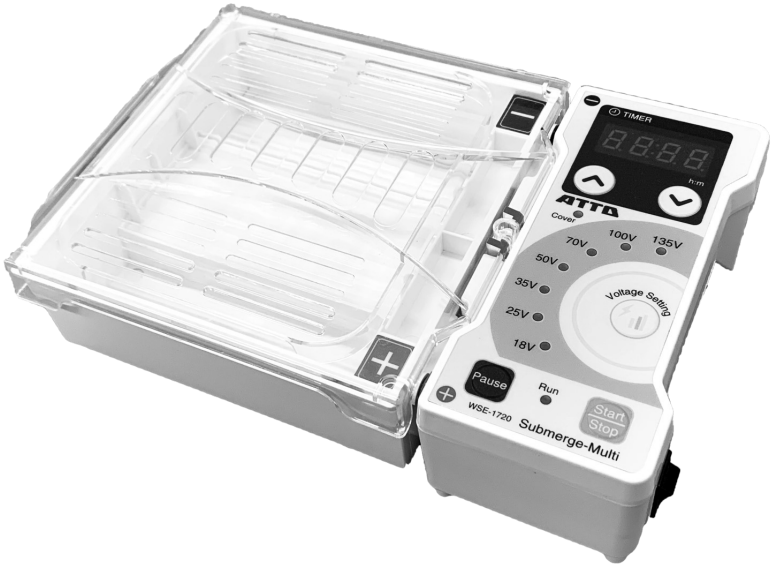
# Instruction Manual

Submarine Type Electrophoresis System
Built in Power Supply

## WSE-1720

## Submerge-Multi




3rd edition

June 22nd, 2022

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## Introduction

Thank you for purchasing our submerge type electrophoresis system "WSE-1720 Submerge-Multi". This instruction manual (i.e. this document) is delivered to you together with the device so that you can make full use of the device. Not only those of you who use this device for the first time, but also those who have used it before, should read this document carefully to understand the contents. If you use this device for the first time, please read this document in order from the beginning. In addition to how to use it, this document contains information related to maintenance, guarantee and services as well. Please keep it handy all the time to make full use of it.

If you have any inquiries on your purchased product or the instruction manual, please feel free to contact us. (Please refer to the back cover.)

## About instruction manual

Before using the product, please read this document carefully. After reading, please be sure to keep it for your future reference. When you relocate this device, be sure to attach this document to it.

If there is any defect in this document such as misplaced or missing pages, or if this document is lost or tainted, we will replace it with a new one. Please contact to the distributor you purchased the product or us (please refer to the back cover). At that time, please inform us of your product name and model. This document was created with our most careful attention; however, should you find any queries, errors or omissions, please inform us (please refer to the back cover).

## Safety precautions

To use this device safely, It must be operated properly. Do not use this product until you read this document carefully and fully understand this manual. Precautions on usage and safety described in this document are applied to the use of this device only for the specified purpose of use. Do not use this device for any other purpose than described here, or do not use this device by any other method than described here. If you use this device for any other purpose or by any other method than described in this manual, the operator is responsible for all necessary safety measures.

If this device is operated for the first time, it should be supervised by an experienced person who has proper knowledge and understanding of the operations and methods. In addition to first-time users, experienced users who have received specialized training should also keep the instruction manual handy and make effective use of it. In order to prevent any electric shock caused by the device or any damage to the device, please understand and follow the correct operation method shown in this manual. If you have any questions or concerns related to the operation of maintenance or inspection, feel free to contact us (please refer to the back cover).

## Safety symbols

To use this device safely and maintain the safe status, the following symbols are indicated in the instruction manual and on the device's main unit. Please note the meaning of each symbol and observe each item.

| Symbol | Description |
|---|---|
| ⚠Danger | This symbol indicates emergent danger, such as death or heavy injury caused by ignoring the symbol and mishandling the device. |
| ⚠Warning | This symbol indicates possibility of danger, such as death or injury, caused by ignoring the symbol and mishandling the device. |
| ⚠Caution | This symbol indicates possible occurrence of physical damage caused by ignoring the symbol and mishandling the device. |
|  | This symbol indicates prohibition. |
|  | This symbol indicates an important matter. |
|  | This symbol indicates a tip related to the operation. |

## CE Marking

CE Complies with the provisions of following Directives as completed equipment under evaluation of conformity based on the following harmonized standard.

| Directive | Test Standard |
|---|---|
| Low Voltage Directive, 2014/35/EU | EN 61010-1:2010 |
| EMC Directive, 2014/30/EU | EN 61326-1:2013 |
| RoHS Directive, 2011/65/EU | EN IEC 63000:2018 |

Indicate disposal instruction.

**DO NOT** dispose of this product in the trash.

To ensure utmost protection of the global environment and minimize pollution, please recycle this unit.

## Operation precautions

These are precautions for preventing fire, electric shock and other accident or failure. Read and understand the information well, and be sure to observe it.

### ⚠Danger

| | |
|---|---|
| Power supply connection  | Do not use a deformed or corroded electrode terminal, power cable whose insulation coating is peeled off, or damaged power cable. In addition, do not connect anything other than the one supplied with the device. Before operating this device, check and confirm that there is no damage to it. Otherwise, it may catch fire or cause electric shock due to loose connection. If there is any damage, stop using this device and contact our company (please refer to the back cover). After use, be sure to turn off the power switch and disconnect it from the outlet. When disconnecting power cable from the outlet, be sure to turn off the power switch, and then disconnect it by holding the power cable instead of pulling the cable. |
| No wet hand  | When handling this device, keep your hands dry.<br>Do not touch power cable with wet hands. If you do, electric shock or failure may be caused.<br>If the power cable gets wet, do not use it. If you do, electric shock or failure may be caused. |
| Main Unit  | Do not put any debris, aggregation or clumps into this device. If you do, electric shock or failure may be caused. If the external surface of this device gets wet, do not use it. If you do, electric shock or failure may be caused. When using the device, wipe off any moisture on the surface and keep it dry. |
| Maintenance  | If an error occurs or there seems to be an error or failure while this device is being used, stop using it immediately. If you find any defect at the time of inspection, do not use this device. If you do, electric shock or defect may be caused. During use, visually inspect the device periodically for abnormalities such as abnormal noise, smoke or liquid leakage. If you find an error, failure or defect, discontinue use and contact us (please refer to the back cover). |
| High temperature warning  | The aluminum block may be hot during and immediately after use of this device.<br>Do not allow direct contact with the human body. It may cause burns, accidents or other harm to the human body. |
| Reagents  | Powerful drug, hazardous, carcinogenic substances, etc. may be used in reagent preparation and so on. Avoid direct contact with the human body. It may cause death, burns, or other harm to the human body. When using chemicals, protect yourself with gloves, masks, etc., and carefully read and follow the instruction manual attached to the chemical. |

