

# MULTI-PURPOSE CENTRIFUGE



## Instruction Manual



**Model : LMPC-20B**

Please read this manual carefully before using the instrument

**Labnics Equipment**

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## CHAPTER 1. INTRODUCTION :

### 1.1 Specifications:-

<b>Model No.</b>	<b>LMPC-20B</b>
Max. Speed	10,000 rpm (Angle) / 3,200 rpm(Swing)
Max. RCF	12,857 x g
Max. Capacity	4 x 750ml
Speed setting & display	1 rpm
Temperature	-20°C to 40°C
Timer	9hr59min59sec, Continuous operation
Acceleration/Deceleration	10 steps
Programs	10 memory
Applicable Rotors	Swinging out rotor & Angle rotor
Display	Digital type Speed, RCF, Time, Temperature, Program, Breaking Steps
Standard Power Supply	Single Phase, 60Hz, 220V, 1.8kW (It depends on customers)
Dimension(W x D x H)	640 x 630 x 450 mm
Weight	112 kg
Drive Motor	Brushless AC Induction Motor
Catalog No.	01120403

<b>Rotor Type</b>	<b>Capacity</b>	<b>Max. RPM</b>	<b>Max. RCF</b>	<b>Radius</b>
LAR-113	15ml x 24	8,000	8,801	13.4
LAR-114	50ml x 10	10,000	13,975	12.5
LAR-115	85ml x 6	10,000	10,062	9.2
SBR 2	750ml x 4	3,200	2,381	19.0

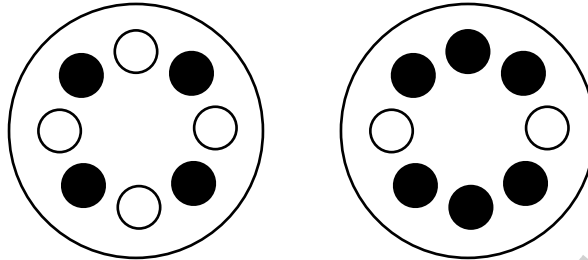
### 1.2 Caution:-

#### OVERSPEED

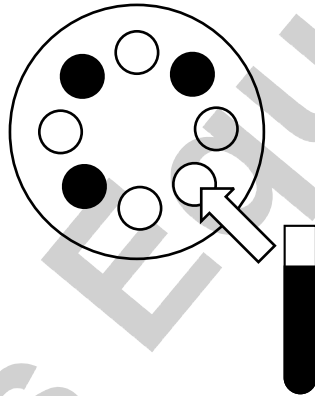
- Make sure that the Rotor speed is not more than maximum rotation speed. Don't cross the maximum speed of rotor.
- When the rotor is subjected to relative centrifugal force over the allowed seal intensity, the destruction of rotor occurs because the shape of the rotor is designed so that the rotor can stand an external force in accordance with the allowed seal intensity of the rotor.

## IMBALANCE OF TUBE

Put the exact samples to be measured in each tube and load tubes symmetrically into the rotor, So that the tubes with equal volume are placed opposite to each other, otherwise serious turbulence will occur during rotation and the motor, rotor and the shaft gets damaged.



Tubes should be symmetrically loaded on the rotor.



If the numbers of tubes are not symmetrical, load another tube having same weight as other's have.

### 1.3 Safety Note:-

#### Power On/Off

An automatic circuit breaker protects the instrument circulation when it is overpowered in emergency situations, such as power surges, which could damage the unit.

#### DOOR

When door opens, the door limit switch by sensor makes the rotor be still.

## CHAMBER SAFETY

- The double stainless steel protection kit which has enough intensity, structure and material of instruments to stand all kinds of risks, is installed at the outer of chamber.
- The head and bottom plate manufactured with 25mm of stainless steel protects user from danger as rotor is destructed, and the chamber is enclosed by 45c stainless steel having 13mm in thickness.
- Above safety devices are inspected by **Labnics Equipments** and confirmed safety.

## SPEED

- If the rotor is used with speed more than the maximum speed continuously for a long time, it is incurred that rotor is destructed.
- The centrifuge should be used with designated speed according to rotors respectively and if operated with overspeed, overspeed control system gives an alarm signal and stops the centrifuge by the designated deceleration time.

