Explorer® One™

COMPACT AND LIGHTWEIGHT UV AND GREEN ns LASERS

The Explorer One Advantage

- *Unique all-in-one design – most compact and highest power laser of its class*
- *Lightweight – less than 1.5 kg – ideal for gantry applications*
- *Feature rich software and hardware features for ease-of-use and simplified integration*
- *Outstanding pulse energy stability of <3%*
- *Single pulse energy measurement up to 300 kHz*
- *Air-cooled design*
- *Rugged, reliable design for demanding 24/7 applications*

Applications

- *MALDI-TOF mass spectrometry*
- *Laser microdissection*
- *FPD repair*
- *UV titling*
- *Intra-glass and glass surface marking*
- *General UV marking*
- *Micromachining*
- *Wafer inspection and marking*
- *Metal marking*
- *Thin film scribing*
- *LIDAR*

The Spectra-Physics Explorer® One™ series combines innovative and leading edge laser technology by uniting control electronics and laser resonator design into the same footprint of its predecessor, the Explorer. Re-engineered to offer the most compact and powerful solution, the Explorer One *It's in the Box™* design sets the pace for innovation and unmatched laser performance in a tiny package.

The Explorer One laser models are available in the UV at 349 nm, 355 nm and in the green at 532 nm. The Explorer One 349 lasers deliver a pulse energy of 60 µJ and 120 µJ at 1 kHz, the new Explorer HE 355-100 achieve a pulse energy exceeding 80 µJ at 10 kHz and the Explorer One HE 532-200 offers 200 µJ pulse energy at 10 kHz pulse repetition frequency. The new Explorer One 355-1 offers now 800 mW average power and the Explorer One 532-2 provides 2 W of average power at 50 kHz pulse repetition rate.

The Explorer One series' ease-of-use and handling simplify integration into different tools or instruments. The very small dimensions of the air-cooled Explorer One series makes this laser the technology of choice for system integrators who require integrating lasers into a tight space or small tabletop-like instrument. Only the 24 VDC supply cable and a serial or analog control cable is required to install and operate the laser on a moving system like gantry integration.

Versatility and flexibility is realized by integrating advanced and value-added hardware and software elements such as E-Pulse™, active pulse detection, Burst mode, on-demand auto-calibration and single pulse energy measurements up to 300 kHz. Explorer One's output power is adjustable to optimize the laser performance to the application needs. Additionally, the system can be operated using TTL and analog control signals. Real-time pulse energy values are available on the integrated analog port. For applications that rely on the synchronization of multiple lasers, the Explorer One offers a dedicated port to operate multiple lasers synchronously or with precisely separated laser pulses.

Based on the proven Explorer architecture, the Explorer One is extremely rugged, highly reliable, and ideal for demanding 24/7 applications. All optical components are soldered in place to ensure exceptional ruggedness and durability in harsh operating environments. No solder flux is used, thereby minimizing organic contaminants that can degrade laser performance. The Explorer One has been tested to endure shock and vibration with accelerations exceeding 200 g's.

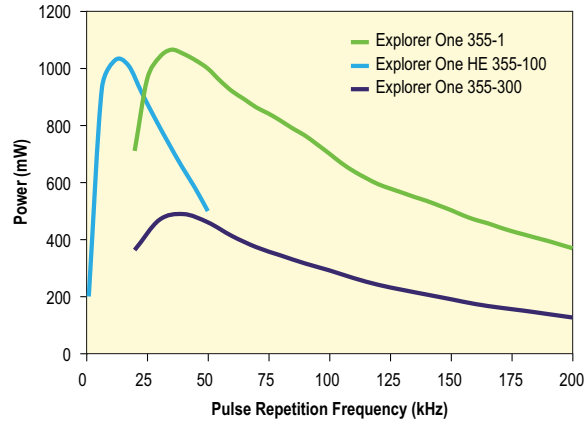
Explorer One lasers provide superior mode quality (M^2 <1.1) over the full repetition range of up to 300 kHz. The Spectra-Physics patented intra-cavity design enables efficient conversion to the UV, resulting in the highest pulse-to-pulse stability for consistent processing and higher yields.

