DW-5210A Rotary Evaporator

User Manual

DRAWELL
Artist of Science

Please read operating manual before installation and operation.

Drawell International Technology Limited

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Safety notice

●Please connect the power supply correctly (see technical parameters for details) and ensure a good grounding!

●When working, the cooling water pipeline and the suction pipeline should be kept unobstructed, and there should be no dead bends.

●When installing the glass parts in the pipeline, they should be installed by rotating forward to avoid damaging the glass parts.

●When using flammable samples or organic solvents, please do not spill the solution, keep away from open flames and prepare emergency measures.

●After cleaning the stubborn stains on the glass components, wipe them with a rag, do not knock the glass with hard objects.

1. Features

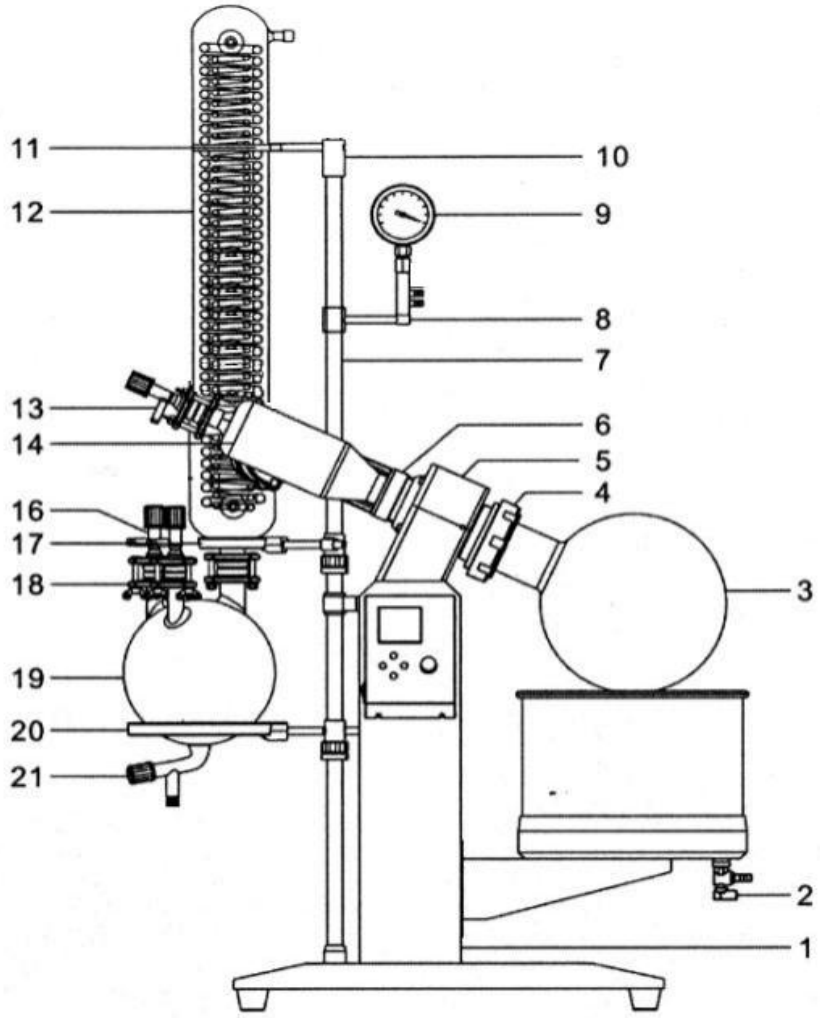
- series of large-scale rotary evaporators are mainly used for small-scale, pilot-scale and production in the fields of biology, medicine, chemical industry, and food. It has a large-capacity, large-caliber rotary evaporating flask, which is placed in a water bath and heated while rotating to make the solution diffuse and evaporate efficiently. The product can be combined with circulating water multi-purpose vacuum pumps, diaphragm vacuum pumps, low-temperature circulation (vacuum) pumps, circulating coolers, constant temperature circulators, low-temperature coolant circulation pumps and other supporting system devices.
- Teflon (PTFE) and fluorine rubber dual rotary seal, patented technology to ensure high vacuum.
- The temperature control system is accurate and reliable.
- It can be collected continuously without affecting the system vacuum and solution distillation.
- PTFE discharge valve, corrosion-resistant and pollution-free.
- There are two types: conventional and explosion-proof, which can be selected according to the experimental environment.
- Equipped with a transparent protective cover, temperature stability, heat preservation, splash-proof safety, environmental protection and reliable.
- The design is equipped with a vacuum meter and valve (to prevent the liquid in the vacuum pump from backwashing into the glass container of the rotary evaporator, so that the experiment is successful at one time).

