

4.7 BEAM PULSING OPTIONS cont.

BEAM PULSING with FIXED / VARIABLE GRID POWER SUPPLY

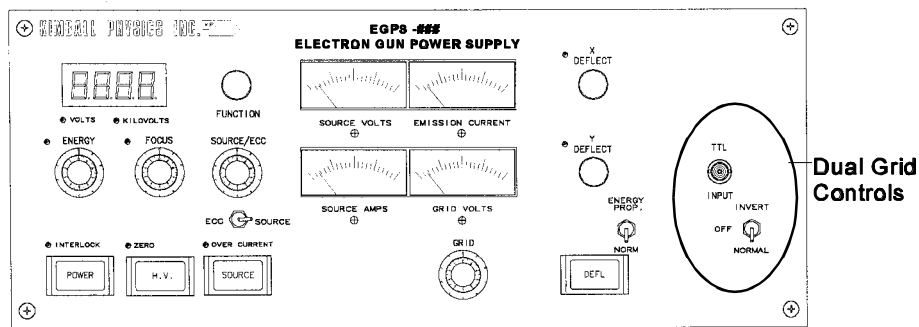


Figure 4.7.5: Front panel of a typical Power Supply with Fixed/ Variable Dual Grid Pulsing option, showing TTL controls

This method of pulsing usually involves a main EGPS Power Supply unit containing two grid supplies which is ordered at time of purchase. Alternatively, this pulsing option can be added to an existing system as a separate pulsing supply unit. A user-supplied TTL (transistor-transistor logic) pulse source is also required. TTL pulse widths from 2 μ s to DC at repetition rates up to 1 kHz may be employed.

With this dual grid pulsing option, beam pulsing is accomplished using a TTL signal to alternate between two Grid supplies: one fixed and the other variable. The fixed grid supply is set at the factory to supply a single, fixed voltage which cuts off the electron beam. The variable grid supply is the normal control grid supply which is varied by the user with the grid potentiometer on the front of the Power Supply. The variable supply should be adjusted to a voltage which allows optimum beam current. Switching the output rapidly between these two supplies then pulses the electron beam off and on. The block diagram, Fig. 4.7.7 below, shows the relation of the supplies.

The amount of beam current emitted by the gun is a function of both energy and grid voltage. See the Data Section for graphs of Beam Current vs Grid Voltage at various Energy values. Precise beam current levels vary with operating conditions, so the user must determine appropriate grid voltages for the specific operating conditions employed.

DESCRIPTION OF CONTROLS

Pulsing Switch: A three-position toggle switch labeled **INVERT/ OFF/ NORMAL** for the Dual Grid Pulsing option, that enables the fixed grid for pulsing and can invert the TTL grid pulse signal.

In the **OFF** position, the TTL signal is disconnected in the Power Supply and only the variable grid supply is functional.

In the **INVERT** and **NORMAL** positions, the TTL signal controls the fixed grid supply, and the switch provides a method of inverting the pulse output.

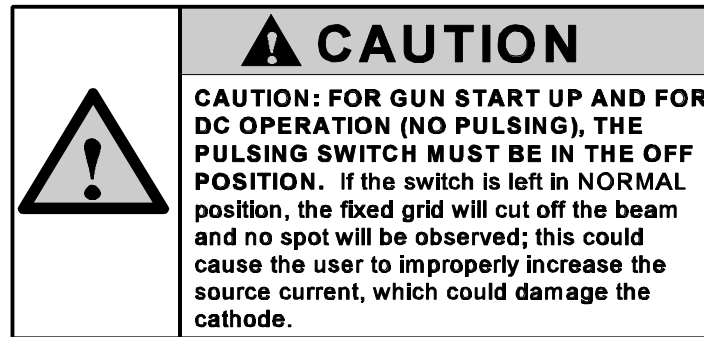
Pulse TLL Input BNC: A BNC labeled **PULSE TTL INPUT** to receive a 0 to +5 VDC TTL signal from a user-supplied TTL source for the Dual Grid Pulsing option.

Grid (G-1) Control: A ten-turn dial potentiometer labeled **GRID** that voltage programs the variable Grid (G-1) supply.

Grid Voltage Meter: An analog meter labeled **GRID VOLTS** that monitors the variable Grid bias voltage. **NOTE: With pulsing, it does not monitor the output to the gun.**

4.7 BEAM PULSING OPTIONS cont.

BEAM PULSING with FIXED / VARIABLE GRID POWER SUPPLY: OPERATION



1. Connect a user-supplied 0 to +5 VDC TTL source to the **PULSE TTL INPUT** BNC on the front of the EGPS.
2. With the pulsing switch labeled **INVERT/ OFF/ NORMAL** in the **OFF** position:
 - a. Follow the Normal Start Up Procedure, Section 4.2.
 - b. Adjust the **GRID** potentiometer to set the variable grid supply to the voltage that produces optimum beam current and uniformity. Monitor this supply on the analog **GRID VOLTS** meter.
3. To begin pulsing: Set the pulsing switch in either **NORMAL** or the **INVERT** position.
 - a. The **INVERT/NORMAL** toggle switch reverses the TTL logic and so provides a method of inverting the pulse output. (See Figure 4.7.6)
 - b. In **NORMAL** mode:
 - 0 V TTL input = fixed grid supply = beam cut-off
 - +5V TTL input = variable grid supply = beam on
 - c. In **INVERT** mode:
 - 0 V TTL input = variable grid supply = beam on
 - +5V TTL input = fixed grid supply = beam cut-off
4. Turn on the user-supplied 0 to +5 VDC TTL source, and adjust the pulse rate as desired.
5. To turn off pulsing: Set the pulsing switch in the **OFF** position. The TTL source may remain connected, as it will be disconnected in the Power Supply.

