StonyLab®

Rotary Evaporator

Operation Manual

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

Content

1. Working Principle and Scope of Application

Laboratory equipment Rotary evaporator is mainly used for continuous distillation of a large number of volatile solvents under reduced pressure conditions. In particular, the reaction product can be isolated and purified by concentrating the extract and distilling the receiving liquid upon chromatographic separation. The basic principle of rotary evaporator is vacuum distillation, that is, under reduced pressure, when the solvent is distilled, the distillation flask in a continuous rotation.

2. Precautions

Safety Warning

Dangerous (may result in serious loss of property or casualties)

1. The instrument must be grounded and away from sources of electromagnetic interference (must not be zero line or middle line for the ground).
2. Please use this product in the laboratory environment, the use and operation of this product must undergo a professional study or training, laboratory safety knowledge, and have some basic knowledge of physics, chemistry, biology, medical and other professional knowledge and related Laboratory skills.
3. Please comply with safety norms, personal safety and accident prevention and other related norms, especially in the vacuum!
4. Do not allow casual access long or cut short instrument power connection.
5. Do not modify this product, do not use for purposes other than the provisions of this product, if modified or for other than the provisions may lead to electric shock or cause equipment failure.
6. This product is non-explosion-proof specifications, do not set in a place of environmental risk, such as the use of dangerous places in the environment, will lead to fire and other accidents; Do not heat solvents under atmospheric pressure.
7. The use of flammable samples or organic solvents, please take full care not to splash spilled solution.
8. The function or performance of the product, the host part need to rotate use in the high temperature water bath, at the same time, there are glass components in this

product, such as improper use of glass caused by the split, will lead to unintended injuries or accidents.

9. Do not disassemble the device. There is voltage or high temperature inside the device. If it is disassembled and dismantled, it will cause personal injury.

 **Warning (may cause property damage or personal injury)**

1. Before use, please confirm the voltage and frequency of the power supply match the requirements of the instrument.
2. The instrument should use a separate power outlet, and confirm the plug, socket grounding good.
3. Do not allow to unplug the power plug under the operation of the instrument does not turn off the power switch.
4. Before use, please carefully check the equipment, accessories, especially glass components are damaged, do not use damaged parts.
5. The instrument is only suitable for the medium that does not react to the energy generated in the process to produce dangerous medium; at the same time, the material to be processed could not react with the energy generated by other ways, such as light to generate danger.
6. In the operation of this product need to wear safety glasses and appropriate protection devices, prohibit the use of non-heat-resistant, fragile and other safety-affecting containers and aids.
7. Shall not be repaired without authorization, commissioned by the company must be repaired by professionals.
8. Please use the correct method and supplies appliances for cleaning and maintenance of this product.

 **Note (may affect the service life of the instrument cause it could not work normally)**

1. The product should be placed in a hard and firm plane, to keep it level.
2. Handling equipment, please hand support instrument base and hold the fuselage together with handling.
3. Water bath should be energized after inject water, not allowed to dry without water.
4. Glass should be hand gently, washed and dried.
5. The use of grinding mouth instrument before installation should be evenly coated with

a small amount of vacuum grease.

6. Expensive solution should be done first simulation test, confirm the instrument is applicable and then transferred to the normal application.
7. The product should be retained around the gap, to ensure that there is enough space above the instrument, the glass components may exceed the height of the instrument;
8. The product must be used under certain conditions of use.
9. To ensure that the instrument does not move due to vibration when opened.
10. To keep the use of the environment clean and dry, away from the heat source, a strong magnetic field, flammable or other similar magnetic products.
11. This product could not invade the liquid, must not move while using, must unplug the power cord when moving or cleaning.
12. After the work, turn off the switch, unplug the power plug.
13. Long-term non-use, please turn off the power switch, and unplug the power plug from the outlet.

3. Structure and Composition

3.1 Rotary Evaporator Outside View

Manual lifting type rotary evaporator outline drawing: (This figure is for reference only, subject to the real thing!)

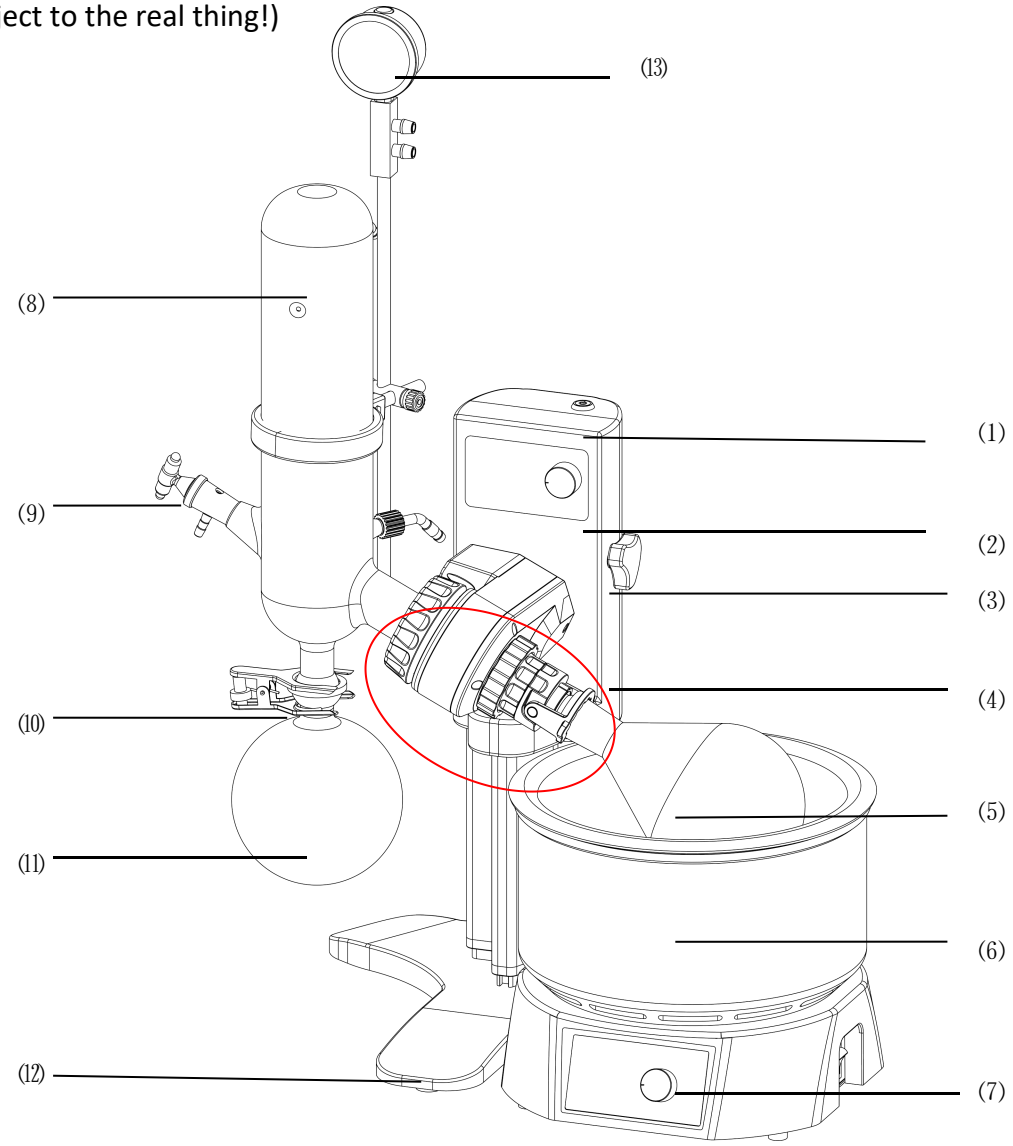


Figure 1 (a)

