Kalstein

YR02301

Recirculating Chiller

Instruction Manual

Thank you very much for purchasing our Recirculating Chiller YR02301.

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

Recirculating Chiller YR02301

USE

Kalstein´s Recirculating Chiller YR02301 is compact chiller is particularly designed for lab scale rotary evaporator. Circulating joint nozzle can be rotated 360° which makes it easy to connect with corollary equipment. All parts contacting refrigerant is made of stainless steel 304 and macromolecule anti-corrosive material. World famous brand compressor ensures high reliability. YR02301 Kalstein´s Series Recirculating Chiller provides low temperature liquid to other machines with its cooling system and circulating system.

- Technical Specifications

Table 1.4 Technical Specifications

Item		Specifications
Min Temp without loading（℃）		-15
*Working Temp range（℃）		-15– 25
Ambient Temp (℃)		5 – 35
Relative Humidity（%）		≤ 70
Power Supply		220 -240V～，50Hz
Temp Display		Digital
Temp Stability (℃)		±2
Temp Sensor		Pt100
Safety Protection		Delay, overheating, overcurrent
Power consumption（W）		500
Fuse		TSD,5AL,250V, Φ5×20mm
** Refrigerating Capacity @ 0℃ (W)		400
Refrigerant		R134a
Bath fluid filling volume（L）		3
Circulating Pump	Flow rate（L/min）	17
	Pressure （bar）	0.2
Degree of Protection		IP20
Pollution Degree		Class 2
Bath fluid outlet / inlet size		PP tubing：Φ10×1.5mm
Circulating Hose		Silicone rubber hose:
Material of bath fluid tank		SUS 304
Whole dimension (W×D×H) (mm)		265×410× 605
Net Weight (kg)		26

* The upper limit of service temperature should no more than Room Temp deduct 5℃ ($T_{max} \leq$

**The above testing results are acquired when the equipment was tested with Room Temp at 25℃.

PRODUCT INTRODUCTION

Thanks for choosing “YR02301 Series Recirculating Chiller” . This operation manual stated the installation, using, maintaining and servicing of this instrument. Before using this instrument, please ensure that you have read and understood this manual completely.

- Safety

This chapter describes the installation, safety rules in the process of using of YR02301 Series Recirculating Chiller. Users must grasp the related warning signs, strictly abide by the operation procedures to ensure the security of the equipment and personal and avoid the occurrence of accident.

- User’s Qualification

YR02301 Series Recirculating Chiller must be operated by the person who has the practical operating experiences and can grasp of the detailed requirements in this manual. Otherwise, it must be used under the guidance of the person who has the related technology skills.

- Proper Use

YR02301 Series Recirculating Chiller requested to install indoor, it can be used with many kinds of devices to provide low-temperature condition for experiment or production.

Application fields:

a) Provide cooling source for Rotary Evaporator or glass reactor.

b) Provide cooling source for electrophoresis, CT and other analytical instruments.

c) Provide cooling source for laser and other equipment。

1.2.3 Improper Use

The operation that not abide by the related stipulation in this manual are regarded as improper use. Any damage caused by improper use is responsible by the users themselves.

Operation under the following conditions is prohibited:

a) Used in explosive gas environment or explosive dust environment;

b) Used in the places which the power supply is not in conformity with the requirements;

c) Used in high magnetic fields, corrosive environment.

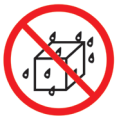
- Warning Sign

Sign	Description
 Danger	**Danger** It shows that the situation is very dangerous and will lead to death or serious injury.
 Warning	**Warning** It shows that the situation is very dangerous and will lead to death or serious injury.
	**Warning** Dangerous electrical voltage.
 Note	**Note** It shows that the situation is very dangerous and will lead to injury.
 Prohibit	**Prohibit** Get wet in the rain or splashing water.
 Note	**Note** Beware of close to the rotating parts.
	**Note** Please wear protective equipment, otherwise may cause personal injury.
Reminder	**Reminder** May cause equipment damage.

Especially pay attention to each warning sign.

- Hazards Related to the Instrument

Please pay attention to the following safety tips:

	**Danger** ● Do not use it in explosive gas environment or explosive dust environment.
	**Prohibited** ● Do not use it outdoor. Get wet in the rain or splashing water will cause electrification on metallic shell surfaces, and will cause casualties.
	**Warning** ● Make sure the power supply is in conformity with the requirements on the name plate. ● If found refrigerant leakage, please open the ventilation device to reduce the cold media content in air as soon as possible.
	**Warning** ● It is equipotential bonding, protective bonding conductor are not allowed to be removed. ● Before open the equipment enclosure for maintenance and repair, be sure to disconnect the power supply, then operate it after 5s, ensure the residual voltage release to safety value to avoid electric shock. ● In case of equipment shell not installed into place, do not use the equipment to prevent electric shock. ● The insulation of electrical components and cables is damaged; ● Electrical clearance or creepage distance in strong electric area is less than the prescribed value, which may be caused by falling foreign body or component deformation
	**Note** ● If there's any abnormal situation when using it, please disconnect the power supply immediately for troubleshooting or contact professional maintenance personnel. ● Please wear leather working gloves when cleaning and maintenance. Beware of condenser fin hurt your hands.

