

6.4 POWER SUPPLY MAINTENANCE

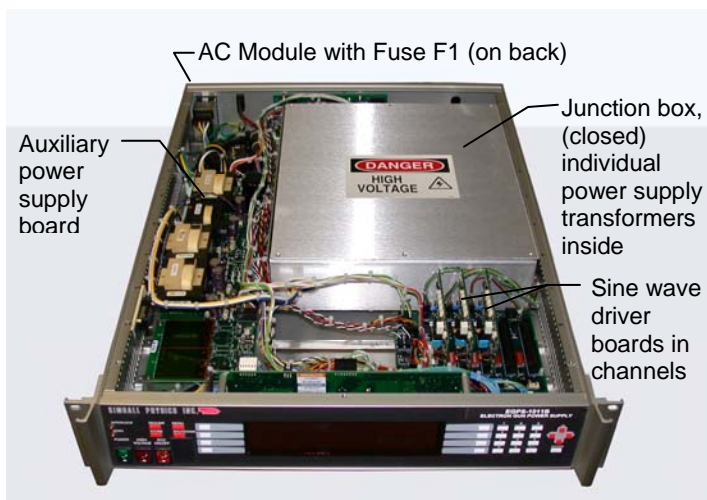






Fig. 6.4-1 A typical Power Supply with top cover removed, showing boards inside (Controls and number of boards will vary with power supply model.)

	 <h1 style="margin: 0;">DANGER</h1>
	<h2 style="margin: 0;">HIGH VOLTAGE</h2> <p style="margin: 0;">Can cause ELECTRIC SHOCK or BURN</p> <p style="margin: 0;">FOR EMERGENCY SHUT DOWN, DISCONNECT THE POWER CORD FROM THE AC OUTLET.</p>

The Power Supply employs a modular design for ease of operation and repair. The main Power Supply unit includes a number of separate sine-wave driver boards, depending on the particular gun. The driver board is a sine-wave oscillator and is common to all of the control supplies such as Energy, Source, Grid, etc. Each individual power supply has a corresponding sine-wave driver board that provides transformer drive and remote metering signals. In some power supply systems, instead of individual boards, there is one auxiliary board that drives a transformer that provides power for all floating supplies, except Source. Most boards are accessible by removing the top cover of the Power Supply. In some units the junction box is attached below the main unit and its boards are accessible by removing the bottom cover.

Each pull out board is factory-adjusted for a dedicated channel position and is not interchangeable, except for troubleshooting. Additionally, the trim potentiometers on each board (current limit, frequency adjustment, voltage adjustment, meter adjustment, etc.) usually should not be changed. However if the cathode in the gun is changed, it may be necessary to adjust the Zener limit trim potentiometer on the Source/ ECC board. Consult Kimball Physics before making any adjustments

Some Power Supply schematics are included in the Drawings Section at the end of the manual.

	 <h1 style="margin: 0;">DANGER</h1>
	<h2 style="margin: 0;">HIGH VOLTAGE</h2> <p style="margin: 0;">Can cause ELECTRIC SHOCK or BURN</p> <p style="margin: 0;">Proper electrical safety precautions must be observed during troubleshooting operations. Unplug the Power Supply power cord from the AC power outlet before removing covers or replacing fuses.</p>

NOTE: Safety interlocks will shut off the Power Supply if the covers are not on tightly, or if the gun cables are not connected to the Power Supply.

6.4.1 REPLACEMENT OF THE MAIN SUPPLY FUSE

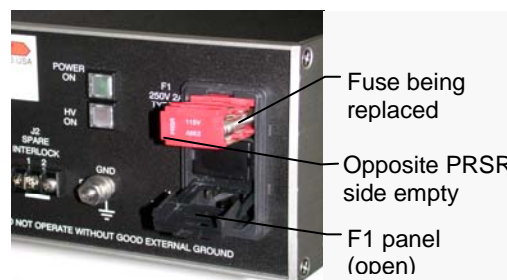


Fig. 6.4-2 Back panel AC Input Module showing main supply fuse F1 in holder in position for 115 VAC

1. Secure (turn off) operation of the electron or ion gun system according to the shut down instructions in the Normal Operation Section.
2. **H. V. WARNING: Unplug the Power Supply power cord from the AC power outlet.**
3. On the rear panel of the Power Supply, pry open the small panel labeled **F1** at its top edge with a small screwdriver; be careful as the plastic can crack. Similarly pry out the red two-fuse holder.
4. Replace the blown fuse(s) with new 250 V Type T / 3AG fuse(s) of the same amperage.
5. Replace the fuse holder assembly in the same orientation and close the small panel. Check that the appropriate voltage is shown in the window.
6. Before re-applying power, look for the problem that caused the fuse to blow. For example, discharging in the gun can cause a backsurge of high voltage.

