Desktop High-speed Refrigerated Centrifuge

The Use and Maintenance Manual

Thanks to use MRC LTD centrifuge products

Please read this manual before the installation, using and maintenance in order to achieve the best performance and security.

Hagavish 3 st. Israel 58817 Tel: 972 3 5595252, Fax: 972 3 5594529 mrc@mrclab.com
1. CAUTIONS
   1.1 Installation and maintenance ........................................... 3
   1.2 Electric protection ....................................................... 3
   1.3 Fire protection ........................................................... 3
   1.4 Operation security ....................................................... 3
   1.5 Chemical and biological security ...................................... 4

2. Codes and meanings .......................................................... 4

3. Product instruction .......................................................... 4

4. Main technical parameters
   4.1 Host performance parameters .......................................... 5
   4.2 Rotor parameters ......................................................... 6

5. Installation and commissioning
   5.1 Remove package ............................................................ 6
   5.2 Installation requirements .............................................. 6
   5.3 Commissioning requirements ......................................... 7
   5.4 The instrument panel key explanation ............................... 7

6. Use and operation
   6.1 Start .............................................................................. 7
   6.2 Stop ............................................................................. 8
   6.3 Open the door cover ...................................................... 8
   6.4 Lift settings ................................................................. 8
   6.5 Program save and call .................................................... 8
   6.6 Common fault code and ruled out ................................... 9

7. Repair and maintenance ....................................................... 9

8. Transportation and storage ................................................... 10
1. Cautions

Security and Cautions based on the description of the safe operation of centrifuge requirements. Please read it carefully before the installation, operation, maintenance and repairs. Understand the security and the matters needing attention and the right operation. This will help you avoid the operating personnel injuries and the use of centrifuge damage performance.

1.1 Installation and maintenance

- The machine centrifugal indoor may have placed the rotor accessories packaging. It must be sure to open the door cover and take it out.
- During maintenance process, anywhere need to remove the cover may lead to electric shock and human injury. Be sure to shut down all the power supply button before the machine maintenance, and the power cord plug from the socket has been plucked; Maintenance work need by professional personnel.
- Replace its component must be has been proved to meet the requirements of the centrifuge.

1.2 Electric protection

- To avoid the electric shock, The centrifuge using the three core type plug, must have the ground with three core socket connection.
- Make sure the Wall socket and ground wire Is connected, Power supply voltage must be determined with this centrifuge corresponds with the use of voltage.
- DO NOT use three holes become two hole expansion power adapter.
- DO NOT use two line of the expansion socket or Use no ground the multi-purpose power adapter.
- DO NOT put the filled with liquid containers on the machine or Close to the local machine, the liquid will go inside the machine and damage electrical or mechanical components if carelessly overturned container.

1.3 Fire protection

- Please use the same type specification overload insurance fuse. This machine use the type specification for the fuse is BGXP ￠5×20 250V 10A.
- The centrifuge is not for separation has characteristics of inflammable and explosive material design. DO NOT do operation on this kind of material, Neither dressed up these substances in machines or will such material in all the surrounding distance 30cm range..

1.4 Oeration security

- Please use our company for the design of this centrifuge rotor and accessories.
- Please make sure the centrifugal indoor has to clean up, without sundry before starting it.
- Please make sure the centrifugal rotor of indoor the screw has tightened before starting it.
- Please don't make it to the rotor speed more than the maximum speed limit during the working.
- Please don't force centrifuge slow or stop the rotor with your hand.
- When the centrifuge not stop rotating rotor, please don't lift and move it.
- Please don't open the door cover during the operation.
- During the operation it must remain other objects 30cm away. Please don't work in that range.
except in the commissioning. DO NOT reach anything into the centrifuge when it work.

- Strictly no turned idling! Otherwise easy cause spring chuck cracking.

1.5 Chemical and biological security
- The conventional operation may include all kinds of solution and test samples. They can be the pathogenic, poisonous or radioactive substances. Such material is not can use this centrifuge operating. Unless has taken necessary protective measures.
- Please pay attention to the instruction of the liquid in the original containers before the operation.
- Holding the liquid must be careful Because they are contagious.
- During the operation it must be strictly obey the the provisions and way of the laboratory.
- The destruction of all waste solution must comply with the safety and environment protection requirements.

When you ask our service man to come to you must to clean your centrifuge very carefully------it’s your duty.

