Kalstein

Model YR02306

Rotary Evaporators

Instruction Manual

Thank you very much for purchasing our Model YR02306 Rotary Evaporators.

Please read the “Operating Instructions” and “Warranty” before operating this unit to assure proper operation. After reading these documents, be sure to store them securely together with the “Warranty” at a hand place for future reference.

 Warning: Before operating the unit, be sure to read carefully and fully understand important warnings in the operating instructions.

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Name and model

Rotary Evaporators YR02306

Use

It is suitable for experiment of evaporation, distillation or separation of chemicals. It usually works with water circulating vacuum pump and recirculating chiller as a whole system to meet the production and experimental requirements.

Technical Specification

Name		Rotary Evaporator YR02306
Performance	Rotation speed(r/min)	10 - 280
	Evaporating speed (ml/min)	23*
	Sealing	Pressure rise rate <= 0.33kPa /min
	Rotation speed adjustment	Stepless speed control
Specifications of components	Rated motor power(W)	40
	Condenser	Double coil
	Evaporating flask(L)	0.5 , 1, 2
	Receiving flask(L)	1
	Glass rotation axis(mm)	Inner diameter Φ15× Length 190
	Vacuum sealing	PTFE＋FV rubber, viton double sealing
	Interface diameter(mm)	External diameter Φ10
	Engine base(mm)	T-type
	Lifting stroke(mm)	150
Adjustment	Rotation speed setting	Knob
	Rotation speed display	LED
	Lifting function	Motorized
Safety		Over-load protection, short-circuit protection, ground fault protection
Power supply		110 - 240V~, 50/60Hz
Fuse		F2AL, 250V
Ambient temperature(℃)		5 - 35
Ambient relative humidity (%)		<= 65
Enclosure protection class		IP20
Pollution prevention class		Class 2
Dimensions W*D*H(mm)		450×350×700
Net Weight(Kg)		10

* Using pure water as the experimental object.

Safety

The chapter describes the installation, safety rules in the process of using 'YR02306 rotary evaporator'. Users must know the related warning signs, strictly follow the operation procedures to ensure security of the instrument and operator, avoid any accident.

1. Warning Signs

Please pay special attention to all warning signs.

	**Danger** It means very dangerous that shall cause death or serious injury.
	**Warning** It means very dangerous that shall cause death or serious injury.
	**Prohibited** Exposed to rain or water is prohibited.
	**Caution** Caution high temperature.
	**Note** It means very dangerous that shall cause serious injury.
	**Note** Please wear protective equipment, or it may cause personal injury.
Reminder	**Reminder** It means that might cause damage to the device.

2. Hazards Related to the Instrument

	**Dangerous** ● It is prohibited to use in explosive gas environment or explosive dust environment. ● It is prohibited to deal with dangerous materials which are beyond its design purpose. ● It is prohibited to repair by nonprofessionals.
	**Warning** ● Make sure the power supply is in conformity with the requirements on the name plate. ● It is equipotential bonding, protective bonding conductor are not allowed to be removed. ● Before opening the instrument shell for maintenance and repair, be sure the power supply is disconnected, then operate after 5s, ensure the residual voltage released to safety value to avoid electric shock. ● There could be a risk of explosion if using broken glassware. ● If the solvent vapor is gathered in the housing, it may cause explosion.
	**Prohibited** ● Do not use it outdoor. Get wet in the rain or splashed with water will cause live shock by touching the instrument shell.
	● The surface of working parts is quite hot, especially the water bath, do not touch them directly, to avoid injury.
	**Note** ● If there is any abnormal situation when using it, please disconnect the power supply immediately for trouble shooting or contact professional maintenance personnel. ● Be careful of the broken glass parts. ● There is a risk of generating static electricity when feeding solvent or powder to the flask with the feeding funnel.
Reminder	**Reminder** ● Do not use in high temperature and humid environment. Otherwise, its performance and life-span will be affected. ● Keep the device in a place with good ventilation.

3. Other Hazards

	**Warning** • The samples in the flask or some solvents near the flask may possibly form peroxides or high concentration of flammable solvents. • Beware of explosion risk when handling hazardous materials or samples of unknown composition.