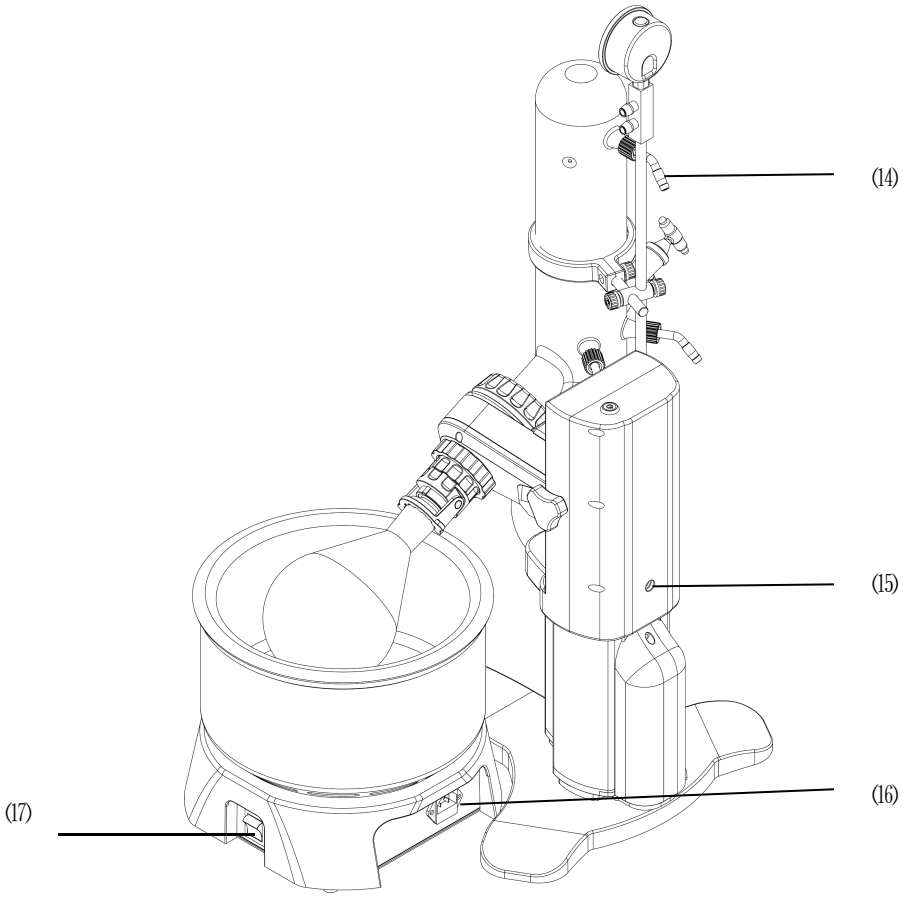


Figure 1 (b)

(1) Power switch
(2) Host control panel (Figure 4)
(3) Fasten screw nut
(4) Head (Figure 2)
(5) Rotary flask
(6) Water bath (Figure 5)
(7) Water bath control panel (Figure 6)
(8) Condenser
(9) Feeding valve
(10) Stainless steel clip
(11) Collection flask
(12) Base
(13) Vacuum gauge
(14) Faucet
(15) Power connector
(16) Bath power connector
(17) Bath power switch

Note: There are manual lift type and automatic lift type.

Head Structure Decomposition Diagram

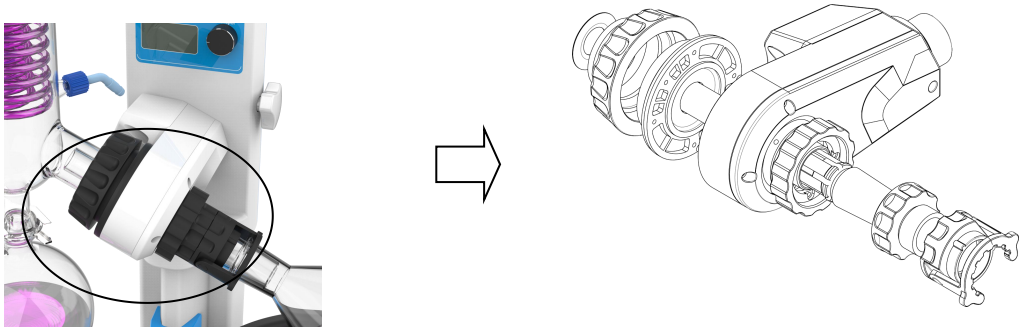


Figure 2

Condenser Structure Diagram

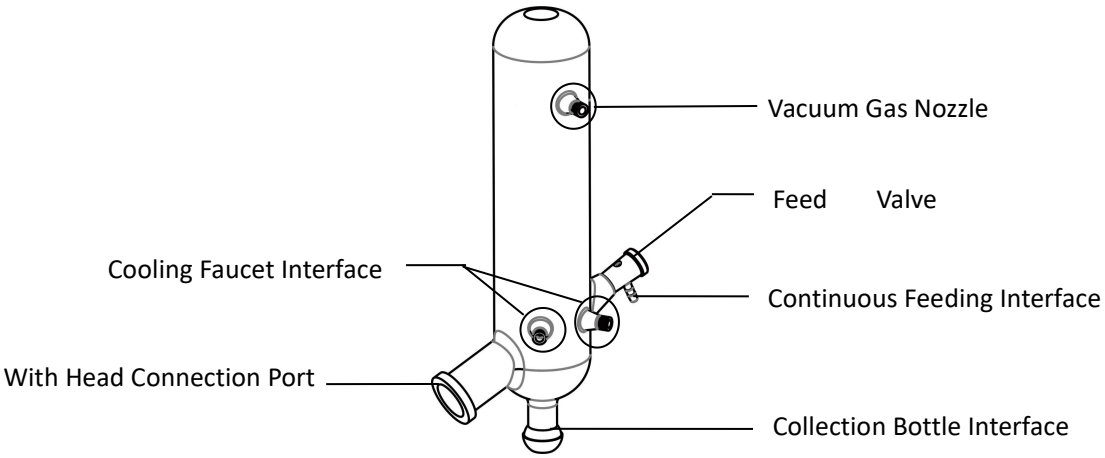


Figure 3

3.2 Rotary Evaporator Operating Instructions for Control Panel

3.2.1 Manual Lifting Type Control Panel

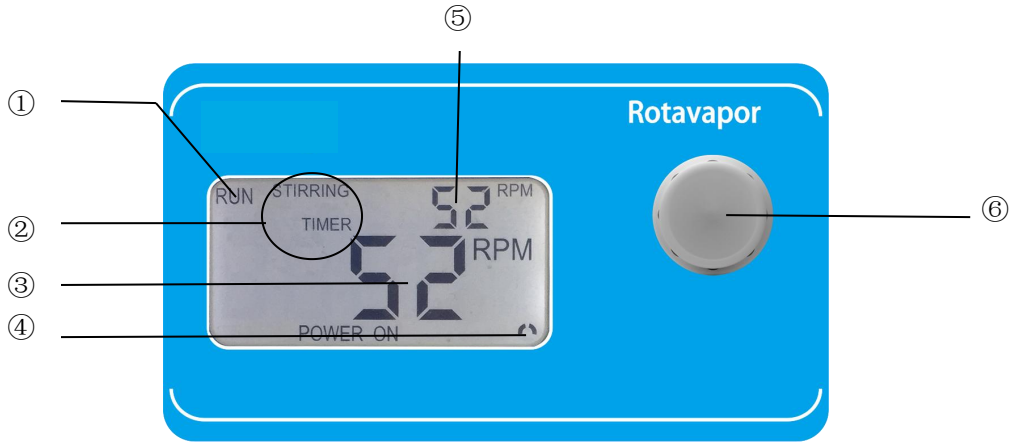


Figure 4（a）

① Running status display: two status ''RUN' or ''STOP''.