2. Codes and Meanings

Chart 1

<table>
<thead>
<tr>
<th>No.</th>
<th>CODE</th>
<th>GB No.</th>
<th>MEANING</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>~</td>
<td>4706.1</td>
<td>AC</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>5465.2</td>
<td>CONNECT(TOTAL POWER)</td>
</tr>
<tr>
<td>3</td>
<td>O</td>
<td>5465.2</td>
<td>BROKE(TOTAL POWER)</td>
</tr>
<tr>
<td>4</td>
<td>☮</td>
<td>4728.2</td>
<td>GROUNDED</td>
</tr>
<tr>
<td>5</td>
<td>⚠</td>
<td>4793</td>
<td>CAUTION!</td>
</tr>
</tbody>
</table>

3. Product instruction

3.1 Product use and application scope
Tabletop high speed refrigerated centrifuge (hereinafter referred to as the machine), is widely used in biological, physical, and biological medicine and health, agriculture science and environmental protection scientific research units and production department, is the ideal
instruments and equipment in the colleges and universities, research institutes, blood center, biological pharmaceutical enterprise.

3.2 Product features

The machine adopts computer control, touch panel, digital display, electronic locks, brushless dc motor drive and other advanced technology, speed PMW control method, 12 programs can be stored, 19 levels and deceleration can be adjusted. Its features:

(1) Due to the unique of shock absorber, the anti-vibration effect is good.
(2) The speed control adopt PID way, high precision, can choose different raising and lowering speed time, Brushless dc motor make sure the machine working peacefully, to meet the requirements of the laboratory, it's no need to change carbon brush and no dust pollution.
(3) Automatic calculation RCF value; Have the point start function (short-term centrifugal);
(4) Electronic locks security protection function; When the door does not cover well, the centrifuge can't work.

3.3 Product name and the classification

desktop high speed refrigerated centrifuge, the highest speed 16500 r/min.

• According to the classification of medical devices catalogue belongs to medical laboratory equipment management category 1st kind of instruments.
• According to shock protection with the protection measures of grounding belongs to class 1 common equipment.
• According to the structure belongs to desktop refrigerated centrifuge.
• According to rotating speed, belongs to high-speed centrifuge.

3.4 Working principle

Using the centrifuge spins the powerful rotor produce centrifugal force, Accelerate the settlement of particles in the liquid, make the samples of different subsidence coefficient and different density of the substance separate, concrete and pure.

4. Main technical parameters

4.1 Host performance parameters.

- The highest speed: 16500 r/min
- The biggest centrifugal force: 19070 x g
- The most quantity: 4 x 100 ml (10000rpm)
- Speed control precision: ±10 r/min
- Temperature range: -20°C ~ 40°C
- Temperature precision: ±1
- Time control scope: 1 min ~ 99 min/point move
- Power: AC220V frequency 50 Hz 15 A
- Noise: <60 dB(A)
- Overall size: 420 mm * 625 mm * 360 mm
- Weight: 55 Kg (not include the rotor)
4.2 Rotor parameters

Chart 1:

<table>
<thead>
<tr>
<th>Rotor</th>
<th>Highest speed (r/min)</th>
<th>Most quantity (ml)</th>
<th>Biggest centrifugal force (xg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rotor 1</td>
<td>12X1.5ml/2.2ml</td>
<td>16500rpm</td>
<td>19000Xg</td>
</tr>
<tr>
<td>Rotor 2</td>
<td>12X5ml</td>
<td>15000rpm</td>
<td>18270Xg</td>
</tr>
<tr>
<td>Rotor 3</td>
<td>24X1.5ml/2.2ml</td>
<td>14000rpm</td>
<td>18880Xg</td>
</tr>
<tr>
<td>Rotor 4</td>
<td>12X10ml</td>
<td>13000rpm</td>
<td>15620Xg</td>
</tr>
<tr>
<td>Rotor 5</td>
<td>6X50ml</td>
<td>12000rpm</td>
<td>15970Xg</td>
</tr>
<tr>
<td>Rotor 6-1</td>
<td>4X100ml</td>
<td>10000rpm</td>
<td>10640Xg</td>
</tr>
<tr>
<td>Rotor 6-2</td>
<td>8X50ml</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rotor 7</td>
<td>6X10ml</td>
<td>16000rpm</td>
<td>19070Xg</td>
</tr>
<tr>
<td>Rotor 8</td>
<td>6X15ml</td>
<td>12000rpm</td>
<td>14520Xg</td>
</tr>
<tr>
<td>Rotor 9</td>
<td>4X0.2ml PCR8 tubes</td>
<td>13000rpm</td>
<td>17000Xg</td>
</tr>
<tr>
<td>Rotor 10</td>
<td>6X100ml</td>
<td>8000rpm</td>
<td>7600Xg</td>
</tr>
<tr>
<td>Rotor 11</td>
<td>2X2X48 holes microplate</td>
<td>4000rpm</td>
<td>1500Xg</td>
</tr>
</tbody>
</table>

