

# **HIGH SPEED CENTRIFUGES**



## **Instruction Manual**



**Model : LMHS-20A**

**Please read this manual carefully before using the instrument**

**Labnics Equipment**

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## CHAPTER 1. INTRODUCTION :

### 1.1 Specifications:-

<b>Model</b>	<b>LMHS-20A</b>
MAX RPM	17,000 rpm
MAX RCF(xg)	28,756
MAX CAPACITY	85ml x 6
SPEED DISPLAY	1rpm
TEMPERATURE RANGE	-20°C to +40°C
TEMPERATURE BOUNDARY SET UP RANGE	0°C to ±30°C
TIME	99MINUTE 59SECOND, CONTINUOUS OPERATION
PULSE STAGE	ON/OFF
BREAK STAGE	Slow, Normal, Fast (3 step)
PROGRAM STAGE	10 MEMORY
DIGITAL DISPLAY	RPM, RCF, TIME, TEMPERATE, TEMPERATURE BOUNDARY, PROGRAM, BREAK SYSTEM, PULSE STAGE
POWER SUPPLY	SINGLE PHASE 230V,50/60Hz,1.5Kw
DIMENSION(W D H)	410 x 470 x 825
WEIGHT(Kg)	81
DRIVE MOTOR	Brushless AC Induction Motor
DRIVESYSTEM	INVERTER CONTROL (VARIABLE VOLTAGE AND FREQUENCY)

### 1.2 Caution

#### OVERSPEED

- Centrifuge includes dangerous factors by using a rotating body of high speed.
  - Certainly, read the following notes and prevent from making any damage
- A centrifuge must be installed on the horizontal and flat face not to make vibration.
  - Before connecting a centrifuge to the power, confirm the voltage to use. The Wrong voltage may make damage to the product.
  - You have to use rotors offered in **LABNICS PVT. LTD.**
  - When you separate toxic and radioactive substances with a centrifuge, you have to take safety measures.
  - When a centrifuge is contaminated by toxic and radioactive substances, the contaminated substances have to be eliminated thoroughly.
  - The substance which can cause volatile and explosive gas must not separate in a centrifuge.
  - It doesn't have to be operated more than the maximum speed which a rotor allows.

- You don't reduce the speed or stop a rotating rotor by your hands.
- A rotor has to be necessary used after the balance work about symmetrical material weight
- A rotor has to be fixed accurately on the axis of rotation, and a lid of rotor has to be fixed tightly. If not, the accident of taken off a lid may occur during rotating.
- Only qualified engineers can repair equipments without reference in manual.
- Before repair, contaminated substances should be eliminated thoroughly.
- To use a centrifuge of the best condition and to maintain during long time, a rotor chamber should be kept dry.
- When an aluminum rotor contacts strong acid, base or clean liquid in laboratory, Cesium/Silver/ the salt of Mercury (especially the salt of chloride ion ), the reaction starts to corrode, so it's very cautious.

### Over speed

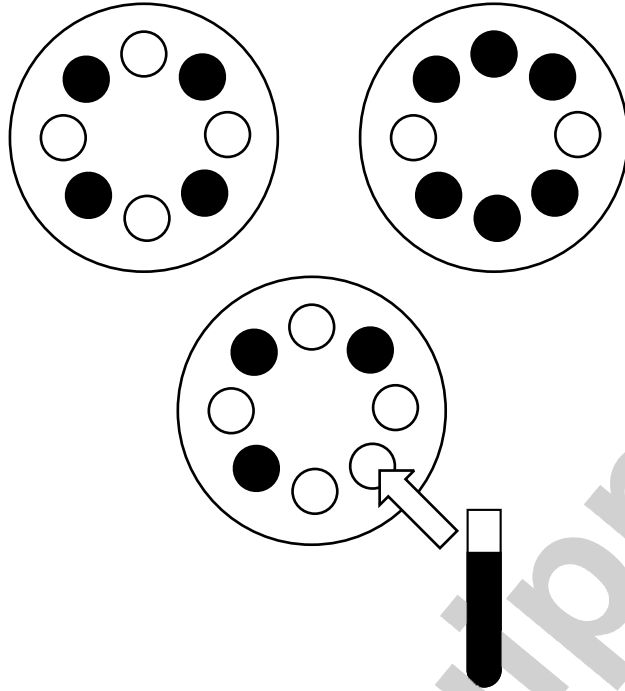
- Rotating speed of a rotor doesn't have to exceed the maximum rotating speed. As a Rotor is designed to endure the power outside, according to allowing intensity of a rotor, in case of receiving the exceeded centrifugal fore, a rotor will be wrecked.

