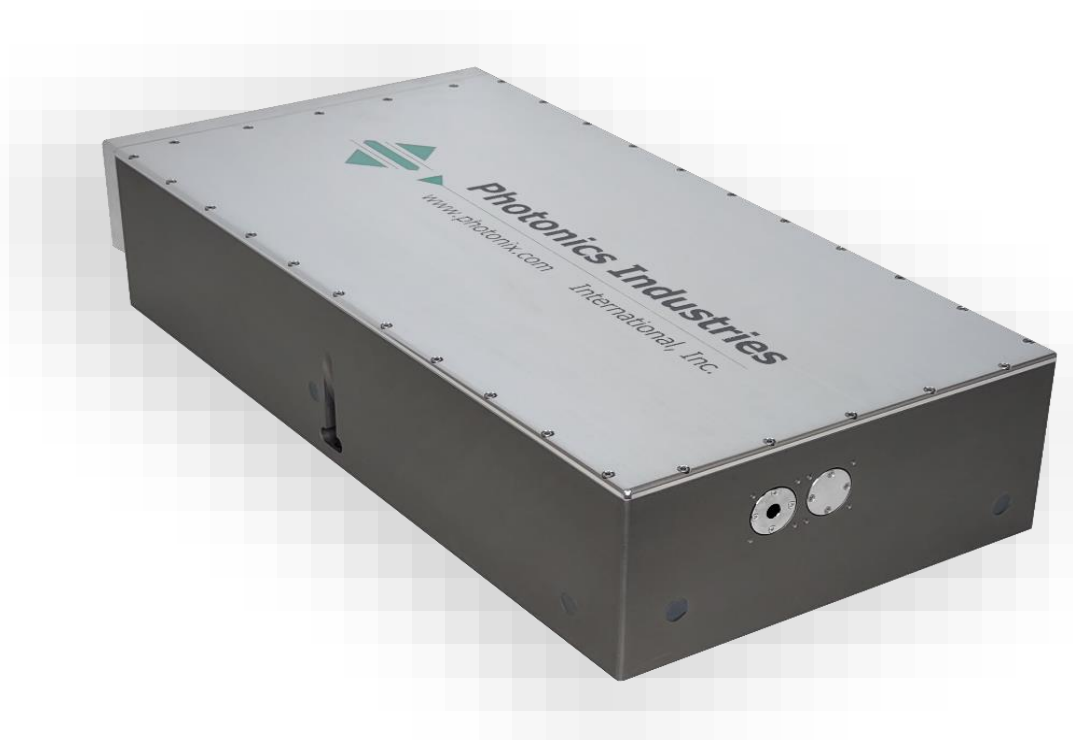


# FS Series

## FS Femtosecond Lasers

Experience unmatched precision with Photronics Industries' FS Series Femtosecond Lasers. With ultra-short pulses (<550 fs), up to 200 W at 1030 nm, and high repetition rates up to 8 MHz, these compact lasers deliver high-efficiency performance for any application requiring speed, accuracy, or versatility. Designed for seamless integration, the FS Series delivers up to >1.3mJ single-pulse energy in a compact all-in-one design, eliminating bulky external components. It's perfect for industrial systems and advanced research.



### APPLICATIONS

- Glass Cutting, engraving and drilling.
- Through Glass Via (TGV) and interposer processing.
- Semiconductor and Microelectronics Processing
- Precision Micromachining of metals and ceramics
- Foils and Films for Batteries and Superconductors.
- UV Processing of Polymers and Organic Materials
- Polymer Cutting & Drilling
- Quantum Technology Development
- Medical Device Manufacturing

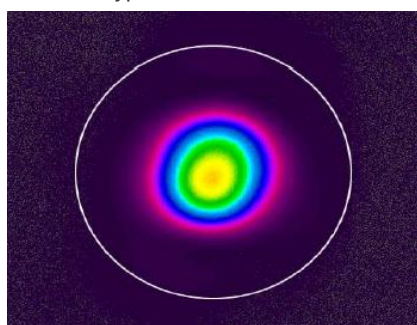
### FEATURES

- Up to 1.3mJ Pulse Energy at 100kHz
- True TEM<sub>00</sub> Output
- Ultrafast Short Pulse Widths
- **DIGI-Burst™** Mode for Pulse Control
- **FLEX-Pulse™** suit of controls including:
  - Dynamic Pulse Energy Control - **PEC**
  - Position Synchronized Output - **PSO**
- Power Monitoring and Self-Calibration
- Robust & Compact Monolithic Form Factor

