LabTech

EV311H

Rotary Evaporator

USER MANUAL

ISO 9001

Your Lab, Our Tech

CONTENTS

NOTE: Please read the manual carefully! Any incorrect action may result in the unit damage, so it will out of its warranty.

Chapter 1

REMARKS

The information contained in this document may be the object of patents or patent applications by LABTECH.

The possession of the document in force does not confer any licence rights in and to such patents:

The following names are LABTECH trademarks throughout the world:

LABTECH EV311H

This guide is updated regularly.
Updatings are incorporated in the new editions.

The information furnished by this edition may be amended before the products defined herein become available.

GUARANTEE

The new equipment and material sold by LABTECH is guaranteed against any manufacturing defects for one year (unless otherwise stated by LABTECH) with effect:

- From the technical acceptance of the equipment in the factory by the buyer or his designee,
- or failing this:

  For other destinations: from the date of factory shipment certified by air waybill, consignment note or bill of lading.

The LABTECH company guarantee applies exclusively to defectiveness arising from a design fault or from a concealed defect. It is strictly limited to the free dispatching of replacement parts (except for consumable items) or to the repairing of the equipment in our workshops within a deadline of 10 working days (shipping delay not included).

By express agreement, the following are strictly excluded from our guarantee:

- All damages, notably for staff costs, loss of earnings, business trouble, etc
- Any breakdown due to an incorrect use of the equipment (non adapted mains, fall, attempt at transformation, etc) or to a lack of maintenance by the user or to poor storage conditions.
- Any breakdown due to the use of parts not supplied by LABTECH, on LABTECH equipment
- Any breakdown due to the transporting of the equipment in packaging which is not its original packaging
- Generally any item which appears in the "accessories" section on the price list.

Our customers are kindly asked to apply for our consent before returning any instrument for repair. No return of materials may be accepted whithout the prior written consent of our Sales Management which will precise the terms of such return.
If the above consent is given, articles shall be returned in their original packaging on a prepaid basis to the following address:

North and South America
Address: 114 South Street, Hopkinton, MA 01748, U.S.A

Europe and Africa
Address: Via fatebenefratelli, 1/5-24010, Sorisole (BG), Italy

Asia
Address: No.6 Anqing Street, Area B, Tianzhu Airport Industrial Park, Shunyi District, Beijing 101312 China

Whatever method and conditions of transport are chosen for the shipment of the equipment to be repaired under guarantee, in the original packaging, the corresponding costs and the insurance costs will be payable by the customer.

Any damage connected to the return transport of the equipment falls within the framework of the guarantee on the express condition that the customer has sent his complaint within forty-eight hours by registered letter with acknowledgement of receipt to the carrier. A copy of the letter should be sent to LABTECH.

For equipment with a guaranty card, this is only applicable if the card delivered with the equipment is returned to LABTECH duly completed.

TRADE SECRET AND PROPERTY RIGHTS

Chapter 3

RECEPTION

If the material is not immediately used, it agrees that it is stored in an own and dry place. To respect temperatures of storage (0 - 50°C).

The LABTECH equipment has been designed, manufactured, tested and inspected according to the ISO 9001 standards.

LABTECH equipment is carefully inspected before it is packed. As soon as you receive your equipment, check the condition of the packaging and if you notice any problems, notify your carrier within 48 hours. Then consult the packing list and check that everything is in order. Finally, if you discover that something is missing, or if the goods are damaged:

DO NOT WAIT, CALL
LABTECH

To benefit some LABTECH services (cards of applications, LABTECH information, technical advices...), send back us from now on the joined guarantee questionnaire duly completed to the following address:

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Chapter 4

SAFETY

4.1 WARNINGS

Before using the equipment, make sure you read and understand all instructions and safety precautions list in this manual. If there is any question, please contact our Customer Service Center.

4.2 PRECAUTIONS

Please use the special-purpose and independent socket, and a safe protection ground wire must be provided; otherwise it may cause the electric accident.

When the equipment is working or its temperature hasn't cooled down to ambient temperature, make sure not to touch the heating area.

Observe all warning labels and never remove them.

Please take care of glass parts when do installation and detach. Avoid vibration, scraping and temperature changing suddenly. Please clean and dry the glass vessel before using.

