OPERATING MANUAL

〈Live Cell Engineering Station〉

(주)엔바이오텍
N-BIOTEK
Leading Biotechnology

CONTENTS

Introduction

Thank you for purchasing our Live Cell Imaging work station. This work station is designed to conduct live cell processing by Microscope under optimal environment of cell culture.

This operation manual describes practical information such as performance, usage, and cautions and notices for use of the product. Prior to using the product, please read it carefully all the safety instructions described in this manual and keep this manual near equipment.

WARRANTY

Item	Co2 Incubator with Peltier	**Model**	NB-203C
Date of Installation	mm-dd-year	**Supplier**	
Serial NO.		**Period**	1 year

NBIOTEK 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 NBIOTEK or reliable distributor's examination.
2. The warranty period is 1 year from date of installation or 1 and Half year from the date of shipment from NBIOTEK, whichever is sooner as indicated in above table. This period is proved by serial no.
3. NBIOTEK will not be responsible of free warranty service for the faulty caused by user's improper operation, excessive use, use of incorrect voltage & frequency, storage in wrong environment mentioned in Manual.

4. Complete the above table after installation and keep this card. Then, present it to a dealer or NBIOTEK when warranty repair is needed.

Signed By

President Daeyong Kim
N-BIOTEK,INC.

PRECAUTION

1. 1 General Information on Precaution

- *Precaution* is to prevent the possible accident or danger during operation.

  So, you must read this manual carefully and follow the instruction.

- *Precaution* is divided into caution and warning. And, each of them has following meanings.

If you don't keep this warning, you may face an accident or a fire.

If you don't keep this caution, you may get an injury 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.)

Be sure to operate the device only with the specified power supply.

ecting various products simultaneously can cause short circuit)

Clean the power plug using a dry towel and connect it properly.
(Foreign substances or unsafe connection can cause a electric shock.)

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

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

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

If unexpected sound, smell, or smog occur, unplug the main plug and contact manufacturer or a supplier.

1.3 Precaution for ground connection

Please ground before use the product, if you don't ground, you can get an electrocution 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.)

Please be careful to use inflammable substances such as benzene, thinner, alcohol and LP gas.
(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 unplug 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 break down 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 at its four lower corners with the aid of 2 people. (Weight: 35kg)

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%.
If 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 operation conditions

When you install the product, you have to put the distance of 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 plugged out 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 can 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 can 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 an 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.)

Do not use this work station in the place where particle and dust are too much.

(This may shorten the life time of HEPA filter than normal life time)

FEATURES

Integrated Multiple Function combined clean bench and CO2 Incubator

Using HEPA filter and CO2 Incubator Module, this work station provide clean and optimal environment for your cell culture.

Ideal Cell Observation System

The micro scope is placed in combined clean bench with CO2 incubator function. Cell growth and differentiation can be observed or even recorded by Micro Scope under its optimal culturing environment.

Dual Incubation Mode

This work station provide 3 type of incubation mode.

1. Large Chamber Mode – Provide same environment of CO2 Incubator in chamber of work station
2. Mini Chamber Mode - Not only that work station, there is mini chamber which is designed for small cell culture on the stage of Micro Scope. Cell can be observed by Micro Scope while it is cultured. This mini chamber is controlled to equip with precise temperature and CO2, humidity.
3. FULL Mode- Both incubation modes can be used at one time. This is the best environment for cell culture.

Precise Temperature and Humidity and CO2 control

1. Large Chamber Incubation

Heating: Internal body of work station is wrapped with heating wiring. Heat from 5 sides of workstation spreads to entire chamber and maintain stable temperature.

CO2 Supply : CO2 is supplied from gas tank and controlled by Micro PID. Dual beam IR sensor detect the CO2 density in chamber and control CO2 excellently. Besides CO2 is supplied through heap filter to filter dust in CO2 gas.

Humidification: Ultra Sonic Humidifier control humidity up to 60% in entire chamber of work station.

2. Mini Chamber

Heating: Thin wire heater is built in mini chamber. Through air flow holes in chamber, the heat spreads. And the temperature sensor is also placed in chamber to read temperature precisely.

3. Humidifier : Using natural convection humidification, the chamber is equipped with proper wet-air. By internal heater and natural humidification, water condensing is not foamed on the way of scoping.

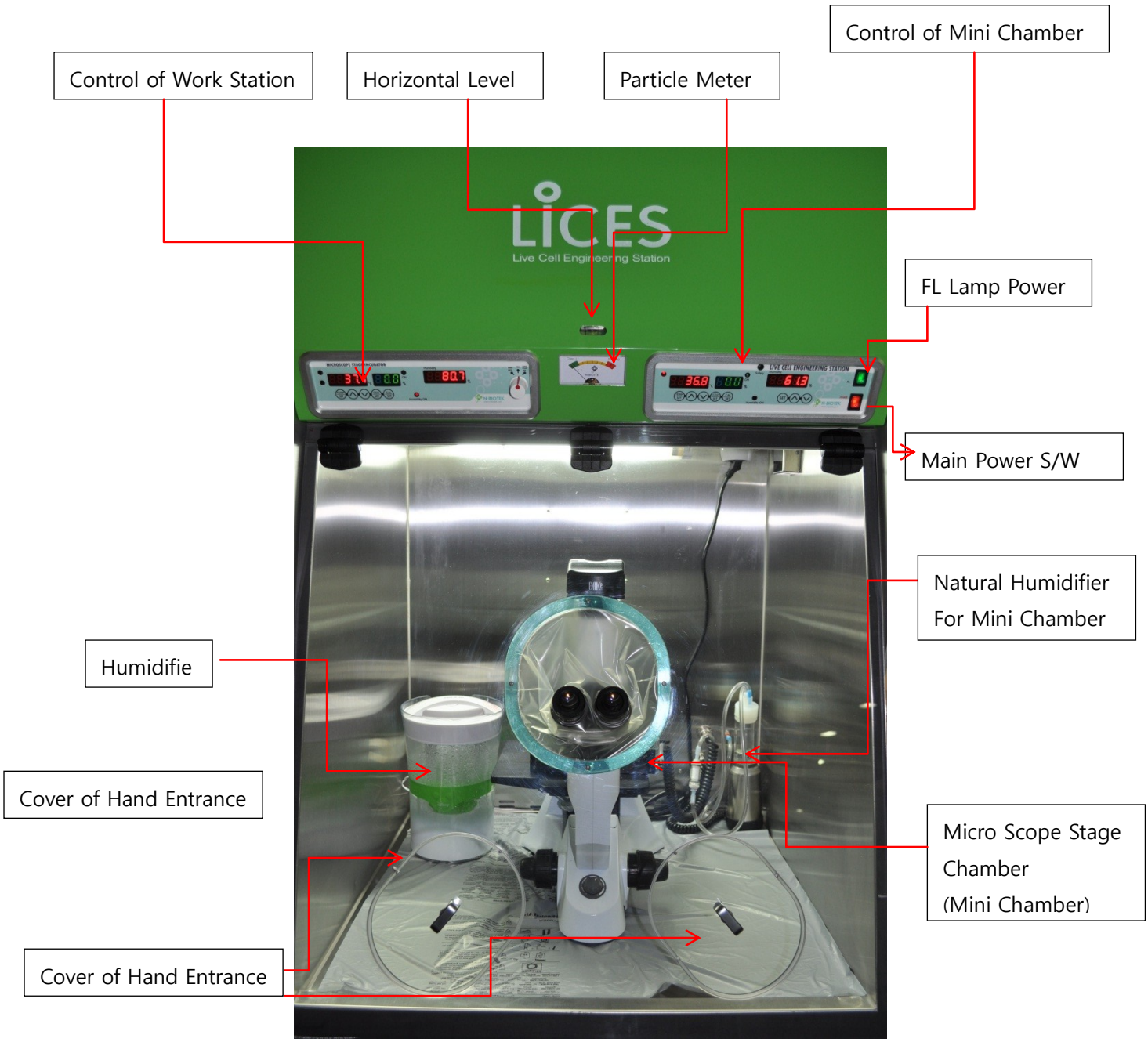
Flexible Adjustment of Micro Scope Lens

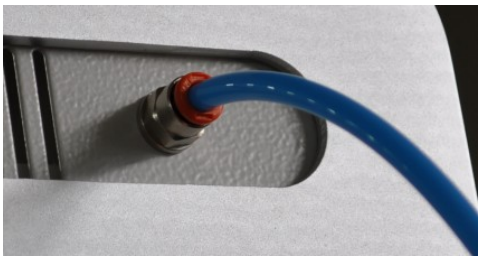
Using Latex Cover for lens of Micro Scope, user can adjust their view properly.

LIVE CELL ENGINEERING STATION SPECIFICATION

ITEMS	UNIT	LICES(NB-801LCS)
WORK STATION(CLEAN BENCH)		
HEPA FILTER		99.99% EFFICIENCY ON PARTICLES OF 0.3μm
HEPA FILTER DIMENSION	mm	660(W) x 380(D) x 70(H)
FLUORESCENT LAMP		36W x 1
UV LAMP(BEHIND OF FILTER)		8W x 1
AIR FLOW		UP TO DOWN FLOW(Internel Circulation Only)
FRONT DOOR		Poly Caborna Coated
CHAMBER		SUS 304
DOOR OPEN		OPEN TO FRONT
POWER OUTLET(IN CHAMBER)		2 EACH INDIVIDUAL POWER OUTLET
WORK MODE(INCUBATION MODE)		3 SELECTION MODE 1. LARGE CHAMBER(INCUBATION IN WORK STATION ONLY) 2. FULL(INCUBATION IN BOTH LARGE AND MINI CHAMBER) 3. MINI CHAMBER(INCUBATION IN MINI CHAMBER ONLY)
LARGE CHAMBER INCUBATION		
CO2		DUAL BEAM IR SENSOR
CO2 CONCENTRATION RANGE		0% TO 20%
CO2 ACCURACY		±0.1% AT 5% 37℃
HUMIDITY OPERATION RANGE		0 ~ 60% (ADJUSTABLE)
HUMIDITIFICATION		FORCED HUMIDIFICATION BY HUMIDIFIER
JACKET		DIRECT WALL WITH AIR JACKET
TEMPERATURE RANGE		AMBIENT +5℃ to +60℃
ACCURACY		±0.1℃ AT 37℃
INCREMENT		0.1℃
HEATING		5 SIDE DIRECT HEATING
CONTROL		MICROPROCESSOR DIGITAL PID
INTERNAL DIMENSION		635(W) X 480(TOP),670(Bottom)(D) X 720(H)mm
OVERALL DIMENSIONS		712(W) x 698(D) x 1087(H)
MINI CHAMBER(FOR INCUBATION ON THE STAGE OF MICRO SCOPE)		
CO2 Sensor		DUAL BEAM IR SENSOR
CO2 RANGE		0% TO 20%
CO2 ACCURACY		±0.1℃ AT 5% 37℃
TEMPERATURE RANGE		AMBIENT +5℃ to +60℃
ACCURACY		±0.1℃ AT 37℃
INCREMENT		0.1℃
HEATING		5 SIDE HEATING
HUMIDIFICATION		NATURAL HUMIDIFICATION FROM WATER BOTTLE
HUMIDITY RANGE		RH 62 ~ 67% AT 20% RH(IN WORK ZONE) RH 78 ~ 83% AT 60% RH(IN WORK ZONE)
DIMENSIONS		185(W) x 115(D) x 40(H)
WEIGHT		3KG
ELECTRICAL CHARACTERISTICS(Ta=25℃)		
POWER INPUT VOLTAGE		AC 220V, 50Hz
CURRENT CONSUMPTION(MAXIMUM)		2.2A(Ampere)
POWER CONSUMPTION(MAXIMUM)		460W(Watt)
WEIGHT		99KG

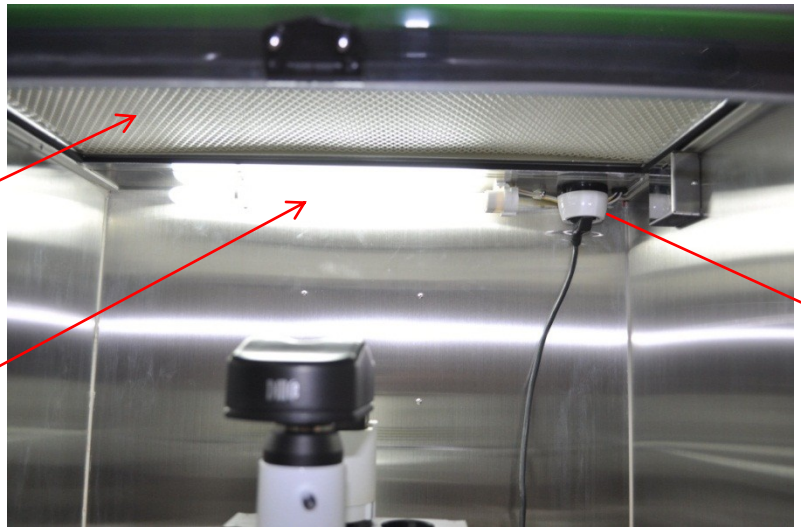
Configuration

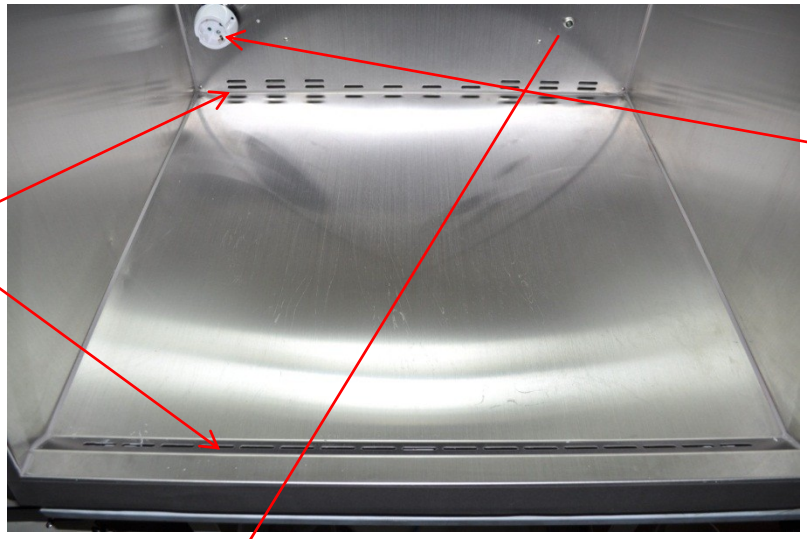




<CO2 Inlet Hole>

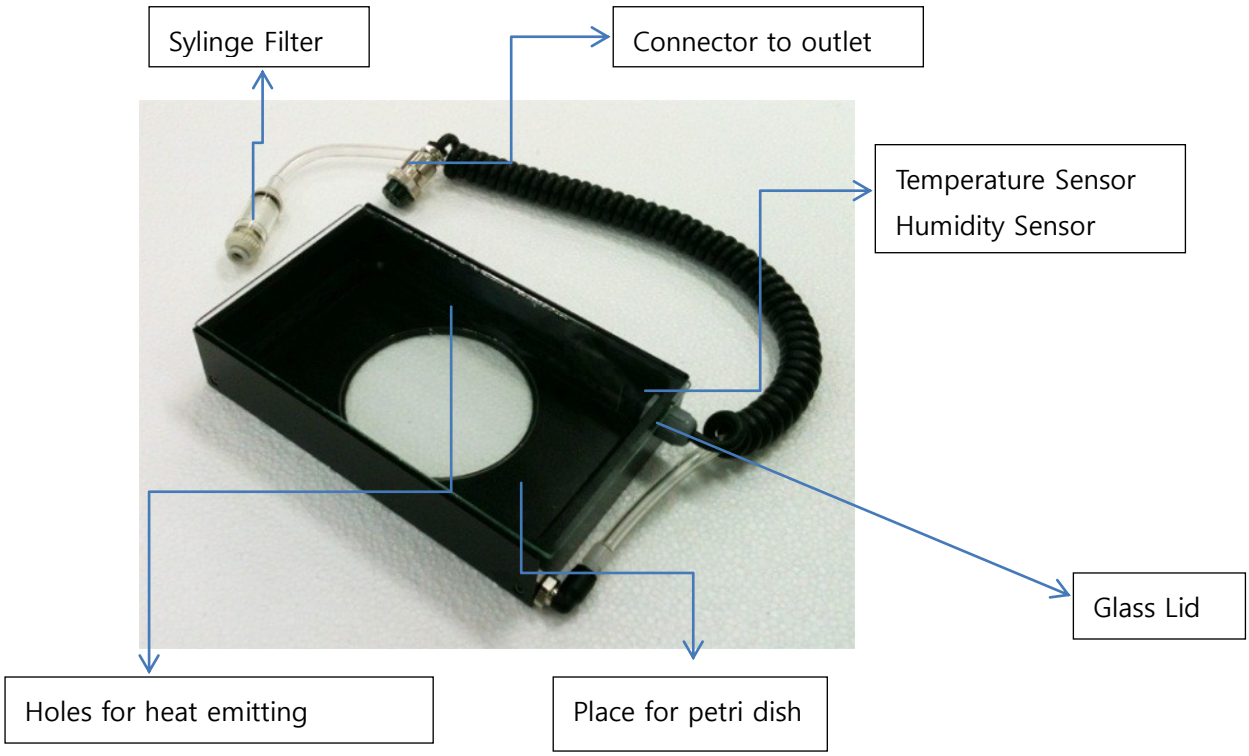
Located at upper right of station


HEPA Filter
Fluorescent light
Power Outlet
for Microscope


Air Flow Path
Power Outlet
For Humidifier


Outlet for cable from Mini Chamber
CO2 gas flow path
Outlet for Heater of Humidification bottle

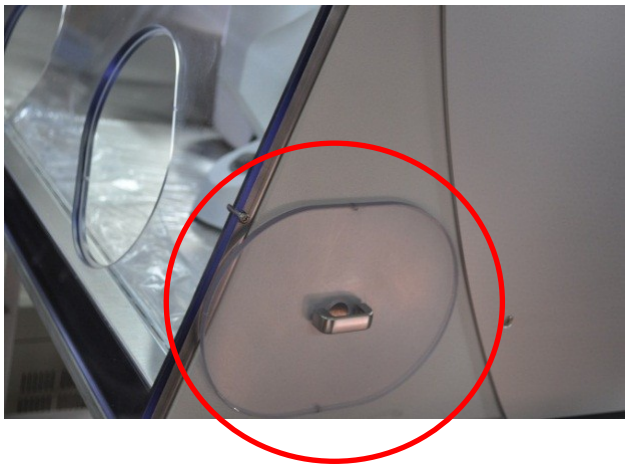
Mini Chamber



One Tip! How to hold the cover of hand entrance! See below photo!

At the center and 3 edge point, some magnetics are built-in.

Attach method by Magnetic



Caution **Do not use this method, when you move the workstation.**

Operational Components

Photo #1

Photo	Description
	**Humidifier** This is ultrasonic humidifier which is used for forced humidification in work station. It is consist of ultrasonic vibrator and power adopter. So, please check all component of this humidifier.
	**Mini Chamber with sensor and tubing** This is small CO2 incubator which will be placed on the stage of Microscope. The wiring cable is consisted of temperature and humidity sensor to control and monitor temperature and humidity. The tubing is used to supply CO2 gas and humidity into this chamber.
	**Heater of Water Bottle**
	**Bottle for Mixing Humidity and CO2 gas** In this
	Tubing for CO2 Supply

Prerequisites

Before you install the Lices, please be cautious of matters followings.

1. You need to prepare your site for installation of station considering its dimension.
2. You must be certain that the area is level and of solid construction.
3. Don't place and use it on the ground. Use table or cabinet to put it on.
4. Need 4 people to pick this station up safely. (Weight is almost 100kg)
5. Don't lay the crate down and maintain standing position as marked on packing.
6. Prepare distilled water which will be used in humidifiers and bottle.
7. When you work to open the crate, carefully disassemble it. The front door is made of Poly Carbonate and it can be scratched by sharp tool.
8. Prepare CO2 Gas Tank or Supply Line with gas regulator.

UNPACKING

1. To open the crate, use a screwdriver and electric hand drill.
2. Carefully unscrew all side of crate except the pallet.
3. Always be carful not to give any shock to front poly carbonate door.

Installation

(1) Work Station

1. Remove all wrap and packing material which applied on the instrument.
2. Check all components which are mentioned in page.11
3. Found 4 fabric grips at right and left side and use them to pick and move the station up to desired place.

Caution Before carrying the station, be sure to remove the cover of two hand holes from the front door to prevent damage of the covers.

4. Place the station on table or desired place considering height of sitting.
   The station should be leveled by checking carpenter's the level installed in between two control panels.
5. If the Lices is placed properly at desired place(on table), open the front door and leave the door open like photo below.

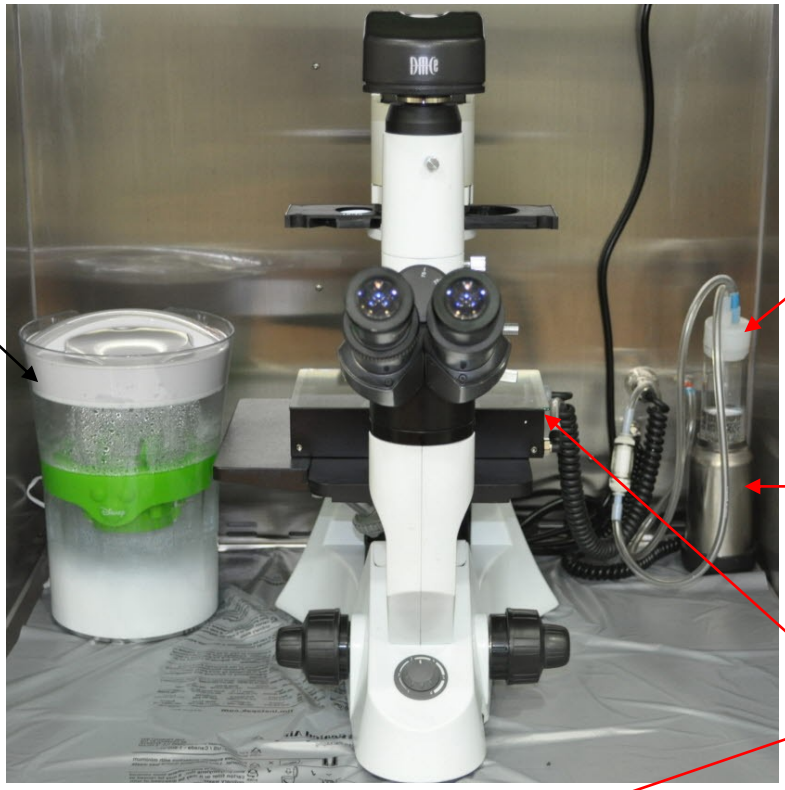
6. Clean all surface in chamber of station using 100% ethanol and soft cloths.

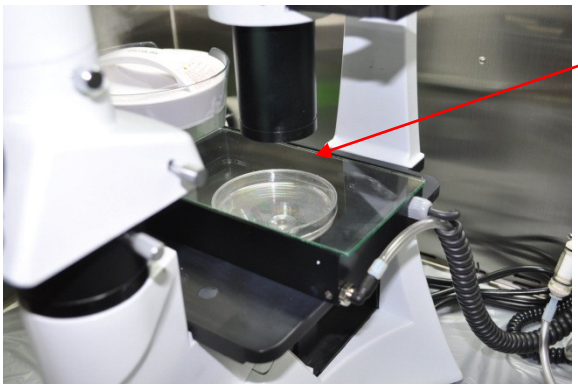
Caution Before installing Micro Scope and necessary device such as humidifier or mini chamber, **don't plug the work station in**.

(2) Installation of Components

Now that the work station is ready to install Micro Scope and Additional device for your live cell imagining, prepare the devices which are placed in work chamber.

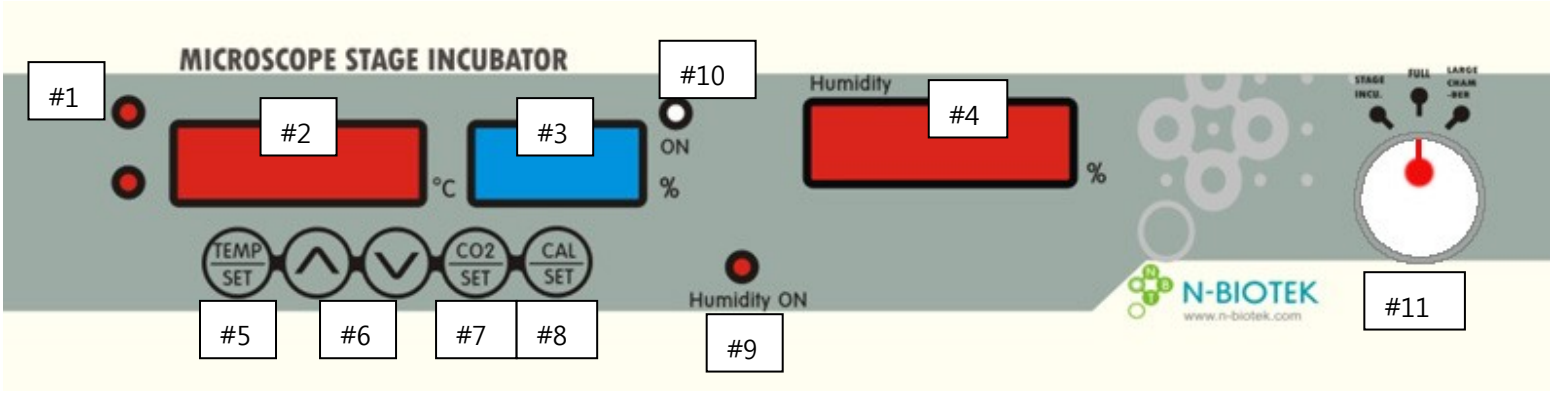
Caution **Do not turn the power of work station on until you complete all installation for the components.**



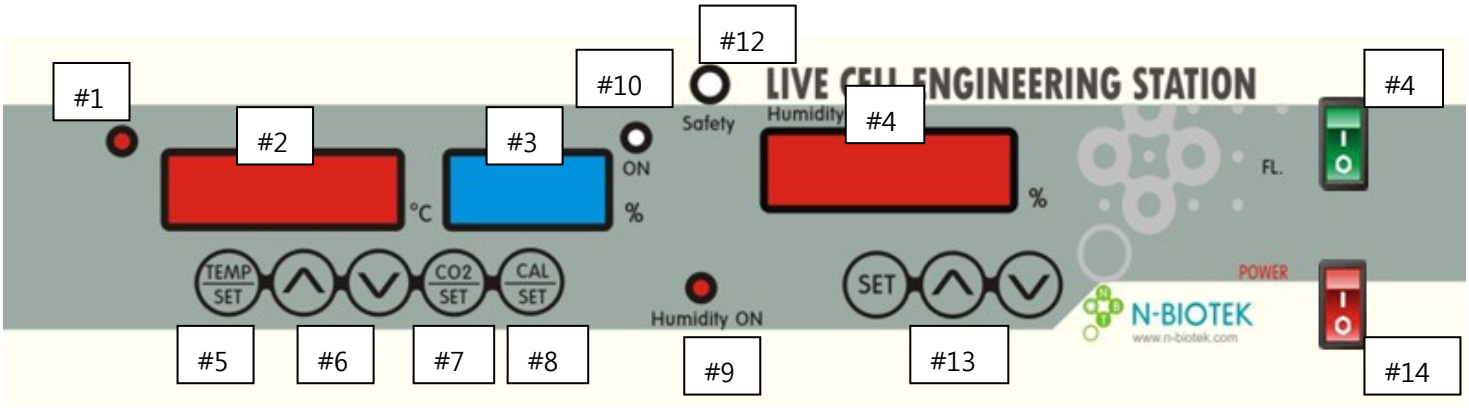


<Heating and Sensor Plug of Mini Chamber>

Control Panel



1) Pilot Lamp of Heater Activation
2) Temperature Display
3) CO2 Density Display.
4) Humidity Display
5) Temperature Set-Up mode
6) UP(▲), DOWN(▼): Adjust Co2 GAS or Temperature to set
7) CO2 SET: CO2 Set-Up Mode
8) CAL/SET: Calibration Mode to modify Temp, CO2.
9) Humidity Pilot: Lighting when the humidification is activated.
10) Co2 GAS PILOT LAMP: Turned on during charging Co2 GAS
11) Mode Selector: Stage Incu(Mini Chamber Mode), FULL(Dual Chamber Mode), Large Chamber(Work Station Mode only)
12) Safety Alarm Lamp: When the overheating protector is activated.
13) Humidity Set-Up Mode of Large Chamber
14)



A. Humidifier(for work station) Installation

Humidifier is used to control humidity in entire work chamber.

Before using this ultrasonic humidifier, please be cautious as followings.

========== Caution ==========

When needed to move, make sure lock the top lid and use middle handle.

Not allowed to dismantle except for authorized Service Person.

Single socket required to avoid any electric shock, fire

Make sure that the water level is not exceeding MAX line to avoid overflow.

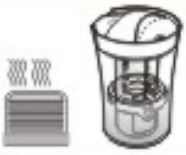
Hold the plug when pull out the main adapter to avoid any damage. Don't pull the line

The container should stay still when power is on.

Make sure that the container stands straight for proper operation

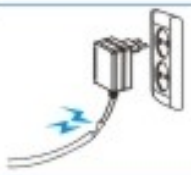
Do not move container during run

Make sure that the water level is up to MAX marked.



Place this where the direct light or heater(more than 50℃) is not close

When close the lid, To engage both lid and container is highly required



Highly required to replace the damaged power cord.

========== Warning ==========

Be cautioned that water container is fragile.

Do not put any other materials other than water

Do not touch ultrasonic vibrator. It may cause malfunction of humidifier.

Use the running water for vibrator cleaning.

This is a standard form of installation.

Do not place it near computer. The fan of computer may absorb moisture

Do not give any shock to it. This is not strong enough to withstand any shock.

On bottom of it, Any materials that can absorb the moisture is required to be far away from it.,

Do not inhale the moisture directly. That could raise any concerns on health.

Too much humidification is no good in anyway.

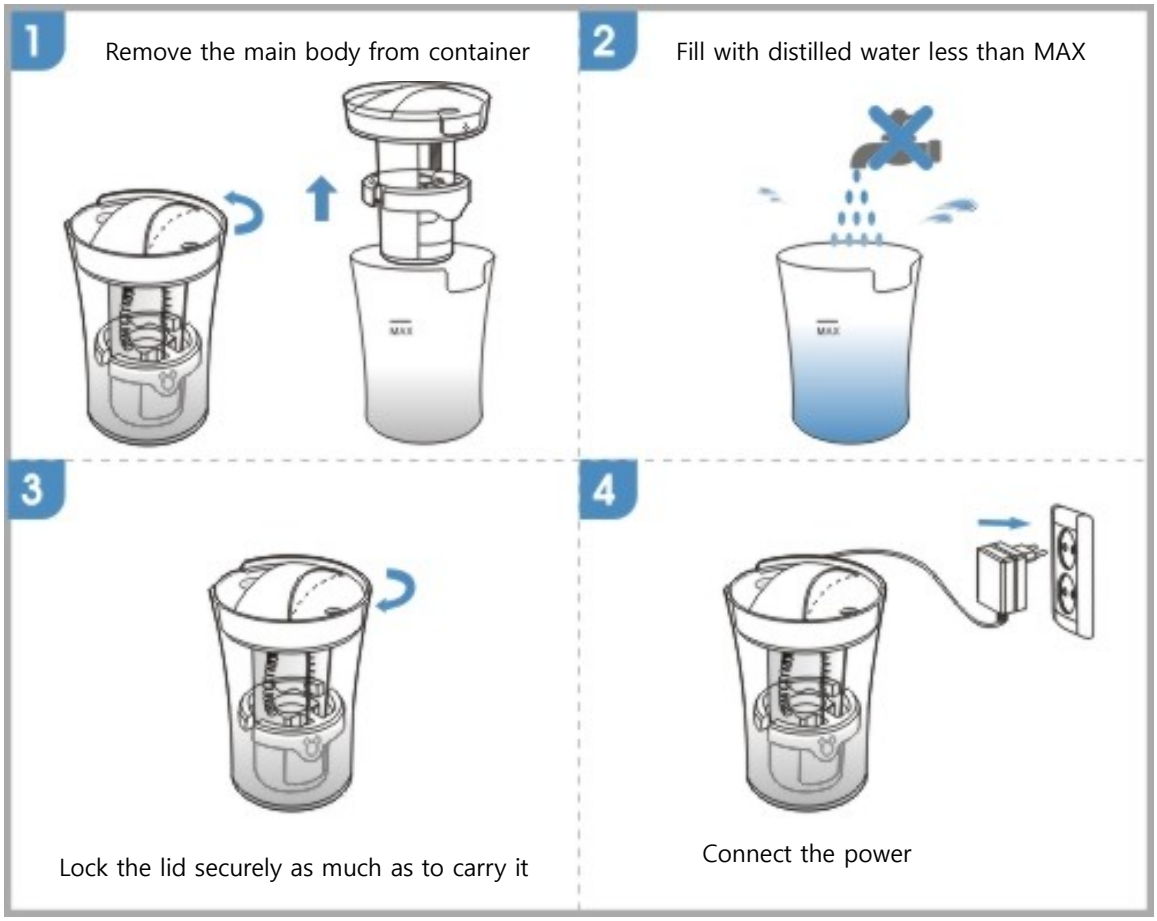
Required to plug out when not using for a long time

Do not clean it up with any chemical or general detergent

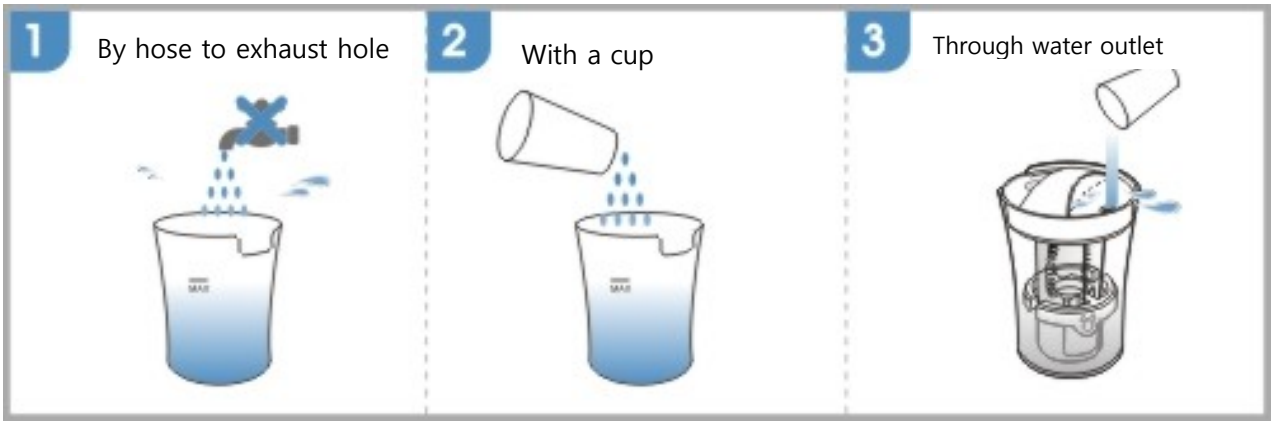
Make sure that this should place on flat surface.

Do not touch the plug with wet hand

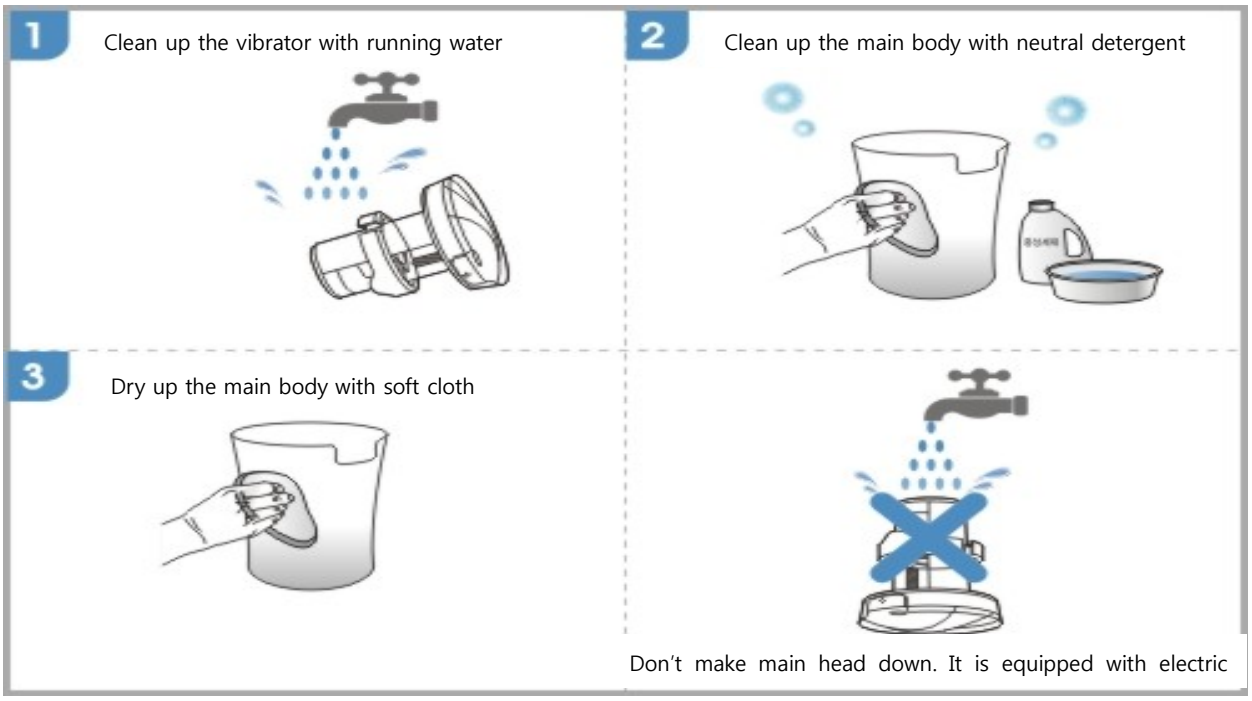
Prerequisites before humidification



How to fill with water



Maintanence



Note :The programmed PID controls electric supply of the humidifier to power either "On" or "Off" by cutting or connecting electric power supply. If the humidity in work station is higher than set-up humidity, the humidifier stops the humidification. The other way, the humidifier does not work if the humidity in station is not less than set-up value. Just plug it in and leave it filled with water. Then, it is controlled Automatically according to the value of set-up Humidity.

B. Mini Chamber Installation

Caution Please handle this chamber carefully because the cover and some part of this chamber consist of clean glass to observe the cell through lens of Microscope.

This chamber is a small CO2 incubator. Temperature and CO2, Humidity in this chamber are controlled individually. Thin wire heater is built in along the edge of chamber frame. Humidity and CO2 are delivered to mini chamber from water bottle after both gas and CO2 is mixed.

You can place petri dish filled with your cells in this chamber and conduct cell incubation individually in small chamber which provide most excellent culture environment. Through this chamber, you can monitor cell growth or transformation by Micro Scope in time. The temperature and CO2, humidity of this chamber are all shown in the display of Microscope Stage Incubator.

To connect the sensor with controller & display also, to connect tube with the bottle of humidification & CO2 supply, take a step following.

1. Plug the black spring wiring cable into one of outlet(bigger than two) check the direction of connector pin(refer to the photo #) and connect it into outlet properly to be fit to outlet. Then, fasten the guide of bolt clockwise.

C. Humidification Bottle Installation

This rolls like humidity water tray of CO2 Incubator. The stainless container(looks like thermos) is the heater which heat filled water up to make humidification. Besides, CO2 gas is supplied to here from the gas tank and mixed with humidification. Then, CO2 gas which mixed with moisture in the bottle is delivered to mini chamber. Humidification is made naturally and it is not able to be set-up. Normally the humidity maintains 70% at 20% humidity in work station

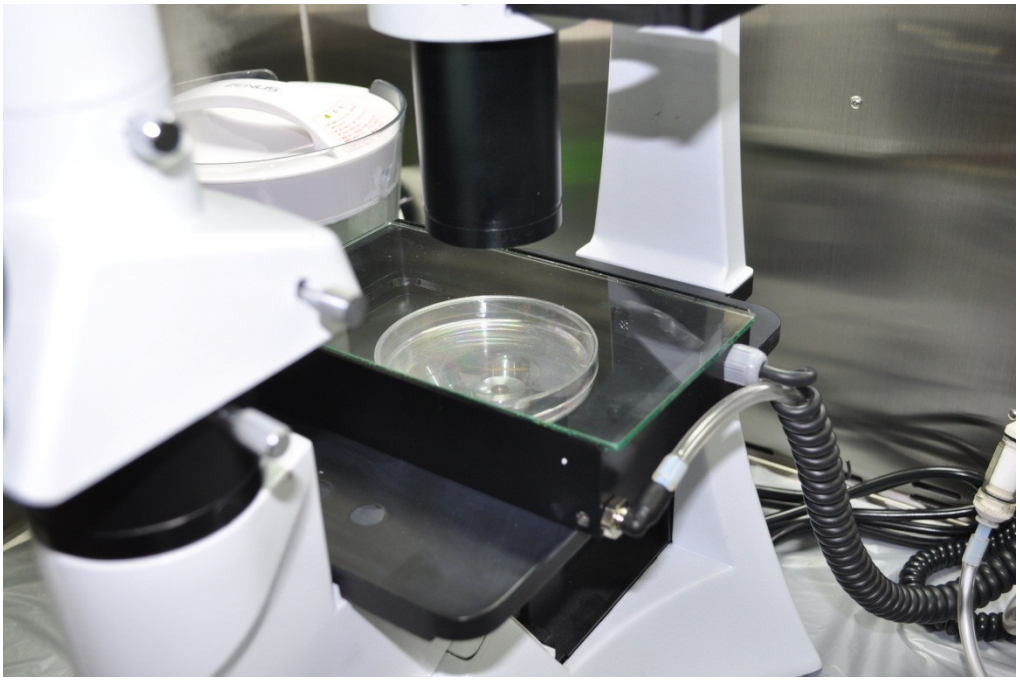
1. Place the stainless heater container on the bottom of chamber.

2. Connect the plug with the smaller outlet and fasten the bolt.
3. Prepare the glass bottle filled with distilled water and put it into the heater container.
4. Connect blue edge of tube into the gas fitting. Pull this tube securely to be sealed. If you need to put the tube out from the fitting, pull the tube maintaining pushing the edge of fitting. Through this tube, CO2 gas is supplied and sensed by IR Sensor.
5. Connect white edge of another tube with the tube of mini chamber.
6. If you securely connect all tubes and wiring cable into proper outlet, hold the container at the proper position. On the bottom of the container, sticky mat is attached. Remove the cover of sticky mat and hold the container on the bottom using the sticky mat. This sticky mat is not two side tape and is not left stick material on the surface of work zone.

D. **Microscope Installation**

After all devices have been set-up, place your micro scope at center of work station. Then, plug it into the outlet located at the right of ceiling. Then, close the front door carefully and adjust the lens of Microscope to be fit into the two lens holes of latex cover zone. And adjust the height of lens and stage to be proper for your Live Cell Imagining Work.

Once your Microscope has been placed at proper position, place the mini chamber on the stage of Microscope like photo below. Place the culture dish on the glass and lens of Micro Scope.



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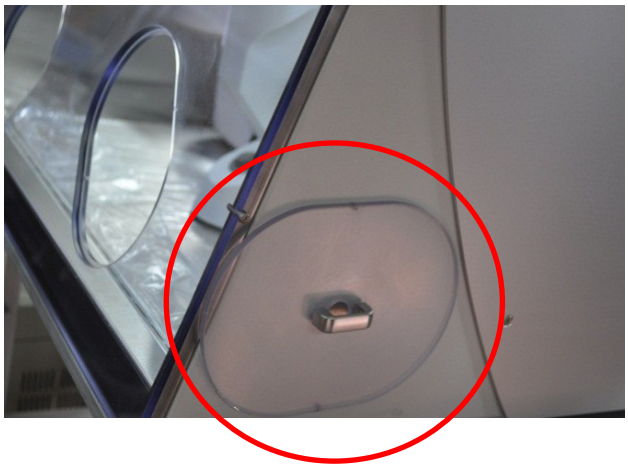


E. CO2 Cylinder Installatiion

Prior to connect the power plug, make sure that the POWER S/W of work station is off.

1. Regulator Pressure Gauge
2. Bombe Pressure Gauge
3. Flow Meter
4. Regulator Valve
5. Master Valve

- Check that gas is leaking at the seam or pipe of the Regulator.
  If gas is leaking at any part, please take an action to stop leaking before providing the CO2 Gas to the work station.
- Clear the air passage for gas input gasket at the rear of the unit. Also check the gas tube and get rid of any obstacles for smooth gas flow.
- Before connecting the blue gas hose with Gas tank, check the remaining gas volume in C02 Gas cylinder. Also, be sure to close the regulator valve and flow meter. Then, put the hose into the connection hole of regulator and also put it into the hole at the rare of incubator.
  Make sure valves of all the part besides GAS TANK, Regulator are locked.
  (④ and ⑤ have the opposite lock direction each other. ④ is clockwise and ⑤ is counterclockwise.)
- Open #5(Master valve of cylinder) and #4(the regulator valve), #3 Flow ball meter. While Flow meter fully open, do adjust Regulator Valve at 0.1MPA. Another regulator in the path of gas flow on control parts is installed and adjusted already to control the gas pressure additionally. However, in case that the ball in flower meter is over than level 2, close the flow meter until the ball is placed lower than level 2.

The pressure gauge may be difference according to its manufacturing companies.
If Regulator's pressure is too high, it causes overflow of CO2 control.

Note: After initial set of regulator, check if the solenoid valve works properly with sounding. Also, observe the CO2 density on display goes up well. The solenoid valves maintain open position until the density is reached to 3% and it starts to control open and close which makes clicking sound.

Operation

Now that all devices including your Microscope have been set-up, you can get start the operation of work-station. From this page, you can learn how to set CO2 density, Humidity, Temperature of work zone and mini chamber.

Air Circulating prior to environment set-up

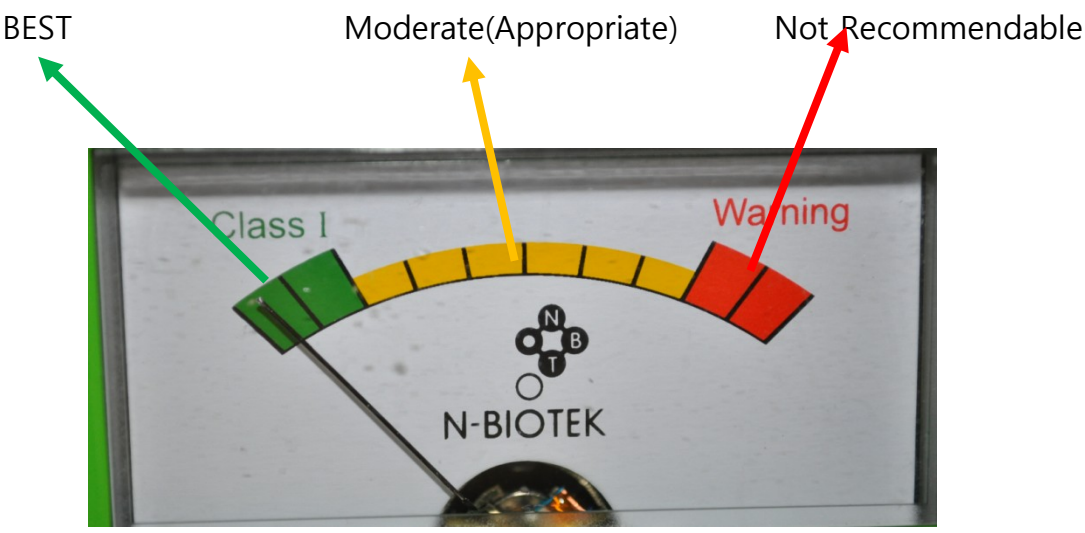
Prior to operation of working chamber and mini chamber, making the chamber be low particle environment(as much as class 100) is recommended. For that, take the step as following.

A. Place white knob(MODE Selector) at LARGE CHAMBER mode and turn Main Power(Red Button at right side)"**ON**". Control display marked as LIVECELL ENGINEERING STATION will show current temperature, CO2 density, Humidity in Chamber of Work Station. And the blower motor begins to circulate air inside and the particle is filtered through HEPA filter. At this mode, the air circulation by blower motor works most strong among 3 modes.

B. Keep this mode until the particle meter is directed in green grade.

Caution If both hand holes open, the particle meter may not direct the green zone.

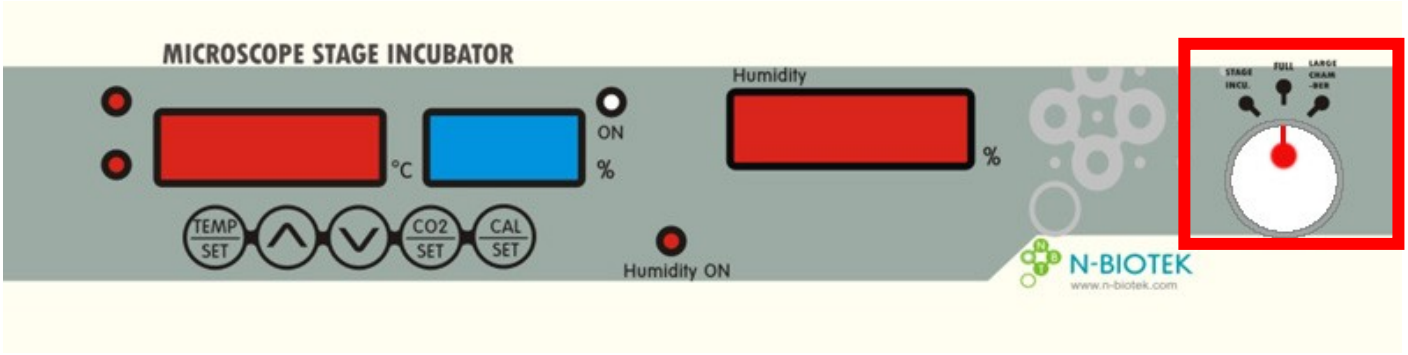
Caution Close the cover of hand entrance to shorten the time of HEPA filteration to Green or Yellow Zone. Particle meter is not precise analyzer but, it is recommendable parameter to check before your work begins in work station.



Working Mode Set-UP

Turn the knob to appropriate Mode among 3 selections.

There is guide and feature for each working modes below.



Once the particle meter indicates within Green or Middle of Yellow Zone, it means that the environment is clean enough to start your cell processing. According to your application, choose one working mode among 3 working modes. Feature and guide of selectable working mode is as following.

1. **Large Chamber Mode – Entire Work Station Control without Mini Chamber Control but, with Humidification of Mini Chamber.**
   If you don't need to use individual environment control of Mini Chamber, choose large chamber mode. At this mode, the heating and CO2 supply in Mini Chamber are not activated and of course, their displays are not shown on. But, the humidification of mini chamber is continuously activated as well as display indicates the humidity of Mini Chamber. If you don't need this Mini Chamber and sample is not placed in mini chamber, remove the Mini chamber and its humidification device such as water bottle and heater. But, even at this mode, using Mini Chamber with its activated humidification is recommendable so that you maximize the humidity in the culture dish.
   Note: The maximum humidity at this mode is 60% maximum.

Caution **Prior to plugging the Mini Chamber and Humidification Device out(if required), be sure to turn Main Power off.**

Caution **Be Careful when you move the Mini Chamber. This Mini Chamber consists of some fragile glasses.**

2. **Full Mode – For using both Mini and Large Chamber.**

   If you prefer to use optimal environment control for your Live Cell imaging work, choose this mode. Not only the work station maintains temperature and CO2 density, humidity by humidifier but also, the mini chamber maintains temperature and CO2 density, higher humidity for cell culture. This full mode is to provide optimal environment for cell growth both in work station and mini chamber. Even if you perform your cell culture in mini chamber, additional heating and humidification, CO2 supply from work station may make the all environment more optimized and precise. If you worry about much CO2 consumption due to supplying CO2 in large chamber at this Full mode, you can set CO2 density of work station at 0%. The Mini Chamber has its individual CO2 control and supply.

   At this mode, both control display are activated to show the status of temperature, CO2 density, Humidification in Work Station and Mini Chamber individually.

3. **Min Chamber – For using only Mini Chamber.**

   If you only need to perform cell culture in Mini Chamber without environment control and HEPA filtering of entire work station, you can choose this mode. At this mode, the display of live cell engineering work station is not activated. It means that CO2 and temperature, humidification in work station is not able to control at this mode. Only the mini chamber maintains temperature, CO2, Humidity as programmed by user. If you don't need to handle your cells in work station(out of mini chamber) and want to minimize power consumption, vibration from blower motor, this mode can be used. In case of long-term monitoring of cell which being cultured in Mini Chamber, this mode can be used.

If room temperature in the lab where this station is placed is too lower than your set-up temperature of Mini Chamber, water condensing by temperature difference may form on the glass cover of Mini Chamber. Which cause unclear observation of cell.

Temperature, CO2, Humidity Set-UP

1. Temperature Set-up

a. Press the "TEMPSET" key, Then, the LED screen will flicker and display.

b. Then, input the desired temperature by pushing UP (▲) and DOWN (▼).

c. Press "TEMP/SET" key again after putting the desired value. “SAVE” is shown up on the LED screen like below.

After a set-up, the LED screen will stop flickering.

* If you don't press the "SET" key lastly after set-up, the new set-up value will not be saved at all.

2. CO_2 DENSITY SET-UP

a. Press "CO2SET" key. Then, LED screen will flicker continually.

b. Input the desired value of Co2 density by pressing UP (▲) and DOWN (▼) key

c. Press "SET" key again after an input. “SAVE” is shown up on the LED screen like below.

After a set-up, LED screen will be stop to be flickering.

* If you don't press "CO2SET" key again after set-up, the new set-up value will not be saved at all.

Note: Due to Large Size Chamber, consumption of CO2 at FULL and LARGE CHAMBER MODE is pretty high. Consider this feature and prepare sufficient CO2 gas. If worried about this, set the CO2 of work station at 0% and culture your cell only in Mini Chamber while using heating and humidification of work station.

3. Humidity Set-UP

The humidification of LARGE CHAMBER is activated by humidifier. In accordance with relative Humidity(RH)in work station compare to set-up RH, the humidifier is turned either on or off. If the RH in work station is lower than set-up RH, the humidifier works until RH of work station reach to set-up. Hence, the humidifier continuously repeats to work or stop to maintain programmed RH.

Note

***Humidifier is activated at FULL and LARGE CHAMBER MODE but, not functioned at MINI INCU MODE.**

***Humidifier start humidification 30seconds after the mode of FULL or LARGE CHAMBER is selected. The pilot lamp marked "Humidity On" shows red light when the activated humidifier makes humidification. In case of natural humidification from small water bottle, it always forms natural humidification at the mode of MINI CHAMBER and FULL.**

a. **Press "SET" key located below of Humidity Display**. Current programmed humidity will flicker on the display.

b. **Adjust the value of Humidity** by pressing UP (▲) and DOWN (▼) key. **Press "SET" key again** to save programmed humidity value in program. After that, the display will flicker along with showing calibration value. This calibration mode(shown after saving humidity value) is purposed to manually calibrate humidity difference between display and real humidity value which is identified by precise humidity analyser. Before releasing the work station from factory, it is calibrated by skilled engineer after inspection using analyser.

Unless there is significant difference or difference is identified by proper analyser, don't change originally programmed value(flickering) and pass this mode by pressing set-key.

The Settable Humidity Range in work-station is up to 60%(RH). Setting lower RH than room RH is not possible.

The humidity in Mini Chamber is not able to set, because humidification of Mini Chamber is Natural Air Convection not controlled manually by specific device.

Note: The humidity of Mini Chamber is affected by humidity from humidifier. At 20 ~ 25% RH in work station with no working of humidifier, Humidity range of Mini Chamber is around 60% or little bit more. In case of dual humidification by both water bottle and humidifier, the humidity in Mini Chamber is maximized. As a reference, if you set 60% humidity at humidifier, the humidity in Mini Chamber would be 75 ~ 82%. Hence, if required to maintain high humidity in mini chamber, select Full Mode to maximize humidity in both MINI and LARGE CHAMBER.

4. Calibration

Please follow up the procedure for calibration below in case of discrepancy between actual values (measured by reliable thermometer or CO2 analyzer)in chamber and display.

Caution

Frequent calibration may cause unstable control for CO2 gas and Temperature.
Do not use the calibration unless the exact diagnose using trustful Thermometer and CO2 gas analyzer is performed.

Before Performing Calibration,

Ensure the Alarm button should be “On” position prior to this procedure.
(If the Alarm button is at OFF, the “CAL/SET” button is not activated to start calibration.)
Do not perform the calibration before temperature and CO2 maintain stably.
Perform the analysis of CO2 density and Temperature when the incubator has been worked in stable temperature and CO2 density for more than 1 hour.

a. Press and hold “CAL/SET” button for 10 seconds. Then, the LED will be flickering like below.

☞ Chamber’s Main Temp calibration➔ 1 Channel Sensor located at the top of the chamber and near circulation fan.
Ch 1 Calibration is purposed to adjust the value of LED display to be shown in accordance with the actual value of Temperature in chamber. Available range of Calibration is ±5℃

Push UP (▲) the temperature value on LED as much as display difference between actual temperature and temperature on LED when actual temperature in chamber is higher than value of temperature display. On the other way, press DOWN (▼) to decrease the value of temperature on LED when the actual temperature is lower than display.
Ex) If the actual temperature is 38℃ and Display shows as 37℃, calibrate Ch1 to be 1℃ more than original value.

Caution

To shift channel to channel, press “CAL/SET” button. After calibration at 5Channel, the LED is back to Temperature Display.

b. Second Click “CAL/SET” ☞ Outer door’s Temp calibration

CH 2 is purposed to perform calibration of temperature sensor n r condensing on glass door caused by high temperature difference between chamber and outside. Recommend to use calibration at Channel 2 in case of water condensing on glass door.

Except water condensing on glass door, calibration of 2 and 3 Channel is not recommendable.
Check if the water condensing is removed in 3 Hours after calibration of CH2 is done.

Caution

c. Third Click “CAL SET” ☞ Door Frame Heater calibration

CH 3 is Nothing. Just pass this channel

d. Forth Click” “CAL SET” ☞ CO2 density calibration

Push UP (▲) and DOWN (▼) to set the value. Before release of CO2 incubator from NBIOTEK factory, CO2 density is calibrated at 5%. When using different density of CO2, the measurement

e. Fifth Click "CAL SET" ☞ Solenoid Valve closure CO_2 percentage calibration

The adjustment by user is not recommendable. This is kind of engineers mode which is recommendable to conduct by engineer authorized by N-BIOTEK.

*NOTE: CH 5 is purposed to set the CO2 density from which solenoid valve start to control supply of CO2 gas into chamber by valve open and close. In factory, 5 Channel is set to 2% and solenoid valve controls the CO2 gas pressure flowing into chamber at the 2% density that CO2 sensor sense. In case of low CO2 gas pressure from the tank, delay the starting point of CO2 density (at 3 or 4%). After calibration, solenoid valve will continue to open until sensor senses calibrated %.
The Calibration range is from 1% to 5%. Only the case of higher CO2 density-set-up or lower CO2 gas pressure from the cylinder is required to calibration it.

f. Fifth Click “CAL SET” for SAVE

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Service Contact

If you need technical service support, please contact your local dealer or international sales team of NBIOTEK.

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