LORDERAN

ENVIRONMENTAL TEST CHAMBER SERIES

USER MANUAL

Environmental Test Chamber

Installation · Operation · Maintenance



100 L | 250 L | 500 L | 1000 L

Applies to the Environmental Test Chamber, Environmental Alternating Test Chamber and Environmental Alternating Damp Heat Test Chamber.

www.lorderan.com

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BEFORE YOU BEGIN

About this manual

BEFORE YOU BEGIN

- Read this manual carefully and make sure you understand all of its contents before installation, accessory connection, operation and maintenance.
- This manual must be kept by the end user.
- The content of this manual may be revised due to functional upgrades without prior notice.
- If you have any questions, please contact Lorderan.

Introduction

This user manual is intended for operators of the test chamber and is written primarily for technical personnel. It explains the correct use of the instrument. Read it carefully to ensure safe and efficient operation. **The on-site explanation given by the commissioning engineer is considered part of this manual.**

First-time users should read this manual in full to avoid unnecessary malfunctions.

Labels on the instrument

Label	Name	Meaning
	**Warning "Danger" label**	Observe the Danger warnings in this user manual.
	**Notice "Read the manual" label**	Read the user manual before powering on the test chamber. During testing, refer to Section 4.2 Maintenance Details.
	**Danger "Voltage" label**	Electrical wiring system inside. Must only be opened by qualified electricians.
	**Warning "High temperature" label**	The air inside the test chamber and all contacted surfaces may be extremely hot. Wear appropriate protective clothing.
	**Warning "Low temperature" (snowflake) label**	The air inside the test chamber and all contacted surfaces may be extremely cold. Wear appropriate protective clothing.

Safety symbols used in this manual

Symbol	Type	Meaning
	**Danger**	If the instructions are not followed, danger may result for personnel, other living beings or the environment.
	**Notice**	Improper operation may create a hazard that causes minor injury to the operator or damage to the device.

Symbol	Type	Meaning
	Prohibited	Directly stipulated behavioural instruction. If it is not followed, the test chamber or the test samples may be damaged.
	Must do	Directly stipulated behavioural instruction. Indicates an instruction tied to a specific action that must be carried out to avoid danger.
	Note	Additional information that helps you operate the instrument correctly.
	Supplementary	Content added to the original manual to make it easier to use. It is compiled only from information given in this manual.

EDITION NOTE

Section numbers of the original manual are preserved throughout, so existing references to this manual (for example “see 3.6.4”) remain valid. Illustrations that originally carried Chinese annotations have been re-labelled in English.

BEFORE YOU BEGIN

Scope and structure

Documentation set

Document	Contents
User Manual (paper version)	This is the first part of the user manual. It explains the fundamental operating methods, such as the basic precautions, troubleshooting and maintenance of the test chamber (this manual).
TEMI561 Panel User Manual (electronic version)	This manual is provided on the USB stick supplied by the manufacturer. It mainly explains the operating methods of the temperature and humidity controller.

Applicable models

This manual applies to the following capacities of the Environmental Test Chamber, the Environmental Alternating Test Chamber and the Environmental Alternating Damp Heat Test Chamber. Please match it to your specific instrument.

Capacity	Inner size (W × D × H)	External size (W × D × H)	Net weight (approx.)
100 L	450 × 450 × 500 mm	720 × 1100 × 1560 mm	240 kg
250 L	600 × 600 × 700 mm	910 × 1560 × 1800 mm	400 kg
500 L	800 × 700 × 900 mm	1100 × 1610 × 1900 mm	550 kg
1000 L	1000 × 1000 × 1000 mm	1260 × 1880 × 2050 mm	800 kg

For the exact weight of your instrument, refer to the instrument nameplate.

How this manual is organised SUPPLEMENTARY

Part	What it covers	Read it when
Chapter 1 — Instrument Safety Precautions	General safety rules, prohibited substances and other precautions	Before anything else
Chapter 2 — Installation and Settings	Unloading, unpacking, placement, water supply, overflow drainage and power-supply checks	Before first power-on
Chapter 3 — Instrument Operation	Performance data, components, touchscreen operation, fixed-value and program operation	During commissioning and daily use
Chapter 4 — Troubleshooting and Maintenance	Alarm points, fault finding, cleaning and care	When an alarm occurs; routine upkeep
Chapter 5 — Instrument Disposal	Material composition and disposal requirements	At end of life
Appendices A–E	Quick-reference data, alarm and fault index, maintenance schedule and logs, checklists, glossary	Any time

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CHAPTER 1

Instrument Safety Precautions

This chapter explains the precautions for the safe operation of the instrument. To prevent accidents during installation, testing and operation, read this chapter and comply with the relevant regulations.

Safety at a glance SUPPLEMENTARY

Situation	Required precaution	See
Touching air, components or surfaces above +38 °C (+100 °F) or below 0 °C (+32 °F)	Do not touch — risk of scalds or frostbite	1.1
Opening the door during or immediately after operation above 55 °C	Wear heat-resistant gloves; chamber contents are hot	1.3
Opening the door during or immediately after operation below 0 °C	Wear cold-resistant gloves; chamber contents are cold	1.3
Electrical control compartment	Open only by qualified electricians	1.1, 3.2
Working near rotating components; condenser fan	Disconnect the main power; keep protective guards intact; keep clear of the fan	1.1
Interrupting the power supply at high temperature	Do not cut the power while operating at high temperature, especially under thermal load	1.1
Placing explosive, combustible, corrosive or conductive dispersible samples in the chamber	Prohibited	1.2, 1.3

1.1 General Safety Guidelines

- Do not operate the instrument until it has been fully installed and set up.
- The instrument operates at extreme temperatures. To avoid scalds or frostbite, do not touch air, components or surfaces with a temperature **above +38 °C (+100 °F)** or **below 0 °C (+32 °F)**.
- Make sure that all safety labels are correctly affixed.
- Make sure that the chamber door is closed during operation. Before opening the door, check the internal temperature to avoid scalds or frostbite.
- The operating chamber carries hazardous electric current. Do not open the electrical control compartment unless you are a qualified professional.
- When working near rotating components, disconnect the main power and make sure that the protective guards are intact.

- The condenser fan of the refrigeration system may start at any time while the power is on. Keep clear of these components.
- Do not cut off the power supply while the instrument is operating at high temperature, especially under thermal load. This can easily cause localized overheating and burn out instrument components.
- Read the safety requirements and the safety labels in this manual carefully before using the chamber.

1.2 Substances That Must Not Be Placed in the Test Chamber

PROHIBITED · DANGER

It is strictly prohibited to place the following explosive substances, combustible substances, or articles containing them, in the test chamber.

Explosive substances

- Nitroglycol, nitroglycerin, nitrocellulose and other explosive nitrate esters.
- Trinitrobenzene, trinitrotoluene, trinitrophenol and other explosive nitro compounds.
- Peracetic acid, methyl ethyl ketone peroxide, benzoyl peroxide.

Combustible substances

- Lithium metal, potassium metal, sodium metal, yellow phosphorus, phosphorus sulfide, red phosphorus, celluloid, calcium carbide, carbon phosphide, magnesium powder, aluminum powder, other metal powders, sodium sulfite.
- Potassium chlorate, sodium chlorate, ammonium chlorate and other chlorates.
- Potassium perchlorate, sodium perchlorate, ammonium perchlorate and other perchlorates.
- Potassium peroxide, sodium peroxide, ammonium peroxide and other inorganic peroxides.
- Potassium nitrate, sodium nitrate, ammonium nitrate and other nitrates.
- Sodium chlorite and other chlorites.
- Calcium hypochlorite and other hypochlorites.
- Hydrogen, acetylene, methane, ethane, propane, butane and other gases combustible at 15 °C and 1 atm.

PROHIBITED · NOTICE

Do not put corrosive substances into the test chamber.

If test samples may produce corrosive substances (that is, substances capable of corroding stainless steel or silicone rubber), the service life of test chamber components, including compressors and door seals, may be significantly reduced.

Corrosive substances include chlorine, chlorides, acids and similar compounds. Although they are non-corrosive at room temperature, these substances may corrode components such as printed circuit boards under high-temperature conditions.

1.3 Other Precautions

Observe the following precautions when using the test chamber.

NOTICE

Exercise extreme caution when opening the door during or immediately after high-temperature operation. The high-temperature air discharged from the chamber is extremely dangerous.

- During or immediately after operation at conditions **above 55 °C**, all contents inside the chamber (including the interior walls, test samples, shelves and the inner side of the door) will be at high temperatures. Direct contact with these surfaces can cause scalds. **Always use heat-resistant gloves.**
- During or immediately after operation at conditions **below 0 °C**, all contents inside the chamber (including the interior walls, test samples, shelves and the inner side of the door) will be at low temperatures. Direct contact with these surfaces can cause frostbite. **Always use cold-resistant gloves.**

PROHIBITED

Do not put conductive dispersible test samples into the chamber. If the sample disperses into the air-conditioning section, it will cause electric leakage of the heater.

PROHIBITED

Do not attempt operations with unpredictable outcomes. If you are unsure of the consequences of an operation, do not run the instrument. If you have any questions, please contact Lorderan.

Limitation of liability

The manufacturer assumes no responsibility for damage resulting from any of the following conditions:

- Unauthorized or improper use.
- Improper installation.
- Incorrect power or water supply.
- Unauthorized modifications.
- Operation based on a misunderstanding of the user manual.
- Accidents.

CHAPTER 2

Installation and Settings

This chapter describes the preparations for proper placement and testing of the instrument. Read this chapter and comply with the relevant regulations.

Installation sequence at a glance SUPPLEMENTARY

1	2	3	4	5	6	7
Unload Section 2.1	**Unpack** Section 2.2	**Position & level** Section 2.3	**Verify configuration** Section 2.4	**Connect water** Section 2.5	**Overflow tray** Section 2.6	**Check power & samples** Section 2.7

2.1 Instrument Unloading

The test chamber is typically wrapped in protective film first and then packed in a wooden crate for transportation.

