

**Infitek**

CFG-B18B

**HIGH SPEED CENTRIFUGE**  
**USER MANUAL**

Version 2024.04.01

**INFITEK CO., LTD.**

## RCF Calculation Method and Maximum Speed Setting Precautions

### ❖ RCF calculation method:

The size of the relative centrifugal force (RCF) depends on the rotation radius **r** and rotation speed **n** of the sample during centrifugation. Its calculation formula is as follows:

$$\text{RCF} = 1.118 \times 10^{-5} \times n^2 \times r \quad (\times g) :$$

**n**—indicates rotation speed (r/min)

**r**—radius of rotation (cm)

**g**—Unit of acceleration due to gravity (9.8m/s<sup>2</sup>)

### ❖ Notes on setting the maximum speed:

The standard maximum speed of this product is experimentally verified based on a sample with a density of 1.2g/ml. If the density of the centrifuged sample is greater than 1.2g/ml, the maximum allowable speed of the rotor will be adjusted accordingly according to the formula below.

$$N_{\text{Max. allowable speed}} = N_{\text{Max. speed}} \times \sqrt{\frac{1.2}{\rho_{\text{new density value}}}} \quad \rho : \text{New density value (g/ml)}$$

The maximum speed refers to the maximum speed allowed when the density of the centrifuged sample is equal to 1.2g/ml.

For the standard maximum speed, please refer to the speed corresponding to the rotor of the purchased model.

Note: It should be clearly emphasized here that if the specific gravity of the sample is less than 1.2g/ml, then the maximum allowable rotation speed of the rotor must not be increased.

Respected user:

Please read the instruction manual carefully and follow the steps in the instruction manual.



No matter you have any questions during use, please contact us according to the phone number and address in the after-sales service information. We are always waiting to serve you.

This instruction manual introduces how to use GFG-B18B correctly (installation, operation, maintenance, inspection, etc.). Please be sure to read this instruction manual carefully before using it. In addition, please understand the safety precautions of the product before using this product.

Note

- In order to illustrate the details of the product, the illustrations in this manual sometimes show the state with the outer cover or safety cover removed. When using this product, be sure to install the casing or cover as specified and follow the instructions.
- The illustrations in this instruction manual are for illustration only and may differ from the product you ordered.
- Due to product upgrades or specification changes, and in order to improve the convenience and accuracy of the instructions, the contents of this manual will be changed in a timely manner.

## Symbol Meaning and Explanation

Symbol	GB code	Meaning
~	4706.1	Alternating current
	5465.2	Power switch is on (main power supply)
○	5465.2	Power switch is off (main power supply)
	4728.2	Protective ground (earth)
	4793	Safety tips: Please pay attention to safety when using!

### Safety Precautions

- Before each start-up of the instrument, make sure that the rotor is tightly fixed. If it is loose, please secure it.
- Safety and precautions are requirements for safe operation of the centrifuge described in this manual. Please read it carefully before installing, operating, maintaining or repairing this centrifuge. Understanding safety and precautions and correct operation can prevent operator injury and centrifuge performance damage.
- Since we are committed to the continuous updating of centrifuges, the information provided by our company is subject to change without prior notice. Please understand.
- Rotor service life: 5 years for aluminum alloy rotors and 7 years for titanium alloy rotors. Rotors that exceed their service life must be scrapped or returned to the factory for inspection.
- It is strictly prohibited to use rotors that are cracked, corroded, or have exceeded their service life.

## Installation and Maintenance Precautions

- There may be rotor accessories and packaging placed in the centrifuge chamber of this machine. During installation, be sure to open the door cover to inspect and remove items from the centrifuge chamber.
- During the maintenance of this machine, any parts that need to be removed may cause electric shock or personal injury. When performing maintenance on this machine, make sure that the power is turned off and the plug of the power cord has been unplugged from the socket; maintenance work needs to be performed by professional staff.
- Before replacing components, please be sure to confirm whether they meet the requirements of this centrifuge; if you are not sure, please contact our company's after-sales service.

## Electrical Safety

- To reduce the risk of electric shock, this machine uses a three-core plug and must be connected to a well-grounded three-core socket.
- Make sure the wall socket and ground wire are properly connected. Make sure the power supply voltage must be consistent with the voltage used by this machine.
- Do not use a three-hole extension power adapter that turns into a two-hole extension.
- Do not use a two-wire extension socket or a multi-purpose power adapter without a ground wire.
- Do not place containers containing liquids on or near the machine. If the container is accidentally knocked over, liquid may seep inside and damage electrical or mechanical components.
- To avoid possible serious damage caused by electric shock, please disconnect the centrifuge power supply before moving the centrifuge.
- If the centrifuge is damaged, do not attempt to repair it yourself. Please leave it to your company's professional technicians or dealers or our company's after-sales service engineers to handle it.

