Infitek

CFGR-5SY

LOW SPEED REFRIGERATED CENTRIFUGE

USER MANUAL

Version 2024.08.01

INFITEK CO., LTD.

Safety Notices

We appreciate your business with CFGR-5SY Low Speed Refrigerated Centrifuge. To prevent any potential accident, please operate centrifuges according to the following safety notices.

1. Before each start-up of the instrument, make sure that the rotor is tightly fixed. If it is loose, please secure it.

2. Unplug the main power cord, when performing maintenance or when centrifuge is expected not being used for a long period of time.

3. Load the rotor with samples arranged symmetrically. Opposing tubes must be of equal weight. Use balance for balancing tubes in rotors for the centrifuge.

4. Never exceed the maximum speed posted for the rotor!

5. Never use the rotor that appears damaged (e.g. O-rings missing, scratched, corroded, and cracked).

Thank you

Content

I. Description

CFGR-5SY Low Speed Refrigerated Centrifuge.

II. Usage

CFGR-5SY Low Speed Refrigerated Centrifuge it is regular laboratory instrument.

III. Main Specification and Technical Parameter

Chart 1

Max. Speed	5000rpm	**Max. RCF**	4730×g
Max. Capacity	4×800ml	**Sound Emission**	≤65dBA
Timer	1s-99h59min59s	**Power Supply**	AC220V 50Hz 8A
Temperature Range	-20℃~+40℃	**Temperature Accuracy**	±1℃
Speed Accuracy	±10rpm	**Power**	1500W

IV. Matched Rotors

CFGR-5SY can be matched with many kinds of rotors to meet different requirement, please check chart 2.

Chart 2

Rotor No.	Rotor Type	Max. Speed	Max. Volume	Max. RCF
No.05207	Swing Rotor	4000r/min	4×800ml	3450×g
No.05608	Swing Rotor	4000r/min	4×600ml（Round）	3530×g
No.05609		4000r/min	4×600ml（Square）	3450×g
No.05611		4000r/min	4×4×96 well	2940×g
No.05610		4000r/min	4×7×50ml	3450×g

No.05612		4000r/min	4×600ml（oval）	3530×g
No.05213	Microplate rotor	4000r/min	2×5×96 well	3210×g
No.05629	Swing Rotor	5000r/min	4×1×50ml	4730×g
No.05630			4×1×100ml	4730×g
No.05635		4000r/min	4×2×100ml	3200×g
No.05634			4×2×50ml	3200×g
No.05640		4000r/min	4×12×10ml vacuum tube	2880×g
No.05636			4×12×7ml vacuum tube	2760×g
No.05637			4×12×5ml vacuum tube	2480×g
No.05631		4000r/min	4×8×10/15ml	3200×g
No.05632		4000r/min	4×6×10/15m|	3200×g
No.05633		4000r/min	4×4×10/15ml	3200×g
No.05628		4000r/min	4×16×5ml vacuum tube	2530×g
No.05627			4×16×7ml vacuum tube	2890×g
No.05614	Swing Rotor	4000r/min	4×30×7ml vacuum tube	3160×g
No.05615			4×40×7ml vacuum tube	3270×g
No.05618			4×28×10m vacuum tube	3270×g
No.05237	Swing Rotor	4000r/min	4×Pasteurized Cream Bottle	3830×g
No.05183	Angle rotor	2000r/min	16×Gable Creamer	896×g
No.05137	Angle rotor	5000r/min	6×15ml	2540×g
No.05139		5000r/min	12×15ml	3080×g
No.05140		5000r/min	24×15ml	3500×g
No.05141		5000r/min	30×15ml	3830×g
No.05142		5000r/min	4×50ml	2520×g
No.05143		5000r/min	6×50ml	2850×g
No.05144		5000r/min	12×50ml	3860×g
No.05145		4000r/min	24×50ml	2970×g
No.05146		5000r/min	4×100ml	2630×g
No.05147		5000r/min	6×100ml	3130×g

No.05148		4000r/min	12× 100ml	2970×g

V. Working Principle

a. 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.

b. 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:

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

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

c. The confirmation of centrifugal time

The 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.

The same solution, centrifugation time is inversely proportional to RCF. The bigger RCF, the shorter of the time. Contrary, the smaller RCF, the longer of the time.

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

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

VI. Features

Brushless motor, LCD touch screen display which indicates the speed, time and RCF. It is the new fashion centrifuge.

