

User Manual

For

TD6C

Low Speed Centrifuge



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

Our duty is at your service !

Our pursuit is satisfying you !

Our motto:

Credit based

Quality first

1 **Safety Notices**

We appreciate your business with us. To prevent any potential accident, please operate centrifuges according to the following safety protocol.

- 1.1 Unplug the main power cord, when performing maintenance or when centrifuge is expected not being used for a long period of time.
- 1.2 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. 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.
- 1.3 Never exceed the maximum speed posted for the rotor!
- 1.4 Never use the rotor that appears damaged (e.g. O-rings missing, scratched, corroded, and cracked).

Thank you!

The Operations Manual for TD6C table top Low speed centrifuge contains all of the information needed to install, operate, and maintenance. To prevent any potential accident, please read this *Operation Manual* carefully and operate centrifuges according to the following safety protocol.

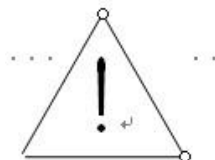
The terms danger, warning, caution and note have specific meaning in this manual.

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 are placed in the left of corresponding text.

2 Model and name

TD6C table top low speed Centrifuge

3 Application

TD6C table top low speed centrifuge is widely used in the fields of clinic medicine, biochemistry, laboratory , blood Bank, genetic engineering and radio immunity, best choice to all labs of science units and hospitals.

This centrifuge is in accord with national standard GB4793.7 and international standard IEC 61010-02-2.

4 Features and specifications

Brushless DC motor for model TD6C and digital display which indicates the speed、time and RCF.

Frame is 3 tiers protection steel jacket, and with the stainless steel chamber. Electronic lock and pneumatic spring and automatic locked cover can assure the security, the lid can not 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, temperature and relative RCF, digital display.

The instrument has following functions:

- a. It can rotate relative RCF
- b. It can store all the parameters automatically in operation, and can use directly when startup next time.
- c. When exceeding max speed with 500r/min, it will stop automatically and protect the system.

5 Technical data for TD6C

Chart 1 Technical Parameters

Max speed:	6000rpm	Max RCF	3660xg
Max volume	6x100ml	Noise	≤55dBA
Timer	0~99min	Net weight	21KG
Dimension(LxWxHmm))	485×320×255mm	Power supply	AC 220V 50HZ 2A
Speed accuracy	±10rpm	Package	Standard export carton
Power Consumption(W)	a.Highest power :500W b.During normal operation 400W c.Stand-by mode:50W	Plug	Hospital Grade Type F power plug in compliance with Indonesia requirements.

6 Matched Rotor for TD6C

Many rotors can be chosen to meet the different centrifugal requirements

Chart 2 Main technical parameters of the rotors

Order No.	Rotor	Max Speed (rpm)	Max Volume (ml)	Max.RCF (×g)	Rotor degree (°)
NO30638	Angle Rotor	6000	6×15	3660	30°
NO30607	Angle Rotor	5000	12×15	3080	30°
NO30611	Angle Rotor	5000	6×50ml	2850	30°
NO30614	Angle Rotor	5000	6×100ml	3130	30°
NO 05242	Swing rotor	4000	6×10ml	2210	90°
NO05221	Swing rotor	5000	6×10ml	3460	90°
NO31685	Angle Rotor	5500	8×50ml	3790	35°

Remark: Above rotors are reusable and autoclavable at 121 °C

7 Working principle

7.1 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.

7.2 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:

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

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

7.3 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 shorter of the time. Contrary, the smaller RCF, the longer of the time.

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.

8 Unpacking the centrifuge

8.1 Check the package before opening the packing box

8.2 Examine the Centrifuge for any shipping damage. If any damage was found, please contact our service department.

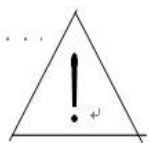
9 Installation

9.1 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.

9.2 Electrical source should be 220V Single phase, with independent earth line



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

9.3 This equipment is for indoor use only. The centrifuge is suitable for operation between 5°C and 40°C. When the temperature is below 31°C, the maximum relative humidity should be kept below 80%, and when the temperature is 40°C, the relative humidity should be below 50% by linear measurement. Therefore, the centrifuge should be avoided near heat sources (such as direct sunlight, heating elements, and radiators).



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

9.4 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.

10 Operation

10.1 Power on

Power switch is located on the right bottom corner of control panel. Turn it to “on” position, the power indicator will turn red.



