Specifications

Main unit

Lithography performance	[Drawing method] Vector scanning Raster scanning (optional) [Stage Movement] Step & repeat [Electron beam shape] Spot beam (Gaussian) [Lithography field size] 3000μm x 3000μm (maximum) 100μm x 100μm (minimum) [Minimum line width] 6nm or less (100kV, 100μm square field) [Beam positioning] 1,000,000 x 1,000,000 positions (maximum) [Beam positioning resolution] 0.1nm
Electron optics system	[Emitter] ZrO/W thermal field emitter [Acceleration voltage] 100kV, 50kV, 25kV changeover [Minimum beam diameter] φ1.8nm (100kV) [Beam current] 20pA to 100nA
Lithography unit	[Exposure area] 130mm x 150mm [Stage movement range] X direction: 156mm Y direction: 156mm Z direction: 5mm [Laser interferometer resolution] 0.3nm [Field stitching accuracy] ± 15nm (100μm square field) [Overlay accuracy] ± 20nm (100μm square field) [Maximum specimen size] 6" wafer or 5" square mask

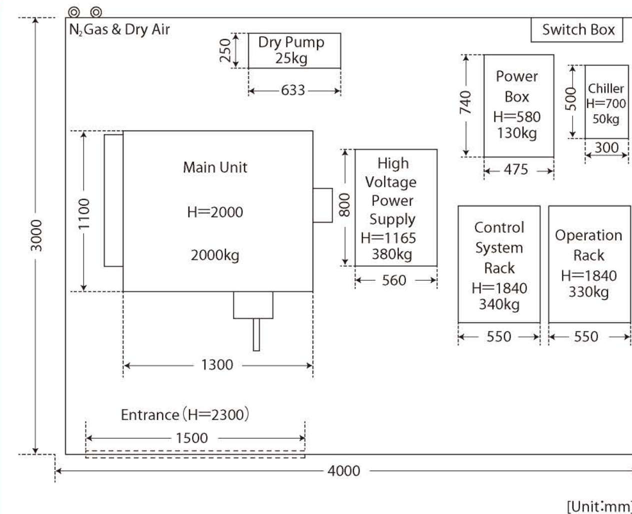
Options

- Small piece specimen holder
- Circle pattern generator
- Spot lithography function
- Variable field size function
- Field size small step modulation function
- Function for graphic language
- Data conversion function (GDS II, DXF format)
- Large sample chamber
- Data communication function
- BSE Detector
- GenISys Layout BEAMER

Installation requirements

Room size	4.0mW x 3.0mD x 2.3mH or more
Power requirements	Single phase AC200V 6kVA 50/60Hz A distribution board is needed in the room.
Room temperature	±0.3˚C or less, within 20 - 25˚C (±0.1˚C or less for ultra fine lithography)
Humidity	60% or less
Floating magnetic field	0.3μTeslar (3mgauss) or less (0.1μTeslar (1mgauss) or less for ultra fine lithography)
Floor vibration	Acceleration 0.5gal, displacement 4μm p-p or less (Acceleration 0.2gal,displacement 2μm p-p or less for ultra fine lithography)
Ground terminal	100Ω or less, exclusive Two of the conductors in the triplex cable are for power and the other is for grounding. The distance between the power source and the ground terminal must be no more than 30 cm. An exhaust duct for the oil-sealed rotary pump is also required when installing in a nitrogen gas, compressed air, or clean room environment.

Layout example



[Unit:mm]

Notice:

The product information contained within this brochure is subject to change without notice. Please contact the Sales Department at our headquarters for the latest information. Copying or reproducing the contents of this catalog without permission is prohibited.

ELIONIX ELIONIX INC.

http://www.elionix.co.jp

[Headquarters and Showrooms] 3-7-6 Motoyokoyama, Hachiouji, Tokyo 192-0063, Japan
TEL: 042-626-0611 FAX: 042-626-6136

[Nano-Tech System Center] 279 sairicyo, Hachiouji, Tokyo 192-0012, Japan
TEL: 042--692-0660 FAX: 042--692-0690

[North America and Europe] SEMTech Solutions, Inc., 6 Exectutive Park Drive, North Billerica, MA 01862, United States
TEL: 978-663-9822 FAX: 978-663-9823 Email: sales@semtechsolutions.com

P-EN-14405

ELIONIX

Ultra High Precision
Electron Beam Lithography System

ELS-G100

ELIONIX INC.