② Function indication area: two Functions ''STIRRING'', ''TIMER''.

③ Rotate speed measurement display: when the rotary evaporator is running, the running speed value is displayed.

④ Rotation sign: This symbol is in motion while the rotary evaporator is running.

⑤ Speed set point display: Set the desired speed for the rotary evaporator.

⑥ Knob: Rotate left and right to set the speed and time, press down to confirm and start / stop.

3.2.2 Automatic Lifting Type Control Panel

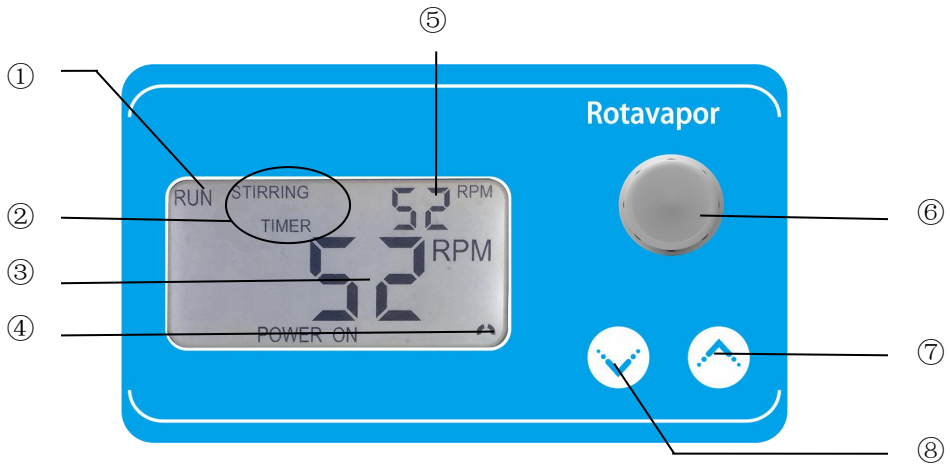


Figure 4 (b)

① Running status display: two status ''RUN'' or ''STOP''.

② Function indication area: two Functions ''STIRRING'', ''TIMER''.

③ Rotate speed measurement display: when the rotary evaporator is running, the running speed value is displayed.

④ Rotation sign: This symbol is in motion while the rotary evaporator is running.

⑤ Speed set point display: Set the desired speed for the rotary evaporator.

⑥ Knob: Rotate left and right to set the speed and time, press down to confirm and start / stop.

⑦  Arrow keys: adjust the height of the host, long press this button can be automatically up to reach the desired height release.

⑧  Arrow keys: adjust the host height, long press this button can be automatically down to reach the desired height release.

3.2.3 Rotary Evaporator Operation Instructions

When the rotary evaporator is on:

1) Speed setting

Turn the knob on the control panel to turn the knob left and right to adjust the desired speed when the "RPM" rotation indicator flashes, and press the white knob to confirm the speed setting.

2) Time setting

Turn the knob on the control panel to turn the knob left and right to adjust the desired speed when the "TIME" rotation indicator flashes, and press the knob down to confirm the time setting.

Operation of timer function

Time function is turned off.

If you need to turn it on, press the knob about 5 seconds until LK appears, turn the knob to set LK= 168 and find the parameter ''nt'' , set nt value as 1, press the knob until the Time appears in the screen.

3) When the speed and time setting is completed, press the knob on the control panel again to start.

Note: The setting time is the running time, in minutes, it starts to count when the control knob on the control panel is pressed, the rotation stops automatically when the time is over, or the knob on the control panel is pressed in the working state to stop the rotation.

3.3 Water Bath Outline Drawing

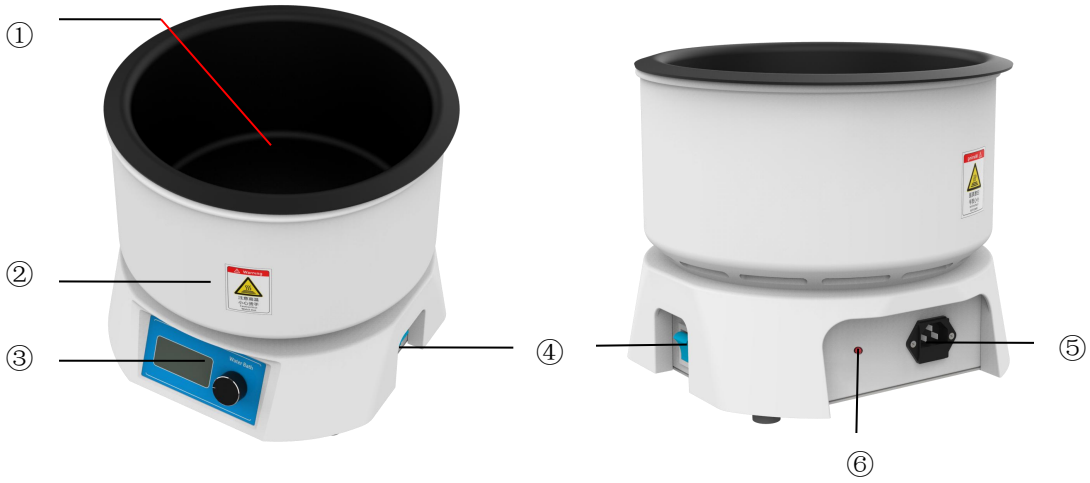


Figure 5

① Bathing in the water bath
② High temperature-resistant ABS material shell
③ Control panel
④ Power switch
⑤ Power plug
⑥ Anti dry burn reset switch

Note: Water bath shell affixed with safety signs:

Be careful of burns!

When the liquid temperature is high,

do not move.