### Critical speed

- Every rotating equipments have a critical speed to make serious vibration during operation. In other words, reduction speed is a resonance that's why this one makes the combination with various equipments and it's necessary special about all of rotating equipments.
- User doesn't has to use in the speed to appear a critical speed.
- When vibration of product is severe, vibration will disappear after the territory of the speed, as it set free of the dangerous speed territory. User has to use it in other territory, not a territory of a critical speed. Also, it is different according to aging.

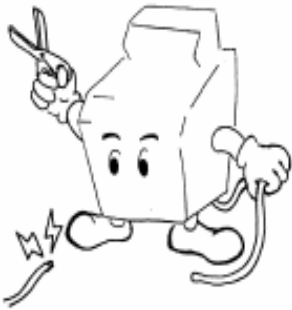
### IMBALANCE TUBE

- If the vibration doesn't stop for operating, as it has problems, you have to contact to get A/S. A balanced load is essential for all centrifuges, as unbalanced load produces vibration, and can damage the unit. Always ensures that the rotor is loaded symmetrically, with a full complement of accessories, and a full set of tubes, tube adapters should also be installed symmetrically. Opposite places of the rotors must always be loaded with same accessories.



### 1.3 Safety Instructions :

#### POWER ON/OFF



Use automatic circuit breaker to protect controller when it overpowered

#### DOOR



The rotor will stop automatically when door opens, and automatic door lock isn't opened for operating.

## CHAMBER SAFETY



In the outside chamber, Amor steel is installed to be able to endure every danger expected for operating. The top steel and under steel are installed the steel of 25mm and it can protect users. Also, the chamber is safe to be wrapped by the 45c steel pipe with efficient steel.

## VIBRATION



Motor will be vibrated when vibrating heavily during spinning of rotor. This system senses vibration of motor and gives alarm sounds with flashing imbalance. It begins to start decelerate based on posing deceleration time. This safety device can protect any accident in the lack of operator.

## CHAPTER 2. NOTE FOR INSTALLATION:-

### 2.1 Location:-



## BEST LOCATION

A centrifuge must be installed to be level on the flat surface not to vibrate severely. A fixed and stable location is important. Improperly loaded centrifuge can vibrate or move.



## AIR CIRCULATION

All energy consumed by the centrifuge is converted into heat and emitted into the ambient air. Therefore, sufficient ventilation is very important. As the air-ducts in the unit must be opened, keep a clean, at least 30cm around centrifuge. Also, centrifuge shouldn't be positioned near radiators and should not be directly exposed to sunshine.



### TEMPERATURE & HUMIDITY

For normal operation, the ambient temperature should not be fall below 10°C and not exceed 35°C. and the max humidity of air 80% during transport from cold to warmer places. Water will condense inside the centrifuge. It is important that there is enough time for drying before the centrifuge can be started again.



### AVOID CORROSIVE GAS

Set up in the place that corrosive gas doesn't occur. If sulfur dioxide and chlorine gas are in the air, the damage of all part of steel can occur and corrosion in rotor and axis can occur.

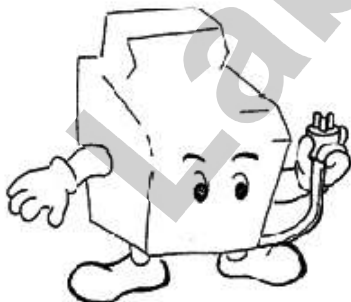
## 2.2 Balance:-



### BALANCING

The shaft should be vertical from the ground. Put your balancer on the top of mounted rotor. You have to make sure that you have your balancer to make horizontal level on the top of spinning shaft or mounted rotor only. Do not measure your balance. It is not make horizontal when you put your balancer on the surface of main case.

