Order: 010-59822688
Toll-free: 800-990-6057 /400-810-6057
TIANGEN BIOTECH (BEIJING) CO., LTD

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TGear HC16R High Speed Frozen Centrifuge User Manual



Catalog Number	Product Name
OSE-HC-02	TGear HC16R High Speed Frozen Centrifuge

For Research Use Only. Not for use in diagnostic procedures.

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Chapter 1 Important Instructions

1.1 Instrument Installation Precautions

When you receive the instrument and open the packaging, be sure to follow the steps below to install and debug the centrifuge. Failure to operate as required may lead to serious consequences, causing instrument damage or personal injury!!!

When moving the instrument, lift the device from both left and right sides, balancing the force. Do not shake the machine. After moving the instrument out, carefully place it gently on a suitable table.

As this instrument is a refrigerated model containing a refrigeration compressor, after placing it on the table, let it stand for half an hour before turning it on and using it.



Note: When moving the centrifuge, do not apply force to its front cover, and do not invert the machine, as this will damage the machine.

1.2 Safety Warning and Caution Statements

Symbol	Description
	**Electrical Shock Warning:** Be sure to strictly follow the requirements of the electrical shock warning information to avoid electric shock accidents!
	**Note:** Caution: Caution statements contain particularly important information. Please read carefully. Failure to follow the instructions may cause the instrument to malfunction or even damage the instrument!
	Protective Grounding Symbol

1.3 Safe Use

Safety Operation Information



(1) Users must carefully read the user manual before using the instrument.

(2) No one is allowed to operate the instrument without reading this manual. Operating the instrument without following the instructions may cause damage to the instrument, render it unusable, or even lead to serious personal injury.

Environmental Requirements

(1) For indoor use only.

(2) Suitable ambient temperature range: 5~40°C.

(3) Suitable relative humidity range: 10~80%.



(4) Ensure the instrument is used on a level, firm, non-slip surface.

(5) This instrument has a switching power supply. Applicable voltage range: AC 200~240 V, frequency: 50/60 Hz, current: 10 A.

(6) It is recommended to maintain a 30 cm clearance between the instrument and walls or other instruments.

(7) Do not place the instrument in damp, dusty, high-temperature, strong magnetic field, or explosive environments.

Accessory Use



(1) This instrument is compatible with 6 types of rotors. When using accessories, please use the dedicated accessories provided by our company. If you choose to use rotors from other brands, the company will not be responsible for the consequences.

(2) Different accessory rotors have different maximum centrifugal forces. After installing the rotor, the instrument automatically identifies the rotor number. Please verify that the rotor number displayed on the instrument matches the actually installed rotor, and operate within the maximum speed and maximum centrifugal force range of that rotor.

Usage Precautions

(1) Ensure the rotor is securely installed before centrifugation.

(2) Ensure samples are balanced before centrifugation.

(3) Do not open the centrifuge lid using the temporary unlocking device while the instrument is running.



(4) When using the refrigeration function, do not keep the lid open for a long time, as it may cause frosting or water droplets inside the centrifuge chamber. After using the refrigeration function, open the centrifuge lid and wipe or air dry the moisture inside the chamber with a cleaning cloth.

(5) It is recommended to regularly clean the centrifuge rotor and chamber inner walls according to the cleaning methods in this manual to prevent instrument corrosion.

(6) Do not open the casing or disassemble instrument parts without authorization. If necessary, it must be done under the guidance of our company's professionals.

Container and Sample Precautions



(1) Do not centrifuge flammable, explosive, highly corrosive, or biohazardous samples.

(2) Do not centrifuge toxic or harmful samples. If centrifuging microbiological samples such as pathogens, please select an aerosol-tight rotor and remove the entire rotor after centrifugation before opening it in a clean bench.

(3) Ensure sample tubes are balanced during centrifugation. Imbalance can affect centrifugation results and cause danger. Long-term use without balancing can affect instrument stability.