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 LCD display. The French Danfoss compressor unit is equipped with a comprehensive safety protection system. This instrument is a highly intelligent instrument with strong cooling power, stable operation, low noise, simple operation, convenient use, safe and reliable, and beautiful appearance of the instrument.

The centrifuge has following main functions:

a. High resolution LCD display with touch screen functions, showing the speed, RCF, time,rotor number, ACC,DEC &Program number.The value can be entered and stored in the screen directly.

b. 100 program storage and call.

c. It can store all the parameters automatically in operation, and can use directly when start up next time.

d. When exceeding max speed with 500r/min, it will stop automatically and protect the system.

e. 10 Acceleration & 10 deceleration.

f. A wide range of interchangeable rotors for your choice and with muti-function.

g. Imported compressors fluorine free,double cycle cooling, cold and hot alternating easily, free environment pollution and precise in temperature control.

VII. 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.

VIII. Installation

1. Environmental requirements.

a. The ground shall be solid and flat concrete floor without vibration source.

b. The highest altitude is 2000 meters.

c. This equipment is limited to indoor work. Centrifuges are suitable for operation at room temperature. The maximum relative humidity is 80% at 31 ℃ and 50% at 40 ℃. If the room temperature is higher than 25 ℃, the centrifuge may not be able to keep low temperature under high-speed operation. Therefore, it should be avoided to place the centrifuge near the heat source (such as direct sunlight, heating pipe and radiator). Similarly, multiple centrifuges should not be placed together or together with other heat producing laboratory instruments.

2. 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.

3. Electrical source should be 220V 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.

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.

Danger Centrifuge rear over with power socket_!_ \ ,the security identity is enclosed. Socket is 220V, be careful when connecting the socket.

IX. Operation

The operation of the CFGR-5SY universal laboratory centrifuge includes power on, lid opening, rotor installment, lid closing, setting parameters, start the centrifuge, stop the centrifuge, open the lid and take out the rotor these 8 steps. Here is the detailed description.

9.1 Power on

Power switch is located on the right side of the machine. Turn it to "I" position, the centrifuge is power on(while it turns to "O" position, the centrifuge is power off).

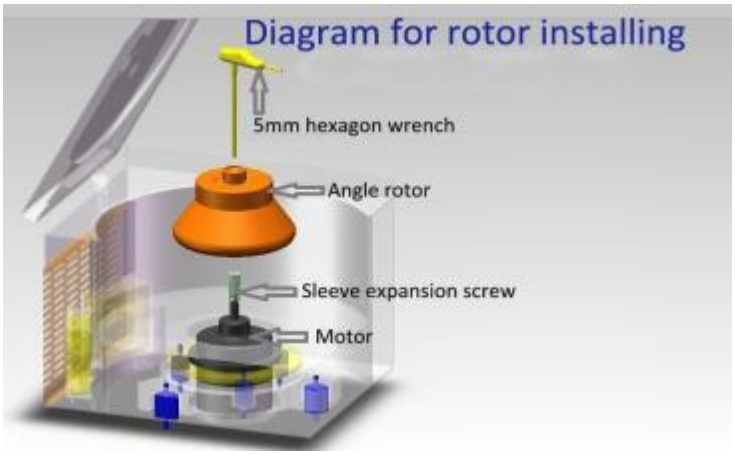
Caution Side of this power switch is posted with safety marking ! this means the power is 220V 8A, It is dangerous voltage, beware of electric shock.