4. Safety Measures

	• Please wear personal protective instrument when operating this instrument, such as protective glasses, clothing and gloves.

General Introduction

Thanks for using 'Kalstein´s YR02306 Rotary Evaporator'. This manual stated instructions for installation, operation, maintenance and repairing. Please read it carefully before using.

1. Operating Requirements

- **User's Qualification**

'Kalstein´s YR02306 Rotary Evaporator' must be operated by people who has practical operating experiences and who can keep in mind of detailed requirements in this manual. Otherwise, it must be used under guidance of people who has professional technology skills.

- Proper Use

Application fields:

a) Evaporation.

b) Distillation.

c) Separation of chemicals.

d) Drying powder materials in the rotating bottle.

e) Crystallization.

- Improper Use

The purposes which not mentioned above are improper use. Any damage caused by improper use is responsible by the users themselves.

It is prohibited to use the machine under following condition:

a) Use it in explosive gas environment or explosive dust

b) Environment.

c) Use it in places where power supply is not in conformity with the requirements;

d) Use it in high magnetic fields or corrosive environment;

e) Deal with hard and brittle materials (such as rock and soil samples, etc.), which might damage the evaporating flask;

f) Sample volume in the evaporating flask should not exceed the specified limit

Instrument Configuration

1. Host Configuration

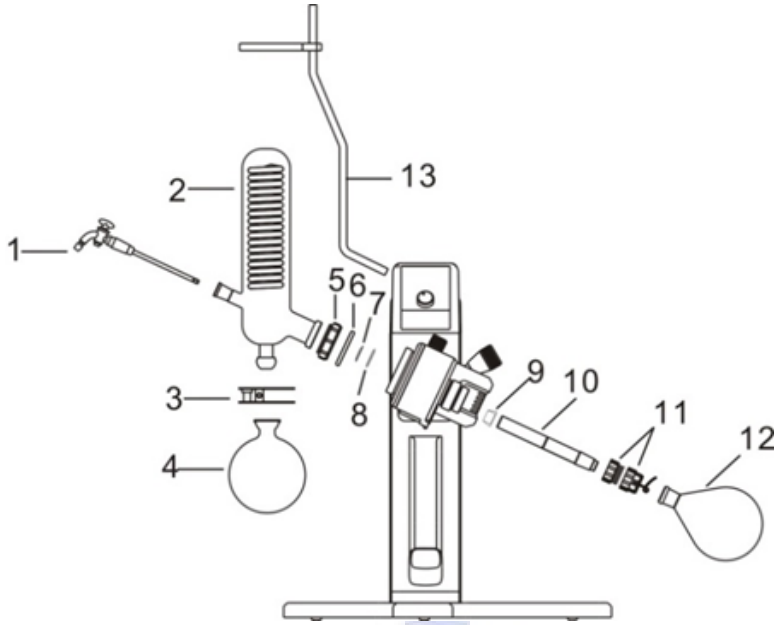
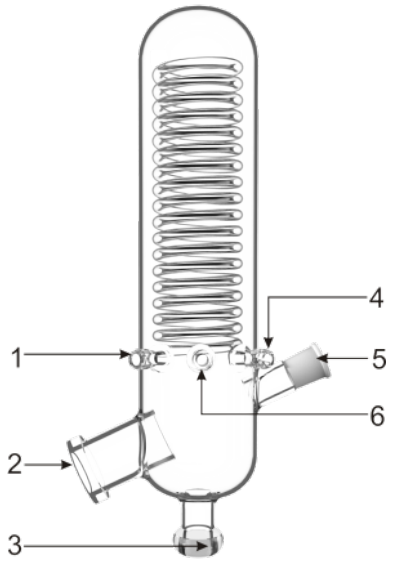


Figure 1 Rotary Evaporator Components. Please see each components' name in table 3.

