

Cole-Parmer[®]

RV-200 Series

Rotary Evaporators



Instruction Manual

52411_2L Rotary Evaporator_ver_1.0



Applicable to 230V a.c. models only

User Warning



WARNING

Failure to follow all warning and instructions could result in serious injury. Your safety is very important to us, we urge you to take the following precautions when using this product.

We are not responsible for injury or damage caused by misuse.

- Instrument must be grounded and away from any electromagnetic interference
- Use instrument in a laboratory environment with proper ventilation
- Before using the instrument, the user must have some basic knowledge of the equipment/process and obtain related laboratory skills
- Do not retrofit the instrument, this may lead to electric shock or cause equipment failure
- Do not use instrument for applications not listed in the purpose section
- This instrument is not explosion proof; do not operate in an explosive environment
- If using flammable sample or organic solvents take caution in spilling hazards
- During operation be cautious of hot bath and rotating flask
- Do not disassemble the instrument. Electrical components can cause personal injury
- The instrument should use a separate power outlet
- Do not unplug the unit during operation. Turn off heating and rotating then switch the unit off before unplugging the instrument
- Proper personal protection equipment shall be used during operation
- Instrument cannot be repaired without authorization of the vendor/manufacturer
- Do not position the unit in such a way as to make disconnection from the power supply difficult.

NOTE: (This may affect the service life of the unit)

- Please make sure the power connection is correct and well grounded.
- For detachable cord models: Ensure that if mains cord is replaced, it is appropriately rated.
- Ensure that the glassware is free of cracks, chips, or any other notable defects. Do not use if defective.
- Check that all hosing (vacuum/chilling) does not have tears or kinks.
- Avoid cracking condenser barb connections or injection valve when assembling hosing by rotating and pushing hosing on connections.
- Avoid overtightening clamps on glass joints. This can affect the seal of the joint and create leak points. Double check all screws on clamps are evenly tightened.
- Check rotating screw caps on motor are tightened and making a seal with the glass.
- During operation place rotary evaporator on even surface and lock feet.
- Use vacuum grease in all connections.

Purpose

Rotary Evaporators are used to distill solvents from compounds with precise evaporation. These are especially useful when trying to separate organic compounds from ethanol, or any other low boiling point solvents. Boiling points can be lowered by pulling a vacuum on the system. The evaporating flask rotates with variable speeds, allowing you to spin the solution into a thin film around the flask. With a combination of a reduced pressure and large heating surface area, these are great for quick distillation. Internal glass coil condenser cools solvent vapors, allowing them to fall into the collection flask. This leaves you with distilled solvent, ready to use again.

The heating element is controlled by a PID controller, accurate to the degree. Slowly raise temperatures to achieve your solvent's boiling point without disturbing the extract.

Structural Features

- Dual thermocouple positioned for accurate bath temperature control
- PTFE valve cores, corrosion-resistant without any pollution
- Check valve between collection flask and condenser to allow the emptying of recovered solvent without having to break vacuum
- Vacuum gauge and manifold for direct feedback of any vacuum loss
- Electric lifting bath with dual heating coils for uniformity
- Rigid frame to easily support and transport unit around laboratory
- Triple coiled condenser for maximum surface area
- Compact footprint.

Unpacking

Note: The glassware set is fragile; unpack with care.

- Open the package.
- Check the parts according to the packing list. If there are any missing, please contact us.
- Carefully clean the glass to maintain cleanliness before assembly.
- Prepare all the tools needed for installation.

Structure and composition

Rotary Evaporator Outside view (Following figure 1)

RV-200 rotary evaporator outline drawing: (This figure is for reference only, subject to model)

