

OPERATING MANUAL

AUTO CLAVE

NB-1045/1060
NB-1080/1100



Caution for safety

1. Caution for handling power cable.
2. Caution for product handling and installation.
3. Caution for sterilization preparation phase.
4. Caution for sterilization operation phase.
5. Caution for sterilization completion phase.
6. Caution for others.

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3. Description for operation.
4. Description for factory setting.
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Warranty

Thank you for choosing N-BIOTEK product.

This operation manual describes practical information such as performance, usage, 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.

Model			
Date of Installation	mm-dd-year	Supplier	
Serial NO.		Period	1 year

N-BIOTEK product is warranted from defect in all parts and workmanship. This product is warranted for 1 (one) year against faulty components and assembly. Our obligation under warranty is limited to repairing and replacing the instrument or part after our examination.

This warranty does not extend to any N-BIOTEK products which has been misused, neglected, accident or mis-installation, application.

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 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, 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 N-BIOTEK when warranty repair is needed.

Caution for safety

- Precaution is to prevent the possible accident or danger during operation. So, you must keep it. Precaution is divided 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****Warning**

1. Caution for handling power cable.

- ⓘ Please check your voltage on the serial sticker sticking to the back of product and plug it to right voltage. Different voltage connection will make a malfunction on product and a fire will occur. Unless otherwise noted, it is 220V, 50/60Hz. Hz is dual purpose for 50Hz and 60Hz.

- ⓘ A socket for this product should be dedicated to this product. Its heater capacity is as below.
NB-1045/2Kw, NB-1060/3Kw, NB-1080/4Kw, NB-1100/4Kw
Multiple plugs on a socket will cause a fire and electrical fire incident.

-  Power plug must be intact, not damaged, not bended to avoid electric incident.
 - Keep the product at least 20cm from the others.
-  NB- 1045, NB-1060 is already equipped with ground on the power cable. So the socket from the building should have a ground measured so that ground will work.
-  NB-1080, NB-1100 provides 1 set of 30A of male plug for ground and female consent. Male plug comes from the cable of product and female consent is attached to it. Therefore, please ask an engineer for ground connection for your safety.
-  In case of no ground connection enabled for AC 220V or place where ground is impossible.
 - Ask an electric engineer for an advice of ground or install earth leakage breaker on the socket.
 - If no ground nor earth leakage breaker is taken, it will cause a fire or electrical fire incident.
-  Place where ground must be prohibited.
 - Electrical cord, gas pipe, water pipe, antenna, lightning rod, telephone wire.
 - If ground is installed on above places, it will cause a severe electrical incident.
-  Clean the power plug with a dry towel and connect it properly.
(Foreign substances or unsafe connection can cause a fire.)
-  Do not touch socket or power cable with a wet hand.
 - It will cause an electric shock.
-  Do not use damaged power cable or socket for safety.
 - It will cause a fire, electric shock or electrical incident.
-  When you see smoke coming from the product or smell something like burning or any other strange symptoms, you have to cut off the power cord and stop using it. (It can cause an electric shock and a fire.)



Warning

2. Caution for product handling and installation.

- ⓘ Please unlock the wheels when needed to move the product and try your best for no shock on the product to avoid product damage.

Lay down or upside down of product is prohibited in order for water level sensor, temp. sensor to be working normal.

- ⓘ Please check voltage before connecting the power.
 - Different voltage use will cause a damage to PCB and other parts.

- ⓘ No direct light, not too hot place is required for installation and operation.
 - Operational condition is 10°C~30°C/20%~80% RH.

- ⓘ Please appoint someone in charge of this product for stable operation.



Caution

- ⓘ Make sure to secure proper footprint for operation.
- ⓘ 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.)
After installation, make sure to lock the wheels to fix the product.
If it is not balanced, water level sensor will mistakenly sense the water level.
- ⓘ After sterilization process, make sure to wear a glove to protect the heat for your safety.



Warning

3. Caution for sterilization preparation phase.



- ❗ Make sure the chamber is cleaned.
- ❗ Make sure to check the drain valve in board room is at locked position (refer to board room page ⑨)
- ❗ Make sure that the steam trap bottle at the rear of product is empty before operation.
 - Usually one third of cooling water in that bottle is optimal for operation but without changing cooling water at every time will lower its main function. Therefore, keep the trap empty after use.
- ❗ Make sure distilled water is right above the water level sensor cover.
 - Consumption of distilled water is different based on sterilization sample and its process. Therefore checking the distilled water up to the water level sensor cover is required at every time.
- ❗ Make sure that pressure release valve is locked at the front side of product (refer to page 11 ⑤). Clockwise is to lock the valve. If it is not locked properly in operation, pressure will not fill up the chamber in which will cause the temperature not going to sterilization level and the damage to heater and other parts.
- ❗ Please follow this manual for operation before using it.



Warning

4. Caution for sterilization operation phase.



- ❗ Please check the setting value before start.
- ❗ Please check the lid to see if it is closed properly.
- ❗ Keep any liquid from the control box or board room. If you spill any liquid, turn off the power and clean it up as fast as you can before it goes into electric part to prevent any electric incident.
- ⊘ Keep flammable substances away from the product to prevent a fire or explosion incident.
- ⊘ Do not open or touch the lid during operation to prevent burn.

-  Be aware that initial pressure release will occur at the first stage of sterilization.
You are kindly required to keep the distance from the product during process.
-  Be aware that at the end of sterilization stage, the last pressure release will occur after set time is over.
You are kindly required to keep the distance from the product during process.




Warning

5. Caution for sterilization completion phase.

-  Make sure that pressure gauge gets to zero and temp. is below 60°C for door open.
 - Pressure gauge zero means that there is no pressure in chamber and a sign of ok for door open that will not cause a damage by at least pressure.
 - In case of below 100°C where the below boiling point is, steam occurs anyway but that much still carries hot temperature so be careful otherwise it gets user burned.
 - Temp. 60°C means that it is highest temp. for door open. But it does not mean it is safe temp. for that. Therefore, be careful when you open the door at around 60°C.
-  Make sure to use the handle and turn it to the end for open.


When close the door, turn it to the end where the bottom of door sticks to the upper body of product so that there is no leakage of pressure from the chamber.

 - If it is no proper door open or close as above advise, it will cause a damage to the gasket of door.
Damaged gasket will cause a pressure leakage and a failure of sterilization.
-  Be careful to get the basket after door open. It still carries hot heat.




Warning

6. Caution for others.

 Do not disassemble or remodel the product and PCB wiring except for locking drain valve, connecting drain hose, pressure release valve, and setting value.

- Remodeling at your disposal will cause an unexpected damage to the product and the incident.
- Please connect the drain hose to the drain.

 Please wear a glove for your safety to prevent any burn.

FEATURE & SPECIFICATION

1. Product features.

- 1) Straightforward operation and whole process checking is simple by control panel.
- 2) Heat-up → Initial pressure release → Pressure filling up → Sterilization → Pressure release → End.
- 3) Possible to adjust pressure release quantity and its speed for application of respective sample.
- 4) Multiple safety measures.
 - Overheating control program by temp. control (function of solenoid valve open and overheating control)
 - Water level sensor for distilled water level.
 - Overheating control by safety switch..
 - Overpressure release by pressure release device.
- 5) Operation cut off when lack of distilled water detected by water level sensor.
- 6) Smooth inner chamber and rounded corner for easy clean.
- 7) Sustainless material for chamber.
- 8) Minimized heat delivery to the handle.
- 9) Perforated basket for uniform heat distribution.
- 10) Front 2 wheels with lock system out of 4 wheels make to control of product with locking.
- 11) Pressure release valve for urgent case to open the door.
- 12) 121°C standard temperature and optional 132°C temperature
- 13) Proper heater capacity for less power consumption and minimizing inconvenience for replacement.

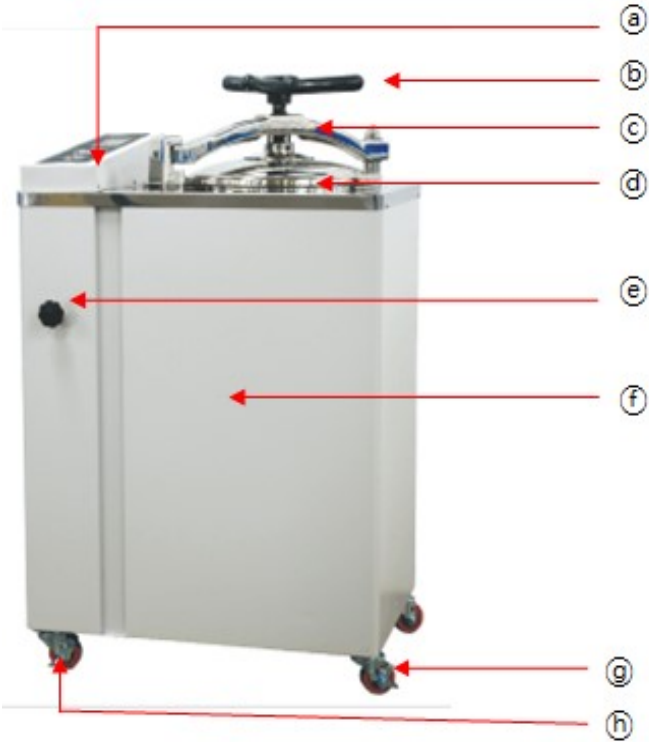
- NB-1045 : 2KW heater →1EA.
- NB-1060 : 3KW heater →1EA.
- NB-1080 : 2KW heater →2EA.
- NB-1100 : 2KW heater →2EA.

2. Specification.

Items	Unit	NB-1045	NB-1060	NB-1080	NB-1100
Use Temp.		121℃(Standard), 132℃(Option)			
Temp. Accuracy		±0.5℃ at 121℃			
Operating Pressure		0.1~0.21 Mpa			
Temp. Control		Digital P.I.D Controller			
Timer		Electronic Type. 0~99h 59min.			
Pressure Gauge		Mechanical Gauge 0~0.3 Mpa			
Air Exhaust		Adjustable Valve			
Safety Device		Over Temp. Limit By Controller Over Heat Limit By Safety S/W Over Pressure Limit By Protector Valve Water Level Sensor Protector			
Monitor Unit		Audible & Visible Device			
Basket		Mesh Type, Standard / Stainless Steel / 2ea			
Dimension (in) (out)		300øx630mm 670x470x1080(H)mm	350øx630mm 670x470x1080(H)mm	400øx630mm 810x630x1150(H)mm	450øx630mm 810x630x1150(H)mm
Capacity		45Liter	60Liter	80Liter	100Liter
Heater		2kW×1ea	3kW×1ea	4kW(2kW×2ea)	4kW(2kW×2ea)
Weight		71kg	73kg	120kg	125kg
Power		220V,50/60Hz (Standard), 110V,50/60Hz(Option)			

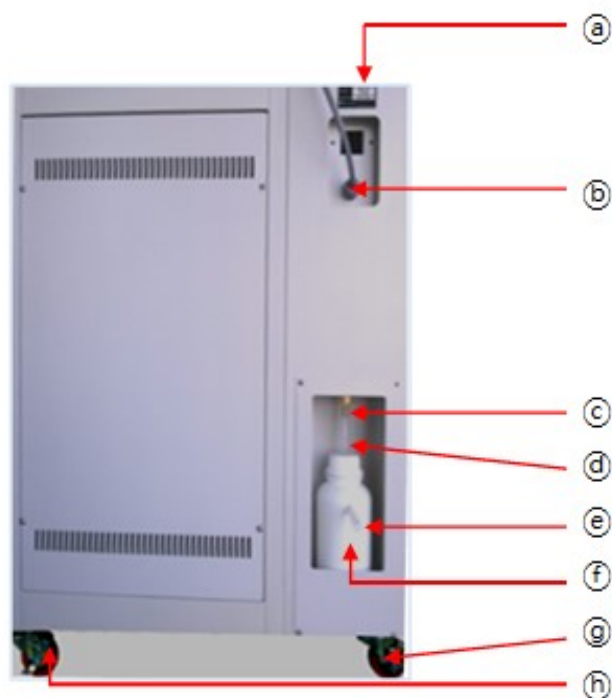
CONFIGURATION

1. Front body figure



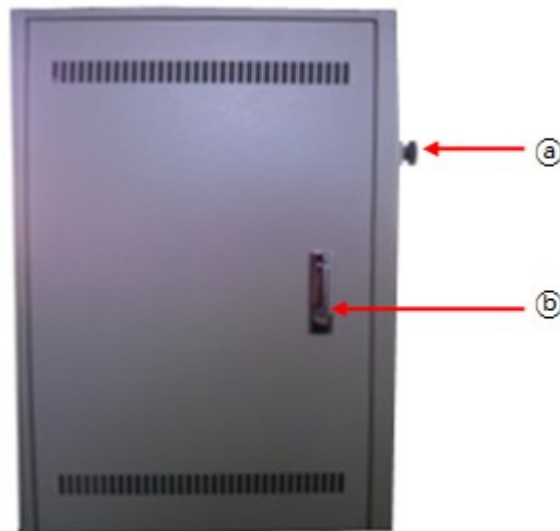
Ⓐ	Control panel
Ⓑ	Door handle
Ⓒ	Supporter for door
Ⓓ	Door
Ⓔ	Pressure release valve
Ⓕ	Front body
Ⓖ Ⓗ	Front wheel lock system

2. Back body figure



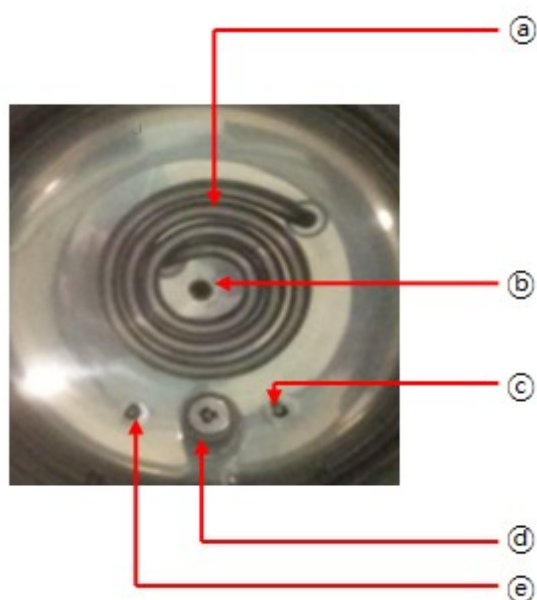
(a)	Serial number
(b)	Power cable
(c)	Steam exhaust port
(d)	Steam exhaust silicon hose (chamber to trap bottle)
(e)	Steam exhaust silicon hose(trap bottle to outside)
(f)	Steam trap bottle
(g) (h)	Rear side wheel

3. Side body figure



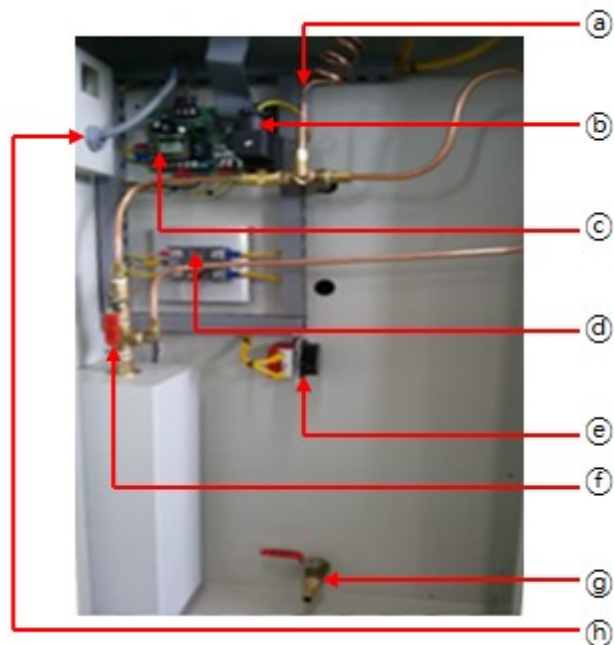
①a	Pressure release valve
①b	Open button to PCB board room

4. Inside chamber (bottom)



(a)	Heater (2 heaters for NB-1080 and NB-1100)
(b)	Drain hole
(c)	Pressure sensor (overheating detecting sensor)
(d)	Water level sensor
(e)	Temperature sensor (detecting inside chamber temperature)

5. PCB board room



①	Pressure gauge connection vessel
②	Solenoid valve
③	PCB
④	SSR
⑤	Safety switch
⑥	Steam release mini valve (Above image shows you that it is at open position and it should be at open position when in operation)
⑦	Drain valve (Above image shows you that it is at locked position and it should be at locked position when in operation)
⑧	Power cable connection part

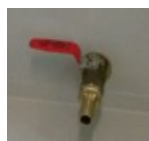
6. Components

- 1) Autoclave / 1SET
- 2) Mesh Type Basket / 2ea
- 3) Heater Cover (Basket) / 1ea
- 4) Steam Trap Bottle / 1ea
- 5) Drain Hose / 50cm
- 6) Manual / 1ea

OPERATION

1. Operation

- 1) Make sure to check the drain valve in the PCB board room is locked as below image.



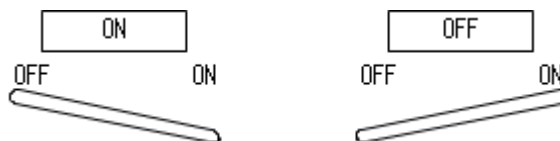
(locked position)

- 2) Steam release mini valve in PCB board room is opened as below image. It must keep that position for normal performance of autoclave. It could sometimes be 30 ~ 45 degree tilted. That has no impact on operation but follow as below position.



(opened position)

3) Make sure to lock the front 2 wheels for your safety in operation..



4) Open the door and take baskets out..

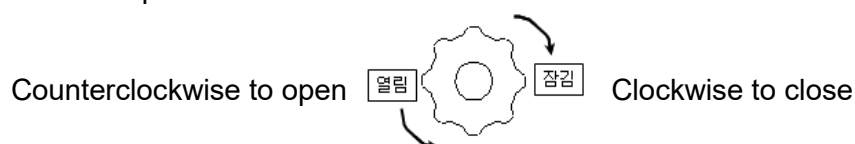
5) Make sure to fill up the distilled water above the heater cover.

6) Open up the heater cover and push the water level sensor to check if it floats.

7) Take the basket with sterilization objects back to the chamber.

8) Close the door.

9) Check the pressure release valve is well closed.



10) Connect to power and turn on the power switch as below..



(Power switch On)

11) Input setting value is at 121°C and 15mn~20min for process time.

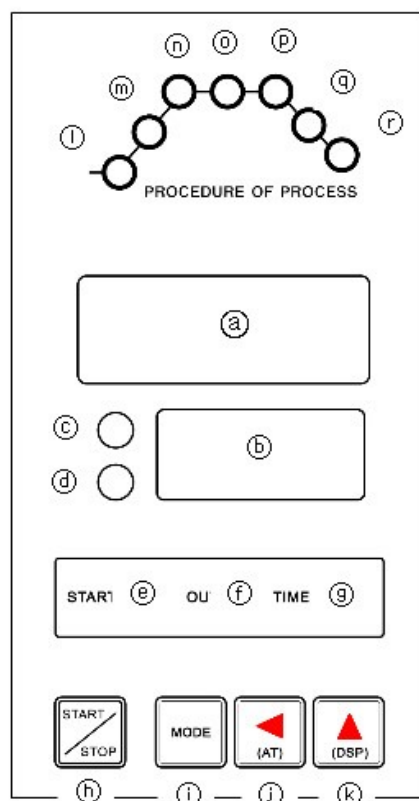
12) Press START button for start.

13) Observe the process to see if any malfunction occurs.

14) Carefully door open and take sterilization objects out after a few hours gone.

15) After take them out, do the proper maintenance inside and close the door.

2. Control panel description.



	FUNCTION
(a)	DISPLAY, TEMPERATURE
(b)	DISPLAY, SETTING UP TEMPERATURE & TIME
(c)	LAMP, SETTING UP TEMPERATURE
(d)	LAMP, SETTING UP TIME
(e)	LAMP, START/STOP (RUN)
(f)	LAMP, HEATER (OUT)
(g)	LAMP, TIMER
(h)	BUTTON, START/STOP
(i)	BUTTON, MODE SETTING
(j)	LEFT (◀ SHIFT)/ TOUCH FOR 5SEC.-> auto-tuning(AT)
(k)	UP (▶ INC)/ ONE TOUCH -> DISPLAY, SETTING UP TEMP. & REMAINED TIME (DSP)
(l)	(BLINK) TEMP. BELOW 30% OF SETTING / (ON) TEMP. OVER 30% OF SETTING
(m)	(BLINK) TEMP. BELOW 60% OF SETTING / (ON) TEMP. OVER 60% OF SETTING
(n)	(BLINK) TEMP. BELOW 90% OF SETTING UNTIL OPERATION START
(o)	(BLINK) AFTER START OPERATION, UNTIL 50% OF SETTING TIME
(p)	(BLINK) UNTIL 99% OF SETTING TIME
(q)	(BLINK) AFTER OPERATION, UNTIL THE TEMP. REACHES BELOW (A _{off})
(r)	DISPLAY, TOTAL OPERATION END

3. Control panel handling.

1) Temp. Time. Controller

(1) Beginning :

Once power is on, current temp. and setting temp. will display on display panel.
If needed to check setting time, press DSP button slightly then it will show.

(2) Changing value on window. :

Once press DSP button, time and temp. will show up in turn. If operation is underway, remaining time will appear. If no operation is underway, current temp. will appear. At first, setting time will appear then time appears as operation goes.

(3) Operation :

After temp. and time setting, press START/STOP button prompts temp. control to start.
To stop it is to press START/STOP button once again.
Timer activates once setting temperature reaches to setting value.

(4) LED ③, ④, ⑤

When temperature control starts, LED for START/STOP ③ will turn on,
When heater works, LED ④ will turn on.
When time is activated, LED ⑤ will turn on.

(5) Setting for temperature and time

For example) Temperature = 121℃ Time = 15 min.

(5-1) Press MODE button.

(5-2) "TEMP" will appear on temperature display with beeping sound and blinking the first letter of TEMP.

(5-3) Use ① button (▲ INC) for adjusting the value. It moves from 1 to 9 and to zero

(5-4) Use ② button (◀ SHIFT) to move to next digit.

(5-5) Move to next digit and set, then press ③ button.

(5-6) Then beeping sound will occur with "TIME" on display window as well as below window blinking for time setting.

- (5-7) Input 5 at fourth digit and 1 at third digit and zero at first and second digit. Then press MODE button to save. Then beeping sound will occur.
- (5-8) After previous stage, 121°C will appear on temperature display and 00:15 will appear on time display window. Please re-check setting temp. by pressing DSP button.
- (5-9) If setting time is "00:00" then "--.--" will appear on time window and timer does not work but temperature control works only. Therefore, you should set the time.
- (5-10) DSP button will show you setting temp. and remaining time.

2) Process status indication.

(1) START :

Timer will activate once the setting temperature reaches its setting value with the lamp on

(2) END :

"End" on timer window will blink when time is over.

If you press START button, timer is off with beeping sound and turns to STOP status and then setting temperature will appear.

(3) Timer activation and TIME indication :

Once press START button, it activates the timer to work for setting value.

(4) AUTO-TUNING :

In order to activate AUTO-TUNING function, press START button for temperature control. Then press ① button (◀ **SHIFT**) for more than 5 seconds then beeping sound will occur. That is a sign of AUTO-TUNING start. After its process, it will be beeping.

During AUTO-TUNING process, setting temp. will appear at time display window.

Be informed that AUTO-TUNING is required when heater and other parts replacement.

Frequent AUTO-TUNING will cause the malfunction.

3) Caution for operation and safety

- (1) After setting up the temp. and time then press START for about 2 seconds, ③ **START** and ④ **OUT** Lamp will be on and ⑨ **TIMER** Lamp will blink.
- (2) Timer activates when temperature reaches to setting value. Its sign is that ⑨ **TIMER** Lamp keeps on. It means TIMER activates.
- (3) If you press **START** button, temperature rises. Until it reaches to 105°C ~ 110°C, initial pressure exhaust will occur automatically. after it passes that temperature range, solenoid valve takes control of pressure to let the temperature reach to setting value for sterilization. When the process ends, solenoid valve works again to be ON for pressure release.

- (4) When it reaches to setting temp. (121°C) Timer activates for sterilization and lasts for setting time (15minutes)
- (5) When the process ends, alarm sound will let you know the end of process with a message of "END" on a display window as well as pressure release.

Note :

Do not press STOP button to the message of "END"

If you do, it makes solenoid valve off and pressure stays inside. it means you can't open the door, or you could face a big incident if you try to open the door by force.

In this case, you are required to open pressure release valve for pressure out and wait until pressure gauge indicates to zero position. Be careful for burn or any other incident when open door.

- (6) If you are in previous position or door is not opening, please open pressure release valve to let the inside pressure out for door open. In this case, make sure pressure gauge is at zero for door open and take some time until temperature goes down.
- (7) If distilled water runs out during process, water level sensor will give you an alarm. Then immediately stop the operation and power off and wait until you are allowed to open the door. Then fill up the distilled water up to water level sensor cover.

4. Control parameter setting.

1) This page is for control parameter that is necessary in operating this product..

2) Parameter setting manual and its value.

- (1) In order to enter the parameter mode, press ⓘ MODE button for more than 5 seconds then AHL mode will appear with first digit blinking. Use ⓘ button (◀ SHIFT) or ⓘ button (▲ INC) to adjust the value.,

Note : AHL setting value from factory is **02.0**.

- (2) To go to next parameter is to press MODE button.

Below is parameter list.

ALH → AALH → ALL → AALL → COOL → HyS → beep → AdJ → LoC

- (3) Factory setting value (**AALL, AdJ is different by model**)

ALH : 02.0, AALH : N/A, ALL : N/A, AALL : 105~108, COOL : N/A
HyS : 00.1, beep : 0030, AdJ : 00.5 ~ -00.5, LoC : 0000

3) Advanced level for parameter setting.

- (1) In order to enter the advanced level for parameter setting, press ⓘ MODE button for more than 25seconds. Then “**rnt**” mode will appear with beeping sound as well as first digit blinking. Use ⓘ button (◀ SHIFT) or Ⓚ button (▲ INC) to adjust the value.

Note : “**rnt**” setting value from factory is 130.0.

- (2) To go to next parameter is to press MODE button.

Below is parameter list.

Rnt → ACTP → Prd → P → A → I → D → Mode0 → Mode1 → Mode2 → Cton →
CtoF → Cdly → drAn → dTon → Aoff

- (3) Factory setting value. (**P, A, I, D. value is decided by AUTO –TUNING**)

Rnt : 130.0, ACTP : 00.0, **Prd : 01**, P : current value, A : current value, I : current value,
D : current value, **Mode0 : 1011**, **Mode1 : 0111**, **Mode2 : 0000**, Cton : N/A, CtoF : N/A,
drAn : N/A, dTon : N/A, Aoff : N/A

5. Safety function

1) Safety function by control

If it exceeds +2℃ against setting value of 121℃, temperature high limit by control will launches the safety function to control the heater output.

2) Safety function by water level sensor

When lack of distilled water or out of distilled water occurs, water level sensor will detect it and takes control of heater to be cut off.

3) Temperature detection by pressure.

When lack of distilled water or out of distilled water with water level sensor damaged in which leads to heater damage occurs, temperature detection by pressure will detect it and let the power of heater cut off for its safety.

4) Pressure detection

Pressure detection is installed inside of chamber. If over pressure is detected, it will let the pressure discharge out of chamber immediately.

<The most important thing to follow is>

- 1) to check the distilled water and clean up the chamber.**
- 2) to fill up the distilled water up to heater cover.**
- 3) is to have the Steam Trap Bottle empty at everytime.**

Appendix I

Spare part list

ATCV001	POWER CORD
ATCV002	POWER PLUG
ATCV003	PRESSURE INDICATOR
ATCV004	BIMETAL
ATCV005	POWER SWITCH
ATCV006	MAIN CONTROLLER
ATCV007	WATER LEVEL SENSOR
ATCV008	TEMPERATURE SENSOR
ATCV009	PRESSURE RELEASE VALVE
ATCV010	SOLENOID VALVE
ATCV011	SAFETY VENT
ATCV012	SSR (SAA1-225Z)
ATCV013	SSR (SAA1-240Z)
ATCV014	HEATER
ATCV015	GASKET

☎ should you need any assistance for the product, please contact local distributor or NBIOTEK.



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