Fix all of the glass components before lift or lower the system. Let the system lift and drop calmly and slowly to avoid the violent vibration of glass vessel.

Never operate damaged equipment.

Lift up the rotation vessel first and then turn off the equipment and disconnect the power cord from the power socket when no operation is needed.

Always turn off the equipment and disconnect the power cord from the power source before performing any service or maintenance procedures, or before moving the unit.

Never place the equipment in a moist place. The moisture may reduce the insulation capacity.

Keep a distance of more than 100mm around the equipment, if the distance is too short, it may cause articles around to be damaged.

Please put the equipment on a firm, strong holder. Avoid the resonant from the holder, and this will decrease the vibration and noise.

Fluids in rotating flask should not over half of the flask's full volume.

Clean heating bath periodically to make scale off.

The unit has been calibrated to water bath, if oil bath is needed, please recalibrate or consult our engineers.

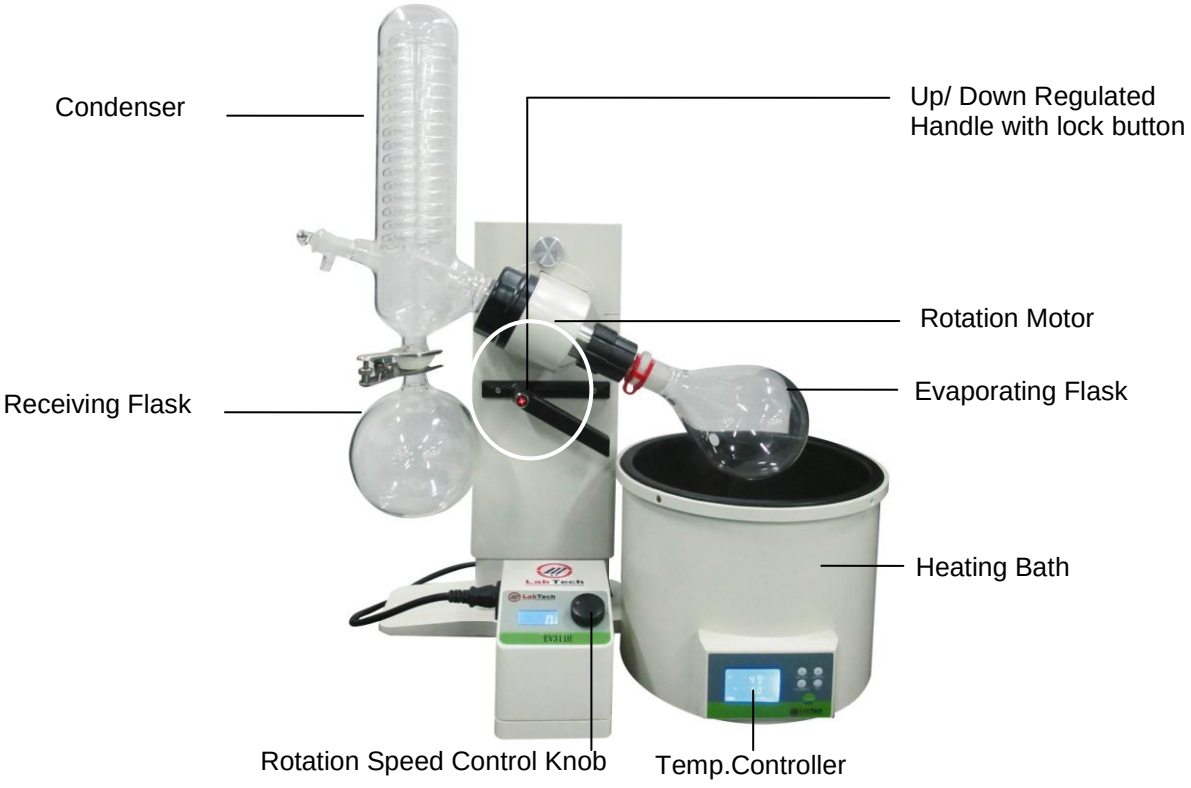
It's better to consult our engineers before performing any maintenance; wrong action may damage the equipment and void the manufacturer's warranty.

Chapter

5

GENERAL INFORMATION

5.1 FRONT VIEW



5.2 SPECIFICATION

EV series rotary evaporator system, combining with LabTech chiller and vacuum pump, provides a total solution package to customer who wants to have an efficient, fast and gentle way to separate liquids.

