



Hunan Labwe Scientific Instruments co.ltd

Operation & Service Manual

For

BW12R

**Floor standing High-Capacity Refrigerated
Centrifuge**

This manual is a guide to the use and maintenance of the

BW12R

Floor Standing High-Capacity Refrigerated Centrifuge

Information herein has been verified and is believed adequate for the intended use of the centrifuge. Because failure to follow the recommendations set forth in this manual could produce personal injury or property damage, always follow the recommendations set forth herein. Our company could not guarantee results and assumes no obligation for the performance of centrifuges or other products that are not used in accordance with the instructions provided. This publication is not a license to operate under, nor a recommendation to infringe upon, any process patents.


Publications prior to the Issue Date of this manual may not contain data in apparent conflict with that provided herein. Please consider all data in this manual to be the most current.

WARNING, ***CAUTION***, and ***NOTE*** within the text of this manual are used to emphasize important and critical instructions.

WARNING informs the operator of a hazard or is unsafe practice that could result in personal injury, affect the operator's health or contaminate the environment.

CAUTION informs the operator of an unsafe practice that could result in damage of equipment.

NOTE highlights essential information.

WARNING and ***CAUTION*** are accompanied by a hazard symbol  and appear in the left sidebar near the information they correspond to.

Important Safety Information

Certain potentially dangerous conditions are inherent to the use of all centrifuges. To ensure safe operation of this centrifuge, anyone using it should be aware of all safe practices and take all precautions described below and throughout this manual.



WARNING

When using radioactive, toxic, or pathogenic materials, be aware of all characteristics of the materials and the hazards associated with them in the event leakage occurs during centrifugation. If leakage does occur, neither the centrifuge nor the rotor can protect you from particles dispersed in the air. To protect yourself, we recommend additional precautions be taken to prevent exposure to these materials, e. g., use of controlled ventilation or isolation areas.

Always be aware of the possibility of contamination when using radioactive, toxic, or pathogenic materials, Take all necessary precautions and use appropriate decontamination procedures if exposure occurs.

In the future, if biocontainment products are added, the use of sealed rotors, buckets, and /or sample containers will offer increased protection from contamination during routine operation, However, these items will not guarantee protection from accidents resulting from damage to the rotor or buckets. Do not run hazardous materials in the centrifuge unless placed in a biohazard enclosed and operated using all appropriate safety precautions.

Never use any materials capable of producing flammable or explosive vapors, or creating extreme exothermic reactions. Use of another manufacture's rotor can cause rotor failure which could result in personal injury or centrifuge damage.

Never exceed the maximum rated speed of the installed rotor; to do so can cause rotor failure.

Always reduce (derate) rotor speed as instructed in this manual whenever.

- the rotor speed/temperature combination exceeds the solubility of the gradient material and causes it to precipitate
- the compartment load exceeds the maximum allowable compartment load specified.

Failure to reduce rotor speed under these conditions can cause rotor failure.

Centrifuges routinely deal with high energy levels and could move suddenly in the unlikely event of rotor failure. During centrifuge operation, never lean on or move the centrifuge, keep the surrounding area clear of objects (including all hazardous materials),and do not work in tip of or next to the centrifuge.

Do not attempt to open the chamber door when the rotor is spinning; never override or otherwise disable any of the safety systems of the centrifuge.



CAUTION

Do not run or precool/preheat a rotor at the critical speed, as this will have a detrimental effect on centrifuge component life.

Do not operate the centrifuge with a rotor out of balance. To do so can cause damage to the centrifuge drive assembly.

Do not operate centrifuge without a rotor properly installed and locked to the drive, and the rotor cover (if any) must be properly installed.

Locate the centrifuge on a level floor to avoid rotor imbalance during operation.

The centrifuge can be damaged if connected to the wrong voltage. Check the voltage before plugging the centrifuge into a power source.

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Chapter 1: INTRODUCTION & DESCRIPTION

This manual contains information required to operate and maintain the BW12R Floor Standing High-Capacity Refrigerated Centrifuge, If you require additional information regarding operation or maintenance, please contact us.

Tel: 86-731-88383668 or sales@lab-we.com

Centrifuge Description

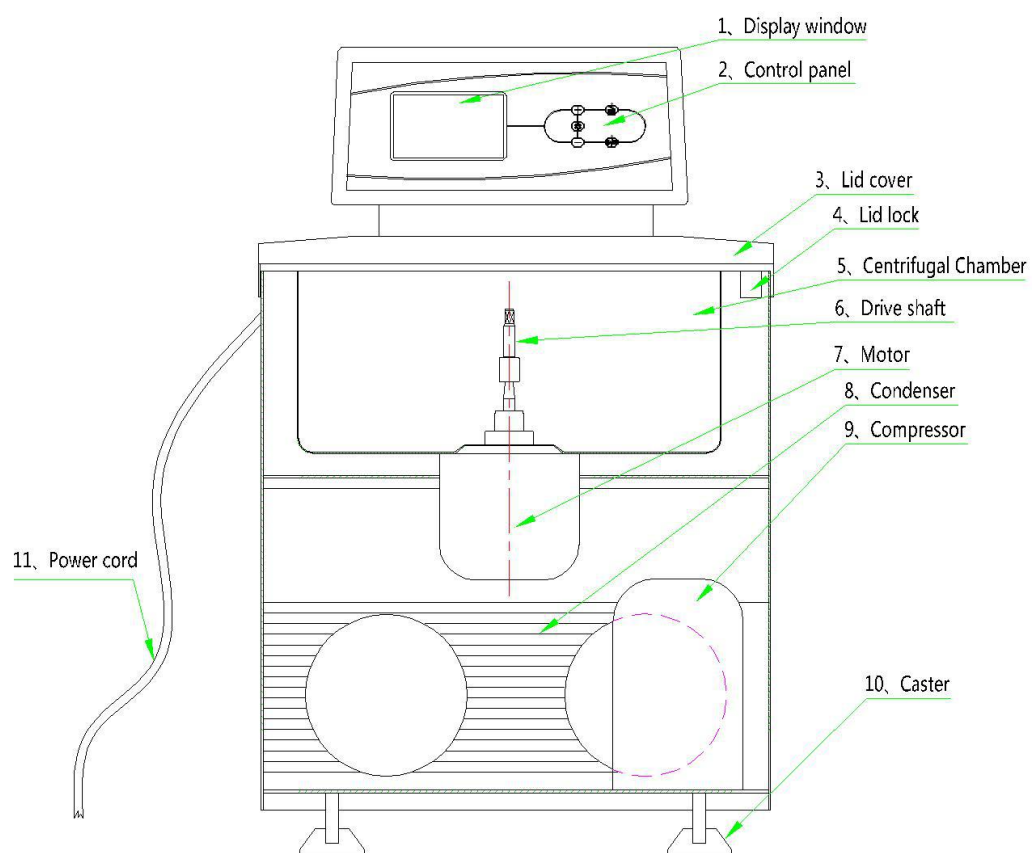
The BW12R is a microprocessor controlled, high-capacity refrigerated centrifuge designed for use in regulated environments (such as those found in blood banking, biotechnology, or pharmaceutical areas). The control panel, designed to be easy to use and easy to clean, allows simple input through a positive feedback keypad with visual verification of set parameters and current run conditions. The control panel also prompts users for correct entry and displays user messages. The control panel introduces automaton of quality control runs.