## 2.3 ELECTRICAL REQUIREMENTS:-

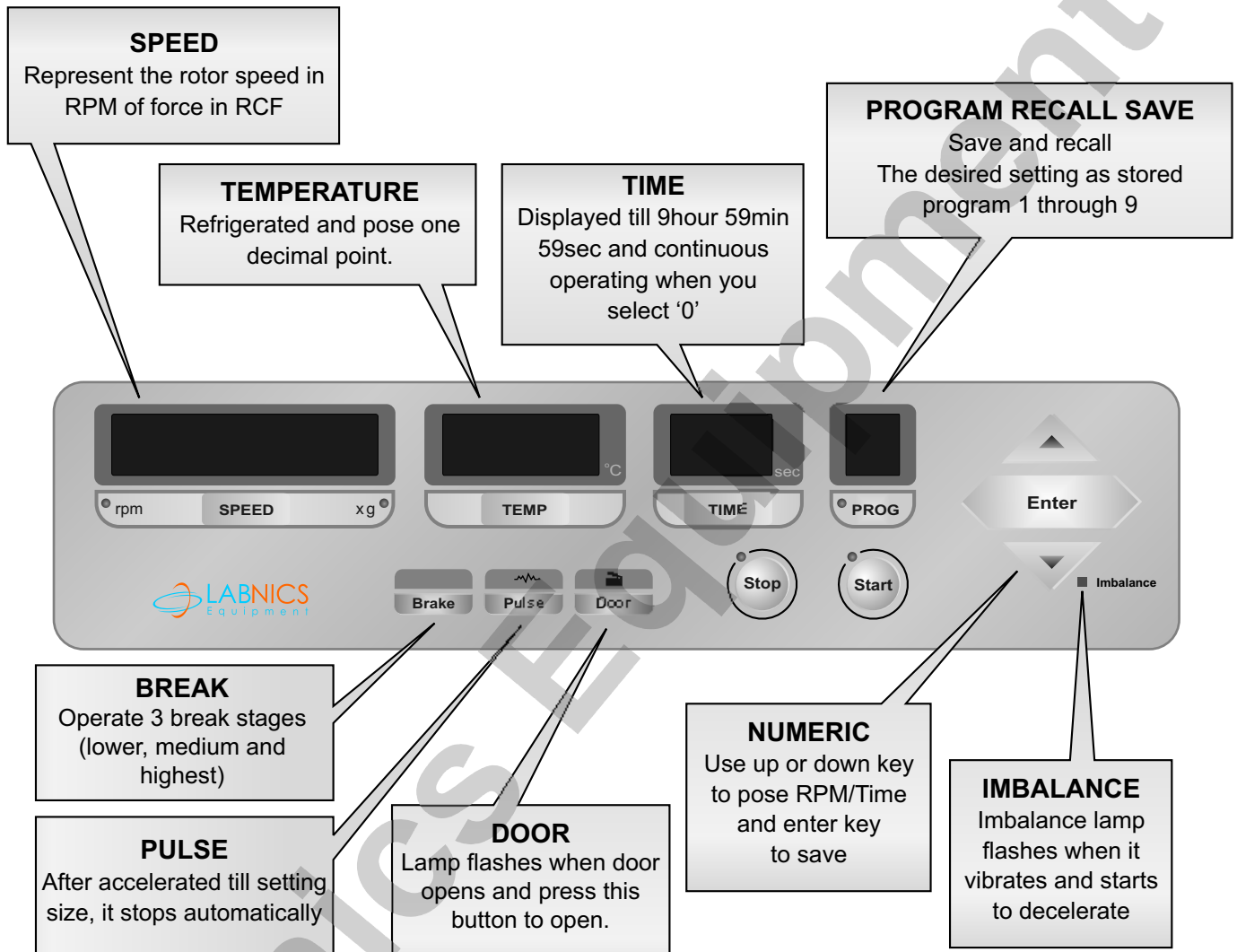


### POWER REQUIREMENT

You must connect after certificating the table in the back panel of centrifuge, as it can change in accordance with order of user, though the power uses 220V. If the voltage changes from more than 10% to less than 10% in standard voltage, you can't get a precise reliance rates. If addition, the constant poser must continue to be supplied as it can damage in various parts of centrifuge.

## CHAPTER 3. PARTS DESCRIPTION:-

### 3.1 Control Panel:-



## CHAPTER 4. OPERATION PROCEDURE:-

### 1. Power Supply

- Turn on main power switch on the back of unit.
- Turn switch to "On" possible and lamps will be on and ready to use.
- There will be sounds and all displays will be on when you turn to "power on" Position, the unit displays last saved on the control board.

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

- Door will be opened when power on.
- Door will be closed automatically when the rotor starts to rotating, door will be opened when rotor stops.
- Door will be open when it presses the door button on the controller during the spinning stage.
- After the door is closed, the light turns off.