On arrival, the unloading personnel should use appropriate equipment to move the instrument from the vehicle to level ground. This operation should preferably be performed by personnel experienced in forklift unloading. **The rated load capacity of the unloading equipment must be greater than or equal to the weight of the instrument** (refer to the instrument nameplate for the exact weight). Observe the following precautions:

⚠ NOTICE

- Unload the instrument using appropriate methods (for example, forklift or crane). **If you use a forklift to unload an instrument without a wooden crate, make sure that the forks do not contact the bottom motor.**
- The specially designed wooden pallet facilitates unloading.
- Although the unloading equipment is simple, make sure that the instrument remains balanced throughout, and avoid moving it on uneven ground.
- If you use a crane for unloading, do not use steel cables for hoisting, as this may damage the external structure of the instrument.
- To prevent compressor oil from entering the refrigerant circuit, **the unit must be moved, stored and unloaded in a horizontal position.** If the instrument must be tilted during positioning, please contact us.

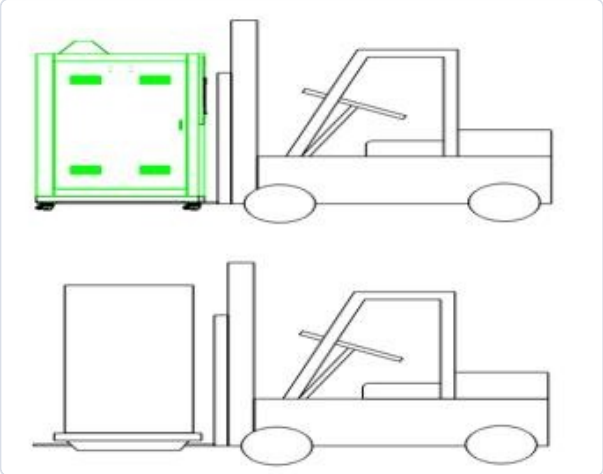


Figure 2-1 Forklift unloading diagram

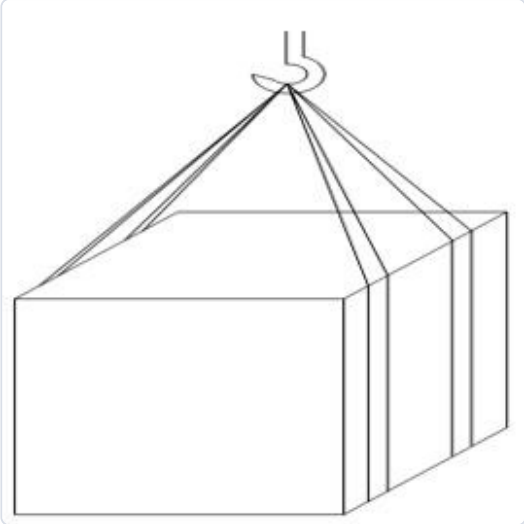


Figure 2-2 Crane lifting diagram

2.2 Instrument Unpacking

2.2.1 Precautions

- **Protective measures:** wear gloves and safety goggles throughout the process to prevent injury.
- Collect all removed nails together. Do not discard them randomly, to prevent puncture wounds.
- The wooden crate is secured with nails; a hammer and a pry bar are required for unpacking. If the crate is to be reused, avoid disassembling it with excessive force.

2.2.2 Unpacking

- **Sequence:** start from the top, then progressively remove the side panels, the internal partitions and the base plank.
- **Technique:** insert the tip of the pry bar into the gaps between planks and use the lever principle to pry them apart. For stubborn nails, gently tap them loose with a hammer first.
- Clean the site after unpacking. Sort and store the wooden planks for reuse.



Figure 2-3 Wooden shipping crate

2.3 Instrument Placement

2.3.1 Verify the Installation Location

The following describes the suitable installation location and set-up space for this instrument.

Installation location

Install the instrument in a location that meets the following conditions:

- A level and stable floor.
- A place with minimal mechanical vibration.
- A place that is well ventilated and not exposed to direct sunlight.
- A place with an ambient temperature of **5 °C to +32 °C** and humidity of **≤85 % RH**.
- A place without rapid temperature changes.
- A place with low dust.
- A place with no flammable materials nearby.
- A place free of flammable and corrosive gases.
- A place near the utility power source, gas supply source and drainage channel.
- A place without a fire detector installed directly above the instrument.
- For water-cooled instruments: confirm the cooling-water supply connection and observe the flow direction. The cooling-water temperature must be between **5 °C and +32 °C**.
- Make sure that the on-site water-line connections are properly installed so that water can enter and drain smoothly.

> **NOTICE**
> The ambient temperature range for instrument operation is **5 °C to +32 °C**. Operation outside this range may cause malfunctions.

2.3.2 Chamber Positioning

During initial installation, place the instrument on a level floor and check that the chamber is level. **If the chamber is not level during operation, compressor failure may occur.**

Adjust the four casters using an external spirit level (to be provided by the customer). If necessary, use equipment such as a hydraulic pallet jack to assist, so that the chamber is level.

2.3.3 Clearance

Provide adequate clearance for maintenance on both the left and right sides of the instrument. Sufficient space for the door to open must be available at the front. Space for condenser-fan ventilation must be reserved at the rear. No fire-alarm devices may be installed directly above the chamber.

Dimension	Minimum clearance
A	40 cm
B	60 cm
C	80 cm

Dimensions A, B and C are as indicated in the figure.

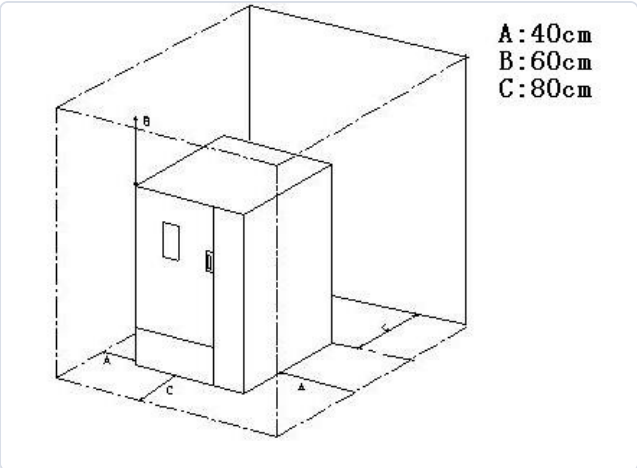


Figure 2-4 Required installation clearances

2.4 Unpack and Verify Factory Configuration

- After unpacking, open the front door and check that all factory items (documents, sample racks, spare parts and so on) are complete.
- Remove the cable ties that secure the sample racks. Adjust the vertical spacing of the sample racks as required.

PROHIBITED

Never operate the instrument without removing the cable ties. High temperatures will melt the cable ties and cause an unpleasant odour.

2.5 Water Supply Connection

The **100 L** climate chamber has an external water tank, located at the rear-right side of the instrument. Before powering on, the water line must be installed and an adequate amount of purified water must be added to ensure proper humidification. Proceed as follows:

1 **Open the instrument door**, take out the water tank and place it in the designated location.



Figure 2-5 Water tank

2 **Install the water pump.** Open the water tank cap and take out the pump. Route the pump's power cord through the hole at the top of the tank and plug it into the reserved power interface on the instrument. Then connect the instrument's water inlet pipe to the pump.



Figure 2-6 Installing the water pump

3 **Secure the water pump.** Attach the pump's suction cup to the tank bottom.

> **NOTE**
> To ensure that the pump operates normally, make sure that the suction cup is securely adhered to the tank bottom. If the pump is floating, the water supply may be insufficient and humidity may be reduced.



Figure 2-7 The pump draws water from the bottom of the tank

4 **Connect the water inlet pipe.**

5 **Connect the water return pipe.**

6 **Install the low-water protection.** Insert the low-water protection terminal from the tank into the reserved "Low-water Protection" socket on the instrument. Make sure that the guide slots on the tank terminal and the instrument socket are aligned. See the figures for the final configuration.



Figure 2-8 Align the guide slots



Figure 2-9 Low-water protection terminal

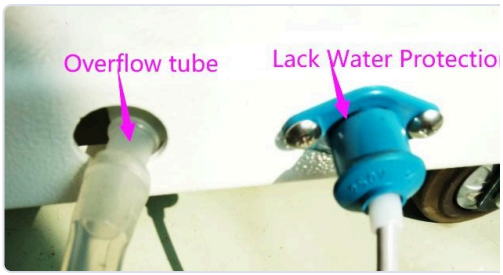


Figure 2-10 Overflow tube and low-water protection connection

7 **Fill the water tank with purified water**, keeping the water level between **1/2 and 3/4 full**.

NOTE

If the instrument triggers a low-water protection alarm but the water level is normal, check the black float inside the tank. The correct float states are shown below.



Figure 2-11 Float position at normal water level



Figure 2-12 Float position at low water level

NOTE

- Check the water level in the tank regularly. Add water promptly if the level is too low.
- If a low-water alarm occurs during initial start-up, it may be caused by air trapped in the water lines. Open the rear door and repeatedly squeeze, by hand, the water tube connected to the “Water Level Switch” to purge the air.

2.6 Water Tray of the Overflow Outlet

During operation, a small amount of condensation forms inside the chamber and is discharged through the pipe at the overflow outlet of the instrument. This is a normal phenomenon. Place a water tray at the end of the overflow-outlet pipe.

For the location of the overflow outlet, see the external view diagram in Section 3.2 (Figure 3-2).

