

# INSTRUCTION MANUAL

## High Current Power Supply

### EPS-200-II



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## IMPORTANT USER INFORMATION

This Instruction Manual will explain how to use this product safely and effectively. Please read and carefully follow the instruction manual in its entirety.



The triangle/exclamation mark symbol alerts the user of the product to important operational, maintenance, and/or warranty requirements.



The triangle/lightning bolt symbol alerts the user of the product to potentially hazardous electrical exposure.

Failure to adhere to the instructions could result in personal and/or laboratory hazards, as well as invalidate any warranty. Always turn off the DC power source prior to disconnecting power cords from the product. Disconnect power cords from the power source first, and then from the product. For maximum safety, always operate this system in an isolated, low traffic area, not accessible to unauthorized personnel. Never operate damaged or leaking equipment.



## WARRANTY AND LIABILITY

This product was produced utilizing the highest practical standards of materials, workmanship, and design. C.B.S. Scientific warrants that the product has been tested and will meet or exceed published specifications. This warranty is valid only if the product has been operated and maintained according to the instructions provided.

C.B.S. Scientific warrants this product to be free from defects in materials and workmanship under normal service for three years from date of shipment. If the product proves defective during this period, C.B.S. Scientific will repair or replace it at our option, free of charge, if returned to us postage prepaid. This warranty does not cover: damage in transit, damage caused by carelessness, misuse or neglect, normal wear through frequent use, damage caused by solvent corrosion, damage caused by improper handling or user alteration, nor unsatisfactory performance as a result of conditions beyond our control. C.B.S. Scientific shall in no event be liable for incidental nor consequential damages, including without limitation, lost profits, loss of income, loss of business opportunities, loss of use and other related damages, however caused, nor any damage arising from the incorrect use of the product.

