



Low Speed Centrifuge

LB-20LSC

Index

Sr.no	Title	Page no
1.	Safety Measures	2
2.	Introduction	3
3.	Features	3
4.	Specifications	4
5.	Applications	4
6.	Instrument Introduction	5
7.	Installation	6
8.	Operations	9
9.	Maintenance	11
10.	Troubleshooting	12
11.	Circuit Diagram	13

1. Safety Measures

- 1) Unplug the main power cord, when performing maintenance or when the centrifuge is expected not to be used for a long period.
- 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 weight.
- 3) 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.
- 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).
- 6) All centrifuges have potential risk factors during operation; you must understand the operating procedures and safety precautions for the safe use of centrifuges.
- 7) Failing to operate the provisions of this manual may result in personal injury or property damage, be sure to abide by the rules.
- 8) The Company is not liable for obligations if the consequences are not made in conformity with the rules and operations of this manual.
- 9) When starting to use the centrifuge machine, make sure to do these:
 - Press the power switch first after plugging it in.
 - Check the nut tight and rotors balance.
 - Operate it according to the Operation Instructions.

2. Introduction

Low speed centrifuge LB-20LSC is a microcomputer controlled unit with 6000 rpm driven by brushless DC stepless speed regulation motor. Features a special key for centrifugal force through which the centrifugal force can be set or observed anytime during the process.

3. Features

1. Microcomputer controlled system
2. Driven by brushless DC stepless speed regulating motor
3. Automatic stop on opening of the door to ensure operational safety
4. AC frequency conversion motor drive
5. Offers nine ascending and descending rate selection modes
6. Offers ten different kinds of custom work mode selection
7. Speed/ centrifugal force can be set and double synchronous display screen
8. Door with double lock rod design, magnetic locks and electric door
9. Up to 30 grams stress tolerance with no special load balancing

4. Specifications

Model No.	LB-20LSC
Max speed	6000 rpm
Max RCF	5000 x g
Rotor capacity	4 x 100 ml
Temperature raise	≤ 10 °C
Speed accuracy	± 20 rpm
Noise	≤ 55 dB
Timer range (continuation/ short term centrifugal)	1 s~ 99 mins
Power supply	AC 220 V 50 Hz
Power	300 VA
Dimensions	433 x 580 x 402 mm
Weight	65 kgs

Rotor Selections

Sr No	Model	Max speed	Max RCF	Rotor capacity
1.	Swing out rotor	5000 rpm	4472 x g	4 x 100 ml (round hanging cup)
	Adapter 01			4 x 100 ml
	Adapter 02			4 x 50 ml
	Adapter 03			12 x 15 ml (bottom tip with cover)
				12 x urinary sediment tubes
	Adapter 04			16 x 10 ml/15 ml
				16 x Vacuum blood tube (higher)
	Adapter 05			16 x vacuum blood tube (lower)
2.	Angle rotor	6000 rpm	5000 x g	12 x 15 ml
3.	ELISA plate rotor	4000 rpm	1842 x g	96 holes x 2

5. Applications

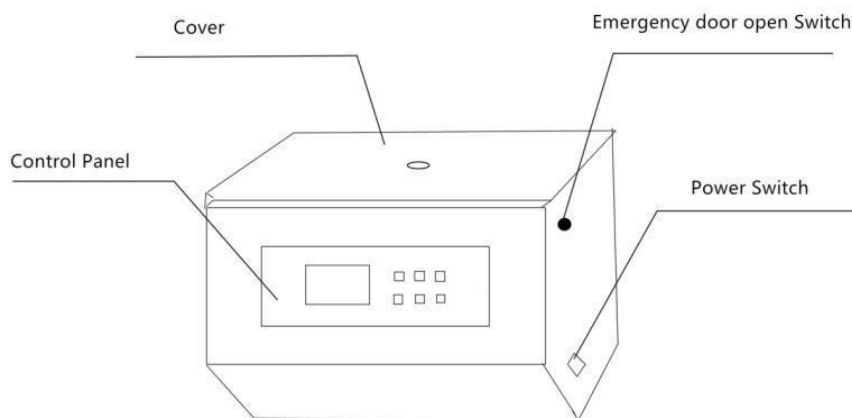
Used for a wide range of biomedical analysis, immunoenzyme analysis, microplate processing and cell culture applications.

