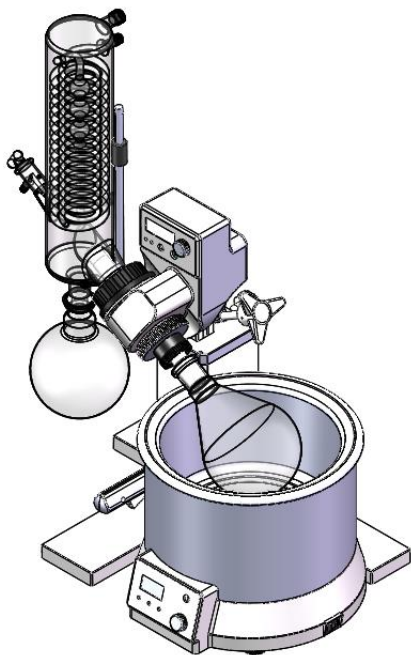


RSLab Digital Rotary Evaporator, model RS100-S, code PGB009

User Manual

Digital Rotary Evaporator RS100-S



Please carefully read this Manual and use the product safely under the direction of the Instructions.

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Introduction

Users are advised to read carefully this manual before using this instrument, operate the instrument according to the instructions contained herein and be aware of all precautions

How to acquire help

If you encounter any problems or need help while installing or using this instrument, please immediately contact the After-sales Service Department of the manufacturer / supplier.

Please prepare the following information and materials:

- Product serial number (on the instrument nameplate)
- Description of problem phenomenon
- The method and operating steps you have undertaken to resolve the problem
- Your contact details including telephone number, fax number and email address

Warranty

The warranty period of the product is 24 months (since the purchase date) provided that it is used by the normal operation method under the normal service conditions specified in the Manual. This warranty does not cover any performance degradation of or damage to the instrument due to incorrect installation or operation, unauthorized disassembly or repair or any other violations of the operating instructions contained herein.

1. Safety notes

- Please carefully read the Manual before operating the product, and observe the specifications on safe operation.
- Please properly keep the operating instructions for easy reference in case of need.
- Please ensure only suitably trained personnel can operate this instrument.
- Please comply with the safety rules, personal safety and accident prevention norms, especially when creating vacuum!
- According to the type of medium handled, please wear suitable protective devices when operating the instrument; otherwise, the following dangers may occur:
 - Splatter of liquids
 - Fly-out of parts
 - Contamination of human body, hair or clothes by splattered substances
- Warning! Inhale of contact with toxic liquids, gases, spatters, vapor, dust, biological or microbiological medium might cause damage to the operator.
- Place the instrument on a stable, clean, antiskid, dry and fireproof table surface.
- Make sure there is sufficient space above the instrument and the glass assembly might exceed the height of the instrument.
- Before use, please carefully examine the instrument and accessories especially the glass assembly for any damage. Please do not use any damaged parts.
- Ensure the glass assembly is free of stress! Each of the following reasons might result in damage to the glass assembly:
 - Stress due to incorrect installation
 - Effect of external mechanical force
 - Sharp change to the ambient temperature
- Ensure the instrument will not move due to vibration when turning on the instrument.
- Note the danger caused by the following circumstances:
 - Flammable substance
 - Flammable low-boiling-point medium
 - Breakage of glass component
- Warning! Never distill or heat any substance whose ignition point is lower than the temperature set for the

safety of the heating bath.

- The heating bath's safety temperature shall at least 25 °C lower than the ignition point of the medium being handled.
- Please don't operate or use this instrument in an explosive environment or underwater or use this instrument to handle any dangerous substance.
- This instrument is only suitable for the medium that does not react with the energy generated in the handling process in a way that might cause danger. Meanwhile, the substance being handled may not produce danger due to energy generated in any other manner such as illumination reaction.
- The instrument must be monitored all the time when operating the instrument.
- Please don't operate this instrument under overpressure.
- To ensure the effective condensation of the motor system, please do not block the vent of the motor system.
- Only use of the accessories in the list of "optional accessories" can guarantee the operational safety.
- Please refer to the operating instructions for heating

kettle.