## Fire Precautions

- Please use overload fuses of the same model and specifications.
- This machine is not designed to separate substances with flammable and explosive characteristics. Unless necessary protective measures are taken, such substances cannot be centrifuged, nor can these substances be contained in the machine or stored within 30cm of the centrifuge.

## Operational Safety Precautions

- When using this centrifuge, please use the rotors and accessories designed by our company for this centrifuge. It is strictly prohibited to use rotors and accessories that are corroded, cracked or have exceeded their service life.
- Before starting the centrifuge, please make sure that the centrifuge chamber has been cleaned and free of debris; please make sure that the locking screw (nut) on the rotor in the centrifuge chamber has been tightened.
- When the centrifuge is working, the set speed should not exceed the maximum speed of the rotor; please do not force the centrifuge rotor to slow down or stop with your hands; do not open the door cover.
- Do not lift or move the centrifuge until the centrifuge rotor has stopped spinning.
- If a glass tube breaks in the centrifuge chamber, use extreme caution when inspecting and cleaning the seals and centrifuge chamber as glass shards may have become embedded in their surfaces.
- Keep a distance of 30cm from other objects when the centrifuge is running. Please do not stay within this range when the centrifuge is working. Unless you are debugging the centrifuge, please do not put any objects into the centrifuge when the centrifuge is running.

## Chemical and Biological Safety Precautions

- Routine operations may include a variety of solutions and test samples, which may be pathogenic, toxic or radioactive substances. Such

substances cannot be handled with this centrifuge unless necessary protective measures have been taken.

- Before operating, observe the instructions on the original solution container regarding the solution contained in the container.
- Care must be taken when handling these solutions because they are contagious, and the procedures and methods specified by the laboratory must be strictly followed when operating.
- All waste solutions must be destroyed in compliance with environmental safety and protection requirements.
- After using these solutions, if you ask our after-sales service personnel to provide service, please clean the centrifuge, thank you!

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# I. Installation and Debugging

## 1.1. Centrifuge installation and requirements

Warning: Do not install this machine near flammable and explosive substances. Before powering on the instrument, manually open the centrifuge door cover and inspect the centrifuge chamber. Do not power on before taking out the items in the centrifuge chamber.

## 1.2. Installation environment

- Ambient temperature and humidity: The surrounding environment has a certain impact on the life and performance of the centrifuge. It is best for the centrifuge to work within the allowed ambient temperature range (10°C ~ 35°C), with a relative humidity of ≤80%.
- It is required that there are no experimental equipment that generates large heat sources or strong vibration sources nearby.
- Avoid installation in direct sunlight and humid places.
- Avoid installing in places where there are corrosive, flammable, and explosive gases in the air.
- Avoid installing in places with oil, dust, and metal dust.

## 1.3. Installation location

- When the centrifuge is working, the rotor and accessories are rotating at high speed, so the centrifuge should be placed horizontally and installed on a solid level table.
- There should be large gaps between the sides and back of the centrifuge and the wall to meet the air circulation requirements for centrifuge heat dissipation.

## 1.4. Installation steps

- When receiving the goods, please check whether the appearance of the packaging box is intact. If there is any damage, please negotiate with the

freight forwarder in time and notify the company.

- Open the outer packaging, carefully take out the centrifuge, and place it on a solid, level surface so that the four feet of the centrifuge are in even contact with the surface.
- Open the door cover: pull out the rubber pull cord from the front end of the right side of the casing and pull it outward (see the picture for the position of the pull cord); inspect the centrifuge chamber, take out the items in the centrifuge chamber, and clean the centrifuge chamber.
- Check the packing list: Check whether the host, accessories, random tools, and random files are complete and correct.
- Rotor installation: Take the rotor out of the packaging box, carefully check whether the rotor is damaged or deformed during transportation, hold the rotor body with both hands, and place the rotor vertically and smoothly on the rotor seat; hold the rotor body with one hand, use the other hand to insert the hexagonal handle into the hexagonal nut in the center of the rotor, and tighten it clockwise to lock the rotor on the shaft, so that the cone surface of the rotor body is in close contact with the cone surface of the drive shaft. As shown in Figure 1.4

