LABWAVE

Operating Instructions
使用说明书

High-Speed Refrigerated Centrifuge
高速冷冻离心机

HC-3000R

1. Operating Instructions

1.1 Using this manual

Please read the operating instructions completely before using the device.

It is not allowed to operate the device without reading the manual. Be sure to observe all safety instructions in this manual. If neglected, personal injury and/or instrument damage can be caused. Carefully read and fully understand the following safety notices.

1.2 Safety instructions

- Follow the instructions and precautions described in this manual to operate, repair and maintain this device safely, which if not strictly observed, will result in damage or short service life of the device.
- This device is for indoor use only. Please carefully read this manual before use to avoid personal injury or possible death.
- Only trained staff should operate this device.
- Do not open or repair the device, which will void the warranty and may also expose to the risk of electric shock. Please contact the supplier for repair.
- The device must be grounded properly to avoid electrical shock hazards. This device uses a three-pin plug, and the third pin is a ground pin. Only use earth/grounded sockets with a protective earth (PE) conductor.
- Ensure that power connection is in accordance with the

specifications on the name plate. Replace the power cord if it is broken.

- Only use a power cord with the same specs and ratings as the original cord.
- Avoid operating the device in a dusty or humid environment or close to water or strong sunlight.
- The device may only be used in a safe environment, such as in the open environment of a well-ventilated laboratory or a fume hood.
- Do not operate the device in areas where explosive substances, aggressive gases or strong magnetic field is present.
- Switch off the device if it is not used. If not in use for a long term, then disconnect the device from the power supply, and cover it with soft cloth or plastic paper to avoid dust or other materials going into the device.
- The ventilation slots of the device must not be obstructed during operation.
- Disconnect the device from the power supply immediately and contact your distributor if:
  - Liquid or water splashed on to the rotor;
  - Abnormal sound or smell during the operation;
  - Device is dropped accidentally or housing is damaged;
  - Any apparent changes in the function.

2. Unpacking

Please unpack the device carefully and check it for damage. It is important that any transport damage is detected when the device is unpacked. In the case of any damage a fact report must be sent immediately (post, rail or forwarder).

Package contains:

No	Item	QTY
1	High-speed refrigerated centrifuge	1
2	Power cord	1
3	Emergency lid release pin	1
4	Wrench	1
5	Operating instructions	1
6	Warranty card	1
7	Certificate	1

3. Product Description

The CF321 High-Speed Refrigerated Centrifuge has a maximum capacity of 24x1.5ml or 24x2.0ml (centrifuge tubes) and reach a maximum of 15,000rpm/21,130xg. Four rotors are suitable for various applications, including 24x1.5/2.0ml tubes, 18x1.5/2.0ml tubes, 4xPCR strips or 12x5ml tubes. Three adjustable speed levels allow for a wide range of lab applications.

Product features:

- 5-inch color LCD touch screen displays time, speed, and temperature.
- Lid locking offers improved safety, and the lid can be easily closed with light pressure.

- With wide temperature control range: -10°C to +40°C
- Brushless DC motor, maintenance-free and long service life.
- Strong fast pre-cooling function ensures reliable cooling at 4°C even at maximum rotor speed.
- With a fast pre-cooling speed (Room Temperature to 4°C in only 8 minutes), the centrifuge is ready for use in a very short time.
- Built-in condensate tank to prevent the accumulation of condensate in the rotor chamber.
- The rotors are made of high-strength aluminum alloy, resistant to high temperature and high pressure.

4. Specifications

4.1 Working conditions

Permissible ambient temperature：5℃~30℃

Relative humidity：≤70%

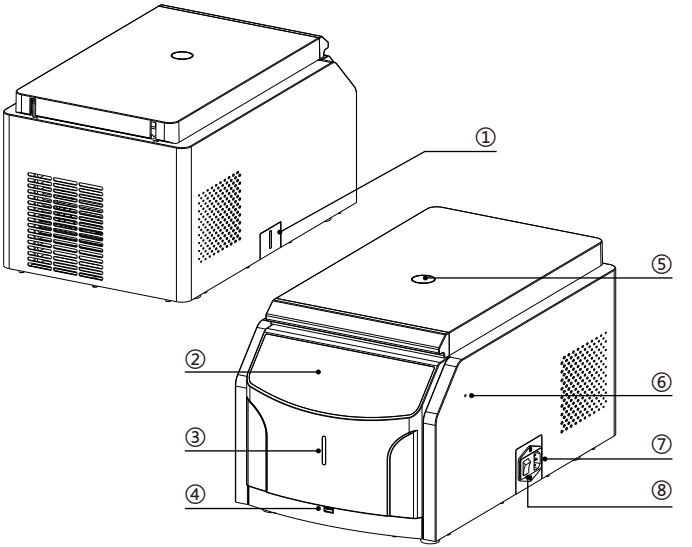
Power supply：AC100~120V/AC200~240V, 50/60HZ