- Other Hazards

	**Warning** ● If there's any corrosive material such as acid, alkali vapor around the equipment, the components performance and service life will be impacted. ● Do not contact the secondary refrigerant of these series equipment with foods, drugs and tobacco in case of personal injury.

- Safety Measures

	● Please wear personal protective equipment when operating this instrument, such as protective glasses, protective clothing and gloves

Instrument Configuration

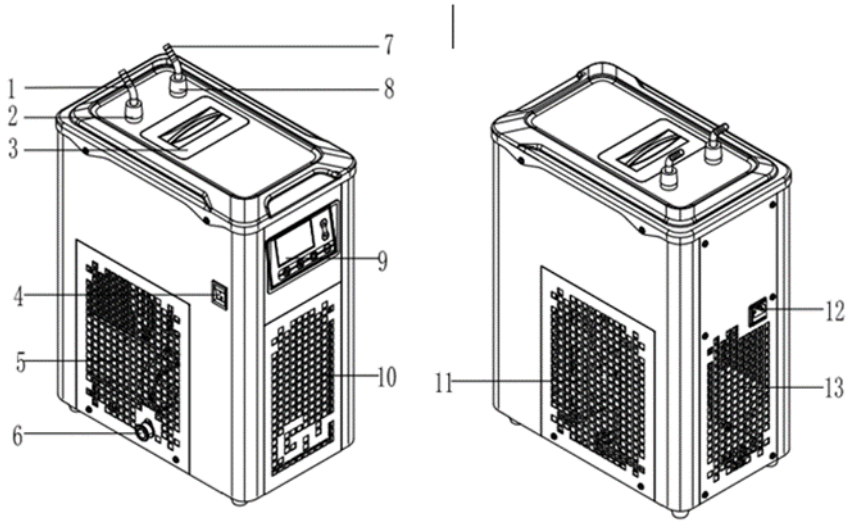


Figure 1.2 YR02301 Recirculating Chiller

1 Bath fluid outlet	2 Bath fluid outlet fixing nut	3 Bath liquid filling port Cover	
4 Master switch	5 Left service panel	6 Drain port	
7 Bath liquid inlet	8 Bath fluid inlet fixing nut	9 Control panel	
10 Font panel	11 Right panel	12 Appliance inlet	13 Back panel

Note: Part "10" "11" "13" in figure 1.1 can be removed separately for maintenance.

CONTROL PANEL

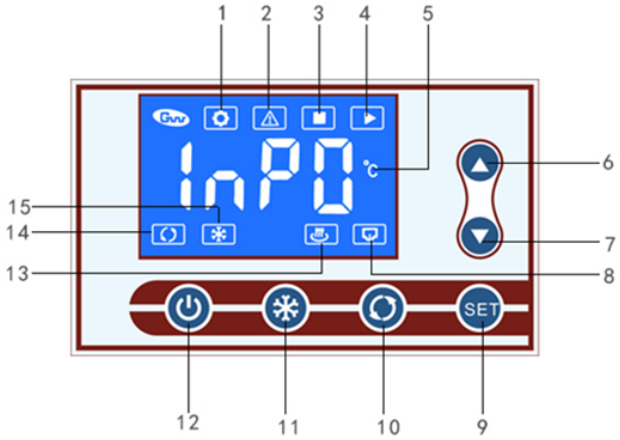


Figure 1.3 Control panel

1 Setting state indicator	2 Alarm state indicator	3 Stop state indicator
4 Working state indicator	5 Temperature unit	6 Increase
7 Decrease	8 Not used	9 SET
10 Circulation on/off	11 Cooling on/off	12 Power on/off
13 Not used	14 Recirculation indicator	15 Cooling indicator\

- Unpacking and Installation

1) Open the outer packing, read the user's manual carefully, and check the components are complete or not according to the packing list.

2) Please place the machine in right place and keep it still for more than 12hours before starting up.

3) Keep it in well ventilated place and maintain the ambient temperature below 35℃.

Note: Do not cover the ventilation holes of the machine.

4) Please refer to Figure 2.1 when connecting bath fluid outlet and inlet.

5) If there's any liquid splash on the surface of shell, please wipe it clean first, and confirm all parts are in good condition before starting to use it.

