

Operation Manual



BBRC-202

Blood Bank Refrigerated Centrifuge

Thank you for Choosing Biolab products. Please read the “Operating Instructions” and “Warranty” before operating this unit to assure proper operation.

Safety Notices

We appreciate your business with BBRC-202 centrifuge. To prevent any potential accident, please operate centrifuges according to the following safety notices.

1. Unplug the main power cord, when performing maintenance or when centrifuge is expected not being used for a long period of time.
2. Load the rotor with samples arranged symmetrically. Opposing tubes must be of equal weight. If necessary, use "water blank" tubes to balance sample tubes of unequal weigh. Do not conclude that tubes are balanced by sight over volume. Use the pan balance provided in the centrifuge room for balancing tubes in rotors for the centrifuge.
3. Never exceed the maximum speed posted for the rotor!
4. Never use the rotor that appears damaged (e.g. O-rings missing, scratched, corroded, and cracked).

The Instruction Manual for BBRC-202 large capacity refrigerated centrifuge contains all of the information needed to install, operate, and maintenance. To prevent any potential accident, please read this User Manual carefully and operate centrifuges according to the following safety protocol.

The terms danger, warning, caution and note have specific meaning in this manual.

Danger advises against certain actions or situations that could result in personal injury. Warning advises against certain actions or situations that could result in personal injury, health risk and environment pollution. Caution advises against actions or situations that could damage instrument, produce inaccurate data, or invalidate a procedure.

Note provides useful information regarding an operation, function, or procedure.



The signs of danger, warning and caution and note are placed in the left of corresponding text.

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01 Introduction

Blood Bank Refrigerated Centrifuge BBRC-202 I is an ideal centrifugal instrument widely used in cosmetic surgery, laboratory, blood bank and hospital.

1.1 Application and Features

The BBRC-202 centrifuge can be equipped with large capacity rotor. The Max Speed is 6000rpm, Max RCF is 6600xg and the Max Capacity is 6x1000ml. It is the usual instrument for separating and producing. Brushless frequency motor, LED(digital) display which indicates the speed, time and temperature.

Frame is 3 tiers protection steel jacket, and with the stainless steel chamber. Automatically electronic lock and pneumatic spring and automatic locked cover can assure the security, the lid cannot open in order to protect the operator in operation.

Small vibration, low noise and beautiful design. Adopt advanced CPU control system realizing microprocessor control, it can control rotate speed and relative RCF and LED display.

The centrifuge has following functions:

- a) It can store all the parameters automatically in operation, and can use directly when startup next time.
- b) When exceeding max speed with 500r/min, it will stop automatically and protect the system.
- c) There are 10 kinds of acceleration and 10 kinds of deceleration.
- d) Rotor pre-cooling

This centrifuge is in accord with national standard GB4793.7-2001 and international standard IEC61010-2-20.

1.2 Main technical parameters for BBRC-202:

Max speed	6000rpm	Max RCF	6600xg
Max volume	6x1000ml	Noise	≤60dBA
Timer	1 ~ 9h59min	Net weight	310KG
Dimension(LxWxH)	800mm×740mm×930mm	Power supply	AC 220-240V 50-60Hz 10A
Speed accuracy	±20rpm	Temperature range	-20~40°C
Temperature accuracy	±1°C	Package Speed accuracy	wooden box

1.3 Matched Rotors for BBRC-202:

Rotor No	Rotor Type	Max Speed (r/min)	Capacity (ml)	Max RCF (xg)
30223	Angle Rotor	6000	6×500	6600
30298	Swing Rotor	4200	6×1000	5100


02 Installation

2.1 Unpacking the centrifuge


- a) Check the package before opening the packing box
- b) Examine the Centrifuge for any shipping damage. If any damage was found, please contact our service department.

2.2 Instrument Installation


1. The work table should be smooth and stable, the four feet of the centrifuge should touch the surface of the work table firmly

 **Warning:** In order to ensure safety, please keep 30cm space around the instrument, and stay out of the safety space in operation, do not store any inflammable and any other dangerous goods in the safety space.


2. Electrical source should be 220-240V Single phase, with independent earth line

 **Danger!** Error voltage or the voltage over 10% will damage the instrument. You need to check the voltage before connect the power.

3. This instrument only can be used indoor and it is better to operate under 20°C (constant temperature) condition. maximum relative humidity is 80% for 31°C, while 50% for 40°C, and avoid placing the centrifuge under heat producer(e.g sunshine, heating pipe and radiator)

 **Caution!** In order to assure ventilation effect, you should keep enough space for centrifuge devices. Overheating and poorly ventilated room will damage the instrument.