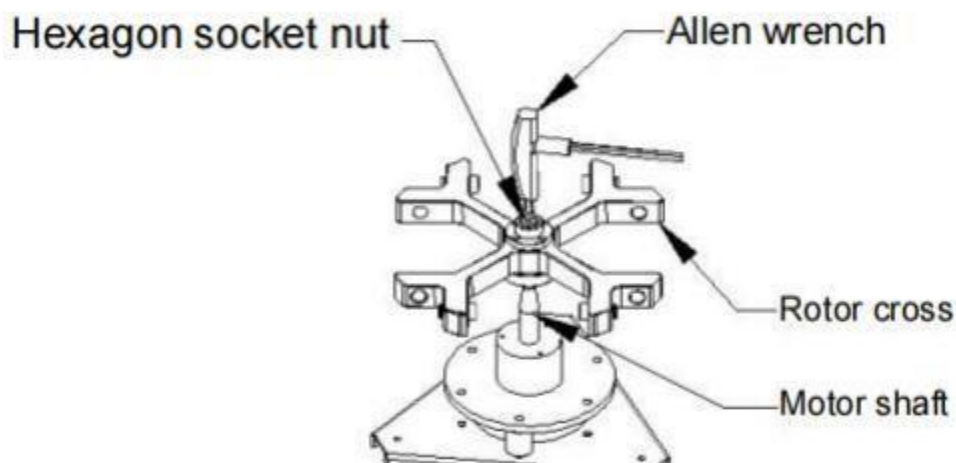


Figure 1.4

- Confirm that the power supply voltage is consistent with the voltage required by the machine. Connect the plug end of the power cord equipped with the machine 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 turn the power switch marked on the right side of the centrifuge. Press the end with the symbol "I" to turn on the power.

#### 1.5. Centrifuge debugging

1. Before starting the machine, first confirm whether the rotor is loose, whether the centrifuge is leveled, and whether it is in firm contact with the horizontal surface. According to the number on the hanging cup, place the hanging cup on the same number as the rotor and check whether the hanging cup is Hang it firmly and check whether the rotation is flexible. If there is no abnormality, run with no load. Set the maximum speed to 1000r/min. After starting the machine and running to 1000r/min, set the maximum speed to 2000r/min. When the speed reaches 2000r/min, Then increase the speed by 1000r/min in sequence until the maximum speed allowed by the rotor of this machine.

To prepare the maximum load, if you are using a horizontal rotor, you should press the hanging cup with your hand to see if there is any cup sticking phenomenon. If there is no abnormality, start running. The maximum speed is set to 1000r/min. After starting up, run to 1000r/min. , and then set the maximum speed to 2000r/min. When the speed reaches 2000r/min, increase it by 1000r/min in sequence until the maximum speed allowed by the rotor of the machine; if there is no abnormality, the debugging is successful.

