

# Helena Laboratories

## EWS Power Supply



## Operator's Manual

Cat. No. 1520

110 VAC

Cat. No. 1521

220 VAC

ONE - INSTRUMENT USE AND FUNCTION . . . . .	1
TWO - PRINCIPLES OF OPERATION . . . . .	1
THREE - PRECAUTIONS AND LIMITATIONS . . . . .	1
FOUR - HAZARDS . . . . .	1
FIVE - DESCRIPTION . . . . .	2
5.1. Design and Operation . . . . .	2
5.2. Controls and Displays . . . . .	3
SIX - INSTALLATION INSTRUCTIONS . . . . .	4
6.1. Unpacking and Inspection . . . . .	4
6.2. Installation . . . . .	4
SEVEN - OPERATING INSTRUCTIONS . . . . .	5
7.1. Preparation . . . . .	5
7.2. Mode Selection . . . . .	5
7.3. Set Time . . . . .	5
7.4. Start Electrophoresis . . . . .	5
7.5. Unlimited Time . . . . .	6
7.6. Stopping a Run . . . . .	6
EIGHT - TEST FUNCTIONS AND QUALITY CONTROL . . . . .	7
8.1. Test Functions . . . . .	7
8.2. Quality Control . . . . .	7
NINE - PERFORMANCE SPECIFICATIONS . . . . .	8
TEN - MAINTENANCE, TROUBLESHOOTING, WARRANTY . . . . .	9
10.1. Maintenance . . . . .	9
10.2. Troubleshooting . . . . .	9
10.3. Warranty . . . . .	10

**ONE - INSTRUMENT USE AND FUNCTION**

The EWS (Electrophoresis Work Station) Digital Power Supply is microprocessor-controlled and is intended for use in electrophoresis.

**TWO - PRINCIPLES OF OPERATION**

The EWS Digital Power Supply is a constant current or constant voltage power source with preset or programmable output and time settings. The power supply is microprocessor-based with self monitoring capabilities. Electrophoresis time can be extended by pressing a button to bypass the timer while electrophoresis continues.

**THREE - PRECAUTIONS AND LIMITATIONS****3.1.**

The entire Operator's Manual should be read and understood before attempting instrument operation.

**3.2.**

Installation is to be performed by the operator.

**3.3.**

Provide adequate room at the sides and back of the instrument for good air circulation.

**3.4.**

No harsh cleansers, acids, or bases should be used on inner or outer surfaces. Do not immerse the power supply. Always unplug the power cord before cleaning spills.

**3.5.**

Before an electrophoresis run, ensure that the chamber polarity is correct, that the buffer tanks are filled to the correct level, and that the sample plates are oriented correctly.

**FOUR - HAZARDS****4.1.**

The EWS Digital Power Supply contains high voltages which can be extremely dangerous. Always unplug the power cord and use extreme care when attempting disassembly for cleaning or adjustments.

**4.2.**

Operate the power supply only if the power cord is plugged into a grounded wall outlet of the proper voltage and frequency, or damage may occur.

**4.3.**

For emergency shut down, disconnect the power supply's power cord from the wall outlet or turn off the power using the On/Off switch.

## FIVE - DESCRIPTION

### 5.1. Design and Operation

The functional units of the EWS Digital Power Supply are shown in Figure 1. The CPU (central processing unit of the microprocessor) directs all functions of the power supply, using user-entered data and the programmed information in its memory to control operation.

The microprocessor receives user-input from the keyboard and controls via an operator interface. User input determines the mode of operation (constant-voltage or constant-current), the output amplitude, electrophoresis time, and other aspects of operation.

Input from the timer causes the CPU to automatically cut off power to the chamber when time remaining reaches zero. The meter is used by the CPU to monitor the power module's output, allowing regulation of output amplitude. CPU outputs control the displays, the power supply output, and timer operation.