3.3.1 Water Bath Operating Instructions for Control Panel

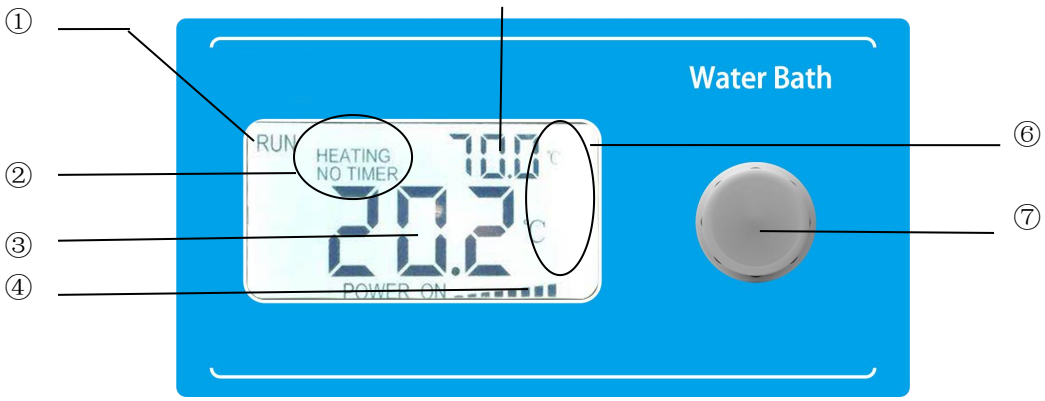


Figure 6

① Operating status indication area: Two status ''RUN'' or ''STOP''.
② Function indication area: Two functions ''HEATING'', ''TIMER''.
③ Digital display area A2: 0 - XXX.X (or XXXX).
④ Power size indicator column: small - big.
⑤ Digital display area A1: 0 - XXX.X (or XXXX).
⑥ Unit display area: ''°C''.
⑦ Knob: Rotate left and right to set the heating degree and time, press down to confirm and start / stop.

3.3.2 Water Bath Operating Instructions

When the water bath is powered on:

1) Temperature setting

Turn the knob of the control panel to turn the knob left and right to adjust the desired speed when the "RPM" rotation indicator flashes, and press the white knob to confirm the speed setting.

A: Prohibited anhydrous heating in pot, so as not to affect the heater life.

B: Forbidden to add other liquids besides purified water to the pot, especially the corrosive liquids.

2) Time setting

Turn the knob of the control panel to turn the knob left and right to adjust the desired speed when the "TIME" rotation indicator flashes, and press the knob down to confirm the time setting.

Operation of timer function

Time function is turned off.

If you need to turn it on, press the knob about 5 seconds until LK appears, turn the knob to set LK= 168 and find the parameter ''nt'' , set nt value as 1, press the knob until the time appears in the screen.

3) Temperature controller

When the heating pipe in the water bath reaches the protection value set by the temperature limit controller, the temperature limit controller will automatically cut off the power to prevent the water bath from burning up.

4) Reset switch

When you find that the heating bath is dry, turn off the power switch, unplug the power cord, and wait for the heating bath to reach a certain temperature (not hot), put the heating

bath upside down, there is a reset switch at the bottom, and turn on the reset switch when you move it up and down, Then connect the power cord, turn on the power switch, the bath will be used normally.

4. Technical Indexes

Index \ Type	Manual Lifting Type	Automatic Lifting Type
Rotate speed	20 - 300 rpm	
Water bath temperature range	Water: RT+5 - 99.9°C (Silicone oil: RT+5 - 180°C)	
Evaporation capacity	22 ml/min	
Speed setting	Knob setting + LCD display	
Lifting way	Manual	Automatic
Electric lifting function	No	Have
Thermostatic bath heating method	External heating	
Main motor	DC brushless	
Condenser	S-shaped condenser condensation area 0.15 m^2, 1L rotary flask, 1 collecting flask, feeding valve	
Vacuum seal	PTFE+Teflon coating	
Water bath size(Inside)	230 x 130 mm (D x H)	
Water bath material	Stainless steel + corrosion-resistant coating	
Power	1000W	
Environment temperature range	5 - 35°C	
Mains voltage of power supply	220V 50/60Hz	

Note: 1. A recirculating cooler and a corrosion-resistant diaphragm pump is optional for this product!

2. The above data is measured under insulation.

5. Operating Instructions

5.1 Preparation before Operation

Ensure that the product use environment meet the following conditions of use:

1) Use it in the room.

2) Ambient temperature: 5 - 35°C.

3) Power supply: AC 220V 50/60Hz.

4) Barometric pressure: (86 - 106) KPa.

5) Elevation not higher than 4000 m.

6) Use of the environment: low humidity, no hanging drops, no condensation, good ventilation, no direct sunlight.

7) No intense shock source and strong electromagnetic field around.

8) It should be placed on a steady, horizontal and solid bench or ground without direct sunlight. No heavy dust or corrosive gas in the room.

9) There should be no serious dust or corrosive gas in the room.

10) A space of not less than 50cm should be left around the product (front, behind, left, right and top). Height should be left with not less than 100CM of the gap.

5.2 Instructions for Installation and Use of Instruments

Before operation, place the instrument on a hard and firm surface to keep it in a horizontal position. Leave some clearance around the product to ensure sufficient space above the instrument. The glass components may exceed the height of the instrument.The product must be used under certain conditions, make sure the instrument does not move due to vibration when open.

Host Layout

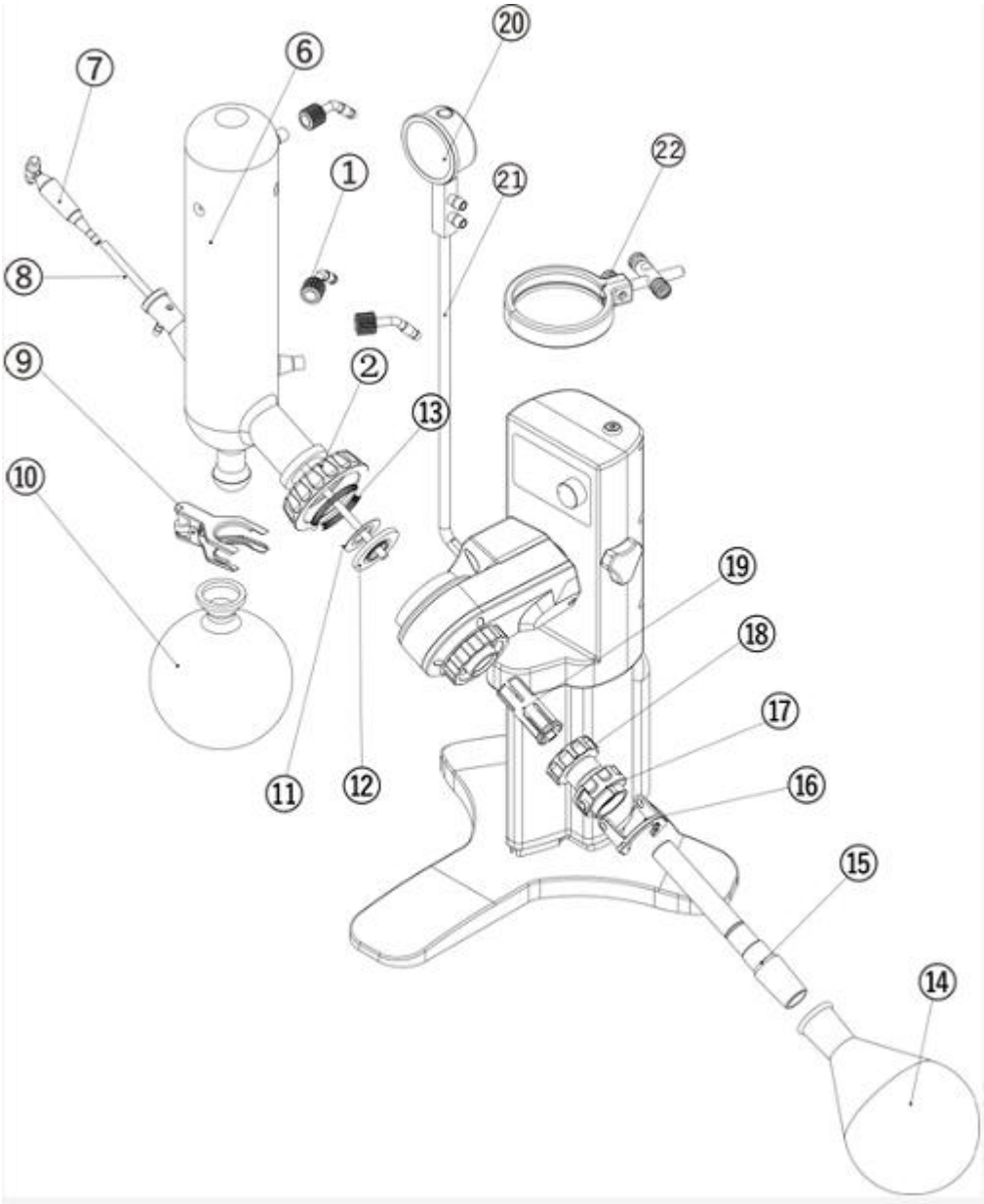
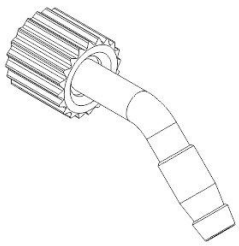
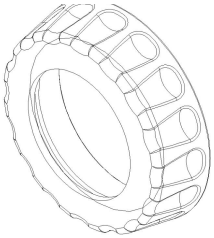
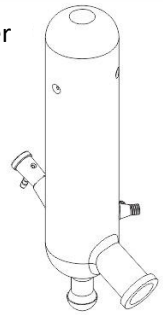
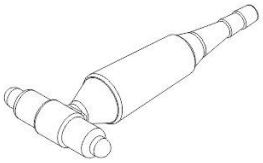
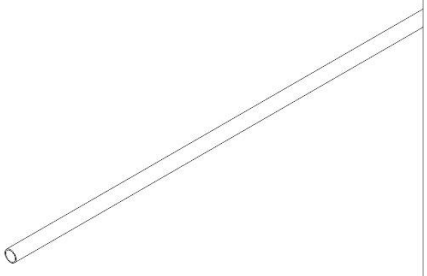
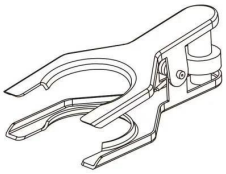
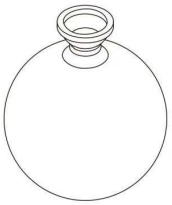


