



Medical Centrifuge
MS-CE12000
Manual

MARSHALL

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Preamble

Thanks for purchasing the micro-medical centrifuge MS-CE12000. (hereinafter referred to as the centrifuge or the instrument).

In order to help you have a better understanding of the centrifuge, this manual mainly describes the product technical parameters, installation environment, operation methods, maintenance methods and simple troubleshooting of the centrifuge. Please keep this manual for reference when necessary.

Application range

This centrifuge is an advanced intelligent equipment, which is widely used in biochemistry, medical and health, food safety, life science, agriculture and forestry science, animal science, blood bank, blood station, biological products, pharmaceutical products and other fields, ideal equipment for sample separation, precipitation and concentration preparation.



Driven by DC motor, with small volume, low noise, convenient and flexible, high efficiency, over-speed automatic protection, safe and reliable advantages, the machine performance is stable and easy to operate. It is the ideal equipment for hospitals, laboratories, scientific research institute and other units at all levels.

This device's body is made of steel. Its surface is treated by spraying plastic, which makes it have good rigidity, high strength, corrosion resistance. It is also of high efficiency, novel appearance, safe and reliable. Besides, it is suitable for the test and analysis work of samples in low quantity with multiple separation steps.

This device is controlled by microcomputer, and integrates motor door lock control and other advanced technologies.

Safety information

In order to safely use this instrument, please read the following safety specifications carefully. Any operation in violation of the following safety specifications may result in personal injury or equipment failure.

Signs	Remark	Description
	General warning mark	Do not disassemble or replace the product by personnel who are not familiar with it. Otherwise, electric shock or fire may occur. Do not perform any operation other than the maintenance operation described in the user manual. In all cases marked with this symbol, it is necessary to consult the documentation in order to ascertain the nature of the potential hazard and any response measures that must be taken.
	Biohazard label	Biological hazards. Wear disposable rubber gloves when operating the instrument. Do not touch the instrument when the skin is broken to prevent virus infection. Instruments should be disinfected before they are used or repaired.

Safety instructions

Before power on:

- Before each use, the user should carefully check whether the rotors and centrifugal tubes have cracks or severe corrosion. If they have, they should be replaced immediately.
- Keep the internal centrifuge clean. Avoid water remaining and prevent granular dirt falling in.
- The rotor system must be installed when the machine is power off.
- During transportation, the rotor must be removed its wrap from the inner barrel.
- The power supply voltage must be the same with the centrifuge input voltage, single-phase 220v 50/60Hz, and ensure that the power input end has a protective grounding wire.

During use:

- When the product is under acceleration or deceleration process, short-term vibration is normal. No needs to turn off or press the stop button on the operation panel.
- If there is a power failure or passively power off, do not open the product's door immediately, it can be opened only when the motor stops (about 5-10min).
- After each parameter setting, press the "OK" to save.
- After each centrifugalization, the centrifuge will wait for the user to open the door for sampling. If it does not open the door and continues to work, the user has to wait.
- After use, the user should well keep the device, especially the rotor and centrifugal tube, in order to prevent corrosion caused by acid and alkali liquid contamination.
- The centrifuge works continuously for no more than 60 minutes at a time.

Work environment condition:

To ensure the stable and reliable operation of the centrifuge, the following conditions should be noticed:

- Environment temperature: 5-40°C
- Relative humidity: $\leq 80\%$
- Power supply voltage: AC220v 50Hz
- Working environment should be well ventilated, no dust, floccule, metal chips and other materials that can fall into to interfere its work.
- Anti-corrosion gas, anti-strong electromagnetic interference.
- Working on an perfectly even surface to avoid vibration.

Transport and storage conditions

- The wrapped centrifuge should be transported according to the requirements of the contract. Violent impact, rain, direct sunlight should be avoided during transportation.
- The wrapped centrifuge should be stored in a room with a relative humidity of less than 80%, free from corrosive gases and good ventilation.

Safety Precautions

EMI protection

To prevent EMI from damaging the device, please observe the following precautions during use.