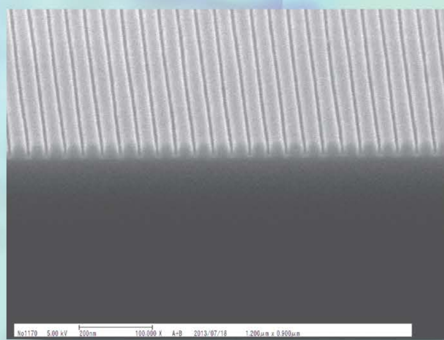
ELS-G100

[Ultra High Precision Electron Beam Lithography System]

Ultra high precision lithography at 100 kV acceleration voltage

Ultra fine line lithography

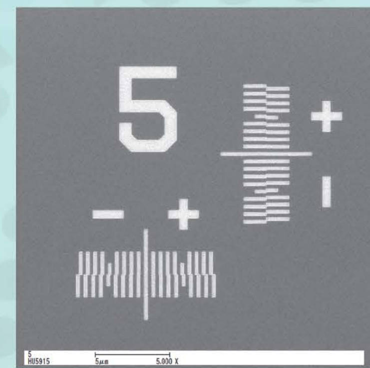
ELS-G100 produces a highly-stable beam with a diameter down to 1.8 nm, using acceleration voltages of up to 100 kV and high beam currents. This allows fine patterns to be drawn with a line width of 6 nm or less, even with commercial resist products. Building on the achievements of the preceding ELS-7000, we have succeeded in realizing high precision beams, long-term stability, and high throughput all at the same time.



5nm line writing

Ultra high beam position accuracy with laser interferometer stage

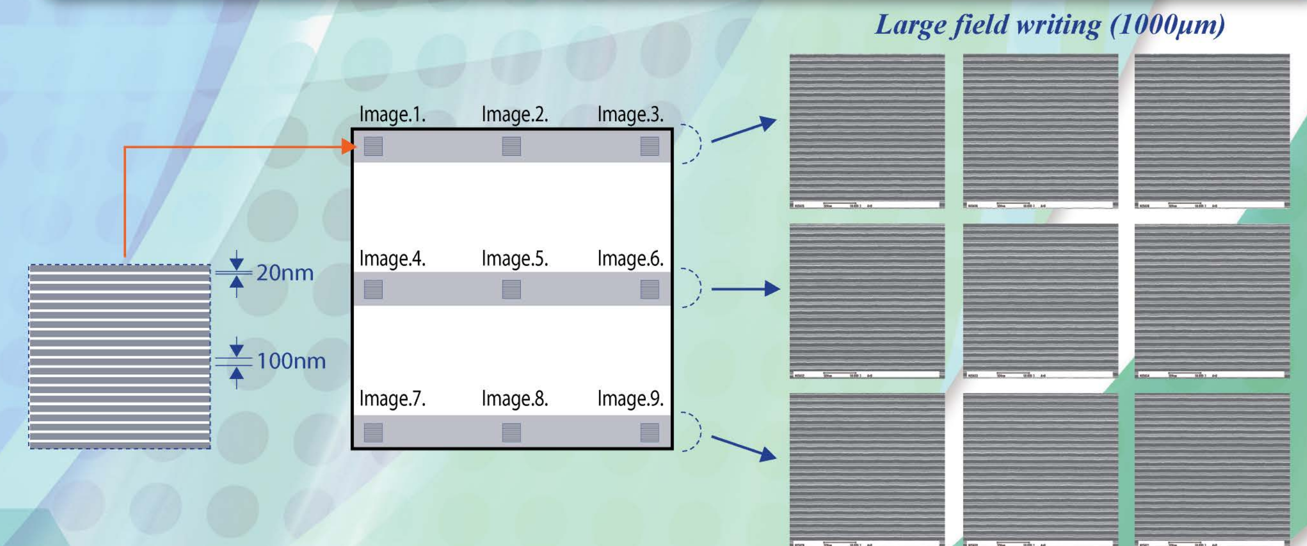
This high-rigidity stage takes advantage of the wealth of experience we have accumulated over the years in developing lithography systems. The outstanding beam positioning resolution of 0.1 nm is made possible using a 20-bit DAC. In addition, we have included a laser interferometer with an optical resolution of 0.3 nm to achieve a stitching precision of ±15 nm and an overlay precision of ±20 nm in a 100 µm square field. This allows fine patterns to be written over a wide range.