Chapter 2 Product Packaging and Accessories

2.1 Packing List

After receiving the TGear HC16R High Speed Frozen Centrifuge, please check that the packaging box contains the following items:

Name	Quantity
Instrument Main Unit	1 unit
Power Cord	1 piece
Assembly Wrench	1 piece
Lubricating Oil	1 unit
User Manual	1 copy / 1 portion
Installation Instructions	1 copy / 1 portion
Warranty Card	1 copy / 1 portion
Certificate of Conformity	1 copy / 1 portion

Note: If any of the above items are missing, damaged, or incorrect, please retain the original packaging box and contact our sales personnel promptly.

2.2 Optional Accessories

Cat. No.:	Rotor No.	Specification	Max Speed (rpm)	Max RCF (×g)	Compatible Consumables
OSE-HC-B01	1	24×1.5/2.0 ml Angle Rotor	16000	23470	1.5 ml/2.0 ml Centrifuge Tubes
OSE-HC-B02	2	24×Capillary Rotor	12000	14330	Capillaries
OSE-HC-B03	3	10×5 ml Angle Rotor	16000	18140	5 ml Round Bottom Tubes
OSE-HC-B04	4	4×0.2 ml×8 Angle Rotor	14800	16200	0.2 ml Single Tubes & 8-Strip Tubes
OSE-HC-B05	5	36×0.5 ml Angle Rotor	15000	16350	0.5 ml Centrifuge Tubes
OSE-HC-B06	6	8×5 ml (Conical Bottom) Angle Rotor	16000	18140	5 ml Conical Bottom Tubes

Chapter 3 Product Introduction

3.1 Product Introduction

TGear HC16R is a high-speed refrigerated centrifuge that utilizes the centrifugal force generated by high-speed rotor rotation. It is commonly used for separating components in solid-liquid mixtures or liquid mixtures, suitable for rapid separation of micro samples and processing samples requiring low-temperature centrifugation. The TGear HC16R High Speed Frozen Centrifuge is easy to operate, convenient to use, and equipped with various rotors.

3.2 Product Features

- Clean and clear operation panel, convenient operation
- Maximum speed up to 16000 rpm, maximum RCF 23470×g
- Acceleration/Deceleration gears 1~9 plus 0 free deceleration, meeting different experimental acceleration/deceleration requirements
- Automatic rotor identification function, preventing rotor overspeed, safe and reliable
- Electromagnetic double door lock design, quick lid closure with a light press, safe and quiet
- Refrigeration function, minimum cooling temperature down to -20°C
- Rapid cooling, one-key quick pre-cooling & automatic cooling when lid closed, saving cooling waiting time
- Imported compressor & environmentally friendly refrigerant, durable product, precise cooling effect
- Can preset and save 30 programs, one-key recall of setting programs, convenient and fast
- Rotor automatic imbalance detection, ensuring operational safety
- Centrifuge chamber with Teflon coating for corrosion resistance
- Precision structure, imported sealing ring, ensuring instrument sealing effect and extending instrument life

3.3 Instrument Structure

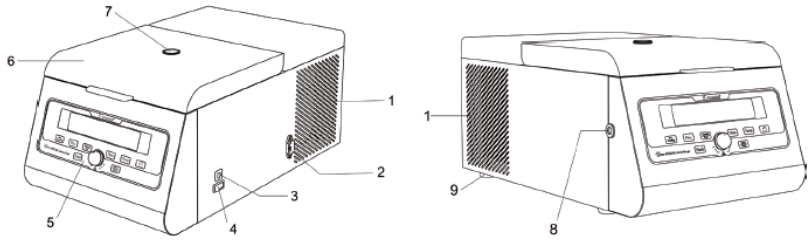

Figure 1 Instrument Structure Diagram

Table 1 Instrument Structure Description

No.	Name	Description
1	Ventilation Holes	Instrument cooling vents
2	Power Cord Socket	Power Cord Socket
3	Electronic Protector	Automatically activates when instrument circuit is overloaded or short-circuited
4	Power Switch	Turn instrument ON/OFF
5	Control Panel	Set programs, display operating status
6	Centrifuge Lid	Centrifuge can only be started after lid is closed
7	Speed Viewing Window	Instrument speed calibration port
8	Emergency Door Lock	Emergency lid opening location when instrument lid malfunctions
9	Instrument Feet	Instrument support feet

