



High and Low Temperature Integrated Machine

(Cooling & Heating Circulator)

Operation Manual

(Please read the instruction carefully before you use the machine)

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1. Product Overview

1.1 Foreword

Thank you for choosing StonyLab High and Low Temperature Integrated Machine. This manual provides detailed information on the installation, operation, and maintenance of the machine. To ensure safe and optimal performance, please read this manual thoroughly before using the machine.

1.2 Safety Guidelines

This section outlines the essential safety guidelines for the installation and operation of the High and Low Temperature Integrated Machine. To ensure the safety of both personnel and equipment, users must thoroughly understand all warning indicators and strictly adhere to the operational procedures. Failure to do so may result in equipment damage or personal injury.

1.2.1 User Qualifications

The operator must have practical experience with the High and Low Temperature Integrated Machine and be thoroughly familiar with the instructions outlined in this manual. In the absence of such experience, operation must be conducted under the supervision of qualified personnel with appropriate technical expertise.

1.2.2 Proper Use

This machine is designed for indoor use and can operate either as a standalone cryogenic bath or in coordination with other equipment to deliver the required temperature conditions for experimental or production processes.

Application examples include:

- Cooling flasks, beakers, and test tubes
- Cooling glass reactors and fermentation tanks
- Use with rotary evaporators, vacuum freeze-dryers, and other cooling needs

1.2.3 Improper Use

Any operation not following the manual's instructions is considered improper use, and any resulting damage will be the user's responsibility. The machine must not be operated under the following conditions:

- In environments containing explosive gases or flammable dust
- Where the power supply fails to meet the specified requirements
- In areas exposed to strong magnetic fields or corrosive substances

1.2.4 Warning Signs

Sign	Meaning
 Danger	"Danger" indicates an extremely hazardous situation that, if not avoided, will result in death or serious injury.
 Warning	"Warning" indicates a hazardous situation that, if not avoided, could result in death or serious injury.
 Caution	"Caution" indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury.
 Be careful of frostbite	Avoid direct contact with surfaces at low temperatures to prevent frostbite.
 Prohibited in the rain	Do not use the device in the rain. Keep it protected from splashing or dripping water.
 Pay attention to high temperature	When the liquid is hot, do not touch or move the container to avoid the risk of burns.
 Beware of fire	The machine contains a heating device. Do not leave it unattended during operation.
  Note	Wear appropriate protective gear to reduce the risk of personal injury.
Prompt	"Prompt" indicates a situation that may result in equipment damage if not addressed.

1.2.5 Equipment-Related Hazards

Please note the following safety tips:

 Note	Do not use in explosive gas environment or explosive dust environment
 Prohibited in the rain	Avoid using in outdoor environments. Exposure to rain or splashing water may cause electrical leakage, leading to serious injury or fatal accidents.
 Warning	Ensure the power supply matches the specifications listed on the equipment nameplate. Implement equipotential bonding for the equipment, and do not remove the internal grounding wire. Before opening the equipment casing for maintenance or repairs, disconnect the power supply and wait 5 seconds to allow any residual voltage to dissipate to a safe level to avoid electric shock. Do not operate the equipment if the casing is not properly installed to prevent electric shock. In case of refrigerant leakage, follow the procedures outlined in GB/T16483-2008 "Safety Data Sheet for Chemical Products." Large refrigerant leaks may pose a risk of anesthesia or suffocation for personnel on site. If the refrigerant level is confirmed to be insufficient, stop using the equipment and have a professional replenish the refrigerant.
 Note	If any abnormalities occur during equipment operation, first disconnect the power supply and then proceed with troubleshooting. Contact professional maintenance personnel as needed. When cleaning or performing maintenance, ensure proper safety measures, including wearing protective gloves to avoid injury from the condenser fins. Refrigerant Discharge: To prevent injury from refrigerant discharge, it is recommended to perform the discharge within the safe temperature range of 5-40°C.
 Be careful of frostbite	The liquid outlet, return pipeline, and valve may drop to extremely low temperatures. Please exercise caution to avoid frostbite.
 Pay attention to	Keep a safe distance from rotating parts to prevent potential injuries.