# II. Product Instruction

## 2.1 Host structure and display control panel

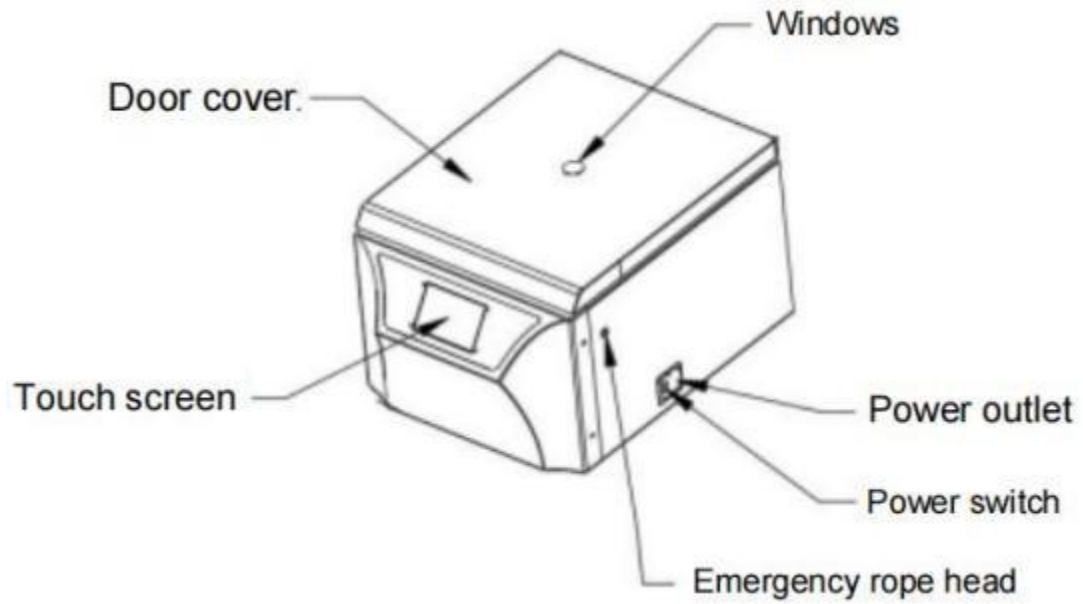


Figure 2.1

## 2.2.1 Touch screen instruction

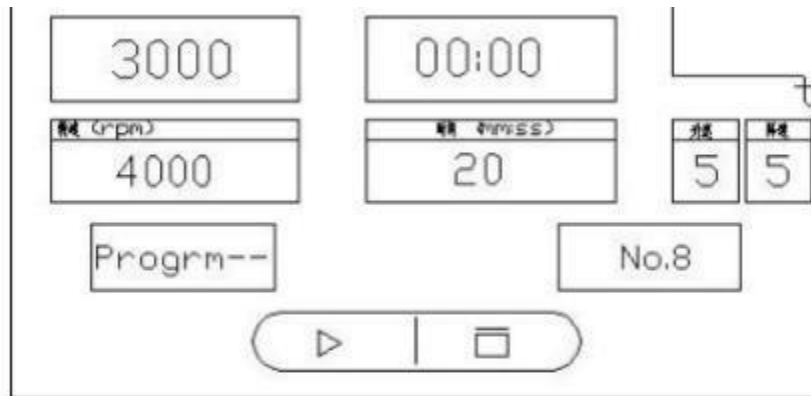


Figure 2.2.1

## 2.2.2 Centrifugation parameter settings

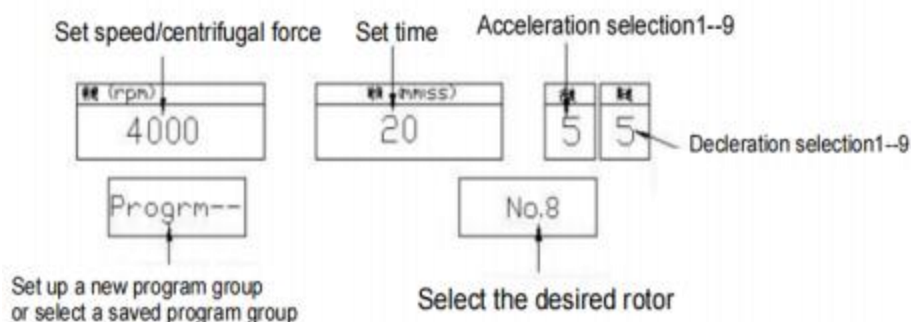



Figure 2.2.2-1

1. Press  the number area to enter the speed centrifugal force setting page.

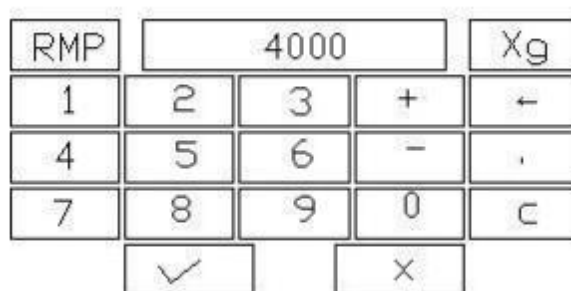




Figure 2.2.2-2


- a. Press the letter RMP square, RMP turns black, and you can set the speed.

After setting OK, press  to return to the main page. The running status of the equipment is displayed in the speed of the home page.


Press  to cancel this operation and return to the home page.

- b. Press the letter Xg square, Xg turns black, and the centrifugal force can be

set. After setting OK, press  to return to the main page, where the operating status of the equipment is displayed by centrifugal force.

Press  to cancel this operation and return to the main page.

- c. If the speed is set, press the Xg square and the system will automatically switch to the corresponding centrifugal force.