6. Instrument Introduction

6.1 Structure

This centrifuge is composed of the main machine, rotor, and other accessories (by user's option). And main machine is composed of a machine frame, door lid, control panel, drive system, refrigerating system, and electric control system.

6.2 Main Frame Shape

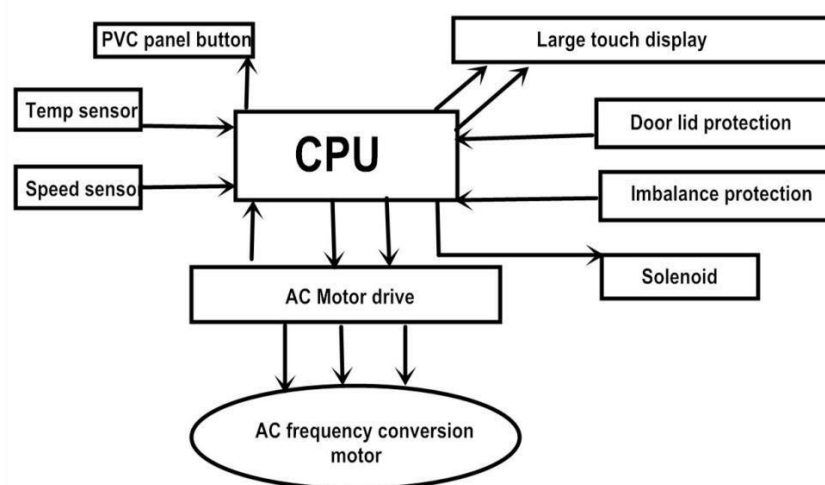


6.3 Drive System

Direct drive system. A frequency conversion motor with high torque is equipped with a special shock absorber for reducing vibration and noise.

6.4 Electric Control Part

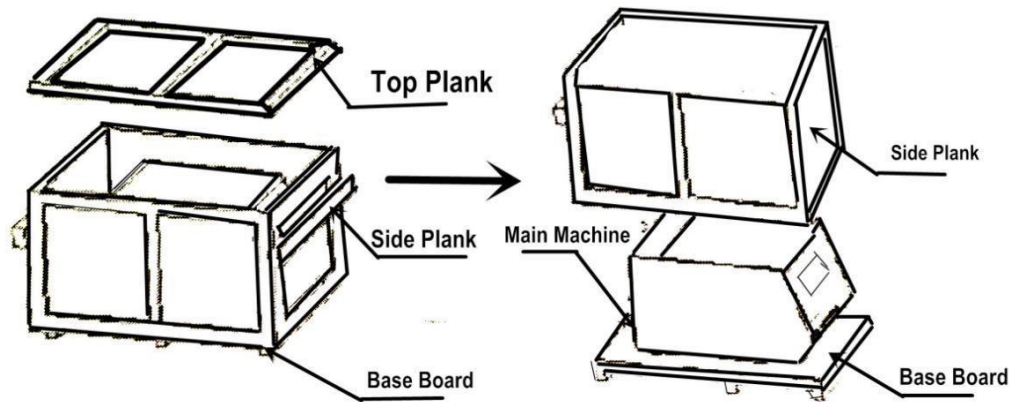
System control is adopted 8-digital CPU. Through sensors CPU detects the temperature in the centrifugal chamber, speed and fault signal, etc., and compares them with the setup parameters such as temperature and speed, then deal with them correspondingly.



7. Installation

7.1 Unpacking of package

Users should check the appearance of the packing case after receiving it, and the goods should not happen with sharp hitting and upending during delivery.



7.2 Installation Requirements



Warning: This centrifuge should be installed indoors with steady ground, no conducting dust, no corrosive gas, no strong shock source, and no direct sunlight.