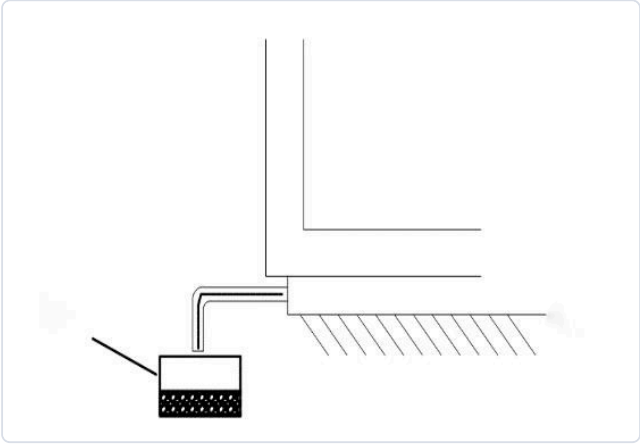


Figure 2-13 Water trap positioned under the overflow outlet

NOTICE

- Check the status of all water-line connections regularly, paying special attention to hose joints.
- Use flexible connections at the joints between the chamber and the water inlet and outlet, to make it easier to move the unit.
- Inspect the panel of the water system periodically.
- The drain pipe, excluding the condensate discharge pipe, also serves to equalize the pressure between the inside of the instrument and the outside environment. Make sure that the connection is configured so that no siphoning effect can occur.

2.7 Requirements for Power Supply Connection

Before connecting the power supply, confirm the following items:

CHECKLIST

1. The instrument is correctly positioned.
2. The water lines are properly connected.
3. A water trap is placed under the overflow outlet.
4. The correct power supply is provided, matching the power and voltage specifications shown on the instrument nameplate. (See also Section 3.2, item 9.)
5. Test samples are correctly placed. Arrange samples evenly and in a staggered pattern. **The total volume of a full load must be less than 3/4 of the working chamber volume.** Arrange the samples as shown in the figure below to ensure adequate air circulation. Do not block airflow with loaded samples.

PROHIBITED

Do not place samples on the bottom shelf or in front of the air outlet on the back plate.

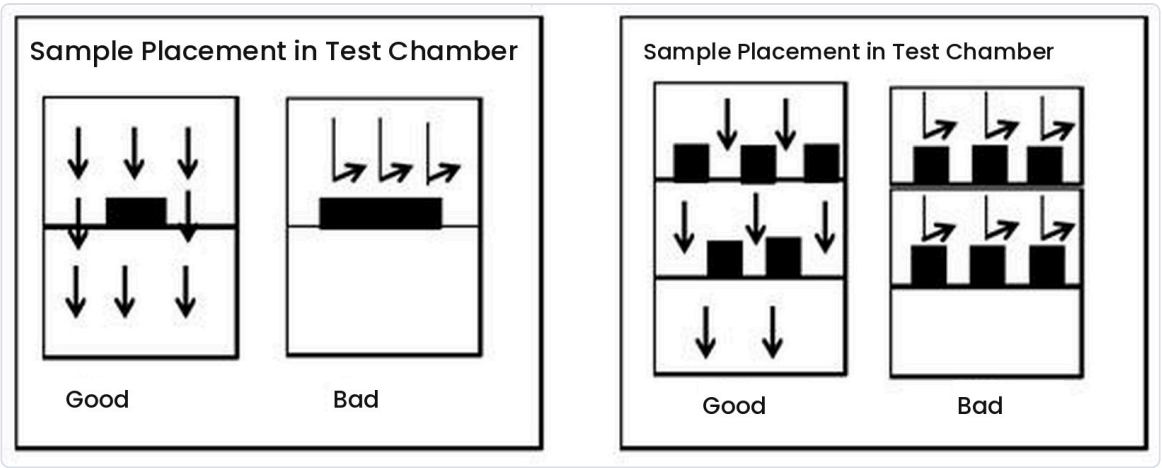


Figure 2-14 Sample placement in the test chamber — Good and Bad examples

PROHIBITED

When using this instrument, as with any other electrical appliance, the following basic rules must be strictly observed:

- Do not touch the instrument with wet hands.
- Keep the equipment surface dry.
- Do not operate the instrument in a damp environment.

CHAPTER 3

Instrument Operation

This chapter provides an overview of the test chamber, the functions of its components, and the use of the control panel. Read this section thoroughly and comply with the relevant regulations.

Operating sequence at a glance SUPPLEMENTARY

1	2	3	4	5	6
Power on	**Standby**	**Set**	**Run**	**Stop**	**Power off**
Press the main power button (3.3.1)	Panel starts; chamber is in standby	Set temperature and humidity	Tap RUN, then START	Tap STOP, then STOP (3.3.3)	Press POWER, unplug the cable

3.1 Technical Performance Specifications

of the Environmental Alternating Damp Heat Test Chamber

This test chamber has a vertical chamber structure. The exterior is made of stamped cold-rolled sheet metal with a powder-coated finish. The inner liner is constructed of stainless-steel sheet. The space between the outer casing and the inner liner is filled with polyurethane foam insulation to ensure thermal efficiency. Inside the chamber, dedicated cold and hot air ducts, together with a circulation fan, enhance air circulation and improve temperature uniformity within the workspace.

The electrical control box on the chamber houses the main controller board, relays and other components. The refrigeration unit is located at the bottom. The instrument is equipped with a touchscreen and has USB and PC communication interfaces for real-time data viewing, storage and backup. An independent over-temperature limit controller is installed; it automatically cuts off the heating if the temperature exceeds the set limit, ensuring safe operation and preventing accidents. At the rear of the chamber, the power inlet and fuse holder are installed, with the overflow outlet located below them.

Table 3-1 Technical performance specifications

No.	Parameter	Specification
3.1.1	**Temperature range**	Refer to the instrument nameplate
3.1.2	**Humidity range**	Refer to the instrument nameplate
3.1.3	**Temperature deviation**	≤ ±2 °C
3.1.4	**Temperature uniformity**	≤ 2 °C
3.1.5	**Temperature fluctuation**	≤ ±0.5 °C
3.1.6	**Humidity deviation**	≤ ±3 % RH
3.1.7	**Humidity uniformity**	≤ 5 % RH
3.1.8	**Heating rate**	≤ 3 °C/min (overall average value at no load)
3.1.9	**Cooling rate**	0.7 ~ 1.0 °C/min (overall average value at no load)

3.2 Instrument Components and Functions

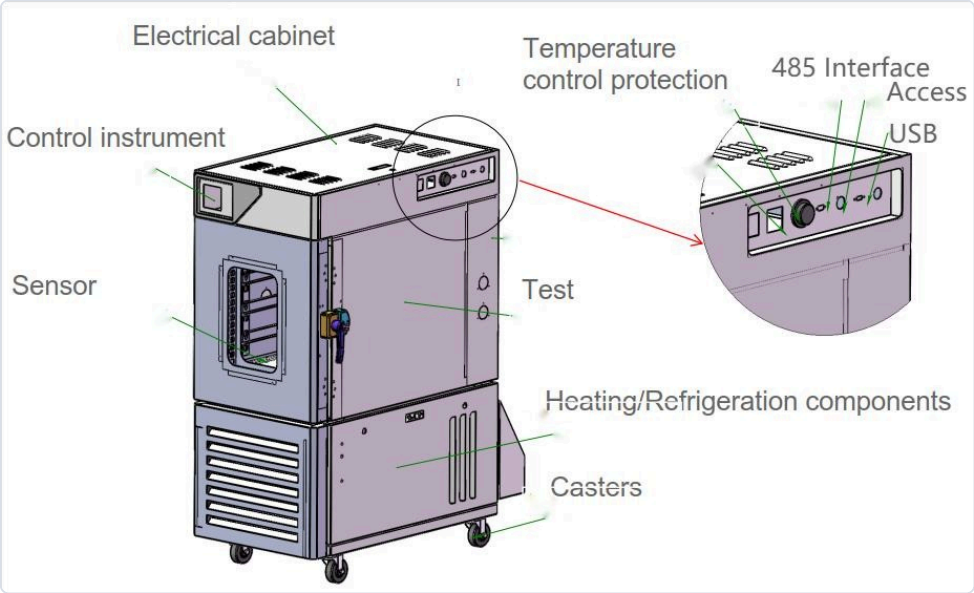


Figure 3-1 Instrument components — front and top view (100 L model, for reference only)

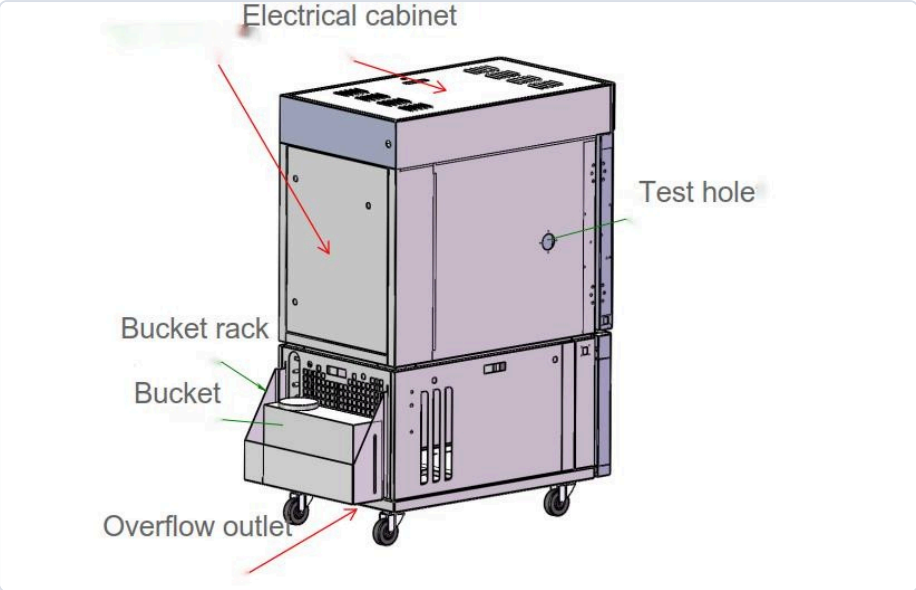


Figure 3-2 Instrument components — rear and lower view, showing the test hole, water bucket and overflow outlet (100 L model, for reference only)

NOTE

The illustrations are for a 100 L device and are for reference only.