Prompt	Avoid using the device in high-temperature or humid environments, as this may negatively impact its normal operation and shorten its service life. Regularly clean the condenser to maintain the equipment's cooling efficiency. A dirty condenser can reduce cooling capacity and increase power consumption. Ensure the area around the equipment has proper ventilation, and leave at least 0.7m of space around it, avoiding any nearby obstructions. Refrigerant Selection: Choose the appropriate refrigerant based on the required temperature range and the materials used in the equipment's components to ensure optimal performance.
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1.2.6 Other Hazards

 Warning	The presence of corrosive substances such as acid or alkali vapors near the equipment can damage its insulation and compromise the performance and lifespan of components. The used coolant should not come into contact with food, medicine, or tobacco products to prevent potential harm to individuals.
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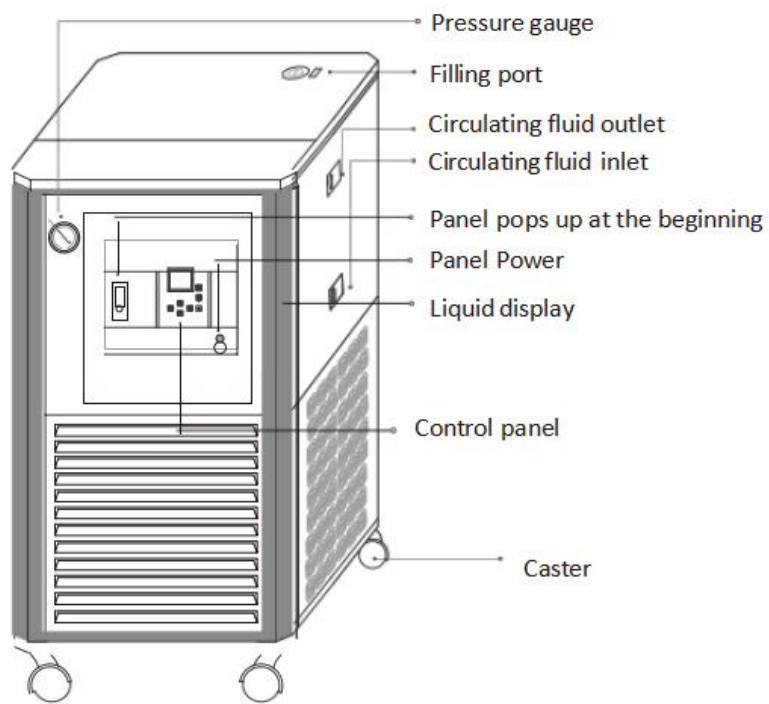
1.2.7 Security Measures

	When operating this equipment, always wear appropriate personal protective equipment (PPE), including safety glasses, gloves, and protective clothing.
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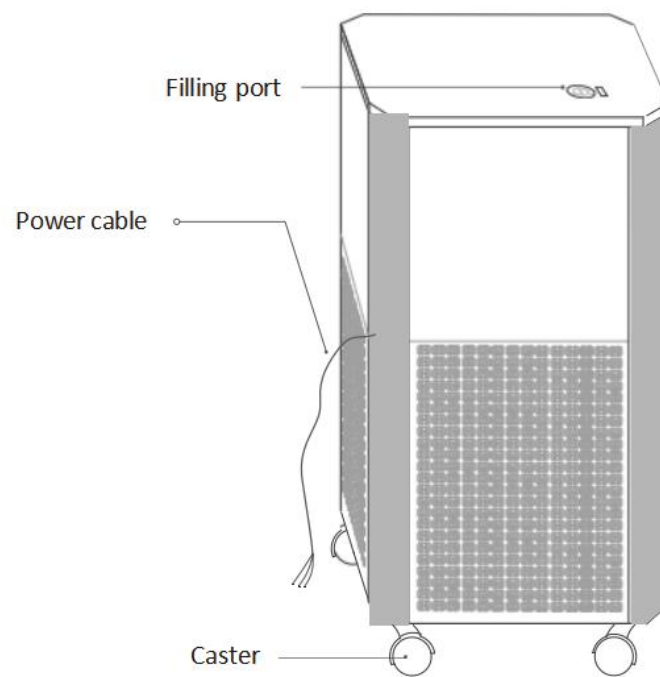
1.3 Equipment Introduction

The entire liquid circulation system of the high and low temperature integrated machine operates in a closed loop and includes an expansion container. This container is thermally insulated from the liquid circulation, meaning it doesn't directly participate in the circulation process but is mechanically connected. Regardless of whether the circulation temperature is high or low, the medium in the expansion container remains below 60°C. The closed system prevents water vapor absorption at low temperatures and oil mist formation at high temperatures. The thermal oil used has a broad operating temperature range, making it suitable for equipment like glass reactors and stainless steel jacketed reaction vessels.

