



EGA-1012 / EGPS-1012 ELECTRON GUN / POWER SUPPLY

5 eV to 1000 eV High-Current Medium-Diameter Low-Energy Electron Beam

FOR USE IN:

- ▶ Surface physics studies
- ▶ Vacuum physics experiments
- ▶ Charge neutralization
- ▶ Electron desorption
- ▶ Surface scrubbing
- ▶ Phosphor testing
- ▶ Ionization experiments
- ▶ Semiconductor processing

FEATURES / OPTIONS:

- ▶ Beam current up to 2mA
- ▶ Feedback stabilized emission current
- ▶ User-replaceable firing units
- ▶ UHV compatible / bakeable
- ▶ Computer / Remote control
- ▶ Beam pulsing option



EGA-1012 Electron Gun on 2 3/4 inch CFF

The Kimball Physics EGA-1012 Electron Gun, with its matching EGPS-1012 Power Supply, is intended for use in a variety of UHV, surface physics, and processing applications where high beam currents are needed at low energy. It is a complete subsystem ready to attach and turn on. Beam energy, beam current and beam divergence are all independently adjustable. The EGA-1012 Electron Gun uses a space-charge-limited oxide-coated cathode to generate a uniform flood beam. This design allows for generation of the beam down to low energies and very low currents.

UHV technology is used throughout. The electron gun is bakeable up to 350°C with cables removed. The standard cathode is a high current, rugged yttria-coated disc (Y₂O₃). The cathodes are not damaged by repeated exposure to atmospheric gases or water vapor when cold. The gun can be run in vacuums from 10⁻¹¹ torr to 10⁻⁵ torr. Cathode lifetime is a function of vacuum conditions and beam current as related to cathode temperature. Cathode lifetime at low currents in good vacuum may be in the many hundreds of hours, or even over a thousand hours.

Firing units (containing cathode, control grid, and anode, with ceramic insulators and electrical connections—the complete triode structure) are user-replaceable; used firing units may be returned to the factory for rebuild. The electron gun itself may also be sent back to the factory for complete disassembly, cleaning, and rebuild of the firing unit assembly (including installation of a new cathode).

The EGPS-1012 Power Supply Unit contains all power supplies necessary to generate the required voltages to run an EGA-1012 Electron Gun. An external connector allows computer/remote control of all gun power supplies, including the floating supplies, via 0 to 10 V analog inputs at ground potential.

The FlexPanel provides a digital display screen and a keypad for programming control on the front panel. Rear panel connectors allow remote /computer control and metering of all gun power supplies. An RS-232 serial port and an analog input/output connector are included on standard power supply units. All common computer interface bus types can be accommodated, by use of appropriate digital to analog converters. RS-422/485 conversion is possible.

An optional LabVIEW™ computer program designed for the EGA-1012 is available for remote computer control and metering. Software is available in two types: Using National Instrument DAQ boards and SCSI connectors on the EGPS-1012, or via a simple serial connector interface. The program provides a virtual panel of controls and real-time metering on the user's computer screen.

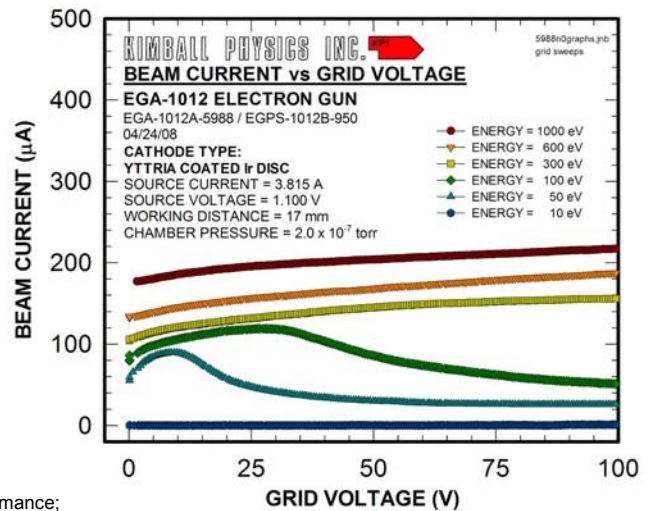
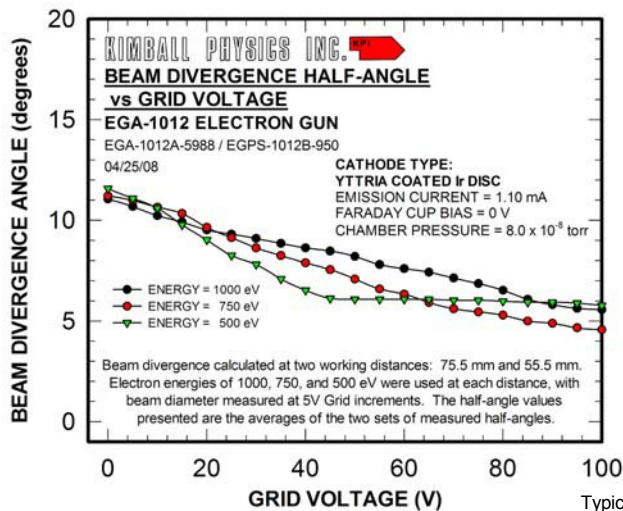
Phosphor screens (for locating / experimenting with electron beams) are available in UHV and Ruggedized versions.