Space requirement:

The distance between the centrifuge and wall should be kept at 3cm at least for air circulation. The room temperature should not exceed 35 for the best.

Power requirements:



Warning: The ground wire should be connected properly in case of electric shock.

As for measures, this centrifuge is adopted with a single phase and three wires plug to make sure of grounding. If your plug can not plug in the main jack, please contact the electrician to replace your main jack. Make sure that the centrifuge is grounded properly.

7.3 Adjusting Requirements Checking the goods:

Check the packing list and make sure if the damage has occurred during delivery. Installation, adjustment, and maintenance should all be guided or operated by professional technicians.

Door lid opening:

After installing the main machine, check the connection of all connectors and fuses first, and turn on the main switch. When the screen displays the model/Logo, and then the main specifications will be shown. Pull the latch on the door lid lock device manually, and the doorlid gradually opens at the holding of gas springs polar and your hands.

Rotor installation:

The rotor should be checked carefully before use. It is forbidden to use rotors and buckets with cracks and corrosion spots (especially the bucket's bottom of the swing rotor). All accessories should not be used if it is exceeding of its service life. The conical surface of the driving shaft should be smeared with some lubricating grease if the main spindle is left unused.



Warning: The conical surface of the rotor and driving shaft must be connected closely.

As shown in the following figure: Firstly, clasp the symmetric spoke of the rotor, and put it on the rotor base vertically and placidly while the rotor bottom's location cone aims at the location cone of the drive shaft; then put the flat gasket on the lead screw and screw down the cap nut. At last, hold up the rotor steadily (not shacking) by one hand, and put the solid wrench on the cap nut by another hand. In the meantime, turn the wrench for 3 to 6 rounds in a clockwise direction until the rotor connects the drive shaft closely.

Rotor disassembly: (After finishing adjust or centrifugal)

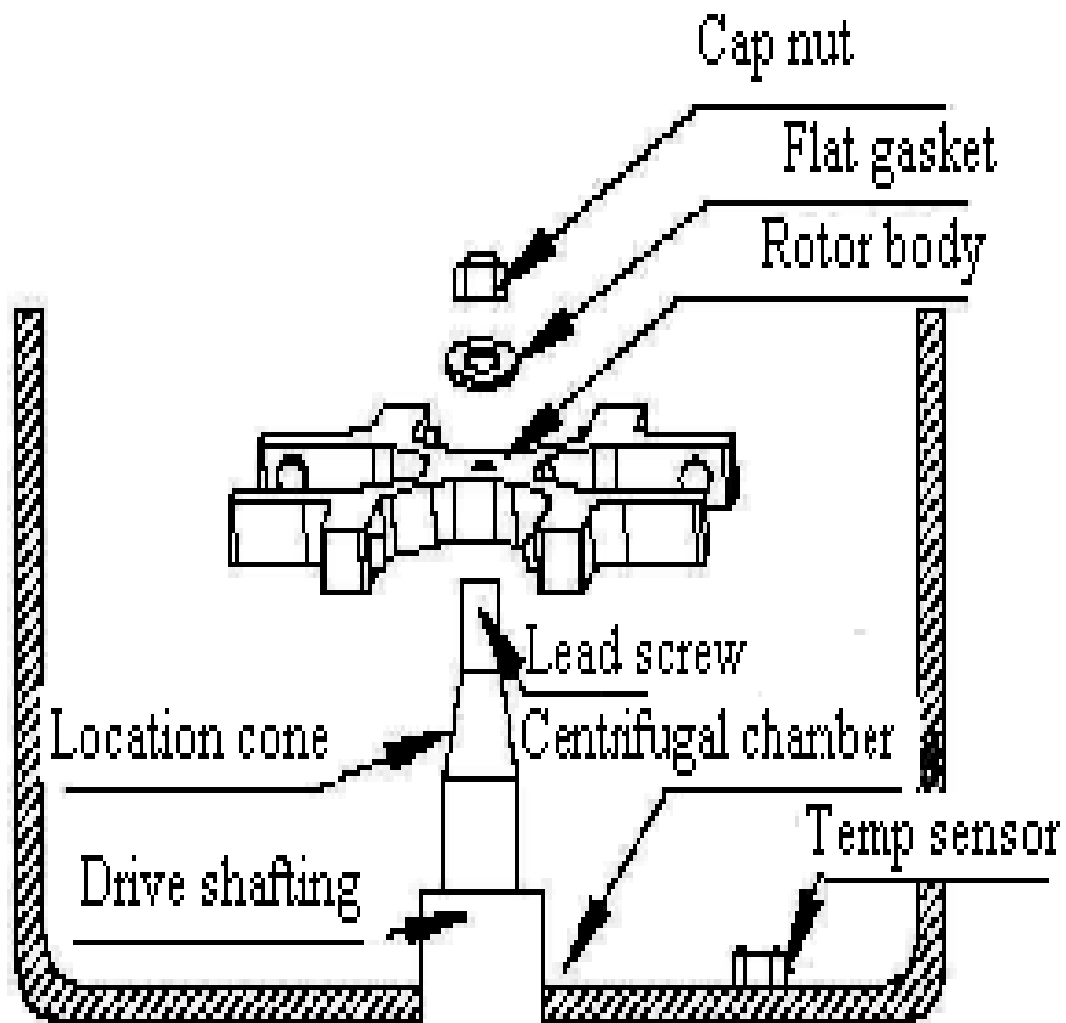
First, clasp the spoke of the rotor with one hand, and put the solid wrench on the cap nut by another hand. In the meantime, turn the wrench for 3 to 6 rounds in a counterclockwise direction to lose the cap nut until the rotor can be separated from the driving shaft. If the rotor is not taken out from the drive shaft for a long time and blocked, you can beat the surrounding spoke of the rotor several times lightly with a wooden or rubber hammer. Then clasp the symmetric spoke of the rotor lift slightly by both hands and put the rotor on the flat table and ground covered with a soft pad.



