

# EQ-10R-SXR

## Compact, Easy-to-Use Electrodeless Z-Pinch™ Soft X-Ray (SXR) Source

### Overview

Soft x-rays (SXR) for water-window microscopy and other applications have not readily been available outside synchrotron facilities. Now, thanks to a new lab-scale source from Energetiq, soft x-rays can be produced in any research laboratory at flux levels suitable for imaging and microprobing.

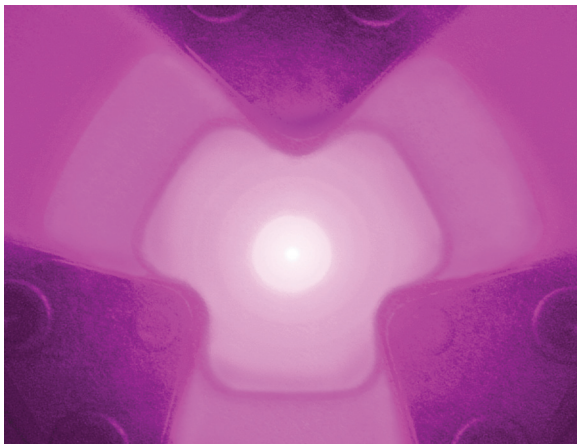
The EQ-10R-SXR is a compact, easy-to-use, reliable, and cost-effective SXR light source system based on Energetiq's unique Electrodeless Z-Pinch™ technology using Nitrogen gas.

The EQ-10R-SXR comprises a 19" rack containing the gas subsystems, power delivery subsystem and control electronics; the Electrodeless Z-Pinch™ source assembly with integrated vacuum pumping and a high efficiency pulse modulator. This modular design allows easy integration to a microscope or other application equipment.

The EQ-10R-SXR is capable of delivering up to 400 milliwatts of 2.8 nm power into  $2\pi$  steradians and will run continuously at pulse repetition rates of up to 2 kHz.

To accommodate the differing requirements of the various applications, the source operating conditions are user-adjustable. The light output can be optimized for peak power or for peak brightness as required by the user. Plasma size is typically below 1mm in diameter under typical operating conditions.

A simple and flexible optical interface is provided to the user on the front face of the electrodeless SXR source assembly to connect to the application equipment. Custom interfaces are available to meet specific customer requirements.



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



### Typical Performance

Unique electrodeless design
2-4 nm soft x-rays produced using Nitrogen
< 1 mm diameter for high brightness
Low debris

### Cost of Ownership

Low consumable cost
Low cost per SXR watt
Small footprint

### Proven Reliability

Patented Electrodeless Z-Pinch™ technology
CE Mark and SEMI S2-0715 compliant

### Applications

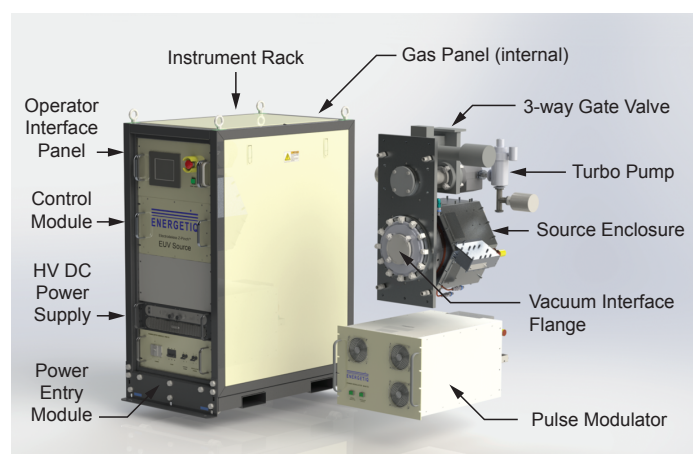
Water-Window Microscopy
Microbeam Probing of Cells

## 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-SXR System Components



## 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, 3Ø, 50/60 Hz, 30A
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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[www.energetiq.com/patents](http://www.energetiq.com/patents)



Energetiq Technology, Inc.  
205 Lowell Street  
Wilmington, MA 01887

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Phone: +1 781-939-0763  
Fax: +1 781-939-0769  
Email: [info@energetiq.com](mailto:info@energetiq.com)  
[www.energetiq.com](http://www.energetiq.com)

Specifications are typical and  
subject to change without notice.  
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