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INSTRUCTION MANUAL FOR

# ECENR-210

Micro Size Refrigerated Centrifuge



**PLEASE READ THIS MANUAL CAREFULLY BEFORE OPERATION**

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## **I. SPECIFICATION**

SPEED (rpm)	1,000 ~ 14,000 LCD Digital display
MAX RCF	16,000 x g
MAX CAPACITY	1.5 / 2.0 ml x 18pcs
TEMPERATURE RANGE	0 °C ~ 40 °C
ELECTRIC COTNROL	Microprocessor Control
	10 Memory Programs
SAFETY DEVICE	Auto Power off for Rotor Imbalance
	Overheat and Overload safety protection
	Auto power off when door open. Safety lid lock.
	Fuse Safety device
TIMER	99min:59sec / Digital Timer display
WEIGHT (kg)	35.00Kgs.
SIZE (cm)	55 x 42 x 28 Cm
POWER	220 V , 50/60Hz
POWER CONSUME	200W

## II ROTOR AND ACCESSORY

1. Centrifugal force calculation: Use its speed and radius to calculate force as following formula.

$$RCF = (\text{rpm})^2 \times 0.00001118 \times R$$

R: radius (cm)


RCF: Relative Centrifugal Force ( x g )

2. Cautions for using the rotor:

The rotor is made of steel or aluminum with high density coating and highly resistant to corrosion, but not fit to alkaline and strong acid substance. Furthermore, don't heat the rotor to a high temperature for a cleaning or sterilizing purpose, or the quality of the rotor would be getting inferior.

★ Please don't use the rotor any more if it is with any split, deforming, or other strange conditions.

★ Suggestion: Under a normal use situation, we suggest that each rotor's useful life should be not over 5 years.

ROTOR		CAPACITY (ml x pcs)	MAX SPEED (rpm)	MAX RCF RCF (x g)	TUBES SIZE (mm)
REA-1518		1.5 / 2.0 x 18	14,000	16,000	φ 10 x 40

3. Accessory: Tube adapters (The parts should be bought extra. )



0.2 ml adapter



0.5 ml adapter

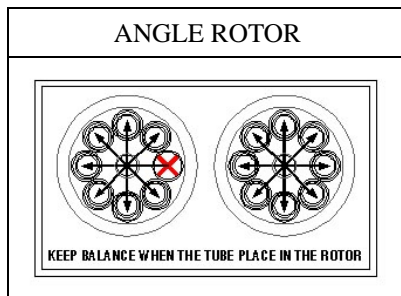
## NOTICE BEFORE USE

**DO NOT PLUG IN POWER AFTER REMOVE THIS CENTRIFUGE, WAIT 30 MINS TO ONE HOURS ; THEN, USE NORMALLY.**

1. KINDLY CHECK CAREFULLY IF THE OUT-LINE OF THE CENTRIFUGE IS WITHOUT ANY BREAK, SPLIT OR DAMAGE OF IT
2. BE SURE TO PUT THE CENTRIFUGE ON THE PLANE TABLE TO KEEP THE MACHINE BALANCE.
3. BE SURE THE POWER SUPPLY IS CORRECT WITH THE MACHINE IT'S SELF.

POWER	REANGE OF VOLTAGE
220V	198V ~ 242V

4. BE USE AT A DRY AND CLEAN PLACE.
5. AVOID TO USE WITH OTHER MACHINE IN ONE POWER SUPPLY.
6. NOTICED WITH THE POSITION WHEN PLACE THE TUBES.THIS IS VERY IMPORTANT CONCERNING WITH THE BALANCE.



