

MS 3AP Power Supply

Instruction Manual

Catalog No. MP-3AP



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Version 01D
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Packing list

MS-3AP:

- 1 x MP 3AP Power Supply
- 1 x Power Cord
- 1 x MP 3AP Power Supply Instruction Manual

Signed:

Date:

Major Science is liable for all missing or damaged parts / accessories within 7 days after customer received this instrument package. Please contact Science immediately regarding this issue. If no response within such time period from consignee party, that will be consignee party's whole responsibility.

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Warning

MS 3AP power supply has been tested and found to comply with the limits for CE regulation. Also, MS 3AP power supply series is RoHS compliant to deliver confident product, which meets the environmental directive. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This power supply generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this 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 the user to read carefully the following points before this equipment is operated.

1. Read and follow carefully the manual instructions.
2. Do not alter the power supply. Failure adhered to these directions could result in personal and/ or laboratory hazards, as well as invalidate equipment warranty.
3. Use a properly grounded electrical outlet with correct voltage and current handling capacity.
4. Disconnect from power supply before maintenance and servicing. Refer servicing to qualified personnel.
5. In the event, solution is accidentally spilled into the instrument, disconnect grounded plug and the user must carry out appropriate procedure or contact Major Science or the representative. Replace damaged parts.
6. 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.
7. Refer maintenance and servicing to qualified personnel.
8. Ensure that the system is connected to electrical service according to local and national electrical codes. Failure to properly connection may create fire or shock hazard.
9. Ensure the appropriate used materials and correct operation to avoid possible hazards of explosion, implosion or release of toxic or flammable gases arising from the materials being overheated.

10. The unit shall be operated Only by qualified personnel.
11. Not to position the equipment so that it is difficult to operate the disconnecting device.



Max. voltage: 300 V
Max. current: 3000 mA
Max. watt: 300 W

Safety Information

Use the high level of precautions against any electrical device. Before connecting with the electrical supply, check the supply voltage is within the range stated at the rating label, and this device must be earthed. Place the unit in a safe and dry location and **MUST NOT** touch things in the surrounding. Also do follow the safety precautions for chemicals and dangerous materials. If needed, please contact qualified service representative or service@majorsci.com:

Environmental Conditions

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

- $\leq 95\%$ RH,
- 75 KPa-106 Kpa,
- Altitude not to exceed 2000 meters
- $4^{\circ}\text{C} \sim 40^{\circ}\text{C}$ operating temperature.

Avoiding Electrical Shock

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

MS 3AP power supply has been designed to use with shielded wires thus minimizing any potential shock hazard to the user. Major Science recommends against the use of unshielded wires.

To avoid electrical shock:

1. In the event of solution accidentally spilled into the instrument, it must be dried out for a period of time, at least 2 hours, and restored to **NORMAL CONDITION** before each operation.

2. NEVER connect or disconnect wire leads from the power jacks when the red indicator light at the Start/Stop key is light.
3. WAIT at least 5 seconds after stopping a run before handling output leads or connected apparatus.
4. ALWAYS make sure that 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 3-prong grounded AC outlet, using the power cord provided with the power supply.

Avoiding Damage to the Instrument

1. Do not attempt to operate the device if it is damaged.
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. Do not operate the power supplies in high humidity environments (> 95%), or where condensation may occur.
5. 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.
6. Prior to apply any cleaning or decontamination methods other than manufacturer's recommendation, users should check with the manufacturer's instruction to confirm if the proposed method will not damage the equipment.

Equipment Operation

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

1. It must be checked the displayed figure to see if it is in the normal condition for use before using this unit.
2. NEVER access dangerous chemistry or other material to prevent possible hazards of explosion and damage.

Symbols

The symbols used on MS 3AP Power Supply are explained below.



Used on MS 3AP Power Supply to indicate an area where a potential shock hazard may exist.

Used on MS 3AP Power Supply to indicate a warning. Consult the manual to avoid possible personal injury or instrument damage.

