

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 Size
- 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 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 pico-amps (pA) to five milliamps (mA) 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. Bakeout is limited to 200°C with the magnetostatic deflection option. 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

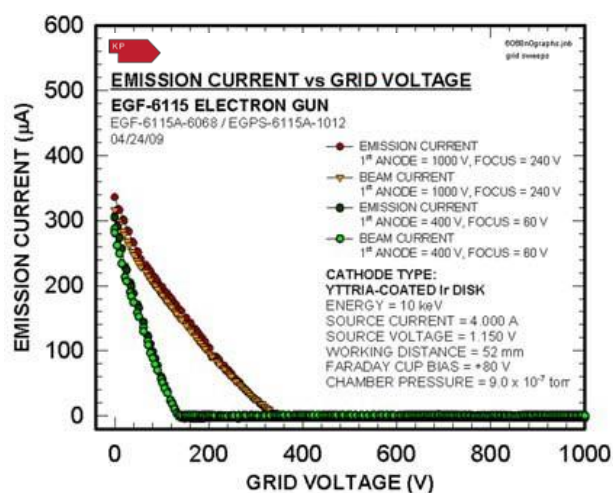
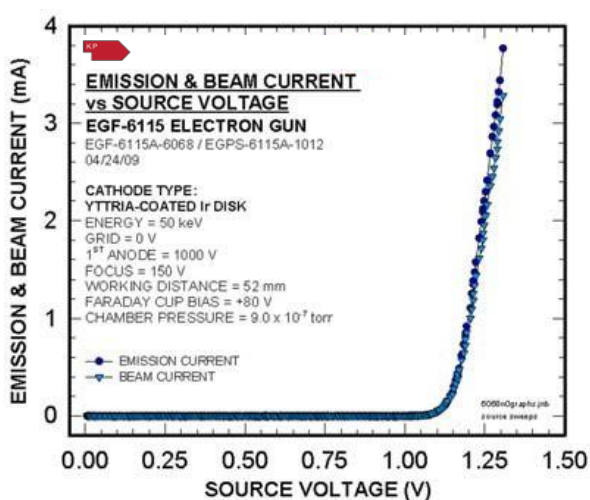
EGF-6115 Electron Gun. The power supply system includes a separate HV supply, connected to, and controlled by the EGPS-6115.

An optional LabVIEW™ computer program designed for the EGF-6115 is available for remote computer control and metering. Software is available in two options: Standard

configuration is via serial connections. or an option using National Instrument DAQ modules and the 50-pin connector on the EGPS-6115 is available. The program provides a virtual panel of controls and real-time metering on the user's computer screen.



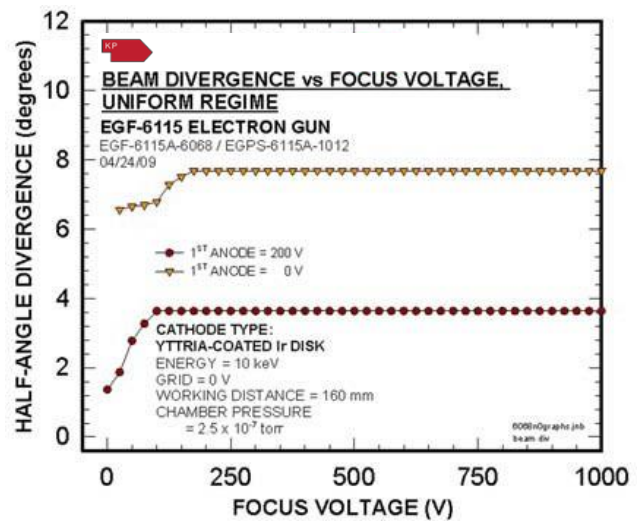
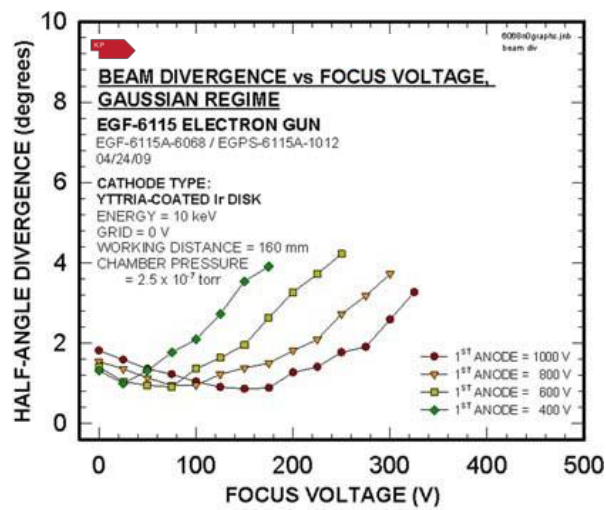
A typical lab set-up of a complete Kimball Physics system with power supplies, electron gun, and optional computer control system.