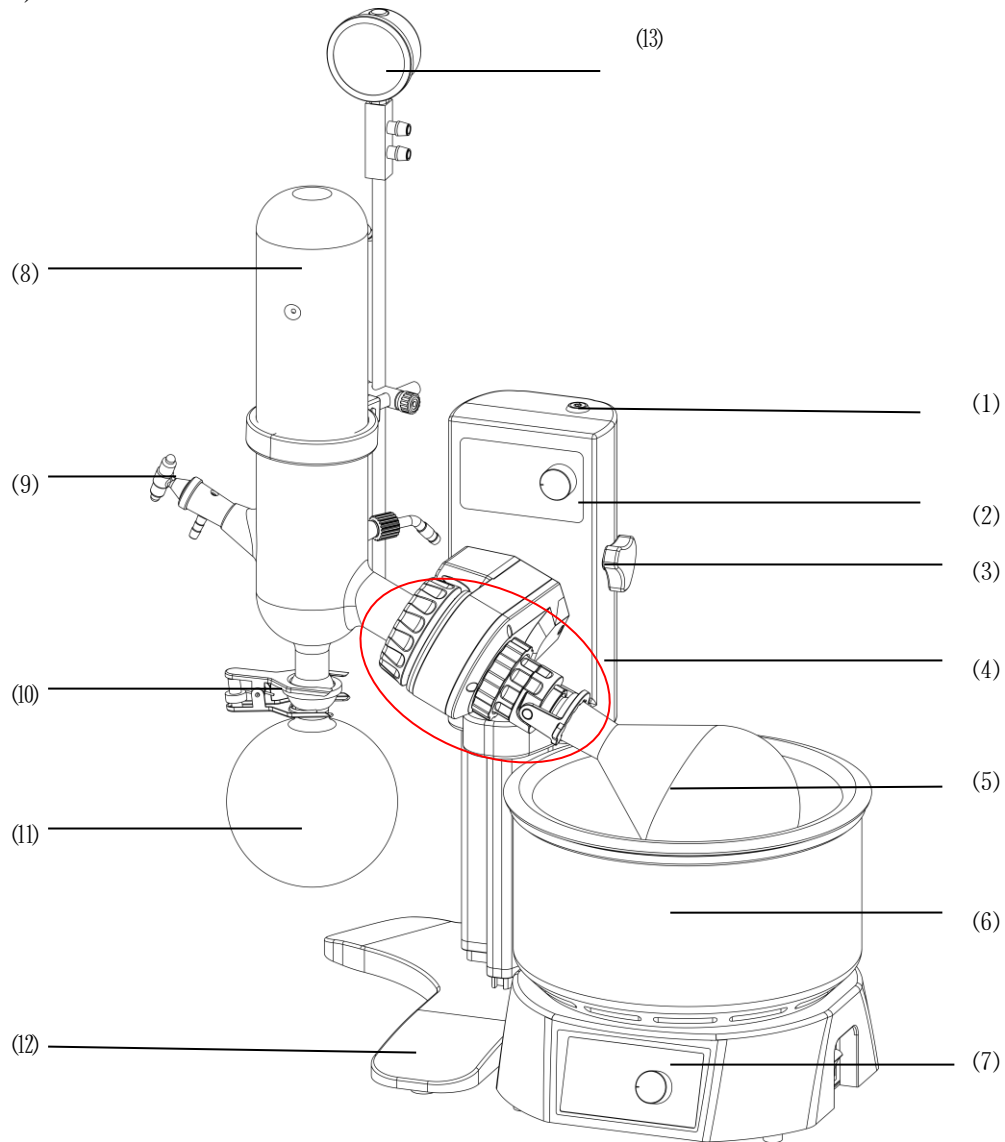


Figure 1 (a)

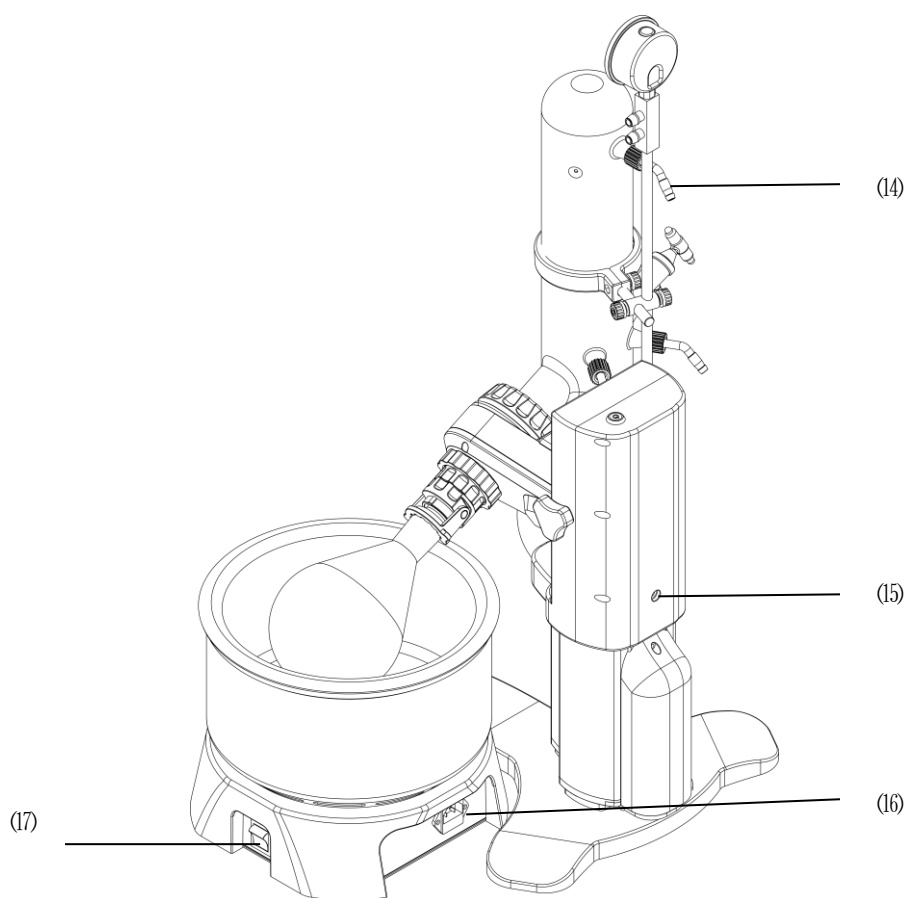


Figure 1 (b)

- | | |
|---|---------------------------------------|
| (1) Power switch | (2) Host control panel (see Figure 4) |
| (3) Fasten screw nut | (4) Head (Figure 2) |
| (5) Rotary flask | (6) Water bath (Figure 5) |
| (7) Water bath control panel (see 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: RV-200 type is manual lifting, and RV-200A type is automatic lifting.

Head structure decomposition diagram

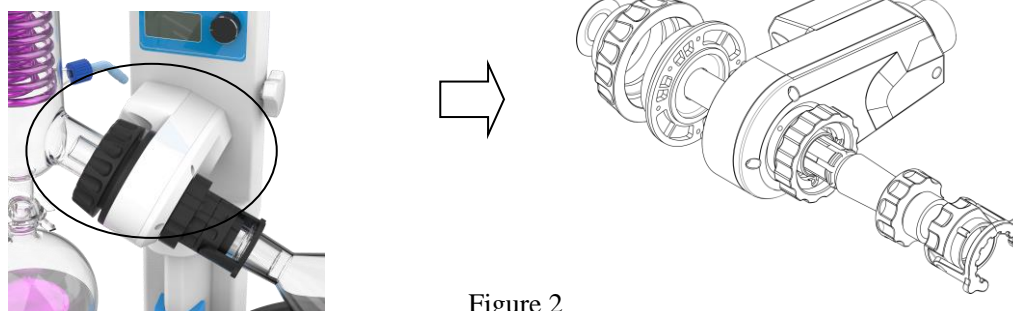


Figure 2

Condenser structure diagram:

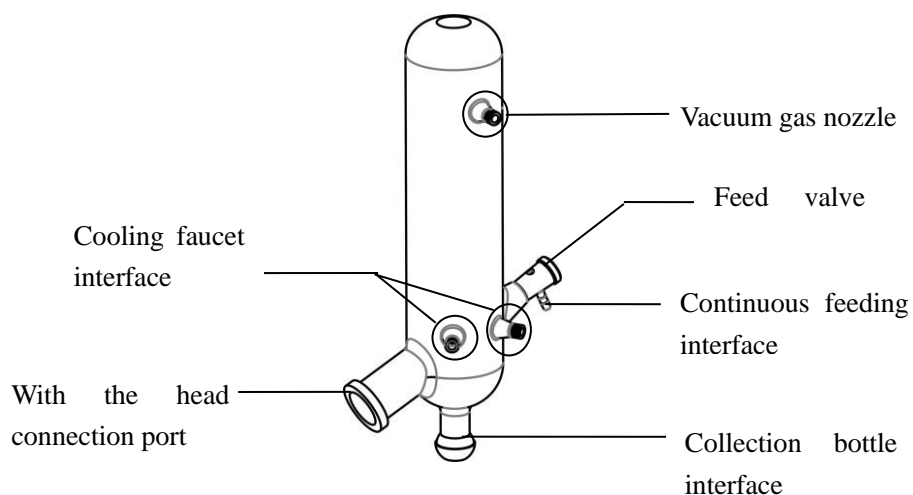


Figure 3

Rotary Evaporator Operating Instructions for Control panel (Figure 4)

RV-200 type control panel description:



Figure 4 (a)

- ① Running status display: two status “RUN” or “STOP”.
- ② Function indication area: two Functions “STIRRING” and “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 setpoint 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.

RV-200A type control panel description:

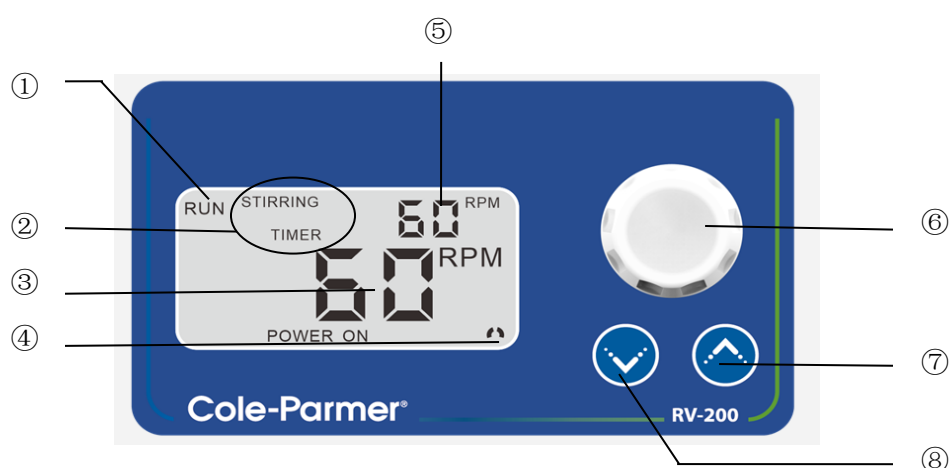




Figure 4 (b)

- ① Running status display: two status “RUN” or “STOP”.
- ② Function indication area: two Functions “STIRRING” and “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 setpoint 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 to automatically lift to the desired height.
- ⑧  Arrow keys: adjust the host height, long press this button to automatically drop down the desired height.

Operation instructions

When the rotary evaporator is on:

1) Speed setting

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

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 while operating to stop the rotation.

Water bath outline drawing (Figure 5)

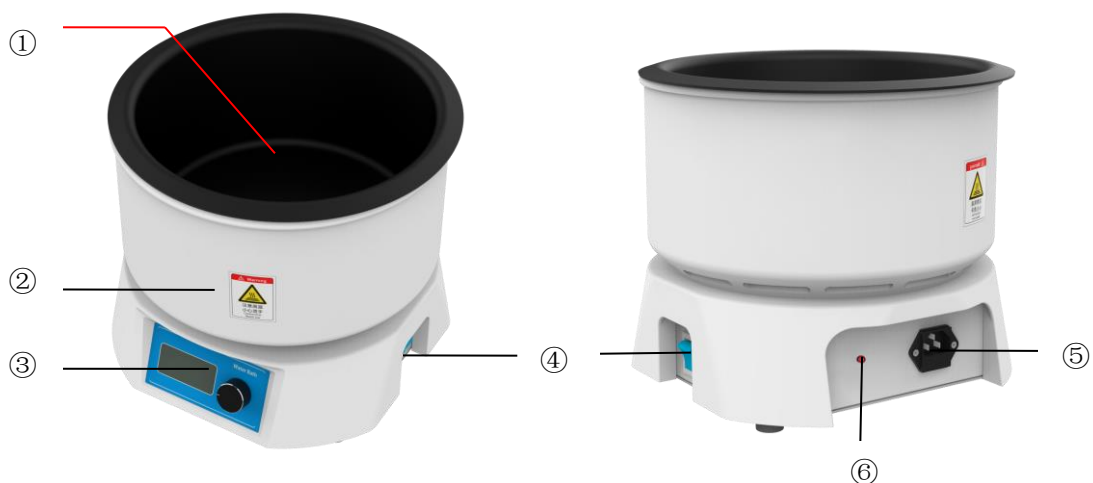


Figure 5

- | | |
|-----------------------------|---|
| 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.**

Water bath operating instructions for control panel (Figure 6)

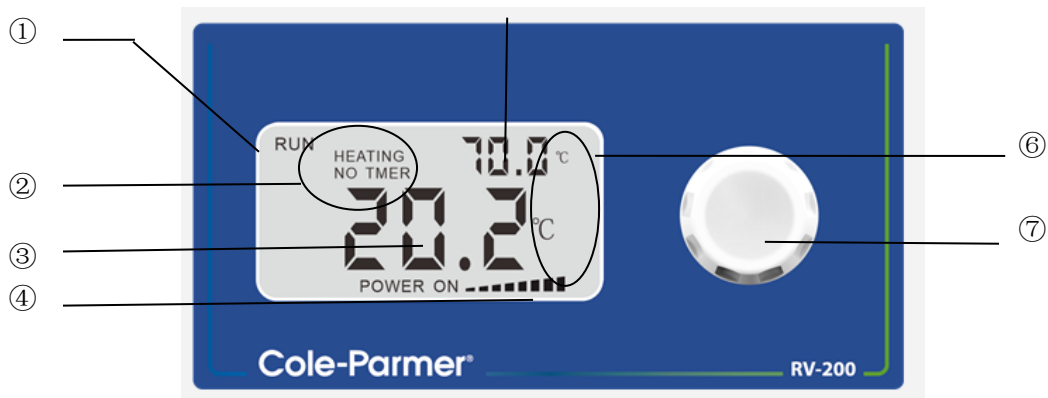


Figure 6

- ① Operating status indication area: Two status “RUN” or “STOP”.
- ② Function indication area: Two functions “HEATING” and “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.