2. Press  the number area to enter the time setting page

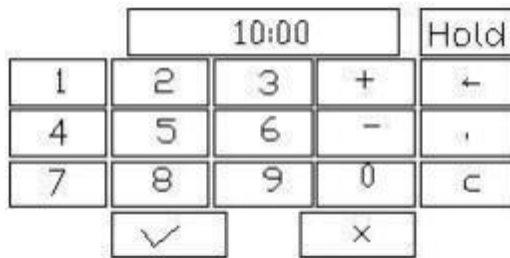





Figure 2.2.2-3

- a. When the letter Hold is displayed in white, you can set the centrifuge time required for the viewing angle between 0-99 minutes and 99 seconds.

After setting OK, press  to return to the main page. The running status of the equipment is displayed in the speed of the home page.

Press  to cancel this operation and return to home page.

- b. When pressing the letter Hold to display black, you can set the centrifuge time required for the viewing angle between 0-99 minutes and 99 seconds. If the time is set to 00 minutes and 00 seconds, the device will run continuously and Hold will be displayed in the time box on the homepage.

After setting OK, press  to return to the main page, where the operating status of the device is displayed in rotation speed.

Press  to cancel this operation and return to the home page.

3. Press  the number area to enter the speed-up setting page

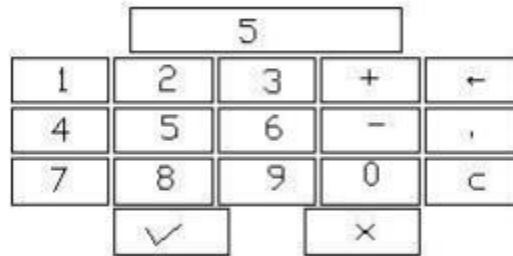


Figure 2.2.2-4

The speed can be selected between 0-9 gears and the time required to set the actual centrifugal speed to 0. After setting OK, press  to return to the main page. The running status of the device is displayed in the speed of the home page. Press  to cancel this operation and return to the home page.

4. Press  the letter area to enter the program group setting page

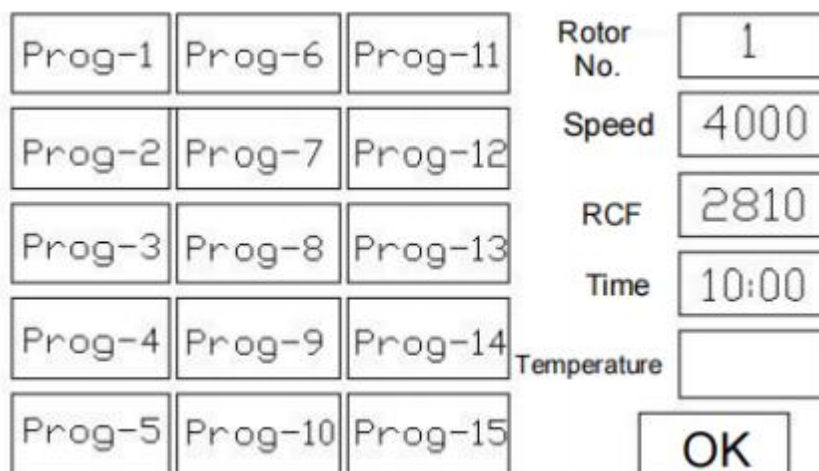


Figure 2.2.2-5

There are 15 program groups in total, which can be selected from Prog-1 to Prog-15. Press the alphanumeric area of Prog-1. After Prog-1 turns into black font (the rest are gray), you can press the rotor number, speed, centrifugal force, and time. In the corresponding numbered box area next to it, enter the settings of the corresponding rotor number, rotation speed or centrifugal force (the rotation speed and centrifugal force system are converted into corresponding settings) and time. After setting OK, press OK to return to the homepage.