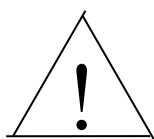
Caution Side of this power switch is posted with safety marking ! this means the power is 220V 2A, It is dangerous voltage, beware of electric shock.

10.2 Lid opening

There is open key on the control panel③,. Press "open③, lock opened. push the lid upward until it open completely, Spring level will help to open the lid.

10.3 Rotor installment and solution adding

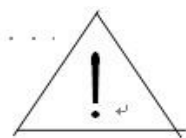
10.3.1 Load the rotor to the central adapter located on the axle of electrical motor, Fasten the screws in the central sleeve till the rotors are installed. Use the special wrench to fasten the screws after installing the rotors in the central sleeve of the axle.



Warning

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

10.3.2 Fill the tubes equally by eye (about 75% of the total volume), balance the tubes by scale. After solution added, should weigh with balance for Volume $\geq 10\text{ml}$ tubes



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 posted for the rotor and the cups!

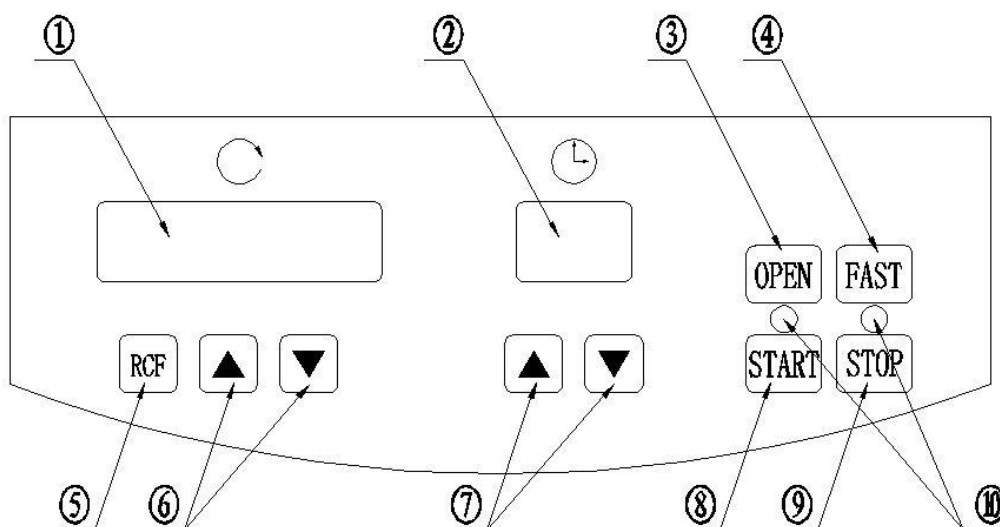
10.4 Closing the lid

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

10.5 Setting parameters

The time and speed will be showing on the panel, switches and buttons as shown in Chart 3:

Chart 3



Explanation for control panel:

- ① RCF/RPM ② time ③ open ④ fast ⑤ RCF and RPM converse
⑥ speed up and down ⑦ time up and down ⑧ start ⑨ stop
⑩ working and stop indicator

10.5.1 Set the speed

press speed button $\triangle$ speed selection range from 0rpm to maximum 4000rpm, press speed button ∇ speed will be down, choose the speed you prefer.

10.5.2 Set the time

Press time button $\triangle$, the time selection range from 0 minute to 99 minutes, then press time button ∇ the time will be down, set the time which you want.

10.5.3 Start the centrifuge

Press the start button, the start indicator will be brighten , the centrifuge starts to work, the speed window will show the speed; the time window begin to count down,, the speed will be up to what you preselected within1-2minutes 。 Press the RCF button in the process of operation , the speed window will show the current RCF., 10 seconds later, it will return to show the speed。

10.5.4 Stop the centrifuge

When the time window count down to 0 (or press the stop button), stop indicator will be brighten , the speed will be down to 0,then the centrifuge will stop running.

10.5.5 Open the lid

Press the “open the lock” button③, the lock will be unlocked, then take out the sample, all the centrifugation process finished.

10.5.6 Power off

Press the down side of the switch button , now the panel is cut off, but the whole machine is not power off, if you stop using the machine, you should take out the plug from the power supply socket.

