

# Laboratory 20L Glass Reaction Kettle Reactor

## (Complete Equipment)

## Operation Instruments



- Thank you for choosing our laboratory reactor device.
- Please reading this instruction carefully and install this instrument correctly.
- After reading, please keep the manual well.

Ai Shengke (Jiangsu) Chemical Technology Co., Ltd.

## Dear User:

Thanks for choosing our company products.

We hope this set of glass reactor device can make your work more relaxed and happy, so that you can get the feeling of office automation in the research and development work.

Before using the instrument, please read this manual, and operate and maintain the instrument according to the instructions in order to prolong its service life.

When you are satisfied with the instrument, please tell your friends; When you are not satisfied with the use of this instrument, please call 400-928-0585 to tell us ---- Aishengke (Jiangsu) Chemical Technology Co., LTD., who will make you satisfied!

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## 1 Product profile

### 1.1 Foreword

Thank you for using the "ASK-Glass reactor". This operation manual describes the installation, use, maintenance and maintenance of the glass reactor. Please read the operating instruction carefully before using the device.

### 1.2 Safety

This chapter describes the safety rules and regulations involved in the installation and use of "ASK-glass reactor". Users should strictly abide by the operation procedures on the premise of grasping the relevant warning signs to ensure equipment and personal safety and avoid accidents.

#### 1.2.1 User qualification

The operator of ASK-glass reactor shall have practical operation experience and the technical level shall meet the requirements in the product instruction manual; otherwise, it shall be used under the guidance of personnel with corresponding technical ability.。

#### 1.2.2 Proper Use

The equipment is suitable for the following experiments:

- a) processes requiring high and low temperature conditions;
- b) Decompression and stirring process;
- c) Dispersion process;
- d) Distillation (reflux), concentration;

According to specific requirements, assembled into a glass reactor combination device.

#### 1.2.3 Improper use







Failure to operate in accordance with the instructions belongs to improper use. Any damage caused by improper use shall be borne by the user

Do not use under the following conditions:

- a) Explosive gas environment or explosive dust environment;
- b) Places where the power supply does not meet the requirements;
- c) Strong magnetic field environment and corrosive environment;
- d) Hydrofluoric acid solution;
- e) Handling hard and brittle block materials (such as stones, soil samples, etc.) may damage the kettle body;

The sample volume added to the reactor exceeds the specified limit.

#### 1.2.4 Warning marks in product instructions





Mark	Meaning
	Dangerous Indicates a very dangerous situation that could result in death or serious injury
	Warning Indicates a critical situation that could result in death or serious injury
	Forbid Rain or splashing
	Attention Indicates a dangerous situation that could result in injury
	Attention High temperature, beware of scald
	Attention Wear protective equipment; otherwise, personal injury may occur


提示	Reminder Indicates conditions that may cause device damage
----	---

### Pay attention to all warning signs.

#### 1.2.5 Hazards associated with equipment

Please pay attention to the following safety tips:

 危 险	<p><b>Dangerous</b></p> <ul style="list-style-type: none"> <li>● Xylogenic bans use in explosive gas or explosive dust environments</li> <li>● Lent forbids the use of explosive reactants inside a kettle;</li> <li>● Lent bans the use of hydrofluoric acid and high concentrations of lye;</li> <li>● It is forbidden to pass steam into the jacket of the reactor as a heat source</li> </ul>
 警 告	<p><b>Warning</b></p> <ul style="list-style-type: none"> <li>● Be sure to connect to the power supply specified on the device's nameplate.</li> <li>● Equip connection is implemented on the equipment, and internal grounding connection is not allowed to be removed.</li> <li>● To open the shell for maintenance and overhaul, you have to switch off the power supply of the device, waiting for 5s before operating to ensure that the residual voltage is released to a safe value and avoid electric shock.</li> <li>● Do not use broken glass devices</li> </ul>
 禁 止	<p><b>Ban</b></p> <ul style="list-style-type: none"> <li>● Do not use in outdoor environment. Rain and water splashing may cause the shell to be charged, resulting in electric shock</li> </ul>
	<p><b>Warning</b></p> <ul style="list-style-type: none"> <li>● The surface of the kettle body and its connecting pipe may be high temperature, do not directly touch with the body to avoid scalding</li> </ul>