3.4 Technical Specifications

Name	Parameters
Speed Range	100~16000 rpm / Speed increment 10 rpm
Maximum RCF	23470×g / RCF increment 10×g
Maximum Capacity	50 ml (5 ml×10)
Effective Centrifugation Time	1 sec~99 h 59 min 59 sec settable, accuracy ±1 sec
Cooling Temperature Range	-20°C~+40°C, display accuracy 0.1°C
Rapid Cooling	Rapid cooling key / Automatic cooling when lid closed
Lid Type	Electronically controlled automatic latch dual lock
Drive Motor	Maintenance-free, brushless variable frequency induction motor
Rotor Automatic Identification System	Yes
Built-in Programs	Can store 30 programs
Product Dimensions	370 mm×610 mm×262 mm (L×W×H)
Weight (without rotor)	49 kg
Noise Level at Max Speed	≤60 dB(A)
Fastest Acceleration Time	18 sec
Fastest Deceleration Time	20 sec
Power Supply	AC 200~240 V/50~60 Hz
Input Power	650 W
Interference Suppression Standards	EN 61010-1, EN 61010-2-020, EN 61326-1, EN 61010-3-2/A2
Operating Environment	Temperature 5°C~40°C / Humidity ≤80%

Chapter 4 Operation Instructions

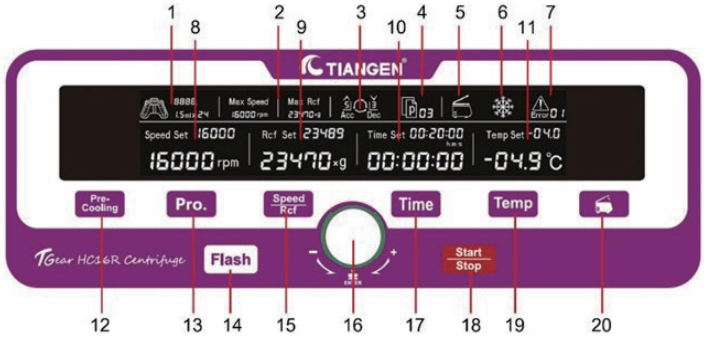

Figure 2 Instrument Panel Diagram

Table 2 Panel Description

No.	Name	Description
1	Rotor Number Display Area	Displays corresponding rotor number and information
2	Rotor Speed/RCF Display Area	Displays max speed/RCF for corresponding rotor
3	Acceleration/Deceleration Gear Display Area	Displays set acceleration/deceleration gears
4	Program Number Display Area	Displays program number
5	Lid Status Display Area	Displays instrument lid open/closed status
6	Cooling Status Display Area	Icon lights up and flashes, indicating cooling in progress
7	Alarm Prompt Display Area	Lights up and displays corresponding number when instrument alarms
8	Speed Display Area	Displays set/actual speed
9	RCF Display Area	Displays set/actual RCF
10	Time Display Area	Displays set/actual time
11	Temperature Display Area	Displays set/actual chamber temperature
12	Pre-Cooling Key	One-key selection of default pre-cooling program for rapid cooling
13	Program/Acceleration-Deceleration/Rotor Key	Cycles through Program/Acceleration-Deceleration Gear/Rotor Number areas
14	Short Spin Key	Press and hold to start centrifugation, release to stop
15	Speed/RCF Setting Key	Set speed/RCF
16	Adjustment Knob	Rotate to adjust parameters, press to confirm
17	Time Setting Key	Set run time
18	Start/Stop Key	Start/stop centrifugation
19	Temperature Setting Key	Set cooling temperature
20	Lid Open Key	Open the lid

4.1 Power On

Connect to power using the instrument's power cord. Turn on the power switch on the side of the instrument. The instrument emits a "beep" sound, performs a self-check, the control panel lights up, and startup is complete.

