

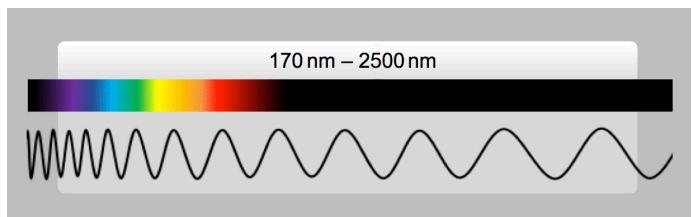
Laser-Driven Light Source (LDLS™)

Product Selection Guide

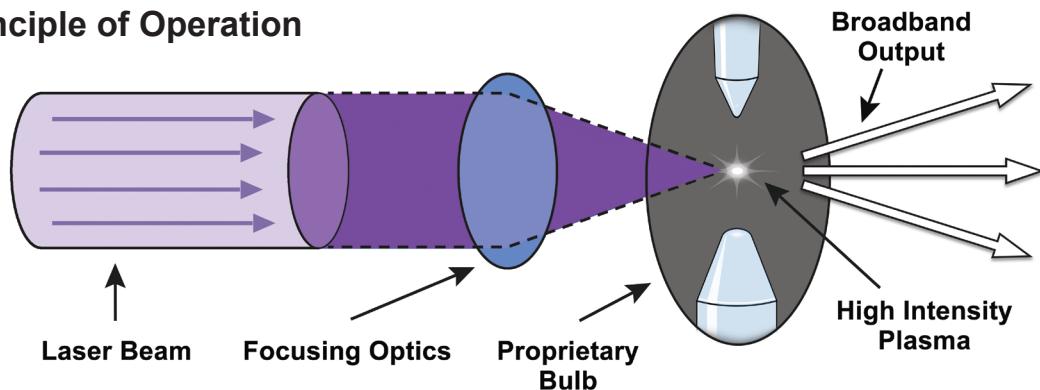
Energetiq introduces breakthrough products using our patented, ultra-bright Laser-Driven Light Source (LDLS™) technology.

- Extremely broad wavelength range
- A long lifetime compared to other sources
- High radiance from a small plasma
- High spectral and spatial stability

Wavelength Range



Principle of Operation



EQ-99X



EQ-99X-FC



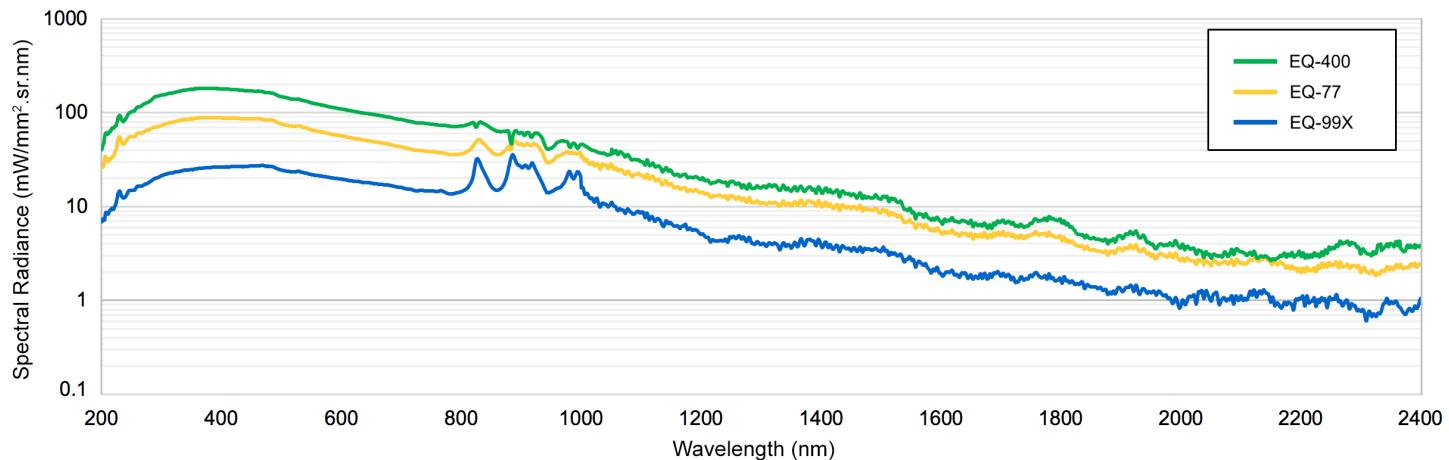
EQ-77



EQ-400

Spectral Radiance Comparison

Average radiance, measured with quartz output windows. For reference only.



LDLS™ Selection Guide



EQ-99X



EQ-99X-FC



EQ-77



EQ-400

Properties

Wavelength Range	170 nm - 2500 nm	190 nm - 2500 nm	170 nm - 2500 nm	170 nm - 2500 nm
Plasma Size*	100 µm X 180 µm	100 µm X 180 µm	125 µm X 320 µm	370 µm X 800 µm
Numerical Aperture	0.47 NA	Output fiber: 0.22 NA	0.5 NA	0.5 NA
Lifetime	10,000 hours	10,000 hours	10,000 hours	10,000 hours
Distance of Plasma from Output Window*	28.00 mm	—	18.00 mm	28.00 mm
Optical Interface	Diverging beam	Fiber coupled output	Diverging beam with retroreflector	Diverging beam with retroreflector
Laser Class	Class 1 (IEC 60825-1: 2014)	Class 1 (IEC 60825-1: 2014)	Class 1 (IEC 60825-1: 2014)	Class 4 (IEC 60825-1: 2014)

*Average

Typical Performance

Spectral Radiance at 500 nm	25 mW/mm².sr.nm	N/A	75 mW/mm².sr.nm	110 mW/mm².sr.nm
Broadband Optical Power*	0.75 W	95 mW**	2.75 W	15 W

*Measured with thermopile, **UVFIBERX-230 fiber optic cable

Physical Specifications

Lamphead Dimensions	84 x 78 x 87 mm	84 x 78 x 87 mm	125 x 207 x 95 mm	137 x 146 x 133 mm
Lamphead Weight	0.7 kg	0.7 kg	2.2 kg	2.7 kg
Controller Dimensions	106 x 113 x 302 mm	106 x 113 x 302 mm	157 x 251 x 133 mm	134 x 484 x 538 mm
Controller Weight	1.4 kg	1.4 kg	2.9 kg	18.8 kg

Facility Requirements

Cooling	No auxiliary cooling required	No auxiliary cooling required	Lamphead: ≥ 0.5 liter/minute, 18 - 30°C, 100 psig (0.69 MPa) max. inlet pressure Controller: 3 - 4 liters/minute, 18 - 24°C	Lamphead: ≥ 1 liter/minute, 18 - 30°C Controller: 3 - 4 liters/minute, 18 - 24°C
Nitrogen Purge	Recommended. Grade 4.8 or higher, filtered to 5 µm. 20 psig ±2	Recommended. Grade 4.8 or higher, filtered to 5 µm. 20 psig ±2	Recommended. Grade 4.8 or higher, filtered to 5 µm. 20 psig ±2	Required. Grade 4.8 or higher, filtered to 5 µm. 20 psig ±2
Electricity	100-240 V~; 2.5 A; 50/60 Hz	100-240 V~; 2.5 A; 50/60 Hz	100 – 240 V~; 50/60 Hz, 350 W	200 – 240 V~; 50/60 Hz, 1700 W max.
Ambient Temperature	15–35°C	15–35°C	15–35°C	15–35°C

*Purging with nitrogen will mitigate ozone contamination that will impact output in the UV range.

Note: Product information included in this Selection Guide represent typical values and are provided for reference only.

www.energetiq.com/patents



ENERGETIQ
A HAMAMATSU Company

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

Phone: +1 781-939-0763
Fax: +1 781-939-0769
Email: info@energetiq.com
www.energetiq.com

Specifications are typical and subject to change without notice.
LDLS Selection Guide—4/2021

©2021 Energetiq Technology, Inc. All rights reserved.

EQ-99X LDLS™

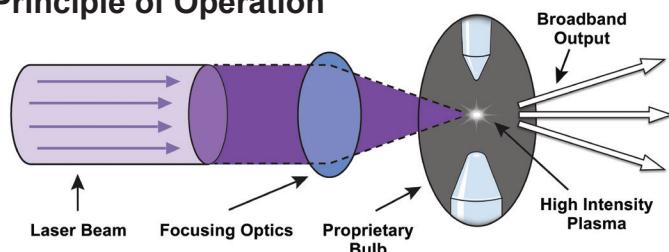
Laser-Driven Light Source



Overview

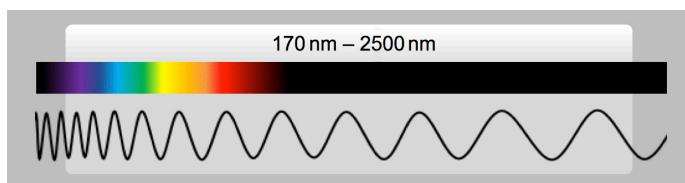
Energetiq's EQ-99X LDLS is a high brightness source with a broad wavelength range from UV to Visible and into the NIR region. The unique principle of operation provides extremely bright, spatially and spectrally stable broadband radiation from 170 nm – 2500 nm with a lifetime greater than 10,000 hours.

Principle of Operation



LDLS technology utilizes a laser to create an extremely small, high brightness plasma with a broad spectral range.

Wavelength Range



Properties

Wavelength Range	170 nm – 2500 nm
Plasma Size (FWHM)*	100 µm X 180 µm
Numerical Aperture	0.47 NA
Bulb Lifetime	10,000 hours
Distance of Plasma from Output Window*	28.00 mm
Laser Class	Class 1 (IEC 60825-1: 2014)

*Average

Typical Performance

Spectral Radiance at 500 nm	25 mW/mm².sr.nm
Broadband Optical Power*	0.75 W

*Measured with thermopile

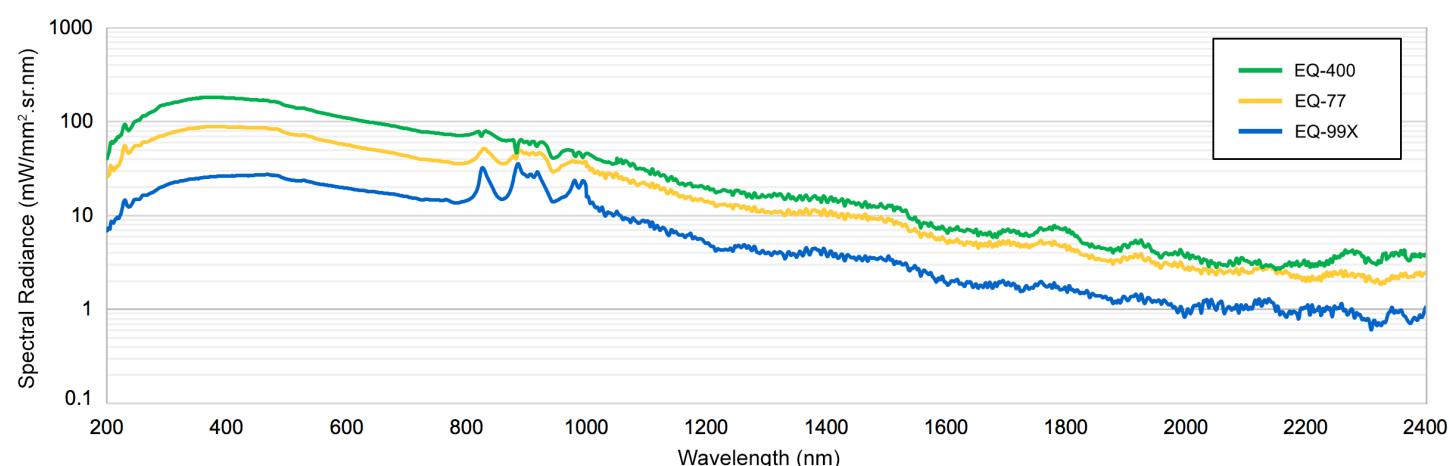
Models

LDLS are sold as systems. Each EQ-99X system includes a lamphead, controller, remote control, and necessary cables.

Part Number	Description	Wavelength Range
EQ-99X-QZ-S	EQ-99X with Quartz Window	170 nm – 2500 nm
EQ-99X-MGF-S	EQ-99X with MGF Window	170 nm – 2500 nm
EQ-99X-YAG-S	EQ-99X with YAG Window	190 nm – 2500 nm
EQ-99X-BK7-S	EQ-99X with BK7 Window	350 nm – 2500 nm

Spectral Radiance Comparison

Average radiance, measured with quartz output windows. For reference only.



Consumable Components

The recommended service interval is 10,000 hours.