<p><b>FRANÇAIS INFORMATION IMPORTANTE À L'USAGE DES UTILISATEURS</b></p> <p>Le présent manuel d'utilisation explique la manière de se servir efficacement du produit en conditions de sécurité. Il est recommandé de soigneusement lire la totalité du manuel, avec ses consignes et ses instructions.</p> <p> Le triangle avec point d'exclamation est un symbole destiné à avertir l'utilisateur du produit de l'importance de certaines exigences relatives au fonctionnement, à l'entretien et/ou à la garantie.</p> <p> Le triangle avec flèche en zigzag est un symbole destiné à avertir l'utilisateur du produit de la possibilité d'exposition à des décharges avec danger de secousses électriques.</p> <p> Tout manquement à l'observation des consignes et des instructions peut exposer les personnes et les biens à des dommages corporels et/ou matériels et peut annuler toute garantie. Il faut toujours interrompre l'alimentation de courant continu avant de déconnecter les cordons d'alimentation du produit. Déconnecter d'abord les cordons d'alimentation branchés sur la source de tension (alimentation de secteur) puis ceux branchés sur le produit. Pour une sécurité maximum, il faut toujours faire fonctionner ce système dans un lieu isolé, peu fréquenté, où le personnel non autorisé n'a pas accès. Ne jamais faire fonctionner un matériel endommagé ou affecté par des fuites.</p> <p><b>GARANTIE ET RESPONSABILITÉ</b></p> <p>Le produit a été fabriqué conformément aux normes applicables les plus exigeantes en matière de matériaux, de main d'œuvre, de conception et d'ingénierie. C.B.S. Scientific garantit que le produit a subi des essais et que ses performances rempliront les conditions des spécifications publiées ou leur seront même supérieures. La présente garantie n'est valide que si le produit a fonctionné et a été entretenu conformément aux consignes et instructions fournies.</p> <p>C.B.S. Scientific garantit que le produit sera dépourvu de vices de matériaux et de main d'œuvre, en conditions de service normales, pendant un an à compter de la date d'expédition. Au cas où le produit s'avérerait défectueux pendant cette période de garantie, C.B.S. Scientific réparera ou remplacera le produit, à sa discrétion et gratuitement, si le produit lui est retourné port payé d'avance. La garantie ne couvre pas les dommages de transport; les dommages causés par l'imprudence, le manque de soins, l'abus ou la négligence; l'usure normale résultant d'une utilisation fréquente; les dommages causés par la corrosion des solvants; et les dommages causés par la manipulation inadéquate ou des changements apportés par l'utilisateur. La garantie ne couvre pas non plus les performances non satisfaisantes résultant de conditions hors du contrôle de C.B.S. Scientific. C.B.S. Scientific ne pourra en aucun cas être tenue responsable de dommages indirects, y compris, de manière non limitative, la perte de bénéfices, le manque à gagner, la perte d'occasions d'affaires, l'impossibilité d'usage ou tous autres dommages associés, quelle qu'en soit la cause, ni de dommages résultant de l'usage incorrect du produit.</p>	<p><b>ESPAÑOL INFORMACIÓN IMPORTANTE PARA EL USUARIO</b></p> <p>El presente instructivo explica la manera de usar este producto en forma segura y efectiva. Sírvase leerlo en su totalidad y seguir detenidamente las indicaciones que contiene.</p> <p> El símbolo del triángulo con exclamación llama la atención del usuario a requisitos importantes para el uso y mantenimiento del producto, así como para la validez de la garantía.</p> <p> El símbolo del triángulo con rayo llama la atención del usuario a la posibilidad de riesgos eléctricos.</p> <p> El incumplimiento de las instrucciones aquí señaladas podría dar lugar a riesgos a la persona, al laboratorio o a ambos y podría anular toda garantía. Siempre apague la fuente de corriente continua antes de desenchufar los cables eléctricos del producto. Primero desconecte los cables de la fuente de energía y después del producto. Para mayor seguridad, siempre use este sistema en un área aislada, de poco movimiento de personas e inaccesible a personal no autorizado. Jamás use equipo que presenta algún daño o fuga.</p> <p><b>GARANTÍA Y RESPONSABILIDAD</b></p> <p>Este producto fue fabricado de acuerdo con las normas más estrictas que sean factibles en cuanto a materiales, mano de obra y diseño. C.B.S. Scientific garantiza que se sometió el producto a pruebas que cumplirá o excederá las especificaciones publicadas. Esta garantía será válida únicamente si se usa y se da servicio de mantenimiento al producto de acuerdo con las instrucciones señaladas.</p> <p>C.B.S. Scientific garantiza que este producto se encontrará libre de defectos de materiales y mano de obra por un periodo de servicio normal de un año a partir de la fecha de embarque. Si el producto resulta defectuoso durante este periodo, C.B.S. Scientific lo reparará o lo repondrá, a criterio de C.B.S., libre de cargos, si se devuelve el producto a C.B.S. porte pagado. Esta garantía no cubre daños sufridos en tránsito, daños provocados por descuido, mal uso o negligencia, desgaste normal como consecuencia del uso excesivo, daños atribuibles a corrosión provocada por solventes, daños causados por el uso indebido o alteraciones realizadas por el usuario ni rendimiento insatisfactorio atribuible a circunstancias fuera del control de C.B.S. Scientific. C.B.S. Scientific en ningún caso asumirá responsabilidad por daños incidentales o sucesivos, incluyendo, en forma no limitativa, la pérdida de utilidades, de ingresos, de oportunidades comerciales o del uso del producto y otros daños afines, fuere cual fuere su origen, ni por daños derivados del uso incorrecto del producto.</p>
