

User Guide

mA700 Essential Power Supply

mA700

Introduction

The mA700 Essential Power Supply is microprocessor controlled and designed to meet most electrophoresis needs. This manual describes the setup and operation of the power supply, including important information on safety and maintenance. The mA700 Essential Power Supply can run horizontal & vertical electrophoresis, SDS-PAGE, native PAGE, two-dimensional electrophoresis, and electro-blotting.

The power supply offers access to 4 terminal pairs, enabling use with multiple electrophoresis devices simultaneously. The mA700 Essential Power Supply provides constant voltage, constant current or constant power.

Features of mA400 Basic Power Supply:

- Compact size
- Microprocessor controller
- Constant voltages, constant currents and constant power
- Four terminal outlets
- LCD display
- Timer with alarm function
- Advanced safety devices
- Stackable
- Wide applications for DNA, RNA, and protein electrophoresis

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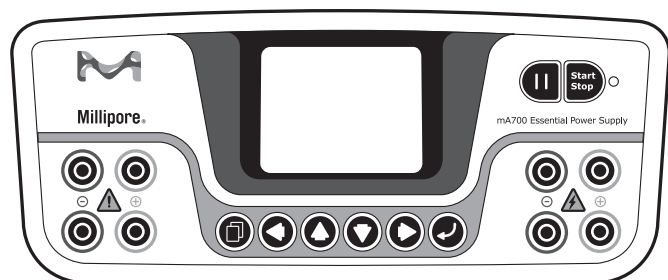
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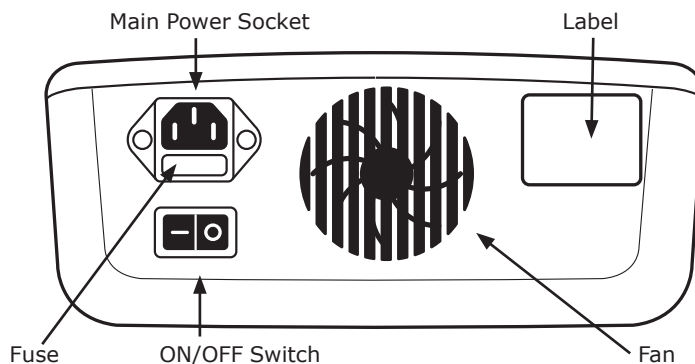
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Front View






Back View



Equipment Operation

Symbols Used on Device

The following symbols are used on this device, throughout this user guide and/or on product labels, and the user shall abide by indicated requirements.

Symbol	Definition
	Warning alerts you to actions that may cause personal injury or pose a physical threat.
	Indicates an area where a potential shock hazard may exist. Consult the user guide to avoid possible personal injury or instrument damage.
	Do not discard with common solid waste at end of life. Segregate with other waste electrical and electronic equipment (WEEE) and send to an appropriate facility for recycling. For information on recycling electrical and electronic products in the European Union, please visit SigmaAldrich.com/weee .

Regulatory

The mA700 Essential Power Supply has been CE marked to reflect compliance to the necessary European Directives and NRTL (Nationally Recognized Testing Laboratory) marked under the requirements of OSHA (Occupational Safety and Health Organization) for North America. For additional details into our compliance claims, please refer to the product's web page online at SigmaAldrich.com. Search for the product page, which shows the Declaration of Conformity.

Warnings

The power supply unit generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the user guide, may cause harmful interference to radio communications. Operation of the mA700 Essential Power Supply in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their expense. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. It is strongly recommended for the user to read the following points carefully before operating this equipment.

- Do not alter the equipment. Failure to follow these directions could result in personal and/or laboratory hazards, as well as invalidate equipment warranty.
- Use a properly grounded electrical outlet with correct voltage and current handling capacity.
- Disconnect from power supply before maintenance and servicing. Refer servicing to qualified personnel.

