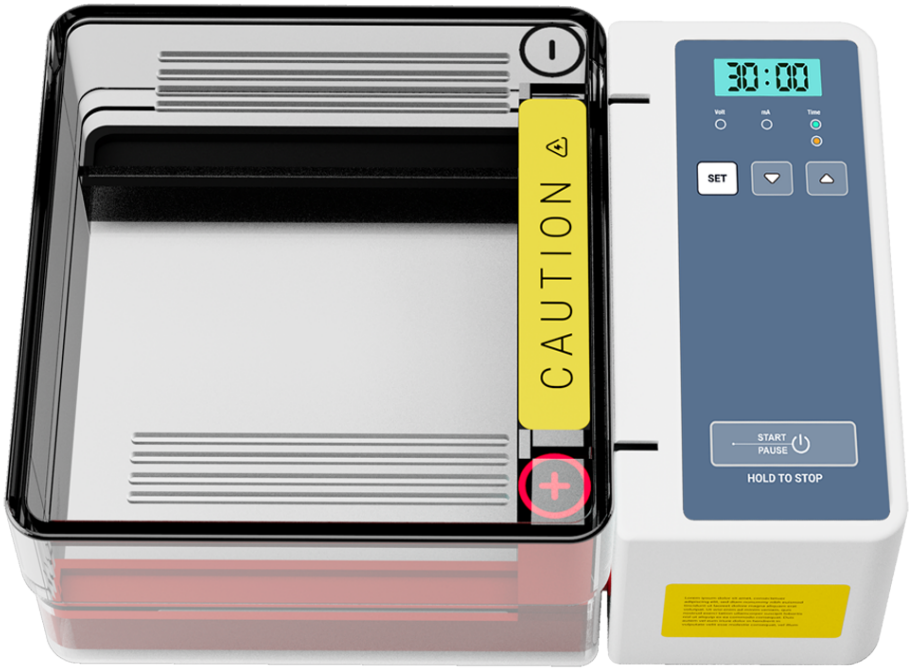
English

Horizontal Gel Electrophoresis System

USER Manual



Model: ALA-EPH

Preface

Thank you for purchasing this instrument. This user manual provides detailed information on its functions and operating procedures. Please read it carefully and keep it in a safe place for future reference.

Inspection

Upon receiving the product, open the packaging and inspect the instrument and its accessories. If you notice any discrepancies, such as missing or incorrect items, packaging errors, or product damage, please contact the seller or manufacturer within 7 days of receipt. Claims made after this period may not be accepted.

Safety Warnings and Guidelines

1. Important Operational Safety Information

Before using the instrument, carefully read this manual to ensure a complete and clear understanding of its correct and safe operation. Proper handling will help prevent personal injury and equipment damage.

2. Warnings

✔ Placement & Stability:

- The instrument must be placed on a flat and stable surface for safe operation.

✔ Handling Precautions:

- There is a risk of pinching between the plastic enclosure and the electrophoresis power supply.
- Do not expose the device to organic solvents.
- Do not expose the device or its accessories to temperatures above 60°C.

✔ Electrical Safety:

- The electrophoresis power supply must not be disassembled. If a malfunction occurs, only an experienced technician should repair it.
- To avoid electric shock, do not operate the device with wet hands.
- Do not insert fingers or objects into the electrophoresis tank while the power is on.
- Do not disconnect the power supply while the electrophoresis tank contains buffers and the power is on, as this may cause damage.

✔ User Restrictions:

- Only trained personnel should operate this product.

- To prevent electric shock and injury, do not attempt to open or repair the device. If repairs are needed, contact the distributor or manufacturer.

✔ Environmental Conditions:

- Store the device in a low-humidity, dust-free environment.
- Keep it away from water, direct sunlight, corrosive gases, strong magnetic fields, heaters, open flames, and other heat sources.
- Ensure proper ventilation around the device.

 Failure to comply with these guidelines may result in serious consequences, for which the user assumes full responsibility.

3. Maintenance of the Instrument

✔ Storage & General Care:

- If the instrument is not used for an extended period, store it in its original packaging to prevent dust and moisture from affecting its functionality.
- Always disconnect the power supply before performing maintenance or cleaning.
- After use, turn off the power and cover the instrument with a soft cloth or plastic wrap to prevent dust accumulation.
- Avoid direct contact between the power supply and liquids, as this may cause a short circuit.

