



# EGF-6115 / EGPS-6115 ELECTRON GUN / POWER SUPPLY

## 1 keV to 50 keV Uniform High Power Flood Electron Beams

### FOR USE IN:

- ▶ General Vacuum Physics
- ▶ Spacecraft Materials Testing
- ▶ UHV Charging
- ▶ Surface Physics

### FEATURES / OPTIONS:

- ▶ Uniform Flood Beam
- ▶ Rastering / Beam Washing for Wide Angle Uniform Spot
- ▶ Electrostatic Divergence Control
- ▶ Magnetostatic Deflection
- ▶ Internal Alignment while Operating
- ▶ User-replaceable Firing Units
- ▶ 2.75 inch CF Mounting
- ▶ UHV Technology / Bakeable
- ▶ Computer / Remote Control
- ▶ LabVIEW™ Computer / Programming



EGF-6115 Electron Gun mounted on 2.75 inch CF Flange (shown without Deflection)

The Kimball Physics EGF-6115 Electron Gun with its matching EGPS-6115 Power Supply is a complete subsystem ready to attach to the user's vacuum system and turn on. It can deliver electrons over a broad range of energies, currents and power. The EGF-6115 is a high-power, focusable flood gun for use in spacecraft materials testing and other surface physics and general vacuum physics applications.

The gun can generate a high energy, adjustable divergence, flood electron beam. Both beam energy and beam current are independently adjustable over wide ranges; energies from 1 keV to 50 keV and currents from picoamps to five milliamps can be achieved. The electron beam can be pulsed by an input signal to the control grid.

The adjustable optics of the gun can adapt to different divergences and different working distances. Rastering / beam washing is used to provide a large uniform spot. Electrostatic focusing provides control of the spot size, which is typically in the tens of centimeters. The flood beam is also partially dependent on the grid, anode and working distance.

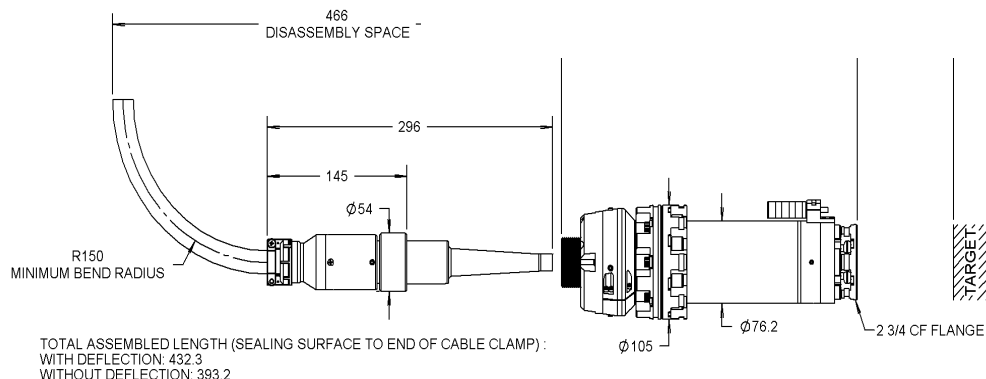
The firing unit cartridge (including the cathode, cathode-mount, and Wehnelt aperture) is user-replaceable without removing the entire gun from the vacuum chamber; used firing units may be returned to the factory for rebuild.

UHV technology is used throughout. The electron gun is bakeable to 350°C with cables and electronics box removed. The gun is usually mounted on a 2.75 inch CF flange, and it has zero insertion distance into the vacuum chamber. Various stand-alone Faraday cup designs are available.

The EGPS-6115 Power Supply System contains all necessary power supplies to run the EGF-6115 Electron Gun. The power supply system includes a separate HV supply, connected to, and controlled by the EGPS-6115.

An optional LabVIEW™ computer program designed for the EGF-6115 is available for remote computer control and metering. Software is available in two types: Standard configuration is via serial connections. or an option using National Instrument DAQ boards and SCSI connectors on the EGPS-6115 is available. The program provides a virtual panel of controls and real-time metering on the user's computer screen.

EGF-6115 ELECTRON GUN  
(Dimensions in mm)

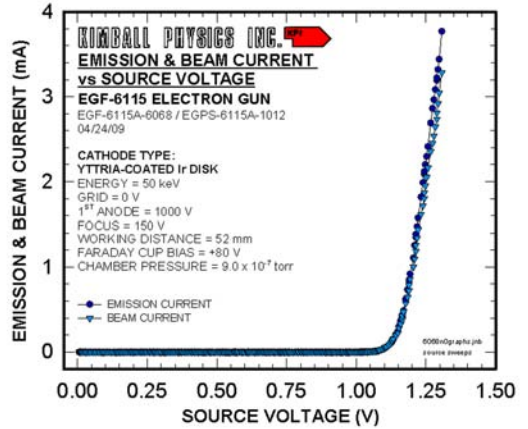
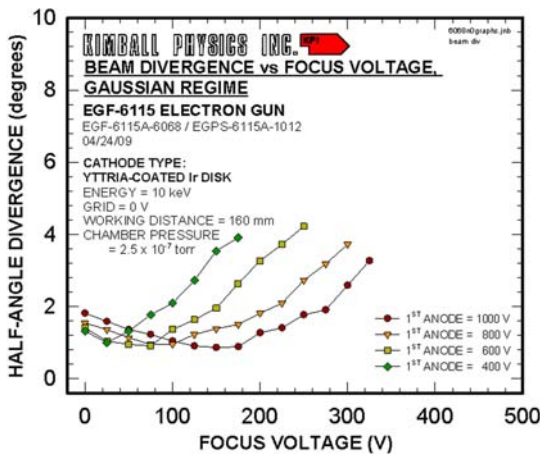


