

Benchtop High Capacity Refrigerated Centrifuge

BRC-5300 User Manual



**Thanks for using out instrument !
For your fast and sincerely service please read the manual carefully when you
use the machine.**

Safety Notices

We appreciate your business with BRC-5300 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. Use balance 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).

Thank you!

1. Function

BRC5300 (Table top large capacity refrigerated centrifuge) is a necessary centrifugal equipment used in the field of medicine, life-science and agricultural science, it can be equipped with many rotors which are different in specification, it can widely meet the requirements of every kinds of scientific researching experiments and small quantity manufacturing. Its maximum speed is 5000r/min, its maximum RCF is 4730*g, its maximum capacity is 4*300ml, it uses the frequency brushless motor, microprocessor control, touchable board, digital display and overall safe-protection system, it is a high intelligent instrument, it has the specialties of effective in refrigeration, stable in working, low noise, simple in operation, convenient in usage and reliable. It is produced according to the IEC61010-2-20:1992 international standard. Its quality attains the international advanced level in the same kind of centrifuge. It has a very well reputation among the users.

2. Main Technical Parameters

Max. Speed	5000 r/min
Max. Capacity	4×300ml
Max. RCF	4730×g
Temperature range	-20°C ~ 40°C
Time range	0-99m59s
Temperature accuracy	±1°C
Speed accuracy	±50 r/min
Noise	≤65dB (A)
Power	AC220V, 50Hz, 15A
Size	670x655x370mm
Net Weight	118 Kg

3. Available rotors

Many rotors can be chosen to meet the different centrifugal requirements
Main technical parameters of the rotors

Order No.	Rotor	Max Speed (rpm)	Max Volume (ml)	Max. RCF (×g)
NO31392	Swing Rotor	4000	4×300ml (Round Cup)	2920
NO30570	Swing Rotor	4000	4×300ml (Square Cup)	2920
NO30589	Swing Rotor	4000	4×24×5ml	2840
			4×24×7ml	3140
			4×18×10ml	
NO30589	Swing Rotor	4000	4×31 Khan tube	2840
NO30607	Angle Rotor	5000	12×15ml	3080
NO30611	Angle Rotor	5000	6×50ml	2850
NO30640	Angle Rotor	5000	4×50ml	2520
NO30613	Angle Rotor	5000	4×100ml	2630
NO30639	Angle Rotor	5000	24×15ml	3500
NO30641	Angle Rotor	5000	12×50ml	3860
NO30614	Angle Rotor	5000	6×100ml	3130
NO30642	Angle Rotor	4000	12×100ml	2970
NO31491	Microplate Rotor	4000	2×4×96 Well	2490
NO31376		4000	2×3×48Well	2300

Explanation: 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:

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

The transfer coefficient 11.2 is a approx value, which is calculating according acceleration of gravity (1g = 9.81m/s²)

4. Open the Package

As soon as you receive the centrifuge, you should see whether the package is in good condition before opening it. (in case of accidents such as violent collision and up side down in the transportation), the outlook of the package should be in good condition generally.

Process of opening the package, first you should remove the wood screw from the cover board, second opening the cover, taking out the packing list, checking the accessories according to the packing list, if the accessories are not the same as the description in the packing list, please contact us directly, third removing the six wood screws from the bottom board, last taking out the package in an upward direction, putting the centrifuge on the work table.

5. 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, and there must be more than 30(CM) spare space around the centrifuge.
- (2) The power should be 220V single phase and has sole earth wire; the earth wire shouldn't be substitute by neutral wire.
- (3) There should be no violent vibrating resource around the working place、no corrosive gas and relative humidity less than 85%.
- (4) In order to meet the requirement of air refrigeration to gas exhaling and exhausting, the back of the centrifuge should be 150(mm) away from the wall.
- (5) Insert the power wire attached with the centrifuge.

