

 EKSPILA

- ▶ **Atlantic 6**  
6 W, 5 MHz, 8 ps
- ▶ **Atlantic 60**  
60 W, 1 MHz, 13 ps
- ▶ **Atlantic HR**  
16 W, 88 MHz, 8 ps

# Atlantic

## SERIES

Industrial High Power  
Picosecond Lasers



# Atlantic



Laser micromachining is rapidly becoming the material processing technology of choice for numerous small scale, real world applications. New advances in diode pumped solid-state (DPSS) lasers are enabling material processes once found only in research laboratories to be incorporated into growing numbers of production lines.

From its inception, the Atlantic – a third generation picosecond high power and high pulse energy laser – has been designed as a versatile tool for a variety of industrial material processing applications.

The Atlantic is an OEM rugged, compact laser with up to 60 W output power at 1064 nm. Featuring short pulse duration Atlantic series laser offers minimized thermal damage to the material, what is becoming more and more important in wide range of industries: photovoltaics, electronics, biomedicine, auto.

Innovative design, employing fiber based oscillator ensured excellent output beam parameters:  $M^2 < 1.3$  with

pulse energy fluctuations  $< 1.5\%$ . All optical components are placed into sealed monolithic block thus ensuring reliable 24/7 operation.

High, up to 5 MHz repetition rate, combined with low maintenance requirements establishes this laser as good choice for industrial, high throughput material processing systems, requiring speed and precision. Optical components are installed in a robust, precisely machined monolithic aluminum block, which could be used as a separate module for customized solutions. The system is sealed to provide long term stable operation in manufacturing environments. Designed for robust, low maintenance operation, the Atlantic offers maximum reliability due to an optimized layout, PC-controlled operation, a built-in self-diagnostics system and advanced status reporting. Superior beam quality allows easy focusing of the laser beam into the smallest spot size at various working distances and enables processing of practically any material.

## Industrial High Power Picosecond Lasers

### FEATURES

- ▶ Up to **60 W** at **1064 nm** output power
- ▶ Up to **5 MHz** repetition rate
- ▶ Short pulse duration **8 ps**
- ▶ Excellent beam quality  $M^2 < 1.3$
- ▶ Compact, sealed and rugged design
- ▶ PC control and remote control keypad
- ▶ Low maintenance
- ▶ Single-phase powering
- ▶ No external cooling water
- ▶ Burst mode, pulse on demand (Atlantic 6)
- ▶ Air cooled (Atlantic 6)

### APPLICATIONS

- ▶ Drilling
- ▶ Cutting
- ▶ Patterning
- ▶ Structuring
- ▶ Ablation
- ▶ Micromachining

The Atlantic has been designed as a low-maintenance-costs solution. All replacement of consumables can be performed at user facilities by trained technicians.

SPECIFICATIONS <sup>1)</sup>

**Atlantic 6**

	Atlantic 6-1064	Atlantic 6-532	Atlantic 6-355
<b>GENERAL SPECIFICATIONS</b>			
Wavelength	1064 nm	532 nm <sup>2)</sup>	355 nm <sup>2)</sup>
Repetition rate	100 kHz to 5000 kHz with arbitrary pulse selection (single-shot or burst on demand) using pulse gating system		
Average output power	> 6 W at 5000 kHz	> 1.2 W at 100 kHz	> 0.8 W at 100 kHz
Pulse energy at 100 kHz	> 25 µJ	> 12 µJ	> 8 µJ
Pulse energy contrast	> 100 : 1	> 500 : 1	> 1000 : 1
Power fluctuations over 8 h (Std. dev.)	< 2.0 %	< 2.5 %	< 3.0 %
Pulse energy stability (Std. dev.)	< 1.5 %	< 2 %	< 2 %
Pulse duration (FWHM) <sup>3)</sup>	< 8 ps		
Spatial mode	TEM <sub>00</sub>		
Pulse output control	arbitrary pulse selection, power attenuation		
Polarization	linear, vertical 100 : 1		
M <sup>2</sup>	< 1.3		
Beam divergence	< 2.0 mRad	< 1.5 mRad	< 1.5 mRad
Beam pointing stability	< 50 µRad		
Beam diameter (1/e <sup>2</sup> )	1.8 ± 0.2 mm		
Triggering mode	internal / external		
Control	keypad / USB		
<b>OPERATING REQUIREMENTS</b>			
Mains requirements	100/115/208/230 V AC selectable, single phase 50 or 60 Hz		
Power	< 1.2 kW		
Operating ambient temperature	18–27 °C		
Relative humidity	10–80 % (non-condensing)		
<b>PHYSICAL CHARACTERISTICS</b>			
Laser head size (W × H × L)	360 × 120 × 350 mm	TBA	
Power supply unit size (W × H × L)	471 × 153 × 512 mm		
Umbilical length	3 m		
<b>CLASSIFICATION</b>			
Classification according EN60825-1	CLASS 4 laser product		