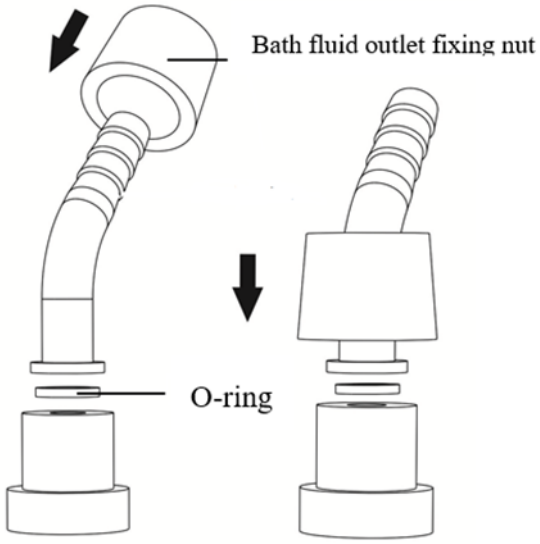


Figure 2.1 Bath Fluid inlet/outlet Connection

OPERATING

- Selection of Bath Fluid

Target temperature depends on the bath fluid used in YR02301 Series Recirculating Chiller. Bath fluid should be non-toxic, non-corrosive, viscosity ≤ 22mPa•s at low temperature.

1) The distilled water or deionized water is recommended as a bath fluid when working temperature is above 10℃.

2) Ethylene glycol aqueous solution or 99% (mass fraction) of ethanol is recommended as bath fluid when working temperature between -15～10℃.

Table 4.1 Ratio of ethylene glycol aqueous solution and freezing point

Mass fraction（%）	15	25	30	40	50	55
Freezing point	-5	-10	-15	-22	-33	-40

Note:

Ethanol is flammable item, caution risk of fire!

3) Ethanol Explosion limits: 3.5%～18.0%(volume)； Open cup flash point： 13℃。

4) Users can choose suitable bath fluid according to the actual temperature.

5) It is prohibited to use brine (KCl/H2O,NaCl/H2O, CaCl2/H2O) as bath fluid.

6) The bath fluid shouldn't be corrosive to stainless steel, chromium and silicone rubber material.

3.2 How to fill in bath fluid

YR02301 is designed with a big opening for bath liquid filling. Take off the cover and fill in bath liquid into the bath tank until the evaporator coils all immersed in the bath liquid.

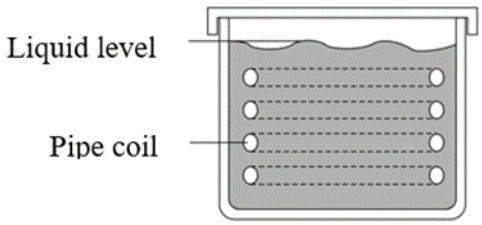


Figure 2

- Power Connection

The power must be supplied in accordance with the requirements on the name plate. The power supply must be grounded properly.

- Starting up and setting specifications

When the master switch (4) is on position " | ", it is powered on. When the master switch (4) is on position "O", it is powered off, please refer to figure 1.5

Press the button "⏻" for 2 seconds, all indicators will be light on. The temperature

display window "[redacted]"will show "InPO"at the same time. 4 seconds later, it will enter standby state, then "Temperature display window [redacted]" shows the actually temperature of the bath fluid in the tank.

1) Press"SET", "Temperature display window[redacted]" will show "SP", then press "▲" to increase the set temperature value, or press "▼" to decrease the set temperature value accordingly.

2) Press "▲"or "▼" once, the set temperature will increase or decrease 0.1℃；

Keep pressing "▲" or "▼" for more than 3 seconds， the set temperature will continuously increase or decrease. When temperature reaches the desired point, press "SET", this temperature point will be automatic saved. If you don't press "SET" for seconds, it means to give up this setting, the program will auto-exit and maintain original set valve.

- Start Circulation Unit

Press "↻" to start the circulating pump, then the circulating system begins to work. But before this, please make sure that the whole circulation system is smooth and not blocked.

- Start Refrigeration Unit

Press "❄" on the control panel, refrigeration unit will start working delay. When the temperature decreased less than the set temperature， refrigeration unit will stop working automatically. When its temperature higher than the set temperature (refrigeration unit need to reach its delay time) refrigeration unit will start working itself. Repeat this progress to make the circulating system temperature maintained

around the set valve.

Note: Start circulating system first then start refrigeration unit.