 <p>注 意</p>	<p><b>Attention</b></p> <ul style="list-style-type: none"> <li>● When something goes wrong during using the device, power off the device in a timely manner, troubleshoot the fault and contract professional maintenance personnel.</li> <li>● Be careful of damaged or broken glass parts to prevent personal injury;</li> <li>● The maximum allowable temperature deviation inside and outside the kettle is 80°C, beyond which the glass will break;</li> <li>● When moving glass components, do not scratch the surface or impact the inside and outside of the glass;</li> <li>● The circulating liquid pressure in the jacket of the kettle body shall not exceed 0.03mpa, otherwise it may lead to the rupture of the kettle body;</li> <li>● Ensure that the circulating liquid pipeline is unblocked and the circulating liquid pressure does not exceed 0.03Mpa;</li> <li>● The liquid in the jacket of the kettle body expands when heated, leading to the pressure rise of the kettle body, which may cause the rupture of the kettle body;</li> <li>● The allowable pressure range inside the kettle body is "absolute vacuum-atmospheric pressure". A positive pressure generated during material reaction can cause rupture of the kettle body.</li> <li>● The temperature range of this product is -80-200°C, beyond the use range, may lead to damage to sealing parts affect sealing effect or glass breakage;</li> <li>● After use, the discharge valve and its interface with the kettle body should be cleaned in time to avoid affecting the sealing effect;</li> <li>● The thermal insulation sleeve of the kettle body can effectively prevent the rupture of the kettle body and hurting people</li> <li>● There is the danger of static electricity when the material is added into the kettle from the feeding port</li> </ul>
<p>Reminder</p>	<p><b>Reminder</b></p> <ul style="list-style-type: none"> <li>● Be sure to use a defined environment. Otherwise, the normal operation and service life of the equipment will be affected;;</li> <li>● Keep good ventilation around the equipment;</li> <li>● Avoid using it unattended</li> </ul>

### 1.2.6 Other danger

 <p>警 告</p>	<ul style="list-style-type: none"> <li>● Some of the solvents added to a device, or used near it, can form oxides, high concentrations of flammable solvents, etc.</li> <li>● Vibration when corrosive materials such as acid and alkali steam exist around the device, the insulation of the device will be damaged, affecting component performance and service life.</li> <li>● Beware of the risk of explosion when handling samples of hazardous materials or unknown components</li> </ul>
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### 1.2.7 Security measures



- When operating the device, please wear personal protective equipment, such as protective glasses, gloves, and work clothes

### 1.3 Equipment introduction

Ask-glass reactor is mainly used for material synthesis, distillation, concentration and other experiments. The kettle body structure is divided into three types: single layer, double layer and three layer.

According to the need, the kettle can be pumped to the state of negative pressure, meet the experimental conditions. By adjusting the constant pressure funnel or the control valve on the feeding bottle to control the material to drip evenly. The heat exchange function of condenser is used to achieve distillation or reflux of solvent.

The reactor body of single-layer glass reactor has no interlayer.

The kettle body of a double-layer glass reaction kettle has an inner layer and an outer layer. Interlayer external heating (refrigeration) cycle device, through the high (low) temperature of the cycle liquid, adjust the temperature of the material in the kettle.

The three-layer glass reactor has two glass interlayers inside and outside. The inner sandwich is connected with the heating (refrigeration) circulation device, through the circulating liquid of high (low) temperature, adjust the temperature of the material in the kettle; The external interlayer is connected with a vacuum pump, which is pumped to the negative pressure state to achieve thermal insulation function.