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6.3 POWER SUPPLY BOARDS and MAINTENANCE cont.

EGPS-1012 Power Supply Boards, General Layout

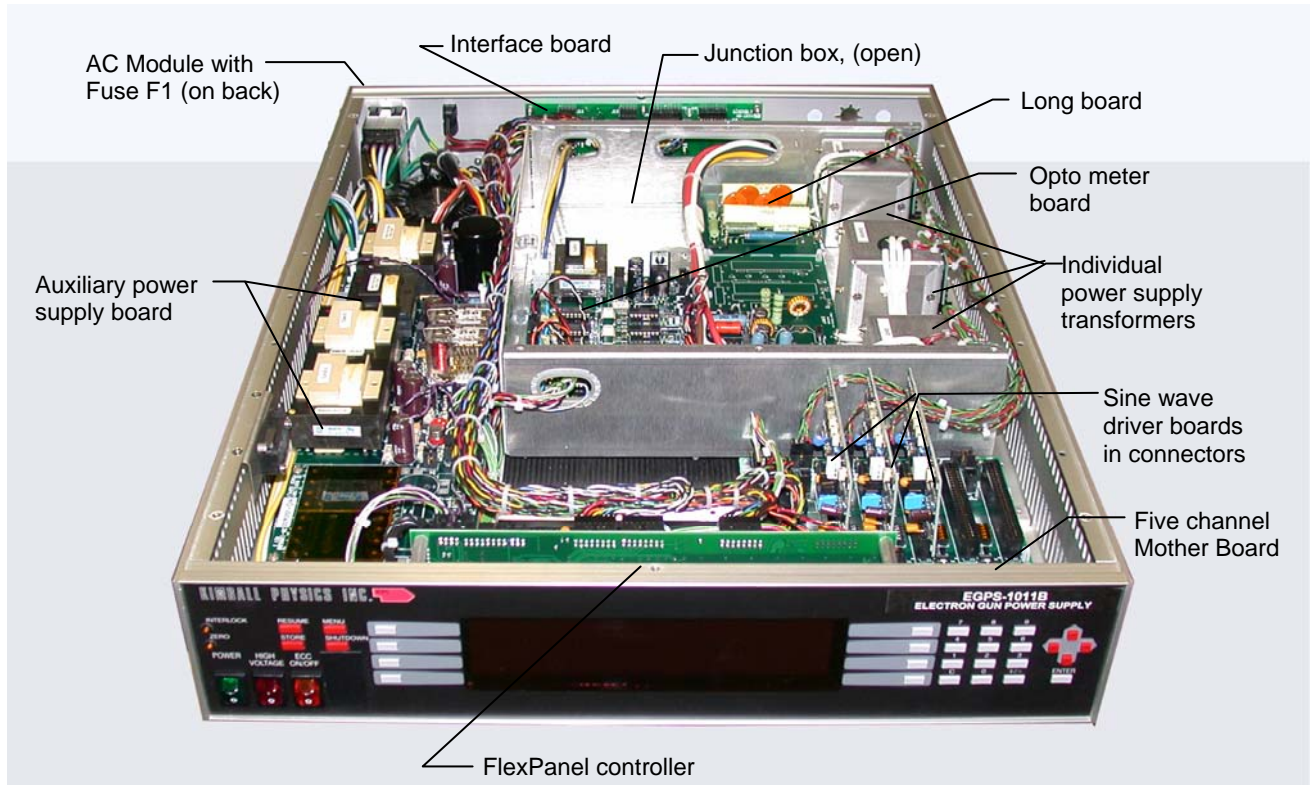


Fig. 6.4-3 Standard EGPS-1012 Power Supply with top cover and junction box cover removed, showing general layout of boards inside unit (details may vary with options).

