

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

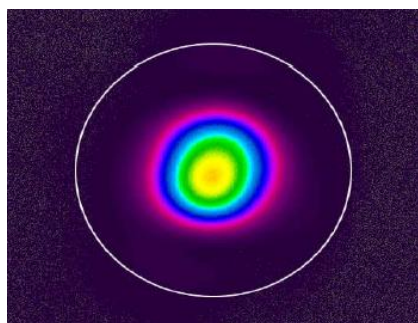
FEATURES

- Up to 1.3mJ Pulse Energy at 100kHz
- True TEM₀₀ 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) ¹ | 1030 ± 5 | | | |
| Average Power (W) @ 1MHz | 50 | 100 | 150 | 200 |
| Pulse Energy (μJ) @100kHz | >250 | > 700 | >1000 | >1300 |
| Pulse Width ² | <550fs to 5ps | | <650fs – 5ps | |
| Pulse repetition rate ^{3,4} | Single shot to 2 MHz | | | |
| Pulse-to-pulse stability (RMS %) ⁵ | ~1 | | | |
| Long-term power stability (RMS %) ⁶ | <1 | | | |
| Beam spatial mode [†] & M ² | TEM ₀₀ - M ² <1.3 | | | |
| Beam Diameter at 1 MHz (mm) | ≤2 | | ≤2.5 | |
| Pulse Picker Leakage (dB) | 40 | | | |
| Beam Roundness (%) | ~90 | | | |
| Beam pointing stability (μrad) [†] | <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) ⁷ | <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 ² | 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 | | | |

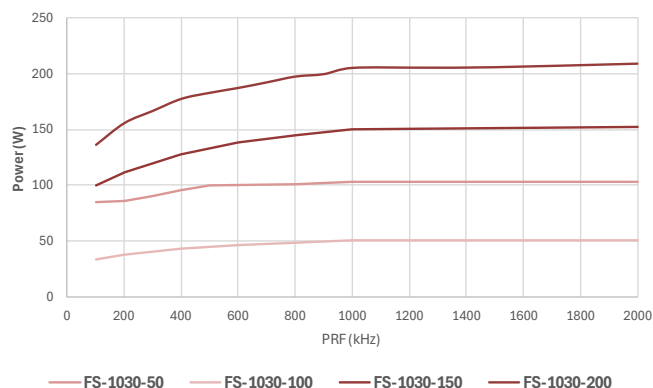
[1.] Multi-wavelength options are available. Contact us. [2.] Specifiable pulse width. [3.] Lower repetition rates, down to single shot, achieved by utilizing PSO. [4.] Fixed pulse repetition rate at ~32 MHz available on request. [5.] Measured at ambient temperature ± 2°C. [6.] Measured over 8 hours ± 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

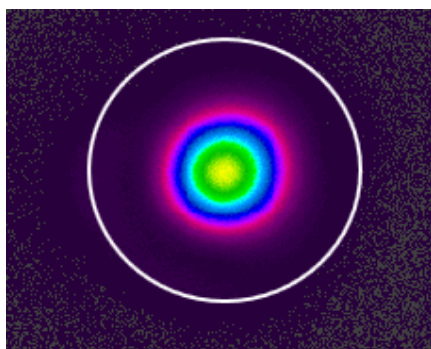
Power Vs. PRF



| Specifications – FS Series | | | | |
|---|--|--|---|--|
| | FS-515-25 | FS-515-50 | FS-515-75 | FS-515-100 |
| Wavelength (nm) ¹ | 515 ± 3 | | | |
| Average Power (W) @ 600kHz | 25 | 50 | 75 | 100 |
| Pulse Energy (μJ) @400kHz | >125 | >350 | >550 | >750 |
| Pulse Width ² | <550fs to 5ps | | <650fs – 5ps | |
| Pulse repetition rate) ^{3,4} | Single shot to 2MHz | | | |
| Pulse-to-pulse stability (RMS %) ⁵ | ~1 | | | |
| Long-term power stability (RMS %) ⁶ | ≤1 | | | |
| Beam spatial mode [†] & M ² | TEM ₀₀ - M ² <1.3 | | | |
| Beam Diameter at 1 MHz (mm) | ≤2 | | ≤2.5 | |
| Pulse Picker Leakage (dB) | 40 | | | |
| Beam Roundness (%) | ~90 | | | |
| Beam pointing stability (μrad) [†] | ~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) ⁷ | <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 ² | 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 | | | |