Figure 7

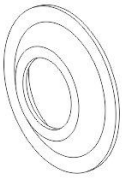
Parts List

① Water nozzle 	② New condenser cover 
⑥ Condenser (glass) 	⑦ Feed valve (glass) 
⑧ PTFE tube 	⑨ Stainless steel clip 

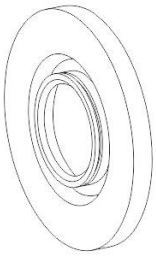
⑩ Collection bottle (glass)



⑪ Auxiliary seal

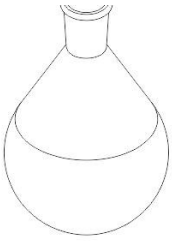


⑫ Main seal

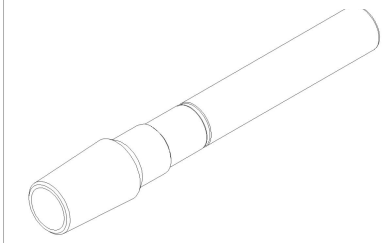


⑬ Condenser fastening spring

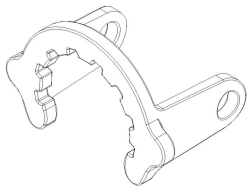
⑭ Rotating bottle (glass)



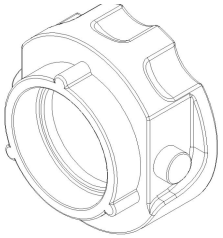
⑮ Rotary shaft (glass)



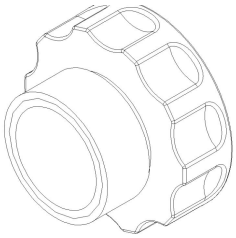
⑯ Retraction clip



⑰ Retraction nut

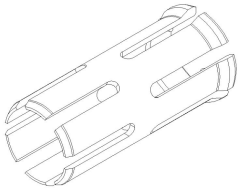


⑱ Clamping nut

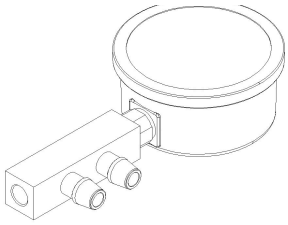


Water bath AC power cable (220V or 110v)

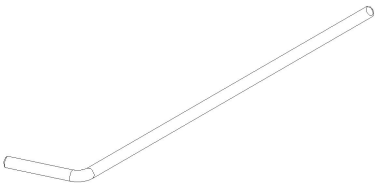
⑲ Spring chuck



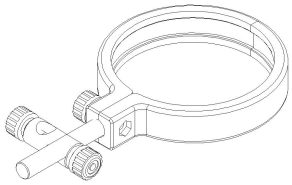
⑳ Vacuum pressure gauge



㉑ Condenser fixing rod



㉒ Holding clamp components



㉓ AC power adapter

5.2.1 Adjusting the Angle of the Nose

Turn the lock nut counterclockwise to loosen the interface between the machine head and the fuselage, turn the machine head by hand to adjust the required tilt angle, and tighten the lock nut clockwise. (See Figure 8)

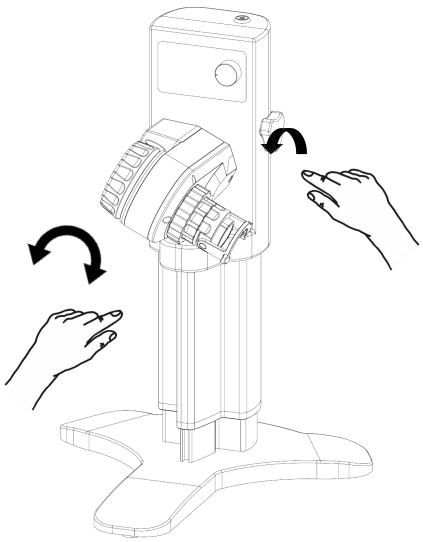


Figure 8

5.2.2 Installation of Components Such as Condensers and Containers

(1) Set the spring chuck (Figure 7: 19), clamping nut (Figure 7: 18), Retraction nut (Figure 7: 17), bottle clip (Figure 7: 16), and glass rotating shaft (Figure 7: 15) according to the following The arrow in the figure indicates to put in one by one, and insert the glass rotating shaft into the machine head as shown by the arrow, hold the rod-back ring, turn the clamping nut clockwise to fix it, and put the main and auxiliary seals on the other side of the machine head. And install the condenser.