✔ Cleaning Procedure:

- Before cleaning, separate the electrophoresis tank from the power supply.
- Electrophoresis tank: Rinse thoroughly with deionized water. The platinum electrode at the bottom is fragile—handle with care.
- Gel-making accessories:

Gel maker bracket, gel tray, and comb – Wash with clean water or neutral detergent.
For heavy dirt – Use a mild cleaning solution (e.g., dishwashing liquid). Avoid alkaline detergents.
To remove residual ethidium bromide, soak the electrophoresis tank and accessories in 1% bleach solution for 16 hours, then rinse thoroughly.

✔ Important Cleaning Precautions:

- Solvent degradation of acrylic parts can cause discoloration, cracking, warping, or etching of the electrophoresis unit.
- Do NOT use the following solvents:

Benzene, xylene, toluene, chloroform, carbon tetrachloride, alcohols, phenols, ketones, or esters.

- ABS combs should not be exposed to formaldehyde for extended periods. If casting gels with formaldehyde, remove the combs promptly after the gel hardens and rinse with deionized water.

✔ Eliminating RNase Contamination:

- Clean the unit with mild detergent, then:

Soak for 10 minutes in 3% hydrogen peroxide solution.
Soak for 1 hour in 0.1% DEPC (diethyl pyrocarbonate).
Rinse thoroughly and air dry.

- ⚠ CAUTION: DEPC is a suspected carcinogen—handle with care.
- Alternatively, soak in 2.2 mM acetic anhydride-treated water (200 µl/liter) for at least 5 minutes.

✔ Special Considerations for RNA Work:

- Prepare electrophoresis buffers and other RNA solutions with RNase-free precautions to prevent contamination.

4. After-Sales Service Commitment

A) Warranty Instructions

- The company will replace the instrument within 1 month from the date of delivery in case of product failure.
- During the 1-year warranty period, the company provides warranty for non-human damage or faults caused by product defects.
- Warranty-covered products must be sent to the designated maintenance department, with the user covering the shipping cost for sending the item.
- The company will bear the return shipping cost after repair.
- For repairs outside the warranty period or not covered by the warranty, the company will charge the corresponding repair cost.

B) Scope of Warranty

- The warranty does not cover:
- Damage caused by accidental disasters (e.g., fire, flooding, earthquakes).
- Improper use by the user or wrong application of the instrument.
- Damage caused by unauthorized maintenance or modifications.

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Introduction

The horizontal gel electrophoresis system is a multifunctional device that integrates preparation, operation, and power supply. It consists of a gel tray, comb, gel tray base, gel tank, and a digital power supply. The electrophoresis tank, gel tray, and multi-channel comb are molded for leak-proof performance, ensuring long service life.

The compact design makes it significantly smaller than traditional electrophoresis tanks and power supplies. The power supply is directly connected to the electrophoresis tank, eliminating the need for external wires.

The instrument is primarily used for the detection, separation, and purification of nucleic acids.

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1. Features

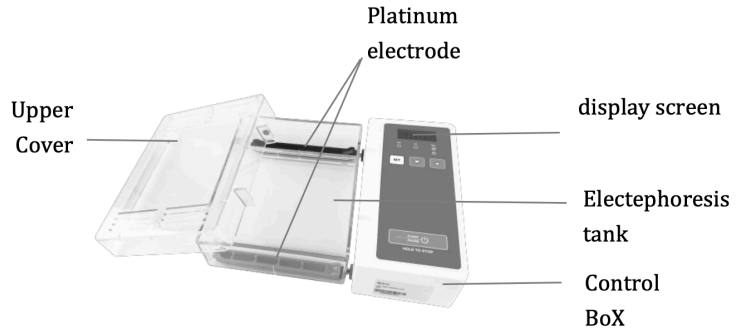
- Compact and portable design – The electrophoresis tank and power supply are separable, making them easy to use and clean.
- No external wiring required – The electrophoresis tank connects directly to the power supply, allowing both constant voltage and constant current experiments.
- Built-in safety sensor – The power supply activates only when the cover is securely in place, ensuring safe operation.
- Versatile gel trays – Compatible with various nucleic acid electrophoresis applications.
- Adjustable timing – Operates continuously or with a timer (0–99h 59min). Features a pause function with an alarm reminder.
- Fast and easy gel casting – No tape or clips required.