- Never use this instrument series without having the safety cover correctly in position.
- Do not use the unit if there is any sign of damage to the external tank or cover. Replace damaged parts.
- Do not use in the presence of flammable or combustible material; fire or explosion may result. This device contains components which may ignite such materials.
- Refer maintenance and servicing to qualified personnel.
- Ensure that the system is connected to electrical service according to local and national electrical codes. Failure to make a proper connection may create fire or shock hazard.

Safety Precautions

Take a high level of precaution when using any electrical device. Before connecting the electrical supply, confirm that the supply voltage is within the range stated on the rating label, and see that the device is securely positioned. Place the unit in a safe and dry location; it must NOT touch the surrounding. Follow the safety precautions for chemicals / dangerous materials.

1. **NEVER** access dangerous chemicals or other materials to prevent possible hazard of explosion and damage.
2. Do not operate the unit without lids or covers to prevent possible hazards.
3. A temporary conductivity caused by condensation might occur even though this series is rated Pollution Degree 2 in accordance with IEC 664.

Environmental Operating Conditions

Ensure the instrument is installed and operated strictly under the following conditions:

1. Indoor use only
2. < 95% Relative Humidity
3. 75 - 106 kPa
4. Altitude must not exceed 2000 meters
5. 4 - 40 °C operating temperature
6. Pollution degree: 2
7. Mains supply voltage must not fluctuate more than $\pm 10\%$ of the normal voltage



Avoiding Electrical Shock

Follow the guidelines below to ensure safe operation of the unit.

The mA700 Essential Power Supply has been designed to utilize shielded wires thus minimizing any potential shock hazard to the user. We recommend against the use of unshielded wires.

To avoid electrical shock:

1. In the event of solution spilling on the instrument, it must be dried out for at least 2 hours and restored to **NORMAL CONDITION** before each operation.
2. Never connect or disconnect wires loading from the power jacks when the red indicator light of power switch is on.
3. **WAIT** at least 5 seconds after stopping a run before handling output leads or any connected apparatus.
4. **ALWAYS** make sure that your hands, work area, and instruments are clean and dry before making any connections or operating the power supply.
5. **ONLY** connect the power cord to a properly grounded AC outlet.



Avoiding Damage to the Instrument

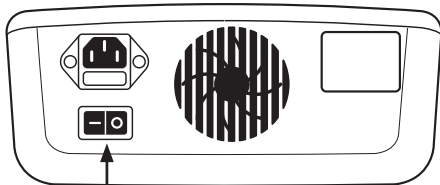
1. Do not attempt to operate the device if damage is suspected.
2. Protect this unit from physical damage, corrosive agents and extreme temperatures (direct sunlight, etc.).
3. For proper ventilation and safety concerns, keep at least 10 cm of space behind the instrument, and at least 5 cm of space on each side.
4. Use high level of precaution against potential damage on the unit.
5. Do not operate the unit out of environmental conditions addressed above.
6. Do not operate the power supplies in high humidity environments (> 95%), or where condensation may occur.
7. To avoid condensation after operating the power supply in a cold room, wrap the unit in a plastic bag and allow at least 2 hours for the unit to equilibrate to room temperature before removing the bag and operating the unit.
8. Prior to applying any cleaning or decontamination methods other than manufacturer's recommendation, users should check with the manufacturer's instruction to see if the proposed method will damage the equipment.

Technical Specifications

Output Voltage/ Inc.	5-300 V / 1 V
Output Current/ Inc.	1-700 mA / 1 mA
Max. Output Watt	150 W
Rated Voltages	100 - 240 Vac, 50 / 60 Hz 200 W: T2.5A / 250 V
Type of Output	1. Voltage or Current with automatic crossover. 2. When target constant mode is set, system automatically adjusts the two other parameters to maximum to allow constant run (later could be changed by user).
Program Multi-Step	Up to 6 steps
Editable Program Function	1. Have typical running conditions program 2. Manual editable program
Display	2.4" TFT
Control	Microprocessor controller
Safety Device	No Load detect
	Leakage detect
	Over temperature protection
	Overload detection
	Sudden load change detection (could be enabled by proper setting)
Timer	Shrouded plugs and sockets
	Constant: 1-9999 mins with alarm, continuous Program: 1-999 mins with alarm, continuous
Crossover	Yes
Stackable	Yes
Automatic Recovery	Yes
IQ/OQ Protocols	Yes, optional
Operating Temperature	4-40 °C
Construction Material	Flame-retardant ABS faceplate
Unit Dimension	215 mm x 335 mm x 104 mm (W x L x H)
Weight	Approx. 2.1 kg