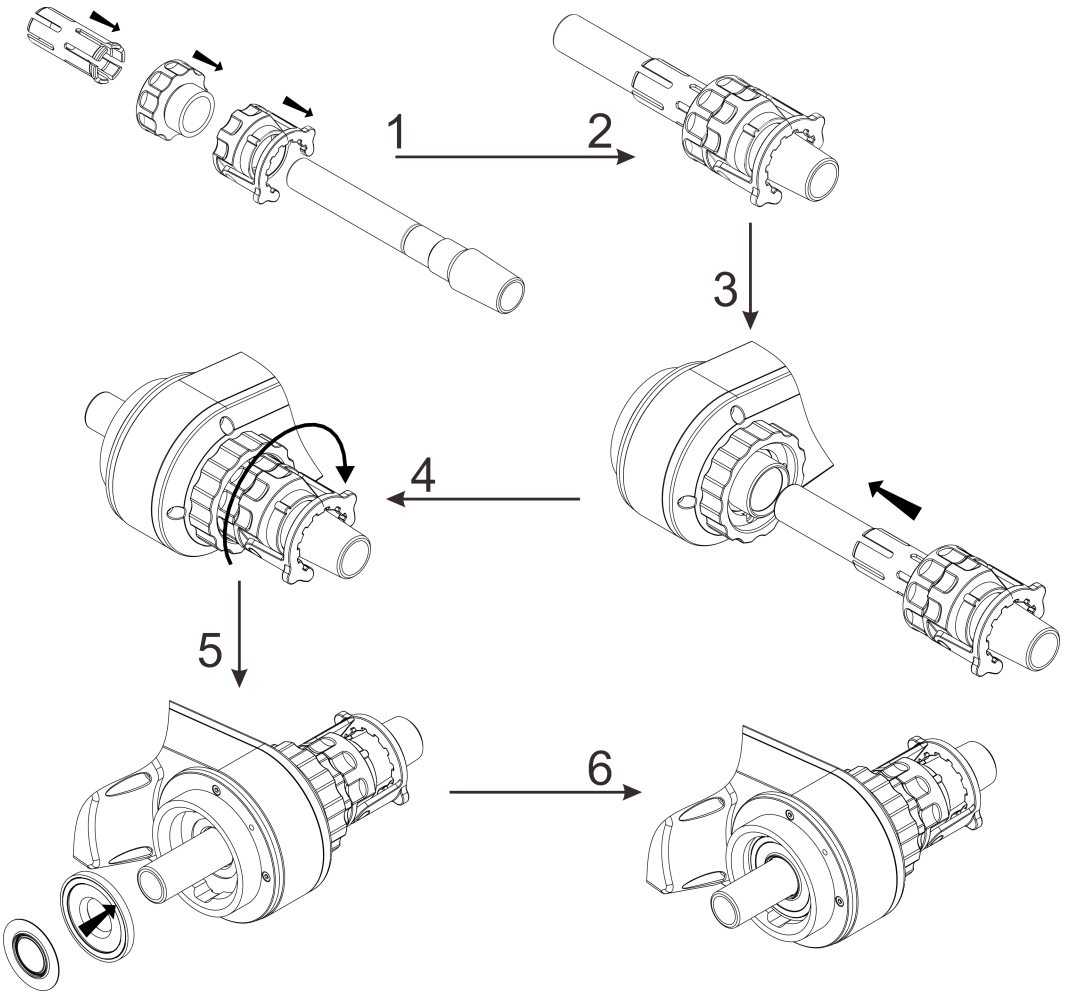


Figure 9

(2) Mount the condenser fixing rod on the main unit: Turn the super knob to fix the fixing rod.

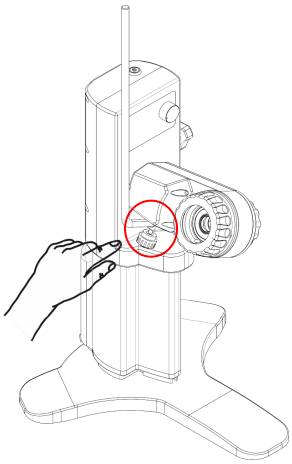


Figure 10

(3) The condenser interface is covered with a condensation fixing cover (Figure 7: 2) and a condenser fixing compression spring (Figure 7: 13). The bottle surface of the condenser interface is aligned with the main and auxiliary sealing rings in the machine head and tightened at the same time. (See Figure 11)

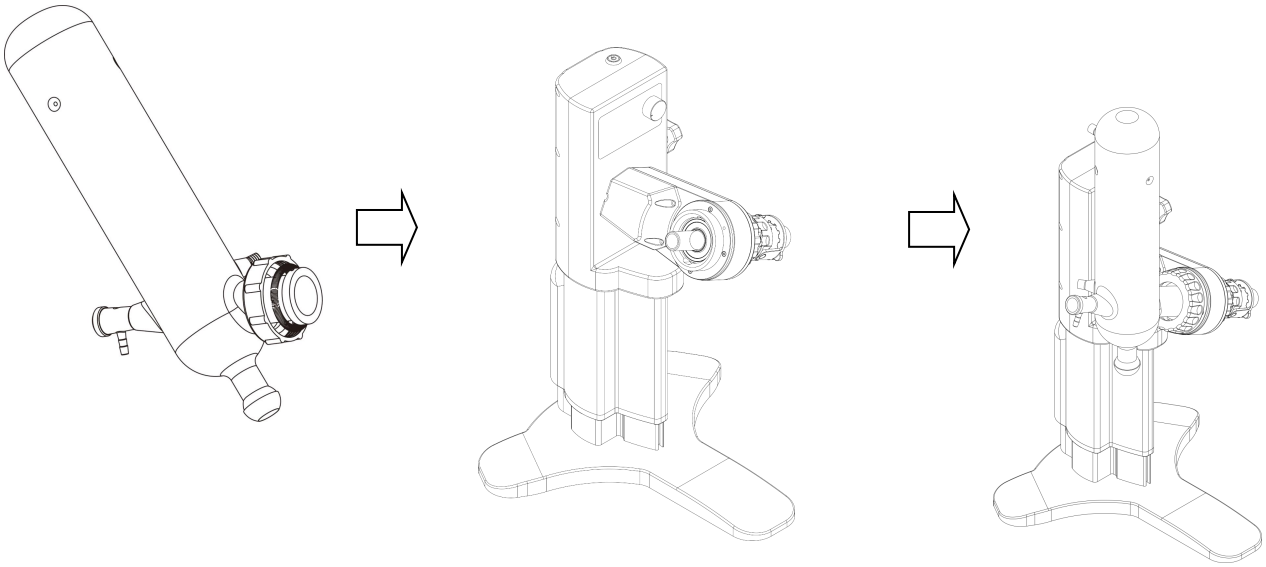


Figure 11

(4) Put the connecting rod of the holding clamp assembly (Figure 7: 22) into the hole of the locking connecting rod, and then insert the other hole of the locking connecting rod into the fixing rod. After the holding clamp is adjusted to the level, use the lock Bolt fixed.