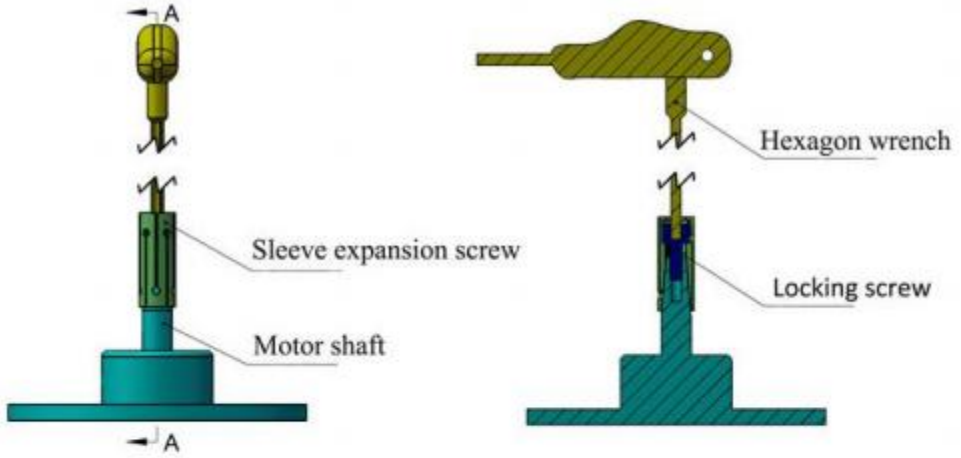
9.2 Lid opening

The LCD control panel has a door open button (see Figure 2). Press the door open button, the door lock is opened, and the door cover is pushed up. The gas spring assists in opening the door cover, and the status indicator of the door cover is displayed OPEN

9.3 Rotor installment

Install the rotor correctly: (pay attention to this part carefully).

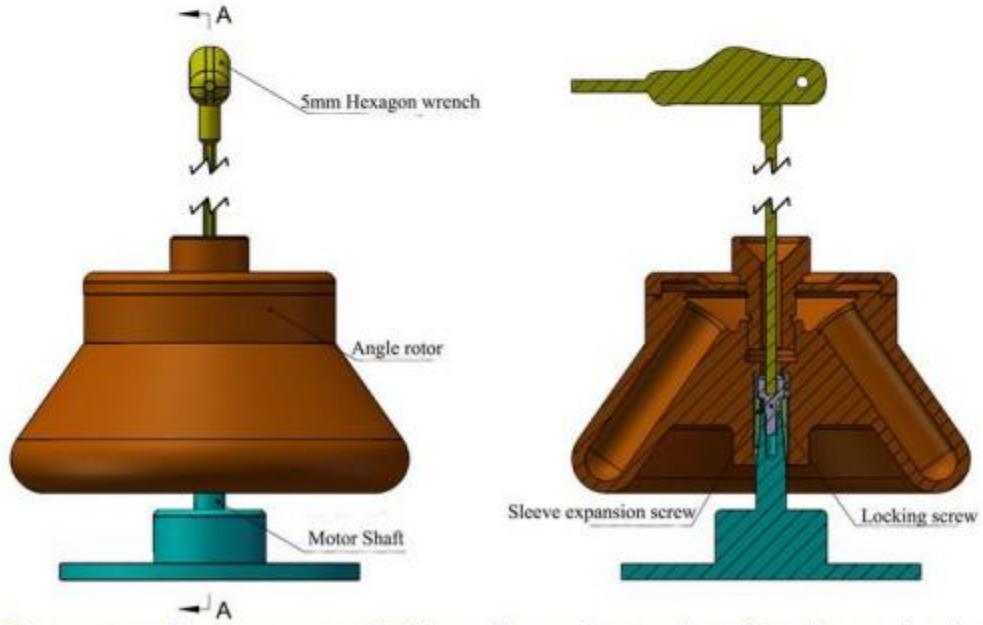




No.1 Please make sure the sleeve expension screw is very loose before putting into rotor.

No.2 If the rotor is fully installed down to the shaft,move up and down the rotor you could hear "bang bang " sound.

Diagram of angle rotor and the motor parts



Do remember,we can tighten the rotor only after the rotor is installed fully down to the shaft.

Take out the sleeve expansion screw from the centrifuge chamber, put the sleeve expansion screw into the motor shaft. Rotating with the wrench from clock-wise with 1-2 circles,then put the rotor. **Check the sleeve expansion screw to make sure it is**

very loose before putting into rotor. That is because only when the sleeve expansion screw is very loose,the rotor can be fully installed down to the shaft which is correctly installed. **If the rotor is installed fully: move the rotor up and down from the shaft,you could hear "bang bang..." sound.**If you find the sleeve expansion screw is tight and the rotor can not be installed down fully,rotating with the wrench from anticlockwise 3-4 circles to loose the screw and move the rotor up and down to check,if you can hear"bang bang",it is correct,if not,continue to loose the screw till the rotor can be fully installed down to the shaft. **Only after the rotor is fully installed down to the shaft,then you can tighten the rotor.**

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

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!

9.4 Closing the lid

Close the door cover gently, without pressing down forcefully, the door cover will lock automatically. The door cover status indicator shows 

means that the door cover has been closed.