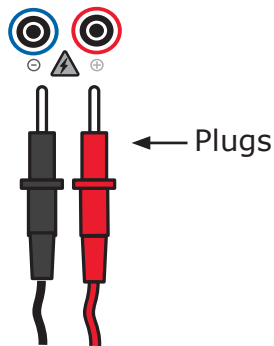
Installation Instructions

1. Place the unit on a sturdy and level surface in a safe dry place away from laboratory traffic.
2. Ensure that the power switch is OFF, and then plug one end of the three-pronged power cord into a grounded three-prong AC outlet with appropriate voltage (100 V to 240 V, as indicated on the rating sticker near the AC cord on the back of the unit) and plug the other end into the main power socket.



Power Switch

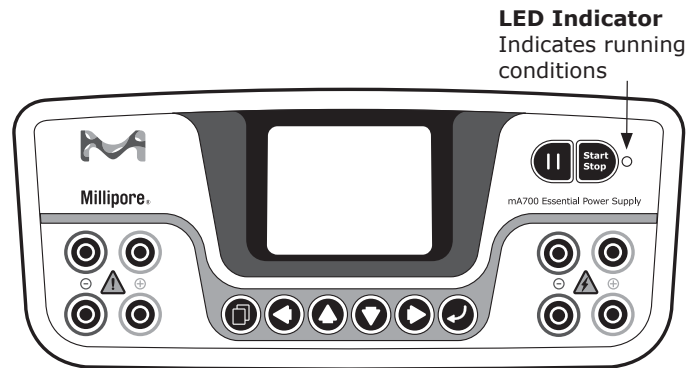
3. Connect the DC output jacks from the electrophoresis unit; insert the red lead (+) into the red output jack, and the black lead (-) into the blue output jack.



4. Power ON the unit by pressing the ON / Off switch on the back.

Operating Instructions

Control Interface



LED Indicator
Indicates running conditions

Button Functions

Key Descriptions	Icon	Function
Start Stop		Press to activate or stop the unit.
Pause		Press to temporarily interrupt power to an operation in progress; resume power after pausing without resetting the timer.
Page Toggle		Press to go back to previous page.
Enter		1. Press to enter the next page. 2. Press to enable numeric set-up.
Left Arrow		Press to move cursor left forward between parameters.
Right Arrow		Press to move cursor right forward between parameters.
Up Arrow		1. Press to move cursor up between parameters. 2. Press to increase numeric values.
Down Arrow		1. Press to move cursor down between parameters. 2. Press to decrease numeric values.

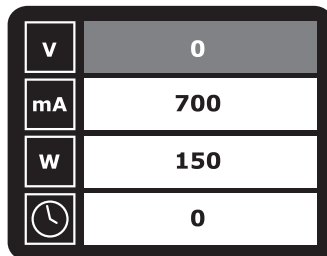
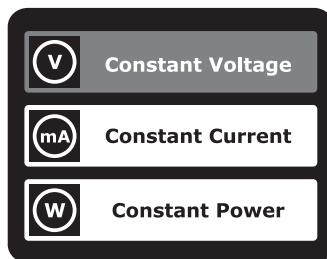
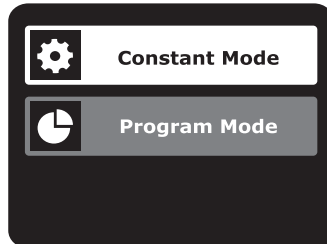
General Operating Instructions

There are 2 modes available: Constant Mode, and Program Mode.

Constant Mode Setup

Use the **Constant Mode** for applications that require only one specific limit: voltage / current / power during the entire operation of electrophoresis.

