



OPERATING INSTRUCTIONS

XL5A *Bench Top
Low Speed
Centrifuge*

Hunan Cenlee Scientific Instruments Co., Ltd.

Tel: 0086-731—88803020

Fax: 0086-731—84863976

Website: www.xianglilxj.com

www.cenlee.com

E-MAIL: xiangli@xianglilxj.com

Content

| | |
|--|----|
| Part1. Synopsis | 3 |
| 1.1 Introduction of Product | 3 |
| 1.2 Technical Parameter of the Centrifuge | 3 |
| 1.3 Rotor Selection of XL5A | 4 |
| Part2. Installation | 4 |
| 2.1 Open and Check | 4 |
| 2.2 Power Supply Requirements | 4 |
| 2.3 Installation Conditions | 5 |
| 2.4 Instrument Installation..... | 5 |
| 2.5 Rotor Installation and disassembly..... | 5 |
| Part3. Attentions..... | 6 |
| Part4. Operational Procedures | 7 |
| 4.1 Control Panel..... | 7 |
| 4.2. Operation..... | 7 |
| 4.2.1 Power on..... | 8 |
| 4.2.2 Open the Lid..... | 8 |
| 4.2.3 Put Test Samples..... | 8 |
| 4.2.5 Operation Procedure..... | 8 |
| 4.2.5 Close and lock the door | 10 |
| 4.2.6 Start the running | 10 |
| 4.2.7 Stop the running | 10 |
| Part5. Maintenance..... | 11 |
| 6.1 Centrifuge Maintenance | 11 |
| 6.2 Rotor Maintenance | 12 |
| 6.3 Anti-pollution Measures | 13 |
| 6.4 Clean and Disinfection of Chamber, Rotor & Accessories | 13 |
| Part6. Trouble Shooting..... | 14 |
| Part7. Warranty Policy..... | 16 |
| Part8. QC Certificate | 17 |
| Part9. Packing List | 18 |

Part1. Synopsis

This manual is a guide for the operation and maintenance of the XL5A Bench Top Low Speed Centrifuge.

1.1 Introduction of Product

XL5A is a Microprocessor Controlled and Bench Top Low speed Centrifuge, which is widely used in the industries including radio-immunity, Biochemistry, Pharmaceutical industry etc. especially the separation and purification of the blood products. This product is driven by DC brushless motor (controlled by microprocessor) and has many protection functions. It's safe and easy to use.

The max speed of XL5A is 5000rpm, max RCF is 4390×g. The DC brushless motor with large torque assures the centrifuge runs in very stabile status. XL5A has 9 profiles (1-9) for acceleration & deceleration.

XL5A also has the following security protection functions: the Centrifugal chamber surrounded by steel which offers protection; imbalance, over-speed, door-lock, power supply. The centrifuge will be stopped automatically if the door is not completely closed or if the door is open during operation.

1.2 Technical Parameter of the Centrifuge

Max Speed: 5000 r/min

Max RCF: 4390×g

Speed Control Accuracy: ±30 rpm

Over-speed Protection: When over Setting Speed ±300rpm

Max Capacity: 800ml

Max Setting Time: 1min~99min

Noise: ≤65dB

Supply Power: AC220V 50HZ 10A

Environment Request:

Temperature: 5~40℃

Relative Humidity/RH: ≤80%

Net Weight (without the rotor): 40kg

Dimension: 590mm×460mm×405mm (L×D×H)

1.3 Rotor Selection of XL5A

| Type | No. | Capacity | Max Speed | Max RCF |
|------------------|------------------------|--------------------------|-----------|----------|
| Angle Rotor | 1 | 12 x 10ml | 5000r/min | 4020 x g |
| Swing Rotor | 2 | 4X100ml | 5000r/min | 4020x g |
| | | 8X50ml (Tube holder) | 4000r/min | 2810 x g |
| | | 4X50ml (Tube holder) | | |
| | | 32X10/15ml (Tube holder) | | |
| | | 16X10/15ml (Tube holder) | | |
| | 8X100 ml (Tube holder) | | | |
| | 3 | 48/40X5ml | 4000r/min | 2810 x g |
| Microplate Rotor | 4 | 2X2X96wells | 4000r/min | 2300 x g |

Part2. Installation

2.1 Open and Check

1. When receive the cargo, please check carefully whether the centrifuge is damaged after transport. If any, please reject the goods and written notice to the supplier. And take photos of the damaged instrument.