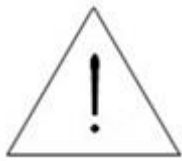
Operation

The operation of the BRC-5300 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

marking



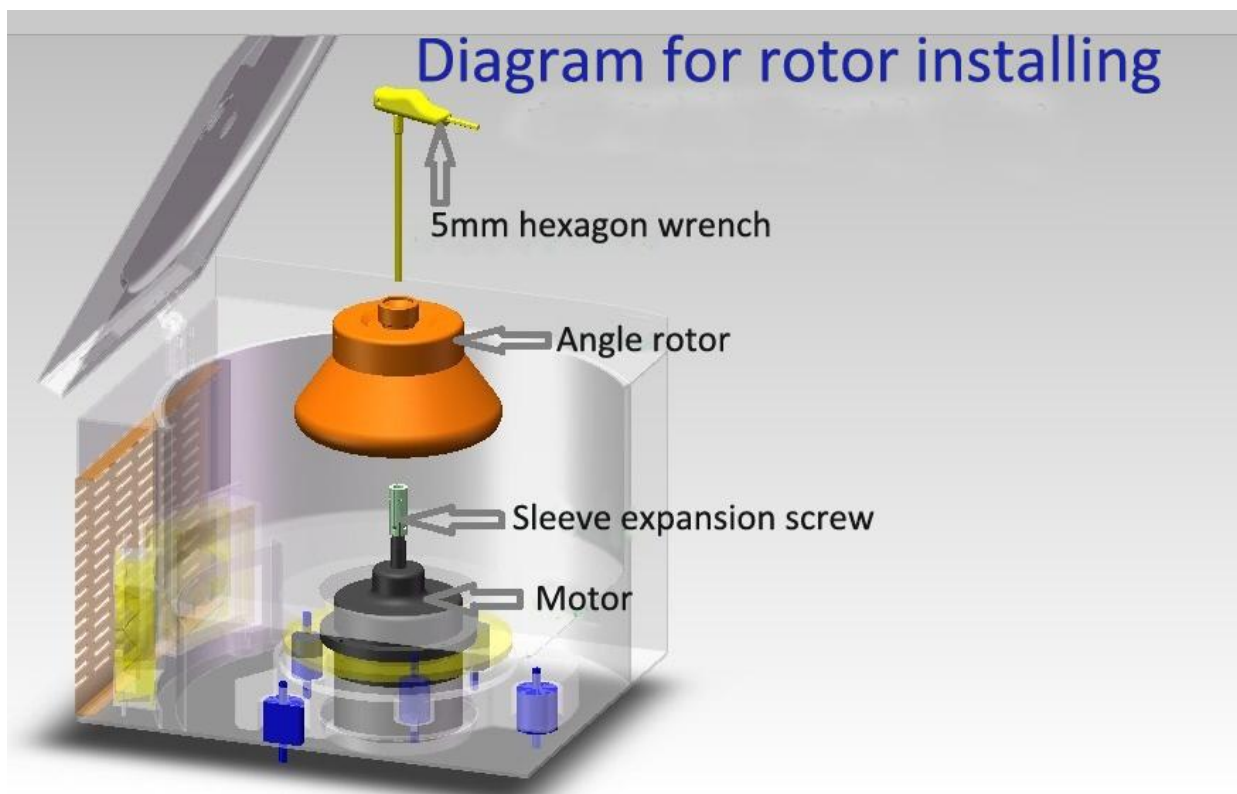
Side of this power switch is posted with safety marking this means the power is 220V 4A, It is dangerous voltage, beware of electric shock.