## IMBALANCE & VIBRATION

- During rotation, if rotor is operated with imbalance over standard, motor also moves. In this case, the danger is detected by measuring the vibration of motor. With an alarm imbalance “**LED**” lit up and the rotation stops by preset deceleration level. Safety device as above keeps the instrument from an accident during operator's absence in Lab.

## TEMPERATURE

- When the inner temperature of chamber rises abruptly beyond the limit, over temperature LED lits up and an alarm sounds continuously.

## SYSTEM

- When system is not working properly or abnormally, it lits up and indicate the user that there is some malfunction.

## CHAPTER 2. NOTE FOR INSTALLATION:-

### 2.1 Location:-



#### Best Location

The rotating instrument should be placed on the flat and solid surface. In case of inclined surface, shaft becomes bent by the heavy weight rotor as a result of long time rotation.



#### AIR CIRCULATION

For the proper air circulation, distance of at least 30cm should be maintained around the centrifuge during operation. Avoid keeping the instrument in a dusty place.



#### TEMPERATURE & HUMIDITY

The centrifuge which is controlled by a high-tech microprocessor is affected by the external conditions such as temperature or humidity. If the room temperature is extremely high because of direct ray of light or heater, or very low, the accuracy and reliance of instruments are reduced by the errors of electronic parts. On top of that the high humidity causes the corrosion of rotors or parts. A proper temperature and humidity should be maintained accordingly.



#### AVOID CORROSIVE GAS

Keep centrifuge at a place where corrosive gases doesn't occur. If there is sulfur dioxide or chlorine gas in the atmosphere, it will cause corrosion of rotor and shaft, also a great damage to metals.

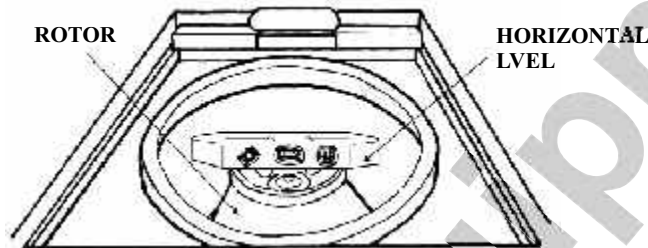
## 2.2 Balance:-



### BALANCING

The shaft has to be perpendicular to the ground. At this time, a balancing gauge should be placed on the head part, mounting rotor on the instrument.

If you measure a balancing gauge not on the shaft but on the main body of the instrument, It can't support the shaft to be rotated normally.

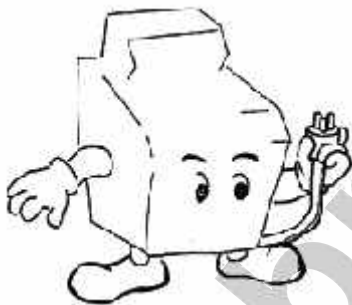


If it is not easy to maintain the balance with balancing gauge on the shaft, then you can do the balance by placing a balancing gauge on the upper rotor without a lid onto the shaft. Each control bolt should be placed on the corner of square, which is at the bottom of centrifuge, adjust the height.

Place a driver in the hole of control bolt and turn clockwise.

If in case it is not easy to balance the balancing gauge on the shaft, it is allowed that you can do balance by placing a balancing gauge on the upper rotor without a lid onto the shaft. Each control bolt should present at the corner of square, which is at the bottom of centrifuge then adjust the height.

## 2.3 REQUIREMENTS:-



### POWER

The standard power requirements are a single phase and 220V, but those are changeable depending on user's request. Therefore, plug in after checking the name plate located on the rear panel. Be sure not to use three phases.