2. Check the package and see if all parts are in coincide with the order. If not, contact with supplier.

3. Remove the package. Dismantle the steel belt and nails off the box, and then remove the box. Take off the instrument plastic jacket. Take out the parts from the centrifuge chamber.

2.2 Power Supply Requirements

1. Power Supply Requirement is 3x2mm² line, single phase alternating current power 50Hz, voltage 220V±10%, Rated Current is 10A. Use the voltmeter test the voltage, if the voltage has more than 10% different to the rated voltage, the power is non-conforming installation requirement. If the voltage can't meet the requirement, Automatic AC voltage stabilizer is required.

2. Provide the 10A electrical plug & outlet or circuit breaker for user self. The distance between the outlet or breaker and the instrument should be no longer than 1 meter.

3. For ensure safety, the centrifuge should be connect to a long-range emergency switch (the emergency switch should be close to the exit or be set outside of the room where the centrifuge is installed).If there is any failure, we can cut down the power at a safe place.

4. Please be sure that the outlet has been connected with power line and the earth line. The three-wire to two-wire or to adaptor plug is forbidden.

2.3 Installation Conditions

1. Centrifuge should be placed in a draft location, avoid direct sunlight; interior environment is dry and clean. The floor should be smooth and stable; load bearing is no less than 100kg.

2. No vibration source near by the centrifuge.

3. The ambient temperature of working condition is between 5℃ to 40℃, Relative Humidity/RH<80%.

4. Avoid heat source around the centrifuge.

5. Space requirements: the dimension of centrifuge is 590mm×460mm×405mm(L x D x H). The total height after open door is about 880mm. Assure there is at least 20cm space around every side of the centrifuge. The interval between the back of centrifuge and the wall should be no less than 0.5 meter to ensure the air circulation.

2.4 Instrument Installation

Push the instrument to installation position, place the instrument on the solid, shock-proof, and the level of the ground, then ensure the four feet bear even stress. Check the instrument with a level gauge and make sure it is positioned levelly and steadily.

Notice: Ensure that four feet bear stress even. They are forbidden to lose steady contact with the earth.

2.5 Rotor Installation and disassembly

1. Ensure the rotor chamber is clean and dry, there is no foreign body in it.

2. Use the mull to wipe the rotor support and holes in the rotor, and smear them with a filmy lubricant. Lightly put the rotor onto the rotor support by hands, fasten the rotors by a hold-down nut. The special tool used to screw the hold-down nut must be taken out. It cannot be spin with the rotor.

3. When it is swing out rotor, check if its rotor yoke and buckets can rotate freely. When it is angle rotor, ensure to screw down the rotor lid.

4. To take out the whole rotor from the centrifuge:

When it is swing rotor, first take off the adapters and buckets, loose the hold-down nut with the special nut, use the rotor puller to screw into the rotor centre hole until the rotor gets loose, then hold the rotor yoke with both hands to take the rotor out from the chamber.

When it is angle rotor, unscrew the rotor lid by hands, screw off the hold-down nut with the special tool, use the rotor puller to screw into the rotor centre hole until the rotor gets loose, and then hold the rotor body with both hands to take the rotor out from the chamber.

Notice: The rotor should be taken out vertically upwards. It is forbidden to drag the rotor yoke in case of damaging the rotor support.

Part3. Attentions

1. Inspect the rotor and tubes and see if there are any cracks & flaws and corrosion prior to use. Do not use it if any part damaged.

