

# EQ-10R-HP

## Extreme Ultraviolet Light Source

### Overview

The EQ-10R-HP 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-10R-HP EUV source is uniquely suited for metrology and research applications. With over 40 delivered and installed around the world, the EQ-10R 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-10R-HP builds on the technology and track record of Energetiq's EQ-10 products. The EQ-10R-HP 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-10R-HP 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-10R-HP is capable of delivering up to 20 Watts of in-band EUV into 2  $\pi$  steradians and will run continuously at pulse repetition rates of up to 2.5 kHz.



### Typical Performance

20 W into 2 $\pi$ using Xenon
Up to 2.5 kHz pulse rate
500 $\mu$ m
Low debris

### Cost of Ownership

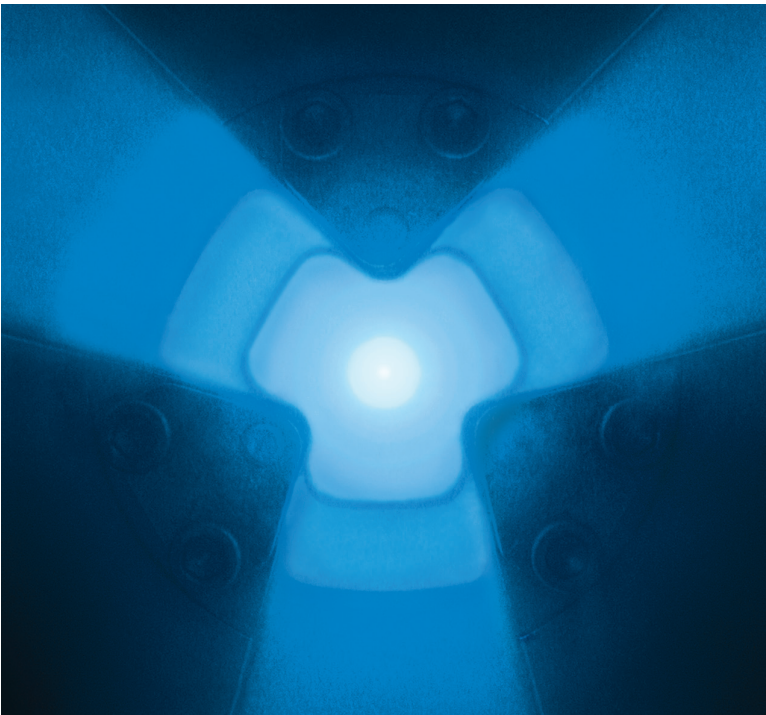
Low Xenon flow rate
Minimized consumable cost
Small footprint
Minimized downtime

### 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



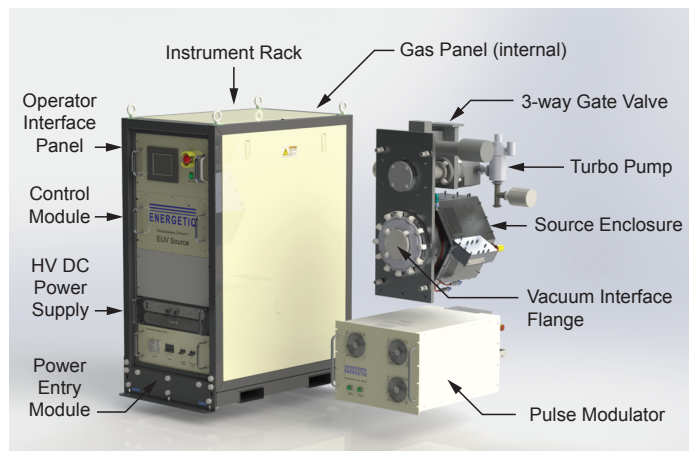
*Electrodeless Z-Pinch Source – View of visible light*

## 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.

## EQ-10R-HP System Components



## Specifications

EUV Power Output	20 Watts into 2 $\pi$ 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

Component	Dimensions (H x W x D)	Weight
Instrument Rack	1356 x 611 x 915 mm	215.5 kg
Modulator	498 x 356 x 701 mm	54.4 kg
Source	764 x 556 x 533 mm	95.3 kg
Fore Pump Assembly	643 x 259 x 460 mm	27.7 kg

## Utility Requirements

Electrical	200–230 V, 3 $\phi$ , 50/60 Hz, 30 A
Cooling Water	40–60 PSIG (0.28–0.41 MPa), 2.5 gpm (9.5 lpm) 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-10R Series	CE Mark, SEMI S2-0715
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