Used on MS Power Supply to indicate a disposal instruction.



DO NOT throw this unit into a municipal trash bin when this unit has reached the end of its lifetime. To ensure utmost protection of the global environment and minimize pollution, please recycle this unit.

Section 1 Introduction

1.1 Overview

Major Science MS 3AP Power Supply is recognized as one of the most advanced high current power supplies equipped with outstanding specifications to cover the majority of electrophoresis applications on the market. Sufficient and accurate output voltages, four pairs of terminator, compact size, RoHS and CE compliance for environmental and safety concerns can deliver accurate and reliable experimental results from one experiment to another. Both of them are perfectly designed to accomplish with any of electrophoresis systems/ units on the market.

Front of Unit



Rear of Unit



1.2 Product Description

Major Science MS 3AP (Cat. No. MP-3AP) power supply is microprocessor controlled power supply designed to meet most electrophoresis needs in a personal, single, easy to use unit. This manual describes the setup and operation of the MS 3AP Power Supply including important information on safety and maintenance of the unit. The MS 3AP power supply is capable of running horizontal & vertical electrophoresis, SDS-PAGE, native PAGE applications, and two-dimensional electrophoresis, and electro-blotting. In addition, A Timer with alarm function is also equipped in the unit, and so is Pause function. Furthermore, the powerful specifications plus four pairs of terminator pairs can be used for multi electrophoresis units simultaneously.

Major Science MS 3AP power supply provides Constant Voltage or Constant Current or Constant Power to instruments used in electrophoresis. 4 pairs of terminator and the powerful specification equipped enable the maximum capability of MS 3AP power supply compared to other existing similar product on the market. MS 3AP also has a 2.6" LCD screen where many of parameters are shown on the same display, which provides a better concern of user friendly to the user.

Features of MS 3AP power supply:

- Compact size
- Advanced capacity: 300W, 3,000mA, 300V
- Microprocessor controller
- Constant voltages, constant currents and constant power
- Four pairs of outlet terminator
- LCD display
- Timer with alarm function
- Advanced safety devices
- Stackability
- Wide applications for DNA, RNA and protein electrophoresis

Section 2 Product Specifications

Output Voltage / Inc	5~300V / 1V
Output Current / Inc	10~3,000mA / 10mA
Max. Watt / Inc	300W / 1W
Operating Mode	Voltage or current or power
Control	Microprocessor controller
Program Storage	30 programmed files
Program Multi-Step	Up to 6 steps
Terminator Pairs	4 pairs
Display	2.6" LCD
Timer	Constant mode: 1~9999 mins with alarm, continuous Programmable mode: 1~999 mins with alarm, continuous
Safety Device	No Load detect Leakage detect Sudden load change detection Over temperature protection Over current detection Over voltage detection Shrouded plugs and sockets
Crossover	Yes
Operating Temperature	4°C ~ 40°C
Unit Dimension	190 x 305 x 95 mm (W x L x H)
Construction Material	Flame retardant ABS faceplate and aluminum
Rated Voltages	100 ~ 240V; 47/60 Hz
Input Rating	360W
Weight	Approx. 2.5 kg

Section 3 Installation Instructions

Major Science MS 3AP Power Supply is actually an already installed instrument. As long as it is placed on a sturdy and level surface in a safe, dry place, and further connects with well-prepared electrophoresis system, it is ready for operation.

Section 4 Operation Instructions

4.1 Controls and Features

Please refer to Figures on the following page for the location of the following controls and features.

MS 3AP Power Supply



Front Control Panel

1.  **Key** - to move cursor up between parameters and to increase numeric values
2.  **Key** - to move cursor down between parameters and to decrease numeric values

3.  **Key** - to move cursor left forward between parameters
4.  **Key** - to move cursor right forward between parameters
5.  **Key** – to select either Constant Voltage or Constant Current mode or Time
6.  **Key** – to enter the numeric value set up
7.  **Key** – to activate or stop the unit
8.  **Key** – to temporarily interrupt power to an operation in progress without terminating electrophoresis and to resume power after pausing without resetting the timer.

