



Explorer[®] One[™]

Component Selection Guide



The Spectra-Physics[®] Explorer One and Explorer 1064 nm lasers deliver reliability and versatility in a compact footprint through their innovative diode-pumped solid state architecture. The lasers are easy to use and supply excellent mode quality. Their nearly diffraction-limited TEM₀₀ output beam allows for tight focusing and high spatial resolution. High reliability, high repetition rate, Gaussian beam parameters and superior pulse-to-pulse stability make the lasers the ultimate economic solution for demanding applications. The Explorer One series combines innovative and leading edge laser technology by uniting control electronics and laser resonator design into a compact design.

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 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 are required to install and operate the laser on a moving system like gantry integration.

Versatility and flexibility are realized by integrating advanced and value-added hardware and software elements such as E-Pulse[™] pulse energy control, burst mode, on-demand auto-calibration and single pulse energy measurements up to 300 kHz. The new E-Track[™] dynamic pulse energy control feature actively measures and controls the laser for continual energy and power stabilization even under rapidly changing operating set points or environments. E-Track enables "on-the-fly" adjustments and fast gating for precision micromachining applications such as scribing marking, and drilling of tiny features.

Recommended Optics & Optomechanics

It is critical to choose the right optics and optomechanical components that work best with your Explorer laser. Explorer's high UV and green output power necessitates optics that have a high damage threshold. MKS Newport offers a wide selection of the highest quality optics and optical components covering the entire spectrum UV, VIS, NIR and IR wavelengths to help you with your most challenging applications. In addition, for more than 30 years, we have manufactured the world's most comprehensive line of optical mounts and mechanics. Our precision optomechanics help our customers stay at the leading edge. MKS also offers LaserClean[™] components for low-contamination applications.

Please use the following recommendations to determine which components best serve your needs. If you need help making a selection or have questions about the following tables, please contact us at tech@newport.com.

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Recommended Optics & Optomechanics