Caution When closing the door, do not put down the door cover and lift

it up quickly, otherwise the door lock will be misoperated, so that the door cannot be locked. In case of door lock misoperation, turn off the power first, press and hold the open key by hand, and then power on the instrument to reset the door lock automatically.

9.5 Parameter Setting

The front cover is provided with a touch LCD display window in the middle of the control panel. (see Figure 1)

Figure 1

1). Contents displayed on the LCD display window. (see Figure 2)

Figure 2

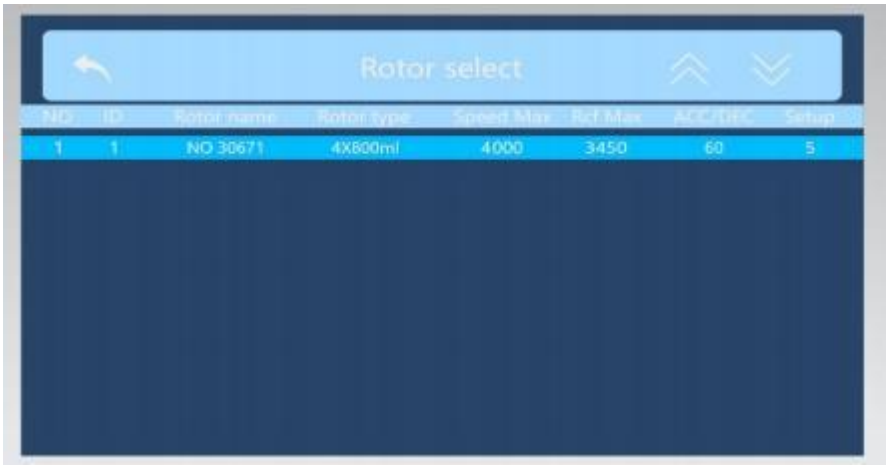
1—Running model 2—Rotor No. 3—Speed&RCF display area 4—Time display area 5—ACC 6—DEC 7—Start 8—Close 9—Speed display state 10—RCF display state 11—Temperature display area 12—Preset No.

13—System Setting 14- Status indicator of door cover.

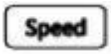
（a）Rotor Display area

Click on the rotor number  , and the rotor number parameter window will pop up as shown in Figure 3. Directly click on the row of parameters corresponding to the rotor number on the screen, the blue bottom is the selected rotor number, and then press  to exit. Press  and  to turn pages.

Figure 3



（b）Speed&RCF display area

Press 

to switch and display the set speed and centrifugal force, the blue bottom is the current display state, Figure 2 is the speed display state, click on the speed and centrifugal force display area, the speed setting window will pop up as shown in Figure 4, enter the required speed parameter value, and press Enter "to exit the current numeric keyboard window, and the entered parameter value is the set speed. Press "Exit" to directly exit the current numeric keyboard window without saving the entered parameter value. The input parameter value must be within the value range, otherwise the input data is invalid. The centrifugal force parameter corresponding to the set speed good parameter changes accordingly.

Figure 4

Figure 5

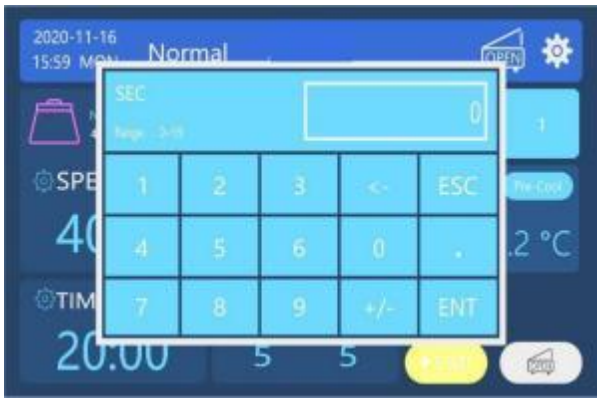
Figure 5 shows the centrifugal force display state. In the current state, click the speed and centrifugal force display area to pop up the centrifugal force setting window. The centrifugal force setting method is the same as the speed setting method.

（c）Time display area

The maximum time of time display is 99h59min Press the front part to pop up the minute setting window as shown in Figure 6, and press the back part to pop up the second setting window as shown in Figure 7. The setting method is the same as the speed setting method.

Figure 6

Figure 7



（d）ACC/DEC display area

According to the rising rate, the speed setting window pops up as shown in Figure 8. The rising speed is divided into nine gears from 1 to 9, the larger the number, the faster the speed; the lower speed setting window pops up according to the falling speed as shown in Figure 9, and the falling speed is divided into There are ten gears

from 0 to 9, the larger the number, the faster the speed reduction, and the 0 gear is free to brake.