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2. Basic Parameters & Functions

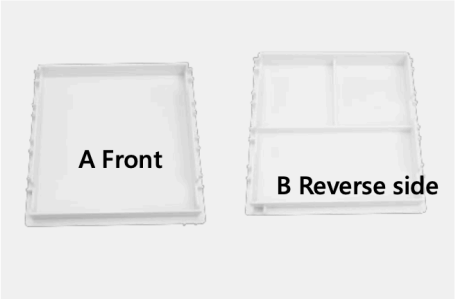
Parameter	Value
Model	ALAEPH
Electrophoresis Tank Capacity	500 mL
Gel Tank Size	L150 × W150 × H40 mm
Timing Function	0–99h 59min or continuous
Output Voltage / Current	10–150V / 10–400mA
Power Consumption	55W
Gel Sizes	130×130mm (1 piece), 130×65mm (1 piece), 60×65mm (2 pieces)
Overall Dimensions	L263 × W195 × H62 mm
Weight	0.83 kg
Power Supply	100–240V, 50/60Hz

3. Product structure



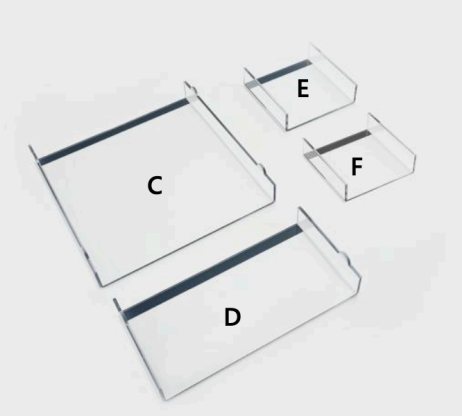


4. Standard set contents



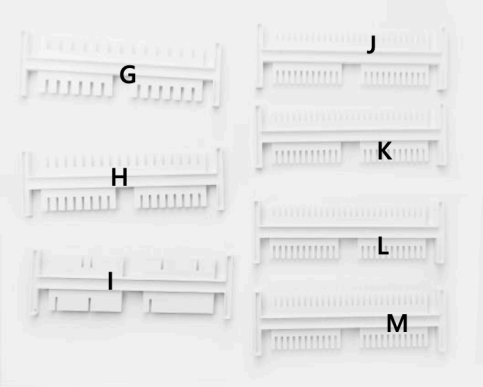
Gel tray

A/B： Integrated gel tray



Gel maker tray

C： Large size 135x135mm
D： wide size 135x65mm
E/F:small size 65x65mm

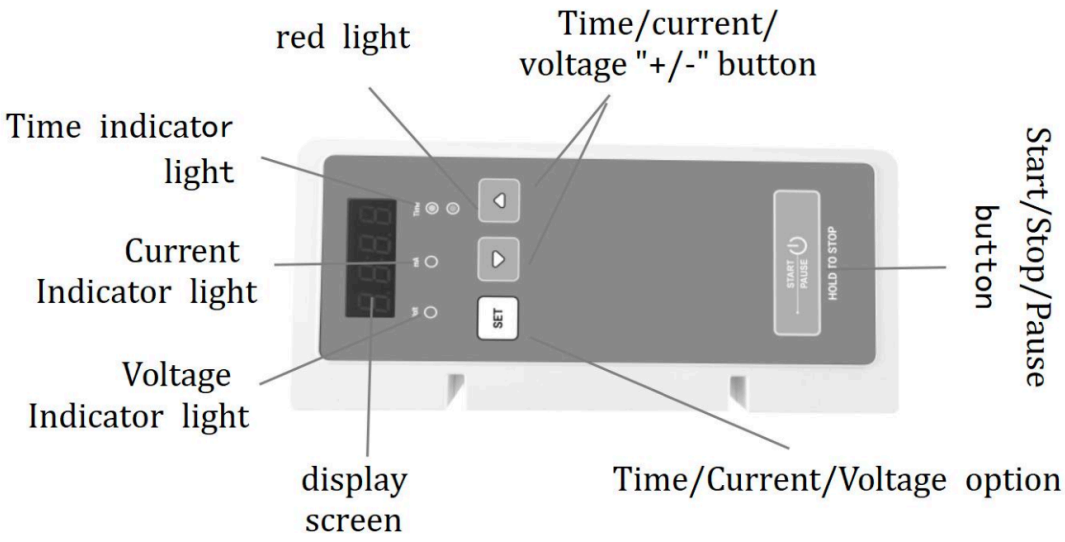


Comb

G:1.5mm， 7+7/14 wells
H:1.5mm， 9+9/19 wells
I:2.0mm， 2+3/3+3 wells
J/K/L/M: 1.0mm， 12+12/27 wells

Operation guide

1. Operation Panel Functions



The operation panel provides an intuitive interface for setting voltage, current, and time parameters. Below are the key functions:

✔ Display Screen – When the power switch is turned on, the display shows the last set value with a beep sound, indicating that the instrument is in its initial state.

