

EQ-10HP

High Power EUV Light Source



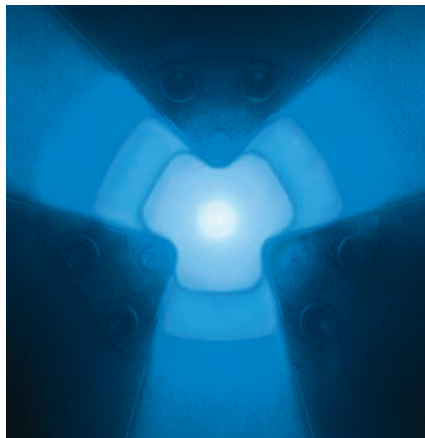
Electrodeless Z-Pinch™ 20 Watt EUV Source

The EQ-10HP is a compact, easy-to-use, reliable, and cost-effective EUV light source based on Energetiq's proven Electrodeless Z-Pinch™ technology using Xenon gas. The EQ-10HP EUV source is uniquely suited for metrology and research applications. The EQ-10 series sources have become the workhorse EUV sources for the EUV community, through their proven reliability, ease of use, and low operating cost.

The EQ-10HP builds on the technology and track record of Energetiq's EQ-10 products. The EQ-10HP operates at substantially higher input powers than its predecessors and delivers double the output EUV power and significantly higher brightness, making it suitable for imaging applications such as EUV mask inspection.

The Energetiq EQ-10HP EUV source's modular design makes it ready to be integrated into a process tool. The system includes the Electrodeless Z-Pinch™ source assembly, vacuum and gas subsystems, power delivery subsystem, and control electronics. The EQ-10HP is capable of delivering up to 20 Watts of in-band EUV into 2π steradians and will run continuously at pulse repetition rates of up to 2.5 kHz.

**Electrodeless
Z-Pinch Source**
– View of visible light



Features and Benefits

- **Performance**
 - 20W into 2π using Xenon
 - Up to 2.5 kHz pulse rate
 - Small plasma size
 - Low debris
- **Low Cost of Ownership**
 - Low Xenon flow rate
 - Minimized consumable cost
 - Small footprint
- **Proven Reliability**
 - Patented Electrodeless Z-Pinch™ technology
 - CE Mark and SEMI S2-0703 compliant

Applications

- EUV Mask Inspection
- EUV Metrology
- EUV Resist Development
- EUV Microscopy

Electrodeless Z-Pinch™ Technology

Z-pinch plasmas have been shown to be effective at producing EUV and SXR light. However, all the implementations to date have involved conducting high discharge currents into the plasma using electrodes. These electrodes, which are typically in contact with high temperature plasma, can melt and produce significant debris.

Energetiq's unique technology is also based on a Z-pinch plasma, but it avoids electrodes entirely by inductively coupling the current into the plasma. The plasma in the Energetiq source is magnetically confined away from the source walls, minimizing the heat load and reducing debris. Energetiq's Electrodeless Z-Pinch™ technology has excellent spatial stability, and stable repeatable power output.

Specifications

EUV Performance		
• EUV Power Output	20 Watts into 2π steradians (13.5 nm, $\pm 1\%$ bandwidth)	
• Pulse Repetition Rate	1200 to 2500 Hz	
• Source Operating Pressure	70 to 150 mTorr typical	
• Xenon Flow Rate	5 to 15 sccm typical	
Physical Specifications		
	System Dimensions (H x W x D)	Weight
• Instrument Rack	1356 x 611 x 915 mm (53.4 x 24.1 x 36.0 in)	215.5 kg (475 lbs)
• Modulator	498 x 356 x 701 mm (19.6 x 14.0 x 27.6 in)	54.4 kg (120 lbs)
• Source	764 x 556 x 533 mm (30.1 x 21.9 x 21.0 in)	95.3 kg (210 lbs)
• Fore Pump Assembly	643 x 259 x 460 mm (25.3 x 10.2 x 18.1 in)	27.7 kg (61 lbs)
Utility Requirements		
• Electrical	200–230V, 3 ϕ , 50/60 Hz, 30A	
• Cooling Water	40-60 PSID (0.28–0.41 MPa), 2.5gpm (9.5lpm) min., 30°C max. inlet	
• Clean Dry Air	75–90 PSIG (0.52–0.62 MPa)	
• Xenon	15–40 PSIG (0.10–0.28 MPa), 20 sccm max. (10 sccm typ.)	
Compliance		
• EQ-10 Series	CE Mark, SEMI S2-0703	

Patent Numbers: US 7,307,375; US 7,199,384; US 7,183,717; US 7,948,185; US 8,143,790; EP 2187711; Other patents applied for.

About Energetiq

Energetiq Technology, Inc. is a developer and manufacturer of advanced light sources that enable the analysis and manufacture of nano-scale structures and products. The Energetiq team combines its deep understanding of the high power plasma physics needed for high-brightness light generation with its long experience in building rugged industrial & scientific products. The result is that users can expect the highest levels of performance combined with the highest reliability.



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