- Please refer to the operating instructions for optional accessories.
- Please use this instrument in a closed fume hood or other suitable protective device.
- Select the distilling device according to the amount to be distilled and the distillation type. The condenser must work normally. Please monitor the flow rate of the coolant at the outlet of the cooler.
- To prevent pressure buildup, the glass assembly shall be kept vented when operating under normal pressure, such as keeping the condenser open.
- Please note that gases, vapor or other substances can pose danger through overflow from the upper opening of the condensation tube. To minimize or avoid such danger, please take suitable measures, such as connecting the cooling tube and scrubbing bottle or other effective extraction devices downwards.
- The glass evaporating flask may not be heated on one side. The rotating evaporating flask must rotate at the heating phase.
- The glass assembly' design pressure tolerance is 10mbar. The venting valve (see the part of "Testing")

must be opened before heating and once again after cooling. When performing vacuum distillation, the steam must be condensed before release or released safely.

If the residue after distillation is likely to be decomposed when exposed to oxygen, please add only gas for stress release into it.

- Warning! Please be careful to avoid the formation of peroxides, as the decomposition of peroxides accumulated in the distillation process might result in explosion.

Please protect any liquid forming peroxides from ray of light, especially ultraviolet irradiation. Please be careful to examine formation of any peroxides before distillation and to remove the peroxides if any. Many organics are easy to form peroxides, such as methoxy pyridine, diethyl ether, dioxane, tetrahydrofuran, unsaturated hydrocarbon styrene, such as tetrahydronaphthalene, diene, isopropylbenzene, ketone and solutions of the aforesaid substances.

- Warning! The heating bath, heating medium, evaporating flask and glass assembly might become hot in the operation process and remain hot for a while

after stop of the operation! Before further operation, please let each part cool down.

- Note: be careful to avoid boiling delay! When the instrument is not started up and rotated, never heat the evaporating flask! Sudden appearance of foams or gases indicates that the medium inside the evaporating flask begins decomposing. Please immediately shut down the heating bath and lift the evaporating flask above the heating bath, keep the surrounding danger area well ventilated and inform surrounding personnel.
- Note! When the evaporating flask rotates, never operate the instrument. Before the motor is started up, please lower the evaporating flask down to the heating bath, otherwise the boiling heating medium might splatter.
- When operating the instrument, if necessary, please reduce the motor speed to prevent the medium in the heating bath from splattering.
- When operating the instrument, never touch any rotating parts. Due to the instrument or fabrication problems, the instrument might be unbalanced, possibly damaging the glass assembly. When imbalance or abnormal noise occurs, please

immediately turn off the instrument or reduce the rotation speed.

- In case of powering on after power failure, the instrument will not automatically be started up.
- The power supply to the instrument will be disconnected only when the instrument is turned off or the power plug is pulled off.
- The power socket must be easy to operate.
- The actual supply voltage must be consistent with the voltage specified on the instrument's nameplate.
- The power socket must be grounded.
- To prevent possible infiltration of outside liquid, moving parts must be mounted in place.
- Ensure the instrument and its accessories are protected from extrusion and collision.
- Only professional repairman may open the instrument.

2. Scope of application

This instrument is designed for such application environments as schools, labs and factories, in conjunction with the optional accessories recommended by the manufacturer, which may be used for:

- Rapid softening of distilled liquid
- Distillation of solutions or suspensions
- Crystallization, synthesis or cleaning of chemicals
- Drying of powder or particulate substances
- Recovery of solvents

This instrument is intended for use in the following environment:

- Altitude: $\leq 2,000$ m ASL;
- Ambient temperature: 0-40°C;
- Voltage fluctuation: within the range of -10%~+10% of normal value (the product is designed for indoor socket);

The product is unusable in residential area or under the restrictions specified in Chapter 1.