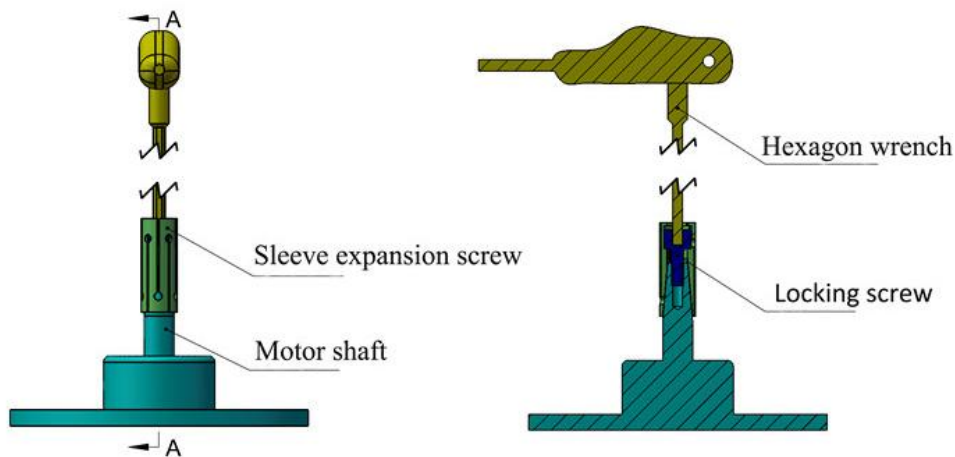
9.2 Lid opening

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. 

9.3 Rotor installment

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

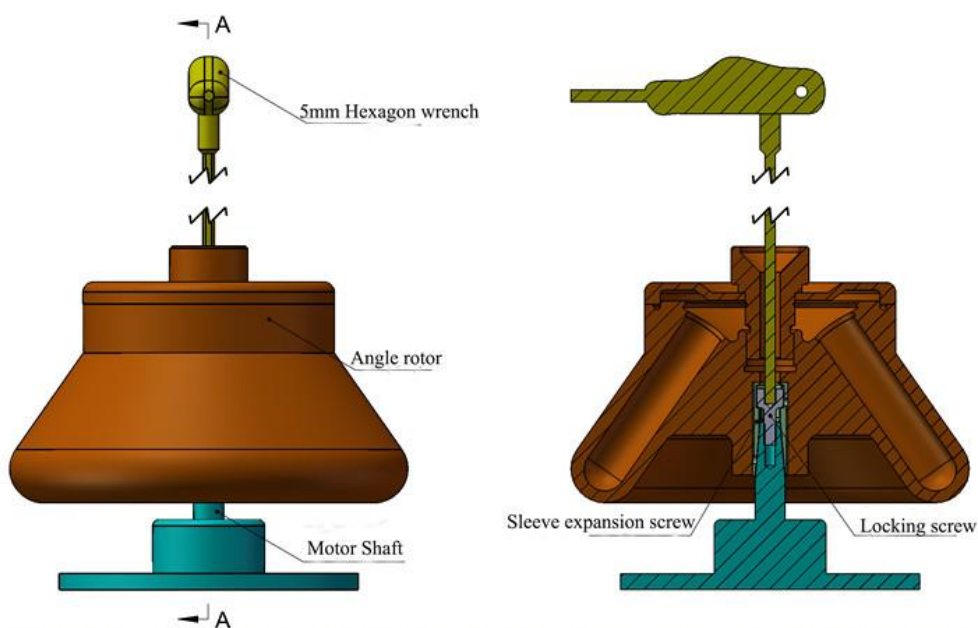




No.1 Please make sure the sleeve expansion screw is very loose before putting into rotor.

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.

(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 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.

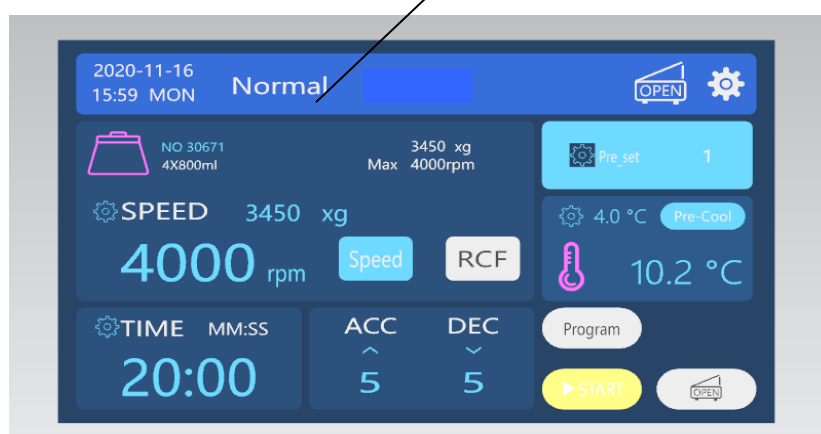
Caution When closing the door, do not put down the door cover and lift it up quickly, otherwise the door lock will be misoperated, so that the door cannot be locked. In case of door lock misoperation, turn off the power first, press and hold the open key by hand, and then power on the instrument to reset 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)