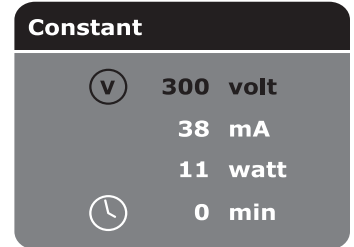
1. Use the Up and Down arrow keys to select the **Constant Mode** button. Use the Enter key to select.
2. Use the Up or Down arrow keys to select any of:
 - > Constant Voltage (V)
 - > Constant Current (mA)
 - > Constant Power (W)
3. Use the Enter key to select.
4. Use the Up or Down arrow keys to toggle between
 - > Voltage (V)
 - > Current (mA)
 - > Power (W)
 - > Time (minutes)
5. Use the Enter key to select the specified parameter to set target value.
6. Use the Up or Down arrow keys to adjust the value for the selected parameter. Use the Enter key to set value.



Note: Under **Constant Mode**, when target value is set, system automatically adjusts the other two parameters to maximum to allow constant run. For example, if constant voltage (V) is set, system will adjust current (mA) and power (W) to the maximum value. User could later lower the other two values. System will hold the value either at the target constant value or the one which has been reached first. If the time value is set to "0," it means *infinite*, and the power supply will constantly operate until the user manually ends the run.

Constant Mode Operation

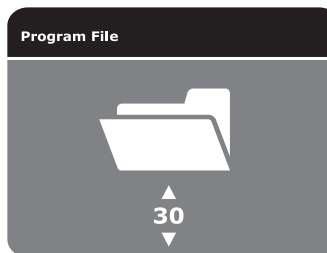
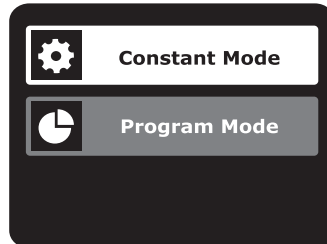
1. Press the Start Stop key to start operation. The LED is lit, and the screen will show real-time parameter values. When parameter reaches the set value, its color will turn orange.
2. Press the Toggle key to switch the display between real-time value and set value page.
Note: When a run is completed, operation stops with an alarm, and **COMPLETE** is displayed on the screen.
3. Press the Start Stop key to terminate the run.
4. Turn the power off by using the switch on the back before removing the power leads.
Note: It takes approximately 5 seconds for the unit to power off.
5. Press the Pause key to temporarily pause the ongoing run without terminating the timer. The LED will flash to indicate that the run is paused. Press the Start Stop key to resume the run.
6. Press the Start Stop key to terminate the run. To modify any parameters during the operation (without terminating the timed run), pause the run by pressing the Pause key.
7. Press the Toggle key to enter the Settings page.
8. Adjust the desired parameter and then press the Start Stop key to resume the run.
9. To terminate and start a new run during operation, press the Start Stop key instead of the Pause key.
10. After adjusting the parameters, press the Start Stop key again to start a new run.
Note: To terminate and start a new run, the timer will reset and does not take into account the time before.



Program Mode Setup

Use the **Program Mode** to vary levels in voltage (V), current (mA), and power (W) during specified time periods for up to 6 Steps, depending upon your electrophoresis needs. The mA700 Essential Power Supply will store up to 30 different program files stored for user's convenience. Follow the instructions below to set the **Program Mode**.

- Use the Up and Down arrow keys to select **Program Mode**.
Use the Enter key to select.
- Use the Up and Down arrow keys to select the appropriate file number, then press the Enter key to select.
- Use the Up or Down arrow keys to toggle between
 - > Voltage (V)
 - > Current (mA)
 - > Power (W)
 - > Time (minutes)
- Use the Enter key to select the specified parameter to set target value.
- Use the Enter key and the Up and Down arrow keys to set the appropriate values, then press the Enter key to set. Repeat this step until all the parameters are set properly. There are 6 steps available.