Caution

Since the centrifuge has both an electric drive system that produces strong electromagnetic interference, and a microcomputer weak current system that is sensitive to electromagnetic interference, it is the user's responsibility to ensure that there is no corrosive gas and electromagnetic field interference around the device to prevent premature failure of the protective layer on the outside of the device and prevent interference with electrical components.

When the device is used in a dry environment, especially in a dry environment with artificial materials (artificial fabrics, carpets, etc.), it may cause damaging electrostatic discharge, which may interfere with normal operation.

It is forbidden to use the device near strong radiation sources, otherwise it may interfere with the normal operation of the device.

Prevent electric shock

To prevent electric shock, please observe the following precautions.



Caution

- Do not plug or unplug the power supply with wet hands, it may cause electric shock.
 - Do not use damaged wires and connecting cables, which may cause electric shock or fire.
 - Do not use wires and cables other than those required by the design, and do not use power cords or sockets that are not certified by 3C, which may cause electric shock or fire.
 - Do not put detergent and water on the surface of the device to avoid liquid leaking into the device and causing damage to the device.
-

Prevent fire and explosion

To prevent fire and explosion, please observe the following precautions.



Caution

- The alcohol used for device cleaning is flammable, so be very careful when cleaning and using it.
 - This machine is not suitable for separating flammable and explosive liquids. Centrifugation of such substances is strictly prohibited, and flammable and explosive materials cannot be stored inside the device or within 30 cm of the device.
 - It is strictly forbidden to move the centrifuge or to open the door manually during operation.
 - If the slide clip ruptures during centrifugation, it will cause greater vibration. It should be shut down immediately. After the device is stable, the inside of the device should be disinfected to prevent aerosol infection, and then the inside of the device should be cleaned and replaced with new clip ruptures.
 - Because the rotor is running at high speed, centrifugal stress will be generated inside, and because centrifugal samples are mostly corrosive, even ordinary tap water is corrosive to aluminum rotor connectors. The coexistence of stress corrosion and chemical corrosion produces double corrosion fatigue, which can lead to failure of the rotor. In order to avoid this, users should always carefully observe the parts of the rotor connectors that are prone to corrosion, such as the connection between the bottom of the rotor and the main shaft, and the large thread on the upper part of the rotor.
-

Protection against chemical hazards

To prevent personal injury caused by chemical dangerous goods, please observe the following precautions.



Caution

Certain samples or reagents may damage the skin. Please use it carefully to prevent direct contact between hands and clothes. If you accidentally touch your hands or clothes, please wash them immediately with soap and water. If it gets into the eyes accidentally, rinse immediately with plenty of water and consult an ophthalmologist.

Prevent biological infection

In order to effectively protect against biological hazards, please observe the following precautions.



Biological infection risk

- Improper use of samples may result in infection. Do not touch samples, mixtures, and waste liquids directly with your hands. If the spilled liquid leakage is found to fall off when the centrifuge door is opened, there may be a risk of aerosol infection. Please be sure to wear gloves, a mask, and work clothes to prevent infection during operation, and wear protective glasses if necessary.
 - If the sample accidentally touches the skin, please handle it immediately in accordance with the user's working standards and consult a doctor.
 - When cleaning the device, please wear gloves. Do not use chemical reagents such as turpentine oil and benzene to clean external stains, because it may cause changes in color and shape. Use a soft or damp cloth to scrub. For serious stains, use detergent or 75 % Alcohol clean. For spilled samples at risk of infection, clean them with 75% alcohol.
-

Waste liquid treatment

To prevent waste liquid from causing environmental pollution and personal injury, please observe the following precautions when disposing of waste liquid.



Biological infection risk

- Waste slide clip, waste absorbent paper, waste glass slide, and some substances in the waste liquid containing samples, washing liquid, etc. are controlled by pollution regulations and discharge standards. Please comply with local standards and consult the relevant reagent manufacturer or distributor.
 - After the centrifuge is used, the casing of the device, the interior of the centrifugal chamber and the rotor should be disinfected in sequence
 - When accidents such as sample spilling or slide clips rupture occur, stop the machine in time. After the device is completely stopped and stabilized, turn on the device manually to clean the inside of the device. Please wear gloves, masks, and work clothes during operation in case of being infected, wear protective glasses if necessary. When the slide clips broken, please be extra careful when checking and cleaning the sealing ring and the centrifuge chamber to avoid fragments from scratching your hands and causing infection.
-

Disclaimer

Statement

Our company has the final interpretation right of this user manual.