4.2 Opening/Closing the Lid

(1) Opening the Lid

Press the "Lid Open Key" on the control panel. The instrument lid opens, "OPEN" flashes in the speed display area on the screen, and the lid icon on the display shows the open state. Do not place items on the centrifuge lid to avoid danger. If the instrument suddenly loses power or experiences a lid opening failure, you can also insert the assembly wrench into the emergency door lock on the left side of the instrument and turn it clockwise to open the lid. The emergency door lock location is shown as position 8 in Figure 1.

(2) Closing the Lid

Close the instrument lid. The door lock is electronically self-locking. The instrument emits a "beep" prompt sound, and the lid icon on the display shows the closed state, indicating the lid is closed and the centrifugation program can be started normally.

4.3 Installing the Rotor

First, ensure the instrument is powered off when installing the rotor. Align the matching centrifuge rotor (Figure 3, point A) with the slot on the motor shaft inside the centrifuge chamber (Figure 3, point B). Insert the rotor vertically, and use the simple wrench provided in the box to turn clockwise to tighten the screw cap (Figure 4).

After multiple centrifugation runs, check if the lock sleeve is secure. If loose, tighten it before running again.

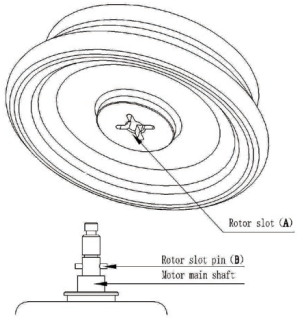

Figure 6 Rotor Installation Diagram

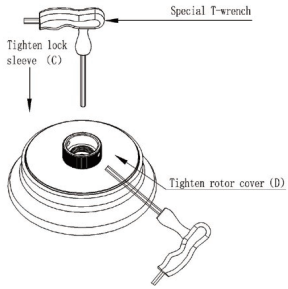

Figure 7 Rotor Tightening Diagram

4.4 Rotor Number Setting

(1) Automatic Rotor Identification

After installing the rotor on the instrument, the instrument automatically identifies each rotor model and adjusts its maximum speed and RCF according to the identified rotor number. When the number in the instrument's rotor number display area shows "AT---", the instrument is in automatic rotor identification state. The rotor speed/RCF display area shows the maximum speed and RCF for the corresponding rotor number.

(2) Manual Rotor Setting

If automatic identification fails or Error 12 alarm occurs, press and hold the "Temp" + "Speed/Rcf" keys for 5 seconds while the instrument is in standby mode to switch the instrument state. The rotor number display area will show "16---", indicating manual identification state. Rotate the adjustment knob to select the corresponding rotor number, and press the adjustment knob to confirm the selection. The instrument defaults to automatic identification state. When the power is restarted, the system will revert to the initial setting.

4.5 Speed/RCF Setting

(1) Speed Setting

Press the "Speed/Rcf" key. The "Set" value in the speed display area on the screen flashes. Rotate the "Adjustment Knob" to set the value. Press the knob to confirm or wait for three flashes; the setting is complete.

(2) RCF Setting

Press the "Speed/Rcf" key twice. The "Set" value in the RCF display area on the screen flashes. Adjust the RCF setting. Operation is the same as above.

4.6 Time Setting

The time display area corresponds to h (hours): m (minutes): s (seconds) setting. Press the "Time" key. The "Set" number in the time display area flashes. Rotate the "Adjustment Knob" to set the time. Press "Time" to cycle through the three time segments. Press down on the "Adjustment Knob" or wait for three flashes; the time setting is complete. The instrument time setting range is 1s to 99h59m59s. Timing starts after reaching the set speed.

