PACKAGE INSERT INSTRUCTIONS

C.B.S. SCIENTIFIC MODEL PS-250 POWER SUPPLY

INTENDED USES AND SPECIFICATIONS

The PS-250 Power Supply is a dual purpose unit intended for use with any electrophoretic chamber for electrophoresis where high voltage and low current are required or any electroblotting (electrophoretic transfer) unit where low voltage and high current are required. The operation mode is Constant Voltage. Two (2) sets of standard recessed female banana jacks are provided as voltage outlets. Red is positive, black is negative. A digital readout provides either voltage output or current output (milliamps) as selected by a function switch.

The PS-250 Power Supply provides up to 75 watts of output power (multiplication of volts and milliamps). At 250 volts, up to 300 milliamps of current can be delivered. When operating at 150 volts or below, up to 500 milliamps of current can be delivered. A visual overcurrent indicator is illuminated at approximately 510 milliamps and an audible alarm sounds to indicate that the setting should be reduced to avoid blowing the fuse. If the fuse does blow, a check fuse indicator is illuminated when the power supply main switch is turned on provided the unit is plugged into an active outlet.

EQUIPMENT

(1) Material Provided:

The PS-250 Power Supply is complete with power cord, three (3) digit digital readout, On-Off Switch, Meter Function Switch (volts or milliamps readout), twelve (12) position Voltage Output Selection Switch, Range Switch (Hi or Lo) for the Voltage Selection Switch, Check Fuse Light (illuminates if fuse is blown when unit is turned "On"), Power "ON" Light, Overcurrent Light (activated when 500 milliamp current draw is exceeded), and protective fuse.

2) Material NOT Provided, but Available if Ordered:

Appropriate patch cord for connection from the power supply to the electrophoretic cell(s).

PROCEDURE

(l) Set-up

(a) Unpack and examine the power supply carefully. Report any damage to the transporting carrier and C.B.S. SCIENTIFIC. Be sure to save all cartons for claim purposes if damage is found.

(b) Place the power supply in proximity to the electrophoresis cell or transfer unit with which it is to be connected. Be sure to place the power supply in a safe, dry location with the controls accessible, but with the power supply placed away from normal personnel activities.

(c) Plug the power cord into the appropriate receptacle. Unless otherwise indicated, the power supply is set up for 100 to 120VAC, 50/60Hz input. For 230V input service, see the section covering adjustments.

PLEASE NOTE: This is a three (3) wire grounded style and should NOT be used with a two (2) wire receptacle with a conversion plug. Because there are high voltages available within the power supply, the ground connection is a necessary safety precaution.

(d) For safety reasons, it is recommended to connect the patch cord first to the electrophoretic cell and then, with the power "OFF", to the power supply output terminal(s).

(e) When disconnecting the set-up, turn the adjustment knob of the power supply full counterclockwise and then turn off the Main Power Switch. After the power supply is off, then disconnect the patch cords from the power supply connection and then finally from the electrophoretic cell.

(2) Operation

(a) After the power supply is appropriately connected to the electrophoretic cell, initially set the Voltage Output Selection Switch to "MIN." (minimum full counterclockwise) and the Voltage Select Range Switch to "LO". Set Meter Function Switch to milliamps. Turn on power.

(b) Note the current reading and observe that the overcurrent light is not illuminated. If it is, the electrophoretic cell system is too conductive (too low a resistance) and buffer and/or gel conditions must be changed.

(c) If current level is within range (0-500mA), adjust voltage to desired range level with the Voltage Select knob and the Meter Function Switch in the "Volts" mode.

(d) Check current at the desired voltage range. If overcurrent light is illuminated, reduce voltage to a level where overcurrent light is out.

PLEASE NOTE: Voltage is read to the nearest volt and the reading will fluctuate several volts with line voltage changes. Also, due to line voltage changes, line voltage, and current phase differences, the same setting may yield a slightly different voltage (±3-5%) from day to day.

Current is read to the nearest 1 milliamp and the last digit may change frequently with line voltage changes and/or bubble formation on the electrophoretic cell electrodes. The power supply may be operated for brief periods above 500mA, but should only be for short periods as otherwise the fuse will blow and/or damage to the internal parts may occur.

(e) The Voltage Select Switch is a twelve (12) position switch which may be operated at any time as may the Range Switch and the Display Mode Switch.

(f) PLEASE NOTE: On disconnect of the electrophoretic chamber, the power supply continues to produce voltage (no current if an open circuit) and care must be excercised not to create a hazardous electrical condition with dangling leads.