Optics					Optomechanics		Explorer One Model											
Optics Type	λ	Part Number	LIDT	Description	Mount P/N	Mount Description	349	HE 355-100	355-1	355-300	532-2	532-200	532-5	355-2	355-4	1064-3	HP 355-6	HP HE 355-200
 Mirrors	355 nm	10QM20HM.45	3.5 J/cm ² @ 355 nm, 10 ns, 10 Hz	1" dia Mirror, 45° AOI	SN100C-F2H-V6	Suprema Clear Edge Mirror Mount, 1.0 in., (2) 100-TPI Locking Hex Key	•	•	•	•				•	•		•	•
	532 nm	10QM20HM.35	20 J/cm ² @ 532 nm, 20 ns, 20 Hz	1" dia Mirror, 45° AOI	9817-6-NI-K	Stability OEM Center Mount, Nickel Plated, 1.0 in., 3 Allen Adjust					•	•	•					
	532 nm	10Q20HE.2	15 J/cm ² @ 532 nm, 20 ns, 20 Hz	1" dia Mirror, 45° AOI	9814-6-NI-K	Stability Top Adjust Mirror Mount, Nickel Plated, 1.0 in., 2 Allen-key					•	•	•					
	1064 nm	10QM20HM.15	45 J/cm ² @ 1064 nm, 10 ns, 20 Hz	1" dia Mirror, 45° AOI	SN100C-F2H	Suprema Clear Edge Mirror Mount, 1.0 in., (2) 100-TPI Locking Hex Key											•	
	1064 nm	10Q20HE.1	40 J/cm ² @ 1064 nm, 20 ns, 20 Hz	1" dia Mirror, 45° AOI	9814-6-NI-K	Stability Top Adjust Mirror Mount, Nickel Plated, 1.0 in., 2 Allen-key											•	
 Polarizing Cube Beam Splitters	532 nm	05BC15PH.3	10 J/cm ² @ 1064 nm, 10 ns, 10 Hz	0.5" Polarizing Cube BS, High Power	UGP-1 and UGP-KIT-1	Ultima Gimbal Prism Mount, 1 in., 100 TPI Adjustment Screws and Adapter Kit, 0.50in. (12.7mm) Cube Riser					•	•	•					
	1064 nm	05BC15PH.9	10 J/cm ² @ 1064 nm, 10 ns, 10 Hz	0.5" Polarizing Cube BS, High Power	UGP-1 and UGP-KIT-1	Ultima Gimbal Prism Mount, 1 in., 100 TPI Adjustment Screws and Adapter Kit, 0.50in. (12.7mm) Cube Riser											•	
 Waveplates	355 nm	10RP02-08	2 J/cm ² @ 355 nm, 10 ns, 10 Hz	1" dia zero order 1/2 waveplate	RM25B	Polarizer Rotation Mount, 25.4 mm, 2° Grads, 1° Sensitivity	•	•	•	•				•	•		•	•
	355 nm	10RP04-08	2 J/cm ² @ 355 nm, 10 ns, 10 Hz	1" dia zero order 1/4 waveplate	9401	Rotary Mount, 1 inch Waveplates or Polarizers,	•	•	•	•				•	•		•	•
	532 nm	10RP02-16	2 J/cm ² @ 532 nm, 10 ns, 10 Hz	1" dia zero order 1/2 waveplate	RSP-1T	360° Continuous Rotation Stage, 1 in Aperture, Coarse & Fine Adj.					•	•	•					
	532 nm	10RP04-16	2 J/cm ² @ 532 nm, 10 ns, 10 Hz	1" dia zero order 1/4 waveplate	GM-1RA	Gimbal Tip/Tilt Rotation Mount, Ø1 in., 100 TPI					•	•	•					
	1064 nm	10RP02-34	2 J/cm ² @ 1064 nm, 10 ns, 10 Hz	1" dia zero order 1/2 waveplate	RSP-1T	360° Continuous Rotation Stage, 1 in Aperture, Coarse & Fine Adj.											•	
