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Operation Manuals
Tabletop High-Speed Centrifuge
Model: TG24-WS



DRAWELL

Thanks for using Drawell centrifuge! In order to get quick and sincere service, please read the operation manuals carefully before you operate.

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Safety Notices

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

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. 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.
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).

All centrifuges have the potential risk factors during operation; you must understand the operating procedures and safety precautions for the safe use of centrifuges.

Failed to operate the provisions of this manual may result in personal injury or property damage, be sure to abide by the rules. The Company is not liable for obligations for the consequences are not made in conformity with the rules and operations of this manual.

Warranty Card

Name & Model	TG24-WS Benchtop High-Speed Centrifuge
Specifications	
Date of Delivery	
Address	

Service Records

Date	Contents	Signature	

Rotor option

Rotor	Max. Speed (r/min)	Max. RCF (xg)	Capacity	
1	24000	47800	12×1.5/2ml	
2	16000	18200	8×5ml	
3	14000	23120	6×10/15ml	
4	15000	21800	24×1.5/2ml	
5	12000	15040	48×0.5/1.5ml	
6	14000	18200	36×1.5/2ml	√
7	13000	16760	6×50ml	
8	10000	9800	4×100ml	
9	4000	1400	2×2×48holes	
10	8000	9800	8×50ml	
11	13000	17000	6×30ml	

Packed by:

Inspector:

Date:

When start to use the centrifuge machine, please:

- 1.Press Power Switch first after plugged in;
- 2.Check the nut tight and rotors balance
- 3.Operate it according to the Operation Instructions.

1. Technical Description

TG24-WS Benchtop High-Speed Centrifuge, operates on the principle of centrifugal sedimentation for the separation, purification or concentration of solution with different density particles.

The centrifuge consists of housing, centrifugation chamber, drive system, control system and operating display panel, including rotors and tubes as accessory.

2. Technical Features

TG24-WS centrifuge, equipped with brush-less motor, computer controller, door safety device etc. for simple operation, is widely used in the fields of biochemistry, radio immunity, environment protection, Chinese & western pharmaceutical for particles separation with different density.

2.1 Technical Data

Max. Speed: 24000r/m Noise: ≤65dB (A)
Max. RCF: 47800×g Power: AC220V 50Hz 5A
Max. Capacity: 6×50ml

Rotor Data

Note :Speed and capacity can be customer designed

Packing List

Ser.No	Description	Quantity	Remark
1	Centrifuge	1Set	√
2	Rotor	1 pcs	√
3	Certificate	1pcs	√
4	Operation Instruction	1pcs	√
5	Packing List	1pcs	√
6	Solid wrench	1pcs	√
7	Rotor Handler	1pcs	√
8	Adapter	1Set	√
9	Accessories	Set	
10			

Quality Certificate for TG24-WS

Benchtop High-Speed Centrifuge

Max.Speed: 24000r/min

Max.RCF: 47800xg

Serial No:

It is certified that the centrifuge is passed quality inspection
& test .

Test Department :

General Manager :

Date:

Rotor	Max. Speed (r/min)	Max RCF (xg)	Capacity
1	24000	47800	12×1.5/2ml
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6	14000	18200	36×1.5/2ml
7	13000	16760	6×50ml
8	10000	9800	4×100ml
9	4000	1400	2×2×48holes
10	8000	9800	8×50ml
11	13000	17000	6×30ml

2.2 Installation Requirements

- The centrifuge should be placed on the firm table with four feet contacting the table.
- Certain space should be allowed around the centrifuge for idea ventilation
- Power: AC 220V 50Hz 10A with socket capacity > 10A , ground connection should be secured.