6.3 POWER SUPPLY BOARDS and MAINTENANCE cont.

Typical Power Supply Boards and Fuses

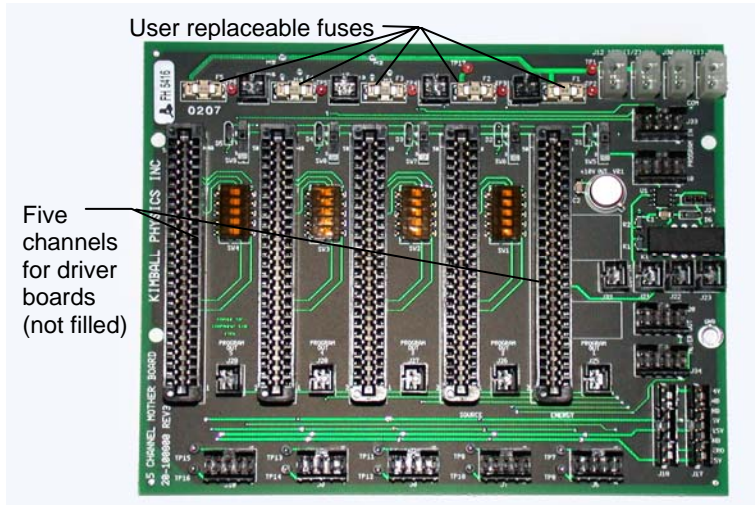


Fig. 6.4-4 A typical Mother Board, showing position of fuses (The board is not filled so fuses are visible.) The fuse for an individual pull-out board is adjacent to that board's connector. The number of boards installed will vary with the power supply model.

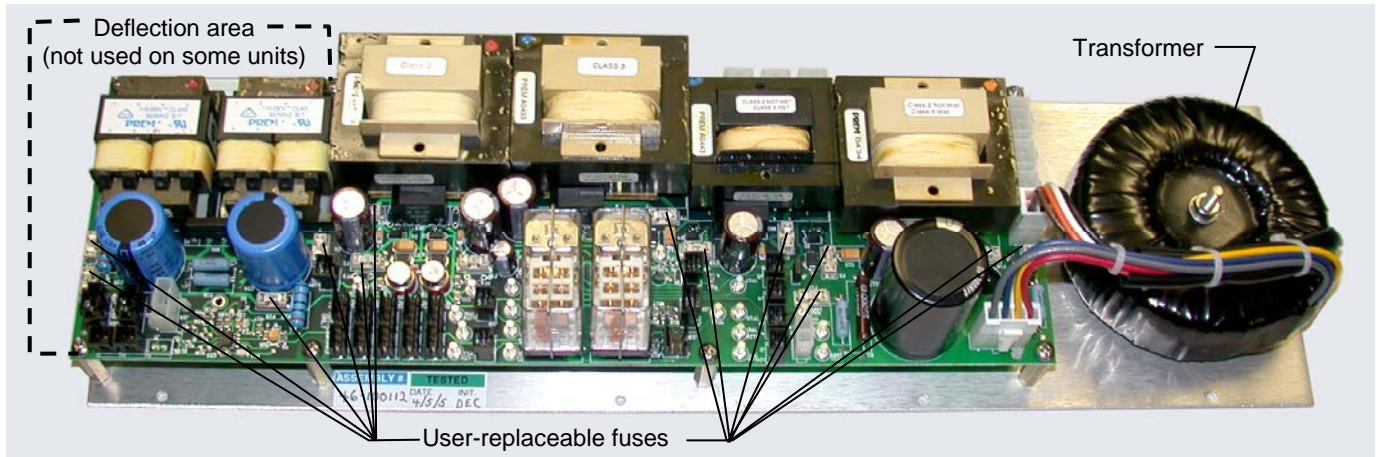


Fig. 6.4-5 A typical Auxiliary Power Supply Board with deflection, showing position of fuses

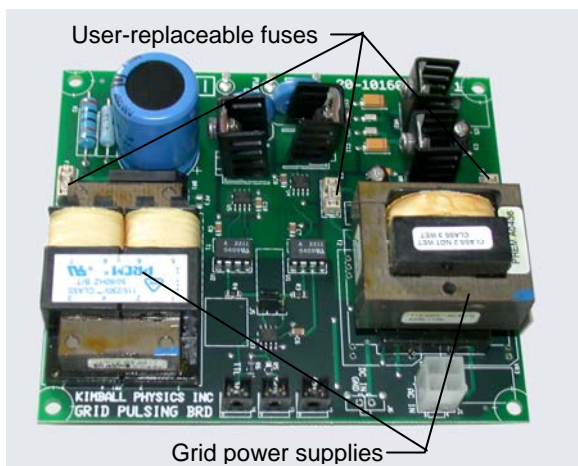


Fig. 6.4-6 A custom Grid Pulsing Power Supply Auxiliary Board, showing fuses (for boards and fuses in unit see Table 6.3-1)