## 1.4 Technical specification

### 1.4 Product Technical Parameters

Type	ASK-5	ASK-10	ASK-20	ASK-30
Speed range (rpm)	50~500			
Permissible interlayer pressure (Mpa)	≤0.03			
Permissible pressure in the kettle (Mpa)	Vacuum -- atmospheric pressure			
Service temperature range(°C)	-80~200			
Motor rating (W)	90			
Speed regulation mode	Frequency control of motor speed			
Material volume of the kettle body (L)	5	10	20	30
Volume of jacket tank(L)	About1.5	About 3	About6	About 10
Tank body inlet and outlet hose specifications	Rc3/4 screw thread			
Kettle lid opening	Stir the mouth	50#Flange mouth		
	Temperature sensor port	24#Standard grinding mouth		
	Connecting port of condensate separator	50#Flange mouth		
	Vacuum gauge mounting port	35#Flange mouth		
	Constant pressure funnel connector	35#Flange mouth		
	Solid feeding port	80#Flange mouth		
Constant pressure funnel volume (mL)	1000			
Voltage (V/Hz)	220-240V,50/60Hz			
Ambient temperature (°C)	5~35			
Ambient relative humidity (%)	≤ 70			
Enclosure protection class	IP20			



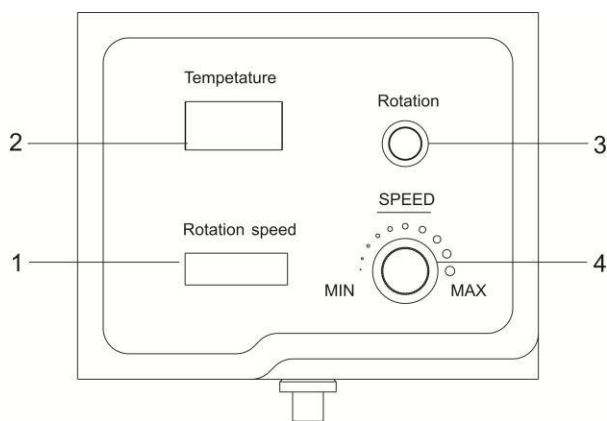
Dimension (mm) W×D×H	850×1100×2050	850×1100×2050	850×1100×2050	860×1100×2500
Discharge port away from the ground (mm)	About 380-730	About 180-580	About 130-530	About 220-620

## 1.4 Product Technical Parameters

型 号		ASK-50
Speed range (rpm)		50~500
Permissible interlayer pressure (Mpa)		≤0.03
Permissible pressure in the kettle (Mpa)		Vacuum--atmospheric pressure
Service temperature range(°C)		-80~200
Motor rating (W)		140
Speed regulation mode		Frequency control of motor speed
Material volume of the kettle body (L)		50
Volume of jacket tank(L)		About16
Tank body inlet and outlet hose specifications		Rc3/4 screw thread
Kettle lid opening	Stir the mouth	50#Flange mouth
	Temperature sensor port	24#Standard grinding mouth
	Connecting port of condensate separator	50#Flange mouth
	Vacuum gauge mounting port	35#Flange mouth
	Constant pressure funnel connector	35#Flange mouth
	Solid feeding port	80#Flange mouth
Constant pressure funnel		1000

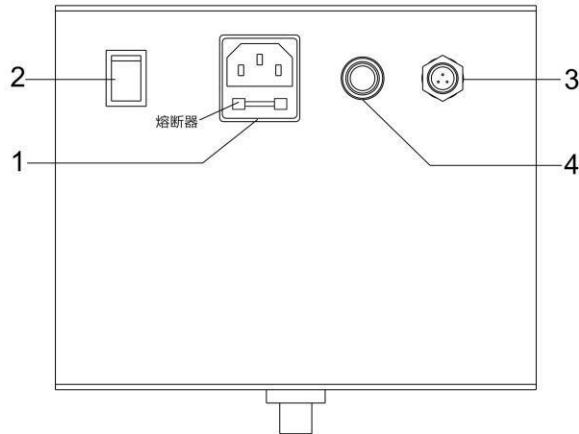
volume (mL)	
Voltage (V/Hz)	220V,50/60Hz
Ambient temperature (°C)	5~35
Ambient relative humidity (%)	≤ 65
Enclosure protection class	IP20
Dimension (mm) W×D×H	860×1100×250 0
Discharge port away from the ground (mm)	About210—570

### 1.5 Device configuration



1.5.1 operate box

- 1 Speed display window
- 2 Temperature display window
- 3 Rotate start button
- 4 speed regulator



### 1.5.2 back of operate box

- |                                  |                   |
|----------------------------------|-------------------|
| 1 Power input socket (with fuse) | 2 Power switch    |
| 3 Sensor input                   | 4 Motor power end |

## 2 Unpacking and installation

### 2.1 Preparation before unpacking and installation

- 1) Open the packing case, take out the product instruction manual, read it carefully, and check the components according to the packing list.
- 2) Carefully take out the frame of the product from the packing box, place the casters down smoothly, and lock the four casters.
- 3) Before assembly, carefully clean the glass device to make its cleanliness meet the test requirements.