The Door can't open without supply of power. When you can open only manually in emergency like a cease-fire, press the right-head bottom of product.

## 3. In-put an each items:

- Again Set up wanted data such as RPM, Time, temperature, procedure of reduction and so on.
- Press a key to change speed, time, temperature, and so on.
- Previous setting data continue to tune off.
- Enter the wanted data.
- After finishing in-put, press a enter key.

## 4. Press a start button to operate the unit:

- When you don't need to change any parameters such as rpm, time, temperature, press a start button. After finishing time, it is stopped. After stopping perfectly, door lock release, and it is changed to initial values. If you want to stop for operating, press a key of stop.

## 4.1 CONTROL FUNCTION:

### 1. RPM :

Provide very precise rpm(every 4 rpm) and control system in this model 4 rpm, user can select desired rpm (every 1 rpm). Refrigeration system will only operate and rotor does not spin during posing operation time when posting "0" in rpm window. It's very efficient way to adjust chamber temperature as same as sample evenly.

- Speed display unit: (Speed display unit) : 4 rpm
- Speed setting unit: (Speed setting unit) : 1 rpm
- Speed accuracy: (Speed accuracy) : maximum 1% (setting speed standard maximum 10rpm (less than 2,000rpm )

### SETTING -

- Press speed button on the controller.  
Previous setting data turn off with sounding.  
Turning off speed data will be fixed and the screen will be returned initially after pressing enter or speed button.  
You can input wanted values by using a key of number, and the Method of enter number uses the method of Shift Left (whenever you enter values, previous values are shifted to left a unit by unit .

You can enter the wanted data by using numeric key, and the numeric entrance use the most general method of shift left which shaft previous data to left step by step.

- Input a desired RPM with a key of number.  
(If it is wrong, do it again.).
- After entering, if you press a key of enter, it is fixed.  
The flashing data are fixed on display board.

## 2. RCF (xg) :-

After pressing a key of speed, you can see a mark of RCF in original place of speed and to show it is changed, the light to wrote "xg" turns on in bottom of screen.

For the conversion of RCF, it continues to calculate RCF of a present RCF on the standard of Maximum Radius automatically. As RPM/RCF are mutually calculated with working, when user input data to select RPM, RCF is automatically calculated, when RCF is selected, RPM is automatically calculated and also in the middle of operation.

- Centrifugal force direction unit (RCF display unit) : 1 x g
- Centrifugal force setup unit (RCF setting unit) : 1 x g

### SETTING -

- Press a key of speed 2 times.  
With signal, previous RCF is turned off In this condition, ENTER is buttoned, turning off value is fixed and returns to the initial condition. By using a key of number, you can use input desired values and in the input procedure, input values are turned off continuously.
- Input the wanted centrifugal force (xg) to use a key of number.  
If it is wrong, input again.  
The unit of RCF is (1xg), be cautious.
- After entering data, press a button of "ENTER". It will be over.
- Turning off numbers in the screen are fixed.

## 3. TEMPERATURE:-

- Temperature displays 3 figures, it can be input by the 1st decimal point.
- The measurement of temperature and control is controlled by the unit of 0.1 very exactly.
- To improve confidence of measured temperature data, it indicates the average value of sequence 8 temperature data.
- The range of temperature installation (Temp. setting range) : -20°C ~ + 40°C
- The unit of temperature indication (Temp. display unit) : 0.1°C.
- The unit of temperature installation (Temp. setting unit) : 0.1°C.
- The density of temperature control (Temp. accuracy) : 0.5°C.  
(standard equilibrium temperature).

### Button "Temperature" key

## SETTING-

With signal, previous input temperature setup value is turned off. This condition is to make the environment in chamber before movement Button "Temperature" or "ENTER" key, turning off values are fixed and returns to the initial condition.

### **Input required temperature using number keys:**

- When values include decimal point and "-" and decimal point doesn't input, they are recognized as only fixed number.
- When input is wrong, you can try to input again.

### **After input and button "Enter" key, the input of temperature is completed:**

- In the signal of temperature, turning off numbers are fixed. When turn on, for a minute to protect refrigeration, the refrigerator is not working very well.
- At that time "START" key is buttoned, rotor is not rotated but it will be worked after wait a minute.
- Refrigeration function is paused when input [100] instead of the operation temperature in the TEMP. Sign board. It gives conveniences to use refrigeration function.
- Previous temperature environment: After required temperature in th chamber, input 0 rpm in the Rotor Speed indication and input "START" key, rotor is not worked and internal temperature in the chamber is composed. When input key, rotor is not rotated and internal temperature in the chamber is recomposed. If a centrifuge is only moved, a refrigerator is operated, to preserve material is inconvenient. In case to use this function, it can operate only refrigeration system but rotor is not rotating. Users feed material in the rotor and operate refrigerator so keep the material.