| EGF-6115 ELECTRON GUN SPECIFICATIONS |   |
|--------------------------------------|---|
| BEAM ENERGY                          | 1 keV to 50 keV (Independently adjustable)  |
| BEAM CURRENT                         | 1 nA to 5 mA (Independently adjustable)   |
| ENERGY SPREAD                        | Approx. cathode thermal spread, calculated $Y_2O_3 - 0.4eV$   |
| BEAM DIVERGENCE                      | Variable. Adjustable optics to adapt to different divergences and different working distances   |
| SPOT SIZE                            | 15 mm to 50 mm at 100 mm working distance   |
| WORKING DISTANCE                     | 100 mm to 1000 mm   |
| BEAM DEFLECTION                      | Magnetostatic: $\pm 20^\circ$ at 50 keV (Optional)  |
| RASTERING/BEAM WASHING               | Magnetic: Improves beam uniformity (optional)   |
| PULSE CAPABILITY                     | Optional Dual Grid Power Supply: pulse width 2 $\mu s$ to DC, rep rates to 1 kHz, rise/fall 500 ns, rep rates to 5 kHz using appropriate pulse generator (not supplied) |
| BEAM UNIFORMITY                      | Center to outer edge $\pm 10\%$ , with rastering and appropriate gun potentials   |
| FIRING UNIT                          | Customer-replaceable Firing Unit Cartridge includes precision-aligned cathode, and Wehnelt (G-1) assembly Firing unit also includes first anode                         |
| CATHODE TYPES                        | Yttrium oxide ( $Y_2O_3$ ). Cathode not harmed by repeated exposure to atmosphere while cold  |
| MOUNTING                             | Standard: 2.75 inch CF flange   |
| INSERTION LENGTH                     | Zero mm   |
| GUN DIMENSIONS                       | Gun length: 432 mm (393 W/O deflection) sealing surface to end of cable connector, Gun dia: 76 mm   |
| FEEDTHROUGHS                         | Multi-pin brazed ceramic with threaded stainless shell  |
| CABLES                               | Multiconductor high voltage fully ground-shielded, with mating aluminum connector to connect gun to power supply.   |
| MAXIMUM BAKEOUT                      | 350°C with cables removed. 200°C for magnetic optics  |

| EGPS-6115 ELECTRON GUN POWER SUPPLY SPECIFICATIONS |   |
|--|---|
| OUTPUT   | All necessary voltages to drive the EGF-6115 Electron Gun.  |
| ENERGY STABILITY                                   | <0.01% per hour with 0.05% rms ripple at full output  |
| BEAM STABILITY                                     | $\pm 0.1\%$ per hour with Emission Current Control or $\pm 10\%$ per hour after warm up without ECC   |
| CONTROLS   | FlexPanel controls: Energy, Focus, Anode, Grid, Source Voltage, Emission Current Control, optional Raster X and Y Size and Frequency  |
| METERING   | FlexPanel digital meters: Energy, Focus Anode, Emission, Grid, Source Volts, Source Current   |
| COMPUTER/REMOTE CONTROL & METER                    | All power supplies: 0 to +10 volts or -10 to +10 volts<br>All meters: 0 to +2 volts   |
| SOFTWARE   | Standard configuration designed for RS-232 connectors<br>Optional: National Instruments LabVIEW™ file, designed to run with computer DAQ boards NI PCI-6733 and PCIe-6341. SCSI interface |
| INPUT  | 115 VAC or 230 VAC, 50 to 60 Hz, 100 W  |
| DIMENSIONS (width x height x depth)                | Approx: 17 in. x 7 in. x 22 in. (432 mm x 180 mm x 560 mm); with rack mount kits, overall width is 19.5 in. (495 mm)  |

| OPTIONAL HARDWARE RASTERING / BEAM WASHING |  |
|--|--|
| RASTER GENERATOR                           | Frequency in X and Y directions can be independently set. X freq. is up to 500 Hz, Y freq. 100Hz. (Frequencies above 100 Hz reduce total raster angle). All parameters controllable via RS-232, RS-422, RS-485, analog input, or computer control with LabVIEW™ software option. |

A typical lab set-up of a complete Kimball Physics high energy system with an flood-style electron gun, power supplies and optional computer control system (details vary with gun model)



Typical performance; data for guidance only.