10.6 Troubleshooting Table

The instrument has a self-diagnostic function. When a fault occurs during instrument operation, the instrument will display a corresponding fault code or symbol. To facilitate after-sales maintenance and future inquiries, the instrument's fault codes are customized.

The specific fault codes are as follows:

Serial Number	Fault Codes	Fault Description	Solution
1	E -0 0	Over-temperature fault: The driver board temperature exceeds 65 °C .	Check if the load is too heavy or the acceleration/deceleration speed is too fast.
2	E - 0 1	Door cover malfunction: A malfunction alarm caused by the door cover not being closed properly or the door cover protection detection device being damaged.	Check if the door is closed properly. Is the door cover protection microswitch working properly?

3	E - 0 2	Motor stall fault: A fault alarm caused by the motor not turning.	Check if the motor shaft rotates freely.
4	E - 0 3	Overvoltage fault: A fault alarm caused by the driver board exceeding the rated voltage.	Check the input voltage?
5	E - 0 4	Overcurrent fault: A fault alarm caused by the driver board exceeding the rated current.	Check if the load is too heavy or the acceleration/deceleration speed is too fast.
6	E - 0 5	Temperature sensor malfunction: This is a fault alarm triggered when the temperature sensor is not properly connected or is damaged.	Check if the temperature sensor is properly connected. Is the temperature sensor functioning correctly?
7	E - 0 6	Over-temperature fault: A fault alarm is triggered when the temperature inside the centrifuge chamber exceeds the set temperature by 5°C.	During temperature control, check
8	E - 0 7	Speed sensor malfunction: This is a fault alarm triggered when the speed sensor is not properly connected or is damaged.	Check if the speed sensor is properly connected. Is the speed sensor functioning correctly?
9	E - 0 8	A fault alarm that occurs when the instrument exceeds the set maximum rotor speed of 500 rpm during operation.	Check if the load is too heavy or the speed is too fast.
1 0	E - 0 9	Imbalance fault: A fault alarm caused by instrument vibration due to unbalanced counterweight of the rotating head.	Check if the rotor load is symmetrically assembled and if the load is balanced.
1 1	E -10	Door lock motor opening failure: When the door is opened by pressing the open button, if it takes more than 3.5 seconds , it is due to damage to the door lock	Check if the microswitch is functioning properly when the door lock motor is fully open.

		motor or damage to the micro switch at the opening position, or the micro switch at the opening position does not detect a signal.	
1 2	E -11		
1 3	E -12	Undervoltage protection: A fault caused by insufficient power supply voltage.	Check the input voltage?
1 4	E -13	Door lock malfunction: When closing the door, it takes more than 3.5 seconds. The door lock motor or the micro switch in the closing position is damaged, and the micro switch in the closing position does not detect a signal.	Check if the door lock's electrical system is in the off position and if the microswitch is functioning properly.
1 5	E -14	Communication failure: A failure caused by a lack of communication between the driver board and the display board.	Check if the communication cable between the driver board and the display board is properly connected.
1 6	E -15	Driver board failure: Faults caused by damage to the driver board.	Check if the driver board is working properly.
1 7	E -16	The fault was caused by the door lock motor position switch not being plugged in.	Check the motor door lock position and check if the micro switch is plugged in.
1 8	E-17	No rotor signal	Rotor signal not detected
1 9	E-18	Rotor signal missing	Rotor signal incomplete
20	E-19	Rotor mismatch	The rotor number set is inconsistent with the rotor actually used.
21	E-20	The timeout period for selecting the hanging cup has expired.	After the rotor is automatically identified, if the hanging cup is not selected within the specified time, the hanging cup will be automatically selected.
22	E-21	Unable to identify rotor	The rotor is not used in the current model.
23	E-30	Overvoltage fault	Overpressure on the brake lever, or sensor malfunction.

(1) press the up side of the switch button, the centrifuge doesn't work, please check the fuse in the socket mounted on the rear of the centrifuge, if it is damaged, please replace it with the 5A fuse. if not , then check the switch, if the above two places is in good condition, please contact us.

(2) Make sure never ask the non-professional person to solve the electronic board problem.

11. Other safety precautions

11.1 Centrifuge tubes should be replaced periodically, never use tubes with cracking.

11.2 You should care for the overflowed harmful substance when open the rotor lid or clean the centrifugal chamber.

11.3 When the rotors damaged you can only move the centrifuge for 30(cm), make sure no dangerous subjects within 30 (cm) around the centrifuge.