Warning: All actions on the rotor must be soft to avoid the damage of driving shafting.

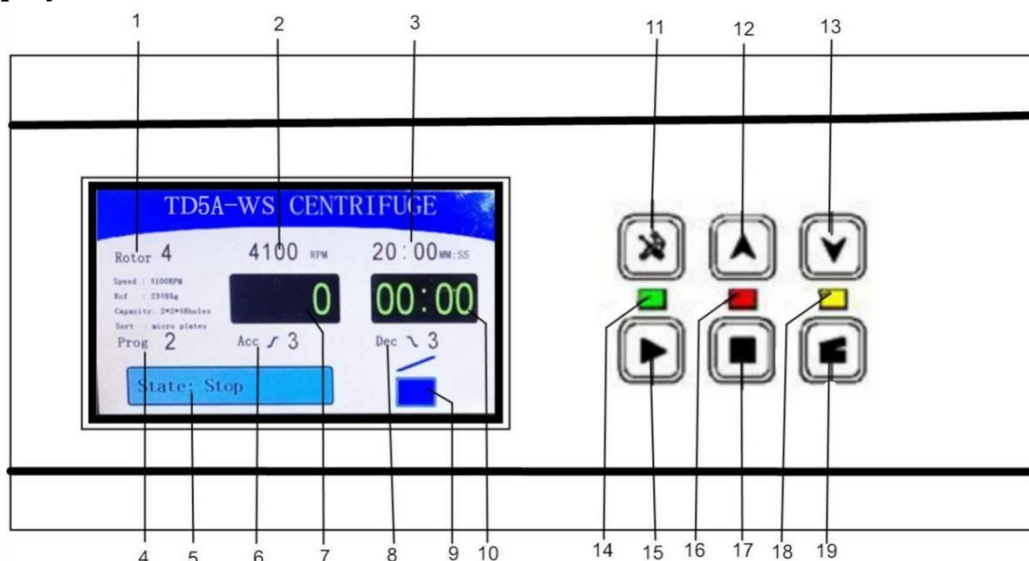
Installation of Brackets and Tubes

Place the brackets into the slot of the rotor; make sure that the bracket is turning smoothly, tube Sets (adapters) are placed into holes of brackets, and the solution is separated into the tubes. Visually check if the solution in the tubes is roughly equal before putting them into the tube Sets