The rotary evaporator principle is that the evaporating flask generates an effective heat transfer for fast evaporation and prevents a local overheating whilst leading to a smooth mixing of the content.

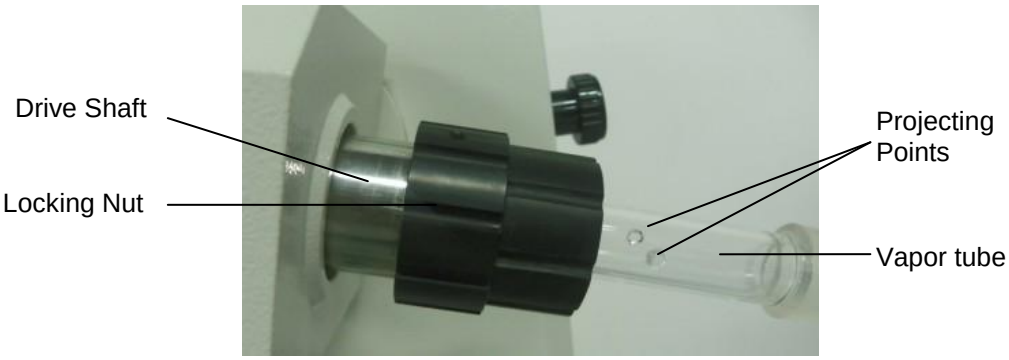
	Model	**EV311H-V/L**
Main Unit	Evaporation Volume	50-2000 ml
	Rotation Speed	20-260 rpm
	Rotation Speed Display	LCD
	Head Tilt Angle	0-60°
	Rotation Motor Power	40W
	Lift up and down	Motor
	Motorized Lift stroke	150 mm
	Clockwise/Counterclockwise Rotation	Yes
Heating Bath	Model	HB-05
	Temperature Range	Ambient～+180 ℃
	Bath Material	Stainless steel
	Temperature Control	PID (LCD)
	Temperature Accuracy	±1℃ (Water) ±2 ℃(Oil)
	Heating Power	1300 W
	Bath Volume	5 L
	Timer	Yes

5.3 PARTS INSTALLATION

Please check all parts and accessories before installation and set up according to the following:

5.3.1 Install vapor tube

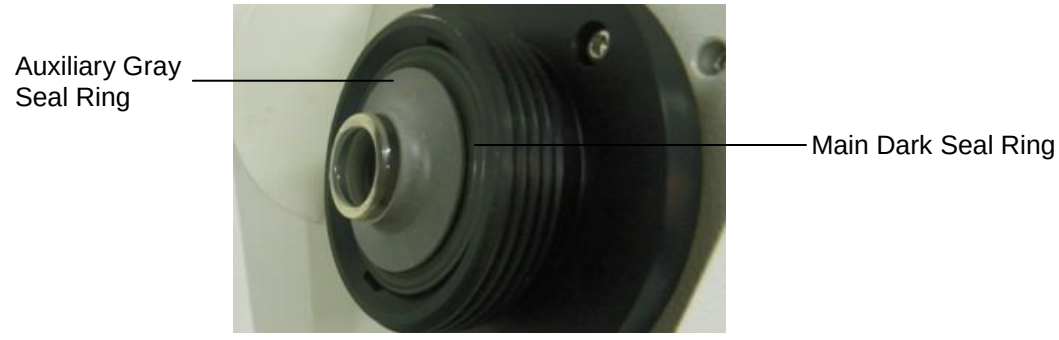
Insert the vapor tube into the drive shaft until it stops, rotate the vapor tube to fix its projecting points to the groove of locking nut. Then clockwise rotate the locking nut tightly. Try to pull the vapor tube out to check if it was firmly installed.



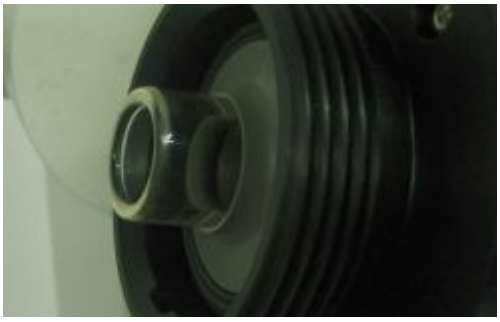
After Installation

5.3.2 Install seal rings

Place the dark seal ring in the glass axis with the spring side face inside, then fit the gray seal ring to glass axis with central bulge part out. Press the two seal rings to the bottom. Note the seal ring direction, improper installation will cause system vacuum failure.