2. Technical parameters

model	5210A
The best environment temperature (℃)	5～35
Working power supply (V/Hz)	AC220/50
Host speed regulation	Digital display DC stepless speed regulation
Main engine speed (rpm)	10～130
Temperature control (℃)	Digital display temperature control, water bath: normal temperature -99 degrees; ±1℃
Maximum vacuum (Pa)	399.9 (below 3mmHg)
Rotating bottle (L)	10 Flange mouth Ø95
Recycling bottle (L)	5
Condenser	Vertical, one-piece condenser, high-efficiency three-return condenser
Bath pot material	stainless steel
Bath size (mm)	Φ350×220
Lifting function	Electric lift
Lifting stroke (mm)	0～160
Heating power (kW)	3.5
Whole machine power (kW)	3.8
Dimensions (cm)	106*55*210

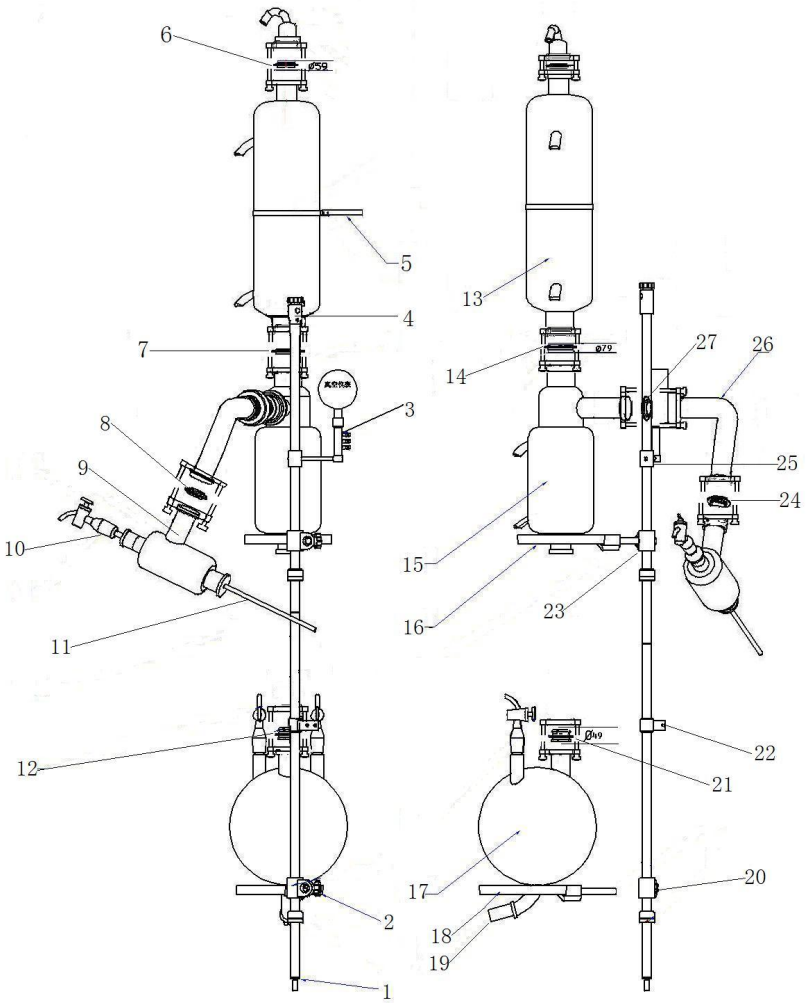
3. Description of main components

3.1 DW-5210A Whole machine diagram



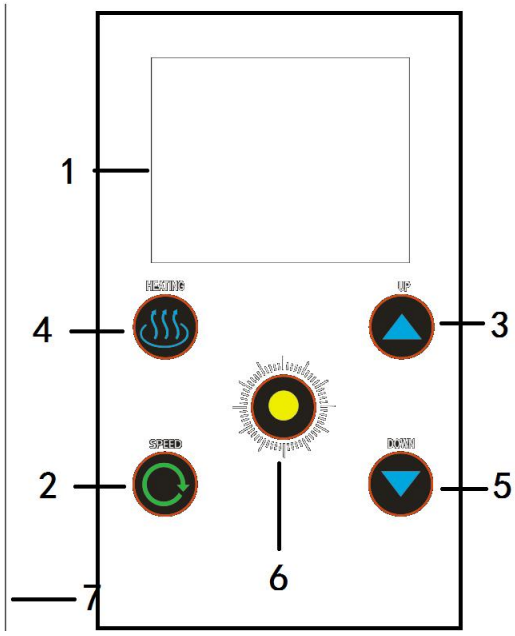
1. Host + water bath	2. Drain valve	3. Rotating bottle 20L
4. Rotate bottle lock nut	5. Rotating mechanism	6. Tee bottle lock nut
7. Vacuum meter holder	8. Vacuum gauge	9. Pole
10. Condenser clamp holder	11. Condenser clamp	12. Main condenser
13. 40 Dosing valve	14. Tee bottle	15. 0
16. Air release valve	17. Condenser tray	18. Connecting flange
19. Recycled bottle 10L	20. Recycled bottle tray	21. 15 Valve