Part Number	Description	Wavelength
EQ-99X-RB4	Replacement Bulb (Field Replaceable)	170 nm – 2500 nm
EQ-99-RW-QTZ	Replacement Window, Quartz (Field Replaceable)	170 nm – 2500 nm
EQ-99-RW-MGF	Replacement Window, MGF (Field Replaceable)	170 nm – 2500 nm
EQ-99-RW-YAG	Replacement Window, YAG (Field Replaceable)	190 nm – 2500 nm
EQ-99-RW-BK7	Replacement Window, BK7 (Field Replaceable)	350 nm – 2500 nm

Facility Requirements

Electrical	100-240 V~; 2.5 A; 50-60 Hz
Cooling	No auxiliary cooling required
Nitrogen Purge	Recommended. Grade 4.8 or higher, filtered to 5 µm. 20 psig ±2
Ambient Temperature	15-35°C

Optional Accessories

Part Number	Description
EQ-99-EWP	12 Month Extended Warranty Protection for EQ-99X
EQ-99-MGR	Smart controller with shutter control, status monitoring, operating hours (Shutter not included)
EQ-99-SHU	Shutter for use with EQ-99-MGR
EQ-99X-OTM	Optical Mounting Bracket for EQ-99X and EQ-99X-FC
EQ-99-OAP-EFL-4	Off-Axis-Parabolic Assembly - 4" EFL, 2x magnification
EQ-99-OAP-EFL-6	Off-Axis-Parabolic Assembly - 6" EFL, 3x magnification
EQ-99-OAP-EFL-8	Off-Axis-Parabolic Assembly - 8" EFL, 4x magnification

Physical Specifications

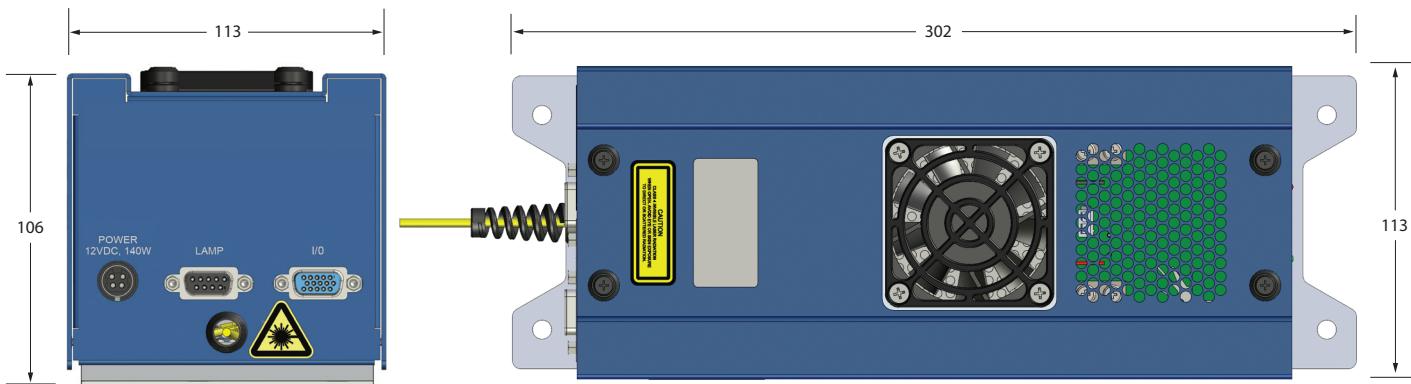
Lamphead Dimensions (H x W x D)	84 x 78 x 87 mm
Lamphead Weight	0.7 kg
Controller Dimensions (H x W x D)	106 x 113 x 302 mm
Controller Weight	1.4 kg

Lamphead Dimensions (Unit: mm)



Drawings are for reference only and are not to scale. STEP-File available.

Controller Dimensions (Unit: mm)



www.energetiq.com/patents



EQ-99X-FC LDLS™

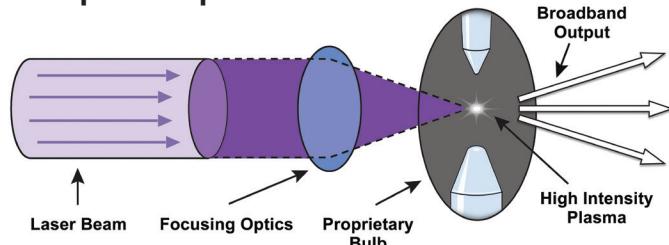
Laser-Driven Light Source



Overview

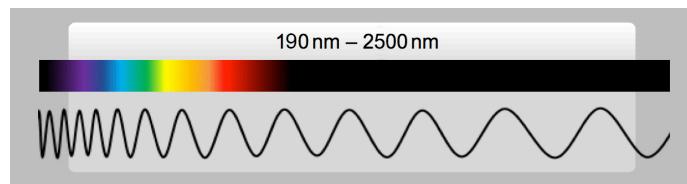
Energetiq's EQ-99X-FC LDLS is a high brightness fiber-coupled source with a broad wavelength range from UV to Visible and into the NIR region. The unique principle of operation provides extremely bright, spatially and spectrally stable broadband radiation from 190 nm – 2500 nm with a lifetime greater than 10,000 hours.

Principle of Operation



LDLS technology utilizes a laser to create an extremely small, high brightness plasma with a broad spectral range.

Wavelength Range



Properties

Wavelength Range	190 nm – 2500 nm
Plasma Size (FWHM)*	100 µm X 180 µm
Numerical Aperture (Output Fiber)	0.22 NA
Bulb Lifetime	10,000 hours
Laser Class	Class 1 (IEC 60825-1: 2014)

*Average

Typical Performance

Broadband Optical Power* | 95 mW

*Measured with thermopile; *UVFIBERX-230 fiber optic cable

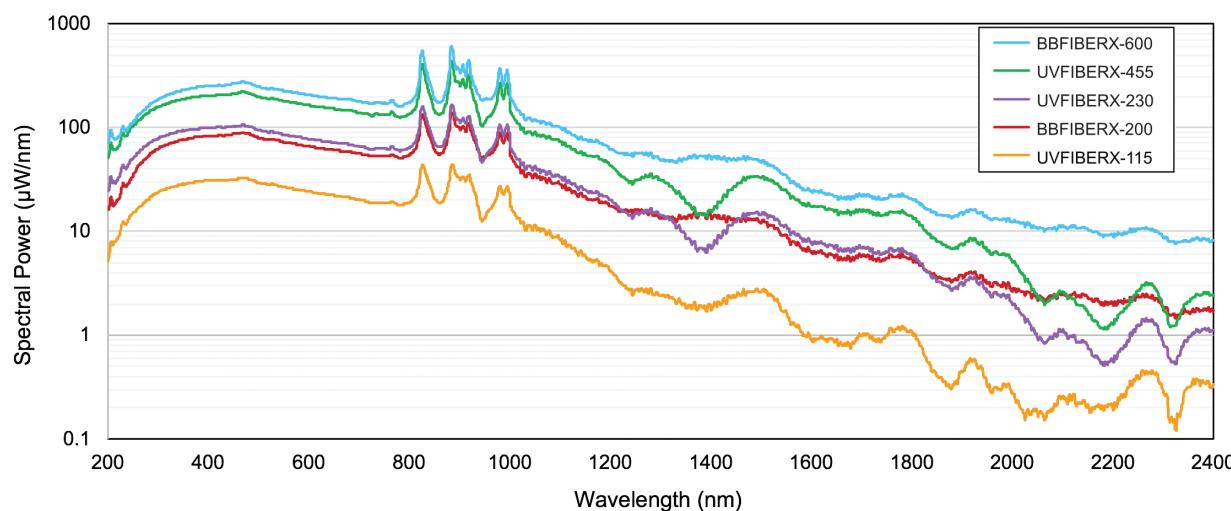
Models

LDLS are sold as systems. Each EQ-99X-FC system includes a lamphead, controller, remote control, and necessary power cables. Please note: Fiber optic cable assembly must be purchased separately.