4.2 Technical parameters

Model No.	HC-3000R
Speed range	300~15000rpm (increment: 100rpm)
Temperature control range	-10 °C to +40 °C
Time Setting Range	30s-99h59min, with continuous run function
Rotor Capacity	24×1.5/2.0mL tubes (standard), 18×1.5/2.0mL tubes or spin columns, 12×5mL tubes, 4×8×0.2mL PCR strips/tubes
Max. RCF	21,300xg
Temperature control accuracy (at 4°C)	±1°C
Pre-cooling time (at speed of 15000rpm)	≤20min from RT (~21°C) to 4°C
Power	500W
Weight	30Kg
Dimension (L*W*H)	520×305×285mm

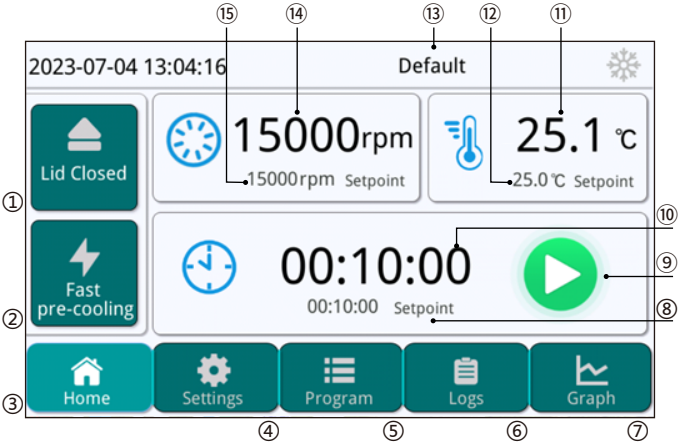
5. Product overview

5.1 Product structure



①	Condensate tank	⑤	View Port
②	Operation panel and display	⑥	Emergency lid release hole
③	Indicator	⑦	Power socket
④	USB interface	⑧	Power switch

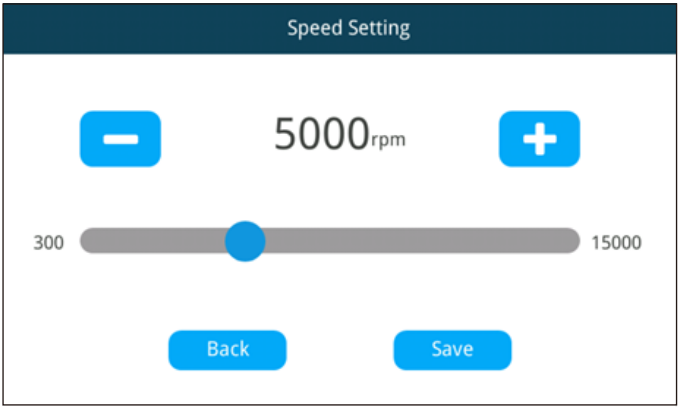
5.2 Operation Panel



①	Open/close the lid
②	Switch on/off the fast pre-cooling function
③	Back to the home screen
④	Click to enter Settings Menu
⑤	Create/Edit programs
⑥	Check the operation Logs
⑦	Display the speed and temperature
⑧	Set centrifugation time
⑨	Start/Stop Program
⑩	Display the remaining centrifugation time
⑪	Display the real-time temperature
⑫	Set the temperature
⑬	Display the running program name
⑭	Display the real-time speed
⑮	Set the speed