✔ Voltage Indicator Light (Volt) – Lights up when the voltage option is selected, allowing the user to adjust voltage parameters.

✔ Current Indicator Light (mA) – Lights up when the current option is selected, allowing the user to adjust current parameters.

✔ Time Indicator Light (Time) – Lights up in green when the time option is selected. If no time is set, the device runs continuously.

✔ Red Light Indicator –

- Lights up when the device starts running.
- Flashes if the device is paused or encounters an error.

- Turns off when the device is completely stopped.

✔ SET Button – Allows switching between voltage, current, and time settings. When an option is selected, its corresponding indicator light turns on.

✔Adjustment Controls (+ / -):

Increasing Parameters:

- Voltage: Press ”+” to increase by 10V per short press. Hold for continuous 10V increments.
- Current: Press ”+” to increase by 5mA per short press. Hold for continuous 5mA increments.
- Time: Press ”+” to increase by 1 minute per short press. Hold for continuous 1-minute increments.

Decreasing Parameters:

- Voltage: Press ”-” to decrease by 10V per short press. Hold for continuous 10V decrements.
- Current: Press ”-” to decrease by 5mA per short press. Hold for continuous 5mA decrements.
- Time: Press ”-” to decrease by 1 minute per short press. Hold for continuous 1-minute decrements.

✔ START/PAUSE Button:

- Short press: The red light turns on, and the device starts running.
- Short press again: The device pauses, and the red light flashes.
- Long press: The device stops running, and the red light turns off.

✔ Parameter Ranges:

- Time setting range: 0~99h 59min
- Output voltage setting range: 10~150V
- Output current setting range: 10~400mA

This panel design ensures ease of use, precision adjustments, and safe operation for electrophoresis applications.

2. Instrument preparation

- Remove the outer packaging and carefully place the power supply, electrophoresis tank, and required casting accessories in a stable, horizontal workspace.
- The instrument should be placed in a clean, dry, and well-ventilated area.
- Avoid corrosive environments and direct exposure to sunlight to ensure long-term performance and durability.

3. Instrument operation

A. Casting the Gel

1. Place the gel casting tank on a horizontal operating surface.

2. Select the appropriate gel tray size and position it in the casting tank.
   - For a 130×130mm gel, use the 135×135mm gel tray.



3. Insert one or more combs into the gel casting slot.



   - For best results, place the first comb near the black bar at the end of the tray.
   - If using two combs, place the second in another casting slot.

4. When the gel solution cools to ~55°C, slowly pour it into the gel tray.
   - CAUTION: Pouring gel that is too hot may warp the tray over time.

5. If bubbles form, tap them with a comb or gently push them to the side of the gel.
   - Large bubbles may cause artifacts during electrophoresis.

6. Allow the gel to solidify at room temperature for at least 30 minutes.

B. Removing the Comb

Once the gel is fully solidified and opaque, gently wiggle the comb from both sides while slowly pulling it upward.
   - This ensures that the gel wells remain intact and undamaged.

📌 NOTE:

   - Combs exposed to formaldehyde gels for too long may degrade.
   - Immediately remove combs from formaldehyde gels once the gel has solidified and rinse them before storage.

- If the gel cannot be used immediately, store it in a plastic bag or container with 1X electrophoresis buffer + 1mM NaN_3 at 4°C.

C. Loading Samples into Gel Wells

1. Carefully lift both ends of the gel tray, remove it from the casting tank, and place it into the electrophoresis tank.
   - Ensure the sample wells are positioned correctly.

📌 NOTE: The electrophoresis tank must be level to avoid irregular migration.

2. Fill the electrophoresis tank with 1X electrophoresis buffer, ensuring the gel is covered by 1-5mm of buffer (~300mL required).

📌 NOTE: Always use the same batch of buffer for both gel casting and running to prevent differences in ionic strength or pH, which could affect migration.

3. Load samples into gel wells using a pipette, ensuring the tip does not puncture the bottom of the wells or deposit samples onto the gel surface.

D. Running the Electrophoresis

1. Ensure the power is OFF before starting.



2. Insert the black (-) and red (+) electrodes into the corresponding ports on the power supply.
3. Place the electrophoresis tank cover directly onto the tank, ensuring the inner part of the cover makes contact with the power supply.
4. Use the standard power cord to connect the power supply and turn on the main switch.

