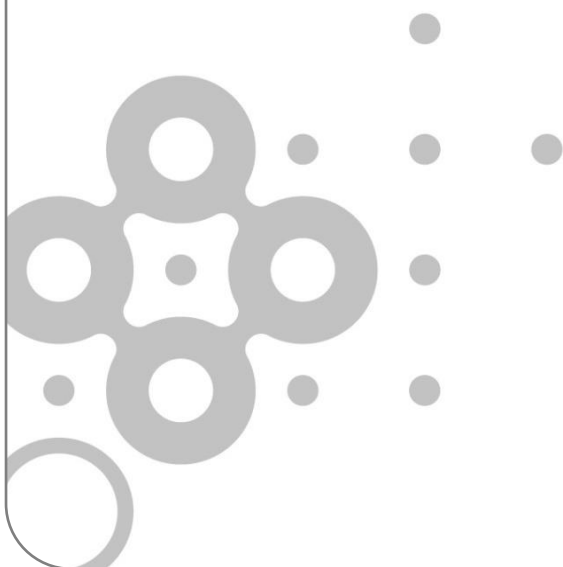


# OPERATING MANUAL

## TABLE TOP CENTRIFUGE

**MODEL : NB-5000i / 5500i**



**N-BIOTEK**  
Leading Life science

## ● ATTENTION



Warning



Precaution



Direction





## Cautions in installation

1. Install the Centrifuge on a place of ventilative and not high temperature, humidity.
2. Please ensure that the Centrifuge has at least 30cm free space from the wall. And it should be installed on an even surface.
3. It is recommended that the Incubator is not installed in a location where inflammability or explosive material placed for user's safety.
4. Check that the power source corresponds to the rated current.
5. The Centrifuge shouldn't be installed where has the high range of voltage fluctuation. (allowed range of voltage fluctuation :  $\pm 10\%$ )
6. Connect the power cord to a properly grounded outlet.



## Cautions in use

1. Do not use under  $2^{\circ}\text{C}$ , over  $40^{\circ}\text{C}$  of room temperature or over 80% of humidity.  
The Centrifuge may not operate appropriately.
2. Do not plug in the power with wet hand to avoid the danger of a electric shock.
3. Ensure not the temperature around the product to be changed rapidly.  
It might be a cause of break down due to the moisture inside of the chamber.  
(Clean out the moisture with a soft and dry towel if the moisture take placed inside of the chamber.)
4. The same capacity of TUBES must be put symmetrically on the rotor or the centrifuge would not work. And it might be a cause of break down due to the unbalance.
5. The door must not be opened during the rotation. After the door opened, there remains a little of turning force.  
Take the material out after the rotation stopped completely.
6. The rotor must be separated when it is being moved or not used for a long time. If you leave it combined for a long time, the rotor may not be separated.



## The Other Cautions

1. Do not clean the machine with chemical agent such as thinner but use a neutral detergent.
2. Recommended Tubes must be used.
  - Plastic tube(Nalgene, Falcon, Corning, Nunc, Sastedit ect.) is recommended.
  - GLASS TUBES are not recommended to use. If it is unavoidable, check weather the tube is affordable for required RCF(G-force).
3. If there occurs an error, please contact our service center and take a proper management after blocking the main power supply.
4. We strictly forbid any repair or exchange of parts by individuals except the repair by authorized engineer.  
(The product may be damaged or do not function properly. Furthermore, there is a danger of an electric shock or a fire.)

## ● COMPOSITION

### ► COMPOSITION OF THE PRODUCT

Check the accessories right after the receipt of the product.