<p><b>DEUTSCH WICHTIGE INFORMATION FÜR DEN BENUTZER</b></p> <p>Diese Bedienungsanleitung beschreibt wie man dieses Produkt sicher und wirksam benutzt. Bitte lesen und befolgen Sie alle Anweisungen in dieser Anleitung.</p> <p> Das Dreieck mit Ausrufezeichen weist den Benutzer des Produktes darauf hin, daß wichtige Bedienungs-, Wartungs- und/oder Garantievorschriften zu beachten sind.</p> <p> Das Dreieck mit Zickzackblitz warnt den Benutzer des Produktes vor möglichen Gefahren durch elektrische Spannungen.</p> <p> Nichtbeachtung dieser Anweisungen kann zu persönlichen und/oder laborotechnischen Schäden führen und gleichzeitig alle Garantien als nichtig erklären. Die DC Stromzufuhr muß immer, vor dem Entfernen der Stromkabel vom Produkt, abgeschaltet werden. Die Stromzufuhrkabel müssen zuerst von der Steckdose und erst dann vom Produkt entfernt werden. Um höchste Sicherheit zu gewährleisten sollte dieses System in einem abgesonderten und besonders ruhigen Bereich eingesetzt werden und vor Unbefugten sicher sein.</p> <p><b>GARANTIE UND HAFTUNG</b></p> <p>Dieses Produkt wurde unter Anwendung von Produkten mit höchster Qualität und aus Materialien mit bester Verarbeitung und modernstem Design hergestellt. C.B.S. Scientific garantiert, daß das Produkt getestet wurde und alle publizierten Spezifikationen übertrifft. Diese Garantie ist jedoch nur gültig, wenn das Produkt nach der beigefügten Bedienungsanleitung bedient und gewartet wurde.</p> <p>C.B.S. Scientific garantiert, daß dieses Produkt bei normaler Bedienung aus fehlerfreiem Material besteht und fehlerfrei in der Ausführung ist. Diese Garantie gilt für ein Jahr ab Lieferdatum. Sollte das Produkt in diesem Zeitraum fehlerhaft werden, bietet C.B.S. Scientific eine kostenlose Reparatur bzw. kostenlosen Ersatz, einschließlich freiem Rückporto. Diese Garantie schließt folgendes aus: Transportschaden, Schaden durch Nachlässigkeit, Mißbrauch oder Vernachlässigung, normale Abnutzung durch regelmäßigen Gebrauch, Schaden durch Säureangriff, Schaden durch falsche Handhabung, Veränderung des Produktes durch den Benutzer, oder unzureichende Leistungen die sich nicht im Verantwortungsbereich von C.B.S. Scientific befinden. C.B.S. Scientific kommt unter keinen Umständen für folgende Schäden auf: Sachschadensverlust, Einkommensverlust, Verlust von Geschäftsmöglichkeiten, Verlust der Anwendung und andere damit verbundene Schäden die auf irgend eine Art und Weise entstanden sind, oder Schäden die aus falscher Anwendung des Produktes entstanden sind.</p>	<p><b>ITALIANO INFORMAZIONI IMPORTANTI PER L'UTENTE</b></p> <p>Questo manuale spiega come utilizzare questo prodotto in maniera sicura ed efficiente. Si preghi di leggere e seguire con cautela le istruzioni di ogni parte di questo manuale.</p> <p> Il triangolo contenete il simbolo di un punto esclamativo avverte l'utente di importanti requisiti relativi al funzionamento, manutenzione e/o garanzia del prodotto.</p> <p> Il triangolo contenete il simbolo di un lampo avverte l'utente del prodotto della possibilità di pericoli dovuti a corrente elettrica.</p> <p> La mancata osservanza delle istruzioni può essere causa di pericolo alla propria persona ed al laboratorio, oltre a poter annullare la garanzia. Prima di distaccare il cordone d'alimentazione dal prodotto, spegnere sempre la sorgente di corrente continua. Distaccare i cordoni d'alimentazione prima dal lato della sorgente di tensione e poi dal lato del prodotto. Per maggior sicurezza, mettere sempre in funzione il prodotto in un'area isolata con poco traffico che non sia accessibile al personale non autorizzato. Non mettere mai in funzione un'apparecchiatura che sia danneggiata o abbia perdite.</p> <p><b>GARANZIA E RESPONSABILITÀ</b></p> <p>Questo prodotto è stato fabbricato seguendo gli standard più elevati per i materiali, la manodopera e la progettazione. La C.B.S. Scientific garantisce il prodotto è stato sottoposto a prova e raggiunge o supera i valori pubblicati per i dati tecnici. Questa garanzia è valida solo se il prodotto è messo in esercizio e soggetto a manutenzione secondo le istruzioni fornite.</p> <p>La C.B.S. Scientific garantisce che questo prodotto è libero di difetti di materiali e manodopera, in normali condizioni d'esercizio, per la durata di un anno dalla data di spedizione. Se, in questo periodo, il prodotto si dimostrerà difettoso, la C.B.S. Scientific, a suo giudizio, lo riparerà o sostituirà. 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## SECTION 1 General Information