## ⚠Warning

| | |
|---|---|
| Installation  | Do not install the device on an unstable table, tilted place or a heavily vibrating place. Install it on an experimental table with horizontal, stable and solid surface. Otherwise, electric shock due to falling or liquid leakage may be caused. Do not put any object on this device. If you do, electric shock due to falling may be caused. |
| Main Unit  | This device is not of explosion-proof structure. Install it at the place where there is no exposure to fire or combustible gas. When taking this device out of a low-temperature room for use, take measures against dew condensation before moving it. If condensation is seen, dry it completely. It may cause an electric shock or malfunction. |
| Transfer  | Do not touch or move any part of the unit other than the operation panel while the unit is in operation. The electric cords may get entangled and the device may fall. When moving this device, be sure to turn off the power switch and disconnect the power cable , and then disconnect all wiring cables. |
| Maintenance  | When you execute maintenance or cleaning, be sure to turn off the switch of the power supply and disconnect all lead wires. To maintain good performance and safety of this product, please ask us for periodical maintenance, inspection and calibration . |
| No disassembly  | Do not disassemble or modify this device. Do not remove the external cover.<br>Interior adjustment or repair of this product should be made by our engineers. If adjustment or repair needs to be done, please ask us (please refer to the back cover). Our company will not accept any responsibility for any accident or failure caused by disassembly or modification done by yourself. |
| Label sticker  | Do not remove the warning label. It indicates the dangerous parts of the device.<br>If the sticker is removed or becomes dirty and unreadable, please contact us. |
| Power cable  | Do not use the power cable of this device for any purpose other than the operation of this device. It may cause malfunctions or accidents. We are not responsible for accidents or failures caused by using the power cable of this device for anything other than this device. If this device is used outside Japan, prepare the conversion adapter complying with the standards of the country where you use it. If a non-standard adapter is used, heat generation or ignition may occur. If you have any inquiries, please contact us or the distributor from whom you purchased. |

## ⚠Caution

| | |
|---|---|
| Label sticker | The label sticker shows important information for maintenance and management of the product. Do not peel it off. |

## Notices

| | |
|---|---|
| Application | This device is for life science research use only.<br>It's not a medical device and cannot be used for medical treatment, such as making medical-related judgments or confirming the effectiveness of treatment. |
| Export | Export of specific work and cargo are controlled by Foreign Exchange Laws and Cabinet Order/Ministerial Orders of Foreign Trade Control Laws and those controls are applied to this unit. Even if the unit is not applicable to the Cabinet Order, it's required to submit documents accordingly and if it's applicable, then obtain export license from the Ministry of Economy, Trade and Industry, and then submit the license to the customs office. When you export our products, please confirm with your supplier or us in advance. |
| Trademarks/ Copyright |  Information in this manual or specification of the product is subject to change without notice. |

# 1 Overview

## 1.1 Purpose

WSE-1720 Submerge-Multi is the device for separating nucleic acids by electrophoresis using agarose gels. Electrophoresis is performed using agarose gels prepared with the included gel casting kit.

## 1.2 Principle

This system supplies electric power through electrode buffer from power supply unit attached to electrophoresis chamber. Negatively charged nucleic acid samples applied to wells of gel will move to anode side by electricity. Nucleic acid is separated to each band depending on the size of nucleic acid.

# 2 Inspection when unpacking the product

## 2.1 Inspection when unpacking

Upon arrival of the product, please confirm whether the main body and accessories are packed correctly or if any defects exist. In case there is any inadequacy, deficiency, etc., please inform your supplier or our company immediately. Please perform your confirmation as above at the time of unpacking within a week upon arrival of the unit. Confirmation after more than a week may result in not receiving compensation for defects or missing articles.

## 2.2 Product component

This device consists of a main body and accessories.

### Main body

| | |
|---|---|
| **Model/ Product code** | WSE-1720 / 2322130 |
| **Main body** | Submerge-Multi |

### Accessories

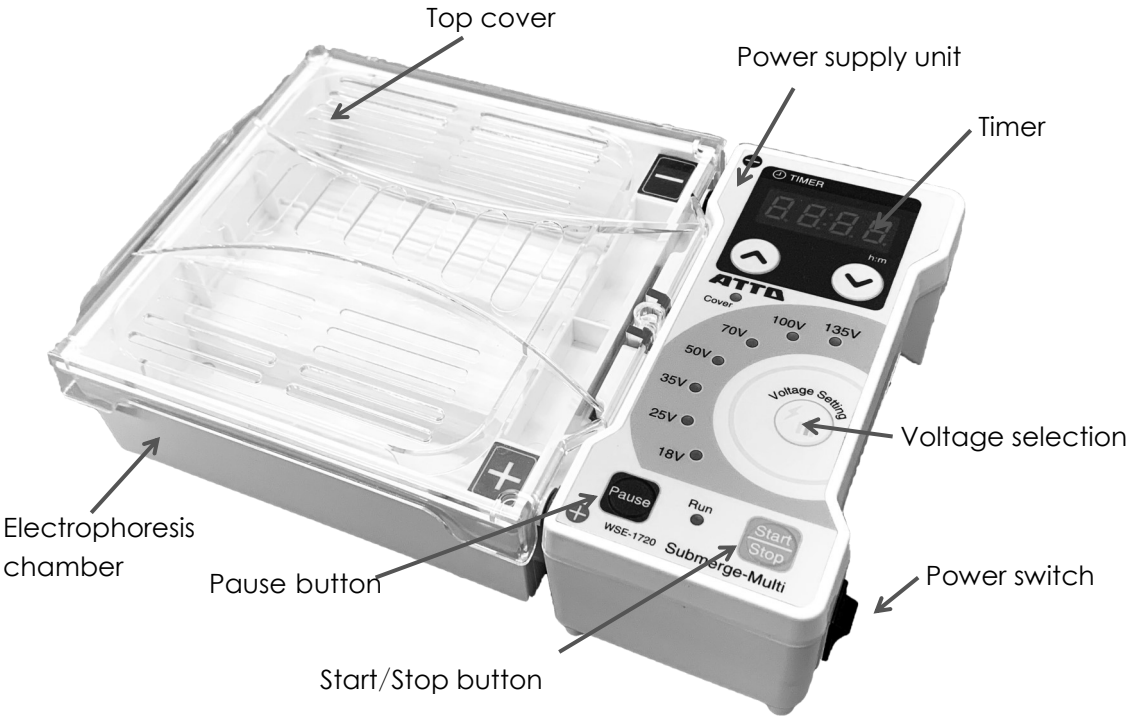
| Product name | Code# | Quantity |
|---|---|---|
| Electrophoresis apparatus | - | 1 pc |
| Power cable | - | 1 pc |
| Gel tray S for WSE-1720 | 2322136 | 2 pc |
| Gel tray M for WSE-1720 | 2322137 | 1 pc |
| Gel tray L for WSE-1720 | 2322138 | 1 pc |
| Gel casting stand for WSE-1720 | 2322141 | 1 pc |
| Comb for WSE-1720 25/11 samples | 2322139 | 4 pc |
| Comb for WSE-1720 18/8 13/6 3/2 samples | 2322140 | 1 pc each |
| Support sheet | - | 2 pcs each |
| Instruction manual | - | 1 pc |

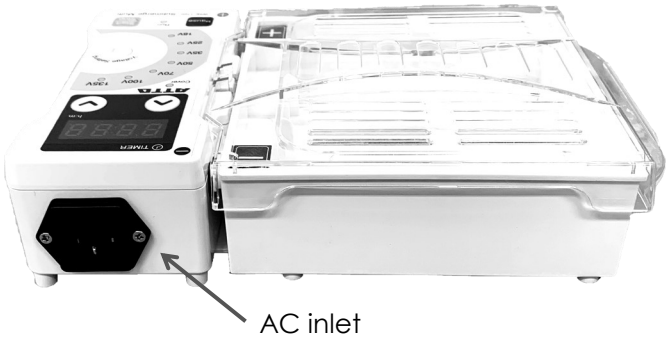
### Optional accessories

| Product name | Code# | Quantity |
|---|---|---|
| Gel tray S for WSE-1720 | 2322136 | 2 pcs |
| Gel tray M for WSE-1720 | 2322137 | 1 pc |
| Gel tray L for WSE-1720 | 2322138 | 1 pc |
| Gel casting stand for WSE-1720 | 2322141 | 1 pc |
| Comb for WSE-1720 25/11 samples | 2322139 | 4 pcs |
| Comb for WSE-1720 18/8 13/6 3/2 samples | 2322140 | 1pc each |
| Safety cover for WSE-1720 | 2322142 | 1 pc |

# 3 Name and function

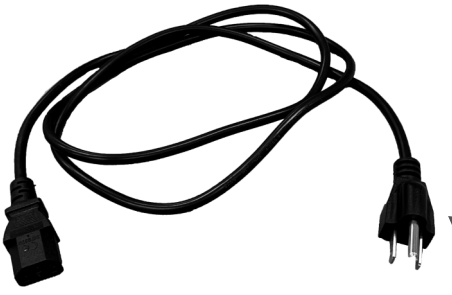
## 3.1 Main unit




## 3.2 Power cable

This power cable is available from AC 100V to 110V.



**DC plug**

This part is inserted to the inlet in the back of the main unit.

**Power plug**

This part is inserted to the outlet.

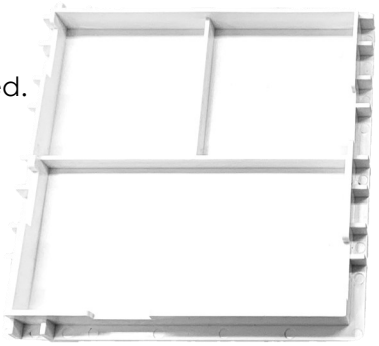
## 3.3 Gel casting kit

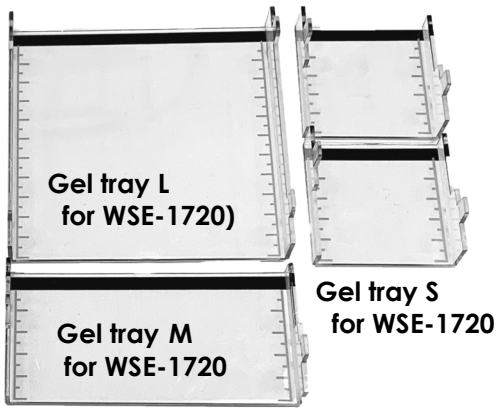
This kit which consists gel stands, gel trays and combs is for casting agarose gel. The gel trays are made of UV transmission resin.

**Gel casting stand for WSE-1720**

**Gel stand A side**

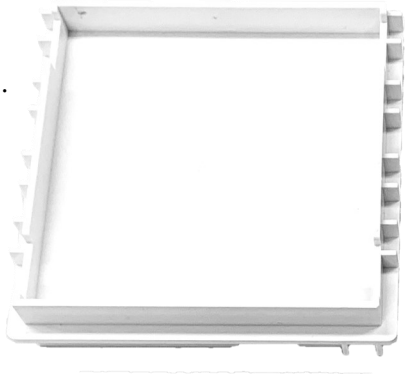
Gel tray S or M can be used.






**Gel stand B side**

Gel tray L can be used.



**Support sheet**

**Comb for WSE-1720 18/8 13/6 3/2 samples**

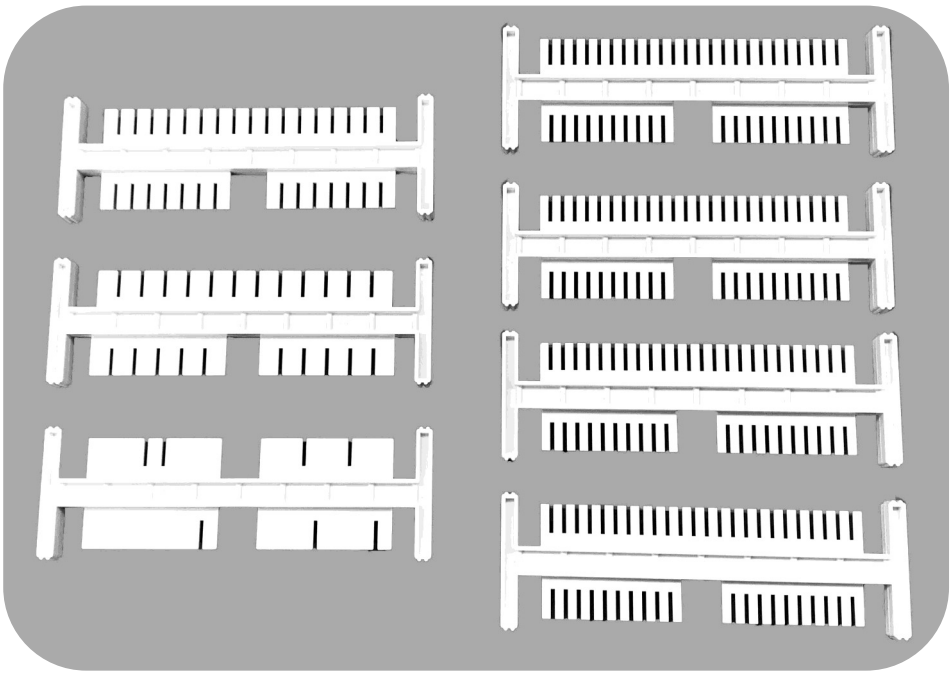
**Comb for WSE-1720 25/11 samples**

*Compatible with multichannel pipettes

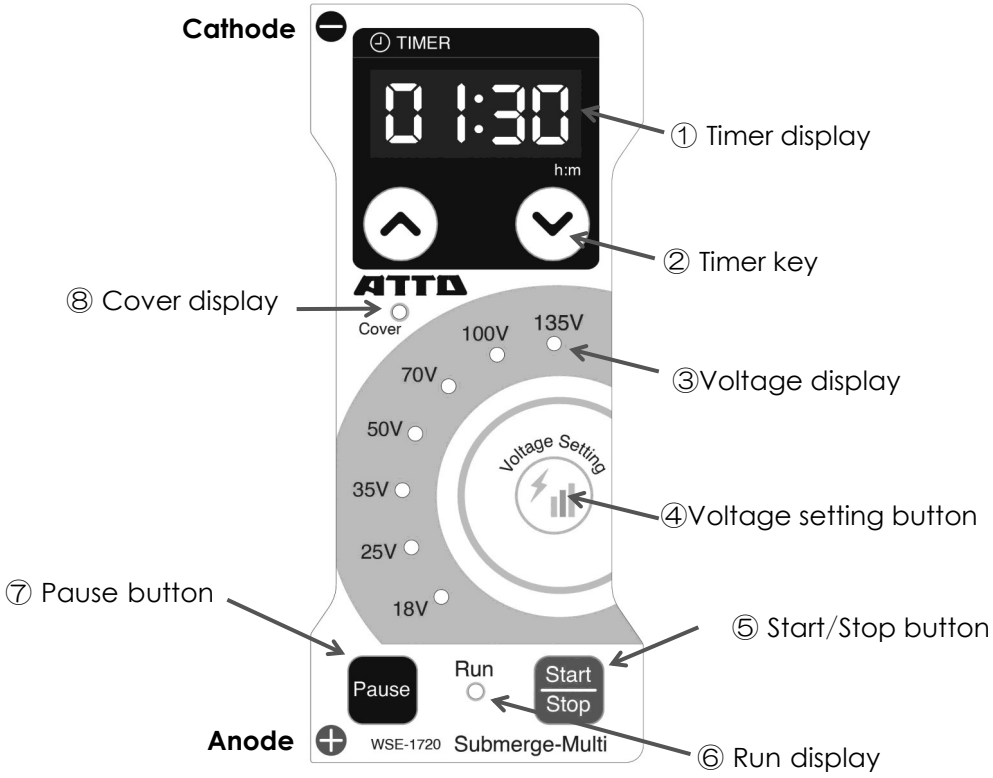
**Comb 18/8 samples**

**Comb 13/6 samples**

**Comb 3/2 samples**



## 3.4 Control panel




① Timer display

The time display shows setting time (at the time of setting) and remaining time (at the time of running, countdown). If timer is set as "OFF", you can use it in timer-free.

② Timer key

The timer key is used to set the running time. Press the arrow keys to increase or decrease the setting time. If timer is set as "OFF", you can use it in timer-free.

③ Voltage display

The LED of the set voltage lights up.

④ Voltage setting button

Press the button to change the set voltage. The LED display of the voltage indication will change.

⑤ Start/Stop button

Press the button to start electrophoresis. Pressing the button during electrophoresis stops it.

⑥ Run display

Pressing the Start/Stop button starts electrophoresis and turns on the LED. Press again to stop the electrophoresis and turn off the LED.

Pressing the Pause button during electrophoresis pauses the electrophoresis and the LED blinks.

⑦ Pause button

Press the Pause button to pause electrophoresis and the timer countdown.

Press it again to resume electrophoresis.

⑧ Cover display

If the top cover is set correctly, the LED will light up. If it's not set correctly, the LED will turn off.

# 4 Preparation

## 4.1 Installation environment

Please use this system under the following condition.

| | |
|---|---|
| Location | Inside a room only |

**⚠Warning**

Do not install the product in combustible gas atmosphere. It is not of explosion-proof structure, so the product may cause explosion or fire. Install it in an environment without combustible gas. Do not install the product in corrosive gas atmosphere. This is because it can cause corrosion of conductor inside this product or contact failure of connecter, which may lead to malfunction, failure or fire. Do not install the product in an environment with much dust or dirt. Dust or dirt may stick to the product, which can cause electric shock, fire or failure.

**⚠Caution**

Do not use the product at a place where there is strong magnetic or electric field around, or a place where there is much waveform strain of input power supply or noise. It may cause malfunction. Do not install the product at a place where it is exposed to direct sunlight, where temperature suddenly changes, or where humidity is high. If dew condensation occurs, do not use this product. This system cannot be used outdoors, It is designed to ensure safety and performance under the following environmental conditions: ambient temperature 5℃-30℃, relative humidity 5%-70%(No dew condensation).

## 4.2 Pretreatment of reagent

Standard running buffer for electrophoresis is TAE and TBE. TAE is suitable for separation of longer DNA (more than several kbp), and TBE is suitable for separation of shorter DNA. The component of reagent used for electrophoresis is as the following.

**Gel buffer and Running buffer**

**50x TAE**（Store at room temperature ）

| | |
|---|---|
| 2 M | Tris base |
| 1 M | Acetic acid |
| 50 mM | EDTA |

OR

**10×TBE**（Store at room temperature ）

| | |
|---|---|
| 500 mM | Tri base |
| 485 mM | Boric acid |
| 20 mM | EDTA |

**5× Gel loading solution**（Store at refrigerator）

| | |
|---|---|
| 0.25% | BPB（Bromophenol blue) |
| 40% | Saccharose |

**DNA staining solution**（Store at cool and dark place）

| | |
|---|---|
| 0.2 mL | 10mg/mL Ethidium bromide |
| 200mL | 1xTAE or 1xTBE |

***The reagents manufactured by ATTO are also available (see page 12).**

**⚠Warning**

For electrophoresis, deleterious, dangerous or carcinogenic material may be used for preparation of buffer, staining or destaining operation. Do not allow it direct contact to human body. If you do, fatal accident or body injury, like burn, may be caused. When using chemicals, read the manual attached to reagent and protect your body with gloves and a mask.

| Concentration of Agarose gel（w/v) | Size of DNA（bp) |
|---|---|
| 0.6% | 1,000-20,000 |
| 0.7% | 800-100,00 |
| 1.0% | 500-7,000 |
| 1.2% | 400-6,000 |
| 1.5% | 200-3,000 |
| 2.0% | 100-2,000 |

The agarose concentration should be selected according to the size of DNA to be separated.

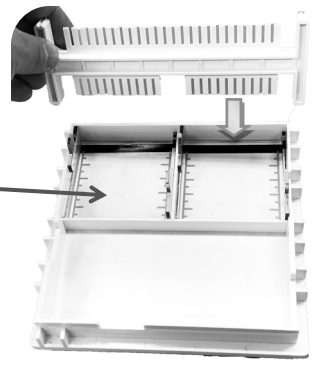
The table on the left shows the agarose gel concentration suitable for the size of DNA to be separated.

## 4.3 Assembling gel casting kit

A. When using Gel Tray S (gel size 60(W)×60(L)mm)

① Insert the gel tray S into the A side of the gel stand .

② Insert one of the combs into the gel tray S.

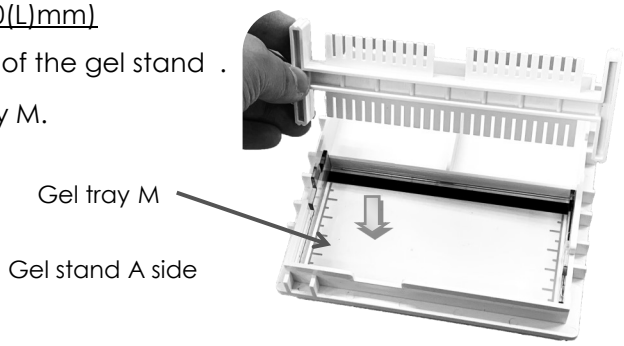



The gel tray should be placed with the black line on the top (where the comb is inserted).

B. When using Gel Tray M (gel size: 120(W)×60(L)mm)

① Insert the gel tray M into the A or B side of the gel stand .

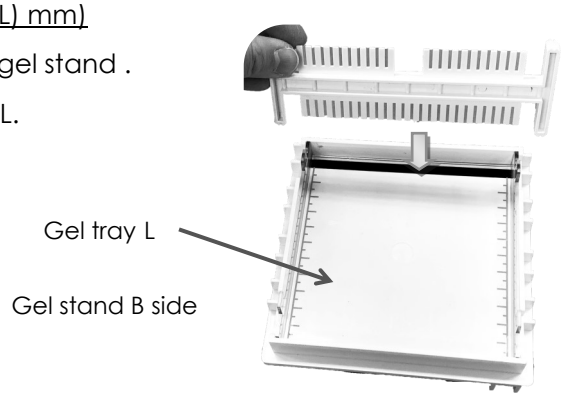
② Insert one of the combs into the gel tray M.




C. When using Gel Tray L (gel size 120 (W) x 120 (L) mm)

① Insert the gel tray L into the B side of the gel stand .

② Insert one of the combs into the gel tray L.




D. When casting gels for multiple samples (gel size 120(W)×120(L)mm)

Using Gel Tray L and comb 1, it's possible to cast an agarose gel that can electrophoresis up to 100 samples at the same time.

① Insert the gel tray L into the B side of the gel stand.

② Insert 4 combs (25/11 samples) into the gel tray L.

## 4.4 Casting agarose gel

① Weigh the required agarose according to the size of separated DNA (Refer to the table on chapter **4.2)**, and add appropriate amount of 1xTAE or 1xTBE to it.

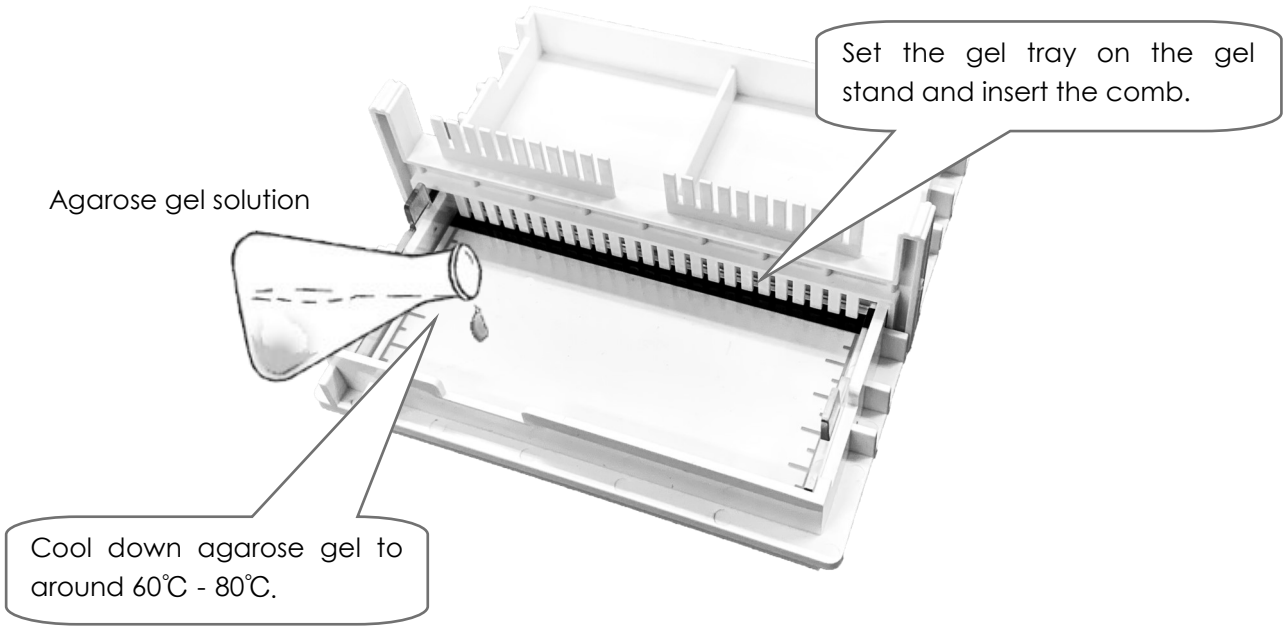
② Dissolve completely the agarose by heating in a microwave or water bath.

③ Cool down the gel solution to about 60℃ - 80℃.

④ Pour gently agarose gel solution to gel casting kit.

∗The necessary amount of agarose gel solution is 15-25 mL per 1 S size gel, 30-50 mL per 1 M size gel, and 80-100 mL per 1 L size gel. The proper gel thickness is 5-10 mm.

∗The height of the solidified gel is lower than the gel solution because the gel shrinks slightly when it hardens.



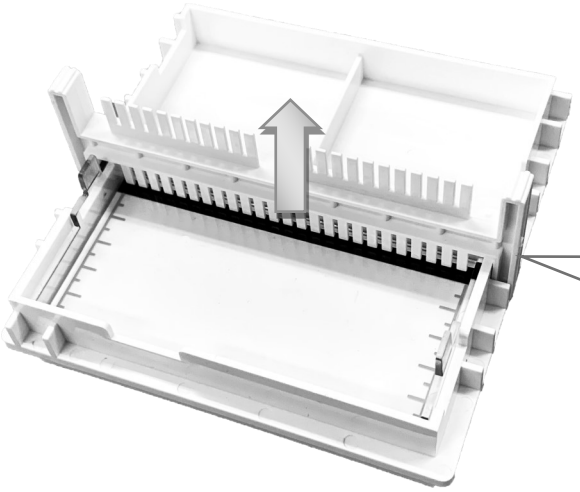

**⚠Waming** Agarose gel may boil after dissolved and may cause burns due to its extremely high temperature. Please protect your body with heat-resistant gloves, etc., and handle with care.

The gel tray, gel stand, and comb are made of heat resistant materials.
The materials and heat resistant temperatures of each part are as follows.
When handling high-temperature gel solutions, please be very careful not to burn yourself.

Gel tray: Made of polycarbonate up to 135 ℃
Gel stand, Comb: Made of polycarbonate and ABS synthetic polymer up to 115℃

⑤ Stand the gel to be solidified in 30-60 min at room temperature.

⑥ Hold both edges of the comb and pull it up.

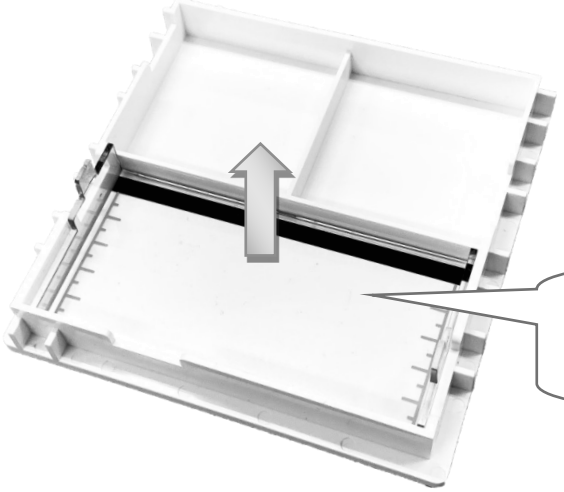


Pull up the comb vertically and remove it.

Be careful not to get out of shape of the well.

⑦ Remove the gel tray from the gel stand.

*Hand-cast agarose gel can be refrigerated in 1 x TAE or 1 x TBE buffer for about a week.



Hold the gel tray and remove it from the stand.

Be sure not to slip out the gel.

## Related ATTO Products

| Product code | Model | Product name | |
|---|---|---|---|
| 2332394 | WSE-7040 | EzApplyDNA | Loading dye for DNA electrophoresis（6 x, sterilized ） |
| 2332391 | WSE-7050 | EzRunTAE | Tris, Acetic acid, EDTA buffer（50 x , sterilized） |
| 2332392 | WSE-7051 | EzRunTBE | Tris, Boric acid, EDTA buffer（10 x , sterilized） |
| 2332395 | WSE-7130 | EzFluoroStain DNA | Fluorescent dye for detection of DNA (10,000 x) |
| 2332397 | WSE-7135 | EzPreStain DNA&RNA | Fluorescent dye for DNA & RNA(10,000 x) |

# 5 Operation

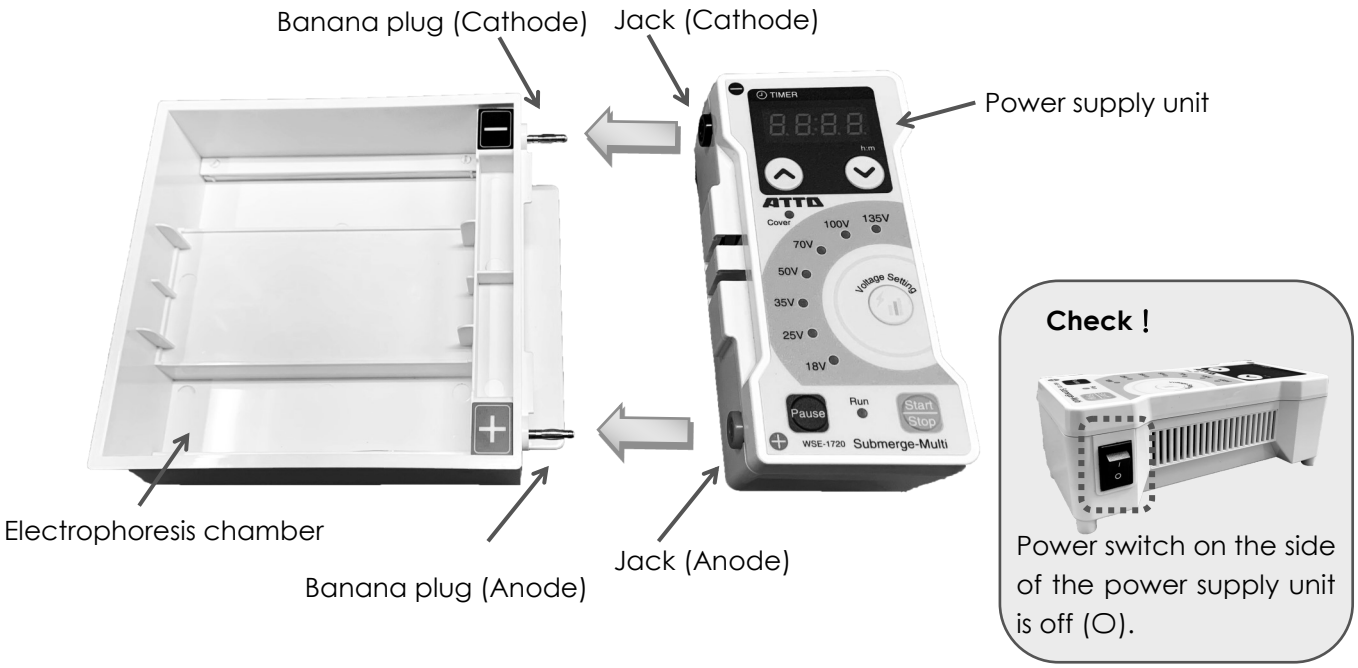
## 5.1 Starting operation

① Make sure the power cable is not connected.

② Make sure the power switch on the side of the power supply unit is turned off (○).

③ Connect the power supply unit to the electrophoresis chamber.

＊Insert firmly banana plug of the chamber into jack of the power supply unit.



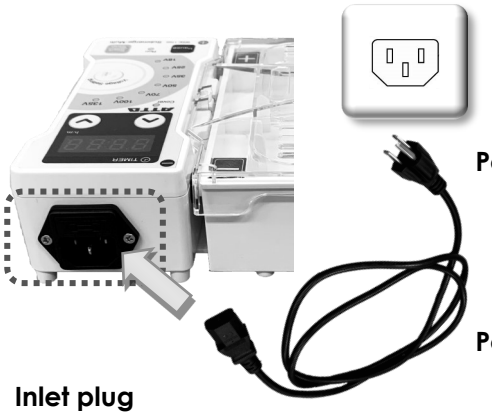

**Check !**



Power switch on the side of the power supply unit is off (O).

④ Connect the plug on the inlet side of the power cable to the AC inlet on the back of the power supply.

⑤ Connect the power plug to the outlet.



**Power plug**

Connect to the outlet.

**Power cable**

**Inlet plug**

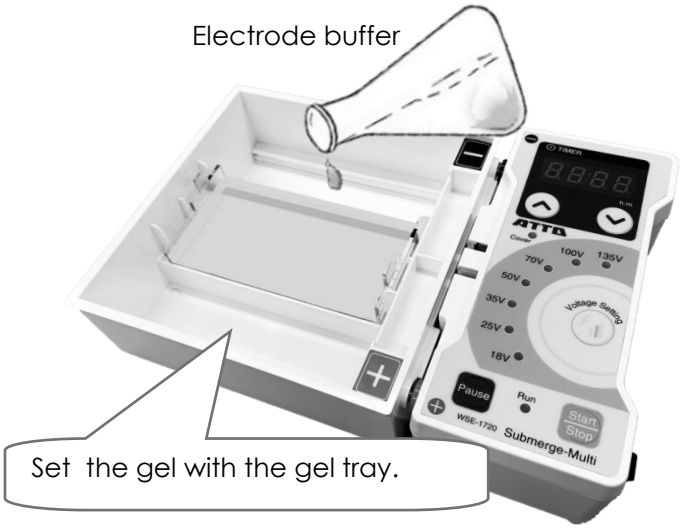
Connect to the AC inlet on the back side.

**⚠Warning**

Do not use a deformed or corroded electrode terminal, power cable whose insulation coating is peeled off, or damaged power cable. Also do not connect any power cables other than the one attached to this unit.

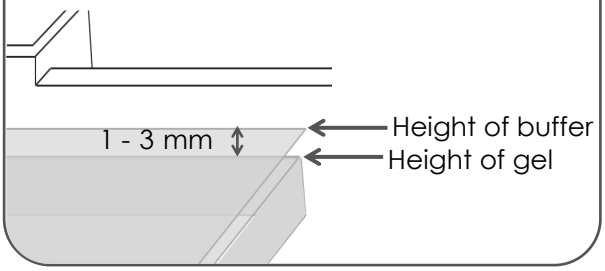
⑦ Set the agarose gel with the gel tray into the electrophoresis chamber.

⑧ Pour 330-360mL electrode buffer to the chamber.



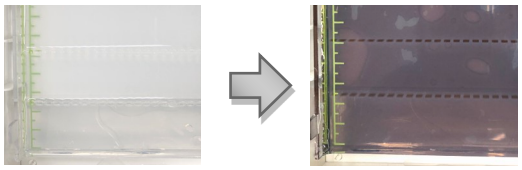

The amount of buffer should be 1 to 3 mm above the top surface of the gel.

If the amount of buffer is large, migration time would be longer because the electricity flowing to the buffer increases.




**⚠Caution**

Do not pour more than 360 mL of electrode buffer. Also, pour the buffer so that the top surface of the gel is completely submerged. If you do not pour adequate amount of the buffer, it may result in a disturbed electrophoresis, reduced electrophoresis speed, or overflow of buffer during electrophoresis.



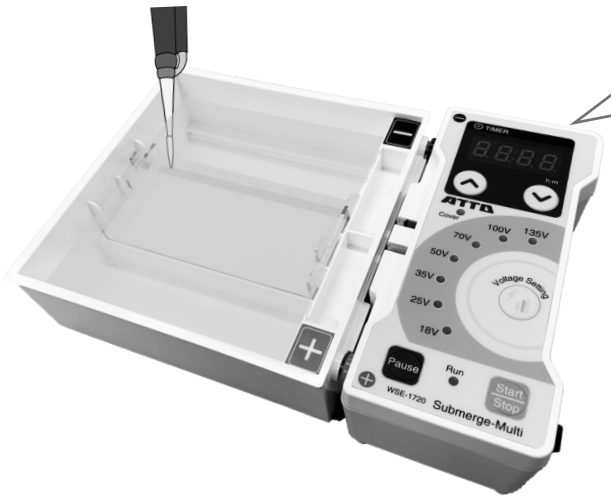
When support sheet is used

When applying samples using multiple combs, set the support sheet under the gel tray.

It helps make wells easier to see.

Also, electrophoresis can be performed with the support sheet under the tray.

⑨ Apply sample added gel loading solution to the wells.




Slowly add the sample.

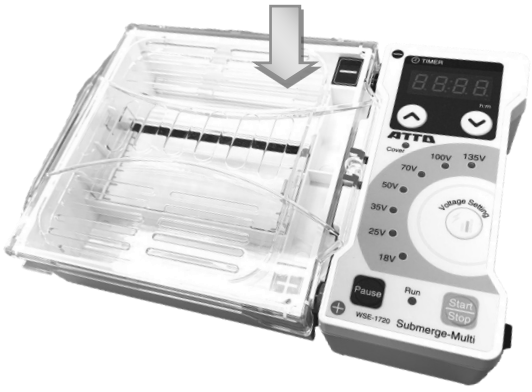
Be careful not to allow air to enter the wells, as it will cause the sample to float.

Nucleic acids are negatively charged and therefore flow to the anode side.

Cathode side（Upper side）


Anode side

⑩ Set the top cover.



If the top cover is not set, electricity does not flow.

**⚠Caution**

Be sure to set the top cover. Also do not insert or put anything through the space of the cover while running the device. It may cause ignition or shock hazard.

⑪ Turn on (-) the power switch on the side of the power supply unit.

*The timer is displayed and the LED of the set voltage is lit.

⑫ Set the voltage and time.

*Time is displayed in countdown and the remaining time is displayed.

⑬ Press the Start/Stop button and start electrophoresis.

*Pressing the Start/Stop button during electrophoresis will stop electrophoresis.

*Pressing the Pause button during electrophoresis pauses electrophoresis and the timer countdown.

Press the arrow keys to set the time.

The time will be displayed with the remaining time.

If the timer is set to "OFF", it can be used without timer.


The LED for the set voltage will light up.

Press the Voltage setting button for setting voltage.

LED lights up when electrophoresis is started.

Press the Start/Stop button ** to start electrophoresis.

Pressing the Pause button* while running will pause the electrophoresis and the timer.

*Press the Pause button again to resume electrophoresis.

**Electrophoresis is stopped by pressing the Start/Stop button while running.

**⚠Caution**

If electrophoresis is performed under 135V setting, the temperature of the buffer may become high as 40-50℃. If agarose gel whose melting point is low is used, be careful because it may be affected by re-melting point (around 65℃ in general).

## 5.2 Finishing operation

① When the setting time is over, a beep sound will be heard and "End" will be displayed.

② Turn off（O）the power switch on the side of the power supply.


③ Unplug the power cable from the outlet.

④ Disconnect the inlet-side plug of the power cable from the AC inlet on the back of the power supply unit.

⑤ Remove the top cover.

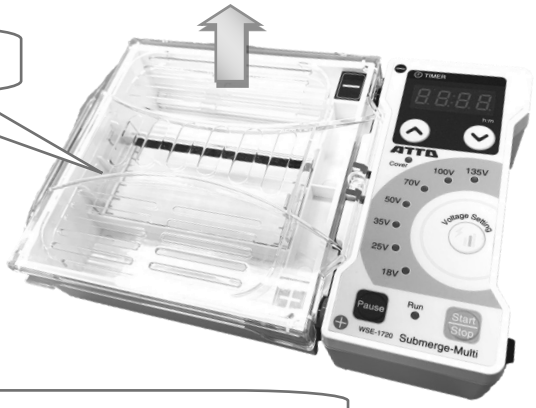
⑥ Remove the gel with the gel tray from the chamber.

⑦ Collect the gel from the tray, and stain or de-stain it.

⑧ Detect the migration pattern of nucleic acid bands.

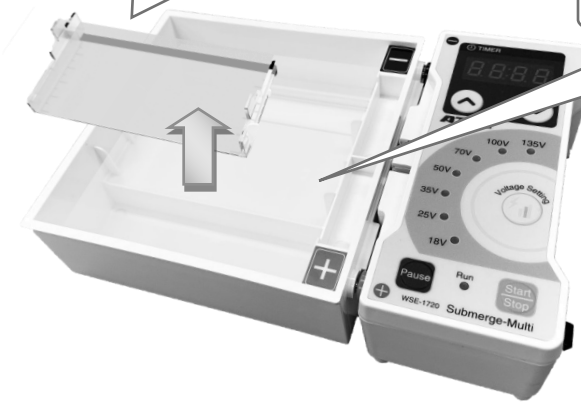
Turn off the power switch（O）.

Remove the top cover.




Remove the entire gel tray from the chamber.

Be careful that the electrode buffer may be hot.




**⚠Warning** The temperature of the buffer may be high as 40-50℃ just after the running finishes. Put on gloves and prevent human body from touching electrophoresis apparatus directly. It may cause an accident burns, or other injury to the human body.

**⚠Warning** Reagents used in staining and de-staining operations may contain deleterious, hazardous, or carcinogenic substances. When using reagents, please protect your body with gloves and masks, and carefully read and follow the handling instructions attached to the reagents.

# 6 Troubleshooting

| Symptoms | Cause | Solution |
|---|---|---|
| No display is shown. | Connection failure of power cable. | Remove the power cable from the power supply unit and connect it again.<br>Make sure the cable is properly connected without any slack. |
| | Power switch is off. | Turn on the power switch. |
| Migration is not started. | Power supply unit is not connected. | Make sure that the power supply unit and the chamber firmly connected.<br>If the above does not solve the problem, please contact us. (See the back cover.) |
| | Power switch is off. | Turn on the power switch. |
| Migration distance is abnormal. | Voltage and timer settings are incorrect. | Reconfirm the voltage and timer settings. |
| | The amount of buffer is not adequate. | Use appropriate volume (330-360 mL) of buffer.<br>Use enough buffer to completely soak the gel. |
| | The buffer is reused. | Use new buffer. |
| Error [Err1] is displayed. | Overvoltage is detected for more than 2 seconds. | The concentration of the electrode buffer may be too high or the volume may be too large.<br>Make sure the electrode buffer concentration and volume are correct. |
| Error [Err2] is displayed. | The top cover came off during migration.<br>The top cover is not set. | After turning off the power switch, set the top cover and close it firmly.<br>Then press Start/Stop button to start electrophoresis. |
| There is no reaction when the button is pressed. | There are abnormalities such as poor button contact. | Stop using it immediately and contact us (Please see the back cover). |
| Power is not supplied. | Connection failure of the power cable.<br>The power switch is off. | Make sure that the power cable is properly connected without any loose connections.<br>Turn on the power switch. |
| | The fuse is blown. | Replace the fuse with a new one (250V 1A φ5×20) (Please see the next page). If you do not know how to replace it, please contact us. |

## How to Check and Replace Fuses

Follow the steps below to check and replace the input fuse.

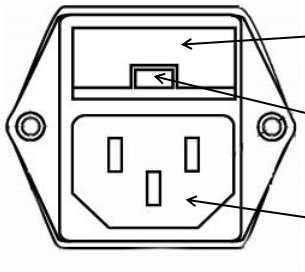
① Turn off the power switch and unplug the power cord from the power outlet.

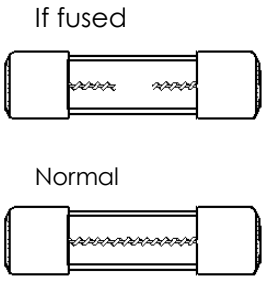
② Disconnect the connection between the power supply and chamber, and unplug the power cord.

**⚠Waming** To avoid electric shock, always unplug the power cord before checking or replacing the fuse.

③ Using a flat-blade screwdriver or similar tool on the lock knob shown in the figure below, pull the fuse holder toward you and remove the fuse holder.

④Visually check to see if the fuse is blown, and if so, replace it with a fuse of the correct standard (250V 1A φ5 × 20). Do not use a fuse of a different standard.





Fuse standard: 250V-1.0A fast-acting type

φ5×20

⑤ After replacement, close the fuse holder in the reverse order of the above procedure.

If you are unsure how to obtain or replace a replacement fuse, please contact us.

# 7 Maintenance

## 7.1 Cleaning

| | |
|---|---|
| **Electrophoresis chamber** | Remove the power supply unit at first. Clean the chamber with soft sponge, water and neutral detergent. There is platinum wire at the bottom of the chamber so be careful not to disconnect it. |
| **Gel stand/Gel tray/Comb** | Clean the gel stand, gel tray and comb with soft sponge, water and neutral detergent. |
| **Power supply unit/ Power cable** | If the surface gets dirty, wipe it softly by soft cloth with neutral detergent diluted with water. Do not use until it gets dry completely. |

**⚠Warning**

- Do not use highly concentrated alcohol or corrosive detergents to clean the unit and its accessories.
- Be careful not to disconnect the platinum wire at the bottom of the electrophoresis chamber when cleaning it.
- Turn off the power switch and remove the power cable before cleaning.

## 7.2 Inspection

Regular maintenance and inspections will help prevent malfunctions and accidents and ensure safe use of the unit. Although it depends on the frequency and duration of use, periodic inspections are recommended to maintain performance. Please contact us if you find any of the following abnormalities or malfunctions.

| | |
|---|---|
| **Main unit** | Visually check for damage, deformation, or corrosion of the power jack. |
| **Power cable** | Visually check there is no damage, deformation or insulation coating which is peeled off or damaged. |

**⚠Warning**

- Turn off the power switch and remove the power cable before inspecting the main unit.
- Remove the power cable from the main unit and outlet before inspecting it.

## 7.3 Maintenance and Repair

As maintenance and repair parts, we will retain new parts that have the same function/ performance or reused parts whose quality is assured as the same as new parts, for 10 years after the manufacturing termination announcement and perform maintenance and repair. Please contact us for maintenance of the unit older than 10 years. It may not be repaired if repair parts are not available even if 10 years haven't passed after manufacturing.

If any abnormality or failure occurs while using the unit according to this instruction manual, or if you notice any problem during your maintenance/inspection work, please contact us after checking it according to the relevant [Troubleshooting] item.

If repair is required, please contact us or our distributor in advance and send the unit back to us or our distributor.

In the case of on-site repair, a travel fee will be charged in addition to the repair cost.

## 7.4 Warranty

ATTO Corporation warrants all of its products under the following terms and conditions.

1. This warranty covers all new products that are sold by ATTO Corporation (hereinafter called ATTO).

2. Expendable items are not covered by this agreement.

3. Claims under this warranty are limited to defects in material and workmanship of the products.

4. Malfunction and/or damage due to neglect, abuse, operation or repair contrary to specifications and/or instructions presented by ATTO are not warranted.

5. ATTO shall not be liable to consequential damage, labor, loss or expense directly or indirectly arising from use of the products.

6. Damage due to transit is not covered by this warranty.

7. The warranty period is one (1) calendar year from a date when the products are shipped from ATTO to an original purchaser.

8. This warranty is not applied to any defect that is reported to ATTO later than one (1) calendar month from a date of warranty termination.

9. ATTO Shall supply parts to replace faulty parts of defective products under this warranty, free of charge.

10. ATTO shall repair defective products under this warranty, which cannot be repaired at field, free of charge.

11. ATTO shall replace defective products under this warranty, which cannot be repaired, free of charge.

12. Freight charges for return and replacement shipments under this warranty are shared by ATTO and a purchaser, that is one way by either party and another way by another party.

13. Warranty period of repaired products and replacement products or parts is three (3) calendar months from a date when the said products or parts are shipped from ATTO, or a remaining term of an original warranty period of the defective products, whichever lasts longer.

14. Return of the products for credit or refund is not accepted unless otherwise agreed in writing by ATTO.

# 8 Specification

| **Product name** | ***Submerge-Multi*** |
|---|---|
| Model / Product code | WSE-1720 / 2322130 |
| Dimensions & Weight | 260x170x68mm 0.77kg（AC excluded） |
| Dimensions of chamber | 150x135x50mm （inside dimensions） |
| Buffer volume | 330 - 360mL |
| External dimensions of top cover | 185x165x25 mm |
| Material of chamber | Chamber：Polycarbonate (Heat resistance temperature: -40 to 135℃)<br>Top cover：Polycarbonate (Heat resistance: -40 to 135°C) |
| Dimensions of power supply | 80x170x60 mm |
| Input | AC100~110V, 50/60Hz, 60W |
| Output | DC18V / DC25V / DC35V / DC50V / DC70V / DC100V / DC135V |
| Timer | 0 -99 hours 59 minutes setting Alarm<br>([OFF] setting: continuous output) |
| Display | LED (Time: min, At the end: End, Error indication: Err1,Err2) |
| Safety mechanism | If safety cover is not set, output stops and alarm notifies.<br>Fuse：250V-1.0A fast-acting fuse type, midget form |
| Gel casting stand | 138x138x35mm both sides (A side, B side) 1 pc<br>*Made of polycarbonate and ABS synthetic polymer<br>(Heat resistance temperature: -20 to 115°C) |
| Gel tray | Gel tray S：60x60 mm 2 pcs<br>Gel tray M：120x60 mm 1 pc<br>Gel tray L：120x120 mm 1 pc<br>*Made of polycarbonate (Heat resistance temperature: -40 to 135℃)<br><br>Support sheet：120x120 mm 2 pcs<br>*Made of polypropylene (Heat resistance temperature: 0 to 140℃) |
| Comb | Comb 25/11：3×1mm×25 well / 11 well 4pcs<br>Comb 18/8：5×1.5mm×18 well / 8 well 1 pc<br>Comb 13/6：7×1.5mm×13 well / 6 well 1 pc<br>Comb 3/2：20,15,5×2mm×3 well / 42mm×2mm×2 well 1pc<br><br>*Made of polycarbonate and ABS synthetic polymer<br>(Heat resistance temperature: -20 to 115℃) |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