Table 3 Rotary Evaporator components and quantity

No.	Picture	Name	Quantity
1		Glass feeding valve	1 pc
2		Glass condenser	1pc
3		Receiving flask clamp	1pc
4		Receiving flask	1pc

5		Condenser locknut	1pc
6		Circlip	1pc
7		Deputy vacuum sealing ring	1pc
8		Main vacuum sealing ring	1pc
9		Taper sleeve	1pc
10		Glass rotation axis	1pc
11		Quick release clamp	1set
12		Evaporating flask	0.5L 1pc 1L 1pc
13		Condenser rod	1pc
14		Feeding tube	1pc
15		Host	1set

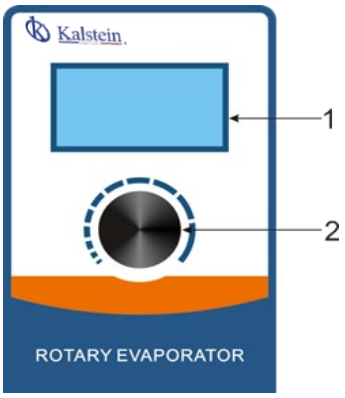


1.Cooling liquid inlet
2. 50 flange port
3. Receiving flask connection port
4. Cooling liquid outlet
5. Material feeding port
6.Vacuum port

Figure 2 Glass condenser ports.

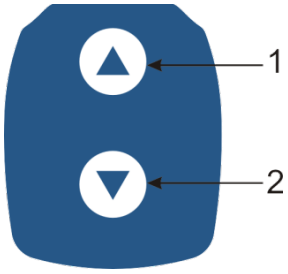
1 Locking knob
2. Angle adjustment knob
3. Rotation axis
4. Quick lock button
5. Machine head

Figure 3 Rotating mechanism



1.Rotation speed display window
2.Rotation speed regulator

Figure 4 Control panel



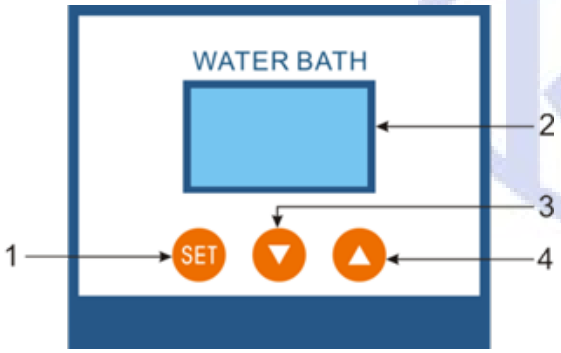
1. Up 2.Down

Figure 5 Lifting control panel

2. Bath Configuration

Figure 6a

Figure 6b



1.Temperature setting
2.Temperature display window.
3.Decrease set value
4.Increase set value.

Figure 6c Control panel

Unpacking and Installation

1. Unpacking and Installation

a) Glass is fragile, please be careful when unpacking.

b) Be careful of these small parts in case of missing.

c) Please place this instrument on a plain and stable bench and consider its maximum dimensions.

d) Please check every component according to the packing list before install it.

2. Power Connection

a) Make sure the power supply is in conformity with the requirements on the name plate.

b) It should be connected with socket which is grounded properly.

c) Make sure that there is no sparks around the instrument, to avoid damages could be caused by the sparks.

3. Installation

When assembling the instrument, please refer to the following steps:

1) Insert the taper sleeve (9) to the smooth side of the Glass Rotation Axis(10), move it to the raised part. Please see figure 7.

Figure 7

2) After fixing the taper sleeve (9), insert the Glass Rotation Axis(10) to the middle hole of the rotation axis from the right side. Please see figure 8

Figure 8

3) Install the quick release clamp (11) of the Evaporating flask, then insert it to one side of the glass rotation axis as shown in Figure 9. Press the lock button of the rotation axis and turn it to the lock position, and screw the quick release clamp (11) clockwise.

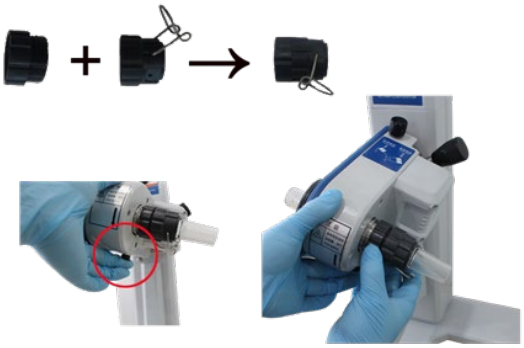


Figure 9

4) Insert the Main Vacuum Sealing ring (8) from the left side of rotation axis. Please see figure 10.