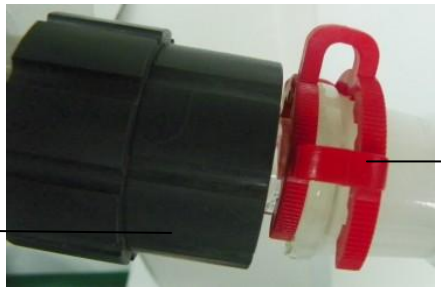


After Installation



5.3.3 Install evaporating flask

Connect the evaporating flask to the end of glass axis and fix it by a clamp. Manually rotate the evaporating flask to check if it was fixed firmly. User can detach the evaporating flask from glass axis easily by anticlockwise rotating the push-off nut below.



Note: When replacing the evaporating flask, first switch off power and turn on the PTFE valve to balance the pressure inside and outside the system.

5.3.4 Install condenser

Cover the condensation tube by lock handwheel. Place the whole system above the top-left corner of rotation head. When the condenser mouth connects fully to the seal ring inside the rotation head, spin the lock handwheel tightly; do not over-tighten.

5.3.5 Install sample adding tube

Insert the sample adding tube of sample adding valve into condensation tube and adjust the block septa to optimal position.
Adjust the valve hole to be aligned with the feeding hole of condenser for sample adding.

Sealed the valve by adjusting the valve hole to be 90^0 vertical with feeding hole of condenser.

5.3.6 Install receiving flask

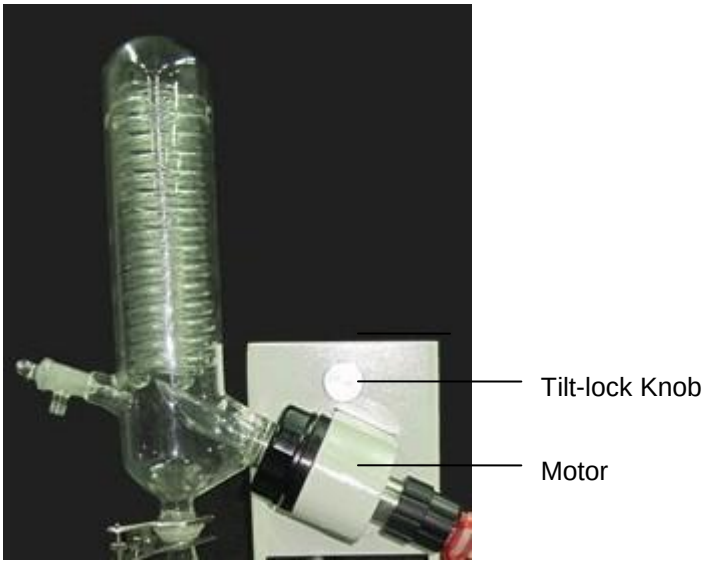
Let receiving flask cover the condensation tube and adjust the end-screw of the clamp to fix them.

NOTE: When replacing the evaporating flask, be sure to switch off the power and turn on the sample adding valve to let the pressure inside and outside of the system to get balance.

OPERATION

6.1 HOW TO ADJUST THE TILT ANGLE OF ROTATION HEAD

Loosen the tilt-lock knob and adjust the tilt angle of motor to appropriate angle by the other hand then re-lock the knob. Common angle is 30°.
NOTE: This function is only available for vertical type condenser; **do not adjusting the rotation head when diagonal condenser is applied.**



6.2 HOW TO ADJUST THE HEIGHT OF EVAPORATING FLASK

Firstly, set the rotation speed to minimum, switch on power, switch off the up/down control button on the handle, lift up/down the rotary evaporator to suitable height. Gently switch on the control button to lock it.
Careful handling will avoid flask breakage.

6.3 HOW TO SET THE ROTATION SPEED OF EV311H

Rotate the speed control knob clockwise to increase speed, counter-clockwise to decrease.