### 1.1 Intended Uses and Specifications

The EPS-200-II Power Supply is intended for use with any electrophoretic device designed to operate below 200 volts and 2000 milliamps DC. Four sets of outputs operate in parallel to provide between 5 and 200 volts in 1 V steps, 0.01 – 2 Amps in 0.01 A steps, and up to 200 watts in the constant voltage mode. Features a 24 hour timer. . A single LED display provides output voltage or current readings.

### 1.2 Certification: EN61010-1-1993 (IEC1010-1), CE

### 1.3 Specifications

Outputs : Voltage --- 5 - 200 VDC adjustable in 1 V steps.

Current --- 10-2000mA DC adjustable in 10mA steps.

Power --- 200 W max.

Input power. Three wire with ground

110V±10% 50/60 Hz or 220V±10% 50/60 Hz

Operation Temperature

0-40°C

Humidity

10% to 90% R.H. Non-condensing

Noise Level

27dB

Regulation:

Ripple:

EPS-200-II

±0.3% @ 200V and 200W

Line Regulation:

EPS-200-II

±0.3 % @ 200V and 200W

From 90 ~ 132VAC or 198 ~ 264 VAC

Load Regulation:

EPS-200-II

±0.5 % 200V for a 50% change in output load

Drift:

EPS-200-II

±0.3 % after 30min warm up at 200V and 200W

Physical Dimensions:

Weight

Net ~2kg (4.4lbs) Gross ~kg (6.6lb)

Length

320mm

Width

240mm

Height

73mm

### 1.4 Set-Up. Power supply is intended for LABORATORY USE ONLY.

(A) Unpacking and Set Up: Unpack and carefully examine the power supply. Report any damage immediately. Do not attempt to operate this device if physical damage is present. Save all packing material if damage is found.



## 1.4 Set-Up---Continued



### (B) Connecting to mains electricity supply

- This apparatus is designed to safety class 1. Before connection to the mains electricity supply, examine the information on the apparatus rating label.
- Ensure that the mains supply is single phase alternating current (a.c.) of the stated frequency (Hz), with Neutral nominally at earth potential.
- Check that the supply voltage is within the stated range. The apparatus rating label states the value of the fuse fitted to the apparatus itself.
- Ensure that the plug or outlet circuit is fitted with an appropriate fuse of higher value.

**WARNING: THIS EQUIPMENT MUST BE EARTHED.**

The wires in the electrical lead are colored in accordance with the following code:

Green	Earth	(Ground)
White	Neutral	(Common)
Black	Live	(Phase)

Connect the wires to a non-reversible plug as follows:

Green wire to the terminal marked E (Earth), G (Ground), or colored Green.

White wire to the terminal marked N (Neutral) or Common.

Black wire to the terminal marked L (Live) or Phase.

### (C) IMPORTANT ELECTRICAL SAFETY NOTES:



Consult a qualified electrician if any doubt or if your supply system has any of the following:

- No Earth
- A Color Code Different from the Above
- Reversible Plugs
- Supply and Return Leads that are Both Above Earth Potential



### (D) Locate:



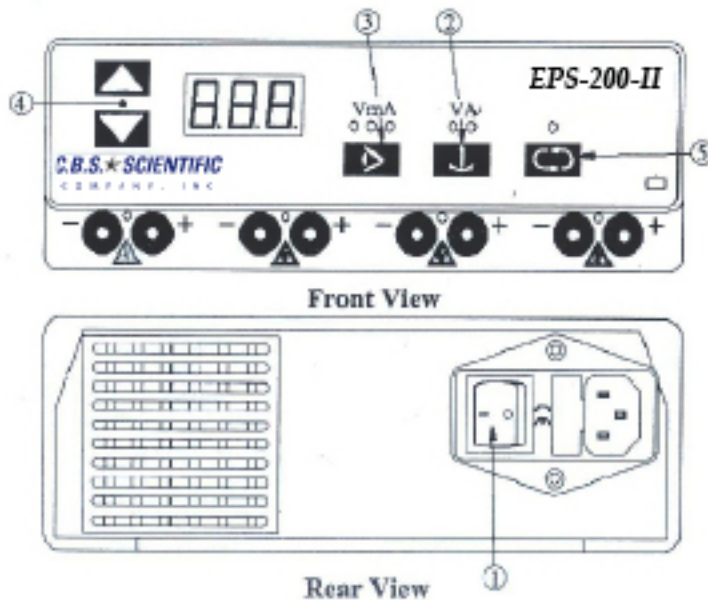
Place the power supply and cell on a level work surface in an authorized work area. Place the power supply in proximity to the electrophoretic cell(s) with which it is to be connected. Be sure to place the power supply in a safe, dry location with all the controls accessible.