4. Schematic diagram of glass assembly



1. Pole 2. Cross clamp 3. Vacuum gauge holder 4. Condenser clamp holder
5. Silicone rubber wrap 6. Flange gasket 7. Flange gasket
8. Flange gasket 9. Tee bottle 10. Feeding piston
11. PTFE tube 12. Flange gasket 13. Main condenser
14. Flange gasket 15. Sub condenser 16. Condenser tray
17. Recycle bottle 18. Recycle bottle tray 19. Discharge valve
20. Cross clamp 21. Flange gasket 22. Pole joint 23. Cross clamp
24. Flange gasket 25. Cross clamp 26. Glass elbow 27. Flange gasket

5.Panel description



XD-5220A

1. LCD screen

2. “ ” button, click this button to enable or disable the rotation function

3. “ ” button, click this button to make the bath rise intermittently, press this button for 3 seconds to make the bath rise continuously

4. Click this “ ” button to start or close the heating function

5. Click this “ ” button to make the bathtub drop intermittently, press and hold this button for 3 seconds to make the bathtub drop continuously

6. Coding switch “ ” : Click this button to set the temperature and speed value; press this button for more than 3 seconds, when the upper part of the display shows the prompt "Lc" and the lower part shows "00", it will enter the secondary control of the system Parameter setting status.

Note: The prompt "Lc" is the protection control character set by the secondary control parameter of the system.

7. Power switch

6.Ready to install

1.Open the packing box and check whether the parts are complete according to the packing list. If there are missing parts, please contact our company.

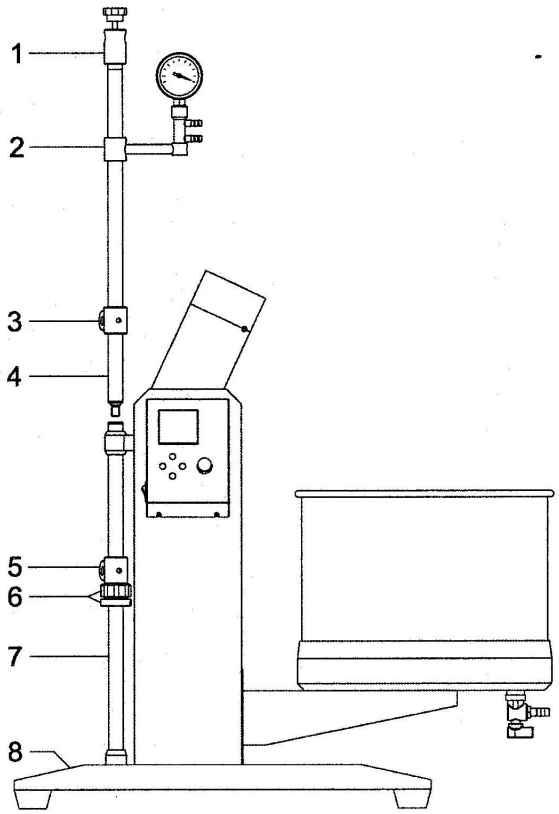
2.Before assembling, remove the residue on the glass and keep the glass contact surface clean; apply vacuum grease on both sides of the sealing ring before installing the sealing ring.

3.Prepare the tools needed for installation, such as hexagonal wrench and screwdriver.

7.Installation Notes

7.1 **Installation of pole**

The upper pole rotates in a clockwise direction, and the lower pole is screwed together (as shown in the figure below), and then the cross clamp, the vacuum gauge holder and the condenser clamp holder are installed on the pole in turn.