1. Body ----- 1set
2. Rotor, Bucket ----- 1set
3. AC Power Code (220V) ----- 1ea
4. Manual in English ----- 1ea

### ► INSTALLATION

1. Place the body where you want to use. The Centrifuge should be installed on an even and vibration-free floor.
2. Check the external appearance of the product and install it with at least 30cm free space from the wall. Open the door and check the accessories.
3. Connect the AC Power Cord on rear part and connect to the grounded outlet. (220v)  
Please use proper voltage to prevent fire, electrical accident or damage on unit.
4. Load the rotor on the body.
  - Open the door and loosen the nut on the motor shaft clockwise. Load the swing rotor on the (+)groove exactly and fasten the nut with a wrench. (↻ : Close, ↺ : Open)  
(Fasten the nut firmly with a wrench or some other device to prevent the nut loosened during the operation.)
5. Load the BUCKET on the rotor.
  - The number of the BUCKET must be corresponded. After loading the bucket, shake it softly for smooth moving.  
The weight of each samples must be same.  
Imbalance of the rotor may cause abnormal noise, vibration and break down of the product.

## ● CHARACTER

### ► TERM DESCRIPTION

1. RPM : The number of rotor's rotations per a minute.
2. RCF : Relative Centrifugal Force.

### ► CHARACTER OF THE PRODUCT

1. NB-5000i,NB-5500i are for a table top centrifuge with Inverter Motor applied.
2. The body case is composed of steel plate(CR 41), and liquid pulverulent coated to prevent corrosion of the body. The inside of the chamber is composed of aluminium.
3. The microprocessor controller has 2 modes (RPM, RCF) and is able to save 9 of programs for user's convenience.
4. Adjustable Acceleration / Deceleration mode.  
(Accel : In fast/slow mode, Decel : In fast/slow/normal mode)
5. The product has Self-diagnosis function. If there occurs an error, the display will show the details.
6. The user can regulate the settings by convenient touching of  $\triangle$ ,  $\nabla$  buttons on the Segment Numeric Display.
7. Safety devices : Self-diagnosis function, Over/Under speed protector, Overload protector, Unbalance detector

## SPECIFICATION

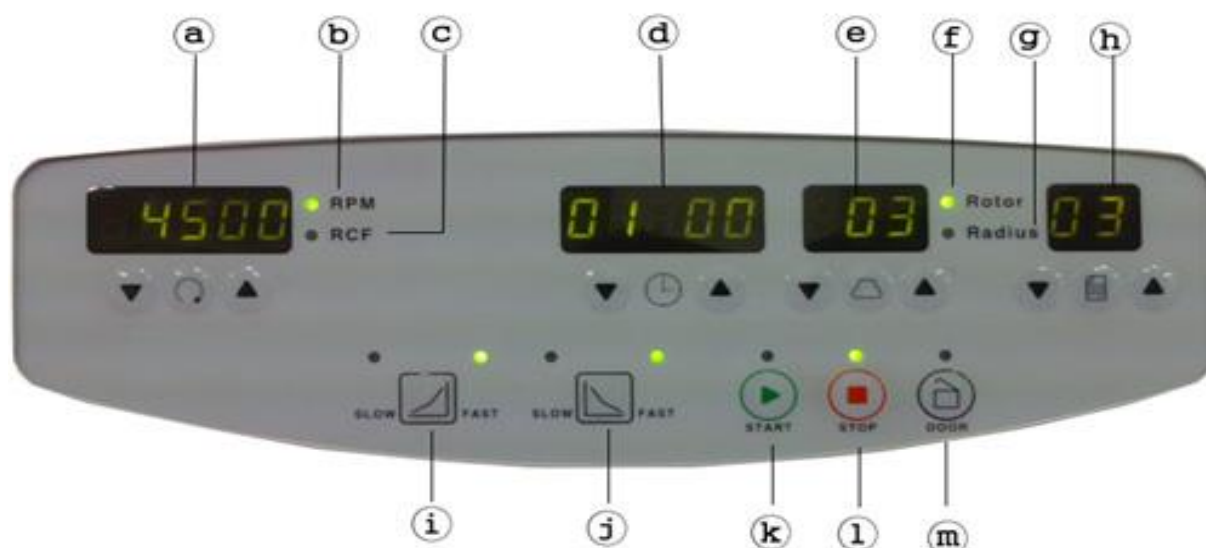
	NB-5000i	NB-5500i
Max. Speed	5,000 rpm (Swing rotor)	5,500 rpm (Swing rotor)
Max. Force	4,612 x g (Swing rotor)	5,580 x g (Swing rotor)
Max. Capacity	NB-32(Swing rotor)	
Standard Rotor	Swing rotor (NB-50S) ,NB-32 Buckets	
Main Controller	Microprocessor	
Display	7-Segment Numeric Display	
Program	20 Memory	
Acc / Decel	Accel : In fast/slow mode Decel : In fast/slow/normal mode	
Timer	99 Hour. 59 Min. & Hold Run	
Cooling Device	Air cooling	
Dimensions	440 x 520 x 330(H)mm	
Drive System	Inverter Motor	
Safety Devices	Over/Under speed protector, Overload protector Unbalance detector	
Power Supply	220V, 50Hz, 4A	

### ※ Type of Rotor

Rotor No	Rotor / Bucket	NB-5000i	NB-5500i
1	Swing rotor / NB-50S 50mlx1Tubesx4pcs / NB-04	5,000RPM / 4,612 x g	5,500RPM / 5,580 x g
2	Swing rotor / NB-50S 50mlx2Tubesx4pcs / NB-08	4,500RPM / 3,736 x g	5,000RPM / 4,612 x g
3	Swing rotor / NB-50S 15mlx4Tubesx4pcs / NB-16	4,000RPM / 2,952 x g	4,500RPM / 3,736 x g
4	Swing rotor / NB-50S 15mlx8Tubesx4pcs / NB-32	4,000RPM / 2,952 x g	4,500RPM / 3,736 x g
5	Rack Carrier/NB-40	3,500RPM / 2,260 x g	3,500RPM / 2,260 x g
6	Micro plate rotor/NB-02M 96well micro plate x 2ea	2,500RPM / 1,153 x g	2,500RPM / 1,013 x g

## ● OPERATION

### ► CONTROL PANEL



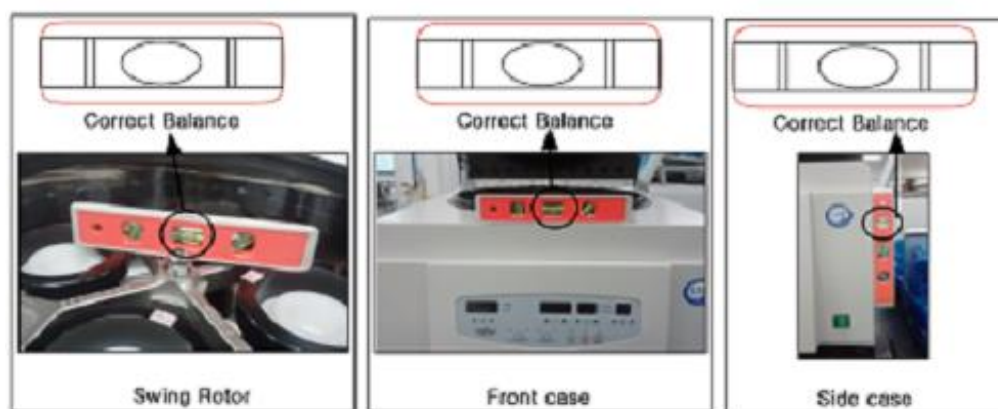
No.	Name	Function
Ⓐ	Speed control & display	RPM setting / Shows present speed
Ⓑ	<b>RPM LED</b>	Shows RPM mode
Ⓒ	<b>RCF LED</b>	Shows RCF mode
Ⓓ	Time control & display	Timer setting / Shows time setting value
Ⓔ	Rotor display	Selection of Rotor number / Checking radius
Ⓕ	Rotor LED	Rotor number mode
Ⓖ	Radius LED	Rotor radius mode
Ⓗ	Program control & display	Program number / Program setting mode
①	Acceleration	Setting Acceleration (Slow / Fast mode)
①	Deceleration	Setting Deceleration (Normal / Slow / Fast mode)
Ⓚ	Start Key	Starts the operation
Ⓛ	Stop Key	Stops the operation
Ⓜ	Door Key	Opening Door

## ► OPERATION

1. Put the unit on horizontal plate. Make a balance on left, right and upside of unit by using balance.

Turn on the main power switch.

**\*\* Not proper balance upon installation will incur damage in operation.**



2. If there is no problem, present status is shown on the display.

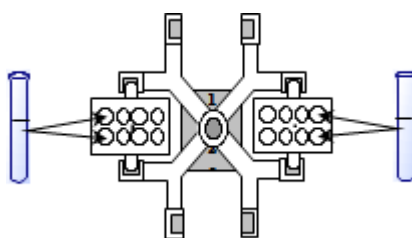
3. Open the door, put the rotor exactly.

4. Put the tube on the buckets, close the rotor nut.

\* You should lock the nut strongly by using 20mm spanner.

If you do not lock it strongly, damage might be occurred by unbalance.

※ **Put the tube on bucket symmetrically as below**



5. Put the test material in the tube. Volume should be same.









① Test Material has to be put on bucket with same volume symmetrically If not, damage might be occurred by unbalance.

6. Set each parameter by below order.

7. If you do not want program setting,

(※ **If you want to set the program, go to No.8.**)



- 7-1. Check page 7. Then, choose rotor number you use among them.  
Set the rotor number by using UP/DOWN key on the display  
If rotor number is set, Max.RPM of the rotor is shown.  
Press the Radius mode by pressing rotor mode key.  
Rotor radius is shown on the display (  )
- 7-2. Set RPM value by using UP/DOWN Key.  
If you want to see g force, press speed mode key.(  )
- 7-3. Set the time by using UP/DOWN Key. (99Hour 59min.)  
If you want to use it continually, set the time to 00:00 ("HOLD" is shown)
- 7-4. Set the acceleration step.(Slow, Fast mode(  key)
- 7-5. Set the deceleration step.(Normal, Slow, Fast mode(  key)  
If 2 LED is off, It means it is under Normal mode.
8. Set the program. (※ available 20 Program totally)
- 8-1. Press program setting mode by using the Program mode key(  )  
(Program display is blinking.)
- 8-2. Select program number by using UP/DOWN Key.
- 8-3. Set each parameter like No.7 or No.8.
- 8-4. Press program mode key. Setting value is save.( )  
(Blinking of Program display is stopped.)
9. Press the Start key.(  )
10. After all progress is finished, centrifuge is stopped automatically.  
If you want to stop while it is running, press the STOP key .(  )  
Running is stopped forcibly.
11. After unit is stopped, Press the DOOR Key (  ). Door is opened  
Pick up the tube from buckets.  
Even though you press the Stop key when it is running, rotor is not stopped suddenly.  
While rotor is running, door is not opened.  
Wait until rotor is stopped completely.
12. If DOOR is opened, refrigerator is stopped automatically.
13. After using centrifuge, turn off the main power switch.
14. Be careful test material is not dropped into unit chamber while you pick it out from buckets.

## ● SERVICE MANUAL

This service manual is designed to help implement the exact and prompt service for Centrifuge (Model : NB-5000i/NB-5500i)

Therefore, a service representative should fully understand the manual and use it to be the proper reference materials. Please follow the manual because mechanical damages can happen and a user can be hurt during installation, operation and A/S, if you do not follow the manual.

The operation should be conducted by the man who can handle with the equipment that has electric current. If the manual is lost, please ask the head office or an agency.



If you don't understand the contents of the manual, please feel free to contact the head office or an agency.