4.7 Temperature Setting

Press the "Temp" key. The "Set" number in the temperature display area flashes. Rotate the "Adjustment Knob" to set the parameter. Press the "Adjustment Knob" or wait for three flashes; the temperature setting is complete. Based on the set temperature, if the set temperature is lower than room temperature, the instrument starts cooling, the snowflake icon in the cooling status display area lights up, and cooling begins.

4.8 One-Key Pre-Cooling Function

Close the instrument lid and press the "Pre-Cooling" key. The instrument starts pre-cooling. The pre-cooling program is set to 0°C, 3000 rpm, 3 min. Timing starts when the set temperature is reached. After timing completes, it stops automatically, and the instrument completes rapid pre-cooling.

4.9 Short Spin Function

Press and hold the "Flash" key. When holding this key, the centrifuge starts, and the speed increases continuously until it reaches the maximum speed corresponding to the matched rotor. Time is counted up, with a maximum duration of 99s. Release the key to stop centrifugation.

4.10 Program Selection

Press the "Pro" key. The program number display area flashes. Rotate the "Adjustment Knob" to select a program number. After setting the centrifugation program, the instrument automatically stores the program. The next time it is called, it will be the current centrifugation program. The instrument can edit and store up to 30 programs.

4.11 Acceleration/Deceleration Setting

Press the "Pro" key twice to switch to the acceleration/deceleration setting area, which will flash. Rotate the "Adjustment Knob" to select the acceleration/deceleration gear. Acceleration gear 1~9 adjustable, deceleration gear 0~9 adjustable, where 0 is free deceleration. The higher the gear number, the shorter the acceleration/deceleration time.

4.12 Beep Tone Setting

Press and hold the "Time" and "Speed/Rcf" keys for 3 sec. "SONG1" appears and flashes in the Speed/Rcf display area. Rotate the "Adjustment Knob" to select the beep tone type. Press the "Adjustment Knob" or wait for three flashes; the beep tone setting is complete. SONG1~SONG4 are beep tone types, SONG5 turns off the beep tone.

4.13 Parameter Adjustment During Operation

After the machine speed stabilizes, parameters such as speed/RCF, time, and acceleration/deceleration can be modified if needed. After resetting the parameters, no manual confirmation is needed. The system automatically flashes three times to confirm the setting, and the instrument continues running according to the modified parameters.

Chapter 5 Maintenance and Care

Regularly (or based on usage) clean and maintain the centrifuge casing, inner chamber, rotor, and separation containers used. This is to prevent contaminants from remaining on them, causing corrosion to the components used and environmental pollution.

Users should follow the methods described in this manual for cleaning and decontamination to ensure no damage to the equipment. Using inappropriate cleaning agents and incorrect disinfection procedures may cause damage to the centrifuge and its internal components!

5.1 Instrument Cleaning and Maintenance

5.1.1 Rotor Cleaning

(1) Turn on the power switch and press the "Door Open Key" to open the centrifuge lid.

(2) Use the rotor removal tool provided to loosen the lock sleeve and remove the rotor (clockwise to tighten, counterclockwise to loosen). When removing the rotor, grasp it with both hands and lift it vertically upward. Do not shake it sideways.

(3) When cleaning the rotor, use a mild detergent or distilled water to dampen a sponge or soft cloth for cleaning, then gently rinse off the detergent with distilled water. Do not spray or jet water onto the rotor, as liquid may remain in certain areas and cause corrosion. After cleaning, allow it to air dry inverted.

(4) Generally, clean the rotor once a week. If separating salt solutions or other corrosive samples, clean immediately after use. If sample splashing, soaking, or dripping onto the rotor is found during use, immediately absorb and clean the affected area locally.