	1064 nm	10RP04-34	2 J/cm ² @ 1064 nm, 10 ns, 10 Hz	1" dia zero order 1/4 waveplate	GM-1RA	Gimbal Tip/Tilt Rotation Mount, Ø1 in., 100 TPI											•	
 Lenses (AR.10 for 355 nm, AR.14 for 532 nm & AR.33 for 1064 nm)	355 nm	SPXxxxAR.10	2 J/cm ² @ 355 nm, 10 ns, 10 Hz	Plano-convex lens, fused silica, 25.4 mm	(M-)LH-1A	A-LINE Fixed Lens Mount, 1.0 in. (25.4 mm) Diameter, 8-32(M4) Thd.	•	•	•	•				•	•		•	•
	355 nm	SBXxxxAR.10	2 J/cm ² @ 355 nm, 10 ns, 10 Hz	Bi-convex lens, fused silica, 25.4 mm	LPV-1	XYZ ØXØY Compact Lens Positioners, 1.0 in. Diameter	•	•	•	•				•	•		•	•
	355 nm	SPCxxxAR.10	2 J/cm ² @ 355 nm, 10 ns, 10 Hz	Plano-concave lens, fused silica, 25.4 mm	HVM-1t	Vertical Drive, Thin Optic Industrial Mount, , 1 in., 2 Locking Allen-Keys	•	•	•	•				•	•		•	•
	355 nm	SBCxxxAR.10	2 J/cm ² @ 355 nm, 10 ns, 10 Hz	Bi-concave lens, fused silica, 25.4 mm	LP-1A-XYZ	XYZ Lens Positioner, 1.0 in. (25.4 mm) Diameter	•	•	•	•				•	•		•	•
	532 nm	SPXxxxAR.14	7.5 J/cm ² @ 532 nm, 10 ns, 20 Hz	Plano-convex lens, fused silica, 25.4 mm	LA1V-XY	XY Compact Lens Positioner, 1.0 in. Diameter					•	•	•					
	532 nm	SBXxxxAR.14	7.5 J/cm ² @ 532 nm, 10 ns, 20 Hz	Bi-convex lens, fused silica, 25.4 mm	P100-At38	Kinematic, Thin Optic Mount, 25.4 mm, 3 Locking Allen-Key, 80 TPI					•	•	•					
	532 nm	SPCxxxAR.14	7.5 J/cm ² @ 532 nm, 10 ns, 20 Hz	Plano-concave lens, fused silica, 25.4 mm	LP-1A-XY	XY Lens Positioner, 1.0 in. (25.4 mm) Diameter					•	•	•					
	532 nm	SBCxxxAR.14	7.5 J/cm ² @ 532 nm, 10 ns, 20 Hz	Bi-concave lens, fused silica, 25.4 mm	LP-1A	XYZ ØXØY Lens Positioner, 1.0 in. Diameter					•	•	•					
	1064 nm	SPXxxxAR.33	7.5 J/cm ² @ 1064 nm, 10 ns, 20 Hz	Plano-convex lens, fused silica, 25.4 mm	LA1V-XY	XY Compact Lens Positioner, 1.0 in. Diameter											•	
	1064 nm	SBXxxxAR.33	7.5 J/cm ² @ 1064 nm, 10 ns, 20 Hz	Bi-convex lens, fused silica, 25.4 mm	P100-At38	Kinematic, Thin Optic Mount, 25.4 mm, 3 Locking Allen-Key, 80 TPI											•	
1064 nm	SPCxxxAR.33	7.5 J/cm ² @ 1064 nm, 10 ns, 20 Hz	Plano-concave lens, fused silica, 25.4 mm	LP-1A-XY	XY Lens Positioner, 1.0 in. (25.4 mm) Diameter											•		
1064 nm	SBCxxxAR.33	7.5 J/cm ² @ 1064 nm, 10 ns, 20 Hz	Bi-concave lens, fused silica, 25.4 mm	LP-1A	XYZ ØXØY Lens Positioner, 1.0 in. Diameter											•		