✔ Setting the Run Time:

- Press the “SET” button to switch to the time option.
- The green light will turn on.
- Use the ”+”/”-” buttons to adjust the time (range: 0–99h 59min).
- If the time is set to ”–:–”, the device runs continuously.

✔ Setting Constant Voltage Mode:

- Press “SET” to switch to the voltage option (indicator light turns on).
- Adjust the voltage using the ”+”/”-” buttons (range: 10–150V).
- Press “SET” again to switch to the current option, setting the current to ”—”.

✔ Setting Constant Current Mode:

- Press “SET” to switch to the current option (indicator light turns on).
- Adjust the current using the ”+”/”-” buttons (range: 10–400mA).
- Press “SET” again to switch to the voltage option, setting the voltage to ”—”.

✔ Starting Electrophoresis:

- Short press the “START/PAUSE” button → Red light turns on, and electrophoresis begins.
- Pausing/Stopping Operation:
- Short press “START/PAUSE” → Red light flashes, device pauses.
- Long press “START/PAUSE” (3 sec) → Red light turns off, operation ends.
- Modifying Parameters During Electrophoresis:
- Pause the device first.
- Use the “SET” button to change voltage, current, or time.
- Press “START/PAUSE” again to resume operation.

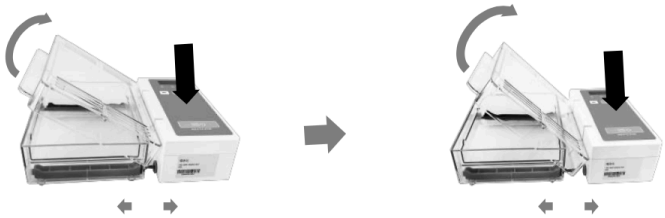
📌 NOTE:

- Do not shake or move the gel tank after starting electrophoresis. The Hall Effect safety switch relies on a magnet inside the lid—moving it can pause the system until the lid is repositioned.
- If an error occurs, the red light will turn off.

E. Post-Electrophoresis and Cleaning

1. After electrophoresis is complete, turn off the switch and unplug the power cord to ensure safety.

2. Remove the gel from the electrophoresis tank or clean the tank immediately.



3. When cleaning:

- Separate the electrophoresis tank from the power supply before cleaning.
- Never clean them together, as water exposure may damage the power supply.

F. Separating the Electrophoresis Tank from the Power Supply

1. Hold the power box firmly with your right hand to keep it stable.

2. With your left hand, lift the left edge of the electrophoresis tank cover slightly.

3. The electrophoresis tank and power supply will separate easily.

📌 NOTE:

- Do not pull the electrophoresis tank and power supply sideways.
- Continuous side-to-side force may damage the positive/negative electrodes over time.

Summary

- Follow proper gel casting and loading techniques to prevent sample loss or distortion.
- Use proper buffer solutions and ensure a stable, level workspace for accurate migration.
- Set voltage/current parameters carefully before starting.
- Always disconnect power and clean the equipment separately after use.
- Avoid excessive movement of the gel tank during operation to prevent unintended pauses.

By following these guidelines, you can ensure reliable electrophoresis results and prolong the lifespan of the instrument.

Failure Analysis and Handling

No.	Problem	Possible Cause	Solution
1	The LCD screen is not displaying	1. Incorrect use of the power cord 2. Poor power connection or disconnection 3. Power controller failure	1. Check if the power supply is faulty 2. Ensure the power cord is standard and properly connected 3. Contact the manufacturer or supplier
2	No migration of nucleic acid in the gel	1. The electrophoresis tank is not connected to the power supply 2. A short circuit in the electrophoresis tank components 3. Incorrect buffer concentration	1. Turn on the power switch 2. Contact the manufacturer or supplier
3	Abnormal electrophoresis migration distance	1. Input voltage or current error 2. Other possible factors	1. Verify that the set voltage and current are correct

No.	Item	Unit	Qty	Note
1	Power supply	unit	1	
2	Power supply line	unit	1	
3	Electrophoresis tank including cover	pcs	1	
4	Integrated gel tray	pcs	1	
5	135x135mm Gel maker tray	pcs	1	
6	135x65mm Gel maker tray	pcs	1	
7	65x65mm Gel maker tray	pcs	2	
8	Comb 1.5mm, 7+7/14 wells	pcs	1	
9	Comb 1.5mm, 9+9/19 wells	pcs	1	
10	Comb 2.0mm, 2+3/3+3 wells	pcs	1	
11	Comb 1.0mm, 12+12/27 wells	pcs	4	

Packing list