注 意

Note: glass devices are fragile, please unpack them carefully

### 2.2 Installation

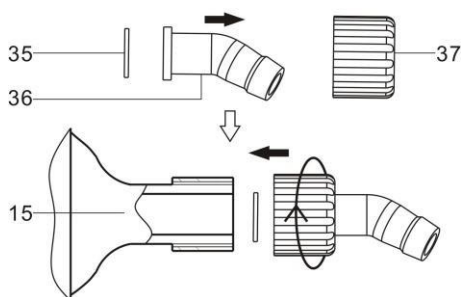
When leaving the factory, the kettle body, kettle cover and frame of ASK series products have been assembled together to form a composite.

### 2.2.1 Agitator installation

Remove the cover of the reaction kettle, put the stirring paddle into the kettle body, put the stirring rod through the hole of the kettle cover, connect the stirring rod and the magnetic coupler, and then connect the magnetic coupler with the motor.

### 2.2.2 Mixing bearing installation

Install the condenser connector as shown in Figure 2.2.4.

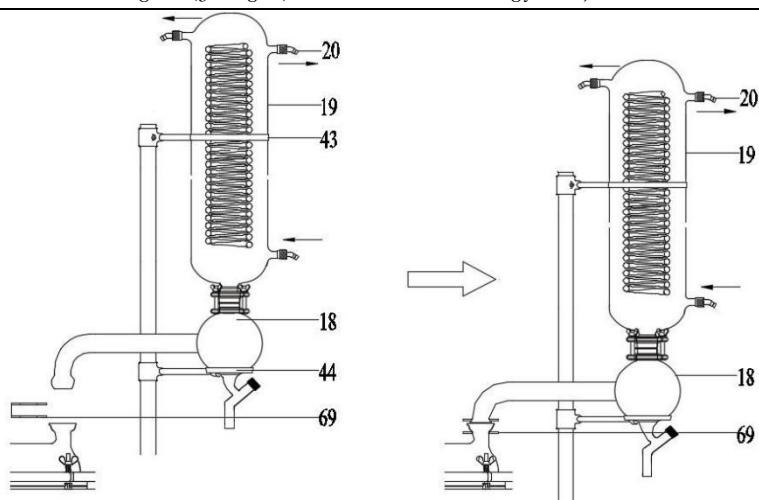


### 2.2.3 图 2.2.4 Mixing bearing installation

15 condensor 35 Flat washer 36 Answer the nozzle 37 Pick up nozzle nut

### 2.2.4 Condensing separator and condenser installation

As shown in FIG. 2.2.5, the tray (44) is mounted on the vertical rod (1), and the condensate separator (18) is mounted on the tray (44). Connect the interface between the condenser separator (18) and the kettle cover, adjust the position of the tray (44), connect the condenser and the condenser with a flange, and lock the silicon rubber hoop (43) around the middle and upper part of the condenser

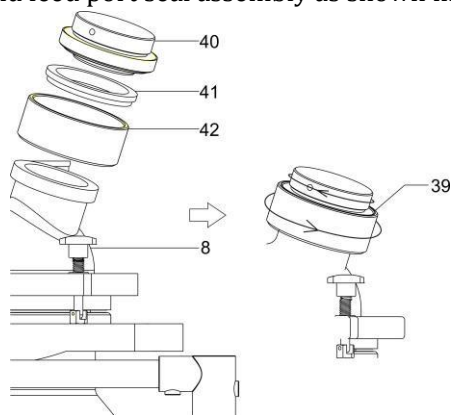


2.2.5 图 2.2.5 Condensing separator and condenser installation

- |                         |                         |                        |
|-------------------------|-------------------------|------------------------|
| 18 condensate separator | 19 condenser            | 43 silicon rubber hoop |
| 44 tray                 | 69 stainless steel clip | 20 Cycle by nozzle     |