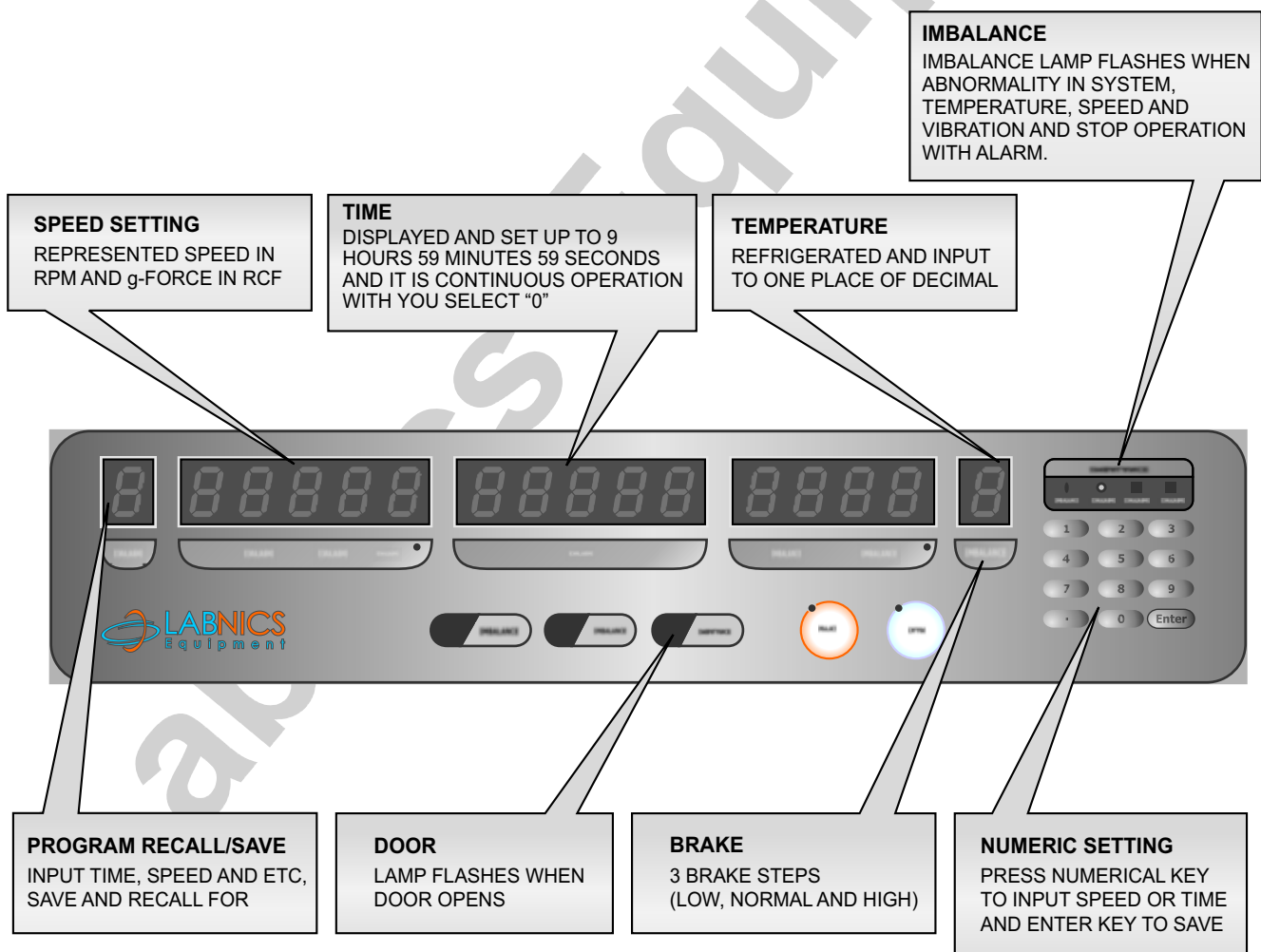
### Grounding method of centrifuge:

- Grounding method of centrifuge: Grounding line of our centrifuge is a green line of power line and the power is a single phase power and 220V.
- If a user wants to certify whether external grounding is connected well or not in the power line, users have only to certify whether between one of the black or white line and green line is 110V.

- In case of installation of instrument, if the grounding isn't conducted well, it may cause a wrong operation of centrifuge, and the electronic system of centrifuge may be damaged by the external electrical shock, so that it is necessary to conduct the grounding.
- Don't connect a grounding line to a water pipe, gas Pipe, electric line, lighting rod and a telephone line.
- Especially, in case of a water pipe, although an exposed part is a copper pipe, as grounding function may be impossible according to that the PVC line connected to in the middle of the pipe, so it is better to avoid. As for using a gas pipe to ground, a flame can cause fire. In the moist place, installation of an electric leakage cut off is much safer.

