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RWD

RWD Life Science Co.,Ltd

Microcentrifuge M1324

Руководство по эксплуатации

User Manual A

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Contents

1- Introduction

1.1 Overview

First of all, thank you for choosing the Microcentrifuge manufactured by RWD.

Before the installation and application of this product for the first time, please read all attached materials to help you use this product in a better way.

RWD Life Science Co., Ltd. is committed to continually improving product features and service quality, and reserves the right to make changes to the User Manual and any product mentioned herein without prior notice.

For the latest product information, please call or write us or visit our website (http://www.rwdstco.com/). Please contact RWD in the case of any inconsistency between actual conditions of product and the User Manual, or any question or suggestion, during your application of equipment.

This user manual is applicable to the follow product manufactured by RWD:

- Microcentrifuge M1324

1.2 Safety

When operating the system, please read the **"2-System Safety"** section carefully to avoid hurts to operators and damages to the equipment.

If you have any question or suggestion regarding safety, please contact RWD for after-sales support.

This equipment should be operated and managed by trained professionals!

1.3 Comprehensive description

The Centrifuge is a machine used to separate components in a mixture of liquid and solid particles or liquids via a centrifugal force generated from uniform circular motion of liquid samples in the rotor driven by a motor. It is mainly used to separate solid particles from liquid in suspension or two kinds of liquids with different density and insoluble with each other in emulsion.

Microcentrifuge is mainly used to process liquid samples with a volume of or less than 1.5/2 ml. It has a speed over 10,000 r/min.

The product is applicable to daily needs of molecular biology application in labs, such as nucleic acid kit extraction and tissue protein separation.

1.4 Product features

- Compact and simple design
- Mechanical lock design for the microcentrifuge lid could be opened and closed easily
- The combination of touch screen with buttons provides quick and convenient parameters setting and operation
- Preset program in the form of program package can be easily called during operation
- Small vibration and noise during equipment running make less interference to samples and operators

1.5 Environmental requirements for equipment

Please prepare the instrument operating environment according to the conditions listed below to ensure the operability and safety of the system.

	Description
Working environment	Temperature: 0 ℃ ~ 40 ℃
	Humidity: 10% ~ 80% (non-condensing)
Storage environment	Temperature: -20 ℃ ~ 60 ℃
	Humidity: 15% ~80% (non-condensing)
	Air pressure: 50 kPa ~ 106 kPa
	Class of pollution: 2
Operating voltage	AC 220V ±10%, 50 Hz

1.6 Product parameters

Parameters	**Description**
Dimension	385mm×262mm×286mm
Weight	22.5kg
Screen size	4.3 inch
Screen pixel	800*480 px
RPM	100-15800rpm
RCF	1xg-23444xg
Centrifugation time	00:30-09:59:59, ∞

1.7 Product list

Configuration	Items	Qty	Description
Standard	Device	1	Microcentrifuge
Standard	Power cord	1	Power supply connection
Standard	Rotor wrench	1	Tool for replacing rotor
Standard	Air tightness quick lock rotor 24 X 1.5/2.0 mL	1	/
Optional	Air tightness rotor 24 X 1.5/2.0 mL	1	/
Optional	Air tightness quick lock rotor 10 X 5.0 mL	1	/
Optional	Non-airtightness quick lock rotor 24 X 1.5/2.0 mL	1	/
Optional	Non-airtightness rotor 24 X 1.5/2.0 mL	1	/
Optional	Rotor 18 X spin column	1	/
Optional	Rotor 4 ×PCR 8-Tube Strips	1	/

2- System safety

2.1 Main purposes

The equipment is applicable to daily needs of molecular biology application in labs, such as nucleic acid kit extraction and tissue protein separation.

2.2 Personal protection

The equipment can only be operated and managed by trained professionals. Please carefully read the User Manual and get acquainted with the operating steps before use.

2.3 Operating restrictions

1) It is prohibited to use the equipment in rooms with explosive substances.
2) It is prohibited to use the equipment for processing explosive or highly active substances.
3) It is prohibited to use the equipment for processing substances that can producing explosive gases.

