

# IR CONCENTRATOR OPERATING MANUAL

Model: NB-503CIR  
(Micro-Cenvac™)



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# 1. PREREQUISITES

## 1.1. General Information on Precaution

- Precaution is to prevent the possible accident or danger during operation. Therefore, you must keep it.
- Precaution is divided into caution and warning. And, each of them has following meanings.



If you don't keep this warning, you can get an accident or a fire.



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

### Other Marks



## 1.2. Precaution for Connecting the Power Cable



You have to use the product under specified electrical conditions.

(If you use the product at the place in different power pressure, it causes a fire and malfunction of the product.)



Do not make the power plug be pressed by back of the product.

(A space between the product and the plug must be 20 cm 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 hard 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.)



Remove  
plug

When you see smoke comes out from the product or smell something is burning or see any other strange symptoms, 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 Installation



Compliance

Use it with the proper voltage.

Please check the voltage & Hertz written on serial label.

(Failure to do so could damage the product and cause poor performance.)



Prohibition

Do not install or use at relative humidity over 80%.

(It causes an electric leakage accident and a corrosive of the product.)



Prohibition

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°C ~ 30°C.)



Prohibition

Do not put inflammable substances near the product. (It can cause a fire.)



Compliance

When you install the product, you have to put the distance of more than 20 cm from the wall.



Compliance

Install at a flat and solid ground.

(If the ground is not flat, it can cause a vibration of the product.)



Prohibition

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



Compliance

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.)



Compliance

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

## 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 loss from a different study results than the original purpose.)



Do not use the product for different purpose.  
(It can cause malfunction or poor function. Consequently, it can cause 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 of the surface.)



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

## 1.5. Precaution for Ground Connection



Please ground before use the product. If you don't ground, you can be electrically shocked 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 occur an electric shock, an electric leakage and a 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 occur an electric shock, an electric leakage and a fire.

## 2. FEATURES & SPECIFICATION

### 2.1. Features

- IR concentrator uses centrifugal force with heat and vacuum to rapidly evaporate solvents from biological samples.
- Transparent IR-Emitting Glass Lid Heater  
Infrared rays from IR Glass Lid heater uses radiant heat to efficiently heat samples and speed concentration length under vacuum conditions.  
The transparent glass lid allows you to watch inside the chamber by using LED real scope for viewing the samples during running.
- No cross-contamination, No sample loss by Vacuum Pump  
Vacuum pump(built-in, Teflon-coated diaphragm pump) pulls vapor out through the small holes at the center of the chamber to minimize cross-contamination. And the expelled vapor is gathered in the glass trap.
- Stand-by Function: For efficient experiment, desired temperature can be set ahead of running.
- BLDC Induction Driving  
Built-in Magnetic Induction Drive provides maintenance free, low noise and vibration.
- Centrifugal Function: Up to 5,000 rpm
- The compact design allows the device to be placed on bench top working environment.
- Glass Trap: A glass trap is provided to condense and collect solvent exiting the chamber.

## 2.2. Specification

Items	Unit	NB-503CIR
<b>Temperature</b>		
range	°C	35°C to 65°C
control		Microprocessor digital PID
increment	°C	0,1°C
standby		Pre-heat
<b>Operating panel</b>		Touch button
<b>Heat mode</b>		IR, IR & Heat, Heat
<b>Display</b>		LED Display
<b>Timer</b>		99Hour 59Min
<b>Capacity</b>	ml,ea	1,5mlx24ea, 10mlx16ea, 0,5mlx50ea, 15mlx12ea, 30mlx8ea
<b>Speed</b>		
range	rpm	1700, 2500 and 5000rpm
control		Selector
<b>Vacuum</b>		
pump	mbar	Diaphragm Vacuum Pump (PTFE Coating)
ultimate		100mbars/abs
oper. pressure		1,5bar/g
atm. pressure		6,5lit/min
<b>Dimensions</b>	mm	213(W)x255(D)x225(H)mm
<b>Power</b>	V/Hz	110/220V, 50/60Hz, 210W
<b>Weight</b>	kg	9,5kg

## 2.3. Glass Trap



A Glass Trap is provided to condense and collect solvent exiting the chamber.

## 2.4. Configuration



- 1 HEATING MODE SELECTOR
- 2 CONTROL PANEL
- 3 VACUUM GAUGE
- 4 IR LID
- 5 RPM SELECTOR
- 6 OPERATION MODE SELECTOR
- 7 STROBE LIGHT (REAL SCOPE)



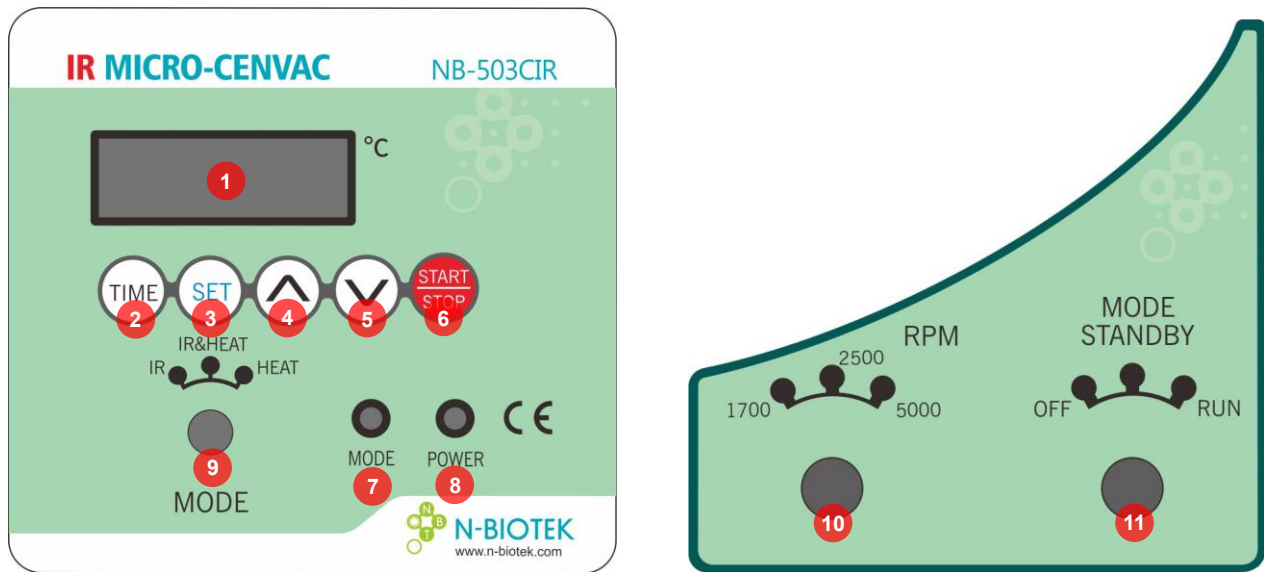
- 8 CIRCULATION FAN
- 9 IR ELECTRIC WIRE
- 10 STROBE LIGHT OUTLET
- 11 MAIN POWER S/W
- 12 GLASS TRAP
- 13 EXHAUST HOSE
- 14 PASSIVE UNLOCK DEVICE
- 15 INFLOW HOSE FROM CHAMBER
- 16 INHALATION HOLE WITH FILTER



- 17 IR HEATER
- 18 DOOR SAFETY LOCK
- 19 TEFLON-COATED CHAMBER
- 20 ROTOR
- 21 INTERLOCK SWITCH FOR LID



## 2.5. Control Panel



- 1 DISPLAY : Shows set point and actual measured conditions
- 2 TIME BUTTON : Use to display TIME remaining / press again to get back to Temperature
- 3 SET BUTTON : Use to set TEMPERATURE and TIME
- 4 INCREASE BUTTON : Use to increase TEMPERATURE and TIME in set up mode
- 5 DECREASE BUTTON : Use to decrease TEMPERATURE and TIME in set up mode
- 6 START/STOP BUTTON : Use to START or STOP a run and reset the timer
- 7 MODE LAMP : To indicate that the selected heater is on and cycling
- 8 POWER LAMP : To indicate that the unit is in STANDBY(preheat) or RUN mode (red light)
- 9 HEATING MODE SELECTOR : Use to select IR, IR/HEAT, or HEAT(only) mode
- 10 RPM SELECTOR : Use to select RPM at 1,700 or 2,500 or 5,000
- 11 OPERATION MODE SELECTOR : Use to select OFF, STANDBY(preheat), or RUN mode

## 3. OPERATION

### 3.1. Operating the IR Concentrator

The location where you are desired to install it should be level and sturdy surface.

Before connecting the power cable to the plug, TURN OFF the power switch and select OPERATION mode to "OFF".

Once the device is powered on, the lid is unlocked.

The initial set points are 50°C and 00:00 min.

✓ *For non-stop operation, the time setting on the timer should be at "00:00".*

1) Turn on the device power switch located on the bottom right side of the back panel.

2) Turn the OPERATION mode switch to "STANDBY"(Preheat).

✓ *Preheat the chamber if desired. (IR & HEAT is recommended)*

*The heater will raise the chamber temperature to set temperature.*

✓ *On STANDBY mode, the set time continues to flow regardless of whether the centrifuge is operating or not.*

3) Open the lid and place the samples in vials. (It should be no more than half full.)

4) Close the lid.

5) Set the desired temperature, run time, and RPM.

6) Turn the OPERATION mode to "RUN". The rotor and vacuum pump will work.

The display will show the actual chamber temperature.

✓ *The vacuum will work and the gauge for vacuum will indicate about "-90kPa" within 20 min.*

7) Set point parameters can be changed at any time during the operation.

8) Select OPERATION mode "OFF" or "STANDBY", or press "STOP" to finish the operation.

9) When the rotor stops moving, you can open the lid. Lift the lid and remove the samples.

✓ ***Use caution as the lid and rotor should be hot.***

### 3.2. Temperature Set-Up

The temperature range is from +35°C ~ 65°C.

Initial set temperature and time is at 50°C, 00:00 min respectively.

● Selection of Heating Mode (It is also applied in STANDBY mode)

- IR: Only IR Lid is heated. (GREEN light in mode lamp)

- IR & HEAT: IR Lid and Chamber Bowl are heated simultaneously. (ORANGE in mode lamp)

- HEAT: Only Chamber Bowl is heated. (RED in mode lamp)

✓ *The mode of heating can be changed by user during the operation.*

- 1) Choose the Heating mode which you want to set. (IR / IR&HEAT / HEAT)
- 2) Press SET button once, then the display will flicker with showing the current set value of temperature.  
In this status, adjust the desired set value by using INCREASE & DECREASE buttons.
- 3) After setting the value, press SET button again to SAVE.  
At the same time as saved, it will move on to next step, Time Setting.

- ✓ *There is no light in mode lamp when the chamber temperature is higher than set value.*
- ✓ *If the set value is higher than current temperature of chamber, then heating starts with mode pilot lamp on. When the temperature is almost reached to set temperature, the pilot lamp will be flickering.*

### 3.3. Time Set-Up

- 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.
- ✓ *For non-stop operation, the time setting on the timer should be at "00:00".*
  - ✓ *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.)*

### 3.4. Run / Stop

Before starting the concentration, its condition(rpm, temperature, and mode) should not be harmful to sample. Also, observe the solvent safety precaution.

- ✓ *For best evaporation, preheating prior to concentrating is recommendable.*

After setting all modes, turn the OPERATION mode to "RUN".

Inside chamber will become the vacuum condition after setting OPERATION mode to "RUN".

### 3.5. Installing Strobe Light(real scope)

An LED light comes as standard with each IR Concentrator.

This light allows you to check the samples as they are rotating in the chamber.

When you try to connect the real scope with the device, the device must be turned off to avoid any short circuit. And attach the connector into the socket on the back of terminal marked “STROBE”.

To use the real scope light while the unit is operating, press the push button on the light and shine the light on the samples in the rotor through the lid.

### 3.6. How to Unlock the Lid with Power Failure Situation

It is possible to open the IR lid only when

- Main power is on.
- The pressure on the pressure gauge indicates zero pressure in the chamber.

The lid cannot be opened by itself when there's a power failure.

When you face this situation and need to open the lid: pull out the latch located at the top left side of backside of the device(Unlock Device). While pulling the latch out, open the lid with the other hand.

### 3.7. Guide Line for Using IR Concentrator

- Under the state of vacuum in chamber, you are not able to open the lid. If you want to check sample volume without pause, try the Real-Scope.
- If you want to open the lid or to exhaust vacuum during the operation, place OPERATION mode lever at “STANDBY” or “OFF”, then wait until the rotation stops moving completely.
- The temperature will rise up to set value at “STANDBY” mode.  
But when the lid is open, heating does not work.
- Before the vacuum in chamber is fully exhausted, do not turn off the main S/W. If you turn off the main S/W in vacuum condition, you cannot open the lid due to the vacuum pressure.

## 4. ACCESSORIES

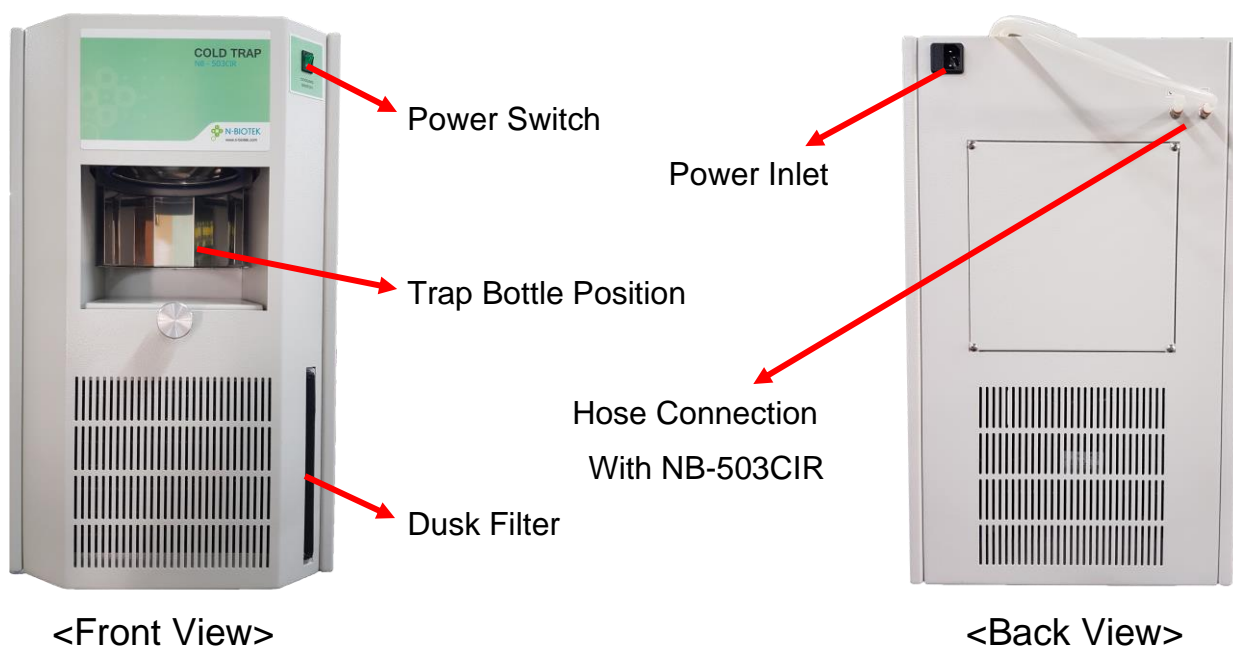
PART NO.	DESCRIPTION
503-0524	Rotor 0.5ml tube x 50ea
503-1524	Rotor 1.5ml tube x 24ea
503-10016	Rotor 10ml vial x 16ea
503-15012	Rotor 15ml vial x 12ea
503-30008	Rotor 30ml vial x 8ea

## 5. TROUBLESHOOTING

Refer to the following if your IR Concentrator fails to operate properly. If the suggested corrective actions do not solve your problem, contact N-Biotek for additional assistance.

PROBLEM	CAUSE	CORRECTIVE ACTION
Unit does not operate	Unit is not connected to electrical power	Connect the unit to proper electrical receptacle
	Circuit breaker has blown	Correct electrical problem and reset the circuit breaker
	Lid open	Close the 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 the pump
	Liquid in vacuum line	Clear the vacuum line
	Obstruction in the hose	Remove the obstruction or replace the hose
	Lack of adequate vacuum	See below (No vacuum / poor vacuum)
	Temperature set point is too low	Increase the temperature set point
No vacuum / Poor vacuum	Liquid in the glass trap	Empty the glass trap
	Leaks in lines or connectors or gasket	Locate and repair
	Foreign material on lid gasket	Clean the gasket and lid

## APPENDIX I. COLD TRAP(Optional)



### 1. Operation

The location where you are desired to install it should be level and sturdy surface.  
Before connect the power cable to the plug, turn off the power switch.

- 1) Connect the hoses to NB-503CIR. (IN → IN / OUT → OUT)



- 2) Turn on the power of NB-503CIR.  
Then, turn on the power of Cold Trap.



- 3) Place the trap bottle to the correct position.  
(Turn the handle clockwise to lift the trap bottle.)



- 4) Run the NB-503CIR when it is ready.

## 2. Precautions

- 1) Do not put NB-503CIR on the Cold Trap.
- 2) Connect the hoses properly.  
Make sure the hoses are fully connected.
- 3) Tilt the trap bottle slightly when you place it or take it out from its position.
- 4) Adjust the trap bottle to the correct position so that it is vacuumed.  
While it is vacuumed, do not take out the trap bottle.
- 5) Ice can be shown as below picture during the operation.



This is because of the freezer, not that there is a problem with the equipment.  
Ice removal is needed to start a new experiment.

- 6) It takes some time to get fully vacuumed. (approx. 20min to get -90kPa)
- 7) Clean the dust filter if there is any dust on it.  
(Dust filter is for the protection of compressor.)

Thank you for purchasing our Micro-Cenvac™, IR Vacuum Centrifugal Concentrator.

This operation manual includes practical information such as performance, usage, and cautions and notices for use of the product.

So, before using the product, please read it carefully all the safety instructions described in this manual and keep this manual for future use.

## WARRANTY

<b>Item</b>	Micro-Cenvac™	<b>Model</b>	NB-503CIR
<b>Date of Installation</b>	mm-dd-year	<b>Supplier</b>	
<b>Serial NO.</b>		<b>Period</b>	1 year

N-BIOTEK provides a warranty on all parts and factory workmanship. The warranty includes areas of defective material and workmanship, provided such defect results from normal and proper use of the equipment.

1. The free warranty service will be provided once the unit is proved to be defective by wrong workmanship after N-BIOTEK or reliable distributor's examination.
2. The warranty period is 1 year from the date of installation or 1 and half year from the date of shipment from N-BIOTEK, whichever is sooner as indicated in above table.  
This period is proved by serial number.
3. N-BIOTEK will not be responsible of free warranty service for the faulty caused by user's improper operation, excessive use, use of incorrect voltage & frequency, and storage in wrong environment mentioned in manual.
4. Complete the above table after installation and keep this card. Then, present it to dealer or N-BIOTEK when warranty repair is needed.

Signed By



President Daeyong Kim  
N-BIOTEK, INC.