Operation Manual of 10-50L Rotary Evaporator

Application

Rotary evaporator is an necessary lab instrument mainly used for the evaporation, concentration, crystallization, drying, separation and solvent recovery in medicine, chemical engineering and biopharmacy industry. Rotary evaporator is developed from principle of thermostat heating makes thin film evaporate under vacuum negative pressure condition. Rotary evaporator use stepless speed regulation to rotate glass bottle in a constant speed, material forms a large area of balanced thin film in bottle wall, then the smart thermostat water bath heats the rotating bottle and conducts high speed evaporation under vacuum condition, solvent steam is cooled by high efficiency glass condenser and recycled to receiving bottle. Rotary evaporator is equipped with charging joints, rotary evaporator above 5L volume has discharging outlet, which is convenient for automatic and continuously working in evaporation; rotary evaporator above 10L volume is equipped with double condenser(main condenser and vice condenser), which enables a better condensation effect and higher recovery rate. Since rotary evaporator works under vacuum condition, and parts where may contact material all adopt high temperature resistant high borosilicate glass and PTFE material, thus, it is especially suitable for the concentration, crystallization, isolation, solvent recovery of heat sensitivity material and material which is corrosive to stainless steel metal. This instrument has large contact area, high evaporation efficiency, easy to operate, low noise, reliable sealing and be able to handle easily foaming material, complete in specifications and we already have various specification products of 2L, 3L, 5L, 10L, 30L, 50L, 100L, the 100L rotary evaporator is an exclusive large-scale rotary evaporator owned by our factory, met the needs of large-scale production. Our products adheres to the principle of efficient, practical, convenient and excellent, absorbed essence of like products from domestic and abroad, also aims at satisfying client's using conditions, customer first!

Features

Rotating body is composed of a set of reliable three-phase asynchronous motor and a transducer control device. Under function of frequency control, it can rotate between 10-110rpm, which has reached advanced level at home and abroad.

1. Main structure is made from stainless steel and aluminum alloy, fastness and beautiful.
2. Rotary evaporator adopts manual up and down of bath kettle, lifting distance 180mm.
3. Main and vice condenser ensure a high recovery rate, be used to evaporate organic solvent, vertical design greatly saved space.
4. Rotation axis is made from high borosilicate glass, connecting parts is framework oil sealed by fluororubber, superior sealing performance.
5. Rotary evaporator is equipped with up and down heating groove and closed type resistance wire heater, water or oil temperature is between room temperature to

99℃ or 400℃, water tank is produced by casket type excellent stainless steel, that has strong anti-corrosion ability and long service life. The heating groove can lift up and down, smart temperature control of bath kettle, digital display, temperature control is realized by K type sensor. When water temperature reach to set temperature, controller will automatic cutout heater's power supply; when lower than water temperature, controller will automatic turn on heater's power supply, in this way water temperature is constant. Besides, heating groove can move from left to right.

6. Rotary evaporator's rotating speed is controlled by frequency changer, digital display and rotating speed is stable, use speed adjusting turn-knob to set needed rotating speed.

7. Has function of vacuum display.

Installation

Rotary evaporator is composed of three parts: main engine, glass part and lifting thermostat bath kettle. Instruments should be installed in place where is flat, near to water source sewer, power supply and vacuum source.

Main Engine

1. Upright main engine's holder, generally back side is lean against the wall, leave a 0.5-1m's gallery for maintenance. If ground isn't flat, please level up the underpan.
2. Install the nose on the center upright rod of main engine's holder, adjust nose axis to parallel with underpan, screw down the nose and fastening bolt. Can not displace if push hard.
3. Fix the VVVF on center upright, screw down set screws.
4. Insert the 5-core plug to 5-core socket under transducer.
5. Insert vacuum meter upright to the left side hole at the back of rack, please insert it to the second lampstand hole, if top and bottom hole is misalignment, loosen some set screws can align, please screw down all of the M8 inner hexagonal set screws to make sure main engine's structural strength.
6. Insert the big bottle ring to 51*19 retaining clip of main upright bottom, then screw down the star grip knob.

Glass Part

Glass part assemble is the important thing of this instrument, gas tightness is the key, we should strictly live up to following notes:

1. Please check if has damage at first. Damage due to selling, storage, transportation, assemble and user's fault, our company won't responsible for it.
2. Clean away wrap page and filler, carefully clean all glass components. If you use organic solution, please don't touch plastics parts or oil paint.
3. All standard mouth, flange mouth and piston's sealing face should be scrubbed clean, dry it and re-coat vacuum silicone grease to guarantee instrument's vacuum degree.
4. Fully adjust each movable joints, after aligning at flange hole, screw down nut,

otherwise it will damage the glass.