## SECTION 2 Operation

### 2.1 Displays

The front and rear panel keys discussed in Fig-3.1 are used to set up and run the EPS-200-II Power Supply. A beep sound will alarm to inform user when front panel key been pressed. A long beep sound will alarm after the run is complete or if an error occurs. This beep sound will continue to alarm every ten seconds until any key is pressed or the power is turned off.

	<b>KEY</b>	<b>Description</b>
1	ON/OFF	ON/OFF Power Supply
2	CONST	Select voltage or current to be constant
3	MODE	Select the volts, milli amps, or time to be displayed
4	△ ▽	Changes the displayed value of the selected parameter
5	RUN	Starts and Stops the output of power from the Power Supply



1. **MAINS POWER SWITCH**
2. **CONSTANT KEY SELECT VOLTS OR MILLIAMPS**
3. **MODE KEY SELECT.** Display of Volts, Milliamps or Time
4. Changes the displayed value of selected parameter
5. **RUN KEY.** Starts and stops the DC output of power
6. **MAINS POWER CORD RECEPTACLE**

## 2.2 SET UP and OPERATIONS

Step	Action	Description
1	Connect the electrophoresis cell(s) to the power supply.	The power leads are color coordinated to the output terminals.
2	Turn on MAINS power (#1 in Fig. 3.1)	The default display is constant voltage and "0"
3	Select the constant parameter.	V and A are alternately selected by pressing the CONST key (#2 in Fig 3.1).
4	Adjust Limits	Use up or down keys to enter suitable value.
5	Set the default limit if different than maximum default value.	Default current limit is 2000mA Default voltage limit is 200V.
6	If programming a timed run, press MODE to display Time and enter the minutes to be run (countdown timer).	Time is in minutes & the maximum is 24 hours or 1,440 minutes.

CONTINUOUS RUN: Leave the timer at "0" to start a continuous run. The power supply will continue to operate indefinitely, until stopped manually. The timer will start counting up, indicating the length of the run in minutes. After reaching the maximum time of 1440 minutes the timer will automatically reset and recount again from 0. Therefore for over night operation the resulting operation time is the addition of the current timer value with the previous maximum timer 1440 minutes.

TIMED RUN: Press the up and down buttons to set the timer to the desired value (minutes). The timer counts down during the run, indicating the time remaining. At the end of the timed run, a ~3 second beep sounds and the display changes to "OFF". To reset the power supply press any button except the RUN button.

7A POWER FAILURE DETECTION (PFD) The Power Failure Detection feature will save the time, voltage and current settings in the event of a power outage and automatically continue the run when the power is restored. To alert the user that a power failure occurred during the run, the error message "E6" flashes at the end of the run instead of the usual "OFF" message. The "E6" error message means that despite the power outage, the power supply successfully supplied the programmed voltage and current for the entire length of time that was programmed. The time shown at the end of the run is the time the gel ran since power was restored, not the total time of the run. The default settings for Power Failure Detection are:



<u>RUN</u>	<u>Time Settings</u>	<u>PFD</u>	<u>Code</u>
Timed Run	1-1440 minutes	ON	PF1
Continuous Run	0	OFF	PF0

The Power Failure Detection feature can be deactivated during a timed run.

- Press the MODE button to move the indicator light under clock symbol.
- Press the UP and DOWN buttons to enter in the run time in minutes.
- Press both UP and DOWN buttons at the same time. The display will briefly show "PF0", indicating that the PFD mode is disabled.
- Press both the UP and DOWN buttons at the same time again. The display will show "PF1", indicating that the PFD mode is enabled.