* Multiple lenses can be mounted with Newport's lens tubes and spacers

** Additional optics types and sizes are available – please go to <http://www.newport.com> or contact your local MKS sales representative

*** The optics listed in this guide will meet the requirements of most customer applications for the Explorer laser. Not all optics have been tested for all potential Explorer applications, so compatibility with all applications cannot be guaranteed. When selecting optics, please evaluate suitability for requirements of your application. If you need assistance, please contact your local MKS sales representative

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Recommended Optics & Optomechanics Continued

Optics					Optomechanics		Explorer One Model											
Optics Type	λ	Part Number	LIDT	Description	Mount P/N	Mount Description	349	HE 355-100	355-1	355-300	532-2	532-200	532-5	355-2	355-4	1064-3	HP 355-6	HP HE 355-200
 High Energy Plano-Convex Lenses	355 nm	SPXxxxAR.3	5 J/cm ² @ 355 nm, 20 ns, 10 Hz	Plano-Convex Lens, Fused Silica, 25.4 mm, AR.3 coated	LP-1A-XYZ	XYZ Lens Positioner, 1.0 in. (25.4 mm) Diameter	•	•	•	•				•	•		•	•
	532 nm	SPXxxxAR.2	8 J/cm ² @ 532 nm, 20 ns, 10 Hz	Plano-Convex Lens, Fused Silica, 25.4 mm, AR.2 coated	LP-1A	XYZ ΘXΘY Lens Positioner, 1.0 in. Diameter					•	•	•					
	1064 nm	SPXxxxAR.1	15 J/cm ² @ 1064 nm, 20 ns, 10 Hz	Plano-Convex Lens, Fused Silica, 25.4 mm, AR.1 coated	LP-1A	XYZ ΘXΘY Lens Positioner, 1.0 in. Diameter										•		
 Nano-Texture Surface Lenses	355 nm	SPXxxxRAR.S	35 J/cm ² @ 1064 nm, 10 ms, 10 Hz	Plano-Convex Lens, Nano-Textured Fused Silica, 12.7 mm	LP-05A-XY	XY Lens Positioner, 0.5-in. Diameter	•	•	•	•				•	•		•	•
	355 nm	SPCxxxRAR.S	35 J/cm ² @ 1064 nm, 10 ms, 10 Hz	Plano-Concave Lens, Nano-Textured Fused Silica, 12.7 mm	LP-05A-XYZ	XYZ Lens Positioner, 0.5-in. Diameter	•	•	•	•				•	•		•	•
	532, 1064 nm	SPXxxxRAR.L	35 J/cm ² @ 1064 nm, 10 ms, 10 Hz	Plano-Convex Lens, Nano-Textured Fused Silica, 12.7 mm	LP-05A	XYZ ΘXΘY Lens Positioner, 0.5 in. Diameter					•	•	•			•		
	532, 1064 nm	SPCxxxRAR.L	35 J/cm ² @ 1064 nm, 10 ms, 10 Hz	Plano-Concave Lens, Nano-Textured Fused Silica, 12.7 mm	LP-05A-XYZ	XYZ Lens Positioner, 0.5-in. Diameter					•	•	•			•		
 Attenuators ****	355 nm	VA-CB-355	2 J/cm ² @ 355 nm, 10 ns, 10 Hz	Manual Variable Attenuator	PS-series Pedestal Posts	1.0 in. Optical Pedestals, Graduated Diameter	•	•	•	•				•	•			
	355 nm	VA-CB-355-CONEX	2 J/cm ² @ 355 nm, 10 ns, 10 Hz	Motorized Variable Attenuator, CONEX	PX Forkless Pedestal Posts	1.0 in. PX Forkless Optical Pedestals and Posts	•	•	•	•				•	•			
	532 nm	VA-CB-532	2 J/cm ² @ 532 nm, 10 ns, 10 Hz	Manual Variable Attenuator	Pedestal Forks	1.0 in. Pedestal Base Clamping Forks					•	•	•					
	532 nm	VA-CB-532-CONEX	2 J/cm ² @ 532 nm, 10 ns, 10 Hz	Motorized Variable Attenuator, CONEX	PS-series Pedestal Spacers	1.0 in. Pedestal Spacers & Extensions					•	•	•					
	1064 nm	VA-CB-1064	2 J/cm ² @ 1064 nm, 10 ns, 10 Hz	Manual Variable Attenuator	Pedestal Forks	1.0 in. Pedestal Base Clamping Forks										•		
	1064 nm	VA-CB-1064-CONEX	2 J/cm ² @ 1064 nm, 10 ns, 10 Hz	Motorized Variable Attenuator, CONEX	PS-series Pedestal Spacers	1.0 in. Pedestal Spacers & Extensions										•		

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**** The removable PL15 beam dump that is included with the VA-CB-(-CONEX) variable attenuators/splitters has a damage threshold of 30 W/cm² and can't be used with these lasers. The reflected beam will need to be controlled using external beam routing or an external high power beam dump.

Recommended Laser Measurement Sensors*



For optimal application results, it is critical to ensure that the delivered laser power at the sample is precisely controlled. Laser power sensor is a detector that absorbs a laser beam and outputs a signal proportional to the beam's power. MKS Newport offers a wide selection of power sensors to accurately measure the Explorer laser power delivered to the sample. The specific type of sensor depends on the details of the laser beam being measured, including power level, spectral region, beam size, etc.

Explorer Type	Explorer Model	Recommended Sensor	Laser Damage Threshold	Aperture	Power Measurement Range	Spectral Range	Description
Explorer One	Explorer One 349	919P-030-18	20 kW/cm ²	17.5 mm	20mW to 30W	0.19 to 11 μm	<ul style="list-style-type: none"> Spectrally flat broadband coating NIST-traceable calibration included Insensitive to beam position Sensitive with low noise & drift
	Explorer One HP 355-6	919P-010-16 at >20 cm distance (for larger beam size)	28 kW/cm ²	16 mm	20mW to 10W		
	Explorer One HP HE 355-200						
	Explorer One HE 355-100						
	Explorer One 355-1						
	Explorer One 355-300						
	Explorer One 532-2						
Explorer One HE 532-200							
Explorer One XP	Explorer One XP 532-5	919P-030-18	20 kW/cm ²	17.5 mm	20mW to 30W		
	Explorer One XP 355-2	919P-010-16 at >20 cm distance (for larger beam size)	28 kW/cm ²	16 mm	20mW to 10W		
Explorer One HP	Explorer One HP 355-4	919P-010-16	28 kW/cm ²	16 mm	20mW to 10W		
	Explorer One HP 355-6						
	Explorer One HP HE 355-200						
Explorer	Explorer 1064-3	919P-030-18	20 kW/cm ²	17.5 mm	20mW to 30W		