Test Chamber Workspace

- The chamber interior is constructed of high-quality polished stainless steel.
- Test samples can be placed on the adjustable sample racks. **Do not place samples directly on the bottom shelf.**

1 Power supply, controller power, illumination switch

- After connecting the power cord, with the circuit breaker in the closed position, verify that the phase sequence protector indicator is functioning properly. The phase sequence protector is present only when the input power is three-phase 380 V; this protection is not available with a 220 V input power supply.
- Press the **POWER** button to start the test chamber.
- The test chamber is equipped with an interior light. The switch button is located in the upper right corner of the touchscreen. Press the light switch button to illuminate the fixture.



Circuit breakers and phase sequence protector



POWER button



Light switch icon on the touchscreen

2 Test Chamber Door

- The door is fitted with a glass observation window, allowing users to view the samples inside the chamber in real time (the interior light can be turned on for observation).

3 Touch Screen / Controller

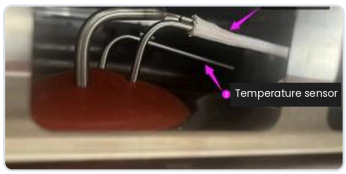
- All control and operation commands can be executed by lightly touching the corresponding symbols on the touchscreen.



Main screen

4 Temperature and Humidity Sensor

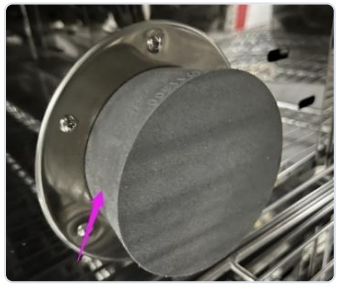
- The temperature and humidity measurement sensors are located beneath the front edge of the inner chamber floor.
- The humidity sensor is covered with white gauze (which must remain moist during humidity detection). To ensure accurate humidity readings, replace the gauze regularly. **Replace it every three months, or immediately when the gauze turns yellow and hard.**



Temperature and humidity sensors

5 Test Port

- A standard test-lead port with a rubber plug is located on the left side panel.
- Test wires and monitoring equipment can be fed into the chamber through this port.
- Seal the port with the rubber plug when it is not in use.



Test port

6 Overflow Outlet

- The overflow outlet / condensate drain is located beneath the rear cover plate of the test chamber.
- Place a water-collection trap under this outlet.



Overflow outlet

7 Electrical Cabinet

- Contains fuses, control components and electrical parts, including short-circuit switches, compressor overload protection, phase sequence protection, solid-state relays and others.
- Accessible by removing the cover with the supplied triangular key. **Access is restricted to qualified electricians only.**
- **100 L models:** located inside the top cover plate.
- **250 L / 500 L / 1000 L models:** located behind the rear cover plate.

8 Over-temperature Protection Device

- Consists of primary protection (temperature-controller over-temperature protection) and secondary protection (knob-type protector), providing dual safety for the instrument and the samples.
- Refer to Sections 4.1.1 and 4.1.2 for details.

9 Power Supply

- **100 L, 250 L models:** AC 220 ±10 % V, single phase.
- **500 L, 1000 L models:** AC 220/380/480 ±10 % V, 3 phase + N + G (ground resistance ≤ 4 Ω).

10 **Heating / Refrigeration Unit**

- Accessible by removing the lower cover plate with the triangular key.
- Includes components such as the compressor and condenser that are required to create the test conditions.
- A dedicated triangular key for accessing this unit is supplied with the instrument.



Opening the unit with the triangular key

11 **Mobile Casters**

The test chamber is equipped with four mobile casters at the base for easy relocation. Considering the load capacity, the instrument is fitted with different caster specifications:

100 L models

The two front casters are equipped with brakes; press them down to lock the chamber in place.

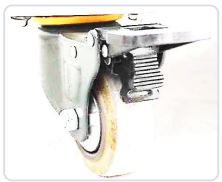
250 L / 500 L / 1000 L models

Height-adjustable Foot Master swivel casters are used, which are more effective at maintaining stability on uneven floors.

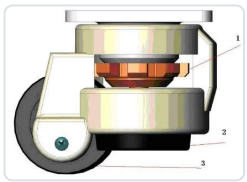
Adjusting the four casters (250 L / 500 L / 1000 L): (1) Lifting turntable; (2) Fixed base; (3) Wheels.

1. Rotate the lifting turntable to raise the fixed base, so that the wheel contacts the ground. Do this on all four casters, then move the chamber to the desired location.
2. Once the chamber is in position, lower the turntable. This retracts the wheels and brings the fixed base into contact with the ground, securing the chamber.

> ⚠ **NOTICE**
>
> **Before moving the instrument, always check whether the brakes on the two front casters are locked.** Do not force the instrument to move while the brakes are engaged, as this may damage the casters.



Caster with brake (100 L)



Height-adjustable caster (250 L / 500 L / 1000 L)

3.3 Panel Operation Instructions

3.3.1 Panel Monitoring Screen — Start-up (Main Interface)

1 Press the **main power button**. The circuit is energized, the panel starts up and the chamber enters standby mode.

2. Set the desired temperature and humidity conditions on the touchscreen interface.

3. Tap **RUN** in the lower right corner, then tap **START** in the pop-up window. The instrument starts running (operating status as described below).



Figure 3-3 Start-up interface



Figure 3-4 Login interface



Figure 3-5 Post-login interface

Login interface	Description
Username	**Admin:** Super User · **user2:** Administrator · **user3:** Operator
Password	The default password is **0**. It can be modified by the user.

Post-login icon	Function
Light icon	Tap to turn the chamber interior light on.
USB icon	Lights up when a USB stick is inserted; allows data copying.
Lock icon	Default is unlocked, and the interface is operable. When tapped and locked, the display interface is locked and becomes inoperable.



Figure 3-6 Monitoring screen (Fix Run) with numbered items

Item	Description
1	Current temperature value (PV value)
2	Temperature setting value (SV value)

Item	Description
3	Current humidity value (PV value)
4	Humidity setting value (SV value)
5	Cumulative run time
MV	Displays the current control output of temperature and humidity

3.3.2 Panel Monitoring Screen — Starting and Operating

There are two operating modes: **Fix Value operation** and **Program operation**. In either mode, tap **RUN** in the lower right corner of the screen to open the control window.

Fix Value mode



Figure 3-7 Fix Value screen



Figure 3-8 Control window after tapping RUN

STOP	Stop the chamber.
START	Start the chamber.
AT	Instrument self-tuning function.
BACK	Return to the current interface.

Program mode



Figure 3-9 Program screen



Figure 3-10 Control window after tapping RUN

STOP	Stop the chamber.
START	Start the chamber.
JUMP	End the current running segment and move to the next one.
HOLD	Hold or cancel the current temperature set value. While holding, all relays remain active and the remaining time pauses.
BACK	Return to the interface.

When the program has finished running, “Finished” appears in the lower right corner.

3.3.3 Panel Shutdown (Standby)

1. Tap the **STOP** button in the bottom-right corner of the touchscreen, then tap **STOP** in the pop-up interface.
2. Press the **POWER** button to power off.
3. Unplug the power cable. The instrument is now fully powered off.



Figure 3-11 Shutdown (standby) interface



Figure 3-12 Power off (power cable unplugged)

> **NOTICE**
>
> **If the test was running below 0 °C**, set the temperature SV to **60 °C** and run the chamber for **30 minutes** so that the interior warms up. Then proceed with shutdown and unplug the power cord.

3.3.4 Monitoring Screen Curve

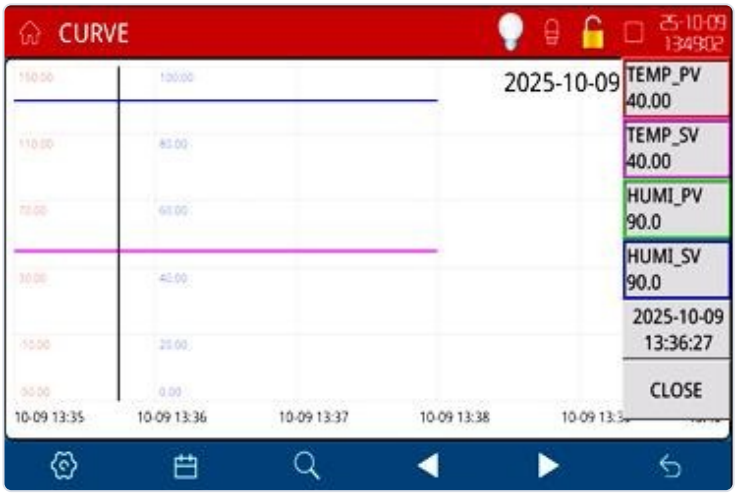


Figure 3-13 Curve screen

- 1 Shows the temperature and humidity PV/SV values, along with the current date and time.
- 2 Allows scrolling the curve forward and backward to view data from any time period.
- 3 Tap these three function keys to open the submenu. See the details below.

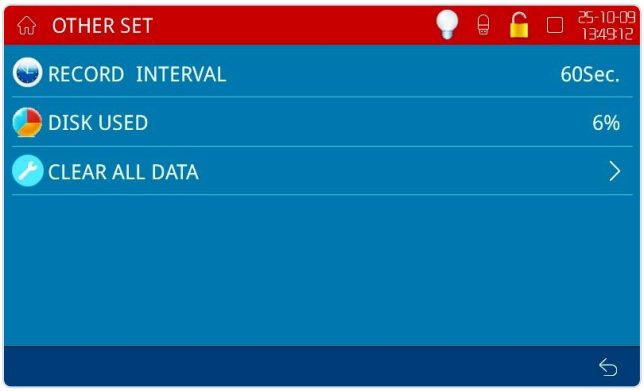


Figure 3-14 Submenu: OTHER SET

Key	Function
Record Interval	Set the curve logging time interval.
Disk Used	Show the usage status of the panel's memory.
Clear all data	A dialog box appears when tapped. Tap **OK** to delete the records. Caution: deleted data cannot be restored.