Note: The main vacuum sealing ring(8) with two colors should be placed facing outside.

Figure 10

5) Put the Deputy Vacuum Sealing ring (7) up on the Main Vacuum Sealing ring (8), the raised part of Deputy Vacuum Sealing ring should be placed facing outside.

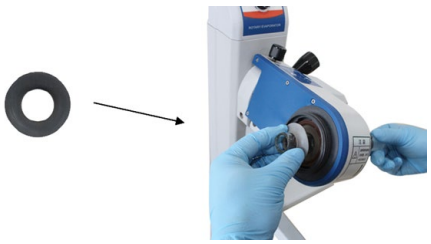


Figure 11

6) Insert Condenser Locknut (5) on 50# flange mouth of Glass Condenser (2) as shown in Figure 12.

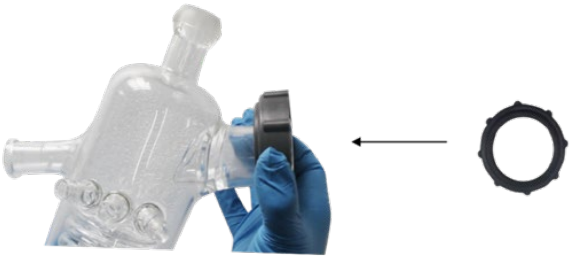


Figure 12

7) Insert the Circlip (6) inside of Condenser Locknut (5); gently push the Circlip (6) until it is fixed on the 50# flange mouth of Condenser.

Figure 13

8)After the condenser locknut(5) and circlip(6) fixed to the glass condenser, insert the condenser to the left side of rotation axis. Keep the receiving mouth downward and turn the condenser locknut(5) tightly. Please see figure 14.

Figure 14

9) Insert the condenser rod (13) into the corresponding fixing hole on the host, tighten the fixing screws of the rod, please see Figure 15.

Figure 15

10) Adjust the condenser hoop to the appropriate height to make it twines around the condenser, please see Figure 16.

Figure 16

11) Connect the Receiving Flask (4) with the receiving mouth of Condenser, use the Receiving Flask Clamp (3) to fix them.

Figure 17

12) Adjust the screw of the Receiving Flask Clamp (3) until the flask does not shake anymore (Counter clockwise: to tight; clockwise: to loosen). Please see figure 18.

Figure 18

13) Install the Evaporating flask(12) on the rotation axis, adjust the position of Quick release clamp(11) to ensure the hook and Evaporating flask are fit tightly. Please see figure 19.

Figure 19

14) Install the vacuum nozzle to the vacuum port of the glass condenser, tight it clockwise. Please see figure 20.

Figure 20

15) Insert the Feeding Tube(14) to the end of Glass Feeding Valve(1), ~20mm is better. Please see figure 21.

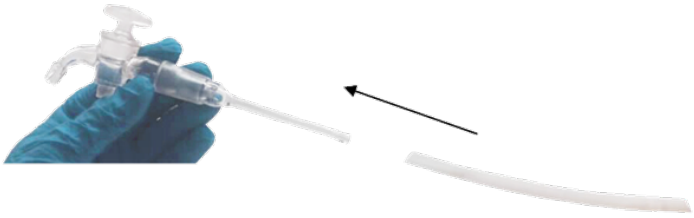


Figure 21

16) Insert the Glass Feeding Valve(1) with the Feeding Tube into the Glass condenser(2). The Feeding Tube will go through the glass rotation axis(10) and reach the Evaporating flask(12). Please see figure 22.

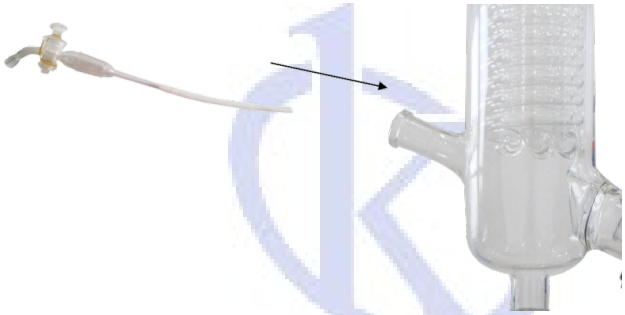


Figure 22

17) Check whether all the components are assembled correctly. Please see figure 23.