2.4 Operating safety

Operation of the equipment should be in strict accordance with the user manual. The following general precautions should be followed during operation. Failure to follow these precautions will be considered as violation of safety standards and intended use of the equipment. RWD will not be responsible in any case your misuse of the equipment or failure to follow basic safety requirements.

2.5 Safety symbols

The user manual and the equipment may contain the following safety symbols and common signs. If you have any question or suggestion regarding safety, please contact RWD for after-sales support. Please carefully follow these instructions in order to prevent equipment damage and prolong service life of the equipment.

Risk of hand injuries
When the microcentrifuge is in use, the rotor will run at high speed. Therefore, failure to follow the safety precautions and the User Manual will result in risk of hand injuries.

Warning – general danger zones
When such sign appears on the equipment, the following instruction should be strictly complied with. Safety precautions on the equipment cannot be ignored.

Warning –Power supply safety
The equipment can only be started when the equipment and the power cord are not damaged and correctly connected. In case of dangerous situations, the

equipment power should be immediately cut off and the plug should be removed from the equipment or the power socket.

Hazard in flammable environment

It is prohibited to use the equipment in environment with flammable gases

Hazard of electromagnetic interference

Please operate the equipment under controlled electromagnetic environment to avoid danger from equipment faults. It is prohibited to use signal transmitters including mobile phones near the equipment. In case of faults and/or needs for maintenance, please turn off the equipment and contact RWD after-sales service.

The equipment is designed and tested in accordance with group A of CISPR 11 for Class A devices that emit radio interference as specified in EN 61326-1/EN 55011.

Warning: Class A devices are used in industrial environments. There may be potential difficulties in ensuring EMC in other environments due to conductive and radiation harassment in use.

Radiation Hazard

When processing radioactive samples, please follow all applicable radiation safety procedures. When processing radioactive pollutants, please take appropriate disinfection and safety measures. Wear protective suit (such as particle protection mask, gloves and protective shoe covers) according to rules and regulations on processing of radioactive pollutants in your labs. Dispose radioactive pollutants based on relevant regulations.

Biological infection hazard

Samples used during intended operations of the equipment can be infectious. Therefore, it is recommended to follow the general lab regulations on infection control procedure. Refer to the *Laboratory Biosafety Manual* of WHO (1984) for information concerning decontamination media and its use, dilution and effective application scope. Please comply with all applicable safety procedures when processing infectious samples. Please take appropriate disinfection and safety precautions when processing infectious substances. Wear protective suit (such as particle protection mask, gloves and protective shoe covers) according to infection control procedures in your labs. Dispose infectious wastes based on applicable regulations.

Waste treatment

Dispose all debris, wastes and infectious and radioactive pollutants generated from operations based on application lab regulations. Disinfectants, cleaning fluids and biological wastes must be disposed according to special waste disposal regulations! Reagents must be disposed according to MSDSs of their manufacturers.