NOTE

- The logging interval is adjustable. The default is **60 seconds**.
- Check the memory usage of the storage. **If memory usage exceeds 80 %**, back up the data to a computer promptly and then clear all records to free up memory. If the memory is full, the oldest stored data is automatically overwritten.

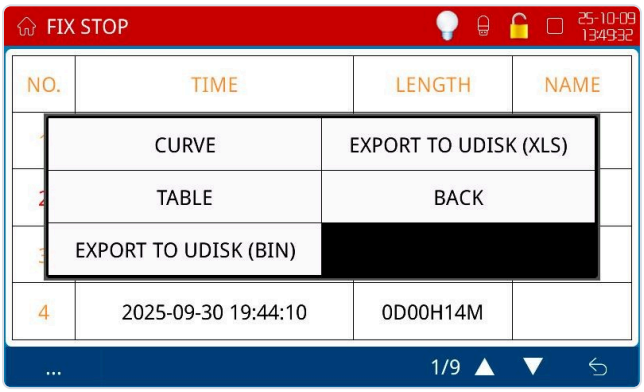


Figure 3-15 Curve / table / export dialog (calendar key)



Figure 3-16 Curve interval time selection (search key)

Detailed introduction

1. Records the date and time of the running curve; the length is the recorded duration of the run.
2. Tap to view the curve or table. (The "Export to USB" function appears only when a USB drive is inserted.)

Detailed introduction

Tap to open this dialog box and view the curve interval time selection.

Exporting data to a USB stick



Figure 3-17 USB icon appearing in the upper right corner of the interface

1. Insert the USB stick into the designated USB port. The USB icon appears in the upper right corner of the interface, indicating a successful connection.
2. Data export is complete when the **Export Status Indicator** shows **100 %**.
3. Tap the USB icon in the upper right corner to safely eject the USB stick.

NOTE

The "Export Data" button is not visible on the curve interface unless a USB drive is inserted.

3.3.5 Monitoring Screen Details

Fix Value operation

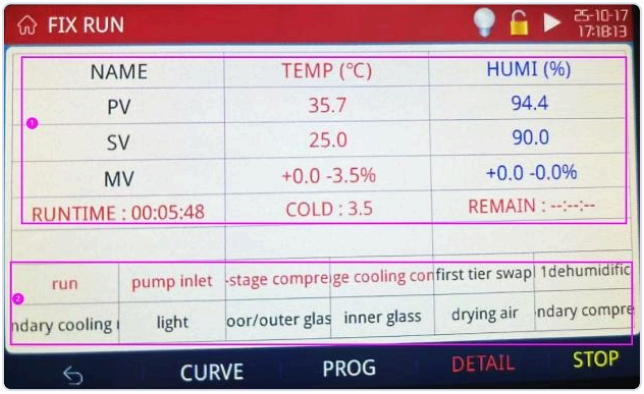


Figure 3-18 Fix Value operation details

- 1 See Section 3.3.1.
- 2 Displays the operational status of the various DI (digital input) definitions during the current run. Text in red indicates "Running" (active); text in black indicates "Not Running" (inactive). These definitions are preset by the technical staff and do not require modification by the user.

Program operation

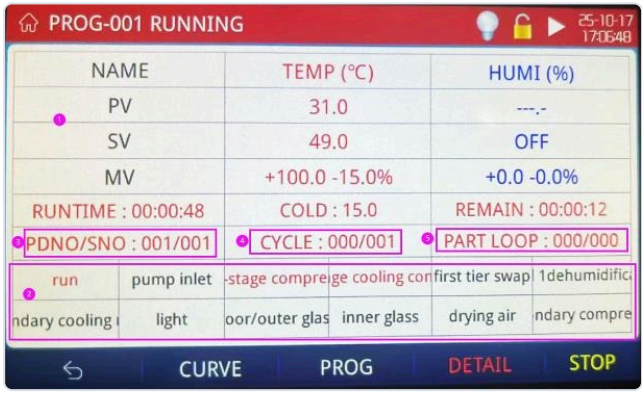


Figure 3-19 Program operation details

- 1 See Section 3.3.1.
- 2 Displays the operational status of the various DI (digital input) definitions during the current run (red = Running, black = Not Running). These definitions are preset by the technical staff and do not require modification by the user.
- 3 Program / segment number: Segment 1 of the currently running Program 1.
- 4 Total cycle count for Program 1.
- 5 Segment looping: loops can be defined between segments within Program 1.

3.4 Operation Setting Explanation

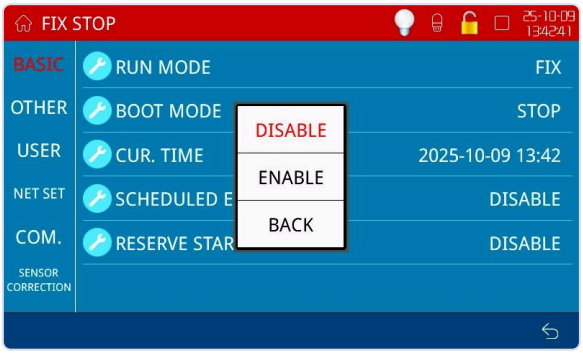


Figure 3-20 Run mode / power failure mode (BOOT MODE) and scheduled-start options

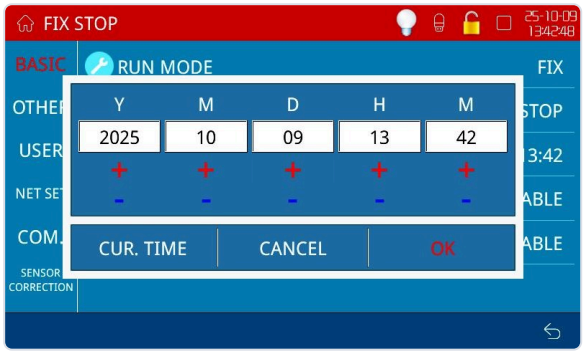


Figure 3-21 Scheduled start — date and time dialog

Setting	Description
Operation mode	Fix Value operation or Program operation. For Fix Value operation details, see Section 3.5; for Program operation details, see Section 3.6.

Setting	Description
Power failure mode (tap to open the dialog box)	**Stop** — After power recovery, the operation continues from the segment/step where the power was interrupted, or runs at a set-point. **Cold Start** — Upon power recovery, the chamber automatically resumes operation from the program start (Segment 1) / set-point. **Hot Start** — After power recovery, operation continues from the segment/step of interruption, or runs at a fixed set-point.
Scheduled start (tap to open the dialog box)	Tap **Disable** → a dialog box appears → tap **CUR. TIME** (switches to the system date and time) → set the required date and time → tap **OK**.
Daily schedule	Once enabled, set the scheduled time; the unit then starts automatically at that time every day. For example, if set to 9:00, the unit starts operation automatically at 9:00 every day.

NOTICE

When a test is stopped midway (while configured for **Cold Start** or **Hot Start**), you must press the **STOP** button on the instrument. **Strictly avoid turning off the main power switch or unplugging the power cord directly**, as the equipment will otherwise start automatically at the next power-up.

3.5 Operation Mode — Fix Value Settings



Figure 3-22 Fix Value settings screen

Run Time	Continuous or timed run (RUN TIME on the screen). When the operating time in fixed set-point mode exceeds the preset duration, the unit stops automatically.
Temperature Ramp Rate	Sets the rate of temperature change during set-point operation (TEMP SLOPE on the screen). The current temperature value gradually reaches the target set-point at the configured ramp rate.
Humidity Ramp Rate	The same principle applies to humidity (HUMI SLOPE on the screen).

3.6 Operation Mode — Program Settings

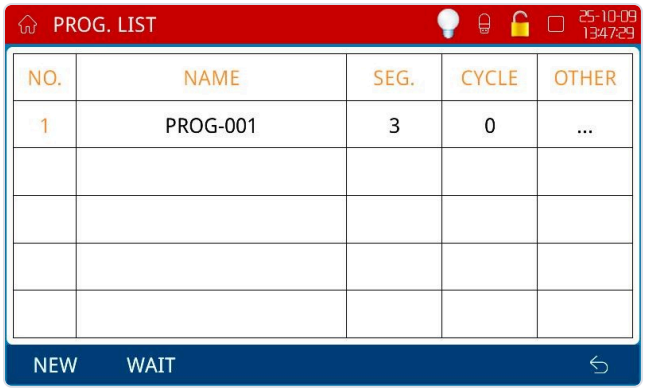


Figure 3-23 Program list screen

NO.1	Program number.
Name	Tap to open the name-editing screen and set the desired name.
Segments	Tap the corresponding segment column to enter the program segment setting interface.
Cycle	Tap the corresponding Cycle column to enter the program cycle settings interface.
Other	Tap the corresponding Other column to enter the other settings interface for the program.
New	Tap New to bring up the numeric keypad. Enter the new program number and tap OK to create a new program.
Wait	Tap Wait to enter the standby setting interface (see Section 3.6.1).

NOTE

New program segments cannot be inserted, and the segment cannot be deleted, while the program segment value is at its initial setting. This operation also cannot be executed while the system is in the run state.

3.6.1 Standby Setting



Figure 3-24 Standby (WAITING SET) screen

WAIT SW.	Turns the standby function on or off.
WAIT TIME	Sets the effective duration of the standby function. If the standby conditions are not met within this time, standby mode is canceled.
TEMP WAIT ZONE	Sets the standby temperature range, which

	defines the release zone of the standby function.
HUMI WAIT ZONE	Sets the humidity standby zone (%). Humidity follows the same principle as temperature.

TIP

Example: if the standby range is set to 5 °C and the set value is 50 °C, the standby function is released when the PV (process value) reaches the range of 45 °C ~ 55 °C.