1. **Do not hit the rotor with sharp objects. Prevent bumps and collisions during handling and disassembly/assembly. Prevent cracks from developing in the rotor during use due to scratches or external damage.**
2. **Regularly check the rotor assembly (especially the bottom of tube holes) for corrosion spots, grooves, or fine cracks. If any of these conditions are found, stop using the rotor and contact our company.**

5.1.2 Centrifuge Chamber Cleaning

(1) After opening the lid and removing the rotor, remember to turn off the instrument power and unplug the power cord.

(2) Use a cotton cloth moistened with distilled water and wring it out to ensure no dripping water enters the main unit. Gently wipe the chamber walls for cleaning.

5.1.3 Motor Shaft Cleaning and Maintenance

(1) After removing the rotor, clean the conical part of the motor shaft to remove dirt. This unit provides lubricating grease. Apply an appropriate amount of lubricating grease evenly to the connection area between the motor shaft and the rotor shaft hole.

(2) Do not use organic solvents, as they can break down the grease inside the motor bearing. During cleaning, prevent liquids, especially organic solvents, from contacting the motor shaft and the balls inside the bearing!

5.2 Instrument Troubleshooting

5.2.1 Emergency Lid Opening

If a sudden power outage occurs while the instrument is running normally, or if the instrument door open key malfunctions, you can use the emergency door opening device. Insert the provided assembly wrench into the emergency door lock and turn it clockwise until the lid opens.

Note: If a sudden power outage occurs while the instrument is running, the instrument cannot perform braking, and the rotor will take a long time to stop. Wait for a period of time before opening the emergency door lock.

5.2.2 Instrument Error Alarm Description

Display Symbol	Abnormal Phenomenon Description	Troubleshooting Method
Error 01	Imbalance	1. Balance the sample or bucket placement, allowable imbalance ≤1.5 g. 2. Check if the imbalance protection switch leads are short-circuited and closed (should be open circuit under normal conditions). 3. Contact the manufacturer to replace parts.
Error 02	Overspeed	1. Alarm occurs when speed detected during operation exceeds the current rotor's maximum speed by 500 rpm. Usually occurs during the acceleration phase; reduce the acceleration gear.
Error 03	Lid Not Closed	1. Check if the lid signal cable is properly connected. 2. Check if the lid detection switch leads are open circuit (should be short-circuited and closed when the lid is normally closed).
Error 04	Low Voltage Fault	1. Drive board fault or mains power input voltage too low.
Error 05	Brake Overvoltage	1. Check if the brake resistor is properly connected or if the brake resistor is burnt out. 2. Reduce the deceleration gear (DEC) value.
Error 06	Overcurrent	1. Acceleration too fast under heavy load; reduce the acceleration gear (ACC) value. 2. Drive board fault or external grid power voltage too high. 3. Motor fault.

Error 07	No Speed Signal	1. Check the speed sensor cable to ensure it is properly connected. 2. Motor speed Hall sensor fault; need to replace the speed disk at the motor end.
Error 08	Communication Error	1. Check if the communication ribbon cable (10 pins grey flat cable) is properly connected. 2. Drive board fault; need to replace the drive board.
Error 09	Overvoltage	1. Ensure the external grid power supply voltage meets the machine's rated voltage.
Error 10	Door Open Fault	Confirm door is fully open, check signal status. Door open limit switch fault.
Error 11	Door Close Fault	1. Confirm door is fully closed, check signal status. 2. Door close limit switch fault.
Error 12	Rotor Identification Fault	1. Rotor not installed properly.
Error 13	Lock Position Damage	1. Detected simultaneous input of door open and door close signals; check if the lock position signal is working properly.
Error 15	Speed Cannot Reach Setting	1. Contact the manufacturer.
Error 16	Temperature Sensor Fault	1. Check if the sensor plug is properly connected. 2. Sensor open circuit; contact the manufacturer.
Error 17	Hall Signal Not Identified	1. Rotor not installed properly. 2. Magnet at the bottom of the rotor fallen off.
Error 18	Identification Error	1. Contact the manufacturer.
Error 19	Identification Magnet	1. Contact the manufacturer.
Error 20	Rotor Does Not Match This Main Unit	1. The identified rotor does not match the rotor supplied with the machine; replace with a compatible rotor.