4.2 Start the operation

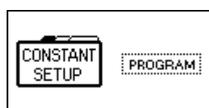
The 3AP Power Supply is designed to operate under two modes, **Constant Mode or Programming Mode**, depending upon your electrophoresis needs. Use the **Constant Voltage / Current / Power Operation** for applications that require only one specific voltage limit, current limit, and power limit continuously during the entire duration of electrophoresis.

Display Screen



The  is the display screen to appear after turning on the power to your instrument. You can choose the operational Mode (**Constant** or **Program**) on the **downward** side of the display screen.

- Afterwards, on the **Display Screen**, you would select :



- either Constant Setup:

- or Program Setup:

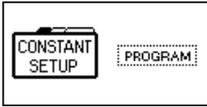


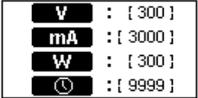
4.3 Constant Setup Operation

Instructions for operating MS 3AP Power Supply in the **Constant Operation** are provided in this section. The **Constant Voltage / Current / Power Mode** allows you to specify a voltage limit, and current limit to be used continuously during the entire duration of electrophoresis. Review the guidelines provided in this manual before starting electrophoresis using MS 3AP Power Supply. We recommend reading the guidelines provided in this manual for best results before starting an operation.

1. Place MS 3AP Power Supply on a sturdy and level surface in a safe, dry place, away from laboratory traffic.
2. Ensure that the AC power switch is OFF, and then plug the three-pronged power cord into a grounded three-prong AC outlet of the appropriate voltage (110V to 240V as indicated on the rating sticker near the AC cord on the back of the unit).
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 black output jack.
4. Use the power switch on the rear of the instrument to turn on the MS 3AP

Power Supply. The  will appear on the screen.

5. Use  Key and  Key to select , and then press

 Key or  Key to enter the next screen, .

6. Use  Key,  Key,  Key and  Key to move cursor to the parameter, for instance voltage (V) or current (mA) or power (W) or Time (Minute), press  Key to set the specified parameter.

7. Use  Key,  Key to set the appropriate value, and then press  Key, and move to the next parameter until all the parameters are set in the same operation method.

8. Press  Key to start electrophoresis,  , the LED is lit, and the

screen will show the real time parameter values,

CONSTANT
Volt : 300
mA : 2000

, and

press  Key or  Key to see the following screen,

CONSTANT
Wat : 100.0
Min : 888

.

Press  Key or  Key back to

CONSTANT
Volt : 300
mA : 2000

.

9. Press  Key to temporarily interrupt power to ongoing electrophoresis without terminating the operation,  , the LED is flashing. Press  Key to restart the run.

10. Press the  Key again to stop electrophoresis.

11. When the run is completed, operation stops with alarm and

CONSTANT
COMPLETE

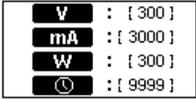
is shown on the screen. Press  Key to terminate a timed run, and Turn

the AC power OFF by the switch on the rear.

12. To change Limits of Electrophoresis in Progress

If you need to make changes to the current running limits, you must stop

electrophoresis by pressing the  Key. Press  Key to enter the

setting screen, . Enter the changes and then press 

Key once again to restart your operation.

Note: After stopping and restarting an operation, the timer resets to selected time and does not take into account the time that electrophoresis was in progress before it was stopped.

4.4 Programming Setup Operation

Instructions for operating MS 3AP Power Supply in the **Programming Operation** are provided in this section. The **Programmable Mode** allows you to vary levels in voltage (V), current (mA), and power (W) during specified periods of time as discrete changes (STEP) or as gradients (RAMP) for up to 6 Steps, depending upon your electrophoresis needs. The MS 3AP power supply is capable of having 30 different program files storages for user's convenience. We recommend reading the guidelines provided in this manual for best results before starting an operation.