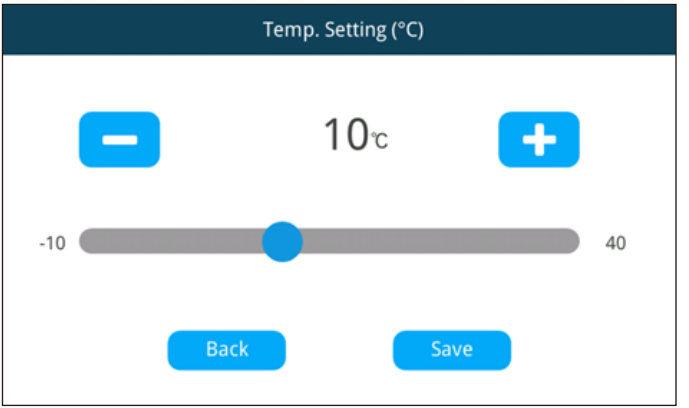
6. Operation Settings

6.1 Speed setting



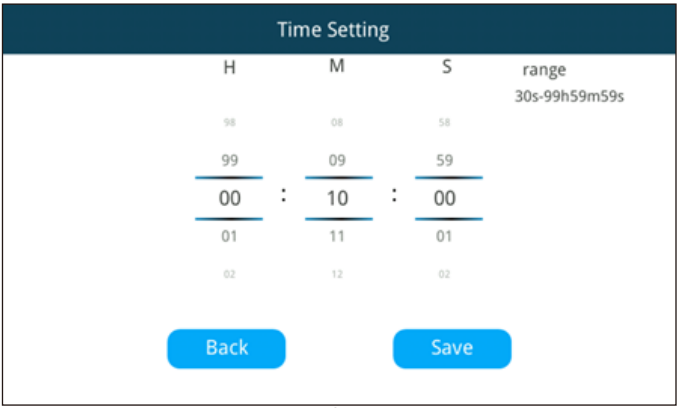
Set the speed of centrifugation and adjust it by pressing “+/-” icons (increment is 100rpm) or use slide function for faster adjustment. The speed range is 300~15000rpm.

6.2 Temperature setting



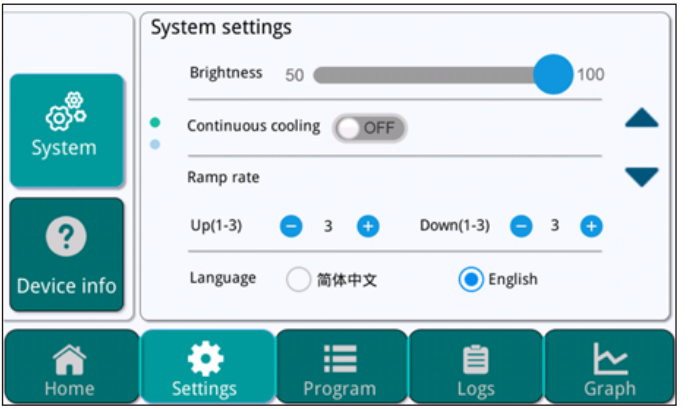
Press “+/-” icons to adjust the temperature (increment is 1°C) or use slide function for faster adjustment. The temperature control range is -10~40°C.

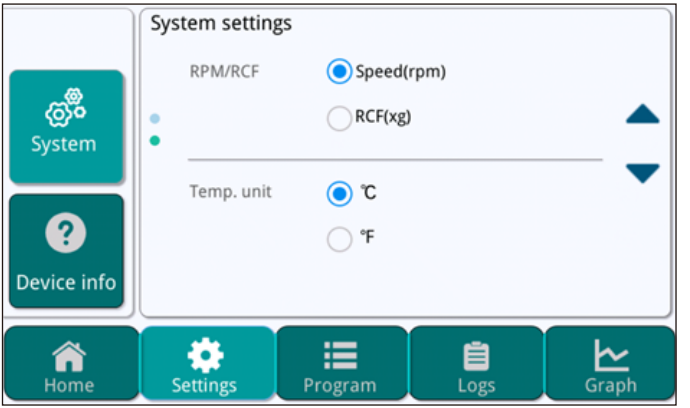
6.3 Time setting



Slide up and down to set the centrifugation time.