5. Installation and commissioning

5.1 Remove package (done by users)
You should inspect the appearance when you got the machine. There should not be a severe impact. If anything like that happened you should let us know as soon as possible.
First dismantled the package on the cover, take out the rotor and accessories, then the host. Finally packing boxes and packing should be deal with properly so as not to cause environmental pollution.

5.2 Installation requirements (done by users)

(1) Environment requirements
This machine should be installed in the interior, installed on the rigid, solid mesa. Without conductive dust in the air, no corrosive or destroy the insulation of the gas, and no strong vibration sources nearby, avoid direct sunlight.

(2) Space requirements
This machine should be installed on the back of the distance from wall not less than 30 cm, in order to ensure requirements of the air cooling, the temperature should not be more than 35 °C to ensure the best performance.

(3) Power supply requirements
This machine used power of single-phase ~ 220 V, frequency 50 Hz, 15 A. Power supply must have independent ground connection. It is strictly prohibited to use zero line instead of ground connection. If you have questions, please contact your dealer or local power supply bureau.

As security measures, this centrifuge is equipped with three core single-phase plug, ensure good ground connection. If you can't plugged into the plug sockets, please contact electrician change your original power socket and not let single phase three core security role plug failure. Please ensure that centrifuge ground connection is good.

(4) Installation requirements
When the machine on the point, this bottom four rubber of machine should be uniform feet force, or to increase the cushion block (done by users) to readjust to requirements.

5.3 Commissioning requirements.

WARNING: DO NOT start the machine when it is not clean up inside, or you will damage it!

• According to the provisions of article 6 operating instructions, first of all, choose low speed running, and gradually increased to the highest speed operation. If there is no exception, the commissioning is successful.

5.4 The instrument panel key explanation

According to relevant function keys, press ▲ key or ▼ key can adjust the parameters. Please save it after set it. This centrifuge with LCD and digital dual display. LCD display show set point. Digital display show current parameters in order to observe easily.

6. Use and operation

6.1 Start
Click "run" button, the green indicator, machines start to run, to set the speed, began to count down. (please check the liquid tube keep symmetrical balance before running, the difference can not more than 1g)

6.2 Stop

During the machine running process, when the time comes back to decrease, centrifugal machine will slow down according to parameters. As the rotor completely stop working, you can open the door cover when heard the alarm. If you want to stop the running machine, press the "stop open the door" button, the machine will stop according to the above procedures.

When the machine is in error, you can clear it by click the "stop-open the door" key.

6.3 Open the door cover.

Click the "stop-open the door" button, push the door cover upward to open it. The machine has a wire at frontbelow, you can use it to open it when there is a problem about power supply or lock-broken. At ordinary times is not to be used to open the door.

6.4 Acceleration/Deceleration Setting settings

Press the "accel/slow down" button. Speed column will show A 1 words flashing, right now for acc set condition. According to ▲ or ▼ key to adjust the back of the Numbers, 1 is the fastest, the lowest for 19, there are 19 grade in all. Press the confirm key to save. Press the "accel/slow down" button. Speed column will show D1 words flashing, right now for slow set condition. According to ▲ or ▼ key to adjust the back of the Numbers, 1 is the fastest, the lowest for 19, there are 19 grade in all.

6.5 Program store and Debug

In order to convenience of the user, this machine can store 12 centrifugal program.

▲ DO NOT use rotors overspeed. The user should be responsible for the loss, which is caused by overspeeding. (The solution in the tube should be 75% of the tube nominal capacity.)

The users should be discharge the rotor when they need to replace it, loose the lock nut with hexagonal wrenches, then get out of the rotor, check attach photo. To avoid overspeeding, Relative rotor number should be set again when the rotor need to be replaced everytime. Reset the speed again.

▲ DO NOT lift up or move the centrifuge when it is working.

