

RX1 Series Picosecond Lasers

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Photonics Industries' RX1 Series low power picosecond lasers offer high performance, high precision, and robust form factor for the most demanding industrial as well as scientific applications. Photonics Industries is proven, with over a thousand picosecond lasers shipped worldwide, to meet and fulfill precision needs in manufacturing, scientific research, and new, emerging requirements necessitating ever smaller pulse widths in the ultrafast regime.



Applications

- Cutting/Drilling/Scribing Thin Metal/Metal Foil, Ceramic, Glass, Ultra Thin Glass (UTG), Plastic, Glass-reinforced Plastic
- Flat Panel Display, LCD/LED/OLED Repair/Microprocessing
- Ink-Jet Nozzle Hole Drilling, Laser Milling Ink-Jet Nozzle Holes, Laser Ablation Ink-Jet Nozzle Holes
- Brittle Material Microprocessing
- Medical Stents, Medical Device Laser Microprocessing
- Low- κ Dielectric Wafers, Silicon Wafers, Flexible Printed Circuit Boards (FPCB), Printed Circuit Boards (PCB) Microprocessing
- Hydrophobic Material Manufacturing, Hydrophilic Material Manufacturing, Ultrafast Laser Assisted Etching (ULAE) Systems

Features

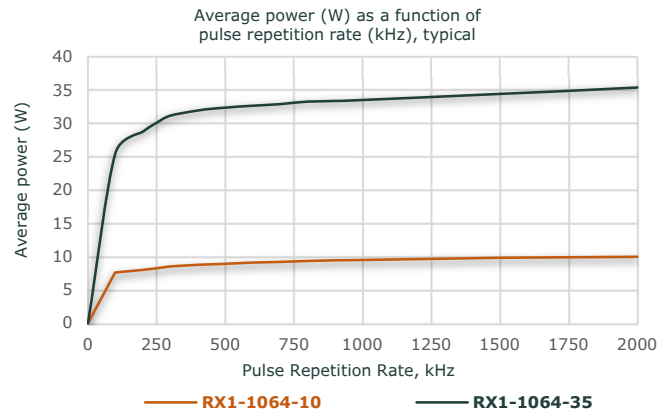
- High single pulse energy:
Up to $> 250 \mu\text{J}$ at 100 kHz, RX1 IR models
- Short pulse laser:
 $\sim 10 \text{ ps}$ for IR, $\sim 7 \text{ ps}$ for Green & UV
Option up to $\sim 30 \text{ ps}$ available
- Wide range of wavelengths:
1064 nm, 532 nm, 355 nm
MWB, MWS, & 266 nm options on request
- Smallest, all-in-one (AIO), high power picosecond laser on the market:
Up to 35 W IR, 25 W GRN, or 10 W UV,
In the small RX1 form factor 21 x 8.5 x 3.75 inches.
- Highest efficiency picosecond laser with the lowest power consumption:
 $< 400 \text{ W}$ typical
- High repetition rates:
Options up to 8 MHz or $\sim 32 \text{ MHz}$
- Excellent TEM₀₀ beam, and Pointing Stability:
Typical $M^2 < 1.2$; $< 20 \mu\text{rad}$
- Exceptional and Versatile Pulse Control:
PEC (Power or Pulse Energy Control).
PSO (Position Synchronized Output) mode for external triggering to any arbitrary PRF while maintaining a constant, stable pulse energy with low jitter.
Burst Mode for individually controllable pulses in burst envelopes of up to 10 pulses with intra-burst pulse separation of $\sim 31 \text{ ns}$.
POD (Pulse-On-Demand) pulse bursts can be triggered internally, externally, or continuously, while maintaining constant pulse energy.

	RX1-1064-10		RX1-1064-35
Beam and output specifications			
Wavelength®	1064 nm		
Output power¹	Standard	10 W at 2 MHz	35 W at 2 MHz
	-HP	> 70 µJ at 100 kHz	> 250 µJ at 100 kHz
Long term power stability²	≤ 1% rms		
Pulse width®	~10 ps		
Pulse repetition rate³,®	Single shot to 2 MHz (option up to 8 MHz)		
Pulse-to-pulse stability⁴	< 1% rms		
Beam diameter, at exit	~1.5 mm		
Beam spatial mode	TEM₀₀ M² ~1.2		
Beam pointing stability	< 20 µrad		
Beam divergence	< 2 mrad		
Beam roundness	> 90%		
Beam bore sight accuracy	≤ 1 mm lateral (to specified exit location), ≤ 5 mrad angular (to specified exit direction)		
Polarization	Vertical >100:1		
Operational specifications and system characteristics			
Interface	RS232, Ethernet, Software GUI, External TTL Triggering		
Warm-up time	< 15 minutes		
Electrical requirement	100-240 V AC; or 32 V DC, 10 A		
Line frequency	50-60 Hz		
Climate	Ambient 15°C to 30°C (59°F to 86°F) Operating Range, Relative Humidity 90% Maximum, non-condensing		
Power consumption⁵	~120 W	< 400 W	
Dimensions (LxWxH)⁶	15 x 8.615 x 3.75 in.	21 x 8.5 x 3.75 in.	
Weight	~31 lbs	~50 lbs	
Vibrational tolerance	Up to 3g		
Cooling system®	Air-cooled (water-cooled plate or water-cooled base options available)	Closed-loop chiller	

⊕ See options in below table.

[1.] Optimized maximum single pulse energy at 100 kHz (-HP, high single pulse energy optimization option). Higher pulse energies available utilizing the Burst Mode feature. [2.] Measured over 8 hours ± 1°C. [3.] Lower repetition rates, down to single shot, achieved by utilizing PSO or POD features. [4.] Measured at ambient temperature ± 2°C. [5.] Power consumption data does not include an external chiller's power consumption. [6.] RX Series picosecond lasers are all-in-one (AIO) and do not require a separate controller or utility module. All connections for operation and control of the laser can be found on the back panel of the AIO laser.

Options	Designation
Pulse width ~30 ps, Long pulse option	-LP e.g., RX1-1064-10-LP
Single shot to 8 MHz, High pulse repetition rate option	-8M e.g., RX1-1064-10-8M
Fixed pulse repetition rate ~32 MHz, Quasi-CW (continuous-wave) operation option	-QCW e.g., RX1-1064-10-QCW
Multi-wavelength blended or selectable output option	-MWB, or -MWS e.g., RX1-1064-10-MWB
Water-cooled plate Water-cooled plate on air-cooled form factor lasers option	-WC e.g., RX1-1064-10-WC



	RX1-532-5	RX1-532-25
Beam and output specifications		
Wavelength [Ⓢ]	532 nm	
Output power ¹	5 W	25 W
Long term power stability ²	≤ 1% rms	
Pulse width [Ⓢ]	~7 ps	
Pulse repetition rate ^{3,Ⓢ}	Single shot to 2 MHz (option up to 8 MHz)	
Pulse-to-pulse stability ⁴	~1% rms	
Beam diameter, at exit	~1 mm	
Beam spatial mode	TEM ₀₀ M ² < 1.2	
Beam pointing stability	< 20 μrad	
Beam divergence	≤ 1 mrad	
Beam roundness	> 90%	
Beam bore sight accuracy	≤ 1 mm lateral (to specified exit location), ≤ 5 mrad angular (to specified exit direction)	
Polarization	Horizontal >100:1	
Operational specifications and system characteristics		
Interface	RS232, Ethernet, Software GUI, External TTL Triggering	
Warm-up time	< 15 minutes	
Electrical requirement	100-240 V AC; or 32 V DC, 10 A	
Line frequency	50-60 Hz	
Climate	Ambient 15°C to 30°C (59°F to 86°F) Operating Range, Relative Humidity 90% Maximum, non-condensing	
Power consumption ⁵	~120 W	< 400 W
Dimensions (LxWxH) ⁶	15 x 8.615 x 3.75 in.	21 x 8.5 x 3.75 in.
Weight	~31 lbs	~50 lbs
Vibrational tolerance	Up to 3g	
Cooling system [Ⓢ]	Air-cooled (water-cooled plate or water-cooled base options available)	Closed-loop chiller

Ⓢ See options in below table.

[1.] Output power is specifiable at different pulse repetition rates. [2.] Measured over 8 hours ± 1°C. [3.] Lower repetition rates, down to single shot, achieved by utilizing PSO or POD features. [4.] Measured at ambient temperature ± 2°C. [5.] Power consumption data does not include an external chiller's power consumption. [6.] RX Series picosecond lasers are all-in-one (AIO) and do not require a separate controller or utility module. All connections for operation and control of the laser can be found on the back panel of the AIO laser.

Options	Designation
Pulse width ~20 ps, Long pulse option	-LP e.g., RX1-532-25-L-LP
Single shot to 8 MHz, High pulse repetition rate option	-8M e.g., RX1-532-5-L-8M
Fixed pulse repetition rate ~32 MHz, Quasi-CW (continuous-wave) operation option	-QCW e.g., RX1-532-25-QCW
Multi-wavelength blended or selectable output option	-MWB, or -MWS e.g., RX1-1064-10-MWB
Water-cooled plate Water-cooled plate on air-cooled form factor lasers option	-WC e.g., RX1-1064-10-WC

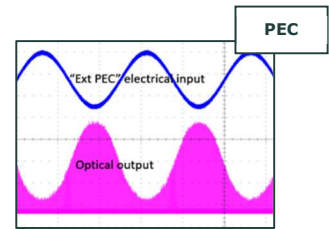
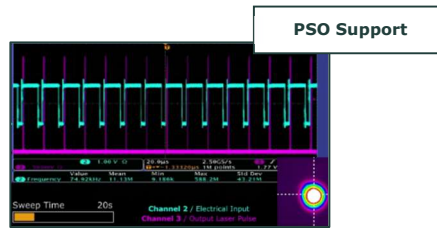
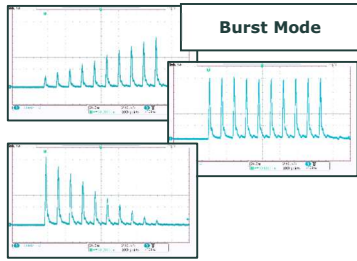
	RX1-355-3	RX1-355-10
Beam and output specifications		
Wavelength [Ⓢ]	355 nm	
Output power ¹	3 W	10 W
Long term power stability ²	≤ 1% rms	
Pulse width [Ⓢ]	~7 ps	
Pulse repetition rate ^{3,Ⓢ}	Single shot to 2 MHz (option up to 8 MHz)	
Pulse-to-pulse stability ⁴	< 2% rms	
Beam diameter [Ⓢ] , at exit	~1 mm	
Beam spatial mode	TEM ₀₀ M ² < 1.2	
Beam pointing stability	< 25 μrad	
Beam divergence	≤ 1.3 mrad	
Beam roundness	> 90%	
Beam bore sight accuracy	≤ 1 mm lateral (to specified exit location), ≤ 5 mrad angular (to specified exit direction)	
Polarization	Vertical >100:1	
Operational specifications and system characteristics		
Interface	RS232, Ethernet, Software GUI, External TTL Triggering	
Warm-up time	< 15 minutes	
Electrical requirement	100-240 V AC; or 32 V DC, 10 A	
Line frequency	50-60 Hz	
Climate	Ambient 15°C to 30°C (59°F to 86°F) Operating Range, Relative Humidity 90% Maximum, non-condensing	
Power consumption ⁵	~120 W	< 400 W
Dimensions (LxWxH) ⁶	15 x 8.615 x 3.75 in.	21 x 8.5 x 3.75 in.
Weight	~31 lbs	~50 lbs
Vibrational tolerance	Up to 3g	
Cooling system [Ⓢ]	Air-cooled (water-cooled plate or water-cooled base options available)	Closed-loop chiller

Ⓢ See options in below table.

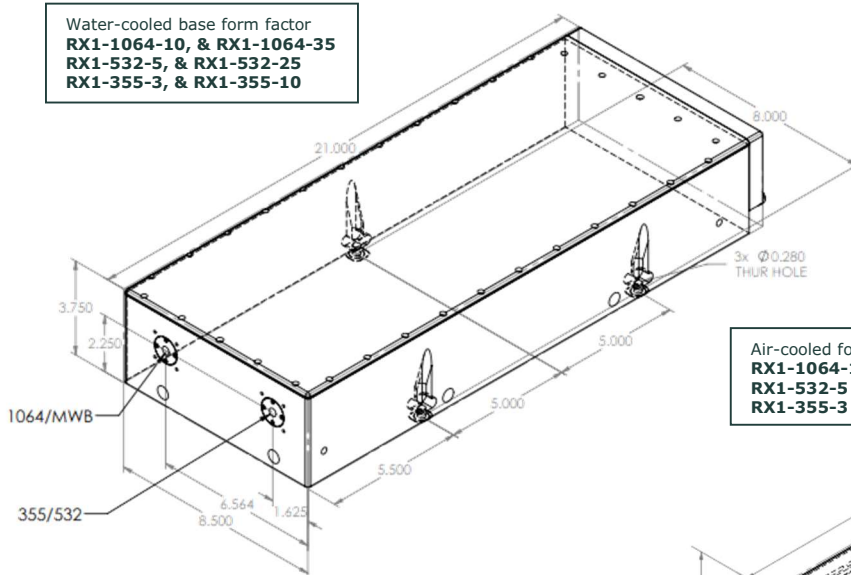
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Options	Designation
Pulse width ~20 ps, Long pulse option	-LP e.g., RX1-355-3-M-LP
Single shot to 8 MHz, High pulse repetition rate option	-8M e.g., RX1-355-15-H-8M
Fixed pulse repetition rate ~32 MHz, Quasi-CW (continuous-wave) operation option	-QCW e.g., RX1-355-3-QCW
Multi-wavelength blended or selectable output option	-MWB, or -MWS e.g., RX1-1064-10-MWB
Beam diameter at ~4 mm, Beam expansion option	-BEX e.g., RX1-355-10-BEX
Water-cooled plate Water-cooled plate on air-cooled form factor lasers option	-WC e.g., RX1-1064-10-WC

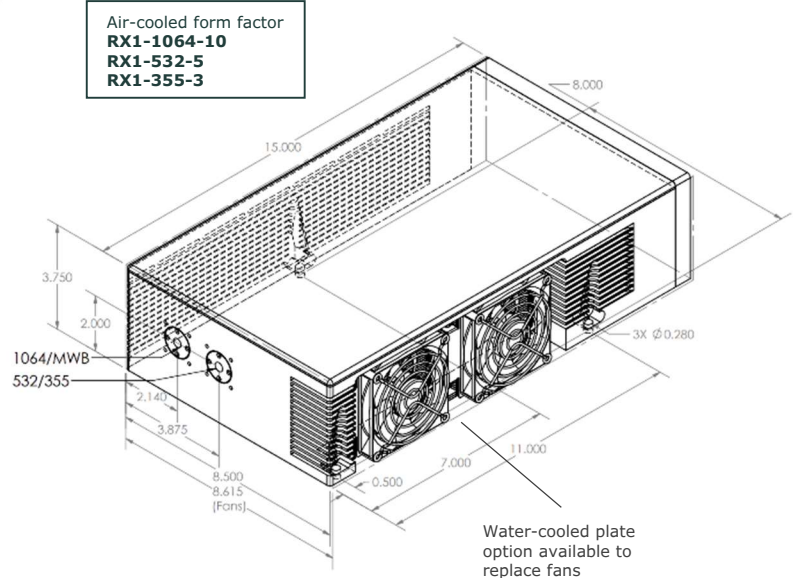
Features



Dimensional Drawing



Photonics Industries RX Series picosecond lasers are all-in-one (AIO) and do not require a separate controller or utility module. All connections for operation and control of the laser can be found on the back panel of the AIO laser.



Due to Photonics Industries' commitment to continuous product improvement, specifications and drawings are subject to change without notice.

Photonics Industries conforms to provisions of US 21 CFR 1040.10 & 1040.11 and is made under one or more US patents listed below: 9,531,147, 8,817,831, 7,869,471, 7,346,092, 7,082,149, 7,079,557, 6,999,483, 6,980,574, 6,961,355, 6,842,293, 6,762,405, 6,690,692, 6,587,487, 6,584,134, 6,366,596, 6,356,578, 6,327,281, 6,246,707, 6,229,829, 6,108,356, 6,061,370, 6,028,620, 5,936,983, 5,898,717 and Pending Patents.

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Main Headquarters: 1800 Ocean Ave, Ronkonkoma, New York 11779, United States

Photonics Industries International is the pioneer of intracavity harmonic lasers and is at the forefront of developing, manufacturing and marketing a wide range of nanosecond, sub-nanosecond, picosecond and femtosecond lasers for industrial, scientific, defense, and medical industries. Check out our products and see how we can help you apply our lasers to your needs.

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Rayture Systems



レイチャーシステムズ株式会社

〒160-0006 東京都新宿区舟町7 ロクサンビル7F

TEL : 03-3351-0717 FAX : 03-3351-6771

URL : <http://www.rayture-sys.co.jp>

E-mail : laser@rayture-sys.co.jp