** Additional options from MKS Ophir are available. Please visit www.ophiropt.com or contact your Ophir sales representative for consultation

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Recommended Power Meter*

1919-R is one of MKS Newport's most feature rich and technologically advanced power meters. It offers a plug-and-play functionality and is compatible with almost any of the wide range of Newport sensors. 1919-R is also the most precisely calibrated unit on the market thus measuring with the highest accuracy. With its versatility, ease of use, and user-friendly interface, the sensor can be used stand-alone or interfaced with LabVIEW or the user's own software.

Power Meter	Part Number	Description
	1919-R	<ul style="list-style-type: none"> Compatible with all standard Newport thermal sensors USB and RS232 interfaces with PMManager PC applications and User Commands document LabVIEW driver and COM Object Interface Select between English, Japanese, Russian, and Chinese interfaces

PC Interface (optional)

A PC interface allows you to connect your laser power sensor directly to the PC. The Model 844-PE-USB is a Power Meter with a USB connection to use a computer as the monitor, allowing the user to access the full computing power of the PC.

PC Interface	Part Number	Description
	844-PE-USB	<ul style="list-style-type: none"> Optical Power and Energy Meter, Virtual, USB Ideal when equipment space is tight or there is a need to control multiple power meter channels Has a USB output and 0-1 V analog output. Application installation is simple & takes care of the USB driver installation

* Other Newport display meters are available – please contact your local MKS sales representative

Recommended Beam Profiler & Attenuators*



In addition to the average or instantaneous Watts or Joules of the laser beam, it is critical to understand how the power is spatially distributed in the cross-section of the beam. A beam profiler can help detect laser performance issues such as beam wander, jitter, divergence and astigmatism. MKS is the market leader with the largest installed base of laser beam profilers. With our unmatched accuracy, customizable layout, cutting edge R&D and global support system, we are ready to help our customers solve their most challenging problems.

Explorer Type	Explorer Model	Recommended beam profiler	Recommended Attenuator	Description
Explorer One	Explorer One 349	LBP2-HR-VIS3	LBP2-SAM-UV2	<ul style="list-style-type: none"> The LBP2-HR-VIS3 Laser Beam Profiler is a powerful software driven system with comprehensive beam diagnostic measurement features. It features a 1624 x 1224 pixel CCD camera for the wavelength range between 190 and 1100 nm. The easy to use graphical user interface includes all of the accuracy and ISO approved quantitative results. The LBP2-SAM beam sampler operates by reflecting the incoming beam from the front surfaces of a pair of wedges through 90 degrees into the camera. Approximately 99% of the beam is transmitted through the beam sampler with 0.01% passed on to the available filter slides where you can add an additional attenuation up to ND6.
	Explorer One HE 355-100			
	Explorer One 355-1			
	Explorer One 355-300			
	Explorer One 532-2			
Explorer One HE 532-200	LBP2-SAM-VIS2			
Explorer One XP	Explorer One XP 532-5		LBP2-SAM-VIS2	
	Explorer One XP 355-2		LBP2-SAM-UV2	
Explorer One HP	Explorer One HP 355-4		LBP2-SAM-UV2	
	Explorer One HP 355-6			
	Explorer One HP HE 355-200			
Explorer	Explorer 1064-3	LBP2-SAM-NIR2		

* Additional options from MKS Ophir are available. Please visit www.ophiropt.com or contact your Ophir sales representative for consultation



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The laser measurement sensors, power meter & PC interface, beam profilers & attenuators listed in this document are RoHS compliant.

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