3.6.2 Program Mode Settings



Figure 3-25 Program segment setting screen (PROG 001 SET)

Program and segment	Tap NO. to bring up the Insert and Delete buttons for the selected segment.
TEMP	Set the temperature value for the program segment.
HUMI	Set the humidity value for the program segment.
TIME	Set the continuous running time for the program segment: 1 hour → 1.00; 30 minutes → 0.30; 1 minute → 0.01; off → -0.01.
TS	Set the activation mode of the TS signal. See Section 3.6.3 TS Settings.
WAIT	Set the standby function ON/OFF for the program segment.
LOOP SET	Tap to enter the loop setting interface for the program group. See Section 3.6.4.
CURVE	Tap to enter the interface for simulating / displaying the data curve set in the program segments.

READING THE EXAMPLE SCREEN

In the example screen above, segment 001 holds 40.00 °C and 90.0 % RH for 0.15 (15 minutes by the TIME rule); segment 002 holds 40.00 °C and 90.0 % RH for 2.00 (2 hours); segment 003 holds 120.00 °C with humidity OFF for 0.15 (15 minutes). The TS columns TS1–TS3 and WAIT are all OFF.

3.6.3 TS Settings

NO	DELAY	ON TIME	OFF TIME	CYCLE
OFF	OFF	OFF	OFF	OFF
ON	ON	ON	ON	ON
ACT1	00:00:00	00:01:00	00:01:00	0
ACT2	00:00:00	00:01:00	00:01:00	0
ACT3	00:00:00	00:01:00	00:01:00	0
ACT4	00:00:00	00:01:00	00:01:00	0
	1/2 ▲	▼	BACK	OK

Figure 3-26 TS setting screen

Activation mode	OFF / ON. ACT 1 to 6 are configurable. Setting OFF means the action is not activated. Setting ON means the action remains continuously active while the instrument is running.
Delay	Set the delay time for the activation of TS ACT 1 ~ 6 (tap OFF/ON directly to switch the delay off/on).
On Time	Set the start time for ACT 1 to 6 (for OFF/ON, simply tap to set).
Off Time	Set the stop time for ACT 1 to 6 (for OFF/ON, simply tap to set).
Cycle	Set the number of cycles for the TS loop's ON and OFF segments and the ACT 1 to 6 sequence. A cycle count of **0** indicates infinite looping.

TIP

Example for ACT 1: Segment 1: ON-time running for 3 hours. Segment 2: OFF-time running for 2 hours. The loop is set to 2 repetitions, meaning ACT 1 stops after the two segments have been executed 2 times.

3.6.4 Loop Settings



Figure 3-27 Program cycle setting screen

BEGIN	Sets the program segment in the created profile at which a partial segment loop begins.
END	Sets the program segment in the created profile at which a partial segment loop ends.
CYCLE	Sets the number of cycles for the segment loop. A setting of **0** means no loop.
PROG Cycle	Sets the loop count for the program group. A setting of **0** means the program runs infinitely.
LINK PROG NO.	The program can link to another program after execution.

BEGIN, END and CYCLE together control the cyclic execution of the program steps — see Section 3.6.5 Partial Cycle Explanation. For the program-group cycle and program linking, see Section 3.6.6.

3.6.5 Partial Cycle Explanation

Example 1

NO.	1	2
BEGIN	02	03
END	04	05
CYCLE	02	02

Figure 3-28 Example 1 settings

Run	Segment execution sequence
1	01 → 02 → 03 → 04 (02~04, first run)
2	02 → 03 → 04 (02~04, second run)
3	03 → 04 → 05 (03~05, first run)
4	03 → 04 → 05 → 06 → 07 → 08 (03~05, second run)

Segments 02–04 cycle 2 times. Segments 03–05 cycle 2 times.

Example 2

NO.	1	2
BEGIN	03	02
END	05	04
CYCLE	02	02

Figure 3-29 Example 2 settings

Run	Segment execution sequence
1	01 → 02 → 03 → 04 → 05 (03~05, first run)
2	03 → 04 → 05 (03~05, second run)
3	02 → 03 → 04 (02~04, first run)
4	02 → 03 → 04 → 05 → 06 → 07 → 08 (02~04, second run)

Segments 03–05 cycle 2 times. Segments 02–04 cycle 2 times.

> **NOTE**
> In a partial loop, the cycle always starts at the designated segment number (regardless of its value) and executes the segments sequentially, without any skipping.

3.6.6 PROG Cycle and Program Linking Explanation

Example	Settings	Program execution sequence
Example 1		Program 1 runs once (the cycle count is set), then executes the linked Program 2. **Program 1 → Program 2**
Example 2		Program 2 runs twice (the cycle count is set), then executes the linked Program 3. **Program 2 → Program 2 → Program 3**

Figure 3-30 PROG CYCLE 000001, LINK PROG NO 002

Figure 3-31 PROG CYCLE 000002, LINK PROG NO 003

Example	Settings	Program execution sequence
Example 3		Program 3 runs three times (the cycle count is set). As no program is linked, execution ends. **Program 3 → Program 3 → Program 3 → End**

Figure 3-32 PROG CYCLE 000003, LINK PROG NO 000

3.6.7 Other Program Settings

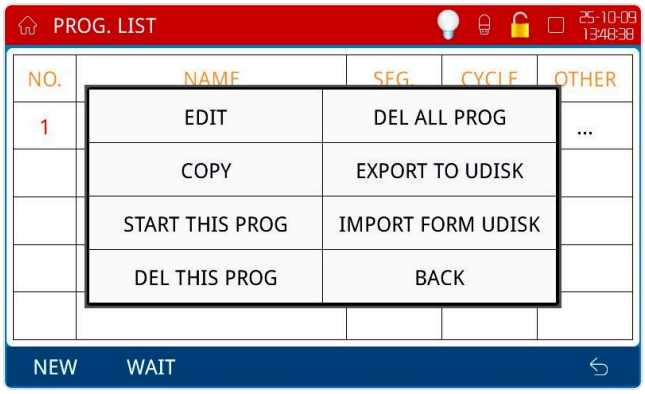


Figure 3-33 Program options menu

Edit	Tap to enter the program segment editing interface.
Copy	Copy the parameters of a program group to a target program group. Example: select Program Group 1, tap Copy, then enter the target program group number 3. The copied program group is now named Program Group 3, but its parameter settings are identical to those of Program Group 1.
Start this prog	Tap to start running the currently selected program.
Del this Prog	Tap to delete the currently selected program group.
Import from USB	Import programs from a USB stick.
Export to USB	Export programs to a USB stick.
Del all Prog	Tap to clear all programs.

CHAPTER 4

Common Troubleshooting and Instrument Maintenance

This chapter lists the alarm points built into the instrument, explains how to clear each of them, and describes routine cleaning. Read it before you carry out any fault finding or maintenance.

4.1 Common Troubleshooting

To ensure test safety, the instrument features a built-in fault alarm function during operation, as detailed in the table below.

Table 4-1 Alarm points, alarm content and solutions

Alarm point	Alarm content	Solution
DI1	Temperature Controller Over-temperature Protection	Instrument powers off (refer to 4.1.1 for the solution).
DI2	Over-temperature Protection	Instrument powers off (refer to 4.1.2 for the solution).
DI3	Dry-fire Protection	Alarm prompt on the panel. After resolving the issue, click “Reset” on the panel to resume operation (refer to 4.1.5).
DI4	Second-level Compressor Overload Protection (non-standard configuration)	Instrument cannot start (refer to 4.1.4 for the solution).
DI5	First-level Compressor Overload Protection	Instrument cannot start (refer to 4.1.4 for the solution).
DI6	Phase Sequence Protection	Instrument cannot start (refer to 4.1.6 for the solution).
DI8	Water Tank Low Water Protection	Alarm prompt on the panel. After resolving the issue, click “Reset” on the panel to resume operation. **Note:** when the alarm screen background is red, the “Reset” button is disabled. After the fault is resolved and the background turns green, click “Reset” to resume instrument operation.
DI10	Circulation Fan Protection	Alarm prompt on the panel. After resolving the issue, click “Reset” on the panel to resume operation.
/ No alarm	Short Circuit Protection	Instrument powers off (refer to 4.1.3 for the solution).

ALARM NUMBERING

The alarm numbering used by the instrument is DI1–DI6, DI8 and DI10. No DI7 or DI9 alarm is defined in this manual. Appendix B lists every alarm and fault on a single page.

Example of the panel during an alarm

The panel shows the alarm in the title bar of the screen. The actual alarm content may vary; the image is for reference only.

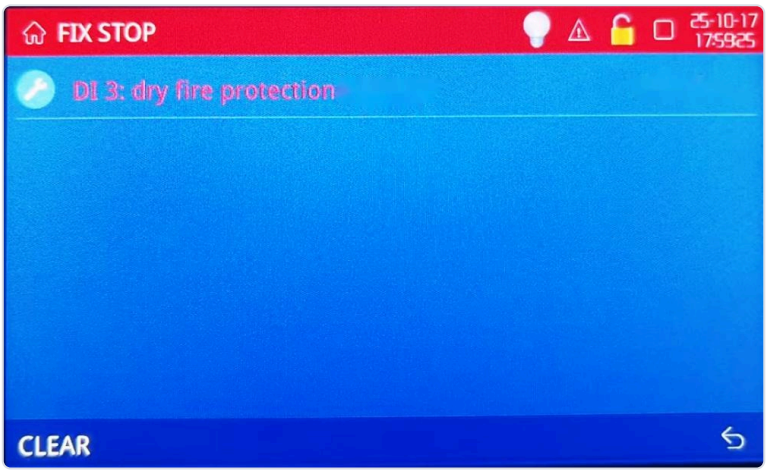


Figure 4-1 Example alarm screen (DI 3: dry-fire protection). The CLEAR button is inactive while the background is red; once the fault is cleared, the background changes to green, and pressing CLEAR resumes equipment operation.

4.1.1 Over-temperature Primary Protection: Temperature Controller Protection

The over-temperature protection is divided into two types: the **Temperature Controller Over-temperature Protection** and the **Knob-type Protection**. The temperature controller is located on the upper right side of the test chamber.