2. Before running the centrifuge, remove the foreign body from the centrifugal chamber, install the rotor; if it's a swing out rotor, ensure that the buckets on the rotor are hung on stably and they are nimble.

3. It's forbidden to run the rotor over the rated speed.

4. Ensure the tubes and sample liquid are symmetrically placed in the rotor and assure the bucket loads are well balanced.

5. Do not remove the centrifuge or open its door when it is running. Do not touch the running rotor.

6. Do not touch the converter or do not change the setting value of the converter.

7. It's forbidden to run the centrifuge without a rotor.

8. Check the power supply and make sure it is grounded and meets the requirement.

9. Do not use any rotor from other centrifuges; that may cause the damage of the instrument and people's lives.

10. If the centrifuge or rotor has been discontinued the use for three month, it must run at the low speed for 10min first, then can run at its max speed.

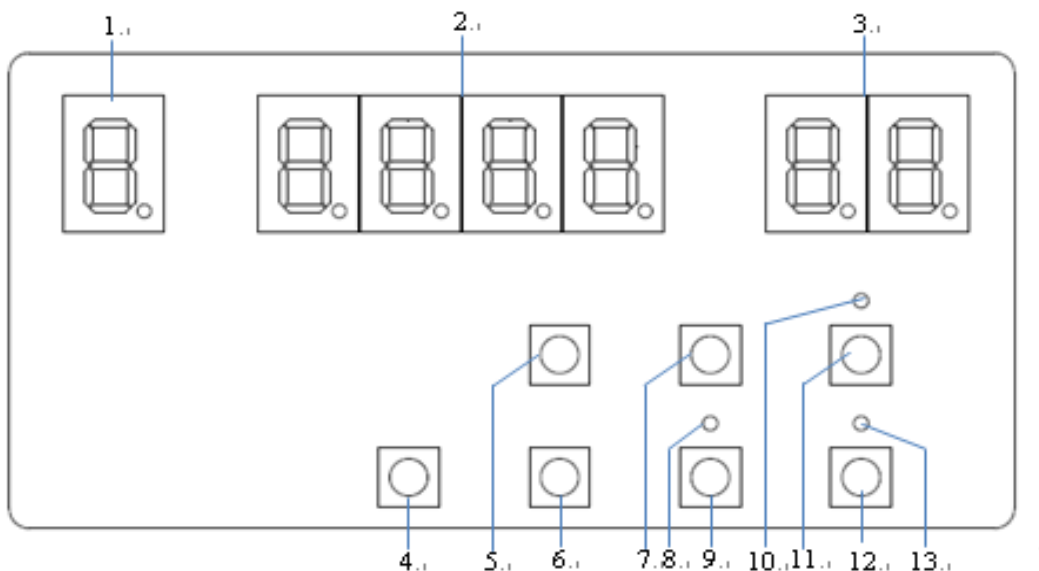
11. Do not put any liquid storage tank on the machine. Avoid any liquid filter into the centrifuge and corrode the motor and other parts.

12. Do not separate the flammable and explosive liquids (like the chloroform and alcohol). And keep it away from the centrifuge at least 30cm.

Part4. Operational Procedures

4.1 Control Panel

The control panel of XL5A is easy to operate.



- (1) Display Rotor No.
- (2) Display Speed or RCF
- (3) Display Time
- (4) Set Key
- (5) + key
- (6) - Key
- (7) Confirm Key
- (8) RCF display indication lamp
- (9) Speed and RCF Converse Key
- (10) Running indicating lamp
- (11) Start Key
- (12) Stop or Open Key
- (13) Stop indicating lamp

4.2. Operation

Attention: Before use the instrument, please ensure that the instrument is rightly installed (please see the detailed information Part 2.) and read this user manual carefully at first.

4.2.1 Power on

Right connects the power supply; press the main switch, the display of Instrument Status and Setting Value displays normally, that means the XL5A is on.