The BW12R uses a balanced , high-torque brushless motor designed to deliver optimal performance with smooth , quiet operation over its full speed range, with long bearing life .Advanced capabilities of this motor offer precise control of acceleration and deceleration, Directly connected to the motor is a heavy-duty gyro-action drive with a square spindle that accepts the BW12R high-capacity swinging bucket rotor .A viewing port in the chamber door permits speed confirmation using an ;optical tachometer.

Precise temperature control is made possible by a refrigeration system that is capable of delivering both cooling and heating and CFC free. The high-capacity system is charged with R404a refrigerant. The microprocessor-controlled system consists of a low- temperature evaporator, a hermetically – sealed thermally-protected compressor, and a fan-cooled finned condenser..

The BW12R has the following safety features: a protective armor plate steel guard within the cabinet; automatic shutoff of the drive motor for over speed protection; circuit breakers on the main power and the control panel circuits; and a door interlock which prevents starting the drive while the chamber door is open, or opening the door while the rotor is in motion.

The following Figure identifies and Main parts of the BW12R.



Centrifuge Specifications

Maximum Selectable Speed	8000 rpm
Maximum Relative Centrifugal Force	14336xg
Speed Control Accuracy	±20rpm
Timer Selection Range:	1～99Minutes
Temperature Selection Range	-20℃ to 40℃
Temperature accuracy:	±1℃ .
Maximum Noise Level	< 58dB**
Weight (without rotor)	500kg
Dimensions	960×860×1220mm(L×W×H)
Supply Power Requirements:	220V 50/60Hz 30A 5.5KW

Rotors Specifications

Rotors Number	Max speed	Capacity	Max RCF
NO.1 Fixed rotor	8000r/min	6x1000ml	14336xg
NO.2 Swing rotor	4200r/min	6x2x1000ml	5900xg
NO.3 Swing rotor	4600r/min	6x2400ml	7060xg
NO.4 Swing rotor	4200r/min	6x2000ml	6045xg



Caution: We had set the rotors number before shipment, So in case of any accidents, please don't change its rotor number by yourself.

Chapter 2: INSTALLATION

This chapter contains to prepare the BW6R centrifuge for operation.

Inspection

1. When you receive your centrifuge, carefully inspect it for any signs of shipping damage. If find damage, report it immediately to us and take clear pictures of packages and machine, and file a damage claim, then notify us.
2. Check the parts received against the shipping list; if any parts are missing, contact us (see back cover).
3. Remove all packing material. and remove any remaining items from inside the rotor chamber (where this manual was).

Unpacking

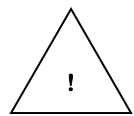
1. Cut the steel belt outside the box with pliers or big force Scissors.
2. Loose the screws and then open the box.



3. Remove the packing stuffing inside the box and take out the carton which Pack the 6pcs adapters as follows picture:



4. Remove the packing stuffing inside the box and take out the centrifuge with fork truck or hands(four person),it is in about 500 KGS(With rotor inside). Both hands holds on to a centrifuge after raising it.and put it on the smooth ground.