## CHAPTER 3. PARTS DESCRIPTION:-

### 3.1 Control Panel:-





## CHAPTER 4. OPERATION PROCEDURE:-

### 4.1 Standard Operation-

#### 1. Power Supply

- Turn on the main power switch at the back of the instrument.
- Turn “on” the keys switch located in front of the instrument.
- With the power being connected, the lamp is off and be to the operation standby status.
- When turn the switch to “**power on**” status, all the indicators on the board, lights off with alarm and last data before power out is indicated.

#### 2. Open the door and install the rotor onto the shaft

- Door is closed when power is on. Door closes automatically when the rotor is starts to spin and will open when rotor stops. Door will open when press the door button on the panel, during the spinning stage.



Don't press door button when rotors spins.

#### 3. Input desired setting parameters.

- Reset the desired data for RPM, time, temp., brake system.
- Press the control button to change the data for speed, time, temperature and so on.
- The previous setting data flashes.
- Input desired parameters.
- Press “**save**” button to save it.

#### 4. Press “start” button to run the instrument.

- Press “**start**” button to run the unit without changing any parameters such as rpm, time and temperature. The refrigeration system will run to calibrate temperature and the rotor will not run when the actual temperature is not in the temperature limit range.
- The centrifuge will start to decelerate when it reaches the time limit. Door will open when it stops and setting parameters will be displayed. Press the “**stop**” button to stop operation.

### 4.2 Programmed Operation:-

#### Speed Setup

- Whenever “**RPM**” and “**RCF**” keys are pressed, the indicator lights on alternately and users can select the desired speed.
- When the indicator of “**RPM**” lights on, it sets the number of rotation per minute and when the indicator of “**x g**” lights on, it sets up the g-Force.
- When indicator lights on, finish the setting by pressing the numerical key.
- After entering the number of speed, press the “**speed**” key two times, and then now confirm that g-force sets up automatically.

### Time Setup

- After pressing “**Time**” key, enter the numerical data, press “**Enter**” key. The setting range is 0 minute to 59 seconds 59 minutes 9 hours and after setting up “0 minute” and running the instrument, its functions “**Free-run**” continuously without time.
- In case of lower than 1 minute, “**SEC**” indicator lights on and is displayed in second.

### Program Save & Recall

- When “**Save**” lights on, it means save mode is active to save the current setting data. Input the data by using the numerical key and press “**Enter**” key.
- When “**PROG**” key lights off, it means recall mode is active to return the stored data.
- The numbers are available from 0 to 9.

### Start

- Press “**Start**” key to start running. If door opens, alarm will sound 3 times, note the door opening and this is the standby status of running.
- When the door closes, the instrument starts to run.
- It is able to regardless of temperature, so that if pre-cooling for sample protection and preserving refrigeration is needed, start to run after confirming the temperature to set up to the designated data.
- During the running time set up, it stops automatically after the running time.

### Stop

- Press “**Stop**” key to suspend the running.
- If the stop is finished, the short alarm sound 7 times and notify the stop status. When “**Stop**” key lights on, it means the stop.

### Door Opening

- If the dial on the right side is turned, the door opens.

### Brake Setup

- After pressing “**brake**” key, press the desired brake step on the numeric board and “**Enter**” key.

## CHAPTER 5. MAINTENANCE:-

This chapter explains how to keep your unit in a good operating condition.

It includes instructions for cleaning, decontaminating and storing. This chapter also covers the cover interlock by pass.

### Care and Cleaning:-

- Keep your centrifuge clean to ensure good operation and to extend its life.
- Clean the sample chamber, rotor and lid at the end of each working day and immediately after any spill. To clean the chamber, use a damp sponge, warm water and a mild liquid detergent, suitable for washing dishes by hand, don't use caustic detergents or detergents that contain chlorine ions. These attack metals.

- Remove stubborn stains with a plastic scrub pad. Don't use steel wool, wire brushes, abrasives, or sandpaper. They create corrosion sites. Never pour water directly into the rotor chamber. Scrub the rotor's tube cavities with a stiff test tube brush that has end bristles and a non metallic tip. Dry each part, after cleaning, with a clean absorbent towel.
- If glass breakage occurs, remove all broken glass embed in the plastic or rubber accessories.
- Glass particles can come in contact with new glass tubes, creating pressure points that may results in breakage recurring. Glass particles, in the chamber, grind to a fine gray dust, during centrifugation.
- This dust can coat the inside of the centrifuge.

