

## 10 eV to 1000 eV Cs, Li, Na, K, Rb Alkali Metal Ion Beams

### FOR USE IN:

SURFACE PHYSICS  
ION SCATTERING STUDIES  
VACUUM PHYSICS

### FEATURES / OPTIONS:

VERY LOW ENERGIES  
WIDE ENERGY RANGE  
CONSTANT BEAM CURRENT  
CONSTANT SPOT SIZE  
ZOOM LENS FOCUSING  
DEMOUNTABLE GUN  
HIGH SPEED PULSING  
DEFLECTION, RASTERING  
COMPUTER / REMOTE CONTROL



Standard ILG-6 Ion Gun Mounted on a 2 1/4 inch CF Flange Multiplexer

The Kimball Physics ILG-6 Alkali Metal Ion Gun, with its matching IGPS-1016 Power Supply is intended for use in a variety of surface physics applications and represents a significant advance in alkali-metal surface-ionization ion-source technology. It is a complete subsystem ready to attach and turn on.

By use of different source firing units, the alkali ion beams of Cs, Li, Na, K, and Rb can be generated. The alkali metal is generated as needed by a solid-solid chemical reaction, and is then surface ionized and evaporated with low energy spread. The resulting ion beams can be generated down to low energies, and very low currents.

Ion beam energy, beam current and spot size are independently adjustable over wide ranges. The ion energy is variable from 10 eV to 1000 eV. By use of multistaging and a computer-designed electron zoom lens, a constant beam current is maintained over a two order-of-magnitude change in energy, with a spot size also roughly constant. With a cesium or lithium ion source, the ion beam current is variable from 1 nA to 100 nA. Spot sizes range from less than 1 mm to 5 mm.

UHV technology is used throughout. The gun can be run in vacuums from  $10^{-11}$  torr up to  $10^{-5}$  torr and is bakable to 350°C with cables removed. The ion source units are not damaged by repeated exposure to atmospheric gases or water vapor when cold.

Ion source firing units are user-replaceable; spare firing units can be purchased new, and used firing units may be returned to the factory for rebuild. Alternatively, the entire ion gun can be sent back to the factory for complete cleaning, rebuild, ion source replacement, and optional in-vacuum testing.



Demountable ILG-6 Ion Gun, unmounted, separated from the 2 1/4 inch CF Flange Multiplexer

The ILG-6 Ion Gun is available in two different mounting configurations: as a standard mounted gun with a 2 1/4 CF Flange Multiplexer, or as a demountable gun. The Demountable ILG-6 can be used as mounted gun, or it can be removed by the user from its mounting and used as an unmounted gun with the Flange Multiplexer as a separate vacuum feedthrough.

The control grid allows pulsing options: either fast capacitive beam pulsing or dual grid pulsing. Capacitive beam pulsing, using a Pulse Junction Box, permits fast beam pulsing down to 20 ns with 20% maximum duty cycle. Capacitive pulsing requires an external, variable-voltage pulse generator (not included). Pulsing of the electron beam can also be accomplished with dual grid supplies, requiring only a TTL pulse input.

The IGPS-1016 Power Supply features a modular design with miniaturized power supply clusters, optically isolated signals, and the new FlexPanel digital interface controller. The included power supplies are Ion Beam Energy and X,Y Deflection, as well as the floating Source/ECC, Grid, Extract, and Focus supplies. A rastering option can be provided by an additional separate power supply unit, the Raster Generator Deflection Unit.

The new FlexPanel provides a digital display screen and an encoder wheel 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 ILG-6 is available for remote computer control and metering using National Instrument DAQ boards and SCSI connectors on the IGPS-1016. The program provides a virtual panel of controls and meters on the user's computer screen.

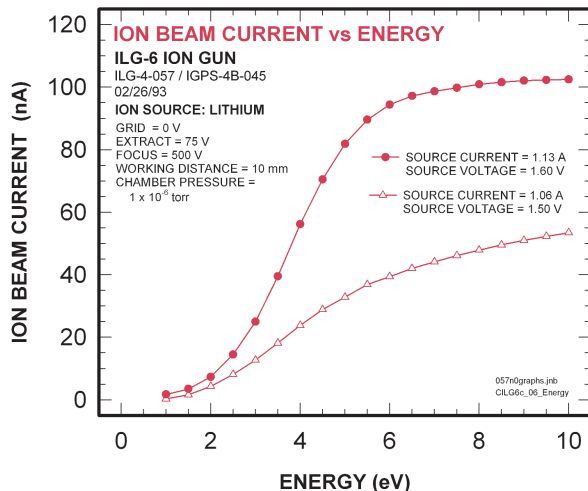
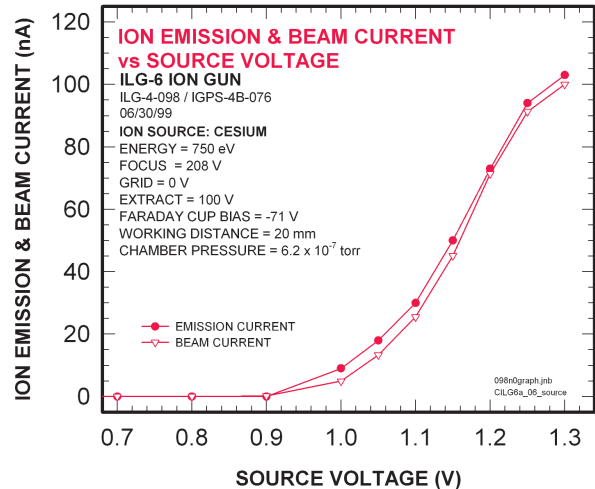
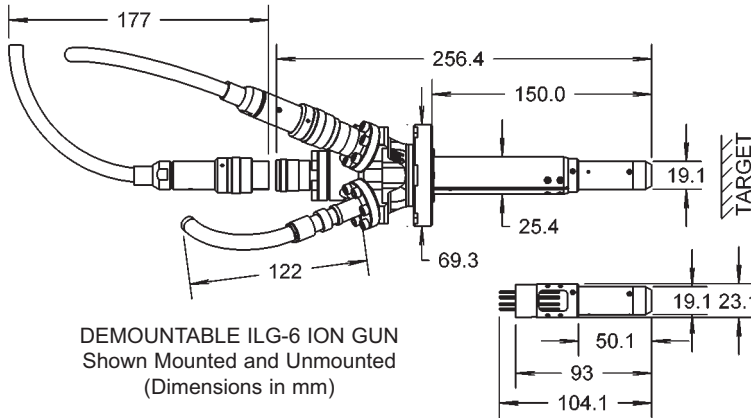


