BEAM PULSING with GRID REMOTE CONTROL

Pulsing of the beam current is accomplished by varying voltage applied to the control grid (Wehnelt) aperture, so that the beam is alternately turned on or cut off. The grid potential must be negative with respect to the cathode. When the grid voltage set to zero or some empirically-determined low value, the beam current will be at its maximum. As the grid voltage is increased, the cathode emission is suppressed and eventually completely cut off. This cut-off voltage is dependent on other operating parameters, such as Energy. Before pulsing, It is advisable to determine the optimum grid voltage and the cut-off grid voltage for the conditions.

The full range of grid voltage is controlled remotely by a pulsed 0 to 10 V signal into the remote control Grid terminals on the back of the EGPS Power Supply. The output grid voltage varies proportionally from 0 to its full range. The input voltage signal can be obtained from any source (i.e., a computer with a digital to analog converter, or an analog supply).

For example, if the grid range is 0 to -300 V, and grid cut-off is -150 V, the beam can be pulsed on and off with computer/remote input pulses of +5 V as shown in Fig. 4.7.1. The voltage that turns on the beam does not need to be zero. The actual values of cut off and beam current will vary with the gun model and operating parameters. (see Data Section)

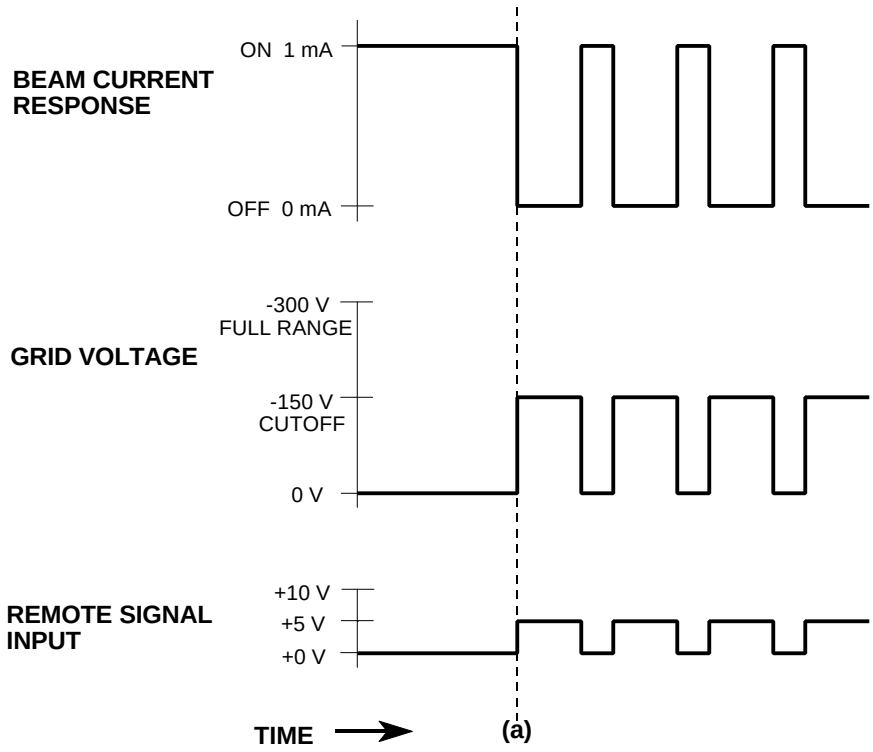

Figure 4.7.1 Beam Pulsing with Grid Remote Control: At time (a) the pulsed signal into the Grid remote terminal is turned on.

4.7 BEAM PULSING OPTIONS

BEAM PULSING with GRID REMOTE CONTROL: OPERATION

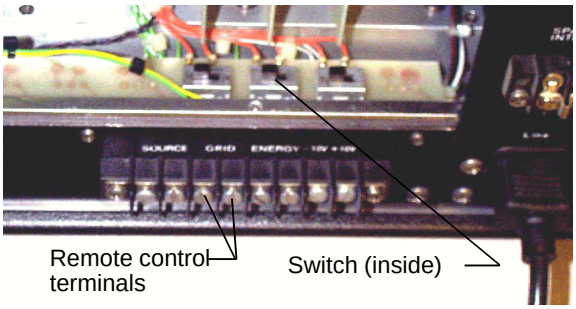

Figure 4.7.2 Typical power supply with rear access panel removed, showing remote switches

1. Set-up:
   a. **Ensure that the Power Supply is OFF**.
   b. Turn the front panel **GRID** potentiometer fully counterclockwise, to avoid problems due to unexpected settings if the unit is switched back to local mode.
   c. Remove the rear access panel of the Power Supply.
   d. Change the position of the Grid switch inside the Power Supply from L (Local=left) to R (Remote=right) as viewed from the rear of the Power Supply (Fig. 4.7.2).
   e. Replace the rear access panel.

2. Voltage program the Grid Power Supply as follows:
   a. Attach the output of the pulsing source to the Grid program terminal labeled PROG. The pulsed signal should not exceed the 0 to +10 V range.
   b. Reference the system to ground on the terminal labeled COM.

3. Operate the Electron Gun as described under Normal Start Up Procedure:
   NOTE: In the Remote mode, the Grid is not controllable by its front panel potentiometer.
   a. The remote signal must be **off initially**, so that the Grid will be zero while setting the Source current.
   b. Set the magnitude of the input signal so that the Grid will alternate between the value that yields the desired beam current and the appropriate cut-off voltage for the operating parameters, such as Energy. (See Data Section for Beam Current vs. Grid Voltage graphs.) The remote voltage source signal maps linearly onto the Grid supply range.
   c. Set the frequency of the input to the desired pulse rate. The maximum usable pulse rate depends on electrical components in the program signal and grid supply circuitry, and will vary from system to system. In general, the maximum pulse rate is 100 Hz.
   d. With pulsing, the Grid meter does not give an accurate reading; it will either fluctuate rapidly or will give an averaged value.

This completes the Beam Pulsing with Grid Remote Control Instructions.