Only when all of the following requirements are met, the company considers to be responsible for the safety, reliability and performance of the product, namely:

- The assembly operation, expansion, re-adjustment, improvement, maintenance and parts replacement are all carried out by professionals approved by the company.
- All repaired parts involved in replacement and supporting accessories and consumables are the original equipment (original) of our company or approved by our company.
- The relevant electrical equipment complies with the national standards and the requirements of this user manual.
- The operation of the product is carried out in accordance with this user manual.

Item

The company is not responsible for the failure and damage of the instrument under the following conditions, or the direct or indirect damage during use.

- Failure and damage caused by violation of the usage method, precautions and purpose of use described in this user manual.
- Failures and damages caused by operators who are not trained by our company or the company's designated agents, such as inspection professionals, doctors, or experimenters.
- Failure and damage caused by maintenance or modification by a company not designated by the company.
- Failure and damage caused by the use of instruments not specified by our company.
- Failure and damage caused by the inconsistency between the operating environment and the operating environment specified by the company (power supply conditions, installation environment, etc.).
- Failure and damage caused by natural disasters such as earthquakes and floods.
- Failure and damage caused by unknowingly moving or transferring (transporting) the equipment after the equipment is installed.

After-sales service and contact information

After-sales service

During or outside the warranty period, any abnormal phenomenon in use can be dialed to the manufacturer 24h for professional technical support.

The service life of the device is 5 years, and the production date is detailed on the product nameplate.

Repair steps

- Confirm the fault and repair method: First contact our company's after-sales service department to confirm the fault situation, and confirm whether the repair method is on-site repair or return to the factory for repair.
- Maintenance cost: Negotiate with our company according to the specific situation.
- Freight: If the device is shipped to our company for repair, the user must bear the freight (including customs fees and charges).

Return steps

- Obtain the right to return the product. Get in touch with our company's after-sales service department and inform the product serial number (see the nameplate on the back of the device for details) and explain the reason for the return. If the product serial number is not clearly identifiable, no product returns will be allowed by our company.
- On the premise of obtaining the right to return the goods, please go through the relevant procedures in accordance with the requirements of our company.

EC declaration of conformity

This medical device has been assigned to class I according to Annex VIII of the Regulation (EU) 2017/745. It bears the mark



Whose single authorized EU-Representative:

Name: Luxus Lebenswelt GmbH



Add: Kochstr.1, 47877, Willich, Germany

Email: info.m@luxuslw.de

Chapter 1 Overview

The MS-CE12000 Medical Centrifuge is a microcomputer-controlled desktop low-speed centrifuge. The device is a steel body, multi-layer explosion-proof design, good rigidity and high strength. This device adopts a mechanical and electronic double-layer door lock protection system. The centrifuge is only started after the door lock is closed, and the cover can be opened only after the motor brake is completely stopped, making your operation safer and more reliable. This device uses a microcomputer processor for precise control, digital display of parameters such as speed, time, etc., has alarm protection functions, and is convenient to operate. This device uses a brushless DC motor, simple operation, maintenance-free, fast lifting speed, low noise, and low temperature rise.

This device used for the separation of human samples before sample separation and is widely used in immunity hematology laboratory, checkout room, laboratory, red blood cells can be serological test, identification of antigens, antibodies and kum type experiment results of judgment, etc., suitable for all body fluids, cells (ascites, pericardial fluid, urine, sputum, articular cavity fluid, brain effusion, puncture fluid, bronchial fluid, etc.) of smear. It is small in size and greatly saves limited laboratory space. The opening height is low, and it is also suitable for the laboratory bench with clamps.

1.1 Product Overview

1.1.1 Working principle

The centrifuge adopts the two principles of centrifugal filtration and centrifugal sedimentation. Under the action of centrifugal force, the cells (particles) of different densities in the solution can be separated, concentrated or purified under the action of centrifugal force.