Attention: If some display not lighting, please records it and get contact with supplier.

During the process of starting-up, the microprocessor of centrifuge will do auto diagnosis. If there is any fault, the display will show the corresponding fault code.

4.2.2 Open the Lid

Press the stop/open key 【control panel key(12), then the door is unlocked. The door can be lifted on to open.

4.2.3 Put Test Samples

1. Rotor should be running in the regulated speed range. Do not run the rotors over speed and over weight. (Please see the detailed technical parameter of rotor.)

2. Open the centrifuge door; ensure no foreign body in the chamber.

3. Before using a swing rotor, ensure the bucket is cleaned, hang the right bucket into the right rotor, make sure it is according to the number which marked in the rotor and bucket. Ensure the bucket is nimble.

Put the equivalent test sample into centrifugal tubes symmetrically. The tolerance of the test sample weight should be less than 2g. To put into centrifugal tubes or solution unsymmetrical is forbidden. Wrongly using centrifugal tubes will cause huge vibration, and it might cause damage to the instrument or endanger personnel safety.

4.2.5 Operation Procedure

1. Enter into Accel Step and Decel Step:

Hold the + key【control panel key(5)】until the speed display【control panel key(2)】shows A01, which means you can input the Accel. Step. Press the + Key【control panel key(5)】 or — key【control panel key(6)】to adjust the parameter required. When the display comes to the desired value, check the value and press the confirm key【control panel key(7)】to enter and save the parameter.

Notes: This value is possible to be setted only when speed and time parameters donot get into entering status.

It can be modified when the centrifuge is running. It doesnt save the value modified

during running.

2. Enter into Decel Step:

Hold the - key【control panel key(6)】until the speed display【control panel key(2)】shows D01, which means you can input the Decel. Step. Press the + Key【control panel key(5)】 or - key【control panel key(6)】 to adjust the parameter required. When the display comes to the desired value, check the value and press the confirm key【control panel key(7)】 to enter and save the parameter.

Notes: This value is possible to be setted only when speed and time parameters donot get into entering status.

It can be modified when the centrifuge is running. It doesnt save the value modified during running.

3. Enter into the rotor No.:

Press the Set key【control panel key(4)】 when the speed comes to 0 to set the rotor's corresponding number.

When the rotor No. display【control panel key(1)】 flashes , press the + Key【control panel key(5)】 or - key【control panel key(6)】 with 1 increment to adjust the parameter required.

If the the + Key【control panel key(5)】 or - key【control panel key(6)】 is kept pressed, the value changes with increasing speed.

When the display comes to the desired value, check the value and press the confirm key【control panel key(7)】 to enter and save the parameter.

Notes: This value can be setted only when the speed have come to 0. It cannot be modified when the centrifuge is running.

Pls refer to the table of Selection Rotors of XL5A at Part 1 when entering rotor No.

4. Enter into Speed or RCF value.:

Press the Set key【control panel key(4)】until the speed display【control panel key(2)】 flashes. Press Speed/RCF toggle key【control panel key(9)】 to show speed or RCF.

Press the + Key【control panel key(5)】 or - key【control panel key(6)】 to input the speed value with 50 increment to adjust the parameter required. When by RCF, it is input with 10 increment.

If the the + Key【control panel key(5)】 or - key【control panel key(6)】 is kept pressed, the value changes with increasing speed.

When the display comes to the desired value, check the value and press the confirm key【control panel key(7)】 to enter and save the parameter.

Notes: It can be modified when the centrifuge is running. It doesnt save the value modified

during running.

Do not exceed the rotor's maximum speed or RCF to run the rotor. For rotor's max speed and RCF, pls refer to the table of Selection Rotors of XL5A at Part 1 when entering rotor No.

5. Enter into the running time.:

Press the Set key【control panel key(4)】until the Time display【control panel key(3)】 flashes. When the Time display 【control panel key(3)】 flashes , press the + Key 【control panel key(5)】 or – key 【control panel key(6)】 with 1 increment to adjust the parameter required.