2.2.6 Solid feeding port seal assembly installation

Install the solid feed port seal assembly as shown in Figure 2.2.7



2.2.7 图 2.2.7 Solid feeding port seal assembly installation

- |                |                                  |
|----------------|----------------------------------|
| 8 Kettle cover | 39 Feeding port sealing assembly |
| 40 bolt        | 41 Retaining ring                |
|                | 42 nut                           |

## 2.2.8 Constant pressure funnel and vacuum gauge installation

Install a constant pressure funnel and vacuum gauge as shown in Figure 2.2.8

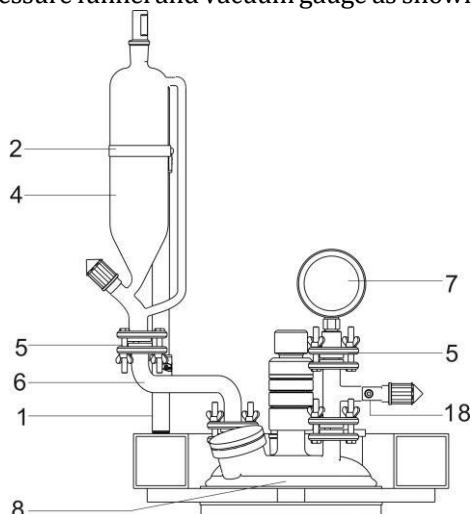


图 2.2.8 Constant pressure funnel and vacuum gauge installation

1 stud	2 Silicone rubber wrap	4 Constant voltage funnel	5 Flange
6 elbow	7 Vacuum gauge	8 Kettle cover	18 Vacuum gauge mounting valve

## 2.2.9 Discharge valve installation

Tip: Before installing the discharge valve (13), please make sure that it is placed in open state to prevent damage to the kettle body.

As shown in FIG. 2.2.9, the flange (5) and the retaining ring (43) are successively mounted on the flange of the kettle body (11) and discharging valve (13), and the sealing gasket (44) is placed on the flange of discharging valve (13). Align the position and tighten the butterfly screw to fix it.

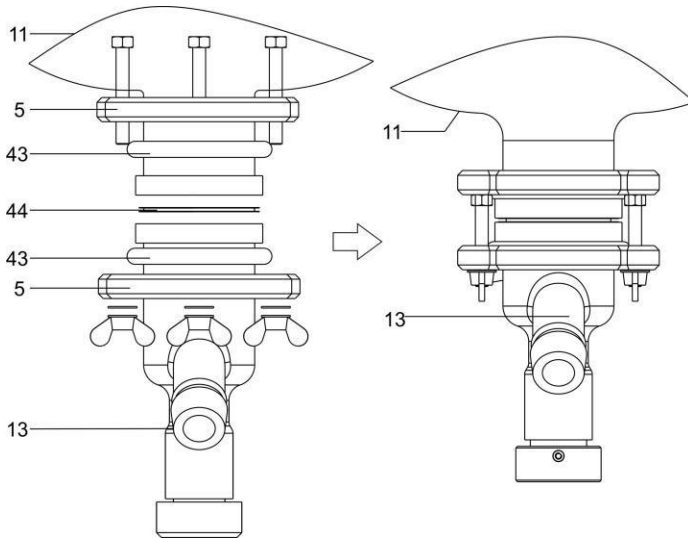
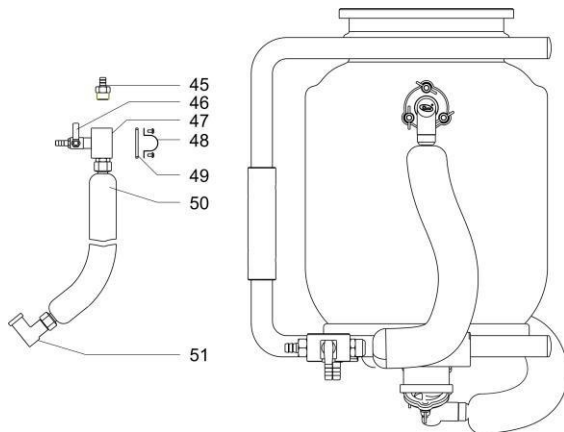