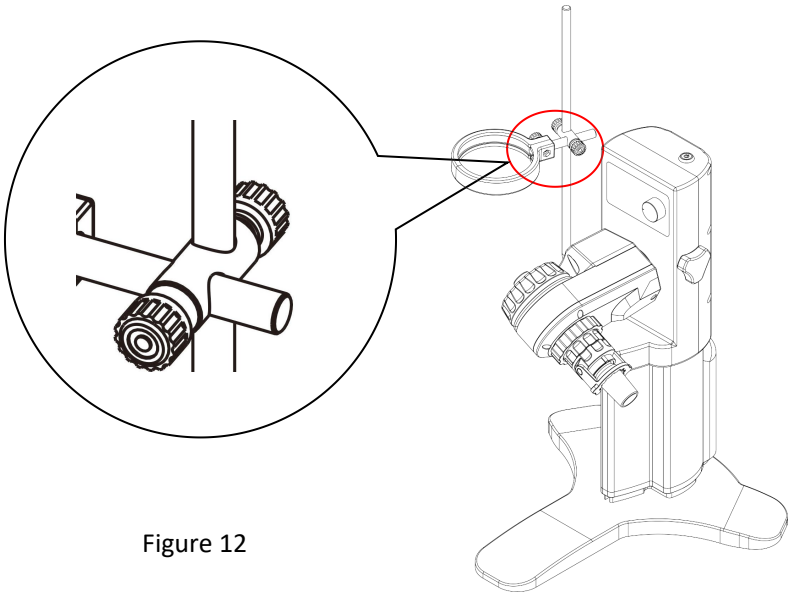


Figure 12

(5) Insert the PTFE tube (Figure 7: 8) into the lower port of the feeding valve (Figure 7: 7), and then insert it from the side interface of the condenser, adjust the angle of the feeding valve to keep it sealed. Use a stainless steel clip (Figure 7: 9) to fix the collection bottle (Figure 7: 10) to the lower interface of the condenser (Figure 7: 6); use a bottle ejection clip (Figure 7: 16) to buckle down to hold the sample bottle (Figure 7: 14) Fix it on the lower interface of the glass rotating shaft (Figure 7: 15), hold the eject ring clockwise to lock the bottle nut (Figure 7: 17). (See Figure 13)

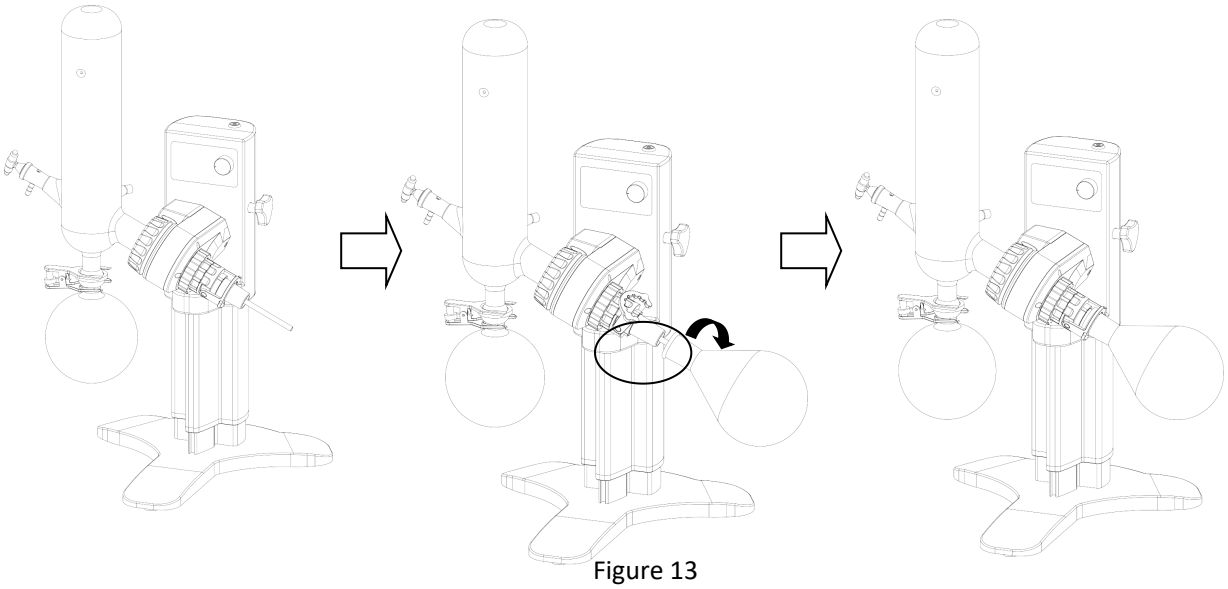


Figure 13

(6) Install two cooling nozzles and one vacuum nozzle on the screw port of the condenser (see Figure 3) (the nozzle assembly is shown in Figure 14) (just tighten the nut to tighten), before installation. Check if the gasket is fitted into the groove.

Assembly diagram of the nozzle and nozzle:

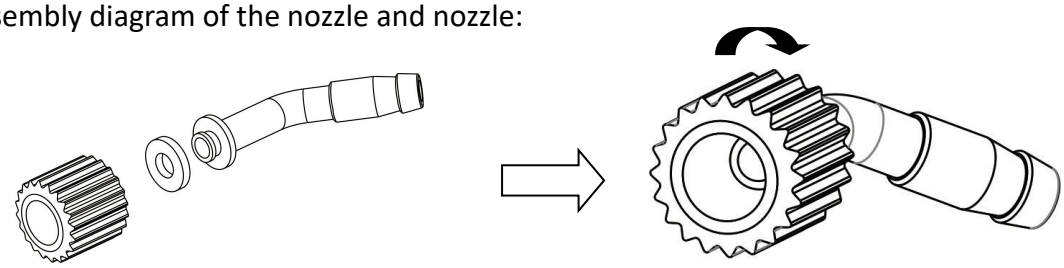


Figure 14

(7) After the above components are installed, the condenser should be perpendicular to the working platform (if necessary, please follow 5.2.1).

(8) Vacuum gauge assembly drawing:

Wrap the raw material tape around the thread on the top of the condenser rod, and then screw the vacuum gauge clockwise.

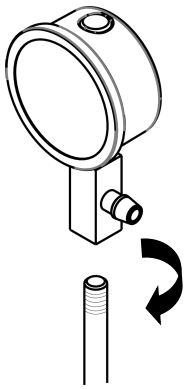


Figure 15

(9) When disassembling, please proceed in reverse order.

5.2.3 Adjusting the Height of the Host

Using the handle on the body, press the handle to adjust the desired height and rotate the handle to the right to fix it. The reverse rotation handle is loosened to adjust the height.

Note: The above lifting method is manual. When adjusting the height of the main unit, just touch the "  " button on the control panel. Release it when you reach the desired height.

5.2.4 The Schematic Diagram of the Circulating Cooler and the Condenser

Figure 16

Note: When removing the silicone hose, press the stainless steel tab on the tab to push the hose out. This figure is for reference only, subject to the real real thing.

5.2.5 Instructions for Use

(1) When the condenser cooling water nozzle is a threaded component and the connecting pipe diameter of the cooling circulator is ϕ10mm, add two sets of reducing adapters (PE straight + inner diameter ϕ7mm length 100mm silicone tube).

Note: If the diameter of the connecting pipe of the cooling circulator is ϕ8mm, there is no need to use a reducing adapter, and the connecting pipe of the cooling circulator can be directly connected to the cooling water nozzle.

As shown

Figure 17

Figure 18

(2) Turn on the condensate, connect the power supply, and press the power switch down. The indicator light is on to indicate that the host is turned on.

Note: Connect the power cord:

Before use, please confirm that the voltage and frequency of the power supply conform to the requirements of the instrument. The instrument should use an independent power socket, and confirm that the plug and socket are well grounded.

(3) When the device is turned on, according to the 3.2 operation instructions, after setting the time and speed, press the knob to collect the bottle and start to rotate. Open the water bath switch and adjust the required temperature according to the operation instructions of 3.3.1. The instrument starts automatic temperature control heating and enters the running state. The temperature and vacuum reach the desired range, ie the solvent can be evaporated to the collection bottle.