Please understand that there could be some differences in some of the contents, pictures and images if the parts change for safety reason or quality and performance improvement reason.

We are not responsible for troubles or injury resulting from disassembly without any proper tools or maintenance facilities during working.

If you contact our marketing team about any improvement or illogicality during working, we will improve after closely reviewing it.

### ► SAFETY PRECAUTION

SIGN	SAFETY CLASSIFICATION	DESCRIPTION
 <b>DANGER</b>	The serious injury or death of a user or loss of property could happen, if you do not follow safety precaution.	Do not operate the unit in places to be directly exposed to moisture or water.
		Do not operate the unit in places with flames.
		Do not touch the power cord with wet hands.
		Do not use any damaged or loose plugs.
 <b>CAUTION</b>	The serious injury of a user or loss of property could happen, if you do not follow safety precaution.	Do not operate the unit except people who are well informed of the operating way.
		Do not install the unit in places to be exposed to moisture or water.
		Do not unplug by pulling on the cord. (There could be electric shock or fire)

 <p><b>CAUTION</b></p>		Do not plug several electric products in to an electrical outlet. (There could be electric shock or fire)
		Keep the plug and electrical outlet clean. (There could be electric shock or fire)
		Connect the power cord to a ground outlet and ground the unit. It is essential for safety.
	<p>The serious injury of a user or loss of property could happen, if you do not follow safety precaution.</p>	Maintain level during installation or operation.
		Do not wear loose clothing or a scarf during working.
		Do not bend the power cord or press it with a heavy stuff.
		Operate only the unit with a rated current.
		Use Only the prescribed fuse to avoid fire.
		Do not install the unit in a place with moisture or dust.
		Use only the recommended parts and accessories by N-BIOTEK
		We are not responsible for the damage of the unit or any accidents resulting from the use of the unrecommended parts and accessories.
		When using the hazardous materials (pathogenicity, toxicity, radiation), a user certainly should understand the materials for safety.
		If the hazardous materials are contaminated inside or outside the unit, take safety measures(ventilation, isolation) after removing the materials.
		Do not use combustible and explosive materials.
		Before use, keep the unit dry.
		Be careful of the corrosion by a high level acidity, base, salts.
		Use the proper tools.

## ► INSTALLATION

### 1. Inspection

- 1) When a centrifuge arrives, check closely the damages for packing.
- 2) When the packing do not have any damages, open and check the damages for the unit.
- 3) Check if the unit has all accessories.
- 4) Check the standard power requirements.

Contact our marketing team if the there are damages or defects for the unit.

You can find our contact number on the cover of the manual or the warranty.

## 2. Location

- 1) Install a centrifuge on a large and strong spot.
- 2) If a centrifuge is installed on a desk or worktable, please use the desk or worktable that can bear the weight and vibration of a centrifuge.
- 3) Please ensure that the both sides and back side of a centrifuge have at least 30cm free space from the wall for the smooth rotation of a centrifuge.
- 4) Keep a centrifuge horizontal. (Use a balancing gauge if necessary)
- 5) Do not put anything on the top of a centrifuge except test materials.
- 6) Be careful not to drop samples on a centrifuge.
- 7) Plug in the power cord.

## 3. Electrical Requirements

- 1) Use a proper wire because the centrifuge requires special electrical requirements.  
**205 ~250Vac, 50Hz/60H, SINGLE PHASE, 1.6A**
- 2) The large outfit during acceleration is the rated power to reduce acceleration time.
- 3) The wire is 7A wire(3C x 0.75mm<sup>2</sup>) including a ground wire.
- 4) Power cord is Mold Cap 250V, 7A.
- 5) The centrifuge is equip with a fuse(6.3A) just in case of a short circuit or overcurrent by the regional difference of electric power.
- 6) Check the voltage by a electrical measuring instrument and then check to meet the requirement of the fifth clause.
- 7) If the measured voltage is  $\pm 10\%$  over 230V, the malfunction or errors of the unit could happen.
- 8) Check if the ground wire of a plug is grounded or the ground connection part is disconnected.