Specifications – FS Series				
	FS-1030-50	FS-1030-100	FS-1030-150	FS-1030-200*
Wavelength (nm) <sup>1</sup>	1030 ± 5			
Average Power (W) @ 1MHz	50	100	150	200
Pulse Energy (μJ) @100kHz	>250	> 700	>1000	>1300
Pulse Width <sup>2</sup>	<550fs to 5ps		<650fs – 5ps	
Pulse repetition rate <sup>3,4</sup>	Single shot to 2 MHz			
Pulse-to-pulse stability (RMS %) <sup>5</sup>	~1			
Long-term power stability (RMS %) <sup>6</sup>	<1			
Beam spatial mode <sup>†</sup> & M <sup>2</sup>	TEM <sub>00</sub> - M <sup>2</sup> <1.3			
Beam Diameter at 1 MHz (mm)	≤2		≤2.5	
Pulse Picker Leakage (dB)	40			
Beam Roundness (%)	~90			
Beam pointing stability (μrad) <sup>†</sup>	<25			
Polarization ratio	>100:1			
	Operational Specifications and Characteristics			
Interface	RS232, Ethernet, Software GUI, External TTL Triggering			
Warm-up time	< 30 Minutes			
Electrical requirement	32 V DC, 28 A	32V DC, 36A	32V DC, 18A / 48V DC, 16A	48V DC, 30A
Line frequency (Hz)	50-60			
Power consumption (W) <sup>7</sup>	<700	<1000	<1600	<2000
Dimensions	20 x 10 x 4.25 in. [508 x 254 x 107.95mm]	22 x 10 x 4.25in [558.8 x 254 x 107.95mm]	24 x 12 x 4.5in [609.6 x 304.8 x 107.95mm]	24 x 14 x 4.5 in [609.6 x 355.6 x 107.95mm]
Weight	60lbs [~27kg]	~65lbs [~29.5kg]	~73lbs [33.1kg]	~90lbs [41kg]
	Environmental Requirements			
Ambient temperature <sup>2</sup>	Ambient 15°C to 30°C (59°F to 86°F) Operating Range			
	Relative humidity 0% to 80% max, non-condensing			
Storage conditions	-10°C to 40°C; sea level to 12000 m			
	0% to 80% relative Humidity, non-condensing			
Cooling system	Water-Cooled			

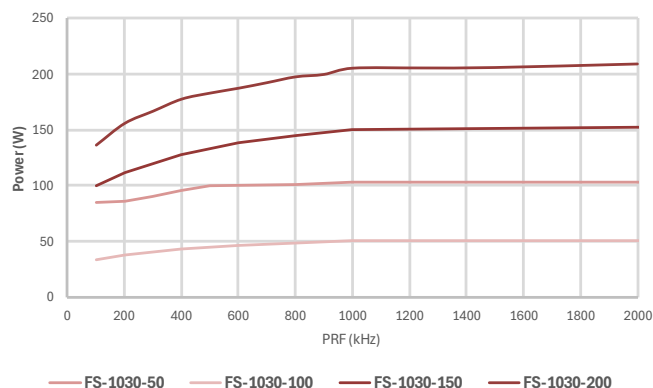
[1.] Multi-wavelength options are available. Contact us. [2.] Specifiable pulse width. [3.] Lower repetition rates, down to single shot, achieved by utilizing PSO. [4.] Fixed pulse repetition rate at ~32 MHz available on request. [5.] Measured at ambient temperature ± 2°C. [6.] Measured over 8 hours ± 1°C. [7.] Power consumption data does not include an external chiller's power consumption. [†] Tested with laser mounted horizontally. [NB] All specifications are at the optimized repetition rate. [\*] For Dimensional Drawing, please contact PI