5.2.6 Evaporation Completed

(1) Turn off the rotary evaporator, stop the rotation of the rotating bottle, press the handle and rotate in the reverse direction to raise the height of the main unit. (Please follow the instructions in 5.2.3)

(2) Rotate the angle of the feed valve to relieve the internal pressure and close the vacuum pump.

(3) If you do not continue to add the sample, please turn off the cooling water circulation device and the water bath.

⚠ Note: After the distillation is finished, the water bath or the rotating bottle will not cool immediately, and it will still be hot. Please pay attention to safety to avoid burns!

(4) Disassembly of the rotating bottle: Hold the rotating bottle by hand, remove the grinding clip (Figure 7: 16), and remove the rotating bottle successfully.

(5) When removing the collection bottle, please hold the collection bottle with your hand and then remove the clip (Figure 7).

(6) Disassembly of the rotating shaft: (see Figure 19）

Rotary Shaft Removal Diagram

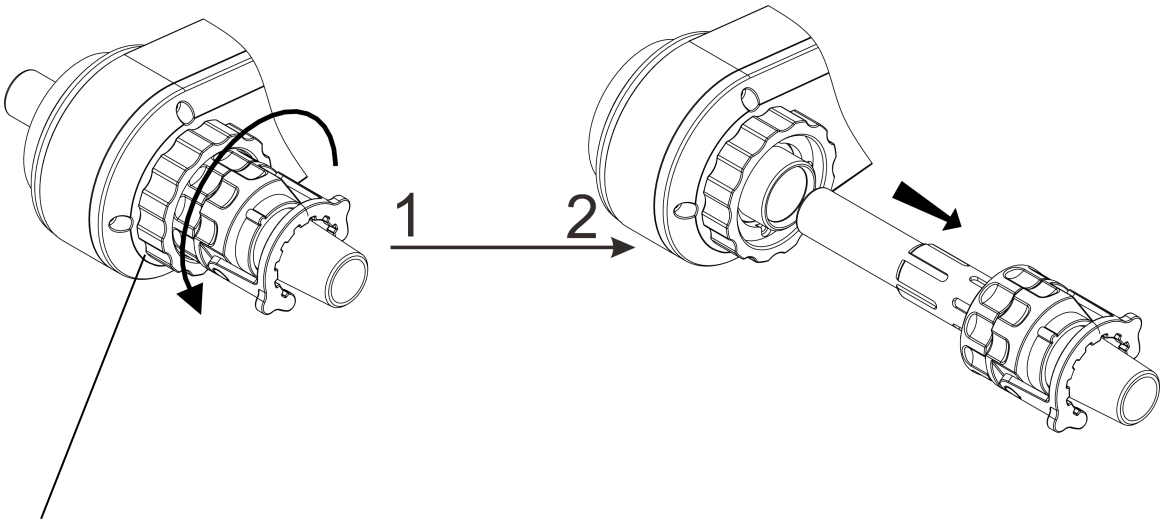


Figure 19

6. Failure Handling Methods

Symptoms	Reason of failure	Troubleshooting method
Turn on the power switch light does not light	The power plug is unplugged or plugged not well. (When connected to the water bath, please also confirm the water bath power connection)	Set the power switch to the OFF position then inserting the power plug into the socket.
	Plug the power cord from the fuse with the power base off or not inserted tight.	Set the power switch to the OFF position, and then plug the power cord into the power cord holder.
	Power is not applied.	Please open the switchboard protection switch.
	Power switch has failed.	Please stop using it immediately and contact the dealer or the nearest service center of this product.
	Circuit board failure.	
	Fuse is blown due to overload. (Short circuit)	
Power switch indicator light, but does not rotate.	Rusty bearings.	
	The motor has failed.	
	Circuit board failure.	
Rotary oscillation	Internal gear wear.	
	Circuit board failure.	
	The motor has failed.	
Abnormal sounding	Seal wear.	Please replace the seal.
	Internal gear wear.	Please stop using it immediately and contact the dealer or the nearest service center of this product.
	Drive lack of oil.	
	The motor has failed.	
Noise from the seal ring	Seal with the rotating shaft contact with poor contact.	Please apply a thin layer of vacuum grease or water on the seal ring.
Pressure leak vacuum is not good	Rotating connection shaft wear.	Please replace the rotary connection shaft.
	Seal wear.	Please replace the seal.
	Bad seal installation. (Opposite direction)	Please refer to the seal installation method, re-install.
	Decompression with gas nozzle gasket aging.	Please replace the air nozzle seal washer.
	Vacuum hose aging.	Please replace the vacuum hose.

Lifter unusually heavy	Spring aging.	Please stop using it immediately and contact the dealer or the nearest service center of this product.
	Sliding bearings wear or rust.	
Lifter could not be locked	Loose screws cause idling.	
	Locking parts worn.	

7. Product Maintenance and Care

1. Please do not disassemble the device, the device has a voltage or high temperature inside the part, such as disassembly dismantling device, will cause personal injury.
2. Please use the correct method and supplies appliances for cleaning and maintenance of this product. Do not spill water directly onto the product, or use abrasive powders, thinners, petroleum, kerosene, acid substances and the like, otherwise accidents such as electric shock may occur.
3. Please turn off the power switch before maintenance, unplug the power plug from the socket.
4. Cleaning, please wring the water wipe soft cloth, the dirt that not easy to remove, please use a neutral detergent, use a rag wipe clean after using detergent.
5. Carefully check before using equipment, if the glass bottles are damaged, the interface is consistent, pay attention to gently.
6. Wipe the interface with a soft cloth (disposable paper towels), and then apply a small amount of vacuum grease. After the use of vacuum grease must be covered well to prevent lime sand into.
7. The interface could not be screwed too tight, to loosen the active regularly, to avoid long-term tight connector killed.
8. First turn on the power switch, and then let the machine run from slow to fast, stop when the machine is in a stopped state, and then off the switch.
9. Fasteners could not be tightened everywhere, easy to damage the glass.
10. After each use must be wiped with a soft cloth to stay in the surface of the machine a variety of oil stains, solvent left, keep clean.
11. Loosen the fasteners around the machine once downtime, long-term still in the working state will make the ring deformation.
12. Regular cleaning of the glass axis of rotation, the method is: Remove the ring, check the shaft is dirt, wipe clean with a soft cloth, and then apply a small amount of vacuum grease, re-install, keep the shaft and the seal smooth.
13. Electrical parts must not be water, strictly prohibited damp.

8. Packing List

Serial number	Category	Name	Unit	Quantity	Remarks
1	Components	Host		1	
2	Components	Water bath		1	
3	Components	Host power cord + adapter		1	
4	Components	Water bath power cord		1	
5	Components	Glass components		1	Rotating bottle, collection bottle, condenser, glass rotating shaft, feeding valve
6	Components	clip		1	
7	Spare parts	Water nozzle		3	
8	Spare parts	Solid compression spring		1	
9	Spare parts	Clamping nut		1	
10	Spare parts	Fuse		2	
11	Spare parts	Return bottle nut		1	
12	Spare parts	Bottle back clip		1	
13	Spare parts	Spring chuck		1	
14	Spare parts	Reducer adapter		2	
15	Spare parts	Vacuum gauge		1	
16	Document	Operation instruction		1	
17	Document	Packing list		1	