6.4 HOW TO SET CLOCKWISE/COUNTERCLOCKWISE ROTATION

In stop status(invalid in running state), press and hold the speed control knob for 3s until “LC” displayed, the lower line displays code, input “9” by rotating the knob, then press the knob to enter into the parameter set interface, press the knob to display "dIF" which means rotation direction, rotation the knob to set dIF value. dIF=0 for clockwise rotation, dIF=1 for counter clockwise rotation, press and hold control knob for 3s to save and quit the setting interface.

6.6 HOW TO OPERATE THE HEATING BATH

6.6.1 Choose appropriate heating transfer medium.

Bath Type	Temp. Range	Heat Transfer Medium	Remark
Water Bath	Ambient temp.~100℃	Water	Hardness of the water must be as low as possible; When using deionized waterr, please add 0.2% $Na_2B_4O_7$*$10H_2O$ solvent for anti-corrosion.
Oil Bath	100℃~180℃	Silicone Oil	Viscosity of the silicone oil must below 50centipoise.

Add liquid to heating bath with appropriate volume for specific experiment. Connect the unit to power supply, press the green button to switch on the unit; and red to switch off.

6.6.3 HB-05 Heating Bath

SET Set or check temperature, holding time and other parameters.
SHIFT/AT In set interface, the key is a digital transposition key. In other interface, press and hold the key for 6 seconds to enter or quit auto-calibration system.
DEC/RERUN In set interface, press the key to decrease value, press and hold it to speed up the value decrease. In other interface, press and hold the key for 3 seconds can rerun the system after finishing the heating method.
INC/LED In set interface, press the key to increase value, press and hold it to speed up the value increase. In other interface, press the key to backlight on/off.

How to setup parameters

Press SET key to enter into **temperature set** interface, SP will be displayed in the upper line then you can set the temperature via △ ▽ ◁ .

Press SET key again to enter into **holding time set** interface, ST will be displayed in the upper line then you can set desired holding time on the setpoint. 0=timer function is not available.

Press SET key again to enter into the **heating mode set** interface, nd will be displayed in the upper line then you can set the heating mode to 0 (water bath) or 1(oil bath).

Press SET key again to save and back to the normal interface.

The lower line of LCD screen displays the total running time. When the actual temperature is up to the setpoint, the timer start and the second signal of time flash. The screen will display **End,** when the holding time is over also the beeper will keep buzzing for 30s. Press and hold ▽ for 3s to rerun the unit.

Note: Set the holding time to 0, the lower line of LCD screen will display the setpoint temperature and the system will keep heating state.

When the unit is overheating, the buzzer will alarm and ALM will be displayed in the LCD screen. If the overheating state was caused by temperature set operation, there will be no buzz and only ALM be displayed in the screen.

Press any key can stop the buzzer.

In parameter set interface, the screen will turn to normal interface automatically when no operation in 1minute.

6.7 HOW TO SHUT DOWN THE ROTARY EVAPORATOR SYSTEM

(1) Shut down heating bath; (2) Set rotation speed at 0 and lift up evaporating flask; (3) Shut down main unit; (4) When flask is cooled to ambient, turn off accessories (vacuum pump/chiller).

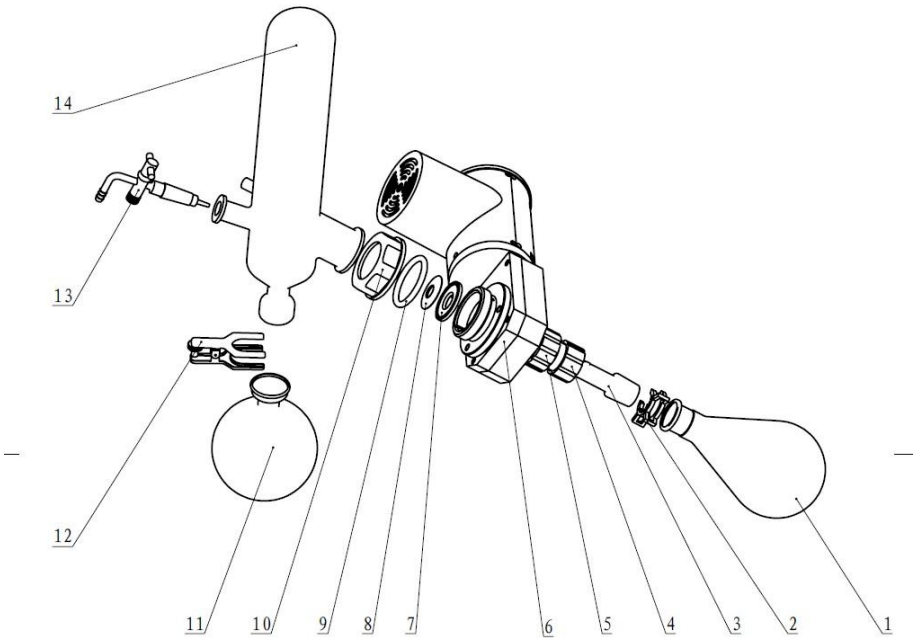
NOTE: After switch off the whole system it's better to disconnect the power plug from power socket to guarantee the safety.