Place the slide clips containing the same amount of test solution centrosymmetrically in the die hole of the rotor, and cover the door. After starting the device, the relative centrifugal force (RCF) generated by the high-speed rotation of the rotor driven by the motor separates the cells(or particles) with different densities in the test solution. The size of RCF depends on the horizontal distance from the position of the sample to the axis, that is, the rotation distance r and the rotation speed n . The calculation formula is as follows:

$$RCF=1.118 \times 10^{-5} n^2 r \times g$$

n——Speed (r/min)

r——Rotation radius (cm)

The time T required for the separation and precipitation of particles in the mixed liquid is calculated by the following formula:

$$T_s = \frac{27.4 \times (\log_e R_{\max} - \log_e R_{\min}) \mu}{n^2 r^2 (\sigma - \rho)}$$

R_{max}——Rotation radius of the test solution farthest from the axis (cm)

R_{min}——Rotation radius of the test solution closest to the axis (cm)

ρ——Density of mixed liquid (g/cm³)

μ——Mixture viscosity (P)

n——Speed (r/min)

r——Particle radius (cm)

σ——Particle density (g/cm³)

1.1.2 Configuration and structure

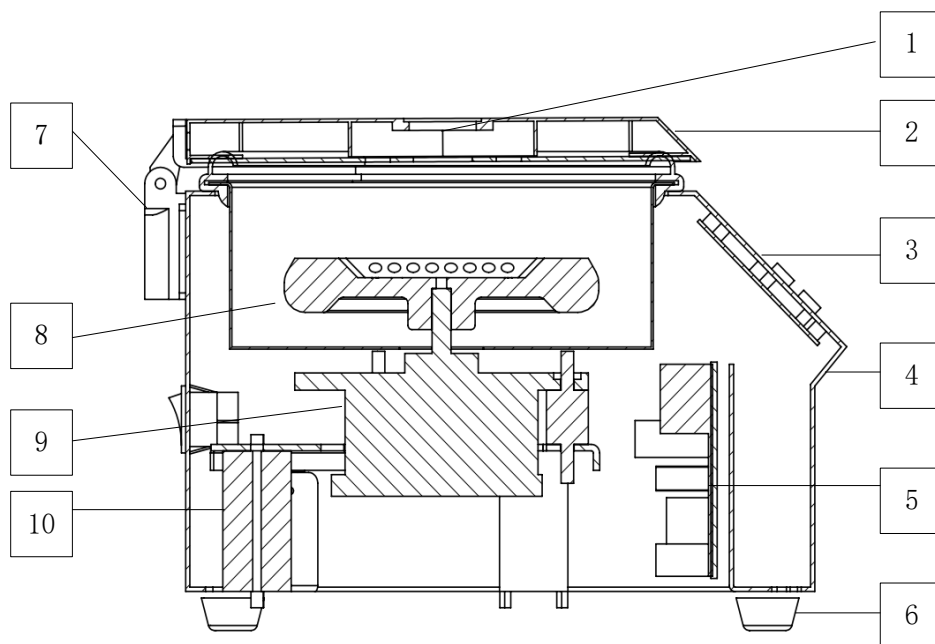


Figure: 1-1 Medical Centrifuge structure

The figure above: 1. Observation window; 2. Top cover; 3. Operation area; 4. Housing assembly; 5. Electrical control panel; 6. Rubber pad; 7. Hinge; 8. Rotor system; 9. Motor assembly; 10. Shock absorption system

1.1.3 Symbol and meaning

Symbol	Meaning
~	AC power
	Power on
O	Power off

1.2 Main parameter

This product belongs to class I medical device, and its basic performance parameters are as follows:

Main parameter	Specification
Power	AC 220V 50Hz
Power supply	150W
Max. speed	12000r/min
Speed control accuracy	±20rpm
Max. RCF	14170xg
Max. capacity	24 Capillary rotor
Timing range	1s-99min
Timing control accuracy	≤±1%
Noise	≤65 dB
Ambient temperature	5°C~40°C
Host machine size (L×W×H) mm	320*380*270 mm
Net weight	19kg
Gross weight	23kg

Table 1-1 Main parameter

The rotor parameters suitable for the centrifuge are as follows:

Model	Max. speed (r/min)	Max RCF (Xg)
24 Capillary rotor	12000	14170

Table 1-2 Rotor parameter

Note:

1. Do not exceed the capacity specified in Table 1-2!
2. The rotors listed in the attached table are all suitable for this type of centrifuge. Users can choose them according to their own laboratory requirements. The specific delivery shall be subject to the actual order signed by both parties.