Typical Beam Profile



FS-1030-100 @ 1MHz

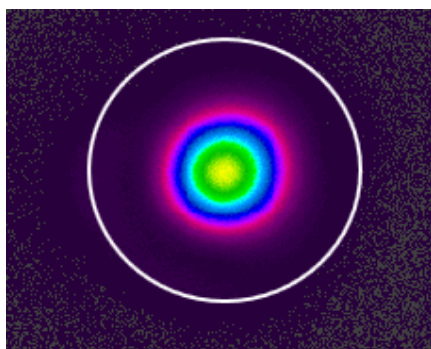
Power Vs. PRF



Specifications – FS Series				
	FS-515-25	FS-515-50	FS-515-75	FS-515-100*
Wavelength (nm) <sup>1</sup>	515 ± 3			
Average Power (W) @ 600kHz	25	50	75	100
Pulse Energy (μJ) @400kHz	>125	>350	>550	>750
Pulse Width <sup>2</sup>	<550fs to 5ps		<650fs – 5ps	
Pulse repetition rate) <sup>3,4</sup>	Single shot to 2MHz			
Pulse-to-pulse stability (RMS %) <sup>5</sup>	~1			
Long-term power stability (RMS %) <sup>6</sup>	≤1			
Beam spatial mode <sup>†</sup> & M <sup>2</sup>	TEM <sub>00</sub> - M <sup>2</sup> <1.3			
Beam Diameter at 1 MHz (mm)	≤2		≤2.5	
Pulse Picker Leakage (dB)	40			
Beam Roundness (%)	~90			
Beam pointing stability (μrad) <sup>†</sup>	~25			
Polarization ratio	>100:1			
	Operational Specifications and Characteristics			
Interface	RS232, Ethernet, Software GUI, External TTL Triggering			
Warm-up time	< 30 Minutes			
Electrical requirement	32 V DC, 28 A	32V DC, 36A	32V DC, 18A / 48V DC, 16A	48V, 30A
Line frequency (Hz)	50-60			
Power consumption (W) <sup>7</sup>	<700	<1000	<1500	<2000
Dimensions	20 x 10 x 4.25 in. [508 x 254 x 107.95mm]	22 x 10 x 4.25in [558.8 x 254 x 107.95mm]	24 x 12 x 4.5in [609.6 x 304.8 x 107.95mm]	24 x 14 x 4.5 in [609.6 x 355.6 x 107.95mm]
Weight	60lbs [~27kg]	65lbs [~29.5kg]	~73lbs [33.1kg]	~90lbs [41kg]
	Environmental Requirements			
Ambient temperature <sup>2</sup>	Ambient 15°C to 30°C (59°F to 86°F) Operating Range			
	Relative humidity 0% to 80% max, non-condensing			
Storage conditions	-10°C to 40°C; sea level to 12000 m			
	0% to 80% relative Humidity, non-condensing			
Cooling system	Water-Cooled			

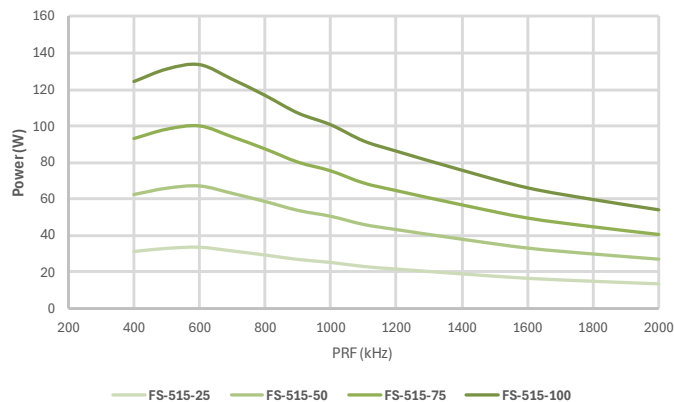
[1.] Multi-wavelength options are available. Contact us. [2.] Specifiable pulse width. [3.] min PRF for standard model is 1 MHz, custom min PRF down to 100 kHz is available. Lower repetition rates, down to single shot, achieved by utilizing PSO. [4.] Fixed pulse repetition rate at ~32 MHz available on request. [5.] Measured at ambient temperature ± 2°C. [6.] Measured over 8 hours ± 1°C. [7.] Power consumption data does not include an external chiller's power consumption. [†] Tested with laser mounted horizontally. [NB] All specifications are at the optimized repetition rate. [\*] For Dimensional Drawing, please contact PI

Typical Beam Profile



FS-515-25 @ 1MHz

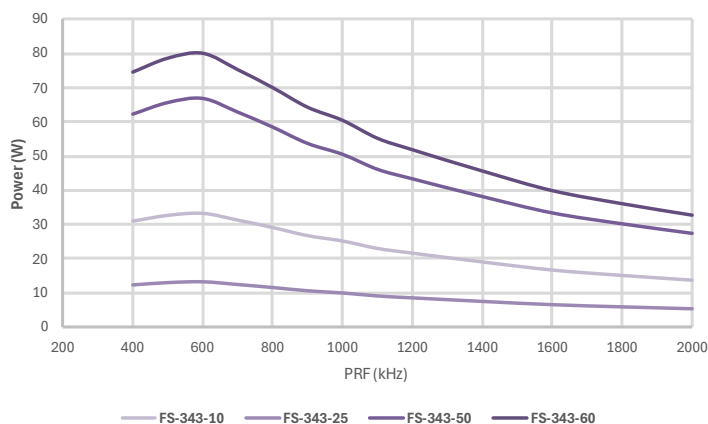
Power Vs. PRF



Specifications – FS Series				
	FS1-343-10	FS-343-25	FS-343-50	FS-343-60 *
Wavelength (nm) <sup>1</sup>	343 ± 2			
Average Power (W) @ 600kHz	10	25	45	60
Pulse Energy (μJ) @ 400kHz	>10	>25	>45	>60
Pulse Width <sup>2</sup>	<550fs to 5ps		<650fs to 5ps	
Pulse repetition rate <sup>3,4</sup>	Single shot to 2MHz			
Pulse-to-pulse stability (RMS %) <sup>5</sup>	~1			
Long-term power stability (RMS %) <sup>6</sup>	≤1			
Beam spatial mode <sup>†</sup> & M <sup>2</sup>	TEM <sub>00</sub> - M <sup>2</sup> <1.3			
Pulse Picker Leakage (dB)	40			
Beam Roundness (%)	~90			
Beam pointing stability (μrad) <sup>†</sup>	<25			
Polarization ratio	>100:1			
	Operational Specifications and Characteristics			
Interface	RS232, Ethernet, Software GUI, External TTL Triggering			
Warm-up time	< 30 Minutes			
Electrical requirement	32 V DC, 28 A	32V DC, 36A	32V DC, 18A / 48V DC, 16A	48V, 30A
Line frequency (Hz)	50-60			
Power consumption (W) <sup>7</sup>	<600	<900	<1500	<2000
Dimensions	20 x 10 x 4.25 in. [508 x 254 x 107.95mm]	22 x 10 x 4.25in [558.8 x 254 x 107.95mm]	24 x 12 x 4.5in [609.6 x 304.8 x 107.95mm]	24 x 14 x 4.5 in [609.6 x 355.6 x 107.95mm]
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Ambient temperature <sup>2</sup>	Ambient 15°C to 30°C (59°F to 86°F) Operating Range			
	Relative humidity 0% to 80% max, non-condensing			
Storage conditions	-10°C to 40°C; sea level to 12000 m			
	0% to 80% relative Humidity, non-condensing			
Cooling system	Water-Cooled			

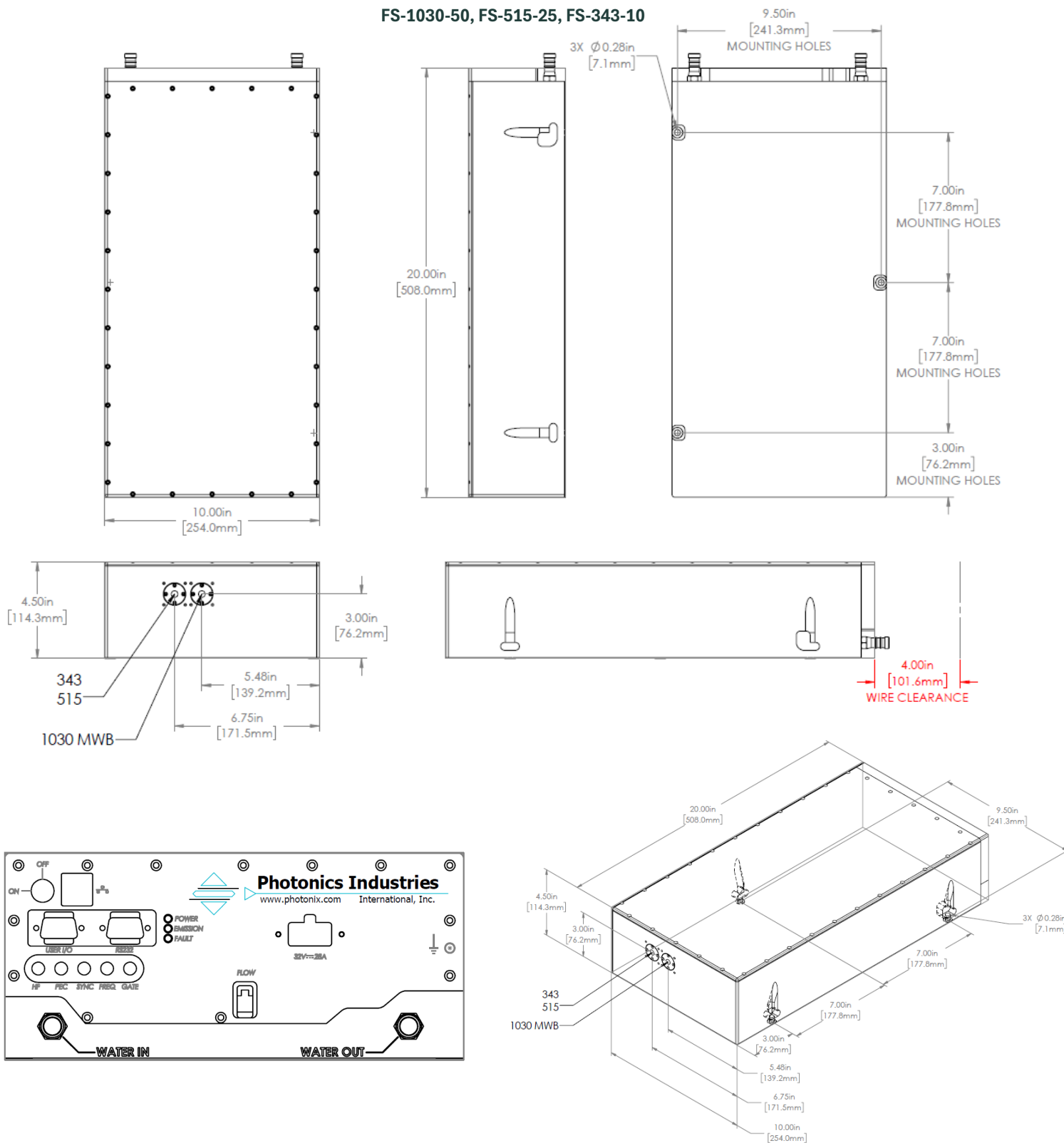
[1.] Multi-wavelength options are available. Contact us. [2.] Specifiable pulse width. [3.] Lower repetition rates, down to single shot, achieved by utilizing PSO. [4.] Fixed pulse repetition rate at ~32 MHz available on request. [5.] Measured at ambient temperature ± 2°C. [6.] Measured over 8 hours ± 1°C. [7.] Power consumption data does not include an external chiller's power consumption. [†] Tested with laser mounted horizontally. [NB] All specifications are at the optimized repetition rate. [\*] For Dimensional Drawing, please contact PI

Power Vs. PRF



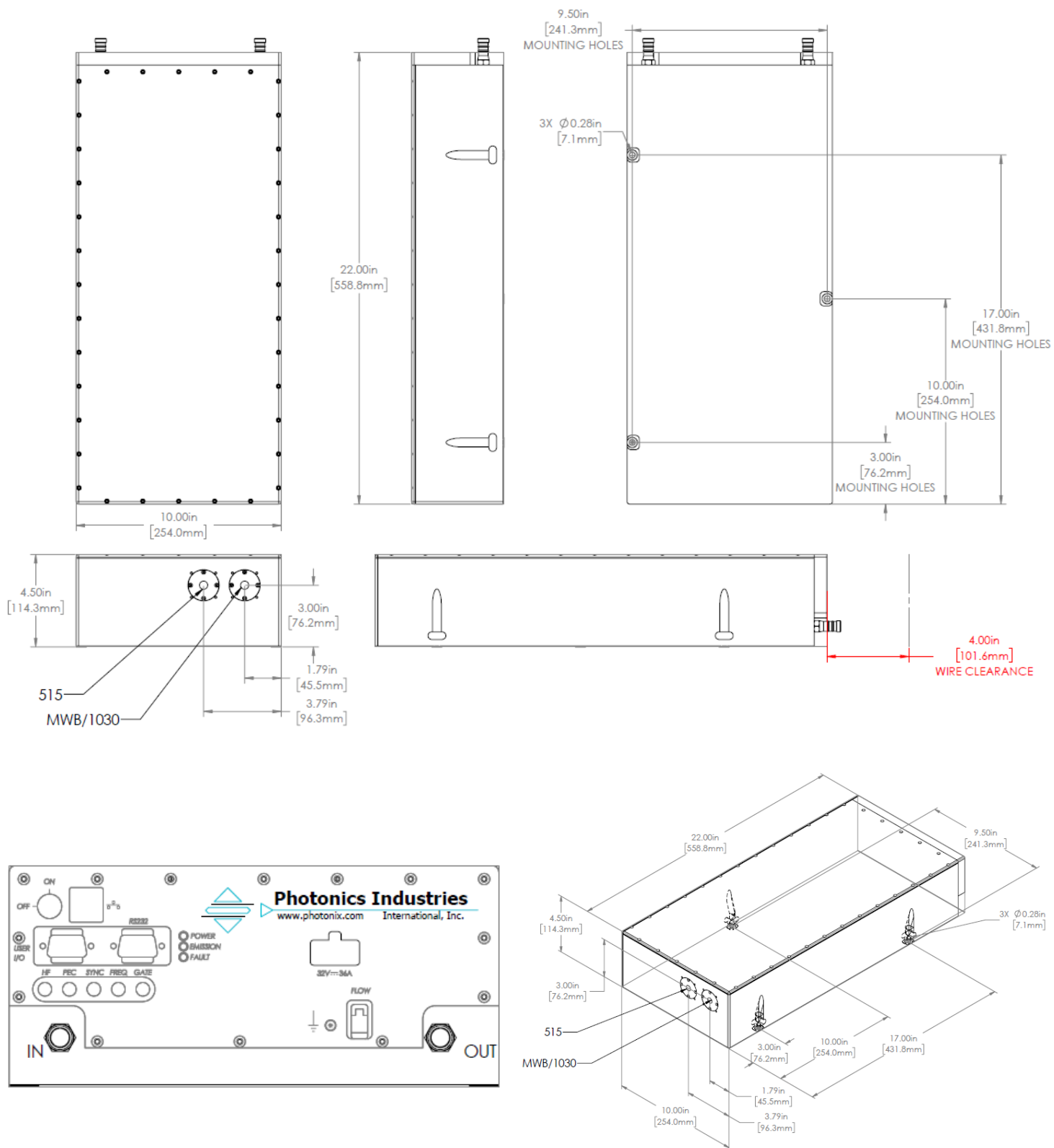
# Dimensional Drawings

**FS-1030-50, FS-515-25, FS-343-10**



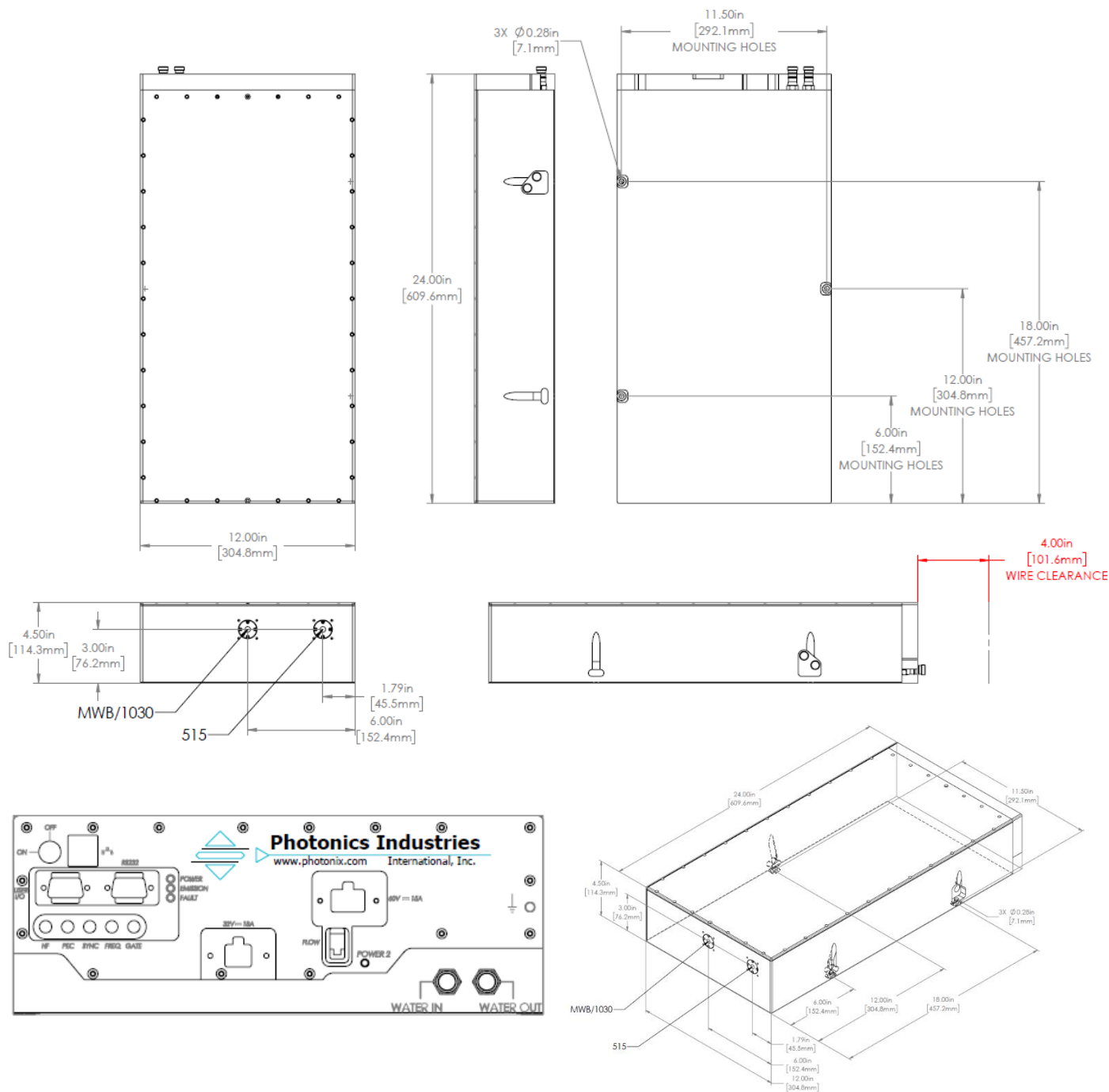
## Dimensional Drawings

**FS-1030-100, FS-515-50, FS-343-25**



## Dimensional Drawings

### FS-1030-150, FS-515-100, FS-343-50



Our ongoing policy is to improve the design and specification of our products. The information provided is non-binding.

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Photonics Industries International Inc. 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 the industrial, scientific, defense and medical industries.

For more information [www.photonix.com](http://www.photonix.com)