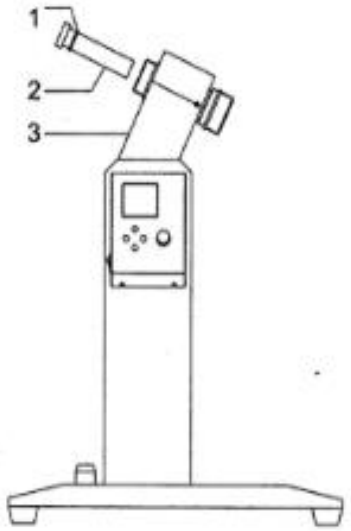
1. Condenser clamp holder 2. Vacuum meter holder 3/5. Cross clamp

4. Upper pole 6. Adjust the screw nut 7. Lower upright

8. Base

7.2 **Installation of rotating shaft**

Put the O-ring on the glass rotating shaft, then insert the rotating shaft into the machine head, and make the O-ring on the glass rotating shaft close to the machine head shell. (As shown below)



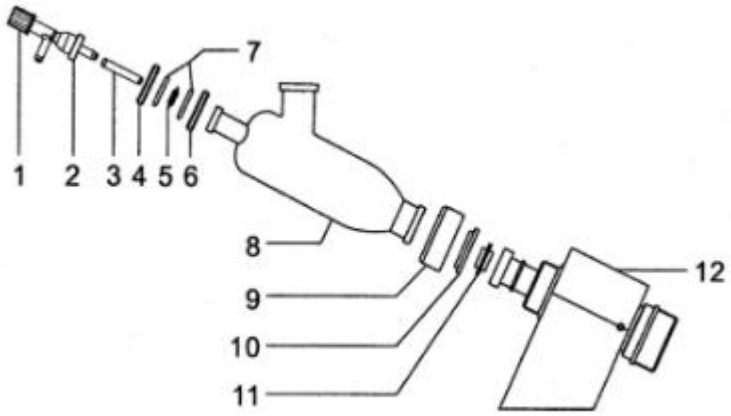
1. O-ring
2. Glass rotation axis
3. Rotating mechanism

Install the O-ring (1) on the glass rotating shaft (2), and then install the glass rotating shaft of the installed O-ring into the rotating mechanism (3) from the left, and it is required to make the O on the glass rotating shaft The ring is close to the housing of the rotating mechanism.

7.3 **Installation of Tee Bottle**

Put the three-way bottle fixing nut on the lower port diameter of the three-way bottle, then put the fixing nut retaining ring on the neck of the lower end of the three-way bottle, insert the flange sealing gasket into the caliber of the three-way bottle, and finally install the flange seal Insert the three-way bottle of the washer into the upper inner opening of the glass rotating shaft, and finally tighten the fixing nut of the three-way bottle properly. (As shown below)

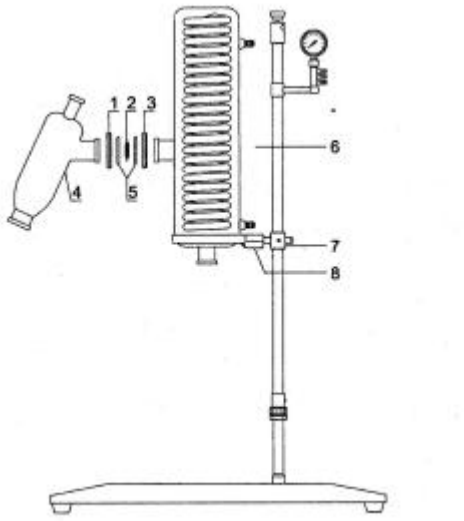
Install the three-way bottle lock nut (9) on the lower port of the three-way bottle (8), install the three-way bottle nut retaining ring (10) on the bottom neck of the three-way bottle (8), and install the flange sealing gasket (11)) Place the three-way bottle in the proper position in the mouth of the three-way bottle, then insert the three-way bottle with flange sealing gasket into the upper end interface of the glass rotating shaft, and tighten the locking nut of the three-way bottle properly.



1.15#valve
2. 40# feeding valve
3. Feeding tube
4.40#Connecting flange
5.40# flange gasket
6.40#Connecting flange
7.40# flange retaining ring
8. Tee bottle
9. Tee bottle lock nut
10. Tee bottle nut retaining ring
11.70# flange gasket
12. Rotating mechanism