Periodically replace heating liquid and clean the bath to keep longevity.

6.8 HOW TO CLEAN AND INSTALL THE SEAL SYSTEM

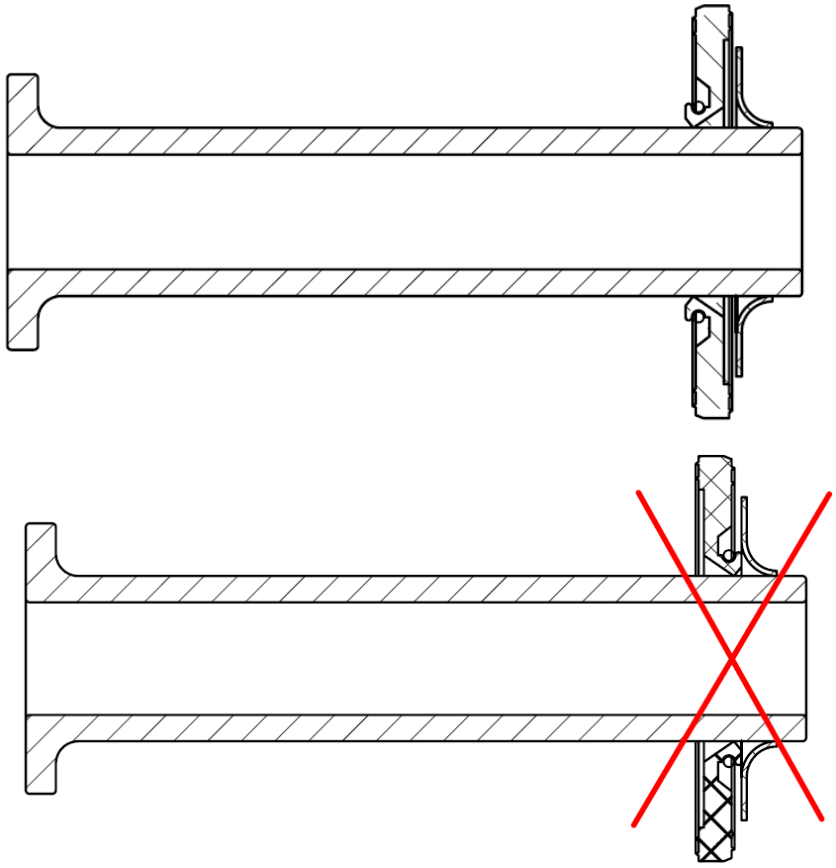
Below picture depicts the basic construction of seal system.

1. Power off and remove the PTFE valve and receiving flasks (#11) and condenser (#14).
2. Anticlockwise rotate the push-off nut (#4) to detach the evaporating flask (#1). Pull the glass axis (#3) out. In the same time, the two seal rings (#7,#8) get off from the other end of glass axis.
3. Clean related components.
4. Reassemble the system according to the installation procedure in chapter 4.3.



1. Evaporation Flask 2. Clamp 3. Glass Axis 4. Push-off Nut 5. Locking Nut 6. Rotation part 7. Main Seal Ring 8. Auxiliary Seal Ring 9. Spring 10. Condenser Lock Handwheel 11. Receiving Flask 12. Clamp 13. Sample Adding Valve 14. Condenser

NOTE: Be sure to install the seal ring in right direction (see below pictures). Incorrect installation will cause improper system vacuum.