Figure 8

Figure 9

（e）Temperature display area

Press the temperature to pop up the preset number setting window as shown in Figure 10. The temperature control range is -20℃~40℃. There is a pre-cooling button in the temperature display area, and the temperature can be quickly controlled by starting the pre-cooling. Note that the rotor must be installed properly when starting the pre-cooling.

Figure 10

（f）Preset No. display area

According to the preset, the preset number setting window appears as shown in Figure 11. There are 100 preset numbers from 1 to 100. Set the rotor number, speed, time, ACC&DEC, then set the preset number .That is, access the parameter to the preset number.You can call this preset number directly next time.

Figure 11

9.6 Start the centrifuge

After setting the parameters, press the START key and the LCD screen will jump to the normal centrifugal operation interface, as shown in Figure 12. The machine starts to run according to the set parameters.

Figure 12

Warning Equipment in operation, the operator may not rely on the instrument, non-staff members may not stay in secure area.

9.7 Stop the centrifuge

When the centrifugal time decreases to zero, the machine will decelerate at the set rate. When the machine sends a stop sound signal, the LCD screen jumps to the conventional centrifugal parameter setting interface, press the key, the door lock is released, and the door cover can be opened. If the machine needs to stop

during operation. Press the  key, the machine will stop according to the above procedure.

Danger It is forbidden to urgently open the door lock unless the speed decelerated to safe speed. It is forbidden to force the rotor to stop running by hand, which may easily cause injuries.

X. Other Function

1. All the parameters except rotor no. can be changed when machine is running, the machine will be running according to changed parameter.

2. Overspeed protection: In order to ensure the safety,we have following protection:

① If setting speed over the max. Speed of this rotor, when press start button, machine can't run, and will show E-2.

② Speed out of control, exceeding the maximum rotor speed by 500r / min, it will automatically shut down, the error window displays E-2.

3. Memory function：

When start machine, it will display the parameter of last time working.

4. Malfunction protection

When the machine occurs following 4 kinds of faults, the machine will automatically shut down.

a) Door not closed

b) Over-speed

c) Speed sensor failure

d) Parameter setting error

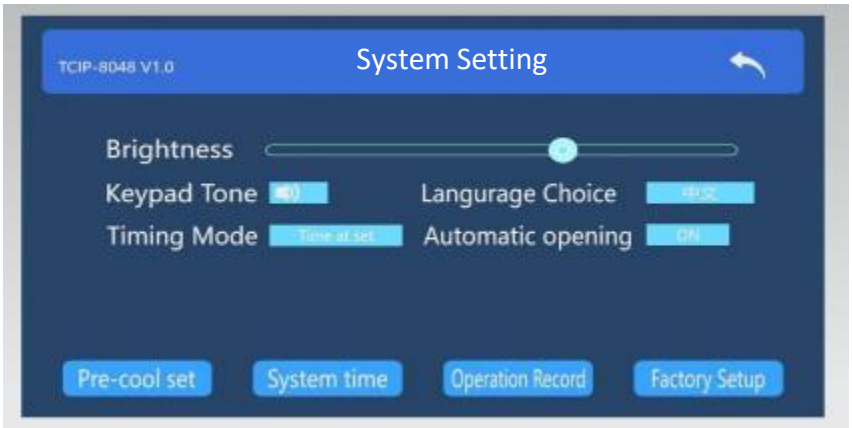
5 .Lid lock protection

When machine runing, can't open the door.

6 .System Setting

In the standby state of the instrument, press the key to enter the system setting interface as shown in Figure 13.

Figure 13



--Drag the small slider for screen brightness adjustment;

---Key sound switch means the key sound is off, which means the key sound is on;

---Language selection: English and Chinese;

---Timing mode: start timing and to speed timing;

Start timing: press the start button, the motor starts to run and starts timing.
Tachometer: the instrument starts timing when it runs to the set speed.