Installation Procedure of Glass:

1. Use nut to fix the guide cylinder on left side of nose, please check if the glass guide cylinder's gas axle end face ¢ 45×3.55 "O" type ring is perfect before installation. Installation location ¢ 60 flange backward, screw down nut and use hand to rotate nose's main shaft. Resistance should be similar with screwing down nut, and no light in half ring and heavy in half ring.
2. Sit the vice condenser on vice cold aluminium backing ring, adjust location of vice cold backing ring, notice that it should be keep flat, make ¢ 60 flange on side of condenser align at ¢ 60 flange on back of guide cylinder(please attention there is a PTFE ring on flange end face, then screw down the nut).
3. Carefully adjust the vice cold backing ring and related movable joints, make sure vice condenser is vertical; vice condenser should sit on vice cold backing ring and no loosening. It is really important.
4. Connect bottom ¢ 80 flange to top ¢ 80 flange(notice that there is a PTFE gasket on end face), circulating water joint backward, screw down related nuts and check if main condenser is vertical.
5. Connect upper bottle neck of receiving bottle to bottom neck of condenser(notice: there is a PTFE check valve on sealing face), adjust the big backing ring center distance over and over again, make receiving bottle neck connect to flange and screw down the nut.
6. Insert 2 pieces of 24# air vent valve to 24# standard mouth of receiving bottle(smear vacuum grease on joints).
7. Insert 34# charging valve to standard mouth of gas cylinder's left side(smear vacuum grease on joints).
8. Insert 19# air vent valve to 19# standard mouth on guide cylinder(smear vacuum grease on joints).
9. Plug battery socket of transducer, turn on power switch, rotate nose, stable stepless speed regulating, no shake, no abnormal noise. Make sure speed governing is normal, then install rotary bottle.
10. Insert the stop pin on rotary head's ¢ 6mm hole, rotate main axis and lock it.
11. Connect rotary bottle to nose, screw down big nut, notice that bottle neck is end face sealed, make sure "O" type ring is in the PTFE groove.
12. Take out stop pin, rotate main axis by hand should be easily. Power on and rotate the bottle from slow to fast, it should be stable and no looseness.
13. If need to take off the rotary bottle, plug stop pin and screw nut in opposite side to discharge.

Water Bath

1. Move water bath to bottom of rotary bottle, align at the center. Inject clean water into water bath with 2/3 water level.
2. Users plug power line to alternating current 220V or 380V voltage grounded three-plug connector(please strictly obey to sign, L-firing wire; N-null wire; D-ground

wire). Connect air switch and water bath begin to work.

Connect to pipeline

1. Connect vacuum pipe and water pipe behind the instrument.
2. Test vacuum pumping, vacuum degree up to -0.096Mpa and last more than 5 minutes if installed normally. Otherwise, please check all connectors or vacuum pump.
3. Connect cooling water, it should be unblocked and no water leakage id installed normally.

Evaporation Condition

Evaporation speed depends on three conditions:

1. The higher of vacuum degree, the faster of evaporation speed, vacuum degree of water evaporation should no less than 0.096MPa.
2. The higher of water temperature, the faster of evaporation speed, but generally it should not exceed 80℃.
3. The lower of cooling water temperature, the faster of evaporation speed, refrigeration water has better effect.

Operation Procedure

1. Vacuum pumping: turn on vacuum pump, if you find that you can't do vacuum pumping, please check if each bottle neck is sealed well, sealing ring on rotary axis is well, connect a vacuum switch on external vacuum tube can enhance recovery rate and evaporation rate.
2. Charging: take advantage of system vacuum negative pressure, liquid material can be sucked into rotary bottle through charging hole, and make sure liquid material not exceed a half of rotary bottle. This instrument supports continuously charging, please notice that: ①turn off vacuum pump; ②stop heating; ③please slowly open the charging valve cock after evaporation is stopped, in case of back flow.
3. Heating: this instrument is equipped with specially designed water bath, it must add water first power on later, temperature control range between 0-400℃. Since thermal inertia, actual water temperature is higher of 2 ℃ than set temperature, you can amend set value when using. Temperature setting: power on water bath, set needed temperature, press SET button, upper display SP. Press shift button (<<) to make to be modified number twinkle, press up or down button, make bottom display your needed value. Press SET button to return to standard mode.
4. Rotary: open speed adjusting switch, adjust turn-knob to best rotary speed, please avoid water vibration wave.
5. Connect cooling water.
6. Recycle solvent: power off vacuum pump, open charging valve and valve the gas, take out solvent in receiving bottle.