5. Press  the alphanumeric area to enter the rotor setting page

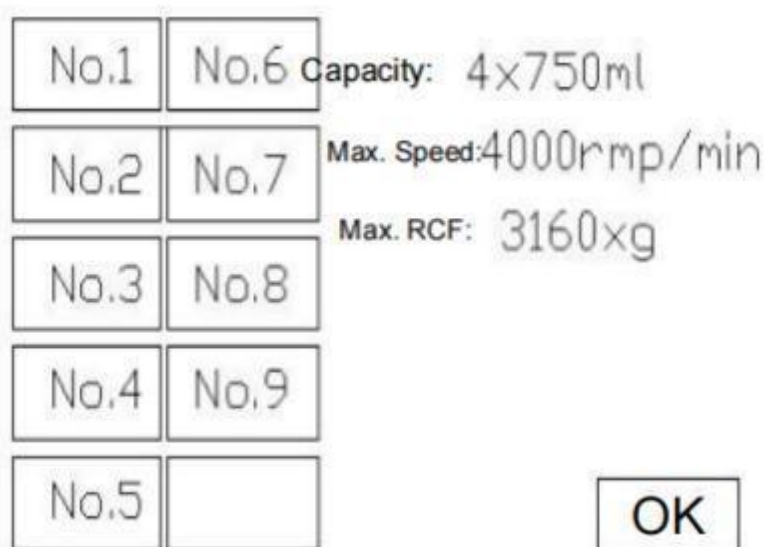


Figure 2.2.2-6

Press the rotor number NO.4. The font of NO.4 turns black (the rest are gray), that is, the rotor is the selected rotor. The maximum capacity, maximum speed and maximum centrifugal force of the rotor are displayed on the right. Press OK to return to the home page.




### 2.2.3 Operation steps


1. Rotor and test tube inspection: The operator must carefully inspect the rotor and test tube before use.

- It is strictly prohibited to use cracked or damaged rotors or test tubes, otherwise it may cause machine damage or personal injury.
- When installing the rotor, it must be installed in place as required.

2. Add liquid and place the centrifuge tube or tube: When adding liquid to the centrifuge tube, you should use a balance to weigh the liquid of equal weight, and then put it into the rotor symmetrically in the center. The two symmetrical centrifuge tubes in the rotor should be of equal weight. Centrifuge tubes must be placed symmetrically around the center, otherwise vibration and noise will occur due to imbalance.

3. Closing the door cover: Close the door cover all the way down. At this time, you can hear the click sound of the lock hook holding the latch. Pull the door cover up with your hand. If the door cover cannot be opened, it means the door

cover is locked. If the key  is pressed, the centrifuge cannot start running, the beep will sound an alarm signal, and the fault display area will display the cause of the fault, such as the door cover alarm.

Press  the red alarm area to clear the fault display; close the door cover again.



4. Set parameters such as rotor number, speed, time, acceleration/deceleration gear according to the operating instructions.


5. Start and stop running:

Warning:

- Do not switch on the centrifuge before inspecting the centrifuge chamber and removing items other than the rotor, otherwise the machine may be damaged.
- It is strictly prohibited to use the rotor at excessive speed; excessive speed

may cause damage to the machine and even personal injury.

- a. Start: Press  the red triangle symbol to start the centrifuge.
- b. Automatic stop: When the set running time countdown reaches zero, the centrifuge will automatically decelerate and stop running. When the speed is equal to 0 r/min, and the door lock can be opened after hearing the alarm sound.
- c. Manual stop: During operation (the running time countdown has not reached zero), the centrifuge decelerates and stops by pressing the key . When the speed is equal to 0 r/min and the door lock is heard after hearing the alarm sound.

6. Take out the centrifuge tube: When the rotor stops rotating, the key will automatically open the door cover when press  (it is forbidden to open the door cover while the instrument is running) and take out the centrifuge tube.

Note: If a power outage occurs during operation, the door cover cannot be opened because the electronic door lock cannot operate. Be sure to wait until the rotor naturally decelerates to 0 before pulling the emergency door opening rope on the right side to force the cover open.

7. Remove the rotor: Use a T-shaped wrench to loosen the locking nut and move the rotor upward to remove the rotor;

8. Turn off the power: After the work is completed, press down the power switch at the rear of the centrifuge, turn off the power and unplug the power cord.

- Do not lift or move the centrifuge while it is running.
- Do not open the door cover while the rotor is rotating.
- The rotor should be removed every day after the last use.

### III. Maintenance and Care

- If the centrifuge is not used for a long period of time, the rotor should be removed from the centrifuge chamber. Then clean the rotor promptly with neutral detergent, dry it with a clean cloth, and store it in a dry and ventilated place. Apply a little grease to the motor shaft.
- The rotor should be installed and taken out easily and vertically to prevent the rotor from falling and damaging the drive shaft.
- During daily maintenance work, clean the centrifuge chamber with neutral detergent and dry it with a clean cloth.
- Check the rotor regularly for corrosion, cracks, etc. and replace it in time.
- Replacement of fuse tube:
  - 1) Turn off the power, first unplug the power cord and the external power supply connection end, and then unplug the power cord and the centrifuge connection end.
  - 2) There is a fuse holder at the lower part of the power socket on the back of the centrifuge. There is a fuse symbol. Find the V-shaped groove of the fuse holder. Insert it with a flat-blade screwdriver. This slot, pull out the fuse holder.
  - 3) Take out the damaged fuse in use, then take out the spare fuse from the holder and replace it with BGXP  $\phi 5 \times 20$ , 250V 10A.
  - 4) Insert the fuse holder into the centrifuge power socket.