High-throughput ultra-fine processing system

In this product, we significantly expanded the beam current dynamic range from 20 pA to 100 nA, and designed the electron optics so that the beam diameter hardly increases even at high currents. At the same time, we improved the deflection system so that the beam diameter remains uniform within the maximum 1mm-square writing field. This significantly improves throughput for wide-area nanoscale patterning and photomask production.

100nm L&S patterning at a 20nm pitch line width within a 1mm-square writing field

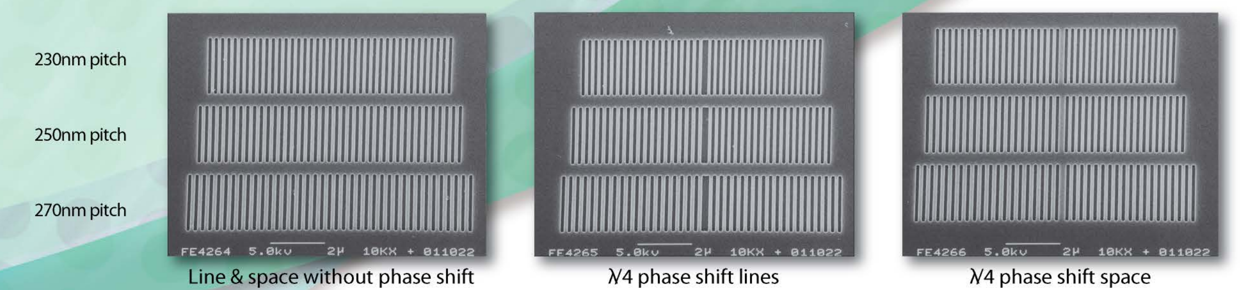


A Wide Variety of Lithography Software

The application includes writing functions for graphics elements as a standard feature. In addition, with the optional circle pattern generator, circles and arcs can be produced. Furthermore, by using the variable field size function, even WDM diffraction gratings can be produced

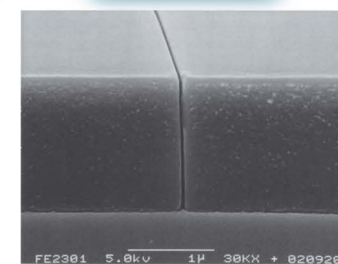
Examples of diffraction gratings with pitches matched to optical communication wavelengths

Suitable for a wide range of pattern pitches for WDM (Wavelength Division Multiplexing),Minimum variable pitch: 0.000005 5Å)



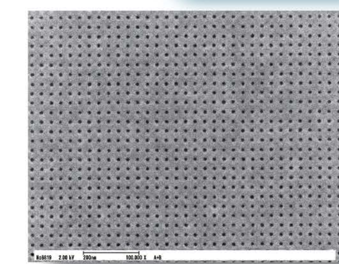
Line & space without phase shift — λ/4 phase shift lines — λ/4 phase shift space

15nm ultra fine line drawn on thick resist

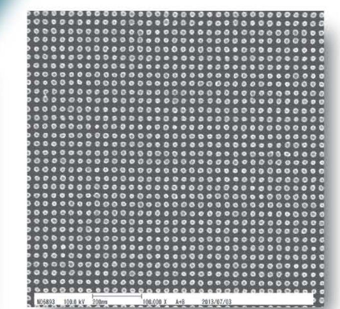


Resist thickness: 1.5um Line width: 15nm

Ultra fine hole lithography



35nm pitch hole pattern



after Cr lift-off