▲ DO NOT open the lid when the rotor is rotating.
### 6.6 Common fault code and ruled out

**Chart 3**

<table>
<thead>
<tr>
<th>normal fault code</th>
<th>probable causes</th>
<th>solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>E.2.</td>
<td>The centrifuge lid isn’t closed when pressing the start key.</td>
<td>Close the lid tight.</td>
</tr>
<tr>
<td></td>
<td>The installation of the lid testing micro switch doesn’t reach the designated position or has been damaged.</td>
<td>Check and change another one</td>
</tr>
<tr>
<td>E.1</td>
<td>The motor operates without speed. Speed signal is not reliable. Or the speed sensor is damaged.</td>
<td>Check and change another one</td>
</tr>
<tr>
<td></td>
<td>The motor doesn’t work. The motor and rotor are locked.</td>
<td>Change motor</td>
</tr>
<tr>
<td></td>
<td>Wires loosen or the powerful electroplax is damaged.</td>
<td>Check and change another one</td>
</tr>
<tr>
<td>E.3</td>
<td>The temperature is too high.</td>
<td>Make sure the temp &lt;40°C</td>
</tr>
<tr>
<td>E.4.</td>
<td>Overspeed protection: The rotor number is wrong or the powerful electroplax is not under protection.</td>
<td>Check and change another one</td>
</tr>
<tr>
<td>E.5</td>
<td>communication malfunction</td>
<td>Contact company</td>
</tr>
</tbody>
</table>

exclude the above several faults, the machine still can not work normally, please contact with our company or service station.

### 7. Repair and maintenance

7.1 Take the rotor out from centrifugal chamber, clean it with neutral cleaning mixtrue, dry it with a clean cloth, prevent chemical corrosion, put it in a dry and ventilated place, Do not use non-neutral detergent to clean rotor. The center hole of rotor should have a little grease for protection.

7.2 The rotor installed and take out should be lightly, take out the rotor vertical, to avoid the rotor drop and damage the drive shaft of the rotor.
7.3 You should clean chamber if you do not use the centrifuge for a long time, drying and taking out the rotor to grease on the drive shaft of the rotor for protection.

7.4 Fuse replacement

(1) Turn off the power, disconnect the plug between the wire and external power supply, then the plug between the wire and centrifuge.

(2) There is a fuse holder below the power socket on the back side of the centrifuge (chart 4), with a fuse symbolic identification. Find the V-groove of the fuse holder (chart 5); use a straight screwdriver to insert this groove, and pull out the fuse holder.

(3) Take out the damaged fuse protector and discard it. Take out the standby fuse protector from the holder and install it. The fuse protector specification of this centrifuge is BGXP BGXP 5x500, 250V, 10A.

(4) Insert the fuse holder into the power socket.
8. Transportation and storage

8.1 Transportation

- Long distance transportation, it must use wooden or paper packing boxes and the centrifuge should be covered with dust mask, and fill up with damping materials all around the machine, it is strictly prohibited of collision, rolling and dipping in the rain or snow in the process of the transportation.
- Movement indoor can do directly, but also should avoid big shock, collision, convert.

8.2 Storage

- The centrifuge don't use for a long time, should open the door cover, stored in ventilation, dry, clean room and the site should without corrosive substances and inflammable and explosive material.
- Due to the technology constantly updated, if there is something different with the manual, please contact our company.

Warranty regulations

All the products of our company, the buyers get two year warranty from the day they bought. We will take all cost because of quality defects during the guarantee period. Out of the warranty period, the users will charge the cost by themselves.

Any of the following conditions is not free maintenance range

- Failures which caused by incorrect installation, operation or maintenance
- Failures which caused by trying to dismantle, change the relevant components parameters
- Failures which caused by using rotors and accessories not designed for this centrifuge
- Failures which caused by force majeure, such as war, natural disaster, etc.

In order to make people understand our product, and provide better service for customers, please pay attention:

Please keep the warranty card and maintenance record.
Benchtop high speed refrigerated centrifuge

Certificate of compliance

Product Name: Benchtop high speed refrigerated centrifuge

Factory Number:

This product is permitted to leave the factory after inspection.

Inspector: 

Date: 

12
# Product warranty card
(maintained by this card within the warranty period.)

<table>
<thead>
<tr>
<th>Product Name</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>Product number</td>
</tr>
<tr>
<td>Date of production</td>
<td>Purchase date</td>
</tr>
</tbody>
</table>

Name of user and Department (stamped)

<table>
<thead>
<tr>
<th>Address:</th>
<th>Contact:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Tel:</th>
<th>Fax:</th>
<th>E-mail:</th>
</tr>
</thead>
</table>

Comments and Suggestions to our products:
