

IR CONCENTRATOR OPERATING MANUAL

Model: NB-502CIR
(DNA-Vac™)



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1. SAFETY

1.1. General Information on Precaution

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



Warning

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



Caution

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

Other Marks



Warning



Caution



Compliance



Prohibition



No
disassemble



Remove
plug



Ground

1.2. Precaution When Using the Power Cable



Compliance

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.)



Compliance

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.)



Compliance

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.)



Prohibition

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.)



Prohibition

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



Prohibition

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.

(Over-voltage or low-voltage can damage the product and cause the 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 result 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 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.)

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. PREREQUISITES

2.1. Location and Exhaust Requirements

The NB-502CIR needs to be placed at flat, stable and level surface.

Some solvents used in this unit may cause damage in human body so the exhaust gas which has been expelled at the rear of the unit through white tube should be led out to the atmosphere or place the unit in the fume hood.

2.2. Space Requirements

There are fan and compressor outlets at the back of the unit, so when placing your DNA-Vac™, Keep the unit at least 30cm away from the wall. The dimension of the unit is 670(W)x685(D)x480(H)mm.

2.3. Transporting the DNA-Vac™

DNA-Vac™ is a heavy unit. When transporting the DNA-Vac™, lift the unit as four bottom corners with the aid of at least 3 people and place the unit on a pallet to move the unit.

2.4. Unpacking the DNA-Vac™

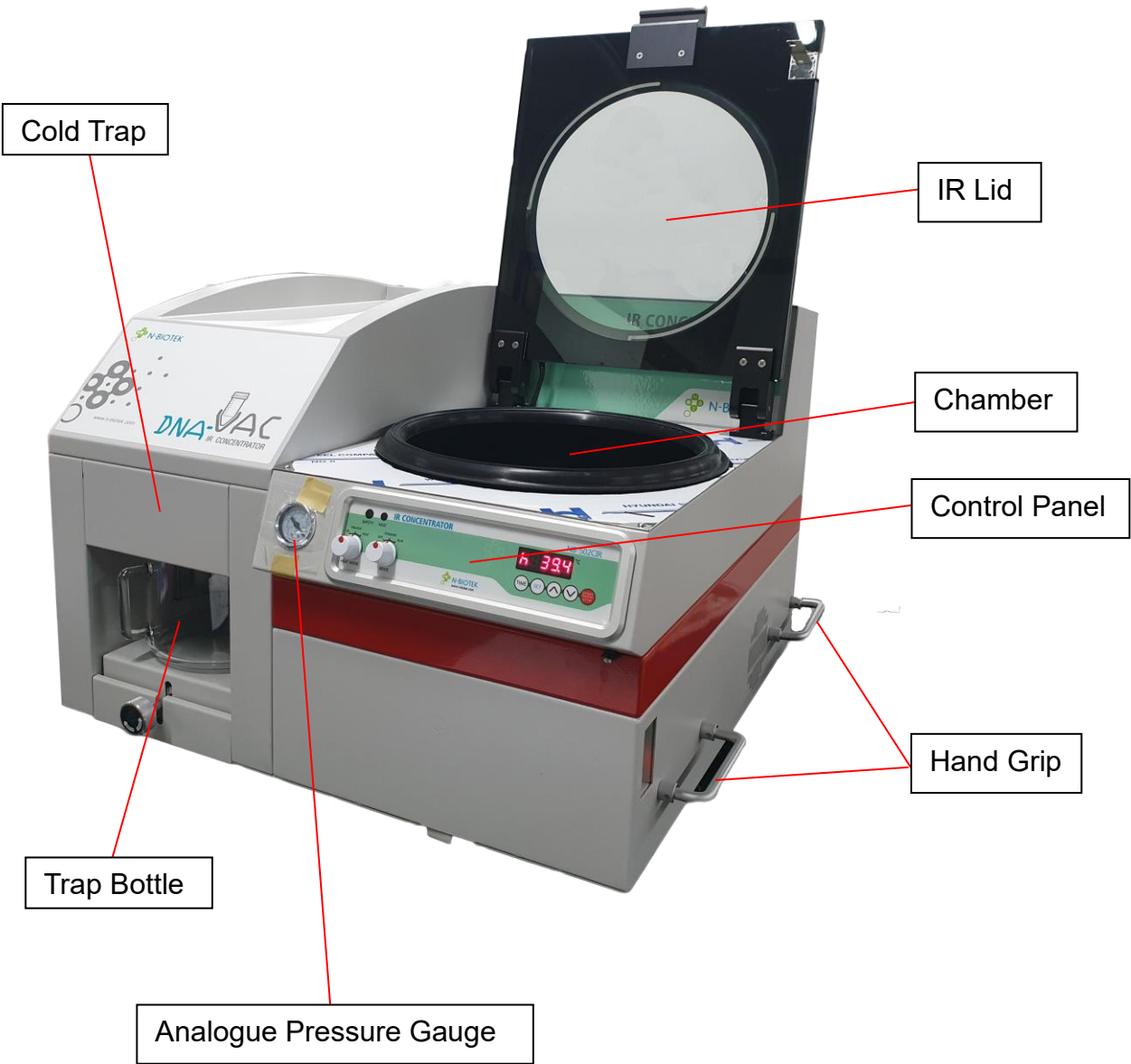
After placing the DNA-Vac™, carefully unpack your DNA-Vac™ and look for any damage that may have occurred during the transportation. If you have found a damage, notify the delivery carrier immediately and contact N-BIOTEK service.

Do not discard the carton or packing material for your DNA-Vac™ until you have checked all of the components and installed & tested the DNA-Vac™.

3. PREPARATION

3.1. Components, Features, and Specifications of the DNA-Vac™

3.1.1. Components



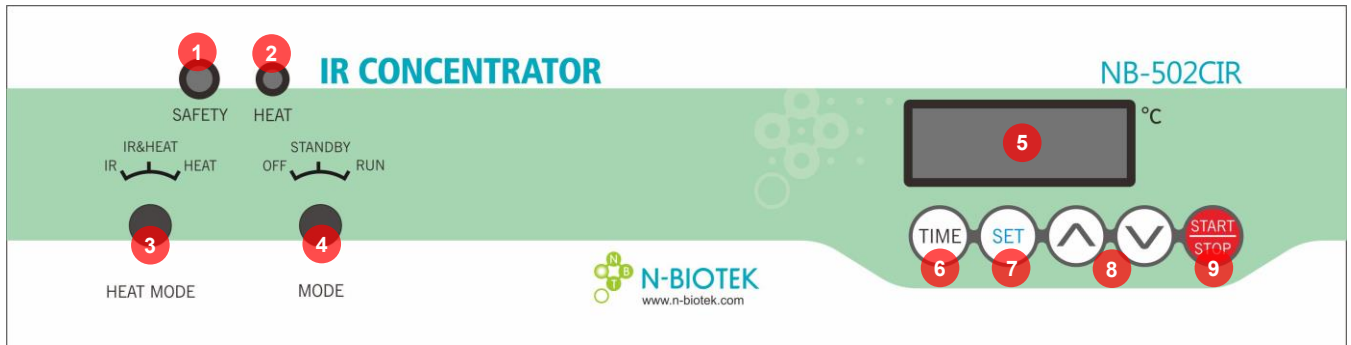
3.1.2. Features

- **Transparent IR-EMITTING GLASS LID**
Infrared rays from IR GLASS LID improve evaporation speed efficiently under vacuum conditions. The transparent glass lid allows you to watch inside the chamber.
- **No Cross-Contamination, No Sample Loss**
The contamination and sample loss are minimized because the exhalation hole for vacuum release is located on the top of the shaft.
- **Built-in Vacuum Pump**
Teflon-coated and oil-free diaphragm vacuum pump is installed in the machine.
- **Stand-by Function**
For efficient preparation, desired temperature is able to be ready prior to centrifugation.
- **BLDC Induction Drive Motor**
Built-in magnetic induction drive provides maintenance free, low noise, and low vibration.
- **Integrated Concentration System**
All necessary device such as cold trap, vacuum pump, and trap bottle are placed in one vacuum concentrator.

3.1.3. Specifications

Items	Unit	DNA-VAC (NB-502CIR)
Temperature		
range	°C	+35°C to 80°C
control		Microprocessor digital PID
increment	°C	0.1°C
standby		Pre-heat
Operating panel		Touch button
Heating mode		Selectable 3 mode IR/IR & Heat/Heat
Display		LED Display
Timer		99Hour 59Min
Capacity	ml,ea	1.5ml micro-tubex132ea 15ml tubex12ea, 50ml tubex8ea, 96 well micro-titer platex2ea
Speed		
range	rpm	Max. up to 1,500rpm
Vacuum		
pump		Chemical resistant PTFE coated Diaphragm pump
ultimate pressure	mbar	8mbar
gauge		Analog vacuum gauge
Dimensions	mm	670(W)x685(D)x480(H)mm
Power	V/Hz	110/220V, 50/60Hz, 400W

3.2. 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)

3.3. Operating the DNA-Vac™



Compliance

Prior to operation, be sure to check below check points.

- Check the voltage and Hz in S/N label attached on next to fuse.
- Ensure the trap bottle of cold trap is empty.
- Ensure the trap bottle of cold trap is securely lifted up without air leakage.
When inserting the trap bottle in its place, make sure that you push the bottle to the end and touch the wall, otherwise there will be air leakage between the rubber grip and the trap bottle.
- Make sure there is no unnecessary material interrupting the sealing between IR lid and the chamber.
And then, close the lid.
- Ensure the rotor is securely fixed with fixing nut.
- All sample on the rotor should be balanced. If there are some unbalance on the rotor, it will make excessive vibration and noise.
- Check the safety dial(safety S/W) is set at least 10°C higher than desired heating temperature.
If this device is sensed overheating, the circuit breaker makes heater stop in order to prevent overheating.

4. START OPERATING

Before turning on your DNA-Vac™, check the operation mode is at “OFF”.

- 1 Turn **Main Power S/W** ‘ON’ located on right side of concentrator (seen at front)
→ RED lamp turns on
- 2 If the cold trap is necessary, turn **Cold Trap Power S/W** ‘ON’
→ GREEN lamp turns on



[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.

[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.

4.1. 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.

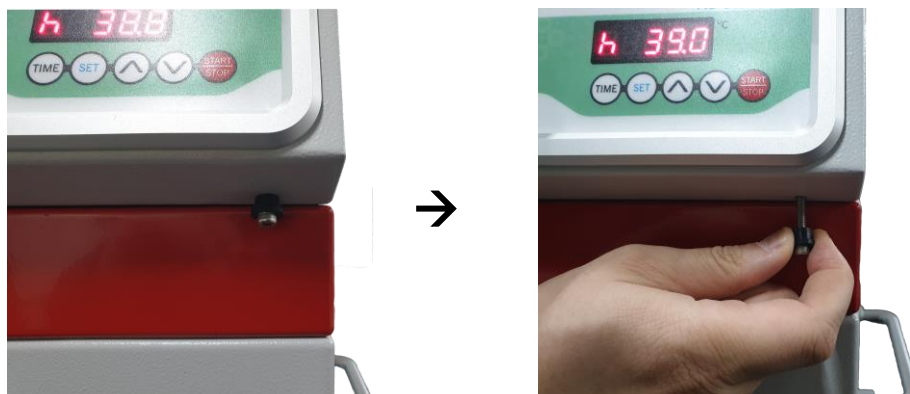
To turn off the cold trap power properly, it is recommended to use the cold trap power S/W.

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.

4.2. Emergency Access into the Chamber

- 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 DNA-Vac™ is designed to prevent access to the chamber in the event of a power disruption. If it is necessary to open the lid when there is no electrical power connected to the unit, pull down the short plastic string on the bottom right corner of the control panel. This will unlock the lid latch mechanism. While holding it down, open the lid with the other hand.



- ◆ **CAUTION : Never attempt to defeat the latch or open the lid during the operation of centrifuge. Personnel injury can result from the moving parts and chemicals.**

5. USE OF SAFETY S/W



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.

6. ACCESSORIES FOR DNA-Vac™

PART NO.	DESCRIPTION
502-15132	Rotor 1.5ml x 132ea
502-15060	Rotor 1.5ml x 60ea
502-1512	Rotor 15ml x 12ea
502-5008	Rotor 50ml x 8ea
502-PLATE	96 well plate x 2ea

7. TROUBLE SHOOTING

Fault Description	Possible Fault Cause	Required Action
Unit does not turn on (Main switch is on)	Miniature fuse has blown	Replace the fuse with type 5x20mm, 220V(5A), 110V(7A). If the newly inserted fuse triggers again, then there is short circuit: Contact N-Biotek service.
	Switch defective	Replace the switch.
The rotor doesn't rotate although mode is switched to "RUN"	Rotor is not fixed properly in the shaft	Take out the rotor and clean the shaft surface, and fix the rotor firmly.
	Lid is open	Close the lid.
	Latch sensor mechanism is broken	Contact N-Biotek service.
Sample odor in the lab	Vent hose exhausting into lab area	Redirect hose to fume hood.
The rotor rotates but vacuum doesn't take place	Foreign material on lid gasket	Clean the lid and lid gasket.
	Trap bottle is not perfectly sealed	Push the trap bottle to the end of the wall; raise the shelf until it is too stiff to turn the lever.
Excessive vibration and noise from the centrifuge	There is an imbalance of the rotor	Reposition sample tube symmetrically.
Evaporation rate is reduced	Heater inoperable	Contact N-Biotek service.
	Vacuum pump failure	Check pump.
	Obstruction in hose	Remove obstruction or replace the hose.
Recovery of condensate in cold trap is less than normally expected	Cold trap is not ON	Check to make sure the switch is ON and condensing unit fan is moving air out of the rear of the unit.
	Cold trap does not cool down	Turn centrifuge OFF and allow cold trap to cool for at least 30 minutes to reach temperature.

8. SERVICE CONTACT & WARRANTY

For technical service support, please contact your local dealer or international sales team of N-Biotek.

Tel) +82-32-321-2100

Fax) +82-32-328-2372

E-mail) export@n-biotek.com

Thank you for purchasing our DNA-Vac™, 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

Item	DNA-Vac™	Model	NB-502CIR
Date of Installation	mm-dd-year	Supplier	
Serial NO.		Period	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.