1.4 Device Configuration



Front figure 1.4.1



Back figure 1.4.2

1.5 Control Panel Description

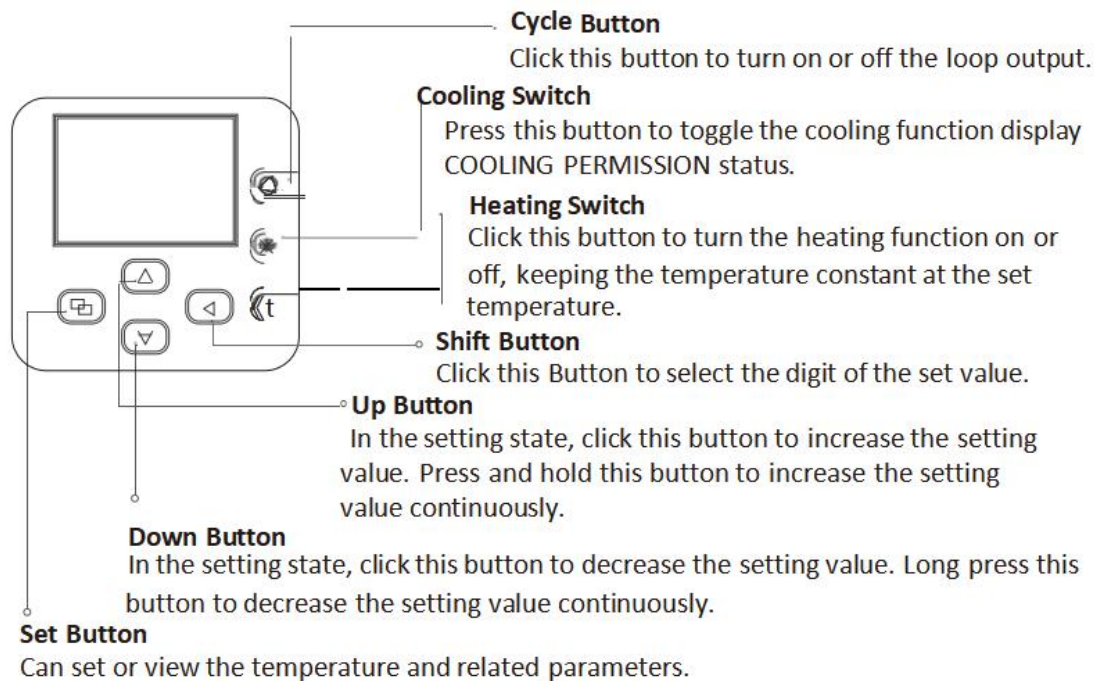


Figure 1.5.1

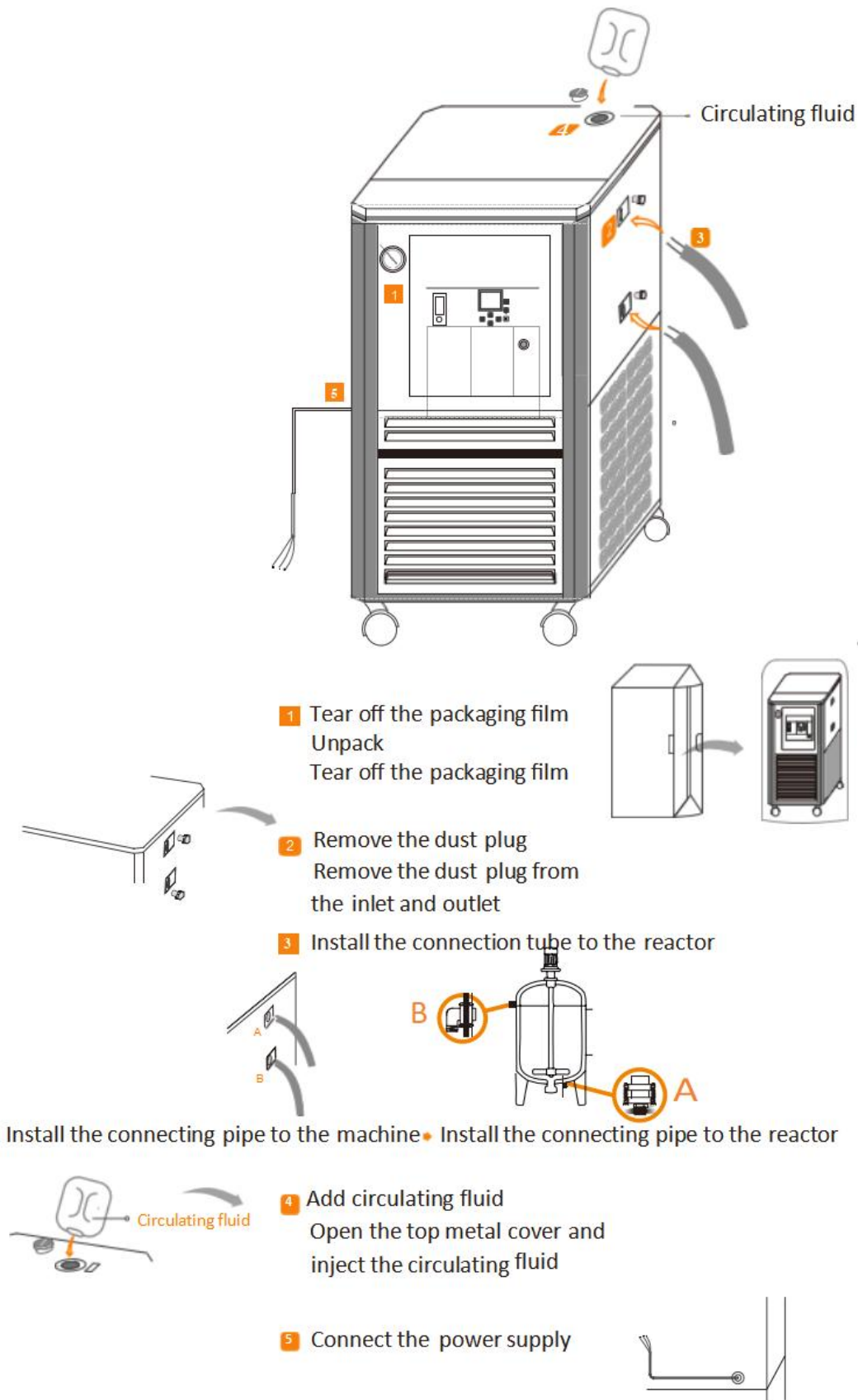
2. Unpacking and Installation

2.1 Unpacking

- (1) Open the outer packaging and carefully read the product instruction manual. Check the packing list to verify that all components are included and the device is undamaged.
- (2) Place the equipment on a stable surface and leave it for at least 12 hours before turning it on and performing any setup or adjustments.
- (3) Ensure proper ventilation and maintain an ambient temperature below 35°C. Note: Do not block the vents on the device under any circumstances.
- (4) Wrap PTFE tape clockwise around the threaded valve interface and securely tighten it to the refrigerant inlet and outlet of the equipment.
- (5) For external circulation, connect the cooling equipment to the inlet and outlet valve interfaces using appropriate hoses.
- (6) Following the installation schematic, connect the circulation system piping. Place the refrigeration unit and refrigerant buffer tank on a suitable concrete foundation, level the equipment, and secure it in place.
- (7) If any liquid spills on the device, wipe it clean and ensure that all components are in

proper condition before using it.

2.2 Installation



3. Operation

3.1 Heat-Transfer Oil Medium

3.1.1 Recommended Heat Transfer Oil

- This equipment does not come with heat transfer oil; it must be purchased separately. We recommend using dimethyl silicone oil with a viscosity of 10–50 cSt or lower. Alternatively, you may consult a professional heat transfer oil supplier based on your specific temperature requirements.

3.1.2 Testing Thermal Oil in Use

- Thermal oil can be used for an extended period within the recommended temperature range.
- To maintain the long-term performance of thermal oil, it is important to conduct regular tests to assess the condition of the oil system.
- Over time, especially at high temperatures, the quality of thermal oil can gradually degrade. For systems operating continuously at the highest temperature, it is recommended to sample and analyze the oil at least once a year.