1. Place MS 3AP Power Supply on a sturdy and level surface in a safe, dry place, away from laboratory traffic.
2. Ensure that the AC power switch is OFF, and then plug the three-pronged power cord into a grounded three-prong AC outlet of the appropriate voltage (110V to 240V as indicated on the rating sticker near the AC cord on the back of the unit).
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 black output

jack.

4. Use the power switch on the rear of the instrument to turn on the MS 3AP

Power Supply. The  will appear on the screen.

5. Use  Key and  Key to select , and then press

 Key or  Key to enter the next screen, .

6. Press  Key first and then use  Key,  Key to select appropriate file number, and then press  Key to enter the following

screen,

F	V	mA	W	⌚
1	100	3000	300	60
2	200	3000	300	60
3	300	3000	300	60

.

7. Use  Key,  Key,  Key and  Key to move cursor to the parameter, for instance voltage (V) or current (mA) or power (W) or Time (Minute), press  Key to set the specified parameter.

8. Use  Key,  Key to set the appropriate value, and then press  Key, and move to the next parameter until all the parameters are set in the same operation method.

9. Use  Key to move down to

F	V	mA	W	⌚
1	100	3000	300	60
2	200	3000	300	60
3	300	3000	300	60

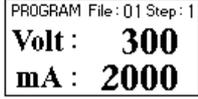
 for setting Step 4-6. Press



Key back to Step 1-3 screen,

F	V	mA	W	⌚
1	100	3000	300	60
2	200	3000	300	60
3	300	3000	300	60

10. Press  Key to start electrophoresis, , the LED is lit, and the

screen will show the real time parameter values, , and press



Key or



Key to see the following screen, . Press



Key or



Key back to .

11. Press  Key to temporarily interrupt power to ongoing run without terminating the operation, , the LED is flashing. Press  Key to restart the run.

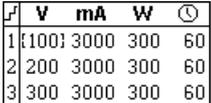
12. When electrophoresis is completed,  is shown on the screen.

Press the  Key again to stop electrophoresis.

13. To change Limits of Electrophoresis in Progress

If you need to make changes to the current running limits, you must stop

electrophoresis by pressing the  Key. Press  Key to enter the

setting screen, . Enter the changes and then press  Key once again to restart your operation.

Note: After stopping and restarting an operation, the timer resets to selected time and does not take into account the time that electrophoresis was in progress before it was stopped.

4.5 Limiting Parameter Setting

The MS 3AP Power Supply is capable of operating at limiting voltage, or limiting Current, or limiting power no matter Constant Setup mode or Programming Setup mode. We use Programming Setup mode as an example.

Voltage Limiting

1. Use  Key,  Key,  Key,  Key, and  Key to set Maximum Current (3A) and Maximum Power (300W), and on the real time

screen “Volt” is shown in hollow type, for instance,

PROGRAM File: 01 Step: 1
Volt: 300
mA: 2000

Current Limiting

1. Use  Key,  Key,  Key,  Key, and  Key to set Maximum Voltage (300V) and Maximum Power (300W), and on the real

time screen “mA” is shown in hollow type, for instance,

PROGRAM File: 01 Step: 1
Volt: 300
mA: 2000

Power Limiting

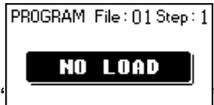
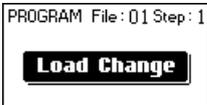
1. Use  Key,  Key,  Key,  Key, and  Key to set Maximum Voltage (300V) and Maximum Current (3A), and on the real time

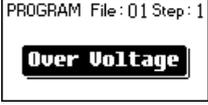
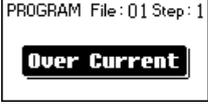
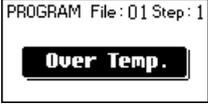
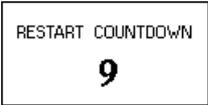
screen “Wat” is shown in hollow type, for instance,

PROGRAM File: 01 Step: 1
Wat: 100.0
Min: 888

Section 5 Troubleshooting Guide

Many operating problems may be solved by carefully reading and following the instructions in this manual accordingly. Some suggestions for troubleshooting are given below. Should these suggestions not resolve the problem, contact our SERVICE DEPARTMENT or a distributor in your region for assistance. If troubleshooting service is required, please include a full description of the problem.