If the the + Key 【control panel key(5)】 or – key 【control panel key(6)】 is kept pressed, the value changes with increasing speed.

When the display comes to the desired value, check the value and press the confirm key 【control panel key(7)】 to enter and save the parameter.

Notes: It can be modified when the centrifuge is running. It doesnot save the value modified during running.

4.2.5 Close and lock the door

Place the lid and lightly press down the front edge of the lid.

4.2.6 Start the running

Check the parameters you entered into, and then press the start key 【control panel key(11)】 , then the centrifuge starts to run and the running indication lamp 【control panel key(10)】 lights up.

Notes: Do not modify the rotor number when the instrument is in working state; the time, speed/RCF and acceleration and deceleration levels can be modified.

4.2.7 Stop the running

When the time goes to 0 or press 'Stop Key' 【control panel key(12)】, there will be a buzzer alarm and the 'Stop indicating lamp' 【control panel key(13)】 lights up, speed & RCF goes down, when down to 0r/min, the instrument stops, and the buzzer alarm will last for 30 seconds 【press any key to stop the buzzer】 . Then user can open the door and take out the sample.

Notes: Do not open the door when the 'Speed' display does not show the '0'.
The reacting time to open the door is about 10 seconds.

After centrifugation be finished, please turn off the power switch and pull out the power plug.

Part5. Maintenance

For the centrifuge long-term, safe and effective work, and keep it in a good state, please do regular maintenance and examination. If there is any question & problem, please get contact with supplier.

| No. | Maintenance Items | Maintenance Times |
|-----|---|---|
| 1 | Clean | Once a week |
| 2 | Clean the chamber | After each usage or if there is any sample spillage |
| 3 | Clean drive spindle and smear antirust grease | After the rotor has been taken out from the chamber |
| 4 | Clean the outside of instrument | If any need or the if any sample spillage |
| 5 | Check the pneumatic spring | Once a month |
| 6 | Check the control of speed, time and | Once a half of year or if there is any potential find problem |
| 7 | Do complete inspection and calibration | Once a year by professional engineer |

6.1 Centrifuge Maintenance

a) The centrifuge should be connecting with stabilizing AC circuit. If the voltage is instability, please equip with AC voltage stabilizer for protect centrifuge. The instrument should be installed on the steady and level ground, and should be kept in good ventilation.

Notice: The interval time between power-on and power-off is not shorter than 5 minutes.

b) Keep clean of the cover of centrifuge, wipe it with a dry soft cloth and use a mild detergent.

c) The chamber should be kept clean and dry. If have any thing in the chamber, please take it out. Wipe it with dry/wet soft cloth and mild detergent, then flushing it with water and wipe it on dry cloth. Please do not use the disinfecting & corrosion detergent. If there is radioactive pollution in the centrifuge, please use the mixture which has 70% alcohols & 10% SDS & Water to disinfect, and then use the alcohol & deionized water to clean.

d) After the centrifuge is used every time, open the door, clean in the chamber and let it become dry naturally. When install or discharge vertically the rotor, pay attention not to bump on the drive spindle and the rotor.

e) There is a rubber sealing ring between chamber and door. There is a rubber sealing ring between drive spindle and chamber. Please check whether the rubber sealing ring is distortion frequently. If any distortion, please replace it.

f) Please use the vacuum cleaner to clear the dust which around the air window by fixed-term.

g) If no use of the centrifuge in a long time, please take the rotor out, and smear antirust grease to avoid the balance function to be destroyed. The rusting rotor support won't match the rotor very well and this may affect the balance function. If needed, please put the desiccating agent into the chamber for moisture absorption, and protect the drive support not rusting.

h) Please check whether the pneumatic spring works normally by fixed-term. If have any crack, please replace it.

i) If separate the noxiousness, radioactive, polluting sample, please take specially safeguard.

j) The user please pays attention to: the rotor should be fixed in the right place, tighten the fastening-screw, check whether the rotor and other accessories are crack or corrosion, and check grounding. .

k) Function Check.