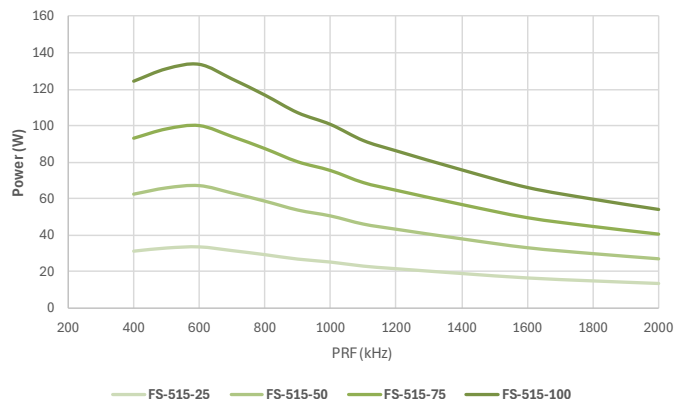
[1.] Multi-wavelength options are available. Contact us. [2.] Specifiable pulse width. [3.] min PRF for standard model is 1 MHz, custom min PRF down to 100 kHz is available. Lower repetition rates, down to single shot, achieved by utilizing PSO. [4.] Fixed pulse repetition rate at ~32 MHz available on 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

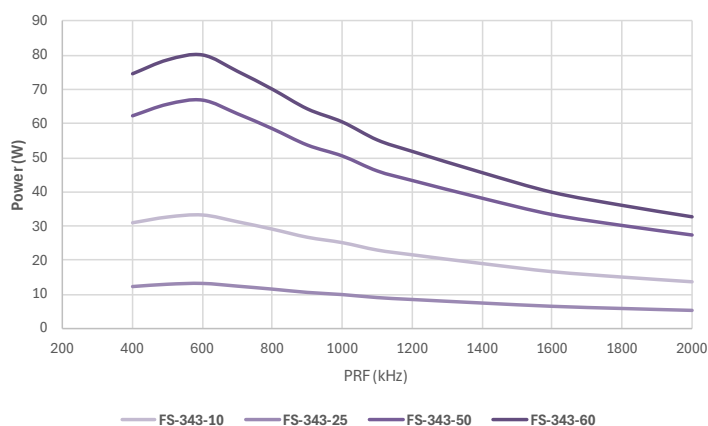
Power Vs. PRF



| Specifications – FS Series | | | | |
|---|--|--|---|--|
| | FS1-343-10 | FS-343-25 | FS-343-50 | FS-343-60 |
| Wavelength (nm) ¹ | 343 ± 2 | | | |
| Average Power (W) @ 600kHz | 10 | 25 | 45 | 60 |
| Pulse Energy (μJ) @ 400kHz | >10 | >25 | >45 | >60 |
| Pulse Width ² | <550fs to 5ps | | <650fs to 5ps | |
| Pulse repetition rate ^{3,4} | Single shot to 2MHz | | | |
| Pulse-to-pulse stability (RMS %) ⁵ | ~1 | | | |
| Long-term power stability (RMS %) ⁶ | ≤1 | | | |
| Beam spatial mode [†] & M ² | TEM ₀₀ - M ² <1.3 | | | |
| Pulse Picker Leakage (dB) | 40 | | | |
| Beam Roundness (%) | ~90 | | | |
| Beam pointing stability (μrad) [†] | <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) ⁷ | <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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| | Environmental Requirements | | | |
| Ambient temperature ² | 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 | | | |