2.3 Normal Working Conditions

- a). Environment temperature: $5^{\circ}\text{C} \sim 35^{\circ}\text{C}$;
- b). Relative Humidity: $\leq 85\%$;
- c). The centrifuge operating room should be free from Conductive dust, explosive or corrosive gas
- d). Power: AC $220\text{V} \pm 22\text{V}$ $50\text{Hz} \pm 1\text{Hz}$, and separate ground connection should be provided in the centrifuge operating room

3. Operation

3.1 Rotor Installation

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

The drive spindle in the chamber and the inside cones of rotor should be first wiped with a piece of soft and clean cloth, then place the rotor with two hands to the cone side of the drive spindle in the centrifuge chamber, Washer should be placed before tightening the screw nuts.



Warning: The conical surface of rotor and driving shaft

centrifuge.

- 5. The trouble is caused by war or other irresistible factors.

This centrifuge has been subjected to thorough testing and quality control before delivery. We promise to do as below:

- 1. One year warranty for this centrifuge (from the date of delivery).
- 2. Our company after-service cCon. will build up files in time and follow up the user's information.
- 3. We will offer the replacement parts freely if the centrifuge within warranty.

Warranty

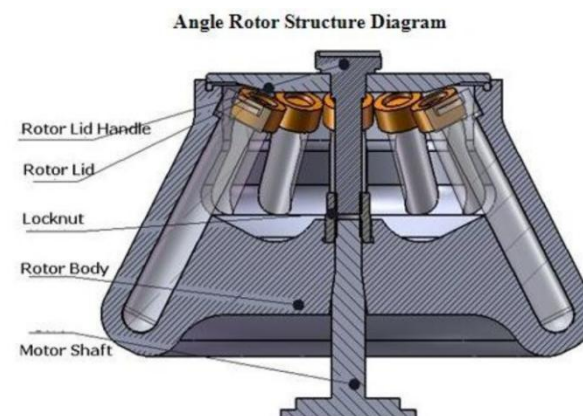
Respected customers,

Thank you for purchase of our company's product. To protect your legal rights and avoid your worries, we provide warranty service for one year with the main machines. If it is broken under warranty with un-artificial reason, we will supply free maintenance service. The customer needs to pay the prime cost of the product parts if the product has exceeded the warranty period. We will not supply the free maintenance if any following matter is happened:

- 1.Exceed of the warranty period or without the warranty card.
 - 2.The trouble is caused by wrong installation, operation and maintenance.
 - 3.The trouble is caused by the unauthorized uninstalling and repairing by our company.
- The trouble is caused by using the rotor not equipped with this

must be connected closely.

As shown in the following figure: Firstly clasp the symmetric spoke of rotor, and put it on the rotor base vertically and placidly while the rotor bottom's location cone aims at the location cone of 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 mean while turn the wrench for 3 to 6 rounds in clockwise direction until the rotor connects the drive shaft closely.



3.2 Installation requirements

Place centrifuge on a steady platform or table. Make four rubber cushions stand in balance to prevent vibration.

Otherwise, add some pads to readjust the height up to the requirements (by user).

3.3 Adjusting requirements

Checking the goods

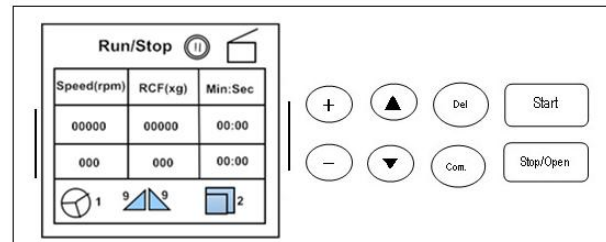
Check the packing list and make sure if damage is occurred during delivery.

Installation, adjustment and maintenance should all be guided or operated by professional technicians.