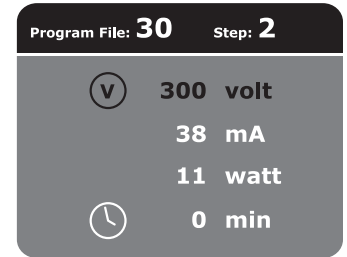


Program File: 30				
	V	mA	W	⌚
1	90	700	150	20
2	200	700	150	60
3	0	700	150	0

Note: If the time value is set to "0" at any stage, it means *stop at previous stage*. For example, if Stage 1 is set to 5 minutes and Stage 2 is set to "0," the system will only complete Stage 1 and stop.

Program Mode Operation

- Press the Start Stop key to start operation. The LED is lit, and the screen will show real-time parameter values. When parameters reach the set value, the color will turn orange.
- Press the Toggle key to switch the display between real-time value and set value page.
- Press the Start Stop key to terminate the run.
- Turn off the power using the back switch before removing the Power Leads.
- Press the Pause key to temporarily pause the ongoing run without terminating the timer. The LED will flash to indicate that the run is paused. Press the Start Stop key to resume the run.
- Press the Start Stop key to terminate the run. To modify any parameters during the operation (without terminating the timed run), pause the run by pressing the Pause key.
- Press the Toggle key to enter the Settings page.
- Adjust the parameter and then press the Start Stop key to resume the run.
- To terminate and start a new run during operation, press the Start Stop key instead of the Pause key.
- After adjusting the desired parameters, press the Start Stop key again to start a new run.



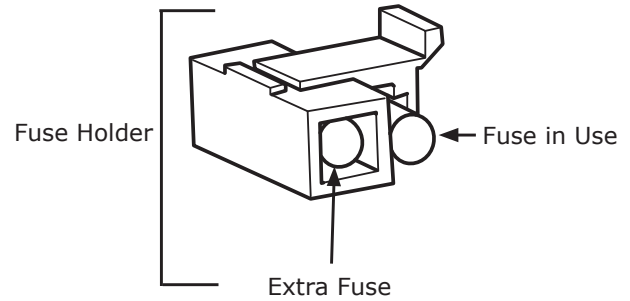
Note: If the run has been terminated, and a new one started, the timer will reset and does not take into account the time before.

Replacing the Fuse

1. Turn off the main power switch at the rear of Power Supply and detach the power cord.
2. Open the fuse compartment located at the Main Power Socket by inserting a small flat blade screwdriver into the slot below the **ON/OFF** switch. Turn the screwdriver to gently pry open the fuse compartment.

Note: The fuse compartment will not open with the power cord in place.


3. Pull the fuse holder out of the compartment and inspect the fuse. If the fuse is burned or there is a break in the fuse element, replace the fuse with an identical type of fuse (T2.5AH250V) as provided in the fuse holder (see figure right).
4. Place the fuse holder back into the compartment.
5. Snap the cover closed.



Troubleshooting and Maintenance

Many operating problems may be solved by carefully reading and following the instructions in this manual accordingly. Should these suggestions not resolve the problem, visit the Technical Service at SigmaAldrich.com/techservice.

Problem	Possible Causes	Solution
No display or lights.	No AC power.	Check if power supply is plugged in, or if AC power source has problem.
	AC power cord is not connected.	Check the AC power cord connections at both ends. Use the correct cords.
	The fuse has blown.	Replace the fuse.
Fuse broken repeatedly.	Hardware failure.	Contact our Technical Service Department.
Operation stops and the screen displays PLC ERROR.	Communication wires on circuit board have loosened or broke.	We recommend that you send the machine back to your local distributor or our Technical Service Department for maintenance.
Operation stops with alarm. The screen displays NO LOAD.	Electrophoresis leads are not connected to the power supply or to the electrophoresis unit(s), or there is a broken circuit in the electrophoresis cell.	Check the connections to the power supply and on your electrophoresis cell to make sure the connection is intact; check condition of wires in electrophoresis unit. Close the circuit by reconnecting the cables. Press START / STOP to restart the run.
	High resistance due to tape left on a pre-cast gel, incorrect buffer concentration, or incorrect buffer volumes in the electrophoresis cell	Make sure the tape is removed from the pre-cast gel, buffers are prepared correctly, and the recommended volume of buffer is added to the electrophoresis unit.
	High voltage application is set to run on a very low current.	DISABLE the No Load alarm on the Display Screen.
Operation stops with alarm. Display shows: LOAD CHANGED.	Bad connections for terminal connectors or damaged wires or damaged platinum wires.	Check all the connections to terminators, cables, wires, and gel tanks.