#### **Storage :**

- Store parts on a soft surface, to avoid damage.
- Rotors and other parts should be clean and dry. Store them open to the air, not in a plastic bag, so that any residual moisture evaporates. Face the parts upward to avoid moisture retention in the cavities.

#### **Decontamination:-**

- If tube breakage occurs, releasing toxic, infections, pathogenic, or radioactive material into the unit, decontaminate the chamber.
- Rotors have sealed containers that provide aerosol containment and, if used as directed, keep silage confined. If breakage occurs, it may be sufficient to only decontaminate the sealed carriers.

#### **Cover Door Lock:-**

- The cover will remain locked, if power fails. If you need to remove samples from the unit, before power is restored, use the cover door-lock, after the rotor has come to a stop.

#### **Refrigeration:-**

- Condenser**      Condenser is to liquidize gas which has high temperature and pressure by refrigeration. The condenser refrigerated by air circulation attaches with refrigeration pin consists of the thin board. It makes heat down according that air contacts the refrigeration pin. Therefore, if the refrigeration fan is contaminated by dirt, it may cause a break down. The dirt of refrigeration pin should be cleaned by the brush or air pump one time per 6 months. The refrigeration pin has material of copper or aluminium so that be sure to be bent.
- Refrigerators**      It runs normally but sounds water flow. This is the sound flowing according that the refrigeration reagent is liquidized. The instrument has no abnormality and use it without anxiety. The collision sounds in the centrifuge. This is the sound indicating the contraction and expansion of parts related in refrigeration. The instrument has no abnormality and uses it without anxiety.

## CHAPTER 6. TROUBLESHOOTING:-

ERROR	SOLUTION
No Running	Check power supply cable.
	Check the door switch.
	Check the temperature setting data.
	Check the temperature deviation from temperature limit.
	Check the inverter output.
	Check the motor status.
Centrifuge shakes and makes a noise during running	Check rotor loading.
	Fasten rotor correctly.
	Check the motor status.
No putting the data/ No input	Check the membrane.
	Check the rotor number.
Abnormality of Temperature	Check the temperature sensor.
	Inspect the connector.
Abnormality of the Operation	Reput the acceleration and Deceleration
Abnormality of the Refrigeration	Check the sealing of the door.
	Check the drive of the refrigerator.
	Check SSR
	Check the radiator.

If the above solutions are unsuccessful, please contact technical & service team.

### <Error Code>

Display	Cause	Solution
HELP 1	The spinning speed isn't recognized. It is caused by the disconnection of the sensor or abnormality of inverter or PCB and so on.	Contact technical & Service team
HELP 2	It causes when the "Start" button is pressed during spinning.	Press the "Start" key after the motor stops.
HELP 3	When the setting data are used to the memory element, it is displayed that the running is defective. Abnormality of IC socket	Replace it with new IC

## SERVICE REPORT

Customer's Address : \_\_\_\_\_ Tel.No.: \_\_\_\_\_  
 \_\_\_\_\_ Fax No.: \_\_\_\_\_  
 \_\_\_\_\_ Weekly Off.: \_\_\_\_\_

Contact Person / Designation : \_\_\_\_\_ Dept.: \_\_\_\_\_

Date	Time		System Configuration	Model	Serial No.	Date :	SR. No.
	From	To					
						Status : OK <input type="checkbox"/>	Not OK <input type="checkbox"/>
						Installation <input type="checkbox"/>	Warranty <input type="checkbox"/>
						Demonstration <input type="checkbox"/>	
						Maintenance <input type="checkbox"/>	Contract <input type="checkbox"/>
						Repairs <input type="checkbox"/>	
						Application <input type="checkbox"/>	Billable <input type="checkbox"/>
						Calibration <input type="checkbox"/>	
						Validation <input type="checkbox"/>	Courtesy <input type="checkbox"/>

Nature of Problem : \_\_\_\_\_

Observation & Action Taken : \_\_\_\_\_

Customer's Remarks : \_\_\_\_\_

Parts Replaced : \_\_\_\_\_

Parts Recommended / Action Required : Yes  No  Requisition Number : \_\_\_\_\_

Service Engineer's Name & Signature	Customer's Name, Signature, Date & Stamp

Page \_\_\_\_ Of \_\_\_\_