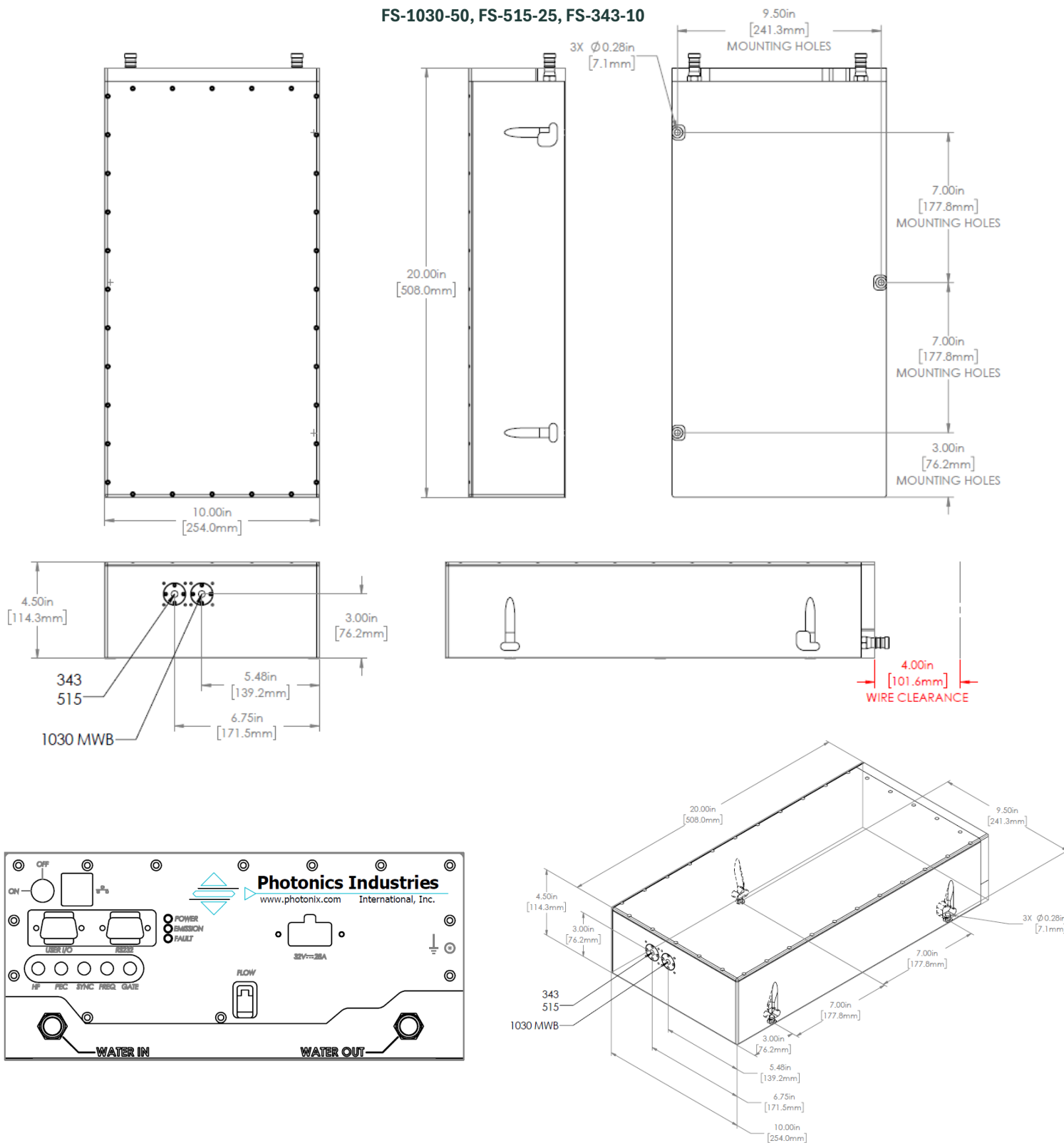
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Power Vs. PRF

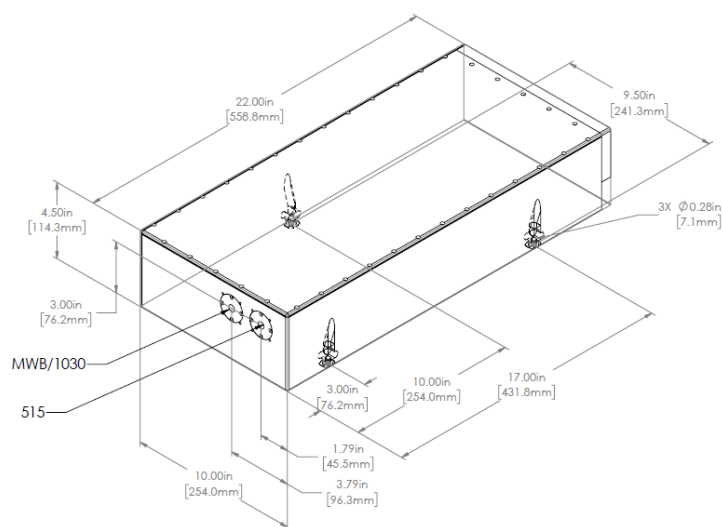
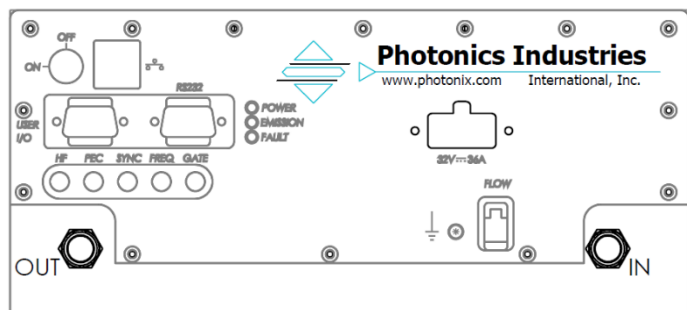
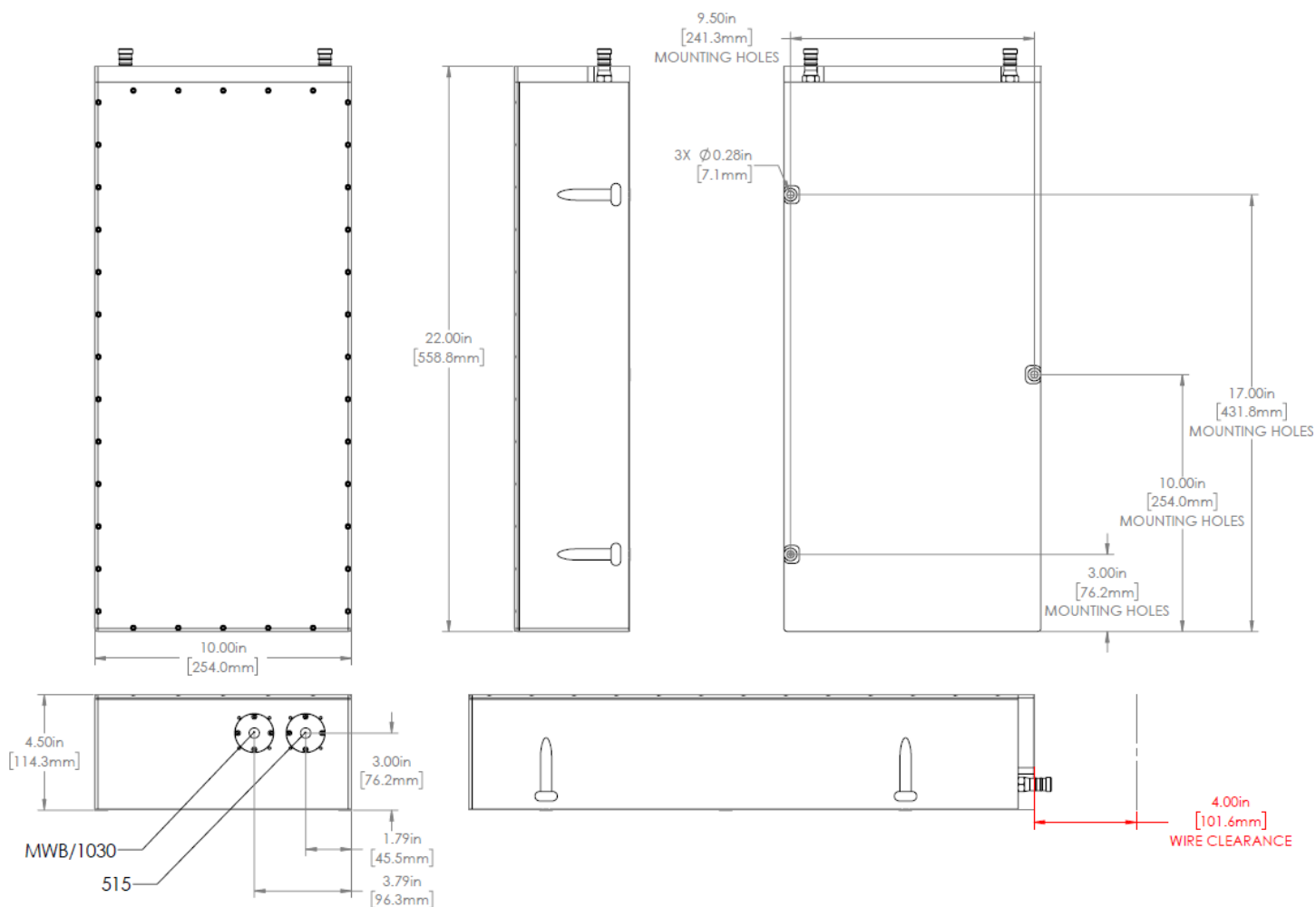


Dimensional Drawings

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

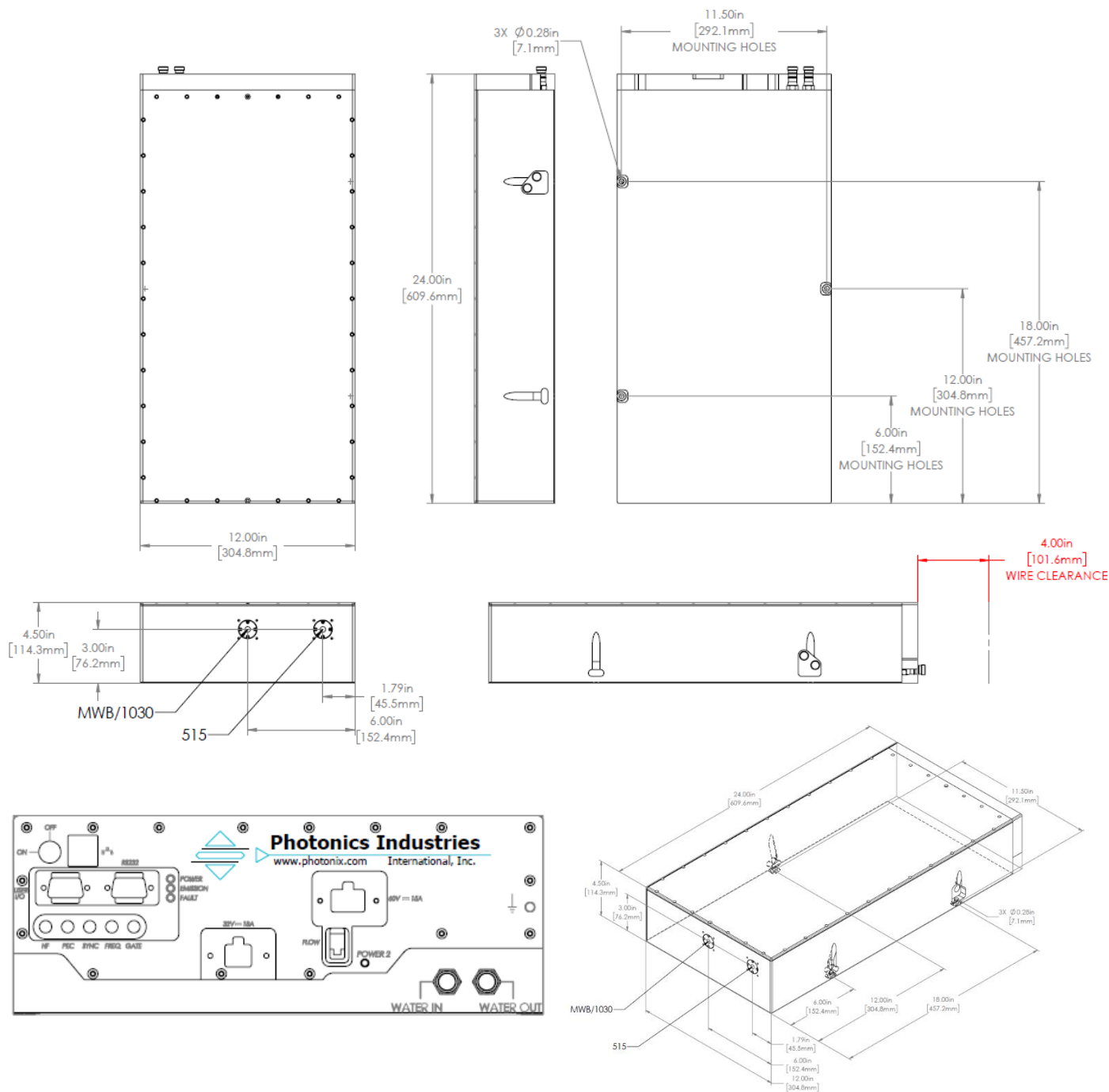


Dimensional Drawings FS-1030-100, FS-515-50, FS-343-25



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