7.3-1 **Installation of condenser and three-way bottle**

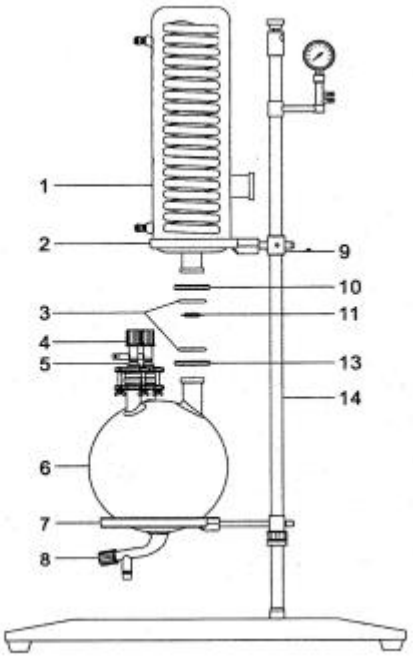
Place the condenser on the tray (8), adjust the height so that the interface on the side of the condenser is on the same level as the interface of the three-way bottle (4), re-tighten the screws to fix the tray (8) and the cross clamp (7). Then connect the flange (3) Install on the root of the condenser (6) interface, and install the flange retaining ring (5) on the condenser interface neck. The connection between the connecting flange (1), flange retaining ring (5) and the three-way bottle interface is the same as above. Then put the flange sealing gasket (2) in the interface of the three-way bottle or condenser, and fix it.



1.60#Connecting flange
2.60# flange sealing gasket
3.60#Connecting flange
4. Tee bottle
5.60# flange retaining ring
6. Condenser
7. Cross clip
8. Tray

7.4 **Installation of recycled bottles**

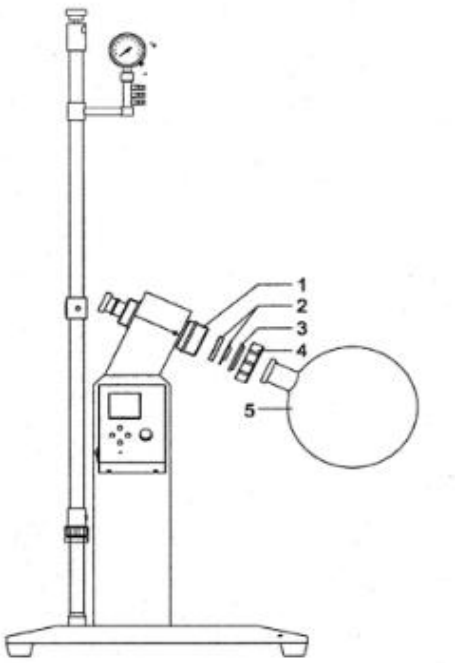
Put the recycling bottle (6) on the tray (7) and raise it to an appropriate height to facilitate the installation of the following components, and fix it with a cross clamp (9). Install the connecting flange (13) on the root of the recovery bottle interface, and install the flange retaining ring (3) on the recovery bottle interface neck. Put the automatic switching valve (12) into the middle hole of the flange sealing gasket (11) and install it into the mouth of the recovery bottle. (Note: The plane of the automatic switching valve faces the recovery bottle, and it should not be reversed.) Then, put the connecting flange (10) and flange retaining ring (3) on the lower interface of the condenser (1) one after another. Readjust the height of the recycling bottle tray so that the other half of the flange sealing gasket with the automatic switching valve is installed into the lower interface of the condenser, and the cross clamp is tightened to fix it.



1. Condenser
2. Condenser tray
3.50# flange retaining ring
4.15# flange retaining ring
5. Air release valve
6. Recycle bottles
7. Recycle bottle tray
8.15# flange retaining ring
9. Cross clip
10.50# flange
11.50# flange sealing gasket
12.0
13.50# flange
14. Pole

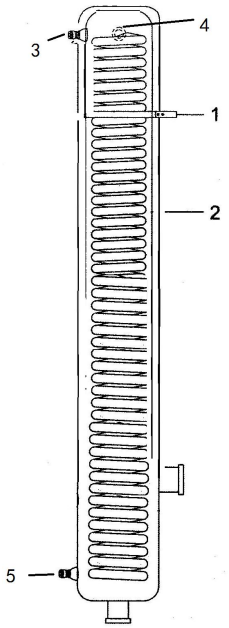
7.5 **Installation of glass rotating bottle**

Put the Teflon seal ring on the installed glass rotating shaft as shown in the figure, then put the rotating bottle fixing nut on the root of the rotating bottle, and the retaining ring on the neck of the rotating bottle. Positioning of the rotating bottle: Insert the inner hexagonal wrench into the hole of the machine head base (left-biased direction), turn the rotating shaft to make the hole on the shaft coincide with the hole of the machine base, insert the inner hexagonal wrench into a section so that the rotating shaft cannot After turning again, finally put the rotating bottle equipped with fixed nut and retaining ring on the neck of the glass rotating shaft, tighten the rotating bottle fixed nut, and rotate the rotating shaft to make the rotation stable and consistent with the center of the rotating shaft.