7. THERE IS A TRANSPARENT LID COVER WITH THE MICRO ANGLE ROTOR, AFTER PLACE CORRECT WITH THE TUBES, COVER IT GENTLY, AFTER THE ROTATION , LID THE TRANSPARENT COVER ,TAKE OUT THE TUBES.
  - 8 .THIS MODEL DESIGINE WITH THE “AUTO LID LOCKED” .THE LID CAN NOT BE OPEN IN ROTATION.
- A:** BE SURE CLOSED THE LID WELL,THEN ROTATION GO NORMALLY.
- B:** TOP LID CAN NOT OPEN, IF ROTOR STILL RUNNING.
- C:** LID COVER CAN OPEN ONLY WITH PLUGE IN POWER ALSO SWITCH ON

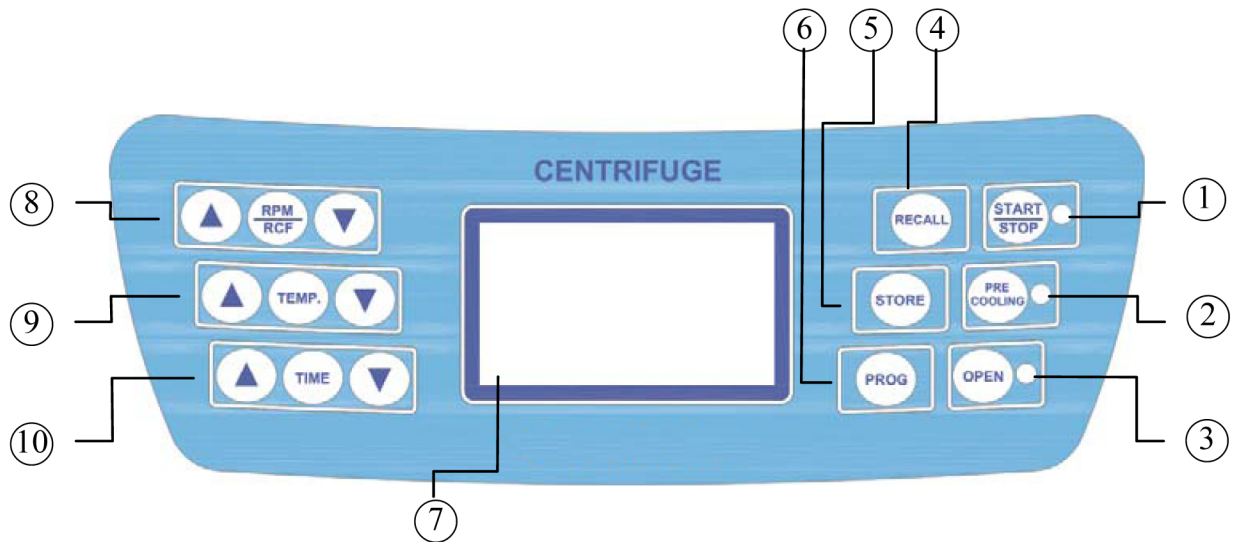
SITUATION.

**D: EMERGENCY OPEN:** THERE IS A SMALL HOLE AT THE LEFT SIDE OF MACHINE BODY, USE A STICK LENGTH OVER 10 CM. , INSERT IT, THEN PUSH THE “ OPEN KEY” , LID OPEN EASILY.

### III. OUT-LINE DESCRIPTION



## THE OPERATION PLANE



- ① “START/STOP” KEY : SWITCH ON MAIN POWER ,THIS KEY CONTROL THE START AND ALSO THE STOP.
- ② “PRE COOLING” KEY : WHEN USERS PUSH “PRE COOLING” KEY, THE MOTOR STARTS ROTATING AND PRE-COOLING IMMEDIATELY; WHEN USERS PUSH “STOP” KEY , THE MOTOR STOPS ROTATING AND PRE-COOLING. (USERS HAVE TO SET AN EXPERIMENTAL TEMPERATURE FIRST BEFORE USING THE PRE-COOLING MOLD.
- ③ “OPEN” KEY : NOTICE THE LID OPENING KEY ONLY FUNCTIONS IN ROTOR ABSOLUTELY STOPPED . THE LID CAN NOT BE OPEN WHEN ROTOR IS STILL ROTATING..
- ④ “RECALL” KEY: RECALL THE SETTED SPEED, RCF AND TIME. PUSH【RECALL】KEY, PUSH THE 【PROG】KEY AFTER “ P” FLASH, TO SELECTE THE PROGRAM THEN PUSH “RECALL” KEY .
- ⑤ “MEMORY” KEYYY : SET THE SPEED (RPM), (RCF) AND TIMER INTO THE MEMORY. WAY OF OPERATION: SET THE SPEED AND TIMER AND PUSH THE 【STORE】 KEY., AND YOU MAY SEE THE FLASH AFTER APPEARING “P”. PUSH 【PROG】KEY TO SLECT THE PRE SET NO. ( 0~9). THEN PUSH 【STORE】, THE PROGRAM MEMORY WILL BE DONE.