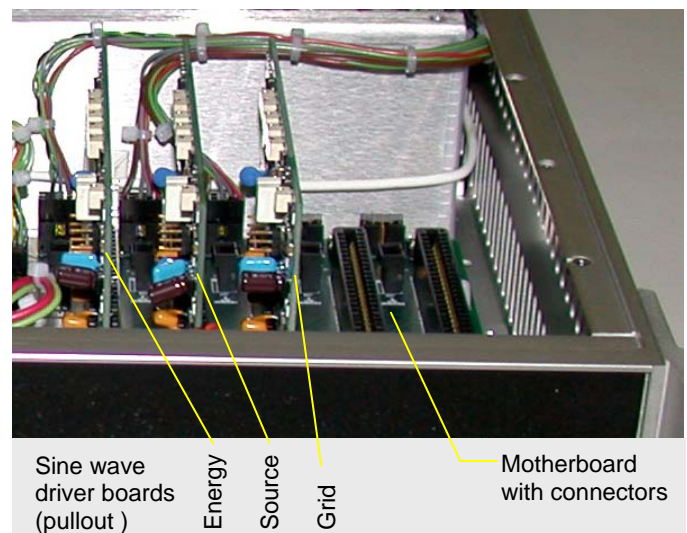




Fig. 6.4-7 Typical pullout Sine Wave Driver Boards in Mother Board (for boards in unit see Table 6.3-1)

6 MAINTENANCE

6.3 POWER SUPPLY BOARDS and MAINTENANCE cont.

6.4.2 REPLACEMENT OF INTERNAL FUSES

	 DANGER
	HIGH VOLTAGE Can cause ELECTRIC SHOCK or BURN High Voltage will be present on the exposed gun connector end of the cable and inside the power supply during this troubleshooting procedure. Do not touch cable end or supply components when the power supply is energized.

A number of user-replaceable surface mount fuses are present on several boards in the Power Supply as shown in figures on the preceding page. The particular boards and number of fuses depend on the power supply model and gun options, see Table 6.3-1 below.

Some boards include poly fuses which reset automatically and should not need to be replaced.

1. Secure the electron or ion gun according to the shut down instructions in the Normal Operation Section. Disconnect **ALL** of the cables from the gun. The other ends of the cables must remain connected to the Power Supply.
2. Remove the screws in the top cover of the Power Supply, and lift it off.
3. Inspect the various fuses, in particular the fuses next to the board of the supply that failed. Measure resistance across fuses with an ohmmeter. **If resistance is greater than 1 Ω , the fuse needs to be replaced.**
4. Replace the blown fuse with one of the same value and rating, see Table 6.3-1. Fuse reference designators are printed on the board and shown in the schematic.
5. Replace the top cover, and secure with its screws.
6. Energize the power supply and check operation of the supply that failed.

NOTE: Safety interlocks will shut off the Power Supply if the covers are not on tightly, or if the gun cables are not connected to the Power Supply.

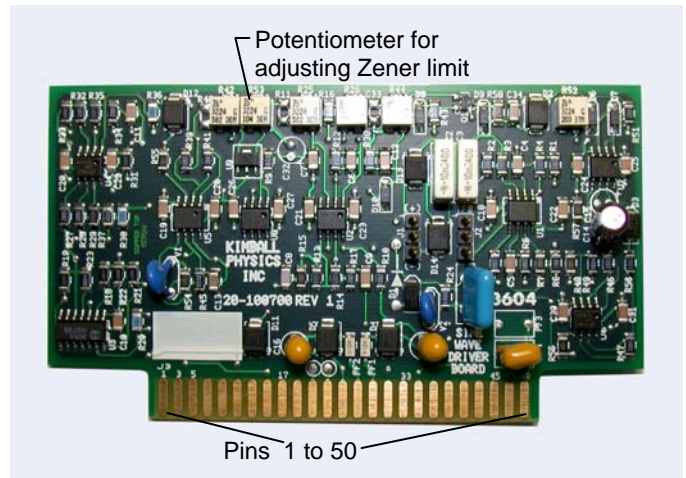


Fig. 6.4-8 A typical Sine Wave Driver Board (no fuses)
This is a Source board showing Zener adjustment potentiometer

6.4.3 REPLACEMENT OF SINE WAVE DRIVER BOARDS

At present, the individual sine wave driver boards are not user-replaceable and are not interchangeable, because the boards require specific calibration. If it is suspected that a board is at fault, contact Kimball Physics Engineering for guidance in troubleshooting.

6.4.4 ZENER LIMIT ADJUSTMENT

Contact Kimball Physics for instructions and advice before adjusting the Zener limit. The limit is pre-set during testing at Kimball Physics to protect the cathode or ion source from high Source voltage or current that could decrease its lifetime. Other troubleshooting may be recommended prior to changing this limit. The adjustment potentiometer is located on the Source sine wave driver board as shown in the figure above.

If these procedures and the information in the General Troubleshooting Tables (Section 6.2) do not repair the Power Supply, contact Kimball Physics for guidance in further troubleshooting.

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