CAUTION

Locate the centrifuge on a level floor to avoid rotor imbalance during operation

Location

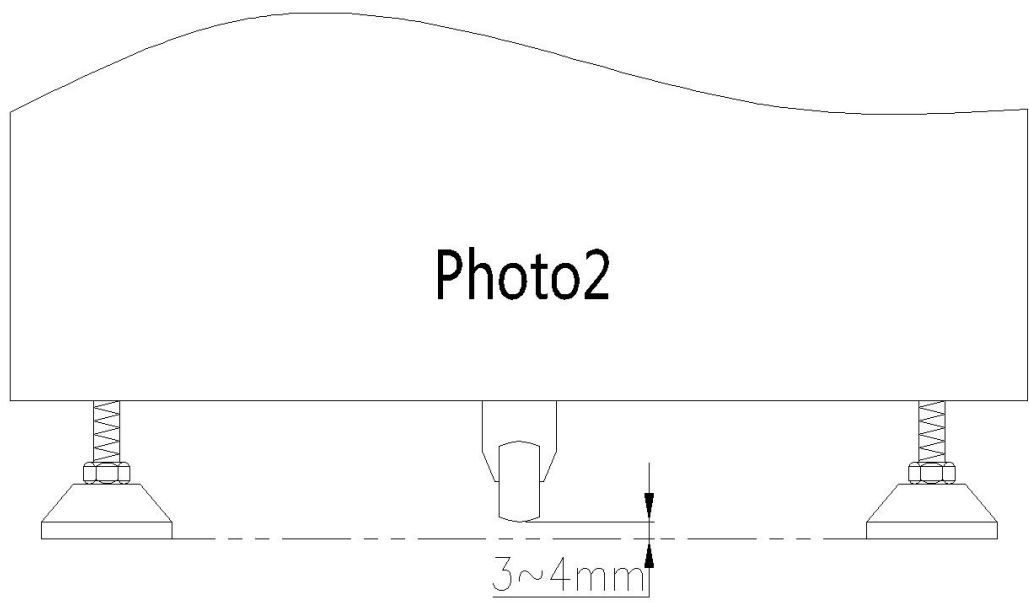
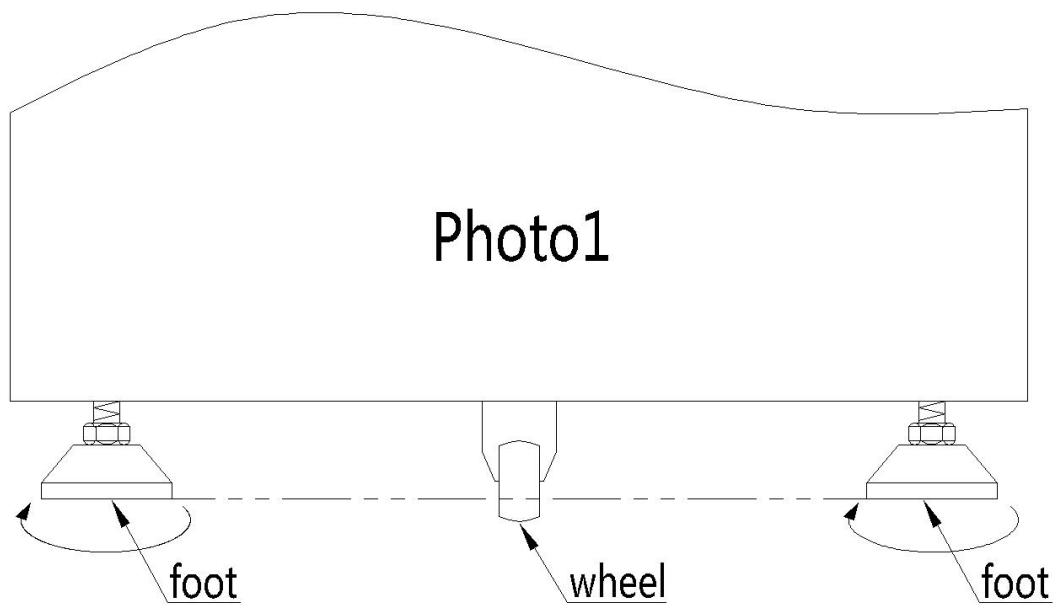
Locate the BW12R on a level floor. For the centrifuge to function properly, ambient temperature and air circulation are very important. To ensure free air circulation, the centrifuge must be positioned so that no air vents are blocked, allowing for its physical size plus an additional 15cm(6 inches) on each side, and a minimum of 5 cm(2 inches)behind the centrifuge(10 cm [4 inches]or more is desired).

Ambient air temperature at the centrifuge air inlets must be between 50 °C to 40 °C (41 °F to 104 °F), with relative humidity $\leq 90\%$ noncondensing, for the centrifuge to operate. Ideal ambient temperature to meet all performance specifications is between 20 °C to 35 °C (68 °F to 95 °F), therefore, avoid areas near heat sources (for example, heating pipes and radiators).Also, avoid close grouping of centrifuges or other heat-producing laboratory equipment.

Generally, the cooler the location, the better the operating conditions will be for the centrifuge.

After the placement, it is necessary to follow the steps below to place the machine normally.

As photo 1 and 2,Use the wrench to adjust the "Centrifuge foot" in Clockwise till the wheel above 3-4MM of the ground.



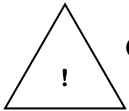
Electrical Requirements

NOTE

BW12R has specific power requirements and must be connected to the correct supply for proper performance.:**220V 50/60HZ 30A 5.5KW**

The centrifuge should be connected to an Overvoltage Protection circuit, and should have a means of power interruption at a remote location.

The supply voltage should be checked with a voltmeter, then you should verify that the voltage is agreement with the measured line voltage.



CAUTION

can be damaged if it is connected to the wrong voltage. Check the voltage and measure The voltage at the power source before plugging in the power cord. We are not responsible for incorrect installation.

If the measured line voltage is not within 10% of the voltage specified above do not connect the power cord and operate the centrifuge or damage to the centrifuge may result.

Open the lid

There is two way helps to open the lid:

- 1.Be sure the POWER switch is set to “OFF” , then plug in the centrifuge power cord.and then Let the centrifuge power on ,just press



button to open the lid(Never start the centrifuge or press any other button,or it will meet trouble or meet accident),For safety issue,please power off the centrifuge once opened the lid and do the following mentioned steps.

- 2.There is emergency lock on the right side of the machine,There is a T wrench attached to open the emergency lock when power off.there is direction shows you how to turn on the emergency lock with the wrench.

Take out the stuffing inside.

There is stuffing inside the centrifugal chamber

There is stuffing inside the swing rotor .

There is stuffing down side the swing rotor and in the bowl of the windshield .

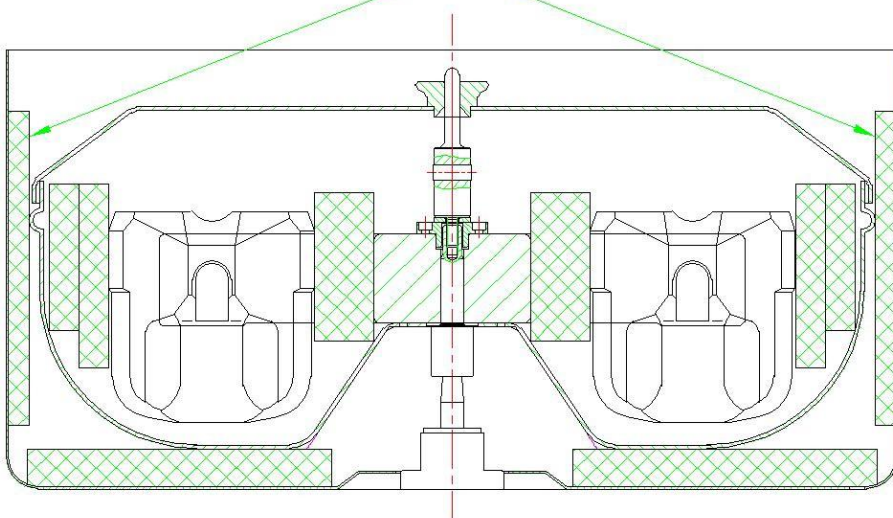
Please follow the instructions below to take out all the stuffing:

WARNING:(When take out padding down side the rotor)

1. The rotor body is heavy and should be lifted by two people whenever it is installed or removed.
2. When installing the rotor body, grasp the body by the ends of the arms **ONLY**.
3. The centrifuge spindle bearings can be damaged if the rotor body is dropped on the drive spindle.