EGPS-1012C Power supply with FlexPanel controller

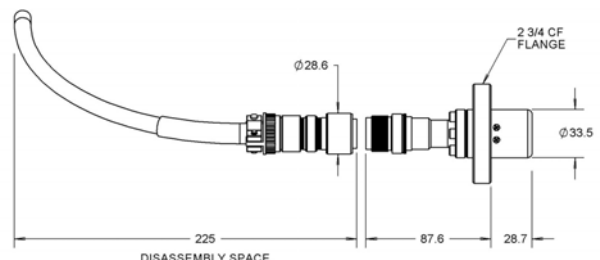
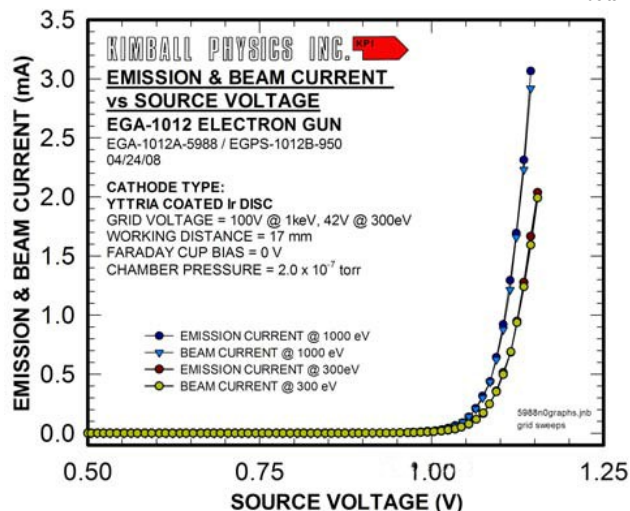


EGA-1012 ELECTRON GUN SPECIFICATIONS	
BEAM ENERGY	5 eV to 1000 eV (Independently adjustable)
BEAM CURRENT	1 μ A to 2 mA (Independently adjustable)
ENERGY SPREAD	Approx. cathode thermal spread, calculated: $Y_2O_3 - 0.4eV$
SPOT SIZE	10 mm to 25 mm at 55 mm working distance
WORKING DISTANCE	10 mm to 200 mm
PULSE CAPABILITY (using appropriate pulse generator, not included)	Optional Dual grid power supply: pulse width 2 μ s to DC, rise / fall 5—ns, rep rates to 5 kHz (TTL required).
BEAM DEFLECTION	None
FIRING UNIT	Customer-replaceable Firing Unit Cartridge includes precision-aligned cathode, Wehnelt (G-1) assembly and anode
CATHODE TYPES	Standard: Yttrium Oxide
MOUNTING	Standard: 2 3/4 inch CF flange Optional: Unmounted
FARADAY CUP	Various stand-alone designs available
INSERTION LENGTH	29 mm
BEAM ALIGNMENT	Optional mechanical alignment with $\pm 2^\circ$ Port Aligner
GUN DIAMETER	33.5 mm at gun end
FEEDTHROUGHS	Multi-pin brazed ceramic, threaded stainless steel shell
CABLES / CONNECTORS	Multi-conductor high voltage fully ground-shielded, with mating aluminum connector to connect gun and power supply. Standard lengths: 3 m, Optional: 5 m
MAXIMUM BAKEOUT	350°C with cables removed (Removable Faraday cup pneumatic actuator 65°C)

EGPS-1012 ELECTRON GUN POWER SUPPLY SPECIFICATIONS	
OUTPUT	All necessary voltages to drive the EGA-1012 Electron Gun
ENERGY STABILITY	$\pm 0.01\%$ per hour $\pm 0.02\%$ per 8 hours at full output
BEAM STABILITY	$\pm 1.0\%$ per hour with Emission Current Control or $\pm 10\%$ per hour after warm up without ECC
CONTROLS	Energy, Source, Grid, Emission Current Control (ECC)
METERING	FlexPanel digital meters: Energy, Source Voltage, Source Current, Emission Current, Grid Voltage
COMPUTER/REMOTE CONTROL	Power supplies: 0 to +10 V Metering: 0 to +2 V Standard 50-pin connector for analog input/output and RS-232 serial port (RS-422 or RS-485 available, if specified at time of order)
INPUT	115 VAC or 230 VAC, 50 to 60 Hz single phase, 250 VA
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 environment unit
SOFTWARE	Standard configuration designed for RS-232 connections. Optional: National Instruments LabVIEW™ file, designed to run with computer DAQ boards NI PCI-6733 and PCIe-6341. SCSI interface
DIMENSIONS (width x height x depth)	17 in. x 3.5 in. x 22 in. excluding handles (425 mm x 90 mm x 560 mm); 19 in. rack mountable



Typical performance; data for guidance only.



EGA-1012 ELECTRON GUN (Dimensions in mm)