The CPU also performs a self-test at power on to detect error conditions or potential problems. Should an abnormal condition be detected, the CPU responds appropriately and displays an error code (see Troubleshooting, section 10.2).

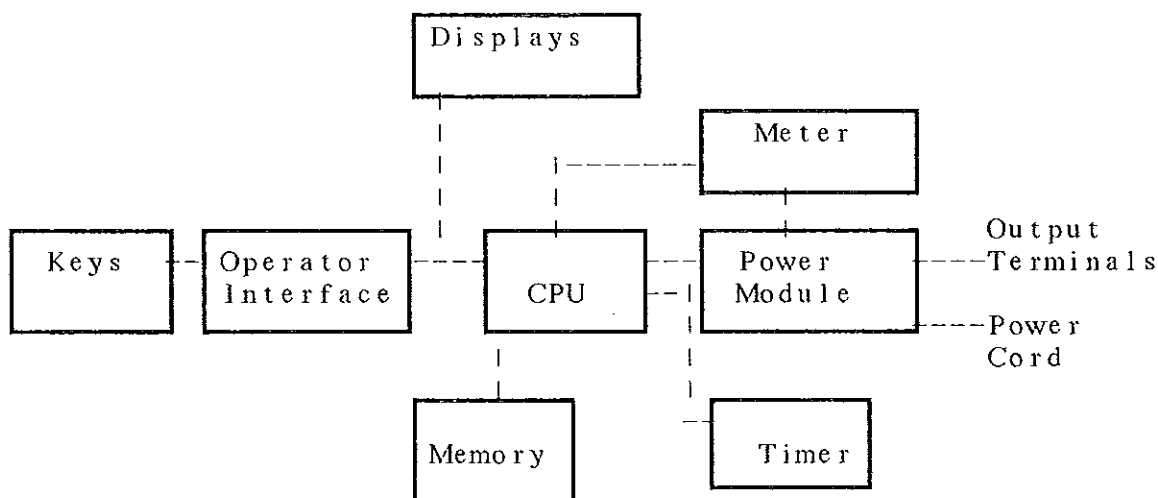


Fig. 1. Functional Block Diagram of EWS Digital Power Supply.

## 5.2. Controls and Displays

### 5.2.1. Controls

**Power ON/OFF:** The power switch is located on the front panel and controls power to the instrument.

**0 to 9:** Used to enter voltage or current and time if different from preprogrammed values.

**VOLTS:** Prior to a run, press to select constant-voltage mode (current fluctuates to maintain voltage at selected level). During a constant-current run, press to display voltage.

**mA:** Prior to a run, press to select constant-current mode (voltage fluctuates to maintain current at selected level). During a constant-voltage run, press to display current.

**TIME:** Press to set electrophoresis time. A preset time of 10 minutes will be displayed, and can be used or changed.

**RUN/WAIT:** Press to start electrophoresis. As an option, press a second time to bypass timer for untimed runs and press a third time to resume timing.

**EXIT:** Press to stop electrophoresis at any time during a run.

**\*** : This key is not functional in this model.

### 5.2.2. Displays

**TIME:** This 4-character LED display shows electrophoresis time in minutes and seconds. After the run begins, remaining electrophoresis time is displayed.

**METER:** This 4-character LED display shows output amplitude. If **VOLTS** is pressed, the Constant Voltage lamp lights and the display shows output voltage. If **mA** is pressed, the Constant Current lamp lights and the display shows output current. After the run begins, actual metered output is displayed.

**Constant Voltage Lamp:** Illuminates when **VOLTS** is pressed to indicate the constant voltage output mode of operation.