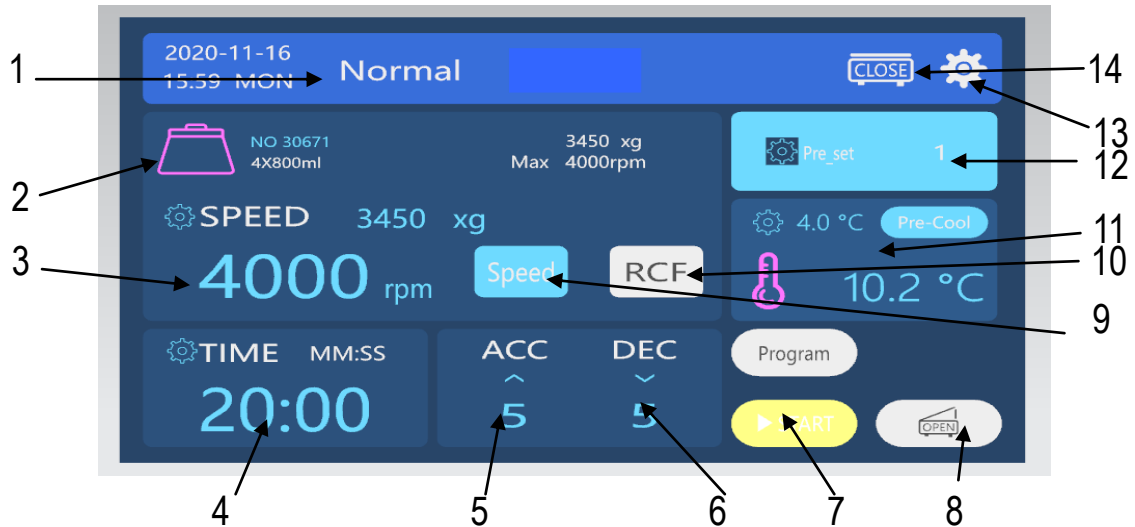
Figure 1

Display window



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





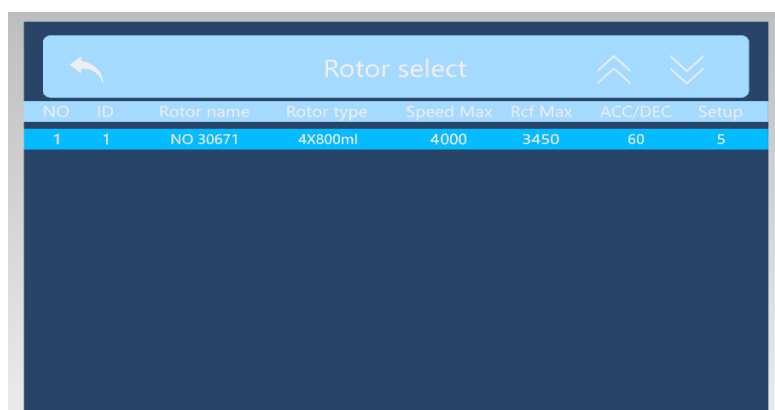
Click on the rotor number , and the rotor number parameter window will pop up as shown in Figure 3. Directly click on the row of parameters corresponding to the rotor number on the screen, the blue bottom is the selected rotor number, and then press  to exit. Press  and  to turn pages.

