Richardson, R. H. University of Texas, Austin, Texas. A safety interlock modification for the Heath IP-32 power supply

A number of laboratories are presently using the Heath IP-32 power supply for starch gel electrophoresis. The working voltages range from about 175v DC to 300v DC, with a current of 25ma to 100ma. These conditions are sufficiently dangerous to warrant precautions for preventing accidental shock.

This power supply has no indicator lights to distinguish a "standby" condition, with zero voltage across the output terminals, from the "on" condition, with up to 400 volts across the output terminals. Furthermore, the switch knob tends to loosen with use, so the switch position may be doubtful.

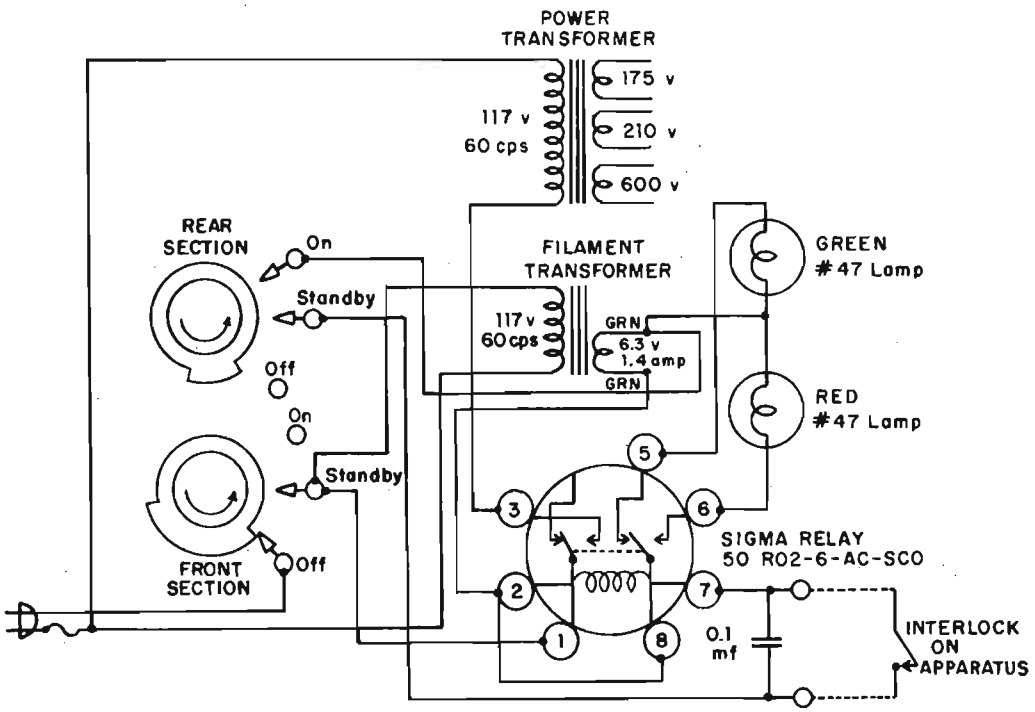

Figure 1. Schematic of modifications for Heath IP-32 power supply to incorporate interlock switching.

The power supply may easily be modified to eliminate the hazard at a cost of less than $20 for parts (see Figure 1). A power relay with an actuating voltage of 6v AC and a resistive current rating of 10 amps (for example, Sigma model 50 R02-6-AC-SCO) may be used to switch the high voltage transformer (power transformer) primary coil, instead of the rear section of the standby switch. The rear section of the standby switch is placed in series with the interlock switch at the gel, and with the relay coil. When all switches are closed, the relay is actuated.

The relay also switches on a green panel light (the one originally on the power supply front panel) when the standby condition exists, or alternatively switches on a red panel light (installed above the green one) when the on condition exists.

The jacks for the relay coil circuit are installed on the front panel above the "B+" and "Common" output jacks. Since the usual connectors to the high voltage jacks are banana plugs, the smaller pin jacks (yellow color coded) are installed for pin plug connections to the interlock switch. This prevents an accidental reversal of interlock and high voltage connections.

The interlock switch may be any of several kinds, but should be closed only when it is impossible to touch the gel, buffer solutions, etc. We have used plastic boxes to

hold the buffer containers, gel, connecting sponges, ice, etc. The interlock switch is closed when the lid of the plastic box is in place, and the switch is open at all other times.

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Richardson, R. H. University of Texas, Austin. A safety interlock for the Heath IP-17 power supply.

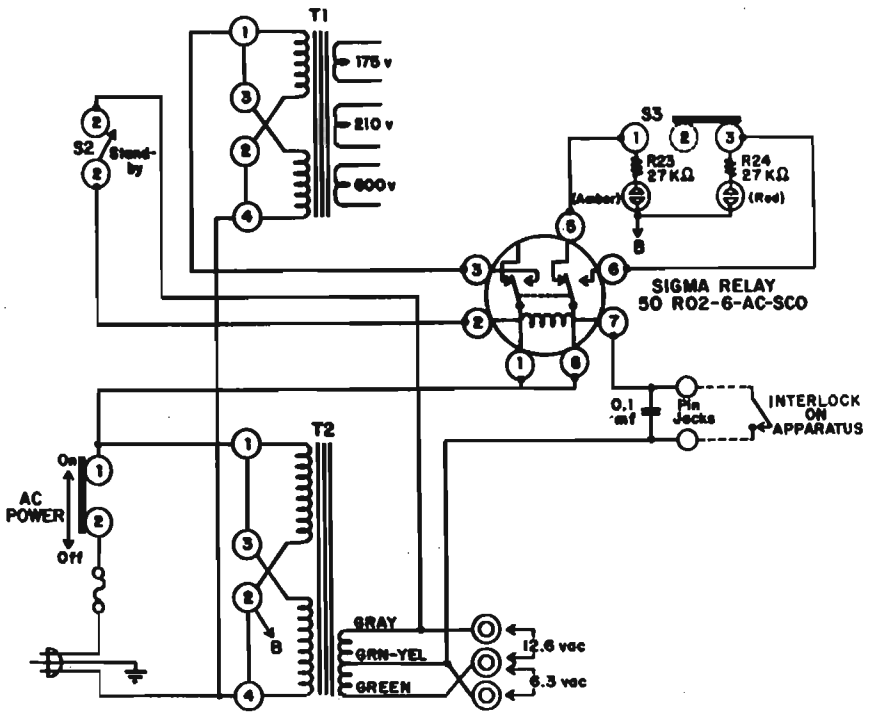
The Heath IP-17 power supply is the new model high voltage regulated power supply replacing the model IP-32. A number of peripheral circuit and cabinet modifications have been made, which result in changes from the IP-32 in details of incorporating a safety interlock. Basic operation of the interlock remains as previously given for the IP-32.

An important Heath change was separating the standby and the filament switches, and making them "positive" action without knobs to loosen. The S2 switch for the high voltage transformer is easily rewired in series with the relay coil and interlock switch.

Instead of adding a standby pilot light, the two lights supplied to indicate position of the meter switch may be rewired so that the red (labeled "B+ volts") indicates high voltage is available, while the amber (labeled "C-volts") may be relabeled "standby" and used to indicate absence of high voltage.

The only additions to the front panel of the IP-17 are two yellow tip jacks for connections of the interlock switches. The relay is mounted on the transformer chassis as near as possible to the top of the chassis between the two 6L6 tubes.

This work was done with the support of A.E.C. Contract No. AT-(40-1)-3681 to K. Kojima.



Schematic for incorporation of a safety interlock into the Heath IP-17 regulated DC Power Supply.