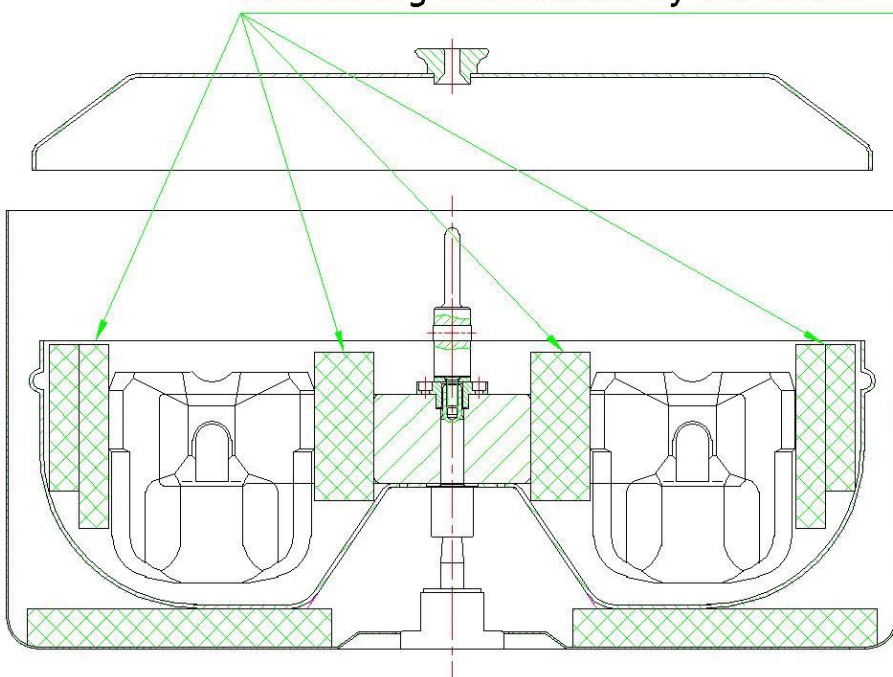
Step 1:

Take out all the stuffing as indicated by the arrow .

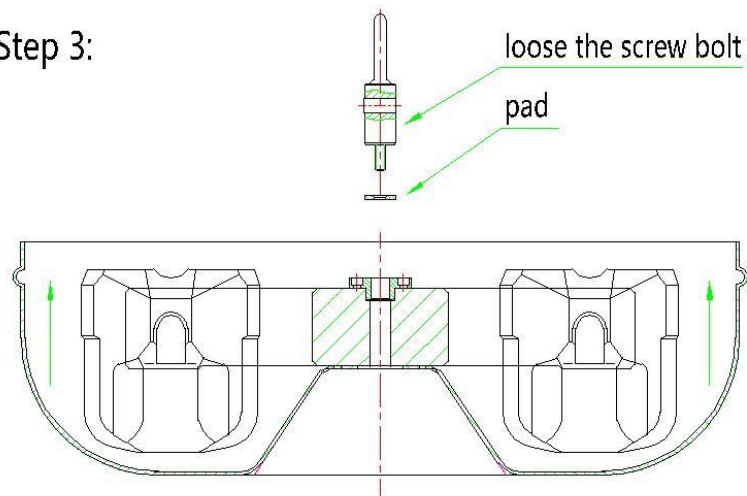


Step 2:

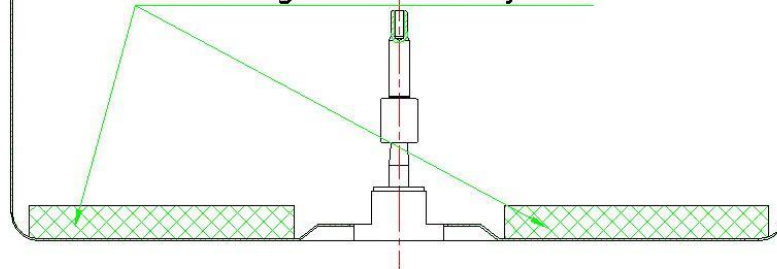
Take out the cover, and then take out all the stuffing as indicated by the arrow.



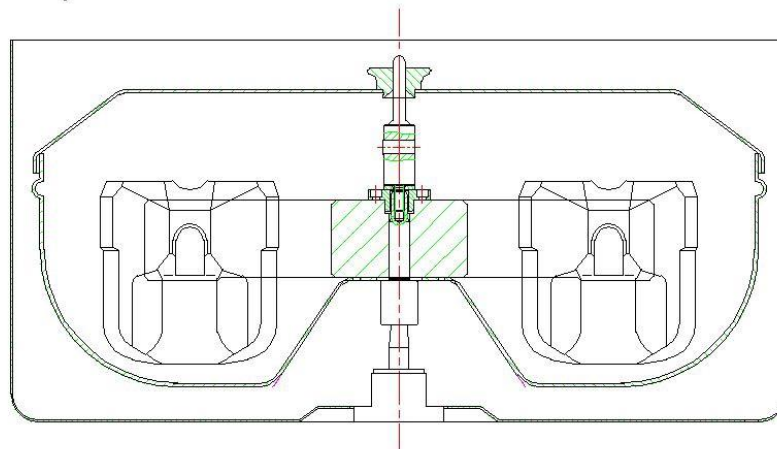
Step 3:



Disassemble the rotor(loose the screw bolt and pad,lift the rotor and take the rotor out), Finally take out the stuffing as indicated by the arrow.