8 Press RUN

Start the run.

During a run, you can view the run conditions just press the MODE key. You also can change the value of constant parameter or the length of a timed run by press MODE key and then the up/down keys.  

9 Stop of run

When timer reaches its preset limits the START/STOP key again to manually stop a run. Display will show you OFF.



LIVE PARTS SHOULD NEVER BE EXPOSED UNLESS THE APPARATUS HAS BEEN SWITCHED OFF AND ISOLATED FROM THE MAINS ELECTRICITY SUPPLY.

## **SECTION 3**

### **Maintenance of Equipment**

#### **3.1 Care and Handling**



Use the same precautions as with any electrical device. Do not operate without the cover in place or with any possible short circuit. Do not operate in a damp, humid environment where condensing moisture may short out internal electrical components. When moving to or from a cold room, allow at least eight (8) hours for the unit to temperature equilibrate.

Should this product become excessively warm, smoke, or display erratic information during operation, discontinue use immediately and contact a qualified service representative.

#### **3.2 Maintenance**

The following inspection and maintenance procedures will help maintain the safety and reliable performance. Replacement parts can be ordered by calling 1-858-755-4959 or by contacting your local distributor.

Use only mild, non-abrasive detergents. DO NOT use solvents or immerse in water, as this may cause permanent damage.

- Banana plugs and power cords should be inspected regularly. If the banana plugs become loose or do not feel friction tight replace the plugs or power cords.
- Should power cord assemblies (connectors, wire or shrouds) show any signs of wear or damage (e.g. cracks, nicks, abrasions, or melted insulation), replace them immediately.
- The platinum wire is secured to the banana jack by compression between a stainless washer and the jack nut. The nut/washer interface should be tight and free of corrosion.

## SECTION 4 TROUBLE SHOOTING

### 4.1 Troubleshooting Guide



#### Pre-caution

Wait 10 seconds from time AC power is disconnected to allow high voltage discharge within the power supply.

<b>Symptom</b>	<b>Action and possible causes</b>
Fan is not spinning LED & Display do not light up Front panel power on indicator off	<ol style="list-style-type: none"> <li>1. Check source wall power.</li> <li>2. Change a new, same configure fuse and try again.</li> <li>3. Check if power switch malfunction.</li> <li>4. Contact C.B.S. Scientific Company, Inc.</li> </ol>
Fan is spinning LED & Display do not light up Front panel power on indicator off	<ol style="list-style-type: none"> <li>1. Check source wall power.</li> <li>2. Check if line voltage select error</li> <li>3. Contact C.B.S. Scientific Company, Inc.</li> </ol>
Fan is spinning LED & Display do not light up Front panel power on indicator on	<ol style="list-style-type: none"> <li>1. Contact C.B.S. Scientific Company, Inc.</li> </ol>
Fuse F1 Blown	<ol style="list-style-type: none"> <li>1. Change a new same configure fuse and try again.</li> <li>2. Contact C.B.S. Scientific Company, Inc.</li> </ol>

### 4.2 General Error Messages

<b>Error Code</b>	<b>Explanation</b>	<b>Possible Solution</b>
<b>E1</b>	<b>No load detected</b> The electrophoresis cell(s) are not plugged in. During a run, load current dropped more than 4mA.	<ul style="list-style-type: none"> <li>★ Check all connections</li> <li>★ Check appropriate buffer volume.</li> <li>★ Press the RUN key to resume the run or any other key to clear the error code.</li> </ul>
<b>E2</b>	<b>Unacceptable Value(s) Entered</b> <ul style="list-style-type: none"> <li>★ No value entered</li> <li>★ Voltage below 10V</li> <li>★ Current below 4mA</li> </ul>	Enter acceptable values and press run key to resume the run or any other key to clear the error code.
<b>E3</b>	<b>Change in Load Resister</b> <ul style="list-style-type: none"> <li>★ Electrophoresis cell(s) were added or removed during a run.</li> <li>★ Buffer leakage</li> <li>★ Loose connection in a connected cell.</li> </ul>	Check and correct any potential resistance problems Then press RUN key to resume the run or any other key to clear the error code.