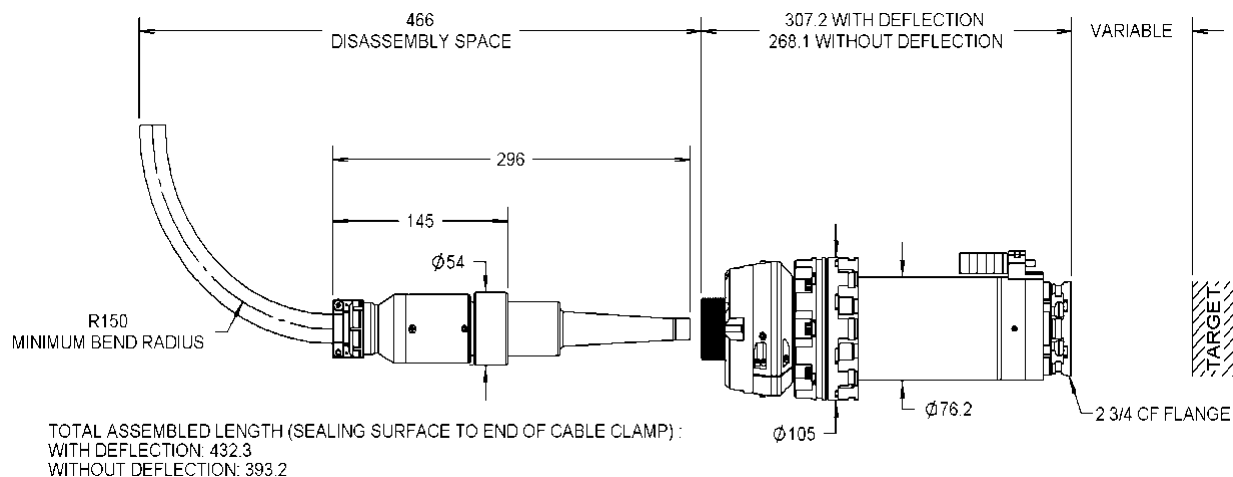


EGF-6115 ELECTRON GUN SPECIFICATIONS	
BEAM ENERGY	1 keV to 50 keV (Independently adjustable)
BEAM CURRENT	1 nA to 5 mA (Independently adjustable)
ENERGY SPREAD	Approx. cathode thermal spread, calculated Y_2O_3 - 0.4eV
BEAM DIVERGENCE	Variable. Adjustable optics to adapt to different divergences and different 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 (using appropriate pulse generator, not included)	Optional Dual Grid Power Supply: pulse width 2 μ 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 TYPE	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 diameter: 76 mm
FEEDTHROUGHS	Multi-pin brazed ceramic with threaded stainless shell
CABLES / CONNECTORS	Multi-conductor high voltage fully ground-shielded, with mating aluminum connector to connect gun to power supply.
MAXIMUM BAKEOUT	350°C with cables and electronics box removed. 200°C with the magnetostatic deflection option.

EGF-6115 POWER SUPPLY SPECIFICATIONS	
OUTPUT	All necessary voltages to drive the EGH-6115 Electron Gun.
ENERGY SUPPLY STABILITY	<0.01% per hour with 0.05% RMS ripple at full output
BEAM STABILITY	$\pm 0.1\%$ per hour with Emission Current Control (ECC) 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 All meters: 0 to +2 volts
SOFTWARE	Standard configuration designed for USB and RS-232 serial connectors. Optional: National Instruments LabVIEW™ file, designed to run with NI DAQ modules
INPUT	115 VAC or 230 VAC, 50 to 60 Hz, 100 W
ENVIRONMENT	Temperature: 0 to 40°C, Relative humidity: 0 to 75% RH non-condensing, Classified as a pollution degree 2, installation category (overvoltage category) II
DIMENSIONS (width x height x depth)	Approximately: 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 RASTER / 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 serial, analog input, or computer control with LabVIEW™ software option.





EGF-6115 ELECTRON GUN (Dimensions in mm)

References

For more information on electron sources / gun operations (and the technical bulletins and additional documents listed below), please visit the Resources and Documents section of our website.

General Operating Hints

Operating Instructions, Typical LabVIEW™ Electron Gun Systems

Beam Pulsing Options

Note: A comprehensive custom manual is supplied with each system.

Notes:

1. Charts /graphs show typical performance, data is for guidance only
2. It is not necessarily possible to achieve all maximum specifications simultaneously.
3. Specifications Subject to Change Without Notice.
4. DE Altobelli, DT Taylor 11/21/2022, 4/20/2025

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