- A 0.5-liter sample is required for testing and analysis. The sample should be representative of the oil in the entire system. After collecting the sample, cool it to room temperature, place it in a clean container, and label it with the factory name, address, sampling date, and oil brand. Seal the container and send it for analysis.

The analysis of thermal oil is typically based on 4 key indicators:

- **Viscosity:** A change in viscosity indicates contamination, thermal cracking, or oxidative degradation. If the change exceeds 15%, attention is required.
- **Flash Point:** Changes in flash point indicate the formation of low-boiling-point substances. If the change exceeds 20%, corrective action should be considered.
- **Acid Value:** An increased acid value indicates pollution or oxidation in the system. If the acid value reaches 0.5, attention should be paid.
- **Carbon Residue:** An increase in carbon residue indicates contamination, corrosion, oxidation, or thermal decomposition. If the value exceeds 0.1% (m %), corrective measures are needed.

If all indicators are within the acceptable range, the thermal oil is in good condition. If one or more indicators exceed the range, consider replacing the thermal oil to restore optimal performance.

3.1.3 Safe Use of Thermal Oil

While thermal oil has a high boiling and flash point, it is still flammable and should be handled with care. Improper use can lead to fires, typically caused by leaks. There are four common causes of thermal oil fires:

- **Insulation Zone Fire:** The most frequent cause of fire in thermal oil systems. Leaks at flanges or instruments penetrate the insulation, and in the presence of air, the oil gradually oxidizes, causing the insulation to ignite.
- **Pipeline Leakage or Burst:** When thermal oil leaks or bursts into a hot flame zone, it can catch fire.
- **Flash Point Fire:** When the oil is exposed to temperatures above its minimum flash point, combined with air and an ignition source, it can cause a fire.
- **Process Material Fire:** If thermal oil leaks into the heating system, it can interact with oxidizing process materials, resulting in fire.

In gas-phase systems, leaked thermal oil vapor may form an aerosol mist, which can lead to explosive combustion when exposed to an open flame. To prevent fires, it is essential to maintain and repair the system to avoid leaks.

3.2 Power Connection

The power supply should be connected according to the equipment's specifications and meet the following conditions:

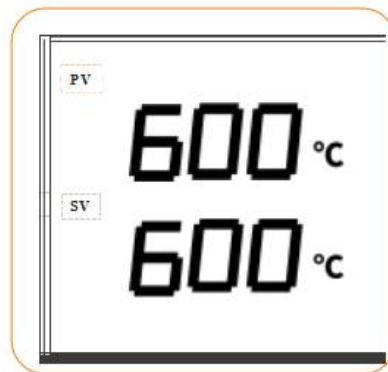
3.2.1 The power supply must be properly grounded.

- For equipment using a single-phase power supply, the user must provide a single-phase, two-wire system (L, N, PE).
- For equipment using a three-phase power supply, the user must provide a three-phase, four-wire system (L1, L2, L3, N, PE).

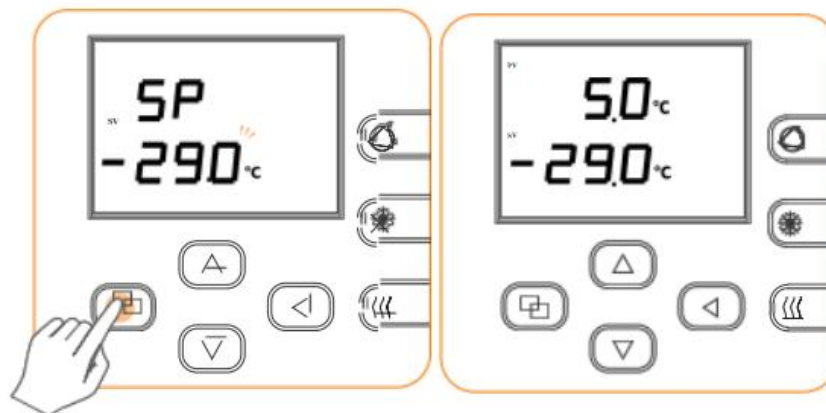
3.2.2 The phase sequence protector for three-phase systems must match the requirements of the low-temperature coolant circulation pump. If not, the machine will not start. In this case, simply swap any two phase lines to correct the connection.

Note: Improper power connection as outlined in section 3.2 may result in electric shock or equipment damage, and the user will be responsible for any consequences.

3.3 Control Panel Operation

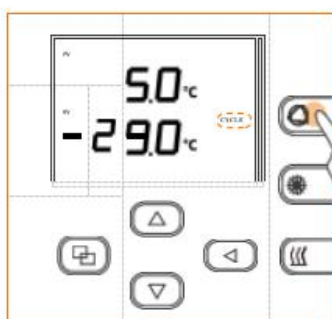


- 1 The upper row of the controller display shows the "Temperature Measurement Value," while the lower row shows the "Temperature Setting Value" (SV) for approximately 3 seconds before transitioning to the normal display mode.

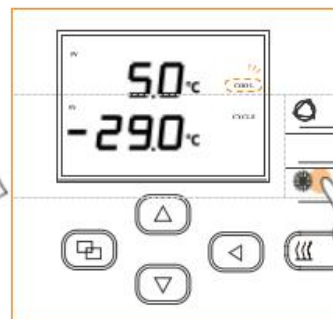


- 2 Press the "Set" button to enter the temperature setting mode. The upper row of the display will show the prompt "SP," and the lower row (SV) will display the current temperature set value. Use the UP, DOWN, and SHIFT buttons (to move the flashing digit) to adjust the value to your desired setting. After making the changes, press the "Set" button again to exit the setting mode, and the new value will be automatically saved.

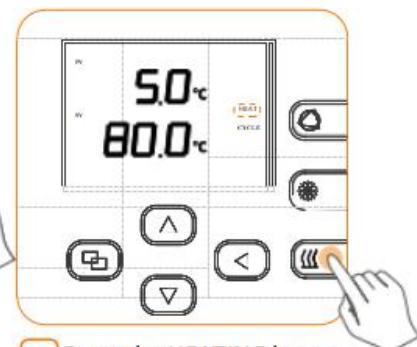
Note: If no buttons are pressed within 1 minute while in the setting mode, the controller will automatically return to the normal display state, and any changes made will not be saved.



- 3 Press the CYCLE button. The display window will indicate "CYCLE."



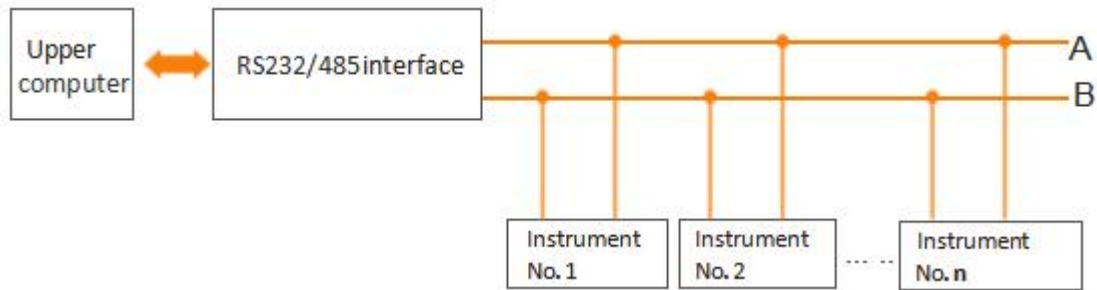
- 4 Press the COOL button. The display window will flash "COOL" for 3-4 minutes before the system starts operating.



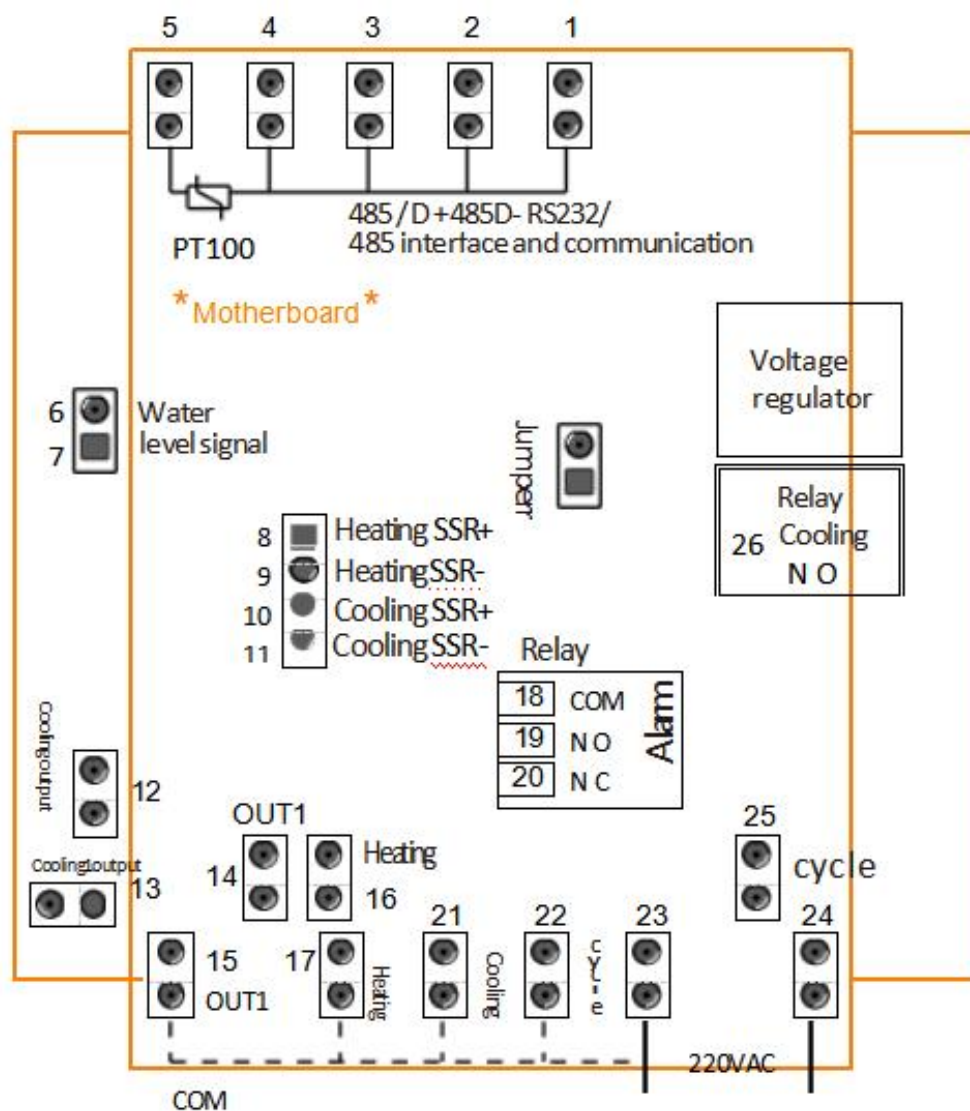
- 5 Press the HEATING button. The display window will show "CT HEATING," indicating that the system is maintaining the temperature at the set level.

3.4 Communication Connection

(Allows for simultaneous connection of up to 32 controllers of this series)



3.5 Wiring Diagram



3.6 Error Display



Temperature sensor is faulty or out of range. The buzzer sounds and the PV window flashes "-E0-".



When the over-temperature alarm occurs, the buzzer will sound and the "ALM" alarm lamp will be on, and the PV window will flash "-E1-".



When the temperature is low, the buzzer beeps and the "ALM" alarm light is on, and the PV window flashes "-E2-".

- When the buzzer sounds, press the decrease button to mute it. In the setting mode, if no button is pressed for 1 minute, the controller will automatically revert to the normal display state, and any unsaved settings will be discarded.

4. Maintenance and Management

To ensure proper operation and extend the service life of the equipment, regular maintenance and management are essential. Before starting maintenance, make sure to disconnect the power supply, gather necessary tools and materials, and follow the instructions in this manual. Failure to do so may result in electric shock or equipment damage.

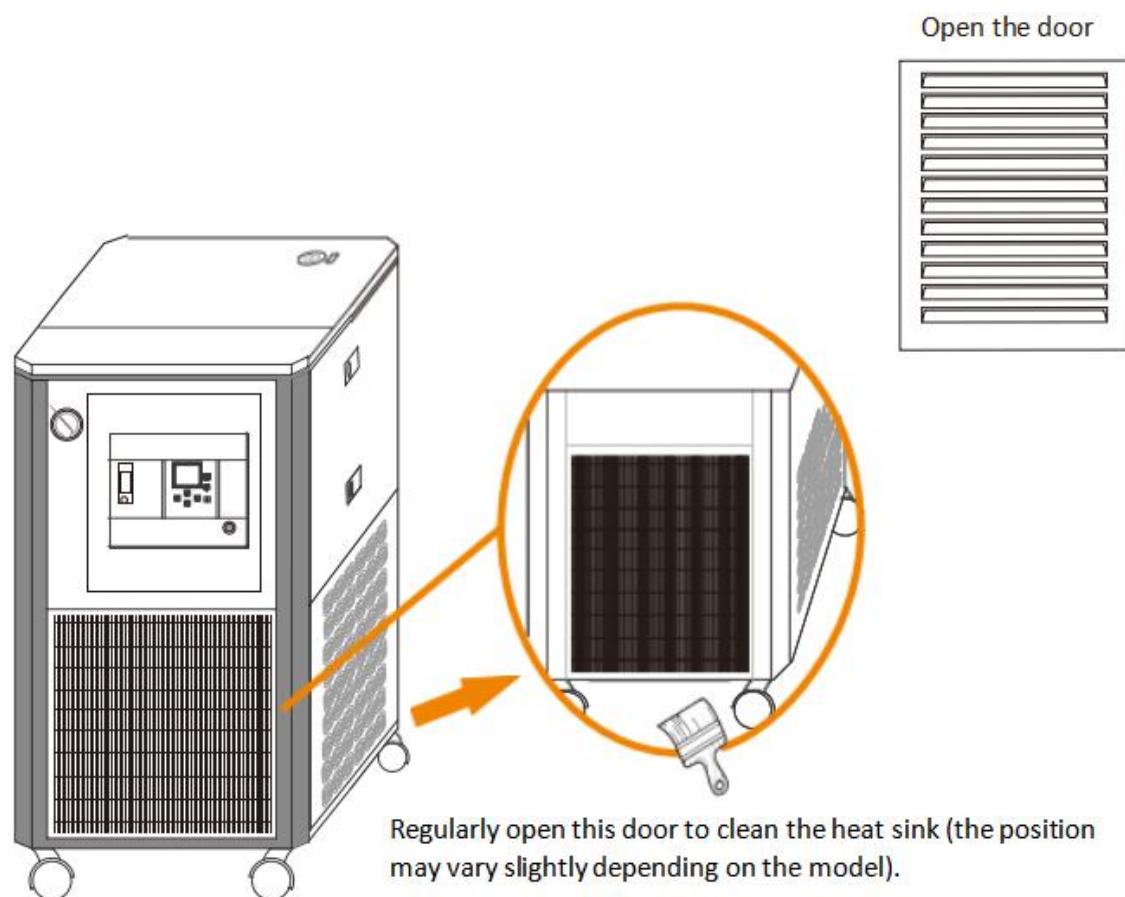
4.1 Management

- Regularly clean the surface of the machine with a soft cloth to keep it free of dust. Do not rinse it with water directly!
- Liquids should only be used in the circulation system and must not enter other parts of the high and low-temperature integrated machine.
- Avoid using brushes, abrasive powders, acids, gasoline, or other solvents to clean the surface to prevent damage to the protective layer.
- After cleaning, ensure the liquid storage tank is thoroughly dried to prevent refrigerant contamination during the next use.
- Regularly inspect the connecting pipes, and if any signs of aging or damage are found, replace them promptly with components that match the original specifications.

4.2 Cooling System Maintenance

To maintain optimal cooling performance, regularly clean the heat sink by following these steps:

- Turn off the device.
- Open the door.
- Clean the dust from the heat sink. It is recommended to use a vacuum cleaner or a soft brush, following the direction of the fins.



4.3 Maintenance Requirements

- (1) Equipment maintenance must be carried out by professional technicians or personnel authorized by our company.
- (2) If the equipment requires factory repair, please contact our company for assistance.
- (3) Before returning the equipment to the factory for repair:
 - The user should release all refrigerant from the circulation system.
 - Complete the fault information record in detail and provide it to the company.
 - Ensure the equipment is securely packaged to prevent damage from vibrations or collisions during transportation.

5. Common Fault Analysis, Causes, and Solutions

Fault Symptoms	Possible Causes	Solutions
NC display is not visible	No power	Check if the power cord is properly connected or if it is loose.

Fault Symptoms	Possible Causes	Solutions
PV displays " ... "	Defective sensor	Repair or replace the sensor.
Not cooling	Check if the thermostat is correctly set, if the compressor is working, if the AC contractor is damaged, or if there is a significant refrigerant leak.	Reset thermostat parameters, repair or replace the AC contractor, check for leaks, and refill the refrigerant after repair.
Cooling slowly	Check if the refrigerant is too thick, if the condenser fan is functioning properly, if the condenser screen is clogged with dust, if refrigerant is leaking, or if the system is blocked by oil or ice.	Replace refrigerant (freezing point < -85°C, boiling point > 50°C). Repair or replace the motor, find and fix any leaks, thoroughly clean the condenser filter, and check the oil separator, capillary tube, filter drier, or expansion valve for issues. Repair or replace as necessary.
Excessive noise	Loose components inside the machine.	Re-tighten the fixing screws of the compressor, fan, condenser, etc.
No circulation	Issue with the circulating pump system.	Clear blockages, repair, or replace the circulating pump.

6. Important Notes

Please carefully read the following notes before using the instrument:

- (1) Upon first use, after opening the wooden case, install the inlet and outlet valves on the marked positions (inlet and outlet) of the machine. Ensure the valve is aligned with the medium's flow direction, as indicated.
- (2) Verify that the phase is correct when connecting the power for the first time.
- (3) Always fully disconnect the power supply before opening the casing.
- (4) In closed refrigeration systems with sealed refrigerants, only professional technicians should service the refrigeration system due to the presence of high-pressure gas.
- (5) After refilling, ensure the liquid level is at the safe position as indicated by the equipment's oil level marker.
- (6) Ensure there is enough space around the high and low-temperature integrated machine during operation.
- (7) The inlet and outlet positions of the equipment must have safety protection devices.
- (8) Perform regular maintenance on the equipment. Inspect the pipelines and wiring monthly, and monitor the condition of the thermal oil.
- (9) Equipment placement:
 - Place the product in a well-ventilated, dry, and pollution-free environment.

- Maintain at least 85 cm of clearance from the isolation barrier.
 - Ensure there are no obstructions or blockages near the ventilation holes.
- (10) Monitor the thermal oil for discoloration, and contact the manufacturer if this occurs.
- (11) Do not add a booster pump to the system.
- (12) Aside from the plug provided by the factory, other plugs are not allowed. Use an air switch for the power supply.

7. Warranty Statement

- (1) **Free Service Period:** The product is eligible for free repairs within 12 months from the date of purchase if the failure is due to quality issues.
- (2) **Exclusions from Free Service:** During the warranty period, the following conditions will void the right to free service:
- No warranty card or proof of purchase.
 - Damage caused by improper use.
 - Failure to install or use according to the instruction manual and equipment guidelines.
 - Damage due to transportation, movement, falls, or impacts.
 - Damage caused by unauthorized modifications to the product.
 - Damage caused by force majeure events such as fire, earthquakes, floods, storms, or abnormal power supply.
 - Regular wear, aging, or replacement of consumable parts.
- (3) **Paid Service:** After the free service period or for repairs outside the warranty coverage, a maintenance fee will apply.
- (4) **Contact:** If there are any issues with the equipment, promptly contact after-sales service personnel.

This instruction manual is subject to change without prior notice.