Part Number	Description	Wavelength Range
EQ-99X-FC-S	EQ-99X with Fiber Coupled Output	190 nm – 2500 nm

Spectral Power Comparison

Average flux, measured with 1 meter long fiber. For reference only.



Consumable Components

The recommended service interval is 10,000 hours.

Part Number	Description
EQ-99X-FC-BKIT-R	Bulb Replacement Kit (Not Field Replaceable)
Fiber Optic Cable Assembly	Energetiq's proprietary optical fibers must be used with the EQ-99X-FC. Please visit www.energetiq.com/fibers for details.

Optional Accessories

Part Number	Description
EQ-99X-FC-EWP	12 Month Extended Warranty Protection for EQ-99X-FC
EQ-99-MGR	Smart controller with status monitoring, operating hours
EQ-99-COL-6-SMA	Fiber Collimator with SMA termination - 6.6 mm diameter beam
EQ-99-COL-6-FC	Fiber Collimator with FC termination - 6.6 mm diameter beam
EQ-99-COL-11-SMA	Fiber Collimator with SMA termination - 11 mm diameter beam
EQ-99-COL-11-FC	Fiber Collimator with FC termination - 11 mm diameter beam
EQ-99X-OTM	Optical Mounting Bracket for EQ-99X and EQ-99X-FC

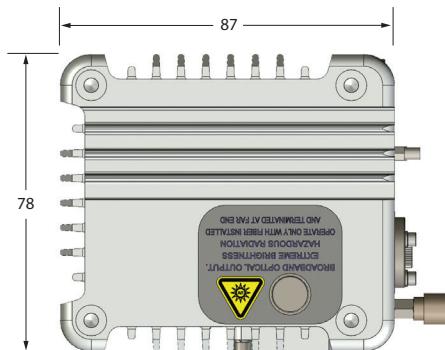
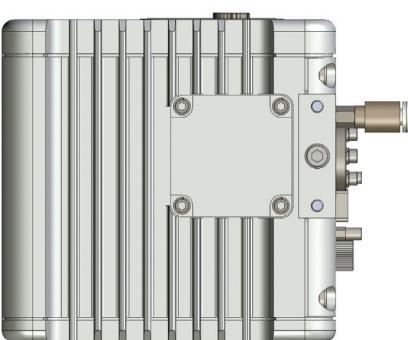
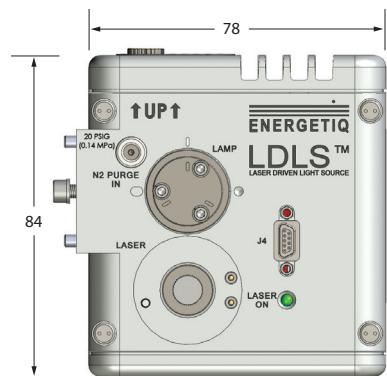
Facility Requirements

Electrical	100-240 V~; 2.5A; 50-60 Hz
Cooling	No auxiliary cooling required
Nitrogen Purge	Recommended. Grade 4.8 or higher, filtered to 5 µm. 20 psig ±2
Ambient Temperature	15-35°C

Physical Specifications

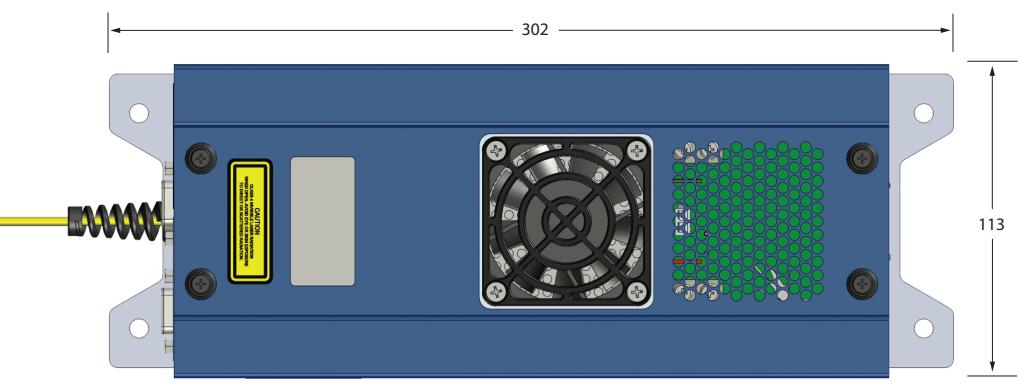
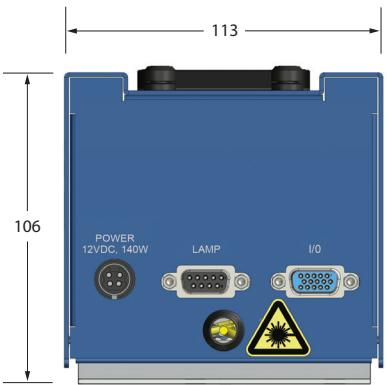
Lamphead Dimensions (H x W x D)	84 x 78 x 87 mm
Lamphead Weight	0.7 kg
Controller Dimensions (H x W x D)	106 x 113 x 302 mm
Controller Weight	1.4 kg

Lamphead Dimensions (Unit: mm)



Drawings are for reference only and are not to scale. STEP-File available.

Controller Dimensions (Unit: mm)



www.energetiq.com/patents

Fiber Optic Cable Assemblies



For use with EQ-99X-FC LDLS™

Our proprietary fiber optic cable assemblies must be used with the EQ-99X-FC LDLS. There are two types of fibers available: UV-Vis Solarization Resistant (UV) and Broadband (BB).

Both the UV and BB fibers transmit from 190 nm – 2500 nm. However, the UV fibers are constructed using silica with a high concentration of hydroxyl groups (OH) and are engineered to withstand ultraviolet solarization. The UV fibers are ideal for applications benefiting from enhanced radiance from 190 nm – 350 nm and the BB fibers are preferable for applications that benefit from enhanced radiance from 350 nm – 2500 nm.

