

LERF Gun Turn-On Procedure

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Estimated Time to Perform: 10-15 minutes

Procedure Overview

This procedure describes how to safely turn the LERF gun ON and bring it up to the 350 kV nominal operating voltage.

Prerequisites



1. The LERF vault must be in *Beam Permit* before turning on the gun.
2. When the LERF is in Beam Permit, the Glassman high-voltage power supply (HVPS), which is located in the LERF Control Room racks, is powered.
3. As part of the hot checkout process, the following have been completed,
 - The grounding rod in the gun tank has been pulled out, and
 - The driving rod for the resistor mechanism, which is located in the spool piece that connects the HVPS tank to the gun tanks, has been pulled out.
4. **Important actions during gun operation:**
 - If the HVPS trips OFF on current or because of a vacuum interlock fault, leave it OFF and immediately contact EGG On-call. *Do not attempt to recover the voltage or vacuum yourself*, wait for instructions from the EGG Group.

Procedure Steps

1. Open the gun valve, VBV0F001.
2. Open the *FEL Gun Power Supply* screen (FEL Main Menu⇒High Voltage⇒High Voltage Power Supply Control; see Figure 1, to the right).

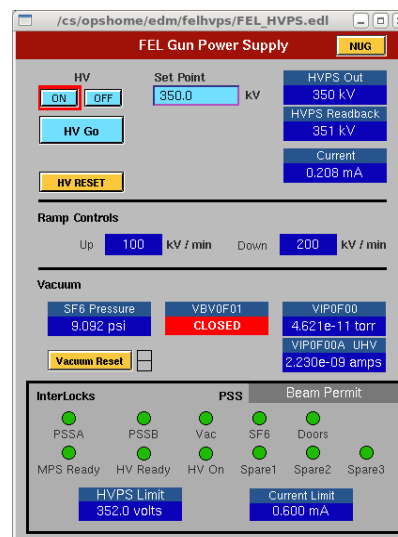


Figure 1: FEL Gun Power Supply Screen

3. Click on the **HV RESET** button to clear any interlock faults.
4. Verify that the **Set Point** value is 0.0 kV.
5. Click on the **NUG** button in the upper right corner of the screen. This opens the striptool shown in Figure 2, below, which includes values for the voltage requested, voltage output, current output, vacuum, and radiation monitors (small Geiger counters positioned around the gun vacuum chamber).

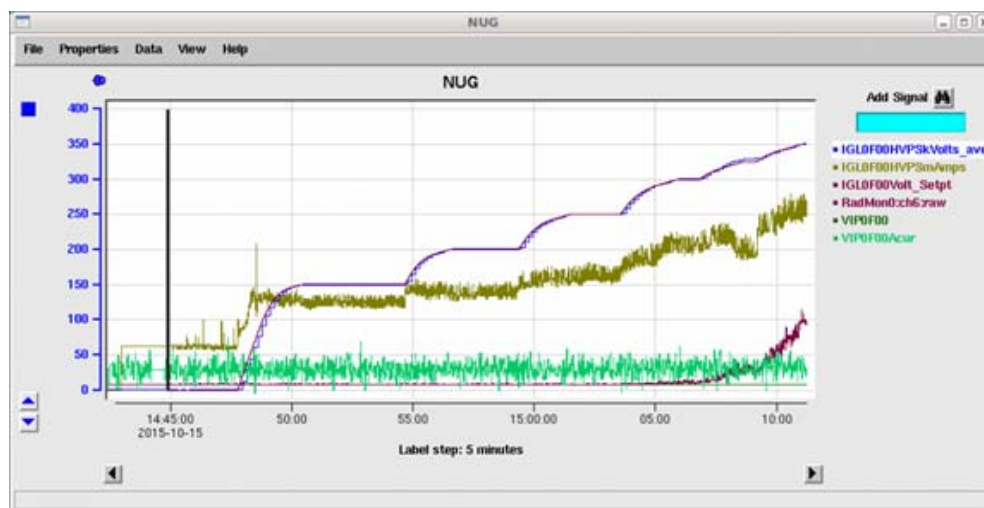


Figure 2: NUG Striptool

6. Click on the **HV Go** button. You now have EPICS control of the gun HVPS.

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7. Are the limits on the *FEL Gun Power Supply* screen exactly as follows (see Figure 3, below)?

- **HVPS Limit** 352 kV
- **Current Limit** 0.600 mA
- **Ramp Control Up rate** 100 kV/min.
- **Ramp Control Down rate** 200 kV/min.