Users should make sure the main parts of centrifuge are in good order, as follows:

Motor is hang stability;

Rotor support is fixed into right place;

Rotor and accessories are not corroded;

Tighten the screws;

Grounding wire is connected in right way.

6.2 Rotor Maintenance

a) After every day's work, please wipe away the residual liquor or water. If it won't be used for a long time, please deposit the rotor and tubes in dry and clean place. And protect the rotor with wax.

b) Please use the good quality tube and bottle, and keep it clean and sterile. Check the rotor and tubes. If there are any corrosion, exfoliation, scratches, deformation and crack, please do not use it.

c) If use the centrifuge in the environment which is wet or has deleterious gas, that will corrode the centrifuge and rotor, and reduction of service life.

d) After working, please take the rotor out, and clean & smear protective agent. Do not keep the rotor in the driving spindle. There might be liquid leak if the rotor runs broken, over brimmed or unsealed tubes. The rotor should be taken out of the chamber and be washed covered by protective agent on time after the separation. In order to avoid the potential danger and corruption, the user should pay attention to the test sample quantity and assure the tubes are completely sealed. Check the ring rubber seal frequently and change it immediately if there is any aging, crack to avoid the possible liquid leak.

e) If the corrosion solvent contact directly with the rotor, please clean the rotor on time, and smear protective agent.

f) Don't bump, bruises scratch the rotor during using and storing it.

g) If the average density (ρ) of sample liquid is bigger than 1.2g/ml, please select a lower speed, and according to this formula to calculate the rpm:

$$N = N_{\max} \times \sqrt{1.2/\rho}$$

h) If use the stainless steel tube, please select a lower speed, and according to this formula to calculate the rpm:

$$N = N_{\max} \times (1 - 25\%)$$

Notice: The service life of rotor is four years. If the rotor service life expires, please get contact with manufacturer.

Warning: This rotor is glass-hard aluminum rotor; strictly do not run the rotor over the speed which regulated. Owner take a risk if use the rotor over speed. Do not use the rotor which has crack and corrosion.

6.3 Anti-pollution Measures

If separate the radioactive or pathological sample, please deal with as follows:

Clear the centrifuge and rotor as above mentioned.

- ◆ Take all rotor out.
- ◆ Take out the rubber sealing ring and gasket of the motor and clear them.
- ◆ Clean the door, chamber and spindle of centrifuge.
- ◆ Clean away all of foreign matter which around motor and rotor support.
- ◆ Clean the rotor.

6.4 Clean and Disinfection of Chamber, Rotor & Accessories

All regular disinfectants can be used. Because the parts of centrifuge made from different materials, please consider the compatibility of disinfectant.

The service life of accessories is relation to the times of disinfection and use. If the color of accessories changes, that means this accessory need to be replaced.

The parameter of disinfection:

| Accessories | Max Temperature (°C) | Time (min) | Max Times |
|-------------|----------------------|------------|-----------|
| Glass Tube | 134-138 | 3-5 | - |
| PC Tube | 115-118 | 30-40 | 20 |
| PP Tube | 115-118 | 30-40 | 30 |

| | | | |
|------------------------------|---------|-------|---|
| Aluminum rotor & Buckets | 126-129 | 10-15 | - |
| Rubber Sleeve/ Rubber Gasket | 115-118 | 30-40 | - |

Part6. Trouble Shooting

During the instrument maintenance, from the very beginning when any cover is opened, the centrifuge parts will be exposed and it may bring a risk of electric shock or a personal injury. Make sure the power switch has been cut off and make sure the centrifuge has been cut off from the main power supply. And such maintenance only can be completed by qualified person.