1.3 Product transportation

The special packaging provided by our company is required when transporting the centrifuge.

Transportation: The fully packaged centrifuge can be transported by automobile, rail, air and sea transportation. The device must be in a packaged state during transportation. At the same time, take care to prevent rain and snow, sun exposure, strong vibration, overweight pile pressure, over-temperature and over-humidity or dumping.




Caution





If the device needs to be moved after being unpacked, please repack the device before it can be transported.

Storage: The packaged device should be stored at -20°C~50°C, relative humidity no more than 80%, atmospheric pressure 86.0kPa~106.0kPa, no corrosive gas and well ventilated environment.

The outer packaging for transportation should contain the following symbols:

Table 1-3 Outer packaging identification

Symbol	Marker	Description
	Upwards	Indicates that the transport package should be upright during transportation.

Symbol	Marker	Description
	Fragile goods	Indicates that the transport package contains fragile items and should be handled with care when handling.
	Afraid of rain	Indicates that the transport package is afraid of rain.
	No tumbling	Indicates that the transport package cannot be rolled during transportation.
	No stacking	Indicates that the package can only be placed in a single layer.

1.4 Configuration List

In order to ensure personal safety and system performance, please use the spare parts and consumables made or recommended by our company. If you need instrument repair or replacement of spare parts or consumables, please contact our customer service center or local distributor.

It is recommended to store the following accessories and consumables available, so that the instrument can be handled in time:

No.	Name	Type	Replacement cycle	Replacement method
1	Brushless DC motor	Accessories	Replace when it fails to work	Replaced by the engineer
2	Door lock	Accessories	Replace when it fails to work	Replaced by the engineer
3	Ring transformer	Accessories	Replace when it fails to work	Replaced by the engineer
4	Fuse	Accessories	Replace when it fails to work	Replaced by the engineer

Note: The accessories in the above table can only be checked and replaced by our approved maintenance engineers, users should not operate by themselves.

Chapter 2 Installation

The installation and operation of this device are simple and easy to operate. In principle, no engineer will be sent to install it. The device is debugged and calibrated by professionals before leaving the factory. After the customer receives the device, it can be installed and operated according to the requirements of this chapter.

2.1 Installation Requirements

Before installation, the user must check whether the laboratory meets the requirements of space, power supply, and working environment.

2.1.1 Space requirement

In order to ensure that there is enough space for heat dissipation, repair and maintenance, the space must meet the following requirements:

1. The distance between the device and its surrounding walls or other objects should not be less than 50 cm (left, right, rear), and the work table must be placed horizontally and can safely support the operation of the centrifuge to ensure that all four feet of the centrifuge are on the table and without shaking.
2. There should be enough space where the power cord plug is inserted into the socket to ensure that the power plug can be unplugged from the power socket quickly and smoothly in an emergency.
3. It is required that there be no experimental device that generates a large heat source and a strong vibration source near the centrifuge.



Caution

The centrifuge must be placed steadily. When the four legs of the centrifuge are not evenly stressed, it will produce vibrations, loud noises, affect the separation effect, and even cause explosions in the centrifuge chamber, resulting in safety hazards.

2.1.2 Power requirements

1. Power supply: AC 220V, 50Hz if the voltage is unstable, UPS voltage regulator device needs to be configured to ensure the stable power output.
2. There is a well-grounded socket within one meter of the device.

3. In order to reduce the risk of electric shock, this machine adopts a three-core plug, which must be connected to the three-core socket of the grounding wire.
4. Make sure that the wall socket is well connected to the ground wire, and make sure that the power supply voltage is consistent with the voltage used by the machine.
5. It is strictly forbidden to use the extended power adapter with three holes to two holes.
6. It is strictly forbidden to use a two-wire extension socket or use a multi-purpose power adapter without a grounding wire.