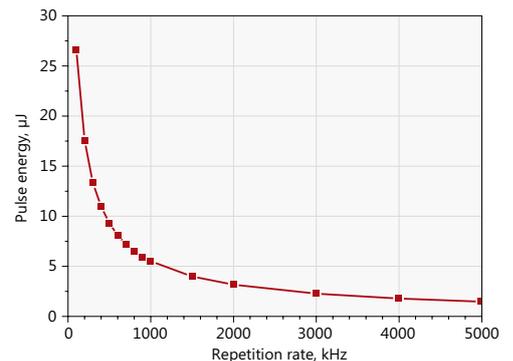
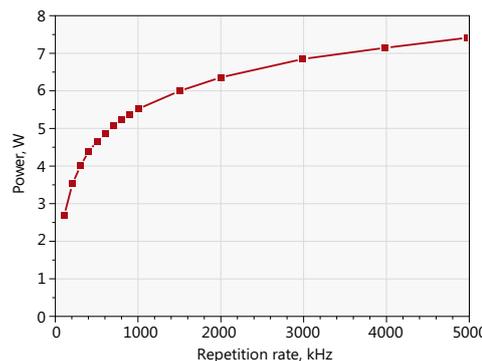
<sup>1)</sup> Due to continuous improvement, all specifications are subject to change without notice. Parameters marked typical are not specifications. They are indications of typical performance and will vary with each unit we manufacture. Unless stated otherwise, all specifications are measured at 1064 nm.

<sup>2)</sup> Preliminary specifications.

<sup>3)</sup> Measured at 1064 nm fundamental wavelength.