Water bath operating instructions

When the water bath is powered on:

1) Temperature setting

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



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

B: Only use purified water in bath, no corrosive liquids.

2) Time setting

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

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 overheating.

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 cool down, turn the heating bath upside down, there is a reset switch at the bottom, push the reset switch, re-connect the power cord, turn on the power switch, the bath can be used normally.



Technical Specifications

Sheet 1

Index \ Type	RV-200 52411-92, 52411-93	RV-200A 52411-94, 52411-95
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	Yes
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 coating	
Dimensions W x H x D (mm)	570 x 860 x 386	
Bath inner Dimension Diameter x Height (mm)	230 x 130	
Water bath material	Stainless steel + corrosion-resistant coating	
Low Voltage Input	100-240V AC/DC Adaptor, 24V 2.5A	
Water Bath Voltage/Power	120V-1000W, 220V-1000W	
Mains voltage of power supply	120V 60HZ, 220V 50/60HZ	
Ambient Operating temperature	5~35°C	
Barometric Pressure	86 ~ 106 KPa	
Altitude Max	2000m	
Pollution Degree	2	

Fuse information

Located on back of unit



52411-93, 52411-95



52411-92, 52411-94

Model number	Cable/plug (US) Black – Live White – Neutral Green - Earth	Cable/plug (EU) Brown – Live Blue – Neutral Green/Yellow - Earth	Fuse
52411-92	18AWG		15A ϕ 6*32mm/ceramic/fast blow
52411-93		1.0mm ²	7A 5*20mm glass/fast blow
52411-94	18AWG		15A ϕ 6*32mm/ceramic/fast blow
52411-95		1.0mm ²	7A 5*20mmglass/fast blow

Fuse replacement

- Power unit off
- Open fuse holder by turning left with flathead screwdriver
- Remove old fuse
- Replace with new fuse
- Close fuse holder by turning right with flathead screwdriver

Operating instructions

Preparation before operation

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

- Use of the environment: low humidity, no hanging drops, no condensation, good ventilation, no direct sunlight.
- There should be no serious dust or corrosive gas in the room.
- 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.

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:

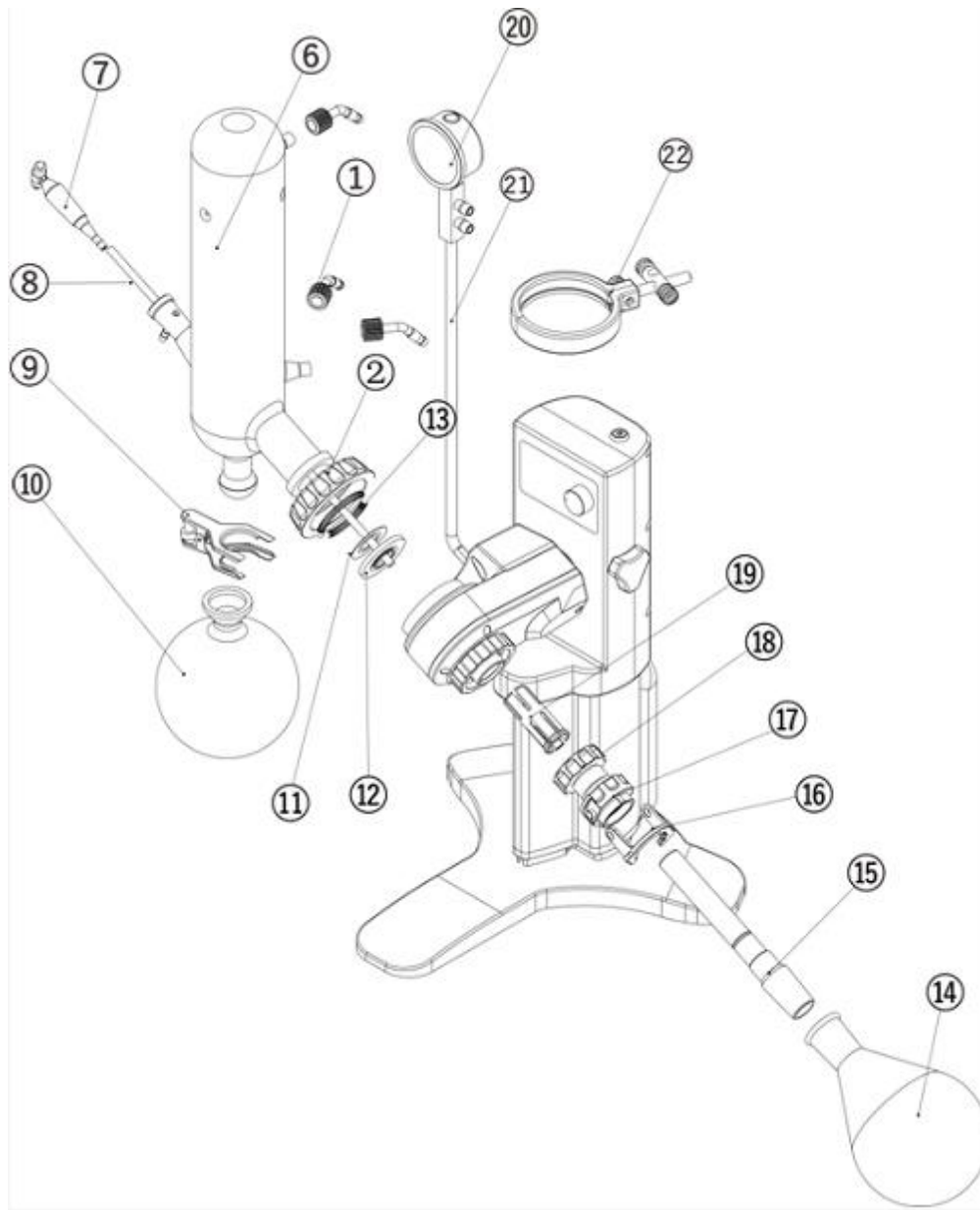
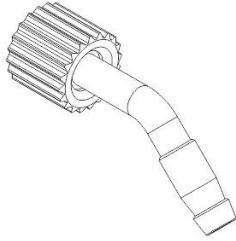
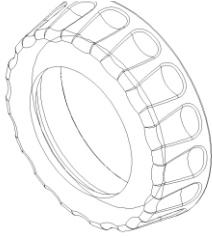
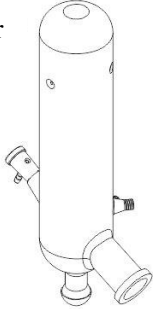
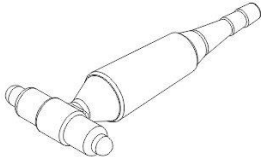
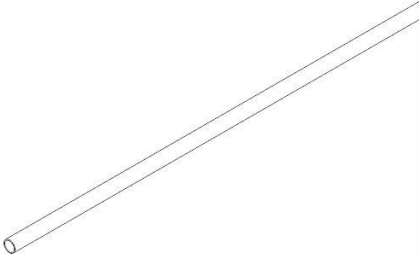
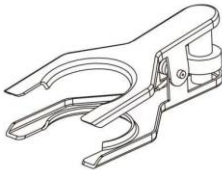


