NB504CIR Operation Manual

Model : NB504CIR

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Leading Biotechnology

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1. SAFETY AND GENERAL PRECAUTION

1. 1 General Information on Precaution

This equipment must be operated as described in this manual. if operational guideline is not followed, equipment damage and personal injury can occur.

Please follow this mark to prevent equipment damage of personal injury.

If you don't keep this caution, you can get injured as well as a property loss.

1.1.1 Safety warning symbols

1.2 Precaution for using the power cable

Do not make the power plug be pressed by back of the product.
(A space between the product and the plug must be 30cm at least.)

The power outlet must be only for this product.
(Using various products simultaneously can cause a fire.)
Clean the power plug with a dry towel and connect it properly.
(Foreign substances or unsafe connection can cause a fire.)

Do not bend the power cable hardly and do not make it to be pressed by heavy products. (When it is damaged, it can cause a fire.)

Do not touch the power cord with wet hands.
(It can cause an electric shock.)

Do not use the damaged power cord and outlet.
(It can cause an electric shock and a fire.)

When you see smoke coming from the product or smell burning, you have to pull out the power cord and stop using it.
(It can cause an electric shock and a fire.)

1.3 Precaution for ground connection

Please ground before use the product, if you don't ground, you could get an electric shock when malfunction or an electric leakage occurs.

At the place where you can't ground,

* Please buy the equipment to prevent any electrical leakage.
* An electric shock, an electric leakage and a fire can be occurred without an electric leakage breaker.

Do not ground to these places; Gas Pipe, water pipe, pipe, lighting rod, telephone wire, etc.

* Wrong ground connection can cause electrical leakage which eventually results in fire.

If you don't have the outlet for AC 220V, then bury it under the ground after connecting the ground line to copper plate.

* No ground connection can bring an electrocution, an electric leakage and a fire.

1.4 Precaution for use

You must not disassemble, fix and remodel the product by yourself.
(You can damage the product throughout a fire and malfunction or get a property loss as well as experimental loss.)

Do not use the product for different purpose.
(It can cause malfunction or poor function. Consequently, you will get a wrong result.)

Do not use an inflammable spray near the product.
(The switch and other electric connection parts can cause a fire.)

When you use inflammable substances such as benzene, thinner, alcohol and LP gas, please be careful. (It can cause a fire and an explosion.)

To prevent water and experiment material from going into the control panel during the experiment, make sure to clean the control panel with a dry cloth.
(It can cause an electric leakage and a fire.)

Do not wash the product with excessive quantity of water, thinner, benzene and Petroleum.
(It can cause an electric leakage, and malfunction or damage on the surface.)

When you don't use the product or clean it, please pull out the power plug.
(It is to prevent an eclectic leakage.)

Open and close the door softly and please use a door knob.
(A heavy shock can damage the product and breakdown the operating part.
Also, your hands can be stuck between the door and body.)

Do not detach the built-in lamp and electrical devices.
(It can cause an electric shock and a fire.)

Please be sure to prevent foreign substances from getting into the sealing silicon of the door.
(The inflow of open air can cause the change of temperature in chamber and discoloration of the packing part by a foreign substance.)

2. TRANSPORTATION, STORAGE, AND LOCATION OF INSTALLATION

2.1 Transportation

DO NOT try to slide or tilt the unit

Lift the unit on each corner of bottom with the aid of 2 people.

Permissible ambient temperature range for transport: -10℃ to 60℃.

2.2 Storage

Do not keep it at place in High Humidity. Permissible ambient humidity: max. 70%
storage in a cold location is the place you transfer the unit to the installation site for start-up, condensation may form. In this case, wait at least one hour until the CO2 incubator has attained temperature and is completely dry.

Please check the voltage & Hertz written on serial label.
(Over-voltage, under-voltage can damage the product and poor performance.)

Do not install at a humid place.
(It causes an electric leakage accident and a corrosive of the product.)

Keep this product out of the direct ray of sun and do not install at a hot place or a place that is near an electric heat.
(The proper indoor temperature is 20℃ ~ 30℃.)

2.3 Location of installation and ambient conditions

Do not put flammable substances near the product. (It may cause a fire.)

When you install the product, you are required to keep the distance at least 30cm from the wall. To completely separate the unit from the power supply, power plug must be disconnected. Install the unit in the way that the power plug is easily accessible and can be easily pulled in case of danger.

Install the unit at a flat surface, free from vibration and in a well-ventilated location. (If the ground is not flat, it may cause an excessive vibration of the product.)