Notes

1. Vacuum degree is the most important technological parameter of rotary

evaporator, and users often come across problems of can't do vacuum pump. It's usually related to using solvent's property, in chemical engineering and pharmaceutical industry, it often use water, ethanol, propyl alcohol, acetic acid, ethyl ester, diethyl ether, petroleum ether, chloroform as solvent, while in general, vacuum can not resist strong organic solvent, you can choose special type vacuum pump with strong anti-corrosion property. (recommend using water circulating pump, our factory is available). Simple method to test if instrument has air leakage---pinch off external vacuum leather hose, observe vacuum meter on instrument, see if it can keep the vacuum degree for 5 minutes. If there has air leakage, please check whether each sealing joint and sealing ring on rotation axis is perfect(see Maintain Tips below). Otherwise, please check vacuum pump and vacuum pipeline.

2. Motor use E-grade insulation, winding use polyester high strength enamelled wire, using environment and height no more than 1000m, environment temperature no more than 40℃, motor surface temperature difference of continuous using no more than 45℃ belongs to normal situation. If beyond 45℃, please check related transmission lubrication system, if environment temperature and water bath temperature is too high, users can use fan to cool it.
3. Please handle gently with glass components, please clean and dry it before and after using.
4. Please add water first power on later of the heating groove, forbid burning without water.
5. Please smear a few vacuum grease on connectors to increase gas tightness.
6. Do not move, please lock nose location.
7. Simulation test should conducted on precious solvent, make sure this instrument is applicable.
8. Use thermometer for accurate water temperature.
9. Shut down switch and take off power plugs when finishing working.

Maintenance

1. Sealing maintenance of rotary head

It is end face sealing between rotary bottle and rotary head, if you find 0 type ring is damaged, please change it in time. We will attach 1 piece of O type ring, it belongs to standard component, customer can purchase it by themselves. Air guide axis doesn't rotate, main shaft sealing of rotating head is assumed by framework oil sealing, since it uses PTFE seal cartridge to isolate, steam of organic solvent is difficult to corrode, service life as long as more than a half year for normal using. You can take out the PTFE seal cartridge and observe if oil sealing is in good condition, please change it timely if it is damaged.

2. Lubricating maintenance of rotary head

If we use hand to rotate normal rotary head, it should be flexible with no block. Lubrication failure will make electric machine heat and damage PTFE cover and oil sealing, so it needs to maintain at fixed period.

(1). Once every month, take out PTFE cover, clean air guide axis outer ring, PTFE

cover and oil sealing hole, smear high-grade lubricating grease of high temperature resistant property of 120℃, scrubbing extrusive grease after back to normal.
(2). Once every month, dismantle air guide bottle, pull out the air guide axis from left side of nose, clean the nose and smear high-grade lubricating grease on each lubricating face. Dismantle 2 pieces of 5M screws and take out the electrical machine, wash variable gear ans smear lubricating grease.(If operate in normal condition, maintenance period can be increased, if organic solution flow into nose, please wash the lubricating parts in time.)

3. Cleaning glass
Please carefully separate the glass part when cleaning glass, you can use electric hair drier to separate it.

Please let us know if you have any question during using the instrument.

Living Example

Material	Bath temperature	Water temperature	Vacuum degree	Feeding weight	Receiving weight	Evaporate to dryness period	Recovery rate
Ethyl Alcohol	60℃	22℃	-0.096 MPa	10L	9.6L	43 min	96%
Water	68℃	22℃	-0.096 MPa	10L	9.8L	90 min	98%

Experiment condition: 20000ml rotary bottle, 60 rotate/min (for your reference)

Technical Parameter of 10-50L Rotary Evaporator

Basic Parameter	Type	RE-1002	RE-2002	RE-5003
	Glass material	GG-17		
	Holder material	Stainless Steel & Aluminium Alloy		
	Spraying plastics anti-corrosion of shell(mm)	490*430*540	630*534*638	710*620*700
	Container material stainless steel(mm)	350*220	450*250mm	550*320mm
	Baseboard Dimension(mm)	500*500	550*500	800*600
	Rotary Bottle Volume	10L ¢ 95flange	20L ¢ 95flange	50L ¢ 125 flange
	Receiving Bottle Volume	5L ¢ 50flange	10L ¢ 60flange	20L ¢ 60flange
	Vacuum degree(Mpa)	0.098		