Figure 7

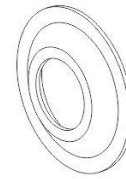
Parts list

<p>① Water nozzle</p>  A technical drawing of a water nozzle. It consists of a cylindrical, ribbed nozzle head attached to a flexible, segmented tube that tapers towards the end.	<p>② New condenser cover</p>  A technical drawing of a condenser cover. It is a circular, ring-shaped component with a series of rectangular slots or openings around its circumference.
<p>⑥ Condenser (glass)</p>  A technical drawing of a glass condenser. It is a vertical cylindrical tube with a side arm at the bottom and a top cap.	<p>⑦ Feed valve (glass)</p>  A technical drawing of a glass feed valve. It is a long, thin cylindrical tube with a tapered end and a side arm.
<p>⑧ PTFE tube</p>  A technical drawing of a PTFE tube, shown as a long, straight cylindrical tube.	<p>⑨ Stainless steel clip</p>  A technical drawing of a stainless steel clip. It is a mechanical component with two curved arms and a central locking mechanism.

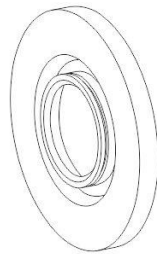
⑩ Collection bottle (glass)



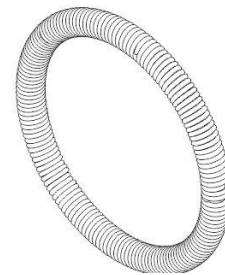
⑪ Auxiliary seal



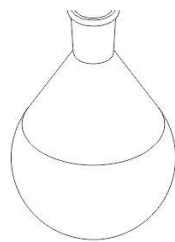
⑫ Main seal



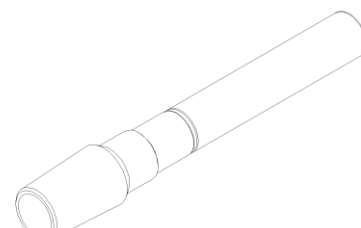
⑬ Condenser fastening spring



⑭ Rotating bottle (glass)

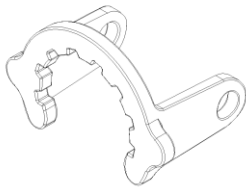


⑮ Rotary shaft (glass)