Step 4: Install the rotor.



Also Attached real pictures which shows where the padding is :

Padding between rotor bowl and chamber



Padding inside the rotor

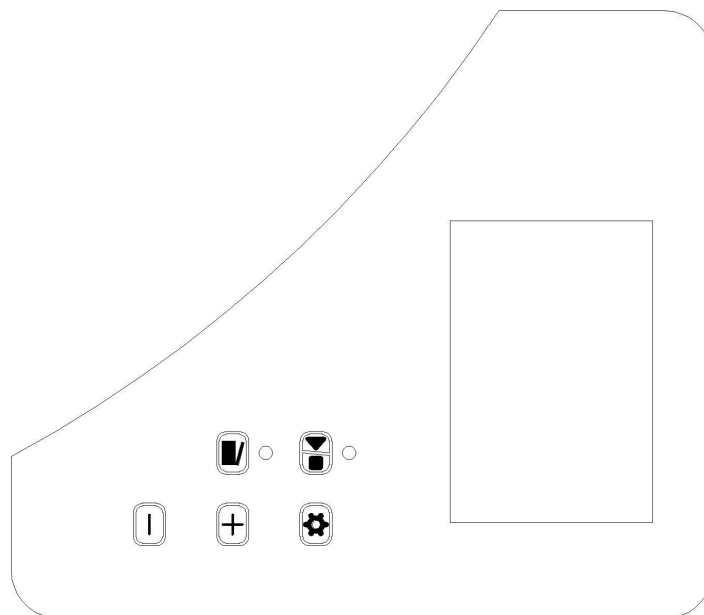


Cleaning

Make sure the centrifuge is power off and then clean its chamber by the cleaning cloth(it is suggested to power off the centrifuge in case of accidents, another reason is that once power on the centrifuge, its cooling system will start to work,so there will be freezer on the chamber)

Chapter 3: CONTROLS, DISPLAYS and INDICATORS

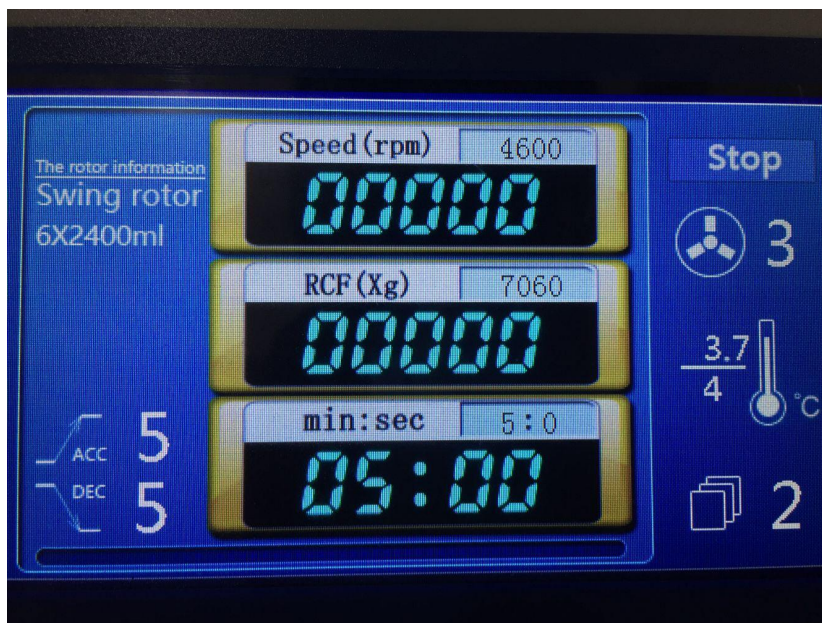
- A user-friendly, easy to clean control panel with an 7 inches LCD display window that shows all the parameters such as Speed,Timer,RCF,Temperature,Rotors Number,Acceleration &Deceleration rate and Program number and Error code information.
- Programming capability allows saving up to 10 sets of run parameters ,allowing simple program recall.
- Rotor SPEED controlled by RPM (revolutions per minute), or by the RCF(relative centrifugal force, or g –force).
- Automatic diagnostics, so that if a system malfunction occurs , a message appears in the display window to alert you of the condition.



Control Panel

There is Two parts on the Control panel,Left part is the parameters display window,Right part is the parameters setting panel.

Parameters Display window as following figure:



Details of the parameters display window:(Explain each parameters From left to right)

Acceleration 2:Means step 2 Acceleration.1-9 steps for choice, The No.1 step is the fastest in speed up.

Deceleration 3:Means step 3 Deceleration.1-9 steps:The No.1 step is the fastest in speed down.

Timer 20: Means 20 Minutes.00:00 Minutes and Seconds

Speed 4200:Means 4200 rpm. Adjusting in 100 rpm

Temperature 4: Means the set temperature is 4 °C, Adjusting in 1°C

RCF 5180: Means RCF in 5180xg,RCF Adjusting in 100xg

Rotors Number 3 :6*1200ml swing rotor in No.3

Program1(Memory):Means Number 1 program.1-9 kinds of program for stock.

It will also shows the real parameters in the central part of the Display window(From top to bottom)

Timer:00:00 Minutes and seconds,counts down from set time, showing the time remaining (in minutes and seconds)until the run terminates and deceleration begins.