5.2.3 Fault Phenomena, Causes, and Solutions

Fault Phenomenon	Fault Cause and Troubleshooting Method
No display on machine or machine suddenly loses display	1. Check if the power socket and cord are in good condition and if the power socket has power. 2. Check if the power switch has poor contact. 3. Check the fuse; if blown, replace with a spare fuse. 4. If it cannot be resolved, contact our company's service personnel.
Machine suddenly stops during operation	1. Exceeded the rotor's maximum rated speed. 2. Once the rotor speed exceeds the rotor's rated speed by 500 rpm or more, the overspeed alarm activates. In this case, you must wait until it stops before resetting the speed. 3. Exceeded the rotor's set speed. 4. When the motor overheats, the internal power is cut off, and the machine stops running. 5. If the keyboard panel has no display, check the machine's power supply system. 6. Possibly low voltage; check if the supply voltage meets specifications.
Lid cannot be opened	1. Rotor has not completely stopped; the lid should not open. 2. Check the door lock assembly. 3. Check the door lock electrical wiring. 4. Use the manual door opening method. 5. If it cannot be resolved, contact our company's service personnel.
Machine vibrates significantly	1. Rotor passing critical speed; some vibration is normal. 2. Check if the rotor is securely tightened. 3. Check the symmetry of the rotor load and the levelness of the machine. 4. Check if the rotor is properly installed. 5. Check the drive shaft. Rotate it by hand. If it does not rotate smoothly, there may be an issue with the drive shaft or motor. If it cannot be resolved, contact our company's service personnel.
After turning on the power switch, the operation panel does not light up	1. Power not connected; check the power supply. 2. PCB board and power socket fuse blown; have a professional replace the fuse. 3. If it cannot be resolved, contact our company's service personnel.
Abnormal display on operation panel	1. May be caused by grid interference; turn off the machine, wait one minute, and turn it on again. The display should return to normal.

Motor does not rotate after pressing start button	1. Electrical control circuit faulty; replace the electrical control board.
Machine emits burnt smell or smoke	1. Cut off the power. 2. Possible electrical component burnout; contact the manufacturer's service personnel.
Beyond the above fault contents	1. Resolve with the manufacturer's professionals.

Chapter 6 After-Sales Service

1. The warranty period for this product is 1 year. During the warranty period, if the user experiences machine failure under normal use, you can contact sales personnel, and we will provide free repair and after-sales service.
2. The following situations are not eligible for free repair, exchange, or return even within the warranty period:
   (1) Failures and damage caused by natural disasters such as fire, earthquake, flood, wind, lightning, as well as abnormal voltage, environmental pollution, or chemical substance erosion.
   (2) Failures or damage caused by improper use or maintenance not following the instructions in this manual.
   (3) Failures or damage caused by human factors such as dropping, moving, transporting, foreign object entry, or products not manufactured by this company.
3. If the instrument's purchase date exceeds the warranty period and a failure occurs, our company is responsible for repair and will charge corresponding repair fees.

TIANGEN BIOTECH (BEIJING) CO., LTD.

Beijing Office

Production Add: Building 5, No.86, Shuangying west Road, Science and Technology Park. Changping District, Beijing, China

Office Add.: South Section, Floor 3, Building 20, Yongyou industrial Park, Yard 9, Yongfeng Road, Haidian District, Beijing

Postcode:100192 Tel.: 010-59822688

Technical Support: 010-59822661/2665 Toll Free: 800-990-6057

Fax: 010-59822788 Email: people@tiangen.com

Website: www.tiangen.com

Shanghai Office

Add.: Room 1601, Building A, No.391 Guiping Road, Xuhui District, Shanghai

Postcode: 200235 Tel.: 021-38453846

Email: sh@tiangen.com