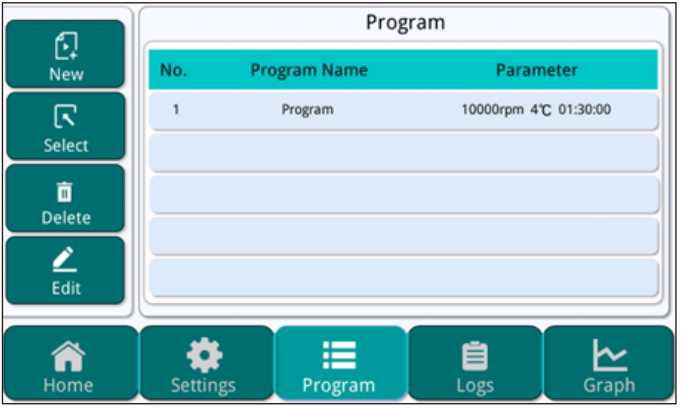
6.4 System settings





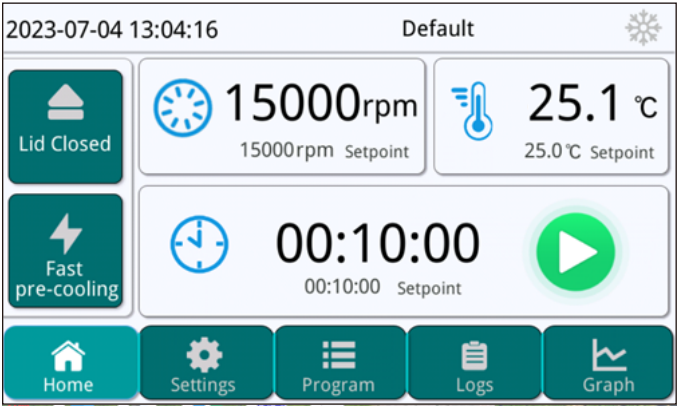
- Brightness： Slide left or right to adjust the brightness.
- Continuous cooling: Switch On and close the lid to start continuous cooling automatically.
- Three adjustable speed levels: Speed can be accelerated from 0 to 15000rpm or decelerated from 15000rpm to 0 at three speed levels. When setting 1st, 2nd, 3rd speed level, the acceleration and deceleration time is 60s, 40s, 15s respectively.
- Language： Chinese or English
- RPM/RCF： speed or RCF
- Temp. unit： ℃ or °F

6.5 Program settings



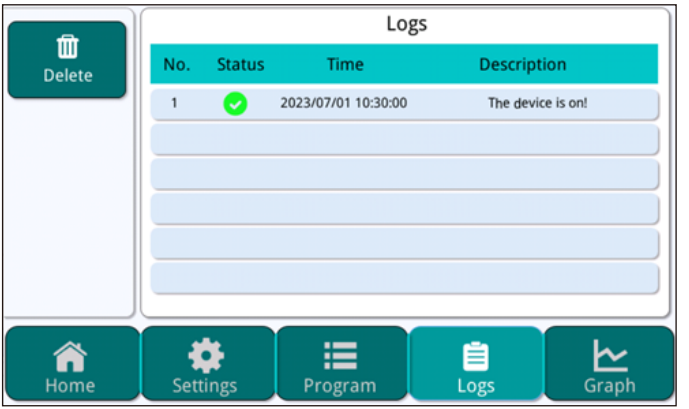
- New: click “New” button to create a new program
- Select: Choose a program to run, then click “Select” button
- Delete: Choose a program to delete, then click “Delete” button
- Edit: Select a program to edit, then click “Edit” button

6.6 Fast pre-cooling



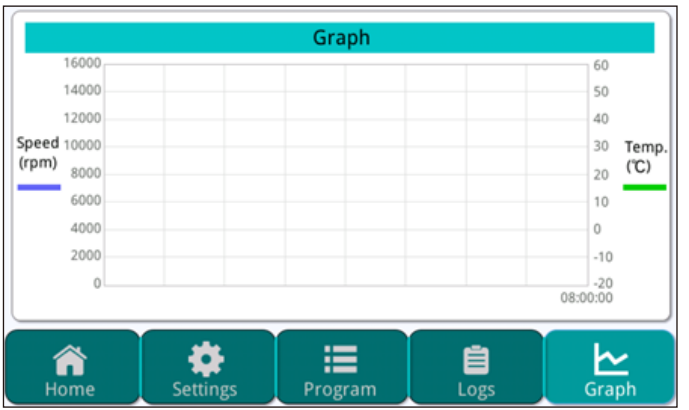
Click to start the fast pre-cooling function. The rotor rotates at the speed of 1000rpm, facilitating the chamber to be cooled down to the set temperature in a short time. The rotor chamber will be maintained at the set temperature for a while.

6.7 Logs



Logs shows program runs and can be used to monitor system performance, and for troubleshooting.