3- Introduction of product structure

Fig. 3-1

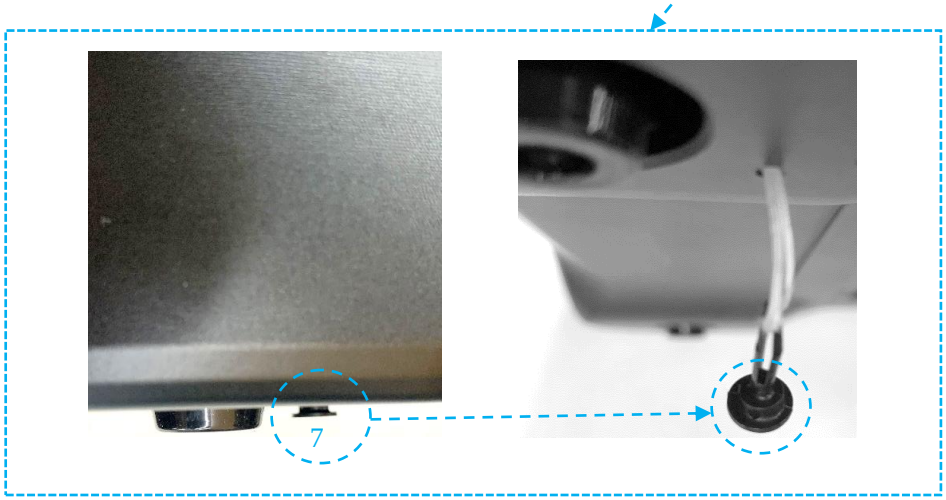


Fig. 3-2

Fig. 3-3

S/N	Part name	Description
1	Sight glass	The transparent device at the top. It is convenient to observe the motion state of the rotor
2	USB port	Software upgrading port (voltage:5V, only for after-sales maintenance personnel)
3	Display screen	Display the user interface
4	OPEN button	Manually open microcentrifuge lid
5	START/STOP button	Start/stop centrifugation run
6	SHORT button	Start short run
7	Emergency unlock device	If the microcentrifuge lid will not be open manually after centrifugation, please open the lid with the Emergency unlock device: Pull out the rubber plug with force, the other end of the rubber plug is connected with the control rope, manually pull out the control rope to unlock the lid, then put the rubber plug back in as shown in Figure 3-2
8	Power inlet	Connect the power supply
9	Fuse holder	For installing/replacing fuse
10	Power On/Off	For controlling power supply

4- Product assembling

1) Unpack first and take out the device and fittings.
   Note: lift the main body of the microcentrifuge under the cooperation of two persons together by placing both hands at the bottom of microcentrifuge.
2) Place the microcentrifuge onto an appropriate bench and remove the plastic packing.
3) Wait until the equipment temperature rises to the ambient temperature.
4) Ensure all power supplies meet equipment requirements. Connect the microcentrifuge to the power supply and turn on the power switch. Wait for the display screen to light up and the microcentrifuge lid to open automatically.
5) Loosen the rotor nuts counterclockwise with rotor wrench, remove the foam packing used to protect the rotor and then put the rotor back. Tighten the rotor nut clockwise with the rotor wrench.

Type of Rotor	Description	Setting Range
M-F24G	Volume: 24×1.5/2.0mL; air tightness	Max.rpm: 15800rpm Max.rcf: 23444xg
M-F24	Volume: 24×1.5/2.0mL	Max.rpm: 15800rpm Max.rcf: 23444xg
M-F4PCR	Volume: 4 ×PCR 8-Tube Strips	Max.rpm: 15800rpm Max.rcf: 20653xg
M-F18Kit	Volume: 18 ×spin column or 1.5/2.0 mL centrifuge tube	Max.rpm: 15800rpm Max.rcf: 20095xg
M-F24QG	Air tightness quick lock; Volume: 24×1.5/2.0mL	Max.rpm: 15800rpm Max.rcf: 23444xg
M-F24Q	Non-airtightness quick lock; Volume: 24×1.5/2.0mL	Max.rpm: 15800rpm Max.rcf: 23444xg
M-F50QG	Air tightness quick lock; Volume: 10×5.0 mL	Max.rpm: 15800rpm Max.rcf: 23444xg

5- Operation instruction

Operating procedures:

1) Before the start of experiments, firstly set parameters such as target rpm/rcf, centrifugation time, acceleration mode, ATset mode and so on, or call preset program.
2) Open the microcentrifuge lid, and then loosen the rotor cover, put in the centrifuge tubes and screw up the rotor cover, and close the microcentrifuge lid, then start centrifugation.
3) After centrifugation is completed, open the equipment and take out the centrifuge tubes from the rotor.
4) Close the microcentrifuge lid, and turn off the power supply.

Note: If the instrument is very noisy during centrifugation, please end centrifugation and check whether the samples are placed symmetrically and the solution is balanced.

Note: It is recommended not to operate the instrument in an unbalanced state. Long-term running in this state will cause damage to the centrifugal motor.