---Automatic lid opening: open and close, the instrument will automatically open the door when it stops;

---Pre-cooling setting: the screen jumps to the system pre-cooling setting interface as shown in Figure 14;

---System time: The screen jumps to the system time setting interface as shown in Figure 15;

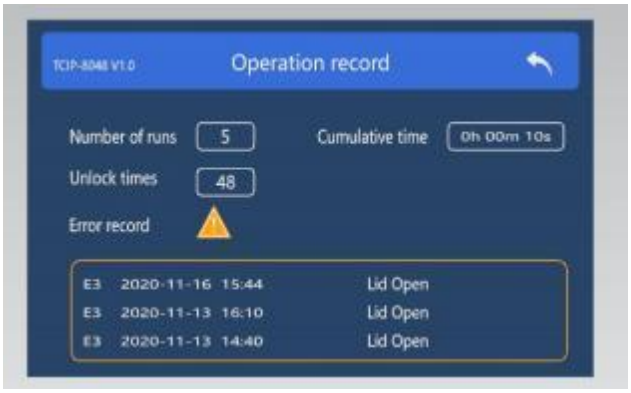
---Operation record: Figure 16 shows the statistics of all operations from the factory;

---Factory setting: It is set before the instrument leaves the factory, no user operation is required;

Figure 14

Figure 15

Figure 16



7 . Power-off protection of the test solution

When the instrument fails to open the door by pressing the door open button due to power failure or other reasons, a mark on the left side of the instrument can be unscrewed in the direction indicated by the arrow mark with the hexagonal wrench provided. **Caution!** It is forbidden to manually open the door lock if rotor still on running. It is strictly forbidden to manually stop the rotor from operating, otherwise it will easily cause injury accident.

8 .Unbalance protection(Optional)

When the rotor loading liquid is not balanced, or loading asymmetry, resulting in rotor is not running smoothly, vibration, the instrument automatically shut down, the error window shows E-9.

XI. Troubleshooting Method

If the instrument has any of the faults listed in Table 3, please follow the instructions below and contact our maintenance department for other faults.

Table 3

Malfunction	Error display	Reason	Ways to solve
Can't start		Missed power	Plug into power
	E-3	Door not closed	Close the door
		Micro switch damaged	Change the micro switch
Overspeed stop	E-2	Speed excess the max. speed	Decrease the acceleration grade
Display window can't work		Switch damaged	Change switch
Imbalance protection	E-9	Rotor loading imbalance	Check the rotor, buckets, tubes etc
	E-4	Voltage too low	Check supply voltage
	E-5	Brake too fast	Decrease the brake grade
No speed display	E-7	Speed sensor damaged	Contact our factory
	E-8	Unable to establish communication connection	Check if the communication line is connected properly
Can't close the door completely	E-17	Close position signal switch damaged	Check door lock close position signal switch
Can't open the door completely	E-18	Open position signal switch damaged	Check door lock open position signal switch

Press the boat-shaped switch, the instrument panel does not shine, the instrument does not work, please check whether it is fuse burned, if so, please replace the fuse, if not, the please remove the front door, the front cover up to move out, check all the pins of the control board is loose or fall off, if the loose or fall off the pin can be inserted. The above two are normal, then replace the switch. If the fault still can not be ruled out,

please contact with our company.

XII. Safety Precautions

Danger 1. Before each use, pay attention to whether the rotor has micro cracks. If cracks are found, stop using it immediately. Otherwise, an explosion accident will occur. When the instrument is running, the operator must not lean on the instrument.

2. It is forbidden to use a rotor that exceeds the service life of the rotor. The service life of the aluminum rotor is 5 years. The cumulative number of uses is 3000 times, and the cumulative use time is 2000 hours. If any of the three items is reached, the service life has been reached.

Warning 3. When the instrument is repaired, the main power plug should be removed, and the cover should be opened after waiting 3 minutes to avoid electric shock.

3. **Attention!** After separating radioactive, toxic or viral substances, steam disinfection and purification of rotors, test cups, hanging baskets, test adapters, etc. should be carried out. The purification methods are shown in Table 4.

Absolute pressure kpa	Corresponding steam temperature		Minimum holding time min
	Rated temperature/℃	Range/℃	
225	136.0	134-138	3
150	127.5	126-129	10
115	122.5	121-124	15
75	116.5	115-118	30
Note: The minimum holding time is the purification time at temperature			

XIII. 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.

Configuration List

Serial No.	Name	Quantity	Remarks
1	Low Speed Refrigerated Centrifuge	1	CFGR-5SY
2	User Manual	1	
3	Configuration List	1	
4	Spring Cone Sleeve	1	
5	Power Cord	1	
6	Swing Rotor	1	
7			
8			
9			
10			
11			

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