	Rotary power(W)	120		180
	Rotary speed(rpm/min)	0-110		
	Heating power(KW)	3	5	8
	Temperature control range of bath kettle(℃)	0-400		
	Temperature control accuracy(℃)	±1		
	Voltage/frequency(V/Hz)	220		380
	Lifting distance(mm)	180		
	Boundary dimension(mm*mm*mm)	970*480*1950	1170*540*2200	1520*620*2470
	Package dimension wooden case (mm*mm*mm)	1350*350*400 1280*570*660	1370*700*680 700*680*740	1450*390*440 1150*840*660 790*730*790
	Package weight(KG)	100	123	170
Functional Configurations	Speed Adjustment Mode	Frequency control		
	Rotating Speed Display Mode	Digital display		
	Temperature Display Mode	K type sensor digital display		
	Temperature Control Method	Smart temperature control		
	Sealing Mode	PTFE component sealing		
	Condenser	Vertical efficient three backflow condenser		
	Continuously receiving	Check valve control		
	Up and down method	Manual up and down of bath kettle		
	Temperature measuring device	19# Standard Aperture		
	Continuously charging	34# charging valve		40 # charging valve
	Discharging method	PTFE discharging valve		
	Vacuum display method	Vacuum meter		
Optional Configurations	Lifting method	Automatic up and down		
	Receiving device	Double receiving bottle		
	Anti-explosion	Explosion proof transducer, explosion proof electric machine EX120W		

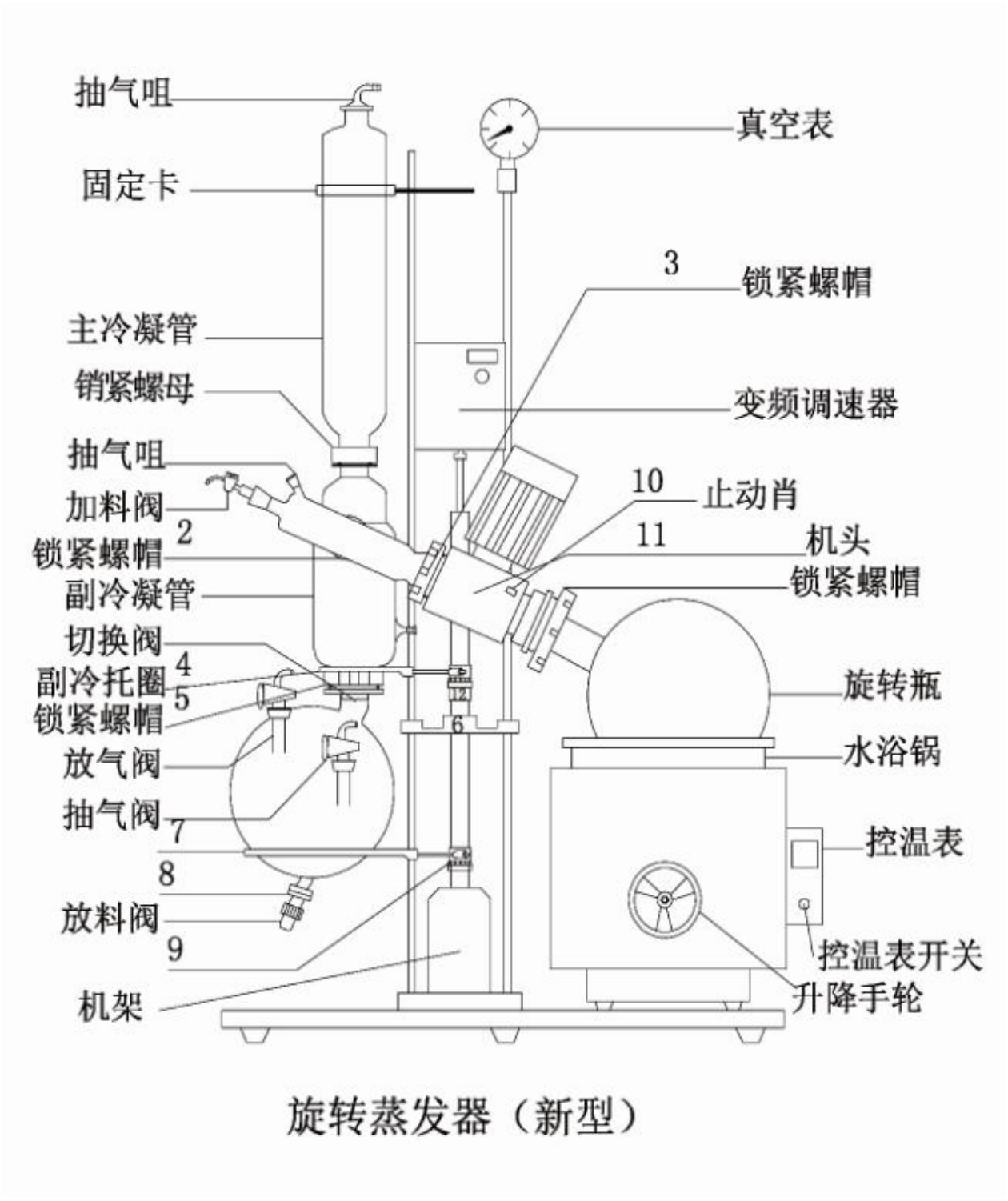
	Framework part	Spraying plastics or PTFE
	Bath kettle material	whole 304 stainless steel
Our company's laboratory glass and laboratory instruments are independent research and development, available for custom-made according to client requirements.		