图 2.2.9 Discharge valve installation

- |                    |                   |
|--------------------|-------------------|
| 5 Flange           | 11 Kettle Body    |
| 13 Discharge valve | 43 Retaining ring |
| 44 Sealing washer  |                   |

2.2.10 Circulating pipeline connecting the interlayer of body installation

The connection port of the interlayer circulation pipe of the kettle body is from bottom to top. Refer to Figure 2.2.11 for flange installation of circular interface.



- |          |                               |               |              |
|----------|-------------------------------|---------------|--------------|
| 45 joint | 46 DN15 High temperature ball | 47 Square tee | 48 U bracket |
|----------|-------------------------------|---------------|--------------|

图

2.2.10 Circulating pipeline connecting the interlayer of body installation



valve

49 liner

 50 Stainless steel  
hose

51 elbow


### 2.3 Connect the reaction kettle with supporting equipment




Correctly connect the reaction kettle with the supporting heating (refrigeration) cycle device to ensure the sealing of each interface.

## 3 Operation

### 3.1 Precautions for Use

表 3.1 Precautions for Use

 注 意	Please read this instruction carefully before use
	Please place the device smoothly and lock the casters
	The equipment is suitable for room temperature 5~35°C environment. Failure may occur if the device is used for a long time outside the allowable temperature range
	Avoid strong vibration; otherwise, glass components may be damaged
	The power supply specified in the device specification should be connected
	Do not press the power cable. When the power cable is heavy or passed between objects, it may be damaged and lead to fire accidents
	When not in use for a long time, remove the power plug from the socket to avoid fire accidents caused by overheating and long-term dust accumulation
	Correct way to pull out plug from socket: Hold the plug and pull it out in parallel and backward. Do not pull the power cord by hand in strength
	Please disconnect the power supply and unplug the device when moving it. Do not move when the power is on to avoid electric shock or fire
	Clean glass components before installation and use
	When glass devices are connected, apply an appropriate amount of vacuum grease on the interface to ensure sealing effect
	When installing glass components, use moderate force to avoid glass breakage
	Glass is fragile, beware of impact
	Glass reactors should not be used in reaction containers for strong alkali solutions
	If the volume of the kettle is not less than 20L, the installation of the kettle body should be carried out under the guidance of professional person
When the reaction kettle is combined with heating (refrigeration) cycle equipment, the viscosity of circulating liquid is required to be $\leq 50\text{CP}$	

	When the reaction kettle is combined with the heating (refrigeration) cycle device, open the circulating pump first, and then open the heating (or refrigeration) unit under the condition that the liquid circulation pipeline is unblocked
 警告	The reactor cannot be heated by steam
	When using the device, in case of any abnormal phenomenon, please immediately turn off the power, unplug the power plug, and seek technical support or contact the manufacturer
	The maximum allowable temperature difference $\Delta T \leq 80^{\circ}\text{C}$
	Do not move the device during operation
 警告	During the test, the kettle body and its connected glass devices may be high temperature, beware of burns! Please wear gloves when handling samples
	Kettle body temperature $T \geq 80^{\circ}\text{C}$ , do not move!
 警告	Do not modify the equipment
	Do not use in outdoor environment. Rain and splashing water lead to electric shell, resulting in casualties

### 3.2 Equipment operation



Note:

Before starting the stirring paddle for the first time, pay attention to the relative position of the stirring paddle and the bottom of the kettle body to avoid collision.

1) Set the "power switch" on the back plate of the control box to the position of "1", and the "speed display window" and "temperature display window" of the control box respectively display the set stirring speed and the measured temperature in the kettle.

Note: when there is no load, it is forbidden to run the stirring paddle at high speed.

2) Slowly add solid or liquid materials into the kettle through the corresponding feeding port.

3) Click the "Rotation" button on the control box operation panel to start the speed control. Then turn the "speed regulator" clockwise slowly to increase the stirring speed to the target value.