**PERFORMANCE**

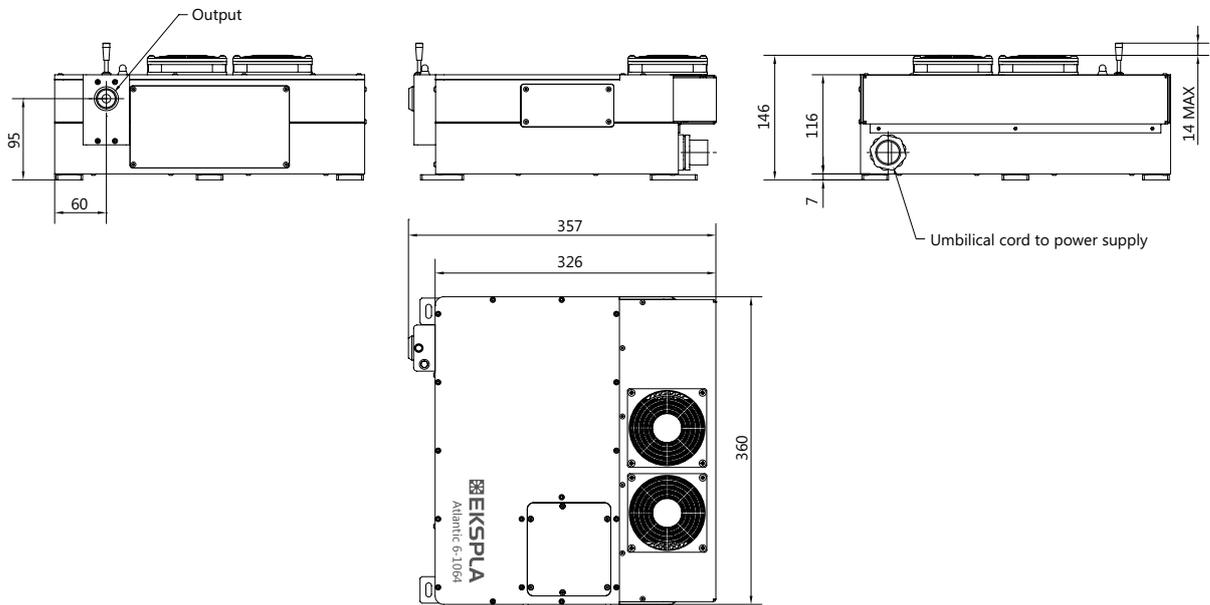


LASER HEAD IMAGE



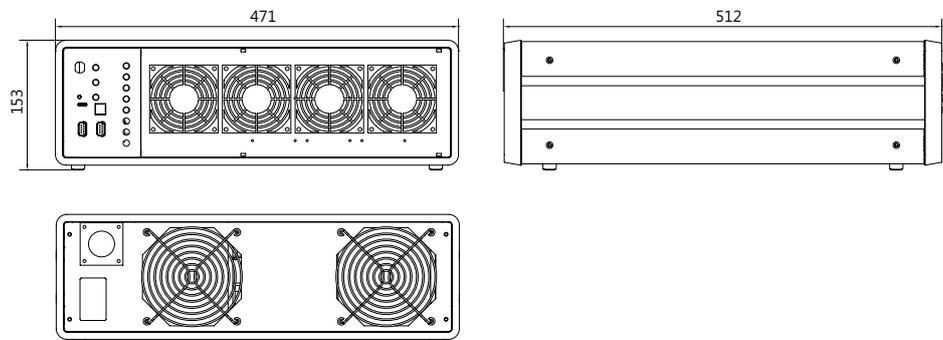
Typical view of Atlantic 6-1064

LASER HEAD OUTLINE DRAWINGS



Atlantic 6-1064 laser head outline drawings

POWER SUPPLY OUTLINE DRAWINGS



Atlantic 6-1064 power supply outline drawings

SPECIFICATIONS <sup>1)</sup>

Atlantic 20

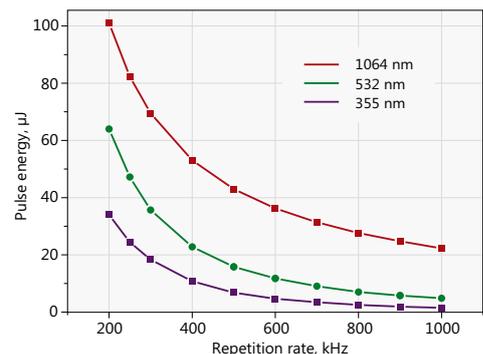
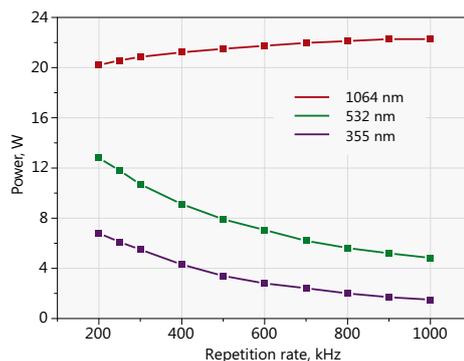
	Atlantic 20-1064	Atlantic 20-532	Atlantic 20-355
<b>GENERAL SPECIFICATIONS</b>			
Wavelength	1064 nm	532 nm	355 nm
Repetition rate	200 kHz to 1000 kHz with arbitrary pulse selection (single-shot or burst on demand) using pulse gating system		
Average output power at 200 kHz	> 20 W	> 12 W	> 6 W
Pulse energy at 200 kHz	> 100 µJ	> 60 µJ	> 30 µJ
Pulse energy contrast	> 100 : 1	> 500 : 1	> 1000 : 1
Power fluctuations over 8 h (Std. dev.)	< 2.0 %	< 2.5 %	< 3.0 %
Pulse energy stability (Std. dev.)	< 1.5 %	< 2.2 %	< 2.5 %
Pulse duration (FWHM) <sup>2)</sup>	< 13 ps		
Spatial mode	TEM <sub>00</sub>		
Pulse output control	arbitrary pulse selection, power attenuation		
Polarization	linear, vertical 100 : 1		
M <sup>2</sup>	< 1.3		
Beam divergence	< 2.0 mRad	< 1.5 mRad	< 1.5 mRad
Beam pointing stability	< 50 µRad		
Beam diameter (1/e <sup>2</sup> )	1.6 ± 0.2 mm	1.8 ± 0.2 mm	1.8 ± 0.2 mm
Triggering mode	internal / external		
Control	keypad / USB		
<b>OPERATING REQUIREMENTS</b>			
Mains requirements	208/230 V AC selectable, single phase 50 or 60 Hz		
Power	< 2.8 kW		
Operating ambient temperature	18–27 °C		
Relative humidity	10–80 % (non-condensing)		
<b>PHYSICAL CHARACTERISTICS</b>			
Laser head size (W × H × L)	364 × 190 × 720 mm	364 × 190 × 891 mm	
Power supply unit size (W × H × L)	553 × 1019 × 867 mm		
Umbilical length	4 m		
<b>CLASSIFICATION</b>			
Classification according EN60825-1	CLASS 4 laser product		

<sup>1)</sup> Due to continuous improvement, all specifications are subject to change without notice. Parameters marked typical are not specifications. They are indications of typical performance and will vary with each unit we manufacture. Unless stated otherwise, all specifications are measured at 1064 nm.

<sup>2)</sup> Measured at 1064 nm fundamental wavelength.



PERFORMANCE



SPECIFICATIONS <sup>1)</sup>

## Atlantic 40

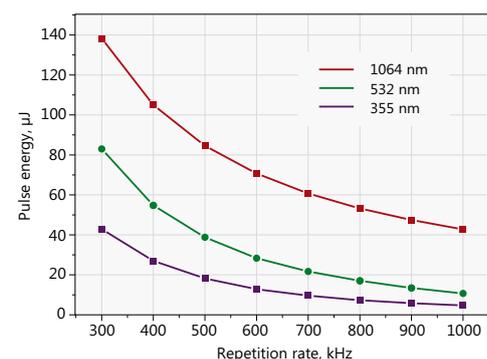
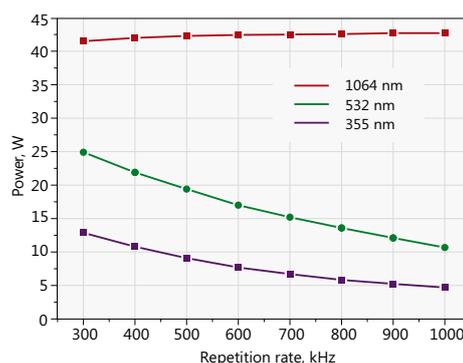
	Atlantic 40-1064	Atlantic 40-532	Atlantic 40-355
<b>GENERAL SPECIFICATIONS</b>			
Wavelength	1064 nm	532 nm	355 nm
Repetition rate	300 kHz to 1000 kHz with arbitrary pulse selection (single-shot or burst on demand) using pulse gating system		
Average output power at 300 kHz	> 40 W	> 20 W	> 12 W
Pulse energy at 300 kHz	> 130 µJ	> 70 µJ	> 40 µJ
Pulse energy contrast	> 100 : 1	> 500 : 1	> 1000 : 1
Power fluctuations over 8 h (Std. dev.)	< 2.0 %	< 2.5 %	< 3.0 %
Pulse energy stability (Std. dev.)	< 1.5 %	< 2.2 %	< 2.5 %
Pulse duration (FWHM) <sup>2)</sup>	< 13 ps		
Spatial mode	TEM <sub>00</sub>		
Pulse output control	arbitrary pulse selection, power attenuation		
Polarization	linear, vertical 100 : 1		
M <sup>2</sup>	< 1.3		
Beam divergence	< 2.0 mRad	< 1.5 mRad	< 1.5 mRad
Beam pointing stability	< 50 µRad		
Beam diameter (1/e <sup>2</sup> )	1.6 ± 0.3 mm	2.0 ± 0.3 mm	2.0 ± 0.3 mm
Triggering mode	internal / external		
Control	keypad / USB		
<b>OPERATING REQUIREMENTS</b>			
Mains requirements	208/230 V AC selectable, single phase 50 or 60 Hz		
Power	< 3.1 kW		
Operating ambient temperature	18–27 °C		
Relative humidity	10–80 % (non-condensing)		
<b>PHYSICAL CHARACTERISTICS</b>			
Laser head size (W × H × L)	364 × 190 × 720 mm	364 × 190 × 891 mm	
Power supply unit size (W × H × L)	553 × 1019 × 867 mm		
Umbilical length	4 m		
<b>CLASSIFICATION</b>			
Classification according EN60825-1	CLASS 4 laser product		

<sup>1)</sup> Due to continuous improvement, all specifications are subject to change without notice. Parameters marked typical are not specifications. They are indications of typical performance and will vary with each unit we manufacture. Unless stated otherwise, all specifications are measured at 1064 nm.

<sup>2)</sup> Measured at 1064 nm fundamental wavelength.



## PERFORMANCE



SPECIFICATIONS <sup>1)</sup>

Atlantic 60

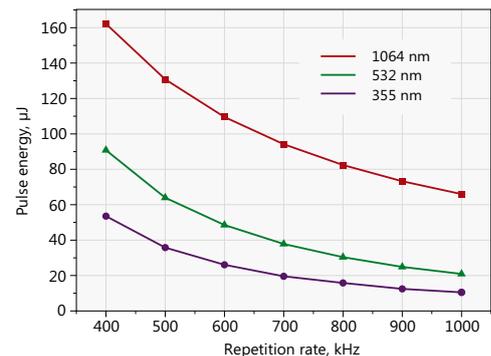
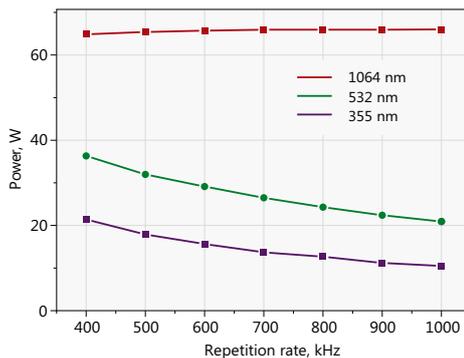
	Atlantic 60-1064	Atlantic 60-532	Atlantic 60-355
<b>GENERAL SPECIFICATIONS</b>			
Wavelength	1064 nm	532 nm	355 nm
Repetition rate	400 kHz to 1000 kHz with arbitrary pulse selection (single-shot or burst on demand) using pulse gating system		
Average output power at 400 kHz	> 60 W	> 35 W	> 20 W
Pulse energy at 400 kHz	> 150 µJ	> 85 µJ	> 50 µJ
Pulse energy contrast	> 100 : 1	> 500 : 1	> 1000 : 1
Power fluctuations over 8 h (Std. dev.)	< 2.0 %	< 2.5 %	< 3.0 %
Pulse energy stability (Std. dev.)	< 1.5 %	< 2.2 %	< 2.5 %
Pulse duration (FWHM) <sup>2)</sup>	< 13 ps		
Spatial mode	TEM <sub>00</sub>		
Pulse output control	arbitrary pulse selection, power attenuation		
Polarization	linear, vertical 100 : 1		
M <sup>2</sup>	< 1.3		
Beam divergence	< 2.0 mRad	< 1.5 mRad	< 1.5 mRad
Beam pointing stability	< 50 µRad		
Beam diameter (1/e <sup>2</sup> )	1.6 ± 0.3 mm	2.2 ± 0.3 mm	2.2 ± 0.3 mm
Triggering mode	internal / external		
Control	keypad / USB		
<b>OPERATING REQUIREMENTS</b>			
Mains requirements	208/230 V AC selectable, single phase 50 or 60 Hz		
Power	< 3.5 kW		
Operating ambient temperature	18–27 °C		
Relative humidity	10–80 % (non-condensing)		
<b>PHYSICAL CHARACTERISTICS</b>			
Laser head size (W × H × L)	364 × 190 × 720 mm	364 × 190 × 891 mm	
Power supply unit size (W × H × L)	553 × 1019 × 867 mm		
Umbilical length	4 m		
<b>CLASSIFICATION</b>			
Classification according EN60825-1	CLASS 4 laser product		

<sup>1)</sup> Due to continuous improvement, all specifications are subject to change without notice. Parameters marked typical are not specifications. They are indications of typical performance and will vary with each unit we manufacture. Unless stated otherwise, all specifications are measured at 1064 nm.

<sup>2)</sup> Measured at 1064 nm fundamental wavelength.



PERFORMANCE

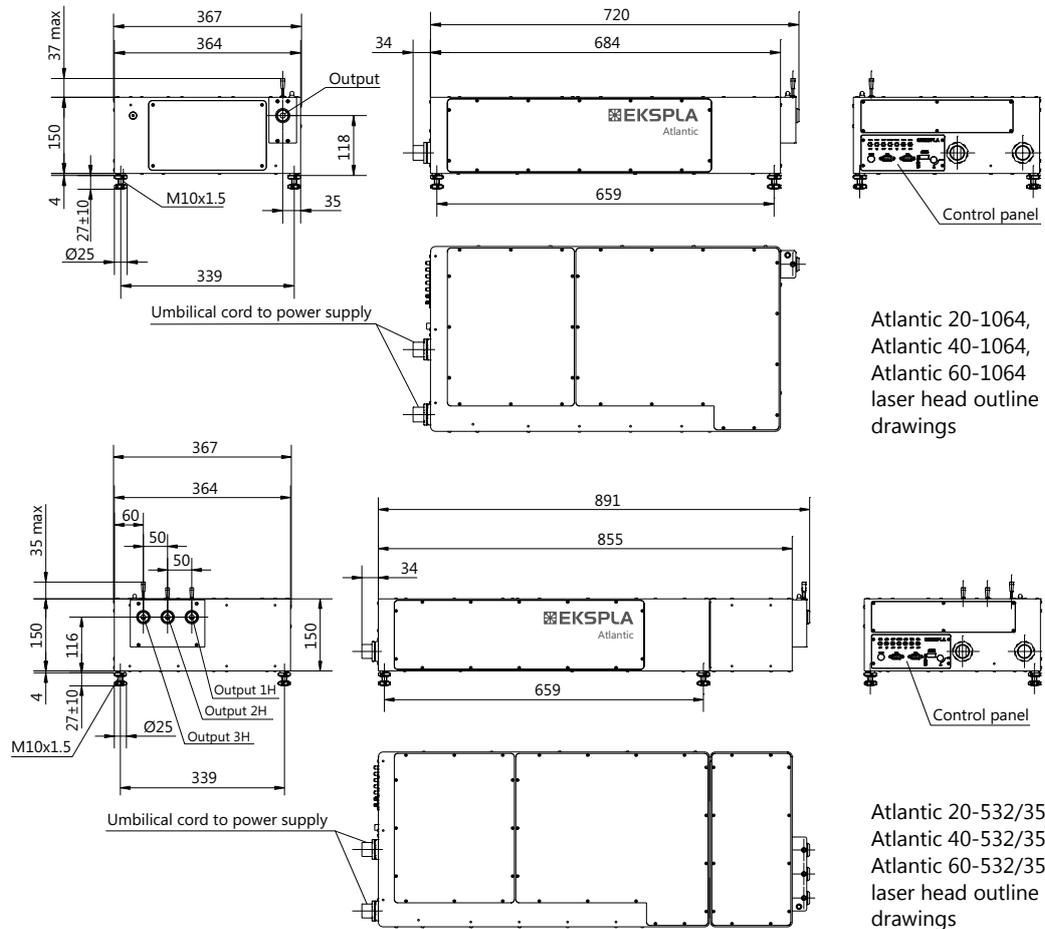


LASER HEAD IMAGE



Typical view of Atlantic 20-1064, Atlantic 40-1064, Atlantic 60-1064

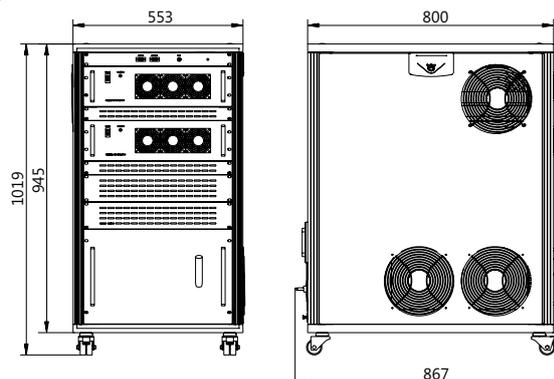
LASER HEAD OUTLINE DRAWINGS



Atlantic 20-1064, Atlantic 40-1064, Atlantic 60-1064 laser head outline drawings

Atlantic 20-532/355, Atlantic 40-532/355, Atlantic 60-532/355 laser head outline drawings

POWER SUPPLY OUTLINE DRAWINGS



Atlantic 20-1064/532/355, Atlantic 40-1064/532/355, Atlantic 60-1064/532/355 power supply outline drawings

# Atlantic HR



The Atlantic HR diode pumped picosecond laser introduces a high repetition rate solution for material processing and other industrial applications.

Diode pumped solid state laser technology combined with EKSPILA's 20 years of experience in picosecond lasers has enabled the design and manufacture of a reliable cost effective tool.

A rugged design ensures stable and reliable operation in diverse ambient conditions. Short pulse duration ( $< 8$  ps) and good beam quality ( $M^2 < 1.3$ ) make this laser an excellent choice for many industrial as well as R&D applications.

A high repetition rate allows for fast processes with multiple meters per second scanning speed.

## Industrial High Repetition Rate Picosecond DPSS Laser

### FEATURES

- ▶ Up to **16 W** output power
- ▶ High **88 MHz** repetition rate
- ▶  **$< 8$  ps** pulse duration
- ▶ High stability and excellent beam quality  $M^2 < 1.3$
- ▶ **1064 nm, 532 nm or 355 nm** output wavelengths
- ▶ Compact, sealed and rugged design
- ▶ Low maintenance
- ▶ Single-phase powering
- ▶ No external cooling water

### APPLICATIONS

- ▶ Patterning
- ▶ Structuring
- ▶ Ablation
- ▶ Micromachining
- ▶ Inspection
- ▶ Amplifier seeding
- ▶ OPO pumping

SPECIFICATIONS <sup>1)</sup>

	Atlantic HR-1064	Atlantic HR-532	Atlantic HR-355
<b>GENERAL SPECIFICATIONS</b>			
Wavelength <sup>2)</sup>	1064 nm	532 nm	355 nm
Output power	16 W	8 W	>2 W
Repetition rate	88 ± 2 MHz		
Pulse length	< 8 ps	< 7 ps	< 7 ps
Spatial mode	TEM <sub>00</sub>		
M <sup>2</sup>	<1.3		< 1.5
Beam diameter	1.8 mm	1.5 mm	~ 3 mm
Beam divergence	< 0.8 mRad	< 0.8 mRad	< 1.5 mRad
Beam ellipticity	> 0.8	> 0.8	> 0.7
Beam pointing stability better than	50 µRad		
Polarization	vertical		
Long term power stability <sup>3)</sup>	2 %	2 %	3 %
Amplitude noise	< 1 %	< 2 %	< 2 %
Maximum warm-up time	1 h		
Static alignment tolerances relative to laser mount			
Beam position	± 1 mm		
Beam angle	± 2.5 mRad		
<b>OPERATING REQUIREMENTS</b>			
Operation ambient temperature	20–25 °C		
Operating voltage	100/115/208/230 V AC selectable, single phase 50 or 60 Hz		
<b>PHYSICAL CHARACTERISTICS</b>			
Laser head dimensions (W×H×L)	164 × 170 × 664 mm		214 × 161 × 681 mm
Power supply dimensions (W×H×L)	561 × 841 × 861 mm		
Laser head weight	25 kg		30 kg
Power supply weight	90 kg		
Umbilical length	3 m		
<b>CLASSIFICATION</b>			
Classification according EN60825-1	CLASS 4 laser product		

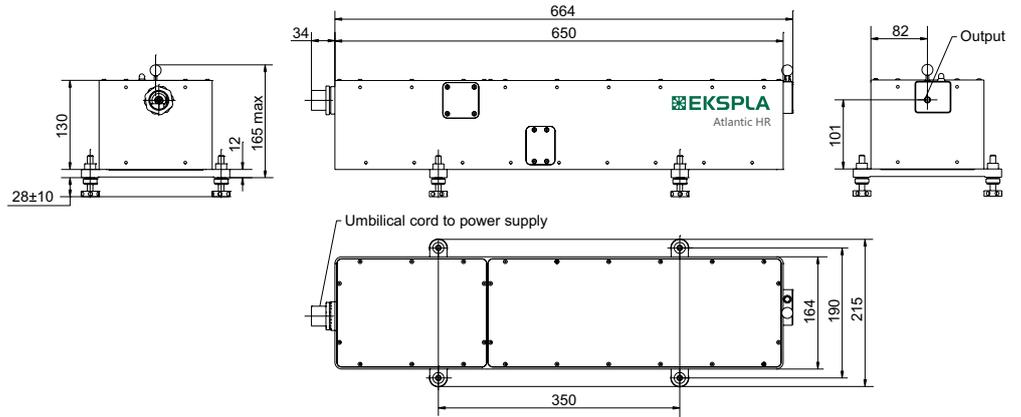
<sup>1)</sup> Due to continuous improvement, all specifications are subject to change without notice. Parameters marked typical are not specifications. They are indications of typical performance and will vary with each unit we manufacture. Unless stated otherwise, all specifications are measured at 1064 nm.

<sup>2)</sup> 266 nm version is available on request.

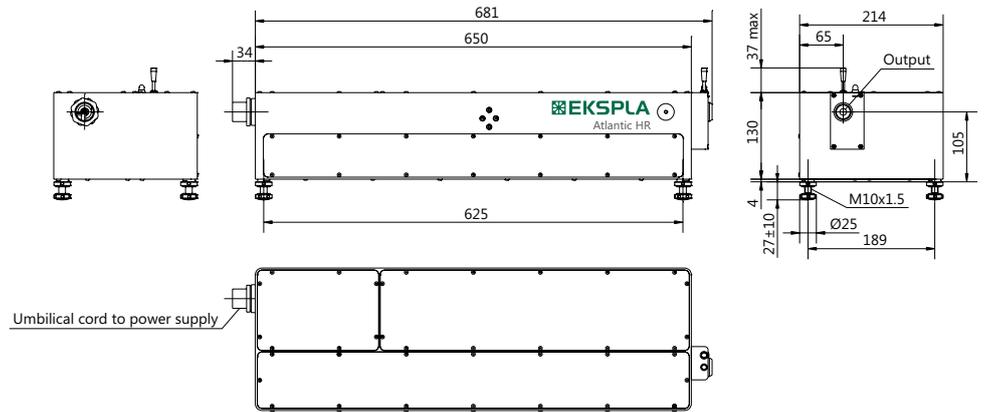
<sup>3)</sup> For 2 hours at constant temperature.



LASER HEAD OUTLINE DRAWINGS

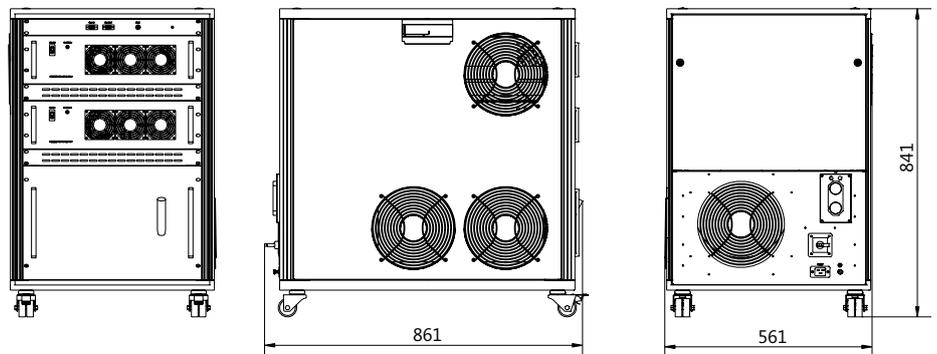


Atlantic HR-1064 and Atlantic HR-532 laser head outline drawings



Atlantic HR-355 laser head outline drawings

POWER SUPPLY OUTLINE DRAWINGS



Atlantic HR power supply outline drawings

## Why EKSPLA?

- Know-how in laser technology and nonlinear optics
- In house design and manufacturing
- Close partnership with scientific community
- Network of photonics companies in Vilnius

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