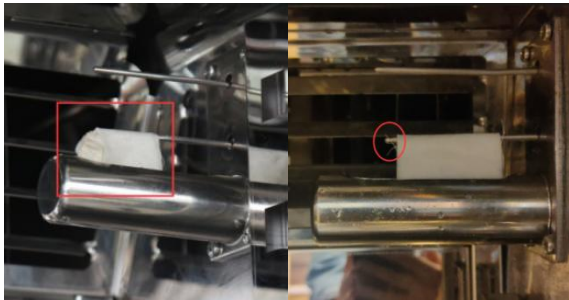
3. Check whether the float in the liquid level gauge floats up. If the float does not float up, it will also trigger a low water level alarm. At this time, just make sure the float is placed correctly or replace it with a new one.


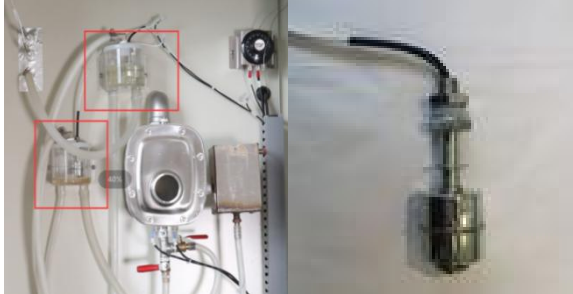
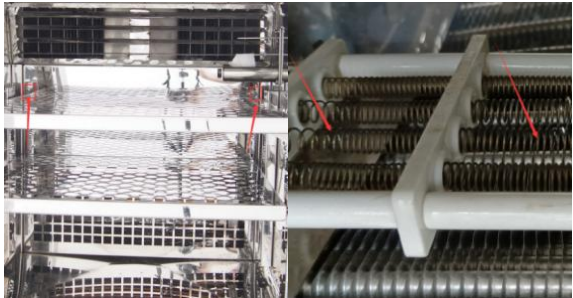
6 Maintenance and Care

6.1 Daily Maintenance

1. It is recommended to use pure water or deionized water.
2. Perform basic inspections every day or after each use, including pre-operation inspections and post-test cleaning.
3. If the low water level indicator light is on, add water to the water tank in time until the high water level indicator light is on.
4. Clean the condenser fan promptly after each use to prevent it from affecting heat dissipation during the next use due to uncleanliness.
5. Before each operation of the equipment, check whether the refrigerant pressure gauge displays normal. The normal range is 5-15bar.
6. Clean the workroom in time after each test and wipe it clean with a dry cloth.
7. Avoid switching the equipment on and off continuously within 3 minutes.
8. Open the sewage outlet valve regularly once every three months to discharge sewage.

6.2 Regular Maintenance

No.	Maintenance	Diagram
1	<p>Check in real time whether the sealing strip under the door and the rubber plug of the test hole on the right side of the chamber are aging and hardening to ensure the safety of the test process. It usually needs to be replaced every two years.</p>	
2	<p>Check and replace the wet bulb gauze regularly. Remember that the gauze must cover the sensor (as shown in the first figure on the right), otherwise the measurement value will be inaccurate. It is recommended to replace it every three months. If the gauze turns yellow or moldy, it needs to be replaced immediately.</p>	 <p style="text-align: center;">Figure 1 Error demonstration</p>
3	<p>Replace the water in the water tank regularly to prevent water quality from deteriorating and impurities from clogging the pipes.</p>	<p style="text-align: center;">/</p>

<p>4</p>	<p>Check the filter regularly, it is recommended to replace the filter once a year.</p>	
<p>5</p>	<p>Open the side cover of the test chamber regularly, clean the water tank and water cup and check whether the float can float normally. It is recommended to drain the water in the water tank and water cup once a month to clean the internal impurities and dirt; check whether the float in the water tank and water cup can float normally. If not, you need to adjust the height of the water cup or replace the float. Clean the impurities in the float once a month.</p>	
<p>6</p>	<p>Remove the screws on the left and right sides of the back of the workroom, remove the cover, and regularly check whether the heating wire is damaged. If damaged, replace it in time.</p>	

<p>7</p>	<p>During the test, pay attention to whether the circulating fan motor makes noise. If there is noise, check whether the fixing screws of the fan blades are loose, causing the fan blades to be unbalanced.</p>	
<p>8</p>	<p>Use pressurized air to regularly clean the dust on the condenser fan, compressor and evaporator. It is recommended to clean them every six months.</p>	
<p>9</p>	<p>Determine the refrigerant pressure in the compressor using the pressure gauge on the back of the test chamber. The larger the value displayed on the pressure gauge, the greater the refrigerant pressure, and vice versa. When the pressure gauge points to " 0 ", it means that the refrigerant is leaking and the leak needs to be repaired and refrigerant needs to be added.</p>	

<p>10</p>	<p>Regularly check the heating tube in the humidifier for damage. If damaged, replace it in time. In addition, make sure to open the humidifier drain valve to drain the water when draining the water in the drain tank every month, clean the impurities in the float and pay attention to whether the float can float normally. If not, adjust the water cup height or replace the float.</p>	
<p>11</p>	<p>Regularly check whether each pipe is blocked by impurities, causing the pipe to be blocked. It should be noted that the water pipes cannot be cross-knotted, otherwise the water flow will stop.</p>	
<p>12</p>	<p>Open the side cover of the test chamber regularly to clean the dust accumulated in every corner. At the same time, check whether the screws or connections of each component are loose, and tighten them if necessary.</p>	



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