- Turn off the unit

Please power it off strictly in accordance with the following steps:

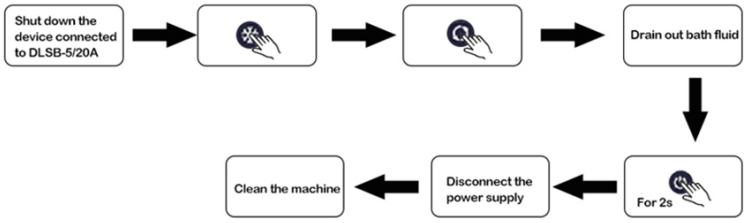


Figure 3 Turn off sequence of YR02301

Note:

If the bath fluid inlet of the device to be cooled is higher than the bath fluid outlet of the chiller, please close the outlet valve of the chiller first after using, and then stop the circulating pump, to prevent the bath fluid flowing back. If the chiller is disconnected with the device to be cooled, please take off the hose connected to the outlet valve, and drain the bath fluid into a prepared container properly.

PROTECTIVE FUNCTIONS

1) The compressor inside the chiller has its own overheating protection. when the compressor is over temperature, the overheating protection will disconnect the power automatically.

2) The chiller is also equipped with a fuse with overload protection and short circuit protection function.

Note:

The equipment protection functions have been set properly (or adjusted in advance) before delivery, users please do not change it by yourself.

MAINTENANCE AND MANAGEMENT

In order to make sure the chiller running normally and increase its service life, users should do regular maintenance and management. Before maintenance, please disconnect the power supply; prepare tools and materials. Clean and maintain the chiller according to the specific requirements in the user manual. Otherwise, it will cause electric shock or equipment damage.

- Management

1) Please use a piece of soft cloth to wipe the surfaces regularly to keep it clean. Direct flush with water is prohibited.

2) Make sure that no water and other liquids get into the housing.

3) Do not use brush, polishing powder, acid, gasoline or alcohol to clean the surfaces of the chiller in case those things will damage the protecting coating.

4) Reservoir must be dried after cleaning in case of polluting the bath fluid when using it next time.

5) Please check the connecting pipelines regularly, if found aging or damage, please replace it immediately according to original specifications.

- Maintenance of Cooling System

In order to maintain the refrigerating effect, please clean the cooling radiator blades (condenser) regularly following the steps below:

1) Power off first.

2) Remove the two screws on the front louver panel with a “+” screw driver, and then take off the panel.

3) Clean the dust on the condenser fins (use a vacuum cleaner or a soft brush), please refer to figure 5.2.

4) After cleared, install the front ventilating panel back.

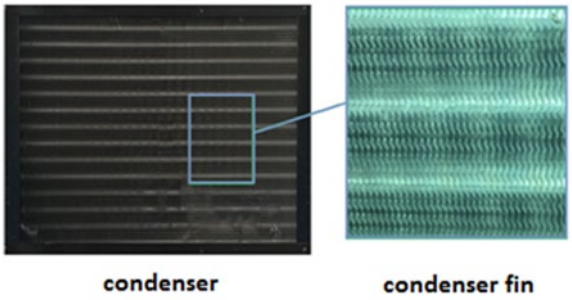


Figure 4

Note: Do not touch condenser fins with fingers in case of any injury!

- Maintenance requirement

1) Equipment maintenance must be done by professional technical personnel or maintenance personnel authorized by our company.

2) If the equipment has to be returned to factory for maintenance, please contact us.

3) Before return to our factory:

a) Please drain out all bath fluid.

b) Please fill in fault information records and feedback to us for reference.

c) Please package the chiller safely to avoid any possible damage during transportation.

- **Failure and troubleshooting**

Table 5 Common failure and troubleshooting

No.	Failure	Probable cause		Solution
1	After power switch on but no indicator is light on	Power supply is not connected		Check the power source
		Fuse damaged*		Stop the machine immediately, contact us or ask professionals for maintenance.
2	Screen display “-EO-”	Sensor lose contact		
		Sensor damage		
3	Screen display “-E2-”	Low temperature alarm		
4	Screen display “-EY2-”	High pressure alarm		Improve ventilation around the machine, check the condenser fins to see if any blockage.
5	Temperature lose control	Large Voltage Fluctuation in Power Grid		Restart it when voltage is stable
		Temperature controller is not connected properly		Stop using it immediately, contact us or ask professionals for maintenance.
		Temperature controller failure		
6	Compressor is working, but cooling effect is decreasing	The ambient temperature is too high		Take measures to reduce the ambient temperature
		Lack or leakage of refrigerant		Stop using it immediately, contact us or ask professionals for maintenance.
7	Cooing system does not work, there is also abnormal noise	Starting capacitor damaged		
		Compressor damaged		
8	Liquid circulation is abnormal	Circulating pump is not working		Stop using it immediately, contact us or ask professionals for maintenance.
		Circulating pump is working	Bath liquid inlet is blocked	Remove the blockage.
			Chose wrong bath fluid which has got frozen in the circulating pump	Replace the bath liquid.
			Pipeline is not smooth	Check and clean pipeline
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