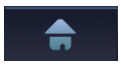
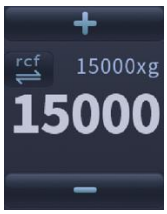
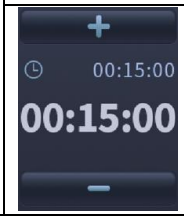
Note: Do not move or carry the instrument while it is in operation

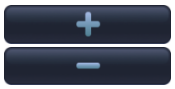
5.1 Start-up

Press the power switch to start the equipment for the first time to enter the home page. Figure 5-1 shows only the page example, the actual parameters on the home page are subject to the instrument displays

Fig. 5-1

Meanings of icons

Type	Icon	Description
Status icon		The icon shows that Soft mode has been enabled. At this time, the rotor accelerates and decelerates gently. This icon will disappear when corresponding function is disabled. The value displayed on this icon means 9 gear up and 8 gear down. For details please refer to 5.6.1
		 indicates that the rotor Max.rpm is the target RPM during short run  indicates that the set RPM is the target RPM during short run
		Atset mode:  indicates that centrifugation timing starts when operation starts  indicates centrifugation timing restarts when 95% of the set RPM/RCF is reached
	 =Sound	 =Sleep  =Auto-open
Settings/Function icon		Click to enter home page
		Click to enter [System Setup] page
		Click to enter [Program pakage] page
		 shows target RCF  shows real-time RCF Click  to shift to  , namely corresponding RPM display
		 shows target centrifugation time  shows past centrifugation time

		Click “+” or “_” to increase or decrease corresponding set values
		Page button. Click to switch to the previous/next subroutine in the current package on the home page
		Save button. Click to enter [Save Program] page
		Parameter lock key. Enable/Disable parameter lock function. This function is mainly used to lock homepage parameters to prevent changes
		Shortcut package keys. Displays the names of the three most recently used packages currently on the home page, in the most recently used order from top to bottom. Click to call the packages. The highlighted package is the one currently in use

5.2 Rotor

Click [System Setup] icon  to enter the page show as figure 5-2

Fig. 5-2

Click the rotor type to enter the rotor page, the rotor Max. rcf, Max. rpm, volume, cycles, etc. is as shown in Figure 5-3, click  /  to view different rotors.

Click the rotor to be selected and click  to confirm it. Click  to cancel the save and back to the previous page.

Note: Before selecting the rotor, please make sure that corresponding rotor have been replaced.

Fig. 5-3

The total rotor life is 100,000 times, when the cycles reaches 95% or more of the upper limit, the cycles is highlighted in yellow, as "99999" in Figure 5-3.

Click  to clear the cycles of used rotor.

When the rotor reaches the service life, the prompts of rotor replacement will pop up，shown as fig. 5-4

Fig. 5-4

5.3 Program call

Click the icon  on the home page to enter the Package page. Here you could preset program which is convenient to call.

Note: no new program can be called during centrifugation.

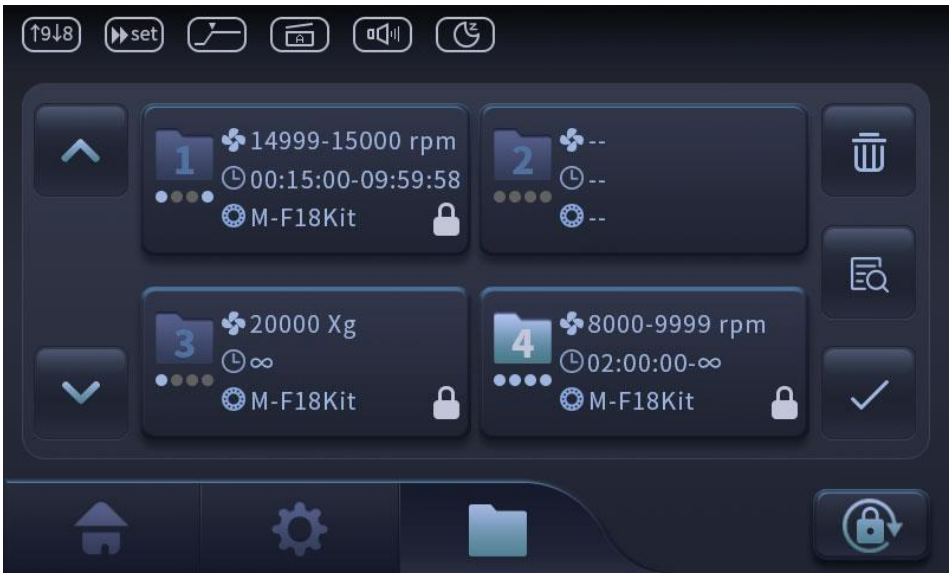


Fig. 5-5

As shown in Figure 5-5, No. 1/3/4 is preset program and has been locked. Click the icon  in the lower right corner to lock or unlock programs. Locked programs cannot be edited. By default, there are no program preset.

Click package to make it to be selected, such as No.4, and then click  to enter the subprogram page as shown in Figure 5-6.

Fig. 5-6

Click to select one of the subprograms, such as "Program: 12.3" in Figure 5-6, and click the icon to delete the program as prompted. Click to enter the parameter setting page, click the icon to confirm to call the program, click to back to previous page.

5.4 Other Settings

Click or to enter the previous or next page in the system setup page and click to enable other system functions, such as Sleep mode, Sound, Auto-open or click to switch between Chinese “中文” and English in the language page.

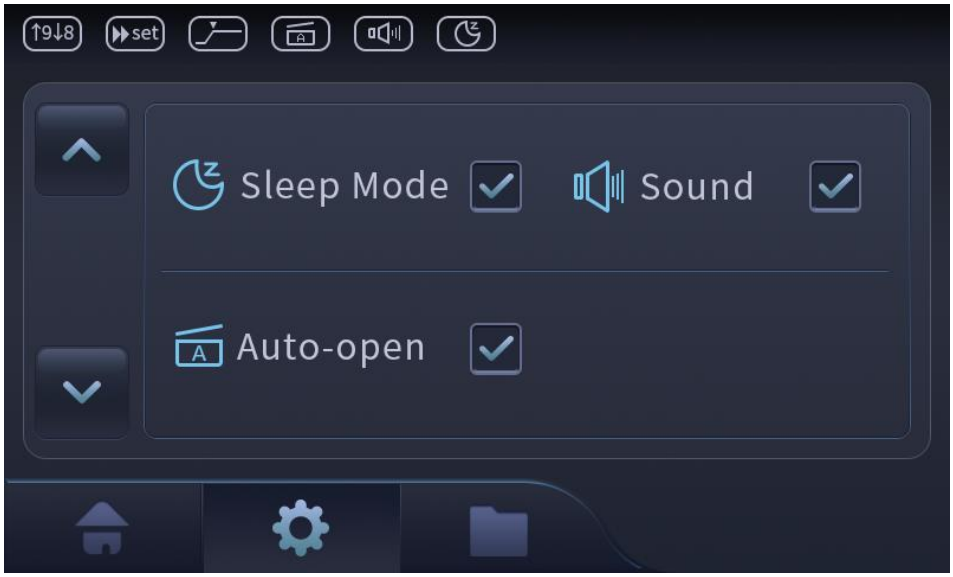


Fig. 5-7

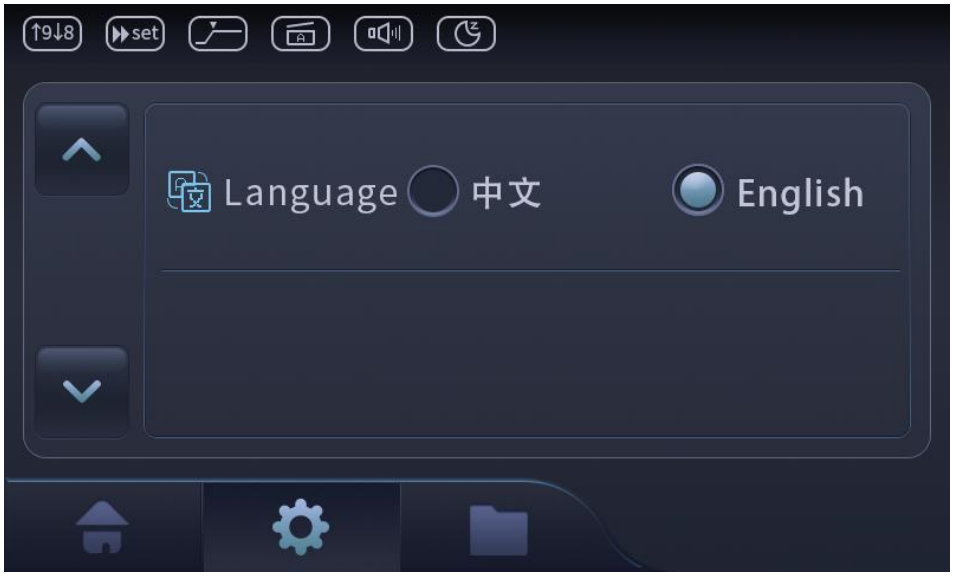


Fig. 5-8

5.5 Placement of centrifuge tube

Open the microcentrifuge lid, loosen the rotor cover, put in the centrifuge tube, tighten the rotor cover, and then close the microcentrifuge lid.

5.6 Centrifugation

5.6.1 Preset time/continuous run

Click any parameters module (RPM/RCF, or Time) on the home page to enter the following parameters setting page.

Fig. 5-9

1) Click 

to shift to 

. Click the parameter input box to pop up the numeric keyboard for RCF/RPM and time settings.

   Note: the setting range of RCF/RPM will be various that depending on the rotor chosen.

2) Acceleration / Deceleration mode

   During centrifugation, two acceleration modes can be chose, one of which is to accelerate to the set RPM/RCF in the general fast mode, i.e. non-soft mode, or to accelerate to the set RPM/RCF in the soft mode. As shown in Figure 5-9, if 

is selected and click  , the soft mode is enabled.

Click the icon  to enter the page as shown in Figure 5-10. At this time, the rotor accelerates and decelerates in a soft way. There are 9 gear of acceleration/deceleration to choose from.

(Acc / Dec) = Acceleration/ Deceleration

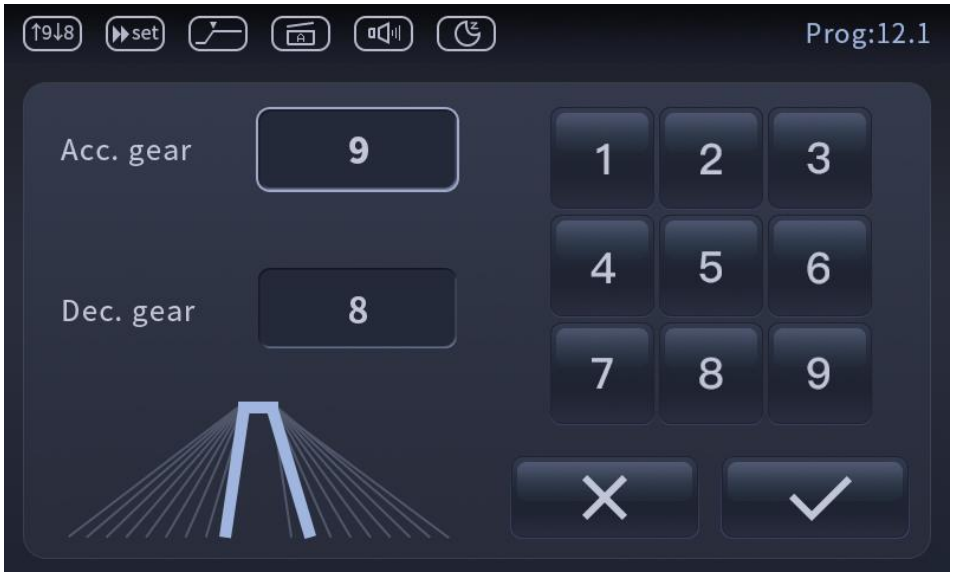
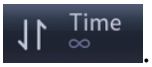


Fig. 5-10

Preset time and continuous run modes are identical in above parameter setup, except that for continuous run, ∞ could be selected by click 

. Manually click the [START/STOP] button to end the centrifugation process is required when start continuous run.

3) Atset mode

When  is selected, centrifugation timing restarts when 95% of the set RPM/RCF is reached; if “Soft” is selected, it automatically changes to 95% timing mode.

When  is selected, means that centrifugation timing starts as soon as operation starts.

After parameter setting, click [START/STOP] button to start centrifugation. When reaching the target centrifugation time, the operation stops automatically. Click [START/STOP] button to stop preset time run early before the target time is reached.

The instrument will automatically switch to the time mode for displaying after no operation for a period of time after starting the preset time centrifuge, which is convenient to check the centrifuge status and remaining centrifuge time.

Fig. 5-11

5.6.2 Short run

Press [SHORT] button on the panel of the centrifugation to start short run but end it by releasing the button.

“Short” centrifugation has no Soft mode but accelerates to the target RPM or Max.rpm in non-soft mode.

After the rotor selection is completed, the mode of “Short” centrifugation can be selected, that is, when clicks "SHORT" to start centrifugation, the system will perform “Short” in the mode of "set" or "Max".

Rotor cannot be selected during centrifugation.

5.7 Treatment after operation

1） Wait for the opening of the microcentrifuge lid,then open the rotor cover;

2） Remove the centrifuge tube and then screw up the rotor cover;

3） Close the lid of microcentrifuge and turn off the power.

6- Alarm prompts

ErrCode	Alarm prompts	Solutions
001	“Lid abnormality! Restart the device!”	1) Restart the device; 2) If the fault remains, please contact the after-sales personnel.
002	“Motor Type abnormality! Contact the after-sales personnel! ”	Please contact the after-sales personnel.
003	“Lid cannot be unlocked! Restart the device!”	1) Restart the device; 2) If the fault remains, please contact the after-sales personnel.
004	“Communication abnormality! Restart the device!”	1) Restart the device; 2) If the fault remains, please contact the after-sales personnel.
005	“IPM abnormality! Restart the device!”	1) Restart the device; 2) If the fault remains, please contact the after-sales personnel.
006	“Hall sensor abnormality! Wait until the rotor stops and then restart the device!”	1) Restart the device; 2) If the fault remains, please contact the after-sales personnel.
007/008	“Temperature sensor failure! Restart the device!”	1) Restart the device; 2) If the fault remains, please contact the after-sales personnel.
009	“Voltage abnormality! Check whether the Voltage is range between 198V-253V!”	Check whether the Voltage is range between 198V-253V.
010	“Drive hot! Turn off the power supply and wait until the device is cool!”	1) Turn off the equipment for 20 min before restarting; 2) If the fault remains, please contact the after-sales personnel.

011	“Main fan failure! Restart the device!”	1) Restart the device; 2) If the fault remains, please contact the after-sales personnel; 3) Do not use centrifugal functions after the fan is damaged.
101	“Speed abnormality! Check whether the rotor or tube is abnormal!”	1) Check whether the rotor or tube is abnormal; 2) If the fault remains, please contact the after-sales personnel.
102 / 202	“Device is unbalanced! Check whether the samples and rotor are abnormal!”	1) Check whether the sample is placed symmetrically; 2) Check whether the rotor is installed correctly; 3) Restart the device; 4) If the fault remains, please contact the after-sales personnel.
103	“Brake failure! Contact the after-sales personnel!”	Restart the device.
104	“Bottom hot ! Wait for an hour until the device is cool!”	1) Turn off the device and let it cool for 1H before use; 2) If the fault remains, please contact the after-sales service.
105	“Rotor not screwed up! Check whether the rotor is abnormal!”	1) Check whether the rotor is abnormal; 2) If the fault remains, please contact the after-sales service.
106	“Lid cannot be locked! Reopen and close the lid!”	1) Reopen and close the lid; 2) Restart the device; 3) If the fault remains, please contact the after-sales personnel.
201	“Lid fan failure!”	1) Restart the device; 2) If the fault remains, please contact the after-sales personnel.
203	“Please pull the lid!”	Open the lid manually by pulling.

7- Troubleshooting

Problem	**Possible cause**	**Solution**
The lid cannot be opened.	The rotor hasn't stopped rotating.	1) Wait for the rotor to stop.
	Power failure	1) Check the microcentrifuge fuse. 2) Check the fuse of the lab. 3) Operate the emergency unlock device of the lid
	The internal components of the microcentrifuge are damaged	1) Operate the emergency unlock device of the lid
Unable to start the microcentrifuge	The lid is not closed	1) Close the lid
The microcentrifuge shakes during starting	The rotor is loaded asymmetrically	1) Shut down the microcentrifuge and load the rotor symmetrically 2) Restart the microcentrifuge
Even though "Short" button is pressed, the microcentrifuge brakes during Short run.	"Short" button is quickly released for more than two times	1) "Short" button must be kept pressing during short run.

8- Maintenance

8.1 Considerations

1) Don’t let any liquid into the equipment in order to prevent electric shock.
2) Do not use alcohol or alcohol-based disinfectant to clean the sealing ring of cavity and rotor.
3) The power can only be turned on when interior and exterior of the equipment are completely dry.
4) Reconnect the power supply only after the inside and outside of the device are completely dry.
5) Before each use, please check the air tightness of rotor cover and centrifuge tube, and they must be clean and undamaged.
6) High-temperature disinfection temperature should not exceed 121 ℃ for no more than 20 min. After disinfection, please apply a thin layer of journal grease onto the screw thread of rotor cover.
7) It is prohibited to use any corrosive chemicals on the equipment and its fittings, such as strong and weak base, strong acid, acetone, formaldehyde, halogenated hydroxide or phenol.
8) When polluted by corrosive chemicals, the equipment should be cleaned immediately with neutral cleaner.
9) Don’t disinfect the equipment with UV, β, γ ray or other HERs. Avoid storing the equipment in areas with strong ultraviolet radiation.

8.2 Regular maintenance

1) Please shut down the microcentrifuge and unplug the power supply before maintenance.
2) Clean surfaces of the equipment and its fittings with contact to operators’ skin with gentle cleanser at least once every week.
3) If the equipment is used to process samples with biological hazards, please regularly remove and clean the rotor and disinfect it at 120 ℃. Clean the rotor with ethyl alcohol or ethyl alcohol-containing disinfectant. Do not use alcohol or alcohol-based disinfectants to clean rotor sealing ring.
   Note: The rotors with a non-detachable sealing ring cannot be disinfected for more than 50 times, otherwise it should be replaced.
4) Brush away dust at ventilation opening of the microcentrifuge once every half a year.
5) Glass tubes may be broken inside the rotor cavity when used. If glass tubes breaks, please completely clean glass pieces and chips on the rotor, the rotor cavity and its fittings.

8.3 Cleaning and disinfection

8.3.1 Clean and disinfect the chamber of microcentrifuge

1) Open the lid. Turn off the power and unplug the power.
2) Loosen the rotor nut counterclockwise with rotor wrench and remove it.
3) Clean and disinfect all contactable surfaces of the equipment (including the power cord) with one soft cloth and recommended cleanser.
4) Apply glycerin or talcum powder onto dry rubber seals to prevent rubber rupture. It is prohibited to apply grease on other parts of the equipment, such as the lid lock, the motor shaft or the rotor cone.
5) Clean the motor shaft with a dry and dust-free soft cloth. Do not use lubricants.
6) Check whether the equipment is corroded or damaged.
7) Reconnect the power only when the equipment is completely dry.

8.3.2 Clean and disinfect the rotor

1) Check whether the rotor and its fittings are corroded or damaged. Do not use them if they are damaged.
2) Clean and disinfect the rotor and its fittings with recommended cleanser.
3) Completely rinse the rotor and its fittings with distilled water.
4) Leave the rotor and its fittings on a cloth for air drying.
5) Put completely dry rotor back into the cavity.
6) If the rotor is not used, leave its cover open.
7) Do not use alcohol or alcohol-based disinfectants to clean rotor sealing ring.

8.4 Replacement of fuses

Refer to ***3-Introduction of product structure*** for positions of fuses. First unplug the power, directly pull out the fuse holder. Both fuses can be removed and replaced.

8.5 Record keeping

It is recommended that the maintenance process should be recorded and kept after maintenance, including time, location, maintenance procedures, etc. for future reference.

8.6 Parts and materials

If you find that some parts or materials should be replaced during maintenance, please contact RWD for after-sales support.

9-Warranty

The warranty of this equipment starts from the date of leaving the factory. During the warranty period, the equipment cannot be used normally due to problems such as materials and process defects. RWD undertakes after-sales service such as equipment maintenance and parts replacement.

Any damage caused by improper use or over-range use is not covered by the warranty. If repair or replacement of parts is required, the cost will be borne by the user.

If the reworked equipment was found to have been unauthorised disassembly, RWD will not provide after-sales service such as warranty, free maintenance and parts replacement.

The warranty statement (including its restrictions) is exclusively issued by RWD and covers all other warranties.

The service life of equipment: 5 years.

Контактная информация сервисных центров

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