Figure 4-2 Temperature-controller over-temperature protector (PV in red, SV in green)

The Temperature Controller Over-Temperature Protection is primarily used to protect the samples inside the equipment. It can be set according to the sample's maximum temperature tolerance. The factory default alarm deviation is **5 °C**.

Setting method

The push-button temperature controller has two display fields: the upper field, **PV**, displays the actual temperature in red, and the lower field, **SV**, displays the set protection temperature in green. Use the ∧ and ∨ keys to adjust the set protection temperature.

4.1.2 Over-temperature Secondary Protection: Knob Protector



Figure 4-3 Knob-type over-temperature protector

This knob protection is primarily designed for equipment self-protection. If the local temperature in the working space exceeds the temperature set on the knob, the equipment automatically cuts off the power supply and **cannot be restarted until the temperature has dropped**.

To resolve the fault, allow the equipment to cool down before restarting the unit.

> **TIP**
> The value aligned with the graduation mark indicates the set temperature for the over-temperature protection.

Possible causes and recommended solutions

1. The user-set temperature is higher than the over-temperature protection set value. *It is recommended to set this temperature approximately 15 °C higher than the chamber's operating temperature.*
2. The heating system is out of control. *It is recommended that an electrician checks whether the solid-state relay (SSR) for heating has output.*
3. The over-temperature protector is damaged. *If the temperature knob is set below ambient temperature, the equipment should not be able to operate, and the rotation should have a clicking sound; conversely, the protector is likely out of control or malfunctioning.*

4.1.3 Short Circuit Protection System

> **DANGER · QUALIFIED ELECTRICIAN ONLY**
> Work on the electrical cabinet must be performed by a qualified electrician.

If the instrument trips a breaker or the controller shows no display due to current leakage or accessory short circuits, a qualified electrician should check the power supply lines, then check whether the ground bar and neutral bar have voltage output. After troubleshooting, reset the breaker using the following method.

1. Use the triangular key to open the electrical cabinet cover plate *(this step must be performed by a qualified electrician)*.

> **NOTE**
> The electrical cabinet location for the **100 L** model is on the **top**. For **250 L / 500 L / 1000 L** models, it is on the **rear** of the instrument.

2. Locate the circuit breaker switches and manually reset them. The **left** breaker is the **Main Power Circuit Breaker**; the **right** breaker is the **Controller Circuit Breaker**.

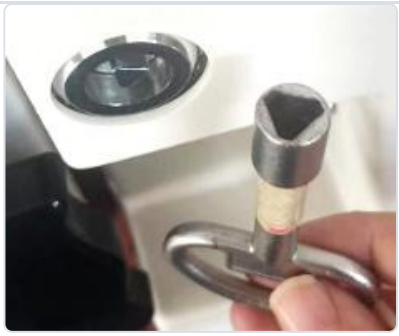


Figure 4-4 Triangular key



Figure 4-5 Cabinet on top (100 L)



Figure 4-6 Cabinet at rear (250 / 500 / 1000 L)

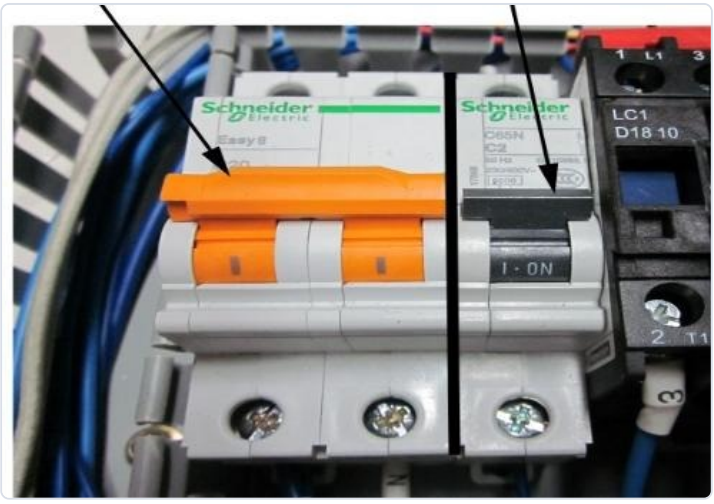


Figure 4-7 Main Power Circuit Breaker (left) and Controller Circuit Breaker (right)

4.1.4 Compressor Overload Reset Button

When the compressor starts, a mechanical malfunction that causes the rotor to "lock up" (seizure) leads to a rapid current increase. Once the current surpasses the rated starting current, the protective device trips and interrupts the current, thereby preventing the motor's start winding from burning out. Similarly, during normal compressor operation, if the temperature rises too high or the current exceeds its allowable limit due to external factors, the protector also trips, cutting off power and preventing the burnout of the motor's running winding.

If this happens, troubleshoot the failure and press the **"RESET"** button to reset the unit.

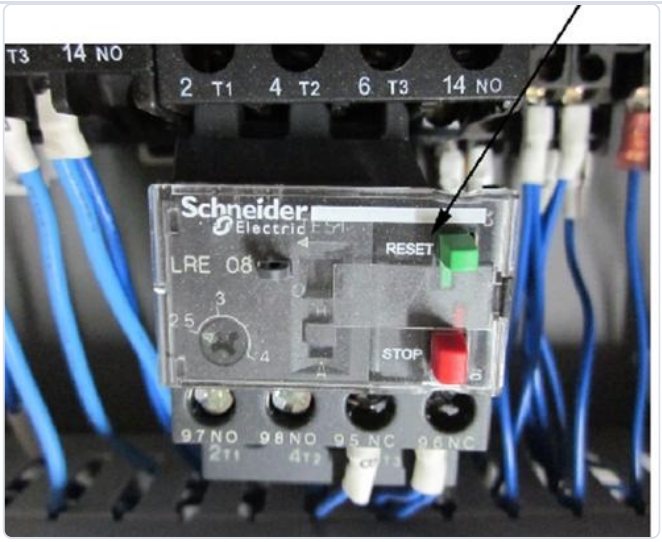


Figure 4-8 Overload relay — press the RESET button to reset

Causes of overload include

- Low supply voltage or poor voltage symmetry.
- Compressor motor operating under load with low voltage for extended periods.
- Excessively high ambient operating temperature.
- Compressor motor operating at low speed for extended periods.
- Blocked cooling-medium path for the compressor motor.
- Incorrect thermal overload relay current setting.

> **NOTE**
> Excessive dust on the condenser can also cause compressor overload. It is recommended to clean the air-cooled condenser **every three months**. For the cleaning method, refer to Section 4.2.1.

4.1.5 Dry-burn Protection



Figure 4-9 Dry-burn protection adjustment button at the lower rear of the chamber

This adjustment button is located at the lower rear of the chamber. If a dry-fire condition occurs in the humidification tank due to lack of water, an audible alarm sounds and the **third alarm point (DI3)** is displayed on the panel. If this occurs, check the following.

Possible causes and troubleshooting suggestions

#	Check	Suggestion
1	The water level in the humidification tank.	A water level below the heating tube causes a dry-fire alarm. Check whether the position of the water level switch has changed; a low water level setting can cause a low water level in the humidification tank.
2	The water tube connected to the pump.	If there is no water in the tube, the pump may be damaged and unable to operate. Replace the water pump.
3	False alarm caused by a damaged dry-fire protector.	Rotate it higher or lower to observe whether the instrument reacts normally. If the protector is damaged, replace it.
4	The water tube connecting the water level switch to the chamber.	Check for air bubbles or blockages. If present, squeeze the tube by hand to purge the air, or clean the tube.

NOTE

If a water-shortage or dry-burn alarm occurs upon initial power-on, it may be due to air trapped in the water pipe, preventing circulation. Open the rear door and repeatedly squeeze the water pipe connecting the humidifying tank and the water level switch with your hand to expel the air.

4.1.6 Phase Sequence Protection (Three-phase Power Models Only)



Figure 4-10 Phase-sequence protector in the electrical cabinet (red indicator lit = phase sequence error)

The phase sequence protector is located in the electrical cabinet at the top of the instrument. If the **red indicator light is on**, it indicates a phase sequence error, triggering the **sixth alarm (DI6)** on the control screen. If this occurs, **swap any two of the three-phase input power lines**.

NOTE

If the instrument alarms and cannot operate, check for a phase sequence error.

4.1.7 Other Faults

The table below lists other faults not self-diagnosed by the instrument (faults without alarm) and common operator errors.

Table 4-3 Other faults (without alarm) and common operator errors

Fault	Possible cause	Solution
THE SCREEN DOES NOT LIGHT UP		
	No input power	Supply power to the instrument
	Main switch is OFF	Turn the main power switch ON
	Display screen failure	Contact us
	Incompatible power supply	Check the power supply
INADEQUATE HEATING (HEATING FAILURE)		
	Excessive sample load	Reduce the number of samples
	Incorrect input value of setting temperature	Verify the setting value
	Malfunction of the solid-state relay for heater control	Contact our after-sales service department
	Heater wire break	Contact our after-sales service department
	Heater circuit breaker is OFF	Turn the heater circuit breaker ON
INADEQUATE COOLING (COOLING FAILURE)		
	Excessive heat generated by samples	Reduce sample heat generation
	Insufficient refrigeration capacity	Check the condenser system (condenser / cooling tower); check whether the compressor is operating
	Compressor circuit breaker is OFF	Turn OFF the main power switch, open the electrical control compartment, and turn ON the compressor circuit breaker
	Condenser fan start capacitor is damaged	Check fan operation status
	Evaporator freezes	Open the chamber door and defrost with high temperature
POOR TEMPERATURE UNIFORMITY		
	Excessive heat generated by samples	Reduce the number of samples
	Improper sample placement	Change the sample arrangement; adjust the air outlet baffle
MAIN POWER CIRCUIT BREAKER TRIPS		

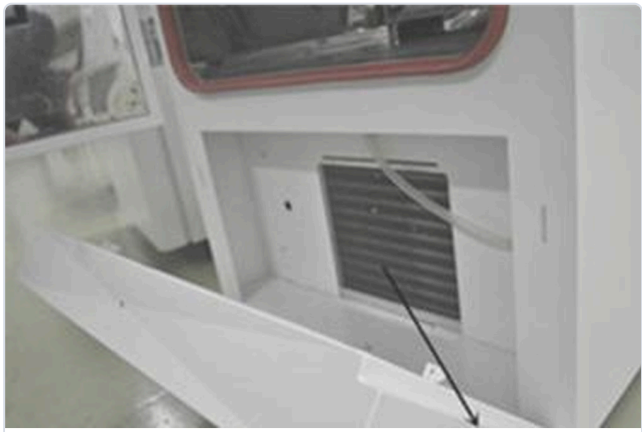
Fault	Possible cause	Solution
	Excessive current on the main power circuit; over-current protection	Turn the power switch OFF, and restart
	Earth leakage protection activated	Check the power supply and contact us

4.2 Maintenance Details

4.2.1 Cleaning the Air-cooling Condenser

During prolonged operation, dust tends to accumulate on the condenser, impairing the refrigeration system's heat dissipation. Regularly inspect the condenser's heat dissipation condition:

1. Check whether the condenser fan is operating normally.
2. Check whether the heat exchanger is severely clogged with dust.



Condenser location

Figure 4-11 Condenser location

The images accompanying this document are for general reference only. If they differ from the actual equipment, the actual equipment shall prevail.

To clean the condenser

1. Use an appropriate screwdriver to remove the lower access panel of the machinery compartment.
2. Clean the dust from the heat exchanger using a soft brush or compressed air (air gun / high-pressure nitrogen).

PROHIBITED

Never use water guns or spray devices for cleaning, as this may damage the instrument's insulation and cause malfunctions.

4.2.2 Internal Chamber Cleaning

If dust or impurities adhere to the inner walls of the chamber, the accuracy of test results may be affected. Clean the chamber before starting operations.

1. Open the test chamber door.
2. Remove debris using a vacuum cleaner.
3. Wipe surfaces with a soft cloth dampened with a neutral detergent, and use a damp cloth for rinsing.

4. Close the test chamber door.

4.2.3 Electrical Control Compartment Cleaning

Dust accumulation in the electrical control compartment can easily cause malfunctions. Clean the electrical control compartment regularly.

1. Ensure the main power is disconnected.
2. Open the compartment door.
3. Use a vacuum cleaner to remove dust from it.
4. Close the compartment door.

DANGER · QUALIFIED ELECTRICIAN ONLY

The electrical control compartment must be opened only by a qualified electrician (see Section 1.1).

CHAPTER 5

Instrument Disposal

This chapter contains the material composition of the test chamber and proper disposal methods. Read this chapter when necessary.

5.1 Instrument Material Composition

Table 5-1 Instrument material composition

#	Material	Used for
1	Steel sheet coated with epoxy resin powder	External structure
2	Polyurethane	Insulation material
3	G steel sheet	Support frame
4	Painted steel	Compressor
5	Copper	Condenser, refrigerant pipe, evaporator, heat exchanger
6	Aluminum	Control panel, fans, evaporator, condenser
7	Polycarbonate	Control panel
8	PVC	—
9	Refrigerant	—
10	Antifreeze oil	—
11	Other materials	—

5.2 Disposal Requirements

Some waste materials such as copper, steel and aluminum are easy to dispose of. However, other materials such as insulation materials, oil and refrigerant must be processed by specialized disposal companies.

The instrument does not contain any toxic or flammable materials that could create hazardous situations upon disposal.

PROHIBITED

- Do not release compressor oil into the environment.
- Do not release refrigerant into the environment.
- Do not dispose of insulation materials in the environment.

RECOMMENDED

It is recommended to contact a specialized company for the recycling of the aforementioned materials.

APPENDIX A

Quick Reference

One-page reference of the key data given in this manual. SUPPLEMENTARY

A.1 Models and dimensions

Capacity	Inner size (W × D × H)	External size (W × D × H)	Net weight (approx.)	Electrical cabinet
100 L	450 × 450 × 500 mm	720 × 1100 × 1560 mm	240 kg	Top
250 L	600 × 600 × 700 mm	910 × 1560 × 1800 mm	400 kg	Rear
500 L	800 × 700 × 900 mm	1100 × 1610 × 1900 mm	550 kg	Rear
1000 L	1000 × 1000 × 1000 mm	1260 × 1880 × 2050 mm	800 kg	Rear

NOTE

Weights are approximate; refer to the instrument nameplate for the exact value. If these values differ from the data sheet of your specific chamber, the nameplate and the data sheet supplied with your instrument take precedence.

A.2 Key values and limits

Item	Value	See
Hazardous surface temperature	Above +38 °C (+100 °F) or below 0 °C (+32 °F)	1.1
Gloves required when opening the door	Above 55 °C: heat-resistant. Below 0 °C: cold-resistant	1.3
Over-temperature protector (knob) setting	About 15 °C above the chamber operating temperature	4.1.2
Controller over-temperature factory alarm deviation	5 °C	4.1.1
Condenser cleaning interval	Every three months	4.1.4
Program TIME entry	1 h = 1.00; 30 min = 0.30; 1 min = 0.01; off = -0.01	3.6.2
Cycle / PROG Cycle setting of 0	Segment loop: no loop. Program group: infinite	3.6.4

A.3 Technical contact

Lorderan — **www.lorderan.com**. When contacting after-sales service, have the model, capacity and serial number from the instrument nameplate ready.

APPENDIX B

Alarm and Fault Index

Find the symptom, the likely cause and the section that explains the solution. SUPPLEMENTARY

B.1 Alarm points

Alarm	Meaning	Machine state	Clear by	Section
DI1	Temperature-controller over-temperature	Powers off	Let chamber cool; check settings	4.1.1
DI2	Over-temperature (knob protector)	Powers off	Let chamber cool; check knob setting	4.1.2
DI3	Dry-fire protection	Alarm on panel	Fix cause, then Reset	4.1.5
DI4	Second-level compressor overload (non-standard)	Cannot start	Press RESET on overload relay	4.1.4
DI5	First-level compressor overload	Cannot start	Press RESET on overload relay	4.1.4
DI6	Phase sequence	Cannot start	Swap two of the three phase lines	4.1.6
DI8	Water tank low water	Alarm on panel	Refill / fix cause; green background, then Reset	4.1 table
DI10	Circulation fan protection	Alarm on panel	Fix cause, then Reset	4.1 table
—	Short circuit / leakage (no alarm)	Powers off	Electrician resets breaker	4.1.3

B.2 Symptoms without an alarm

Symptom	First checks	Section
Screen does not light	Input power; main switch; supply compatibility; display	4.1.7
Does not heat	Sample load; set value; SSR; heater wire; heater breaker	4.1.7
Does not cool	Sample heat; condenser (dust, fan, capacitor); compressor breaker; frost on evaporator	4.1.7, 4.2.1
Poor uniformity	Sample load and placement; air outlet baffle	4.1.7, 2.7
Main breaker trips	Over-current; earth leakage	4.1.7, 4.1.3

APPENDIX C

Maintenance Schedule and Logs

The intervals below are taken from this manual where one is stated; other entries are suggested checkpoints. SUPPLEMENTARY

C.1 Maintenance schedule

Task	Interval	Basis	Section
Clean the air-cooled condenser	Every three months	Manual	4.2.1
Clean the chamber interior	Before starting operations; whenever dust or impurities are visible	Manual	4.2.2
Clean the electrical control compartment (power disconnected)	Regularly	Manual (interval not stated)	4.2.3
Check condenser fan operation and condenser dust	Whenever cooling is poor and at each condenser cleaning	Manual	4.2.1
Check water level and water-line for air	At power-on and after any water alarm	Suggested	4.1.5
Check over-temperature protector setting	Before each new test profile	Suggested	4.1.2

C.2 Maintenance log

Date	Task	Done by	Findings / parts replaced	Next due

APPENDIX D

Checklists and Operation Log

Checklists distilled from Chapters 1 to 4. SUPPLEMENTARY

D.1 Before first power-on

☐ Instrument unloaded, unpacked and levelled; casters locked (Chapter 2).

☐ Clearances around the chamber respected.

☐ Configuration verified against the order.

☐ Water supply connected; overflow outlet routed to the tray.

☐ Supply voltage, phase and frequency match the nameplate; three-phase sequence correct.

☐ No explosive, combustible or corrosive substances in the chamber.

D.2 Before each test

☐ Chamber clean and dry; door closes properly.

☐ Samples arranged evenly, not blocking air flow, within the sample load limit.

☐ Water level normal; no alarm on the panel.

☐ Over-temperature protector set about 15 °C above the test temperature.

☐ Test program checked in the program list (segments, loops, TS, wait).

D.3 After each test

☐ Press STOP on the instrument — do not switch off the mains while a test is running.

☐ Allow the chamber to return to a safe temperature before opening the door (above +38 °C or below 0 °C is hazardous).

☐ Remove samples; wipe the chamber if required.

D.4 Operation log

Date	Operator	Program / set-point	Start	End	Alarms / remarks

APPENDIX E

Glossary

Terms and abbreviations used in this manual. SUPPLEMENTARY

Term	Meaning
PV	Process value — the actual measured value (for example, the actual chamber temperature).
SV	Set value — the target or protection value that has been set.
DI	Digital input — the signal point behind each alarm (DI1 to DI10).
SSR	Solid-state relay — switches the heater.
TS	Time signal — programmable ON/OFF action (ACT 1 to 6) tied to a program segment.
Segment	One step of a program with its own temperature, humidity and time.
Fix Value operation	Runs the chamber continuously at one set-point.
Program operation	Runs a sequence of segments, with optional loops and links.
Hot Start / Cold Start	Power-recovery modes: resume at the interrupted segment, or restart from segment 1.
Dry-fire / dry-burn	Heating of the humidifier with insufficient water.
Phase sequence	The order of the three live phases; wrong order triggers DI6.
RH	Relative humidity.