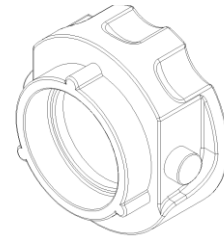
16

Retraction clip



17

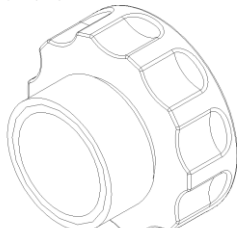
Retraction nut



18

Clamping nut

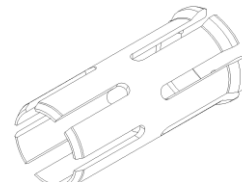
大系螺母



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

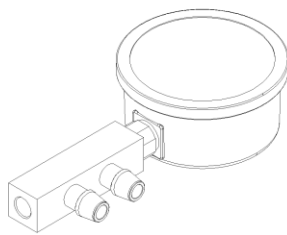
19

Spring chuck



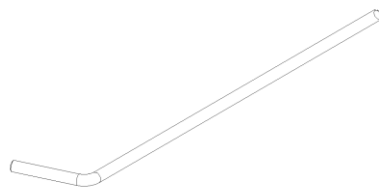
20

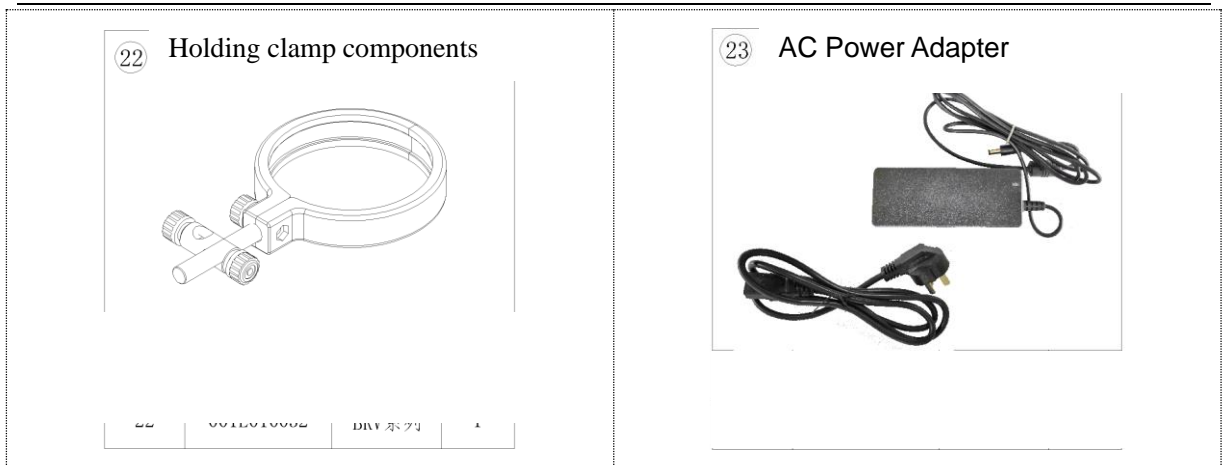
Vacuum pressure gauge



21

Condenser fixing rod





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)

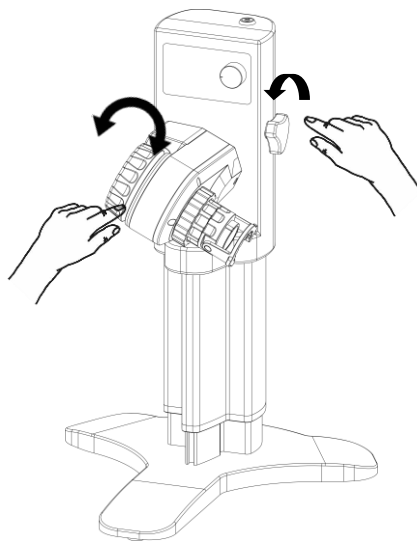


Figure 8

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.

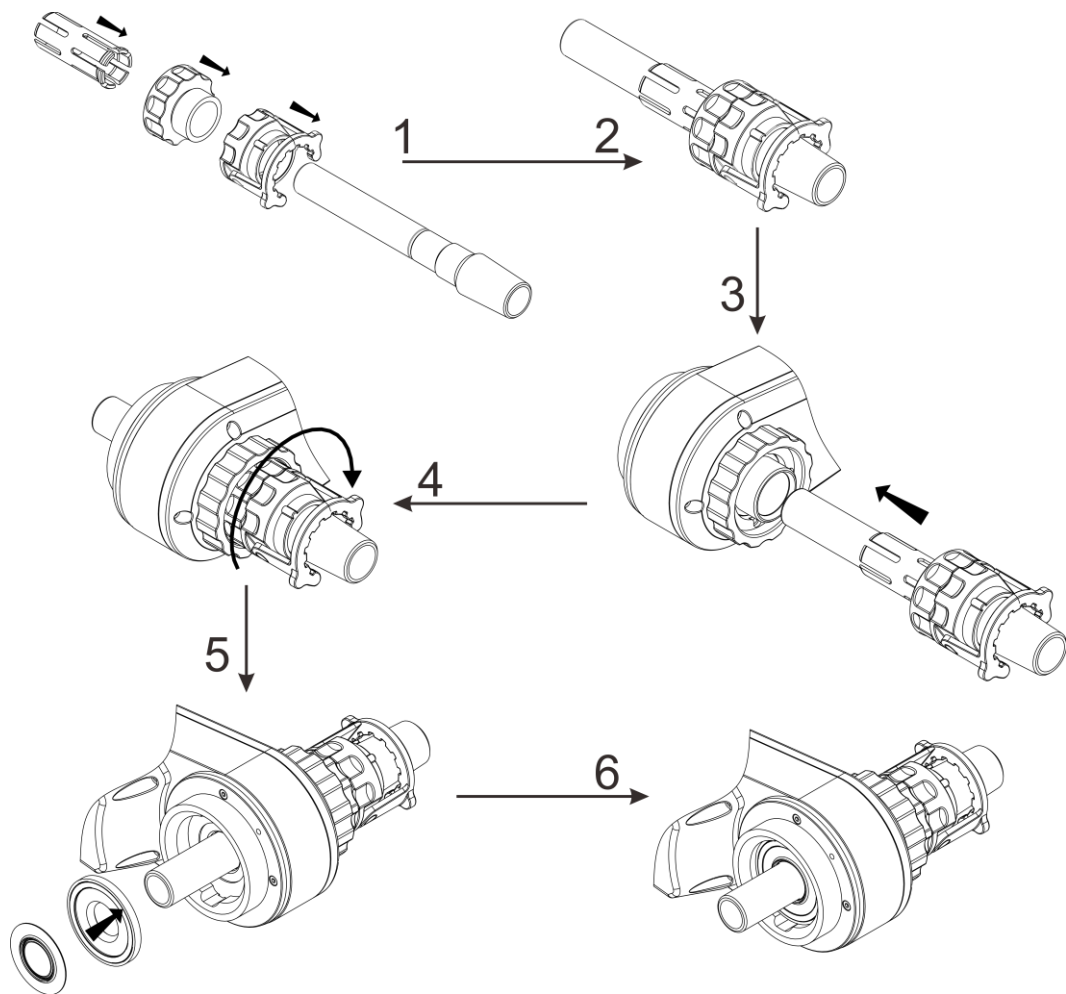


Figure 9

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

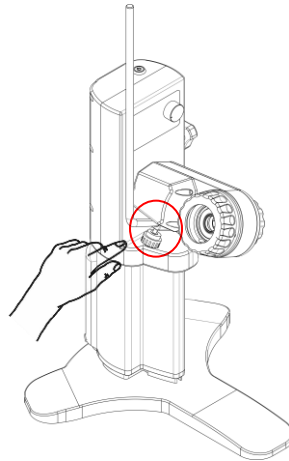


Figure 10

(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)