YES NO → A. Immediately contact Egg On-Call.

Go to
Step 8

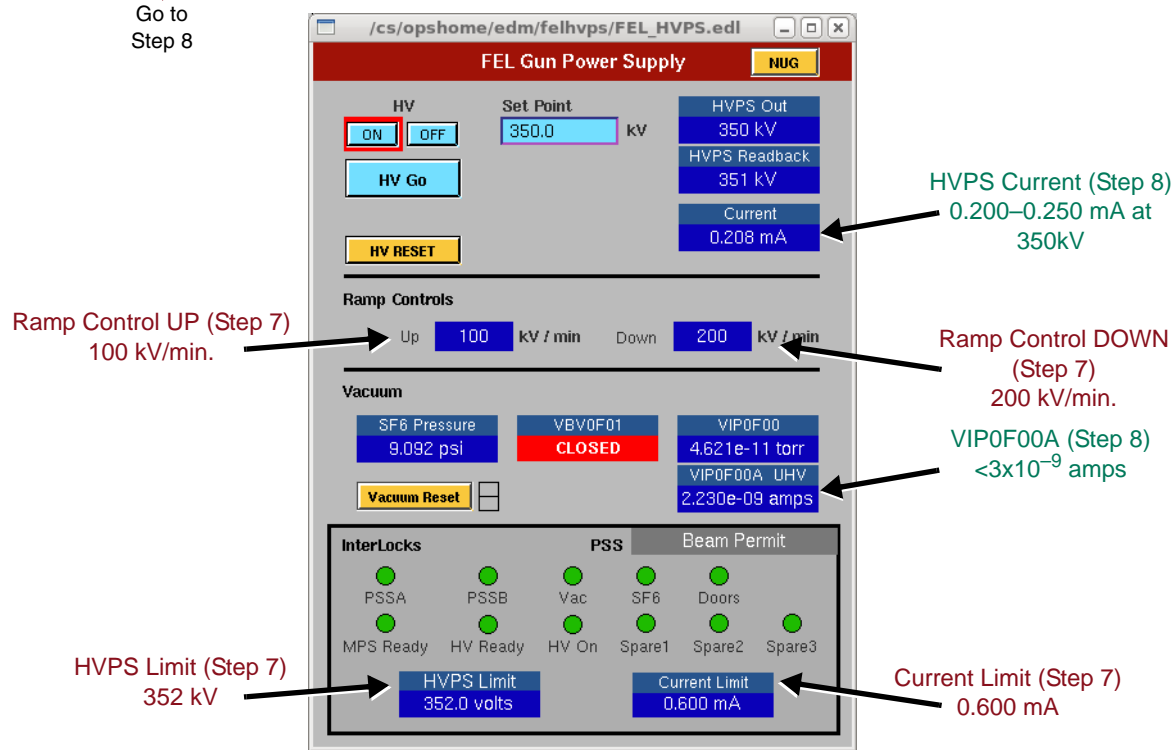


Figure 3: Limits, Ramp Rates, & Readbacks

8. The most relevant signals to observe in the striptool (see Figure 2) during voltage ramp up in the following steps are as follows. *If any of these signals exceeds the limit during the voltage ramp up, contact EGG On-Call immediately.*
- **Vacuum (VIP0F00Acur):** $<3 \times 10^{-9}$ amps (notice that this signal is given in amps from the ultra high vacuum ion pump controller. This is equivalent to $\sim 4 \times 10^{-11}$ Torr) (value also shown on Figure 3, above)
 - **HVPS current (IGL0F00HVPSmAmps):** between 0.200–0.250 mA at 350kV (value also shown on Figure 3, above).
 - **Radiation monitor (RadMon0:ch6:raw):** <500 CPS at 350kV.
9. Set the **Set Point** to 150 kV, press the **RETURN** keyboard key, then click on the **HV Go** button. The voltage will ramp from 0 kV to 150 kV.
10. Monitor the **HVPS Readback** value. When it reaches 150 kV, the gun is at that voltage.

11. Let the gun soak for one minute at 150 kV, then raise the set point in the following increments, pausing for one minute after the gun reaches each set point:
 - 200 kV
 - 300 kV
 - 325 kV
 - 350 kV
12. Make a LERFLog entry stating that the gun is at the nominal 350 kV operating voltage and add screen captures of the *FEL Gun Power Supply* screen and the NUG Striptool.
13. Procedure complete.