3. Inspection

3.1 Open-package inspection

If you find any damage on the package, please specify the damage on the receipt. If you find any internal damage after opening the package, please contact supplier or manufacturer.



Caution:

1. If you find any visible damage on the product, please don't connect the product to power supply.

3.2 Package list

Name	Qty.
Main unit	1
Heating bath	1
Power cable	2
Vertical glass assembly	1
User manual	1

Table 1

4. Control and display

4.1 Control

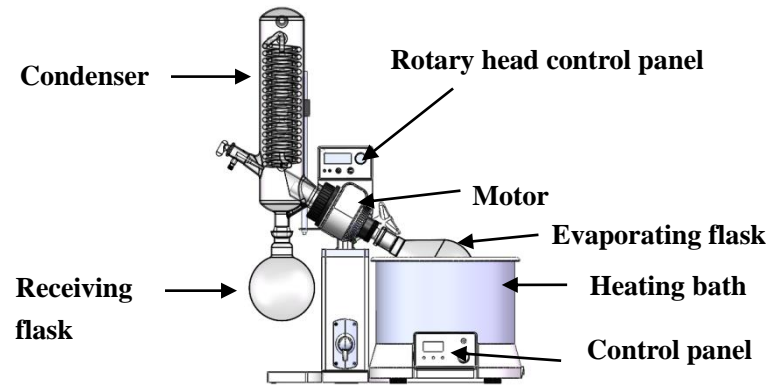


Fig. 1

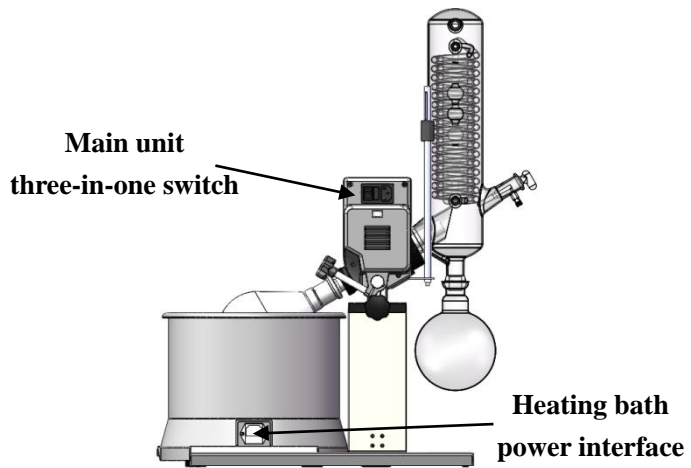


Fig. 2

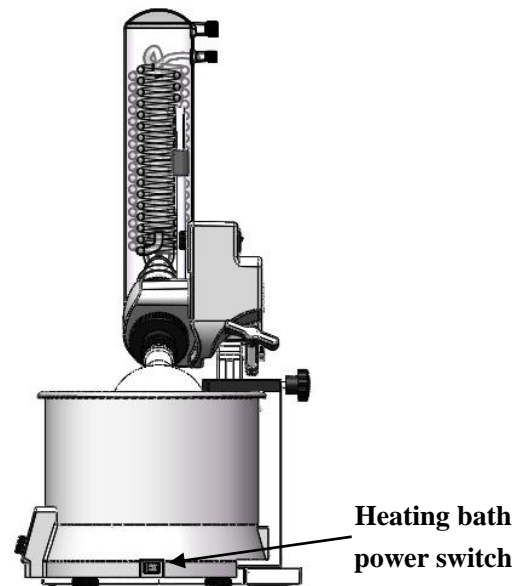


Fig. 3

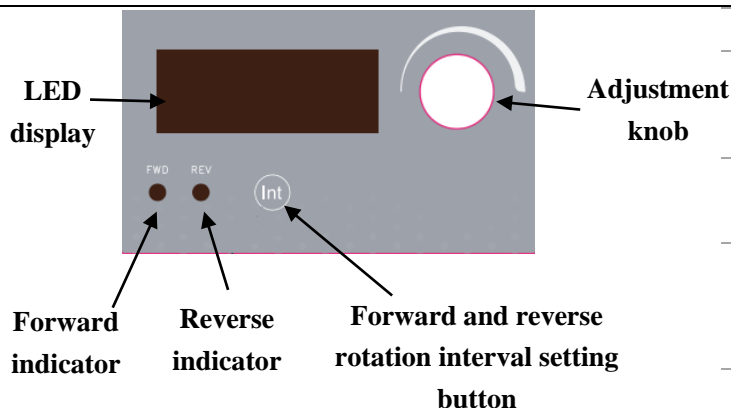


Fig. 4

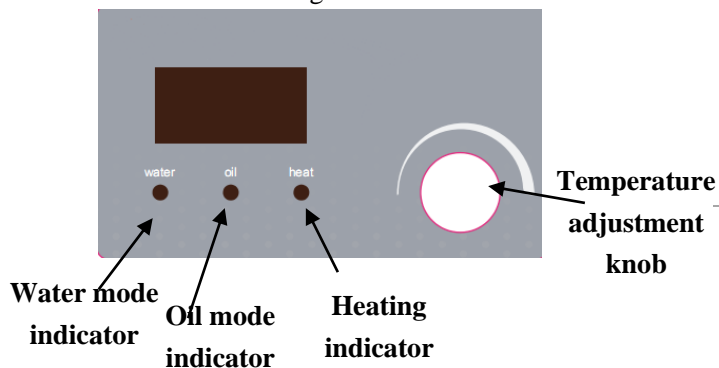


Fig. 5

Name	Description
LED display	Indicates the current working status and parameter setting.
Forward indicator	The indicator is on when the instrument is in the state of forward rotation only
Reverse indicator	The indicator is on when the instrument is rotating forwardly and reversely in turn
Forward and reverse rotation interval setting button	Press this key to enter the state of setting the forward and reverse rotation interval time. Turning the adjustment knob can set the intermittent left and right rotation time within the range of 1-999 sec. When set to 0 sec, the instrument rotates forward only
Adjustment knob	Turn the knob clockwise to increase the parameter and counterclockwise to decrease the parameter Press this key to start / stop the instrument