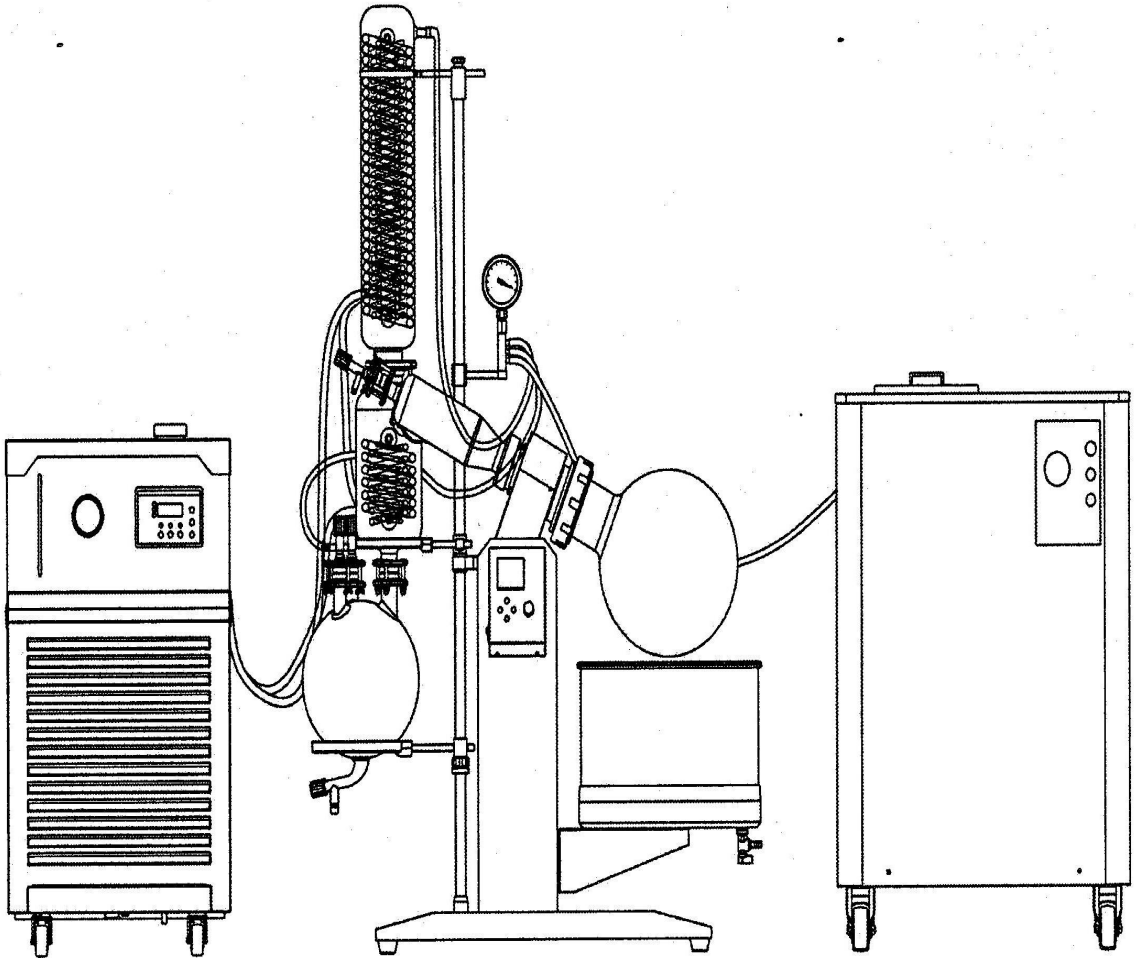
1. Glass rotation axis
2. Teflon sealing ring
3. Rotating bottle nut retaining ring
4. Rotate bottle lock nut
5. Spin the bottle

7.6 Condenser schematic



1. Condenser tube bracket
2. Condenser
3. Cooling water outlet
4. Vacuum interface
5. Cooling water inlet

8.Pipeline connection



Cryogenic circulation pump **Vacuum pump**

9.operating

9.1 **Feeding method**

First pump the rotary evaporator to a negative pressure state, connect the feeding valve with the added sample with a hose, open the feeding valve valve, the sample will be directly pumped into the rotating bottle, close the feeding valve valve after the feeding is completed, and adjust Rotate the height of the bottle to place it in the water bath.