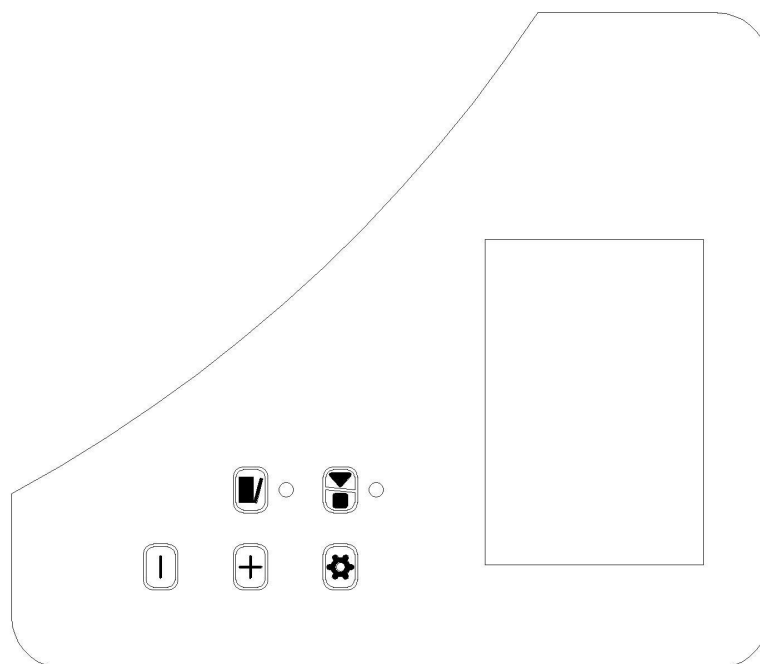
Rpm:The run SPEED(RPM) indicates the current measured rotor speed(in rpm).

RCF:the relative centrifugal force(or g-force)that is currently being generated at the maximum radius of the selected rotor.

Temperature:The current real temperature.

Capacity:Rotors capacity.

Parameters setting panel as following figure:



+ - KEYPAD

Adjusting speed, time, and temperature values; selects programs And Acceleration and Deceleration rates



Start or stop centrifuge run.
Green light when a run is in progress. Red light when stop the run.



KEYPAD

Inputs speed, time, and temperature values; selects programs And Acceleration and Deceleration rates



Lid open button, Once open the lid, its light will on .

Important Safety Information

Certain potentially dangerous conditions are inherent to the use of all centrifuges. To Ensure safe operation of this centrifuge, anyone using it should be aware of all safe Practices and take all precautions described below and through out this manual.

DOOR LOCK: If the centrifuge runs, the door lock works, If you press DOOR LOOK, the door will not be opened until the SPEED display “O”,Never use the manual lock to open the door when the centrifuge is still in running ,or it will meet accidents and we are not responsible for this kind of accidents.

Chapter 4: OPERATION

This chapter provides the operating procedures for the BW6R centrifuge.

Note: Before turning on the centrifuge for the first time, be sure it is properly installed. Before using the BW6R for the first time we recommend that you read all WARNINGS and CAUTIONS to familiarize yourself with the centrifuge controls and features.

Rotor Installation

NOTE: Two persons are required for this procedure. Before installing the rotor, make sure that the centrifuge spindle and rotor body center hole are free of nicks and Scratches. Also, make sure that all rotor parts, the centrifuge chamber surfaces, and the centrifuge drive spindle are clean and dry.

1.In “**Chapter 2 Installation**”All the stuffing inside should be all take out ,But in case of mistake, Here we mention this step again.Take out all the padding inside the rotor and the centrifugal chamber. Especially the padding between the bottom of the rotor bowl and the centrifugal chamber. As pictures below:

Padding between rotor bowl and chamber



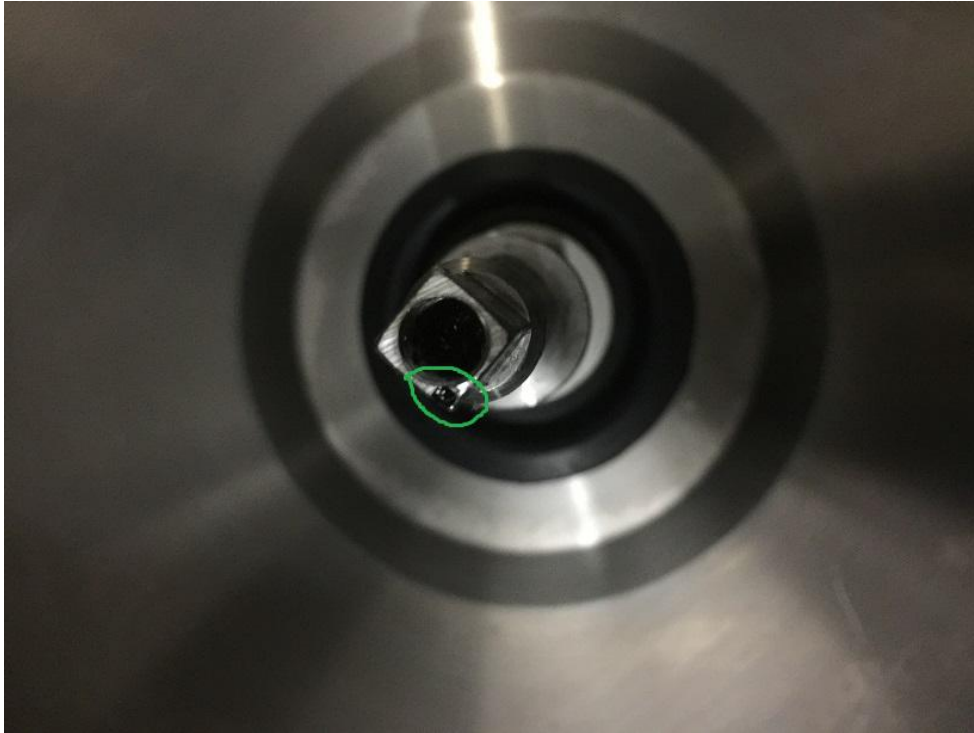


2. We made the balance tests and locate the balance position on the rotor and the motor shaft, please install the rotor as follows, then it will be balance and won't vibrate during the operation. I am sure you know there is resonance zone for every kinds of centrifuge. The resonance zone for BW6R is between 500-900RPM, this vibration is allowed.

Motor shaft



Balance position on the motor shaft



Balance position on the Rotor



Make the rotor balance position and motor shaft balance position on the same direction when install the rotor .



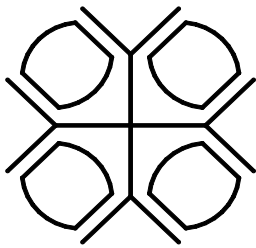
There is arrow marks on the Rotor bowl both sides as pictures below. please close the rotor bowl lid according these arrow marks,make these marks on the same position, then it won't vibrate during the operation in future.