11.4 The operator can't lean on the centrifuge when it is in operation, non-worker can't stay around the centrifuge.

11.5 When the centrifuge is broken down, forbid the non-professionals to repair it. You need to invite the professional maintenance person or send back to our factory. Before repairing, please unplug the main power cord, so the centrifuge can cut off all the power supply.

11.6 In order to protect the safety of operator, can not allow to open the lid when the instrument running. Instrument itself is also with this kind of protection function, that is to say, when speed is over 100r/min, the lid switch will cut off the power automatically. When operator press the OPEN key wrongly, the lid is no response, in order to protect instrument safety, lid can not be opened, But strictly forbid following illegal operations:

11.6.1 When the instrument running, or in the procedure of deceleration to

shutdown, the speed is not decelerated to 100r/min, strictly forbid to pull down the ring in the bottom of the instrument to open the lid. Strictly forbid to enforce rotors to stop running artificially, this will cause personal injury accident

11.6.2 Strictly forbid to close the Power switch artificially ,then connect the power. At this time, centrifuge program think the speed is 0, Press open key, the lid can be opened, this can be easily misleading to stop rotor running artificially.

11.7 Centrifuge tubes should be replaced periodically, never use tubes with cracking.

11.8 You should care for the overflowed harmful substance when open the rotor lid or clean the centrifugal chamber.

11.9 when the rotors damaged you can only move the centrifuge for 30(cm), make sure no dangerous subjects within 30 (cm) around the centrifuge.

11.10 The operator can't lean on the centrifuge when it is in operation, non-worker can't stay around the centrifuge.

12 Maintenance

12.1 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.

12.2 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.

12.3 Please disinfect the machine with 75% medical ethanol. Compatible agents: Double-chain quaternary ammonium salt disinfectant.

12.4 Keep the place which settle the centrifuge clean, make sure the

freezer is not choked by dirty subjects.

13 Quality guarantee

13.1 We have one –year warranty on our all products

13.2 After the machine fixed, our professional technician will file it and keep track of the usage of the machine.

13.3 We will pay attention to the feedback of the customers within 24 hours.

13.4 We won't charge customers any money for repairing the machine in one-year warranty time.

Attention : The malfunction caused by error operation is excluded this warranty, please operate the centrifuge according to our instruction.

13.5 We only charge for the accessories on repairing the machine beyond the one-year warranty time.

14 Cleaning Instruction

I. Prerequisites

1. Power off the equipment; rotor completely stationary.
2. Ventilate the laboratory by opening windows; wear gloves and masks.
3. Absorb blood and bodily fluids before disinfecting

II. Wiping Standards (Slightly damp cloth, not dripping wet; spraying is strictly prohibited)

1. External Body: Wipe the outer casing, touchscreen, buttons, and door handles; allow to air dry.
2. Centrifuge Chamber: Remove the rotor; wipe the chamber walls and corners;

open the lid for ventilation for 2-3 minutes until completely dry.

3. Rotor & Centrifuge Cup: Wipe only the outer walls and slots; do not spray into bearing holes or soak the rotor. Wipe the centrifuge basket and centrifuge cups inside and out, allow to dry, and return to their original positions.
4. Door Rubber Ring: Lightly wipe the seal strip; allow to air dry completely.

III. Spill Emergency Handling

1. Power off; absorb contaminated bodily fluids; change gloves.
2. Wipe the chamber, rotor, and rubber ring twice with alcohol.
3. Ventilate for at least 5 minutes after opening the lid, and only turn on the machine after it is completely dry.

IV. Four Red Lines Prohibited

- ✗ Do not use alcohol spray atomization to prevent electrical fire and short circuit.
- ✗ Do not rinse or soak the rotor, bearings, or motor.
- ✗ Do not close the door and turn on the machine before the alcohol is completely dry.
- ✗ Do not use 95% high-concentration alcohol as a substitute.

V. Frequency of Use

1. Routine Use: Disinfect at the end of each shift, and disinfect the entire machine every morning and evening.
2. High-Frequency Detection: Perform internal cavity cleaning every half day.
3. Specimen Leakage/Positive Samples: Immediately perform terminal disinfection.

Remarks

75% ethanol can kill common pathogens and enveloped viruses without corroding materials; for spore eradication, use neutral hypochlorous acid for deep disinfection weekly, and keep a disinfection record.