Caution

- The power socket should be within one meter of the device to ensure that the plug can be unplugged in time when an accident occurs.
 - Check whether the device voltage is consistent with the grid voltage.
-

2.1.3 Environmental requirements

The centrifuge should be kept away from electromagnetic interference and corrosive indoor places. The device should be placed in a ventilated place to avoid direct heat and strong light. The indoor environment should be dry and clean. It is not suitable to work in an environment with excessive humidity or excessive temperature changes. The device is required to operate in accordance with the normal operating conditions specified in the environmental parameters in section 1.2 above.

2.2 Unpackage

When you receive the centrifuge, please confirm whether the specification and model of the centrifuge are consistent with the one you ordered.

Please carefully check the device packaging for any damage (such as damage, water immersion, stains). If you find any problems with the packaging, please contact our company immediately. After confirming that there is no external damage, follow the steps below to unpack:

- Open the box, check the product packing information according to the packing list, and check whether the corresponding items and supporting documents are complete.
- Take out the device, check the appearance of the device carefully, if there is any damage, please contact our company in time.
- Pull out the screws on the right side of the main unit to open the door, check the centrifuge

chamber, take out items except the rotor, and clean the centrifuge chamber.

2.3 Device Installation

1. Take out the centrifuge carefully and place it on a horizontal work table (the device weighs about 20 kg, and the work table is required to bear more than 75 kg).
2. Confirm that the power supply voltage is consistent with the required voltage of the machine (check the power supply voltage mark at the socket at the back of the machine, the power supply used by this machine is a single-phase three-wire AC 220V, 50Hz power supply). Connect the plug of the power cord to the socket on the centrifuge first, then insert the plug at the other end of the power cord into the external power socket, and press the centrifuge power switch to " | " to turn on the power.

2.4 Installation of the Rotor:

- Take out the rotor, check the rotor carefully, and pay attention to whether there are cracks on the rotor caused by transportation bumps.
- Wipe the motor shaft and rotor with a clean soft cloth.
- Install the rotor on the motor shaft. Pay attention to the center hole position and the slot of the rotor matches the motor shaft pin. After the rotor is installed in place, use the matching screws and washers to fasten it to ensure that the rotor is stable and not loose.



Caution:

- It is strictly forbidden to use a rotor that has exceeded the warranty period or a rotor that is not our company.
 - It is strictly forbidden to use a rotor with cracks or corrosion spots.
 - The rotor and the motor shaft must be closely matched during operation.
-

Chapter 3 Instrument Operation

3.1 Operation Panel

The operation panel of the centrifuge is located in front of the instrument, as shown in Figure 3-1:

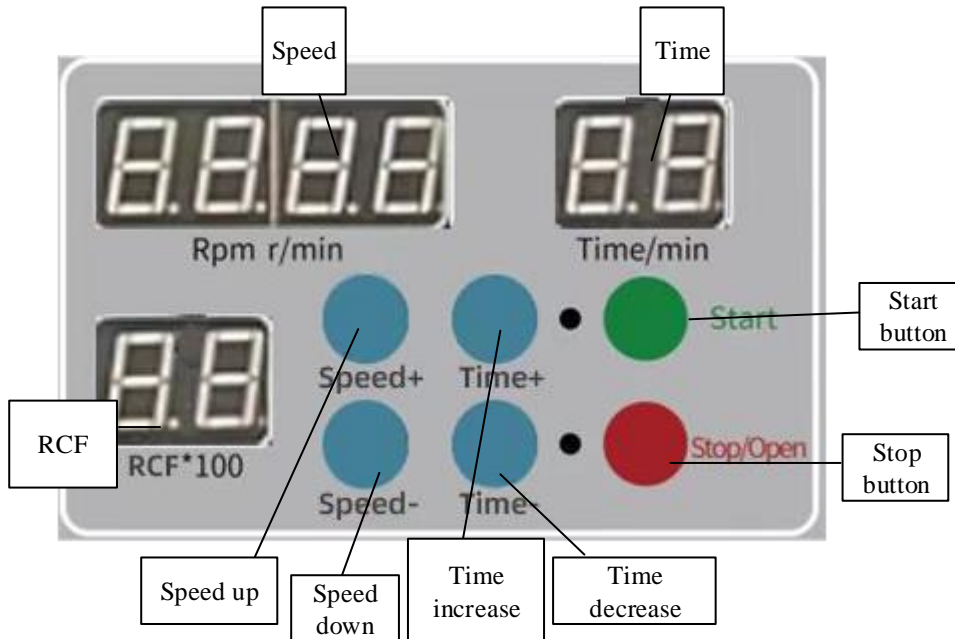


Figure 3-1 Operation panel

3.2 Daily Operation Process

3.2.1 Check before Power-on

- Confirm that the table on which the centrifuge is placed is stable and firm, and there is no liquid placed near the centrifuge.
- The power switch is located on the right rear of the instrument and is marked on (|) and off (O). It controls the power supply connected to the centrifuge. Turn the power switch to the " | " position, the centrifuge is powered on, and the indicator light and display window on the operation panel light up.

3.2.2 Check before Start

- Keep the door cover closed, press "Stop", and check whether the security screw on the right side of the host can be ejected normally and the door cover can be opened normally.
- Open the door and check whether the inside of the centrifuge chamber is clean.

- Check whether there are cracks in the rotor and whether the screws fixing the centrifuge rotor are stable and firm.



Note: The centrifuge rotor should be disassembled regularly and checked for cracks at the bottom connection. It is strictly forbidden to operate with a cracked rotor!

3.2.3 Put in the Centrifuge Tubes

- Check whether the cap of the centrifuge tube is well installed.
- Place the centrifuge tube into the centrifuge tube sleeve symmetrically.
- The centrifugal tube liquid should be added with a balance to measure the liquid of equal weight. The two symmetrical centrifugal tubes in the rotor should have the same weight and cannot exceed the maximum allowable imbalance of 0.5g.
- Centrifuge tubes must be an even number and placed symmetrically, otherwise vibration and noise will be generated due to unbalance. If you are using the centrifuge tube with a cap, please tighten the centrifuge tube cap.



Note: If the centrifuge tubes are placed unevenly, the rotor will swing greatly during the rotation, and in severe cases, the centrifuge may even explode!

3.2.4 Set Centrifugation Parameters

- Click the operation panel to set the speed and time, the operation panel will automatically calculate and display the centrifugal force during operation. Centrifugal force display ranges from 1 to 17.
- The set range of speed is 100~12000r/min, and the adjustable range of centrifugal time is 1s~99min.



Note: The parameters cannot be changed at any time during operation.

3.2.5 Start up

- Close the centrifuge door and slightly lift the door manually to check if the door is locked.
- Press "Start" on the operation panel, the green running indicator lights up, the motor runs, and the speed steadily rises to the set speed. After the speed reaches the preset speed, the time display interface starts timing.



Note: It is strictly forbidden to click "Start" when the door is unlocked!

3.2.6 Shutdown

- When the instrument reaches the preset time, the red LED lights up, the motor brakes, and the speed drops steadily to 0. After the speed drops to 0, the instrument would beep, and you can press "Stop" to open the top cover.
- During running, if you want to shutdown, you can press "Stop", the red stop indicator lights up, the motor brakes, and the speed drops to 0 steadily. After the speed drops to 0, the instrument would beep. You can press "Stop", the door lock pops out and the door can be opened.
- During operation, if there is a power outage in the laboratory, wait at least 10 minutes for the motor to naturally slow down, gently pull down the steel wire pull ring at the bottom of the machine. When you hear patter of the device, the door has been unlocked and the door cover can be opened. It is strictly forbidden to open the door in advance or attempt to manually brake the rotor.



Note: It is strictly forbidden to pull the ring or try to open the door during the operation!

The control system has automatic monitoring and alarm functions. When the following abnormalities occur, the motor would automatically brake and display the fault code on the operation panel:

E1--Start without closing the door or open the door during operation.

E2--Overspeed alarm.

E3--Motor blocked.

E4--The motor has not stabilized to the set speed for a long time after starting.

E5--Motor vibration detection.