Figure 23

18) Connect the associated devices. Connect the working system properly with hoses as it shown in figure 24.

Figure 24

Operation

1. Precautions

Table 4 Precautions

Danger	Do not pour alcohol, benzene and other inflammable and explosive materials into the water bath
Warning	Do not refit this instrument.
	Do not use it beyond prescribed purpose.
	Do not use it under unattended situation.
Note	Please read the user manual carefully before using this product.
	Please use/install this product on a smooth and flat table.
	This product should be used in a room with temperature range from 5℃ to 35℃. It may cause malfunction if use it beyond the temperature range for a long time.
Note	Please do not press the power cord. The power line may be damaged when there is heavy thing on it or when it goes through objects, or it may cause electric shock or fire.
	Please check regularly whether there is dust or dirt on the power plug and make sure the plug is connected properly.
	Please disconnect the power plug from the socket for safety

	when the product will not be used for a long time to avoid fire caused by overheating.
	If unusual noise or signs are found during operation, please disconnect power and pull out the plug immediately or seeking for technical support.
	When moving this product, please disconnect power supply and pull out the power plug. In order to avoid electric shock or fire, moving this product under switch-on condition is prohibited.
	During experiments, some parts could be very hot, beware of burns! When handling the samples, please wear gloves. Do not move it when it is hot.
Reminder	Beware of water overflow when put the evaporating flask into the water bath.
	Please do not adjust the height and angle of the condenser and the driving head during use.
	Please clean the instrument surface in time after using it to keep it clean.
	It can work continuously.

2. Operation

- **How to Feed Material**

1) There are two ways to feed materials to the evaporating flask: Manual feeding and Automatic feeding.

a) Manual feeding:

Open up quick release clamp (part 11), remove the evaporating flask carefully, feed in materials slowly with certain amount specified in table 5, then install the evaporating flask according to figure 19.

b) Automatic feeding:

Switch on the connected vacuum pump, vacuum the rotary evaporator until it reaches negative pressure, transfer the material to the evaporating flask by glass feeding valve(1) to certain amount specified in table 5, close the glass feeding valve(1)after feeding finished.

2)Add certain amount of liquid to the bath. Beware of overflow!

Table 5 Material feeding volume in the evaporating flask

Capacity of evaporating flask(L)	0.5	1.0	2.0
Max. material feeding volume(L)	0.32	0.65	1.3

Turn on the Main Power Supply

Connect the power supply and switch on the rotary evaporator. The 'rotation speed display window' of the host displays 'CC-1', and after 5 seconds, it enters 'monitor interface' and displays the current speed value '0'.

Adjust the Lifting Height and Immersion Angle of the Evaporating Flask

I. Adjust the lifting height: Press '▲' on the "lifting control panel" in figure 5 to rise the host and evaporating flask. During this process, press '▲'again to stop rising. Press '▼'to lower the host and evaporating flask. Click '▼'to stop during process. There are position limiting units for both rising and falling.
II. Turn the locking knob (1) counterclockwise in Figure 3 to release the locking state of the machine head.
III. Rotate the angle adjustment knob (2) in Figure 3 to immerse the evaporating flask in the bath to an appropriate volume, then rotate the Quick lock button (4) in Figure 3 to lock the machine head. Adjust the angle range from 15 – 45°.

Reminder	The angle adjustment range of the evaporating flask should not exceed the specified limit, otherwise the instrument will be damaged.

Rotation Speed Setting

I. Turn the rotation speed regulator(2) on figure 4 clockwise slowly to observe whether the evaporating flask is rotating smoothly.