The time display 【control panel key(3)】 will show error codes and the centrifuge will stop its running:

| Fault Codes | Meaning | Trouble shooting |
|-------------|--|--|
| E1 | Imbalance Error | Check if the motor's vibration is loose |
| E2 | Overspeed | |
| E3 | The door donot be locked | Check the door and close it |
| E4 | The door gets open during running | Close the door |
| E7 | 0 Speed error | Check if the motor connection is loose |
| E8 | Communication faultt | Check if the communication lines get loose |
| E9 | IPM fault | Power off the unit and switch it on after a while |
| EA | Over current | Check if the moter is blocked |
| Eb | Over voltage | Check is the brake resistance is broken |
| EC | Under voltage | Supplied with a voltage regulator or operate the unit when the voltage become normal |
| Ed | Start is pressed before the value is confirmed | Confirm the value and then start again |
| | | |

Common faults and trouble shooting of XL5A

| Common faults | Reason | | Trouble shooting |
|--|---|-----|--|
| Connect with power but display is not light | Check the power supply | Yes | Check the power of control unit and transformer |
| | | No | No 220V power, check the circuit breaker (main power switch) |
| There is display on the LED, but not running after press the start key and no speed display. | rotate the rotor by hand in the stop state | Yes | Check the signal Input/Output, and tighten it. |
| | | No | Replace the Speed detection, Hall sensor |
| | The operation indicating lamp is not light | | Keyboard broken, please replace/change it |
| | Check whether the speed signal input end is loose | | Tighten again |
| Running but speed can not up, and the instrument has strange noise or peculiar smell | Rotate the rotor by hand, has noise | | Motor faults, Maintained by supplier |
| | Control system or motor faults | | Maintained by supplier |
| Actual Speed different with Setting Speed, Out of control or unstable speed | Control system faults | | Maintained by supplier |
| strong vibration | Samples are not symmetrically placed | | Check and adjust the samples |
| | Tube broken | | Check and replace |
| | Rotor loose | | Check and adjust the rotor |
| | Vibration Damper broken | | Check and replace |

Part7. Warranty Policy

We offer the one-year quality guarantee for XL5A, and forever maintenance. If the product is damaged not because of improper operation or not any contravention of the user manual in one year from the date of purchase, the supplier will offer free maintenance. If damage or loss is due to human errors, or over one year, we will charge the basic maintenance cost.

The warranty period of rotor is 4 year, no responsibility for it if there is any damaged caused by the following situations:

The rotor over rated speed to running;

The rotor has scratches, bumps;

The rotor is severe corrosion;

Without permission, non-authorized person can't open the instrument.

All the maintenance and adjustment should be taken according to the user manual by authorized and professional engineer.

No responsibility for any maintenances and adjustment by non-authorized person.

Please refer to the following contact information of the manufacturer:

Hunan Cenlee Scientific Instruments Co., Ltd

Web: www.xianglilxj.com www.cenlee.com

Add: Room 609, No.497 Wuyi Road, Furong District, Changsha 410015, Hunan, China

Tel: 0086-731-88803020

Fax: 0086-731-84863976

Skype: lisaguo851

Email: cenlee@cenlee.com or xiangli@xianglilxj.com

Part8. QC Certificate

QC Certificate

XL5A Bench Top Low Speed Centrifuge

Max Speed: 5000r/min

Max RCF: 4390xg

Product No.: _____

The product is qualified after the examination, permits selling.

QA Technician:

Hunan Cenlee Scientific Instruments Co., Ltd.

Date:

Part9. Packing List

Packing list

| No | Description | Quantity |
|----|-------------------------------------|----------|
| 1 | XL5A Bench Top Low Speed Centrifuge | |
| 2 | Rotor | |
| 3 | Adapter | |
| 4 | Special Tools | |
| 5 | Power Wire | |
| 6 | Operating instruction | |

Packing checker:

Hunan Cenlee Scientific Instruments Co., Ltd.

Date: