

EQ-10HP



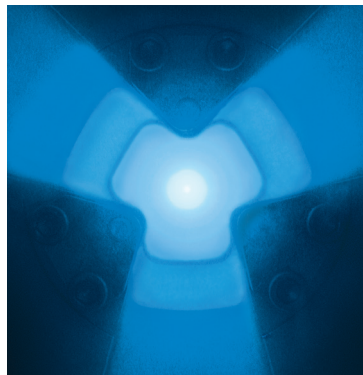
High Power, Electrodeless Z-Pinch™ 20 Watt EUV Source

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. With over 30 delivered and installed around the world, 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 S2-0715 compliant

Applications

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



About Energetiq

Energetiq Technology, Inc. is a wholly-owned subsidiary of Hamamatsu Photonics. Energetiq combines its deep understanding of the 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.

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, however 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, ±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, 3Ø, 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 S2-0715 | |

Patent Numbers: US: 7307375; 7199384; 7183717; 7948185; 8143790 -- EP 2187711 -- Other Patents Pending



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