II. The rotation speed can be increased slowly to required value if the evaporating flask is rotating normally.

Bath Parameters Setting

I. Connect the bath power supply and close its power switch.

II. Press 'SET'(1) on the 'bath control panel' on figure 6c to enter 'temperature setting interface', the 'temperature display window(2)' will shows 'SP' or current setting temperature alternately. Press '▲' to increase the setting temperature value; press '▼' to decrease the setting temperature value. Press 'SET' again to enter 'monitor interface', the light on the 'temperature display window(2)' will stops blinking, then the bath will starts heating and 'HEAT' on the 'temperature display window(2)' will be lighting.

Note: Press '▲' or '▼' once, the setting temperature will increases or decreases 0.1oC; keep pressing '▲' or '▼' to change the temperature setting continuously.

Note: After using the water bath for a period of time, Please go self-turning program to keep the temperature control precision.

Self-tuning method:

Press '▼'button for 5 seconds, the temperature controller will start self-tuning, the 'Temperature display window' displays 'SLF'. After this process, the temperature controller will work under new PID parameters.

Note: The self-tuning process should be done under heating condition.

Start running

I. Switch on chiller.
II. Switch on vacuum pump.
III. Start rotation speed control.
IV. Start temperature control.
V. The system will running normally according to above sequence.

Stop the Instrument

I. Set the water bath temperature below room temperature, then press 'SET' button to stop heating, turn off the power of water bath.
II. Turn the Speed Setting Knob to '0' to stop rotating. Click and press '▲' on the 'lifting control panel' to rise the evaporating flask.
III. Adjust the cock on the feeding valve to release vacuum.
IV. Shut down the vacuum pump and recirculating chiller.
V. Remove the evaporating flask.
VI. Open up the quick release clamp(11), remove the evaporating flask carefully and

clean it.

Maintenance and management

Ensure the instrument running normally to increase its service life; users should do daily maintenance and management. Before maintenance, please disconnect power supply, preparing tools, materials according to specific requirements mentioned in the manual. Otherwise, it will cause electric shock or damage.

1. Maintenance
   - When moving the instrument, please avoid violent vibration, or seek help from professionals.
   - Check the hosing regularly, replace the damaged and worn out accessories with new ones of original specifications.
2. Cleaning
   - Before cleaning the unit, please disconnect the power supply. Otherwise, it may cause electric shock or fire hazard.
   - Please use neutral detergent and soft cloth to clean its surface.
   - Do not use water, Benzene, Thinner or any alcohol to clean it. Otherwise it may cause discoloration or damage.
   - Please follow the laboratory regulations to clean the evaporating flask and condenser.
   - If hazardous materials leak on the machine surface or leak into the machine, please deal with the leakage properly.

- Do not use the detergent or disinfectant which can do chemical reaction with the instrument parts or the materials in the instrument.
- If there's any doubt with the compatibility of detergents or disinfectants with the components of the instrument and the materials contained in the instrument, please consult the manufacturer or its agent.
- Please disconnect the power supply when the water temperature is high in the water bath. And clean it after the water cooled sufficiently.
- In order to avoid damage of components, please do not press the monitor and knob forcedly when cleaning them.

3. Troubleshooting

Table 6 Common Failures and Troubleshooting

Situation		Probable cause	Solutions
Rotary Evaporator doesn't work		Power failure	Check power supply
			Switch on
		Switch failure	Contact us or distributor
		Fuse failure	Replace the fuse with new one of original
Host	'Er-1'	Power module failure	Contact us or distributor
	'Er-2'	Motor stopped	
	'Er-3'	Hall logic error	
	'Er-4'	Low voltage	Check the voltage
	'Er-5'	High voltage	
	'Er-6'	Serial communication failure	Contact us or distributor
Bath doesn't heat	Do not display 'HEAT'	Set temperature is improper	Reset the temperature
		Temperature control board	Contact us or distributor
	Display 'HEAT'	Poor contact of heater 's power cord	
		Heater damaged	

Temperature monitor displays ‘ER2’	Temperature feedback signal is wrong	
Temperature monitor displays ‘bAL’	Temperature measurement exceeds set limit	
System leakage	Pipeline connection is not correct	Check the pipeline connection
	Pipeline aging or breaking	Replace the pipeline with new one of original
	Sealing parts breakdown	Replace the sealing parts with new one of original