6.9 HOW TO CONNECT LABTECH VACUUM PUMP

.1. Connect the vacuum pump to power outlet with provided power cord.

2. Connect the evaporator condenser and the vacuum pump tightly by rubber tube, and make sure the system without leaking. The gas is drained from the exhaust connector by connected tube.

3. Put the switch in the — to start the vacuum pump, put the switch in the O to turn off the vacuum pump.

⚠ **NOTE:** In order to guarantee longevity of this product, please reduce the possibility of unnecessary continuous working and avoid the solvent being sucked into pump.

Please see the **User Manual** of vacuum pump for more detailed instruction.

6.10 HOW TO CONNECT LABTECH CIRCULATE CHILLER

The plumbing connections are located on the rear of the chiller and labeled “SUPPLY” and “RETURN”. Remove the plastic protective plugs from both plumbing connections. Install the barbed adapters to these connections.

1. Connect the fitting “SUPPLY” to the hose feeding the inlet of evaporator condenser. Connect the fitting “RETURN” to the hose from the outlet of evaporator condenser. Clamp all connections.

2. It is important to keep the distance between the unit and the evaporator as short as possible. Tubing should be straight and without bends.

3. Before starting the unit, fulfill the water tank and double-check all electrical and plumbing connections.

4. Place the switch located on the rear of the unit to the up position, the controller will flash and the unit will be started up.

5. Place the switch located on the rear of the unit to the down position, the unit will be shut down.

⚠ **NOTE**: If you want to turn on the unit again after shut down, please wait for at least 10 seconds.

Please see the **User Manual** of circulate chiller for more detailed instruction.

Chapter 7

MAINTENANCE

7.1 ROTATION PART

Use tepid diluted HCI to clean the glass vessel if necessary.

In order to guarantee the longevity of this unit, please disconnect the unit from power socket after switch off the unit.

In normal condition, the sealing ring should be replaced every two years.

7.2 LABTECH CIRCULATE CHILLER

Reservoir Cleaning
Periodically inspect the fluid inside the reservoir. If cleaning is necessary, flush the reservoir with a cleaning fluid compatible with the circulating system and the cooling fluid.

The cooling fluid should be replaced periodically. Replacement frequency depends on the operating environment and run time.

Before changing the cooling fluid ensure that it is at a safe handing temperature.

Condenser Cleaning
For proper operation, the unit needs to pull substantial amounts of air through a condenser. A build up of dust or debris on the fins of the condenser will lead to a loss of cooling capacity. Optional air filters are available, if need please contact our Customer Service Center.

Periodic vacuuming of the condenser fins is necessary. The cleaning frequency depends on the operating environment. After initial installation we recommend a

monthly visual inspection of the condenser. After several months, the cleaning frequency will be established.

Use care cleaning the condenser fins, they can easily bend.

Chapter 8

TROUBLESHOOTING

8.1 INDICATOR LIGHT NO SHINE

Check the power cord; ensure it is plugged in.

Check the fuse; ensure it does not burn out.

8.2 INADEQUATE TEMPERATURE CONTROL OF HEATING BATH

Check the power cord; ensure it is plugged in.

Check if there is too much scale in heating bath, clean it if necessary.

8.3 MOTOR NO ROTATE

Check the power cord; ensure it is plugged in.

Check if the synchronous belt driving is damaged.

8.4 NOISE IN ROTATION PART

Disassemble the glass tube and clean the abrased powder of seal ring.

The synchronous belt is severely worn out or running deviation.

The bearing is over-load.

8.5 NO OR NO ENOUGH VACUUM

Check the seal ring to see if the ring is abrased, if yes replace a new one.

The sucking state of vacuum pump is abnormal. Check the vacuum pump and tighten the head.

Check if the glass parts are broken and replace new one.

Glass parts can not seal tightly. Please coat a vacuum grease layer on the abrading place of glass parts.

⚠ **ATTENTION PLEASE:** Please contact our Customer Service Center if above mentioned method is of no effect.

Chapter 9

SERVICE

The LABTECH worldwide technical support network consists of highly trained Field Service Engineers, Technical Support Specialists and Service Coordinators who are ready to quickly assist customers with answers and resolutions to service needs and application questions.

If you need any help, please feel free to tell LABTECH, and LABTECH will do best to support you.

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