- ⑥ “PROG” KEY : SELECT THE PRE SET NO. YOU MAY CHOOSE FROM 0~9, AND USE TOGETHER WITH ④、⑤ OPERATION.
- ⑦ LCD DISPLAY : SHOW SPEED(RPM), RCF, TIMER , AND PRE SET PROGRAM NO.
- ⑧ “RPM/RCF” SETTING : PUSH AND HOLD THE 【RPM/RCF】 KEY FOR 3 SECONDS , THEN USERS MAY CHOOSE RMP OR RCF SETTING, THEN TO PUSH ▲▼TO SELECT RPM OR RCF SETTING.  
 1/ FOR RPM SEATING : PUSH 【RPM/RCF】 , YOU MAY SEE THE FLASH BEFORE RPM ON LCD DISPLAY . USE▲▼KEY TO HAVE THE RPM YOU NEED. AGAIN , PUSH 【RPM/RCF】 FOR INPUT .  
 2/ FOR RCF SETTING : PUSH 【RPM/RCF】 , YOU MAY SEE THE FLASH BEFORE XG ON LCD DISPLAY ; . USE▲▼KEY TO HAVE THE RCF YOU NEED AGAIN , PUSH 【RPM/RCF】 FOR INPUT
- ⑨ TEMPERATURE SETTING : PUSH 【TEMP】 KEY (LCD SHOWING IS LAST RECORD). .PUSH AGAIN 【TEMP.】 AND WILL SEE A FLASH BEFORE °C , USE ▲▼ TO ADJUST THE TEMPERATURE YOU NEED; AGAIN PUSH 【TEMP】 FOR INPUT.
- ⑩ TIME SETTING : PUSH【TIME】KEY (MIN FLASH) , ADJUST WITH ▲▼KEY TO SET THE MINUTES YOU NEED. AGAIN PUSH 【TIME】 KEY (SEC FLASH) , PUSH ▲▼TO SET ATHE SECOND; PUSH 【TIME】 KEY AGAIN FOR INPUT.

## IV . OPERATION :

- (1). PLUG THE CORRECT POWER, THEN OPEN THE ON / OFF SWITCH.
- (2). SET THE TEMPERATURE, THEN PUSH 【PRE COOLING】 KEY AND THE MOTOR SHOULD START ROTATING AND PRE-COOLING. (WE SUGGEST USERS TO USE THE PRE-COOLING MOLD.)
- (3).PUSH 【OPEN】 KEY TO OPEN THE LID WHEN PRE-COOLING IS FINISHED. USERS CAN PUT TEST SAMPLES AND THEN TO PRESS THE PLASTIC LID LIGHTLY ONTO THE TOP OF THE ROTOR.
- (4) AFTER SETTING ROTATING PARAMETERS OR GROUPS, PUSH 【START/STOP】 TO START THE MOTOR RUNNING AND 【START/STOP】 WILL LIGHT UP IN RED.
- (5) IF LCD SHOWS WITH “ERRO” BECAUSE OF IMBALANCE , AND THE ROTOR STOP AUTOMATICALY, PLEASE PUSH 【OPEN】 KEY TO DELETE THE “ERRO” MESSAGE. PLEASE DO DOUBLE CHECK WITH THE ROTOR OR TUBES IF THERE’S ANY IMBALANCE.