### **The method of operation:**

- Input 4 on temperature and setup around 5 of the boundary of temperature.
- Input rpm "0", only refrigeration system is operated but rotor is not working.
- Users call the program for experiments when the internal temperature Time is 40°C.
- The range of time is 99 minutes 59 seconds and indicated 2 characters.

The change of time is when the centrifuge is operated and counted from the installation time.

It is made to proceed by the unit of 1 second, it's convenient to observe the movement of centrifuge according to the change of time.

## SETTING-

### 1. Button "TIME" key

With signal, previous setup time is turning off.

In this condition, button "TIME" or "ENTER" key, the turning off values are fixed and returns the initial value.

The Method of enter number uses the method of Shift Left (whenever you enter values, previous values are shifted to left a unit by unit.

### 2. Input desired hours till second unit precisely

In the process of in-put, entered values continue to tune off.

When you enter wrong, enter again.

After entering the desired values, press key of enter for finishing.

3. To enter only "0" make you set up continuous act possibly. After pressing a key of start, Down Counting causes, and after every time passes, braking is started and reduced.
  - Use FREE RUN function to operate more than 10 hours of centrifugation. Pose only "0" in the time window to use free run function for unit.
  - CHAMBER TEMPERATURE FURTHERANCE- In case of operating only function of temperature, timer is only adopted in function of temperature and further only temperature surrounding for regular time.

**Speed Reduction Time:**

- The level of speed reduction : the 3rd step
- The latest step is "0" and the fastest is "9" .
- As t were, in the velocity, "9" is set, the speed is reduced very quickly.
- To promote the effectiveness of the layer protection and separation work after centrifugal separation.

**SETTING-**

1. Press the "Break" key  
With signal, the values are turning off, in this condition press "Brake" or "ENTER", the turning off values are fixed and returns to the initial condition.  
By using the number keys, input required program number and then turning off program is stored completely.
2. Input the level of speed reduction using number keys.  
When it's wrong, you can input data again
3. Press "ENTER" key after input data, the input procedure of the speed reduction is completed.

**Storage:**

In this system, from 0 to 10, programs is stored.

- The contents of program storage  
Installation value by functions needed in centrifuge are stored in this program.

**SETTING-**

The method of storing a program

1. Press the "Break" key  
With signal, the previous values are turning off, in this condition, press "Brake" or "ENTER", the turning off values are fixed and returns to the initial condition. By using the number keys, input required program number and then turning off program is stored completely.
2. Input the level of speed reduction using number keys.  
When it's wrong, you can input data again
3. Press "ENTER" key after input data, the input procedure of the speed reduction is completed.
4. Press "ENTER" key after input data, the input procedure of the speed reduction is completed.

**4. CALL:**

In this system, 0 to 10 programs is stored.

The contents of program storage

Installation value and functions needed in centrifuge are stored in this program.

## SETTING-

### Call program storage

- First of all, press "Program" key, and with signal the previous program number is turned off.
- Input new required program number using number key, after input required value and press "ENTER" key, total indication is exchanged with suitable data in accordance with program numbers.

#### 5. **Pulse:**

When press and untouched this key, the speed raise till installation speed and automatically stops and it applies installation speed reduction when it stops.

#### 6. **Strange Oscillation:**

IMBALANCE LED is turned with signals and previous according to previous Excel Time when rotor loses the level of sufficient balance and the vibration is serious.

#### 7. **Door:**

To open the door, Press the button beside "DOOR" key .

#### 8. **Movement:**

Press "START", the movement starts according to installation value .

#### 9 **Stop:**

When press "STOP", the operation is paused on any circumstances.

## CHAPTER 5. MAINTENANCE

This chapter explains how to keep your unit in good operating order. It includes instructions for cleaning, decontaminating and storing. This chapter also covers the cover interlock by pass.

### **Care and cleaning:**

Keep your centrifuge cleans, to ensure good operation, and to extend it's life.

Clean the sample chamber, rotor and lid at the end of each works 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 spillage 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.





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