When you move the product, do not lay down to its side or reverse the head to bottom. (It may cause a malfunction.)

When you move the product, hold the door and other movable parts of the product with a tape. (When the product is moved, the movable door can cause injury of you and damage of the product.)

When you move the product, you must hold up the product. (Pushing or pulling the product can damage the bottom part of the product.)

3. PREREQUISIT AND CONFIGURATION

3.1 Prerequisit

Inspection of Boxes

When you have received the instrument which is packed on pallet, inspect the box carefully for any damages that may have caused any damages to product during shipping.
Please report any damage to the carrier or to your local N-BIOTEK distributor immediately.

Location

The incubator is designed to operate at temperature 4℃. Maximum Room Temperature is 32℃.
To avoid place for use this incubator is as below.

1. Near heater or freezer (if it may generate heat and affect temperature control of incubator)
2. Near equipment generating heat or cold air to incubator
3. Directly sunlight exposed to incubator
4. Uneven ground or table head
5. The place where is being vibrated

Caution

Make sure that the rotor fixing nut is securely fastened before running.
If the unit runs with rotor loosen, it may cause the serious motor shaft damage in which could lead the breakage inside of the unit.

Make sure that the cold trap bottle is well fitted with cold trap.
Make sure that the cold trap where produces -20℃ should be maintained in clean condition for better effect.
Make sure that the passive vacuum release is at right position.
Make sure that the IR lid is well closed.

3.2 Configuration

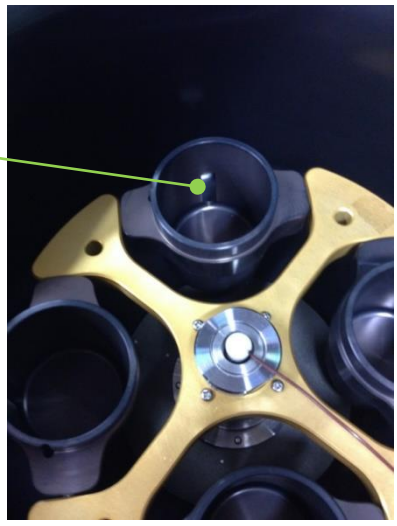
<Figure #1>

1. Safety Lid	6. Chamber, Rotor
2. Vacuum Gauge	7. Front Cover
3. Control Panel	8. Main Power
4. Cold Trap	9. Safety Switch
5. IR Lid	

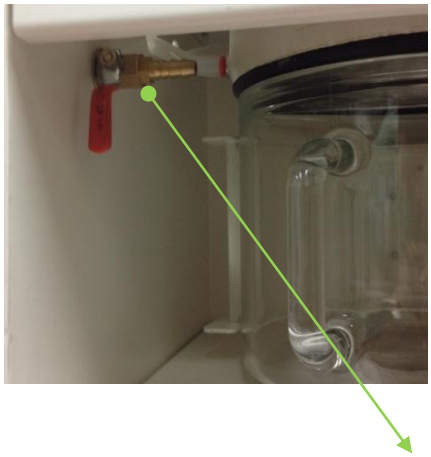
<Figure #2>

Note:

There is a vertical empty gap on rotor. That gap must face to chamber, not to rotor inside in order to create centrifugal force.



<Figure #3>



Passive vacuum release valve <u>at CLOSED position</u>

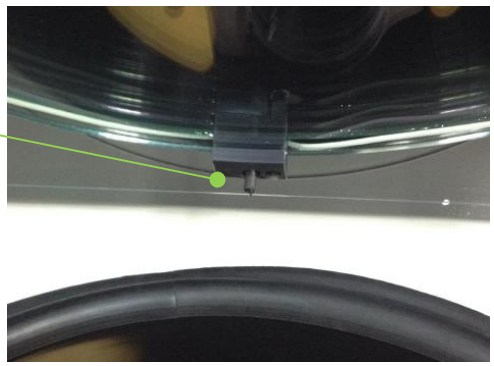
<u>at OPEN position</u>
(When you need to force the vacuum out)
(e.g. In case of power failure(black out) during use)

<Figure #4>

At the rear of NB504CIR, there is a port where air in chamber comes out as vacuum fills up in chamber.
There might be a sound of air coming through this port until chamber gets to vacuum condition.

<Figure #5>

Temperature sensor for chamber on LID



4. FEATURES AND SPECIFICATIONS

4.1 Features

1. IR concentrator uses centrifugal force with heat, IR and vacuum to evaporate solvents faster
2. Transparent IR-emitting glass lid
   → With the use of infrared ray, the sample can be concentrated efficiently, quickly under vacuum condition.
3. Cold trap (-20℃)
   → Cold trap where produces -20℃ helps evaporate more faster and efficiently plus minimize contamination and sample loss.
4. Brushless DC motor
   → Induction motor barely makes noise and vibration. Plus, this gives less maintenance required.
5. User-friendly operation designed
6. Compact & mobile system
   → It is suited for individual researchers with limited footprint.

4.2 Specification

Items	NB504CIR
Temperature	
Range	+4℃ to 80℃
Increment	0.1℃
Controller	Microprocessor Digital PID
Heating Mode	3 Selectable mode (IR, IR/HEAT, HEAT)
Timer	99hrs 59min
Capacity	1.5ml micro-tube x 132ea, 15ml tube x 12ea, 50ml tube x 8ea, 250ml x 4eq, 96 well microplate x 2ea
RPM	Max. up to 1,500RPM (no display of RPM on control panel)
Vacuum	
Pump	Chemical resistance PTFE coated Diaphragm pump
Ultimate pressure	2 mbar
Gauge	Analogue vacuum gauge
Cold Trap	-20℃, 2 liter trap
Weight	138 kg
Overall dimension	600(W) x 630(D) x 1,085(H)mm
Power	110/220V, 50/60Hz

5. CONTROL PANEL

1 Pilot Lamp of Overheating

When overheating is detected by the safety device, GREEN light will be on

2 Pilot Lamp of Heating

Shows which mode of Heating is on by displaying different colors
- IR: GREEN light
- IR/HEAT: ORANGE light
- HEAT: RED light

3 HEAT Mode Selector

Use to select IR, IR/HEAT, or HEAT mode
- IR: IR lid heating only
- IR/HEAT: IR lid and chamber heating simultaneously
- HEAT: Chamber heating only

4 OPERATION Mode Selector

Use to select OFF, STANDBY(preheat), or RUN mode
- OFF: Power off the centrifuge, vacuum pump, and heater (display will be turned off)
- STANDBY: Heating up without centrifuge operation prior to concentration (Preheat)
- RUN: Centrifuge operation and vacuum start

[Note] On STANDBY mode, the set time continues to flow regardless of whether the centrifuge is operating or not.

5 Temperature and Time Control Display

Shows the set value and actual measured values of temperature and time

6 TIME Button

Use to display TIME remaining / press again to get back to Temperature

7 SET Button

Use to set TEMPERATURE and TIME

8 INCREASE / DECREASE Button

Use to adjust the set temperature and time in setting mode

9 START / STOP Button

Use to START or STOP the operation (and reset the timer - reset to the previous set value)

6. OPERATION

The location where you are desired to use it should be flat, balanced surface to keep the unit stable.

Before connecting the power cable to the plug, make sure that the unit is turned off to avoid any electric shock.

[Start Operating]

1) Power On
   - Please check figure #1(pg. 8) where you can see main power switch.

2) Check Cold Trap
   - Make sure that cold trap is well fitted in its place. If not, proper vacuum won't be generated.
   - If the cold trap is necessary, turn Cold trap Power S/W on.
   (* After turn the operation mode to "STANDBY")
   There is a switch for cold trap(TRAP) right next to control panel.

3) Rotor Installation
   - Make sure that rotor and tube or bottle should be balanced for installation.
   - Unbalance installation on those parts will cause a severe malfunction.

[Temperature Setting]

1) Turn the operation mode to "STANDBY". Then, display shows the current temperature of chamber.
2) Choose the desired heating mode (IR / IR&HEAT / HEAT).
3) Press SET button once and LED display will flicker with showing the current set value of temperature.
   In this status, you can adjust the set temperature by using INCREASE & DECREASE button.
4) After setting, press SET button again to SAVE.
   At the same time as saved, it will move on to next step, Time Setting.

[Note] If the set value is higher than current temperature of chamber, then heating starts with HEAT pilot lamp on. When the temperature is almost reached to set temperature, the pilot lamp will be flickering.

[Note] Temperature setting range is from 4°C to 80°C. If operating temperature is needed to be below ambient, please turn on CHAMBER to activate compressor. Otherwise, compressor remains off for longer life span.

[Time Setting]

1) At the same time as set temperature saved, it will move on to Time Setting.
   On LED display, 'HOUR' section will flicker.
2) Adjust to set 'HOUR' section by using INCREASE & DECREASE button.
3) Press SET button again and it will move on to 'MINUTE' section.
   Adjust to set 'MINUTE' section by using INCREASE & DECREASE button.
4) After setting all, press SET button again to SAVE.
   "SAVE" will be shown on the display and then move on to current temperature.

[Note] For non-stop operation, the time setting on the timer should be at "00:00".

[Note] When the set time is expired, the device will automatically stop the operation and "END" will be shown on the display. To restart the operation, press START/STOP button. (The set value will be reset to the previous set value.)

[Operating]

After Temperature & Time setting is completed, turn the operation mode to "RUN".
When rotor starts to rotating, concentration is begun.

[Note] Vacuum gauge at 85~90 is regarded as normal operation.

[Note] Make sure to keep away from the LID during operation if IR heat mode is set.

[General Information]

- In IR or IR&HEAT mode, temperature set-up range is limited up to 65°C, because IR lid has limited heating capacity.
- In IR mode, temperature of IR lid is higher than set temperature because only IR lid is heating and warming up the air inside the chamber.
- There are 4 ways to stop the centrifuge during the operation.
  1) Turn the operation mode to "STANDBY" : It will stop the centrifuge and vacuum pump.
     The display will keep show the current temperature.
     [Note] On STANDBY mode, the set time continues to flow regardless of whether the centrifuge is operating or not.
  2) Turn the operation mode to "OFF" : It will stop the centrifuge, vacuum pump, and heater.
     The display will be turned off.
  3) Press START/STOP Button : It will stop the centrifuge, vacuum pump, and heater.
     The display will show "STOP".
  4) Turn off the main power : It will immediately stop all actions.

[Note] When restart the operation or turn on the power after 2), 3), or 4) : The set value will be reset to the previous set value.

- Cold trap power can be turned on only when the main power is on.
- Cold trap power is turned on/off only through the Cold Trap Power S/W.

  Cold trap power cannot be turned off from the control panel.

  [Note] Turning off the main power S/W also turns off the cold trap power. In this status, turning on the main power S/W leads to cold trap power on automatically.
  To turn off the cold trap power properly, it is recommended to use the cold trap power S/W. Also, it is recommended to turn off the cold trap power first and then turn off the main power when turning off the main power.
- When you turned off and on the cold trap power, it is recommended to wait about 20 minutes for the compressor working properly.

7. SAFETY SWITCH & MAINTENANCE

[Safety Switch]

Safety S/W is a device to shut off the overheating in the chamber and temperature rising by malfunction.
Place safety dial at least 10°C higher than the set temperature as its accuracy is more than 8°C.

If the temperature of concentrator is not able to increase, check if this safety dial blocks the temperature increasing.

This is the safety device for preventing temperature from rising caused by any circumstances.
You can identify its activation by checking lighting of pilot lamp.

[Maintenance]

In order to keep in good condition for longer use of unit, it is highly recommended to clean and check the all components after finishing each concentration. when you clean inside chamber or some part, you should disconnect the power first.

① Clean up all spilled solvent in chamber
→ Remove liquids in chamber and decontaminate all remains on the surface of chamber.

② Clean up the trap and cold trap
→ Make sure that the trap is cleaned after end of each experiment.

③ Deforest inside cold trap
→ Make sure that the cold trap is cleaned after end of each experiment.

④ Remove the rotor nut and clean the rotation shaft for the next use.

⑤ Clean the exterior surface of unit with the dried cloth

⑥ After use of chamber compressor, you are required to run the chamber at 50°C or higher in order to remove cold inside. This is an important procedure for longer life-span and for normal concentration speed next time.

8. TROUBLESHOOTING

PROBLEM	CAUSE	CORRECTIVE ACTION
Unit will not operate	Unit not connected to electrical power	Connect unit to proper electrical receptacle
	Circuit breaker blown	Correct electrical problem and reset circuit breaker
	Lid open	Close lid
Excessive vibration	Sample vials not located symmetrically in rotor	Reposition sample vials
Sample odor in lab	Vent hose exhausting into lab area	Redirect hose to fume hood
Evaporation rate is reduced	Heater inoperable	Contact N-BIOTEK
	Vacuum pump failure	Check pump
	Liquid un vacuum line	Clear vacuum line
Evaporation rate is reduced (continued)	Obstruction in hose	Remove obstruction or replace hose
	Lack of adequate vacuum	See below
	Temperature set point too low	Increase temperature set point
No vacuum/poor vacuum	Liquid in glass trap	Empty trap
	Leaks in lines or connectors or gasket	Locate and repair
	Foreign material on lid gasket	Clean gasket and lid

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