- (6) WHEN THE TIME RAN OUT, THE AUTO BUZZER WILL SOUND, AND THE ROTOR WILL STOP, AND LCD WILL FLASH.
- (7). NO FUNCTION WITH 【OPEN】 KEY DURING ROTATION. THIS IS FOR SAFTY REASON.
- (8). 【OPEN】 LIGHT IN RED WHEN THE DOOR IS OPEN. 【START/STOP】 LIGHT IN GREEN THIS TIME , WHICH IS NO FUNCTION WHEN THE DOOR IS OPENED.
- (9). YOU STILL MAY CHANGE THE SPEED AND THE TIME DURING ROTATION . BUT NOTE THAT THE TIMER WILL BE STARTED AGAIN IF YOU CHANGE IT.
- (10). MICROPROCESS DETECTS ROTATORY SPEED, TIMER DISPLAY AND ERRO INSTRUCTION DISPLAY, TOO.
- (11).10 MEMORY PROGRAMS FOR AVAILABLE, AND THESE PROGRAMS WILL NOT BE RELEASED EVEN THE POWER OFF.
- (12). THERE'S A SMALL HOLE ON THE LEFT SIDE OF MACHINE, WHICH IS AN EMMERGENCY OPENING HOLE OF THE DOOR.

**NOTICE : DO NOT OVER RUN WITH THE SPEED OR OVER CARRY IN CAPACITY WHICH MAY DAMAGE THE MOTOR OR CAUSE AN ACCIDENT. NOT SUITABLE FOR FLAMMABLE ITEMS. MAITAIN: CLEAN THE ROTOR, ADAPTER, INNER TANK IN DRY AFTER USING EVERY TIME. NOT SUITABLE TO STERILIZE OVER TEMPERATURE 100℃ .**

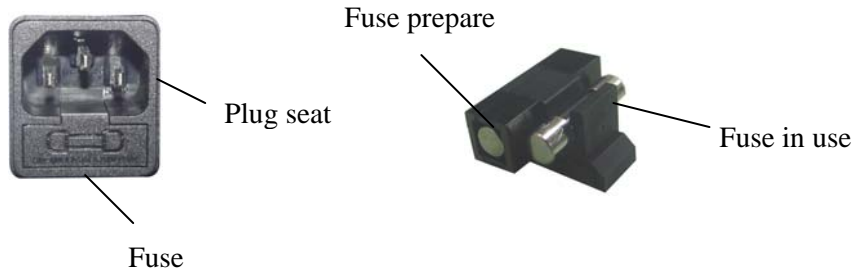
## V . ERRO INFORMATIONS

DISPLAY	STATUS	REASON/EXPLAIN	SOULT
Err-1	1. Motor can not run	1. Fault of the wire 2. Control system fault	1. Check the wire 2. Change the control system
	2. Speed erro	1. Hall IC (speed SENSOR fault ) 2. Fault of the wire 3. Control system fault	1. Change the new sensor 2. Check with the wire 3. Change the control system
Err-3	1. Open the door when rotation	1. Fault of the lid switch	1. Check with the lid switch, or change a new knob. 2. Check the wire.
Err-4	1. No timer seating	1. No seated function timer	1. Check the timer or re-seat again the timer.



Err-5	1. Unbalance	<ol style="list-style-type: none"> <li>1. No balance with the tube or carrier</li> <li>2. Fault of the Unbalance switch.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check carrier and basket even the tube if balance.</li> <li>2. Check unbalance switch or change the new one.</li> <li>3. Check the wire.</li> </ol>
Err-7	1 Brushless motor control ALARM	1. The drive control function start	1. Push 【OPEN】 key to release it

Enclosed with a Free Fuse under the seat of Power Plug, take out the main power wire, also remove out the fuse in use, check if it was broken. Change with the new one if necessary.



## VI . PARTS LIST

DESCRIPTION	Q'TY
MOTOR	1
LCD	1
KEY BOARD (left and right)	2
MOTOR CONTROL	1
RELAY	1
POWER SWITCH	1
LID COVER MAGNET	1
FUSE	2

DOOR LOCK SWITCH	1
LID COVER HINGE	2
POWER PC BOARD	1
MAIN CONTROL P.C. BOARD	1
IMBALANCE SWITCH	1
COMPRESSOR	1
FAN	1
BREAK RESISTOR	1
TEMPERATURE CONTROL VALVE	1
LOWER TEMPERATURE VALVE	1
COMPRESSOR SWITCH	1

## **VII . CIRCUIT DIAGRAM**