3.4 Installation of Brackets and Tubes

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

3.5 PreSet



LCD Display Panel

---Rotor No. ---Acc/Dec
 ---Door open/close

9. Electrical Block

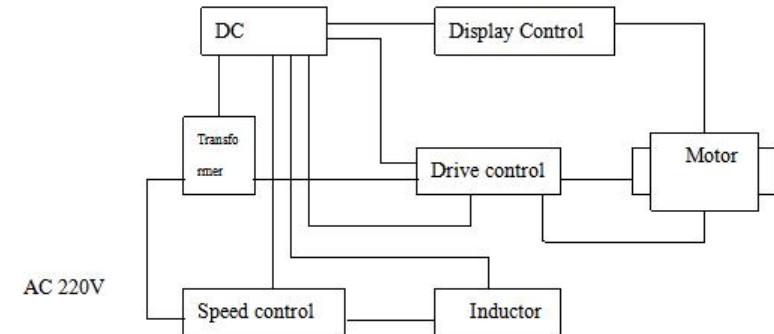



Fig. 2 Electrical Connection Block

several times slightly with wooden or rubber hammer. Then clasp the symmetric spoke of rotor and lift slightly by both hands, and put the rotor on the flat table and ground covered with soft pad.


 **Warning:** All actions on the rotor must be soft for avoiding the damage of driving shafting.

Door lid opening:


After installing the main machine, Check the connection of all connectors and fuses first, and turn on the main switch then. When the screen displays “8.8 8.8.8.8.8. 8.8.8.8. 8.8.8. 8.”, the software inversion No“B dL5H d.C.F. 2.1”(B-frequency conversion control, d.C.F.-temperature controlled by solenoid valve , 2.1-software inversion No.)will be showed. Pull the latch on door lid lock device by manually, and the door lid gradually opens at the holding of gas springs polar and your hands. rounds in clockwise direction until the rotor connects the drive shaft closely.

1). Rotor type Setting

Press [▲]/[▼]once or continuous times to modify rotor type when “rotor” display window flashing in Rotor No, and then press [+]/[-]to increase or decrease the number. Press [Con.] to keep current Setting at last.

 **Warning :** The rotor type should be Set according to the installed one.

2). Rotation speed Setting

 **Warning:** The same rotor can hold buckets and accessories with different speed or RCF value.

Press [▲]/[▼] once or continuous times to modify speed value when ‘SPEED/RCF’ display window flashing in Stop/running status, and then press [+]/[-]to increase or decrease the current value. Press [Con.] to keep current Setting at last.

3). RCF Setting

Press [▲]/[▼]once or continuous times to modify RCF value when ‘ROTOR’ display window shows “F.” and ‘SPEED/RCF’ display window shows the Setup RCF value in Stop/running status, and then press [+]/[-]to increase or decrease the current value. Press [Con.] to keep current Setting at last.

4). Time Setting:

Press [▲]/[▼]once or continuous times to modify centrifugation time when ‘Time’ display window flashing or there is a bright

spot at the right and bottom edge in Stop/running status, and then press [+]/[-] to increase or decrease the current value. Press [Con.] to keep current Setting at last.

5). Acceleration Setting:

Press [▲]/[▼] once or continuous times to modify Acc curve when 'Speed/RCF' display window shows "ACC X" in Stop/running status, and then press [+]/[-] to increase or decrease the current value (The higher the value, the shorter the Acc time; vice versa). Press [Con.] to keep current Setting at last.

6). Deceleration Setting

Press [▲]/[▼] once or continuous times to modify Dec curve when 'Speed/RCF' display window shows "DEC X" in Stop/running status, and then press [+]/[-] to increase or decrease the current value (The higher the value, the shorter the Dec time; vice versa). Press [Con.] to keep current Setting at last.

7). Start or brake

Press [START] after you confirm the Setup parameters, and press [STOP] to brake at any time during a run. If you want to know the RCF during a run, press the [RCF] (RCF light should

excessive increases the speed, or drive damage.)

Velocity-measuring

g protection: E-7

The centrifuge will not Stop when velocity-measuring system is broken, "E7" will display.

Error

manipulation: E-8

Before a run error occurs, the system can not work; during a run Set wrongly, the Setup would be invalid. In stand-by mode press [Start] key, "E8" will be then displaying while it can not Start.

Inverter trouble: E-9

While inverter has trouble, the system can not work and "E9" will be then displaying.