Packing List of 10-50L Rotary Evaporator

Machine Part		**Glass Part**	
Head with the motor	1 set	Rotary bottle	1 pc
Floor shelf	1 set	Receiving bottle	1 pc
Vice cold aluminium backing ring	1 pc	Main condenser	1 pc
Receiving bottle aluminum backing ring	1 pc	Vice condenser	1 pc
YZ-100 vacuum meter	1 pc	Air guide bottle	1 pc
Rotary nut	1 set	Charging valve	1 pc
Vice cold nut	1 set	∅ 60 flange tapping	1 pc
PTFE discharging valve with flange plate	1 set	24# air vent valve	2 pcs
Check valve	1 set	19# air vent valve	1 pc
Rotary F4	1 set	Rotary axis	1 unit
Condenser pipe clamp	1 pc		
∅ 60F4 pad	3 pcs		
∅ 80F4 pad	1 pc		
Big black hat	3.5 sets		
Condenser	1 set		
Water bath kettle	1 unit		

Spare parts			
Instruction book	1 unit	∅ 4 allen wrench	1 pc
Warranty card	1 unit	∅ 43 ○ ring	1 pc
Certificate of quality	1 unit	∅ 48 ○ ring	1 pc
Packing list	1 unit	∅ 90 ○ ring	1 pc
		Protective pipe	2 pcs

The final explanation right of this instruction book belongs to our company, if product has change, please subject to real products, we will not change the instruction book.



旋转蒸发器（新型）rotary evaporator(new type)
抽气咀 air exhaust mouth
固定卡 fixing clip
主冷凝管 main condenser pipe
销紧螺母 jam nut
加料阀 charging valve
锁紧螺帽 lock nut

副冷凝管 vice condenser pipe
切换阀 switching valve
副冷托圈 vice cold backing ring
放气阀 air vent valve
抽气阀 air exhaust mouth
放料阀 discharging valve
机架 rack
真空表 vacuum meter
变频调速器 variable frequency governor
止动肖 locking bolt
机头 nose
旋转瓶 rotary bottle
水浴锅 water bath kettle
控温表 temperature control meter
控温表开关 temperature control meter switch
升降手轮 lifting hand wheel

Commitment Letter of After-Sale Service

Quality Assurance

We guarantee that our sold products are brand-new products according with contracts regulation and passed quality testing, quality and properties, technical index and configuration according with contracts and manufacturer technical documents requirements.

Installation And Trial Run

After receiving our products, if you need us to install at your place, our company or our agents responsible for installation, specific installation fees will be discussed.

Check And Inspect

After installation and trial run, clients check and inspect the products, and confirm accepting whole technical documents, sign on the installation and inspecting report to verify acceptance.

Service

From acceptance date, we offer you 12-month quality assurance(expect for glass part), all maintenance fee and fitting fee will not be charged within warranty period(instruments damage of man-made reason will be charged for fitting's cost price), beyond warranty period, we will responsible for the maintenance for all life long, we will charge maintenance fee according to actual condition.

Service Commitment

We will response you within 24 hours after receiving client's written repair report, needed accessories for change will be delivered from factory through logistics.