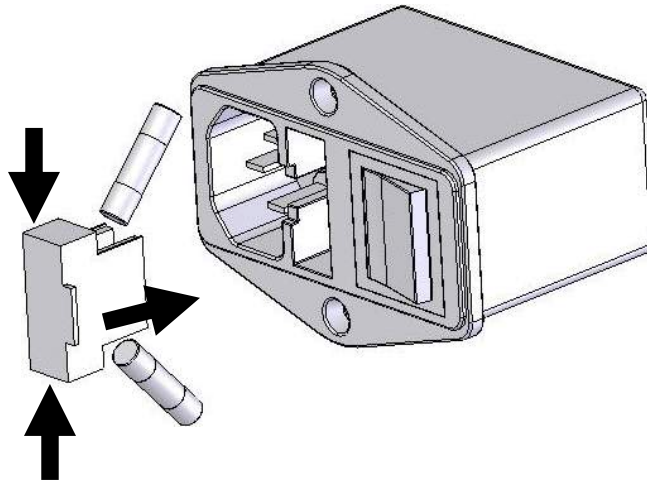
## 4.2 General Error Messages--Continued

<u>Error Code</u>	<u>Explanation</u>	<u>Possible Solution</u>
E4	<b>Power Failure During a Non-Timed Run</b>	Press any key (other than RUN) to clear the error code. Then press the RUN Key to resume the run.
E5	<b>Power Failure During A Timed Run (PFD OFF)</b>	Press any key (other than RUN) to clear the error code. Then press the RUN key to restart the run.
E6	<b>Power Failure During A Timed Run (PFD ON)</b>	Press any key (other than RUN) to clear the error code.
E7	<b>Short Circuit</b> Load current exceeded 500mA	<ul style="list-style-type: none"> <li>★ Check for any short circuit.</li> <li>★ High buffer concentration</li> <li>★ Press the RUN key to resume the run or any other key to clear the error code.</li> </ul>
CHC	<b>Current differential alarm</b> Difference current value (>100mA) between start and final run.	★ Check buffer volume
<b>Any Other Error Code</b>		Contact C.B.S. Scientific Company, Inc.

## 4.3 General Error Messages--Continued

### Replacing the fuses

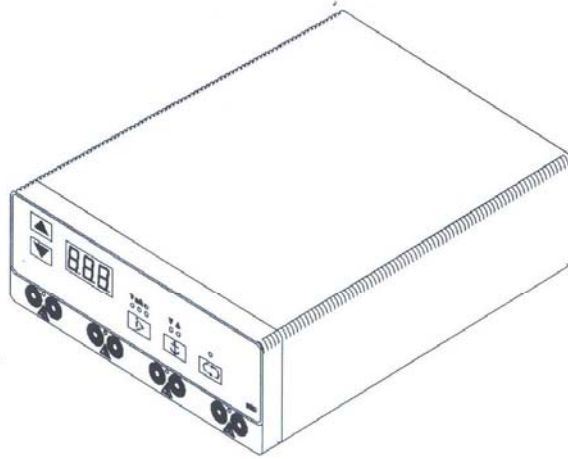
1. Unplug the power cord from the power supply.
2. Locate the fuse compartment on the rear panel.
3. Use a screwdriver to pry out the fuse compartment. There are two fuses in the compartment. Check and replace any blown fuses with a fuse of the same size and ratings.
4. FUSES (2); 250 V, 5 A, 5 x 20 mm fast blow.



**SECTION 5**  
**Power Supply**

Cat. #	Item
EPS-200-II	Mini Power Supply, 10-300 Volts, 500mA, 110V
EPS-200-IIV	Mini Power Supply, 10-300 Volts, 500mA, 220V

Section 7 — Circuit Diagram  
As special request.



# CONTACT INFORMATION



**Telephone:**  
Local or International  
858-755-4959  
Toll Free: 800-243-4959



**Fax:** 858-755-0733



**Online ordering:**  
[www.cbsscientific.com](http://www.cbsscientific.com)



**E-mail address:**  
[sales@cbssci.com](mailto:sales@cbssci.com)



**Mailing address:**  
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