Spectra-Physics®
A Newport Company

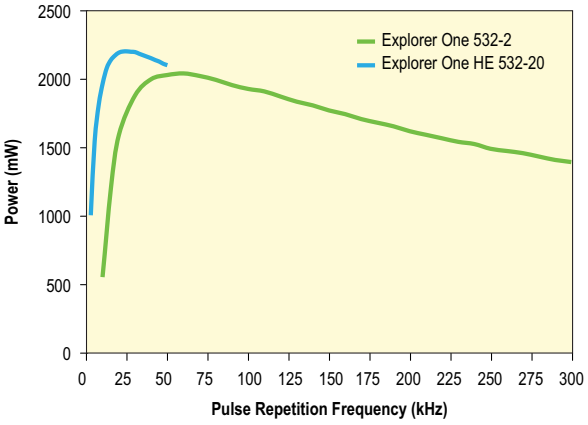
It's in the Box™

Explorer® One™

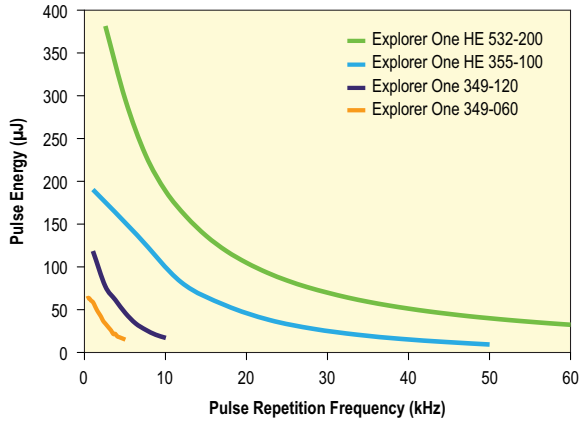
Explorer One 355 Typical Performance[1]



Explorer One 532 nm Typical Performance[1]

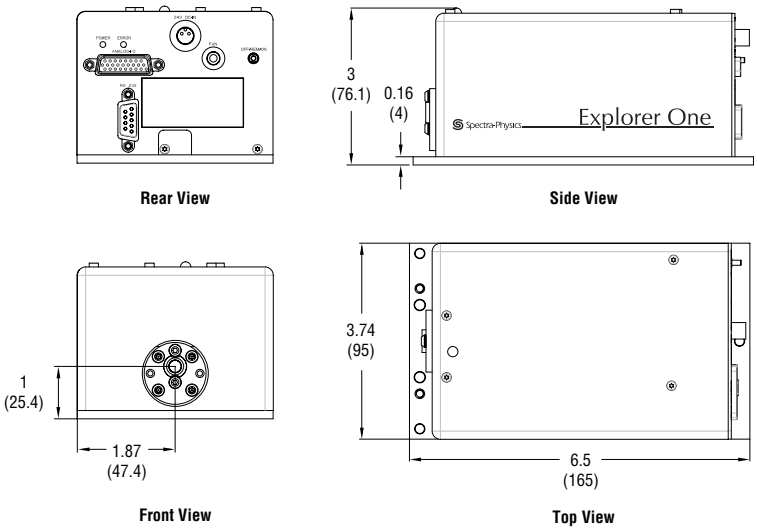


Explorer One High Energy (HE) Models Typical Performance[1]



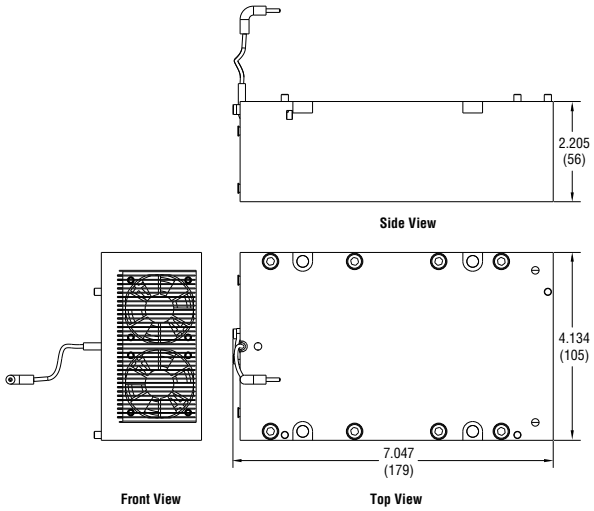
1. Typically measured performance; not a guaranteed or warranted specification.