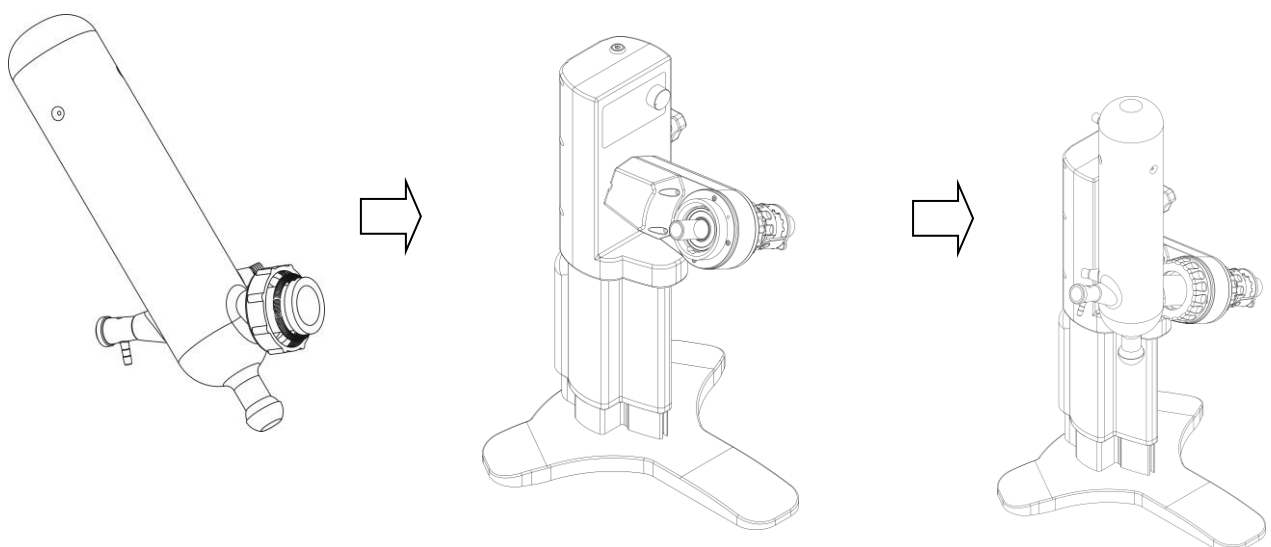


Figure 11

(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.

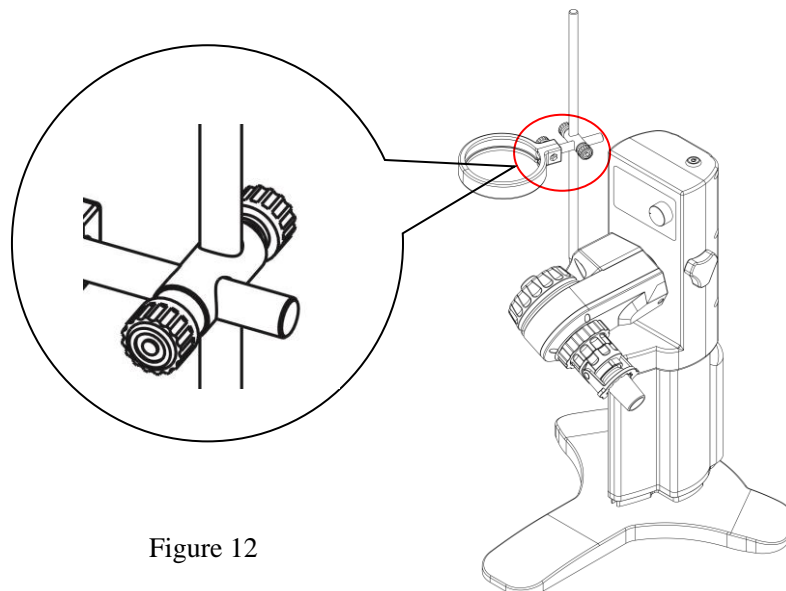


Figure 12

(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)

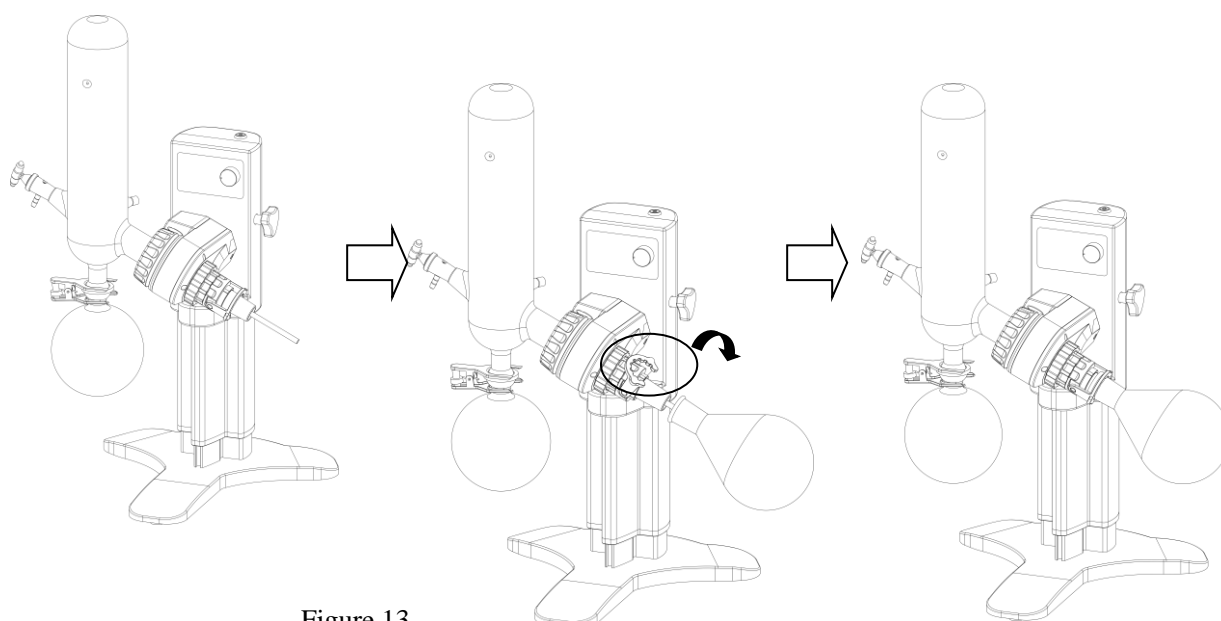


Figure 13

(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:

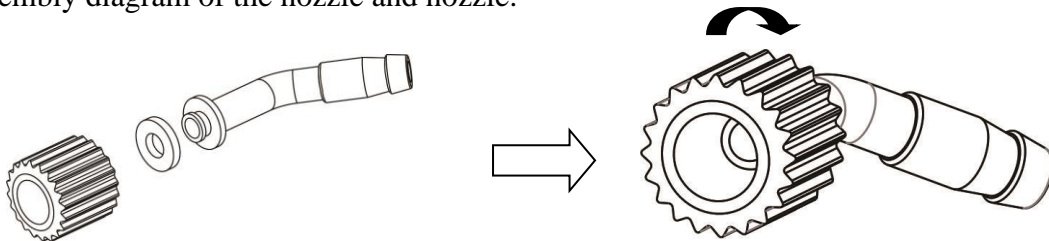


Figure 14

(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.

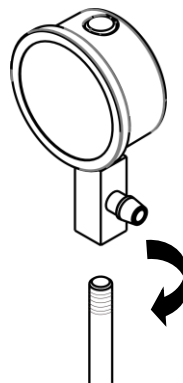




Figure 15

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

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 (applicable to RV-M models). When the RV-A model adjusts the height of the main unit, just touch the “ ,  ” button on the control panel. Release it when you reach the desired height.

The schematic diagram of the circulating cooler and the condenser (this figure is for reference only, whichever is the real thing!)



Figure 16

Note: When removing the silicone hose, press the stainless-steel tab on the tab to push the hose out.

Instructions for use of reducing adapter

When the condenser cooling water nozzle is a threaded component and the connecting pipe diameter of the cooling circulator is $\phi 10\text{mm}$, add two sets of reducing adapters (PE straight + inner diameter $\phi 7\text{mm}$ length 100mm silicone tube).

Note: If the diameter of the connecting pipe of the cooling circulator is $\phi 8\text{mm}$, 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:

Cooling circulator
connecting pipe interface



Cooling water
nozzle connection
port

Figure 17

Installation diagram:



Figure 18

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.

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.

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 (Fig. 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:

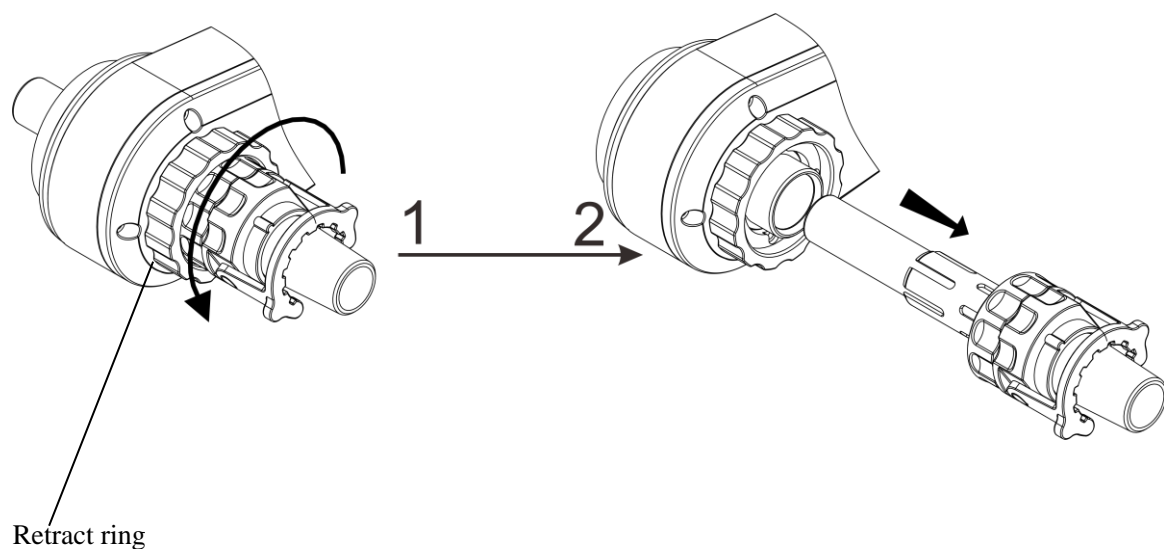


Figure 19

Troubleshooting guide

Sheet 2

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.	
	Circuit board failure.	
Fuse is blown due to overload. (Short circuit)		
Power switch indicator light, but does not rotate.	Rusty bearings.	Please stop using it immediately and contact the dealer or the nearest service center of this product.
	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.	

Product maintenance and care

1. Do not dismantle the unit; internal components contain high temperatures and voltages. This can cause personal injury.
2. Use the correct cleaning supplies when cleaning. Do not spill water directly in the unit, use abrasive powders, thinners, petroleum, kerosene, or acid substances. Electric shock may occur.
3. Use a soft cloth to clean any dirt; hard to remove stains require the use of natural detergents.
4. Inspect equipment before use; if glassware is damaged do not use it.
5. Wipe the glassware joints with a soft cloth, then apply a small amount of vacuum grease.
6. When you first power the unit, allow the motor to run from slow to fast. To turn off, slow down the motor, then turn off.
7. For regular cleaning of the glass axis, remove the ring, and wipe the shaft with a soft cloth. Apply vacuum grease and re-install.

Electrical parts must **never** get wet or damp

Packing List

Product name: **Rotary Evaporator**

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	

Ordering Information

Order No.	Series	Model
52411-92	RV-200	RV-200-2-120
52411-93	RV-200	RV-200-2
52411-94	RV-200	RV-200A-2-120
52411-95	RV-200	RV-200A-2

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