8. Operations

8.1 Display



- | | |
|---------------------|-------------------------------------|
| 1. Rotor No. | 11. Set key |
| 2. Speed setting | 12. Increase Button |
| 3. Time setting | 13. Decrease Button |
| 4. Program | 14. Running Indicate Light |
| 5. State | 15. Start key |
| 6. Acc | 16. Stop Indicate Light |
| 7. Real speed | 17. Stop button |
| 8. Dec | 18. Door Cover State Indicate Light |
| 9. Door cover state | 19. Door Open Key |
| 10. Real Time | |

5.2 Operate

1). Rotation speed Setting

Press [Set] once or continuously times to modify the speed value when the 'Speed' display window flashes or with shadow, and then press the [▲] / [▼] button to increase or decrease the current value. After waiting for 3 seconds, the system will confirm your setting.

2). RCF Setting

Press [Set] once or continuously times to modify the RCF value when 'RCF' displays window flashing or with shadow, and then press [▲ ▼] / [] to increase or decrease the current value. After waiting for 3 seconds, the system will confirm your setting.

3). Time Setting:

Press [Set] once or continuously times to modify centrifugation time when the 'Min: sec' display window flashes or with shadow, and then press [▲]/[▼] to increase or decrease the current value. After waiting for 3 seconds, the system will confirm your setting.

4). Acceleration Setting:

Press [Set] once or continuously times to modify the Acc curve when 'Speed/RCF' displays "Acc X" flashing or with shadow, and then press [▲]/[▼] to increase or decrease the current value. After waiting for 3 seconds, the system will confirm your setting.

5). Deceleration Setting

Press [Set] once or continuously times to modify the Dec curve when 'Speed/RCF' displays "Dec X" flashing or with shadow, and then press [▲]/[▼] to increase or decrease the current value. After waiting for 3 seconds, the system will confirm your setting.

6). Program memory

Press [Set] once or continuously times to set program memory when 'Program' displays "Prog X" flashing or with shadow, and then press [▲]/[▼] to choose the number, then set the parameters needed to memory. After waiting for 3 seconds, the system will confirm your setting. One number for one program memory, 10 programs total.

7). Start or brake

Press [▶] after you confirm the setup parameters, and press [■] to brake at any time during running. If you want to change the RCF or speed or time during running, just operation according to above steps.

9. Maintenance

1) Maintenance of the centrifuge chamber

Clean the centrifugal chamber time, take out the rotor, and then scrub it with a clean cloth. Put the silica gel bag into a chamber if the centrifuge will not be used for a long time to absorb humidity and avoid rust.

2) Maintenance of the rotor

The rotor block cannot bump. Do not damage the cone. Clean carefully rotor block and rotor cone with a soft cloth before the rotor is put in and coated with a little Vaseline or other grease medical.

3) Maintenance of the control box and work surface

Control box and work surfaces must be kept clean. The rotor centrifuge tube and other tools of centrifuge may not be placed on the panel to prevent scratches. Control box and work surface can be only used with a soft cloth and mild detergent.

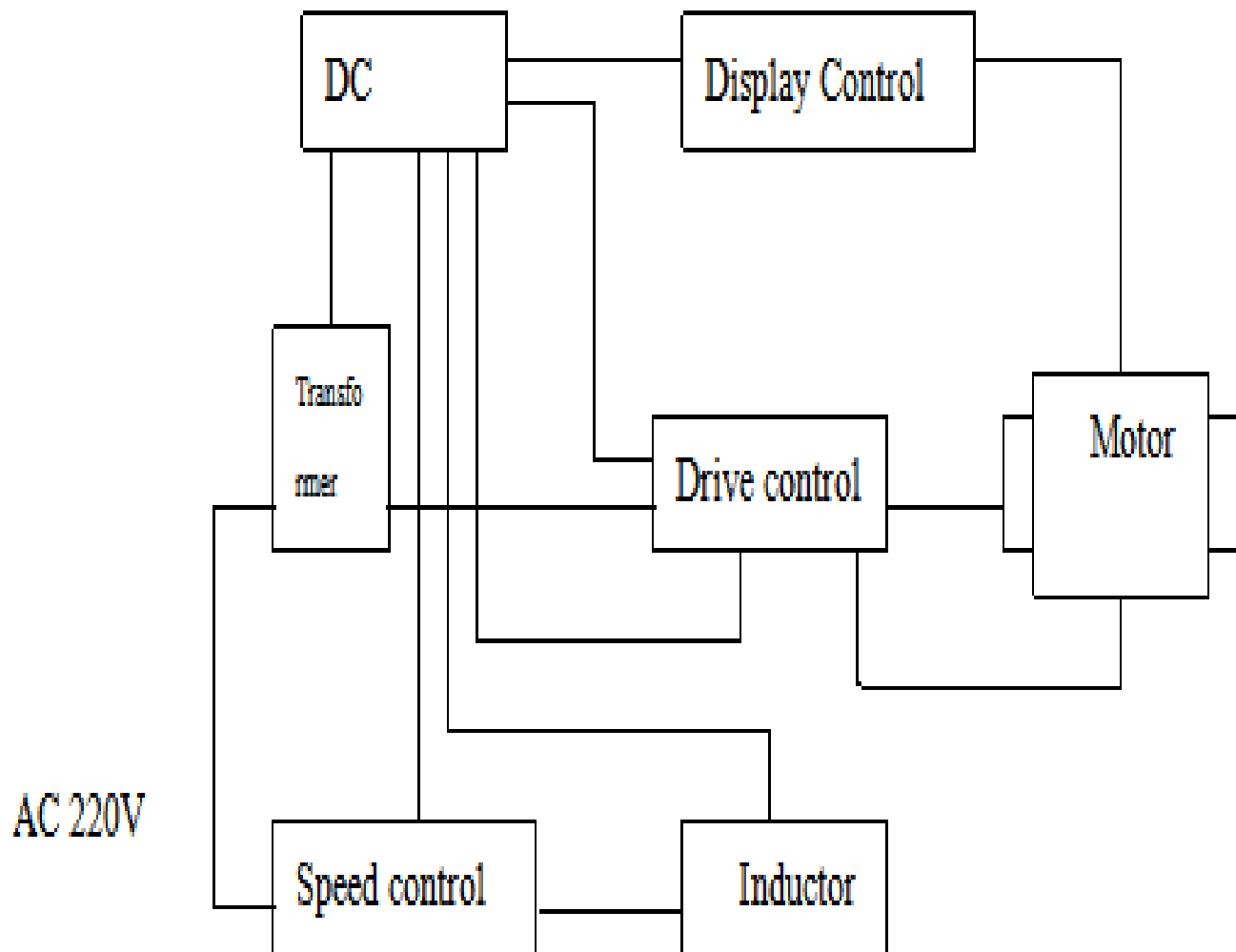
4) Maintenance of drive shaft

The drive shaft must not be hit for conical surface/cone protection. Use a soft cloth to clean the drive shaft and taper hole before rotor installation, and then smear some Vaseline or other lubrication grease.

10. Troubleshooting

- 1) No power indication after the machine is powered on :
 - Check if the power supply is OK.
 - Check if the plug and sockets are well connected.
 - Check if the fuse is burned.
 - The correct size of the fuse is F10A250V ($\Phi 5 \times 20$)
 - Check if the power indicator is burned.
- 2) After the power is on, the power indication is OK, but the operation of the machine is abnormal:
 - Check if the time or speed is Set.
 - Check if the control circuit is normal.
- 3) Abnormal vibration occurred after Starting the machine :
 - Check if there are any foreign materials in the tube Set, check if the solution in the tubes are properly arranged.
 - Check if the tube Set of the swing rotor is properly in contact with the bracket.

11. Circuit Diagram



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