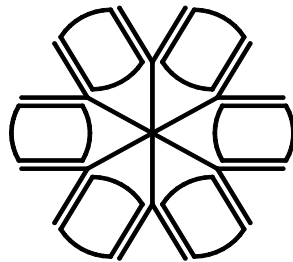
WARNING

1. The rotor body is heavy and should be lifted by two people whenever it is installed or removed.
2. When installing the rotor body, grasp the body by the ends of the arms **ONLY**.
3. The centrifuge spindle bearings can be damaged if the rotor body is dropped on the drive spindle.
4. Always use a full complement of six buckets.

Balanced Load

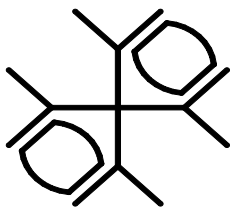


Correct

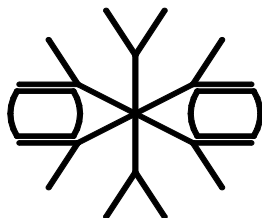


Correct

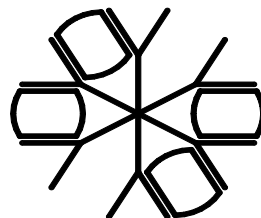
Unbalanced Load



Incorrect



Incorrect







Incorrect

Power on the centrifuge





Turn one centrifuge, the display window and indicator light will on.

Close the lid cover

Parameters Setting :

1. Press  , All the parameters "SPEED, RCF, TIME, ROTORS No., Temperature, Memory, ACCE/DECC" can be set by button  and button   .







2. For example: Set the speed

Press  button till  "Speed" on the panel, and then press   to the speed you want. you can set all the other parameters in the same way .



Caution: We had set the rotors number and locked its number before shipment, So in case of any accidents, please don't change its rotor number by yourself.

3. For example: Set the program

Press  button till  "Program" on the panel, and then press   to set the program Number 1, then press  to set all the other parameters: Speed, timer, temperature Etc, after set all these parameters, it will be stocked as Program No.1, if next time you want to use Program No.1, then choose the No.1 program and then press  button, machine will run according Program No.1 parameters.

Start the centrifuge

After set all the parameters and closed the lid cover,press



button to start the centrifuge

Stop the centrifuge

When finished centrifugation and time counts down to 0 rpm,Press the



button to open the lid and take out the samples.

Power off

When finished centrifugation, clean the centrifuge and close the lid and then power off the centrifuge, if long time don't use the centrifuge ,it is suggested to turn its power source.

Chapter 5: MAINTENANCE

This section describes routine maintenance procedures that should be performed on a regular basis. As the user, it is your responsibility to make certain that these activities are followed when necessary. To keep your centrifuge in good working condition and ensure accurate test results, we recommend that you have the centrifuge serviced annually by our Service Representative.

Inspection and Cleaning

b. Inspection

Inspect the centrifuge each week for encrusted biological deposits, and general cleanliness.

a. Cleaning

Rotor Chamber

The rotor chamber should be kept clean and , if condensation builds up, should be wiped dry to maintain efficient temperature control. When necessary , the rotor chamber may be washed using a mild , nonalkaline detergent such as dishwashing liquid. Rinse with water and dry with a soft absorbent cloth

Drive Spindle

Wipe the spindle with a soft cloth before a rotor is installed to reduce the

chance of the rotor sticking to the spindle, If necessary, to remove deposits, the spindle may be washed with warm water ; make sure it is wiped dry before installing the rotor.

Cabinet

The enameled cabinet panels may be cleaned with a household wax cleaner , A mild , nonalkaline detergent and water may be used to clean the top deck and the chamber door.

Door Gas Springs

Monthly, check that the two door gas springs are functioning properly by opening the chamber door and making sure it remains open. The gas springs counterbalance the weight of the door and hold it in the open position. Also, check that the connecting ends of each gas spring and the brackets they are connected to have not developed cracks. If the chamber door will not stay in the open position, or a gas spring or bracket is cracked , contact your local Service Representative.

Lubrication

All components are prelubricated and require no further lubrication. The refrigeration unit is hermetically sealed and the ball bearings in the gyro-action drive assembly and the centrifuge motor are permanently lubricated.

Customer Control Inspection

To keep your centrifuge in good working condition and ensure accurate and consistent results, we recommend that you use the following procedures to check the speed control, timer control and temperature control at least twice a year or more often as your procedures dictate.

If any of these control checks reveal a control inaccuracy, contact our Service Representative.

Speed Controls

1. Prepare a sample of test fluid .
2. Install the rotor in the chamber and close the chamber door.
3. Press START, wait for the SPEED value in the RUN display to reach the specified SET speed, then wait an additional 5 minutes for speed to stabilize.
4. The tachometer should indicate rpm equal to the SET value ± 10 rpm or 1 % , whichever is greater (2000 rpm and below, ± 20 rpm; above 2000, ± 1 %). If necessary, repeat this procedure at other speeds that are commonly used in your protocols.

Timer Controls

1. Prepare a sample of test fluid.
2. Install the rotor in the chamber and close the chamber door.

3. Set the run parameters for a commonly used protocol, but set the run duration by TIME
4. **Press START, Using a stopwatch**, begin timing precisely as the RUN TIME display counts to 15:30; then stop timing precisely as the RUNTIME display counts down to 00:00.

The stopwatch should read between 13:15 to 13:25, representing $13:20 \pm 0.5\%$ (4 seconds) plus an additional second to allow for cumulative human error. If necessary, repeat this procedure at other time ranges that are commonly used in your protocols.

Emergency Sample Recovery

If a power failure (or malfunction that disables the door unlock function at zero speed) occurs while the rotor is spinning, a means to mechanically override the door interlock is provided to allow sample recovery by using the specialized tool clockwise. This procedure should never be used routinely, or while the rotor is spinning, and is intended for emergency sample recover only.