Water mode indicator	The indicator is on when the heating bath is in the water bath mode

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Oil mode indicator	The indicator is on when the heating bath is in the oil bath mode
Heating indicator	The indicator is on when the Heating bath is in the heating state
Temperature adjustment knob	Turn the knob clockwise to increase the parameter and counterclockwise to decrease the parameter Press this key to start / stop the instrument Press the key for 3s to switch the heating mode
Heating bath power switch	Turn on / off the main power supply to the heating bath

Table 2

4.2 Display

After the main unit is turned on, the interface is on and indicates the real-time speed:

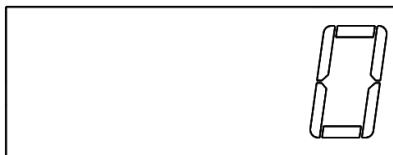


Fig. 6

This interface indicates the real-time speed. Turn the adjustment knob to set the speed and press the adjustment knob to start the instrument. The rotation speed can be changed by turning the adjustment knob while the instrument is in operation. After setting, the interface automatically changes to real-time speed.

Press the “**INT**” key to stop the motor, with LED indicating “txxx” (xxx is the intermittent operation interval, to be set within 1-999sec), as shown in the figure.



Fig. 7

Turning the adjustment knob can adjust the forward and reverse rotation interval time. The instrument only rotates forward when the forward and reverse rotation interval time is 0.

After setting, by pressing the “**INT**” key, the interface changes to the real-time speed display.

When the heating bath is turned on, water mode is the default mode, the water mode indicator is on and the interface is on, indicating the real-time temperature:

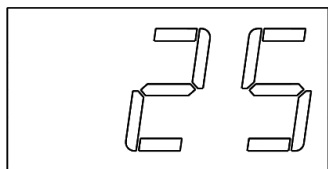


Fig. 8

Turn the temperature adjustment knob to set the target temperature of the heating bath. After setting, by pressing the knob, the heating indicator is on and the heating process begins. In the heating process, the target temperature can be changed by turning the knob. After setting, the interface automatically changes to real-time temperature.

Press the knob for 3s to switch the heating mode, with the corresponding indicator being on.

Water bath mode display:

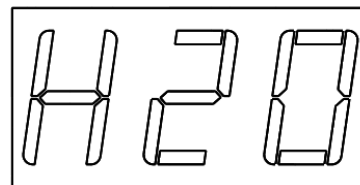


Fig. 9

Oil bath mode display:

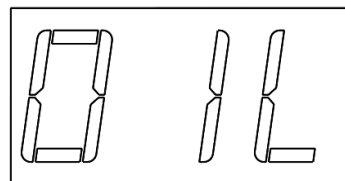


Fig. 10

5. Installation and testing

5.1 Installation

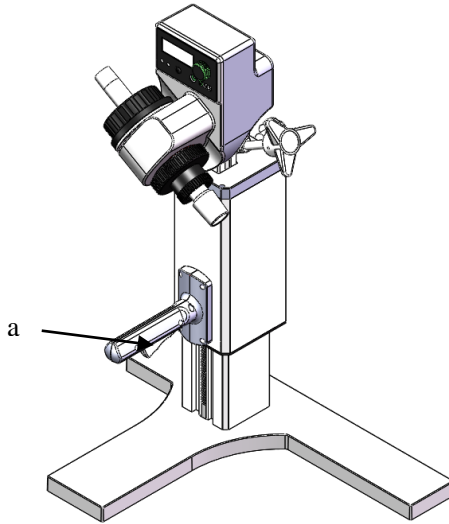


Fig. 11

- Place the main unit on a flat tabletop and squeeze the handle switch (a) to lift it to the highest position.

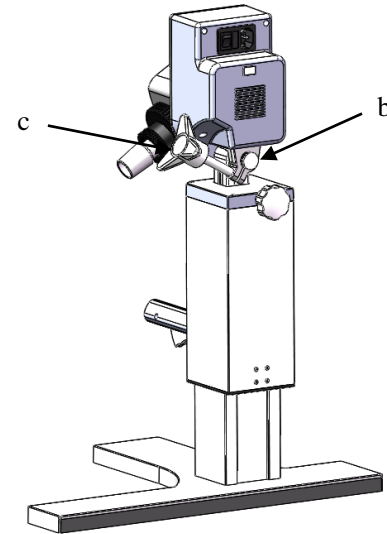


Fig. 12

- Tighten the screw (b) by hand, adjust the angle of the motor head and tighten the rotating head locking nut (c) to prevent accidental rotation.

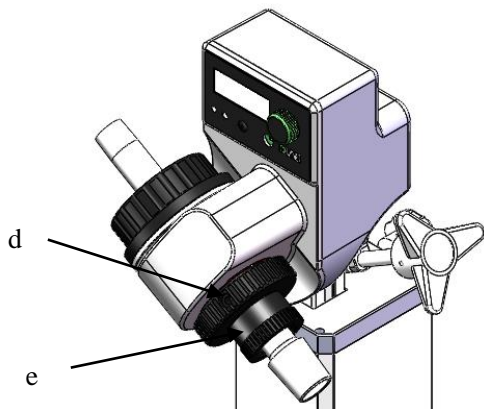


Fig. 13

- Rotate the locking device (d) (Fig. 13) by 60° counterclockwise to mount the evaporating tube in place, and rotate the locking device (d) clockwise for locking.
- Mount the seal ring (Fig. 14 and Fig. 15).

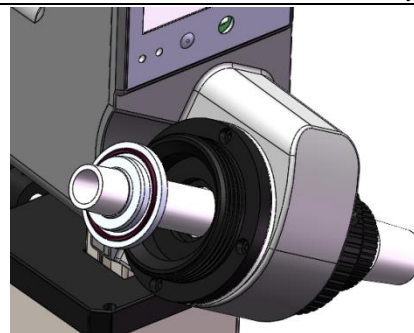


Fig. 14

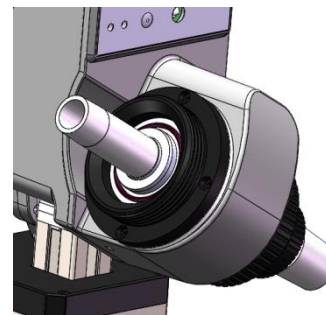


Fig. 15

- Mount the condenser (f) (Fig. 16 and Fig. 17)
 - Slide the locking nut (g) and pressure spring (h) onto the condenser.
 - Screw down the locking nut (g) by hand

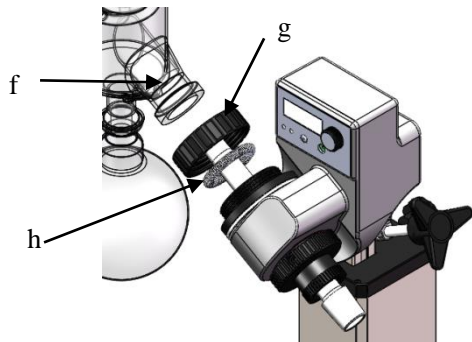


Fig. 16

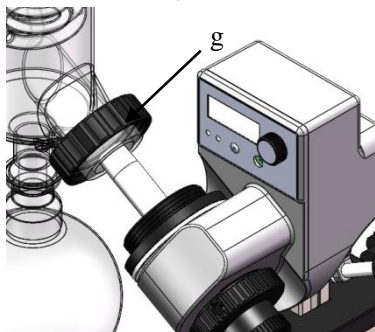


Fig. 17

- Mount the fixing device for the vertical condensation glass assembly (Fig. 18)

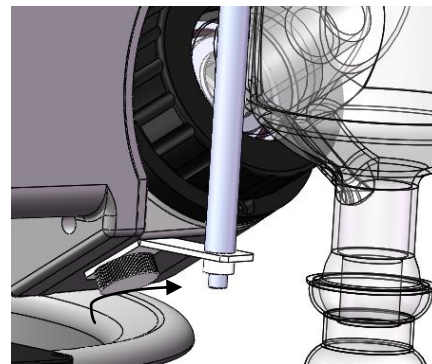


Fig. 18

- Piping connection (Fig. 19)

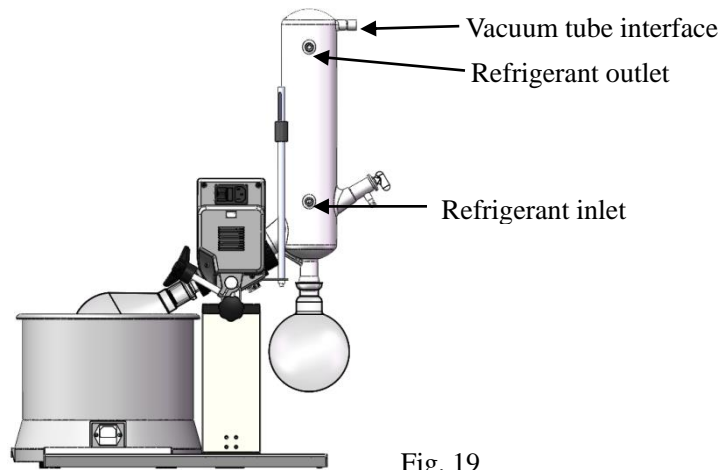


Fig. 19

**Note:**

To ensure good sealing performance, each glass ground joint may be coated with a layer of sealing grease.