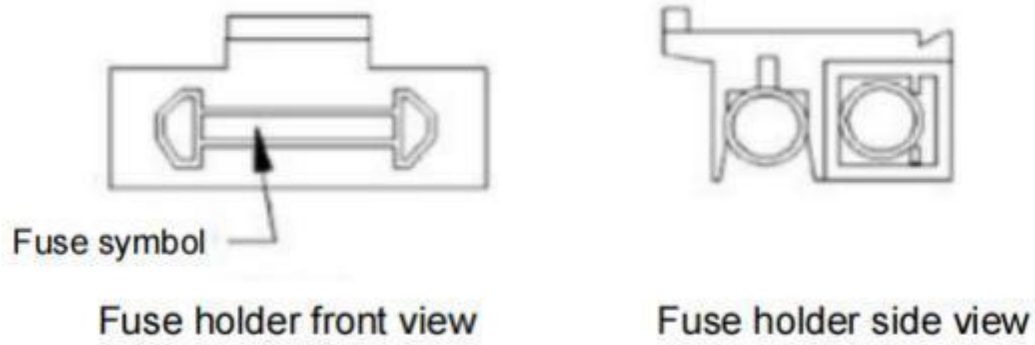


Figure 3.1

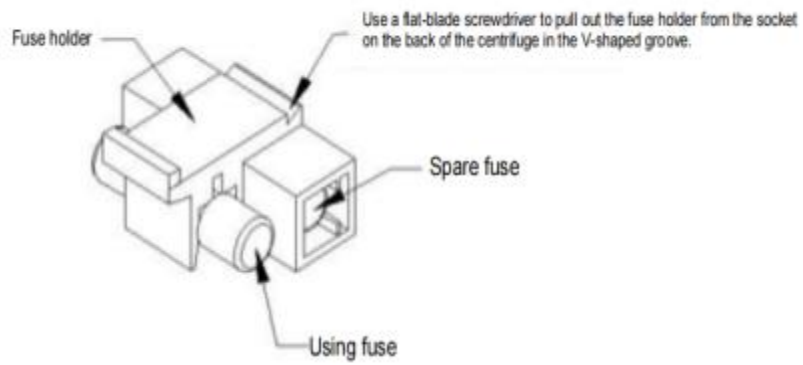


Figure 3.2

# IV . Common Faults and Troubleshooting Methods

## 4.1. Common troubleshooting methods

The centrifuge may encounter the following fault conditions during use. Please refer to the following methods for simple fault analysis:

- ✓ No display when power is on:
  - 1) Use a multimeter to check whether the input power supply of the centrifuge is consistent with the rated voltage of the centrifuge. If there is a problem with the power supply, please check and eliminate it.
  - 2) Check whether the power cord is properly connected to the power socket of the centrifuge. If it is loose or not plugged in properly, please check and eliminate it.
  - 3) Check whether the overload fuse in the fuse holder is intact. If the overload fuse is damaged, please replace it with a fuse of the same model and specifications.
- ✓ Centrifuge vibration is relatively large:
  - 1) Check whether the centrifuge is placed level and stable. If not please place it horizontally.
  - 2) Check whether the weights of the centrifuge tubes placed symmetrically in the rotor are equal. If not, please reconfigure so that the weights of the centrifuge tubes placed symmetrically in the center are equal.
  - 3) Check whether the centrifuge tube is broken. If the centrifuge tube is broken, please clean the rotor and reconfigure the centrifuge tube with a first-class weight.
  - 4) Check whether the centrifuge tubes in the rotor are placed symmetrically around the center. If not, please place two centrifuge tubes of equal weight symmetrically around the center.
  - 5) Check whether the vibration damping part has been damaged. If so,

replace the damping system. (Please proceed under the guidance of professional after-sales engineers)

✓ The centrifuge is not running:

- 1) Check whether the wiring plug-in and the circuit board are plugged in properly and see if there is any looseness. If not, please tighten the wiring.
- 2) Use a multimeter to check the power supply transformer to see if the input and output voltages are correct. If the power supply transformer is damaged, please replace it with a transformer of the same model and specifications.
- 3) Use a multimeter to check whether the motor is powered on. If the motor is powered on but does not run, it means the motor is damaged. Please replace the motor.
- 4) The motor can run but the rotor cannot rotate. Please check whether the rotor has been installed correctly. If no abnormality is found, please contact our after-sales service engineer.