4. Use the attached power cord

 Centrifuge rear over with power socket ! ,the security identity is enclosed. Socket is 220V 20A, be careful when connecting the socket.

03 Operation

The operation of Blood Bank Refrigerated Centrifuge BBRC-202 includes power on, lid opening, rotor installment, lid closing, operation, start the centrifuge, stop the centrifuge, these 7 steps. Here is the detailed description.

3.1 Power on

Power switch is located on the left bottom corner of control panel. Turn it to “ON” position, the compressor start to work and the centrifuge is power on.



CautionSide of this power switch is posted with safety marking this means the power is 220V-240V, It is dangerous voltage, beware of electric shock.

3.2 Lid opening

There is **OPEN** key on the control panel, press **OPEN**, lock opened. push the lid upward until it open completely, Spring level will help to open the lid.

3.3 Rotor installment

1. Load the rotor to the central adapter located on the axle of electrical motor, Fasten the screws in the central sleeve till the rotors are installed. Use the special wrench to fasten the screws after installing the rotors in the central sleeve of the axle.

Warning Check the rotor before loading. Never use rotors showing signs of cracking or corrosion, never use expired rotors.

2. Fill the tubes equally by eye (about 75% of the total volume), balance the tubes by scale.

Warning The difference in weight between the tubes should not exceed 2 grams. Load the tubes symmetrically

The input centrifugal tubes should be even. Large difference may be cause big shaking in running. In this case, the centrifuge should be stopped for checking. The tubes should be placed symmetrically by even number. The tubes input improper, unserious weigh the tubes and imbalance working will result in accidents.

- Note**
- i. Only the specified rotors can be used
 - ii. Never use the rotor that appears damaged. Please confirm all the rotors, buckets and other accessories before use it.
 - iii. Never exceed the maximum speed of the rotor and the cups.

3.4 Closing the lid

After the rotor has been properly loaded, close the centrifuge lid

3.5 Operation

1) Explanation for control panel

The time and speed will be shown on the panel, the control panel as shown in Chart 1:

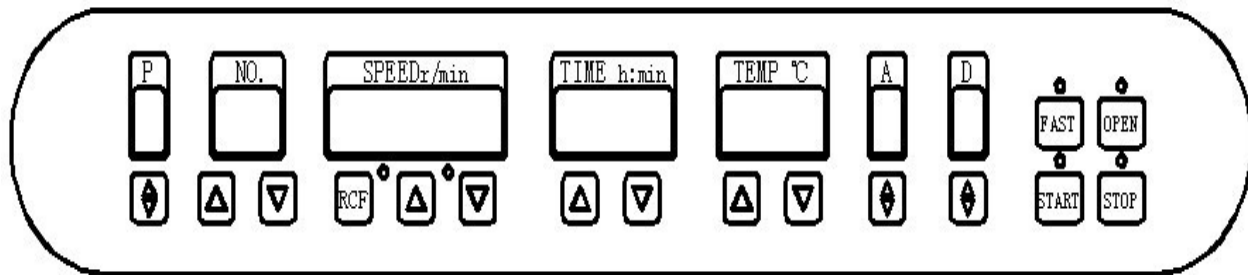


Chart 1

1. P Window
This Window displays the program, there are 0-9 these 10 programs for your choice.
2. NO. Window
This window displays Rotor No., when setting the Rotor No., it is the last two numbers of the rotor. For example, the Rotor No. of 6x1000 swing rotor is 30298, it will display the last two numbers 98.
3. SPEED Window
This window can display both SPEED and RCF, press the “RCF” button below this window, it can transfer from SPEED to RCF, or transfer RCF to SPEED.

4. TIME Window

This window displays the timer, max timer is 9h59min, and the time counts down during the operation.

5. TEMP Window

The window displays two points: ① It mainly displays temperature. When the temperature above 0°C, it will change by 0.5 °C. When the temperature below 0°C, it will change by 1 °C. ② It also can display the errors. All the errors are shown in the following table.

Error Displaying

Error	frequency changer communication error	Lid is not closing	Imbalance	Over Speed	Over Temp	Temp Measure	frequency changer operation error	Speed sensor error	Setting error
Display	E-0	E-1	E-2	E-3	E-4	E-5	E-6	E-7	E-9

6. A Window

This window displays acceleration. There are 0-9 these 10 acceleration for your choice. 0 is constant speed, 1 is the lowest acceleration and 9 is the fastest acceleration.