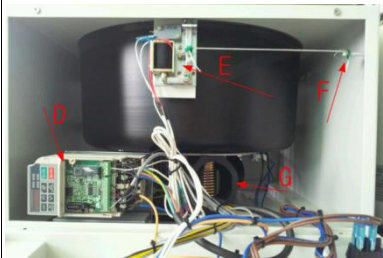
## ► OPERATION

- 1) Check if a centrifuge operates at low speed, when it starts.
- 2) Conduct a basic test at the max speed of a rotor.
- 3) Check the operation with water.
- 4) Check if a centrifuge operates when a door is opened.
- 5) Check if you can open a door when a centrifuge operates.
- 6) Check if the front setting panel of a centrifuge operates properly.

## ► DISASSEMBLY

### 1. Main Body (Before disassembly, check with engineer enough)

**You should unplug when you disassemble or change parts to prevent electrical accidents.**

No.	Description	Pictures
1		Front Door Open Release 2 screws in front bottom of unit.
2		Rear Door Open Release 9 screws in rear of unit
4		Main Control PCB This PCB is attached on front panel
5		Inverter Motor Controller <b>** Do not change initial parameter value in inverter motor controller without our engineer approval.</b>
6		D : Inverter Motor controller E : Door Lock Device F : Emergency Key for Door Open G : Rubber support for balance

No.	Description	Pictures
7		<p>Unbalance S/W</p> <p>It is located in rear of inverter motor controller</p>
8		<p>Release nut to pull out the swing rotor by using spanner.</p> <p>Then, take off the rubber pad in chamber.</p>
9		<p>Motor</p> <p>Release some screws around motor. Motor would be taken off from the chamber.</p> <p>A: Sensor for Rotor recognition</p>
10		<p>Bottom of Motor</p> <p>B : PCB for RPM Sensor</p> <p>C : RPM Gear for Checking Motor RPM</p>



## ► ERROR LIST & TROUBLESHOOTING

### ※ Error message

Signal on RPM display		Description
Err_DoorOpen	1	Door Error. Door is opened
Err_Rotor	2	Rotor loading is incorrect.
Err_RpmSetOver	3	RPM is over than setting value
Err_RpmSetLow	4	RPM is lower than setting value
Err_SetTime	7	Exceed time than setting value
Err_TempSetLow	8	Present TEMP is lower than Setting value
Err_TempSetOver	9	Present TEMP is over than Setting value
Err_Start	11	There are some trouble. Start is not available
Err_Door	12	Door Error. There are some trouble on Door
Err_TempLimit	13	Exceed the TEMP than setting value
Err_No Rotor	15	There is no rotor.
Err_unbalance	20	Some Unbalance is occurred
Err_OverRp,	21	Exceed RPM than setting value
Err_Motor	22	There are some trouble on motor
Err_Inverter	23	There are some trouble on Inverter control

### ※ Reference

1. Press the Program number. You can check set all Program value.
2. Once you select program number, you can review all setting value of that program.
3. To check TOTAL RPM, please turn on the centrifuge with pressing of Speed mode key.
4. In case of failure of power supply, door is not opened by DOOR Key. In that case, you can open the lid forcefully by pulling out a string. You can find it on the left side of centrifuge.



**► CLEANING**

- ① The outside of a unit should be cleaned by soft and dry cloth.
- ② If the outside needs to be cleaned, keep the unit dry by wiping with dry cloth after cleaning with soapy water.
- ③ Do not use caustic detergents such as alcohol, benzene, thinner.
- ④ Use a damp sponge with a mild liquid detergent.
- ⑤ Be careful of a scratch during cleaning.
- ⑥ Do not use steel wool. It could create corrosion.



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