4) According to the reaction needs of materials in the kettle, open the heating (refrigeration) cycle device supporting the reaction kettle to realize automatic temperature control.

5) After the reaction, the heating (refrigeration) cycle should be closed when the material temperature in the kettle is close to room temperature.

Note:



After the heating (cooling) circulation device is closed, the control valve in the circulation pipeline cannot be closed, and must be kept unblocked. Otherwise, when the temperature of the kettle body and the material in the kettle changes greatly, the glass device may be broken.

6) Move the "speed regulator" anticlockwise to the left end, click the "Rotation" button to stop stirring, and set the power switch on the back panel of the control box to the position of "0".

7) Anticlockwise open the black knob of the material valve (14) for discharging. After discharging, disassemble the discharging valve and clean it carefully in time, and clean the discharging port of the reaction kettle. After that, reinstall the discharge valve as required.

prompt:

a) When discharging, the black knob at the lower end of feeding valve should be adjusted anti clockwise.

b) After cleaning the glass device, wipe the attached liquid inside and outside the device with a soft clean cloth to avoid contamination.

## 4 Maintenance and Management

To ensure the normal operation of the equipment and prolong its service life, users are required to perform routine maintenance and management. Before maintenance, disconnect the power supply of the device, prepare tools and materials, and perform the work according to the instructions in this manual. Otherwise, electric shock or device damage may occur.

### 4.1 Management

To ensure the normal operation of the reactor and its associated equipment, please follow the suggestions:

- 1) Regularly check and regulate the ambient temperature and humidity of the reactor to ensure the working conditions of the equipment;
- 2) When moving the reactor, violent vibration should be avoided;

- 3) Beware of foreign objects touching the reaction kettle to avoid damage to its glass devices; Check the system connection pipe frequently, find aging, damage, timely replacement according to the original specifications.

#### 4.2 Maintenance

- 1) Please unplug the power plug before cleaning the body to prevent electric shock or fire;
- 2) Please use a soft cloth to wipe the surface of the body frequently and keep it clean;
- 3) The cleaning of glass devices shall follow the regulations of the laboratory;
- 4) Dangerous substances should be avoided from leaking on the surface of the reactor or entering its interior;
- 5) Do not use brushes, grinding powder, acid, gasoline or other solvents to clean the surface of the body, so as not to damage the protective layer;
- 6) The reactor body and its connected glass devices may be high or low temperature, beware of scald or frostbite! Need to wait until the glass device close to room temperature to do cleaning;
- 7) Do not press the monitor and knob hard when cleaning to avoid component damage.

#### 4.3 Troubleshooting

##### 4.3 Fault symptoms and troubleshooting methods

Fault symptoms	reasons	methods
Switch on the power supply, operation box no display	Power supply is not connected	Check power Cables
	Fuse fault*	Check fuses and installation
In the process of stirring, abnormal noise is generated	Motor breakdown	
	paddle is not properly installed	Reinstall paddle
	There's a foreign body in the kettle	Clean foreign body in the kettle
Discharge valve leakage	large temperature variation range, affecting the sealing of the discharge valve	Adjust connect flange
	Seal ring damage	replace the sealing ring

#### 5 Warranty statement

- 1) Free service period: Within 12 months from the date of purchase, the product can be repaired free of charge if it fails due to quality reasons. If the equipment is damaged due to improper use by users, it is not within the scope of free service.
- 2) Within the specified warranty period, free maintenance will not be enjoyed if one of the following situations occurs.
  - A) The warranty card or proof of purchase cannot be presented;
  - B) Failure and damage caused by failure to install and use according to the requirements specified in the operating instructions and marks on the equipment;
  - C) failure or damage caused by transport, movement, fall or collision;
  - D) Faults and damages arising from product transformation;
  - E) Failure and damage caused by force majeure such as fire, earthquake, flood, wind and other natural disasters and abnormal power supply;
  - F) Consumption, wear and tear, aging and replacement of consumables.
- 3) The company will charge the maintenance fee after the free service expires or outside the free service scope.
- 4) If there is any problem with the equipment, please contact the after-sales service person in time. This instruction manual is subject to change without prior notice.