9.2 **Operating equipment**

9.2.1 **panel:**

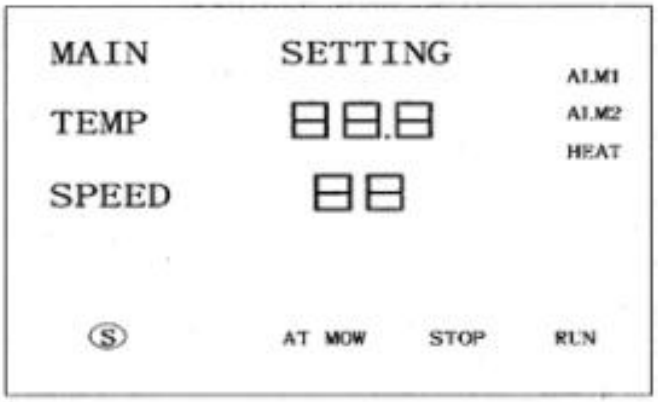
Preparation and parameter setting

(1) Inject pure water into the water bath until the water surface submerges about 50% of the volume of the rotating bottle.

Note: In the process of filling water in the water bath, it is advisable to speed up first and then slow down to prevent overflow!

(2) Turn on the power switch, the temperature display window displays: CC2P", the speed display window displays "S1.1", and all the identifiers on the LCD panel are lit for 4 seconds and enter the normal display state.

(3) Temperature and speed setting



a) Click the "coding switch" knob once, the temperature display window flashes to display the temperature setting value, click again: the "coding switch" knob can modify the setting value (turn it again to increase, turn left to decrease). After the required parameter setting is completed, press the "coding switch" knob, the setting value is automatically saved, and the controller exits the setting state.

b) Press the "“♨”" key to start the heating control, and the "Ⓢ" indicator lights up; when there is heating output, the "HEAT" indicator lights up. Press the "“♨”" button again, the heating is stopped, and the "Ⓢ" indicator goes out.

c) Press the "" button to start the speed control, the rotating bottle rotates, and the "RUN" indicator lights up.

Press the "" key again, the rotating bottle stops rotating, and the "STOP" identifier lights up.

d) Press the "" key, the bath will continue to rise, press the "" key for more than 3 seconds, the bath will continue to rise.

5）Press the "" button, the bath will continue to descend, press the "" button for more than 3 seconds, the bath will continue to descend.

6）System self-tuning

Click the "" button to start heating control. In the non-setting state, press the "coding switch" knob for more than 3 seconds, the temperature window will display the password prompt "Lc", and the speed window will display the corresponding password value. Turn the "coding switch" knob to change the password value to "58": click the "coding switch" knob again to enter the auto-tuning rotation state, the temperature window displays "AT", and the speed window displays its corresponding state value. Turn the “coding switch” knob to modify the AT parameter. When the parameter is set to “1”, press the “coding switch” knob to enter the auto-tuning state, and the “AT NOW” indicator lights up; after the auto-tuning is over, AT When the parameter automatically becomes "0", at this time, press the "coding switch" knob to cancel the auto-tuning.

When the system temperature control effect is not ideal, the user can start the system control self-tuning function. Note: There may be large fluctuations in temperature during the auto-tuning process of system control parameters, and the user should pay attention to it before enabling the auto-tuning function. When an over-temperature alarm occurs during the system's self-tuning process, the "ALM1" indicator will light up, and the heating protection relay will act and automatically disconnect the heating circuit power supply.

4.3 Open circulation cooler

Turn on the circulating cooler.

4.4 Turn on the vacuum pump

Turn on the vacuum pump

4.5 Turn on the heating unit

Click the "" button on the control panel of the evaporator to start the heating control. At this time,the "" indicator lights up; when there is heating output, the "HEAT" indicator lights up.

4.6 Normal operation

After completing the correct installation of each unit according to the above steps, setting the control parameters of the evaporator, and turning on the power of the constituent units in the prescribed order, the evaporator system will begin to operate normally.

9.4 **discharging**

When discharging, directly open the exhaust valve on the recovery bottle to reduce the pressure in the recovery

bottle, and then open the discharge valve to discharge.

9.5 **Downtime**

1. Stop the rotation of the rotating bottle and adjust the lift to make the rotating bottle leave the water bath.
2. Open the feed tube plug to release the internal vacuum.
3. Turn off the pressure reducing device.
4. If you do not continue to add samples, please turn off the cooling water circulation device and water bath together. (*After the concentration is over, the water bath or rotating bottle will not immediately cool down, and it will still be at a high temperature. Be careful of burns!)
5. Removal of the rotating bottle: Use a Phillips screwdriver to insert into the rotating lock hole of the machine head base (left-biased direction) to fix the rotating shaft, use the bottle ejector to loosen the rotating bottle fixing nut, and remove the rotating bottle.