Figure 3



(b) Speed&RCF display area

Press **Speed** **RCF** 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

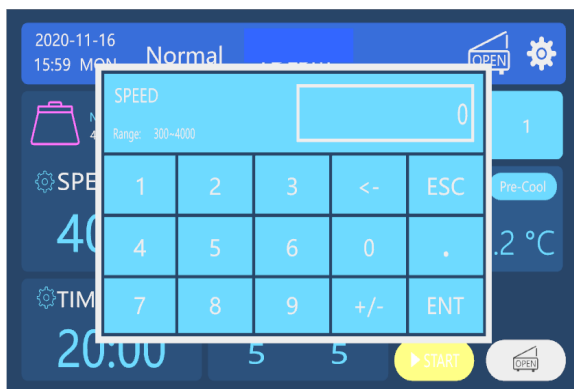


Figure 5

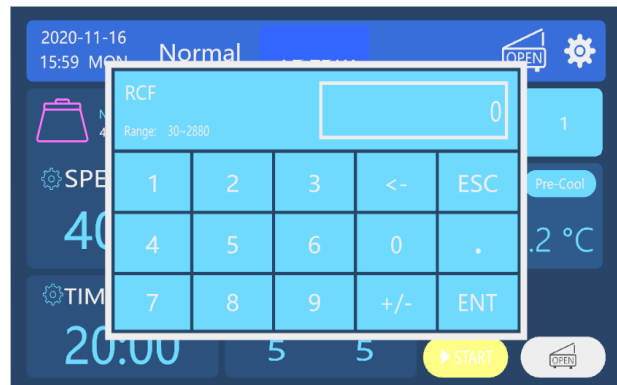


Figure 5 shows the centrifugal force display state. In the current state, click the speed and centrifugal force display area to pop up the centrifugal force setting window. The centrifugal force setting method is the same as the speed setting method

(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

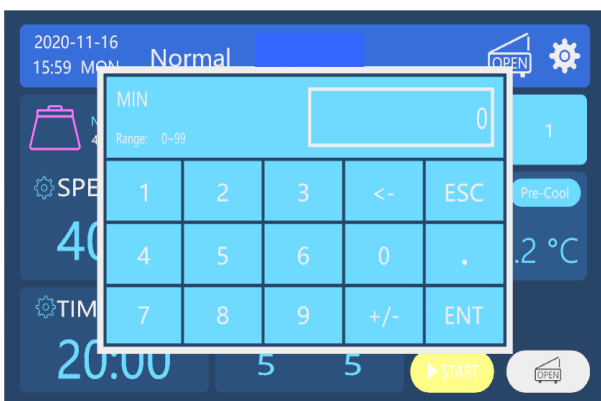
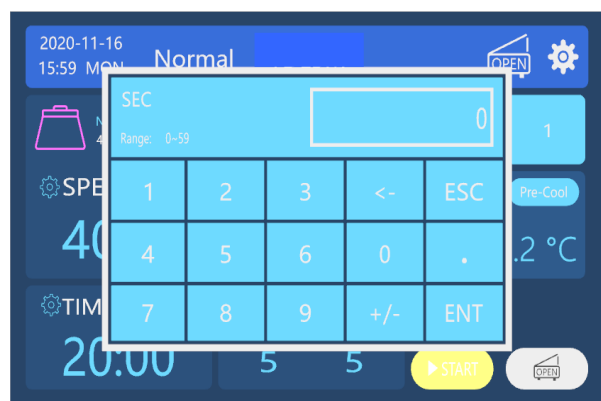