Problem	Cause	Solution
No Display / lights	No AC power	Check if MS power supply is unplugged, or AC power source problem
	AC power cord is not connected	Check AC power cord connections at both ends. Use the correct cords.
	The fuse has blown	Replace the fuse
Repeated fuse broken	Hardware failure	Contact Major Science service department
Operation stops with alarm: The screen displays 	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	Correct the condition by making 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.
Operation stops with alarm: Display shows 	Bad connections for terminal connectors or damaged wires or damaged platinum wires	Check all the connections to terminators, cables, wires, and gel tanks

<p>Operation stops with alarm: Display shows</p> 	<p>Circuit is interrupted</p>	<ul style="list-style-type: none"> - Verify that the running buffer is correct. - Verify the 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.
<p>Operation stops with alarm: Display shows</p> 	<p>Circuit is interrupted</p>	<ul style="list-style-type: none"> - Verify that the running buffer is correct. - Verify the 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.
<p>Operation stops with alarm: Display shows</p> 	<p>Ground leak detected during run</p>	<p>Check the electrophoresis system for improper grounding. Restart the power supply by turning the Power switch off and on.</p>
<p>Operation stops with alarm: Display shows</p> 	<p>Power supply is overheating</p>	<ul style="list-style-type: none"> - 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.
<p>Operation stops with alarm: Display shows</p>  <p>and countdown</p>	<p>Power supply is getting restart ON</p>	<ul style="list-style-type: none"> - Verify that the electrophoresis condition and system is correct. - Pay attention to the own safety.

Encountering Problems

1. Check the troubleshooting section.
2. Call Technical Service or e-mail to service@majorsci.com
3. If the unit must be shipped back for repair, contact Major Science or the distributor for a Return Authorization Number and shipping instructions. The unit will be repaired as quickly as possible and returned to you.

Replacing the Fuse

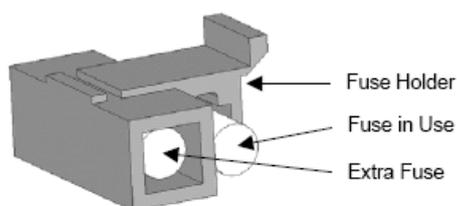
For additional fuses, contact Major Science co. ltd.

To replace the fuse:

1. Turn off the main power switch at the rear of MS 3AP Power Supply and detach the power cord from the rear of MS 3AP Power Supply.
2. Open the fuse compartment located inside the Power Entry Module 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 (4A/250V~) as provided in the fuse holder (see figure below).
4. Place the fuse holder back into the compartment.
5. Snap the cover closed.



Maintenance

MS 3AP Power Supply uses all solid-state components and should require no maintenance or recalibration under normal use. The housing may be cleaned with a dry cloth. If the unit must be returned for repair, contact our **SERVICE DEPARTMENT** or your local distributor for shipping instruction.

Section 6 Ordering Information

Cat. No.	Description
MP-3AP	MS 3AP Power Supply

Section 7 Warranty

Major Science warrants apparatus of its manufacture against defects in materials and workmanship, under normal service, for one year from the shipping date to purchaser. This warranty excludes damages resulting from shipping, misuse, carelessness, or neglect. Major Science's liability under the warranty is limited to the receipt of reasonable proof by the customer that the defect is embraced within the terms of the warranty. All claims made under this warranty must be presented to Major Science within one year following the date of delivery of the product to the customer.

Manufacturer:

Major Science Co., Ltd.

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Wugu Dist., New Taipei City 24888
Taiwan

T/ 886-2-2298-1055

F/ 886-2-2299-7871

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U.S.A

T/ 1-408-366-9866

F/ 1-408-446-1107