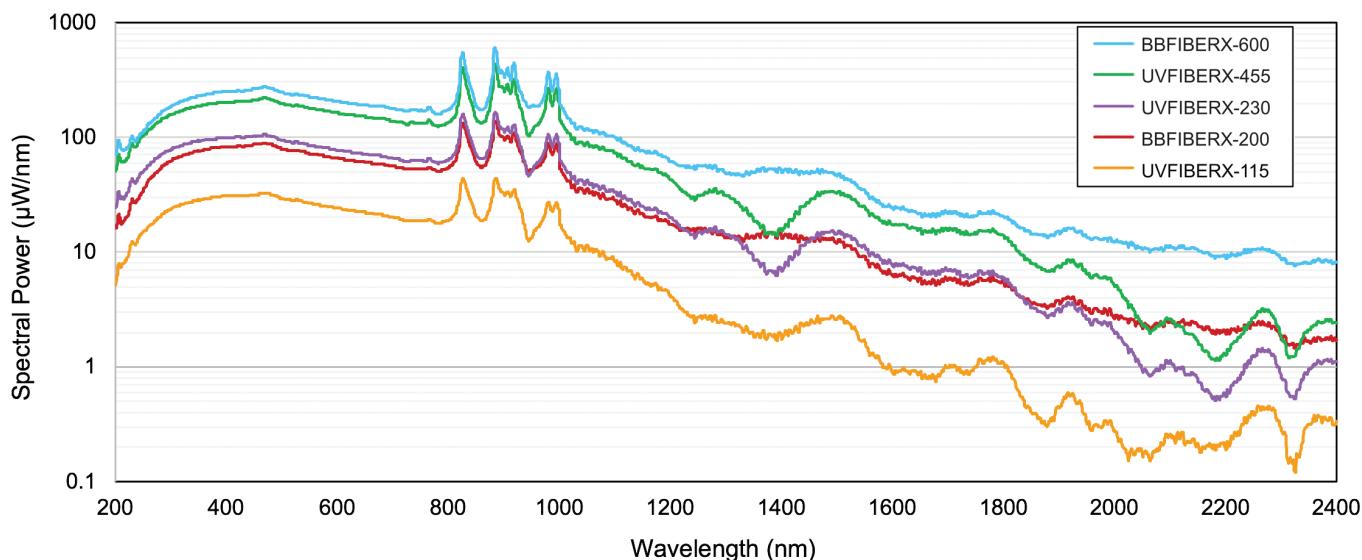
All fibers connect to the lamphead via FC connection and are available with either SMA or FC output termination. The user can select the termination for the output end of the fiber according to their application requirements.

Properties

Compatible LDLS	EQ-99X-FC-S
Wavelength Range	190 nm – 2500 nm
Core Size	Refer next page for details
Cable Length	1 meter or 2 meter
Output Termination	FC or SMA 905
Minimum Bend Radius	30 mm
Core Material	Silica
Length	1 meter or 2 meter
Type	Step-Index
Mode	Multimode
Numerical Aperture	0.22 NA
Jacket/Armor Material	Stainless Steel
Outer Diameter	3.25 mm
Operating Temperature	15–35°C
Lifetime	10,000 hours

EQ-99X-FC Broadband Optical Power (1 meter)

Our fibers transmit from 190 nm – 2500 nm. For applications that benefit from enhanced output from 190 nm – 350 nm, customers should select a UV fiber optic cable assembly. The UV fibers are made of high OH silica and are ideal for transmitting UV wavelengths without suffering from solarization/degradation. There are characteristic dips spectral power in the near-infrared range due to the OH absorption.





UV-Vis Solarization-Resistant Fiber Optic Assemblies

Ideal for applications benefiting from enhanced radiance from 190 nm – 350 nm

Part Number	Broadband Optical Power	Core Size	Length	Termination
UVFIBERX-115-1M-FC-SMA	30 mW	115 µm	1 meter	SMA
UVFIBERX-115-2M-FC-SMA	30 mW	115 µm	2 meter	SMA
UVFIBERX-230-1M-FC-SMA	95 mW	230 µm	1 meter	SMA
UVFIBERX-230-2M-FC-SMA	95 mW	230 µm	2 meter	SMA
UVFIBERX-455-1M-FC-SMA	195 mW	455 µm	1 meter	SMA
UVFIBERX-455-2M-FC-SMA	195 mW	455 µm	2 meter	SMA
UVFIBERX-115-1M-FC-FC	30 mW	115 µm	1 meter	FC
UVFIBERX-115-2M-FC-FC	30 mW	115 µm	2 meter	FC
UVFIBERX-230-1M-FC-FC	95 mW	230 µm	1 meter	FC
UVFIBERX-230-2M-FC-FC	95 mW	230 µm	2 meter	FC
UVFIBERX-455-1M-FC-FC	195 mW	455 µm	1 meter	FC
UVFIBERX-455-2M-FC-FC	195 mW	455 µm	2 meter	FC

Broadband Fiber Optic Assemblies

Ideal for applications that benefit from enhanced radiance from 350 nm – 2500 nm

Part Number	Broadband Optical Power	Core Size	Length	Termination
BBFIBERX-100-1M-FC-SMA	25 mW	100 µm	1 meter	SMA
BBFIBERX-100-2M-FC-SMA	25 mW	100 µm	2 meter	SMA
BBFIBERX-200-1M-FC-SMA	80 mW	200 µm	1 meter	SMA
BBFIBERX-200-2M-FC-SMA	80 mW	200 µm	2 meter	SMA
BBFIBERX-400-1M-FC-SMA	180 mW	400 µm	1 meter	SMA
BBFIBERX-400-2M-FC-SMA	180 mW	400 µm	2 meter	SMA
BBFIBERX-600-1M-FC-SMA	215 mW	600 µm	1 meter	SMA
BBFIBERX-600-2M-FC-SMA	215 mW	600 µm	2 meter	SMA
BBFIBERX-100-1M-FC-FC	25 mW	100 µm	1 meter	FC
BBFIBERX-100-2M-FC-FC	25 mW	100 µm	2 meter	FC
BBFIBERX-200-1M-FC-FC	80 mW	200 µm	1 meter	FC
BBFIBERX-200-2M-FC-FC	80 mW	200 µm	2 meter	FC
BBFIBERX-400-1M-FC-FC	180 mW	400 µm	1 meter	FC
BBFIBERX-400-2M-FC-FC	180 mW	400 µm	2 meter	FC
BBFIBERX-600-1M-FC-FC	215 mW	600 µm	1 meter	FC
BBFIBERX-600-2M-FC-FC	215 mW	600 µm	2 meter	FC

Accessories

Part Number	Description
EQ-99-COL-6-SMA	Fiber Collimator with SMA termination - 6.6 mm diameter beam
EQ-99-COL-6-FC	Fiber Collimator with FC termination - 6.6 mm diameter beam
EQ-99-COL-11-SMA	Fiber Collimator with SMA termination - 11 mm diameter beam
EQ-99-COL-11-FC	Fiber Collimator with FC termination - 11 mm diameter beam

EQ-77 LDLS™

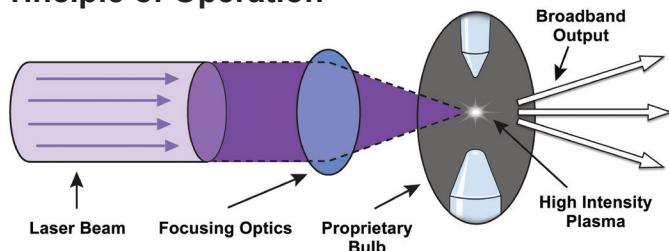
Laser-Driven Light Source



Overview

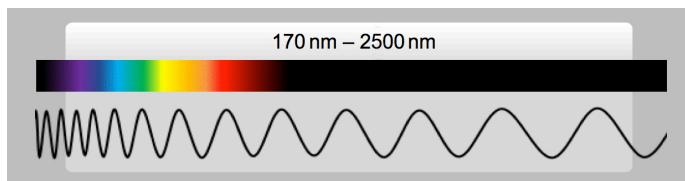
Energetiq's EQ-77 LDLS is a high brightness source with a broad wavelength range from UV to Visible and into the NIR region. The unique principle of operation provides extremely bright, spatially and spectrally stable broadband radiation from 170 nm – 2500 nm with a lifetime greater than 10,000 hours.

Principle of Operation



LDLS technology utilizes a laser to create an extremely small, high brightness plasma with a broad spectral range.

Wavelength Range



Properties

Wavelength Range	170 nm – 2500 nm
Plasma Size (FWHM)*	125 µm X 320 µm
Numerical Aperture	0.5 NA
Bulb Lifetime	10,000 hours
Distance of Plasma from Output Window*	18.00 mm
Laser Class	Class 1 (IEC 60825-1: 2014)

*Average

Typical Performance

Spectral Radiance at 500 nm	75 mW/mm².sr.nm
Broadband Optical Power*	2.75 W

*Measured with thermopile

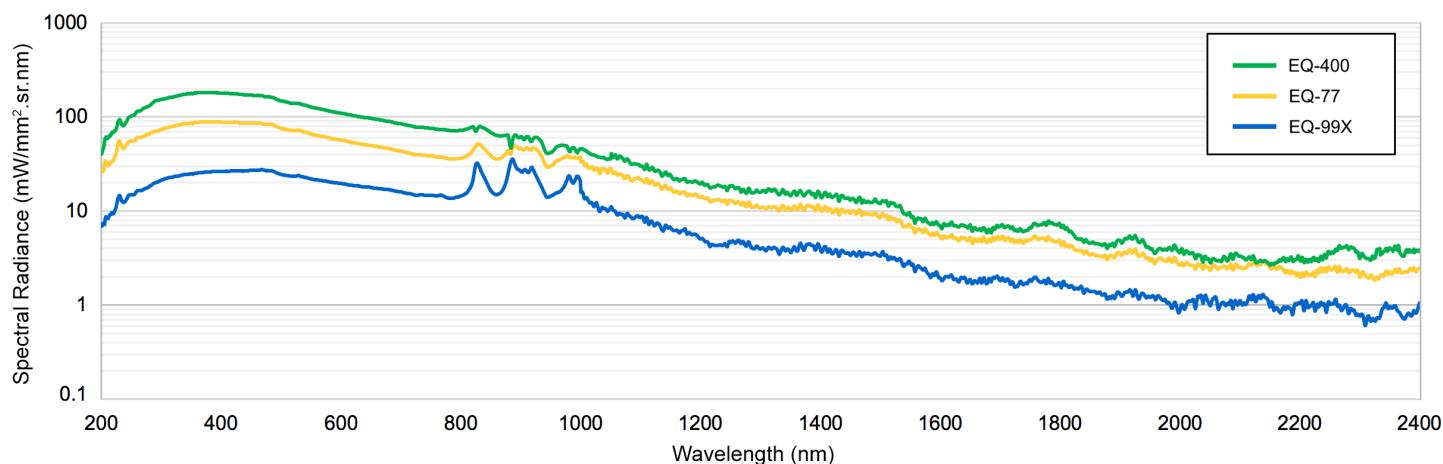
Models

LDLS are sold as systems. Each EQ-77 system includes a lamphead, controller, remote control, and necessary cables.

Part Number	Description	Wavelength Range
EQ-77-QZ-S	EQ-77 with Quartz Window	170 nm – 2500 nm
EQ-77-YAG-S	EQ-77 with YAG Window	190 nm – 2500 nm
EQ-77-BK7-S	EQ-77 with BK7 Window	350 nm – 2500 nm

Spectral Radiance Comparison

Average radiance, measured with quartz output windows. For reference only.



Consumable Components

The recommended service interval is 10,000 hours.

Part Number	Description	Wavelength Range
EQ-77-BKIT-R	Bulb Replacement Kit (Not Field Replaceable)	170 nm – 2500 nm
EQ-77-RW-QTZ	EQ-77 Replacement Window, Quartz (Field Replaceable)	170 nm – 2500 nm
EQ-77-RW-MGF	EQ-77 Replacement Window, MGF (Field Replaceable)	170 nm – 2500 nm
EQ-77-RW-YAG	EQ-77 Replacement Window, YAG (Field Replaceable)	190 nm – 2500 nm
EQ-77-RW-BK7	EQ-77 Replacement Window, BK7 (Field Replaceable)	350 nm – 2500 nm

Facility Requirements

Electrical	100-240 V~ 50/60 Hz, 350 W
Cooling (Lamphead)	≥ 0.5 liter/minute, 18 – 30°C, 100 psig (0.69 MPa) max. inlet pressure
Cooling (Controller)	No auxiliary cooling required
Nitrogen Purge	Recommended. Grade 4.8 or higher, filtered to 5 µm. 20 psig ±2
Ambient Temperature	15-35°C

Optional Accessories

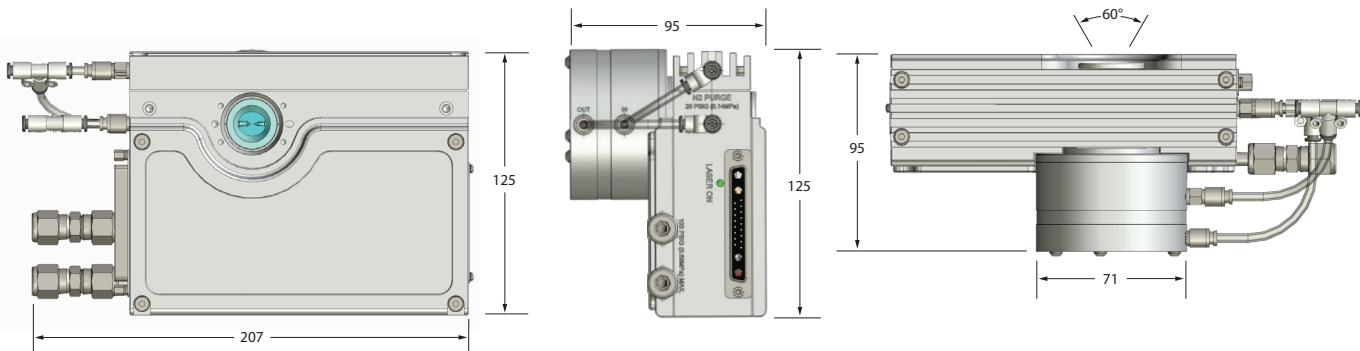
Part Number	Description
EQ-77-OAP-EFL-4-FC	Off-Axis-Parabolic Assembly - 4" EFL with FC Fiber Output
EQ-77-OAP-EFL-4	Off-Axis-Parabolic Assembly - 4" EFL with Tube Extension
EQ-77-OAP-EFL-6-FC	Off-Axis-Parabolic Assembly - 6" EFL with FC Fiber Output
EQ-77-OAP-EFL-6	Off-Axis-Parabolic Assembly - 6" EFL with Tube Extension
EQ-77-OAP-EFL-8	Off-Axis-Parabolic Assembly - 8" EFL with Tube Extension
EQ-77-EWP	12 Month Extended Warranty Protection for EQ-77
EQ-77-CHILLER-KIT	Chiller with Tubing and Filter Kit for EQ-77

Physical Specifications

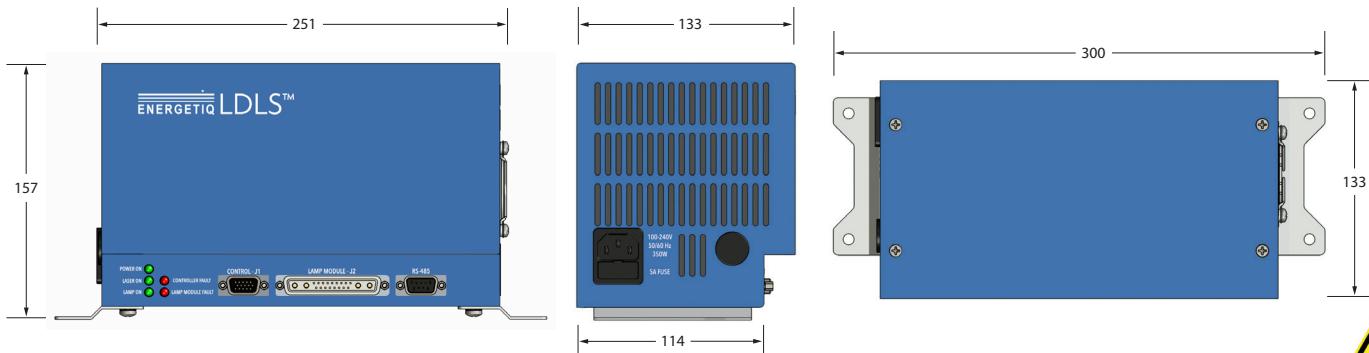
Lamphead Dimensions (H x W x D)	125 x 207 x 95 mm
Lamphead Weight	2.2 kg
Controller Dimensions (H x W x D)	157 x 251 x 133 mm
Controller Weight	2.9 kg

Lamphead Dimensions (Unit: mm)

Drawings are for reference only and are not to scale. STEP-File available.



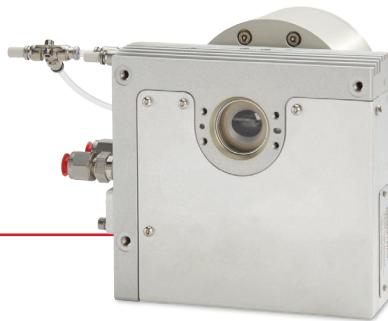
Controller Dimensions (Unit: mm)



www.energetiq.com/patents

EQ-400 LDLS™

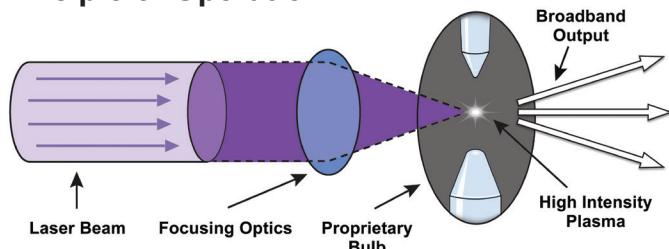
Laser-Driven Light Source



Overview

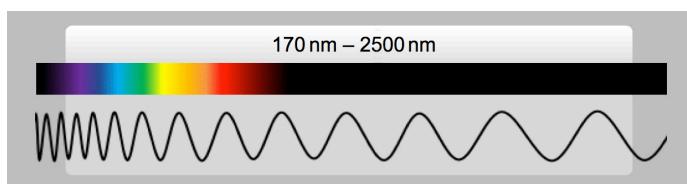
Energetiq's EQ-400 LDLS is a high brightness source with a broad wavelength range from UV to Visible and into the NIR region. The unique principle of operation provides extremely bright, spatially and spectrally stable broadband radiation from 170 nm – 2500 nm with a lifetime greater than 10,000 hours.

Principle of Operation



LDLS technology utilizes a laser to create an extremely small, high brightness plasma with a broad spectral range.

Wavelength Range



Properties

Wavelength Range	170 nm – 2500 nm
Plasma Size (FWHM)*	370 µm X 800 µm
Numerical Aperture	0.5 NA
Bulb Lifetime	10,000 hours
Distance of Plasma from Output Window*	28.00 mm
Laser Class	Class 4 (IEC 60825-1: 2014)

*Average

Typical Performance

Spectral Radiance at 500 nm	110 mW/mm².sr.nm
Broadband Optical Power*	15 W

*Measured with thermopile

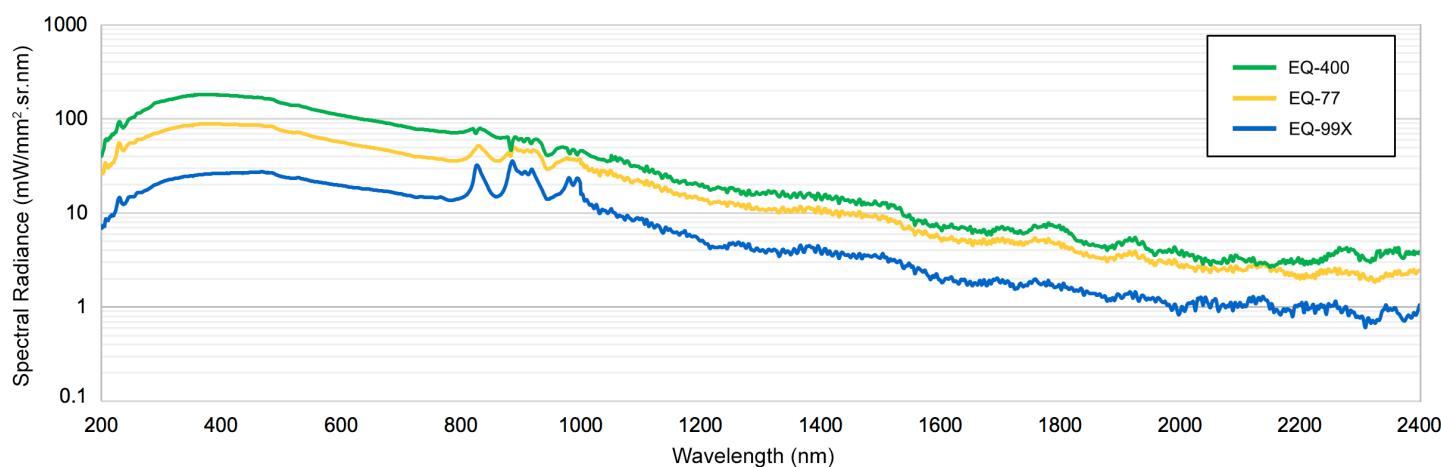
Models

LDLS are sold as systems. Each EQ-400 system includes a lamphead, power supply controller, and necessary cables.

Part Number	Description	Wavelength Range
EQ-400-RH-QZ-S	EQ-400 with Quartz Window	170 nm – 2500 nm
EQ-400-LH-BK7-S	EQ-400 with BK7 Window	350 nm – 2500 nm

Spectral Radiance Comparison

Average radiance, measured with quartz output windows. For reference only.



Consumable Components

The recommended service interval is 10,000 hours.

Part Number	Description	Wavelength Range
EQ-400-BKIT-R	Bulb Replacement Kit (Not Field Replaceable)	170 nm – 2500 nm
EQ-400-RW-QTZ	EQ-400 Replacement Window, Quartz (Field Replaceable)	170 nm – 2500 nm
EQ-400-RW-BK7	EQ-400 Replacement Window, BK7 (Field Replaceable)	350 nm – 2500 nm

Facility Requirements

Electrical	200 – 240 V~, 50/60 Hz, 7A, 1700 W max.
Cooling (Lamphead)	≥ 1 liter/minute, 18 – 30 °C
Cooling (Controller)	3 – 4 liters/minute, 18 – 24 °C
Nitrogen Purge	Required. Grade 4.8 or higher, filtered to 5 µm. 20 psig ±2
Ambient Temperature	15–35°C

Optional Accessories

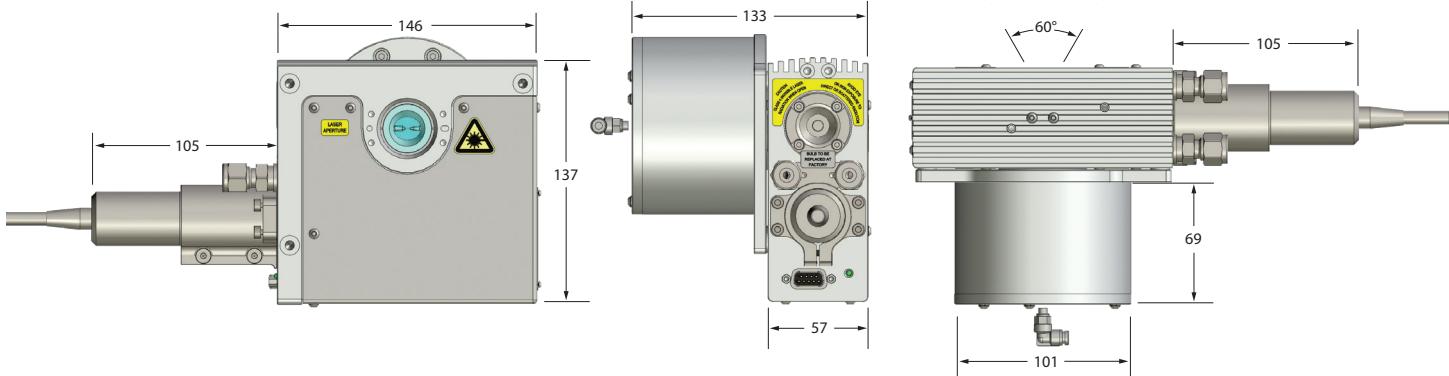
Part Number	Description
EQ-400-CHILLER-KIT	Chiller with Tubing and Filter Kit for EQ-400
EQ-400-EWP	12 Month Extended Warranty for EQ-400

Physical Specifications

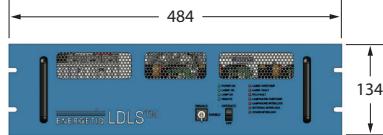
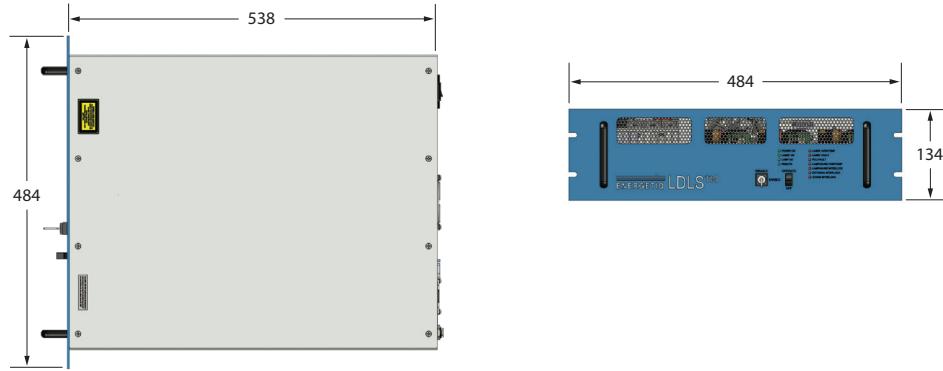
Lamphead Dimensions (H x W x D)	137 x 146 x 133 mm
Lamphead Weight	2.7 kg
Controller Dimensions (H x W x D)	134 x 484 x 538 mm
Controller Weight	18.8 kg

Lamphead Dimensions (Unit: mm)

Drawings are for reference only and are not to scale. STEP-File available. Power brick and laser fiber are not shown.



Controller Dimensions (Unit: mm)



www.energetiq.com/patents