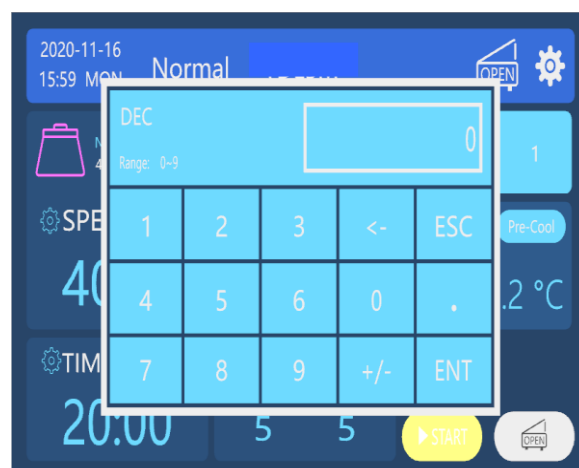
Figure 7



(d) ACC/DEC display area

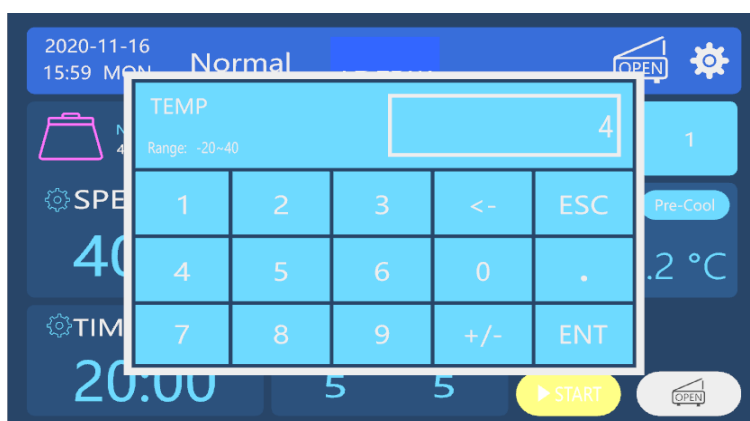
According to the rising rate, the speed setting window pops up as shown in Figure 8. The rising speed is divided into nine gears from 1 to 9, the larger the number, the faster the speed; the lower speed setting window pops up according to the falling speed as shown in Figure 9, and the falling speed is divided into 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°C ~ 40°C . 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.