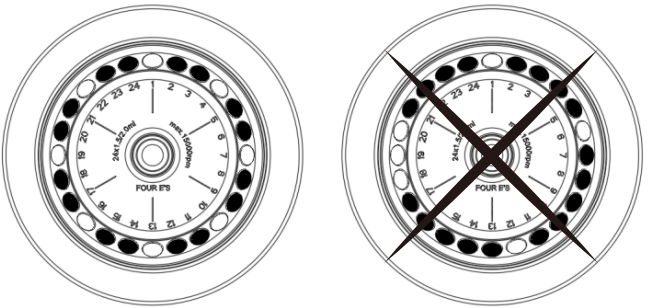
6.8 Graph



The graph helps users intuitively monitor the real-time speed and temperature.

7. Instructions for the Rotor and Tubes

- Insert the rotor to the motor shaft. Ensure the rotor is in position and connected to the shaft. Tighten the locking nut firmly by turning it clockwise with the wrench. Ensure the rotor is firmly secured on to the motor shaft without any slackness or movement. You can remove the rotor by turning the locking nut counterclockwise using the wrench.
- Attach and tighten the rotor lid.
- Insert tubes opposite each other in pairs into the rotor bores. To ensure symmetric loading, tubes that are arranged opposite each other must be of the same type and contain the same sample quantity. To minimize weight differences between filled sample tubes, we recommend balancing. This will reduce wear on the drive and also reduce operating noise.



8. Troubleshooting

8.1 Error messages

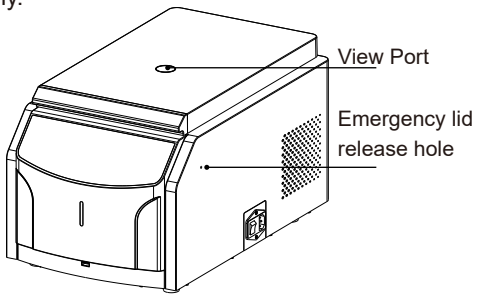
Problem	Cause	Solution
No display	No power connection	Check the power connection
	Damaged power socket	Replace the power socket
	Damaged power switch	Replace the power switch
	Others	Contact distributor/manufacturer
Centrifuge lid can't be opened.	The rotor is still running.	Wait for the rotor to stop.
	Power outage	1. Check the power supply
		2. Activate the emergency lid release.
Loud noise during operation	The rotor is not loaded properly.	Switch off the device and tighten the rotor nut and rotor lid
	The tubes are asymmetrically loaded.	Switch off the device and load the tubes symmetrically.
Temperature display doesn't match the actual temperature.	Damaged temperature sensor.	Contact distributor or manufacturer
Shows "High Rotor Temperature. Device stopped automatically."	The ambient temperature is too high.	The ambient temperature should be less than 30°C.
	No refrigerant or PCB fault.	Contact distributor or manufacturer

Note: In case of any error messages display not in above list, please contact your local distributor or manufacturer.

8.2 Emergency lid release

During power outage, the centrifuge lid cannot be opened using the “Open lid” button on the operation panel. In that case, the lid can be opened by the emergency lid release.

- Ensure the rotor is not running through the view port.
- Disconnect the device from the power supply.
- Insert the emergency lid release pin or a thin screwdriver into the emergency lid release hole and push it, then the lid will open automatically.



9. Maintenance and Cleaning

- Switch off the device and disconnect it from the power supply before starting cleaning or disinfection.
- Do not allow any liquids to penetrate the inside of the housing.
- Remove the rotor and clean it using a soft cloth soaked with diluted alcohol.
- Clean any dust deposits using a brush, but not a wire brush.
- Thoroughly clean the rotor and rotor chamber, and check the rotor for wear, damage and corrosion.

- Only use cleaning agents and disinfectants with pH between 6 and 8.
- If the device has been contaminated by aggressive chemicals, clean immediately using a mild cleaning agent.
- Do not exceed temperature of 121°C or a time of more than 20min. while autoclaving.
- Replace the seals of rotors after 50 autoclaving cycles. (Seal PN: 3.4.603440007)
- Regularly empty and clean the condensate tank.
- Regularly free the rotor chamber from ice formations by thawing, by either leaving the centrifuge lid open or by performing a short temperature control run at approx. 30°C.

10. Warranty

You have purchased an original laboratory machine which meets the highest engineering and quality standards. In accordance with our warranty conditions, the warranty period is 1 year from our shipment.

The warranty does not cover natural wear and tear of parts, nor does it apply to faults or damage caused by negligence, improper operation, or failure to use and maintain the machine in accordance with the instructions in this operating manual.

We reserve the right to change or modify or improve any of our instruments without any obligation to make corresponding changes to any instruments previously sold.

Date：2024.03.11

Version：V1.0