PRECAUTIONS

Use the same precautions as with any electrical device. Do not operate without the sides and chassis fully assembled or with any possible short circuit. It must be remembered that this device can produce voltages, although low by general electrophoretic standards, which can cause shock. QUALIFIED PERSONNEL ONLY SHOULD OPERATE. Do not operate in a damp, humid atmosphere or in a fashion where condensed moisture may short out internal electrical components. When moving the unit from either a normal room temperature condition into a cold room or vise versa, allow at least eight (8) hours for the unit to temperature-equilibrate before use.

ADJUSTMENTS

FOR DIFFERENT LINE VOLTAGE: Unless otherwise specified, the unit has been manufactured for use with 100-120VAC, 50/6Hz line service. If 220-240 input is to be used, an internalwire changeis necessary.

TOOLS REQUIRED: Standard Phillips (X or Star) Style Screw Driver, Small Soldering Iron, Needle Nose Pliers, Solder

PROCEDURE: Unplug the power supply from receptacle. Remove left side (when viewed from front) by unscrewing the four (4) screws holding the side in place. Retain the screws for re-installation.

Observe the three (3) sets of connectors mid-board at the edge. Four (4) wires are connected to at least two (2) of these sets. The wires are black, black with white stripe, brown, and brown with white stripe. The wires are configured as listed below for the input voltage range:

CONNECTOR SET LOCATION	110-120V INPUT	220-240V INPUT
Top	Black & Black-White	Black
Center	Brown & Brown-White	Brown-White
Bottom	None	Brown & Black-White

Unsolder carefully using the needle nose pliers to remove the wires from the holes. Reposition wires correctly according to the above table and solder carefully into place. Replace side by positioning the power supply on the right side and placing the side in proper juxtaposition to the mounting holes. Reinsert the screws.

FOR METER RECALIBRATION: The instrument was calibrated prior to shipment, but with age recalibration may be necessary.

TOOLS REQUIRED: Standard Phillips (X or Star) Style Screw Driver, Small Slot Style Screw Driver, Multimeter to read volts to 300 and milliamps to 500mA (preferably digital), Functioning Electrophoretic Cell or Load Resistor rated at 500 ohms and 75 watts.

PROCEDURE: Unplug the power supply from receptacle. Remove right side (when viewed from front) by unscrewing the four (4) screws holding the side in place.

Observe the two (2) potentiometers on the lower part of the circuit board at the edge.

Top Potentiometer:	Volts Calibrate
Bottom Potentiometer:	Current Calibrate

For voltage calibration, connect meter, with power supply Voltage Select at "FULL", directly into output jacks. Turn on power supply and adjust potentiometer to obtain digital display reading consistent with external meter. Check other settings. If the lower readings of the power supply meter differ significantly (more than $\pm 5\%$), a compromise setting is necessary at the maximum, higher or lower than the external meter, to achieve full range balance of accuracy.

For current calibration, set electrophoretic cell or load resistor, with multimeter in series, to the power supply. Turn on the power supply and set as "high" on voltage scale to obtain a reading as close to 500mA as possible. Adjust the power supply readout potentiometer to read same as external meter.

SERVICE

If the unit is overloaded, the fuse will blow. The "Check Fuse" light will illuminate when the fuse is blown with the unit's plug into a receptacle and the Power Switch "ON". Change fuse. It is a 1 amp Slo-Blo fuse (Little Fuse 313.001). These are available from Radio Shack.

WARRANTY

The power supply is under warranty for one (1) year from date of shipment against defects in material and workmanship. There is no warranty for components which fail as a result of electrical overload.

MANUFACTURED FOR:

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TROUBLESHOOTING GUIDE

A. No Output No Display	1. Dead Receptacle 2. Blown Fuse and "Check Fuse" Light 3. BrokenConnectionbetween Receptacle and Circuit Board
B. One or More Digits not Reading Correctly	1. Bad Decoding Circuit (Change Intersil IC7107) 2. Bad Digit(s) (Change Digit) 3. Incorrect $\pm$5V Supply Check Regulators IC2 and IC3 and Diode D7and D8 (Change as Needed)
C. No Output in One of Voltage Select Positions	1. Bad Hi-Lo Switch 2. Bad Rotary Switch 3. Bad Connection at Switch or Transformer 4. Bad Transformer Winding
D. Voltage Output No Current Output	1. Bad Connection Externally or Internally to Output