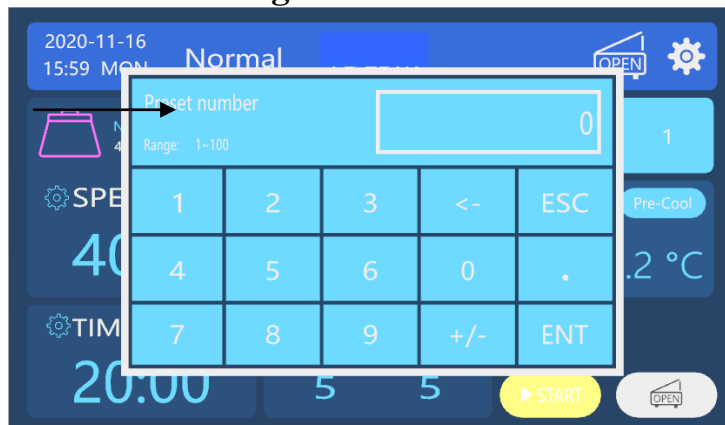
Figure 10


(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

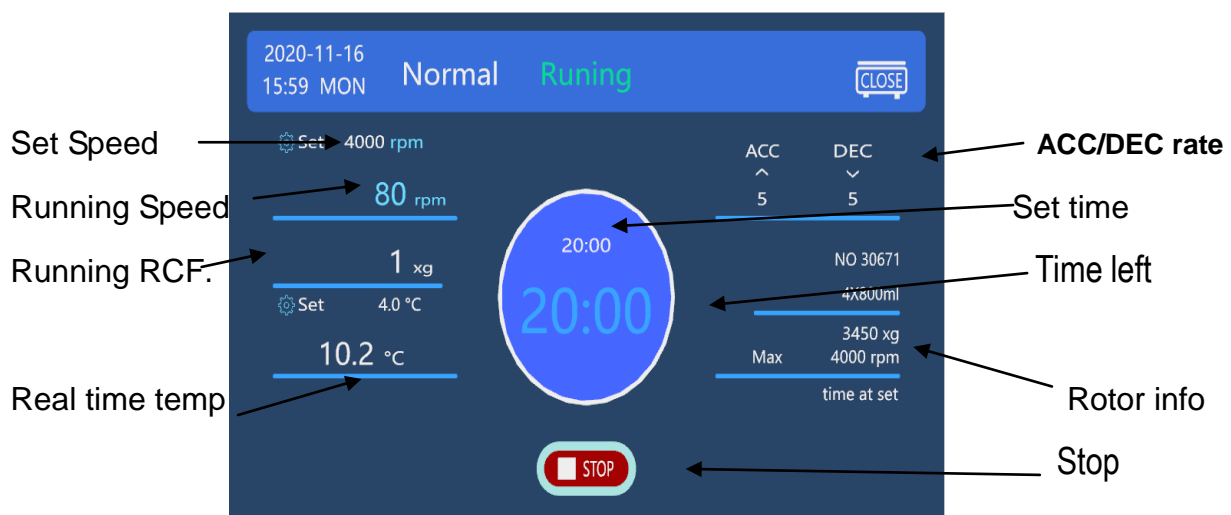
Figure 10



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 par  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

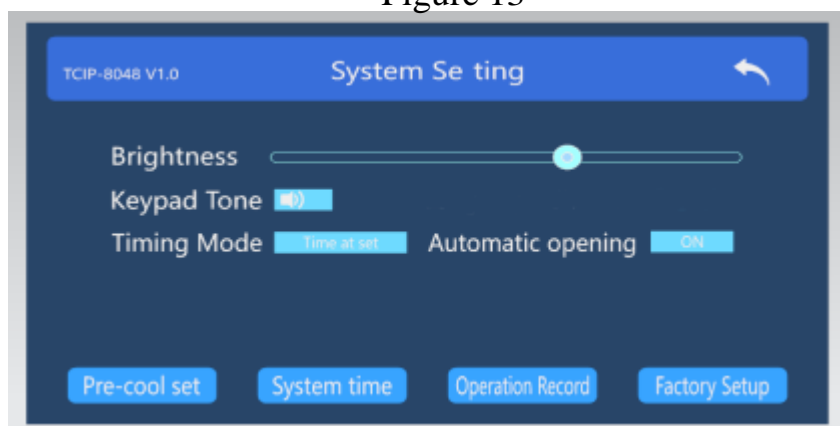
5 .Lid lock protection

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;

---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

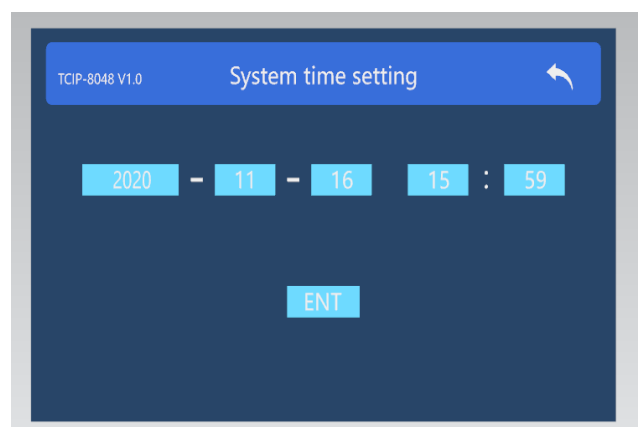
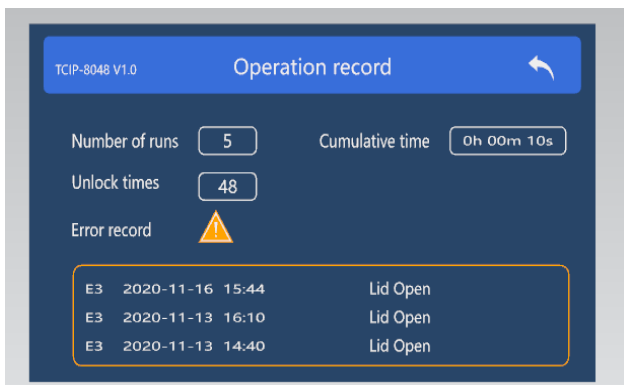


Figure 16



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.

4. **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/°C	Range/°C	
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			

13. 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.

14. Warranty

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.

Pay attention: If operator doesn't operate as the instruction to lead the damage of the centrifuge, we won't be responsible for it.