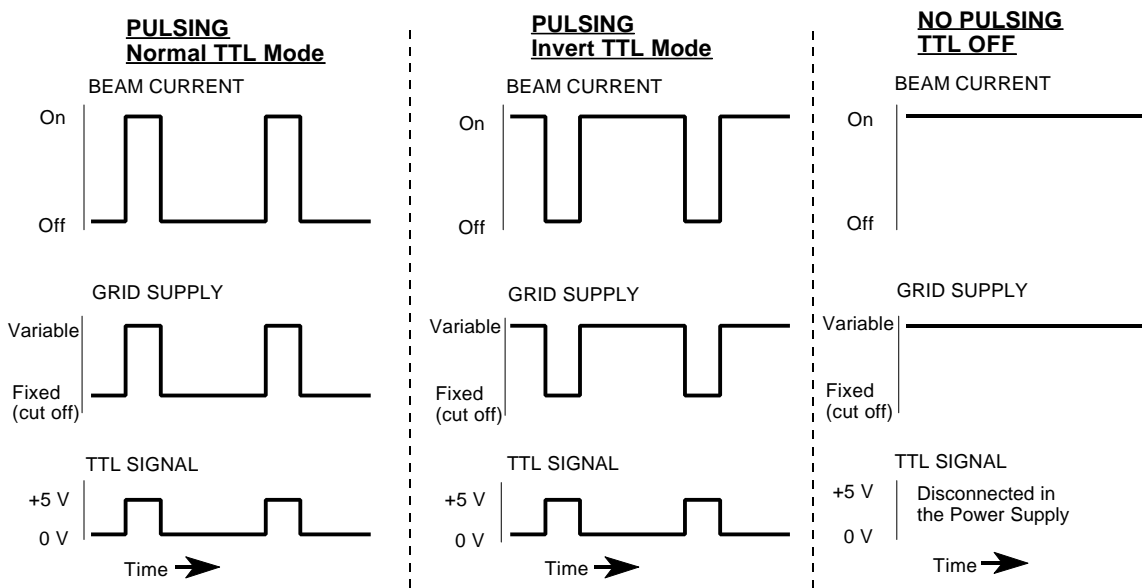


Figure 4.7.6 Normal and inverted pulsing TTL Signal, alternating Fixed and Variable Grid Supplies, and Beam Current Response

4.7 BEAM PULSING OPTIONS cont.

BEAM PULSING with FIXED / VARIABLE GRID POWER SUPPLY cont.

The following block diagram shows the relation of the two grid supplies for a gun with the dual grid pulsing option.

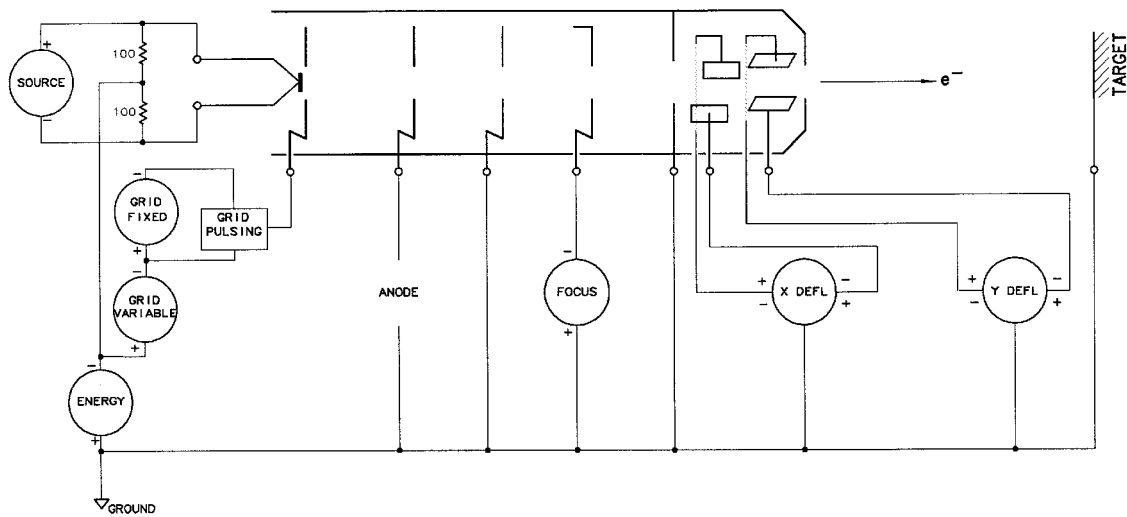


Figure 4.7.7: Block Diagram for a typical Electron Gun with Fixed/ Variable Grid Pulsing

This completes the Beam Pulsing Instructions.