3.3 Shutdown and Maintenance

- Turn off the power on the back of the instrument, turn the power switch to the "0" position, and unplug the power cord.
- Take out all the centrifuge tubes and tube sleeves, and wash the tube sleeves with alcohol and pure water successively.
- Use a moist but non-drip soft cloth dipped in alcohol to disinfect and wipe the inside of the centrifuge chamber, the sealing strip and the inside of the door.
- Use a moist but non-drip soft cloth dipped in pure water to gently wipe the keys on the operation panel.

- Install the dried pipe sleeve into the rotor and close the centrifuge door.



Note: When cleaning the instrument, it is strictly forbidden to drip liquid on the operation panel of the centrifuge or inside the centrifuge chamber!

Chapter 4 Maintenance

4.1 Maintenance of the Centrifuge Chamber

After the centrifuge finishes working, its chamber should be disinfected, and the door should be opened for a period of time to ventilate the centrifuge chamber. If the centrifuge is not used for a long time, put desiccant in the centrifuge chamber and close the door.

4.2 Maintenance of Drive Shaft

Take out the rotor vertically upwards, and be careful not to damage the motor shaft when the rotor falls during the disassembly process. The motor shaft should not be bumped or scratched. Wipe the motor shaft and rotor mounting holes clean with a soft cloth, and apply a little medical petroleum jelly or other grease.

4.3 Maintenance of Operation Panel and Housing

The operation panel and the centrifuge door must be kept clean. The rotor, centrifuge tube or centrifuge cup and other tools cannot be stacked on the centrifuge door to prevent scratches. The operation panel and the centrifuge housing can only be wiped with a soft cloth and neutral detergent to prevent the paint from falling off.



Note: It is forbidden to use corrosive disinfectant (such as 84 disinfectant, etc.) to disinfect the centrifuge.

4.4 Maintenance of the Rotor

Take out the rotor, and then wash it with a neutral detergent. After washing, wipe it dry and turn it upside down to drain the water in the tube hole. For long-term storage, after sterilizing the rotor at high temperature, apply some lubricating oil to the center hole of the rotor and store it in a dry and ventilated place.

Chapter 5 Faults and Troubleshooting

The following failures may be encountered during operation. Please refer to the following methods for simple failure analysis:

5.1 The Operation Panel does not Light up after Power-on

- Use a multimeter to check whether the input power of the centrifuge is consistent with the centrifuge's rated voltage.
- Check whether the power cord is properly connected to the power socket of the centrifuge, and check whether the power cord is loose.

5.2 Severe Vibration or Noise when the Centrifuge is Running

- Check whether the centrifuge tubes placed symmetrically in the rotor have equal weights. If they are not equal, please reconfigure them so that the weights of the centrifuge tubes placed symmetrically are equal.
- Check whether the centrifuge tube is broken. If the centrifuge tube is broken, clean the rotor and reconfigure the centrifuge tube with the same weight.
- Check whether the machine is placed horizontally on a level platform, whether the force on the four feet is even, whether the table is solid, and whether there is a strong seismic source around.
- Check whether the instrument is placed horizontally on a level platform, whether the force on the four feet is even, whether the platform is solid, and whether there is a strong seismic source around.
- Check whether the centrifuge tubes in the rotor are placed symmetrically. If they are not placed symmetrically, please place the centrifuge tubes of equal weight in pairs.
- Check whether the motor shaft is deformed and the rotor is cracked.
- Check whether the buffer part of the motor has been damaged, if it has been damaged, please replace the buffer system. (Please proceed under the guidance of professional after-sales engineers).

5.3 The Centrifuge does not Work

- Remove the centrifugal chamber, check whether the internal circuit is loose, check whether the

wiring plug-in and the circuit board are plugged in, if not plugged in, please fasten the wiring.

- Use a multimeter to check the power supply transformer and check whether the input and output voltages are correct. If the power supply transformer is damaged, please replace it with one of the same model and specifications.
- Use a multimeter to check whether the motor is energized. If the motor is energized but does not run, it indicates that the motor is damaged. Please replace the motor.
- The motor can run but the rotor cannot. Please check whether the rotor has been installed correctly.



Note: If the power supply display is normal, but the centrifuge does not work, please contact our customer service center for help in time, and perform troubleshooting under the guidance of professional engineers. It is strictly forbidden to disassemble internal components without permission.



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