7. D Window

This window displays deceleration. There are 0-9 these 10 deceleration for your choice. 0 is constant speed, 1 is the fastest deceleration and 9 is the lowest deceleration.

Caution! When the solution is heavy, it is better set the lowest acceleration and deceleration.

2) Setting Parameter

Program No	Rotor No	Speed	Temp	Timer	Acceleration	Deceleration
1	30298	4200rpm	4°C	1h20min	6	7

- a) Setting Program No
Press the button below P Window, after setting “1”, the digital tube flash once.
- b) Setting Rotor No
Press the button below NO Window $\Delta \nabla$, after setting 98 and the digital tube flash once.
- c) Setting Speed
Press the button below SPEED Window $\Delta \nabla$, after setting 4200 and the digital tube flash once; Press “RCF” button, it transfers to RCF
- d) Setting Time
Press the button below TIME Window $\Delta \nabla$, after setting 1:20, and the digital tube flash once
- e) Setting Temperature
Press the button below TEMP Window $\Delta \nabla$, after setting 04, and the digital tube flash once
- f) Setting Acceleration
Press the button below A Window, after setting 6, and the digital tube flash once
- g) Setting Deceleration
Press the button below D Window, after setting 7, and the digital tube flash once

All the parameters are set, it shows as following chart 2

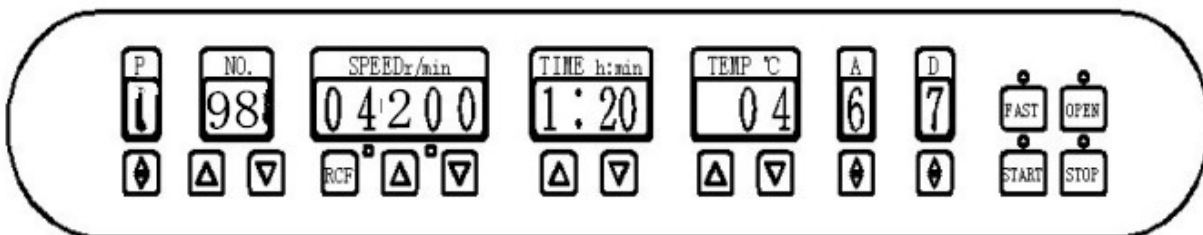


Chart 2

3.6 Start the Centrifuge

Press the “start” button, the green light of the “start” button will be brighten, the time starts to counts down.



Warning: In the operation of the centrifuge, the operator couldn't lean on the centrifuge, and non-worker can't stay around the centrifuge.

3.6 Stop the Centrifuge

It will cut off the electricity automatically in the process of operation when the centrifugal time is 0, the red light will on, it will decelerating according the parameters you set, when you hear the buzz sound, the rotors will stop, the instrument also will stop running.

04 Other Functions

1. Transferable showing of the RCF

The centrifuge is running according to the main parameter speed, if you want to know the RCF in operation, press RCF button, the indicator light for RCF will on, now the digits in the speed window is RCF value, press the RCF button again , it shows the speed again.

2. Protection function

1. Lid protection function

- a. if the lid closing is not closing well, press “start”, the centrifuge cannot run, speed screen shows E-1. Only close the lid properly, press “start”, the centrifuge can run.
- b. When the centrifuge is running, press “open”, the lid cannot open. This program aims to protect the operator, not instrument error.

2. Imbalance Protection

If the test solution is imbalance, the centrifuge will stop automatically and displays E-2.

3. Over speed protection

If the speed gets out of control and exceeds the maximum speed of the rotor with 500rpm, it will stop automatically and you will see “E-3” in the break down window.

Warning: over speed set by the operator is forbidden ! Which severely break the operational rules and will result in accident, which cannot be identified, so the duty of the accident is fully on the operator, In case of accidents, the following operation is forbidden:

For example: the maximum speed is 3500rpm for NO.3 rotor, but the operator mistakes it for NO.1 rotor, which maximum speed is 5000rpm, if the operator set the speed at 5000rpm, it will working at the speed of 5000rpm, then severely accidents will be happened.

4. Over temperature protection

Once the centrifuge reach the protection temperature, the centrifuge will stop automatically, and displays E-4

5. Temperature measure protection

If the temperature measure is broken down, the centrifuge will stop automatically and display E-5

6. Frequency changer protection

If the frequency changer is broken down, the centrifuge will stop automatically and display E-6

7. Speed sensor protection

If the speed sensor is broken down, the centrifuge will stop automatically and display E-7

8. Frequency changer communication protection

If the frequency changer communication is broken down, the centrifuge will stop automatically and display E-0

3. Test sample protection

When the cover is closed or the machine cuts off suddenly, and you want to take out the test tubes, then you can undo the screw which there is mark in the side of the centrifuge by wrench, the cover will open, then take out the test sample.

4. Except for the “Rotors NO.” all the other parameters you can change in the process of operation, it will work according the changed parameters.

5. Memory function

When all the parameters are set, they will be memorized by the machine. The parameters in the window are what you set last time when you restart the machine.

05 Trouble Shooting Services

Trouble Shooting Table

Trouble	Display	Cause	Solution
Cannot Start		1 .No power supply	Connect the power cord
	E—1	2 .Lid is not closed	Close the lid properly
	E—6	3.Frequency changer broken	Contact us
Big vibration	E—2	1 The rotor is imbalance	The weight difference of the solution \leq 2g
		2 Centrifuge feet with imbalance force	Adjust the force
		3 Driving shaft bent	Contact us
Over Speed	E—3	① micro control system	Contact us
		② Speed sensor broken	Contact us
Temp Measure	E—4	Temp Measure broken	Contact us
No display		Switch broken	Change switch
Cannot set programs	E—0	Micro communication broken	Contact us

06 Other Safety Precautions

1. Forbidden for Artificial over speed

Danger: Artificial over speed is a serious violation of operating procedures, easy to occur personal instrument accidents.

2. The service life of the rotor : the service life of the rotor is 5 years. The use of cumulative number is 3000 times, the accumulated use time is 2000 hours. One of the three conditions is reached, the duration of rotor is invalid. Prohibit to use the rotor with exceeding service life.

3. Please check the rotors if had hair line before use every time. The rotors will crack if using cracked and corrosion sign rotors.

Check rotor carefully before each operation.

Danger: Never use rotor with cracking, corrosion sign, and never use expired rotor.

Warning: When maintenance, please take off the plug, wait at least 3 mins open the front cover, otherwise, easy to occur electric shock.

4. Notice

Caution! The rotor head, cup, bucket and adapter needed for strict disinfection purification after separating radioactive, toxic and viral material

07 Maintenance

1. You should take out the rotors from the centrifugal chamber when you don't use the machine for a long time, and then store them in the ventilation and dry place after cleaning.
2. Clean the centrifugal chamber when finished centrifugation, dismantle the central sleeve from the axle regularly, and lubricate the axle and central sleeve, in case of corrosion.
3. Keep the place which settle the centrifuge clean, make sure the freezer is not choked by dirty subjects.

08 Warranty Policy

1. We have one -year warranty on our all products
2. After the machine fixed, our professional technician will file it and keep track of the usage of the machine.
3. We will pay attention to the feedback of the customers within 24 hours.
4. We won't charge customers any money for repairing the machine in one-year warranty time, the freight is also on us.
5. We only charge for the accessories on repairing the machine beyond the one-year warranty time.
6. We have technician training class twice a year, training the technician for our distributor.

Remark :

Regarding how to select RCF parameter

1. The principle of the centrifugation

Centrifuge will produce RCF during operation. Due to sedimentation caused by RCF make the subject dangling in the solution to form precipitation. The substance of the more proportion turned the direction of the largest radius rotor, the lighter substance is on heavier substance and let the subjects of different proportion to be separated hierarchically.

2. How to calculate the relative centrifugal force (RCF)

Centrifugation is depending on the RCF, RCF is depending on the speed and centrifugal radius, the formula of calculating the RCF as follows:

The transfer coefficient 11.2 is a approx value, which is calculating according acceleration of gravity ($1g = 9.81m/s^2$)

3. The confirmation of centrifugal time

Same RCF, centrifugation time is inversely proportional to centrifugal solution's proportion description. The more of the proportion, the less of the time. The less of the proportion, the more of the time.

Same solution, centrifugation time is inversely proportional to RCF. The bigger RCF, the less of the time. Contrary, the smaller RCF, the more of the time.

Same RCF, centrifugation time is related to Min centrifugal radius, longer basket(test bottles) require a longer centrifugation time.

$$RCF = 11.2 \times R \times \left(\frac{N}{1000} \right)^2$$

Therefore, the separation time is difficult to calculate. Usually it is decided by the general test.



BIOLAB SCIENTIFIC LTD.

3660 Midland Avenue, Suite 300, Toronto, Ontario M1V 0B8 Canada

Email: contact@biolabscientific.com Tel: +1 707 533 1445

Website: www.biolabscientific.com