5.2 Testing

- Check that whether working voltage specified on the nameplate matches with power network voltage
- Power socket should be grounded properly
- Switch on the power and turn on the power switch
- Turn the adjustment knob to set the target speed
- Press the forward and reverse rotation interval setting button to set the forward and reverse rotation interval time. If set to “0”, the instrument only rotates forward.
- Press the temperature adjustment knob for several seconds to switch between the water and oil bath modes.
- Turn the temperature adjustment knob to set the target temperature (up to 90°C under the water bath mode).
- Press the temperature adjustment knob to start heating
- Squeeze the handle switch to place the evaporating flask into the heating bath
- Press the adjustment knob to start rotation

Normal work of the product during the operations above means the product can be put into normal service. If abnormal work occurs, which means the product may be damaged during transport, please contact the after-sales service center of local supplier or manufacturer.

**Note:**

Please don't remove the evaporating flask and receiving flask while the instrument is in operation.
If the vacuum pump is not used, keep the vacuum tube interface open.

6. Fault diagnosis

- The instrument's digital tube is not on when the power switch is turned on
 - Check that whether the connection of power line is
 - Check that whether power fuse is damaged or loose.
- ERR 001, indicating driving motor overcurrent.
 - Check the revolving shaft for any blockage and remove the foreign object if any.
- ERR 002, indicating abnormal speed.

- Turn off the instrument and restart it.
- ERR 003, indicating excessively high temperature.
 - Turn off the heating bath and restart it when its temperature falls to the room temperature.
- ERR 004 refers to the sensor failure
 - Change of temperature sensor

If the above faults can not be cleared, please contact the manufacturer/supplier.

7. Maintenance and cleaning

Operate and maintain the product properly, so that it is in a good working state, which can extend the service life of the product. In routine service, keep the product dry and clean, remove the spilled liquid quickly, clean the outer surface with a non-grinding cleaner, and do not connect the power supply until all surfaces are dry. If liquid or moist solid enters the product, please disconnect the power supply quickly and leave off, and contact the manufacturer / supplier for more advice.

- Keep the product clean, and the cleaning solution is not allowed to flow into the machine.
- Power must be disconnected before maintenance and cleaning, and please use our recommended methods to

clean the product. The method to clean:

Dye	Isopropanol
Building materials	Aqueous solution / isopropanol with active agent
Cosmetic	Aqueous solution / isopropanol with active agent
Food	Aqueous solution with active agent
Fuel oil	Aqueous solution with active agent

- You can consult the manufacturer about the materials that are not listed in the above table. Before using other cleaning methods, the user must confirm with the manufacturer / supplier that the method will not damage the instrument. When cleaning the product, please wear suitable protective gloves.

**Cautions:**

- The electronic device cannot be cleaned with detergent.
- The instrument to be repaired must be cleaned while the contamination of hazardous substances must be avoided, and the instrument must be put back to the original packaging box for sending.
- When the product is not used for a long time, please store the product with power off and place it in a dry, clean and smooth place in normal temperature.

8. Relevant standards

The product structure conforms to the following safety standard:

EN 61010-1

UL 3101-1

CAN/CSA C22.2(1010-1)

EN 61010-2-10

Conforming to the following UE standard:

EN 61326-1

The product structure conforms to the following standards:

EMC standard: 89/336/EWG

Mechanical design standard: 73/023/EWG

9. Technical parameters

Item	Main unit	Heating bath
Voltage [VAC]	100-240	200-240/100-120
Frequency [Hz]	50/60	50/60
Power [W]	45	1010
Motor	DC brushless	-
Speed range [rpm]	20-200	-
Display	LED	
Temperature range [°C]	Room temperature -180	-
Temperature control accuracy [°C]	-	±1(oil ±3)
Lifting method	Manual	-
Lifting travel [mm]	110	-
Forward and reverse rotation interval setting [s]	1-999	-

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External dimension [W x D x H, mm]	440×320×450	300×300×240
Weight [kg]	7	3
Allowable ambient temperature [°C]	5-40	
Allowable RH	80%	
DIN EN60529 protection class	IP20	
USB	Yes	