WARNING

Do not open the chamber door when the rotor is spinning. In the event of a power failure (or any failure where RUN speed does not register), the brake will not operate and the rotor will coast to a stop from high speed, deceleration to 0 could take as long as 30 minutes. Before using the mechanical override to open the chamber door, make sure that the rotor has stopped spinning. Opening a chamber door when a rotor is spinning exposes hazardous energy; contact with a spinning rotor could cause personal injury.

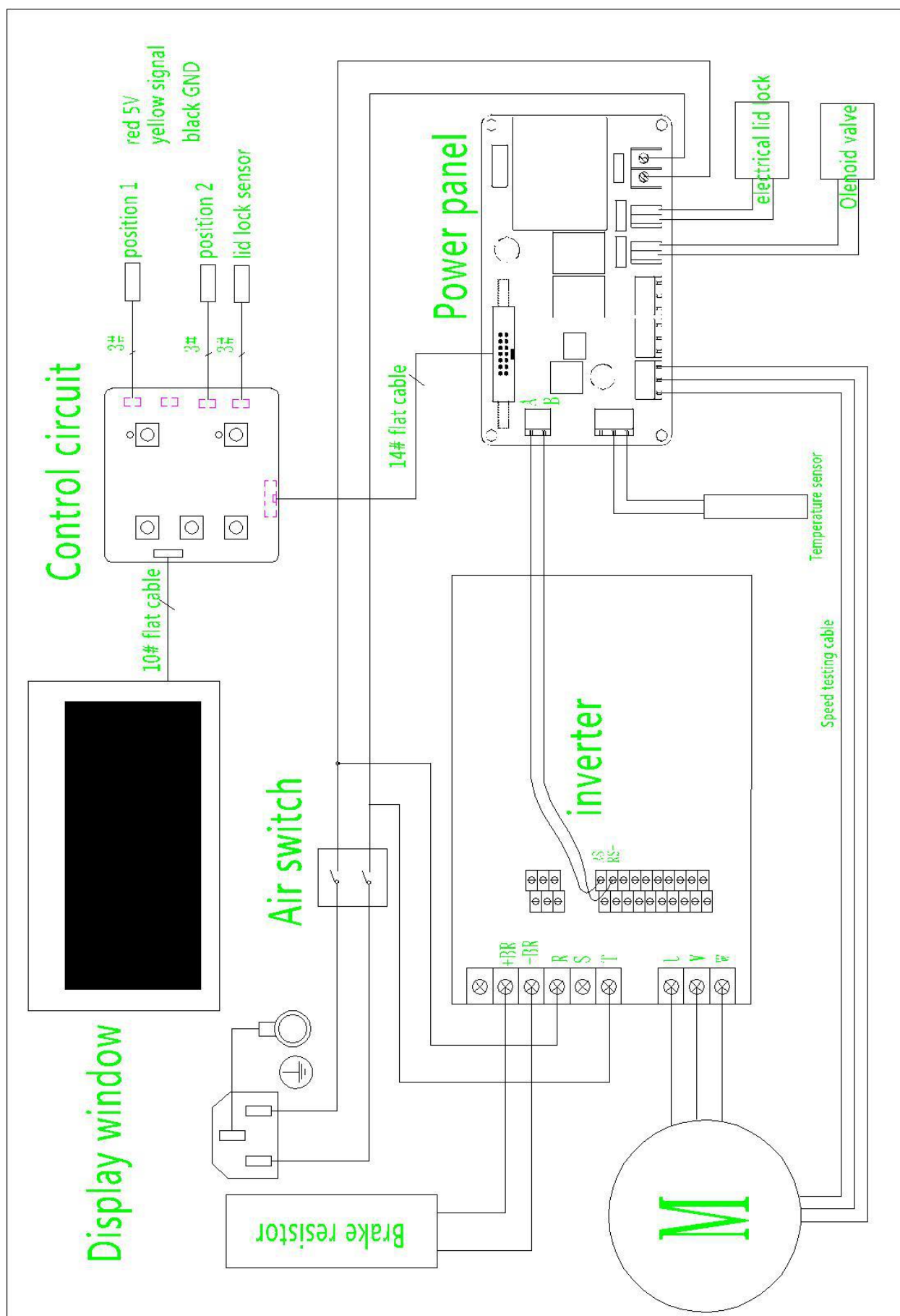
To perform the mechanical latch handle

There is a hole for the mechanical latch handle at the right side of the DLM12L, to be used as the switch for emergency sample recovery **only**.

Chapter 6: Trouble-shooting

Error code	Problem Cause & Solution
E1	Imbalance, Weight again the loads And Insert the loads symmetrically to the center of the rotor
E2	Over speed,Reduce its max speed
E3	Lid not closed,Close the lid .
E4	Lid opening during spinning,Close the lid .
E7	No speed,Check the motor connection to the circuit .
E8	Communication error,Check cable connection
E9	IPM error,Circuit boards module error,replace circuit boards.
EA	Over current ,Turn the Rotor manually
EB	Over voltage,use a voltage stabilizer
EC	Low mains voltage,use a voltage stabilizer

Circuit figure attached:



Chapter 6: Shipping list and Serial number

BW12R Floor Standing High-Capacity Refrigerated Centrifuge

Shipping List

Item	Description	Quantity
1	BW12R Centrifuge	1 Unit
2	6*2400ml Swing Rotor	1 Unit
3	Operation&service manual	1 set
4	Wrench	1 pc

BW12R Floor Standing High-Capacity
Refrigerated Centrifuge

Q C
Certificate

Max. Speed: 8000 rpm

Max. RCF: $14336 \times g$

Max. Capacity: $6 \times 2400\text{ml}$

Serial No.:

It is checked and tested by
Hunan Labwe Scientific Instruments co.,ltd

Chapter 8: Manufacturer information

Hunan Labwe Scientific Instruments Co.ltd

Address:408# Tong-Zi-Po West Rd,YueLu district ,Changsha,Hunan,China.

www.lab-we.com

Email:sales@lab-we.com

Ph:86-731-88383668

Fax;86-731-88381884