Rotor disassembly: (after finishing adjust or centrifuge)

First clasp the spoke of rotor with one hand, and put the solid wrench on the cap nut by another hand. In the mean while turn the wrench for 3 to 6 rounds in counterclockwise direction to loose the cap nut until the rotor can be separated from 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 rotor

displaying “E1”.

Over-speed protection: E-2

The system can not work when the Setting speed is over max speed. Or, the system will be Stopped automatically for actual speed is excess of rotor max speed or the Set up speed by 500r/min. “E6” will be then displaying.

Door lid protection: E-3

Since the centrifuge runs at high speed, it will not run for the door lid opening. If forcing the door lid open during a run, the system will be Stopped automatically and “E3” will be then displaying.

Hall Error: E-4

Hall error (motor Hall sensors are not connected to the transposon)

Over-voltage(shut down) E-5

(DC voltage is too high, causing the rise due to large load speed too fast, or drive damage.)

Over-Current (running) E-6

(motor power supply is too large, causing large loads due to

be on) to check RCF value under the current speed. The centrifuge will be back to the running status in 4 seconds automatically.

If you want to know the Setup parameters during a run, press the [▲]/[▼] to check the Setup parameters. The centrifuge will be back to the running status in 4 seconds automatically (in the case of no Setup revising).

If the time is counted down to “0” or it is Stopped automatically for trouble, the centrifuge will brake and Stop automatically. When the speed is 0 r/min for model , you can press [STOP] to open the door lid(if the electricity cuts off,insert the special unlock tool into the door opening hole and push it horizontally to open the door lid). Then the buzzer tweets 15 times, and press [RCF] to eliminate the buzz; if you press [STOP] to Stop the operation during a run, the buzzer won't tweet.

Since there is a kind of connection $RCF = 1.118 \times 10^{-5} \times r \times N^2$ in instrument interior, the instrument can transfer the Setup speed to RCF value when you Set speed for centrifugation and the number in units is not zero. For the same reason, the instrument can transfer the Setup RCF value to speed when you Set RCF for centrifugation and the speed number in units is not zero too. In order not to impact the effects, we can increase the RCF/Speed value to the biggest value and press [Confirm] to

keep current Setting. Then re-Set the desired speed or RCF value.

4. Safety Notice

- a). CONFIRM button should be pressed after speed is Set.
- b). The centrifuge will not be allowed to operate under any condition if the speed exceeds the rated speed for the rotor and brackets.
- c). The rotor or tube is prohibited for further use if any corrosion or crack occurred.
- d). The door will not be allowed to open when the centrifuge is under operation.
- e). If the rotor is not in use for three months, it should be subjected to operating for 10 min before it can be allowed to operate at its max speed.

5. Maintenance

- a). Dry the centrifuge chamber, rotor and tube with a piece of clean and soft cloth after operation.
- b). Check regularly to find if there is any corrosion or crack on the rotor, bracket, tube Sets and tubes.
- c). If the centrifuge will not be in use for a month, take out the rotor from the chamber, grease the cone side of drive spindle and the Confirm hole of the rotor, and keep the rotor in a dry place.

6. Trouble Shooting

1. No power indication after the machine is powered on:
 - a). Check if the power supply is OK.
 - b). Check if the plug and sockets are well connected.
 - c). Check if the fuse is burned. The correct size of the fuse is F10A250V (Φ5×20);
 - d). Check if the power indicator is burned.
2. After power on, the power indication is OK, but the operation of machine is abnormal:
 - a). Check if the time or speed is Set .
 - b). Check if the control circuit is normal.
3. Abnormal vibration occurred after Starting the machine:
 - a). Check if there is any foreign materials in the tube Set, check if the solution in the tubes are properly arranged.
 - b). Check if the tube Set of swing rotor is properly contacted with the bracket.

7. Instrument safety and protection

This centrifuge has multiple protection functions and will Stop automatically while trouble occurs. The error code will be displayed in the 'SPEED/RCF' window, then press [Stop] for display clearance.

Imbalance protection: E-1

During a run, the system will be Stopped automatically since the high vibration caused by imbalance exceeds extent value and