Problem	Possible Causes	Solution
Operation stops with alarm. Display shows: OVER VOLTAGE.	Circuit is interrupted.	Verify that the running buffer is correct. Verify that all cables are attached correctly. Turn the Power switch off and on again; restart application. If you cannot restart the instrument, turn off the power, disconnect the power cord from the outlet, and contact Technical Service.
Operation stops with alarm. Display shows: OVER CURRENT.	Circuit is interrupted.	Verify that the running buffer is correct. Verify that all cables are attached correctly. Turn the Power switch off and on again; restart application. If you cannot restart the instrument, turn off the power, disconnect the power cord from the outlet, and contact Technical Service.
Operation stops with alarm. Display shows: LEAKAGE.	Ground leak detected during run.	Check the electrophoresis system for improper grounding. Restart the power supply by turning the Power switch off and on.
Operation stops with alarm. Display shows: OVER TEMPERATURE.	Power supply is overheating.	Turn off power supply. Check for sufficient airflow around the power supply fan. After cooling down, restart the power supply by turning the Power switch to the on position. If you cannot restart the instrument, turn off the power, disconnect the power cord from the outlet, and contact Technical Service.
Warning message displays with 5-second beeping sound. Display shows: POWER RECOVERY.	The power that had been cut has now recovered.	User does not need to take extra action. The warning sign and beep sound would only last for 5 second; after that, the machine will continue running the unfinished project. The  sign indicates that the machine has been interrupted by sudden power off. Press the ENTER key to clear the sign.

Product Ordering Information

The mA700 can be purchased with different power supply cords to accommodate a variety of locations. Purchase products online at SigmaAldrich.com/products.

Model	Description	Catalog Number
mA700 Essential Power Supply	mA700 Power Supply with cord for the US, Canada, and locations using NEMA 5-15P (YP12) plugs	MA700-US
	mA700 Power Supply with cord for France, Germany, and locations using CEE 7/7 (YP22) plugs	MA700-EU
	mA700 Power Supply with cord for the UK, Ireland and locations using type G (YP61) plugs	MA700-UK
	mA700 Power Supply with cord for Japan and locations using YP18 plugs	MA700-NI
	mA700 Power Supply with cord for China and locations using Type I (YP03) plugs	MA700-ZH

Also available

mA400 Basic Power Supply	mA400 Power Supply with cord for the US, Canada, and locations using NEMA 5-15P (YP12) plugs	MA400-US
	mA400 Power Supply with cord for France, Germany, and locations using CEE 7/7 (YP22) plugs	MA400-EU
	mA400 Power Supply with cord for the UK, Ireland, and locations using type G (YP61) plugs	MA400-UK
	mA400 Power Supply with cord for Japan and locations using YP18 plugs	MA400-NI
	mA400 Power Supply with cord for China and locations using Type 1 (YP03) plugs	MA400-ZH

Support

Notice

We provide information and advice to our customers on application technologies and regulatory matters to the best of our knowledge and ability, but without obligation or liability. Existing laws and regulations are to be observed in all cases by our customers. This also applies in respect to any rights of third parties. Our information and advice do not relieve our customers of their own responsibility for checking the suitability of our products for the envisaged purpose.

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Contact Information

For the location of the office nearest you, go to SigmaAldrich.com/offices.

Legal Manufacturer

EMD Millipore Corporation
400 Summit Drive, Burlington, MA, USA

Technical Assistance

Visit the tech service page on our web site at SigmaAldrich.com/techservice.

Standard Warranty

The applicable warranty for the products listed in this publication may be found at SigmaAldrich.com/terms.

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