**Constant Current Lamp:** Illuminates when **mA** is pressed to indicate the constant current output mode of operation.

## SIX - INSTALLATION INSTRUCTIONS

### 6.1. Unpacking and Inspection

1. Check all shipping containers for signs of damage. If damage is found, immediately notify the shipping carrier.
2. Carefully unpack the instrument and accessories and remove them from their shipping cartons. The packing material should be removed undamaged, if possible, to facilitate repacking the instrument if necessary.
3. Remove the plastic wrappings from the instrument and accessories. If scissors or a knife are used to cut the plastic or binding tape, take care not to scratch the instrument.
4. Inspect the instrument for any obvious signs of damage. If any damage is evident, notify the shipping carrier and Helena Laboratories.
5. Inventory all items. If any parts are missing, recheck the packing materials before notifying Helena Laboratories.

Table 6-1. Inventory

EWS Digital Power Supply  
2.0 A and 0.2 A Fuses  
Operator's Manual

### 6.2. Installation

1. Select an environment free of excessive humidity, dust, and large temperature fluctuations for the instruments.
2. Place the power supply on a level, flat surface. There should be enough space behind and around the instrument to allow good air circulation.
3. Plug the power cord into a grounded wall outlet of the proper voltage and frequency (check the serial number plate on the back of the instrument for this information). The wall outlet should not be on the same circuit as any large load device such as a refrigerator, compressor, centrifuge, etc.

## SEVEN - OPERATING INSTRUCTIONS

### 7.1. Preparation

1. Connect the positive and negative leads of the electrophoresis chamber to the plugs in the front panel of the power supply. Make sure that the polarities at each end of the leads match.
2. Prepare the chamber as instructed by the appropriate electrophoresis procedure.
3. Turn on the power switch (located on the front panel). A beep will sound and the instrument will run a self check. After approximately 2 seconds, dashes will appear on the displays indicating that the power supply is ready for use. If a code appears instead, refer to the troubleshooting table in Section 10.

### 7.2. Mode Selection

1. If constant voltage mode is desired, press **VOLTS**. A voltage will be displayed and the Constant Voltage lamp will light. To change the voltage, enter the desired numbers using the keyboard. When the correct voltage is displayed, press **TIME** and go to 7.3.
2. If constant current mode is desired, press **mA**. A current will be displayed and the Constant Current lamp will light. To change the current, enter the desired number using the keyboard. When the correct current is displayed, press **TIME** and go to 7.3.

### 7.3. Set Time

1. After selecting the mode and voltage or current level and pressing **TIME**, the display will show 10 min. 00 sec.
2. To change the electrophoresis time, enter the required time in minutes and seconds using the keyboard.

**Note:** Up to 99 sec. may be entered for seconds. The timer will count down the 99 seconds first, and then count down from 60 seconds after that.

### 7.4. Start Electrophoresis

1. Check the electrophoresis chamber for correct cable polarity, proper buffer level, and correct membrane or plate orientation.

Allow the plates to equilibrate for at least one minute before starting electrophoresis. This is necessary to ensure complete electrical contact. If an error code (E04) appears, allow plates to equilibrate another minute and begin again.

2. Press **RUN/WAIT** to start electrophoresis. The **TIME** display will begin counting down remaining electrophoresis time and the **METER** display will show output amplitude.
3. When in constant voltage mode, volts are displayed. Press **mA** to monitor current while in constant voltage mode. Press **VOLTS** to return the display to voltage.

When in constant current mode, current is displayed. Press **VOLTS** to monitor voltage while in constant current mode. Press **mA** to return the display to current.

**Note:** Displayed voltage or current may fluctuate at the beginning of a run. This is normal and the reading will soon stabilize.

4. Electrophoresis will continue at the selected voltage or current for the time programmed. At the end of the run, a beep will sound and power will be turned off. The displays will return to dashes only.

#### **7.5. Unlimited Time**

To bypass the timer for any reason, simply press the **RUN/WAIT** key a second time. The timer will stop but power will remain on. To resume timing, press **RUN/WAIT** a third time (or press **EXIT** to stop the run).

#### **7.6. Stopping a Run**

To stop an electrophoresis run before the programmed time is up, press **EXIT**. A beep will sound and power will be cut off. The displays will show dashes only.