9.6 **Disposal after shutdown**

When not in use for a long time, please turn off the power switch and disconnect the power supply.

10.System self-tuning

During the auto-tuning process, the temperature will have a large overshoot. The user should fully consider this factor before performing system auto-tuning.

Click the "temperature" button to start heating control. In the non-set state, long press the "set" button for 3 seconds, the temperature window displays the password prompt "Lc", and the speed window displays the password value. Change the password value to "58", then click the "Set" button to enter the auto-tuning selection state, the temperature window displays the prompt "AT", and the speed window displays the value. If you modify the value from "0" to "1", click the "Set" button to enter the auto-tuning state, if you modify the value from "1" to "0", click the "Set" button to stop auto-tuning.

If there is an over-temperature alarm during the system self-tuning process, the "ALM1" indicator will light up and the heating alarm relay will be automatically disconnected.

11.Repair and maintenance

1. Please turn off the power switch before maintenance, and disconnect the power cord from the power supply.
2. When cleaning, please wipe with a soft cloth wrung out of water, and use neutral detergent for dirt that is not easy to remove. After using detergent, wipe it clean with a cloth.
3. The maintenance of internal electric control components and heating components must be performed by professionals or professional electricians.
4. When cleaning the site, do not directly pour water on the product or use abrasive powder, thinner, petroleum, kerosene, acidic substances and similar items, otherwise it will cause electric shock and other accidents.

12.After-sales service

The user uses it under normal conditions, and the product fails due to manufacturing quality within 12 months from the date of shipment, and the company is responsible for free maintenance. The company may charge a fee for damage caused by improper use.

The final interpretation right of this manual belongs to our company. Any changes will not be notified.

13. Trouble phenomenon and troubleshooting

Failure phenomenon	possible reason	Treatment measures
Connect the power, the LCD screen cannot display	The power line is not connected reliably	Check the power line
	The power switch is damaged	Replace the power switch
	Circuit board failure	Please stop using it immediately and contact our company.
The rotation permission identifier "RUN" is on, but the rotating mechanism does not rotate	The rotating motor is malfunctioning	
	Circuit board (X2) is malfunctioning	
The heating control circuit of the relay board X3 has output, but does not heat up	Solid state relay (KF1) failure	Replace solid state relay
	Heating element failure	Replace heating element
	The bath temperature sensor is faulty or improperly wired	Check the sensor and wiring
The temperature display window displays "Er-1", and the ALM1 identifier lights up	The bath over-temperature protection sensor is faulty or improperly wired	Check the sensor and wiring
The temperature display window displays "Er-2", and the ALM1 identifier lights up	The bath over-temperature protection sensor exceeds the protection setting value	Power cycle the instrument
The temperature display window displays "Er-3", and the ALM1 identifier lights up	Power module failure	Remove the rotating bottle and let the instrument run without load. If the fault persists, please stop using it immediately and contact our company.
The speed display window displays "Er-1" and the ALM2 identifier lights up	Motor blocked	
The speed display window displays "Er-2", and the ALM2 identifier lights up	Hall logic error	
The speed display window displays "Er-3", and the ALM2 identifier lights up	Power supply voltage is too low	Check the power supply voltage value
The speed display window displays "Er-4", and the ALM2 identifier lights up	Power supply voltage is too high	
The speed display window displays "Er-5", and the ALM2 identifier lights up	Serial communication failure	Please stop using it immediately and contact our company.
The speed display window displays "Er-6", and the ALM2 identifier lights up	Seal ring wear	Replace the seal
	Internal wheel wear	Please stop using it immediately and contact our company.
	Lack of lubricating oil in the driving	

Abnormal noise	part	
	Motor failure	
Vacuum drop	Worn glass rotating shaft	Replace the glass rotation axis
	Seal ring wear	Replace the seal
	Improper installation of sealing ring (reverse direction)	Reinstall the sealing ring
	The sealing gasket of the gas nozzle for decompression is aging	Replace the gas nozzle sealing gasket
	Vacuum hose aging	Replace the vacuum hose
The lifting unit works abnormally	The circuit board (X3) or the lifting motor is faulty	Please stop using it immediately and contact our company.
	Wear or rust of sliding bearings	

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