Due to the reasons mentioned in the above four faults, please seek service, contact the agent of the centrifuge you purchased or directly contact our company, and troubleshoot under the guidance of professional engineers.

#### 4.2. Fault and troubleshooting methods

##### a. Door cover protection failure

Phenomenon: The centrifuge is a high-speed running equipment. If the door cover is not closed properly, the system will not start. If the door cover is forcibly opened during operation, the system will automatically stop. Please make sure the door is closed. Please check whether the door status socket of the control panel is loose or the door detection switch is damaged.

##### b. Overspeed protection failure

Phenomenon: When the set speed exceeds the maximum speed of the corresponding rotor, the system cannot start; when the speed exceeds the maximum allowable speed of the rotor by 500r/min during operation, the system will automatically stop. Check whether the speed sensor socket on the

control board is loose or the speed sensor is faulty.

c. Unbalance protection failure

Phenomenon: After the unbalance switch is not activated, the system will automatically shutdown. Please check whether the weight of the test sample in the instrument is within the range, and please check whether the unbalanced socket on the control board is loose, etc.

d. Rotor error

Phenomenon: The rotor does not match, the sensor is damaged or the magnet is damaged (only applicable to machines with rotor identification function) When the speed reaches 300r/min, the system will automatically stop.

e. Communication error

Check if the readthrough wires between control boards are well connected

f. System error

Module protection, or the external power supply voltage is too low.

g. The motor does not rotate

Check whether the communication line between the motor and the control board is well connected or the motor is damaged.

If d, e, f, or g faults occur, please seek service, contact the agent of the centrifuge you purchased or directly contact our company, and handle the fault under the guidance of professional engineers.

If other faults occur during operation and the centrifuge cannot work normally, please contact our company or the maintenance station designated by our company directly.

## V . Transport and Storage

### ❖ Transportation

1) Wooden or paper packaging boxes must be used. The centrifuge must be placed in the box and filled with foam plastic boards up and down and around the box before it can be transported over long distances. During transportation, avoid large vibrations and collisions. It is prohibited to Rough loading and unloading and inversion or diagonal placement.

2) Short-distance indoor transportation can be carried out directly, but large vibrations, collisions, inversions and tilting should also be avoided.

### ❖ Storage

1) If the centrifuge is not used for a long time, it should be stored in a ventilated, dry and clean room. The storage site should be free of corrosive substances, flammable and explosive substances.

2) If the centrifuge will not be used for a long time, please try to pack it into the company's packaging box according to the original packaging.

3) If the centrifuge will not be used for more than a week, please take out the rotor, clean it with neutral detergent in time, and dry it with a clean cloth.



# After-sale Service

User maintenance instructions

Dear Customer:

Thank you for purchasing our products! In order to protect your legitimate rights and interests and relieve you from worries, if the product fails during the warranty period, our company will repair it free of charge. If a product fails outside the warranty period, our company will only charge cost for repairs. However, the following situations are not within the scope of free maintenance:

- ❖ The warranty period has expired or there is no product warranty card.
- ❖ Product failure caused by incorrect installation, use, and maintenance.
- ❖ Product failure caused by disassembly, repair, or modification without authorization from the company.
- ❖ Faults caused by using rotors and accessories that do not match the machine.
- ❖ Failures caused by force majeure factors such as war, natural disasters, etc.
- ❖ If you have technical questions during use and need consultation, or if the product breaks down and needs repair, you are welcome to call our company's after-sales service number or 24-hour hotline. We will serve you seriously, promptly and enthusiastically.

# Packing List

No.	Name	Model and code	Quantity	Remark
I	Low speed centrifuge	CFG-B18B	1	
II	Accessories and random tools			
1	Power cable		1	
2				
3				
4				
5				
6				
7				
8				
9				
10				
III	Random Document			
1	User Manual		1	
2	Packing List		1	

Packing inspector\_\_\_\_\_

infitek.com

## **INFITEK CO., LTD.**

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