## EIGHT - TEST FUNCTIONS AND QUALITY CONTROL

### 8.1. Test Functions

The instrument performs a self test every time the power is turned on, eliminating the need for the operator to perform most functional tests.

Timer accuracy, output voltage or current levels can be checked only by a qualified electronics technician.

### 8.2. Quality Control

Run an appropriate Helena Laboratories control with all patient samples.

## NINE - PERFORMANCE SPECIFICATIONS

Modes of Operation	Constant Voltage or Constant Current Time Automatically or Manually Controlled
Input Power, Cat. No. 1520	110 Vac, 50/60 Hz, 95 W
Input Power, Cat. No. 1521	220 Vac, 50/60 Hz, 95 W
Constant Voltage Output Range	50 to 400 Vdc +/- 1% (or +/- 1 unit, whichever is greater) in 1.0 V increments
Constant Voltage Mode Current	2.0 mA to 99.9 mA
Constant Current Output	2 to 60 mA +/- 1% (or +/- 1 unit, whichever is greater) in 0.1 mA increments
Constant Current Mode Voltage	Approximately 520 V maximum
Meter Accuracy	+/- 1% voltage or current (or +/- 1 V or 0.1 mA, whichever is greater)
Ripple (Noise)	Less than 1% rms of output amplitude
Timer	1 sec. to 99 min. 99 sec. in 1 sec. increments
Timer Accuracy	+/- 1% of setting, or +/- 1 sec., whichever is greater
Ac Fuse (Top)	2 A, 250 V
High Voltage Fuse (Bottom)	0.2 A, 250 V
Dimensions	5 in. (12.5 cm) high 10.2 in. (25.5 cm) wide 12 in. (30 cm) deep
Weight	5.5 lb (2.5 kg)

## TEN - MAINTENANCE, TROUBLESHOOTING, WARRANTY

### 10.1. Maintenance

1. Inspect the electrophoresis cables for cracks and nicks in the insulation at least monthly. Replace defective cables.
2. To replace blown fuses, push in and twist the fuse holder. Replace the fuse (2 A/250 V upper fuse, 0.2 A/250 V lower fuse) in the holder. Push in and twist the holder to reseal it.
3. Clean spills with a soft damp cloth only after turning off the power and unplugging the power cord. Do not use abrasive or corrosive cleansers. Dry the power supply completely before plugging the power cord back in and turning on the power.

### 10.2. Troubleshooting

Refer to the table below for troubleshooting using the error codes displayed after instrument self test. Contact Helena Laboratories for assistance should the suggested solutions not correct a problem.

Troubleshooting Error Codes

Code	Problem	Solution
E 02	Electrophoresis time is zero.	Set timer.
E 03	Selected voltage or current is out of instrument range.	Reset within ranges specified.
E 04	Unable to maintain selected voltage or current.	1. Check 0.2 A (lower) fuse and replace if needed. 2. Check for proper connection of leads. Check for damaged lead insulation. 3. Check for correct plate orientation, adequate buffer level, and correct buffer.
E 99	Internal fault detected during self test.	Call Helena Laboratories for assistance.

### 10.3. Warranty

Helena warrants each new unit to be free from defects in materials and workmanship. Helena's liability under this warranty is limited to servicing and adjusting any unit returned to the factory and to replace any defective part. This warranty is effective for 6 months commencing from the date of shipment to the original purchaser and does not cover faults caused by misuse, abnormal conditions or damage incurred in shipment.

This warranty is made in lieu of all other warranties, expressed or implied, and is limited in any sale to the repair or replacement of the affected component. It does not cover any accessory hardware or software purchased by the operator to modify the unit from the original designed application.

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For Sales and Order Information, or Technical and Service Assistance, call 800-231-5663 toll free. In Texas, call 800-392-3126. In Alaska, Hawaii or Puerto Rico, call 800-231-4678.

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Helena Laboratories

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