Explorer One Dimensions



Dimensions in inch (mm)

Explorer One with Optional Heatsink



Dimensions in inch (mm)

Explorer® One™

Specifications[1]

	Explorer One 349	Explorer One HE 355-100	Explorer One 355-1	Explorer One 355-300	Explorer One 532-2	Explorer One HE 532-200
Output Characteristics						
Wavelength	349 nm	355 nm	355 nm	355 nm	532 nm	532 nm
Gain Medium	Nd:YLF	Nd:YAG	Nd:YVO_4	Nd:YVO_4	Nd:YVO_4	Nd:YAG
Pulse Energy[2]	60 µJ or 120 µJ @ 1 kHz	80 µJ @ 10 kHz	—	—	—	200 µJ @ 10 kHz
Output Power[3]	—	800 mW @ 10 kHz	800 mW @ 50 kHz	300 mW @ 50 kHz	2 W @ 50 kHz	—
Pulse Width (FWHM)	<5 ns @ 1 kHz	<15 ns @ 10 kHz	<10 ns @ 50 kHz	<15 ns at 50 kHz	<15 ns @ 50 kHz	<15 ns @ 10 kHz
Pulse Energy Noise (rms)[2, 3, 4]	<3%					
Long Term Stability (rms)	<2%					
Repetition Rate	Single shot to 5 kHz	Single shot to 60 kHz	Single shot to 300 kHz[3]	Single shot to 200 kHz[3]	Single shot to 200 kHz[3]	Single shot to 60 kHz
Jitter (Laser Pulse to OptoSync)	<±0.5 ns (peak-to-peak)	—	—	—	—	—
Beam Characteristics						
Spatial Mode	M^2 <1.3, TEM_{00}					
Beam Diameter, at waist ($1/e^2$)	0.170 mm ±0.015 mm (X) 0.150 mm ±0.015 mm (X)[4] 0.150 mm ±0.015 mm (Y) 0.140 mm ±0.015 mm (Y)[4]	0.170 mm ±0.025 mm	0.190 mm ±0.035 mm	0.170 mm ± 0.025 mm	0.21 mm ±0.021 mm	0.185 mm ±0.020 mm
Beam Divergence, full angle ($1/e^2$)	3.0 ±0.5 mrad 3.2 ±0.5 mrad[4]	2.7 ±0.5 mrad	2.5 ±0.6 mrad	3.0 ±0.5 mrad	3.5 ±0.5 mrad	3.8 ±0.5 mrad
Operating Conditions						
Warm-up Time (cold start to >95% full power)	<10 min					
Polarization Ratio	>100:1 (vertical)				>100:1 (horizontal)	
Operating Voltage	24 VDC ±2 V					
Maximum Inrush Current	<4 A					
Maximum Power Consumption	<75 W					
Typical Power Consumption	<50 W at 25°C					
Laser Head Thermal Heat Dissipation	<75 W					
Operating Temperature						
Laser Head	18–40°C (relative humidity <80%; dew point <20°C)[5]					
Storage Temperature Range	-20 to 60°C (<90% relative humidity, non-condensing)					
Physical Characteristics						
Laser Head (L × W × H)	6.5 x 3.54 x 3 in (165 x 95 x 76.1 mm)					
Beam Height	25.4 mm	24.5 mm	24.5 mm	25.4 mm	25.4 mm	25.4 mm
Static Alignment Tolerance						
Beam Position	<±0.25 mm	<±0.3 mm	<±0.3 mm	<±0.25 mm	<±0.25 mm	<±0.25 mm
Beam Angle	<±1 mrad					

1. Due to our continuous product improvement program, specifications may change without notice.
2. Specified at nominal power/energy and repetition rate (see power/energy specifications).
3. PRF range from single shot to 20 kHz accessible with E-Pulse feature only when triggered externally.
4. Applies to Explorer One 349-60 model.
5. Housing temperature at base.

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