IGPS-1016 Ion Gun Power Supply

ILG-6 ION GUN SPECIFICATIONS	
ION BEAM ENERGY	10 eV to 1000 eV (Independently adjustable)
BEAM CURRENT	1 nA to 100 nA (Independently adjustable) Ion species dependent
ENERGY SPREAD	Approx 0.4 eV thermal spread, calculated
ION SPECIES	Cs <sup>+</sup> , Li <sup>+</sup> , Na <sup>+</sup> , K <sup>+</sup> , or Rb <sup>+</sup>
ION GENERATION METHOD	Surface-ionization Alkali Alumino Silicate Plug. Ion source cartridge directly heated
SPOT SIZE	Less than 1 mm to 5 mm (Independently adjustable)
WORKING DISTANCE	Typical: 20 mm. Range: 10 mm to 200 mm
BEAM DEFLECTION	4 Pole Electrostatic: ± 5° at 1000 eV
PULSE CAPABILITY (using appropriate pulse generator, not included)	Optional Capacitive Pulse Junction Box: pulse width 20 ns to 100 μs, rise/ fall 10 ns, 50 Ω impedance, 1 W standard (higher power available) Optional Dual Grid Power Supply: pulse width 2 μs to DC, rise/ fall 500 ns, rep rates to 5kHz (TTL input)
BEAM UNIFORMITY	Gaussian
ION SOURCE UNIT	Customer-replaceable ion source firing unit includes ion source cartridge, grid and extract, with insulators and connectors. Ion source cartridges not harmed by atmospheric gases while cold
MOUNTING	Flange Multiplexer with a 2 3/4 inch rotatable CF, including both tapped and clear mounting holes Optional: Demountable (Unmounted / Mounted) with a Flange Multiplexer with a 2 3/4 inch rotatable CF
FARADAY CUP	Optional: Mounted on gun, manual or pneumatic control
BEAM ALIGNMENT	Optional: Mechanical alignment with ± 2° Port Aligner
INSERTION LENGTH	Standard: 150 mm. Range: 110 mm to 170 mm. Custom lengths available. Gun manufactured at standard length unless otherwise specified at time of order.
GUN DIAMETER	25.4 mm at gun flange. Necks up to 19.1 mm at 100 mm from flange
FEEDTHROUGHS	Multipin brazed ceramic, threaded stainless steel shell
CABLES / CONNECTORS	Multiconductor high voltage fully ground-shielded cable, coaxial extract cable, low voltage deflection cable, with mating aluminum shell connectors, to connect gun and power supply. Standard lengths: 3 m Optional: 5 m
MAXIMUM BAKEOUT	350°C with cables removed (Faraday cup: removable pneumatic actuator 65°C max)

IGPS-1016 ION GUN POWER SUPPLY SPECIFICATIONS	
OUTPUTS	All necessary voltages to drive the ILG-6 Ion Gun
ENERGY STABILITY	±0.01% per hour; ±0.02% per 8 hours at full output
BEAM STABILITY	±1.0% per hour with Electron Current Control or ±10% per hour after warm up without ECC, depends on input gas pressure stability
CONTROLS	FlexPanel controls: Ion Energy, Source, Grid, Extract, Focus, X and Y Deflection, Emission Current Control
METERING	FlexPanel digital meters: Ion Energy, Source Voltage, Source Current, Emission Current, Grid, Extract, Focus, X and Y Deflection
COMPUTER/REMOTE CONTROL & METER	Power supplies: 0 to +10 V (-10 V to +10 V, deflection) Metering: 0 to +2 V (-2 V to +2 V, deflection) On/off switches: 0 or +5 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) Optional: SCSI metering and programming connectors
SOFTWARE	Optional: National Instruments LabVIEW™ file, designed to run with computer DAQ boards NI 6034E and NI 6703
INPUT	115 VAC switchable to 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
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

OPTIONAL RGDU-4A RASTER GENERATOR SPECIFICATIONS	
RASTER GENERATOR	10 separate frequency selections for both X and Y (X up to 1000 Hz, Y up to 50 Hz) Variable position offset (centering). Variable window size. All controllable remotely via RS-232, RS-422, RS-485, or analog input.
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.

